

# Predicting Success, Preventing Failure: An Investigation of the California High School Exit Exam

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PPIC

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# Summary

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The California High School Exit Exam (CAHSEE) is a relatively new component of California's extensive school accountability program. It was introduced as a graduation requirement for the class of 2006 and, today, all California students must pass the CAHSEE to obtain a high school diploma. Because the exam is the only element of the accountability system that has direct consequences for students, it has generated a great deal of controversy. In fact, in spring 2006, the courts came close to cancelling the CAHSEE requirement but, after much legal debate, the requirement was upheld. In the end, 90.4 percent of that year's senior class passed the exam.

Both opponents and proponents of the CAHSEE share some common ground: Both have deep concerns about the students who have trouble passing the test, which is pitched at a grade 8 level in math and a grade 10 level in English. (Among the 10% who did not graduate because of failing the CAHSEE, English Learners (ELs) represent a substantial fraction.)

What can be done to help boost the skills of students at risk of failing? Current legislation is targeted at students in grade 12 and at those two years beyond grade 12 who failed to pass the exam. Should we wait until grade 12, or until students fail to graduate, before providing additional assistance? Or should we intervene earlier? Early intervention assumes that educators can readily identify students who will fail the CAHSEE years before they reach grade 12. This means that finding signposts of failure in the earlier grades is urgently needed.

This report takes on this task, demonstrating that it is possible to identify, with considerable accuracy, students in elementary school who are at risk of failing the CAHSEE. We use the San Diego Unified School District (SDUSD) as a test case, relying on an extraordinarily detailed dataset created through our long-term collaboration with SDUSD. Because the dataset includes students' grades, test scores, and academic environment over many years, and because we can follow the progress of individual students over time, we have learned a great deal about how to forecast who will pass the CAHSEE and have identified factors that may be able to improve students' chances of passing.

## **Strong Predictions of CAHSEE Passage at an Early Age**

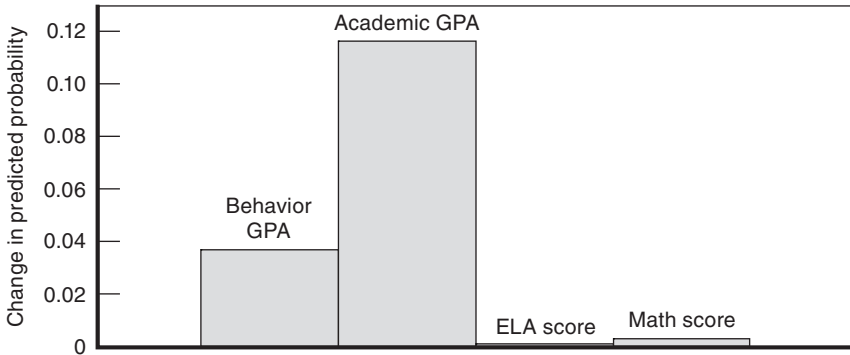
Although we can never forecast exactly who will pass the CAHSEE, the evidence we have gathered suggests that we can predict passage by grade 4 almost as well as we can by grade 9. So there is nothing stopping middle or even elementary school administrators from using some of the strongest predictors, such as test scores and grades, to begin providing additional assistance to students at risk.

Indeed, we found that some information available in the earlier grades may be unusually good predictors of student outcomes. For example, math test scores in the elementary grades actually predict passage of the math portion of the exit exam better than do math scores in the later grades. (This is probably because the CAHSEE's math section is pitched at only a grade 8 level.) In general, academic grade point average (GPA) is the strongest predictor of eventual success or failure on the CAHSEE. The wealth of student behavior information that teachers, at least in San Diego, provide on the report cards of elementary school students is also highly predictive of trouble down the road on the CAHSEE.

Simply put, classroom behavior counts. For example, elementary school students' behavior, such as beginning promptly and following directions, is strongly positively associated with CAHSEE passage years later. We conclude that student behavior in elementary grades is roughly on the same order of importance as academic GPA. Accordingly, we created a "behavior GPA," based on teacher observations and rankings of student conduct. As with the academic GPA, we scale it to range between 0 and 4. This behavior GPA is perhaps more important than reading or math scores in predicting success on the CAHSEE years later. Figure S.1 illustrates the relative strength of the grade 4 behavior GPA in predicting CAHSEE passage in grade 10.

## **When to Intervene: Implications for Policymakers**

Probably our most important insight for policymakers concerns how to time interventions for students. California has recently enacted two laws that provide additional support to students who have reached or completed grade 12 without passing the CAHSEE. Assembly Bill 128 (AB 128) funded tutoring for grade 12 students at risk of failing, beginning with the



NOTES: The figure compares the predicted effect of increasing academic and behavior GPAs by one point and increasing reading and math scores by one standard deviation in grade 4 on the probability of passing CAHSEE by grade 10. A one-standard-deviation increase in test scores would be enough to bring some from a rank of about 84th out of 100 students to 50th out of 100 students, assuming that test scores are distributed like a bell curve, known in statistics as a “normal” distribution. Thus, a one-standard-deviation change in a variable is a fairly big change. ELA = English Language Arts.

**Figure S.1—Grade 4 Behavior GPA: A Strong Predictor of CAHSEE Passage**

class of 2005–2006. More recently, AB 347 provided funds for two years of assistance for students who failed to graduate because of the CAHSEE, beginning in the 2007–2008 school year. From a political standpoint, such spending seems necessary.

However, our results strongly suggest that these eleventh-hour interventions by themselves are unlikely to yield the intended results. Of those in San Diego who failed to graduate in spring 2006 because of the CAHSEE, only 27 percent re-enrolled the next year, and only 3.1 percent passed the CAHSEE in 2006–2007. Unless policymakers can brainstorm innovative ways to induce former students to enroll in tutoring programs after grade 12, it seems unlikely that the newly approved AB 347 funds will reach many of the seniors who have failed to graduate in previous years. Thus, moving a portion of these tutoring dollars to struggling students in earlier grades—when the students are still in school—could be a wise choice. An ounce of prevention could indeed be worth a pound of cure.

We must bear in mind that the CAHSEE is pitched at roughly the grade 8 level in math and the grade 10 level in ELA. It might be more appropriate to focus on remediation closer to the grades in which these

skills are being taught, rather than waiting until grade 12 to help students who have yet to master the skills taught in earlier grades. In addition, we must remember that the characteristics of students in grade 4 predict passage on the CAHSEE almost as well as characteristics of those same students once they have reached grade 9. This finding suggests that rather than waiting until grade 12 or later, we can identify at-risk students quite reliably in middle and even elementary grades—early on in their academic careers.

With this ability to identify at-risk students so early, stark policy tradeoffs emerge: to intervene early or late? To cast a wide net or to target narrowly? In early grades, teachers may be better able than they are in later grades to provide effective remedial help pitched at the basic skills tested in the CAHSEE. However, if we spend extensively on tutoring in the early grades, we will have devoted resources to at least some students who would have eventually passed the exit exam without tutoring. We find this objection to early intervention rather weak. Tutoring in early grades may well produce a range of benefits—beyond passing the CAHSEE—that could prove important to a student’s development. For instance, it could increase rates of grade promotion on time, improve grades, and boost academic engagement.

Additionally, we must remember that the CAHSEE is just one part of a much broader state and federal school accountability system. Tutoring at-risk students in the early grades could boost these students’ achievement on the California Standards Tests administered in grades 2 through 11 and thus help the students’ school meet the achievement yardsticks required by the state accountability system and the federal No Child Left Behind law. Indeed, it might make sense to design CAHSEE interventions to complement the tutoring provisions provided to students at schools labeled under NCLB as “in need of improvement.” Finally, help with reading in the early grades could help a student in all other subjects, given that reading and writing are gateway skills needed to master other areas. This benefit seems particularly relevant to English Learners.

But how will we know for sure when we could intervene most effectively, and what sort of interventions will help students most effectively? A relatively inexpensive yet statistically rigorous way to test

whether earlier interventions are more cost-effective than interventions in grade 12 and later would be to try interventions in various grades, randomly selecting some schools to receive a given intervention and leaving other schools as a comparison group. This approach would be far less expensive than blanket reforms applied throughout the state. It would also yield scientifically credible evidence on which interventions most effectively boost the achievement of California's at-risk students, and in which grades. Education research has been notably lacking in rigorous evaluations of specific educational interventions, making it difficult to give policymakers detailed and credible advice. California would do well to initiate a series of true experimental trials of various interventions to find the best options.

## **Policy Recommendations**

Table S.1 encapsulates steps that policymakers should consider. The full logic behind some of these recommendations will become clearer later in this summary.

## **Do Current Interventions Make a Difference?**

As noted above, the California Legislature has passed two bills that address concerns regarding CAHSEE passage. We looked at the tutoring programs funded by AB 128, aimed at grade 12 students at risk of failing the exam. We did not examine those funded by AB 347, aimed at students who had finished grade 12 but had yet to pass the exam, because AB 347 was signed into law in October 2007, after the period we study in this report. However, we did analyze the literacy reforms that San Diego had implemented in the past, to see if they had any effect on passing the CAHSEE.

San Diego used AB 128 funds to create two tutoring programs for grade 12 students. The first program, designed by the Princeton Review, was a short-term intervention for students who had already come close to passing. The second, designed by Kaplan Inc., featured intensive content-based tutorials for students who had lower scores. Although specific information on the students who participated in each program was not available in time for this study, we were able to test for the relative effect

**Table S.1**  
**Reform Suggestions**

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1. Develop an “early warning” system that uses statistically based methods to forecast which elementary or middle school students will be at risk of failing the CAHSEE.
  2. Consider targeting additional tutoring funds at elementary and middle school students who are at risk. Allowing districts increased flexibility in how they spend AB 128 and AB 347 dollars could help to create such funds. To ensure that elementary school districts focus on the CAHSEE issue, tie tutoring funds at the elementary school level to students identified as at risk on the CAHSEE.
  3. Consider how these additional funds could be aligned with NCLB supplemental service funds for tutoring students at schools that repeatedly fail to make Adequate Yearly Progress.
  4. Commission rigorous statewide studies of the effect of AB 128 and AB 347 funding on outcomes for seniors and post-senior-year students. Researchers should also study what fraction of seniors denied diplomas agree to re-enroll for one or two more years as envisaged under AB 347.
  5. Develop a series of rigorous evaluations of alternative math and ELA interventions targeted at students at risk of failing the CAHSEE. Test whether the effectiveness of such interventions depends on the grade in which the intervention is implemented. Use geographic variation to create true treatment and control groups. Adopt the most successful interventions statewide.
  6. Consider additional academic supports directed at the many students who pass the CAHSEE by only a slim margin.
- 

of the two programs by comparing students just above and below the test-score cutoff point used to assign students. We could detect no statistically significant differences in outcomes between the students offered one or the other type of tutorial. However, we did find some weak hints that the more intensive tutoring may have boosted the probability of passing the ELA portion of the CAHSEE.

As noted, we do not have direct evidence on the efficacy of the tutoring programs funded by AB 347, which provides two years of assistance for students who failed to graduate because of the CAHSEE: These reforms are being implemented for the first time as this report goes to press. However, as noted above, of those in San Diego who did not graduate in 2006 because of the CAHSEE requirement, only 27 percent re-enrolled the next year and just 3.1 percent subsequently passed the exam. These

numbers may not bode particularly well for post-grade-12 programs that are being implemented in the 2007–2008 school year.

In analyzing San Diego’s own literacy reforms, we infer that students who had participated in the district’s after-school reading program were somewhat more likely to pass the CAHSEE than otherwise similar students. The peer coaching system of professional development for teachers in use for part of this decade appears to have had modest positive effects. In contrast, triple-length English classes for students who were behind in reading appear to have reduced students’ chances of passing the CAHSEE.

## Specific Factors That Predict Success on the CAHSEE

Let us look more specifically at the class of 2006 in San Diego. First, how did they do on the CAHSEE? Their overall results were similar to those of students statewide, with a passage rate of roughly 75 percent on both the ELA and math portions in grade 10. To provide a more specific sense of student performance, Figure S.2 highlights the distribution of ELA scores. (The math and ELA portions are taken and passed separately.) The figure shows the distribution of ELA scores, based on the highest ELA scores recorded between grades 10 and 12 by each student who reached grade 12 in 2005–2006. To pass, students must receive a score of 350 or higher. Notably, this figure shows that EL students are overrepresented among both those who failed to pass and those who passed, but with some difficulty.

Next, what student characteristics help to predict passage of the exam? Our analysis relies on a series of regression models to predict student passage of both the overall exam and, separately, the math and ELA segments. Figure S.3 shows some of the main predictors of passage of the overall exam by the end of grade 10.<sup>1</sup> The figure shows that students who are EL, African American, or in special education are significantly less likely to pass than non-EL white students who are not in special education.

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<sup>1</sup>Most of the variables in this figure are indicator variables such as “Hispanic,” in which case the figure shows the predicted effect of changing a given student’s race/ethnicity from white, the omitted comparison group, to Hispanic, while holding constant other demographic and school characteristics.

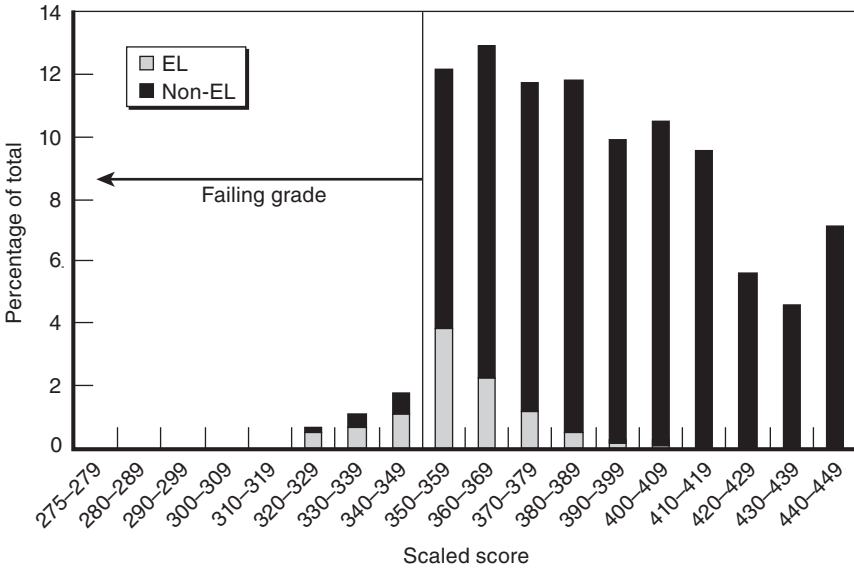


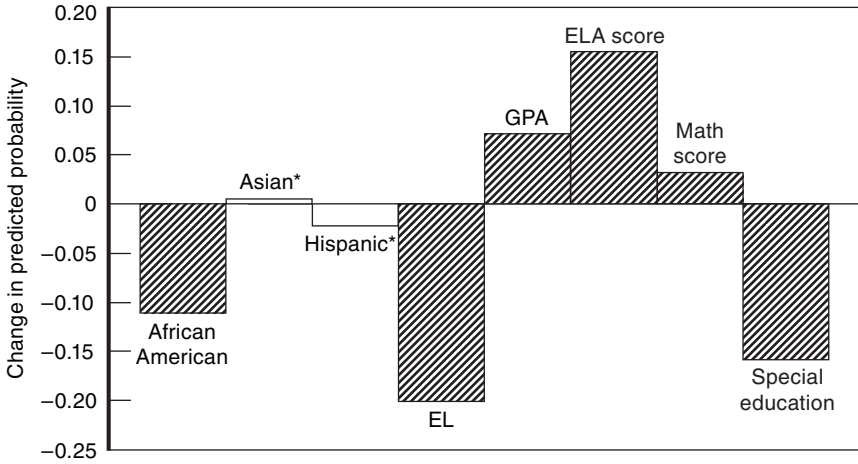
Figure S.2—Distribution of SDUSD’s Class of 2006, by Scaled Scores on the ELA Portion of the CAHSEE

A one-point increase in GPA, or a one-standard-deviation increase in either math or ELA test scores, all measured in grade 9, are associated with significantly higher probabilities of passing.<sup>2</sup> It is worth pointing out that, after accounting for GPA and test scores, Hispanic students are no less likely than white students to pass the CAHSEE.

Educators will find these basic results entirely familiar. More interesting are the new and more subtle findings.

