Remote Schooling Depresses Course Grades for the Most Vulnerable Students

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Abstract

Several quasi-experimental studies have documented the adverse impact of remote schooling on standardized test scores, but none have examined course grades. We capitalized on data from a large, demographically diverse district whose families chose remote or in-person schooling during the 2020-21 academic year. Controlling for prior grades and demographic covariates, high school students who attended school remotely saw their grade point average (GPA) decline steadily relative to classmates who attended in person. The following year, when all attended in person, the GPAs of students who had previously attended remotely recovered to be comparable to those who had attended in person. Declines in GPA during remote schooling were steepest for students who were Black, Hispanic, male, underachieving, or from low-income families.

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How harmful is remote schooling to academic performance—and whom does it harm the most? Now that the vast majority of American students have returned to in-person schooling, it may seem like remote schooling is no longer policy-relevant. However, in 2022-23, one out of three large U.S. school districts continued to offer students the remote-learning options that had been developed in response to the pandemic (Pangenigan & Dusseault, 2022). Moreover, now that districts have set a precedent and developed infrastructure for remote schooling, the practice could easily be reinstated in the future.

Quasi-experimental studies have linked remote schooling during the COVID-19 pandemic to lower standardized test scores in reading and, to an even greater extent, in mathematics (Goldhaber et al., 2022; Halloran et al., 2021; The Nation's Report Card, 2022). Analyses suggest that the nation's most vulnerable students were not only more likely to spend the most time in remote schooling during the pandemic but also to suffer the greatest learning loss as a result—whether vulnerability is indexed by ethnicity and race or by family income (Goldhaber et al., 2022; Halloran et al., 2021).

While evidence to date paints a consistently negative picture of remote schooling and achievement test outcomes, several limitations suggest the need for additional inquiry. First, studies have so far only compared remote and in-person schooling at the school or state level. This leaves open the possibility of unmeasured third-variable regional confounds that covary with the decision to implement remote schooling and with achievement test outcomes. Second, data on standardized tests administered annually prohibit a fine-grained analysis of the temporal dynamics of remote schooling. For example, if remote schooling causally impairs learning, we would expect to see progressive learning loss from marking period to marking period. Third,

standardized tests are not the only valid indicator of student performance. By comparison, course grades better reflect student effort and engagement and are more predictive of long-term outcomes, including college graduation (Galla et al., 2019). Fourth, the inconsistency of annual standardized testing in U. S. high schools has restricted prior research to elementary and middle school grades. Finally, extant research examines mandatory remote schooling and is therefore silent on the more likely scenario for the future—offering students and families the option to voluntarily choose remote schooling.

In this investigation, we address these limitations using longitudinal data from a large, diverse school district that offered students and their families the choice between remote and in-person schooling. We analyzed quarterly student transcript data (N = 9,912) for three full academic years: In 2019-20, all students attended school in person for the first three marking periods; during the fourth marking period, all students attended school remotely. In 2020-21, families were given a choice of learning modality. In 2021-22, all students returned to in-person schooling. As noted below, our main analyses focus on students who were in high school (grades 9 to 11) during the 2020-21 school year and for whom complete data, including school ID and certain demographic covariates, were available across all three academic years. See **Supplementary Materials** for details.

Methods

Participants and Procedure

All data for this investigation were collected from Orange County Public Schools in Florida—one of the ten largest school districts in the United States—by Character Lab Research Network (CLRN), a national, nonprofit consortium of school partners committed to advancing scientific insights that help adolescents thrive. From school records, we obtained and averaged

course grades (on a 100-point scale) to create quarterly GPAs. To the best of our knowledge, grading policies for remote and in-person modalities were identical and did not change across the three-year period of this investigation.

Our main sample comprised N = 9,912 students who were in grades 9, 10, and 11 in the 2020-21 school year, and for whom transcript data were available during the prior (2019-20) and subsequent (2021-22) academic years. In spring 2020, families were offered the choice of attending school remotely or in person for the fall. Changing status during a marking period was not allowed. Remote (vs. in-person) status was a binary indicator obtained from a Character Lab Research Network student survey administered during the fourth marking period of 2020-21. In this district, course content for remote schooling was closely matched to in-person schooling. Both remote and in-person students could be assigned to the same teacher for synchronous class instruction. Remote students adhered to the same bell schedule as in-person students. A majority of teachers in the district (77%) taught both in-person and remote students. See **Supplementary Materials** for details.

