

**Does Readiness for Eighth-Grade Algebra Matter?:
A Quasi-Experimental, Multi-Site Analysis of Short- and Longer-Term Outcomes**

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Background/Context:

Enrollment in eighth-grade algebra doubled from the 1990s to 2012 (National Center for Education Statistics, 2013) as research demonstrated that Algebra I operates as a “gateway” to advanced mathematics courses in high school (Adelman, 2006), and that students who succeed in Algebra I in middle school have more success in mathematics throughout high school. However, prior work was heavily prone to selection bias, focusing on high-performing students. Other work examines outcomes of taking eighth-grade algebra for students with different levels of readiness and highlights negative effects for average or lower performing students (e.g., reduced test scores [Loveless, 2008], decreased likelihood of passing geometry by Grade 11 and Algebra II by Grade 12 [Clotfelter, Ladd, & Vigdor, 2013]). However, these studies have important limitations; they focus on district(s) within one state and/or only examine short-term outcomes, and no study examines graduation outcomes among average and lower-performing students.

Purpose/Objective/Research Question:

Given rapid expansion of access to eighth-grade algebra, the need to examine short- and longer-term outcomes for *all* students is urgent. To address this gap, we conducted an exploration study funded by a grant from the Institute of Education Sciences (IES) to examine the following research questions in two distinct districts:

1. What is the “impact” of placement into eighth-grade algebra on short-term outcomes (attendance, math course performance) across the transition to high school, and on longer-term high school milestones (completing math course requirements, graduation)?
2. To what extent do “impacts” of placement into eighth-grade algebra vary for students with different levels of prior readiness?

Setting:

To broaden generalizability of our results, we examined data from two large and diverse educational settings—Elk Grove Unified School District (EGUSD) in California, and Chicago Public Schools (CPS). Tables B-2 and B-3 display student demographics for the districts.

Population/Participants/Subjects:

We examined secondary, historical data from six cohorts of students from EGUSD (22,429 students, graduating classes of 2011-2016), and four cohorts of students from CPS (100,628 students, graduating classes of 2013-2016). All EGUSD middle schools and approximately one third of CPS K-8 schools offered eighth-grade algebra.

Research Design:

To address selection bias, this quasi-experimental study employs a *propensity weighting* design, where students within a district not enrolled in eighth-grade algebra are weighted to more closely resemble students enrolled in eighth-grade algebra—maximizing internal validity in the absence of random assignment.

Analysis:

We calculated propensity weights using a selection model for each cohort, generating a predicted value for each student’s likelihood of enrolling in eighth-grade algebra given his or her background characteristics and prior achievement before eighth grade (see Tables B-2 and B-3

for all selection model variables with and without weights). Because not all schools in Chicago offered eighth-grade algebra, we calculated propensity weights using the sample of students attending schools that offered eighth-grade algebra. The estimates from that model were applied to all students to calculate propensity weights, and only students in schools that did not offer the course were included in the comparison group.

We used the resulting predicted values to calculate the average treatment effect on the treated (ATT). Nearly all variables from the selection model had standardized mean differences of less than $d=0.25$ post-weighting. When applicable, we combined propensity weights with inverse probability weights (IPW) to account for missingness in outcomes. We generated levels of readiness to take eighth-grade algebra based on students' seventh-grade math test scores, and final course grade in seventh-grade mathematics, and then interacted each readiness level with whether they took eighth-grade algebra (see Table B-4 for definitions of readiness). We used a regression to estimate the effects of taking eighth-grade algebra for students with different levels of readiness, controlling for student characteristics, school, and cohort, weighted by the product of the ATT and IPW for each outcome.¹ Analyses were run separately for each district.

Findings/Results:

Short-term outcomes. In both sites, few students with very low readiness (lowest grades and test scores) were placed into eighth-grade algebra. With regard to attendance in eighth grade, students who took algebra missed less instructional time than students who did not take algebra, though this effect was not significant in Chicago. With regard to course performance, placement in eighth-grade algebra resulted in small decreases in math GPA in eighth grade, potentially as a result of more difficult coursework, and decreases were larger for students with lower prior grades and for students with average prior test scores (middle of the distribution of performance ratings) in both sites. Math course grades recovered by the end of ninth grade, and were higher for students in Chicago who were placed in eighth-grade algebra relative to their counterparts; positive effects on ninth-grade math GPA were larger for students with average prior test scores.

Longer-term outcomes. All students who took algebra in eighth grade were more likely to complete Algebra I, Geometry, and Algebra II before eleventh grade, leaving time for Precalculus and Calculus, and effects on completion of requirements were larger for students with higher prior grades and test scores in both sites. Placement into eighth-grade algebra had no impact on high school graduation in EGUSD, but had a positive impact in Chicago, and this effect was larger for students with average or above-average prior grades and test scores. Results for each site are presented in Figures 1-14 and Tables B-5 and B-6.

Conclusions:

Though preliminary, our study suggests the following conclusions:

- Although placement in eighth-grade algebra may initially result in lower math course performance in eighth-grade, we observed consistently positive, and no negative impacts for students in high school.
- Positive impacts on course performance and graduation were sometimes larger for students who did not attain the highest prior math course grades or test scores, and

¹ Chicago analyses exclude school fixed-effects because treatment status and school effects are collinear.

positive impacts on completion of math course requirements before eleventh grade were larger for higher performing students.

- Relatively few students with the lowest math course grades or test scores in seventh grade took algebra in eighth grade, limiting generalizability for these students.

Appendices
(Not included in word count)

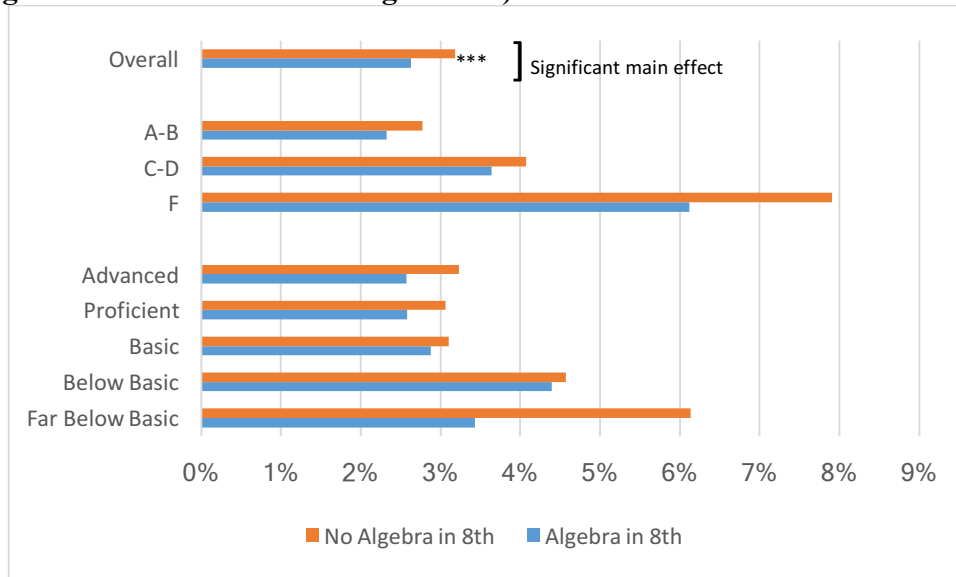
Appendix A. References

- Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*. Washington, DC: U.S. Department of Education.
- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2013). *Algebra for 8th graders: Evidence on its effects from ten North Carolina districts. District Policy Initiative (No. 87)*. Washington, DC: CALDER.
- Loveless, T. (2008). *The misplaced math student: Lost in eighth-grade algebra*. Washington, DC: The Brookings Institute.
- National Center for Education Statistics (2013). *The Nation's Report Card: Trends in Academic Progress 2012 (NCES 2013 456)*. Institute of Education Sciences, U.S. Department of Education, Washington, D.C.

