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TEST FAILURE & SPECIAL ED PROVISION

AFTER FAILING 3RD GRADE MCAS, WHITE STUDENTS ARE MORE LIKELY THAN BLACK AND HISPANIC STUDENTS TO RECEIVE SPECIAL EDUCATION SERVICES

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SUMMARY

This brief examines how 3rd grade standardized test failure is associated with special education identification within Massachusetts between 2006 and 2014. This analysis identifies that:

1. **Black and Hispanic students have higher 3rd and 4th grade special education identification rates than other racial/ethnic groups.**

2. **Black and Hispanic students fail 3rd grade MCAS at higher rates than other racial/ethnic groups.**

3. **White students who fail 3rd grade MCAS are more likely to receive special education services in 4th grade than other racial/ethnic groups.**

4. **Student and school contextual factors including grade retention, special education rates, and MCAS failure rates are contributing factors to special education identification patterns.**

Policymakers should consider whether to account for differences in student demographics, student performance, and school performance when evaluating disproportionality in special education identification rates by race/ethnicity.

INTRODUCTION

In Massachusetts, school districts are required by both state and federal law to provide special education services. Overall, 18.1 percent of the Commonwealth's students receive special education services across 13 disability categories, such as specific learning disability, communication disorder, and emotional disorder. The Massachusetts percentage of students receiving special education services is almost 5 percentage points higher than the national average of 13.7 percent, and Massachusetts school districts spend 20% of their total budgets on special education.[1] In this context, district leaders and policymakers are highly attuned to understanding how special education identification works and whether it can be improved.

The special education identification process is complex and depends on the type and severity of a child's disability. Doctors can usually identify the most significant disabilities, like blindness or deafness, at an early age, before children enter public school. However, for less discernible disabilities like a specific learning disability (SLD), which affects a student's ability to understand or use language, school staff generally make the diagnosis after a student enters public school.[2] This is hard, as not every student who is struggling academically has a disability. Though state law mandates dyslexia screenings for all children, many students are not identified for special education services until they have had months or years of low performance, or their state standardized assessments show low performance relative to grade-level standards.[2–4]

The identification process has become more complicated in recent years with concerns about a higher percentage of Black and Hispanic students receiving special education services relative to

White and Asian students in some schools. The concern has driven the federal government and state education agencies to monitor and penalize districts for having too large a difference in the identification rates between racial/ethnic groups.[5–7] However, some scholars contend that in certain settings, students of color are actually under-identified for special education compared to White students.[6,8,9]

Prior research has revealed substantial differences in the identification, placement, and performance of students with disabilities across Massachusetts districts. While Black and Hispanic students are identified as eligible for special education services at slightly higher rates than White students, the discrepancy diminishes when controlling for economically disadvantaged status and other characteristics like the district's state test proficiency or percentage of economically disadvantaged students. Low-income students are more likely than their peers to be deemed eligible for special education services. The likelihood that a low-income student receives special education increases in higher-income districts. Limited English proficient and English proficient students in Massachusetts, on average, are designated as eligible to receive special education and related services at similar rates.[6,9]

Guidance from the MA Department of Elementary and Secondary Education (DESE) suggests the general education environment is the goal for all students. DESE encourages schools to try a variety of strategies before providing special education services except in cases where a disability is clear, strongly suspected, and known to be causing learning problems. When a student is ultimately referred for a special education evaluation, the student is subject to a comprehensive assessment, including: a history of the student's educational progress in the general curriculum; information regarding the student's specific abilities in relation to the learning standards of the Massachusetts Curriculum Frameworks and district curriculum; the student's attention skills, participation behaviors, communication skills, memory, and social relations with groups, peers, and adults; and the student's educational and developmental potential. [3,10]

Massachusetts guidance says that test scores cannot be the single determinant of a special education designation. Regarding the MCAS, guidance further specifies that a school district is not required to refer a student for evaluation solely because the student has failed these statewide tests. However, anecdotal evidence from state and district officials suggests that some schools may use the signal provided by a low MCAS score as evidence during the special education evaluation process. Given that MCAS is the only statewide measure of achievement for students and schools, it is important to understand the relationship between test results and special education identification.

Leveraging MCAS data between 2006-2014, this brief explores how a student's 3rd grade MCAS score predicts whether that student will receive special education in 4th grade, and how this relationship changes based on student and school characteristics.[i]

[i] This study uses MCAS student, school, and district information from school years 2006-2014, prior to the transition from the MCAS exam to the PARCC exam in 2015 and NextGen MCAS exam in 2017. All students who took the MCAS in 3rd grade are included in the sample.

KEY FINDINGS

This section provides an overview of key findings. The appendix provides more detail on the regression methods along with regression results displayed as visuals and tables.

