

# Projecting the Impact of the COVID-19 Spring School Closures on Student Learning

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COLLEGE OF  
EDUCATION



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# COVID-19 Disruptions to the 2019-20 School Year

## IMPACTS ON SCHOOLS:

- + 2-3 months of school building closures
- + Rollout of distance learning
- + Inequalities in digital access
- + High rates of absenteeism
- + Low teacher/student morale
- + Increased need for parental involvement



# COVID-19 Disruptions to the 2019-20 School Year

## SOCIETAL IMPACTS:

- + National health crisis
- + Huge surge in unemployment
- + Racial disparities in health/economic impacts
- + Increased food insecurity
- + Rise in mental health issues
- + Local/state budget cuts





# What were the impacts of the COVID-19 spring 2020 school closures on student learning?

- + COVID-19 is an unprecedented disruption to students' lives.
- + Spring 2020 student assessments were canceled so we have little data to measure impacts on learning.
- + In this study, we draw upon prior literature on out-of-school time learning to produce a series of projections.



# What do we already know about out-of-school time learning?

While the current interruption to learning is unprecedented, we do have prior research on how missing school impacts student learning:

1. Summer learning loss
2. Weather-related school closures (e.g., snow days)
3. Out-of-school time due to absenteeism

# What do we already know about out-of-school time learning?

While the current interruption to learning is unprecedented, we do have prior research on how missing school impacts student learning:

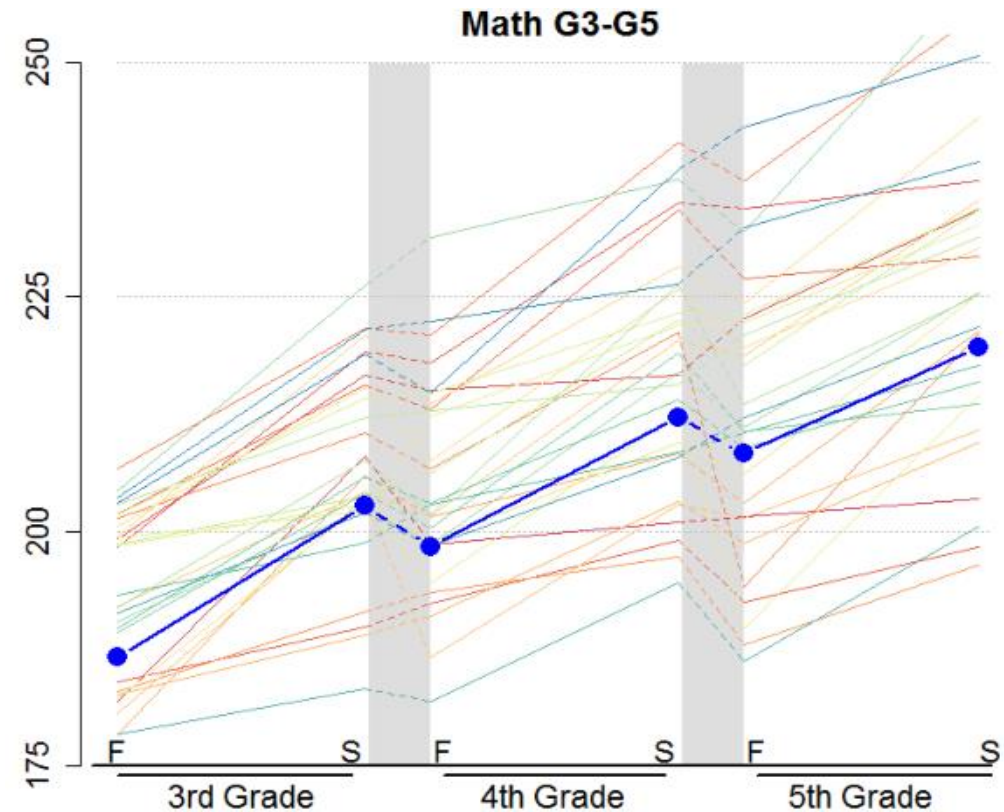
1. Summer learning loss
2. Weather-related school closures (e.g., snow days)
3. Out-of-school time due to absenteeism

Specifically, we drew on studies that:

- a) associated days/months of out school with standardized math and reading test scores,
- b) took place in the US within the last 20 years.

# Summer learning loss

- + **Summer vacation** represents a long break from traditional schooling but is a wholly expected interruption from school.
- + Students often show learning slowdown or slide during traditional summer breaks (von Hippel et al., 2018; Kuhfeld, 2019)
- + However, the magnitude of summer loss and degree to which summer contributes to educational inequalities is highly debated (von Hippel, 2019)





# Inclement weather school closures

- + **School closures** due to inclement weather mirror the unexpected aspect of COVID school closures, but weather-related closures only typically lasted a day or two and were geographically isolated.
- + Studies of snow-related school closures found a range of potential effects, ranging from null effects to .02 SD per day missed (Hansen, 2011; Goodman, 2014).
- + Studies of students displaced by Hurricane Katrina score approximately .10 SD below peers in other parts of the state the next year (Sacerdote, 2012).



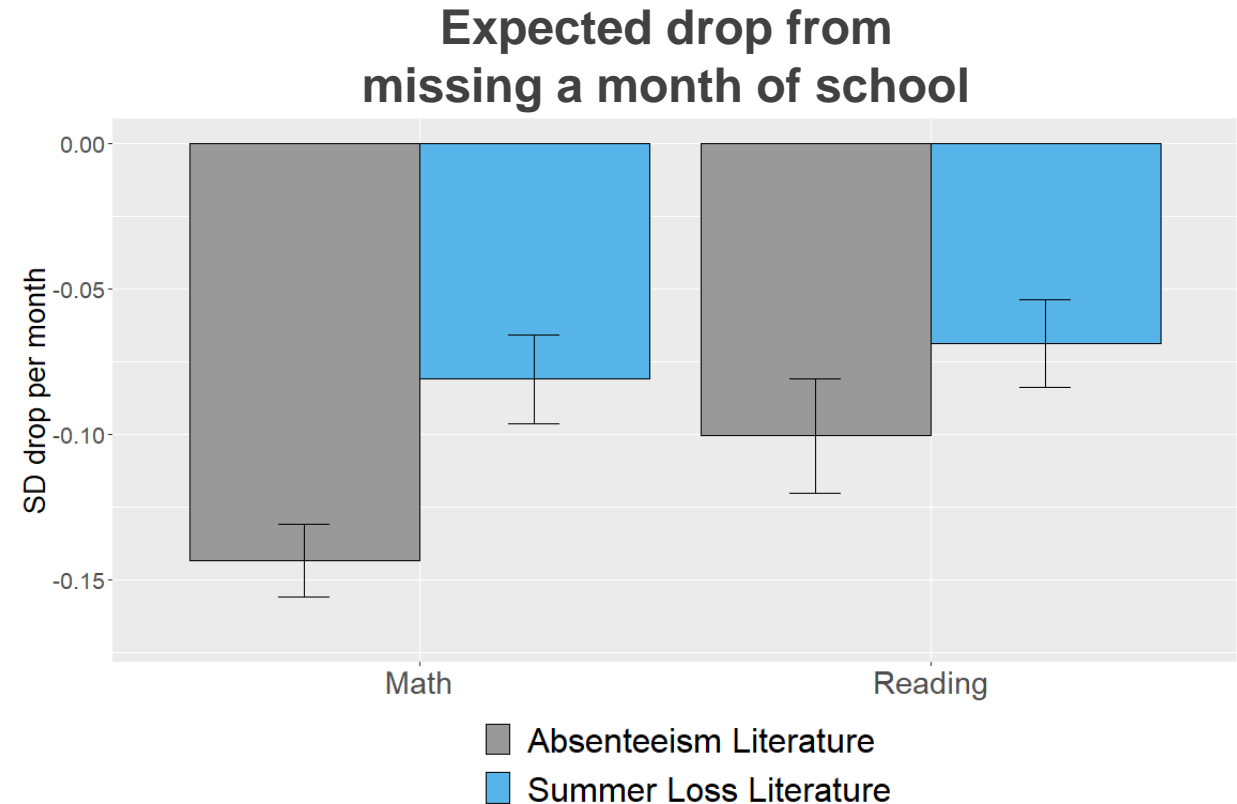
# Absenteeism

- + **Absenteeism** most closely matches the situation for students who schools are providing remote instruction, but students do not show up (for whatever reason).
- + Missing ten school days decreased student mathematics test scores by 0.06 to 0.08 SDs, with slightly smaller effect sizes for ELA scores (Aucejo & Romano, 2016; Gershenson et al., 2017; Liu et al., 2019).
- + The negative effects of absences appeared to accrue linearly (Gershenson et al., 2017; Liu et al., 2019).



# Synthesizing the three bodies of research

- + The inclement weather school closure literature did not provide usable estimates for our study
- + Absenteeism literature implies larger impacts on learning than out of school time related to summer vacation
- + Consequences for math appear to be larger than for reading



# Projecting the impacts of COVID

- + What is the expected overall impact of missing three months of school based on prior out-of-school time literature?



# Projecting the impacts of COVID

- + What is the expected overall impact of missing three months of school based on prior out-of-school time literature?
- + How might an extended out-of-school time period due to COVID school closures impact variability in student test scores?



# Projecting the impacts of COVID

- + What is the expected overall impact of missing three months of school based on prior out-of-school time literature?
- + How might an extended out-of-school time period due to COVID school closures impact variability in student test scores?
- + How might inequalities in test scores associated with school poverty level be impacted by COVID?

# What we cannot account for in these projections

- + The effectiveness of remote learning
- + Trauma due to various aspects of COVID and other national events
- + Different district strategies for rolling out for virtual instruction
- + How “normal” summer loss may interact with lengthened out-of-school time
- + Tutoring/family supports for learning
- + School budget cuts

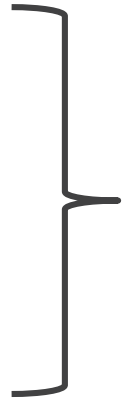
# Four COVID Learning Scenarios

- 1) **Typical Growth:** students continue to learn at a typical growth rate for a given grade/subject
- 2) **COVID Slide:** students lose ground during school closures at a rate associated with typical summer learning loss patterns
- 3) **Partial Absenteeism:** school closures are equivalent to missing 50% of school days (based on teacher surveys saying students received half the amount of normal instruction)
- 4) **Full Absenteeism:** school closures are equivalent to being fully absent from school

# Four COVID Learning Scenarios

1) Typical Growth

2) COVID Slide



Estimated based on historic MAP Growth data from over five million US public school students across two school years (2017-18 to 2018-19)