Appendix B. Tables and Figures

Figures 1-7. EGUSD results.

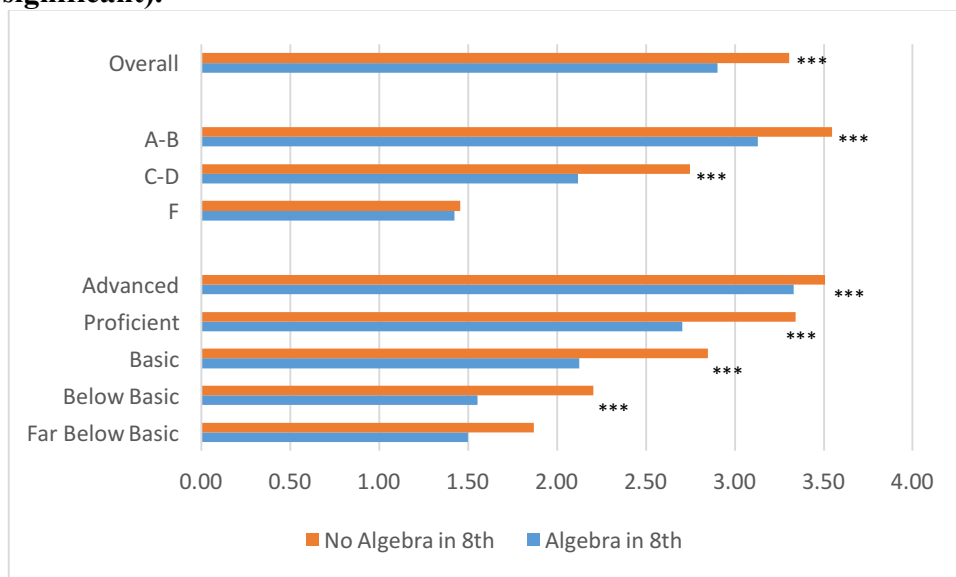
Figure 1. Percent of instructional time missed in eighth grade (interactions with prior grades and test scores not significant).



† = $p < .1$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$. Shown here are significance levels for pairwise comparisons of students who took eighth-grade algebra and those that did not. Significance values are not indicated if the interaction was not significant.

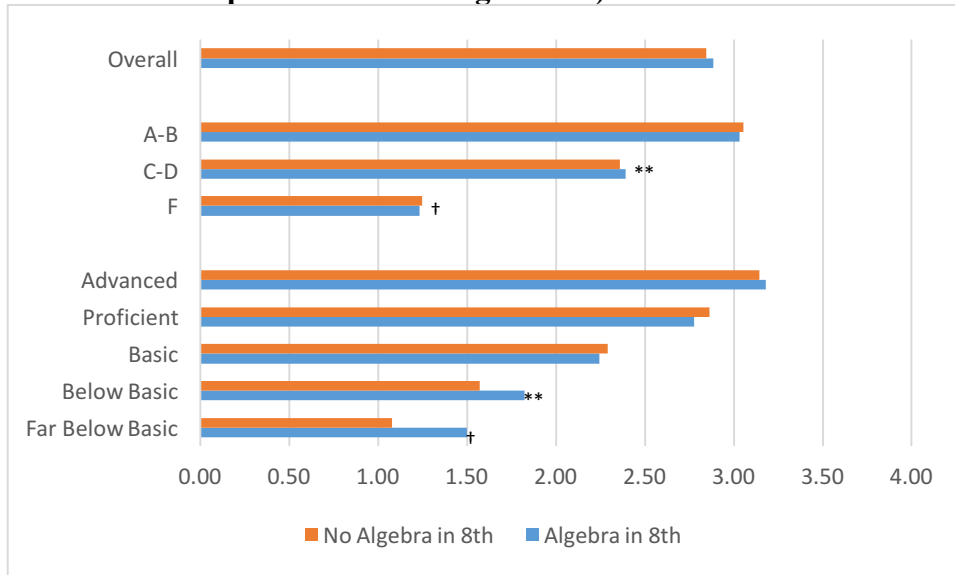
Note: Grades refers to student seventh grade math GPA average, while Scores 1-5 refer to the student's performance level on the California seventh grade math test. Presented here are weighted means (propensity weight and IPW) for each group.

Figure 2. Eighth-grade math GPA (interactions with prior grades and test scores significant).



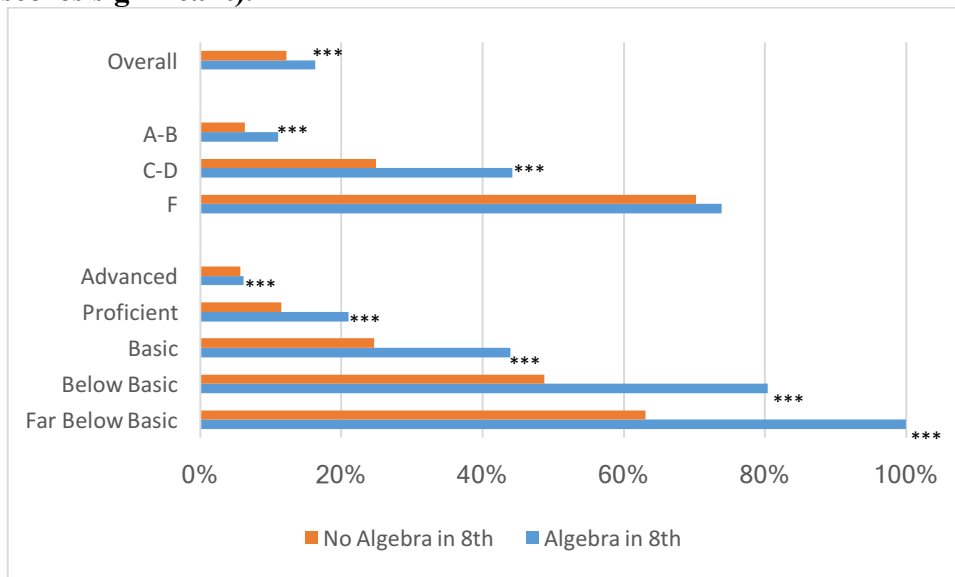
† = $p < .1$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 3. Ninth-grade math GPA (interaction with prior grades marginally significant, interaction with prior test scores significant).