1. **Black and Hispanic students have higher 3rd and 4th grade special education identification rates than other racial/ethnic groups**

By 3rd grade, Black and Hispanic students had higher identification rates for all disabilities than Asian and White students. For example, 20.7% of Black students and 21.1% of Hispanic students received special education services in comparison to 16.5% of White students, and 8.1% of Asian students. In the absence of statewide standardized test information, these are students for whom school personnel and parents sought and received special education services based upon local diagnostic procedures.

Additionally, among students who did not receive special education in 3rd grade but did in 4th grade, a higher percentage were Black and Hispanic students. For example, 4.5% of previously ineligible Black students and 4.4% of previously ineligible Hispanic students received special education services in comparison to 2.7% of White students and 1.5% of Asian students.

Figure. 3rd grade special education identification rates by race/ethnicity

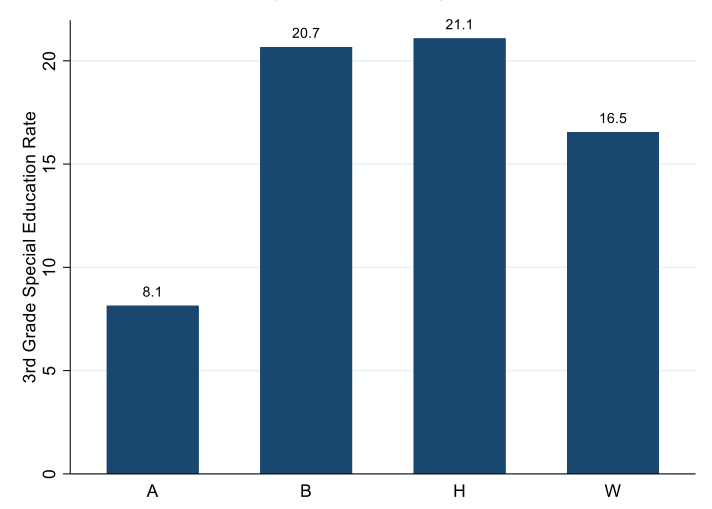
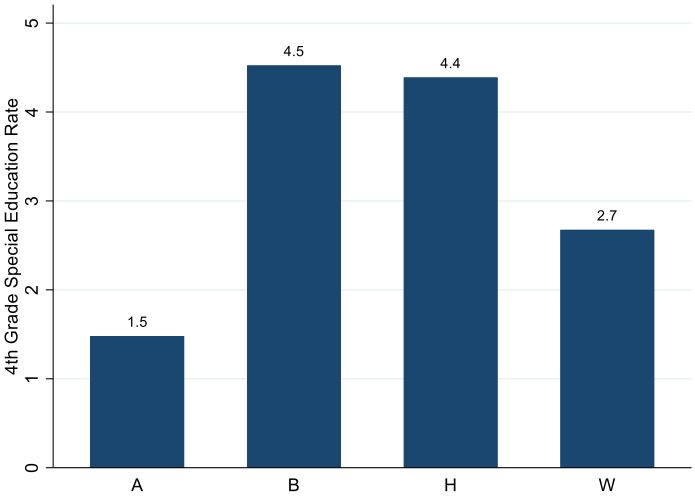


Figure. Percent of students identified in 4th grade by race/ethnicity

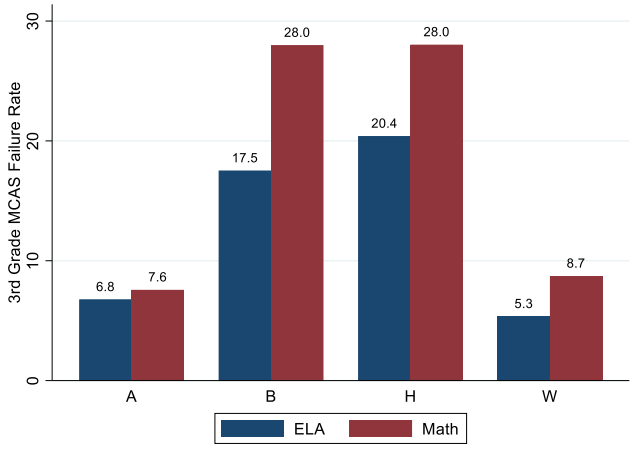


Note: A=Asian, B=Black, H=Hispanic, W=White

2. Black and Hispanic students fail 3rd grade MCAS at higher rates and attend schools with higher failure rates than other racial/ethnic groups

In grade 3, the MCAS is comprised of English Language Arts (ELA) and math tests. The 3rd grade MCAS failure rates (e.g., "Warning / Failing" performance levels) between 2006-2013 represented approximately 10% of all students. However, failure rates were higher for Black and Hispanic students than for Asian and White students. For example, on the 3rd grade ELA test, 17.5% of Black students and 20.4% of Hispanic students received a failing score while 5.3% of White students and 6.8% of Asian students received a failing score.