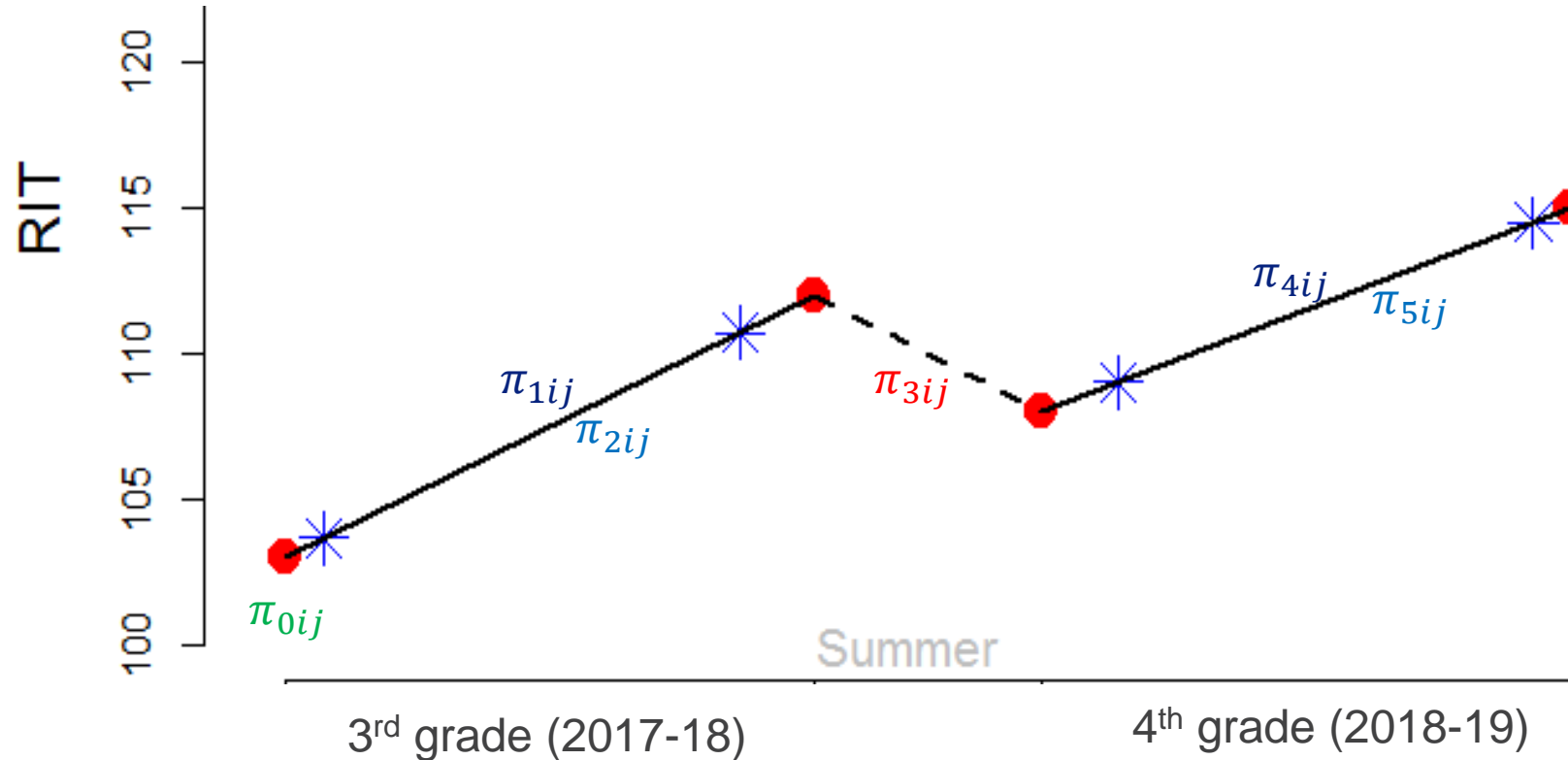
3) Partial Absenteeism

4) Full Absenteeism



Estimated based on aggregated effect sizes (.006 SD for each day absent in math and .0035 SDs for each day in reading) from prior absenteeism work (translated to the RIT scale)

# Growth model for estimating typical growth and summer slide

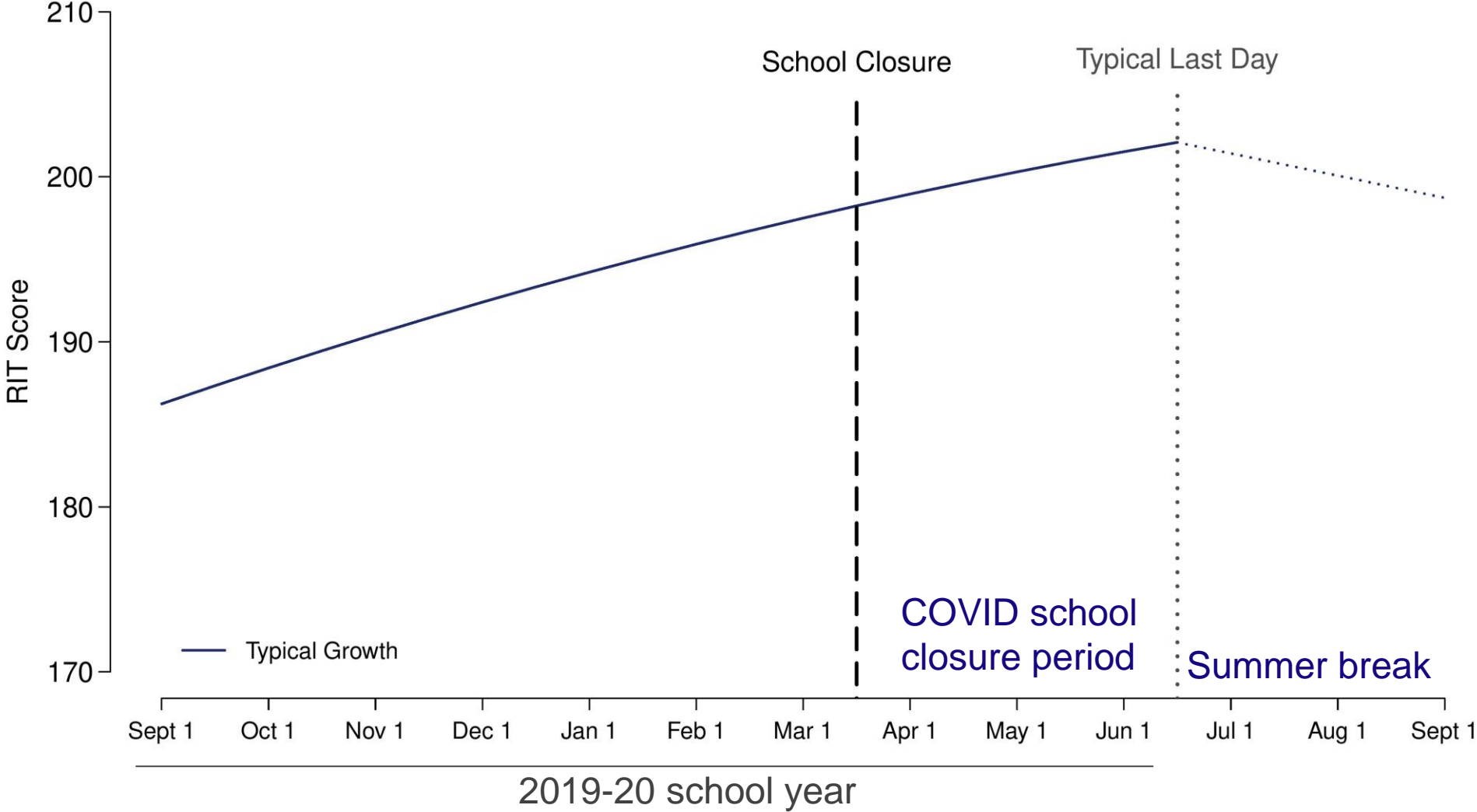


## HLM formulation:

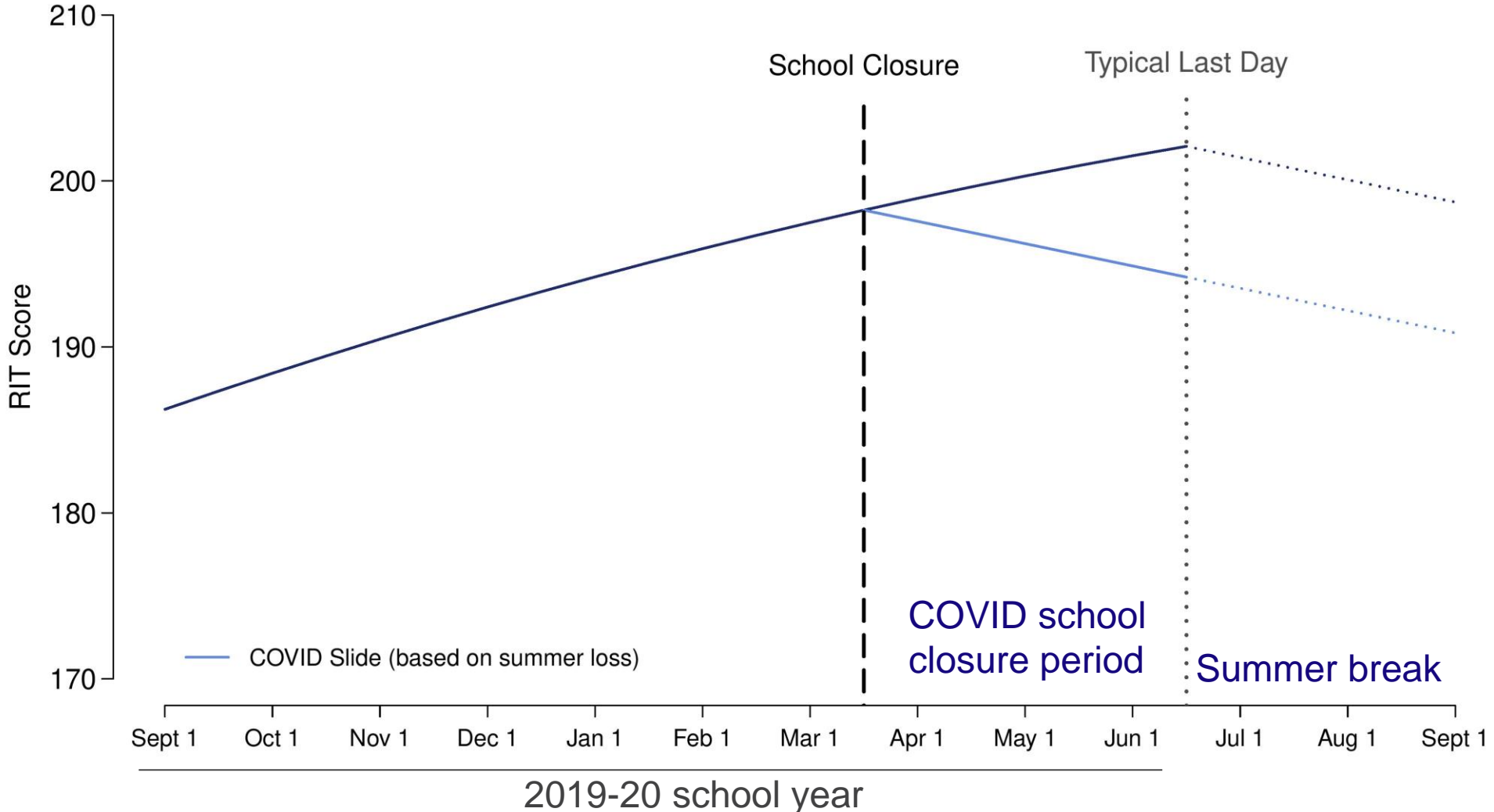
$$y_{tij} = \pi_{0ij} + \pi_{1ij}G3_{tij} + \pi_{2ij}G3_{tij}^2 + \pi_{3ij}Sum_{tij} + \pi_{4ij}G4_{tij} + \pi_{5ij}G4_{tij}^2 + e_{tij}$$



