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Technical Appendices

Passing the California High School Exit Exam

Have Recent Policies Improved Student Performance?

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Appendix A: More Information on Whether Interventions Are Helping Struggling Students

Models of the Impact of AB 128 Funding on the Probability of High School Exit Exam Passage in Grade 11

We estimated a series of linear probability (Ordinary Least Squares) models to estimate whether grade-11 students who had yet to pass the CAHSEE had a higher probability of passing the CAHSEE overall in years when they were eligible for AB 128 funding than in the year when they were not eligible (2005–06). The results discussed in the main text were produced by a model that focused on outcomes for grade-11 students who had failed the corresponding portion of the CAHSEE the year before. In models of results in a given subject area, in addition to a dummy variable indicating whether the cohort was eligible for AB 128 funding in grade 11, other regressors were (1) an indicator for whether the student had failed in the *other* portion of the CAHSEE in grade 10; (2) the grade-10 score on the CAHSEE for the subject under question; (3) dummy variables for female, African American, Asian, Hispanic or "other race" students, with the comparison group being white males; (4) a dummy variable for parental education being less than a high school degree; (5) the CST score in the given subject in grade 10 (and in the case of the mathematics CST, dummy variables for which mathematics test was taken in grade 10); (6) average GPA; (7) indicators for students who were in special education or who were English Learners; (8) the percentage of time absent from the school; and (9) measures of the percentage of the school that was Asian, Hispanic, Pacific Islander, Native American, English Learner, or eligible for free or reduced-price lunch. In the model for overall CAHSEE passage, we included controls for the lagged CST and CAHSEE scores in both subjects and controls for whether the student had failed the mathematics and ELA components of the exit exam in grade 10.

Table A1 shows the estimates, where the dependent variable varies between passage of the CAHSEE overall, passage of the mathematics portion, passage of the ELA portion, and the gains in mathematics and ELA scaled scores on the exit exam between grades 10 and 11.

As a robustness test we re-ran these models after controlling for whether the student participated in the other intervention—CAHSEE prep classes. The AB 128 coefficient changed very little in these models. The only notable exception is that the positive and significant effect of AB 128 on gains in the ELA CAHSEE score in grade 11 becomes significant at only the 5 percent level, and falls in value by about one fifth.

Although the coefficients in these models are generally positive, we avoid listing this as a positive effect in the main text for two reasons – the lack of statistical significance and the fact that we have four years of data, with tutoring being provided in the last three years. We have very few degrees of freedom and indeed, adding a linear time trend, which by construction is highly collinear with the AB 128 dummy suggests if anything a negative effect of AB 128 tutoring.[1]

[1] To save space, in the ensuing results for CAHSEE Prep classes, we do not show results that condition on whether AB 128 tutoring was available to students in a given grade and year, but the results are little changed if we add this control.

TABLE A1
Regression results for impact of offering AB 128 tutoring in grade 11

	Passed both	Passed Math	Passed ELA	Math gains	ELA gains
AB128	0.0147	-0.0138	0.0334	-0.0069	0.0634**
	(0.0163)	(0.0183)	(0.0180)	(0.0241)	(0.0246)
Observations	5821	5217	4670	5217	4670
Pseudo R-Squared	0.331	0.253	0.31	0.361	0.42

SOURCE: Author calculation.

NOTE: The dependent variable is a dummy variable for whether the student fulfilled the CAHSEE requirement in Gr11. AB128 is a dummy variable equal to zero is the student was in Gr11 in 2005 or in 2006, and equal to 1 if the student was in Gr11 after 2006. Robust standard errors in parentheses. * significant at 5%; ** significant at 1%.

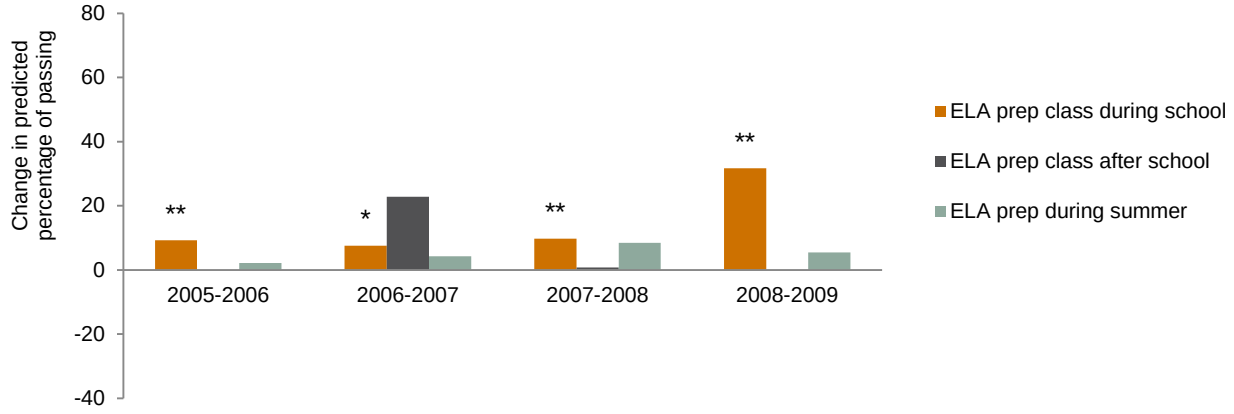
CAHSEE Prep Classes

Figures A1 and A2 show the results when we re-estimated our CAHSEE prep models on a year-by-year basis while at the same time distinguishing between CAHSEE prep classes offered during the regular school day, after school, or in summer session.

We found that in all four years, ELA prep courses made a positive difference while taken during the school year. The size of the effect increased dramatically in 2008–09 with a predicted probability of improvement of 32 percent. This could be due to many factors such as teachers using instructional materials designed specifically for CAHSEE prep coursework. It should be noted that not many students took after school CAHSEE prep courses, which resulted in the models not identifying these values. None of the years showed a statistically significant effect of taking ELA CAHSEE prep courses after school. For ELA prep courses taken during the summer, the effects for each of the four years are positive, but not statistically significant.

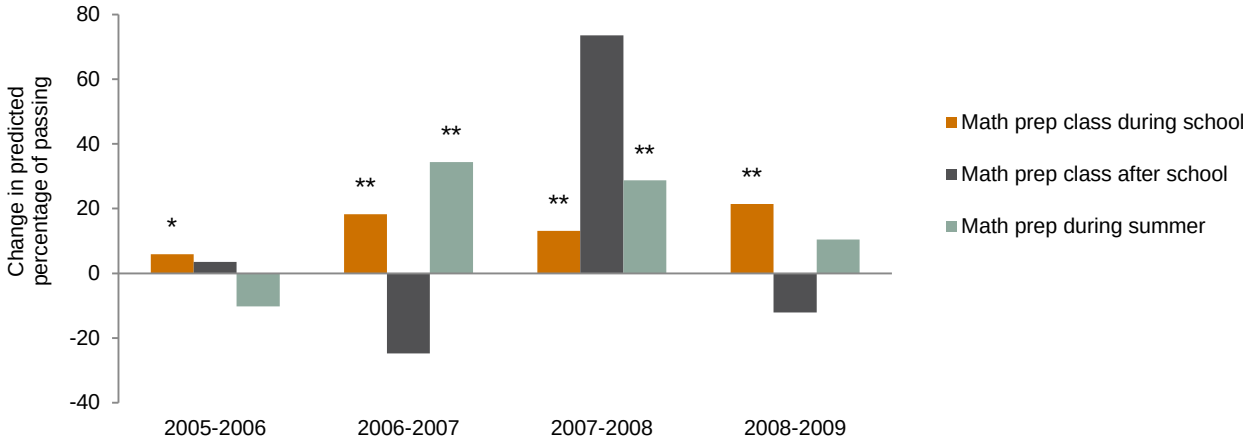
For mathematics prep courses, there is a different pattern, as shown in Figure A2. The effect of mathematics CAHSEE prep courses during the regular school day are positive and statistically significant with a increase in predicted probability of passing the mathematics section of CAHSEE by 21 percent in 2008–09. It should be noted that there is a negative effect of after-school mathematics prep classes in two of the years, but because there were very few students who took the after school mathematics prep course, the results are not statistically meaningful. Taking mathematics prep classes during the summer results in a slightly negative change in predicted probability of passing the mathematics section of CAHSEE in 2005–06, but it is not statistically significant. There are effects the following two years that are positive and statistically significant. In the final year, the effect is positive as well, but not statistically significant. Overall, the pattern is that mathematics prep courses during the summer do have some effect, but the effect tends to decrease over time.

FIGURE A1
The estimated effect of an ELA prep course during school, after school, or during the summer on the probability of passing the ELA CAHSEE section, by year



Source: Author calculation.
*= Significant at the 5 percent level
**= Significant at the 1 percent level

FIGURE A2
The estimated effect of taking a mathematics prep course during school, after school, or during the summer on the probability of passing the mathematics CAHSEE section, by year



*= Significant at 5 percent
**= Significant at 1 percent

The following pages show regression results by year for the models that tested for an effect of taking a CAHSEE prep class on outcomes, followed by a model that pools students across school years. The last table in the set below shows means and standard deviations of variables used in the models. In looking at the latter recall that the sample used to model the impact of CAHSEE prep classes is students in grades 11 and 12 who have yet to pass the CAHSEE. Thus they are by definition students who are struggling, and this explains the low test scores reported in that table.

TABLE A2
CAHSEE results in 2006 for students taking prep classes using standardized test scores and grade 10 data for descriptions of students and schools

	Passed CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE
Any prep class taken	-0.0037				
	(0.0212)				
ELA prep class taken		0.0922			
		(0.0265)**			
Math prep class taken			0.0688		
			(0.0285)*		
ELA prep class taken during the school day				0.0921	
				(0.0265)**	
ELA prep class taken during the summer				0.0220	
				(0.1091)	
Math prep class taken during the school day					0.0593
					(0.0295)*
Math prep class taken after school					0.0352
					(0.1001)
Math prep class taken during the summer					-0.1026
					(0.2257)
Lagged ELA scaled score in CAHSEE	0.0038	-0.0017		-0.0017	
	(0.0004)**	(0.0004)**		(0.0004)**	
Lagged math scaled score in CAHSEE	0.0055		-0.0010		-0.0010
	(0.0004)**		(0.0005)*		(0.0005)*
Student is female	-0.0476	-0.0926	0.0540	-0.0927	0.0543
	(0.0156)**	(0.0159)**	(0.0165)**	(0.0159)**	(0.0165)**
Student is African American	-0.0692	-0.0359	-0.0924	-0.0361	-0.0916
	(0.0295)*	(0.0303)	(0.0314)**	(0.0303)	(0.0314)**
Student is Asian	0.0051	0.0713	-0.0278	0.0713	-0.0272
	(0.0342)	(0.0349)*	(0.0368)	(0.0349)*	(0.0368)
Student is Hispanic	-0.0450	-0.0161	-0.0164	-0.0163	-0.0156
	(0.0280)	(0.0288)	(0.0299)	(0.0288)	(0.0299)
Student is other race	-0.0967	-0.2151	-0.0243	-0.2151	-0.0230
	(0.1044)	(0.1113)	(0.1064)	(0.1113)	(0.1064)
Was student an English Learner?	-0.0539	-0.0587	-0.1350	-0.0586	-0.1353
	(0.0188)**	(0.0194)**	(0.0187)**	(0.0194)**	(0.0187)**
Parental education less than high school	0.0264	-0.0033	-0.0007	-0.0034	-0.0012
	(0.0213)	(0.0219)	(0.0232)	(0.0219)	(0.0232)
Average academic GPA	0.0617	0.0911	0.0756	0.0910	0.0757
	(0.0115)**	(0.0115)**	(0.0124)**	(0.0115)**	(0.0125)**
Standardized CST score in ELA	0.1011	0.0434		0.0435	
	(0.0173)**	(0.0177)*		(0.0177)*	
Standardized CST score in math	0.0054		0.0147		0.0145
	(0.0161)		(0.0173)		(0.0173)