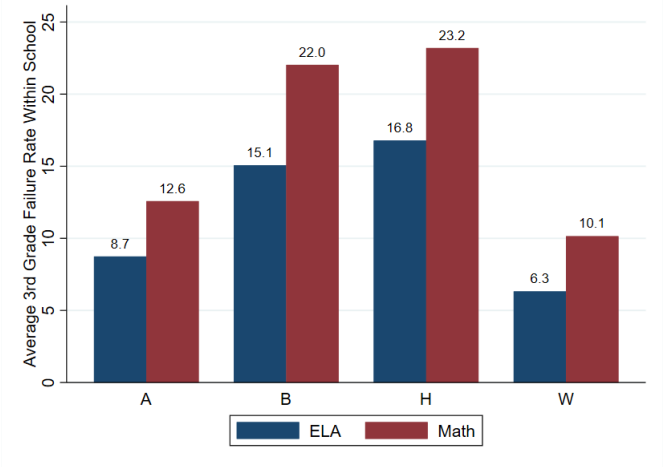
Figure. 3rd Grade MCAS failure rates by race/ethnicity



Note: A=Asian, B=Black, H=Hispanic, W=White

On average, Black and Hispanic students attend schools with higher failure rates. For example, on the 3rd grade ELA test, Black and Hispanic students were on average enrolled in schools with a 15.1% and 16.8% failure rate, respectively, while White students were on average enrolled in schools with a 6.3% failure rate and Asian students in schools with an 8.7% failure rate.

Figure. 3rd grade MCAS failure rates in schools by race/ethnicity

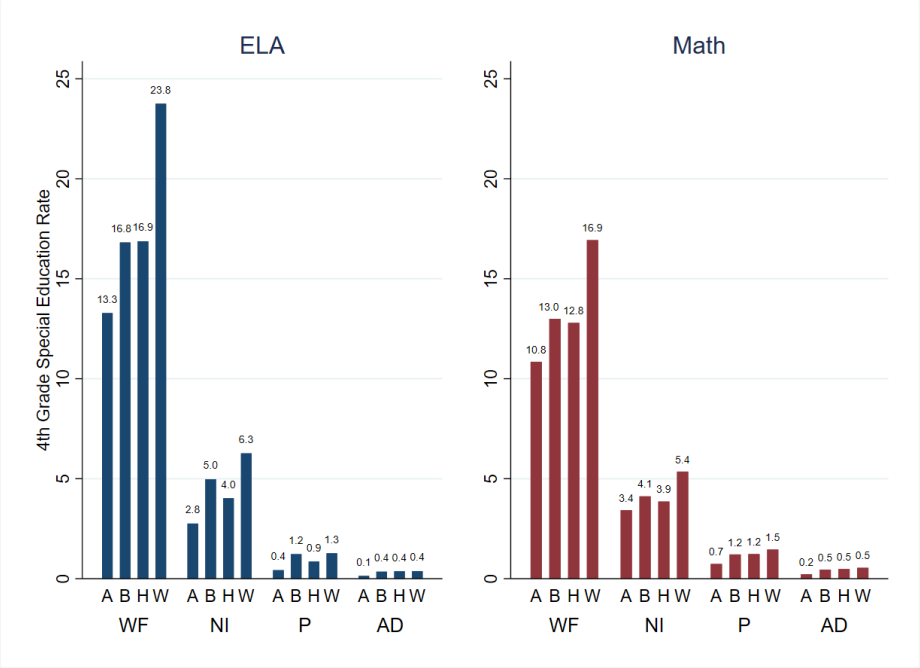


Note: A=Asian, B=Black, H=Hispanic, W=White

3. White students who fail 3rd grade MCAS are more likely to receive special education services in 4th grade than other racial/ethnic groups

Black and Hispanic students are more likely to fail the MCAS. However, among students who did not receive special education services in 3rd grade and failed the MCAS, White students are more likely to receive special education services in 4th grade. For example, among students who did not receive 3rd grade special education services, 23.8% of White students who failed the ELA test received special education services in 4th grade while 16.8% of Black students and 16.9% of Hispanic students who failed the ELA test received special education services in 4th grade.

Figure. 4th grade special education identification rates by 3rd grade ELA and Math MCAS performance category and race/ethnicity



Note: A=Asian, B=Black, H=Hispanic, W=White
WF=Warning/Failing, NI=Needs Improvement, P=Proficient, AD=Advanced

4. **Student and school contextual factors including grade retention, special education rates, and MCAS failure rates are contributing factors to special education identification patterns.**

Regression models help contextualize the previous findings. In models where only race/ethnicity is included as a predictor, previously un-identified Black and Hispanic students are more likely to receive special education in the following year compared to White students. However, incorporating student and school demographic and performance predictors changes this interpretation. In these models, previously un-identified Black and Hispanic students are increasingly less likely to receive special education in 4th grade compared to White students. Regression models also highlight how grade-retained students are the most likely to receive special education services following failure to achieve proficiency on the MCAS. Data models are included in the appendix.

