TECHNICAL BRIEF

Technical appendix for:
Learning during COVID-19: Reading and math achievement in the 2020-21 school year

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1. Introduction

The purpose of this technical appendix is to share more detailed results and to describe more fully the sample and methods used in the research included in the brief, *Learning during COVID-19: Reading and math achievement in the 2020-21 school year.[i]* Two research questions were investigated in this brief:

1. How do gains across the 2020-21 school year compare to pre-pandemic trends?
2. How does student achievement in spring of 2021 compare to pre-pandemic levels?

2. Data

Sample

The data for this study are from the NWEA anonymized longitudinal student achievement database. School districts use NWEA® MAP® Growth™ assessments to monitor elementary and secondary students' reading and math growth, with assessments typically administered in the fall (usually between August and November), winter (usually December to March), and spring (late March through June). The NWEA data also include demographic information, including student race/ethnicity, gender, and age at assessment. An indicator of student-level socioeconomic status is not available. However, a set of school-level characteristics, including school-level free or reduced priced lunch (FRPL) eligibility was obtained from a data file produced by the Stanford Education Data Archive (SEDA) version 4.0.[ii]

In total, our sample consists of approximately 5.5 million 3rd-8th grade students[1] in 12,500 public schools who took MAP Growth reading and math assessments across the 2018-19 and 2020-21 school years. Student test scores for grades 3-8 from the fall, winter, and spring of the 2018-19 school year were treated as the reference distribution (representing a "typical" school year). Fall, winter, and spring test scores for grades 3-8 in 2020-21 describe the trends for the COVID-19 impacted year.

We limited our sample of schools to a consistent set of U.S. public schools that tested at least ten students in a given grade in both the 2018-19 and 2020-21 school years. This sample restriction guards against the competing explanation that any differences we observe in achievement over time are potentially driven by systematic differences between schools that did and did not test students in the 2020-21 school year. Descriptive information for the students in our sample by grade is provided in Table 1 (for reading) and Table 2 (for math). These tables show a comparison of the students in the reference group (spring 2019) and the pandemic impacted group (spring 2021). Overall, the samples of students who tested in 2019 and of same-grade students that tested in fall 2020 were very similar in terms of gender and race/ethnicity, though the number of students tested in each grade was consistently larger in fall 2019.

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[1] Results from our fall comparability analysis[iii] of remote and in-person testing suggest that the remote testing experience is consistent with in-person testing for students in grades 3-8, but may qualitatively differ for the youngest students. Therefore, we have excluded K-2 students from the presented analyses.

Descriptive information for the schools in our sample along with comparison information on the population of U.S. schools is provided in Table 3. The schools in our sample represent roughly 10-15% of U.S. public schools. Our sample reflects a diversity of schools from across various locales (urban, suburban, rural, and town). However, our sample reflects slightly higher percentages of White students and slightly lower percentages of students eligible for FRPL relative to national averages.

Measure of achievement

Student test scores from the NWEA MAP Growth reading and math assessments, called RIT scores, were used in this study. MAP Growth is a computer adaptive test that precisely measures achievement even for students above or below grade level and is vertically scaled to allow for the estimation of gains across time. The MAP Growth assessments are typically administered three times a year (fall, winter, and spring) and are aligned to state content standards. Test scores are reported on the RIT (Rasch unIT) scale, which is a linear transformation of the logit scale units from the Rasch item response theory model.

In this study, we used both students' RIT scores and their achievement percentile scores. Achievement percentile scores were calculated using the NWEA 2020 MAP Growth norms,[iv] which were calculated based on a pre-pandemic sample of students from the 2015-16, 2016-17, and 2017-18 school years. Since MAP Growth can be estimated at any point during the school year, the MAP Growth achievement norms condition on each student's grade, subject, and instructional week of testing (i.e., the week in the school calendar in which a student tested). Instructional weeks were calculated for each student based on their school start date and the individual student's testing dates (for more details on the calculation of instructional weeks, see the norms study). Within each grade and subject, let Y_{it} be a student i's RIT score at instructional week t. The predicted mean $(\widehat{Y}_t)$ and standard deviation $(SD(Y_t))$ for a given grade/subject/instructional week combination were pre-calculated based on the NWEA norms model (see Chapter 4 of the norms report). Based on these values, we calculated a standardized estimate of the student's RIT score:

$$z(Y_{it}) = \frac{(Y_{it} - \widehat{Y}_t)}{SD(Y_t)}.$$

From the standardized score, we calculated the score percentile (e.g., the proportion of the distribution that the student scored as well as, or better than):

$$ps(Y_{it}) = Pr(Y_{it} \leq y_t) = \int_{-\infty}^{y_t} \phi(z)dz,$$

where $\phi(z)$ represents the probability density function. The student normative percentile used in this study was scaled to range from 0.1 to 99.9:

$$Perc = 100 \times p_s(Y_{it}).$$

3. Methods

RQ1: How do gains across the 2020-21 school year compare to pre-pandemic trends?

The first research question was addressed by calculating mean RIT scores for each testing season in 2018-19 and 2020-21 from student test scores. Table 4 displays the means, standard deviations, and fall to spring difference scores for grade 3-8 students in each cohort (2018-19 and 2020-21). Tables 5(a), 5(b), and 5(c) display the results further disaggregated by gender, student race/ethnicity, and school poverty level. School poverty level was calculated based on the reported percentage of students eligible for FRPL. Due to recent changes in reporting practices on FRPL, we chose to use the school-level percentage FRPL-eligibility variable from SEDA, which is weighted average of a school's percentage FRPL-eligibility from 2009 to 2016 (see the Stanford Education Data Archive[ii] for more details). We classified schools into three poverty levels: (a) "Low-Poverty" - less than 25% FRPL eligibility, (b) "Mid-Poverty" - 25-75% FRPL eligibility, and (c) "High-Poverty" - greater than 75% FRPL eligibility.

In the accompanying research brief, the line plots we included to address RQ1 were restricted to grades 3, 5, and 7 for simplicity. For completeness, Figure A1 and A2 show connected line plots of the projected mean RIT score separately by grade level for reading and math, respectively.

RQ2: How does student achievement in spring of 2021 compare to pre-pandemic levels?

To address the second research question, we calculated the median student achievement percentile based on the NWEA 2020 MAP Growth norms in spring 2019 and spring 2021 for each grade level and subject. The overall results are presented in Table 4 and the subgroup results in Tables 5(a) through 5(c).

4. Sensitivity analyses

To test the sensitivity of our findings to concerns around missing data and test quality in the 2020-21 school year, we present a few supplemental analyses further interrogating indicators of test duration/test engagement and attrition patterns. First, we examine test properties across the 2018-19 and 2020-21 school year to see whether students (a) spent similar time taking the test, (b) showed similar levels of test engagement as measured by NWEA's Response Time Effort (RTE) indicator,[v] and (c) got a similar percentage of items correct (with an adaptive test, 50%correct is the expected baseline). These results are presented in Table 6. Overall, students spent a similar amount of time on the test, showed comparably high percentages of average test engagement, and got the expected percent of items correct in 2020-21 as in 2018-19.

Second, comparing raw means could lead to incorrect inferences given that students tested at different instructional weeks on average across the two school years. We observed that students in 2018-19 tested on average in the second week of school in the fall, while students in 2020-21 tested on average in the fourth week of the school year. To test the sensitivity of our mean comparisons to these differences in instructional week of testing, we projected students' test scores to modal weeks of instruction by term (week 4 for fall, week 20 for winter, and week 32 for spring). We did this by regressing students' RIT scores on the weeks into the school year they tested separately by grade, subject, term, and year. Given that growth at various points in the school year may not be linear,[vi] we included linear and quadratic terms in the model.

$$\text{Y}_{it} = \beta_0 + \beta_1 iWks_{it} + \beta_2 iWks_{it}^2 + \epsilon_{it}$$

We used the estimated coefficients from this regression along with students' instructional weeks to assign them a projected test score consistent with the modal date. Observed RIT scores and the projected RIT scores were correlated 0.99. Table 7 displays the observed and projected means and SDs, which showed convergent patterns across the two approaches.

Third, to include the largest sample of students possible within the schools that tested in both 2018-19 and 2020-21, we only required that at least 10 students were tested in a given grade. Students might have tested in any combination of fall, winter, and/or spring terms. One concern with this inclusion rule is that changing samples over the course of the academic year may drive differences over time (e.g., if students were generally more transitory during the pandemic impacted year, this could lead to less stable estimates for the 2020-21 results and potentially lead to biased comparisons with the pre-pandemic cohort). We examined whether the results were sensitive to a slightly more restrictive testing requirement (namely, that students had to test in both the fall and spring). This restriction helps rule out the possibility that changing samples between the fall and spring testing window explains differences in trends over time. A comparison between the two samples is presented in Table 8. The RIT percentiles increased slightly for the more restrictive sample, but the results were largely similar, and the main findings of the brief do not change appreciably.

Finally, we examined attrition rates to better understand how representative the students with observed test scores in 2020-21 are of NWEA's typical testing population. Following the "match rate" formula described by Andrew Ho,[vii] we calculated the percentage of students with observed test scores in a prior school year who were observed in the subsequent school year (see figure below for a depiction).

Baseline (2018-19) match rate: $N_{AB} = A \cap B$, $m_{19} = \frac{N_{AB}}{N_A}$, $att_{19} = 1 - m_{19}$

COVID-19 (2020-21) match rate: $N_{CD} = C \cap D$, $m_{21} = \frac{N_{CD}}{N_C}$, $att_{21} = 1 - m_{21}$

Students were counted as "observed" in a school year if they tested in at least one term in a given subject within a school where testing was offered. We have chosen to present these findings as attrition rates (e.g., 1 minus the observed match rate), which are presented in Table 9 by grade level and subject. Overall, the attrition rates during the COVID-19 impacted year ranged from 16 to 28% of students, when looking at all students testing. As a reference, the attrition rates ranged from 11 to 19% during a typical period. Subgroup attrition rates are presented in Table 10 separately by math and reading. In general, we find higher attrition

among Asian American, Black, Latinx, and American Indian or Alaska Native (AIAN) students at all grade levels relative to White students in 2020-21. Likewise, when considering students' prior MAP Growth score quintile, we see the largest attrition rates amongst students in the lowest and second lowest quintiles of the distribution. The higher attrition rate during COVID-19 is not surprising given the facts that 1) a non-trivial portion of students did not attend in-person school in 2020-21, which was likely concentrated among the subgroups of students most likely to attrit in our data, and 2) the shifting nature of schools' plans during the 2020-21 school year, from fully remote, to hybrid, to fully in-person learning.