# Projected Learning loss – Typical Growth



# Projected Learning loss – COVID Slide



# Four COVID Learning Scenarios

1) Typical Growth

2) COVID Slide

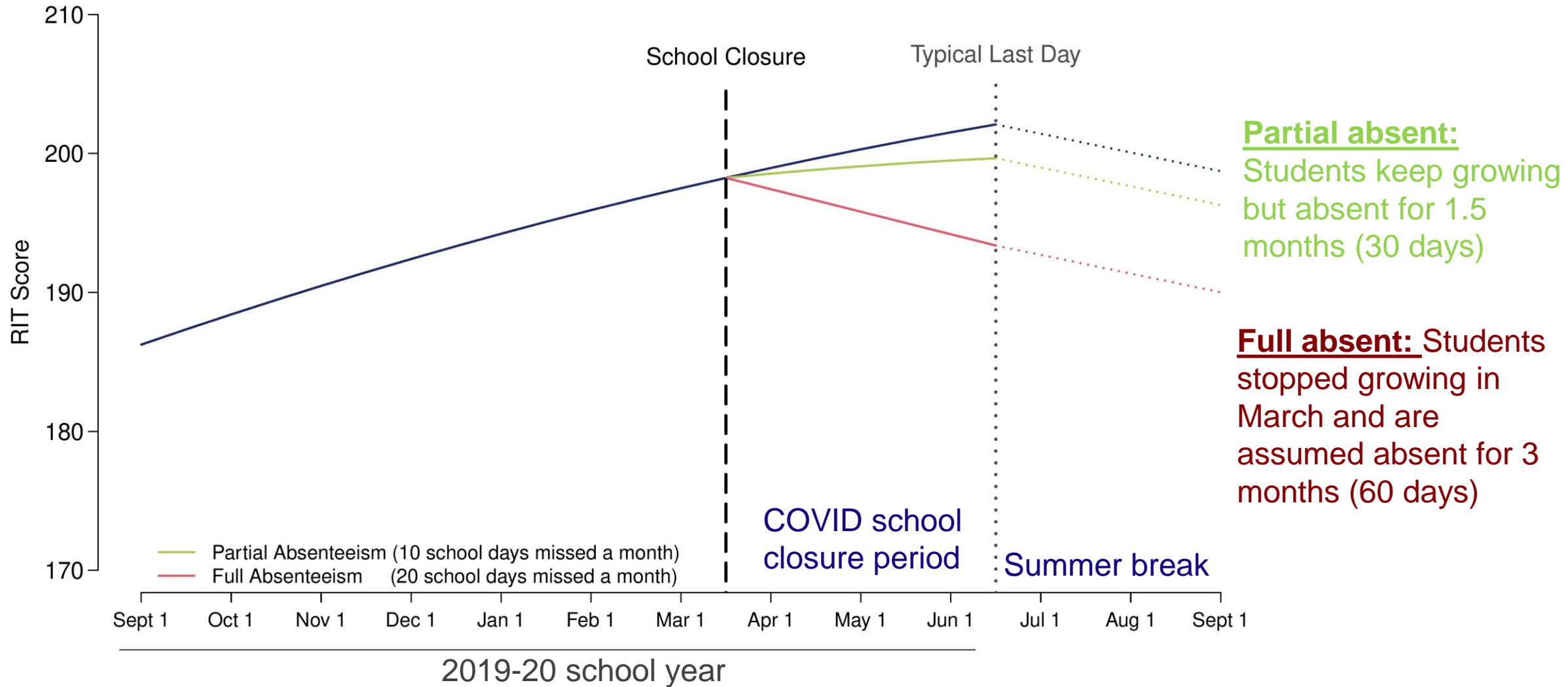
Estimated based on historic MAP Growth data from over five million US public school students across two school years (2017-18 to 2018-19)

3) Partial Absenteeism

4) Full Absenteeism

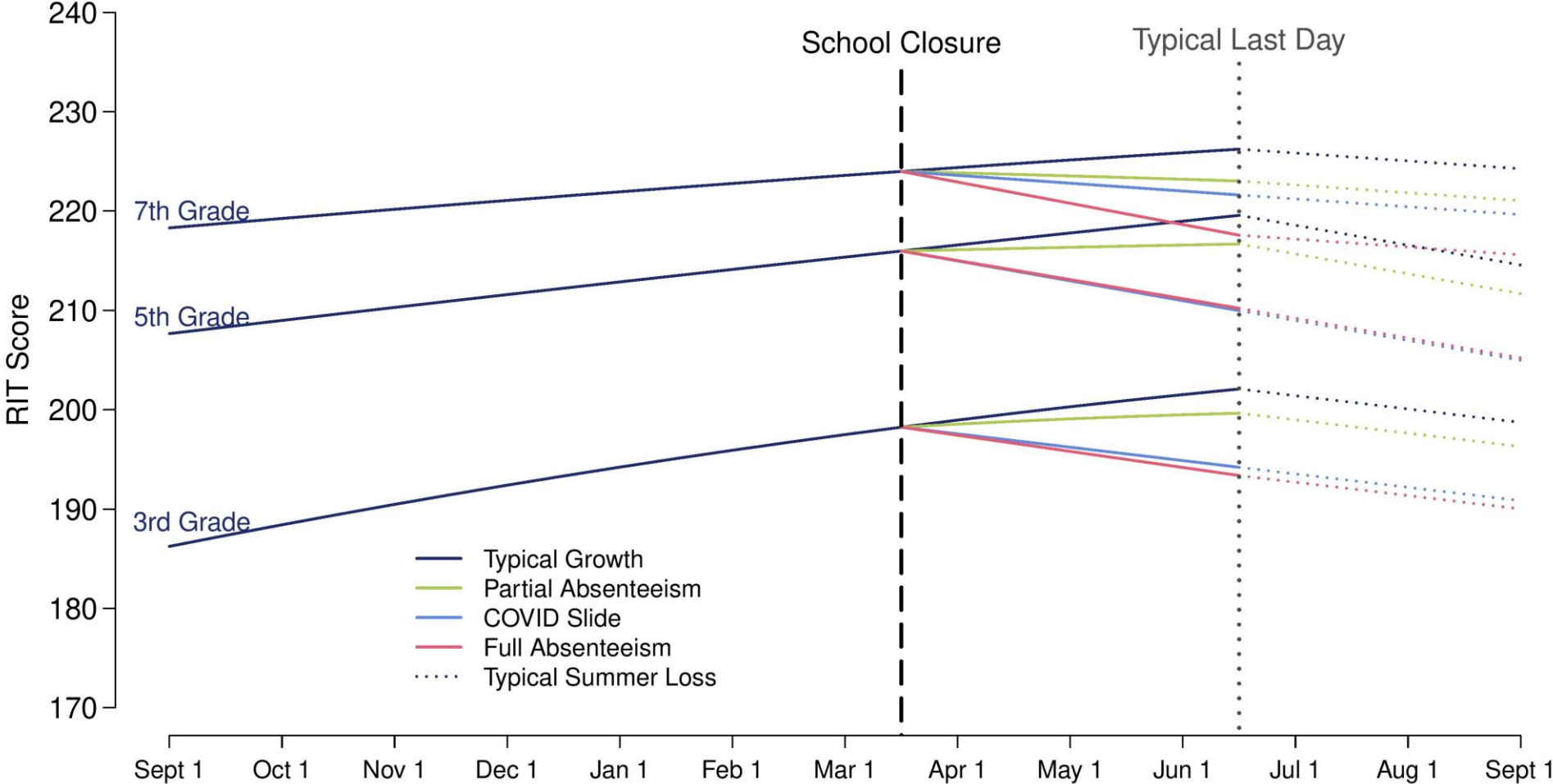
Estimated based on aggregated effect sizes (.006 SD for each day absent in math and .0035 SDs for each day in reading) from prior absenteeism work (translated to the RIT scale)