As a robustness check, we repeated analyses with students who were in middle school in 2020-21, for whom certain 2019-20 demographic variables (e.g., status as English language learner), marking period 1 grades, and school ID were missing in data received from the district. See **Supplementary Materials** for details.

Analytic Strategy

For each marking period of the 2020-21 and 2021-22 school years, we estimated the difference in GPAs of students attending school remotely versus in person, controlling for baseline GPA for every marking period in the 2019-20 school year, as well as baseline grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status,

special education status, home language, and school. Controlling for these covariates was important because, as shown in **Table 1,** students whose families chose remote schooling were not equivalent at baseline.

For each marking period, we used an ordinary least squares (OLS) model to estimate the following equation:

$$Y_{ist} = \alpha + \beta\ Remote_{is} + \gamma\ X_{is} + \nu_s + \epsilon_{ist},$$

where Y_{ist} is the GPA of student i in school s during time period t; β is the estimated disadvantage of attending school in person; $Remote_{is}$ is an indicator for whether a student attended school in person during the 2020-21 academic school year; X_{is} is a vector of control covariates, including baseline GPA and demographics; ν_s is a school fixed effect; and ϵ_{ist} is an error term. Reported standard errors were corrected for heteroskedasticity with the Huber-White sandwich estimator.

To examine moderation effects, we fit a series of models with interaction terms with the remote indicator. For grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, and home language, we included an interaction term between remote schooling and each level of the moderator. For baseline GPA, we dichotomized the variable (students at or above the median vs. students below the median) and interacted this dichotomous variable with the remote schooling indicator. We controlled for all variables that were included in interaction terms. Additionally, we estimated the difference in covariate-adjusted declines in GPA for remote vs. in-person students from Q1 to Q4 of the 2020-21 academic year and the corresponding differences in covariate-adjusted recoveries from Q4 of

the 2020-21 academic year to Q1 of the 2021-22 academic year. We tested whether these declines and recoveries differed between subgroups.

Results

During the 2020-21 school year, slightly fewer than half of students (44.8%; n = 4,439) opted to attend school remotely, and the remainder (55.2%; n = 5,473) opted to attend school in person. This choice covaried with student characteristics—but in contrast to studies in which remote schooling policies were determined by school, district, or state authorities, we found that more vulnerable students in this district were *not* necessarily more likely to attend school remotely. For instance, remote schooling was more likely to be chosen by students who earned higher GPAs the prior academic year and less likely to be chosen by students who were English language learners or in special education. As shown in **Supplementary Materials**, results were similar whether we fit separate univariate probit models predicting remote (vs. in-person) schooling status for each student characteristic or, instead, entered all student characteristics simultaneously into one probit model.

Table 1

Baseline Differences Between Students Who Chose Remote vs. In-Person Learning.

Characteristic (percentage of students unless otherwise noted) at Time 1 (Q1 2019-20)	Means (standard errors) by learning location		Difference between students that chose remote and students that chose in-person (standard error)	*p*-value
	Chose remote	Chose in-person		
Female	60.40% (0.73)	49.72% (0.68)	10.68% (1.00)	<.001
Race/ethnicity				<.001
Hispanic	41.32% (0.74)	38.94% (0.66)	2.38% (0.99)	.016
Black, non-Hispanic	22.66% (0.63)	21.85% (0.56)	0.81% (0.84)	.335
Asian, non-Hispanic	10.16% (0.45)	3.84% (0.26)	6.32% (0.52)	<.001
White, non-Hispanic	22.93%	32.91%	-9.97%	<.001