5. Limitations

There are several important limitations worth noting. Most importantly, we only included schools that tested in both 2018-19 and 2020-21. Schools that consistently tested across years are likely different than schools that tested in just one or the other year. Based on the composition of the schools that met our inclusion criteria, we expect the percentile declines reported here to be less severe than those in the schools excluded. In addition, the higher attrition rate observed this year as compared to 2018-19 is another factor in the observed percentile score declines. Given the higher attrition rate among students of color and students at the lowest quintiles of the MAP Growth score distributions from the prior year, we expect that the magnitude of our results is perhaps less pronounced than in the larger U.S. student population. Additionally, a sizeable percentage of our sample tested remotely in the spring (46%). The comparability study[iii] conducted in the fall and our inspection of the spring metrics of in-person and remote tests provides confidence that the two types of administration are largely equivalent. However, testing remotely is not the same as learning remotely, and we cannot address questions of whether COVID-19 differentially impacted students by instruction modality with these data. Finally, we had access to limited demographic information on students and are unable to disaggregate our data by student-level poverty, English Language status, or special education status.

6. Conclusion

Our study found that academic achievement in spring 2021 was lower than a typical year for all students. Black, AIAN, and Latinx students, as well as students in high poverty schools were disproportionately impacted, particularly in the elementary grades we studied. However, these data alone cannot paint a complete picture of how young people fared this past year. Future work will be needed to examine longer-term academic impacts as well as to measure students' social and emotional learning as students continue to face unprecedented challenges due to the pandemic. Additionally, we plan to work with school districts in the upcoming school year to better understand the most effective recovery efforts for students most impacted by the pandemic. Through our ongoing work, we seek to provide data to inform evidence-based policies to support our students, teachers, and families on the path to recovery and deploy resources where they are most needed, now and into the future.

Table 1. Description of the student sample in reading

Grade	Male	White	Black	Latinx	Asian	AIAN	Other Race	Sample Size		
								Students	Schools	Districts
2018-19 Sample										
3	51	49.3	15.9	17.8	4.3	1.3	11.4	608,603	8,209	2,874
4	50.9	50.5	15.9	17.2	4.3	1.4	10.7	606,841	8,039	2,879
5	51.1	50.4	15.6	17.5	4.2	1.4	10.9	600,724	7,566	2,819
6	51	50.8	15.5	17.5	4.3	1.4	10.5	593,799	4,748	2,743
7	50.8	51.3	14.9	17.2	4.2	1.3	11.1	577,694	4,023	2,644
8	51	51.2	15	17.8	4.2	1.4	10.4	566,538	4,132	2,599
2020-21 Sample										
3	51.1	49.4	15.8	18.2	4.5	1.2	10.9	559,963	8,209	2,874
4	51	50.3	15.6	17.3	4.3	1.3	11.2	550,463	8,039	2,879
5	51	49.9	15.5	18	4.4	1.3	10.9	549,569	7,566	2,819
6	50.9	50.4	15.2	18	4.6	1.3	10.5	541,374	4,748	2,743
7	50.9	50.7	14.9	18.1	4.4	1.3	10.6	540,495	4,023	2,644
8	50.9	50.5	15	18.3	4.3	1.3	10.6	536,318	4,132	2,599

Note. AIAN= American Indian or Alaska Native. As a point of comparison, the percentage distribution of students enrolled in public elementary and secondary schools in fall 2018 was 47% White, 15% Black, 27% Hispanic/Latinx, 5% Asian, 1% AIAN, and 5% Other Race.[viii]

Table 2. Description of the student sample in math

Grade	Male	White	Black	Latinx	Asian	AIAN	Other Race	Sample Size		
								Students	Schools	Districts
2018-19 Sample										
3	51.1	48.6	16	18.3	4.4	1.3	11.4	614,830	8,288	2,879
4	50.9	49.8	16	17.7	4.4	1.4	10.7	613,635	8,120	2,889
5	51.1	50	15.7	17.9	4.3	1.4	10.7	614,108	7,714	2,830
6	51.1	50.2	15.6	18	4.3	1.4	10.5	602,582	4,794	2,755
7	50.8	50.8	15.1	17.7	4.2	1.3	10.9	585,179	4,063	2,661
8	51	50.7	15.3	18.4	4	1.4	10.2	564,334	4,149	2,602
2020-21 Sample										
3	51.1	48.6	15.8	18.9	4.6	1.2	10.9	564,556	8,288	2,879
4	51	49.6	15.7	18	4.4	1.3	11	558,304	8,120	2,889
5	51	49.3	15.5	18.6	4.6	1.3	10.7	561,759	7,714	2,830
6	50.9	50	15.3	18.4	4.5	1.3	10.5	546,938	4,794	2,755
7	50.9	50.2	15.2	18.7	4.1	1.3	10.5	539,673	4,063	2,661
8	51	49.6	15.6	19.2	3.7	1.4	10.5	506,296	4,149	2,602

Note. AIAN= American Indian or Alaska Native. As a point of comparison, the percentage distribution of students enrolled in public elementary and secondary schools in fall 2018 was 47% White, 15% Black, 27% Hispanic/Latinx, 5% Asian, 1% AIAN, and 5% Other Race.[viii]

Table 3. Sample school information

Sample	Grade	Number of schools	Average School Enrollment	% FRPL	% White	% Black	% Latinx	% Asian American	% AIAN	% LEP	% Gifted	% Disabled	% City	% Rural	% Suburb	% Town
NWEA Analytic Sample	3	8,209	461	52%	61%	14%	19%	4%	2%	11%	5%	16%	26%	26%	37%	11%
NWEA Analytic Sample	4	8,039	457	51%	62%	14%	19%	4%	2%	10%	5%	16%	25%	27%	37%	11%
NWEA Analytic Sample	5	7,566	464	52%	61%	14%	19%	4%	2%	10%	6%	16%	26%	27%	37%	10%
NWEA Analytic Sample	6	4,748	521	50%	63%	13%	18%	3%	2%	7%	8%	16%	23%	34%	31%	12%
NWEA Analytic Sample	7	4,023	543	49%	64%	13%	17%	3%	2%	6%	9%	16%	21%	36%	29%	14%
NWEA Analytic Sample	8	4,132	548	51%	62%	14%	19%	3%	2%	6%	9%	17%	25%	35%	28%	13%
U.S. public schools	3	51,888	463	57%	52%	15%	27%	5%	2%	12%	4%	17%	30%	26%	34%	10%
U.S. public schools	4	52,213	463	57%	52%	15%	27%	4%	2%	12%	4%	17%	30%	26%	34%	10%
U.S. public schools	5	52,356	465	58%	52%	15%	27%	4%	2%	12%	4%	17%	30%	27%	33%	10%
U.S. public schools	6	39,668	482	58%	52%	15%	27%	4%	2%	9%	5%	18%	28%	31%	30%	11%
U.S. public schools	7	30,860	493	57%	54%	16%	24%	3%	2%	8%	6%	19%	27%	34%	27%	12%
U.S. public schools	8	30,387	496	57%	54%	16%	24%	3%	2%	8%	6%	19%	27%	34%	27%	12%

Note. FRPL=free or reduced priced lunch, AIAN= American Indian or Alaska Native, LEP=limited English proficiency. Across grades there were 12,500 unique schools in the sample. The school characteristics were retrieved from a school-level covariate data file produced by the Stanford Education Data Archive (SEDA) version 4.0.[ii] The sources of the variables are the Common Core of Data (CCD) collected by the National Center for Educational Statistics and the U.S. Department of Education (ED) Civil Rights Data Collection (CRDC). The U.S. public school population comparison for each grade was determined by limiting to the schools that offered a given grade.

Table 4. Student RIT score means by subject, grade level, and year

Subject	Year	Grade	Number of students tested			Spring Median Percentile	RIT Score Means			RIT Score SDs			Fall-Spring Gain Scores	
			Fall	Winter	Spring		Fall	Winter	Spring	Fall	Winter	Spring	M	SD
Reading	2018-19	3	563,114	538,693	543,375	57.1	187.9	194.5	198.5	16.5	16.0	16.0	10.8	9.4
Reading	2020-21	3	475,863	438,735	453,018	50.9	188.6	193.3	195.8	17.5	17.2	17.4	7.8	11.4
Reading	2018-19	4	561,145	529,945	539,310	56.6	198.2	202.9	205.8	16.2	15.6	15.7	7.7	8.8
Reading	2020-21	4	465,323	425,287	435,898	51.7	198.4	201.9	203.6	16.6	16.6	16.8	5.6	10.0
Reading	2018-19	5	555,218	522,358	531,672	55.8	205.5	209.3	211.4	15.9	15.2	15.5	6.1	8.5
Reading	2020-21	5	463,405	423,791	430,825	51.1	205.5	208.2	209.4	16.3	16.3	16.5	4.3	9.5
Reading	2018-19	6	544,223	475,983	515,125	54.5	211.2	213.5	215.5	15.7	15.4	15.6	4.5	8.5
Reading	2020-21	6	440,050	384,684	406,738	50.6	211.4	213.0	213.7	15.9	16.2	16.5	2.7	9.4
Reading	2018-19	7	521,279	447,701	493,998	55.3	215.4	217.1	218.9	15.8	15.8	15.9	3.8	8.5
Reading	2020-21	7	437,420	371,013	399,685	51.5	215.6	216.7	217.1	16.2	16.6	16.8	1.9	9.5
Reading	2018-19	8	505,769	438,323	466,790	54.8	219.2	220.8	222.1	15.9	15.8	16.0	3.2	8.6
Reading	2020-21	8	434,506	367,119	378,046	51.4	219.3	220.4	220.3	16.4	16.8	17.0	1.4	9.5
Math	2018-19	3	593,368	572,865	580,139	55	188.8	196.3	202.3	13.5	13.4	14.2	13.6	7.6
Math	2020-21	3	486,449	449,118	462,989	43.2	187.6	193.7	198.1	14.1	14.4	15.6	11.2	10.3
Math	2018-19	4	598,988	571,700	583,937	54.7	200.9	206.3	212.1	14.2	14.2	15.6	11.4	7.5
Math	2020-21	4	489,554	448,604	458,890	44.1	198.6	203.5	207.8	14.4	14.8	16.6	9.8	9.2
Math	2018-19	5	600,437	570,944	582,599	53.5	210.4	215.1	220.3	15.5	15.9	17.5	9.9	7.7
Math	2020-21	5	496,319	454,973	460,958	42.4	208.2	212.4	215.8	15.6	16.3	18.0	8.1	8.9
Math	2018-19	6	580,036	513,203	554,989	51.8	215.3	219.0	223.2	15.5	16.1	17.3	8.0	7.5
Math	2020-21	6	456,171	399,676	421,178	43.4	213.5	216.8	219.9	15.3	16.2	17.5	7.1	8.5
Math	2018-19	7	539,835	469,927	518,171	54.6	222.1	224.8	228.5	17.3	17.8	18.8	6.5	7.5
Math	2020-21	7	446,814	380,181	408,054	46.1	220.2	222.7	224.8	16.6	17.5	18.6	5.5	8.4
Math	2018-19	8	516,944	447,562	476,583	55.4	227.7	230.1	233.2	18.4	18.9	20.1	5.6	7.9
Math	2020-21	8	446,883	377,414	388,688	47.2	225.6	227.8	229.1	18.0	18.9	19.8	4.3	8.7

Note. These results were calculated using our main analytic sample described in Section 2.