	Passed CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE
Algebra I CST	0.1189		0.2364		0.2367
	(0.1974)		(0.2256)		(0.2257)
Algebra II CST	0.2237		0.2571		0.2568
	(0.1984)		(0.2267)		(0.2268)
8th/9th-grade math CST	0.0000		0.0000		0.0000
	(0.0000)		(0.0000)		(0.0000)
Geometry CST	0.2010		0.3329		0.3331
	(0.1965)		(0.2247)		(0.2248)
HS math CST	-0.3741		0.0037		0.0043
	(0.3407)		(0.3430)		(0.3432)
Integrated math1 CST	0.0997		0.3067		0.3073
	(0.2018)		(0.2295)		(0.2296)
Integrated math2 CST	0.0000		0.0000		0.0000
	(0.0000)		(0.0000)		(0.0000)
Integrated math3 CST	0.0000		0.0000		0.0000
	(0.0000)		(0.0000)		(0.0000)
Lagged CST score in ELA	0.0776	-0.0091		-0.0091	
	(0.0178)**	(0.0181)		(0.0181)	
Lagged CST score in math	0.0157		-0.0128		-0.0129
	(0.0159)		(0.0172)		(0.0172)
Percent of time absent from school	-0.0021	-0.0004	-0.0058	-0.0004	-0.0058
	(0.0012)	(0.0012)	(0.0013)**	(0.0012)	(0.0013)**
School percent Native American	0.0684	0.0583	0.0495	0.0583	0.0509
	(0.0285)*	(0.0281)*	(0.0300)	(0.0281)*	(0.0301)
School percent African American	0.0052	0.0040	0.0041	0.0040	0.0041
	(0.0013)**	(0.0014)**	(0.0014)**	(0.0014)**	(0.0014)**
School percent Hispanic	-0.0007	0.0001	-0.0009	0.0001	-0.0009
	(0.0005)	(0.0005)	(0.0006)	(0.0005)	(0.0006)
School percent Asian	-0.0005	0.0007	-0.0005	0.0007	-0.0005
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
School percent Pacific Islander	-0.0369	-0.0340	-0.0273	-0.0340	-0.0268
	(0.0171)*	(0.0176)	(0.0180)	(0.0176)	(0.0180)
Percent of school on meal assistance	-0.0007	-0.0006	-0.0012	-0.0006	-0.0012
	(0.0005)	(0.0005)	(0.0005)*	(0.0005)	(0.0005)*
Student in special education	-0.0588	-0.1424	-0.1835	-0.1425	-0.1833
	(0.0201)**	(0.0206)**	(0.0209)**	(0.0206)**	(0.0209)**
Constant	-2.8125	0.7605	0.3853	0.7597	0.3872
	(0.2804)**	(0.1591)**	(0.2851)	(0.1592)**	(0.2853)
Observations	2817	3013	3125	3013	3125
R-squared	0.34	0.08	0.12	0.08	0.12

SOURCE: Author calculation.

NOTE: Standard errors in parentheses.
* = significant at 5 percent
** = significant at 1 percent

TABLE A3
CAHSEE results in 2007 for students taking prep classes using standardized test scores and grade 10 data for descriptions of students and schools

	Passed CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE
Any prep class taken	0.0232				
	(0.0240)				
ELA prep class taken		0.0797			
		(0.0303)**			
Math prep class taken			0.1767		
			(0.0301)**		
ELA prep class taken during the school day				0.0754	
				(0.0310)*	
ELA prep class taken after school				0.2277	
				(0.1562)	
ELA prep class taken during the summer				0.0423	
				(0.0703)	
Math prep class taken during the school day					0.1828
					(0.0303)**
Math prep class taken after school					-0.2479
					(0.1459)
Math prep class taken during the summer					0.3442
					(0.0811)**
Lagged ELA scaled score in CAHSEE	0.0033	-0.0017		-0.0017	
	(0.0004)**	(0.0004)**		(0.0004)**	
Lagged math scaled score in CAHSEE	0.0056		-0.0023		-0.0023
	(0.0005)**		(0.0005)**		(0.0005)**
Student is female	-0.0463	-0.0375	0.0094	-0.0370	0.0095
	(0.0164)**	(0.0164)*	(0.0162)	(0.0164)*	(0.0162)
Student is African American	-0.0212	-0.0176	-0.0670	-0.0173	-0.0678
	(0.0314)	(0.0322)	(0.0311)*	(0.0322)	(0.0310)*
Student is Asian	-0.0092	0.0820	0.0181	0.0787	0.0174
	(0.0382)	(0.0381)*	(0.0384)	(0.0382)*	(0.0382)
Student is Hispanic	-0.0240	0.0022	-0.0097	0.0020	-0.0085
	(0.0301)	(0.0305)	(0.0298)	(0.0305)	(0.0297)
Student is other race	-0.1363	-0.1583	0.0382	-0.1523	0.0400
	(0.1155)	(0.1181)	(0.1186)	(0.1181)	(0.1182)
Was student an English Learner?	-0.0525	-0.0757	-0.1214	-0.0769	-0.1224
	(0.0201)**	(0.0204)**	(0.0184)**	(0.0204)**	(0.0184)**
Parental education less than high school	-0.0200	0.0430	-0.0467	0.0444	-0.0430
	(0.0223)	(0.0225)	(0.0225)*	(0.0225)*	(0.0224)
Average academic GPA					
	(0.0129)**	(0.0127)**	(0.0127)**	(0.0127)**	(0.0126)**
Standardized CST score in ELA	0.0858	0.0444		0.0449	
	(0.0190)**	(0.0190)*		(0.0190)*	

	Passed CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE
Standardized CST score in math	0.0137		0.0188		0.0158
	(0.0182)		(0.0182)		(0.0182)
Algebra I CST	-0.2426		-0.1559		-0.1549
	(0.1340)		(0.1352)		(0.1348)
Algebra II CST	-0.1570		-0.1254		-0.1254
	(0.1365)		(0.1378)		(0.1373)
8th/9th-grade math CST	-0.5253		-0.2069		-0.2057
	(0.4276)		(0.4539)		(0.4523)
Geometry CST	-0.1786		-0.0590		-0.0607
	(0.1335)		(0.1345)		(0.1341)
HS math CST	-0.3098		-0.2414		-0.2375
	(0.3177)		(0.2847)		(0.2838)
Integrated math1 CST	-0.1693		-0.1495		-0.1419
	(0.1416)		(0.1420)		(0.1415)
Integrated math2 CST	-0.1602		-0.1078		-0.1049
	(0.1465)		(0.1503)		(0.1497)
Integrated math3 CST	0.0000		0.0000		0.0000
	(0.0000)		(0.0000)		(0.0000)
Lagged CST score in ELA	0.0529	0.0077		0.0074	
	(0.0196)**	(0.0195)		(0.0195)	
Lagged CST score in math	0.0496		0.0051		0.0062
	(0.0179)**		(0.0176)		(0.0175)
Percent of time absent from school	-0.0024	-0.0022	-0.0014	-0.0021	-0.0013
	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
School percent Native American	0.0415	0.0527	0.0345	0.0515	0.0375
	(0.0183)*	(0.0188)**	(0.0191)	(0.0189)**	(0.0190)*
School percent African American	-0.0029	-0.0035	-0.0007	-0.0035	-0.0008
	(0.0013)*	(0.0013)**	(0.0013)	(0.0013)**	(0.0013)
School percent Hispanic	-0.0003	-0.0011	-0.0010	-0.0011	-0.0011
	(0.0005)	(0.0005)*	(0.0005)*	(0.0005)*	(0.0005)*
School percent Asian	-0.0003	-0.0004	-0.0008	-0.0005	-0.0009
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
School percent Pacific Islander	0.0272	0.0410	0.0030	0.0389	0.0010
	(0.0154)	(0.0158)**	(0.0157)	(0.0159)*	(0.0157)
Percent of school on meal assistance	-0.0006	0.0000	-0.0003	-0.0000	-0.0002
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Student in special education	-0.0551	-0.1289	-0.1537	-0.1288	-0.1518
	(0.0208)**	(0.0208)**	(0.0203)**	(0.0208)**	(0.0202)**
Constant	-2.2498	0.9146	1.2392	0.9226	1.2208
	(0.2625)**	(0.1671)**	(0.2228)**	(0.1671)**	(0.2221)**
Observations	2702	2937	3029	2937	3029
R-squared	0.26	0.05	0.08	0.05	0.09

SOURCE: Author calculation.

NOTE: Standard errors in parentheses.
* = significant at 5 percent
** = significant at 1 percent

TABLE A4
CAHSEE results in 2008 for students taking prep classes using standardized test scores and grade 10 data for descriptions of students and schools

	Passed CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE
Any prep class taken	-0.0177				
	(0.0287)				
ELA prep class taken		0.0963			
		(0.0361)**			
Math prep class taken			0.1312		
			(0.0383)**		
ELA prep class taken during the school day				0.0971	
				(0.0362)**	
ELA prep class taken after school				0.0076	
				(0.3347)	
ELA prep class taken during the summer				0.0846	
				(0.0897)	
Math prep class taken during the school day					0.1307
					(0.0384)**
Math prep class taken after school					0.7356
					(0.4651)
Math prep class taken during the summer					0.2872
					(0.0857)**
Lagged ELA scaled score in CAHSEE	0.0054	-0.0024		-0.0024	
	(0.0005)**	(0.0005)**		(0.0005)**	
Lagged math scaled score in CAHSEE	0.0062		-0.0027		-0.0026
	(0.0005)**		(0.0005)**		(0.0005)**
Student is female	-0.0252	-0.0706	0.0373	-0.0708	0.0342
	(0.0171)	(0.0181)**	(0.0178)*	(0.0181)**	(0.0178)
Student is African American	-0.0781	-0.1013	-0.0790	-0.1023	-0.0777
	(0.0345)*	(0.0370)**	(0.0356)*	(0.0371)**	(0.0356)*
Student is Asian	0.0006	0.0643	-0.0285	0.0637	-0.0309
	(0.0403)	(0.0430)	(0.0421)	(0.0430)	(0.0421)
Student is Hispanic	-0.0231	-0.0196	0.0133	-0.0204	0.0165
	(0.0331)	(0.0355)	(0.0343)	(0.0355)	(0.0343)
Student is other race	-0.0952	-0.4124	0.0691	-0.4121	0.0733
	(0.1520)	(0.1599)**	(0.1497)	(0.1600)*	(0.1494)
Was student an English Learner?	-0.0711	-0.0935	-0.1584	-0.0934	-0.1591
	(0.0214)**	(0.0227)**	(0.0205)**	(0.0227)**	(0.0205)**
Parental education less than high school	0.0009	-0.0036	-0.0349	-0.0035	-0.0331
	(0.0230)	(0.0245)	(0.0243)	(0.0245)	(0.0243)
Average academic GPA	0.0398	0.0365	0.0636	0.0354	0.0609
	(0.0143)**	(0.0148)*	(0.0149)**	(0.0148)*	(0.0149)**
Standardized CST score in ELA	-0.0193	0.0447		0.0451	
	(0.0418)	(0.0415)		(0.0415)	
Standardized CST score in math	0.0185		0.0388		0.0392
	(0.0431)		(0.0403)		(0.0402)

	Passed CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE
Algebra I CST	-0.1047		0.0874		0.0938
	(0.0431)*		(0.0419)*		(0.0419)*
Algebra II CST	-0.0067		0.1611		0.1705
	(0.0527)		(0.0524)**		(0.0524)**
8th/9th-grade math CST	-0.3718		-0.2093		-0.2031
	(0.3018)		(0.2705)		(0.2700)
Geometry CST	-0.0760		0.1265		0.1328
	(0.0398)		(0.0378)**		(0.0378)**
HS math CST	-0.1147		-0.1521		-0.1417
	(0.2162)		(0.1821)		(0.1818)
Integrated math1 CST	-0.0437		0.1368		0.1425
	(0.0685)		(0.0696)*		(0.0695)*
Integrated math2 CST	-0.0589		0.1642		0.1735
	(0.0721)		(0.0746)*		(0.0745)*
Integrated math3 CST	-0.0942		-0.1197		-0.1118
	(0.4245)		(0.4665)		(0.4657)
Lagged CST score in ELA	0.0733	0.0167		0.0161	
	(0.0195)**	(0.0205)		(0.0205)	
Lagged CST score in math	0.0504		0.0023		0.0017
	(0.0193)**		(0.0201)		(0.0201)
Percent of time absent from school	-0.0040	-0.0038	-0.0048	-0.0038	-0.0047
	(0.0014)**	(0.0015)**	(0.0015)**	(0.0015)**	(0.0015)**
School percent Native American	0.0714	0.0388	0.0808	0.0385	0.0783
	(0.0332)*	(0.0352)	(0.0348)*	(0.0352)	(0.0347)*
School percent African American	-0.0017	0.0019	-0.0017	0.0019	-0.0017
	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)
School percent Hispanic	-0.0018	0.0013	-0.0020	0.0014	-0.0020
	(0.0010)	(0.0010)	(0.0010)*	(0.0010)	(0.0010)*
School percent Asian	-0.0002	0.0021	0.0001	0.0021	0.0001
	(0.0010)	(0.0011)*	(0.0010)	(0.0011)*	(0.0010)
School percent Pacific Islander	0.0148	-0.0180	-0.0020	-0.0189	-0.0052
	(0.0147)	(0.0155)	(0.0155)	(0.0156)	(0.0155)
Percent of school on meal assistance	0.0010	-0.0014	0.0009	-0.0014	0.0009
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Student in special education	-0.0496	-0.1327	-0.1498	-0.1331	-0.1493
	(0.0221)*	(0.0230)**	(0.0225)**	(0.0230)**	(0.0224)**
Constant	-3.1881	1.3840	1.3153	1.3772	1.2955
	(0.2421)**	(0.2037)**	(0.1914)**	(0.2039)**	(0.1912)**
Observations	2643	2872	2893	2872	2893
R-squared	0.29	0.06	0.09	0.06	0.09

SOURCE: Author calculation.