We took the predictive power of student characteristics observed in grade 9 and compared it to earlier grades, going all the way back to grade 4. Remarkably, grade 4 outcomes predict CAHSEE passage by grades 10

<sup>2</sup>Some of the variables in the figure are continuous variables. For ELA and math scores, we show the predicted effect of increasing the student’s grade 9 test scores by one standard deviation. (A one-standard-deviation increase in test scores would be enough to bring some from a rank of about 84th out of 100 students to 50th out of 100 students, assuming that test scores are distributed like a bell curve, known in statistics as a “normal” distribution. Thus, a one-standard-deviation change in a variable is a fairly big change.) For grade point average, we show the predicted effect of increasing the student’s GPA in grade 9 by one point; for example, by increasing the student’s grades from an average of C to B.



NOTES: White, non-EL, non-special-education students are the comparison group. Bars show predicted change in probability of passing the CAHSEE by the end of grade 10 in relation to the comparison group. The bar for GPA shows the predicted effect of increasing GPA by one point; the bars for test scores show the predicted effect of a one-standard-deviation increase in the given test score. Bars without shading and with asterisks indicate characteristics that are not statistically significant.

**Figure S.3—Grade 9 Student Characteristics and the Probability of Passing the CAHSEE by Grade 10**

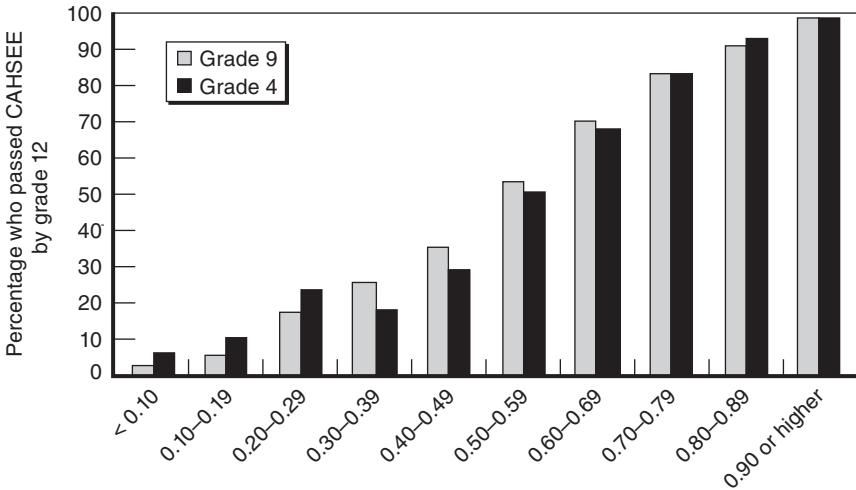
or 12 almost as well as grade 9 outcomes do. This finding suggests that interventions designed to help students pass the CAHSEE could be made many years before high school.

But are our predictions, whether based on grade 4 or on grade 9 data, any good? In fact, the ability of our models to predict who passes and who does not is quite striking, even when we use information about the student available as early as grade 4. Figure S.4 demonstrates the strength of our results. It places students into ten groups, based on their predicted probabilities of passing the CAHSEE. On the vertical axis, we show the actual percentage of students in each group who passed. If we had very little ability to predict whether students in grades 4 and 9 would eventually pass the CAHSEE in high school, then each of these bars should be the same height. But our predictive power is very high. We find a very strong positive relation between students' predicted passage rates on the exit exam and their actual passage rates. For instance, grade 4 information

gathered in 1998 shows that students in the leftmost group have a predicted probability of passing below 0.1, that is, below 10 percent. The actual percentage of students in this group who passed the CAHSEE by 2006 was 6.3 percent. The rightmost group shows students who had a predicted probability of passing that was over 0.9, or above 90 percent. In fact, 98.9 percent of these students did pass.

Of course, tradeoffs exist when choosing a cutoff point below which administrators place students into intervention programs. Ideally, one might think, we would like to set the cutoff high so as to identify as many grade 4 students as possible who will ultimately fail the CAHSEE. However, the higher the cutoff, the more students who would have passed the CAHSEE without the intervention will be included in the intervention. In addition, as we increase the cutoff point, the overall number of students targeted for intervention rises, implying higher program costs.

An example will help to illustrate this tension. Suppose we identified for extra help grade 4 students with predicted probabilities of passing the



Predicted probability of passing based on information in selected grade

NOTE: The figure shows the percentage of students who passed the CAHSEE by the end of grade 12, plotted against the predicted probability of passing, using information about the students available in grades 4 and 9.

Figure S.4—The Strength of Our Predictive Models

CAHSEE of below 0.6. This would include about 20 percent of all grade 4 students. In this group would be 57.9 percent of all those who would ultimately fail the CAHSEE, along with 10.2 percent of all students who would ultimately pass the CAHSEE. At this cutoff level, for every 100 grade 4 students, the targeted group would include 12 students who would have eventually failed the CAHSEE and eight who would have passed; another eight students who would ultimately have failed would not be targeted for special help.

If we were more aggressive and moved the cutoff to 0.7, we would identify 80.0 percent of those who would ultimately fail the CAHSEE. However, this group would now also include 22.7 percent of those who in the end would pass the CAHSEE. In addition, the cost of intervention rises in this scenario, because the share of the population that would receive the intervention rises to 34.8 percent, up from just 20.2 percent in the previous scenario. At this cutoff level, for every 100 grade 4 students, the targeted group would include 16 students who would have eventually failed the CAHSEE and 19 who would have passed; only four students who would ultimately have failed would not be targeted for special help.

Turning to our predictions for grade 9, we find that grade 9 characteristics do predict passage of the exit exam better than those from grade 4, but not by much. The conclusion seems clear: If policymakers want to intervene early to help students at risk of failing the CAHSEE, they could identify those students remarkably well as early as grade 4, using readily available information.

Although grade 4 student characteristics can predict outcomes almost as well as grade 9 characteristics, the relative importance of these characteristics changes in important ways—particularly for English Learners. A student who is still an English Learner in grade 9 is indeed less likely than other students to pass the CAHSEE. But EL students in grade 4 are, on average, no less likely than others to pass the CAHSEE by grade 12. Thus, teachers should be quite concerned about a student who is still an English Learner in grade 9, for there is not much time to catch up.

## **Is the CAHSEE Unfair?**

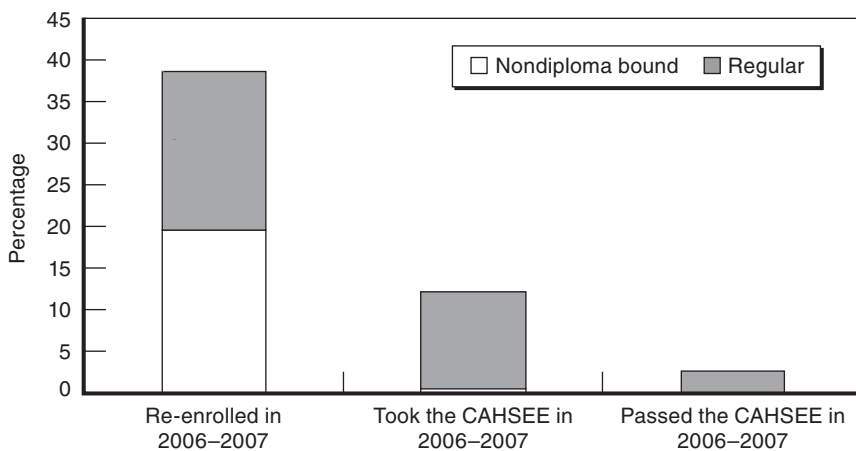
Just months before the class of 2006 was to graduate, a lawsuit was filed against the CAHSEE. *Valenzuela v. O'Connell* alleged that some students

should not be required to pass the CAHSEE because they attended schools with relatively unqualified teachers. We tested this idea in the context of San Diego, examining teachers' experience, education, credentials, and subject authorizations. We used the average characteristics of each student's math and English teachers, measured over grades 9 through 12. We found some evidence that these teacher characteristics are significantly associated with passage of the CAHSEE, even after controlling for students' background and initial achievement. However, the effects are very small. Further, the predicted effects of student characteristics such as EL status and student test scores in grade 9 on CAHSEE passage remain almost as strong after we account for teacher characteristics.

Therefore, differences among high school teachers may explain a very small proportion of the gaps in CAHSEE passage between various groups such as African Americans and whites. However, it seems that even if California were able to equalize teacher qualifications across high schools, and among students within high schools, CAHSEE passage rates among these groups would narrow only modestly at best.

## **What About Those Who Fail the Exam?**

What happened to the roughly 10 percent of students in San Diego's class of 2006 who failed to graduate because of the CAHSEE? Figure S.5 shows the sobering results. Although over a third of these students re-enrolled in fall 2006, many of them were highly disabled students in nondiploma-bound programs, whose re-enrollment had nothing to do with the CAHSEE. Of those students who failed to graduate in spring 2006, only 12.1 percent took the CAHSEE in the following school year and only 3.1 percent passed it. Overall, the graduation rate for the class of 2006 rose from 90.4 percent in spring 2006 to 90.7 percent in spring 2007, after students who had failed the CAHSEE were allowed to come back and take the exam again. With the passage of AB 347, the state will begin in the 2007–2008 school year to provide financial support for students who finish grade 12 without passing the CAHSEE. A crucial policy question is whether many of these students will be induced to return to school after grade 12 and will later pass the CAHSEE. The San Diego results raise serious questions in this regard.



NOTES: The figure shows outcomes for seniors (grade 12 students) in the class of 2006 who had not yet passed the CAHSEE by the end of the 2005-2006 school year. The figure categorizes students as “regular” and “nondiploma bound.” The latter were in a transition sequence for severely disabled students who were not expected to graduate with a regular diploma. Instead, they enrolled in a nonacademic life-skills program at the district. These students represent a subsample of the special education population referred to elsewhere in this report.

**Figure S.5—Re-Enrollment and CAHSEE Outcomes Among Seniors Who Failed to Graduate in 2006 Because of the CAHSEE**

## Final Comments

Students who do not pass the CAHSEE face an increasingly uncertain future, especially when we consider how few pursue remedial help once they have left grade 12. At the same time, we should not be complacent about the skills of those who do pass the exam: At least in San Diego, large numbers of students who passed the CAHSEE did so by quite narrow margins, raising concerns about the skills these young people will later bring into the workplace. In an era when technological change and increasing international competition have dramatically lowered the relative wages of less-skilled workers in the United States, a student who barely passes a high school exit exam pitched at the grade 8 level in math and the grade 10 level in English Language Arts would be foolish to think that such a minimal set of skills is insurance against the vagaries of the labor market. We were struck by comments of SDUSD administrators who believe that

a large fraction of those in the class of 2006 who failed to pass the CAHSEE would not have graduated anyway because these students often fail to satisfy the district's pre-existing course requirements for graduation. The implication is that the CAHSEE is pitched at a relatively low academic level, so low that it is just barely a binding constraint. Indeed, these various strands of evidence suggest that the state may well have set the bar too low, especially in math.

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Research publications reflect the views of the authors and do not necessarily reflect the views of the staff, officers, or Board of Directors of the Public Policy Institute of California.



# Acronyms

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AB	Assembly Bill
API	Academic Performance Index
CAHSEE	California High School Exit Examination
CST	California Standards Test
EL	English Learner
ELA	English Language Arts
GED	General Educational Development diploma
GPA	grade point average
NCLB	No Child Left Behind
OECD	Organization for Economic Cooperation and Development
SB	Senate Bill
SDUSD	San Diego Unified School District



# 1. Introduction: Central Issues Surrounding California's High School Exit Exam

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Throughout the United States, mounting awareness of the large variations among schools in student achievement has led to widespread support for increased educational accountability. Many states introduced accountability programs in the late 1990s, and following the passage of the federal No Child Left Behind law in 2001, all states were required to do so.

As part of its campaign to create content standards, regular student testing, and accountability, California has recently implemented a high school exit examination. Currently, 21 other states nationwide have implemented their own exit exams.<sup>1</sup> The state has adopted the California High School Exit Examination (CAHSEE) in large part because of recognition that student achievement varies dramatically, both among and within public schools. Concern about inequality in educational outcomes seems well placed: Wage inequality in the United States has skyrocketed over the last 25 years, and by numerous measures those with “fewer” skills have performed particularly poorly in the labor market (Katz and Murphy, 1992). At the same time, American students in middle and high school tend to score at the middle of the pack or below when measured against students from other developed nations in international tests of math, reading, and science.<sup>2</sup> Motivated by these issues, high school exit exams such as the CAHSEE set a minimum competency standard intended to ensure that every high school graduate has mastered at least basic skills.

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<sup>1</sup>The nationwide count applies to 2006 and was calculated from information in Warren (2007).

<sup>2</sup>For instance, the 2003 Program for International Student Assessment found that American 15-year-olds ranked below the average in math, science, and problem-solving for nations in the Organisation for Economic Co-operation and Development (OECD) and that their reading skills were not measurably different from the OECD average. See Chapter 6 of Snyder, Dillow, and Hoffman (2007), especially Table 397. (The OECD includes most developed nations.)

But from the start, high school exit exams have been dogged by bitter controversy. In California, the exit exam has met with legal and legislative challenges, as we detail in Chapter 2. Given such challenges, independent research into the basic facts about those who fail this exam—and why they fail it—is crucial. In this report, we use San Diego Unified School District (SDUSD) as a test case, relying on a detailed student-level database we have built over many years of collaboration with the district.

Why focus on San Diego? San Diego is the second-largest district statewide and mirrors the demographics of other large districts. Furthermore, the district's student population resembles that of the state of California as a whole quite closely (see Betts, Zau, and Rice, 2003, Chapter 2). The lessons we learn from the present study are likely to have applicability throughout California and, indeed, in the many other states that have implemented similar exit exams.

This report investigates four central themes. First, who passes the CAHSEE? And what are the most reliable early warning signs that teachers and administrators can use to identify students who are likely to have trouble with the CAHSEE?

Second, do specific interventions improve a student's chances of passing the CAHSEE? Under Assembly Bill 128 (AB 128), the state funded tutoring for students in the class of 2006 who were at risk of failing the CAHSEE. Did this funding make a difference? Did student participants in the various literacy interventions implemented in San Diego in the first half of this decade fare better or worse on the state exam than students who did not participate?

Third, what are the factors most strongly correlated with student failure on the CAHSEE? Can failure be attributed to inadequately qualified teachers or to other aspects of the educational environment, as some lawsuits have claimed?

Finally, what happened to those who did not graduate in June 2006 because they failed the CAHSEE? Did they come back to school in fall 2006? In the 2006–2007 school year, did they successfully re-take the part(s) of the CAHSEE that they had not yet passed? Policymakers should have a keen interest in what happens to these students, particularly since funding from AB 347 goes to programs offered to students who need to pass the exam after they complete grade 12.

Before we delve into these questions, our next chapter will provide more detail on the background and implementation of the CAHSEE, which has a long and controversial history.



## 2. Some Context for the CAHSEE

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Although the CAHSEE became a requirement for high school graduation with the class of 2006, it has a much longer history. The long delays before the CAHSEE at last became a graduation requirement reflect the controversies that appear to have surrounded all high-stakes examinations of this kind.

California is not unusual in requiring that high school students pass a test to graduate. As of 2006, 22 states had high school exit exams. These tests examine content taught at grade levels anywhere from grade 8 up through, in the case of Nevada, grade 12. Most states are similar to California in that they focus on math and English Language Arts (ELA) skills, although a significant number of states also test in other subject areas such as science, social studies, history, and citizenship, among others (Warren, 2007).<sup>1</sup>

In this chapter, we provide some background on the exam, including a short history of its inception, a description of the exam itself, and a synopsis of the legal and political struggles that have surrounded its implementation.

### A Short History of the CAHSEE

California began a comprehensive program to implement educational standards and accountability with the passage of the Public School Accountability Act of 1999. This act, sponsored by then Secretary of Education Gary Hart, former Governor Gray Davis, and a number of key

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<sup>1</sup>Researchers have started to examine the short- and long-run effects on student outcomes of introducing high school exit exams. One of the first topics covered is whether the implementation of exit exams increased dropout rates or the obtaining of alternatives to high school diplomas, such as the GED (General Educational Development degree). Many recent studies show no adverse effects (e.g., Carnoy and Loeb, 2002, and Warren and Edwards, 2005), but the literature is not unanimous (e.g., Warren, Jenkins, and Kulick, 2006). Work by Bishop (1998), Carnoy, and Loeb (2002), and Woessmann (2003), among others, suggests that the use of high school exit exams is associated with higher test scores, both among states within the United States and across nations. An issue with all of these studies, however carefully executed, is that they establish a correlation rather than a direct causal effect of high school exit exams on the various outcomes studied.

legislators, led to the creation of content standards in various subjects, a system of statewide student testing, targets for achievement growth for each school, and, for a short time, a system of financial rewards for meritorious schools and personnel.