	(0.63)	(0.64)	(0.90)	
Other race, non-Hispanic	2.93%	2.47%	0.46%	.160
	(0.25)	(0.21)	(0.33)	
Free or reduced-price meal program	41.50%	40.29%	1.21%	.224
	(0.74)	(0.66)	(0.99)	
English language learner	7.37%	9.88%	-2.52%	<.001
	(0.39)	(0.40)	(0.56)	
Special education	26.67%	29.42%	-2.74%	.002
	(0.66)	(0.62)	(0.91)	
Home language				<.001
English	58.37%	63.95%	-5.58%	<.001
	(0.74)	(0.65)	(0.98)	
Spanish	26.00%	25.00%	1.00%	.256
	(0.66)	(0.59)	(0.88)	
Other language	15.63%	11.05%	4.58%	<.001
	(0.55)	(0.42)	(0.69)	
Grade level				<.001
8	33.54%	42.04%	-8.50%	<.001
	(0.71)	(0.67)	(0.97)	
9	36.86%	34.19%	2.67%	.006
	(0.72)	(0.64)	(0.97)	
10	29.60%	23.77%	5.83%	<.001
	(0.69)	(0.58)	(0.89)	
Overall GPA at Time 1 (Q1 2019-20)	87.02	84.84	2.17	<.001
	(0.12)	(0.12)	(0.17)	
Overall GPA at Time 2 (Q2 2019-20)	86.08	83.64	2.44	<.001
	(0.12)	(0.12)	(0.17)	
Overall GPA at Time 3 (Q3 2019-20)	86.09	83.25	2.84	<.001
	(0.12)	(0.13)	(0.18)	
Overall GPA at Time 4 (Q4 2019-20)	89.18	85.15	4.02	<.001
	(0.14)	(0.15)	(0.20)	
Sample size	4,439	5,473		

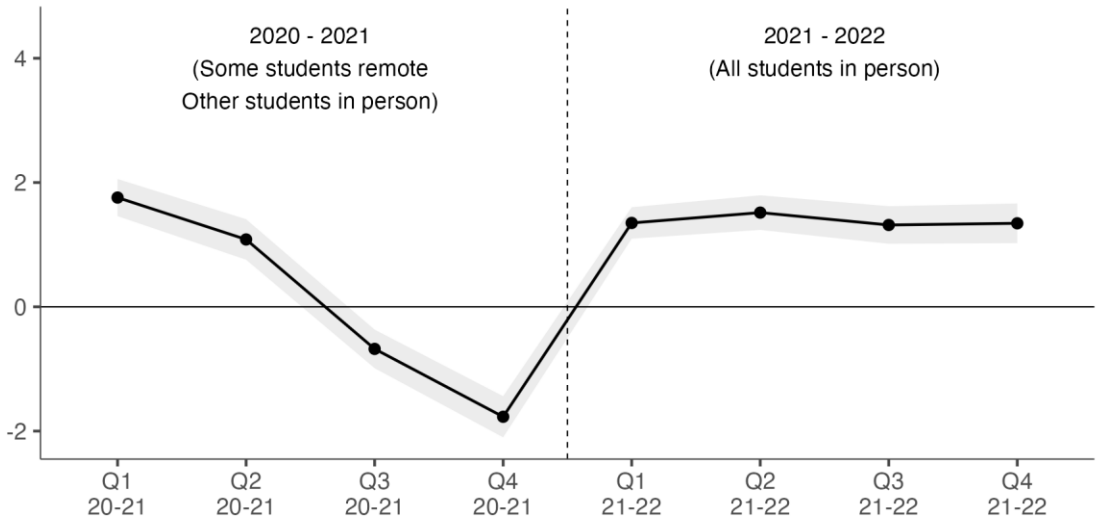
Note. For continuous and dichotomous variables, the *p*-values were calculated using two-tailed t-tests. For categorical variables, the *p*-values were calculated using chi-square tests. * two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$. GPA - Grade Point Average (100-point scale).

As shown in **Figure 1,** students who attended school remotely saw monotonic decreases in their GPAs during each marking period of the 2020-21 school year relative to their in-person peers. By the end of the school year, remote students were $d = 0.17$ standard deviations (1.78 GPA points) below their in-person counterparts. As a benchmark, the impact of remote schooling on course grades was more than five times the median effect size of educational interventions funded by the U.S. Department of Education ($d = 0.03$; Kraft, 2020) and more than four times the average of educational interventions meeting What Works Clearinghouse standards ($d = 0.03$; Herrmann et al., 2019). When reunited with other students for in-person schooling in 2021-22, these students recovered their advantage. In contrast to the asymmetric impact of remote

schooling on math (vs. verbal) achievement test scores (Goldhaber et al., 2022), the impact of remote schooling on GPA was similar for math and English language arts classes. See **Supplementary Materials** for detailed analyses and robustness checks.