Table 5a. Student RIT score means by subject, grade level, year, and gender

Subject	Year	Group	Grade	Number of students tested			Spring Median Percentile	RIT Score Means			RIT Score SDs			Fall-Spring Gain Scores	
				Fall	Winter	Spring		Fall	Winter	Spring	Fall	Winter	Spring	M	SD
Reading	2018-19	Female	3	275,993	263,681	266,134	59.8	189.4	195.9	199.8	16.1	15.4	15.3	10.6	9.0
Reading	2020-21	Female	3	232,929	215,158	221,486	53.3	189.8	194.5	196.9	17.0	16.7	16.8	7.6	11.0
Reading	2018-19	Male	3	286,856	274,798	277,031	54.4	186.5	193.2	197.3	16.9	16.5	16.6	11.0	9.7
Reading	2020-21	Male	3	242,934	223,577	231,532	48.4	187.4	192.2	194.8	17.8	17.7	17.9	8.0	11.9
Reading	2018-19	Female	4	275,928	260,066	264,997	59	199.6	204.2	207.0	15.5	14.8	14.9	7.5	8.4
Reading	2020-21	Female	4	227,932	208,293	213,293	53.7	199.6	203.0	204.7	15.9	15.8	16.0	5.5	9.5
Reading	2018-19	Male	4	284,921	269,639	274,067	54.1	196.9	201.7	204.6	16.8	16.2	16.4	8.0	9.2
Reading	2020-21	Male	4	237,391	216,994	222,605	49.5	197.2	200.9	202.5	17.3	17.2	17.5	5.8	10.5
Reading	2018-19	Female	5	271,939	255,764	260,553	58	207.0	210.6	212.7	15.0	14.3	14.5	5.8	8.0
Reading	2020-21	Female	5	227,125	207,706	211,184	53.3	206.7	209.4	210.6	15.4	15.4	15.6	4.2	8.9
Reading	2018-19	Male	5	282,973	266,351	270,867	53.3	204.1	208.1	210.2	16.7	16.0	16.3	6.3	9.0
Reading	2020-21	Male	5	236,280	216,085	219,641	48.8	204.3	207.1	208.2	16.9	17.0	17.3	4.3	10.0
Reading	2018-19	Female	6	267,258	233,141	252,536	57.2	212.7	215.0	217.0	14.7	14.5	14.6	4.4	7.9
Reading	2020-21	Female	6	216,696	189,084	199,519	53.3	212.7	214.3	215.2	15.0	15.3	15.5	2.9	8.7
Reading	2018-19	Male	6	276,671	242,630	262,384	51.7	209.7	212.1	214.0	16.5	16.2	16.4	4.6	9.1
Reading	2020-21	Male	6	223,354	195,600	207,219	47.7	210.2	211.7	212.2	16.6	17.0	17.2	2.6	9.9
Reading	2018-19	Female	7	257,931	220,224	243,419	58.6	217.2	218.9	220.7	14.6	14.7	14.8	3.7	7.9
Reading	2020-21	Female	7	215,180	182,104	195,859	55	217.2	218.4	218.9	15.2	15.7	15.8	2.1	8.7
Reading	2018-19	Male	7	262,639	226,859	249,918	51.7	213.7	215.4	217.2	16.6	16.5	16.7	3.8	9.2
Reading	2020-21	Male	7	222,240	188,909	203,826	48	214.0	215.0	215.3	16.9	17.4	17.6	1.7	10.1
Reading	2018-19	Female	8	249,128	214,451	228,714	58.4	221.2	222.8	224.1	14.7	14.7	14.8	3.1	7.8
Reading	2020-21	Female	8	213,693	180,126	185,092	55.3	221.2	222.4	222.4	15.3	15.7	15.8	1.6	8.7
Reading	2018-19	Male	8	255,933	223,267	237,408	51.1	217.3	219.0	220.2	16.7	16.6	16.8	3.3	9.4
Reading	2020-21	Male	8	220,813	186,993	192,954	47.4	217.6	218.5	218.3	17.2	17.7	17.9	1.2	10.3
Math	2018-19	Female	3	278,827	263,341	269,575	53.1	188.5	195.7	201.7	12.7	12.6	13.4	13.3	7.2
Math	2020-21	Female	3	232,003	215,302	219,954	40.5	186.8	192.9	197.2	13.4	13.7	14.9	11.0	10.1
Math	2018-19	Male	3	290,861	274,487	280,688	57.1	189.2	196.8	203.0	14.3	14.1	15.0	13.9	7.9
Math	2020-21	Male	3	241,876	223,872	229,984	45.9	188.2	194.4	198.9	14.8	15.0	16.3	11.3	10.6

Subject	Year	Gender	Grade												
Math	2018-19	Female	4	279,891	261,944	269,783	52.9	200.4	205.6	211.4	13.3	13.4	14.7	11.1	7.1
Math	2020-21	Female	4	229,622	211,795	216,214	41.6	197.8	202.7	206.8	13.5	13.9	15.8	9.6	8.9
Math	2018-19	Male	4	290,319	271,647	279,129	56.6	201.4	207.0	212.9	15.0	14.9	16.4	11.7	7.8
Math	2020-21	Male	4	239,040	220,476	225,595	46.6	199.3	204.3	208.7	15.1	15.5	17.3	10.0	9.5
Math	2018-19	Female	5	279,700	260,162	266,487	51.8	209.9	214.5	219.7	14.6	15.1	16.7	9.8	7.4
Math	2020-21	Female	5	229,894	211,634	217,143	40.4	207.4	211.7	214.9	14.7	15.4	17.2	8.0	8.7
Math	2018-19	Male	5	291,620	270,655	276,706	55.4	210.9	215.8	220.8	16.4	16.6	18.2	10.0	7.9
Math	2020-21	Male	5	239,185	220,029	226,079	44.6	208.9	213.1	216.6	16.4	17.0	18.7	8.2	9.2
Math	2018-19	Female	6	272,797	237,816	257,534	50.9	215.0	218.6	223.0	14.5	15.2	16.4	8.1	7.2
Math	2020-21	Female	6	219,432	191,721	199,185	42.1	213.1	216.5	219.4	14.4	15.3	16.7	7.1	8.2
Math	2018-19	Male	6	283,848	247,417	267,828	52.7	215.7	219.3	223.4	16.5	17.0	18.2	7.9	7.8
Math	2020-21	Male	6	226,205	198,135	206,701	44.8	213.9	217.1	220.2	16.1	17.0	18.3	7.1	8.8
Math	2018-19	Female	7	262,368	222,460	247,699	54.8	222.2	224.8	228.7	16.3	16.8	17.8	6.6	7.1
Math	2020-21	Female	7	215,369	182,732	193,394	45.7	220.2	222.8	224.8	15.7	16.8	17.8	5.4	8.1
Math	2018-19	Male	7	268,969	228,705	254,522	54.5	222.1	224.7	228.3	18.2	18.6	19.7	6.4	7.9
Math	2020-21	Male	7	221,629	188,526	200,503	46.6	220.2	222.5	224.9	17.4	18.2	19.4	5.5	8.7
Math	2018-19	Female	8	249,090	213,292	229,458	56	228.0	230.4	233.5	17.5	18.0	19.2	5.6	7.5
Math	2020-21	Female	8	199,434	168,056	171,150	47.3	225.9	228.3	229.3	17.1	18.1	18.8	4.2	8.4
Math	2018-19	Male	8	257,135	220,964	237,821	54.9	227.4	229.8	232.8	19.3	19.8	21.0	5.6	8.3
Math	2020-21	Male	8	206,542	174,796	179,101	47	225.3	227.3	228.9	18.8	19.7	20.6	4.4	9.0

Note. These results were calculated using our main analytic sample described in Section 2.

Table 5b. Student RIT score means by subject, grade level, year, and race/ethnicity