The CAHSEE is a key component of this accountability program. It consists of two independent tests, designed to evaluate whether high school students have mastered English roughly at a grade 10 level and math at a grade 8 level. During their high school career, students have up to six opportunities to take the CAHSEE, once in grade 10, twice in grade 11, and three times in grade 12. If students pass one component but fail the other component, they need only re-take the component they have failed.<sup>2</sup>

California implemented the CAHSEE in 2001, with the expectation that students in the graduating class of 2004 would be required to pass this exam to receive a diploma. However, the State Board of Education suspended this requirement in summer 2003, once it realized that a large minority of students in the class of 2004 had yet to satisfy both components of the test. Subsequently, the test was altered somewhat, and the class of 2006 was informed that it would be the first class for which passage of the CAHSEE would become a requirement for graduation.

Two principal changes were made in the new version of the exam. First, the ELA portion of the test was reduced from two days to one day, mainly by reducing the number of essays from two to one. Second, the content of the math portion of the CAHSEE was revised and simplified, such that student pass rates on the math portion rose significantly in the new version.<sup>3</sup> As we will discuss in the concluding chapter, these changes raise major concerns about whether the CAHSEE is pitched too low academically to do much to boost the skills of students at the bottom end of the achievement distribution.

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<sup>2</sup>For a more detailed description of the content of the CAHSEE and accommodations that have been made for special education and English Learner (EL) students, see California Department of Education (2007).

<sup>3</sup>See Educational Testing Service (2005) for more details on the new version of the CAHSEE.

## Legal and Political Struggles over the CAHSEE

The class of 2006 treated this test seriously, as a very real hurdle that had to be cleared to receive a diploma. Even so, by April 2006, 11 percent of grade 12 students statewide still had to pass one or both of the reading and math components and, so, according to law, would not be allowed to graduate that June.

A court case in early 2006 created considerable doubt regarding whether the class of 2006 would be required to pass the CAHSEE to receive a diploma. Plaintiffs in the Alameda County Superior Court case, *Valenzuela v. O'Connell*, argued that it was unfair to hold all students accountable to CAHSEE standards given that some students were not taught all of the relevant material and that some of their teachers were uncredentialed. In May 2006, the judge ruled in favor of the plaintiffs and three days later extended this judgment to the 11 percent of seniors statewide who had yet to pass the CAHSEE. State Superintendent of Education Jack O'Connell, who drafted the original legislation as a state senator, told the *San Francisco Chronicle*, "I'm prepared to fight. We're prepared for the long haul, and we'll explore every legal option."<sup>4</sup> The California Department of Education immediately appealed the court's decision and won a stay, so that the class of 2006 was subject to the CAHSEE graduation requirement.

The State Department of Education and the plaintiffs later reached a settlement under which the lawsuit was dropped in exchange for legislation ensuring that grade 12 students who fail the CAHSEE receive up to two years of additional assistance from their districts. This legislation, AB 347, was passed and became law in October 2007. Under the new law, districts can apply for a share of up to \$73 million in supplementary funding.<sup>5</sup>

A related controversy continues to surround special education students. In 2006, under Senate Bill (SB) 517, students with disabilities were exempted from the CAHSEE requirement, subject to a long list of

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<sup>4</sup>See Asimov (2006).

<sup>5</sup>See O'Connell (2007a, 2007b), Blume (2007), and Gonzalez (2008).

conditions. This exemption applied to the class of 2006 only.<sup>6</sup> Today, an ongoing lawsuit is attempting to make this exemption permanent (California Department of Education, 2007, and Blume, 2007).

The California Legislature has been another CAHSEE battleground. In 2005, a bill was passed that would have allowed students to graduate without having to pass the CAHSEE. Governor Schwarzenegger vetoed this bill. In the same year, he vetoed a bill that would have exempted students with disabilities from having to pass the CAHSEE (O’Connell, 2005). In mid-2007, Assemblywoman Julia Brownley saw her AB 1379, which called for alternative assessments to be allowed in addition to the CAHSEE, pass the Assembly handily. However, Governor Schwarzenegger vetoed this bill once it passed in the Senate. The veto was unsurprising, since the bill was similar to one he vetoed in 2005 (Sanders, 2007, and California Department of Education, 2008).

The frenzied legal and political activity over the CAHSEE shows no signs of ebbing soon. In light of these controversies, it seems important to know who is failing the CAHSEE. Opponents of the CAHSEE have mentioned EL and special education students as two groups that have suffered disproportionately from the exit exam requirement.

Within this high-stakes environment, there are points of agreement. Both proponents and opponents of the CAHSEE would like to identify not only who is at risk of failing, but also the kind of interventions, if any, that might boost the achievement and hence increase the CAHSEE passage rate of these struggling students. The following chapters help to do so. Next, we investigate San Diego’s passage rates on the exam.

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<sup>6</sup>Accordingly, we have included all special education students in our analysis to reflect what was likely to have occurred in later years. In SDUSD’s class of 2006, 102 special education students were allowed to graduate through this exemption. We thank Peter Bell for providing this information.

# 3. CAHSEE Passage Rates in California and San Diego

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In this chapter, we focus for the most part on students in the class of 2006, the first cohort required to pass the CAHSEE to obtain a high school diploma. How did this cohort fare overall, both in the San Diego Unified School District and in California as a whole? We look at pass rates for seniors in 2006 and for these same students in 2004, at the end of grade 10. The 2004 pass rates provide a broader measure of the class of 2006, since these rates include students who, by grade 12, may have left the district, been held back, or dropped out. Pass rates for grade 10, then, help to demonstrate the extent to which pass rates for grade 12 may overstate the overall success rate of high school students on the CAHSEE. We also examine pass rate margins—that is, how close some students who passed the exam actually were to failing it. Policymakers should be particularly concerned if many barely passed the exam as high school seniors, especially given that the CAHSEE is pitched below a grade 12 level.

## Overall CAHSEE Passage Rates

One of our goals here is to compare San Diego to the state as a whole to ensure that, in overall terms, San Diego’s experience seems representative of the state. The top panel of Table 3.1 shows that the overall passage rates for the class of 2006 in San Diego and statewide are virtually identical, at 91 and 90 percent, respectively. It is important to realize that these pass rates do not include students who drop out before grade 12.

How influential is the CAHSEE in deciding the fate of high school seniors? In the absence of the CAHSEE requirement, would some students still have been denied a high school diploma? In San Diego, district officials estimated that regardless of the CAHSEE requirement, 40 to 80 percent of the students who failed the CAHSEE would not have received a high school diploma in June 2006 because they had not fulfilled the other requirements, including maintaining a grade point average (GPA) of at least 2.0, passing 44 credits, and finishing specific course sequences in math,

**Table 3.1**  
**Class of 2006 CAHSEE Passage Rates, San Diego**  
**and Statewide**

	Passage Rate (%)	
	SDUSD	California
By grade 12		
Overall passage by spring 2006 for class of 2006	90	91
By grade 10		
All students		
Passed ELA	76	75
Passed math	74	74
EL students		
Passed ELA	28	39
Passed math	41	49

SOURCES: For first row: San Diego, authors' calculations; for California, Wise et al. (2006), p. 31; for the remaining rows, data from <http://dq.cde.ca.gov/dataquest>.

science, and other areas. The implication is that the CAHSEE is a binding constraint on perhaps 2 to 6 percent of the district's seniors. If the passing requirements were weakened much further, the CAHSEE would cease to be a hurdle for many students at all, at least in San Diego.

In some ways it is reassuring to know that only about 10 percent of students failed to pass the CAHSEE. But we can learn much more about how difficult students found the test by examining passage rates by spring 2004, when these students were in grade 10. The middle panel of Table 3.1 shows that both in San Diego and in the state, passage rates on the English Language Arts and math components were considerably lower than the ultimate overall passing rates in 2006, with roughly one-quarter of students failing to pass each component. Students in grade 10 appear to have had slightly more difficulty with the math portion than the ELA portion. This finding raises concerns about high school students' facility with math, because the math section is pitched at roughly the grade 8 level, and the ELA portion is pitched at a grade 10 level. One might have expected the

pass rate on the math portion to be far higher than on the ELA portion, rather than slightly lower.

The bottom panel of Table 3.1 focuses on passage rates for grade 10 English Learners in spring 2004. EL students fared far worse on the CAHSEE than did students as a whole, and, predictably, they had slightly more difficulty with the ELA test than the math test. In no cases were grade 10 passage rates above 50 percent and in some cases they were far lower. San Diego EL students appear to have fared slightly worse than did EL students statewide, but it could be a mistake to read too much into this, given that districts across the state differ in the rules used to re-designate EL students as Fluent English Proficient.

## A Closer Look at Grade 10 Results in San Diego

Table 3.2 shows passage rates by the end of grade 10 in San Diego overall and by demographic group. Although this report focuses mainly on the class of 2006, here we also include results for the classes of 2007 and 2008. Socioeconomic status and language status clearly matter a great deal. In the final panel of the table, we subdivide students into two groups based on whether the student's grade 9 test score on the annual California Standards Test (CST) was above the district average.<sup>1</sup> This panel shows that students' grade 9 scores on the CST are quite predictive of success on the CAHSEE.

The trends across cohorts also deserve mention. We can see that EL students are improving their pass rates, although the percentage did fall slightly for the class of 2008. Non-EL students progressed quite well, improving a few percentage points. Improvements at all levels of parental education can be seen, although students with parents having less than a high school education showed much more growth between the 2006 and 2007 cohorts than between the 2007 and 2008 cohorts. Steady gains were made by white and Hispanic students, and Asian students improved their passage rates before leveling off in the youngest of the three cohorts. The 2007 African American cohort showed significant improvements; even though the 2008 cohort dipped slightly, it is still performing 4 percentage points above the 43 percent pass rate for the class of 2006.

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<sup>1</sup>These exams are given in grades 2 through 11.

**Table 3.2**  
**CAHSEE Passage Rates by the End of Grade 10**

	Passage Rate (%)		
	Class of 2006	Class of 2007	Class of 2008
Overall pass rate	59.4	62.4	62.9
EL status			
English Learner	11.1	19.2	16.4
Non-English Learner	69.3	79.9	72.9
Parental education level			
Less than high school	43.2	48.1	49.2
High school	54.7	60.7	63.8
Some college	74.5	76.2	78.1
College graduate	76.8	80.0	81.1
Graduate school	89.4	91.6	92.7
Ethnicity			
White	81.2	82.6	84.2
African American	43.3	48.6	47.4
Asian	76.4	78.7	78.5
Hispanic	40.8	46.4	47.7
Other	74.4	70.7	78.1
California Standards Test score			
ELA greater than average	92.1	93.7	96.1
ELA less than or equal to average	33.9	42.0	46.5
Math greater than average	87.0	92.6	94.2
Math less than or equal to average	48.4	51.6	53.9

NOTES: The bottom panel in this table shows CAHSEE outcomes for students in two groups: those above and those below the district average on the ELA and math portions of the California Standards Test. The results suggest that performance on these statewide tests is predictive of how well students will do on the CAHSEE.

Let us take an even closer look at this grade 10 cohort. Table 3.3 provides a very detailed description of the ultimate outcome for each student who took the CAHSEE as a grade 10 student in the 2003–2004 school year. The table breaks students into particular groups of interest—EL students, special education students, students who are both EL and in special education, and students who are neither. It also follows students over time, providing a view into how CAHSEE passage fits into their high school career.

**Table 3.3**  
**Outcomes for the Class of 2006, Beginning in Grade 10**

Grade 9 Student Status	EL Only	Special Education Only	EL and Special Education	Neither EL Nor Special Education	All Students
Number	1,314	770	221	6,697	9,002
(%)	(100)	(100)	(100)	(100)	(100)
Outcomes on the CAHSEE					
Passed in grade 10	139 (10.6)	177 (23.0)	4 (1.8)	4,513 (67.4)	4,833 (53.7)
Passed by end of grade 12 (in either grade 11 or grade 12)	365 (27.8)	156 (20.3)	27 (12.2)	918 (13.7)	1,466 (16.3)
Passed and moved away	46 (3.5)	25 (3.3)	1 (0.5)	508 (7.6)	577 (6.4)
Left the district before passing the CAHSEE	445 (33.9)	135 (17.5)	44 (19.9)	432 (6.5)	954 (10.6)
Passed and still dropped out	0	1 (0.1)	0	16 (0.2)	20 (0.2)
Dropped out before passing the CAHSEE	7 (0.5)	8 (1.0)	11 (5.0)	60 (0.9)	181 (2.0)
Enrolled in a grade below grade 12 by spring 2006 and did not pass	127 (9.7)	67 (8.7)	24 (10.9)	110 (1.6)	335 (3.7)
Stayed to end of grade 12 but did not pass <sup>a</sup>	185 (14.1)	201 (26.1)	110 (49.8)	140 (2.1)	636 (7.1)

<sup>a</sup>Measured as students who were in grade 12 in 2006.

NOTES: Each cell shows the number of students and the column percentage. The penultimate row shows students who started out in grade 10 in the 2003–2004 school year but who were retained one or more times and so were not in grade 12 by spring 2006.

The rightmost column shows outcomes for all students and the other columns show outcomes for various subgroups. This rightmost column shows that most students pass by grade 12. Others fail to pass the CAHSEE before grade 12 or leave the district before passing.<sup>2</sup> Virtually no

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<sup>2</sup>We distinguish between high school students who dropped out of school and those who left for another district before graduating using data based on the district's own calculations. Because California lacks a longitudinal student data system, districts have

students pass both parts of the CAHSEE and subsequently drop out. The rightmost column also shows that we cannot know with certainty what happens to many students who transfer to other districts before graduation, since California still lacks a longitudinal database that allows completely accurate tracking of students across districts. Indeed, it seems likely that some of the students who left the district may eventually have dropped out.

The first three columns of the table show outcomes for EL students, special education students, and a small number of students who are both EL and in special education. Not surprisingly, passage rates for these three subgroups are far lower than for the population at large, especially those who are both EL and in special education. Notably, about one-third of students who are English Learners in grade 10 leave the district before passing the CAHSEE and are not identified as dropouts. It is difficult to know for certain the fate of these students. Many perhaps did transfer to other districts and may or may not have passed the CAHSEE, and some may have left the state or the country. It seems reasonable to believe that, if anything, the low passage rates for EL students shown in this table underestimate how badly they fared, once we consider the possibility that many of the students who left did not satisfy the CAHSEE requirement in the end.

As the table shows, students who have trouble with the CAHSEE in grade 10 are more likely than those who pass the exam to leave the district. We see that 10.6 percent of students in grade 10 in spring 2004 left the district before spring 2006 without having passed the CAHSEE. Indeed, some may have later dropped out of school or may not have passed the CAHSEE after leaving SDUSD. Thus, our calculations in this report of the percentage of students who ultimately pass the CAHSEE by grade 12 could well be overstated because they exclude students, many of whom were at risk, who transferred to other districts.<sup>3</sup>

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considerable difficulty distinguishing between high school students who have dropped out and those who have transferred to other districts, left the country, and so on. From Table 3.3, it seems likely that some students in the “left district” category ultimately did drop out of high school. With the recent introduction of a statewide student identification code, these identification problems will become less severe in future years.

<sup>3</sup>California has slowly been moving toward development of a longitudinal database that allows school administrators to follow the progress of students throughout the state. Financial cutbacks have prevented this system from becoming fully operational. The problem we note above is one of many examples of how such a system would give local

Another pattern of note, shown in the penultimate row of Table 3.3, is that 3.7 percent of the students who were in grade 10 in spring 2004 had not passed the CAHSEE by spring 2006, and also had been retained a grade or more and so were not in grade 12 by spring 2006. This leads to an understatement in the percentage of students originally in the class of 2006 who passed the CAHSEE within two years.

About 7 percent of students, or 636, were enrolled in grade 12 in 2005–2006 but failed to graduate because they failed the CAHSEE. However, under state law these students were allowed to re-take the CAHSEE exam in the following school year. Chapter 7 studies what happened to these students.

## Student Effort and Margins of Success

Does the CAHSEE encourage students to study harder? Do students who have failed the exam in the past study harder or do they become discouraged and drop out?