CONCLUSION

Entering the first standardized testing experience in 3rd grade, Black and Hispanic students have higher special education rates than White and Asian students. Black and Hispanic students are also more likely to fail the 3rd grade MCAS and attend schools with higher failure rates.

Although higher percentages of Black and Hispanic students are referred to special education following 3rd grade than Asian and White students, this rate masks how referral rates operate for students in the state who receive the lowest scores on standardized tests. Among students who fail the 3rd grade MCAS, White students are more likely to receive special education in 4th grade. The reason for this trend is unclear. Perhaps, this trend is a result of low expectations for students or color. Perhaps it is indicative of White parents' power and agency or the tendency for suburban districts to be more proactive in SPED identification. This brief cannot determine whether this practice has been beneficial for White students nor why staff and parents may respond differently to a White student's MCAS score and seek special education services to remediate a perceived student need relative to students of other races. Regardless, policymakers should consider how MCAS performance may send a different signal about a student's special education needs based upon student and school characteristics. Additionally, policymakers should consider whether to account for differences in student demographics and school performance when evaluating disproportionality in special education identification rates by race/ethnicity.

Future work in this area will continue to assess how students are referred for services based upon MCAS performance, including the new NextGen MCAS introduced in 2017. Additionally, future work will incorporate other student and school demographic characteristics to provide a fuller picture of how these factors contribute to the special education identification process.

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APPENDIX

Regression Methods

Multilevel logistic regression models are run separately on the ELA and math MCAS test population. The models predict the odds that a student is provided special education services in the following year in comparison to a reference group composed of White, female, not limited English proficient status, not free-or-reduced price lunch status, and not grade-retained students. First the models are run using all test-takers. Second, the models are run just for students who fail the ELA or math MCAS to assess if discrepancies are more pronounced in these sub-samples.

These are the models:

1. Model 1 (FE1 and FM1): uses students' race/ethnicity and year fixed effects.
2. Model 2 (FE2 and FM2): adds students' gender/sex, free-or-reduced price lunch status, limited English proficiency status, and grade retention status.
3. Model 3 (FE3 and FM3): adds students' ELA or math MCAS scores.
4. Model 4 (FE4 and FM4): adds students' 3rd grade ELA or math MCAS failure rates within their school.
5. Model 5 (FE5 and FM5): adds students' 3rd grade special education rate, free-or-reduced price lunch rate, and percentage White student rates within their school.
6. Model 6 (FE6 and FM6): adds an interaction between student race and the 3rd grade ELA or math MCAS failure rate within their school.[2]

The models are presented in this way to demonstrate how the incorporation of performance data affects special education identifications trends between 3rd and 4th grade.

[2] Grade-level rate variables are log-transformed.