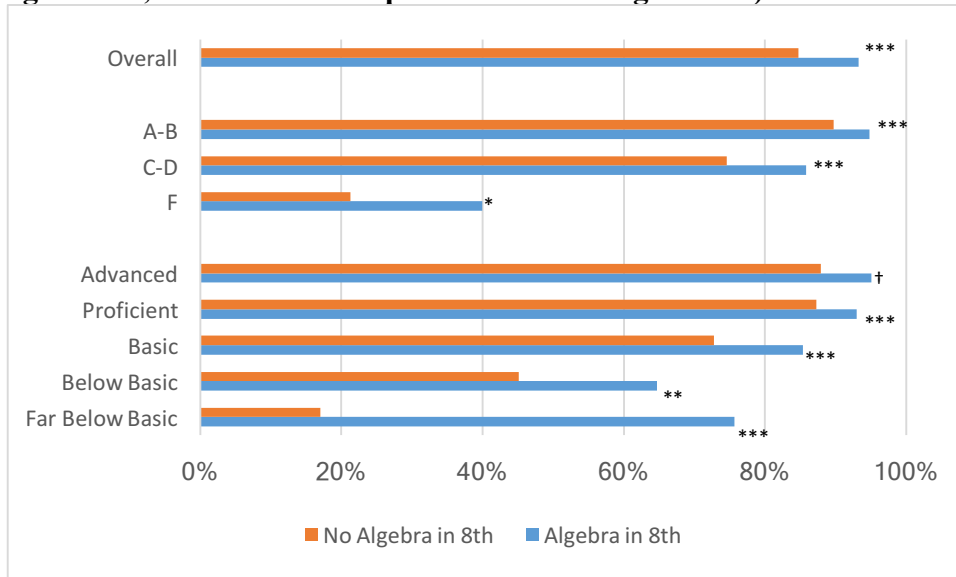
† = $p < .1$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 4. Whether a student repeated Algebra I (interactions with prior grades and test scores significant).



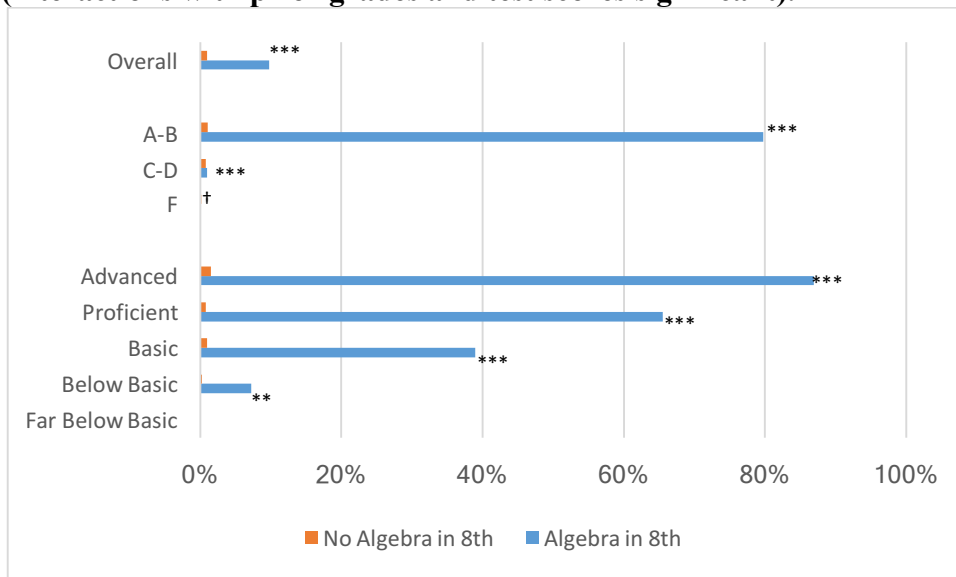
† = $p < .1$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 5. Whether a student took Algebra II (interaction with prior grades marginally significant, interaction with prior test scores significant).



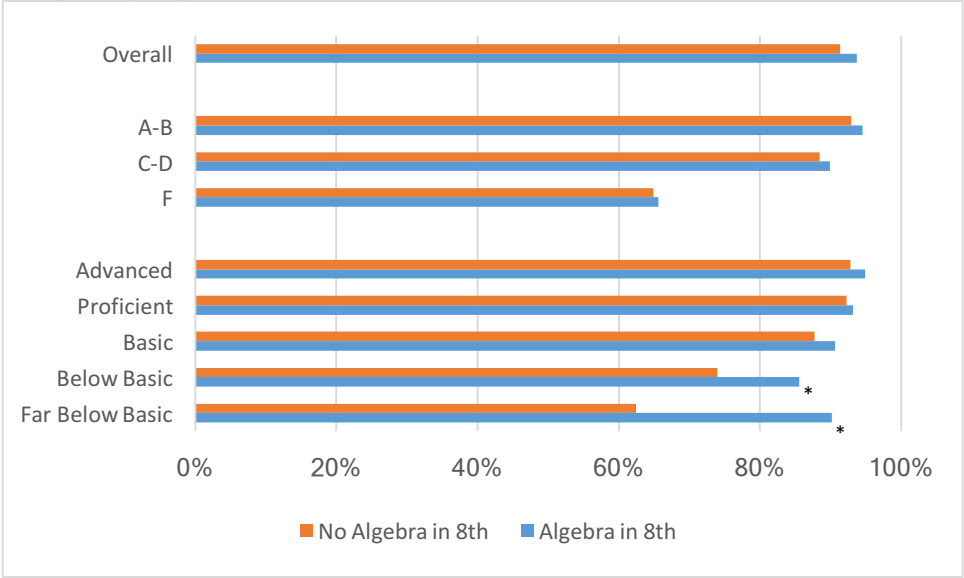
† = $p < .1$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 6. Whether a student completed core math requirements before eleventh grade (interactions with prior grades and test scores significant).