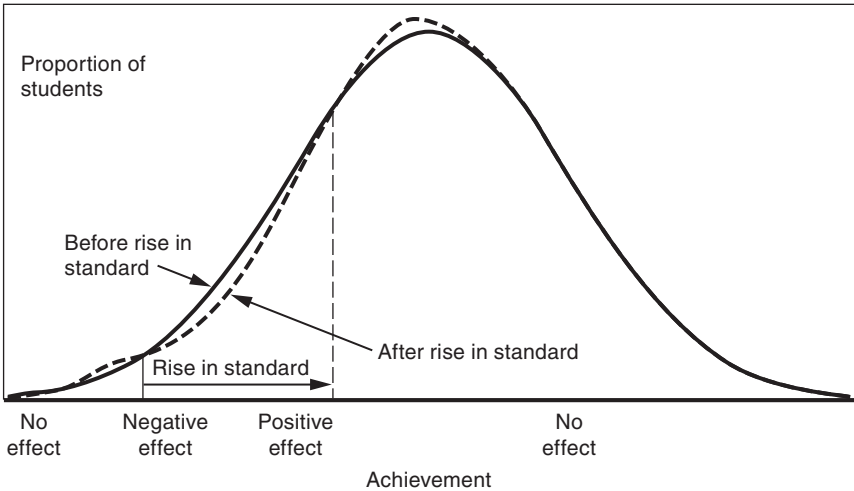
Economists have written extensively on the theory of pass/fail standards (see, for example, Costrell, 1994, and Betts, 1998). Figure 3.1, adapted from Betts and Costrell (2001), shows the theoretically predicted effects of raising a pass/fail standard. We can think of the CAHSEE as just such an increase in passing standards. The figure shows the proportion of students by each level of academic achievement.

Before the standard is increased, students are distributed in a familiar bell-shaped curve. But after the passing standard increases, some students who would have graduated at the lower standard will now fail unless they study harder. The likely outcome is that many students newly at risk of failing will work harder and move up in the distribution of achievement. However, some students who are far below the new passing standard may become discouraged and give up. This is illustrated in the figure by a small upward shift in the proportion of students just below the old passing standard.

Obviously, we cannot observe what the test scores of students in the graduating class of 2006 in San Diego would have been in the absence of the CAHSEE requirement.

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school officials, state policymakers, and researchers alike a better understanding of the academic trajectories of students.



SOURCE: Adapted from Betts and Costrell (2001).

NOTE: Students who initially scored below the new higher standard may either work harder or give up altogether, causing the proportion of students just above and far below the new cutoff point to rise.

**Figure 3.1—Hypothetical Distribution of Students, by Test Score, Before and After a Rise in Graduation Standards**

We can infer a great deal about student effort by examining the distribution of the highest CAHSEE test scores in the two components of the test for students in the class of 2006. Figures 3.2 and 3.3 show the results for English Language Arts and math, respectively.

The patterns are striking. Instead of a smooth symmetric distribution of students—the familiar bell-shaped curve—there is a large “bump” in both distributions just above 350, which is the scaled score required to pass either component of the test.

Part of the reason for this large bump is that students’ scores are rough measures of underlying achievement that can differ randomly from one test-taking session to the next. Seen in this light, students whose true achievement is near 350 but perhaps slightly below will eventually “get lucky,” reaching a score above 350 by taking the test several times.

Another explanation for at least part of this pattern is that students who in grade 10 or 11 had failed the CAHSEE worked very hard to improve their ELA and math skills to the point at which they could pass the

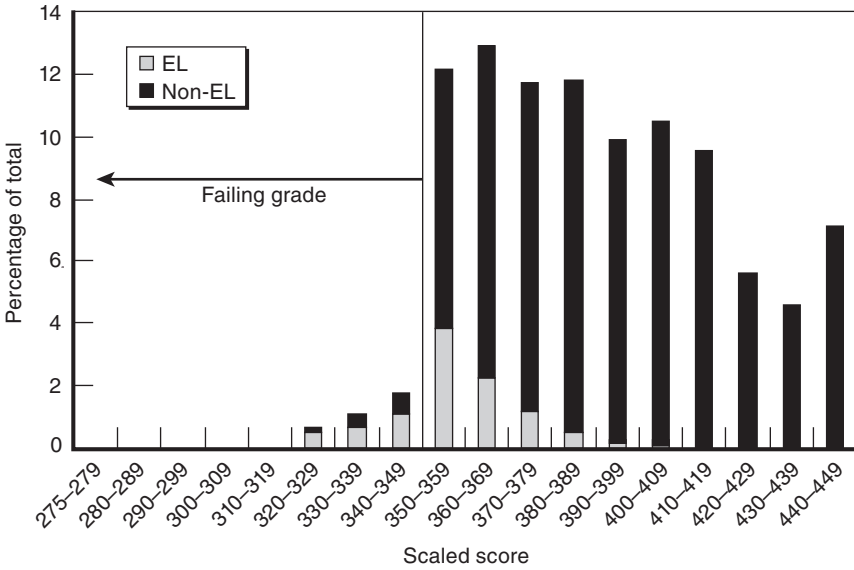


Figure 3.2—Distribution of SDUSD’s Class of 2006, by Scaled Scores on the ELA Portion of the CAHSEE

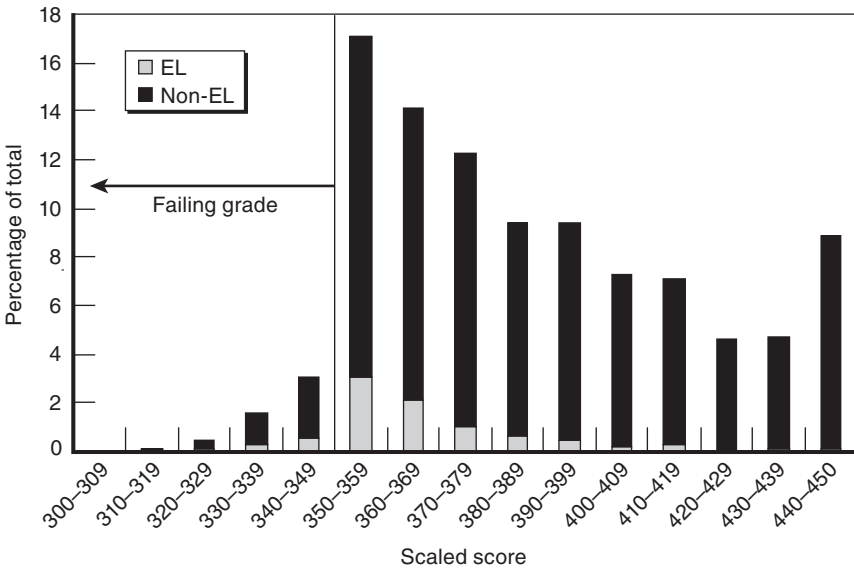


Figure 3.3—Distribution of SDUSD’s Class of 2006, by Scaled Scores on the Math Portion of the CAHSEE

CAHSEE. Although the “upward bump” is very clear, there is no evidence from these figures of a group of students who gave up academically and thus moved down in the distribution.

Notably, a statewide survey by Wise et al. (2006, p. 67) supports the hypothesis that the threat of failing the CAHSEE prompted struggling students to work harder. They found that among students who had failed the ELA or math portion in grade 10, 52 percent reported that they were working harder at this material as a result. Smaller numbers of students reported increasing effort in other ways as well.

In addition to suggesting that students have exerted effort in response to the CAHSEE, these figures also help to illustrate how close San Diego’s students came to failing the exam. A comparison of the two figures reveals that many students who passed the math and ELA requirements did so by the narrowest of margins. This is especially true for the math test, where an increase of 10 points in the cutoff score for a passing grade would have increased the percentage failing by about 17 percent.

The figures break down the percentage of students in each test-score range by EL status. As suggested by Table 3.1, a disproportionate share of students below the passing grade of 350 consisted of English Learners. The same can be said of those students in the range 350–359, who barely passed. The predominance of EL students just above and below the cutoff score of 350 is much stronger on the ELA part of the CAHSEE.

As we can see, the CAHSEE may have had some effect on student effort, with many students making the leap from just failing to barely passing the exam. However, we find cause for concern in the fact that many barely passed the exam as seniors, especially when the CAHSEE is pitched below a grade 12 level.

## Conclusions

San Diego Unified’s students have performed very similarly to those statewide, with roughly 9 out of every 10 students in the class of 2006 passing the CAHSEE. But many more than 10 percent of students struggled to pass the CAHSEE, as we can see from the grade 10 failure rates of roughly 25 percent on both parts of the CAHSEE. English Learners in particular have often found the CAHSEE difficult to pass.

Our analysis of the highest test scores observed for each student in the class of 2006 shows that although many students scored far above the passing level, many just barely passed. If the cutoffs had been just 10 points higher, failure rates among the class of 2006 would have been markedly higher, especially for math. Given that the test is pitched at the level of grade 8 in math and grade 10 in ELA, this finding generates considerable concern about the ability of these barely passing high school graduates to perform adequately in the workplace.

Pitching the mathematics portion of the exit exam at roughly a grade 8 level raises particular concerns. Rose and Betts (2001, 2004) show that in the United States, the mix of courses taken in high school is strongly correlated with earnings a decade after students leave high school. Mathematics courses, and especially intermediate algebra, are among the courses most strongly predictive of adult outcomes in the labor market.

There is growing consensus among economists that technological change in the American labor market over the last 25 years has increased the demand for highly skilled workers and decreased the demand for less-skilled workers, regardless of whether skills are measured in terms of education, white- or blue-collar occupations, or other terms.<sup>4</sup> Other research suggests that changing patterns of international trade also play a role. Put differently, in a time of globalization, increased international competition, and technological change, policymakers should take little solace from the knowledge that many of those who passed the CAHSEE, which tests grade 8 math and grade 10 ELA skills, did so by a narrow margin.

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<sup>4</sup>See, for example, Berman, Bound, and Griliches (1994) and Berman, Bound, and Machin (1998). For evidence on the rising returns to education in California, see Betts (2000) and Reed (2003).



## 4. What Factors Predict Student Success on the CAHSEE?

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The previous chapter strongly suggested that demographic and socioeconomic status and especially English Learner status are associated with higher probabilities of failing the CAHSEE. The goal of this chapter is to find more detailed predictors of student success on the CAHSEE, in a way that might help teachers and policymakers to identify, as early as possible, students at risk of failing the CAHSEE requirement. Several questions will occupy us in this chapter:

1. What are the characteristics of students who pass the CAHSEE exams on the first try in grade 10? And what are they for students who pass by grade 12?
2. Are there academic patterns, such as test scores on the California Standards Test, that can predict failure of the CAHSEE?
3. Do behavioral indicators such as absences or measures of students' ability to follow directions, predict whether students will subsequently have trouble with the CAHSEE requirement?
4. Do the best predictors emerge in the high school years or earlier?
5. Does any combination of these factors together lead to more accurate predictions of whether a student will have trouble with either CAHSEE exam?

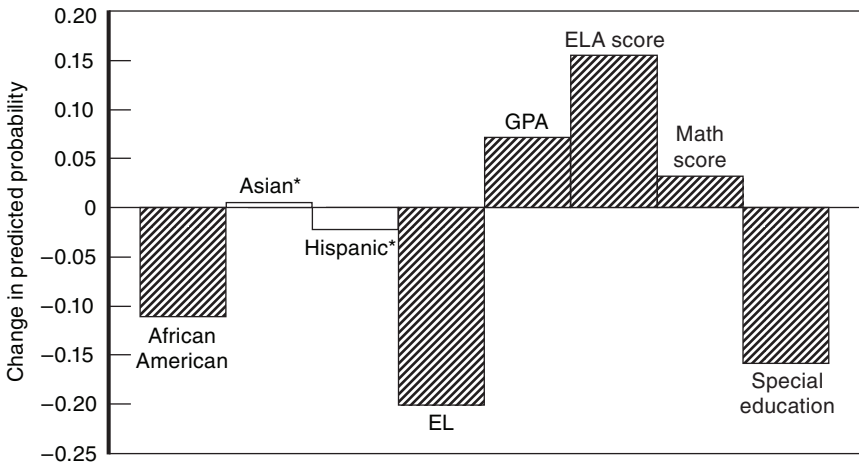
To answer these questions, we make use of a rich student-level dataset that follows the academic progress of each student over time, using measures such as test scores and grades, as well as individual characteristics such as race/ethnicity, EL and special education status, and characteristics of the student's school, peers, and teachers.

### Predicting Success in Grade 9—and Earlier

The following results discuss two measures: passage of the CAHSEE by the end of grade 10, the first time students are allowed to take the exam, and passage by the end of grade 12. Our analysis includes student

characteristics, parental education level, demographics of the school population, grades, and test scores.

We begin by using student data from grade 9 to predict grade 10 CAHSEE outcomes. Figure 4.1 illustrates the effect of individual student characteristics on the probability of passing the CAHSEE.<sup>1</sup> We find



NOTES: The bars show predicted change in probability of passing the CAHSEE by the end of grade 10 given a change from the relevant comparison group (white, non-EL, non-special education). The bar for GPA shows the predicted effect of increasing GPA by one point; the bars for test scores show the predicted effects of a one-standard-deviation increase in the given test score. Bars without shading and with asterisks indicate effects that are not statistically significant.

**Figure 4.1—Grade 9 Student Characteristics and the Probability of Passing the CAHSEE by Grade 10**

<sup>1</sup>Most of the variables in this figure are indicator variables such as “Hispanic,” in which case the figure shows the predicted effect of changing a given student’s race/ethnicity from white, the omitted comparison group, to Hispanic, while holding constant other demographic and school characteristics. Some of the variables in the figure are continuous variables. For ELA and math scores, we show the predicted effect of increasing the student’s grade 9 test scores by one standard deviation. (A one-standard-deviation increase in test scores would be enough to bring some from a rank of about 84th out of 100 students to 50th out of 100 students, assuming that test scores are distributed like a bell curve, known in statistics as a “normal” distribution. Thus, a one-standard-deviation change in a variable is a fairly big change.) For grade point average, we show the predicted effect of increasing the student’s GPA in grade 9 by one point; for example, by increasing the student’s grades from an average of C to B.

that African American students, English Learner students, and special education students were significantly less likely to pass the CAHSEE in grade 10 (relative to white, non-EL, and non-special education students, respectively). The differences are very large. Most dramatically, EL students were about 20 percent less likely than non-EL students to pass the CAHSEE in grade 10. Notably, these large differences are on top of differences that relate to grades and initial test scores, which we also included in the models.

As expected, the better a student performed in the classroom in terms of GPA and on the CST test, the more likely that student was to pass the CAHSEE. For example, for every one-point increase in GPA, students increased their likelihood of passing the CAHSEE by 7.2 percent. On the English Language Arts section of the CST, a one-standard-deviation increase—a fairly big change in a test score—translates into a 15.6 percent increase in likelihood of passing. Math scores on the CST contribute slightly less: A similar one-standard-deviation increase in math scores translates into only a 3.2 percent increase in likelihood of passing.

It is important to note that the effects for Asian and Hispanic students were statistically insignificant but are included in the figure as points of reference.

Several other factors did matter but are not shown in Figure 4.1. For instance, how often a student was absent was a negative predictor. If two otherwise identical students differed by 5 percent in their absence rates, a one-percentage-point gap in the probability of passing the CAHSEE emerges. (These findings and others may be viewed in a technical appendix to this report, which shows the results from all regression models. The appendix can be found at [http://www.ppic.org/content/other/608AZR\\_technical\\_appendix.pdf](http://www.ppic.org/content/other/608AZR_technical_appendix.pdf). It shows results for overall passage of the CAHSEE, passage of the ELA and math components, and passage by grade 10 and grade 12.)

Also notable is what did not matter. Our measures of the racial/ethnic composition of the student population at a school and the percentage of students eligible for free lunch—a generally relied-upon indicator of poverty—typically did not appear statistically significant.