REGRESSION RESULTS

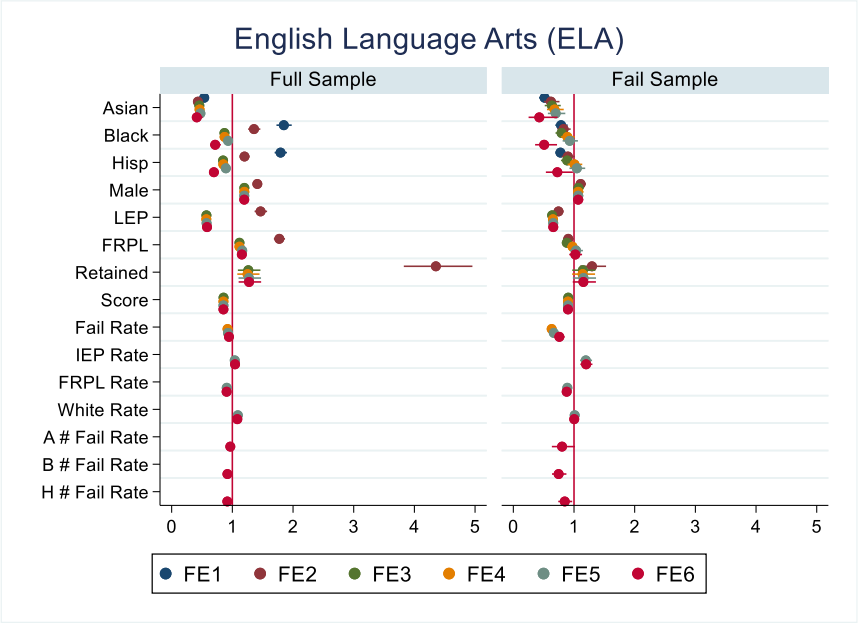
Table. ELA Model Results

	ELA – Full						*ELA - Fail*					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
ASIAN	0.536***	0.433***	0.456***	0.460***	0.474***	0.414***	0.515***	0.620***	0.636***	0.678***	0.698***	0.428**
	0.0321	0.0255	0.0282	0.0284	0.0289	0.0436	(0.0510)	(0.0645)	(0.0668)	(0.0699)	(0.0727)	(0.116)
BLACK	1.848***	1.357***	0.870***	0.872***	0.930	0.717***	0.787***	0.828**	0.795***	0.891	0.930	0.508***
	0.0641	0.0514	0.0359	0.0357	0.0381	0.0447	(0.0521)	(0.0556)	(0.0545)	(0.0589)	(0.0640)	(0.0903)
HISPANIC	1.795***	1.200***	0.847***	0.851***	0.893**	0.696***	0.776***	0.899	0.888	1.008	1.047	0.725*
	0.0518	0.0405	0.0320	0.0317	0.0330	0.0386	(0.0438)	(0.0546)	(0.0556)	(0.0614)	(0.0662)	(0.112)
MULTIPLE	1.345***	1.206***	1.100	1.104	1.127*	1.103	1.060	1.082	1.064	1.093	1.106	0.689
	0.0756	0.0679	0.0668	0.0671	0.0686	0.118	(0.151)	(0.154)	(0.151)	(0.155)	(0.158)	(0.287)
NATIVE	1.534**	1.277	1.021	1.025	1.043	0.631	1.346	1.379	1.391	1.448	1.494	0.286
	0.251	0.206	0.170	0.170	0.172	0.174	(0.361)	(0.373)	(0.391)	(0.397)	(0.408)	(0.263)
PACIFIC	0.535	0.463*	0.362*	0.359*	0.377*	2.150	0.395	0.433	0.427	0.414	0.414	4.708
	0.207	0.175	0.155	0.154	0.157	2.018	(0.285)	(0.313)	(0.306)	(0.314)	(0.311)	(7.390)
MALE		1.411***	1.198***	1.198***	1.196***	1.196***		1.109**	1.073	1.070	1.069	1.069
		0.0244	0.0226	0.0225	0.0225	0.0225		(0.0431)	(0.0420)	(0.0415)	(0.0417)	(0.0417)
LEP		1.466***	0.573***	0.571***	0.576***	0.583***		0.744***	0.640***	0.653***	0.657***	0.658***
		0.0525	0.0260	0.0258	0.0261	0.0262		(0.0396)	(0.0359)	(0.0358)	(0.0361)	(0.0360)
FRPL		1.774***	1.118***	1.117***	1.162***	1.156***		0.905*	0.881*	0.976	1.034	1.022
		0.0468	0.0302	0.0300	0.0315	0.0312		(0.0449)	(0.0436)	(0.0488)	(0.0547)	(0.0537)
RETAINED		4.354***	1.263**	1.251**	1.273**	1.275***		1.296**	1.146	1.143	1.156	1.154
		0.288	0.0944	0.0929	0.0945	0.0943		(0.109)	(0.0968)	(0.0958)	(0.0970)	(0.0970)
SCORE			0.855***	0.853***	0.853***	0.853***			0.905***	0.901***	0.901***	0.900***
			0.00139	0.00138	0.00137	0.00136			(0.00517)	(0.00514)	(0.00514)	(0.00515)
ELA RATE				0.921***	0.928***	0.944***				0.632***	0.668***	0.759***
				0.00573	0.00574	0.00633				(0.0213)	(0.0271)	(0.0416)
IEP RATE					1.040	1.045					1.194***	1.200***
					0.0250	0.0251					(0.0502)	(0.0508)
FRPL RATE					0.908***	0.906***					0.890***	0.880***
					0.0104	0.0103					(0.0267)	(0.0268)
WHITE RATE					1.091***	1.082***					1.011	1.003
					0.0164	0.0157					(0.0160)	(0.0162)
*ASIAN * ELA RATE*						0.966						0.803
						0.0234						(0.0960)
*BLACK * ELA RATE*						0.919***						0.747***
						0.0137						(0.0603)
*HISP * ELA RATE*						0.917***						0.848*
						0.0130						(0.0585)
*MULT * ELA RATE*						0.997						0.811
						0.0268						(0.148)
*NATIVE * ELA RATE*						0.858**						0.473*
						0.0509						(0.179)