† = $p < .1$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

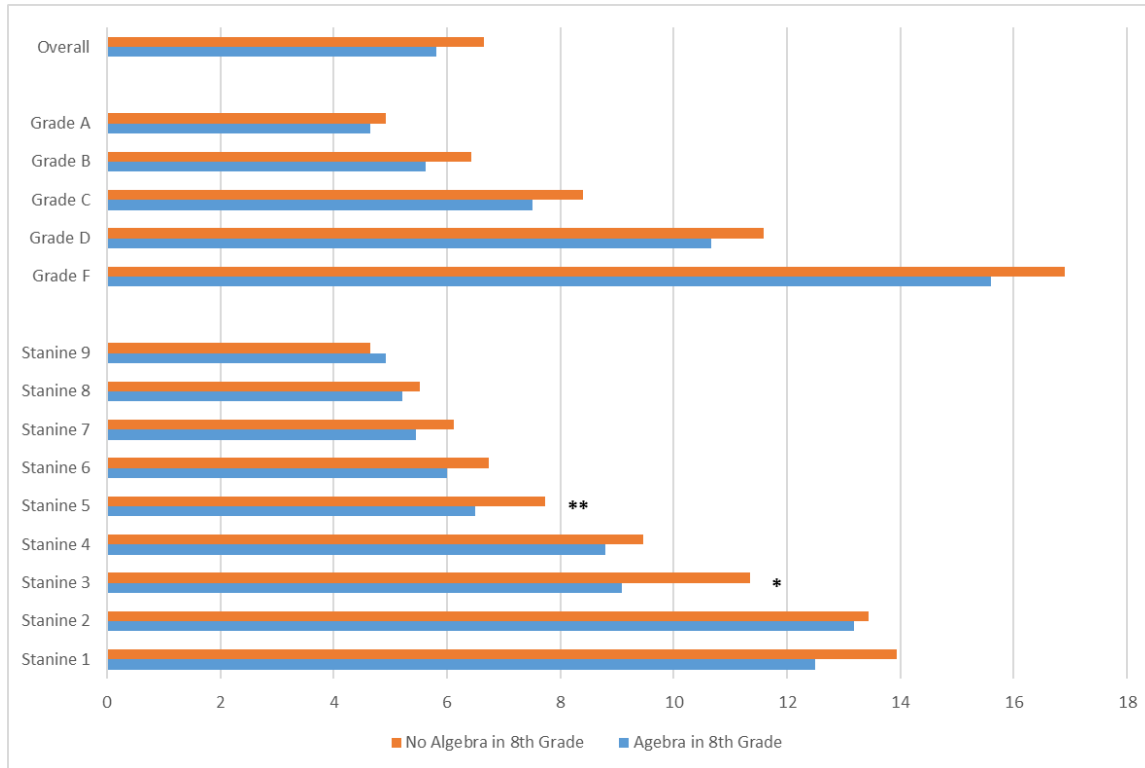
Figure 7. Whether a student graduated in four years (interaction with prior test scores marginally significant).



† = $p < .1$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figures 8-14. CPS results.

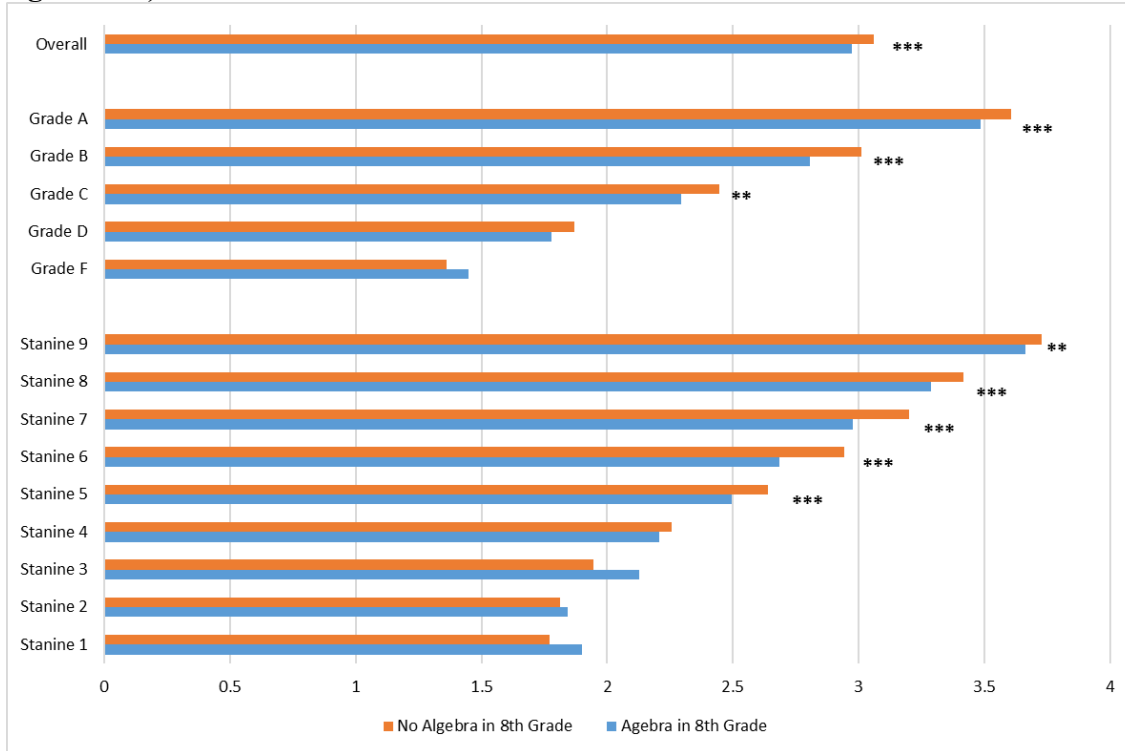
Figure 8. Number of days missed school in 8th grade (interactions with prior grades and test scores significant)



* = $p < .05$, ** = $p < .01$, *** = $p < .001$. Shown here are significance levels for pairwise comparisons of students who took eighth-grade algebra and those that did not. Significance values are not indicated if the interaction was not significant.

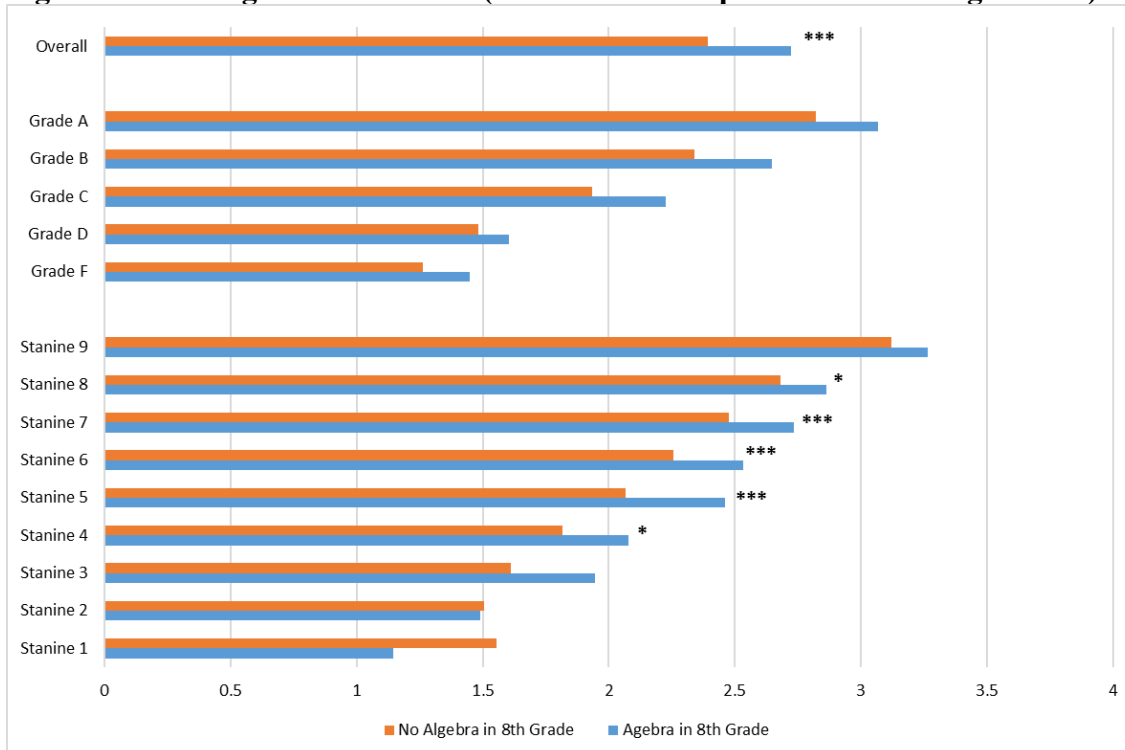
Note: Grades refers to student seventh grade math GPA average, while Stanines 1-9 refer to the student's performance level on the ISAT seventh grade math test.