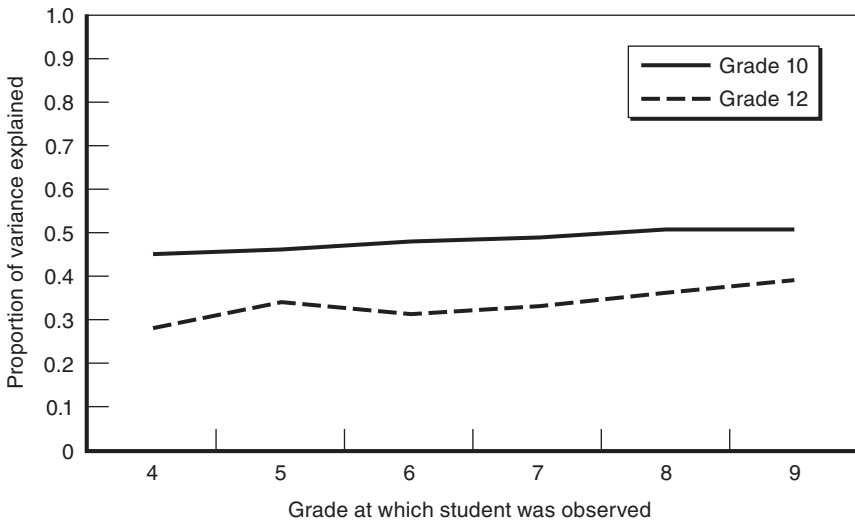
In models that predicted passage of the CAHSEE by grade 12 rather than grade 10, we find similar patterns. However, two important exceptions emerged: The math scores on the CST become statistically insignificant,

and a small disadvantage for girls on passing the CAHSEE in grade 10 disappears by grade 12.

### ***Predicting CAHSEE Outcomes Using Data from Earlier Grades***

Do teachers and school administrators need to wait until they have grade 9 results to predict who will have trouble with the CAHSEE? Ideally, administrators would want a warning as early as middle school or even the late elementary grades so that they could intervene before students reach high school.

Using data from grades 4 through 8, we found quite striking results: Student characteristics as early as grade 4 predict CAHSEE outcomes almost as well as do those from grade 9. Figure 4.2 shows the proportion of the variation in passage of the CAHSEE by grades 10 and 12 that can be explained by our model, measured when the student was in grade 9, grade 8, and so on, all the way down to grade 4. (If our model could explain



NOTE: The graph shows the proportion of the variation in CAHSEE passage rates by grades 10 and 12 explained by our model, using as explanatory variables student information gathered in grade 4 through grade 9.

**Figure 4.2—The Explanatory Power of Our Model of the Probability of Passing by Grades 10 and 12: Relatively Constant, and High, Across Grades**

the passage rates perfectly, it would account for all of the variation in who passes the CAHSEE, and the proportion would be 1. If our model could explain none of the variations in passing the CAHSEE, the proportion would be 0.) As the figure shows, we can explain about half of the variation in CAHSEE passage by grade 10 using student and school characteristics in any grade, and about 30 to 40 percent of the variation in passage by grade 12. By social science standards, this explanatory power is quite high.

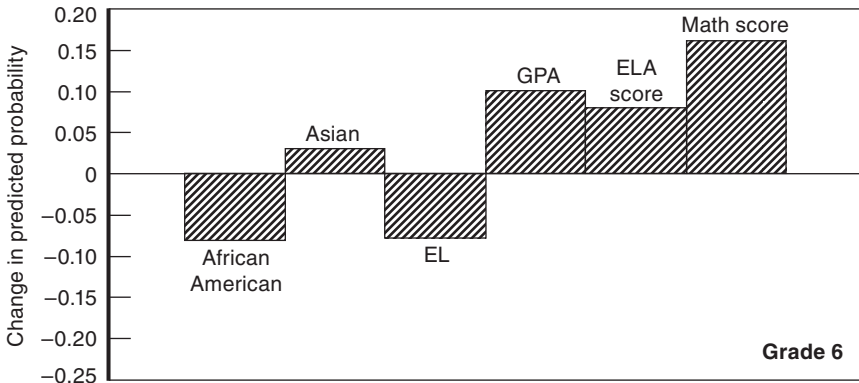
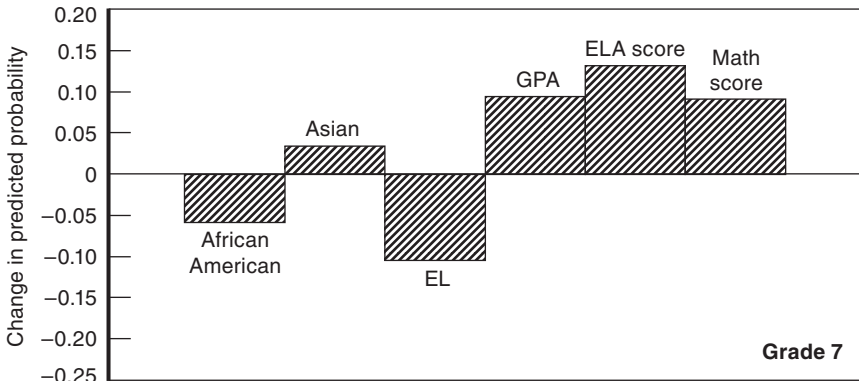
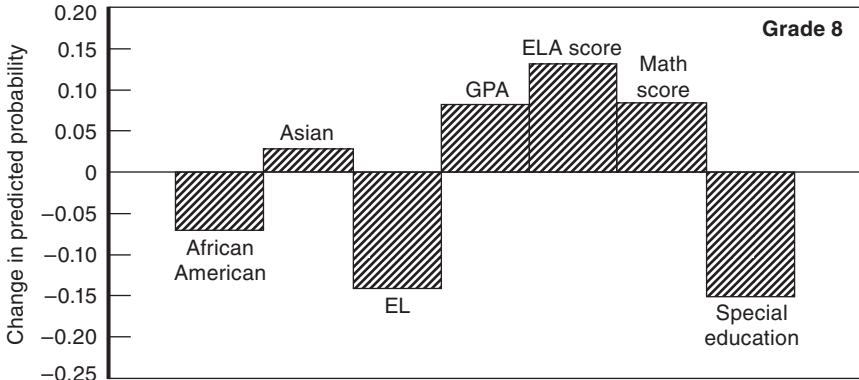
Figure 4.3 shows the predicted effects of the student characteristics—such as race/ethnicity, GPA, and test scores—listed in Figure 4.1, for each grade. Generally speaking, the patterns are very similar to what we found using information from grade 9. Let us focus here on the differences in the earlier grades. Notably, the effect for EL students becomes smaller in earlier grades. Further, English Learner status in grade 4 is not a statistically significant predictor of CAHSEE passage, unlike EL status in later grades. The more negative predicted effects of being an EL student in the later grades could be due to the difficulties faced by middle school EL newcomers to the district. (We will document this later in the chapter by showing that EL students who arrived in the district recently perform markedly worse than other EL students.)

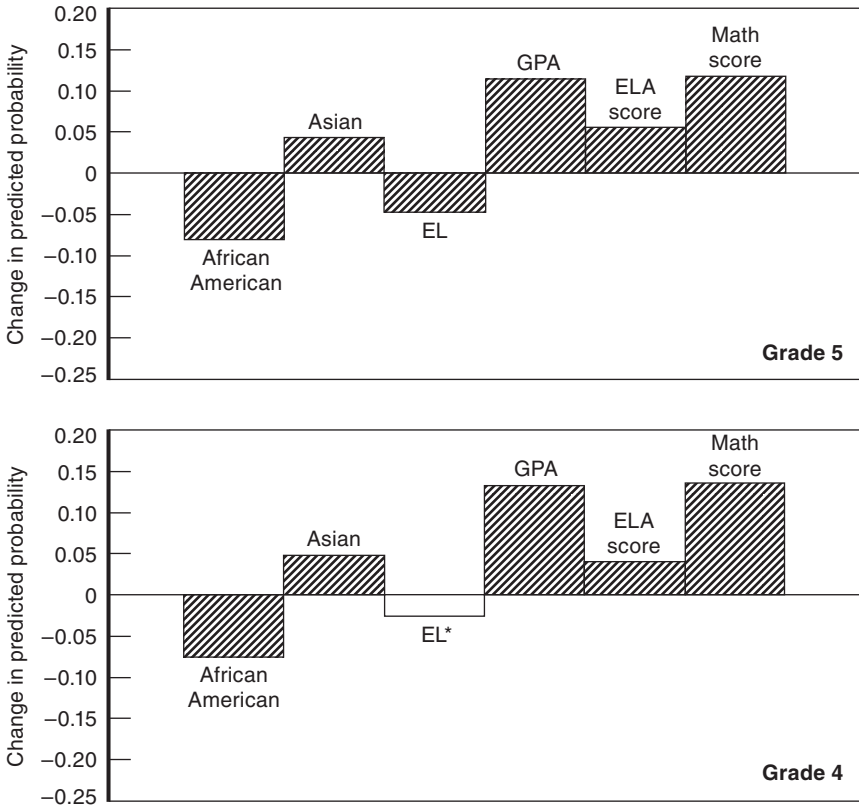
As expected, GPA is a strong predictor of success on the CAHSEE, even when using grade 4 data. However, the contribution of GPA toward passing the CAHSEE actually diminishes as students get older.

Another important variation by grade is that English language test scores are a stronger predictor of success on the CAHSEE from grade 7 to grade 9 than are math scores, but from grade 4 to grade 6 the inverse is true: Math test scores are a stronger predictor of success on the CAHSEE. The most likely explanation is that the math section of the CAHSEE is written at the grade 8 level whereas the English language section is written at the grade 10 level.<sup>2</sup>

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<sup>2</sup>One issue with our comparison of the explanatory power of models that focus on student and school traits in various grades is that the sample of students differs somewhat from one grade to the next. As a test of robustness, that is, reliability of the results, we isolated the subsample of students for whom we had complete data for each of grades 4 through 9. The overall patterns were similar to what we report above.





NOTES: See the note for Figure 4.1. Figures for grades below grade 8 do not include a bar for special education, because special education was measured less precisely in earlier years. Bars without shading and with asterisks indicate effects that are not statistically significant.

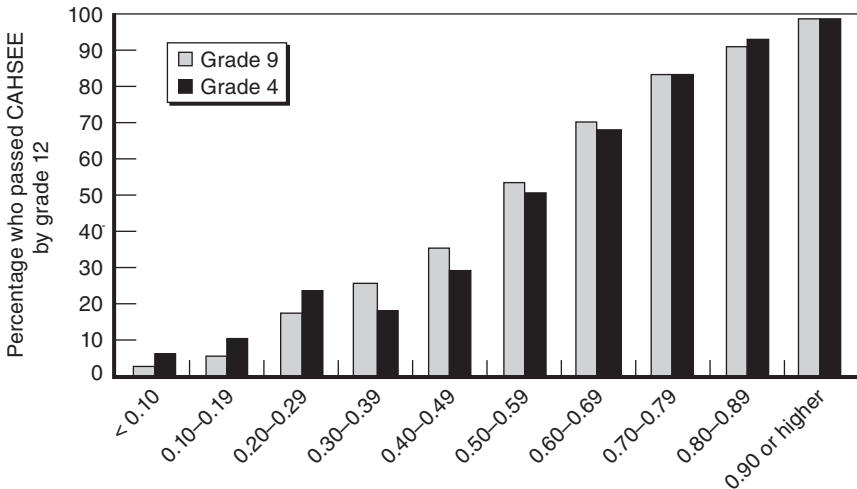
**Figure 4.3—Grade 4 Through Grade 8 Student Characteristics and the Probability of Passing the CAHSEE by Grade 10**

### *How “Good” Are These Predictions?*

It is one thing to say that grade 4 and grade 9 student characteristics predict passage of the CAHSEE by grade 12 about equally well. But this does not address how well student characteristics can in fact predict passage of the CAHSEE in an absolute sense. In this section, we demonstrate the overall predictive power of our models.

To do so, we first predicted the probability of passing the CAHSEE for each grade 4 student, using characteristics analyzed above. We then subdivided students into ten groups, depending on whether their predicted probability of passing the CAHSEE was below 0.1, from 0.1 to 0.2, and so on. Next, we grouped students a second time, using grade 9 characteristics. Finally, we calculated the percentage of students in each of these ten groups who did in fact pass the CAHSEE by grade 12.

Figure 4.4 shows the results. If neither grade 4 nor grade 9 characteristics had any ability to predict passing the exam, then each of the bars in the figure should be of the same height, indicating that the same percentage passed the CAHSEE in all groups. Instead, we find a very strong positive relation between students' predicted passage of the exit exam and their actual passage rates. For instance, looking at grade 4 information gathered in 1998, we see that of the students in the leftmost group, with predicted probability of passing below 0.1—that is, below 10 percent—the actual percentage who passed the CAHSEE by 2006 was 6.3 percent. In



Predicted probability of passing based on information in selected grade

NOTE: The figure shows the percentage of students who passed the CAHSEE by the end of grade 12, plotted against the predicted probability of passing, using information about the students available in grades 4 and 9.

Figure 4.4—The Strength of Our Predictive Models

the rightmost group are students who had a predicted probability of passing of over 0.9—that is, above 90 percent—and 98.9 percent of these students did in fact pass.

Suppose that administrators wished to intervene in grade 4 or 9. How many students are in the bottom four groups? And how many by the end of grade 12 failed to satisfy the CAHSEE requirement? In the predictions based on the grade 4 student data, the bottom four groups comprise 3 percent of grade 4 students, of whom 82.8 percent did not pass the CAHSEE. Using the grade 9 predictors, the bottom four categories comprise 9.7 percent of students, of whom 82.9 percent failed to pass the exam before the end of grade 12. These numbers suggest that administrators could use either grade 4 or 9 data to identify a quite small and manageable group of students, the vast majority of whom will not pass the CAHSEE before the end of grade 12.

This provides just one example of how policymakers could identify struggling students. They could, for instance, decide to cast their nets more widely, by focusing on the bottom seven groups. That is, they could focus on those whose predicted probability of passing was below 0.7. Using the grade 4 predictors, these categories comprise 34.8 percent of students, of whom 48.3 percent failed to pass the CAHSEE before finishing grade 12. The corresponding percentages for the grade 9 predictors are 32.7 percent and 55.6 percent. At first it may not seem to make sense to focus on these larger groups. However, as the next section makes clear, by doing so policymakers can intervene early with more of those who ultimately do fail the CAHSEE.<sup>3</sup>

A close inspection of the figure suggests that grade 9 characteristics do predict passage of the exit exam better, but not that much better, than those from grade 4. The conclusion seems clear: If policymakers want to intervene early to help students at risk of failing the CAHSEE, they could identify those students remarkably well using readily available information

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<sup>3</sup>Another approach that is intermediate between the two extreme examples in the text might be to identify students in the bottom five groups, that is, students with a predicted probability of passing below 0.5. In the predictions based on the grade 4 student data, the bottom five groups comprise 8.8 percent of grade 4 students, of whom 74.5 percent did not pass the CAHSEE. Using the grade 9 predictors, the bottom five categories comprise 15.5 percent of students, of whom 76.0 percent failed to pass the exam.

as early as grade 4. We consider this one of the most important findings of the report.

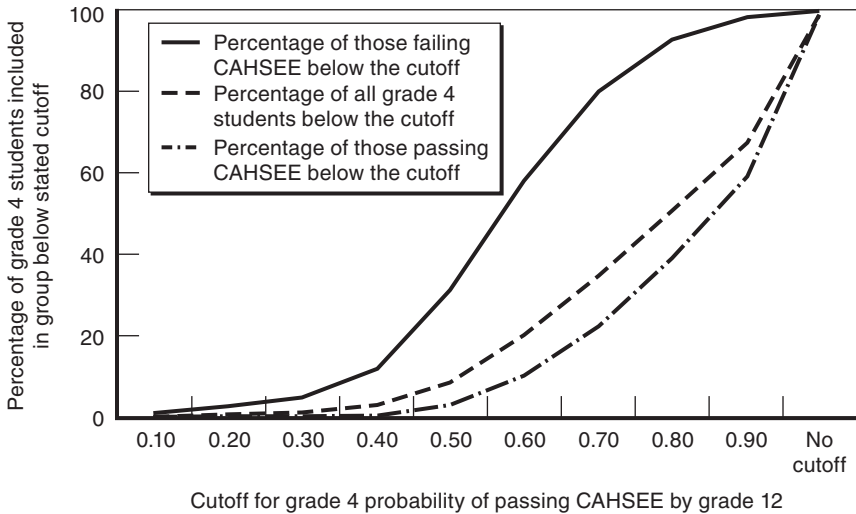
### ***Tradeoffs Between Helping Smaller and Greater Shares of Struggling Students***

There is one important reason for policymakers to want to intervene on the behalf of more students: By doing so they would identify a greater percentage of those who ultimately did fail the CAHSEE. But there are two counteracting factors. First, by increasing the share of students identified for extra help, we risk increasing the percentage of students who will ultimately pass the CAHSEE by grade 12 without extra help. Second, as the cutoff probability below which students are asked to participate rises, the cost of intervention rises simply because more students will be involved.