NOTE: Standard errors in parentheses.
* = significant at 5 percent
** = significant at 1 percent

TABLE A5
CAHSEE results in 2009 for students taking prep classes using standardized test scores and grade 10 data for descriptions of students and schools

	Passed CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE
Any prep class taken	0.0940				
	(0.0412)*				
ELA prep class taken		0.3086			
		(0.0491)**			
Math prep class taken			0.2045		
			(0.0443)**		
ELA prep class taken during the school day				0.3169	
				(0.0493)**	
ELA prep class taken during the summer				0.0541	
				(0.1225)	
Math prep class taken during the school day					0.2141
					(0.0452)**
Math prep class taken after school					-0.1216
					(0.2068)
Math prep class taken during the summer					0.1049
					(0.1007)
Lagged ELA scaled score in CAHSEE	0.0053	-0.0006		-0.0006	
	(0.0008)**	(0.0007)		(0.0007)	
Lagged math scaled score in CAHSEE	0.0078		0.0005		0.0005
	(0.0009)**		(0.0008)		(0.0008)
Student is female	0.0435	-0.0085	0.0583	-0.0081	0.0594
	(0.0282)	(0.0274)	(0.0270)*	(0.0274)	(0.0270)*
Student is African American	-0.0443	0.1228	-0.1011	0.1220	-0.1004
	(0.0636)	(0.0630)	(0.0592)	(0.0630)	(0.0592)
Student is Asian	-0.0509	-0.0186	0.0214	-0.0186	0.0226
	(0.0756)	(0.0734)	(0.0728)	(0.0733)	(0.0728)
Student is Hispanic	-0.0291	0.0921	-0.0527	0.0913	-0.0512
	(0.0624)	(0.0612)	(0.0580)	(0.0612)	(0.0580)
Student is other race	-0.2375	-0.6559	-0.1412	-0.6621	-0.1448
	(0.3086)	(0.3287)*	(0.3307)	(0.3286)*	(0.3307)
Was student an English Learner?	-0.0626	-0.0113	-0.2062	-0.0112	-0.2058
	(0.0359)	(0.0343)	(0.0317)**	(0.0343)	(0.0318)**
Parental education less than high school	0.0451	0.0687	0.0162	0.0695	0.0171
	(0.0386)	(0.0375)	(0.0374)	(0.0375)	(0.0374)
Average academic GPA	0.0049	0.0649	0.0287	0.0635	0.0287
	(0.0216)	(0.0203)**	(0.0209)	(0.0203)**	(0.0209)
Standardized CST score in ELA	-0.0652	-0.0312		-0.0308	
	(0.0871)	(0.0786)		(0.0786)	
Standardized CST score in math	0.0634		0.0996		0.1033
	(0.0781)		(0.0755)		(0.0756)
Algebra I CST	-0.0063		0.0842		0.0857
	(0.0535)		(0.0511)		(0.0511)

	Passed CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE	Passed ELA CAHSEE	Passed math CAHSEE
Algebra II CST	0.0245		0.0320		0.0351
	(0.0995)		(0.0945)		(0.0945)
8th/9th-grade math CST	-0.0271		0.2205		0.2054
	(0.1310)		(0.1308)		(0.1315)
Geometry CST	0.0607		0.1693		0.1713
	(0.0509)		(0.0482)**		(0.0482)**
HS math CST	0.2641		0.0769		0.0779
	(0.3050)		(0.3294)		(0.3294)
Integrated math1 CST	-0.0436		0.0732		0.0748
	(0.1434)		(0.1304)		(0.1304)
Integrated math2 CST	-0.0636		-0.0700		-0.0704
	(0.1367)		(0.1318)		(0.1319)
Integrated math3 CST	0.0000		0.0000		0.0000
	(0.0000)		(0.0000)		(0.0000)
Lagged CST score in ELA	0.0710	0.1146		0.1148	
	(0.0356)*	(0.0343)**		(0.0343)**	
Lagged CST score in math	0.0444		0.0292		0.0244
	(0.0359)		(0.0343)		(0.0344)
Percent of time absent from school	-0.0020	-0.0025	-0.0041	-0.0026	-0.0040
	(0.0018)	(0.0017)	(0.0018)*	(0.0017)	(0.0018)*
School percent Native American	-0.0380	-0.0729	-0.0515	-0.0741	-0.0545
	(0.0498)	(0.0492)	(0.0484)	(0.0492)	(0.0484)
School percent African American	0.0004	0.0015	-0.0029	0.0014	-0.0028
	(0.0026)	(0.0025)	(0.0025)	(0.0025)	(0.0025)
School percent Hispanic	-0.0008	-0.0014	-0.0027	-0.0015	-0.0028
	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)
School percent Asian	0.0009	0.0003	-0.0023	0.0002	-0.0026
	(0.0017)	(0.0017)	(0.0016)	(0.0017)	(0.0016)
School percent Pacific Islander	0.0048	-0.0164	-0.0075	-0.0165	-0.0095
	(0.0229)	(0.0228)	(0.0228)	(0.0228)	(0.0229)
Percent of school on meal assistance	0.0008	-0.0004	0.0010	-0.0004	0.0011
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Student in special education	0.0299	-0.0763	-0.1548	-0.0762	-0.1562
	(0.0333)	(0.0322)*	(0.0310)**	(0.0322)*	(0.0311)**
Constant	-4.0952	0.4259	0.4222	0.4273	0.4361
	(0.3953)**	(0.3112)	(0.3107)	(0.3111)	(0.3108)
Observations	982	1169	1235	1169	1235
R-squared	0.29	0.11	0.15	0.11	0.15

SOURCE: Author calculation.

NOTE: Standard errors in parentheses.
* = significant at 5 percent
** = significant at 1 percent

TABLE A6
Pooled models of CAHSEE results for students taking prep classes using standardized test scores and grade 10 data for descriptions of students and schools

	Passed ELA section of CAHSEE	Passed math section of CAHSEE	Passed CAHSEE
Any prep class taken			-0.0055
			(0.0131)
ELA prep class taken during the school day	0.1206		
	(0.0168)**		
ELA prep class taken after school	0.1601		
	(0.1425)		
ELA prep class taken during the summer	0.0459		
	(0.0460)		
Math prep class taken during the school day		0.1403	
		(0.0170)**	
Math prep class taken after school		-0.0622	
		(0.0754)	
Math prep class taken during the summer		0.2453	
		(0.0495)**	
Lagged ELA scaled score in CAHSEE	-0.0016		0.0044
	(0.0002)**		(0.0002)**
Student is female	-0.0587	0.0409	-0.0329
	(0.0092)**	(0.0092)**	(0.0090)**
Student is African American	-0.0309	-0.0811	-0.0562
	(0.0184)	(0.0180)**	(0.0176)**
Student is Asian	0.0647	-0.0139	-0.0081
	(0.0215)**	(0.0215)	(0.0207)
Student is Hispanic	0.0012	-0.0118	-0.0257
	(0.0176)	(0.0172)	(0.0167)
Student is other race	-0.2455	0.0080	-0.1138
	(0.0723)**	(0.0690)	(0.0680)
Was student an English Learner?	-0.0578	-0.1395	-0.0564
	(0.0114)**	(0.0104)**	(0.0110)**
Parental education less than high school	0.0212	-0.0203	-0.0198
	(0.0126)	(0.0127)	(0.0115)
Average academic GPA	0.0591	0.0615	0.0421
	(0.0070)**	(0.0072)**	(0.0071)**
Standardized CST score in ELA	0.0246		0.0697
	(0.0117)*		(0.0107)**
Parental education less than high school	0.0108		0.0219
	(0.0105)		(0.0100)*
Percent of time absent from school	-0.0032	-0.0040	-0.0030
	(0.0007)**	(0.0007)**	(0.0007)**
School percent Native American	0.0340	0.0377	0.0499
	(0.0136)*	(0.0137)**	(0.0124)**
School percent African American	0.0012	0.0009	0.0004
	(0.0008)	(0.0008)	(0.0007)
School percent Hispanic	0.0004	-0.0006	-0.0002
	(0.0003)	(0.0003)*	(0.0003)

	Passed ELA section of CAHSEE	Passed math section of CAHSEE	Passed CAHSEE
School percent Asian	0.0010	-0.0002	-0.0002
	(0.0004)*	(0.0004)	(0.0004)
School percent Pacific Islander	-0.0092	-0.0126	-0.0043
	(0.0086)	(0.0086)	(0.0083)
Percent of school on meal assistance	-0.0007	-0.0006	-0.0002
	(0.0003)*	(0.0003)*	(0.0003)
Student in special education	-0.1207	-0.1561	-0.0435
	(0.0116)**	(0.0113)**	(0.0114)**
Lagged math scaled score in CAHSEE		-0.0018	0.0056
		(0.0003)**	(0.0003)**
Standardized CST score in math		0.0135	
		(0.0116)	
Lagged CST score in math		-0.0086	0.0219
		(0.0100)	(0.0100)*
Algebra I CST		0.1045	-0.1835
		(0.0204)**	(0.0871)*
Algebra II CST		0.1161	-0.0144
		(0.0265)**	(0.0875)
8th/9th-grade math CST		0.1423	-0.1216
		(0.1079)	(0.2517)
Geometry CST		0.1729	-0.1138
		(0.0185)**	(0.0866)
HS math CST		-0.1223	-0.0959
		(0.1186)	(0.1162)
Integrated math1 CST		0.1240	0.0056
		(0.0344)**	(0.0878)
Integrated math2 CST		0.1216	-0.0970
		(0.0489)*	(0.0944)
Integrated math3 CST		-0.1435	-0.2403
		(0.4525)	(0.1427)
Constant	0.8066	0.8206	-2.7289
	(0.0941)**	(0.0966)**	(0.1494)**
Observations	9991	10282	9144
R-squared	0.05	0.09	0.29

SOURCE: Author calculation.