Figure 9. Eighth-grade math GPA (interactions with prior grades and test scores significant)



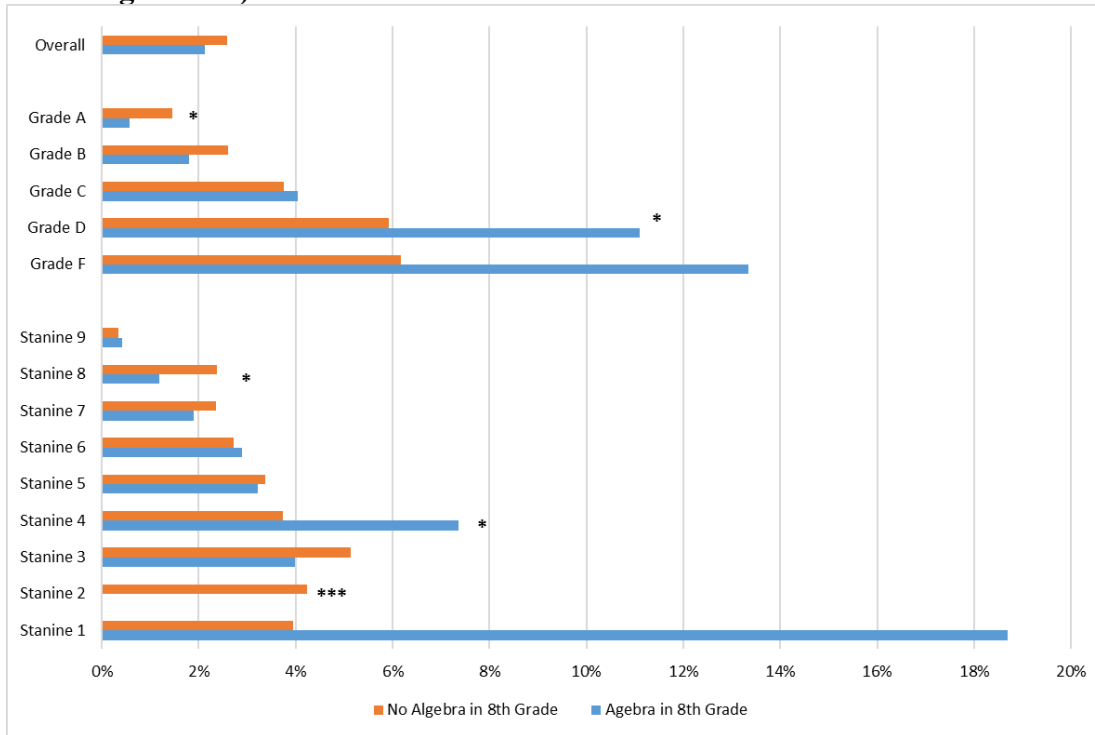
* = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 10. Ninth-grade math GPA (interaction with prior test scores significant)



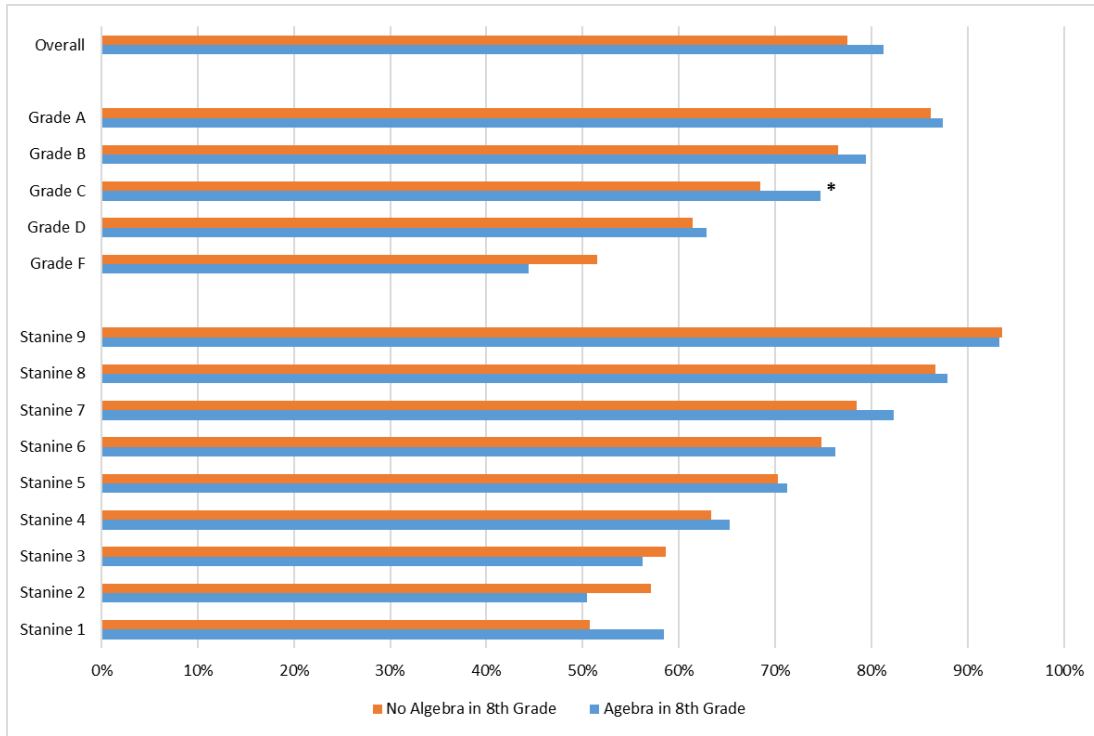
* = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 11. Whether a student repeated Algebra (interactions with prior grades and test scores significant)