*PACIFIC * ELA RATE*						1.892						3.000
						0.685						(2.071)
2007	0.887***	0.889**	0.832***	0.851***	0.855***	0.856***	0.908	0.908	0.945	0.975	0.964	0.962
	0.0320	0.0323	0.0335	0.0341	0.0345	0.0345	(0.0660)	(0.0661)	(0.0706)	(0.0725)	(0.0720)	(0.0719)
2008	0.820***	0.824***	0.552***	0.584***	0.589***	0.590***	0.776***	0.772***	0.775***	0.885	0.869	0.865*
	0.0293	0.0296	0.0220	0.0232	0.0235	0.0235	(0.0563)	(0.0561)	(0.0571)	(0.0642)	(0.0636)	(0.0634)
2009	1.064	1.060	0.933	0.964	0.989	0.988	1.341***	1.347***	1.432***	1.508***	1.514***	1.505***
	0.0390	0.0388	0.0389	0.0399	0.0412	0.0411	(0.103)	(0.103)	(0.112)	(0.115)	(0.116)	(0.115)
2010	0.770***	0.756***	0.981	0.983	1.016	1.012	1.098	1.126	1.215*	1.128	1.143	1.130
	0.0302	0.0299	0.0446	0.0446	0.0462	0.0460	(0.102)	(0.105)	(0.117)	(0.108)	(0.109)	(0.108)
2011	0.717***	0.704***	0.730***	0.747***	0.780***	0.780***	0.936	0.958	0.949	0.950	0.964	0.961
	0.0287	0.0285	0.0343	0.0349	0.0366	0.0365	(0.0797)	(0.0820)	(0.0845)	(0.0818)	(0.0824)	(0.0819)
2012	0.730***	0.716***	0.857**	0.874**	0.921	0.922	0.851	0.875	0.949	0.975	0.987	0.981
	0.0295	0.0291	0.0408	0.0410	0.0436	0.0435	(0.0743)	(0.0764)	(0.0856)	(0.0857)	(0.0867)	(0.0860)
2013	0.739***	0.723***	0.920	0.923	0.982	0.980	0.961	0.988	1.028	1.008	1.052	1.048
	0.0301	0.0297	0.0431	0.0425	0.0458	0.0456	(0.0869)	(0.0890)	(0.0953)	(0.0925)	(0.0966)	(0.0955)
SCHOOL-LEVEL VARIANCE	1.108***	1.141***	1.546***	1.410***	1.295***	1.283***	1.301***	1.281***	1.342***	1.176***	1.160***	1.156***
	0.00914	0.0113	0.0390	0.0313	0.0227	0.0218	(0.0414)	(0.0402)	(0.0468)	(0.0278)	(0.0263)	(0.0258)
OBSERVATIONS	460805	460805	456736	456736	456736	456736	19557	19557	19557	19557	19557	19557
AIC	125547.9	123618.9	103904.9	103721.2	103562.0	103512.9	18592.8	18536.5	18191.2	18014.5	17981.1	17974.4
BIC	125713.6	123828.7	104125.6	103952.9	103826.8	103843.8	18711.0	18686.2	18348.9	18180.0	18170.2	18210.8

Note: Exponentiated odds-ratio estimates are presented from 3rd grade MCAS test-takers. Models only include students who attend schools in which 10 or more students took the ELA or math MCAS. School-level clustered standard errors. * p<0.05 ** p<0.01 *** p<0.001

Figure. 4th grade SPED rate compared to reference – ELA MCAS full and failure samples



Note: Plot of point estimates and standard errors. White, Female, Non-LEP, Non-FRPL, Non-Retained students are the reference group. Retained students remain in 3rd grade. A=Asian, B=Black, H=Hispanic, LEP=Limited English Proficient, FRPL = free or reduced-price lunch; Retained = retained in Grade; Score = MCAS ELA or Math score; Fail Rate = school-grade MCAS failure rate; IEP rate = school IEP rate; FRPL Rate = school free or reduced-price lunch rate; A/B/H # Fail Rate = student race interacted with school-grade MCAS failure rate.