Figure 4.5 illustrates, using predictions from the model based on students' characteristics in grade 4. To create this figure we calculated which students would be put into intervention programs using ten cutoffs for the predicted probability of passing the CAHSEE by the end of grade 12. These cutoffs, ranging from a predicted probability of passing of just 0.10 all the way up to a cutoff so high that all students are identified as at risk, appear on the horizontal axis of Figure 4.5. We draw three lines showing the percentage of all students who are below a given cutoff, the percentage of all students who ultimately failed to pass the CAHSEE by the end of grade 12 who are below the cutoff, and the percentage of students who ultimately passed the CAHSEE who would have been below the cutoff.

For instance, suppose we identified students with predicted probabilities of passing the CAHSEE of below 0.6. As shown, this would identify about 20 percent of all grade 4 students. In this group would be 57.9 percent of all those who ultimately failed the CAHSEE, along with 10.2 percent of all students who ultimately passed the CAHSEE.

If we were more aggressive and made the cutoff predicted probability of passing the CAHSEE below 0.7, we would identify 80.0 percent of those who ultimately failed the CAHSEE. However, the targeted group would also include 22.7 percent of those who in the end passed the CAHSEE, roughly double that of the previous cutoff. In addition, the cost of intervention rises in this scenario, because the share of the population that would receive the



NOTE: Increases in the cutoff would raise the percentage of students who would receive additional help, including the following groups: all students, those who fail to pass the CAHSEE before the end of grade 12, and those who pass the CAHSEE before the end of grade 12.

Figure 4.5—Effects of Increasing the Cutoff Point Below Which Grade 4 Students Are Targeted for Intervention

intervention rises to 34.8 percent, from just 20.2 percent when we instead focused on those with predicted passage probability below 0.6.

## Forecasting Success and Failure for Specific Groups

### *GPA's and Test Scores Among English Learners*

It is possible that the relation between CAHSEE passage and certain factors such as GPA are very different for EL students and non-EL students. Accordingly, we re-estimated our models for EL and non-EL students separately. The general patterns were quite similar to those we report for the overall group of San Diego students.

Some of the exceptions, though, could be quite relevant for policy. Chief among these is that test scores and GPA are much more strongly related to passage of the CAHSEE by grade 10 or 12 for EL students than for non-EL students. Conversely, special education status was less

strongly correlated with CAHSEE passage for EL students than for non-EL students.<sup>4</sup>

### ***The Influence of Native Languages and of Becoming English Proficient***

Our next effort was to ask whether the effects of EL status on the probability of passing the CAHSEE depended on the language spoken at home.<sup>5</sup> We used sample sizes to divide home languages into seven groups: Spanish, Tagalog, Vietnamese, Khmer, Lao, Chinese, and other (non-English) languages. EL students who spoke Tagalog or Khmer (Cambodia) had a significantly lower likelihood of passing the CAHSEE in grade 10 than did EL students who spoke Spanish. However, when we modeled CAHSEE passage by grade 12, the only significant variations in passage rates among EL students were for Vietnamese and “other language” EL students. Impressively, Vietnamese EL students were about 25 percent more likely to pass than Hispanic EL students, and “other language” students held a 9 percent advantage.<sup>6</sup>

We know that EL students are less likely to pass the CAHSEE, but what if we include those who were at one time EL but are now Fluent English Proficient? We defined this change in status as any student who was designated EL before grade 9 but who was no longer EL by grade 9. Students who had once been designated EL were more likely than those who were currently EL to pass the CAHSEE by grade 12. That is, EL students are predicted to be 21 percent less likely to graduate than non-EL students, whereas former EL students are predicted to be 14 percent less likely to graduate. This finding complements the results by grade level, in which we found that EL status in early grades matters less than it does in later grades.

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<sup>4</sup>Interested readers can find a table comparing results for the full EL and non-EL groups in the technical appendix ([http://www.ppic.org/content/other/608AZR\\_technical\\_appendix.pdf](http://www.ppic.org/content/other/608AZR_technical_appendix.pdf)).

<sup>5</sup>Technically speaking, we created interactions of home language and EL status.

<sup>6</sup>These results are quite similar to an SDUSD study of EL students that found that some EL groups, primarily Vietnamese and Filipino, have higher test scores and gains than other language groups on both the math and ELA portions of the CST. See Program Studies Department (2007).

We also tested for differences between EL students in their first, second, and third or later years in the district as of grade 9. As expected, EL students in their first year performed worse on the CAHSEE than did EL students in their second year, who in turn performed worse than EL students in their third year or later.

### ***The Effect of Peer Groups***

Our previous research has shown that the initial test scores of peer groups can affect student achievement (e.g., Betts, Zau, and Rice, 2003). To test for such effects for CAHSEE passage, we re-estimated our main models after adding the average test scores for all students in a given classroom.<sup>7</sup> We used two measures, one for reading scores and one for math scores. (For middle and high school we used peer scores in math and English classes.) We analyzed all peer scores from grades 4 through 9, and we also examined one grade at a time. However, we found no significant and systematic evidence that peers' scores predict individual students' passage of the CAHSEE.

### ***Do Well-Behaved Students Have Better Outcomes?***

At the elementary grade level in San Diego, teachers give not only academic grades but also detailed information on student behavior. For our purposes, we looked at four specific behavior grades: "begins promptly," "follows directions," "classroom behavior," and "self-discipline." For each of these questions, teachers checked the most appropriate box from a list that included the following responses: excellent, good, satisfactory, needs improvement, and unsatisfactory. We translated these into numeric grades of 4, 3, 2, 1, and 0 to correspond to the well-known academic GPA range of 0 (F) through 4 (A). This overall behavior GPA provides a summary of the teacher's rough evaluation of a student's behavior. (See the technical appendix for more information: [http://www.ppic.org/content/other/608AZR\\_technical\\_appendix.pdf](http://www.ppic.org/content/other/608AZR_technical_appendix.pdf).) We were interested in knowing whether academic or behavioral measures at an early age better predict CAHSEE success.

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<sup>7</sup>These scores were standardized to have mean zero and standard deviation one for each grade.

We found this single measure—“behavior GPA”—to be a significant and positive predictor of success on the CAHSEE in grade 10.<sup>8</sup> This held true for grades 4, 5, and 6. The effect of the behavior GPA fell somewhere in between that of the academic GPA and test scores. As shown in the top panel of Figure 4.6, in the fourth grade, a one-point increase in GPA is predicted to lead to a 11.6 percent increase in the probability of passing the CAHSEE. For the behavior GPA, the corresponding change is a 3.7 percent increase. The predicted effect of a one-standard-deviation increase in reading or math scores is far smaller. One-point increases in behavior GPA have predicted effects of about 4 to 5 percent, whether measured in grade 4, 5, or 6. In contrast, the predicted effect of a similar increase in academic GPA falls from about 12 percent in grade 4 to 7 percent in grade 6.

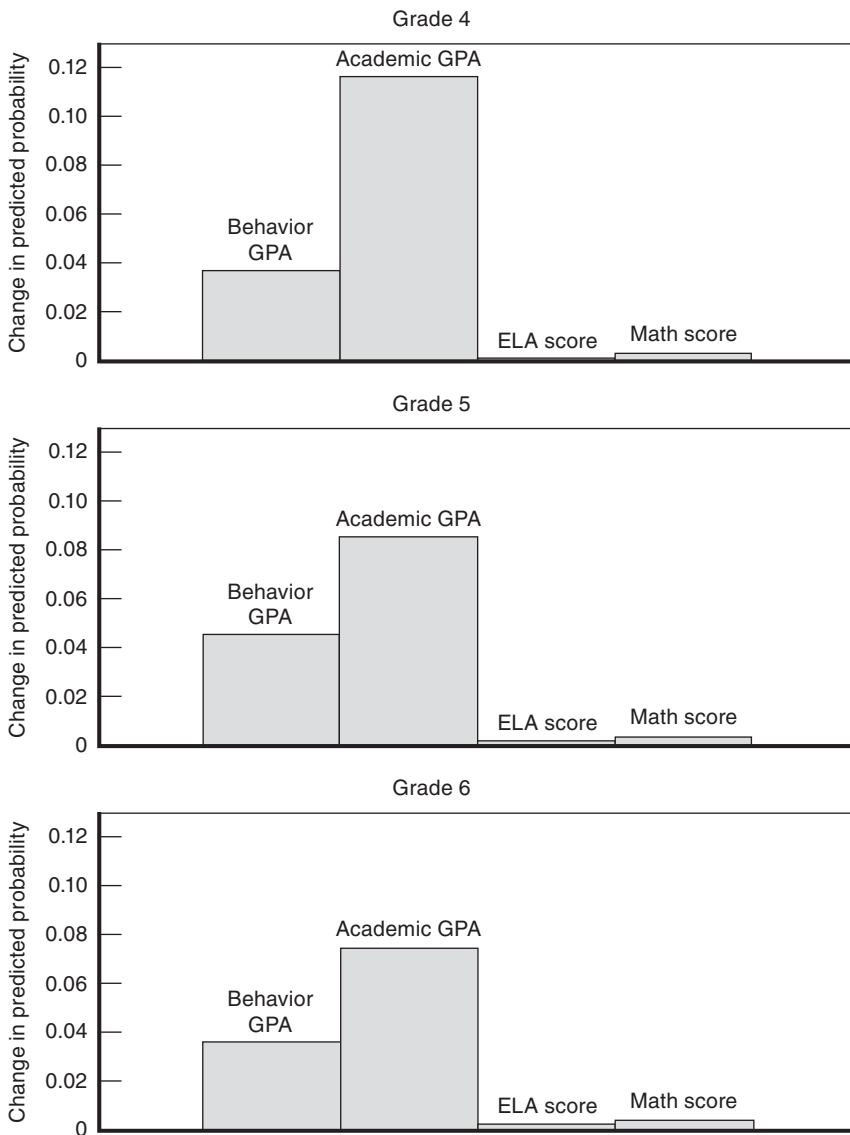
When we look at passage of the CAHSEE by grade 12, we see that the behavior GPA has slightly more predictive power than it did for predicting passage by grade 10. A one-point increase in the behavior GPA increases the probability of passing the CAHSEE by 5 to 6 percent, compared to just 3.7 percent for the model of passage in grade 10. This predicted effect is roughly of the same order as the predicted effect of changes in academic GPA on passage by grade 12: A one-point increase in academic GPA ranges from an increase of 11 percent in grade 4 to a tiny (and statistically insignificant) effect of 2 percent in grade 6.

Overall, we conclude that student behavior in elementary grades is roughly on the same order of importance as academic GPA and is perhaps more important than reading or math scores in predicting success on the CAHSEE years later.

The importance of behavior for predicting success on the CAHSEE may seem slightly less surprising given the recent work by economists suggesting that noncognitive (behavioral) development has at least as big a correlation with adult outcomes as do standard measures of cognitive development (e.g., Heckman, Stixrud, and Urzua, 2006). The point we make here is slightly different, but related: Student behavior predicts an educational outcome (passage of the CAHSEE) surprisingly well.

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<sup>8</sup>We took an average of the four underlying behavior variables because they were highly correlated (with correlations of about 0.97). But each of the individual measures when added alone entered in a positive and significant fashion.



NOTE: The figure compares the predicted effect of increasing academic and behavior GPAs by one point and increasing reading and math scores by one standard deviation, in grades 4 through 6, on the probability of passing CAHSEE by grade 10.

**Figure 4.6—Behavior GPA: A Strong Predictor of CAHSEE Passage**

The policy implications of this finding are unclear. To the extent that elementary school teachers can influence the behavior of their students, this finding could perhaps help them to alter student study habits and subsequent CAHSEE outcomes. But we must be cautious as we do not know that there is a causal relation here. More broadly, the results imply that parents may have important roles in influencing their young children's behavior, which in turn might be related to academic outcomes in secondary school.

### ***Traditional Public Schools Versus Magnet Schools***

Do students at certain types of schools fare better than others on the exit exam? To find out, we analyzed our data after distinguishing between traditional public schools and magnet schools. Magnet schools are public schools that follow a specific academic focus or curricular approach, such as creative and performing arts or bilingual education.<sup>9</sup>

We found some evidence that those attending magnet high schools had a higher probability of passing the math portion of the CAHSEE by grade 12 (a 4 percentage point advantage over otherwise similar students at traditional public schools). Magnet school students also held an 8 percentage point advantage in terms of passing the CAHSEE overall by grade 12. It is not clear whether this difference reflects some advantage conferred by the schools themselves or some unknown differences in motivation, ability, or background among those students who self-select into magnet schools.

### **Can We Improve Predictions of CAHSEE Passage?**

So far we have assumed that given demographic characteristics such as language status, race, and parental education all have separate additive effects on the probability of passing the exit exam. But what if, for instance, some of these variables accentuated or muted the effects of some of the others? Given that three demographic groups, Hispanics, African Americans, and EL students, tended to underperform on the CAHSEE, we

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<sup>9</sup>Because we excluded students whose records lacked detailed data on individual students' teachers, we excluded most charter schools in the district, and so could not estimate a separate effect for charter schools.

estimated more complex models in which we examined these three variables along with indicators for low academic GPA, low test scores, and low parental education. In many cases, we obtained results in which we cannot place a great deal of confidence, but one result stood out: English Learners whose parents have more than a high school education have a probability of passing the CAHSEE by grade 12 that is about 8 percent above that of other EL students. Another pattern that seemed fairly consistent was that EL, African American, or Hispanic students with grade 9 academic GPAs below 3 were about 2 percent less likely to pass the CAHSEE by grade 12 than otherwise similar students in these groups.

## Conclusions

The most important conclusion of this chapter, indeed of the entire report, is this: It is not necessary to wait until high school to identify students likely to fail the CAHSEE. Stunningly, grade 4 student outcomes predict CAHSEE passage by grades 10 or 12 almost as well as grade 9 outcomes do. Furthermore, grade 4 data predict CAHSEE outcomes very well. This finding suggests that interventions designed to help students pass the CAHSEE could perhaps be made far earlier than high school.

What specific factors can predict whether a student will pass the CAHSEE? Some of the findings in this chapter confirm our observations regarding test scores and EL status, based on the simpler tabulations of Chapter 3. What is interesting, and potentially important, are the new findings. African Americans and EL students are indeed less likely than whites and non-EL students, respectively, to pass the CAHSEE, even after controlling for grades and test scores in grade 9. But the Hispanic-white gap in the raw data can be completely explained by observed differences between these two groups in grades, test scores, and other factors.

In addition, characteristics associated more with behavior than with academics, such as student absences and classroom behavior (going as far back as grade 4), are significantly related to CAHSEE passage.

Although grade 4 student characteristics can predict outcomes almost as well as grade 9 characteristics, the relative importance of these characteristics changes in important ways. For example, teachers should be quite concerned about a student who is still an English Learner in grade 9, for there is not much time to catch up. But EL status in earlier grades is

less predictive and, indeed, students who are EL in grade 4 are on average no less likely than other students to pass the CAHSEE by grade 12.

We also find important variations in the predictive power of reading and math scores across grades. Math scores are more predictive of CAHSEE passage when measured in the lower grades, whereas the opposite holds true for reading scores. This almost surely arises because the math portion of the CAHSEE is pitched at a relatively low (grade 8) level, whereas the ELA portion is pitched at a grade 10 level. Thus for instance, high school teachers should not assume that a grade 10 student with a low math CST score necessarily will fail the math portion of the CAHSEE.

## 5. Do Current Policy Interventions Make a Difference?

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Predicting which students will have trouble with the CAHSEE once they get to high school is the first step. Just as important, teachers, principals, and policymakers must find interventions that help students at risk of failing. Statewide, the most relevant intervention relates to AB 128, which provided funds for tutoring programs designated to help seniors in the class of 2006 who were at risk of failing the CAHSEE. Did this funding help at-risk students pass the exam?

Programs funded by a second statewide intervention, AB 347, offer two years of assistance for students who fail to graduate because of the CAHSEE. Such programs were not in place for the class of 2006 and so we cannot discuss their effectiveness in this report. However, Chapter 7 chronicles the fate of those seniors who failed to pass the exam in spring 2006—and may shed some light, albeit indirectly, on the potential of AB 347 to assist students who struggle with the CAHSEE.

In addition, we look at some local interventions. Some districts, such as San Diego, already had intervention programs in place to help boost achievement in reading or math. Did participation in any of these programs lessen the risk of failing the CAHSEE among the class of 2006? This chapter examines both statewide and local interventions in the context of San Diego, analyzing the effects of AB 128 programs and district literacy reforms.