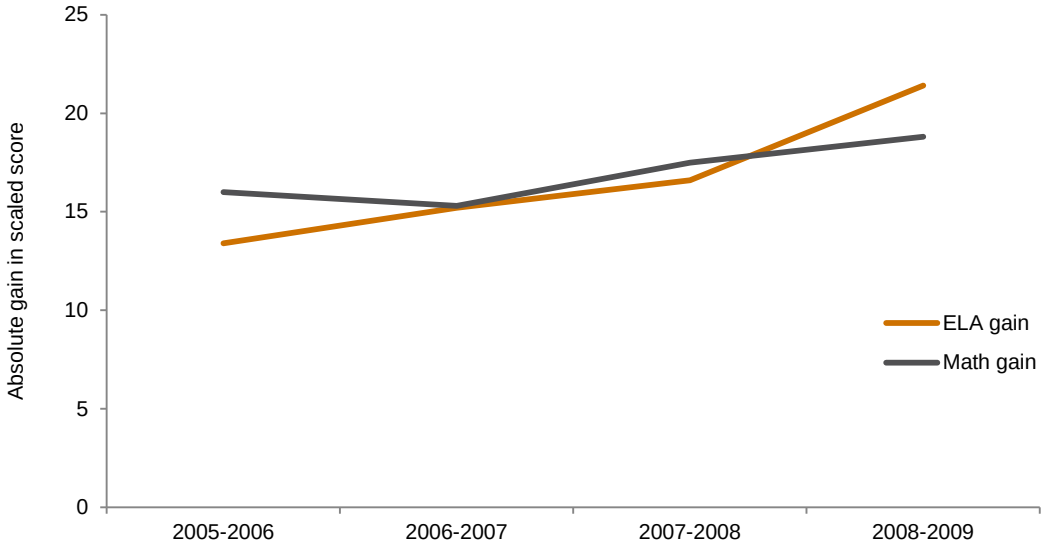
NOTE: Standard errors in parentheses.
* = significant at 5 percent
** = significant at 1 percent

TABLE A7
Summary statistics for prep class regression models

Dependent variables	Mean	SD
Did student pass CAHSEE in 2006	0.149	0.356
Did student pass CAHSEE in 2007	0.298	0.457
Did student pass CAHSEE in 2008	0.502	0.500
Did student pass CAHSEE in 2009	0.540	0.500
Did student pass ELA CAHSEE in 2006	0.169	0.375
Did student pass ELA CAHSEE in 2007	0.189	0.391
Did student pass ELA CAHSEE in 2008	0.167	0.373
Did student pass ELA CAHSEE in 2009	0.048	0.213
Did student pass math CAHSEE in 2006	0.193	0.394
Did student pass math CAHSEE in 2007	0.179	0.383
Did student pass math CAHSEE in 2008	0.165	0.372
Did student pass math CAHSEE in 2009	0.058	0.234
Independent variables	**Mean**	**SD**
Any prep class taken	0.078	0.268
ELA prep class taken	0.045	0.207
Math prep class taken	0.042	0.201
ELA prep class taken during school	0.045	0.207
ELA prep class taken after school	0.000	0.010
ELA prep class taken during summer	0.004	0.060
Math prep class taken during school	0.042	0.200
Math prep class taken after school	0.002	0.050
Math prep class taken during summer	0.002	0.047
Student is female	0.462	0.499
Student is African American	0.200	0.400
Student is Asian	0.104	0.305
Student is Hispanic	0.587	0.492
Student is other race	0.005	0.068
Student was an English Learner	0.412	0.492
Parental education less than high school	0.211	0.408
Average academic GPA	2.14	0.808
Lagged ELA CAHSEE score	337.9	26.1
Lagged math CAHSEE score	337.3	19.8
ELA standardized score on CST	-0.725	.646
Math standardized score on CST	-0.531	0.546
Algebra 1 math subtest taken	0.163	0.369
Algebra 2 math subtest taken	0.063	0.242
Math 8th/9th-grade subtest taken	0.003	0.053
Geometry math subtest taken	0.606	0.489
High school math subtest taken	0.003	0.051
Intermediate math subtest taken	0.023	0.149
Lagged ELA CST score	-0.725	0.646
Lagged math CST score	-0.531	0.546
Percent of time absent from school	6.7	8.7
Percent of school that is Native American	0.444	0.419
Percent of school that is African American	14.359	7.982
Percent of school that is Hispanic	41.525	20.962
Percent of school that is Asian	15.986	14.371
Percent of school that is Pacific Islander	0.742	0.657
Percent of school on meal assistance	53.95	23.28
Student is in special education	0.216	0.412

Finally, Figure A3 below shows the average gain in test scores for all grade 11 students who take a CAHSEE prep course. The gain is calculated as the highest CAHSEE score during the year the prep course was taken minus the highest score from the previous year. The annual gains appear to corroborate the very large increase in the probability of passing the ELA portion of the CAHSEE in 2008-2009 observed in Figure 1. More generally, as discussed in the main text, students who failed the exit exam in grade 10 were on average 17 and 15 points below the passing point. The mean gains of those who took a CAHSEE prep class the next year were close to these levels.

FIGURE A3
Students yet to pass the CAHSEE who enrolled in ELA or math prep classes improved their CAHSEE scores substantially



SOURCE: Author calculation.

NOTES: Figure shows gain in scaled CAHSEE score by year for grade-11 students who failed the given portion of the CAHSEE in grade 10 and who took a prep class in grade 11.

Additional Materials on the Impact of AB 347 Funding

After AB 347 came into effect (for the classes of 2007 and later), can we detect an increase in re-enrollment and CAHSEE passage among those who did not pass the exit exam before the end of grade 12? Tables A8 to A11 extend the calculations from Zau and Betts (2008) for the classes of 2007 to 2009. The tables categorize the outcomes of students by class for the students who made it to 12th grade and had yet to pass CAHSEE. For full disclosure, non-diploma bound students were included in the tables. (The references to students in special education here refer to the subset of students in the TRACE program, who typically remain enrolled in school up to age 22 to gain life skills.) They were, however, not included later in this section using regression analysis to determine whether they re-enrolled and/or passed CAHSEE.

Following the 2006 cohort, there is a noticeable upward trend in re-enrollment especially in the classes of 2008 and 2009. As a percentage of those who still had not passed CAHSEE by the end of their senior year, the classes of 2008 and 2009 did show a higher percentage of students who took the CAHSEE.

Additionally, the pass rate for those who returned and took the test increased quite a lot from 2007 to 2009 compared to 2006.

TABLE A8
Outcomes for students who failed the CAHSEE, class of 2006 by number of students and percentages, two years after students failed to graduate

Student status in grade 12: Number (%)	EL	Special Ed	EL and Special Ed	Neither EL nor Special Ed	All students
Did not come back	175 (95.1)	145 (66.8)	67 (67)	273 (94.8)	660 (83.7)
Did not come back but still passed	6 (3.3)	0 (0)	1 (1)	7 (2.4)	14 (1.8)
Came back and passed	0 (0)	2 (0.9)	1 (1)	0 (0)	1 (0.13)
Came back, took test and failed	3 (1.6)	0 (0)	2 (2)	3 (1.0)	10 (1.3)
Came back, did not take test	0 (0)	70 (32.3)	29 (29)	5 (1.7)	104 (13.2)
Total	184	217	100	288	789

TABLE A9
Outcomes for students who failed the CAHSEE, class of 2007 by number of students and percentages, two years after students failed to graduate

Student status in grade 12: Number (%)	EL	Special Ed	EL and Special Ed	Neither EL nor Special Ed	All students
Did not come back	164 (80.4)	121 (56.3)	70 (72.9)	147 (72.4)	502 (70.0)
Did not come back but still passed	6 (2.9)	0 (0)	0 (0)	8 (3.9)	14 (2.0)
Came back and passed	11 (5.4)	6 (2.8)	1 (1.0)	13 (6.4)	31 (4.3)
Came back, took test and failed	10 (4.9)	5 (2.3)	1 (1.0)	10 (4.9)	26 (3.6)
Came back, did not take test	13 (6.4)	83 (38.6)	24 (25)	25 (12.3)	145 (20.2)
Total	204	215	96	203	718

TABLE A10
Outcomes for students who failed the CAHSEE, class of 2008 by number of students and percentages, two years after students failed to graduate

Student status in grade 12: Number (%)	EL	Special Ed	EL and Special Ed	Neither EL nor Special Ed	All students
Did not come back	120 (57.7)	66 (33.5)	32 (30.2)	84 (67.2)	302 (47.5)
Did not come back but still passed	13 (6.3)	0 (0)	0 (0)	3 (2.4)	16 (2.5)
Came back and passed	17 (8.2)	7 (3.6)	1 (0.9)	7 (5.6)	32 (5.0)
Came back, took test and failed	26 (12.5)	1 (0.5)	9 (8.5)	8 (6.4)	44 (6.9)
Came back, did not take test	32 (15.4)	123 (62.4)	64 (60.4)	23 (18.4)	242 (38.0)
Total	208	197	106	125	636

TABLE A11
Outcomes for students who failed the CAHSEE, class of 2009 by number of students and percentages, two years after students failed to graduate

Student status in grade 12: Number (%)	EL	Special Ed	EL and Special Ed	Neither EL nor Special Ed	All students
Did not come back	98 (63.2)	49 (33.6)	37 (33.9)	66 (68.8)	250 (49.4)
Did not come back but still passed	2 (1.3)	1 (0.68)	0 (0)	4 (4.2)	7 (1.4)
Came back and passed	16 (10.3)	1 (0.68)	2 (1.8)	6 (6.3)	25 (4.9)
Came back, took test and failed	19 (12.3)	8 (5.5)	4 (3.7)	7 (7.3)	38 (7.5)
Came back, did not take test	20 (12.9)	87 (59.6)	66 (60.6)	13 (13.5)	186 (36.8)
Total	155	146	109	96	506

The top panel of Table A12 shows the regression results referred to in the main text. They do not include the TRACE students who were non-diploma bound. The bottom panel provides a robustness test by dropping the classes of 2008 and 2009, which might have been particularly affected by the weakening California labor market for youth without high school diplomas in 2008 and 2009. We thus compare outcomes for the classes of 2006 and 2007, only the latter of which received AB 347 funding. The results are similar whether we drop the later classes, but the estimated effects are somewhat muted in the subsample, especially for passage of CAHSEE within one year of finishing grade 12. Overall, the full sample suggests that AB 347 increased the probability of passing the CAHSEE within two years by 8.3 percent, while the restricted sample suggests a 6.4 percent increase.

TABLE A12
AB 347 regression results using only seniors who failed to graduate, excluding TRACE students, including students in the classes of 2006–2009 and separately including only the classes of 2006–2007, and conditioning on grade-10 characteristics

	Passed CAHSEE 1 year after	Passed CAHSEE within 2 years	Re-enrolled 1 year after	Re-enrolled within 2 years
Classes of 2006 to 2008				
AB 347	0.0578	0.0828	0.2178	0.2434
	(0.0171)**	(0.0194)**	(0.0274)**	(0.0290)**
Observations	1997	1648	1997	1997
R-squared	0.12	0.12	0.18	0.17
Classes of 2006 and 2007 only				
AB 347	0.0372	0.0642	0.1335	0.1510
	(0.0170)*	(0.0201)**	(0.0250)**	(0.0276)**
Observations	1211	1211	1211	1211
R-squared	0.11	0.12	0.19	0.18

NOTE: The indicator variable for the classes of 2007 to 2009 is our dummy variable capturing whether students were in a cohort to whom AB 347 applied. Other regressors included: indicators for having not yet passed the mathematics portion of the exit exam or the ELA portion, indicators for female, African American, Asian, Hispanic, other race, English Learner, special education, parental education less than high school diploma; GPA, mathematics and ELA CST scores in grade 11 and lagged CST scores from prior grade, controls for type of mathematics CST test taken, percentage of days absent, school percentage of students who are in each of the above racial/ethnic groups, percentage eligible for free lunch, percentage EL, and indicators for missing test scores and other variables.

Table A13 shows descriptive statistics for the subsample of students who fail to pass the CAHSEE by the end of grade 12.

TABLE A13
Summary statistics for AB 347 regression models

Dependent variables	Mean	SD
Passed CAHSEE 1 year after	0.055	0.228
Passed CAHSEE 2 years after	0.064	0.245
Re-enrolled 1 year after	0.173	0.378
Re-enrolled 2 years after	0.197	0.398
Independent variables	**Mean**	**SD**
AB 347 classes of 2007 to 2009	0.663	0.473
Student is female	0.470	0.499
Student is African American	0.235	0.424
Student is Asian	0.111	0.314
Student is Hispanic	0.550	0.498
Student is other race	0.009	0.090
Student was an English Learner	0.468	0.499
Parental education less than high school	0.181	0.385
Average academic GPA	2.13	0.87
ELA standardized score on CST	-0.688	0.683
Math standardized score on CST	-0.408	0.547
Algebra 1 math subtest taken	0.157	0.364
Algebra 2 math subtest taken	0.058	0.234
Math 8th/9th-grade subtest taken	0.005	0.067
Geometry math subtest taken	0.486	0.500
High school math subtest taken	0.007	0.080
Intermediate math subtest taken	0.042	0.199
Lagged ELA CST score	-0.800	0.676
Lagged math CST score	-0.529	0.556
Percent of time absent from school	6.97	8.75
Percent of school that is Native American	0.439	0.554
Percent of school that is African American	15.098	9.155
Percent of school that is Hispanic	40.652	21.583
Percent of school that is Asian	15.762	14.589
Percent of school that is Pacific Islander	0.790	0.724
Percent of school on meal assistance	52.552	24.206
Student is in special education	0.288	0.453

NOTE: Student observations included in this sample for years after student was first enrolled in grade 12 and failed to have completed the CAHSEE before the end of grade 12.

Importantly, the uptick in re-enrollment and CAHSEE passage rates shown in Figures 3 through 5 in the report occurs in years that coincide with the recent severe recession. It is entirely possible that students had difficulty finding jobs during that time and decided to go back to school to complete their education.[2] Thus we cannot claim with any certainty that AB 347 brought these students back to school after they failed to graduate.