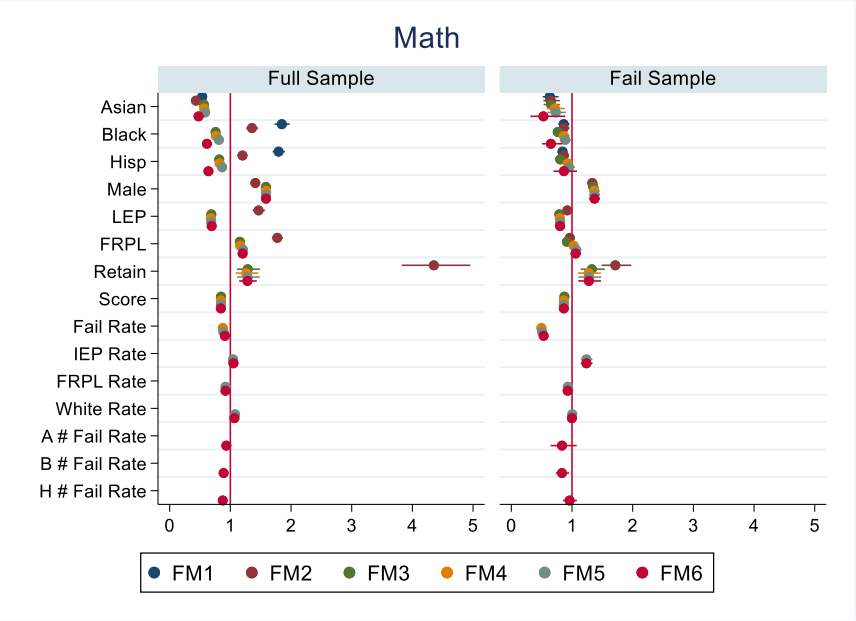
Table. Math Model Results

	Math – Full						*Math - Fail*					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
ASIAN	0.536***	0.433***	0.564***	0.570***	0.584***	0.477***	0.634***	0.650***	0.654***	0.719**	0.732**	0.529*
	(0.0321)	(0.0255)	(0.0321)	(0.0323)	(0.0331)	(0.0434)	(0.0662)	(0.0688)	(0.0690)	(0.0749)	(0.0759)	(0.140)
BLACK	1.848***	1.357***	0.756***	0.763***	0.812***	0.615***	0.863**	0.862**	0.765***	0.866**	0.887*	0.652***
	(0.0641)	(0.0514)	(0.0298)	(0.0297)	(0.0317)	(0.0348)	(0.0449)	(0.0470)	(0.0430)	(0.0455)	(0.0480)	(0.0846)
HISPANIC	1.795***	1.200***	0.817***	0.824***	0.865***	0.639***	0.844***	0.864**	0.805***	0.929	0.951	0.867
	(0.0518)	(0.0405)	(0.0294)	(0.0292)	(0.0307)	(0.0301)	(0.0369)	(0.0414)	(0.0400)	(0.0443)	(0.0471)	(0.0981)
MULTIPLE	1.345***	1.206***	1.024	1.029	1.049	0.966	1.010	1.021	0.969	1.013	1.023	1.130
	(0.0756)	(0.0679)	(0.0602)	(0.0606)	(0.0618)	(0.0970)	(0.100)	(0.102)	(0.0991)	(0.105)	(0.106)	(0.299)
NATIVE	1.534**	1.277	1.043	1.046	1.071	0.781	1.105	1.100	1.080	1.165	1.191	0.358
	(0.251)	(0.206)	(0.173)	(0.174)	(0.176)	(0.210)	(0.272)	(0.275)	(0.271)	(0.283)	(0.290)	(0.273)
PACIFIC	0.535	0.463*	0.413*	0.428*	0.444*	0.933	0.419	0.425	0.454	0.485	0.492	1.525
	(0.207)	(0.175)	(0.160)	(0.164)	(0.167)	(1.032)	(0.249)	(0.256)	(0.286)	(0.308)	(0.309)	(1.851)
MALE		1.411***	1.585***	1.588***	1.588***	1.588***		1.335***	1.350***	1.368***	1.372***	1.371***
		(0.0244)	(0.0290)	(0.0291)	(0.0291)	(0.0288)		(0.0413)	(0.0430)	(0.0435)	(0.0437)	(0.0436)
LEP		1.466***	0.687***	0.679***	0.686***	0.693***		0.924	0.790***	0.798***	0.804***	0.804***
		(0.0525)	(0.0298)	(0.0295)	(0.0298)	(0.0224)		(0.0450)	(0.0407)	(0.0402)	(0.0403)	(0.0402)
FRPL		1.774***	1.157***	1.163***	1.208***	1.202***		0.965	0.916*	1.028	1.065	1.060
		(0.0468)	(0.0303)	(0.0301)	(0.0318)	(0.0291)		(0.0399)	(0.0384)	(0.0422)	(0.0458)	(0.0455)
RETAINED		4.354***	1.286***	1.262**	1.285***	1.282***		1.714***	1.327***	1.274**	1.280***	1.278**
		(0.288)	(0.0962)	(0.0938)	(0.0956)	(0.0743)		(0.124)	(0.101)	(0.0951)	(0.0957)	(0.0957)
SCORE			0.846***	0.844***	0.844***	0.844***			0.875***	0.866***	0.866***	0.865***
			(0.00159)	(0.00157)	(0.00155)	(0.00115)			(0.00423)	(0.00414)	(0.00414)	(0.00414)
MATH RATE				0.876***	0.886***	0.910***				0.496***	0.507***	0.533***
				(0.00667)	(0.00686)	(0.00733)				(0.0149)	(0.0181)	(0.0237)
IEP RATE					1.045	1.051*					1.237***	1.238***
					(0.0240)	(0.0213)					(0.0487)	(0.0489)
FRPL RATE					0.921***	0.920***					0.931***	0.929***
					(0.00996)	(0.00870)					(0.0200)	(0.0200)
WHITE RATE					1.078***	1.067***					1.004	0.999
					(0.0150)	(0.0123)					(0.0155)	(0.0158)
*ASIAN * MATH RATE*						0.933**						0.835
						(0.0240)						(0.109)
*BLACK * MATH RATE*						0.890***						0.835**
						(0.0178)						(0.0554)
*HISP * MATH RATE*						0.875***						0.960
						(0.0139)						(0.0575)
*MULT * MATH RATE*						0.973						1.064
						(0.0303)						(0.145)
*NATIVE * MATH RATE*						0.883						0.514
						(0.0795)						(0.196)