### Tutoring Funded by AB 128

AB 128 provides funds to pay for supplementary tutoring for students in the class of 2006 who had yet to pass the CAHSEE as of the fall of their senior year. Overall, SDUSD spent \$508,000 on tutoring funded by AB 128, with 1,488 students in the class of 2006 receiving help.<sup>1</sup>

SDUSD used this funding to provide two tiers of tutoring. Grade 12 students who scored between 320 and 349, and were therefore close to the

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<sup>1</sup>We thank Karen Bachofer for providing these figures.

passing score of 350, were invited to attend tutoring with the Princeton Review. The Princeton sessions focused mostly on test-taking strategies. Grade 12 students who had scored below 320 were invited to attend tutoring designed by Kaplan Inc., which focused on reviewing the content tested in the CAHSEE. The Princeton Review sessions consisted of Saturday “boot camps,” with some schools opting for sessions during the school week. Princeton Review tutors taught these courses. In contrast, Kaplan tutoring was given by regular classroom teachers who had received Kaplan training, and these sessions took place during the regular school day. Kaplan tutoring lasted for one semester and involved about three hours of tutoring per week. We estimate that the Kaplan sessions lasted for roughly 50 hours in total, compared to only 12 hours for the Princeton Review tutoring.

Information regarding which students participated in the AB 128 tutoring was not available at the time this report was prepared, so we could not test whether specific students benefited from either type of tutoring. However, we are able to estimate the relative effect of offering these two programs by comparing the passage rates of the students in the Kaplan group to those of the students in the Princeton group.<sup>2</sup>

As detailed in the technical appendix ([http://www.ppic.org/content/other/608AZR\\_technical\\_appendix.pdf](http://www.ppic.org/content/other/608AZR_technical_appendix.pdf)), we made eight attempts to test for a difference in the passing rate of students in the two groups. In seven of eight cases, our estimates suggest that the more intensive Kaplan tutoring had a bigger effect than did the less intensive Princeton tutoring, but the differences never became significant in a statistical sense.<sup>3</sup>

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<sup>2</sup>Another potential way to investigate the effects of programs funded by AB 128 is to use data showing the students who participated in a given program and to test whether those who participated fared better than those who did not. A potential weakness in such a method is that it would not account for why some students failed to enroll in a tutoring program. If unobserved characteristics, such as student motivation, influence enrollment decisions, then such comparisons could produce incorrect conclusions. Data limitations make this method unavailable to us; however, such an analysis would have been difficult to interpret in any case.

<sup>3</sup>We also re-estimated these models after allowing for a school fixed effect. The results were similar in that no statistically significant differences emerged and that more often than not, the Kaplan effect, although insignificant, was positive.

We also estimated the highest math and ELA scores recorded in 2005–2006 for all students involved in tutoring programs, using the same method. In one case, we found statistically significant evidence that the highest ELA scores in the Kaplan group exceeded those in the Princeton group. This provides more direct evidence that the more intensive program may have produced bigger gains in achievement. However, we need to be cautious, since this last result is based on a sample of only 79 students.

## The Effects of San Diego’s Literacy Reforms on CAHSEE Passage Rates

In 2000, San Diego Unified implemented a major reform effort, known as the Blueprint for Student Success, to improve student achievement. This effort received nationwide attention because of its audacity: It was far and away the most important educational reform in the district in the last decade. In short, these reform efforts greatly increased time on reading for students. They also provided professional development for teachers, emphasizing methods to improve student literacy.<sup>4</sup>

The Blueprint reform included strategies for preventing students from falling behind in English Language Arts, mainly focused on teacher training, and included intervention for those students demonstrably behind in ELA, focused on reading programs.<sup>5</sup> Students participated in various reading programs if they scored one or more grade levels below the norm on a diagnostic exam (the Stanford Diagnostic Reading Test). English

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<sup>4</sup>A much fuller description appears in Betts, Zau, and King (2005).

<sup>5</sup>Prevention applied to all students and teachers and focused on extensive training of teachers, in particular through peer coaches in each school who provided literacy training to regular classroom teachers. A double-length English class called “genre studies” was given to grade 6 or 7 students who were at or above grade level in reading during their first year of middle or junior high school as a preventive measure. Intervention applied to students performing below grade level. Teachers used a district-administered reading test to identify below-grade-level students. Students who tested 1 to 1.9 grades below national norms were labeled as “below grade level.” Students who were 2 or more grade equivalents behind in reading were labeled as “significantly below grade level.” These students then received extra instruction, including extended-length English classes, an extended day, or summer school and more-focused teacher training in literacy, depending on the student’s needs.

Learners were strongly encouraged to participate in all of the Blueprint interventions, regardless of their test scores.

For students performing below grade level, the key intervention strategies were:

1. Literacy block. Literacy block was a double-length English class offered in grades 6 through 10.
2. Literacy core. In grade 9, the literacy class was extended to three periods. In 2001–2002, grade 6 and 7 students also began to participate in literacy core.
3. Extended day reading program. In all schools with grades 1–9, participants received three 90-minute periods each week of supervised reading before or after school.
4. Summer school. Participants included students from most grades from K through 9, who were asked to attend for six weeks for four hours per day. Some schools in the district, mostly elementary schools, were year-round schools, in which case participants attended special intersession studies.

Participation rates in these reforms were quite high. For instance, in 2001–2002, the 21.9 percent of students in the relevant grades participated in the literacy summer school.<sup>6</sup> Overall, 28 percent of district students participated in at least one literacy intervention in 2001–2002.

How might participation in such programs affect a student’s ability to pass the CAHSEE? We consider the effect of such programs over a student’s entire career. Because passing the CAHSEE is a one-time event, we are interested in whether a student participated in an intervention at any time, rather than in just the year of data used in our models. Note that for students in the class of 2006, most aspects of the reform had not been implemented until they had reached grade 7.

First, we examined passage of the CAHSEE by grade 10. We found that participation in many aspects of the literacy program is correlated with lower probabilities of passing the CAHSEE. The explanation for this pattern appears to be that students who participated in the literacy program

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<sup>6</sup>Corresponding percentages were 26.3, 22.3, and 3.2 for the extended day reading program, double-, and triple-length English classes, respectively.

were by definition students who lagged seriously behind and so were far less likely than the average student to pass the CAHSEE. By adding controls for students who tested 1 to 1.9 levels below grade level in reading as well as for those significantly below grade level, defined as students who tested at least 2 levels below grade level, we obtained evidence that many of these negative effects at least in part result from low-performing students being required to attend the literacy interventions.

When we modeled grade 12 outcomes, we found markedly different results. Literacy core—triple-length classes—was the *only* literacy intervention that appeared to lower participants' chances of passing the CAHSEE by grade 12. In contrast, the other literacy programs appeared to have either zero or positive effects on CAHSEE passage by the time these students were seniors. In particular, extended day reading became statistically significant and positive: Students who had participated had a 4 percent higher probability of passing the CAHSEE than otherwise similar students. Similarly, the number of peer coaches as a percentage of enrollment at the school had a positive and statistically significant effect (as it did in the model of passage by grade 10).

We conclude that the peer coaching aspect of teacher professional development and the after-school reading programs may have helped some students pass the CAHSEE. However, the triple-period literacy classes appear to have had a large negative effect. Betts, Zau, and King (2005) found similar overall results when modeling gains in students' scores on standardized tests.

Several possible explanations have emerged for the negative effects of triple-length English classes at the high school level. The first is that the stigma attached to these classes greatly reduced the participants' enthusiasm for school. A second possibility is that one of the most important architects of the reforms, former Chancellor Tony Alvarado, did not have sufficient experience with high school level reforms, despite his extensive experience at implementing similar reforms in a K–8 school district in New York City. It may have been that his administration's lack of experience in this regard limited the effectiveness of the high school interventions. A third possibility, for which we have only anecdotal information, is that the district found it harder to get “buy-in” from high school English teachers for the triple-length classes, in part because the outlook of a typical high

school English Language Arts teacher is focused much more heavily on teaching literature than on teaching remedial reading, at least relative to teachers in lower grades.

Given the relatively small numbers of students in literacy core compared to the extended day reading program, the results suggest that overall the literacy reforms may have modestly boosted students' chances of passing the CAHSEE.<sup>7</sup>

## Conclusions

In sum, because all struggling grade 12 students were offered funding using AB 128 funds, we cannot easily estimate whether the spending was effective. But we do find weak evidence that the Kaplan sessions, the more intensive form of tutoring provided under AB 128, may have done more to boost CAHSEE test scores than the Princeton Review sessions, the less intensive form of tutoring provided by the district. It is difficult to draw generalizable conclusions, but the results hint that the more intensive form of tutoring that focused on content may be more helpful than tutoring focused more heavily on test-taking skills.

What about the effect of the local reforms in San Diego? We believe that some of the literacy reforms enacted in San Diego in the first half of the current decade may hold promise for helping students in other districts. Not all of the reforms appear to have influenced CAHSEE passage, but some of the professional development and the after school reading programs appear to have boosted students' chances of passing the CAHSEE. These findings also hint that local interventions already put into place in various districts could benefit from replication, with funding from such sources as AB 128, elsewhere. For this to happen, AB 128 and related streams of financial supports should be made flexible.

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<sup>7</sup>The results here mesh fairly closely with models of the effect of the Blueprint reforms on test score gains in the Stanford 9 reported by Betts, Zau, and King (2005).

## 6. Is the CAHSEE an Unfair Graduation Requirement?

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As noted above, the CAHSEE has generated a great deal of controversy—not the least of which was a lawsuit filed in spring 2006, which attempted to stop the CAHSEE from becoming a binding requirement for graduation.

Plaintiffs in the *Valenzuela v. O’Connell* lawsuit alleged that it was unfair to make the CAHSEE a requirement for high school graduation, in part because some students did not have access to the required courses, and in part because teachers at their high schools were not sufficiently highly qualified. It is certainly true that California’s high schools differ markedly in the qualifications of their teachers, and variations in course offerings also exist.<sup>1</sup> However, these differences do not necessarily cause variations in CAHSEE passage rates among schools.

We did not formally assess whether access to courses influenced passage rates, because it became apparent early in the analysis that access was unlikely to explain why some students do not pass the CAHSEE. This is especially true for the math component, which is pitched at roughly a grade 8 level of math. In San Diego, and presumably statewide, all students have access, multiple times, to the content tested at this level and to the content tested in the ELA component of the CAHSEE, which is pitched at a grade 10 level.

### Unequal Access to Highly Qualified Teachers?

We studied more formally the possibility that variations in teacher characteristics could account for the variations in CAHSEE passage rates among students. We took an average over grades 9 to 12 of the characteristics of English teachers who taught each student in the class of 2006; we calculated similar averages for math teachers. These characteristics included teachers’ demographic background, education level, years of teaching experience, credentials, and subject authorizations

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<sup>1</sup>For example, see Betts, Rueben, and Danenberg (2000).

held. We then re-ran our basic model to see what would happen to the predicted effect of student variables, such as test scores and EL status, on the probability of passing the CAHSEE by grade 12. Would those effects become smaller? For instance, if we found that the large negative EL effect reported in Chapter 4 disappeared after we took into account the qualifications of the teachers each EL student had, it would imply that unequal access to qualified teachers accounted for the large EL/non-EL gap.

Taken as a whole, the teacher variables are statistically significant, but they are not significant in a policy sense. Put differently, the estimated effects for the teacher characteristics are very small.<sup>2</sup> To give one representative example, the model predicts that if we compare two otherwise identical students throughout their high school careers, and suppose that one has English teachers who hold master's degrees and the other has English teachers with only bachelor's degrees, we find that the former student will have a 0.05 percent higher probability of passing the CAHSEE. Of course, we are reporting here only the "average" effects of teacher characteristics. There may be some students for whom being in a classroom with a teacher with certain qualifications could be more important than average and others for whom teacher qualifications do not matter at all.

Next, we looked at the student characteristics that were significant predictors of CAHSEE passage. Did the predicted effects of EL status and grade 9 test scores disappear once we accounted for differences in teacher qualifications? They did not. In fact, student characteristics remained highly significant predictors of passage of the CAHSEE.

Table 6.1 illustrates this point. The first column of numbers shows the changes in the probability of passing the CAHSEE by grade 12, relative to the student characteristics listed in the first column. For instance, EL students are predicted to be 18.5 percent less likely than non-EL students to pass the CAHSEE. Averages of English teacher characteristics and math teacher characteristics experienced by individual students between grades 9 and 12 were added to our model, and the third column shows how the predicted effects of the student characteristics changed. The final column takes the ratio between the effects after and before adding

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<sup>2</sup>Results from this and other regressions are available in the technical appendix ([http://www.ppic.org/content/other/608AZR\\_technical\\_appendix.pdf](http://www.ppic.org/content/other/608AZR_technical_appendix.pdf)).

teacher characteristics. A ratio of 1 means that the addition of the teacher qualifications did not change the effect of the given student characteristic at all.

As Table 6.1 shows, the size of the effects of the student characteristics changed only slightly, typically by about 5 to 12 percent, after we added teacher characteristics. In other words, it appears that variations across students in EL status, grade 9 test scores, grades, and so on reflect very real differences in the mastery of ELA and math skills among students. These characteristics are not merely standing in for inequalities in access to highly qualified teachers.

**Table 6.1**

**Student Characteristics: Strong Predictors of Passing the CAHSEE by Grade 12, Even After Controlling for Teacher Characteristics**

Student Characteristic	% Change in Probability of Passing the CAHSEE by Grade 12	% Change After Adding Teacher Characteristics	Ratio
African American	-4.1	-4.2	1.01
EL student	-18.5	-16.2	0.88
GPA	6.7	6.5	0.97
ELA score	10.2	9.2	0.90

## Conclusions

Overall, we find that teacher characteristics do not have a great effect on the probability of a student’s passing the CAHSEE. We do tentatively conclude that differences in the observable traits of high school teachers might explain a quite small proportion of the gaps in CAHSEE passage between African Americans and whites, between EL and fluent students, between students with high and low GPAs, and between high- and low-scoring students on the ELA component of the state test. Even if California were able to equalize teacher qualifications across high schools, and among students within high schools, CAHSEE passage rates among these groups would narrow modestly at best.

These findings are highly relevant to the recent lawsuit, *Valenzuela v. O’Connell*, that claimed, in part, that it was unfair to hold all students to the standards embodied in the CAHSEE ELA and math exams because some students lacked access to fully qualified teachers. The San Diego data suggest that variations in teacher qualifications play at best only a minor role in the variations in passage rates among various groups of students.

## 7. The Fate of High School Seniors Who Failed to Pass the CAHSEE in Spring 2006

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Much of the angst surrounding the CAHSEE focuses on those students who fail to graduate because they have completed grade 12 without passing one or both components of the exam. Do these students completely give up, or do they come back and attempt to pass the CAHSEE the year after they were supposed to graduate? AB 347 had not been passed in June 2006, so state subsidies to support students after grade 12 were not yet in place. However, in 2006, districts were required to inform seniors who had not passed the CAHSEE of their options to re-enroll and/or to re-take the CAHSEE in the following year. How well did this encouragement to “try, try again” work?

### Patterns of Re-Enrollment and Re-Taking and Passing of the CAHSEE

Using data on San Diego’s class of 2006, we arrive at sobering conclusions. Table 7.1 shows what happened to the 636 students who failed to graduate because of the CAHSEE. The rightmost column shows overall patterns.