Subject	Year	Group	Grade	Number of students tested			Spring Median Percentile	RIT Score Means			RIT Score SDs			Fall-Spring Gain Scores	
				Fall	Winter	Spring		Fall	Winter	Spring	Fall	Winter	Spring	M	SD
Reading	2018-19	Asian	3	23,308	22,601	22,786	71.7	194.6	200.6	204.8	16.0	15.5	15.2	10.1	8.2
Reading	2020-21	Asian	3	21,293	18,907	19,843	66.9	196.6	200.6	202.8	16.5	16.1	16.3	6.7	9.9
Reading	2018-19	Black	3	87,291	83,850	84,940	41.1	182.2	188.5	192.2	15.8	15.8	15.9	10.1	9.8
Reading	2020-21	Black	3	74,737	66,717	66,936	31.4	183.4	186.7	188.3	17.4	17.4	17.4	5.3	13.4
Reading	2018-19	Latinx	3	99,567	97,747	96,738	43.8	182.5	189.1	193.1	16.0	16.0	16.2	11.0	9.4
Reading	2020-21	Latinx	3	83,014	79,352	84,749	34.2	182.6	186.8	189.1	17.3	17.4	17.5	7.0	12.0
Reading	2018-19	AIAN	3	7,265	6,883	7,032	34.8	180.3	186.4	189.9	16.2	16.1	16.6	9.9	9.6
Reading	2020-21	AIAN	3	4,899	4,866	5,707	28.7	181.1	186.0	187.1	17.5	16.8	17.6	6.9	12.2
Reading	2018-19	White	3	281,293	265,684	269,073	64.7	191.0	197.9	202.0	16.0	15.0	14.8	11.0	9.2
Reading	2020-21	White	3	241,820	222,654	226,673	60.3	191.4	197.0	199.9	16.6	15.9	15.9	8.9	10.6
Reading	2018-19	Asian	4	22,964	22,075	22,327	71.5	204.5	208.9	212.1	15.8	15.1	15.1	7.5	7.6
Reading	2020-21	Asian	4	20,152	17,730	18,116	68.3	205.9	209.0	210.7	15.7	15.6	15.8	5.1	8.7
Reading	2018-19	Black	4	87,353	82,653	84,534	40.4	192.2	196.7	199.3	15.9	15.5	15.8	7.2	9.5
Reading	2020-21	Black	4	71,846	64,611	63,074	32.6	192.2	194.9	196.0	16.6	16.7	17.1	3.9	11.7
Reading	2018-19	Latinx	4	96,011	94,042	93,058	44.1	192.9	197.8	200.6	16.2	15.8	16.1	8.1	9.1
Reading	2020-21	Latinx	4	77,520	73,169	77,782	36.5	192.2	195.6	197.3	16.9	17.1	17.2	5.5	10.5
Reading	2018-19	AIAN	4	7,742	7,351	7,486	35.35	190.1	194.8	197.2	16.5	16.4	16.9	7.5	9.4
Reading	2020-21	AIAN	4	5,164	5,022	5,749	31	191.1	194.9	195.1	17.2	16.7	17.6	5.2	10.8
Reading	2018-19	White	4	286,676	265,907	273,014	63.9	201.4	206.2	209.1	15.3	14.4	14.4	7.8	8.6
Reading	2020-21	White	4	240,806	218,965	222,551	60.2	201.6	205.6	207.4	15.5	15.0	15.2	6.2	9.4
Reading	2018-19	Asian	5	22,428	21,483	21,948	72.1	212.0	215.6	218.3	15.7	14.9	14.9	6.1	7.3
Reading	2020-21	Asian	5	20,701	18,254	18,693	69.6	213.1	215.8	217.1	15.5	15.4	15.4	4.2	8.2
Reading	2018-19	Black	5	85,241	80,235	81,683	39.5	199.2	203.1	205.0	15.7	15.2	15.5	6.0	9.3
Reading	2020-21	Black	5	70,894	63,750	61,928	32.1	198.9	201.2	201.8	16.3	16.5	17.0	3.0	11.1
Reading	2018-19	Latinx	5	96,668	94,637	92,983	43.6	200.4	204.3	206.3	16.1	15.5	15.9	6.3	8.9
Reading	2020-21	Latinx	5	81,091	76,003	79,476	36.9	199.5	202.2	203.5	16.7	17.0	17.1	4.5	10.1
Reading	2018-19	AIAN	5	7,824	7,468	7,635	35.4	198.0	201.7	203.4	16.5	15.8	16.3	5.7	9.1
Reading	2020-21	AIAN	5	4,843	4,968	5,479	28.2	197.4	200.4	200.1	17.1	16.5	17.3	3.3	10.7

Reading	2018-19	White	5	282,716	261,662	268,958	62.8	208.7	212.5	214.6	14.9	14.0	14.2	6.0	8.2
Reading	2020-21	White	5	237,536	216,092	217,620	59.1	208.8	211.8	213.0	14.9	14.6	14.8	4.6	8.9
Reading	2018-19	Asian	6	22,393	19,668	22,173	72.1	218.0	220.7	222.9	15.3	15.1	14.9	4.6	7.2
Reading	2020-21	Asian	6	20,732	16,961	18,629	70.2	219.2	221.2	222.1	15.1	15.3	15.5	3.2	8.2
Reading	2018-19	Black	6	81,845	74,365	78,874	38.4	204.7	207.0	208.8	15.6	15.4	15.6	4.3	9.4
Reading	2020-21	Black	6	64,959	57,209	55,871	32.2	204.9	206.2	206.2	16.1	16.4	16.8	1.7	10.8
Reading	2018-19	Latinx	6	95,065	86,791	90,231	42.1	206.1	208.4	210.1	15.9	15.7	16.1	4.4	9.0
Reading	2020-21	Latinx	6	74,435	67,880	74,770	36.5	205.4	206.7	207.7	16.4	16.9	17.1	2.7	10.1
Reading	2018-19	AIAN	6	7,116	6,453	6,995	36.5	203.6	205.9	207.9	16.4	16.0	16.5	4.4	9.3
Reading	2020-21	AIAN	6	4,635	4,515	5,206	30.4	203.8	206.1	205.7	16.8	16.4	16.8	2.0	10.2
Reading	2018-19	White	6	280,778	239,226	261,957	61.5	214.3	216.9	218.7	14.6	14.1	14.2	4.6	8.2
Reading	2020-21	White	6	231,490	199,328	208,865	57.7	214.4	216.4	217.1	14.5	14.6	14.8	2.9	8.8
Reading	2018-19	Asian	7	21,297	17,709	21,013	73	222.5	224.4	226.8	15.3	15.4	15.1	4.0	7.3
Reading	2020-21	Asian	7	20,081	15,976	17,852	72.1	224.0	225.7	226.1	15.6	15.8	16.0	2.2	8.2
Reading	2018-19	Black	7	75,029	68,180	73,284	39.6	208.8	210.6	212.2	15.6	15.5	15.7	3.8	9.4
Reading	2020-21	Black	7	63,894	54,263	54,353	33.5	208.8	209.7	209.5	16.2	16.8	17.1	1.2	10.9
Reading	2018-19	Latinx	7	88,704	80,658	84,348	42.9	210.2	211.8	213.2	16.1	16.3	16.7	3.7	9.2
Reading	2020-21	Latinx	7	74,240	66,364	74,423	38.6	209.7	210.8	211.2	16.8	17.3	17.6	1.9	10.3
Reading	2018-19	AIAN	7	6,802	5,915	6,188	36.9	207.8	209.0	211.0	16.4	16.2	16.8	3.5	9.4
Reading	2020-21	AIAN	7	4,589	4,384	4,896	34.8	208.7	209.8	210.1	17.2	16.7	17.1	1.8	9.9
Reading	2018-19	White	7	271,959	227,000	254,160	62.1	218.5	220.4	222.1	14.6	14.4	14.5	3.7	8.2
Reading	2020-21	White	7	231,015	192,051	205,619	58.3	218.6	219.9	220.4	14.8	15.1	15.2	2.0	8.9
Reading	2018-19	Asian	8	20,431	17,642	19,060	72.2	226.4	228.2	229.7	15.7	15.8	15.5	3.3	7.3
Reading	2020-21	Asian	8	19,415	15,292	16,086	71.6	228.0	229.5	229.2	15.8	16.1	16.0	1.5	8.3
Reading	2018-19	Black	8	72,692	67,021	70,343	40.7	212.9	214.8	216.1	15.6	15.4	15.7	3.3	9.5
Reading	2020-21	Black	8	63,478	54,950	53,204	34.6	212.5	213.4	213.0	16.6	17.0	17.4	0.8	10.9
Reading	2018-19	Latinx	8	87,630	82,015	83,012	44.3	214.0	216.0	217.0	16.3	16.4	16.9	3.4	9.2
Reading	2020-21	Latinx	8	74,245	66,911	70,498	39.6	213.8	215.2	214.8	16.9	17.4	17.8	1.6	10.3
Reading	2018-19	AIAN	8	6,887	5,941	6,264	37.8	212.1	213.1	214.7	15.9	16.1	16.7	2.9	9.3
Reading	2020-21	AIAN	8	4,850	4,055	4,732	36.6	213.1	214.3	214.0	17.3	16.7	17.5	0.9	10.3
Reading	2018-19	White	8	265,070	220,438	238,956	61.1	222.2	224.0	225.1	14.8	14.6	14.8	3.1	8.3
Reading	2020-21	White	8	229,673	188,864	194,395	57.8	222.3	223.5	223.5	15.1	15.4	15.5	1.4	9.0

Math	2018-19	Asian	3	24,216	22,691	23,778	74.6		196.5	203.8	210.6	14.1	14.0	14.6	14.0	7.1
Math	2020-21	Asian	3	21,457	19,155	20,136	65.8		197.5	203.0	207.2	15.6	15.5	16.1	10.0	10.0
Math	2018-19	Black	3	88,416	83,678	85,516	35.5		182.9	189.9	195.3	12.9	13.2	14.0	12.6	7.9
Math	2020-21	Black	3	73,987	66,838	65,551	20.3		182.5	186.7	189.5	14.4	14.6	15.5	7.6	11.9
Math	2018-19	Latinx	3	104,223	101,889	101,007	43.2		184.6	192.2	198.1	13.0	13.1	13.9	13.7	7.6
Math	2020-21	Latinx	3	87,380	83,312	87,928	26.5		183.5	188.9	192.2	13.7	14.0	15.3	9.1	11.2
Math	2018-19	AIAN	3	7,458	6,892	7,214	34.7		182.8	189.4	195.5	13.7	13.5	14.4	12.7	8.0
Math	2020-21	AIAN	3	4,910	4,940	5,686	21.2		181.7	187.8	190.1	14.3	14.2	15.9	9.4	11.7
Math	2018-19	White	3	280,526	261,236	269,729	63		191.6	199.2	205.5	12.7	12.3	13.0	13.9	7.4
Math	2020-21	White	3	236,842	218,886	222,154	54.2		189.7	196.8	202.2	13.0	12.9	13.8	13.0	9.1
Math	2018-19	Asian	4	24,277	22,206	23,782	76		209.6	215.1	222.3	15.1	15.5	16.5	12.5	7.2
Math	2020-21	Asian	4	20,586	18,223	19,019	67.8		209.3	213.9	218.7	16.3	16.7	17.7	9.6	9.0
Math	2018-19	Black	4	89,652	83,939	86,371	35.5		194.2	199.4	204.0	13.7	13.8	15.0	10.0	7.7
Math	2020-21	Black	4	72,606	65,631	64,243	22		192.4	196.0	198.4	14.1	14.5	16.0	6.4	10.2
Math	2018-19	Latinx	4	100,332	97,690	96,922	44.1		196.7	202.2	207.6	13.7	13.7	15.1	11.2	7.5
Math	2020-21	Latinx	4	81,711	78,055	81,619	28.9		194.0	198.6	201.7	13.8	14.2	16.0	8.2	9.5
Math	2018-19	AIAN	4	7,775	7,408	7,502	34.9		193.7	199.3	204.0	14.3	14.2	16.0	10.4	7.9
Math	2020-21	AIAN	4	5,136	5,026	5,732	21.8		192.2	197.2	198.7	14.4	14.3	16.5	7.9	9.5
Math	2018-19	White	4	287,014	264,342	274,804	61.9		203.7	209.4	215.5	13.2	13.1	14.3	11.8	7.3
Math	2020-21	White	4	238,688	219,059	222,362	54.2		201.1	206.7	211.9	13.2	13.4	14.9	11.3	8.5
Math	2018-19	Asian	5	23,800	21,866	23,127	80.1		220.8	225.9	232.6	16.8	17.2	18.1	11.7	7.6
Math	2020-21	Asian	5	21,209	18,758	19,983	71.6		220.4	224.5	228.8	17.5	18.0	19.3	8.4	8.8
Math	2018-19	Black	5	88,266	81,930	83,922	32.4		202.7	206.9	211.0	14.7	15.0	16.4	8.5	7.7
Math	2020-21	Black	5	72,047	65,065	64,033	21.2		200.9	204.0	205.5	14.7	15.3	16.6	5.0	9.4
Math	2018-19	Latinx	5	101,862	98,774	97,307	41.7		205.8	210.6	215.1	14.9	15.2	16.7	9.5	7.7
Math	2020-21	Latinx	5	85,494	81,094	83,975	28.8		203.2	207.2	209.3	14.8	15.4	16.9	6.6	8.9
Math	2018-19	AIAN	5	8,009	7,530	7,791	32.8		203.2	207.2	211.8	15.2	15.4	17.1	8.8	8.0
Math	2020-21	AIAN	5	5,059	5,147	5,782	21.3		201.1	205.1	206.3	15.6	15.9	17.9	6.6	9.4
Math	2018-19	White	5	288,285	263,708	272,231	61.9		213.6	218.6	224.0	14.4	14.7	16.2	10.4	7.5
Math	2020-21	White	5	236,813	216,268	221,673	52.5		211.0	215.9	220.1	14.4	14.9	16.4	9.5	8.5
Math	2018-19	Asian	6	23,117	20,202	22,200	78.5		226.1	230.6	235.8	16.8	17.4	17.9	9.6	7.0
Math	2020-21	Asian	6	20,579	17,245	17,801	72		225.6	229.7	233.0	17.2	17.8	19.1	7.9	8.5