# Projected Learning loss – Partial and Full Absenteeism



# Projected Learning loss

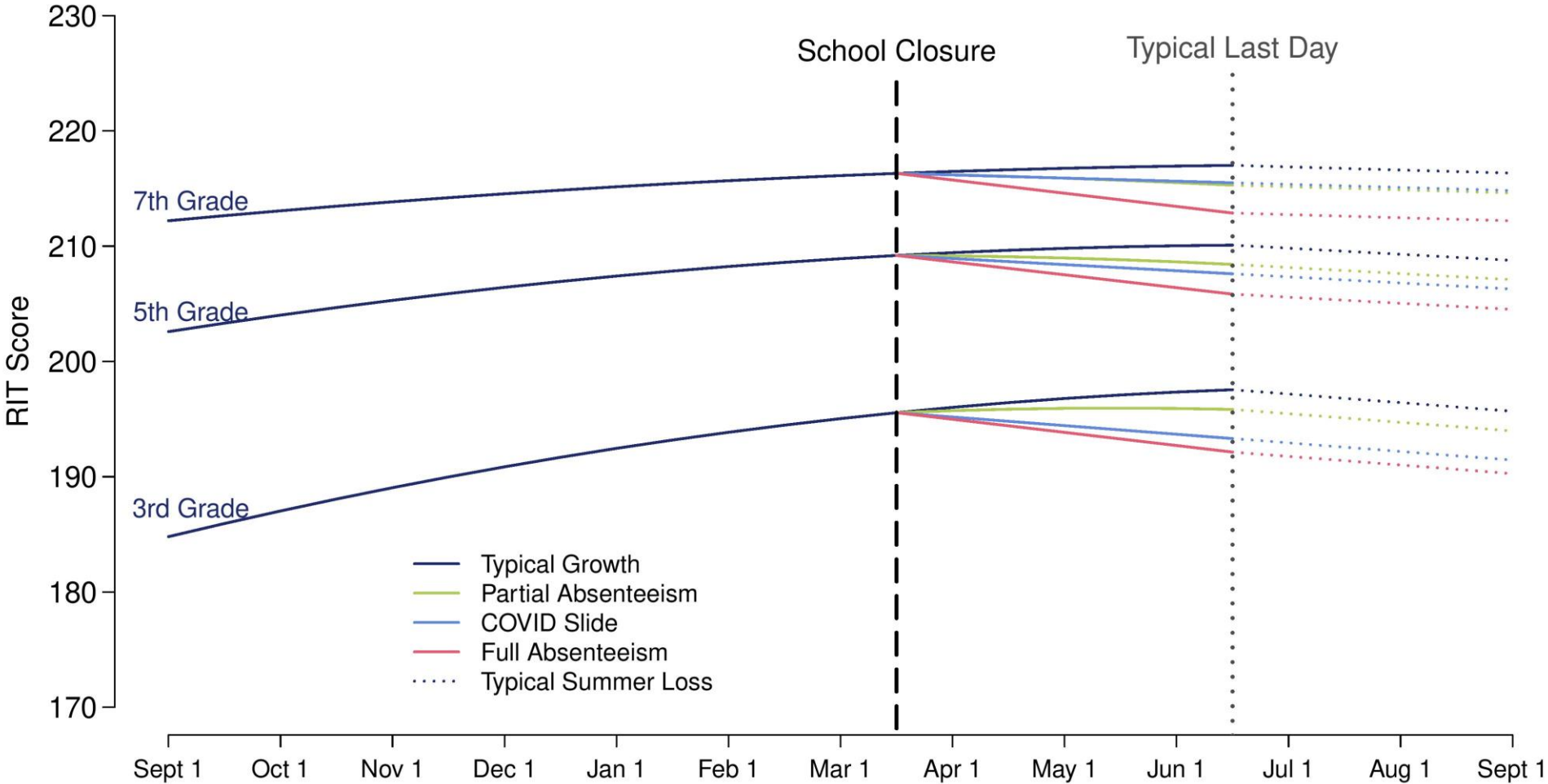
## Mathematics





# Projected Learning loss

## Reading

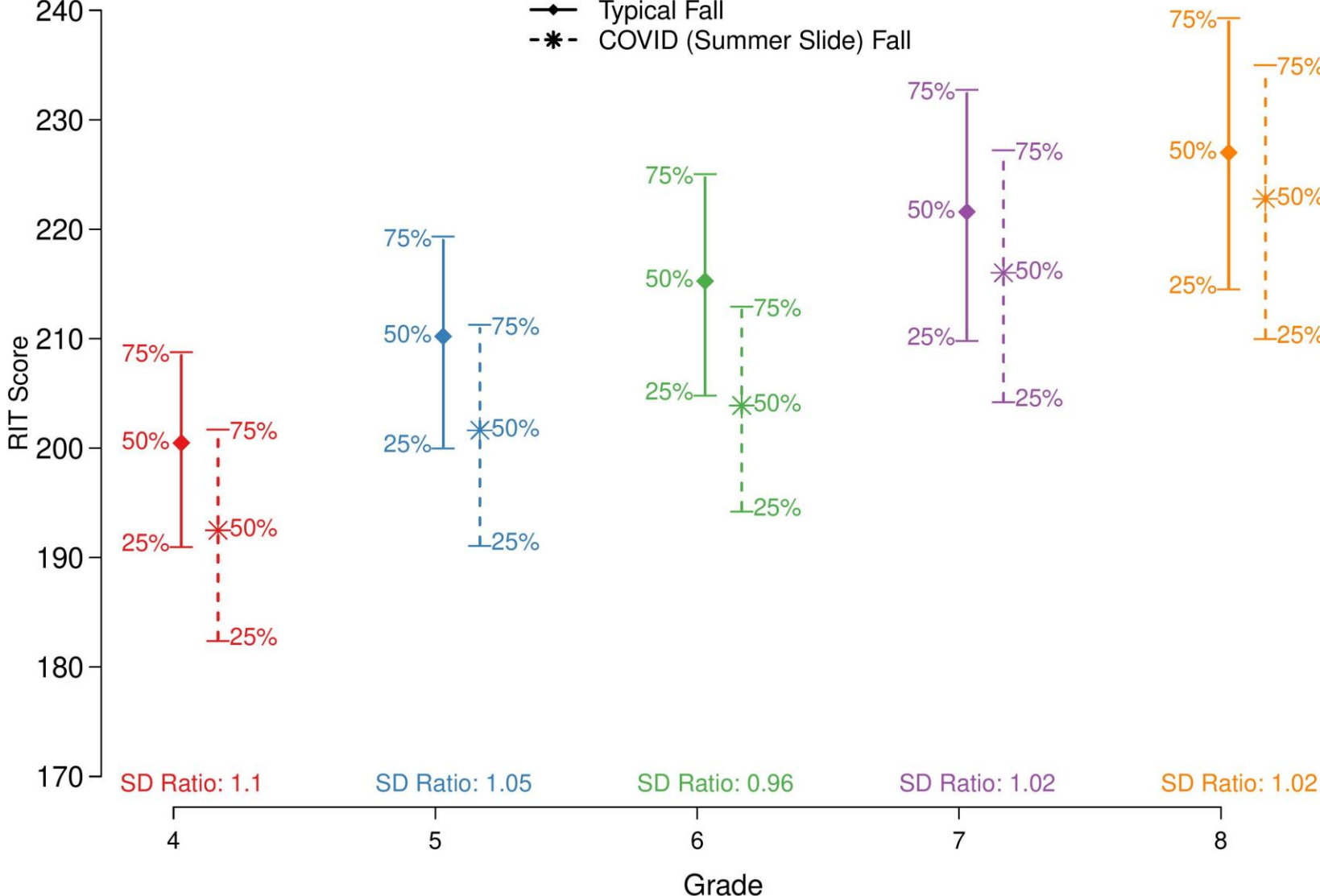


# Projected variability in fall 2020 test scores

- + Using Empirical Bayes (EB) estimates from our growth models, we project fall 2020 test scores under two scenarios:
  - **Typical growth:** assuming students were in school the entire 2019-20 school year and then showed typical summer loss
  - **COVID slide:** assuming students were in school for 6.5 months and then experienced a 5.5-month summer break
- + We then plotted the projected fall score distributions under each scenario

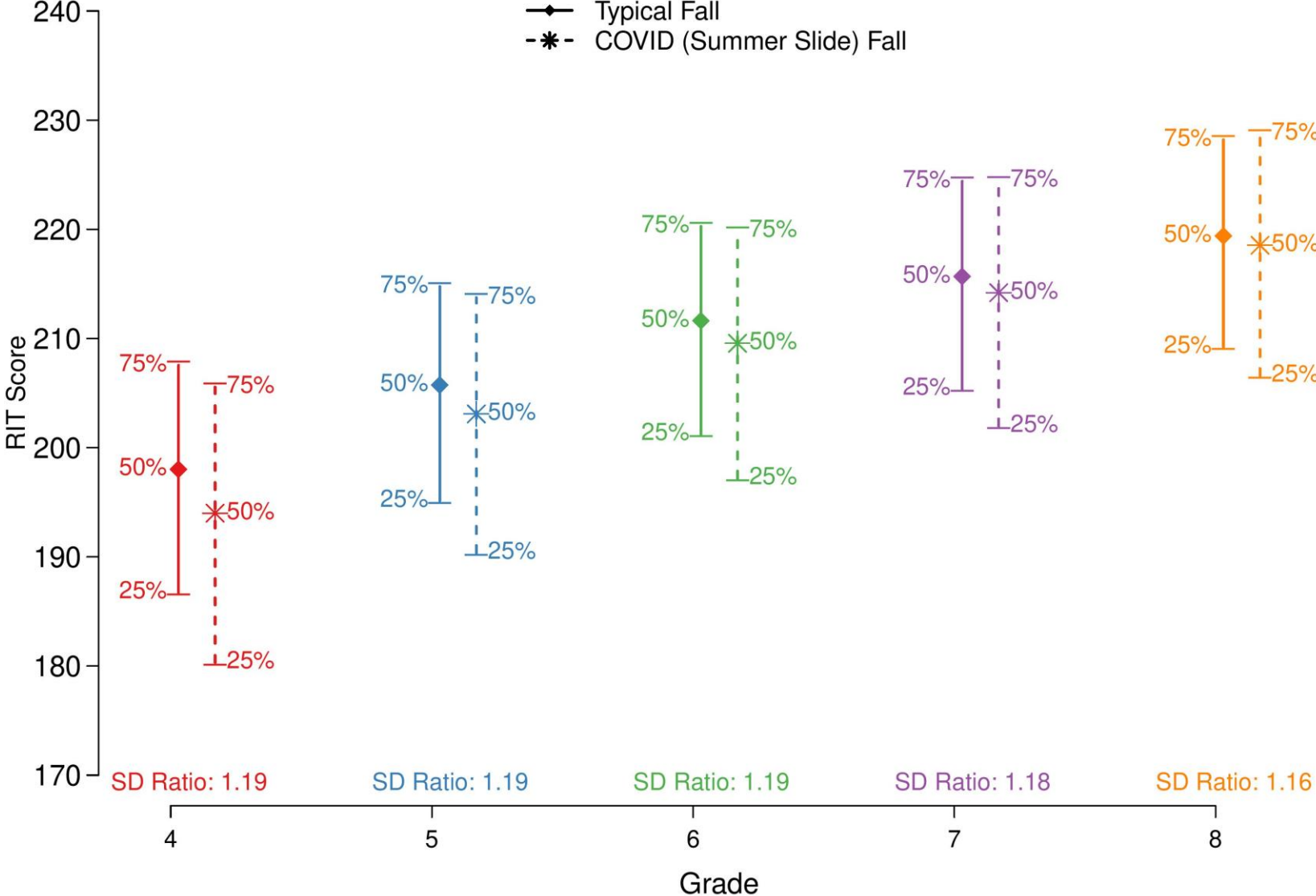
# Projected variability in fall 2020 test scores