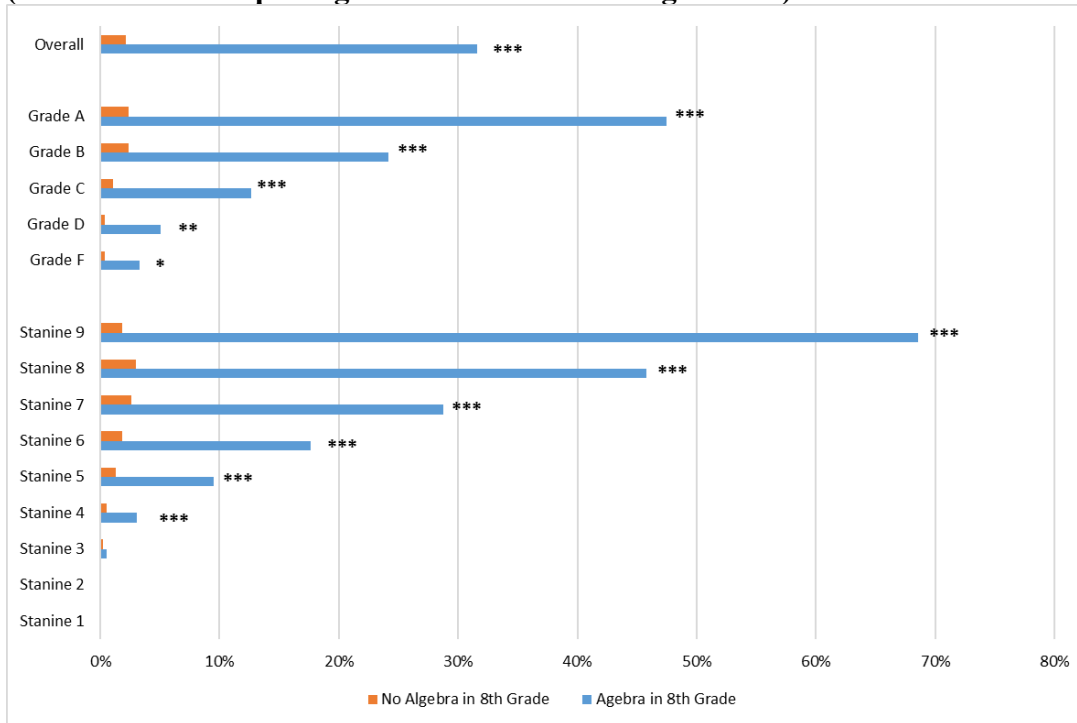
* = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 12. Whether a student took Algebra II (interaction with prior grades significant)



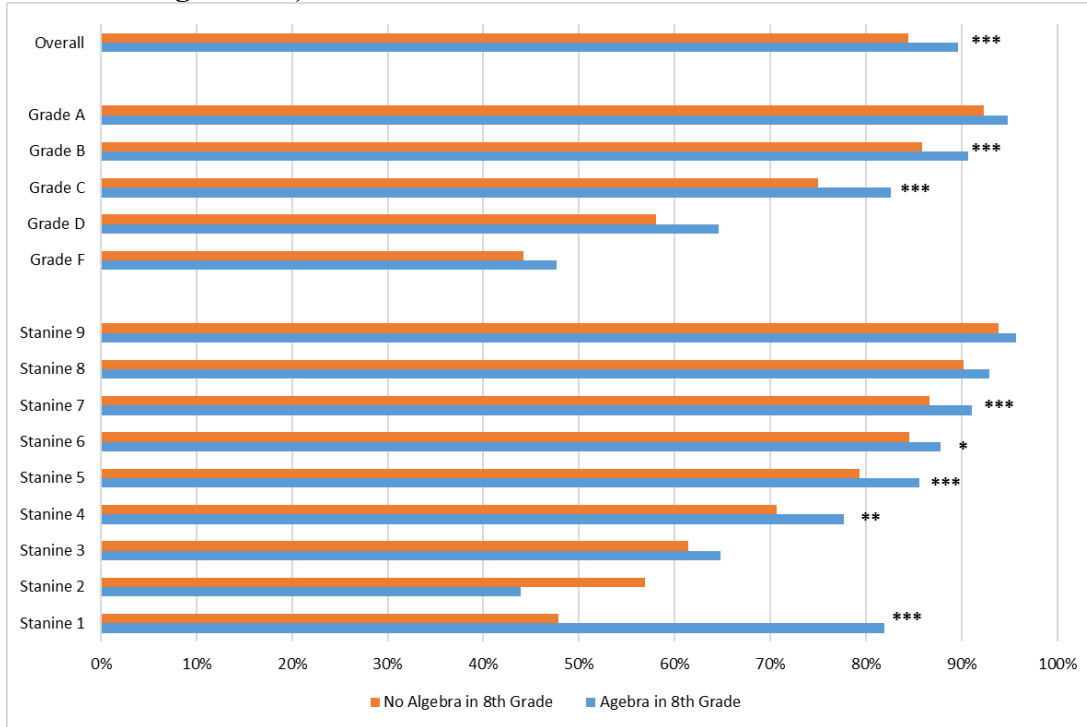
* = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 13. Whether a student completed core math requirements before eleventh grade (interactions with prior grades and test scores significant)



* = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Figure 14. Whether a student graduated in four years (interactions with prior grades and test scores significant)



* = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Table B-1. List and description of outcomes

Outcome	Description
Absences in 8 th grade	Continuous; Percent of instructional time missed in 8 th grade (EGUSD); number of days missed in eighth grade (CPS)
Math GPA in 8 th grade	Continuous; End-of-course GPA of all math classes taken in 8 th grade (if more than one)
Math GPA in 9 th grade	Continuous; End-of-course GPA of all math classes taken in 9 th grade (if more than one)
Repeated Algebra I	Binary; Did the student repeat Algebra I at least once?
Took Algebra II	Binary; Did the student take Algebra II?
Completed core math before 11 th grade	Binary; Did the student complete (pass all sections of) Algebra I, Geometry, and Algebra II before 11 th grade (leaving room to take Pre-calculus and Calculus in high school)?
Graduated in 4 years	Binary; Did the student graduate from high school within four years?

Table B-2. Site demographics and selection model/final analysis variables, with and without weights (EGUSD)

	EGUSD				
	All Students	Students who took Algebra in 8th grade	Students who did not take Algebra in 8th grade	Standardized Mean Differences	
				Not weighted	Weighted
Number of students	22,449	7,463	14,986		
<i>Selection Model Factors</i>					
<i>Ethnicity</i>					
African American students	18%	11%	22%	-0.28	-0.06
American Indian	1%	< 1%	1%	-0.02	0.01
Asian	19%	27%	15%	0.31	-0.05
Filipino	5%	7%	4%	0.13	-0.04
Latino students	25%	18%	29%	-0.24	-0.02
Pacific Islander	2%	2%	2%	0.01	-0.01
White	25%	30%	23%	0.16	0.13
Multi-ethnic	4%	3%	4%	-0.05	0.03
<i>Parent education level</i>					