Figure 1

Differences in GPA (on a 100-Point Scale) Between Students Who Chose Remote (vs. In-Person) Schooling for the 2020-21 School Year



Note. Shaded areas represent 95% confidence intervals. Estimates control for demographics and prior course grades. Positive y-axis values indicate that students who chose remote schooling in the 2020-21 school year earned higher course grades than classmates who instead chose in-person schooling; negative y-axis values indicate the converse.

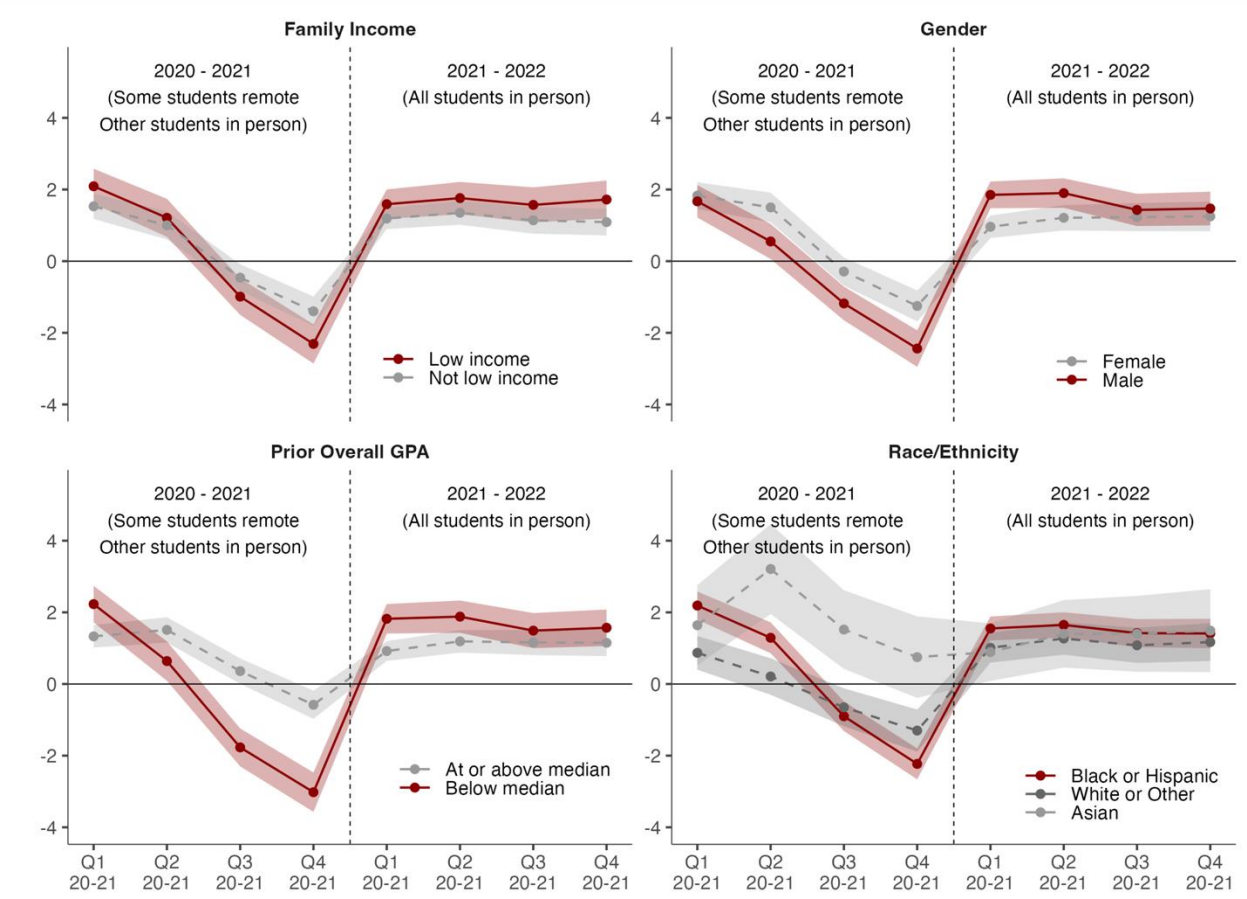
As shown in **Figure 2,** the drop in GPAs during remote (vs. in-person) schooling in 2020-21 was steeper for more vulnerable students. Specifically, declines (measured from Q1 to Q4 of 2020-21) were steeper for students who were Black or Hispanic (compared to White or Other race, difference in declines = 2.25, $p < .001$; compared to Asian, difference in declines = 3.53, $p < .001$), male (difference in declines = 1.04, $p < .01$), from low-income families (difference in declines = 1.48, $p < .001$), or whose GPAs were below-median the prior year (difference in declines = 3.34, $p < .001$).