First, we ask if any of these students remain engaged in the school system. Did some pass the CAHSEE in 2006–2007? Did some re-enroll in regular school? As the table illustrates, some students did both, and some did one but not the other. Among the students who did not pass the CAHSEE in 2005–2006, 38.5 percent re-enrolled in school. However this number overstates the intent of nongraduates to return in a bid to pass the CAHSEE, because about half of these returnees were severely disabled students in nondiploma programs. (These programs help students to acquire basic life skills. They represent a subset of special education

**Table 7.1**  
**Detailed 2006–2007 Outcomes for Those Who Failed the CAHSEE**  
**in Spring 2006**

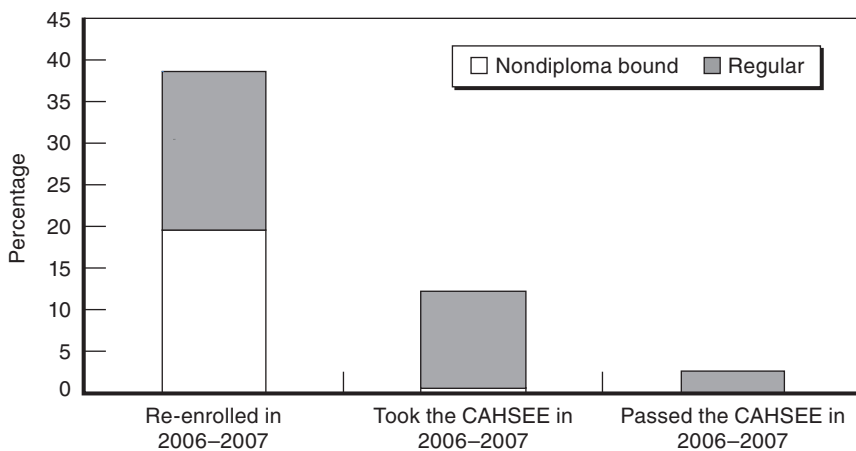
Student Status in Grade 9	EL	Special Education	EL <i>and</i> Special Education	Neither EL Nor Special Education	All Students
Outcome (number and %)					
Did not re-enroll	133 (71.9)	105 (52.2)	54 (49.1)	95 (67.9)	387 (60.9)
Did not re-enroll but still passed	2 (1.1)	0	1 (0.9)	1 (0.7)	4 (0.6)
Re-enrolled and passed	5 (2.7)	2 (1.0)	1 (0.9)	8 (5.7)	16 (2.5)
Re-enrolled, took test, and failed	27 (14.6)	5 (2.5)	8 (7.3)	17 (12.1)	57 (9.0)
Re-enrolled, did not take test	18 (9.7)	89 (44.3)	46 (41.8)	19 (13.57)	172 (27.0)
Sum	185	201	110	140	636

students.)<sup>1</sup> Further, of the 636 who did not pass by spring 2006, only 77, or 12.1 percent, sat for the CAHSEE again, and only 20, or 3.1 percent, passed.

Just as disconcerting, we can see that the majority of those who did not pass the CAHSEE by the end of grade 12—61 percent—do not remain engaged in the public school system. They neither re-enrolled in the school district nor took the CAHSEE test again during 2006–2007.

Figure 7.1 shows this information in another fashion. Again, we see that the percentage of students returning in 2006–2007 was quite high but, as mentioned, about half of the returnees were severely disabled students who had enrolled in nondiploma programs unrelated to the goal of passing the CAHSEE. As the figure shows, the percentage not only taking but

<sup>1</sup>These students were enrolled in Transition Resources for Adult Community Education, a community-based program for young adults with disabilities, 18–22 years of age, as they transition from public school to adult life as mandated by the Individuals with Disabilities Education Act.



NOTES: The figure shows outcomes for seniors (grade 12 students) in the class of 2006 who had not yet passed the CAHSEE by the end of the 2005-2006 school year. The figure categorizes students as “regular” and “nondiploma bound.” The latter were in a transition sequence for severely disabled students who were not expected to graduate with a regular diploma. In 2006-2007, they were enrolled in a nonacademic life-skills program at the district. These students represent a subsample of the special education population referred to elsewhere in this report.

The middle and rightmost bars include four students who did not re-enroll formally in 2006-2007 but who nonetheless took the CAHSEE and passed it during that year.

**Figure 7.1—Re-Enrollment and CAHSEE Outcomes Among Seniors Who Failed to Graduate in 2006 Because of the CAHSEE**

passing the high school exit examination in 2006-2007 was only 3.1 percent.

Overall, how much did the CAHSEE passage rate among the class of 2006 rise after allowing students the option of re-taking the exam the following year? As of June 2006, 90.4 percent of the seniors in that year had passed the CAHSEE. A year later, the passage rate among this same group of students had risen marginally, to 90.7 percent.

These numbers are by any standard disappointing. However, readers should be aware that some of the CAHSEE failers from June 2006 may have moved away and re-taken the CAHSEE elsewhere, and some may have opted to obtain a General Educational Development (GED) diploma as an alternative to a standard high school diploma.

## Conclusions

The fact that so few students remain engaged with the school system after failing to graduate raises some urgent questions. As mentioned, state funding through AB 347 to pay for up to two years of educational services for seniors who failed to pass the CAHSEE was not in place for the class of 2006. But we believe that the lack of re-engagement by those who failed to graduate in spring 2006 sheds some provisional and troubling light on the probable efficacy of AB 347. Policymakers will need to pay close attention to the re-enrollment and passage rates of nongraduating seniors in 2007–2008 and later school years to learn whether the AB 347 funds are making a tangible difference.

At the same time, the miniscule 0.3 percent increase in the graduation rate of members of the class of 2006 between 2006 and 2007, from 90.4 to 90.7 percent, bolsters our earlier suggestion that California allow its schools more flexibility in spending on CAHSEE interventions. Intervening earlier, perhaps in middle school or even in the later grades of elementary school, could perhaps increase the effectiveness of the dollars spent on intervention. Further, some forward-thinking experimental evaluations could do much to pin down the sorts of interventions that work best and the optimal grades in which to intervene.

## 8. Conclusion and Policy Implications

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At the end of the 2005–2006 school year, about 10 percent of students in San Diego and statewide failed to pass the CAHSEE by the end of grade 12. In San Diego, district officials believe that a sizable fraction of these students would have failed to receive a diploma even if the CAHSEE had not been a graduation requirement, because these students also had trouble with course requirements and grades. However, this failure rate is still a matter of great concern, especially since the exam covers material pitched at the level of grades 8 and 10. Indeed, this finding raises major questions about whether the content tested in the CAHSEE is pitched too low.

Further, we should not be complacent about the skills of those who pass the CAHSEE: At least in San Diego, large numbers of students who passed the CAHSEE did so by quite narrow margins, raising concerns about the skills these young people will bring into the workforce. In a time of technological change that has lowered the relative earnings of American workers with relatively little education, students who barely pass an exit exam that tests knowledge of math at a grade 8 level are probably not well poised for successful careers.

What about policy implications? Our research findings hold relevance for two distinct audiences. First, parents, teachers, and school administrators need a reliable set of early warning signs that certain students are likely to have trouble with the exit exam once they get to high school. Second, district and state policymakers, and state legislators, both in California and in the many other states with similar high school exit exams, need answers to two key questions: What interventions can boost the achievement of those struggling with the exam and when should these interventions begin?

### **Spotting Difficulty Early On: Advice for Teachers, Principals, and Parents**

Parents and teachers will not be surprised that indicators such as English Learner or special education status, or low test scores in reading and math,

rank among the best predictors of failure on the CAHSEE. However, many of our more subtle findings point to new indicators that school officials could easily use to intervene selectively to help students, in many cases years before they reach high school.

Teachers' ratings of student behavior in grades 4 to 6 are strongly associated with passage of the CAHSEE six to eight years later. In fact, behavior ratings in these grades are better predictors than test scores and are roughly as important as academic grades in elementary school. This result suggests, but does not prove, that careful work between parents and teachers to improve student behavior could serve students well years later when they prepare to take the high school exit exam.

We found in the case of some student characteristics that their predicted effect on CAHSEE passage differed radically with the student's own age. For example, a student who is an English Learner in grade 4 is no less likely to pass the CAHSEE than otherwise similar non-EL students. That is, English Learner status should not be a matter of great concern for younger students. However, if that student reaches middle school or high school and still retains English Learner status—rather than becoming designated as Fluent English Proficient—this is of great concern, since EL status by those grades becomes a powerful predictor of failure on the exit exam.

Also of note: Among EL students, the language spoken at home does matter. In San Diego at least, Vietnamese-speaking EL students fare far better on the CAHSEE than other EL students. We do not, of course, mean to imply that speaking Vietnamese at home causes better outcomes. Rather, this factor is a good predictor for passage of the CAHSEE, and no doubt the reasons for it are complex and multidimensional.

## **When and How to Intervene: Implications for Policymakers**

For legislators and education policymakers in California and elsewhere, what does this report suggest are the appropriate times to intervene, and how?

### ***When to Intervene***

Probably the most important insight for policymakers from this report concerns how to time interventions for students. Quite naturally, the

California Legislature has focused substantial spending on tutoring for students who have reached grade 12 without passing the CAHSEE. AB 347, passed into law in October 2007, will also fund districts to provide up to two years of educational assistance to those who failed to graduate on time because of the CAHSEE.

Various strands of evidence in this report strongly suggest that these eleventh-hour interventions, however well intentioned, are unlikely by themselves to yield the expected results. First, we must bear in mind that the CAHSEE is pitched at roughly the grade 8 level in math and the grade 10 level in ELA. Does it make sense to wait until grade 12, or until after students have failed to graduate, before spending on additional tutoring to help students master these basic skills?

Second, consider our remarkable finding that student characteristics in grade 4 predict passage on the CAHSEE almost as well as characteristics of those same students once they have reached grade 9. This observation suggests that we can identify students at risk of failing the CAHSEE quite reliably in middle and even elementary grades. Would it not make more sense to intervene early, providing tutoring to students who are quite likely to run afoul of the CAHSEE years later in their academic careers?

Third, state subsidies for tutoring after grade 12 are predicated on the assumption that most seniors who failed the CAHSEE will re-enroll after failing to receive a diploma. In San Diego, the district mailed letters to all seniors in the class of 2006 who had yet to pass the CAHSEE, advising them of the ways they could re-enroll and re-take the CAHSEE in the following school year. But only 38.5 percent of these students re-enrolled, and many of them were severely disabled students with no intention of taking the CAHSEE at all. Almost none of the seniors who failed in 2005–2006 re-took the exam in 2006–2007, and of those who did take it, only a few passed. Overall, only 3.1 percent of seniors from 2006 who had failed to pass the CAHSEE passed it in the 2006–2007 school year. Unless policymakers can brainstorm innovative ways to induce former students to enroll in tutoring programs after grade 12, it seems unlikely that many of those who have failed to graduate will come back for tutoring the next year. Thus, supplementing tutoring dollars for the post-grade-12 cohort with funding to help struggling students in earlier grades—who are still in school—could be a wise choice.

The ability to identify at-risk students so early does raise stark policy tradeoffs: to intervene early or late? To cast a wide net or to target narrowly? In early grades, teachers may be better able than they are in later grades to provide effective remedial help aimed at the basic skills tested in the CAHSEE. However, if we spend extensively on tutoring in the early grades, we will have devoted resources to at least some students who would have eventually passed the exit exam even without tutoring. Spending in grade 12 better targets state dollars but could be less effective than early intervention.

One possible resolution is to acknowledge that even if some struggling students in grade 6, 7, or 8 who receive CAHSEE tutoring would have passed the CAHSEE anyway, their math and reading skills are nonetheless likely to be quite low, so tutoring should provide some benefits for them later in life. Early intervention could improve students' trajectories throughout the rest of their academic careers, for instance by boosting their achievement, reducing the chances that they will be retained a grade, increasing academic engagement, and, especially for English Learners, boosting reading ability in a way that will benefit students' ability to digest material in all other subject areas.

Another objection to the notion of early intervention in elementary and middle schools may arise. Will government leaders support spending today on tutoring that might increase graduation rates from high school several years in the future, while having virtually no immediate effect on graduation rates? The resolution of this problem hinges on the extent to which Sacramento is willing and able to focus on the longer-term well-being of California's youth. We also note that if tutoring in early grades leads to better outcomes on achievement tests, attendance, and related measures, then there could be some shorter-term benefits as well.

Yet another objection we have heard to the idea of early intervention is that in many parts of California, different school districts administer elementary and secondary schools, suggesting that the former districts will have little incentive to worry about how their elementary students will fare on the CAHSEE a decade into the future. We have two answers to this challenge. First, it suggests that Sacramento needs to take action to ensure that elementary-school-only districts concern themselves with preparation for the CAHSEE. One option would be to fund tutoring in math and

reading in elementary schools for at-risk students who were identified by statistical models such as the ones in this report. Because these models provide strong predictions of who is at risk of failure, these tutoring programs could be very accurately targeted.

Second, we must recognize that the CAHSEE is just one part of the state's overall accountability system, and that the federal No Child Left Behind law imposes a separate accountability system on California. It stands to reason that tutoring aimed at improving the math and ELA capabilities of elementary and middle school students will have multiple benefits. Not only might it boost passage rates on the CAHSEE, but it could also boost individual schools' standings on the Academic Performance Index, which is central to both the state accountability system and the measures of Adequate Yearly Progress that lie at the heart of the federal NCLB system. (Indeed, we found that the correlation between students' highest CAHSEE scores and their scores on the California Standards Test in grade 10, the latter of which feeds into school API calculations, were positive and quite large, around 0.5 in math and 0.6 in English Language Arts.)

Third, it may be possible to find ways to leverage existing funding for tutoring, paid for and mandated by NCLB, by adding complementary forms of state-funded tutoring that takes passage of the CAHSEE as its ultimate goal.

A final objection to the idea of expanding tutoring to earlier grades is that it would be foolhardy to increase spending on unproven interventions. California does have a long history of implementing expensive educational reforms that lack solid research support, but this need not be the case this time. It would be quite straightforward for the state to implement tutoring below grade 12 on a limited trial basis, while using lotteries to determine which schools would receive the limited funding available during the trial period. A comparison of subsequent CAHSEE passage rates in these schools would provide a clear picture of whether the interventions worked better in some grades than others. Similarly, the state could test different interventions, such as various forms of after-school tutoring and types of professional development for teachers.

This approach would be far less expensive than blanket reforms applied throughout the state. In addition, the randomization method would set

an important precedent for California, by providing a quasi-experimental framework that would yield compelling evidence on whether these interventions actually help students. Once we know that, then policymakers could make highly informed decisions about whether to expand tutoring to the lower grades, whether to expand or curtail tutoring for those in and beyond grade 12, and which forms of tutoring or other interventions worked best. This approach, which is gaining traction nationally thanks to efforts by the Institute of Education Sciences at the U.S. Department of Education, has so far been almost completely lacking in the design of educational interventions in California. Adopting forward-looking evaluations now would put California on track to becoming a national leader in education reform.

### *How to Intervene*

The manner and efficacy of interventions is also of concern. We looked at two current interventions in place in San Diego, one local and one statewide.

On the local level, we find that certain aspects of the literacy reforms put in place in San Diego in 2000 appear to have helped some students pass the CAHSEE: After-school reading programs in middle school and professional development for teachers, implemented through peer coaching of teachers within schools, both appear to have helped students moderately. However, San Diego's program of triple-length English classes for students identified as two or more grades behind in reading appears to have had a negative effect.

What about statewide interventions? We looked at the effects of tutoring programs sponsored by funds from AB 128, which targeted at-risk students in grade 12. We obtained weak, that is, statistically insignificant, evidence that students offered intensive Kaplan tutoring on the content of the CAHSEE exam, especially in ELA, may have had higher probabilities of passing the CAHSEE than did students who were offered less-intensive tutoring on test-taking methods offered by the Princeton Review. We also obtained some statistically significant evidence that the students offered the Kaplan tutoring may have gained slightly more in ELA reading scores. As the district gains experience with state-subsidized tutoring, we may learn with greater precision what, if any, differences exist in the effectiveness of various types of tutoring.

Again, we could learn much more about the optimal types of interventions and the optimal grades in which to implement them through carefully designed trials in a limited number of randomly chosen schools or districts statewide. Innovative thinking along these lines would leave California doubly blessed: Randomized trials are the most statistically compelling design currently possible, and because of their limited scope they are also far cheaper than implementing blanket statewide reforms.

## Policy Recommendations

Table 8.1 encapsulates steps that policymakers should consider.

**Table 8.1**  
**Reform Suggestions**

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1. Develop an “early warning” system that uses statistically based methods to forecast which elementary or middle school students will be at risk of failing the CAHSEE.
  2. Consider targeting additional tutoring funds at elementary and middle school students who are at risk. Allowing districts increased flexibility in how they spend AB 128 and AB 347 dollars could help to create such funds. To ensure that elementary school districts focus on the CAHSEE issue, tie tutoring funds at the elementary school level to students identified as at risk on the CAHSEE.
  3. Consider how these additional funds could be aligned with NCLB supplemental service funds for tutoring students at schools that repeatedly fail to make Adequate Yearly Progress.
  4. Commission rigorous statewide studies of the effect of AB 128 and AB 347 funding on outcomes for seniors and post-senior-year students. Researchers should also study what fraction of seniors denied diplomas agree to re-enroll for one or two more years as envisaged under AB 347.
  5. Develop a series of rigorous evaluations of alternative math and ELA interventions targeted at students at risk of failing the CAHSEE. Test whether the effectiveness of such interventions depends on the grade in which the intervention is implemented. Use geographic variation to create true treatment and control groups. Adopt the most successful interventions statewide.
  6. Consider additional academic supports directed at the many students who pass the CAHSEE by only a slim margin.
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