[2] Although we know of no study that tests whether non-graduates return to high school in greater numbers during recessions, Betts and McFarland (1995) show, using national data, that community college enrollments rise sharply in recessions, buttressing our argument that when young adults find weak labor market prospects they are more likely to invest their time in further education.

Table A14 shows labor force participation rates (the fraction of people employed or actively seeking work) and unemployment rates for young California residents who had not completed a high school degree in recent years. There is a notable decline in labor force participation and a spike in the unemployment rate of young non-graduates. However, upon closer inspection, we see that the largest deterioration in the labor market occurred in 2008, with roughly comparable labor market conditions in 2006 and 2007. Because we see a large surge in re-enrollment among non-graduates from spring 2007 relative to those in spring 2006, we infer that it is unlikely that the recession can account for the entirety of the uptick in re-enrollment and CAHSEE passage post-grade-12 for this population.

TABLE A14
Labor market outcomes for U.S.-born 17- to 19-year-old California residents, not in school, not high school graduates (highest completed grade is 10 through 12, no diploma or GED)

Year	Percent in the labor force	Percent unemployed (of those in the labor force)
2004	63.9%	32.7%
2005	64.2%	32.1%
2006	54.6%	38.8%
2007	55.3%	38.0%
2008	52.4%	43.1%
2009	50.0%	49.6%
2010	51.7%	46.4%

Source: ACS pums data, accessed via IPUM
Courtesy of Hans Johnson, PPIC

Appendix B: Forecasting Success on the CAHSEE

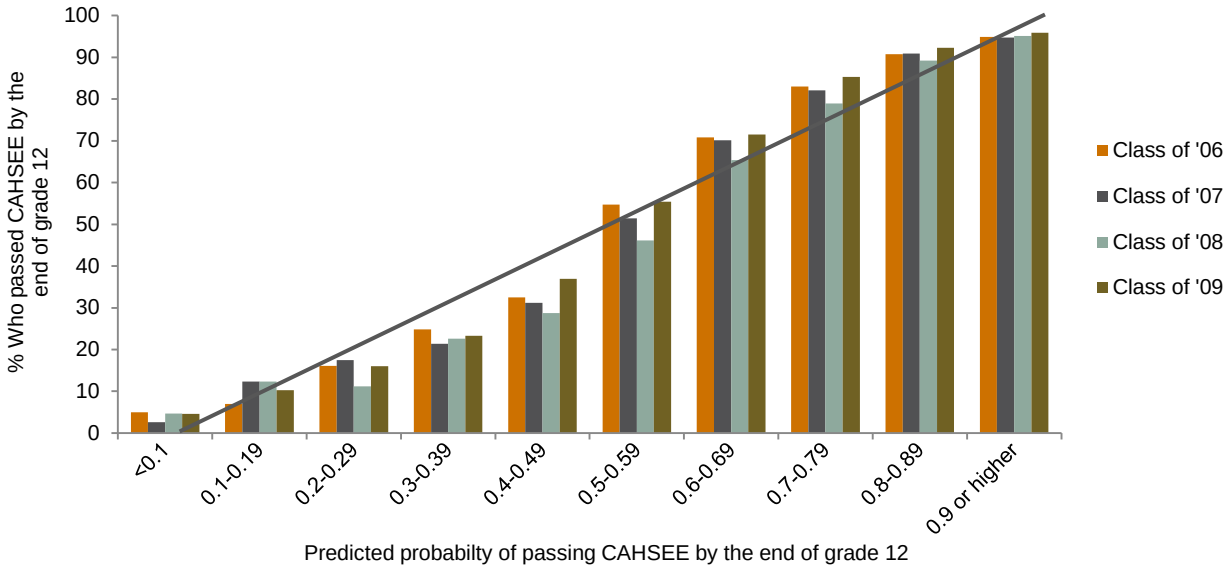
Details on the Out-of-Sample Predictions from the Zau and Betts Models

The main text describes our analysis of how well one can predict passage of the exit exam by the end of grade 10 or the end of grade 12, based on grade-9 student characteristics (Table A1 of the technical appendix of Zau and Betts [2008]). By gathering data on the grade-9 characteristics of later cohorts we were able to predict the probability that each student in the later cohorts would pass the CAHSEE.

We conducted the same exercise for estimating CAHSEE pass rates by the end of grade 12. We use the Zau and Betts model based on the graduating class of 2006 to estimate predicted probabilities of passing the CAHSEE for the graduating classes of 2007, 2008, and 2009.

Figure B1 shows the out-of-sample fit of the Zau and Betts model of passage by grade 12 when applied to the classes of 2007 through 2009. Within each predicted probability group, there are some small variations in the percentage of students who passed the CAHSEE across cohorts. For example, in the predicted probability ranges summarizing outcomes for students with predicted probabilities of 0.4 up to 0.59, the class of 2008 has slightly fewer students who pass the CAHSEE than earlier and later cohorts, but the differences are minor.

FIGURE B1
Out of sample predictive ability of the Zau and Betts model of the probability of passing the CAHSEE in grade 12 based on the class of 2006, applied to later classes



SOURCE: Author calculations.

NOTE: Based on student data available in grade 9.

Further inspection shows that when estimating the probability of passing the CAHSEE by the end of grade 12, the model tends to overestimate the probability of passing in the lower portion of the distribution, i.e. students classified in bins with predicted probability between 20 and 59 percent tend to perform slightly worse than the model suggests. Overall, though, our model performs very well, as signified by a close fit with the 45-degree line.

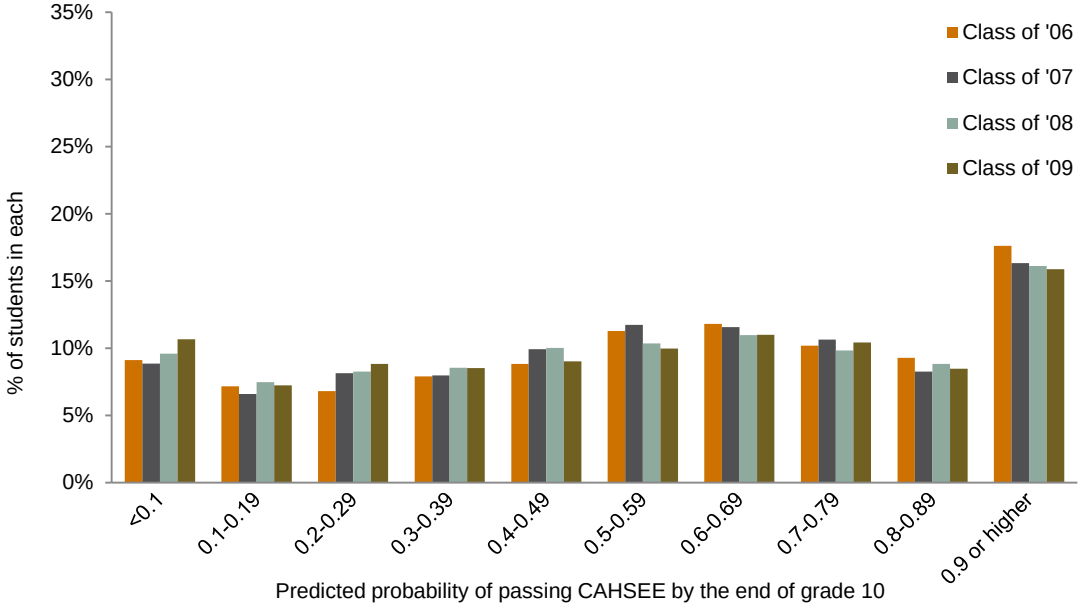
One concern in comparing Figure B1 to the corresponding figure for grade-10 predictions (Figure 8 in the main text) is that some students leave the district between grades 10 and 12, so that this may contribute to the (fairly small) differences we see in the two figures. We redrew Figure 8 after we limited the sample to grade-10 students who also

persisted to grade 12, and the figure did not change markedly. We do not include the new figure here so as to conserve space. The biggest changes were that the underprediction of the actual percent passing in the predicted probability ranges 0.1–0.19 through 0.3–0.39 shown in Figure 8 becomes less severe especially for the class of 2008.

The two panels in Figure B2 show how students were distributed across the ten groups of predicted probability of passing the CAHSEE by grade 10 as well as by the end of grade 12. This is useful information because it gives policymakers some sense of how many students they would be assisting if they decided to, for example, provide tutoring to students whose predicted probability of passing the CAHSEE in grade 10 was 0.3 or lower. (Table B1 shows the percentages underlying these two figures.)

FIGURE B2

Panel A: Distribution of students across predicted probabilities of passing CAHSEE by the end of grade 10



Panel B: Distribution of students across predicted probabilities of passing CAHSEE by the end of grade 12

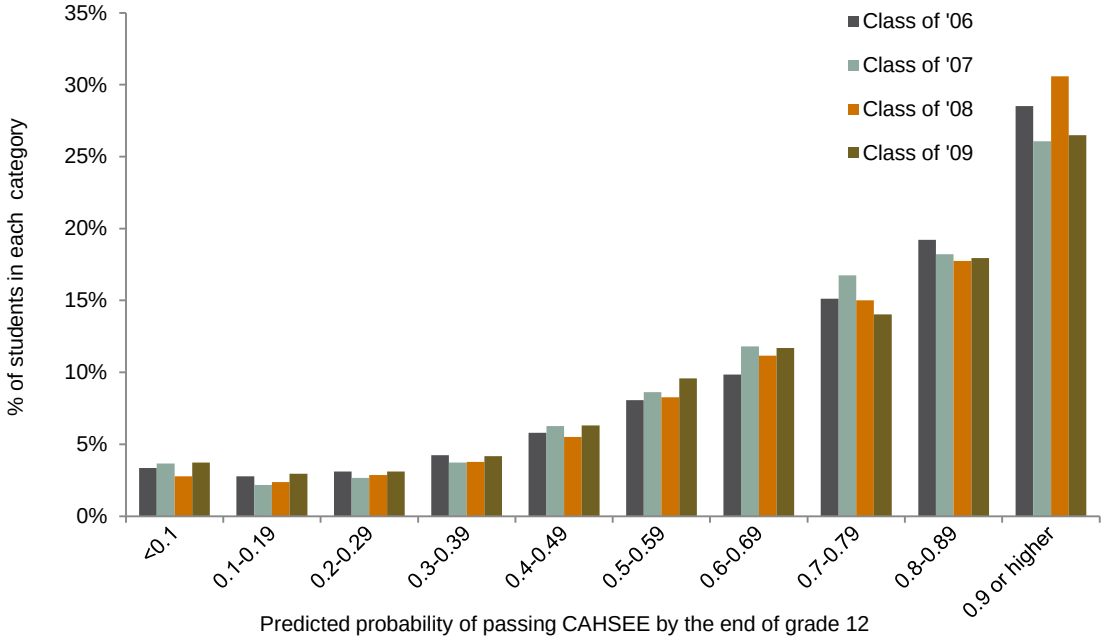


Figure B2 reveals that there are significant differences between the distributions of students when we compare the predicted probabilities of passing the CAHSEE by the end of grade 10 and by the end of grade 12. The student population is relatively evenly distributed across categories in estimation of passage rates by the end of grade 10, although there is a large mass of the student population with a predicted probability of passing the CAHSEE above 90 percent (between 15.9 and 17.6% of the student population, depending on the cohort). In comparison most of the mass in distribution of students across predicted probabilities of passing the CAHSEE by the end of grade 12 is concentrated in the top three categories of the predicted probability (between 58.5 and 63.3% of students, depending on the cohort). The shift in the distribution is consistent with the notion that, given additional time in school, most students will meet the standards being tested in the exit examination. In grade 10, a larger fraction of students find passing the test to be a challenge but, due to the fact that students have multiple opportunities to take the exam and extra time in grades 11 and 12 to improve their skills, a large fraction of students who might have initially failed the test pass it by the end of grade 12, shifting the distribution to the right.

The two panels in Figure B2 also show that the distribution of students in each category is stable across the graduating classes used to obtain out-of-sample predictions.

If we combine the information contained in Figures 8, B1, and B2 we can see that, although the model tends to assign higher predicted probabilities of passing the exam to students in the lower half of the predicted probability scale than we observe in practice, this problem affects a relatively small fraction of students. Approximately 24 percent of the student population in the model of probability of passing by the end of grade 10 falls into the categories where we tend to over-estimate the probability of passing, while only about 13 percent of students fall into the categories where our model over-predicts in estimation of the probability of passing the CAHSEE by the end of grade 12.