Graduate degree	11%	16%	8%	0.26	0.16
College degree	22%	29%	19%	0.25	0.04
Some college	28%	25%	29%	-0.10	-0.05
High school diploma	24%	18%	27%	-0.23	-0.05
Did not graduate high school	10%	8%	11%	-0.10	-0.08
Declined to state	5%	4%	5%	-0.04	0.00
Male students	50%	45%	53%	-0.15	0.00
IEP status in 7 th grade*	8%	1%	11%	-0.37	-0.01
LEP status in 7 th grade*	13%	10%	20%	-0.28	-0.09
Free/reduced-priced lunch*	56%	42%	59%	-0.35	-0.14
Mean days suspended in 7 th grade	< 1	< 1	< 1	-0.35	0.00
Mean % of days absent in 7 th grade	4%	2%	4%	-0.45	-0.01
Mean 7 th grade GPA*	2.69	3.43	2.32	1.36	0.11
Mean 7 th grade mathematics test score (scaled)*	350	406	332	1.80	0.31**
Mean 7 th grade math course GPA	2.42	3.33	1.97	1.42	0.11
<i>Readiness Factors</i>					
<i>(added to final analysis model)</i>					
EGUSD 7 th grade math test scores					
Far Below Basic	5%	< 1%	8%		
Below Basic	17%	1%	25%		
Basic	30%	9%	41%		
Proficient	32%	49%	24%		
Advanced	16%	42%	2%		
7 th grade math course performance					
F	12%	1%	18%		
C-D	47%	21%	61%		
A-B	40%	78%	21%		

*Also included in the selection and final analysis model are missingness indicators of these binary status variables

** Although this is not below the 0.25 threshold, it greatly improved from its unweighted SMD of 1.80. It, and all variables listed, are included in the final analysis models to account for additional variance that weighting does not correct.

Table B-3. Site demographics and selection model/final analysis variables, with and without weights (CPS)

	CPS					Standardized Mean Differences (comparing students who took Algebra to those who did not in schools that did not offer Algebra)	
	All Students	Students who took Algebra in 8 th grade	Students who did not take algebra in 8 th grade			Not weighted	Weighted
			Overall	In Schools offering Algebra	In Schools not offering Algebra		
Number of students	100,628	13,982	86,700	28,018	58,682	---	---
<i>Selection Model Factors</i>							
<i>Ethnicity</i>							
African American students	42%	25%	45%	24%	55%	-0.70	-0.56*
Asian	3%	8%	3%	4%	2%	0.26	0.21
Latino students	45%	49%	44%	61%	36%	0.40	0.35*
White	9%	16%	7%	9%	7%	0.22	0.14
Other	1%	1%	1%	1%	1%	0.08	0.06
Male students	51%	46%	51%	53%	51%	-0.01	0.02
IEP status in 7 th grade	13%	3%	15%	17%	14%	-0.08	0.03
LEP status in 7 th grade	7%	2%	8%	13%	6%	0.00	0.06
Free/reduced-priced lunch	84%	74%	86%	86%	86%	-0.16	-0.15
Mean days suspended in 7 th grade	0.74	0.22	0.82	0.56	0.94	-0.24	-0.11
Mean % of days absent in 7 th grade	95%	97%	95%	95%	95%	0.35	0.16
Mean 7 th math grade GPA	2.21	3.14	2.05	1.96	2.01	0.58	0.06
Mean 7 th grade mathematics test score	254	283	248	247	249	0.86	0.21
Mean 7 th grade reading test score	236	260	232	231	233	0.61	0.14
<i>Readiness Factors</i>							

<i>(added to final analysis model)</i>						
CPS 7 th grade math test scores (CPS stanines)						
1 (mean math test scores = 202)	5%	0%	6%	5%	6%	
2 (mean math test scores = 215)	7%	0%	8%	8%	8%	
3 (mean math test scores = 227)	12%	1%	14%	14%	14%	
4 (mean math test scores = 239)	17%	4%	19%	21%	18%	
5 (mean math test scores = 253)	20%	11%	22%	25%	20%	
6 (mean math test scores = 267)	17%	22%	16%	17%	16%	
7 (mean math test scores = 281)	12%	26%	9%	8%	10%	
8 (mean math test scores = 299)	7%	23%	5%	3%	6%	
9 (mean math test scores = 328)	3%	12%	1%	1%	2%	
7 th grade math course performance						
F	8%	1%	9%	10%	8%	
D	17%	4%	20%	20%	19%	
C	34%	17%	37%	39%	36%	
B	26%	35%	24%	24%	24%	
A	15%	44%	10%	7%	12%	

Note: Test scores for the ISAT tests taken in Illinois are grouped in four categories: Academic Warning (4% students in our sample), Below Standards (22% students in our sample), Meets Standards (52% students in our sample) and Exceeds Standards (17% in our sample). The vast majority of students taking algebra in eighth grade were either meeting or exceeding standards. For Chicago, we created a more fine division of the test scores to better understand the effects of taking algebra among students with different levels of readiness defined by their test scores.

Table B-4. Description of readiness factors

Outcome	Description in EGUSD	Description in CPS
7th grade math GPA	Readiness level 1: Average grade of A or B Readiness level 2: Average grade of C or D Readiness level 3: Average grade of F	Readiness level 1: Average grade of A Readiness level 2: Average grade of B Readiness level 3: Average grade of C Readiness level 4: Average grade of D Readiness level 5: Average grade of F
7th grade math test scores	Readiness level 1: Advanced proficiency score on California Standards Test (CST) Readiness level 2: Proficient proficiency score on CST Readiness level 3: Basic proficiency score on CST	Readiness level 1: First stanine on Illinois Standards Achievement Test (ISAT) Readiness level 2: Second stanine on ISAT Readiness level 3: Third stanine on ISAT

	Readiness level 4: Below basic proficiency score on CST Readiness level 5: Far below basic proficiency score on CST	Readiness level 4: Fourth stanine on ISAT Readiness level 5: Fifth stanine on ISAT Readiness level 6: Sixth stanine on ISAT Readiness level 7: Seventh stanine on ISAT Readiness level 8: Eighth stanine on ISAT Readiness level 9: Ninth stanine on ISAT
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Table B-5. Coefficients, standard errors, and significance for each outcome (EGUSD).

Transition from 8 th to 9 th grade				High School Achievement & Graduation			
	Math GPA in 8 th Grade	Math GPA in 9 th Grade	Absences in 8 th grade	Repeated Algebra I	Took Algebra II	Completed core math before 11 th grade	Graduated in 4 years
Test Readiness							
<i>Algebra</i>	$p = .001$	$p = .004$	$p = .06$	$p < .001$	$p < .001$	$p < .001$	$p = .001$
No Algebra in 8th	(omitted)						
Algebra in 8th	-0.33 (0.65)	0.95 (0.51)	-0.03 (0.01)	0.59 (0.12)	0.49 (0.12)	-0.14 (0.13)	0.22 (0.09)
<i>Test Readiness</i>	$p = .31$	$p = .01$	$p = .59$	$p = .04$	$p = .5$	$p = .01$	$p = .56$
Far Below Basic	(omitted)						
Below Basic	0.09 (0.06)	0.23 (0.09)	-0.01 (.00)	-0.06 (.05)	0.17 (0.04)	-0.10 (0.03)	0.04 (0.04)
Basic	0.17 0.13	0.37 (0.14)	-0.01 (.01)	-0.07 (0.13)	0.24 (0.08)	-0.38 (0.12)	0.04 (0.06)
Proficient	0.18 (0.14)	0.58 (0.16)	-0.01 (0.01)	0.01 (0.14)	0.30 (0.08)	-0.62 (0.12)	0.02 (0.07)
Advanced	0.14 (0.15)	0.75 (0.19)	-0.01 (.01)	0.00 (0.14)	0.30 (0.08)	-.68 (0.13)	0.01 (0.07)
<i>Algebra x Test Readiness</i>	$p < .001$	$p = .001$	$p = .15$	$p < .001$	$p < .001$	$p < .001$	$p = .06$
Algebra & Below Basic	-0.12 (0.66)	-0.38 (0.53)	0.03 (0.02)	-0.27 (0.13)	-0.32 (0.13)	0.30 (0.15)	-0.11 (0.10)