Math	2018-19	Black	6	84,828	76,305	80,845	30.5	207.1	210.2	213.8	14.6	15.1	16.3	6.8	7.8
Math	2020-21	Black	6	66,743	58,710	57,205	22.7	206.1	208.5	210.2	14.3	15.1	16.3	4.6	9.0
Math	2018-19	Latinx	6	99,660	90,169	94,142	39.4	210.5	214.0	217.7	14.3	15.0	16.4	7.5	7.8
Math	2020-21	Latinx	6	77,333	71,270	75,744	29.8	208.4	211.2	213.7	14.3	15.3	16.6	6.1	8.8
Math	2018-19	AIAN	6	7,294	6,562	7,380	34.7	207.9	211.5	216.0	15.4	15.7	17.1	7.1	7.6
Math	2020-21	AIAN	6	4,720	4,550	5,194	22.85	205.8	209.2	210.5	15.5	15.6	16.8	5.7	8.9
Math	2018-19	White	6	283,783	241,536	265,498	60.3	218.7	222.7	227.1	14.5	15.0	15.9	8.5	7.2
Math	2020-21	White	6	232,264	198,816	207,133	52.4	216.3	220.1	223.8	14.2	14.9	16.1	8.1	8.1
Math	2018-19	Asian	7	21,584	17,929	20,686	82.2	234.5	237.6	242.8	18.6	19.0	19.7	8.1	7.1
Math	2020-21	Asian	7	18,580	14,672	15,793	75.1	233.0	236.4	239.1	18.3	19.1	20.5	6.4	8.4
Math	2018-19	Black	7	78,107	69,514	75,320	33	212.8	215.3	218.3	16.1	16.5	17.5	5.7	7.9
Math	2020-21	Black	7	65,680	55,925	55,273	25.9	212.0	214.0	215.0	15.4	16.5	17.4	3.6	9.1
Math	2018-19	Latinx	7	93,219	84,115	88,677	40.7	216.4	219.0	221.9	16.2	16.8	18.0	5.8	7.9
Math	2020-21	Latinx	7	76,637	69,508	75,325	33.5	214.7	217.1	218.6	15.7	16.7	17.7	4.7	8.9
Math	2018-19	AIAN	7	7,095	6,109	6,461	35	214.0	215.7	219.4	16.6	16.8	18.1	5.5	7.8
Math	2020-21	AIAN	7	4,825	4,478	5,213	28.5	213.5	215.0	216.6	16.7	16.4	18.0	4.5	8.4
Math	2018-19	White	7	274,707	226,527	256,532	63.5	225.9	228.9	232.7	16.0	16.4	17.3	6.9	7.3
Math	2020-21	White	7	228,130	189,378	200,941	54.9	223.3	226.2	228.8	15.5	16.2	17.1	6.1	8.0
Math	2018-19	Asian	8	19,556	16,209	18,069	83.1	240.7	243.3	248.1	20.0	20.6	21.4	7.1	7.6
Math	2020-21	Asian	8	15,123	11,786	12,531	76.1	239.1	242.4	244.1	20.2	20.8	22.3	5.3	9.0
Math	2018-19	Black	8	74,796	68,338	71,741	35.9	218.1	220.7	223.2	17.2	17.6	18.5	4.9	8.2
Math	2020-21	Black	8	62,169	53,583	51,253	28.6	216.8	219.0	219.1	16.8	17.9	18.4	2.9	9.4
Math	2018-19	Latinx	8	90,726	83,995	86,050	43.2	221.5	224.5	226.9	17.4	18.0	19.3	5.2	8.4
Math	2020-21	Latinx	8	72,553	67,093	68,515	35.5	219.9	222.4	222.9	17.0	18.1	18.8	3.9	9.3
Math	2018-19	AIAN	8	7,061	5,978	6,422	37.7	219.4	221.3	224.1	17.2	17.3	18.6	4.7	8.1
Math	2020-21	AIAN	8	5,007	4,014	4,901	34	220.3	220.4	222.7	18.3	17.3	19.4	3.6	8.4
Math	2018-19	White	8	262,129	216,766	237,246	64.1	231.7	234.4	237.4	17.2	17.7	18.8	5.8	7.7
Math	2020-21	White	8	210,467	172,129	176,927	55.8	229.1	231.6	233.3	16.8	17.7	18.4	4.8	8.2

Note. These results were calculated using our main analytic sample described in Section 2.

Table 5c. Student RIT score means by subject, grade level, year, and school poverty level

Subject	Year	Group	Grade	Number of students tested			Spring Median Percentile	RIT Score Means			RIT Score SDs			Fall-Spring Gain Scores	
				Fall	Winter	Spring		Fall	Winter	Spring	Fall	Winter	Spring	M	SD
Reading	2018-19	High Poverty	3	127,477	126,843	124,957	41.3	181.5	188.0	192.0	16.1	16.3	16.5	10.8	9.8
Reading	2020-21	High Poverty	3	104,708	98,925	104,798	30.3	181.7	185.5	187.5	17.4	17.6	17.7	6.2	12.9
Reading	2018-19	Low Poverty	3	120,914	114,850	117,617	71.6	194.8	201.4	205.3	15.1	14.0	13.8	10.6	8.7
Reading	2020-21	Low Poverty	3	111,064	99,175	101,354	68.5	195.8	201.1	203.9	15.5	14.7	14.6	8.4	9.9
Reading	2018-19	Mid Poverty	3	276,255	263,668	266,645	57.7	188.1	194.9	198.9	16.1	15.4	15.3	11.0	9.3
Reading	2020-21	Mid Poverty	3	224,013	211,563	217,666	52	188.4	193.6	196.5	16.9	16.4	16.5	8.6	11.1
Reading	2018-19	High Poverty	4	108,021	105,829	102,904	39.8	191.3	196.1	198.7	16.5	16.1	16.5	7.8	9.5
Reading	2020-21	High Poverty	4	96,067	88,746	93,369	32.1	190.9	193.9	195.4	17.0	17.3	17.6	4.8	11.3
Reading	2018-19	Low Poverty	4	121,553	112,553	117,863	70.2	204.8	209.5	212.2	14.2	13.4	13.5	7.4	8.0
Reading	2020-21	Low Poverty	4	112,085	99,782	103,042	67.8	205.6	209.4	211.2	14.2	13.8	14.0	5.9	8.7
Reading	2018-19	Mid Poverty	4	294,829	280,591	286,320	56.8	198.3	203.2	206.0	15.8	15.0	15.1	7.9	8.8
Reading	2020-21	Mid Poverty	4	222,512	209,848	212,064	52	198.4	202.2	204.0	16.0	15.7	15.9	6.1	9.8
Reading	2018-19	High Poverty	5	103,714	101,393	98,530	38.7	198.5	202.5	204.4	16.5	16.0	16.4	6.3	9.4
Reading	2020-21	High Poverty	5	95,987	88,470	92,920	32.7	198.1	200.5	201.7	17.0	17.3	17.5	3.8	10.7
Reading	2018-19	Low Poverty	5	122,392	114,024	119,636	69.1	212.1	215.7	217.7	13.8	13.0	13.2	5.7	7.6
Reading	2020-21	Low Poverty	5	111,630	98,566	101,081	67	212.7	215.6	216.8	13.6	13.4	13.6	4.4	8.1
Reading	2018-19	Mid Poverty	5	292,722	276,722	281,801	55.7	205.6	209.5	211.6	15.4	14.6	14.8	6.2	8.4
Reading	2020-21	Mid Poverty	5	222,270	209,593	210,463	51.3	205.6	208.5	209.7	15.5	15.3	15.6	4.5	9.3
Reading	2018-19	High Poverty	6	89,752	84,173	85,583	36.6	203.7	206.2	207.8	16.3	16.1	16.4	4.6	9.4
Reading	2020-21	High Poverty	6	69,278	63,910	67,920	31.1	203.6	204.9	205.4	16.6	17.0	17.3	2.2	10.6
Reading	2018-19	Low Poverty	6	124,356	102,305	118,610	68.1	217.8	220.2	222.0	13.3	13.0	13.2	4.3	7.5
Reading	2020-21	Low Poverty	6	106,969	88,720	94,591	65.6	218.0	219.9	220.8	13.4	13.6	13.8	2.9	8.1
Reading	2018-19	Mid Poverty	6	290,088	256,319	275,376	54	211.0	213.7	215.4	15.2	14.9	15.1	4.6	8.6
Reading	2020-21	Mid Poverty	6	229,400	204,990	217,073	50	211.2	213.0	213.6	15.3	15.6	15.8	2.9	9.3
Reading	2018-19	High Poverty	7	83,943	77,691	80,775	37.3	207.6	209.4	210.8	16.5	16.6	16.9	3.7	9.6
Reading	2020-21	High Poverty	7	66,478	58,935	64,090	32.9	207.7	208.6	208.9	17.0	17.5	17.9	1.4	10.8
Reading	2018-19	Low Poverty	7	118,323	95,499	112,432	68.9	222.1	223.9	225.5	13.3	13.3	13.4	3.5	7.5
Reading	2020-21	Low Poverty	7	106,884	87,045	94,458	65.9	222.1	223.4	224.1	13.8	14.3	14.2	2.1	8.3