## Mathematics



# Projected variability in fall 2020 test scores

## Reading

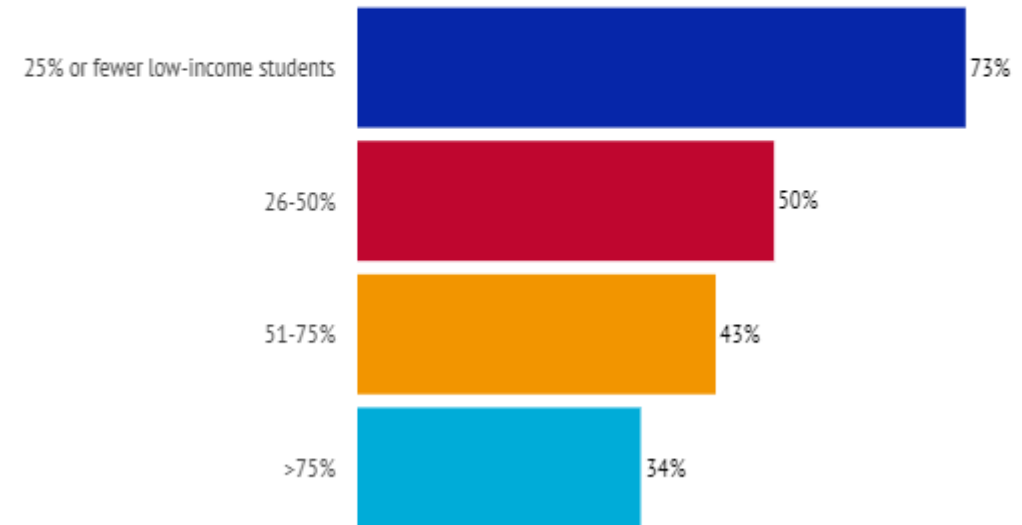


# Projected inequalities by school-level poverty

## + Three achievement gap conditions:

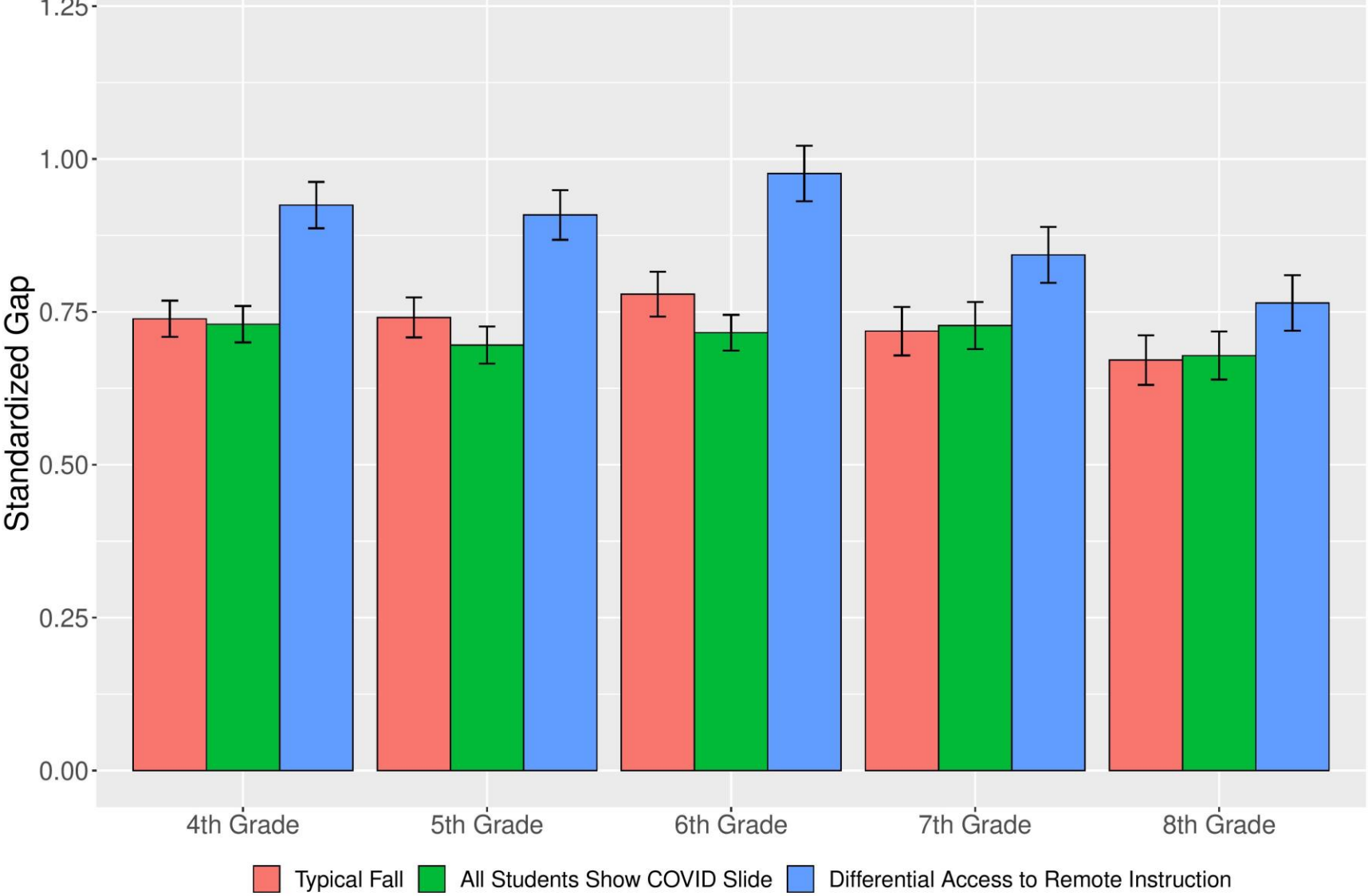
1. All students showed typical learning during the 2019-20 school year
2. All students showed COVID Slide
3. A different percentage of students showed COVID Slide depending on the likelihood of receiving remote instruction

Percentage of district leaders who said they were able to provide online learning opportunities to all students during Coronavirus-related closures (March 24 & 25)



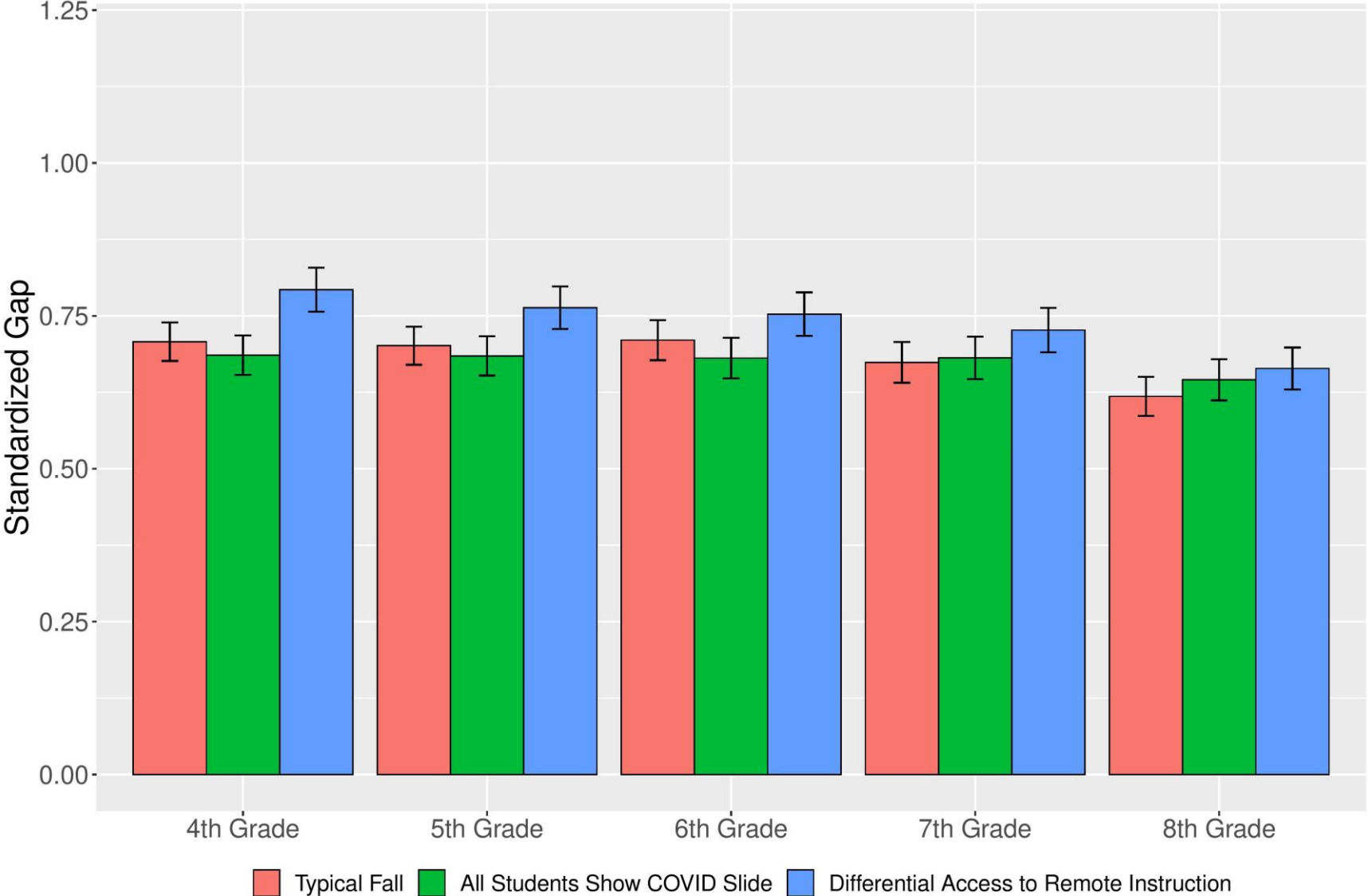
Source: <https://www.edweek.org/ew/articles/2020/04/10/the-disparities-in-remote-learning-under-coronavirus.html>

# Projected inequalities by school-level poverty (math)





# Projected inequalities by school-level poverty (ELA)



# It's already December 2020... how are students performing this fall?

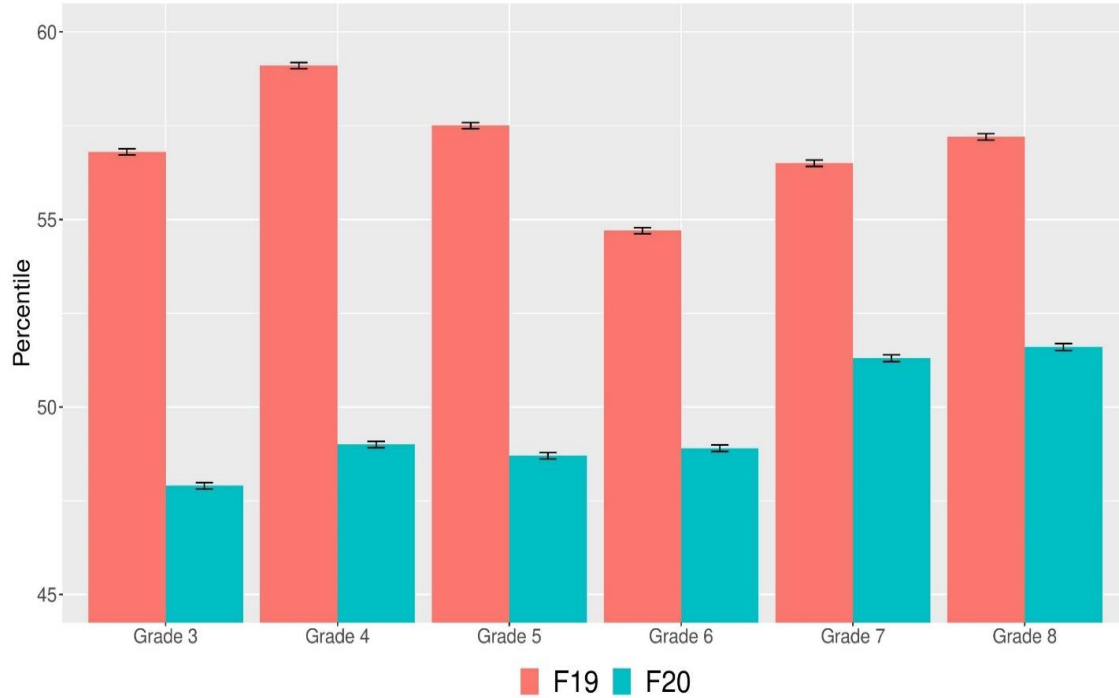
- + MAP Growth testing just finished
- + Nearly 4.4 million students in grade 3-8 took the test in fall 2020 either in-person or virtually.
- + A larger fraction of not-tested students were ethnic/racial minority , low achievers in fall 2019, and in schools with higher concentrations of socioeconomically-disadvantaged students



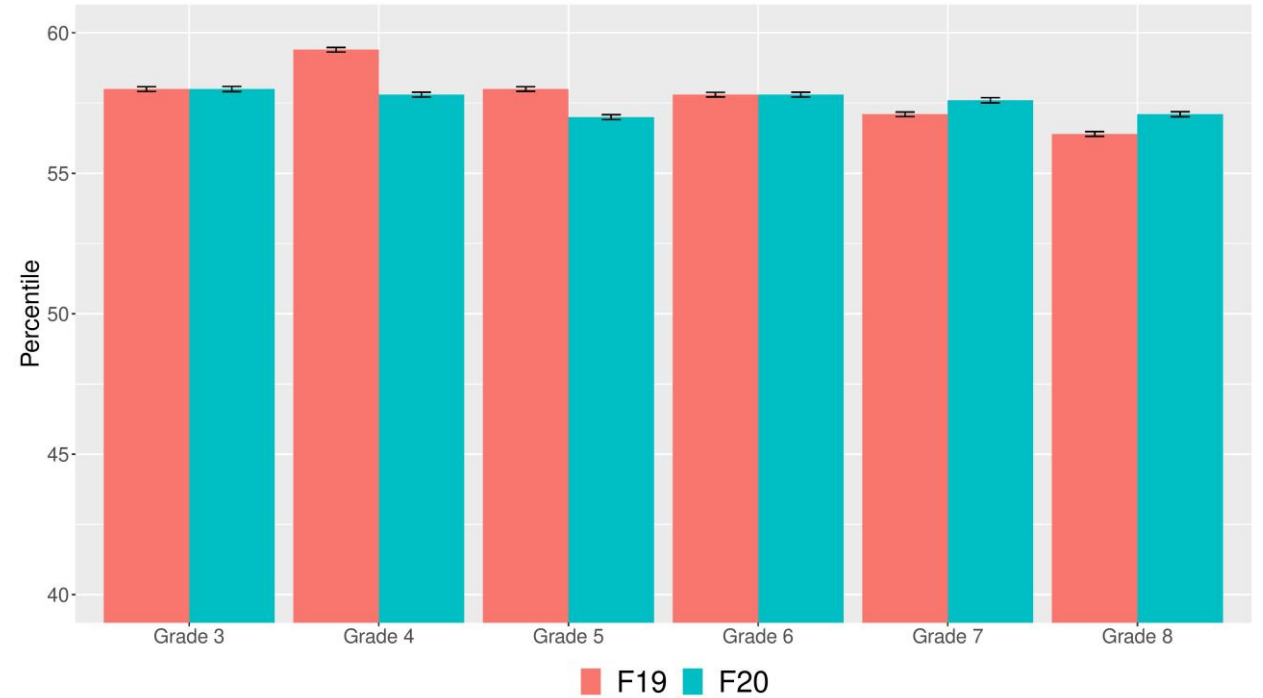
Comparability analysis of remote and in-person MAP Growth testing in fall 2020, Kuhfeld et al. (2020)