Algebra & Basic	-0.26 (0.65)	-0.86 (0.51)	0.03 (0.01)	-0.36 (0.12)	-0.39 (0.12)	0.51 (0.14)	-0.19 (0.10)
Algebra & Proficient	-0.18 (0.65)	-0.94 (0.51)	0.02 (0.01)	-0.46 (0.12)	-0.44 (0.12)	0.78 (0.14)	-0.21 (0.09)
Algebra & Advanced	0.02 (0.65)	-0.95 (0.52)	0.02 (0.01)	-0.47 (0.12)	-0.45 (0.12)	0.86 (0.14)	-0.21 (0.10)
GPA Readiness							
<i>Algebra</i>	$p < .001$	$p = .02$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p = .58$
No Algebra in 8th	(omitted)						
Algebra in 8th	-0.42 (0.02)	-0.001 (0.01)	-0.003 (0.00)	0.02 (0.09)	0.18* (0.08)	0.07 (0.04)	0.03 (0.07)
<i>GPA Readiness</i>	$p = .09$	$p = .91$	$p = .52$	$p = .02$	$p < .001$	$p < .001$	$p = .08$
F	(omitted)						
C-D	-0.03 (0.04)	-0.04 (0.03)	0.002 (0.00)	-0.31 (0.08)	0.29*** (0.06)	-0.12 (0.06)	0.12* (0.6)
A-B	-0.39 (0.09)	-0.07 (0.13)	0.01 (0.01)	-0.26 (0.08)	0.34*** (0.07)	-0.43*** (0.07)	0.10 (0.06)
<i>Algebra x GPA Readiness</i>	$p < .001$	$p = .07$	$p = .13$	$p < .001$	$p = .08$	$p < .001$	$p = .69$
Algebra & C-D	-0.08 (0.04)	0.01 (.02)	-0.001 (.00)	0.22* (0.09)	-0.10 (0.08)	0.29*** (0.04)	-0.03 (0.08)
Algebra & A-B	0.50 (0.12)	-0.07 (0.24)	-0.01 (0.01)	0.08 (0.09)	-0.14 (0.08)	0.65*** (0.04)	-0.01 (0.07)

Note: Shown here are the coefficients for each effect in the model and the standard error (in parentheses). P-values represent significance values for the main effects and interactions. Pairwise significance comparing algebra and non-algebra in eighth grade students for each readiness level can be found in Figures 1-7 for significant interactions.

Table B-6. Coefficients, standard errors, and significance for each outcome (CPS).

Transition from 8 th to 9 th grade				High School Achievement & Graduation			
	Math GPA in 8 th Grade	Math GPA in 9 th Grade	Absences in 8 th grade	Repeated algebra	Took algebra II	Completed core math	Graduated in 4 years

						before 11 th grade	
Test Readiness							
<i>Overall Effect</i>	$p < 0.0001$	$p < 0.0001$	$p = 0.1738$	$p = 0.9971$	$p = 0.7877$	$p < 0.0001$	$p < 0.0001$
Algebra in 8th	-0.19 (0.03)	0.16 (0.02)	-0.17 (0.13)	0.0% (0.002)	0.3% (0.01)	27.3% (0.01)	2.5% (0.005)
<i>Algebra x Test Readiness</i>							
Algebra & Stanine 1	0.33 (0.16)	-0.40 (0.33)	-1.17 (0.91)	12.9% (0.096)	9.0% (0.12)	0.9% (0.01)	38.6% (0.08)
Algebra & Stanine 2	0.14 (0.11)	-0.15 (0.15)	-0.91 (1.30)	-4.9% (0.007)	-4.4% (0.06)	-0.1% (0.01)	-8.0% (0.07)
Algebra & Stanine 3	0.17 (0.09)	0.21 (0.12)	-1.31 (0.54)	-0.8% (0.015)	-4.1% (0.04)	0.4% (0.01)	0.1% (0.04)
Algebra & Stanine 4	-0.04 (0.06)	0.18 (0.08)	-0.25 (0.36)	3.6% (0.014)	1.5% (0.03)	2.4% (0.01)	6.4% (0.02)
Algebra & Stanine 5	-0.13 (0.04)	0.31 (0.04)	-0.59 (0.21)	0.0% (0.007)	0.0% (0.02)	8.1% (0.01)	4.5% (0.01)
Algebra & Stanine 6	-0.24 (0.03)	0.19 (0.04)	-0.23 (0.17)	0.4% (0.004)	0.5% (0.02)	15.5% (0.01)	2.0% (0.01)
Algebra & Stanine 7	-0.27 (0.03)	0.14 (0.03)	-0.15 (0.16)	-0.1% (0.003)	1.8% (0.02)	25.3% (0.01)	2.4% (0.01)
Algebra & Stanine 8	-0.19 (0.04)	0.08 (0.04)	0.09 (0.18)	-0.8% (0.004)	-1.0% (0.02)	41.6% (0.02)	1.0% (0.01)
Algebra & Stanine 9	-0.11 (0.04)	0.05 (0.06)	0.43 (0.27)	0.5% (0.003)	-2.5% (0.01)	65.2% (0.02)	0.5% (0.01)
H0: All algebra x Test Readiness Equal	$p < 0.0001$	$p = 0.014$	$p = 0.0411$	$p < 0.0001$	$p = 0.2498$	$p < 0.0001$	$p < 0.0001$
<i>Algebra x GPA Readiness</i>							
Algebra & F	0.04 (0.15)	0.15 (0.11)	-1.81 (1.23)	7.1% (0.05)	-8.2% (0.05)	4.0% (0.02)	3.3% (0.06)

Algebra & D	-0.10 (0.08)	0.09 (0.08)	-0.76 (0.46)	5.1% (0.02)	-0.1% (0.03)	2.7% (0.01)	5.3% (0.03)
Algebra & C	-0.16 (0.04)	0.19 (0.05)	-0.36 (0.19)	0.6% (0.01)	4.3% (0.02)	11.3% (0.01)	5.4% (0.01)
Algebra & B	-0.24 (0.03)	0.19 (0.03)	-0.21 (0.15)	-0.5% (0.003)	0.6% (0.02)	21.0% (0.01)	2.5% (0.01)
Algebra & A	-0.20 (0.03)	0.10 (0.03)	0.15 (0.16)	-0.5% (0.002)	-2.1% (0.01)	42.2% (0.01)	0.3% (0.01)
H0: All algebra x GPA Readiness Equal	$p = 0.0418$	$p = 0.1663$	$p = 0.0283$	$p = 0.0267$	$p = 0.0029$	$p < 0.0001$	$p = 0.0005$