Empirically, more than 90 percent of students manage to pass the CAHSEE by the end of grade 12. Our model on average assigns 81 percent of students to have a probability higher than 50 percent of passing the CAHSEE by the end of grade 12. This suggests that the model performs well at identifying students at risk of failing the exam. Conversely, it suggests that if administrators wanted to assist at-risk students in a targeted way, it could do so quite easily, for instance by identifying students with a predicted probability of passing the CAHSEE by grade 12 of below 0.5. This would on average identify about 19 percent of students.

Table B1 shows the numbers underlying Figure 8.

TABLE B1
The distribution of students across the predicted probabilities of passing the CAHSEE by the end of grade 10 and grade 12, by cohort, using the Zau and Betts models for the class of 2006

Grade 10	Class of '06	Class of '07	Class of '08	Class of '09
<0.1	9.11%	8.86%	9.60%	10.67%
0.1-0.19	7.16%	6.59%	7.47%	7.22%
0.2-0.29	6.80%	8.13%	8.26%	8.83%
0.3-0.39	7.89%	7.96%	8.54%	8.51%
0.4-0.49	8.83%	9.93%	10.01%	9.02%
0.5-0.59	11.30%	11.73%	10.34%	9.96%
0.6-0.59	11.81%	11.56%	10.97%	11.01%
0.7-0.79	10.19%	10.65%	9.83%	10.43%
0.8-0.89	9.29%	8.25%	8.84%	8.47%
0.9 or higher	17.61%	16.32%	16.12%	15.88%

Grade 12				
<0.1	3.35%	3.67%	2.76%	3.72%
0.1-0.19	2.78%	2.16%	2.36%	2.95%
0.2-0.29	3.10%	2.67%	2.85%	3.11%
0.3-0.39	4.23%	3.74%	3.76%	4.18%
0.4-0.49	5.79%	6.27%	5.51%	6.30%
0.5-0.59	8.06%	8.64%	8.27%	9.58%
0.6-0.59	9.86%	11.81%	11.15%	11.69%
0.7-0.79	15.11%	16.75%	15.00%	14.04%
0.8-0.89	19.22%	18.22%	17.74%	17.94%
0.9 or higher	28.51%	26.08%	30.58%	26.49%

NOTE: Regression model used grade 9 student characteristics.

Information about the Grade-2 and Grade-3 Models of High School Exit Exam Passage

We extended the Zau and Betts (2008) analysis by going even earlier in students' educational histories, estimating linear probability models of the probability that students would pass the CAHSEE by grade 10 and grade 12. In one set of models we used information about the student from grade 2, and in a second set of models we used information available from grade 3. Table B2 shows the regression results.

TABLE B2
Coefficients from linear probability models of the probability of CAHSEE passage by the end of grades 10 and 12, based on student information available in grades 2 and 3

CAHSEE Passage by end of:	Grade 10	Grade 12	Grade 10	Grade 12
Student characteristics as of:	Grade 2	Grade 2	Grade 3	Grade 3
Female	0.0032	-0.0086	-0.0099	0.0075
	(0.0109)	(0.0105)	(0.0106)	(0.0103)
African American	-0.0964***	-0.0662***	-0.0614***	-0.0368**
	(0.0198)	(0.0195)	(0.0186)	(0.0186)
Asian	0.0723***	0.0089	0.0909***	0.0750***
	(0.0184)	(0.0173)	(0.0175)	(0.0165)
Hispanic	-0.0538***	-0.0123	-0.0471***	0.0022
	(0.0177)	(0.0163)	(0.0169)	(0.0161)
Other race	-0.0401	-0.0063	-0.0176	-0.042
	(0.0669)	(0.0615)	(0.0640)	(0.0627)
English Learner	-0.0742***	-0.0112	-0.0126	0.0331**
	(0.0150)	(0.0142)	(0.0146)	(0.0137)
Grade point average (GPA)	0.1709***	0.1139***	0.1814***	0.1179***
	(0.0102)	(0.0100)	(0.0094)	(0.0093)
Behavioral GPA	0.0527***	0.0662***	0.0517***	0.0538***
	(0.0084)	(0.0085)	(0.0084)	(0.0084)
Percent of time absent from school	-0.0071***	-0.0094***	-0.0068***	-0.0091***
	(0.0012)	(0.0012)	(0.0013)	(0.0013)
School percent Native American	0.0055	0.0023	0.0062	0.0087
	(0.0073)	(0.0067)	(0.0069)	(0.0064)

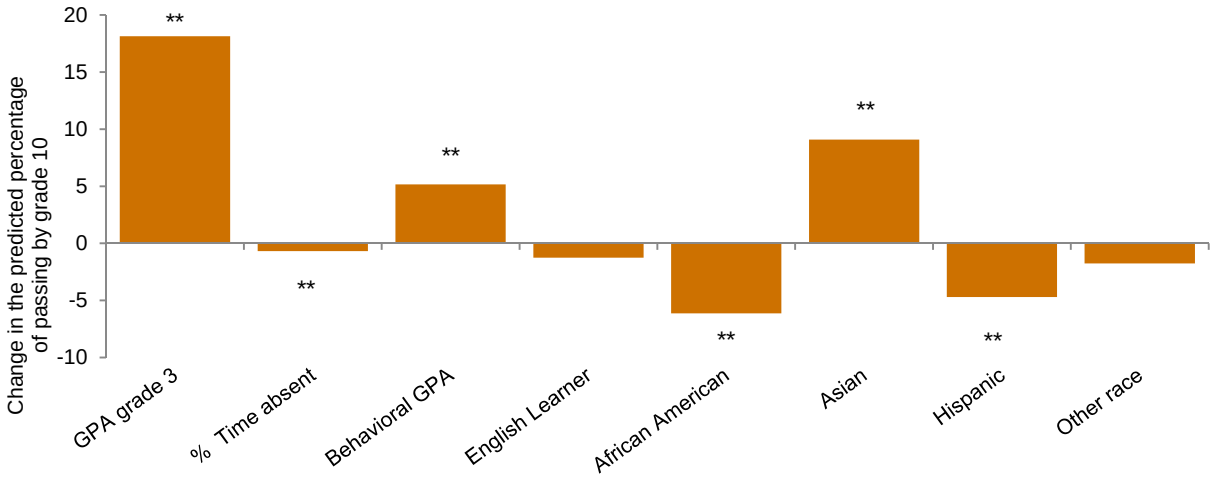
CAHSEE Passage by end of:	Grade 10	Grade 12	Grade 10	Grade 12
School percent African American	-0.0031***	-0.0021***	0.0002	0.0011*
	(0.0007)	(0.0007)	(0.0007)	(0.0007)
School percent Hispanic	-0.0027***	-0.0017**	0.0006	0.0011
	(0.0007)	(0.0007)	(0.0007)	(0.0007)
School percent Asian	-0.0013**	-0.0010**	0.0001	0
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
School percent Pacific Islander	-0.0094	-0.0076	0.0035	-0.0016
	(0.0089)	(0.0089)	(0.0087)	(0.0084)
Percent of school on meal assistance	-0.0003	-0.0006	-0.0025***	-0.0024***
	(0.0006)	(0.0005)	(0.0005)	(0.0005)
Observations	7125	7125	7642	7642
R-squared	0.223	0.15	0.199	0.125

NOTES: Robust standard errors in parentheses. Other regressors not shown are a constant, and dummy variables set to 1 if GPA or behavioral GPA were missing. (In such cases we set the corresponding GPA variable to 0.)
* = significant at 10 percent
** = significant at 5 percent
*** = significant at 1 percent

In the main text we elected not to discuss the coefficients on the school demographic makeup. Some of these variables are statistically significant, mostly in the models that use grade-2 information, but they are not significant in the models that use grade-3 information, suggesting a lack of robustness.

Figures B3 and B4 below show the estimated effects of student characteristics as measured in grade 3 on outcomes on the exit exam by the end of grade 10 and grade 12 respectively. These figures correspond to the results from the model that used grade-2 data, as shown in Figures 9a and 9b of the main text.

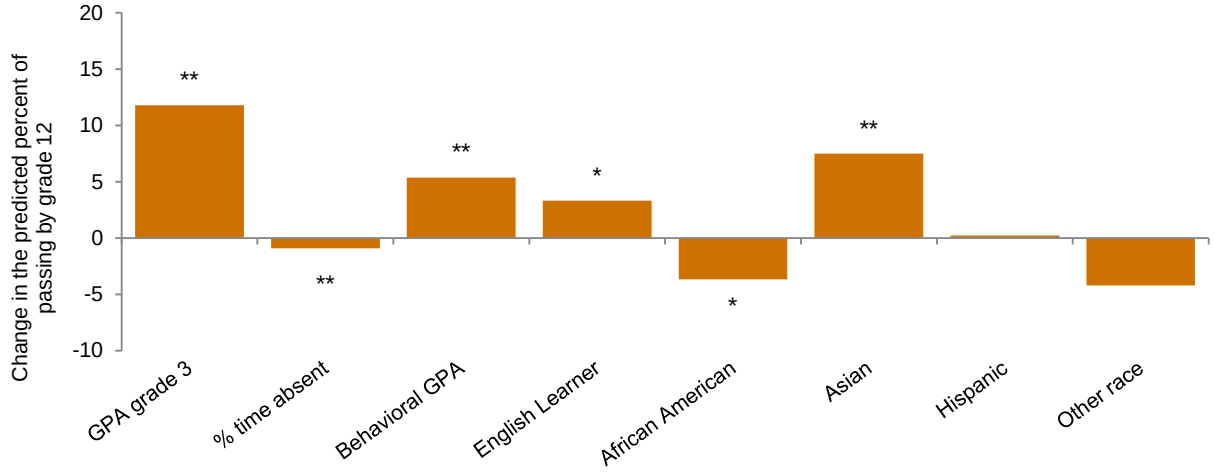
FIGURE B3
Predictors of CAHSEE passage by the end of grade 10, based on grade-3 data, for the class of 2008



SOURCE: Author calculation.

NOTES: Behavioral GPA is a variable we constructed, ranging from 0 to 4, that averages teacher comments on the report card about whether the student begins promptly, follows directions, exercises self-discipline, and exhibits good overall classroom behavior. The bars for academic GPA and behavioral GPA show the predicted effect of a one-point increase in the given type of GPA, while the percentage-of-time-absent bar shows the predicted effect of a five-percentage-point increase in time absent. The five bars at the right of the figure show the predicted effects of being a student who is an English Learner or a member of a given racial/ethnic group, relative to a white student who is not an English Learner.
* = significant at 5 percent
** = significant at 1 percent

FIGURE B4
Predictors of CAHSEE passage by the end of grade 12, based on grade-3 data, for the class of 2008



Source: Author calculation.

Notes: Behavioral GPA is a variable we constructed, ranging from 0 to 4, that averages teacher comments on the report card about whether the student begins promptly, follows directions, exercises self-discipline, and exhibits good overall classroom behavior. The bars for academic GPA and behavioral GPA show the predicted effect of a one-point increase in the given type of GPA, while the percentage-of-time-absent bar shows the predicted effect of a five-percentage-point increase in time absent. The five bars at the right of the figure show the predicted effects of being a student who is an English Learner or a member of a given racial/ethnic group, relative to a white student who is not an English Learner.
* = significant at 5 percent
** = significant at 1 percent

A notable difference between the grade-2 and -3 models is that the model of success on the CAHSEE by the end of grade 10 using grade-2 data suggests that being an English Learner in grade 2 is correlated with a 7.4 percent lower probability of passing the CAHSEE. We do not find a statistically significant effect of being an English Learner in grade 3. Moreover, in the model of passage by the end of grade 12, English Learners (as of grade 3) appear to have a weak advantage over otherwise similar grade 3 students who are not English Learners. The grade-3 models also differ in that the significant Asian-white gap in the probability of passing the exit exam in grade 10 persists when we model the probability of passing by the end of grade 12.