**Compared to fall 2019, student achievement this fall was, on average, 5 to 10 percentile points lower in math, but similar in reading**

### Math

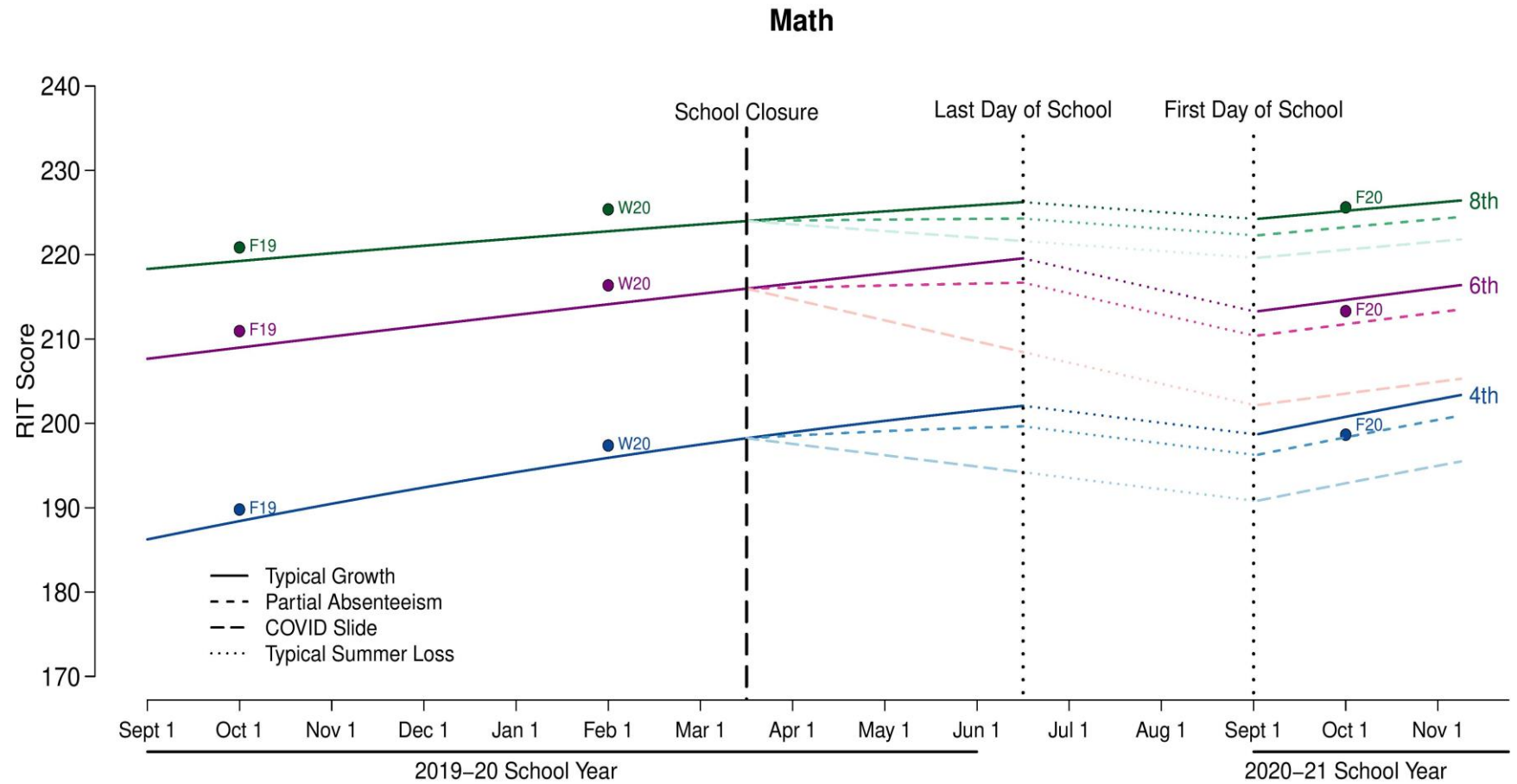


### Reading



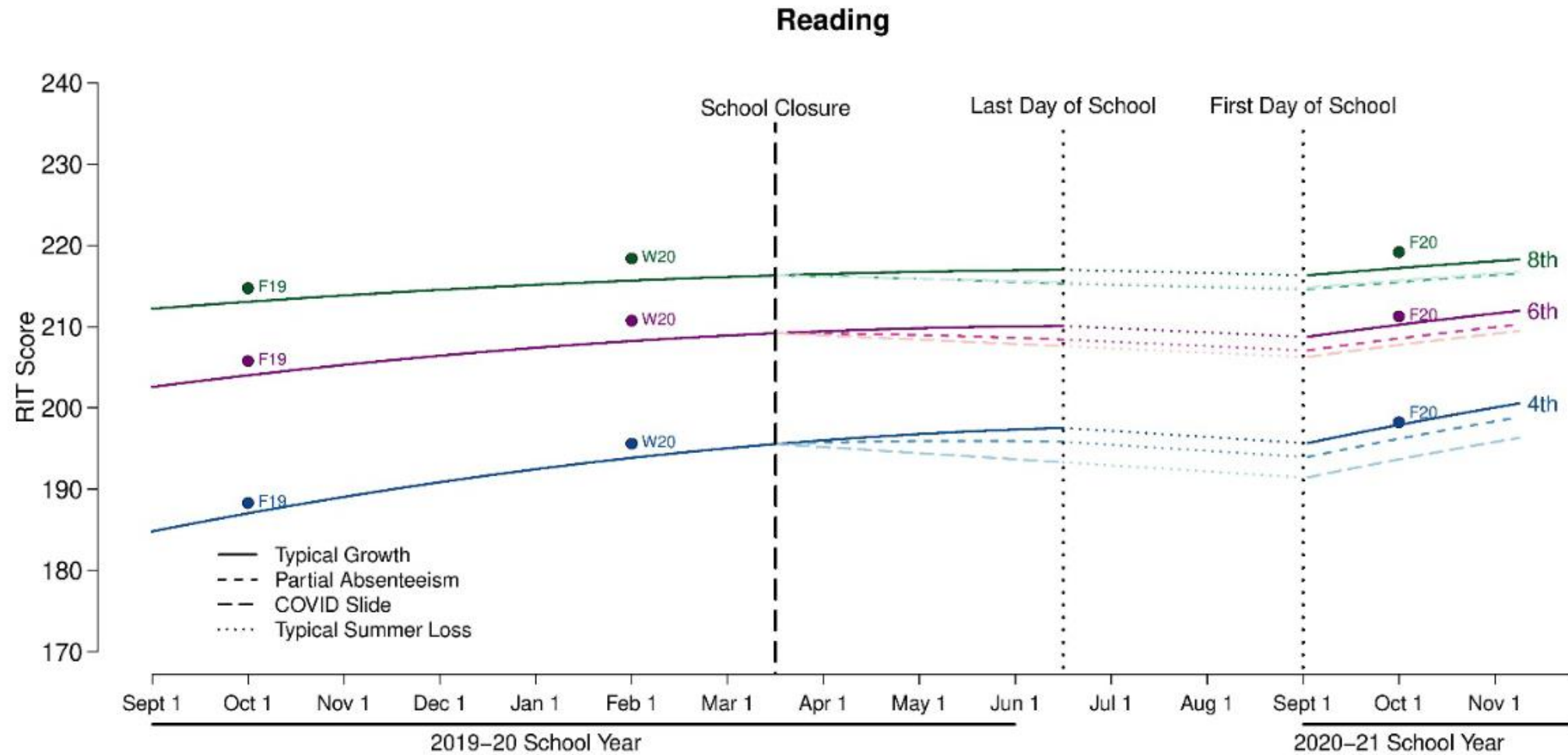
MAP Growth median achievement percentiles by grade level in Fall 2019 and Fall 2020

Compared to our prior projections, on average, in math, student achievement in fall 2020 was in line with projections for grades 4-6 and slightly above in grades 7-8



NWEA COVID learning projections with observed fall 2019, winter 2020, and fall 2020 average RIT scores overlaid

# Students scored better than expected in reading



# Final thoughts

- + COVID is likely to continue to impact all aspects of schooling throughout the 2020-21 school year
- + New results from fall 2020 data show both optimism and concerns, and call for immediate action to support students who have fallen behind
- + Annenberg Institute has released a set of research-based evidence briefs (<https://annenberg.brown.edu/recovery>) that discuss a wide range of topics related how to support schools and recover from learning disruptions due to COVID



# Thank you!

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# References

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- + Liu, J., Lee, M., & Gershenson, S. (2020). *The short- and long-run impacts of secondary school absences*. (EdWorkingPaper: 20-125). Retrieved from Annenberg Institute at Brown University: <https://doi.org/10.26300/xg6s-z169>
- + Gershenson, S., Jackowitz, A., & Brannegan, A. (2017). Are student absences worth the worry in US primary schools? *Education Finance and Policy*, 12 (2), 137-165.
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- + von Hippel, P. T., Workman, J., & Downey, D. B. (2018). Inequality in reading and math skills forms mainly before kindergarten: A replication, and partial correction, of “Are Schools the Great Equalizer?” *Sociology of Education*, 91, 323–357.
- + Kuhfeld, M., Condrón, D., & Downey, D. (2019). When Does Inequality Grow? A Seasonal Analysis of Racial/Ethnic Disparities in Learning in Kindergarten through Eighth Grade. (The Collaborative for Student Growth at NWEA Working Paper).
- + Kuhfeld, M. (2019). Surprising new evidence on summer learning loss. *Phi Delta Kappan*, 101 (1), 25-29.