Reading	2018-19	Mid Poverty	7	279,619	241,843	265,281	54.9	215.3	217.3	218.9	15.2	15.1	15.3	3.8	8.5
Reading	2020-21	Mid Poverty	7	230,498	198,918	214,799	50.5	215.3	216.5	216.9	15.6	16.0	16.2	1.9	9.4
Reading	2018-19	High Poverty	8	85,401	83,066	83,191	40.5	212.0	214.3	215.6	16.5	16.5	16.8	3.6	9.6
Reading	2020-21	High Poverty	8	67,349	62,241	62,724	34.2	211.5	213.0	212.5	17.1	17.6	18.1	1.3	10.7
Reading	2018-19	Low Poverty	8	113,407	91,015	102,540	67.5	225.8	227.3	228.4	13.5	13.6	13.7	2.8	7.7
Reading	2020-21	Low Poverty	8	103,738	84,000	85,726	65.2	226.0	227.2	227.1	14.0	14.6	14.6	1.3	8.5
Reading	2018-19	Mid Poverty	8	270,362	234,370	248,066	54.7	219.1	221.0	222.1	15.4	15.3	15.6	3.2	8.6
Reading	2020-21	Mid Poverty	8	230,085	195,752	203,058	50.9	219.1	220.3	220.3	15.9	16.2	16.4	1.5	9.5
Math	2018-19	High Poverty	3	132,412	129,459	128,883	38.8	183.3	190.7	196.4	13.3	13.5	14.4	13.2	7.9
Math	2020-21	High Poverty	3	107,326	100,562	105,941	21.9	182.2	187.1	190.1	14.2	14.5	15.5	8.3	11.6
Math	2018-19	Low Poverty	3	122,040	113,325	119,896	70.6	195.1	202.6	209.0	12.4	12.0	12.7	13.9	7.0
Math	2020-21	Low Poverty	3	109,211	99,696	101,449	64.2	193.9	200.8	206.3	12.9	12.7	13.4	12.8	8.7
Math	2018-19	Mid Poverty	3	277,738	263,889	268,871	55.5	188.9	196.6	202.6	12.9	12.6	13.4	13.8	7.5
Math	2020-21	Mid Poverty	3	222,117	211,559	215,402	44.6	187.2	193.8	198.7	13.3	13.4	14.4	12.0	9.9
Math	2018-19	High Poverty	4	112,673	109,080	107,016	37.5	194.6	200.0	204.7	14.0	14.1	15.5	10.4	7.8
Math	2020-21	High Poverty	4	99,607	92,486	97,248	23.6	192.4	196.5	199.1	14.2	14.7	16.3	7.2	10.1
Math	2018-19	Low Poverty	4	123,875	111,921	120,981	69.6	207.4	213.0	219.5	13.0	13.1	14.3	12.1	7.1
Math	2020-21	Low Poverty	4	111,571	100,756	104,064	64	205.5	211.0	216.6	13.2	13.5	14.6	11.6	8.2
Math	2018-19	Mid Poverty	4	297,007	282,305	289,186	54.9	200.9	206.5	212.2	13.5	13.4	14.8	11.5	7.3
Math	2020-21	Mid Poverty	4	222,518	212,286	213,742	44.4	198.3	203.4	208.0	13.4	13.7	15.3	10.3	8.9
Math	2018-19	High Poverty	5	109,256	105,714	103,116	34.6	203.3	207.8	211.8	15.3	15.6	17.0	8.8	7.9
Math	2020-21	High Poverty	5	99,956	92,550	96,842	23.5	201.3	204.9	206.7	15.1	15.8	17.1	5.9	9.2
Math	2018-19	Low Poverty	5	127,307	114,448	122,564	71.2	217.7	222.8	228.5	14.2	14.7	16.1	10.9	7.3
Math	2020-21	Low Poverty	5	111,768	100,543	104,696	64.3	216.1	220.9	225.6	14.5	15.0	16.3	9.7	8.3
Math	2018-19	Mid Poverty	5	298,366	280,780	285,592	53.4	210.4	215.2	220.2	14.7	15.0	16.5	10.0	7.6
Math	2020-21	Mid Poverty	5	223,311	211,567	215,998	42.4	207.8	212.2	215.8	14.5	15.1	16.7	8.6	8.7
Math	2018-19	High Poverty	6	95,846	88,770	90,537	32.1	207.5	210.9	214.2	14.8	15.4	16.7	6.9	8.0
Math	2020-21	High Poverty	6	73,135	67,580	69,104	23.4	206.1	208.6	210.4	14.4	15.4	16.5	5.0	9.0
Math	2018-19	Low Poverty	6	124,793	102,232	119,351	69.8	223.1	227.2	231.9	14.3	14.8	15.6	8.9	6.9
Math	2020-21	Low Poverty	6	106,362	87,944	92,470	62.9	220.9	224.8	228.9	14.4	15.1	16.1	8.4	7.9
Math	2018-19	Mid Poverty	6	295,665	261,474	279,649	51.1	215.1	219.0	222.9	14.7	15.3	16.4	8.0	7.4
Math	2020-21	Mid Poverty	6	231,275	206,928	217,759	42.9	213.0	216.6	219.6	14.5	15.3	16.5	7.3	8.3

Subject	Year	Poverty	Grade													
Math	2018-19	High Poverty	7	89,775	82,081	85,318	33	212.8	215.5	218.1	16.3	16.9	18.0	5.4	8.1
Math	2020-21	High Poverty	7	70,061	62,090	65,574	26.7	212.0	214.1	215.2	15.8	16.9	17.7	3.8	9.0
Math	2018-19	Low Poverty	7	118,550	93,581	112,354	73.7	230.9	233.9	238.3	15.7	16.2	16.9	7.4	7.0
Math	2020-21	Low Poverty	7	103,231	83,028	88,867	65.2	228.1	231.0	234.2	15.4	16.4	17.2	6.6	7.8
Math	2018-19	Mid Poverty	7	283,724	243,571	268,907	54	222.0	224.9	228.3	16.3	16.8	17.7	6.5	7.5
Math	2020-21	Mid Poverty	7	229,647	199,625	214,001	45.2	219.7	222.3	224.4	15.8	16.6	17.6	5.5	8.2
Math	2018-19	High Poverty	8	90,547	87,451	87,280	37.6	218.5	221.7	224.1	17.5	18.3	19.3	5.0	8.4
Math	2020-21	High Poverty	8	69,022	64,915	63,236	29.7	217.1	219.6	219.8	17.1	18.2	18.8	3.3	9.4
Math	2018-19	Low Poverty	8	109,983	86,500	99,870	74.2	237.0	239.5	243.2	16.8	17.5	18.5	6.3	7.4
Math	2020-21	Low Poverty	8	90,138	70,881	72,896	66	234.2	236.6	238.8	16.8	17.8	18.4	5.0	8.0
Math	2018-19	Mid Poverty	8	269,433	230,939	247,465	55.1	227.5	230.3	233.0	17.5	18.1	19.2	5.6	7.8
Math	2020-21	Mid Poverty	8	214,011	182,349	189,080	46.7	225.2	227.6	228.8	17.2	18.0	18.8	4.4	8.5

Note. These results were calculated using our main analytic sample described in Section 2.

Table 6. MAP Growth test properties by year

Subject	Year	Grade	Average Test Duration (in minutes)			Average RTE			Average Percent Correct		
			Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
Reading	2018-19	3	55.38	62.70	70.28	0.98	0.98	0.98	0.47	0.49	0.49
Reading	2020-21	3	53.57	57.60	66.24	0.98	0.98	0.98	0.49	0.50	0.49
Reading	2018-19	4	64.45	69.60	74.17	0.98	0.98	0.98	0.48	0.50	0.50
Reading	2020-21	4	61.60	64.98	71.16	0.98	0.98	0.98	0.50	0.50	0.50
Reading	2018-19	5	67.42	73.12	75.31	0.98	0.98	0.98	0.49	0.51	0.52
Reading	2020-21	5	66.94	70.30	74.26	0.98	0.98	0.98	0.50	0.51	0.52
Reading	2018-19	6	74.25	78.68	80.83	0.98	0.97	0.97	0.49	0.50	0.50
Reading	2020-21	6	74.71	77.02	77.52	0.98	0.98	0.97	0.49	0.50	0.49
Reading	2018-19	7	72.28	77.20	78.47	0.97	0.97	0.96	0.49	0.50	0.50
Reading	2020-21	7	75.49	77.45	76.11	0.98	0.98	0.97	0.50	0.50	0.50
Reading	2018-19	8	71.64	77.57	77.17	0.97	0.97	0.96	0.50	0.51	0.51
Reading	2020-21	8	76.05	78.86	75.67	0.98	0.98	0.97	0.50	0.51	0.51
Math	2018-19	3	49.19	55.00	62.45	0.99	0.99	0.99	0.49	0.51	0.51
Math	2020-21	3	52.51	57.02	61.06	0.99	0.99	0.99	0.50	0.51	0.50
Math	2018-19	4	56.43	60.92	67.80	0.99	0.99	0.99	0.50	0.51	0.51
Math	2020-21	4	58.48	62.49	66.08	0.99	0.99	0.99	0.50	0.51	0.51
Math	2018-19	5	60.97	66.84	71.77	0.99	0.99	0.99	0.50	0.51	0.52
Math	2020-21	5	63.64	69.31	71.31	0.99	0.99	0.99	0.50	0.51	0.51
Math	2018-19	6	65.58	71.56	76.60	0.99	0.99	0.98	0.49	0.50	0.50
Math	2020-21	6	69.82	75.48	74.92	0.99	0.99	0.99	0.50	0.50	0.50
Math	2018-19	7	68.53	74.09	76.51	0.98	0.98	0.98	0.49	0.50	0.50
Math	2020-21	7	74.24	79.42	76.06	0.99	0.99	0.99	0.50	0.50	0.50
Math	2018-19	8	69.42	74.61	74.39	0.98	0.98	0.98	0.50	0.50	0.50
Math	2020-21	8	76.51	82.57	76.59	0.99	0.99	0.99	0.51	0.51	0.50

Note. RTE=Response Time Effort (a measure of the percentage of items on which a student showed engaged test behavior, where an RTE of 1.00 indicates that students were fully engaged on 100% of their items.[v]).