*PACIFIC * MATH RATE*						1.413						1.846
						(0.708)						(1.127)
2007	0.887***	0.889**	0.992	0.986	0.992	0.992	0.988	0.987	1.041	1.026	1.021	1.021
	(0.0320)	(0.0323)	(0.0402)	(0.0397)	(0.0401)	(0.0340)	(0.0562)	(0.0558)	(0.0618)	(0.0595)	(0.0595)	(0.0596)
2008	0.820***	0.824***	0.997	0.978	0.990	0.987	1.004	0.995	1.095	1.005	1.004	1.005
	(0.0293)	(0.0296)	(0.0410)	(0.0397)	(0.0403)	(0.0346)	(0.0617)	(0.0614)	(0.0708)	(0.0613)	(0.0615)	(0.0615)
2009	1.064	1.060	1.460***	1.433***	1.470***	1.468***	1.470***	1.479***	1.652***	1.505***	1.528***	1.527***
	(0.0390)	(0.0388)	(0.0617)	(0.0597)	(0.0617)	(0.0489)	(0.0890)	(0.0890)	(0.105)	(0.0912)	(0.0930)	(0.0928)
2010	0.770***	0.756***	1.628***	1.501***	1.553***	1.544***	1.306***	1.321***	1.788***	1.351***	1.366***	1.362***
	(0.0302)	(0.0299)	(0.0749)	(0.0692)	(0.0722)	(0.0566)	(0.0979)	(0.0990)	(0.141)	(0.102)	(0.105)	(0.104)
2011	0.717***	0.704***	1.717***	1.567***	1.640***	1.625***	1.345***	1.361***	1.810***	1.271**	1.294***	1.291***
	(0.0287)	(0.0285)	(0.0836)	(0.0756)	(0.0801)	(0.0615)	(0.103)	(0.105)	(0.147)	(0.0966)	(0.101)	(0.100)
2012	0.730***	0.716***	1.053	1.038	1.085	1.083*	1.072	1.083	1.204**	1.079	1.083	1.082
	(0.0295)	(0.0291)	(0.0501)	(0.0485)	(0.0512)	(0.0398)	(0.0716)	(0.0721)	(0.0849)	(0.0712)	(0.0714)	(0.0712)
2013	0.739***	0.723***	1.435***	1.344***	1.422***	1.410***	1.257***	1.255**	1.649***	1.258**	1.298***	1.296***
	(0.0301)	(0.0297)	(0.0689)	(0.0636)	(0.0680)	(0.0523)	(0.0870)	(0.0875)	(0.121)	(0.0893)	(0.0942)	(0.0939)
SCHOOL-LEVEL VARIANCE	1.108***	1.141***	1.480***	1.338***	1.265***	1.253***	1.308***	1.316***	1.478***	1.150***	1.126***	1.125***
	(0.00914)	(0.0113)	(0.0340)	(0.0253)	(0.0199)	(0.0196)	(0.0368)	(0.0380)	(0.0555)	(0.0211)	(0.0189)	(0.0187)
OBSERVATIONS	460805	460805	459840	459840	459840	459840	36351	36351	36351	36351	36351	36351
AIC	125547.9	123618.9	106268.6	105967.7	105842.7	105769.4	29814.6	29668.6	28670.1	28111.4	28062.0	28061.0
BIC	125713.6	123828.7	106489.3	106199.5	106107.6	106100.5	29942.1	29830.1	28840.1	28289.9	28266.1	28316.1

Note: Exponentiated odds-ratio estimates are presented from 3rd grade MCAS test-takers. Models only include students who attend schools in which 10 or more students took the ELA or math MCAS. School-level clustered standard errors. * p<0.05 ** p<0.01 *** p<0.001

Figure. 4th grade SPED rate compared to reference – Math MCAS full and failure samples



Note: Plot of point estimates and standard errors. White, Female, Non-LEP, Non-FRPL, Non-Retained students are the reference group. Retained students remain in 3rd grade. A=Asian, B=Black, H=Hispanic, LEP=Limited English Proficient, FRPL = free or reduced-price lunch; Retained = retained in Grade; Score = MCAS ELA or Math score; Fail Rate = school-grade MCAS failure rate; IEP rate = school IEP rate; FRPL Rate = school free or reduced-price lunch rate; A/B/H # Fail Rate = student race interacted with school-grade MCAS failure rate.