# NWEA school sample vs. US public schools (2017-18 through 2018-19)

	NWEA Sample of Schools			Population of US Public Schools Serving Grades 3-8		
	N	Mean	SD	N	Mean	SD
<b>3rd grade</b>	13,699	71.51	42.55	53,430	70.87	44.72
<b>4th grade</b>	13,621	73.03	45.54	53,180	72.54	47.21
<b>5th grade</b>	13,220	75.83	54.75	51,881	74.69	55.75
<b>6th grade</b>	9,006	104.08	107.37	37,688	101.47	110.08
<b>7th grade</b>	7,452	123.14	122.29	31,995	117.88	129.00
<b>8th grade</b>	7,344	124.27	124.38	31,770	118.47	130.32
<b>Percent FRPL</b>	18,479	0.50	0.30	72,062	0.51	0.31
<b>Percent Hispanic</b>	18,480	0.20	0.24	72,063	0.24	0.27
<b>Percent Black</b>	18,480	0.17	0.25	72,063	0.15	0.23
<b>Percent White</b>	18,480	0.53	0.33	72,063	0.51	0.33
<b>Percent Asian</b>	18,480	0.04	0.07	72,063	0.04	0.09
<b>City</b>	18,483	0.29	0.45	72,075	0.28	0.45
<b>Suburb</b>	18,483	0.33	0.47	72,075	0.33	0.47
<b>Town</b>	18,483	0.11	0.32	72,075	0.11	0.32
<b>Rural</b>	18,483	0.26	0.44	72,075	0.28	0.45

# NWEA school sample vs. US public(2020-21)

**Table 4.** School Characteristics of the Fall 2020 NWEA Sample of Schools and the U.S. Public Schools Serving Each Grade Level

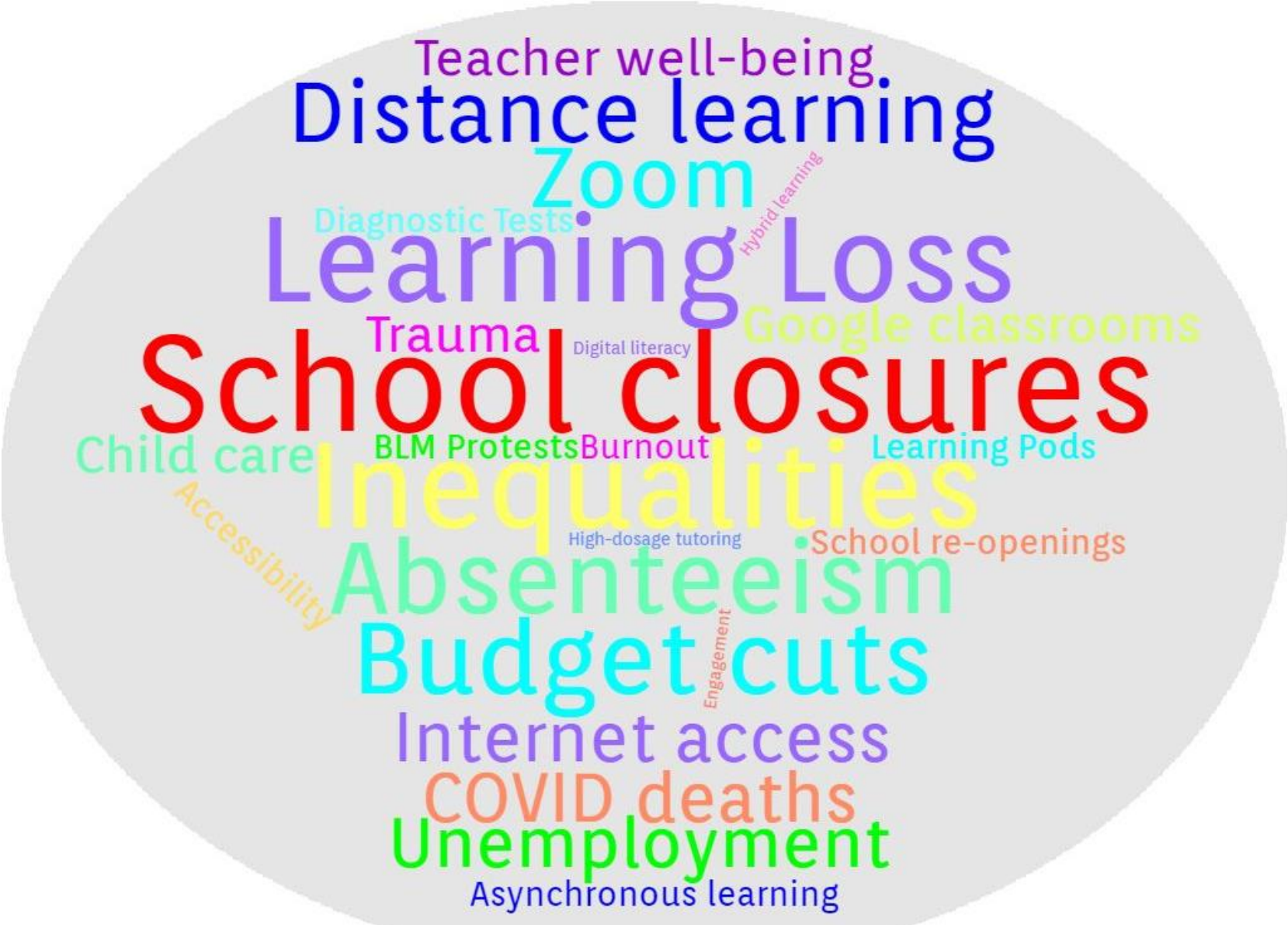
Group	Grade	Number of schools	Average School Enrollment	% FRPL	% White	% Asian	% Hispanic	% Black	% LEP	% Gifted	% Disabled	City	Rural	Suburb	Town
Fall 2020 NWEA Sample	3	5,533	478	0.50	0.64	0.03	0.17	0.14	0.10	0.06	0.14	0.27	0.28	0.33	0.12
Fall 2020 NWEA Sample	4	5,366	479	0.50	0.64	0.03	0.18	0.13	0.10	0.06	0.14	0.26	0.29	0.32	0.12
Fall 2020 NWEA Sample	5	5,105	482	0.50	0.64	0.03	0.18	0.13	0.10	0.06	0.14	0.26	0.29	0.32	0.12
Fall 2020 NWEA Sample	6	2,996	511	0.48	0.69	0.03	0.14	0.12	0.06	0.08	0.15	0.20	0.39	0.27	0.14
Fall 2020 NWEA Sample	7	2,584	529	0.47	0.69	0.03	0.14	0.13	0.05	0.09	0.15	0.20	0.40	0.25	0.15
Fall 2020 NWEA Sample	8	2,567	529	0.47	0.68	0.02	0.14	0.13	0.05	0.09	0.15	0.20	0.40	0.24	0.15
U.S. public schools	3	57,859	449	0.55	0.55	0.04	0.22	0.17	0.12	0.04	0.15	0.30	0.27	0.33	0.11
U.S. public schools	4	57,962	448	0.55	0.55	0.04	0.22	0.17	0.11	0.04	0.15	0.30	0.27	0.32	0.11
U.S. public schools	5	57,894	449	0.55	0.54	0.04	0.22	0.17	0.11	0.05	0.15	0.30	0.27	0.32	0.11
U.S. public schools	6	44,151	456	0.56	0.55	0.04	0.21	0.18	0.09	0.05	0.17	0.29	0.31	0.28	0.12
U.S. public schools	7	35,949	452	0.56	0.55	0.03	0.20	0.19	0.07	0.06	0.18	0.29	0.34	0.26	0.12
U.S. public schools	8	36,329	462	0.56	0.55	0.03	0.20	0.19	0.07	0.06	0.18	0.29	0.34	0.25	0.12

Note: FRPL=free or reduced priced lunch, LEP=limited English proficiency. This table is presented for the schools included in the first analytic sample for reading, but results are highly similar for across the various analytic samples. The school characteristics were retrieved from a school-level covariate data file produced by the Stanford Education Data Archive (SEDA) version 3.0 (Reardon et al., 2019). 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.

# How do we establish the validity of remote tests for research purposes?

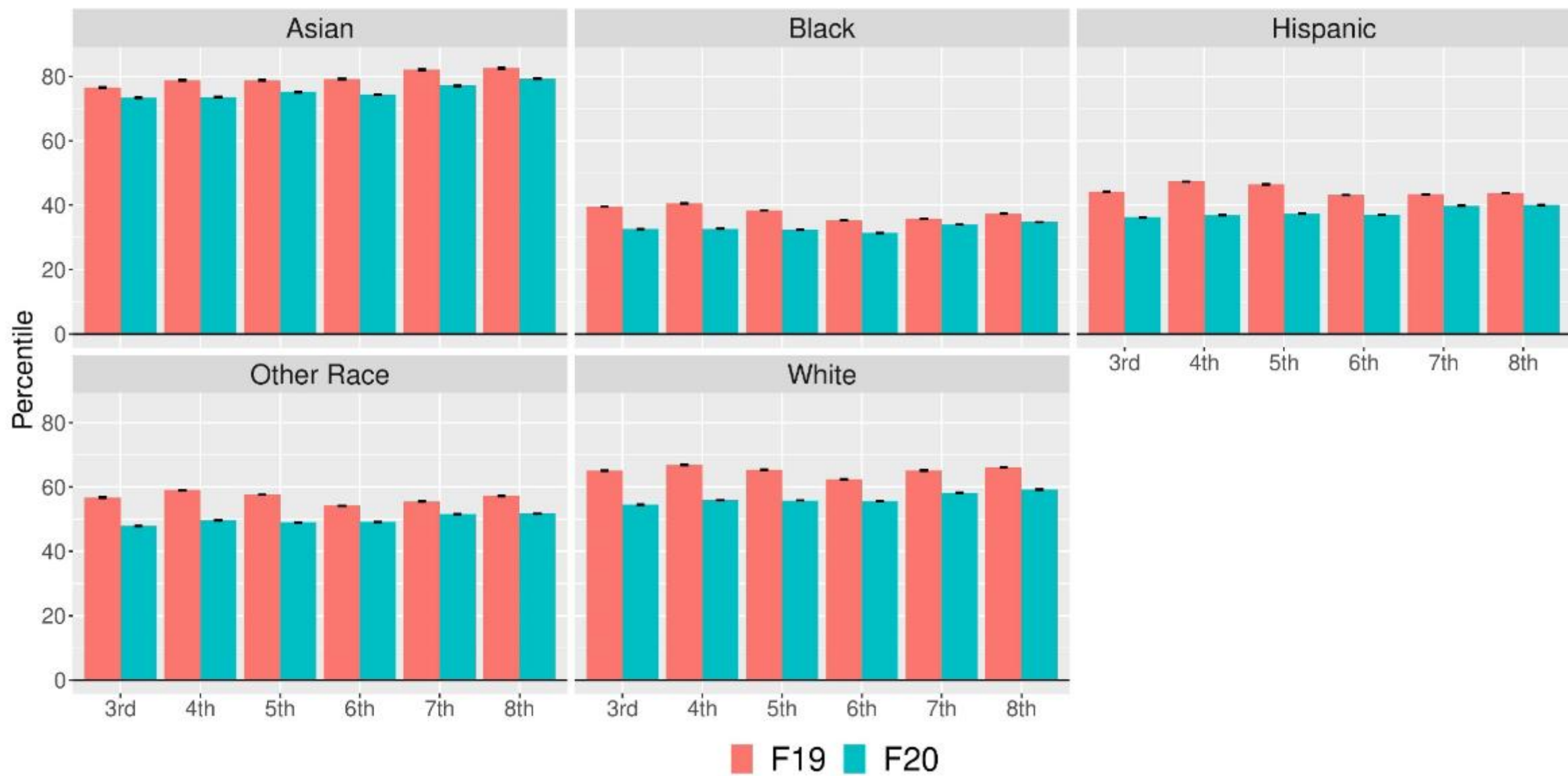
- + Do students who test in-person this fall show similar test results as those who tested remotely?
- + Comparison groups (based on fall 2020 plans):
  - **Remote opening:** Tested normally in F19/W20 and remotely in F20
  - **In-person opening:** Tested in-person in all three timepoints
  - **Hybrid opening:** Combination of students in school and at open
- + Timepoints: Fall 2019, Winter 2020, Fall 2020