Likewise, in 2021-22, when all students attended school in person, these vulnerable groups disproportionately benefited from the district's decision to return all students to in-person schooling. Specifically, recovery in GPAs (measured from Q4 of 2020-21 to Q1 of 2021-22) was greater for students who were Black or Hispanic (compared to White or Other race, difference in recoveries = 1.47, $p < .001$; compared to Asian, difference in recoveries = 3.65, $p < .001$), male (difference in recoveries = 2.08, $p < .001$), from low-income families (difference in recoveries = 1.32, $p < .001$), or whose GPAs were below-median the prior year (difference in recoveries = 3.34, $p < .001$).

As detailed in the **Supplementary Materials,** GPA differences during 2020-21, and corresponding rebounds in 2021-22, were consistent across grade level, English language learner status, special education status, and home language.

Figure 2

Differences in GPA (on a 100-Point Scale) Between Students who Chose Remote vs. In-Person Schooling for the 2020-21 School Year Were Greatest for Low-Income, Lower-Achieving, Black or Hispanic, and Male Students



Note. Shaded areas represent 95% confidence intervals. Students were considered to be from low-income families if they qualified for free or reduced-price meals. Positive y-axis values indicate that students who chose remote schooling in the 2020-21 school year earned higher course grades than classmates who instead chose in-person schooling; negative y-axis values indicate the converse.

We repeated the above analyses in a series of robustness checks, including fitting models using data on students in grades 7 and 8 during the 2020-21 academic year. These younger students were not included in the main analyses because the school district did not provide certain demographic fields, marking period 1 course grade data, or school ID for 2019-20. The

reliability, direction, and magnitude of effects were consistent with those presented in these main analyses.

Discussion

In a large and demographically diverse public school district, we examined quasi-experimental evidence for the impact of remote schooling on course grades. In contrast to prior studies of remote schooling policies imposed by state or district officials, individual students and their families in our sample decided on their preferred schooling modality for the 2020-21 academic year. Controlling for prior GPA and demographic covariates, high school students whose families opted for remote (vs. in-person) schooling during the 2020-21 academic year saw their course grades decline monotonically in that period relative to students who opted for in-person schooling. The following academic year, when all students in the district returned to in-person schooling, this gap disappeared. As a rule, more vulnerable students were not systematically more likely to opt into remote schooling but suffered greater GPA losses when they did: Declines in GPA as a function of remote-schooling status were greatest for students who were Black, Hispanic, male, underachieving, or from low-income families.

Given the substantial literature on pandemic-related adversity and standardized achievement test scores, two unique contributions of this investigation are worth highlighting.

First, while course grades and standardized test scores both reflect academic skills and knowledge, they are not interchangeable (Allensworth & Clark, 2020; Bowen et al., 2009). In particular, course grades disproportionately reflect student effort and the accomplishment of teacher-assigned tasks—which may in part explain their superior predictive validity for long-term outcomes, including college graduation (Duckworth et al., 2012; Galla et al., 2019). Notably, we observed an immediate rebound in course grades when students returned to in-

person schooling in fall 2022, yet an equivalent recovery in standardized test scores for mathematics and reading has not materialized. These scores have continued to decline through 2023 relative to the previous measurement in 2020 (Goldstein, 2023; Kane & Reardon, 2023). This asymmetry in recovery for course grades and test scores underscores their differences, suggesting that the rebound in course grades in this investigation does *not* imply a reversal of learning loss. In addition, we found comparable effects of remote schooling for grades in math and English language arts courses; in contrast, learning losses related to the pandemic in general and to remote schooling, in particular, have been greater when indexed by math versus verbal achievement tests (Goldhaber et al., 2022).