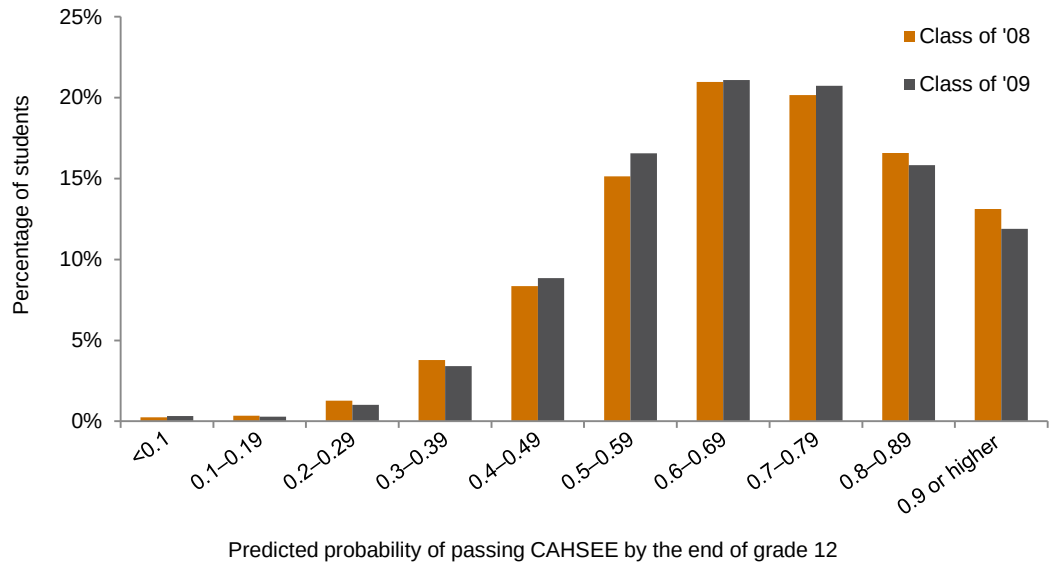
Apart from that we find quite similar results from the grade-2 and -3 models. In particular, the pattern of academic performance decreasing in importance and the behavioral traits gaining (slightly) in importance when we move from the grade-10 to the grade-12 model is apparent in both the grade-2 and grade-3 models.

Figure B5 presents the distribution of students in the graduating classes of 2008 and 2009 across the predicted probability categories for the model of passing the CAHSEE by the end of grade 12. In both cohorts, only 14 percent of students have predicted probability of passing by the end of grade 12 below 50 percent. Thus, the model provides a relatively small pool of students who require early attention, at least based on the 50 percent probability cutoff. The data suggest that the grade 2 model is capable of allowing educators to target early assistance to a fairly small group of students who are indeed very much at risk.

Figure B5 provides some indication about the percentage of the population that would potentially benefit from early detection and support. In order to provide a full picture of the tradeoff between early detection and loss of precision, we provide Figure B6. This figure compares the performance of model predictions for the graduating class of 2008, of the passage rate by the end of grade 10 using data for the students available either for grade 9, grade 3, or grade 2. The figure suggests that the models perform comparably across

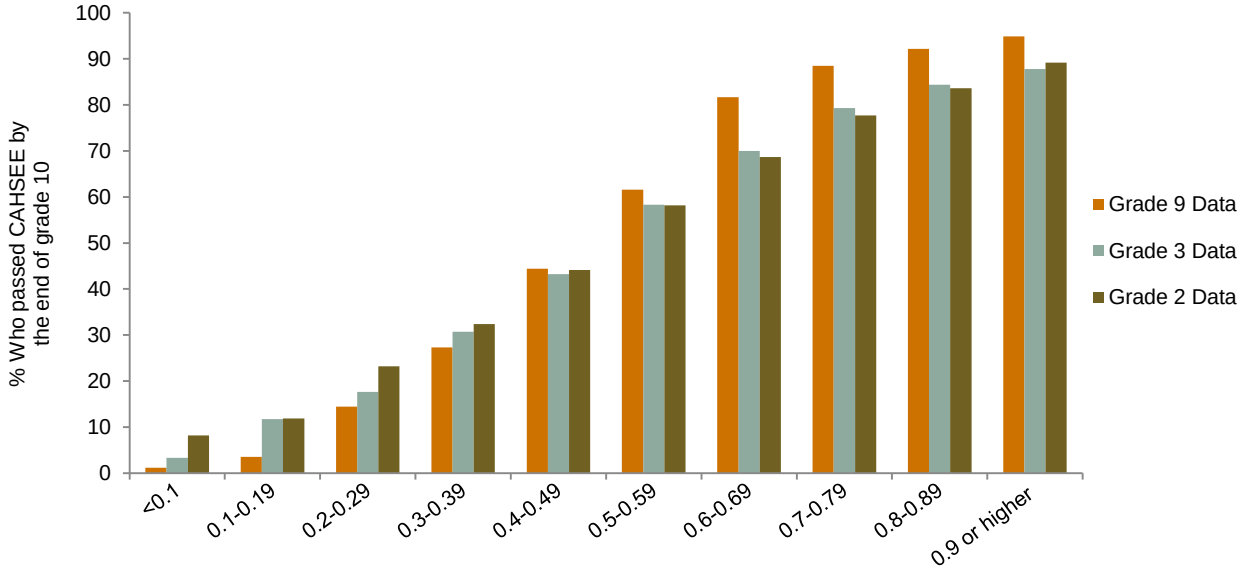
different grade level data. In particular, all of the models are very consistent in the lower tail of the probability of passage. This observation suggests that the models behave consistently even if we move as far into the student's past as grade 2.

FIGURE B5
Distribution of students across predicted probabilities for CAHSEE passage by the end of grade 12, grade-2 data



SOURCE: Author calculations.

FIGURE B6
Actual versus predicted probabilities of passing the CAHSEE by the end of grade 10, for the class of 2008, based on models using student data from three different grades



SOURCE: Author calculations.

Comparing Models with the Full Set of Explanatory Variables and Models That Use Only Test Scores

In this section we provide more details on the relative predictive power of models that use the full set of regressors in Zau and Betts (2008) and much simpler models that use only CST test scores from the given grade. The purpose of this comparison is to gauge whether the many explanatory variables in the Zau and Betts (2008) models actually explain much more than we could do with test scores alone.

Table B3 shows the R^2 from a series of models, each estimated using student data as observed in a given grade, where the dependent variable we are modeling is either the probability of passing the CAHSEE in grade 10 (top panel) or by the end of grade 12 (bottom panel). The R^2 is the proportion of the variation across students that is explained by the model. Examining the top panel of the table, we see that models in the lowest grades that use only test scores explain almost as much of the variance as the full models. For instance, the grade-4 models with and without the full set of variables have R^2 values of about 0.301 and 0.276 respectively, so the full model performs about 9 percent better than the simplified model. However, as we move to models that use data from higher grades, the full model performs better and better relative to a model with test scores only. For example, a model of grade 10 passage that uses grade-8 data produces R^2 values of about 0.41 and 0.35 for the full and simplified models. Thus, the more complex model explains about an extra sixth of the variation in actual outcomes.

As noted in the main text, we conclude that the Zau and Betts model is more powerful than simply using test scores, but this is much more the case in the later grades. The reasons for the difference across grades is that demographic variables such as English Learner status are much more predictive in the later grades.

The CAHSEE Early Warning Model, provided as an accompaniment to this report, strikes a balance between these two extremes, adding to test scores GPA, the percent of days absent, and basic demographic variables that any district should have readily at hand.

TABLE B3
Comparison of the R^2 from grade-specific models of the probability of passing the CAHSEE in grade 10 or by the end of grade 12, using a full set of explanatory variables versus and using only CST test scores as explanatory variables

	Grade level					
	4	5	6	7	8	9
Passed grade 10						
Full model	0.3008	0.3288	0.362	0.3691	0.408	0.4126
Test scores	0.2759	0.2991	0.3374	0.3403	0.3494	0.3393
Passed ever						
Full model	0.1523	0.2464	0.2926	0.2567	0.3425	0.3271
Test scores	0.1306	0.2078	0.2612	0.2239	0.2053	0.1912

NOTE: Grade level refers to the grade from which student data were gathered for use as explanatory variables.

Appendix C: Background Information on the Implementation of the Exit Exam, and a Summary of Policy Research Findings to Date

This appendix provides additional background information on the early history and implementation of the CAHSEE and student supports, and on research findings to date.

More Background on the CAHSEE

The currently used exit exam is not the original version introduced in California. Initially, the CAHSEE requirement took effect with the class of 2004, and students in that graduating class took the exam for the first time in spring 2001. In summer 2003, when it became clear that a large number of students in the class of 2004 had yet to pass, the state board of education suspended the CAHSEE requirement for the class of 2004. At that time, students in the class of 2006 were informed that they would be the first class for which passage of CAHSEE would become a requirement for graduation.

Meanwhile the state made two principal changes to the exam. First, the English Language Arts (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 mathematics portion of the CAHSEE was revised and simplified, such that student pass rates on the mathematics portion rose significantly in the new version, and more closely matched the passing rate on the ELA portion.

Opposition to the CAHSEE came from several quarters.

In early 2006, plaintiffs in *Valenzuela v. O'Connell* argued that California could not apply the CAHSEE requirement to all students because some students had not been taught all of the relevant material, and because some students' teachers were not appropriately credentialed. In May 2006, the judge ruled in favor of the plaintiffs and later extended this judgment to all of the seniors statewide who had yet to pass the CAHSEE (about 11%). The California Department of Education appealed the court's decision and won a stay, so that the class of 2006 remained 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.[3]

The fate of special education students created a second flashpoint in the exit exam debate. In 2006, under Senate Bill 517, school districts were permitted to use a local waiver process to grant students with disabilities an exemption from the CAHSEE requirement, under certain conditions.[4] This exemption applied to the class of 2006 only.

[3] See letter from State Superintendent Jack O'Connell regarding *Valenzuela v. O'Connell* settlement (www.cde.ca.gov/ta/tg/hs/implement347.asp).
[4] SB 517 exempted students with disabilities from the CAHSEE requirement if their Individualized Education Plans (IEPs) or Section 504 Plans state that they are scheduled to receive a high school diploma in 2006, they have satisfied all other state and local requirements for the receipt of a diploma, they have attempted to pass the CAHSEE at least twice after grade 10 with the accommodations or modifications specified in their IEPs or 504 Plans, and they have taken the CAHSEE at least once after receiving remedial or supplemental instruction when taking the CAHSEE. See School Services of California, Inc. "Fiscal Report," February 3, 2006 (www.sscal.com/fiscal/2006Feb/0203hsee.htm).

As detailed in Zau and Betts (2008), chapter 2, between 2005 and 2007 a number of bills with similar intent were passed by the legislature, only to be vetoed by Governor Schwarzenegger. See O'Connell (2005), Sanders (2007), and California Department of Education (2008).

Then in July 2009, Assembly Bill 2 of the Fourth Extraordinary Session (ABX4 2) exempted special education students with Individualized Education Programs (IEPs) or Section 504 Plans from the CAHSEE requirement, provided that they had satisfied all other state and local requirements to receive a high school diploma, beginning with the class of 2010.[5]

After the introduction of the revamped exit examination, several support services for students were mandated by the state. The main text summarizes the relevant legislation (AB 128, AB 347, and AB 1802). Below we expand on the descriptions of these reforms in the main text, and provide some additional insights on how these bills translated into services for students.

Assembly Bill 128

In September 2005, the California Legislature passed Assembly Bill 128 (AB 128), which revised the California Budget Act of 2005 to earmark $20 million in state funds to provide "intensive instruction and services" for students in the class of 2006 who had yet to pass both parts of the CAHSEE. The types of instruction and services allowed under AB 128 included individual or small group instruction, the hiring of additional teachers, purchasing, scoring, and reviewing diagnostic assessments, counseling, designing instruction to meet specific needs of eligible pupils, and appropriate teacher training to meet the needs of eligible pupils. In order to qualify for the $600 per eligible student legislated by AB 128, districts across the state were required to assure that:

- each student would receive an appropriate diagnostic assessment and that instruction and services would be based on the results of that assessment;
- funds would be used to supplement, not supplant, existing services;
- they would provide an accounting of the number of eligible students at each high school in the district; and
- they would submit an annual report describing the number of students served, the types of services provided, and the percentage of students who ultimately passed the CAHSEE.[6]

During the 2005–06 academic year, SDUSD received $509,400 under AB 128, which allowed the district to provide support services to nearly 1,500 eligible students (about 11% of the students in the class of 2006).[7]

In 2006, AB 1811 authorized $69.6 million to extend AB 128 support services to eligible students in grade 11. Funding allocations were made to districts based first on the number of eligible grade-12 students ($500 per eligible student in the class of 2007); the remaining funds were distributed based on the number of eligible grade-11 students (the class of 2008).[8] During the 2006–07 academic year, SDUSD served approximately 3,200 grade-11 students and 1,700 grade-12 students with the $1.1 million received as a result of AB 1811. SDUSD's AB 128 funding and student service levels remained stable (approximately $1.1 million per year)

[5] Note: ABX4 2 requires that special education students take the CAHSEE in grade 10. ABX4 2 will remain in effect until the SBE implements "an alternative means for students with disabilities to demonstrate achievement of the standards measured by CAHSEE or determines that an alternative means is not feasible." See California Department of Education, "CAHSEE October 2010 Assessment Notes" (www.cde.ca.gov/ta/tg/hs/cahseenotesoct10.asp).
[6] California State Board of Education November 2005 Agenda, Item #25 (pdf downloaded 11/9/11).
[7] SDUSD Administrative Records.
[8] California State Board of Education November 2007 Agenda, Item #20 (pdf downloaded 11/9/11).

during the 2007–08 and 2008–09 academic years.[9] Beginning in 2009–10, California has shifted AB 128 funding into flexible funding that districts can use as they see fit. This creates the possibility that districts could provide tutoring or *any* type of assistance far earlier than grades 11 and 12. In SDUSD tutoring has been cut back but CAHSEE preparatory classes in the regular school year and in summer school, which we describe later, have expanded.