Table 7. MAP Growth observed versus projected scores

Subject	Year	Grade	RIT Score Means			RIT Score SDs			RIT Score Projected Means			RIT Score Projected SDs		
			Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
Reading	2018-19	3	187.9	194.5	198.5	16.5	16.0	16.0	188.1	195.0	199.0	16.5	16.0	16.0
Reading	2020-21	3	188.6	193.3	195.8	17.5	17.2	17.4	188.4	194.1	197.1	17.5	17.2	17.4
Reading	2018-19	4	198.2	202.9	205.8	16.2	15.6	15.7	198.2	203.4	206.1	16.2	15.6	15.7
Reading	2020-21	4	198.4	201.9	203.6	16.6	16.6	16.8	198.1	202.6	204.9	16.6	16.6	16.8
Reading	2018-19	5	205.5	209.3	211.4	15.9	15.2	15.5	205.3	209.9	212.1	15.9	15.2	15.5
Reading	2020-21	5	205.5	208.2	209.4	16.3	16.3	16.5	205.3	209.0	211.4	16.3	16.3	16.5
Reading	2018-19	6	211.2	213.5	215.5	15.7	15.4	15.6	210.8	214.1	216.1	15.7	15.4	15.6
Reading	2020-21	6	211.4	213.0	213.7	15.9	16.2	16.5	211.3	213.5	215.2	15.9	16.2	16.5
Reading	2018-19	7	215.4	217.1	218.9	15.8	15.8	15.9	215.9	216.8	218.3	15.8	15.8	15.9
Reading	2020-21	7	215.6	216.7	217.1	16.2	16.6	16.8	215.5	217.1	218.3	16.2	16.6	16.8
Reading	2018-19	8	219.2	220.8	222.1	15.9	15.8	16.0	219.6	220.6	221.6	15.9	15.8	16.0
Reading	2020-21	8	219.3	220.4	220.3	16.4	16.8	17.0	219.3	220.8	221.7	16.4	16.8	17.0
Math	2018-19	3	188.8	196.3	202.3	13.5	13.4	14.2	188.9	196.7	201.8	13.5	13.4	14.2
Math	2020-21	3	187.6	193.7	198.1	14.1	14.4	15.6	187.3	194.3	198.7	14.1	14.4	15.6
Math	2018-19	4	200.9	206.3	212.1	14.2	14.2	15.6	200.8	206.7	211.5	14.2	14.2	15.6
Math	2020-21	4	198.6	203.5	207.8	14.4	14.8	16.6	198.4	203.9	208.2	14.4	14.8	16.6
Math	2018-19	5	210.4	215.1	220.3	15.5	15.9	17.5	210.1	215.5	220.1	15.5	15.9	17.5
Math	2020-21	5	208.2	212.4	215.8	15.6	16.3	18.0	208.0	212.9	216.8	15.6	16.3	18.0
Math	2018-19	6	215.3	219.0	223.2	15.5	16.1	17.3	215.1	219.5	223.1	15.5	16.1	17.3
Math	2020-21	6	213.5	216.8	219.9	15.3	16.2	17.5	213.4	217.1	220.6	15.3	16.2	17.5
Math	2018-19	7	222.1	224.8	228.5	17.3	17.8	18.8	222.5	224.4	228.1	17.3	17.8	18.8
Math	2020-21	7	220.2	222.7	224.8	16.6	17.5	18.6	220.1	223.0	225.3	16.6	17.5	18.6
Math	2018-19	8	227.7	230.1	233.2	18.4	18.9	20.1	227.9	229.6	233.2	18.4	19.0	20.1
Math	2020-21	8	225.6	227.8	229.1	18.0	18.9	19.8	225.5	228.0	229.0	18.0	18.9	19.8

Table 8. Sensitivity analysis results using more restricted sample

Subject	Year	Grade	Number of students tested (Analytic Sample)		N of students tested in both fall and spring (Restricted Sample)	Analytic Sample RIT score percentile		Restricted Sample RIT Percentile	
			Fall	Spring		Fall	Spring	Fall	Spring
Reading	2018-19	3	563,114	543,375	424,289	58.7	57.1	59.4	58.3
Reading	2020-21	3	475,863	453,018	371,909	58.4	50.9	58.7	52.5
Reading	2018-19	4	561,145	539,310	416,350	59.8	56.6	60.6	57.9
Reading	2020-21	4	465,323	435,898	364,597	58.3	51.7	58.5	52.4
Reading	2018-19	5	555,218	531,672	410,362	58.6	55.8	59.3	56.7
Reading	2020-21	5	463,405	430,825	360,828	57.5	51.1	57.8	52
Reading	2018-19	6	544,223	515,125	377,898	58.1	54.5	58.8	55.6
Reading	2020-21	6	440,050	406,738	314,847	57.9	50.6	58.7	52.4
Reading	2018-19	7	521,279	493,998	461,191	58.2	55.3	58.2	55.8
Reading	2020-21	7	437,420	399,685	300,940	57.8	51.5	58.7	53.1
Reading	2018-19	8	505,769	466,790	426,744	57.4	54.8	57.5	55.4
Reading	2020-21	8	434,506	378,046	286,407	57.3	51.4	58.2	53.2
Math	2018-19	3	593,368	580,139	428,514	56.3	55	57.2	56.3
Math	2020-21	3	486,449	462,989	362,320	47.9	43.2	48.7	45.5
Math	2018-19	4	598,988	583,937	421,604	58.8	54.7	59.9	56
Math	2020-21	4	489,554	458,890	366,527	49.3	44.1	49.6	45.3
Math	2018-19	5	600,437	582,599	420,285	57.6	53.5	58.6	54.7
Math	2020-21	5	496,319	460,958	364,900	48.8	42.4	49.3	43.7
Math	2018-19	6	580,036	554,989	396,000	55	51.8	56.3	53.6
Math	2020-21	6	456,171	421,178	315,858	48.6	43.4	49.6	45.9
Math	2018-19	7	539,835	518,171	473,436	57.3	54.6	57.4	55
Math	2020-21	7	446,814	408,054	299,187	51.2	46.1	52.1	48.7
Math	2018-19	8	516,944	476,583	433,877	58.2	55.4	58.4	55.9
Math	2020-21	8	446,883	388,688	266,224	51.8	47.2	52.5	49.6

Table 9. Overall attrition rates by school year

Subject	Grade	2018-19 to 2019-20			2019-20 to 2020-21		
		Total # of Students Tested in Prior Year	Consistent # of Students Tested Across Years	Attrition Rate	Total # of Students Tested in Prior Year	Consistent # of Students Tested Across Years	Attrition Rate
Reading	3	607,798	541,844	10.9%	569,150	478,830	15.9%
Reading	4	650,263	579,088	10.9%	626,035	522,956	16.5%
Reading	5	656,882	581,711	11.4%	629,778	526,283	16.4%
Reading	6	659,418	536,030	18.7%	655,331	473,710	27.7%
Reading	7	639,175	551,476	13.7%	622,377	493,685	20.7%
Reading	8	606,257	529,476	12.7%	606,534	500,094	17.5%
Math	3	626,204	557,835	10.9%	595,837	497,894	16.4%
Math	4	661,063	590,622	10.7%	636,585	530,194	16.7%
Math	5	667,147	591,377	11.4%	642,117	537,011	16.4%
Math	6	670,554	543,547	18.9%	665,596	480,579	27.8%
Math	7	648,716	557,647	14.0%	631,235	493,469	21.8%
Math	8	614,278	528,664	13.9%	612,270	470,578	23.1%

Note. "Consistent" students are defined as students with observed test scores in a prior school year who were observed in the subsequent school year (e.g., observed both in 2018-19 and 2019-20).