# COVID-19 Disruptions to the 2019-20 School Year

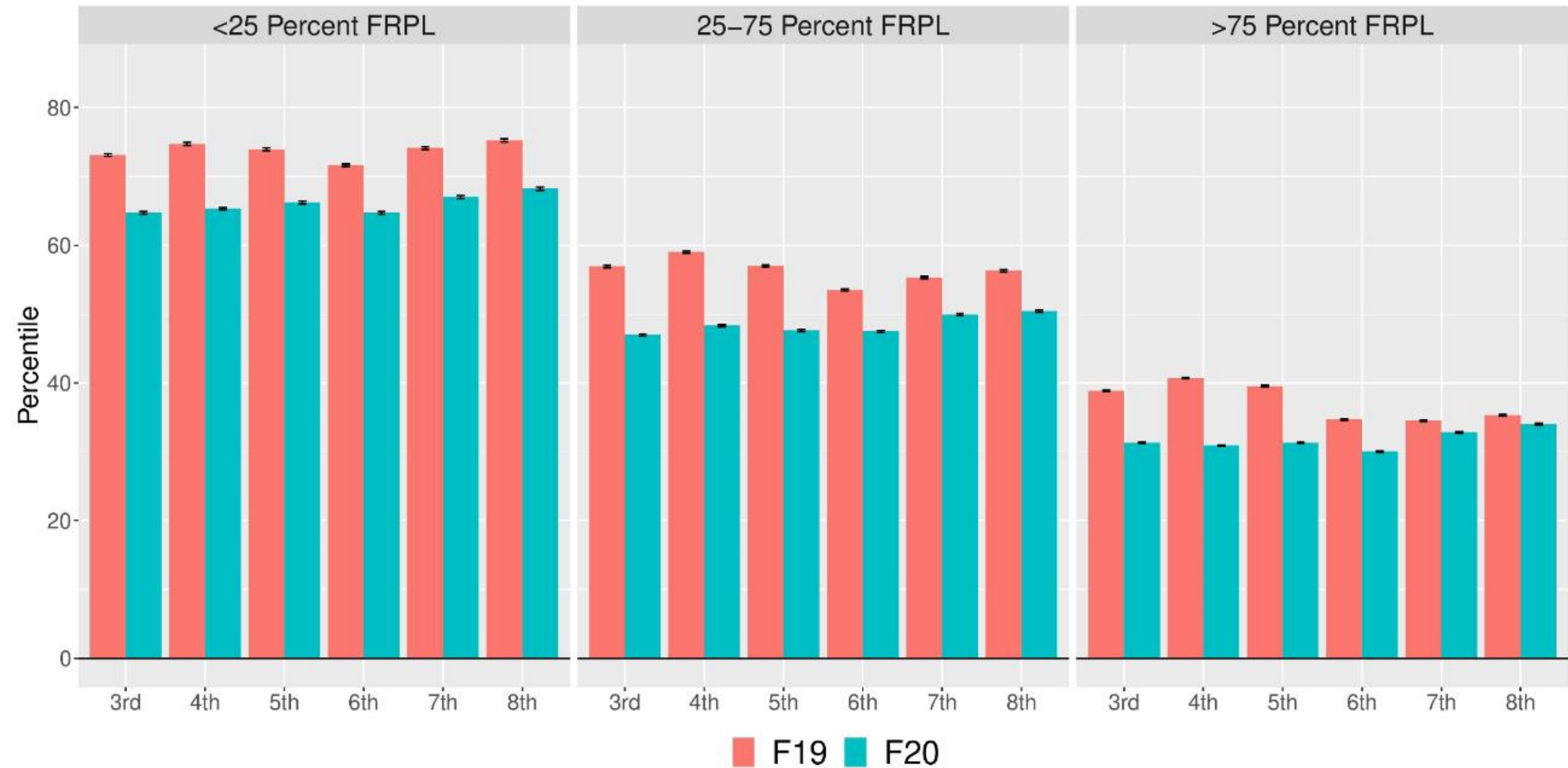




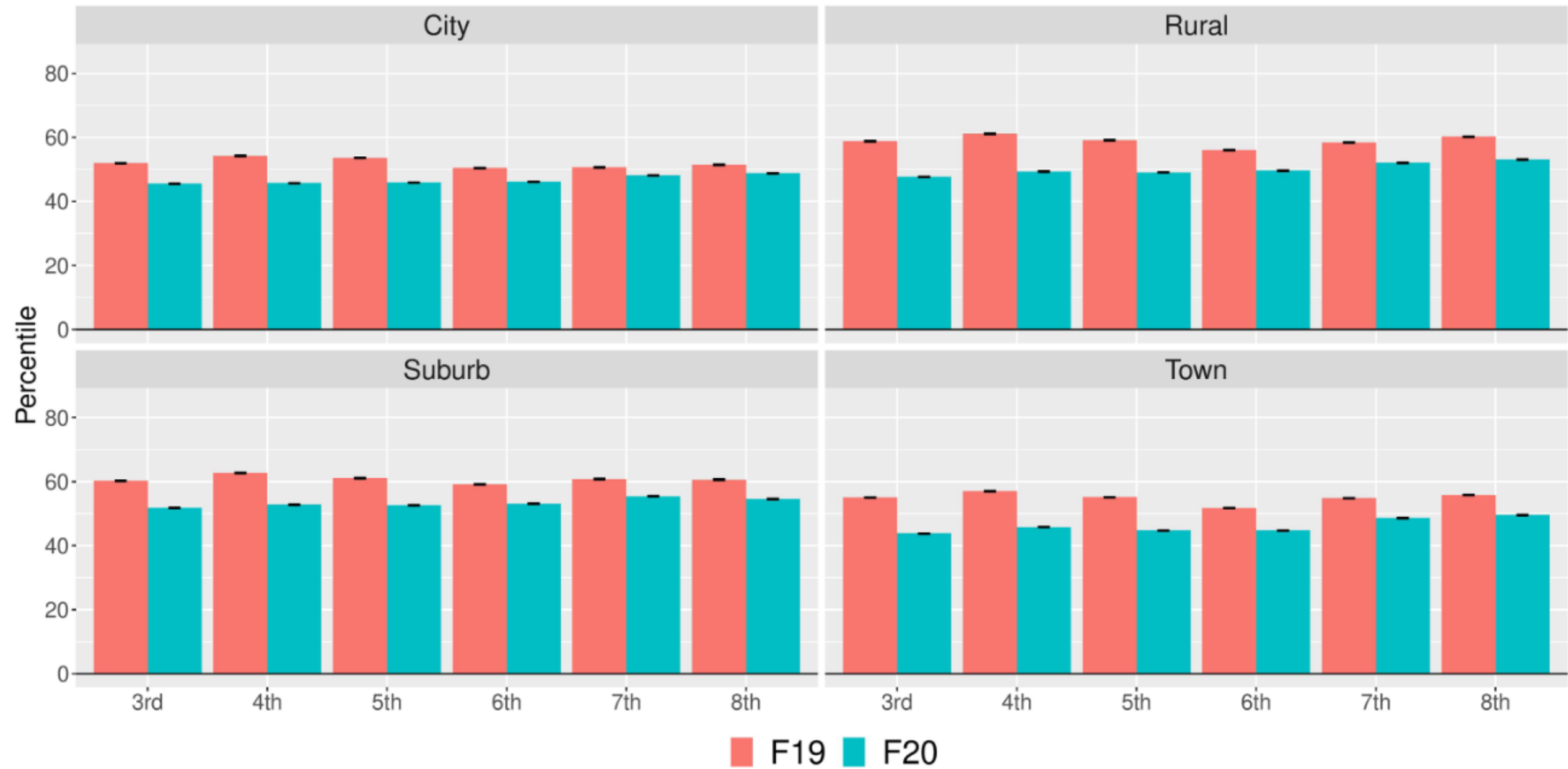
(B) Math



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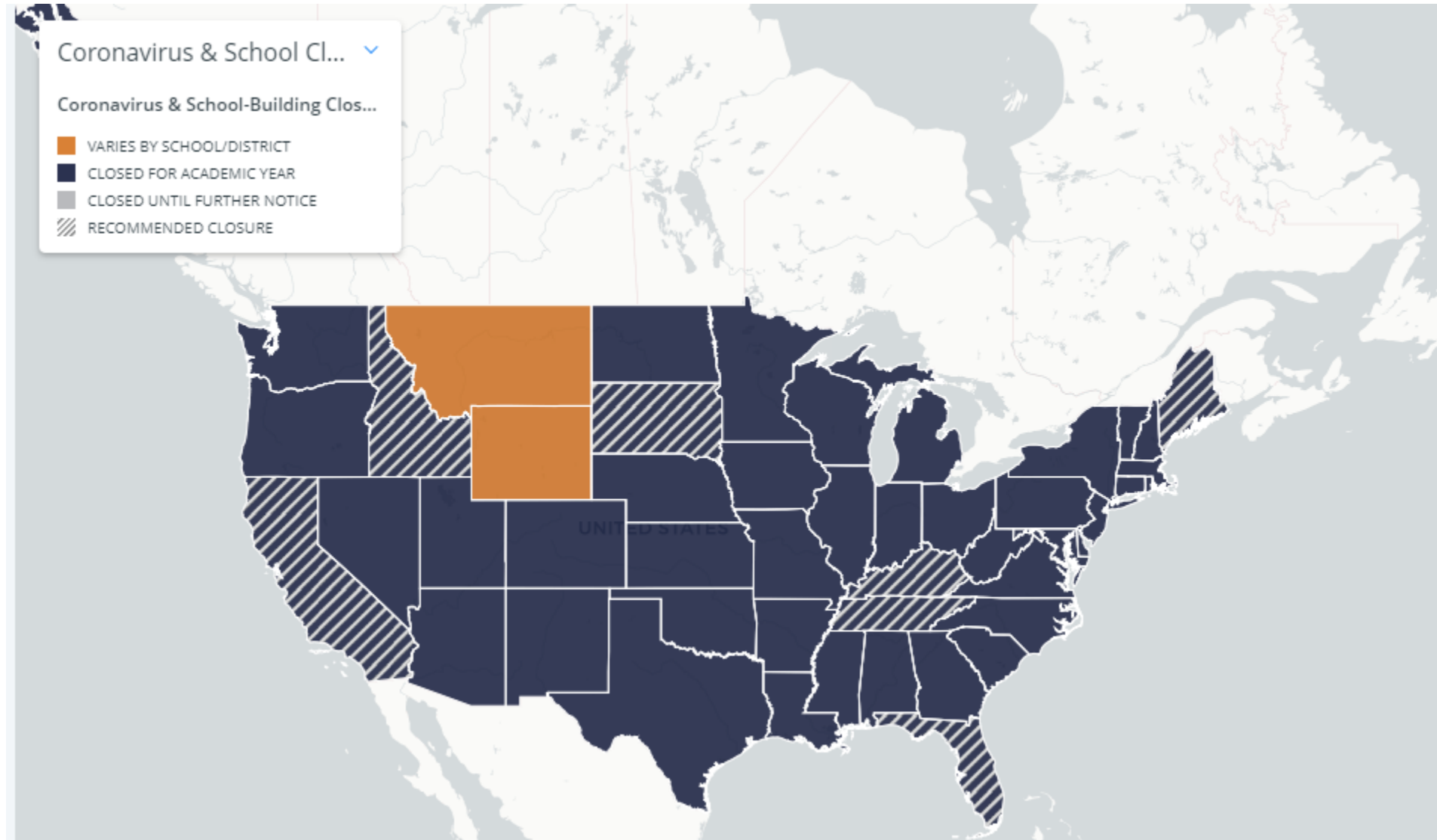


# What does remote testing look like?

- + Happens in the student's home (or wherever there is wifi) on a computer or tablet
- + Remotely proctored by a teacher or administrator



# COVID-19 Disruptions to the 2019-20 School Year



# What are the impacts of the COVID-19 school closures on student learning?

*The Washington Post*  
*Democracy Dies in Darkness*

Education

Millions of public school students will suffer from school closures, education leaders have concluded

*The New York Times*

**50 Million Kids Can't Attend School.  
What Happens to Them?**

America's younger students will need help catching up.

*Los Angeles Times*

CALIFORNIA

A generation left behind? Online learning cheats poor students, Times survey finds

The Education Issue

**Will This Be a Lost Year for  
America's Children?**