Assembly Bill 347

In response to the *Valenzuela v. O'Connell* settlement, the California legislature passed Assembly Bill 347 (AB 347) in October 2007. AB 347, first implemented during the 2007–08 academic year, requires districts receiving funds under AB 128 to use those funds to provide support services for up to two consecutive academic years after grade 12 to students who do not pass the exit exam by the end of their grade-12 year, effective with the class of 2006. The law specifies that districts must post notices in all 10th-, 11th-, and 12th-grade classrooms to inform student of their eligibility to receive services beyond grade 12, to notify students who have completed grade 12, but have not passed both parts of the exam, about their eligibility to receive services for two years beyond grade 12, to provide English Learners who have not passed with English proficiency instruction, and to tailor remedial services specifically toward passing the CAHSEE. As with services provided under AB 128, AB 347 services may be provided during the regular school day if they do not supplant students' instruction in core curriculum areas. Services may also be provided on Saturdays or after/before school.[10]

Assembly Bill 1802 (AB 1802)

Assembly Bill 1802 (AB 1802), effective with the 2006–07 academic year, provided $200 million (approximately $80 per student in grades 7–12) to increase the number of school counselors in the state's middle and high schools. Counselors hired under AB 1802 were (among other tasks) required to review all student records to identify students who have failed, or are at risk of failing, the exit exam, and to conduct individual meetings with students and their parents to discuss each student's transcript and performance on standardized assessments, the consequences of not passing the high school exit exam, the coursework necessary to complete middle/high school, and remediation opportunities for the student, if applicable. Counselors were to explain each student's options for continuing education if he/she failed one or both parts of the CAHSEE, including enrolling in adult education, enrolling in a community college, continuing enrollment in the student's school district, and continuing to receive intensive instruction and services for up to two consecutive academic years after completion of grade 12 or until the student had passed both parts of the CAHSEE. AB 1802 required each school enrolling students in grades 10 through 12 to develop coursework designed to support student success on the CAHSEE and successful transition to postsecondary education or employment.[11] In addition to hiring additional counselors, SDUSD used $400,000 of its AB 1802 funding to purchase CAHSEE prep course materials for students in grades 11 and 12, professional development for teachers, diagnostic assessments and reporting, and CAHSEE intervention program teacher handbooks.[12]

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[9] SDUSD Administrative Records.
[10] See October 26, 2007, letter from State Superintendent Jack O'Connell regarding implementation of AB 347 (www.cde.ca.gov/ta/tg/hs/implement347.asp).
[11] See "Frequently Asked Questions related to the Middle and High School Supplemental School Counseling Program" on the California Department of Education website (www.cde.ca.gov/ls/cg/mc/mhscfaq.asp).
[12] SDUSD Board of Education Agenda, August 7, 2007, Item #63.

CAHSEE Support in San Diego Unified School District

San Diego Unified School District (SDUSD) recognized the importance of providing targeted assistance to students having difficulty passing the CAHSEE well before the state legislature allocated funding for support services via AB 128, AB 347, and AB 1802. During the 2003-04 academic year (before the CAHSEE requirement was removed for the classes of 2004 and 2005), SDUSD developed and piloted CAHSEE prep courses in ELA and mathematics for students in grades 11 and 12 who had yet to pass both parts of the exam. Beginning with the 2004–05 school year, these elective courses were offered at all district high schools during the school day, before or after school, and during summer school; these CAHSEE prep courses are still being offered (as of the 2011–12 academic year).[13]

As stated earlier, districts receiving AB 128, AB 347, and AB 1802 funding were required to document the types of materials and services provided and procured using resources from those sources. District administrative records indicate that, during the 2005–06 through 2008–09 academic years, SDUSD used "intensive instruction and services" funding to support the full range of services specified in the legislation – and that nearly all eligible students received at least one type of service.

Although the California Department of Education (CDE) did not require districts to specify the number of students receiving each type of service during the 2005–06 academic year (only whether the services were provided), these data were collected for 2006–07 and 2007–08. SDUSD's CAHSEE Intensive Instruction Annual Reports for 2006–07 and 2007–08, and conversations with district staff about services provided during 2008–09, reveal that the district used a significant portion of allocated funds to provide intensive instruction for students (e.g., group instruction in CAHSEE academic content, English language development for English Learners (ELs) geared to CAHSEE, instruction in test taking skills, technology-based instruction, and instruction delivered by an outside entity). In addition to providing the elective CAHSEE prep coursework described above, the district used AB 128, AB 347, and AB 1802 funding to support students in grades 11 and 12 – as well as post-grade-12 students – who had not yet passed the exit exam by:

- contracting with vendors to provide student handbooks, diagnostic assessments, and Saturday school/summer school CAHSEE "boot camps" (taught outside school hours by vendor staff);
- contracting with vendors to provide student handbooks, diagnostic assessments, course materials, and training for district teachers delivering CAHSEE prep classes during the school day, before and after school, during summer school, and in the district's Adult Education program; and
- contracting with vendors to provide online CAHSEE prep classes.

While provision of intensive instruction was the primary strategy supported by AB 128, AB 547, and AB 1802 funding in SDUSD, the district used a portion of these resources to provide CAHSEE-specific counseling for students in both individual and group settings, to convene parent meetings and student assemblies, for translation services, and to notify post grade 12 students about their eligibility to receive CAHSEE support services to help them pass the exam.

Research Findings to Date

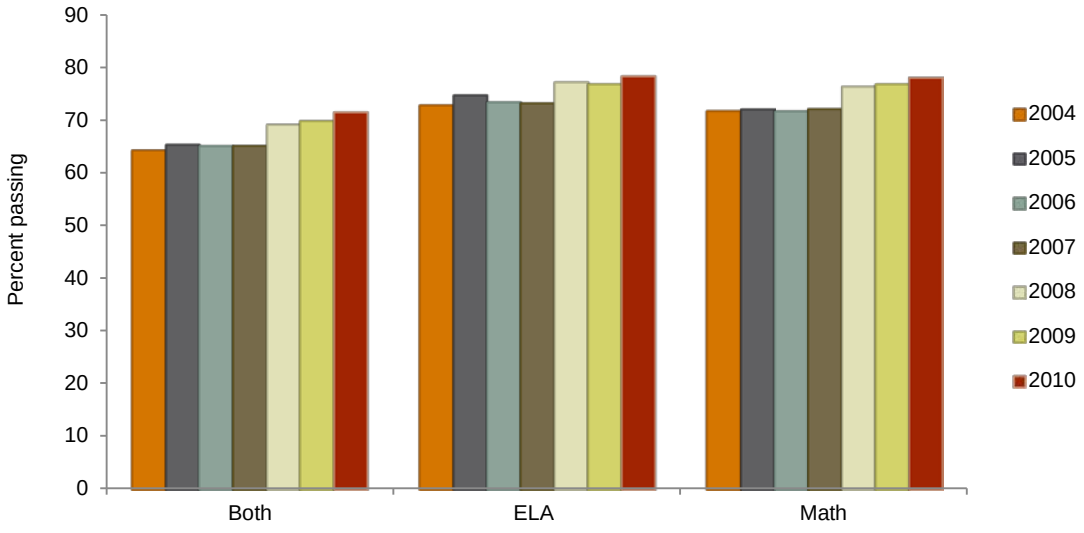
Several research studies have examined student performance on the CAHSEE. Zau and Betts (2008) use SDUSD's class of 2006 to document that it is possible to forecast who will pass or fail the CAHSEE quite

[13] SDUSD *Course of Study, K–12* (2003–04 through 2010–11).

accurately using data from any single grade level between grade 4 and grade 9. In reference to *Valenzuela v. O'Connell*, a lawsuit over the claim that many students are unlikely to be able to pass the exit exam because they receive too few resources, Zau and Betts (2008) show that passage rates are not strongly related to the classroom environment (including qualifications of the teacher) while the student is in high school. They also provide limited evidence that students who received more intensive interventions under AB 128 may have improved their CAHSEE scores by more in grade 12 than did those receiving less intensive interventions. Finally, Zau and Betts (2008) show that few grade-12 students who failed to graduate in 2006 came back and successfully passed the CAHSEE in the following school year.

For the last decade the state Department of Education has contracted with the Human Resources Research Organization (HumRRO) to produce a series of annual reports on statewide student performance on the CAHSEE, as well as useful studies of the quality of the tests and surveys of student reactions to the tests, among other topics. The latest in these reports (Becker, Wise and Watters 2010) shows that the percentage of students passing one or both components of the CAHSEE in grade 10 has inched upwards over time, as has the percentage passing by grade 12. Figure C1 shows passage rates among grade-10 students statewide. The percentage of California's grade-10 students passing both the ELA and mathematics components rose from 64.3 percent to 71.5 percent between 2004 and 2010. Passage rates on the ELA and mathematics components are quite similar to each other and both have increased somewhat over time. The same authors report that there are difficulties in tracking California students between grades 10 and 12. However, they note that between 2006 and 2010 the percentage of students who had reached grade 12 and who passed the CAHSEE rose from 91.2 to 94.4 percent.

FIGURE C1
Statewide passage rates on the CAHSEE among grade 10 students, overall and for ELA and mathematics components separately



SOURCE: Becker, Wise, and Watters (2010), p. ii.

The state-mandated evaluations have explored a number of other important issues related to CAHSEE. They examine the test questions and find them well aligned with the content that the CAHSEE is intended to test. The state evaluations also report on surveys completed by students taking the CAHSEE. Becker, Wise, and Watters (2010) find that, in 2010, 95 and 93 percent of grade-10 students reported that their courses had

covered the topics they had been tested on in ELA and mathematics portions of the CAHSEE, respectively. This is an important finding because, as mentioned earlier, a failed lawsuit had claimed that it was unfair to hold all California students to the standards imposed by the CAHSEE because many students had not been taught the requisite material.

The report also notes that, beginning in 2006, estimates of the graduation rate fell slightly and then partially recovered. However, the report does not attempt to link this decline causally to any specific policy change such as the CAHSEE.

A recommendation made by Becker, Wise, and Watters (2010, p. xiii) that is particularly relevant to the present study is that "new interventions should be targeted at earlier grades, using test scores to identify students who have fallen behind their classmates and are at risk of failing to meet the CAHSEE requirement." Zau and Betts (2008) made a similar recommendation based on two factors: the success of their models that predict passage of the exit exam based on data for individual students from earlier grades and, second, the mixed evidence they found that, in San Diego, grade-12 students who had yet to pass the CAHSEE succeeded in passing by the end of the year.

In their 2009 evaluation Becker, Wise, and Watters (2009, ch. 4) cite this finding by Zau and Betts (2008) and, using statewide data, then study whether grade-7 CST scores for the class of 2008 were predictive of passage of the CAHSEE. They find that grade-7 performance on the CST is highly predictive of performance on the exit exam. Like Zau and Betts (2008), they suggest that this finding presents a major opportunity to shift assistance to struggling students from grades 11 and 12 and beyond to earlier grades, in the process saving many students the negative experience of failing the CAHSEE when they reach grade 10.

Reardon et al. (2009) find some evidence with data from four districts that CAHSEE scores were lower than predicted for low-performing African American students in particular, and that the CAHSEE may be related to lower graduation rates of about 3.6 to 4.5 percent. They find little or no change in dropout rates. The study comes to these conclusions by comparing the class of 2005, which was not subject to the exit exam requirement, to the classes of 2006 and 2007, while attempting to control for other factors that might affect the probability of graduation. In other work, Reardon et al. (2010) find that those who narrowly fail the exit exam are not particularly hurt academically. Putting these two findings together, one can infer that it must be students who badly fail the exit exam who are most affected by the exit exam.

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