Table 10. Subgroup attrition rates by school year

Grade	Subject	Year	Gender Differences		Race/Ethnicity Differences					Prior Score Quintile Differences				
			Female	Male	Asian	Black	Latinx	AIAN	White	Lowest Quin.	2nd Quin.	3rd Quin.	4th Quin.	Highest Quin.
3	Reading	18-19	10.7%	10.9%	11.5%	14.2%	11.3%	13.6%	9.4%	12.7%	10.7%	9.9%	9.1%	8.4%
3	Reading	19-20	15.8%	15.9%	18.0%	19.5%	17.5%	23.1%	13.7%	18.6%	14.6%	13.9%	13.3%	13.5%
4	Reading	18-19	10.9%	11.0%	11.7%	14.3%	10.7%	13.3%	9.4%	12.8%	10.8%	10.1%	9.7%	9.0%
4	Reading	19-20	16.4%	16.5%	18.8%	19.4%	17.5%	22.0%	14.5%	18.0%	15.2%	14.7%	14.4%	14.3%
5	Reading	18-19	11.4%	11.5%	10.7%	14.2%	10.6%	11.9%	10.6%	13.6%	11.7%	10.8%	10.1%	9.3%
5	Reading	19-20	16.3%	16.5%	16.3%	19.8%	17.3%	20.8%	14.6%	18.0%	15.7%	14.8%	14.4%	14.0%
6	Reading	18-19	18.6%	18.8%	19.9%	21.5%	19.4%	17.8%	17.3%	20.4%	18.8%	18.1%	17.5%	16.6%
6	Reading	19-20	27.6%	27.7%	28.8%	32.2%	33.7%	29.8%	23.9%	30.5%	27.9%	26.9%	25.6%	24.9%
7	Reading	18-19	13.7%	13.7%	12.3%	15.7%	12.8%	17.7%	13.5%	15.8%	13.9%	13.0%	11.9%	11.1%
7	Reading	19-20	20.5%	20.8%	20.4%	24.6%	23.0%	29.8%	18.1%	23.7%	21.3%	19.6%	18.3%	17.0%
8	Reading	18-19	12.6%	12.7%	13.6%	14.3%	11.4%	14.7%	12.1%	14.8%	12.6%	11.5%	10.6%	10.1%
8	Reading	19-20	17.5%	17.6%	16.9%	21.5%	19.6%	25.4%	15.1%	20.8%	17.7%	16.3%	15.1%	14.5%
3	Math	18-19	10.8%	11.0%	12.2%	14.9%	10.4%	12.4%	9.6%	12.9%	10.7%	10.0%	9.0%	8.1%
3	Math	19-20	16.3%	16.5%	18.4%	19.9%	17.4%	23.7%	14.5%	19.6%	15.7%	14.8%	14.0%	13.8%
4	Math	18-19	10.6%	10.7%	11.8%	14.3%	9.6%	12.5%	9.3%	12.9%	10.8%	10.0%	9.0%	8.2%
4	Math	19-20	16.7%	16.7%	19.2%	19.8%	17.2%	22.4%	15.0%	18.7%	16.2%	15.1%	14.5%	14.2%
5	Math	18-19	11.2%	11.4%	11.1%	14.4%	9.9%	11.6%	10.6%	13.8%	11.9%	11.0%	9.9%	8.7%
5	Math	19-20	16.3%	16.4%	16.2%	19.8%	16.9%	20.7%	14.6%	18.6%	16.3%	15.0%	14.2%	13.2%
6	Math	18-19	18.8%	19.0%	20.4%	21.8%	19.3%	19.3%	17.5%	21.3%	19.2%	18.1%	17.4%	16.7%
6	Math	19-20	27.7%	27.9%	29.9%	32.0%	33.4%	30.4%	23.8%	31.6%	28.3%	26.6%	25.6%	24.4%
7	Math	18-19	13.9%	14.1%	15.2%	16.0%	13.2%	19.6%	13.6%	16.9%	14.3%	13.0%	11.8%	11.1%
7	Math	19-20	21.5%	22.1%	27.0%	24.8%	23.2%	29.4%	19.3%	25.1%	21.7%	19.8%	18.6%	21.3%
8	Math	18-19	13.8%	14.0%	19.2%	14.8%	12.2%	14.7%	13.6%	15.9%	13.4%	12.0%	11.4%	12.6%
8	Math	19-20	23.1%	23.0%	31.1%	24.4%	23.9%	27.6%	21.4%	22.5%	19.9%	19.2%	21.2%	28.1%

Note. Test score quintiles were calculated based on the prior fall test scores (fall 2018 for the 2018-19 to 2019-20, fall 2019 for the 2019-20 to 2020-21 attrition. Student percentiles calculated using the NWEA 2020 norms were used to group students into quintiles.

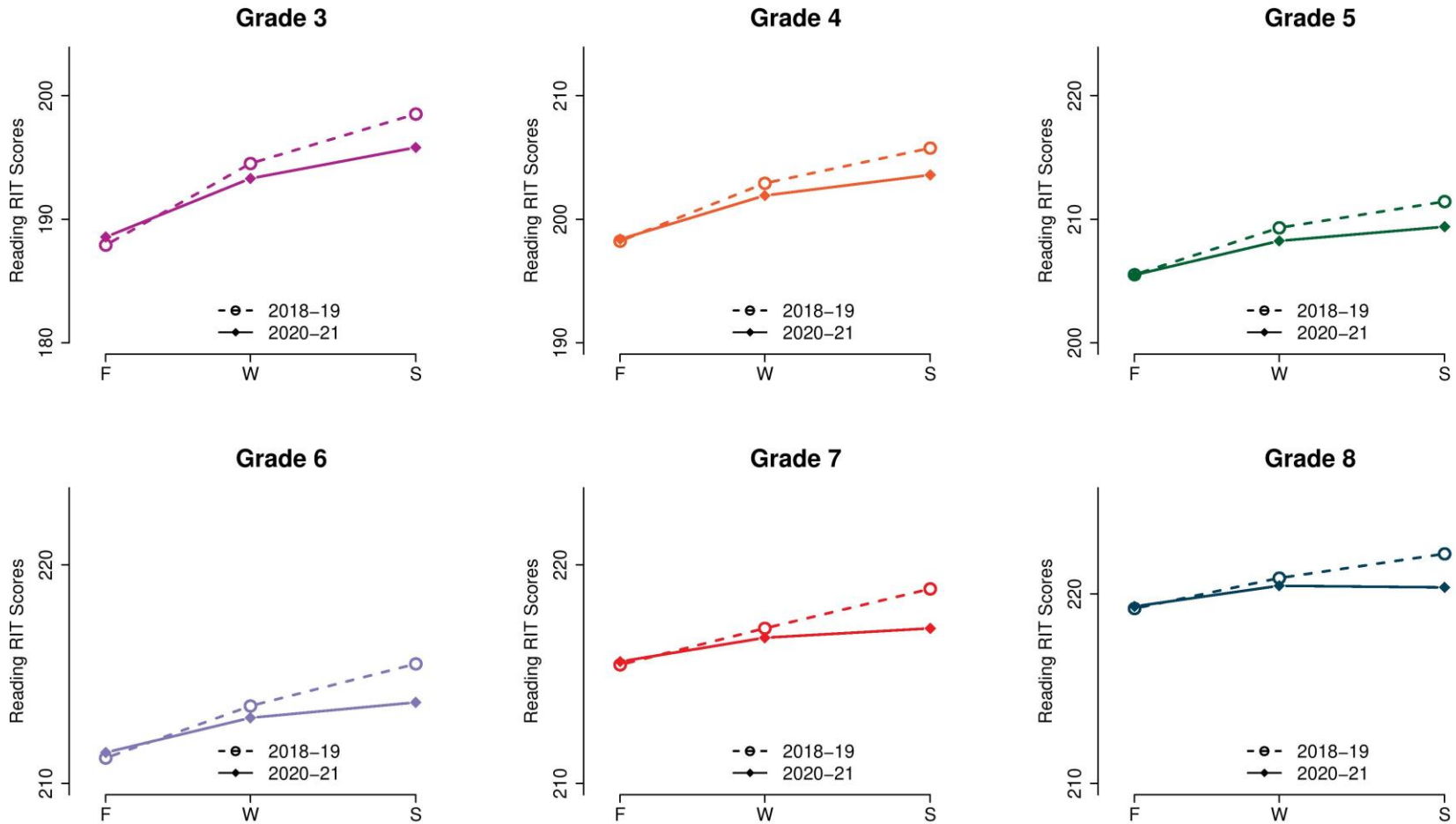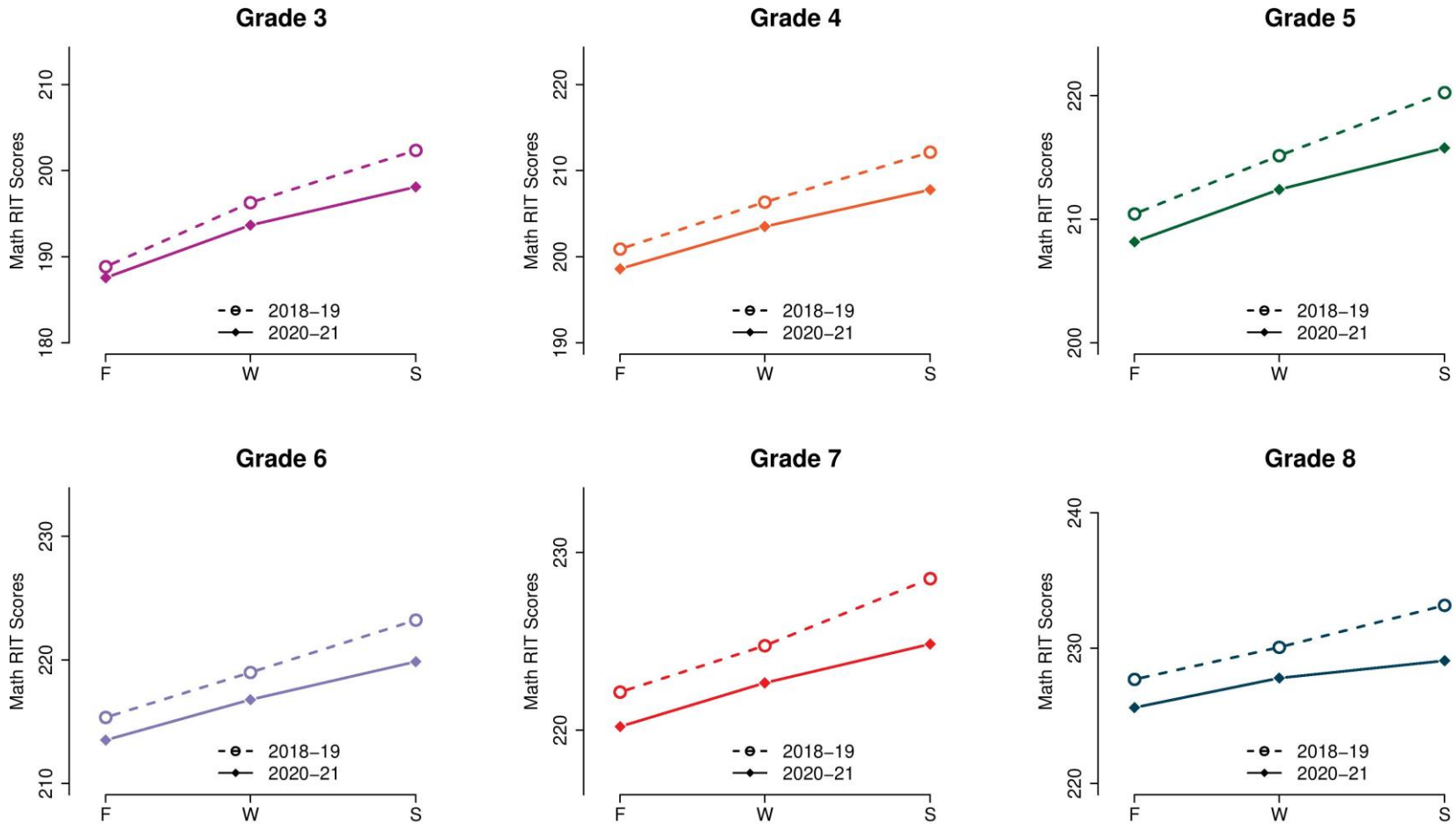**Figure A1. MAP Growth RIT score mean by term in 2020-21 in reading**

Figure A2. MAP Growth RIT score mean by term in 2020-21 in math

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