Second, relative to other studies that compared student outcomes before and after the COVID-19 pandemic, the quasi-experimental data in this investigation allowed us to better isolate one specific mechanism of learning loss—remote schooling—from other pandemic-related disruptions, including financial stress on families, mental health challenges for both students and parents, and COVID-19-related deaths of loved ones. Because our data included both students who attended school remotely and in person during the pandemic, our study accounted for these disruptions to the extent that they were similar for remote and in-person students. Our findings are consistent with Fuller et al. (2023), who compared a variety of academic outcomes in 2020-21 to the same in pre-pandemic years of 2015-16 through 2018-19 for students in North Carolina. However, because their analyses compare the 2020-21 school year with pre-pandemic trends, their investigation could not parse the effect of remote schooling from other pandemic-related disruptions. Nevertheless, the overall negative effect of the pandemic on absences, grade retention, and GPA was more severe for historically marginalized

students (i.e., Black students, Hispanic students, English Language learners, and students from low-income families).

Four limitations of this investigation are worth noting. First and foremost, without random assignment to condition, unequivocal causal inferences are not warranted. That said, the observation that course grades declined steadily during the 2020-21 school year and then rebounded the following year is consistent with the deleterious impact of remote schooling. Second, and relatedly, we can only speculate as to why certain families choose one schooling modality over the other. We venture to guess that families were influenced by multiple factors, including prevailing gender norms (perhaps inclining families to keep girls at home), concerns about physical safety (inclining parents to keep their 9th graders at home more than their 10th or 11th graders), and expectations of academic independence (inclining students with higher GPAs to choose remote schooling). Third, standardized test score data were not available for the high school students in our sample. This is not unusual since district and state-mandated standardized testing is more common in elementary and middle school students in the United States. Nevertheless, this limitation makes it impossible to directly compare the changes in GPAs to changes in standardized test scores. Finally, there are limits to the external validity of our results. Our data are from a single U.S. school district, and we cannot be certain that our findings would replicate in other school districts or countries subject to different pressures and affordances, nor that the effects of remote schooling would be identical in a non-pandemic era.

Notwithstanding these limitations, our results are consistent with the conclusion that remote learning impairs the ability to perform well in school. Separate research suggests that academic engagement, as well as emotional and social well-being, suffer when students are physically isolated from peers and non-parent adults (Duckworth et al., 2021)—and this very

immediately shows up in report card grades. We conclude that schools should endeavor to preserve the option of in-person schooling, which benefits all students but may be especially protective for the most vulnerable learners.

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Supporting Online Material for
Remote Schooling Depresses Course Grades for the Most Vulnerable Students

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This file includes:

Methods

Participants and Procedure

All data for this investigation were collected from Orange County Public Schools in Florida by Character Lab Research Network (CLRN). We obtained students' course grades from school records and calculated GPAs on a 0-100 scale. GPAs were winsorized such that any value greater that 100 was coded as 100. GPAs were calculated by averaging the grades from the up to eight classes that students could take in a marking period.

Our main sample comprised 9,912 students in 8th, 9th, and 10th grade in the 2019-20 school year. The district has offered a full-time virtual academy option for students since before the COVID-19 pandemic. A trivial number of sample students enrolled in the virtual academy at baseline, indicating that inclusion or removal of these students from the study would make no difference in findings. Additionally, because students could change schools over time and enrollment at baseline did not necessarily indicate location of enrollment during subsequent marking periods, students ever enrolled in the virtual academy during the study period were retained in all analyses.

As a robustness check, we repeated analyses with a larger sample (*N* = 20,951) that also included 6th and 7th grade students, for whom the only demographic variables available in data received from the district were grade, gender, race/ethnicity, and baseline GPA. The 2019-20 marking period 1 GPA data were not available for these younger students, so the robustness check controls only for GPA records from marking periods 2 through 4.

Analytic Strategy

At each time point over the 2 academic years of this investigation, we used an ordinary least squares (OLS) model to estimate the difference in GPAs of students attending remotely vs. in person in 2020-21 when accounting for baseline GPA, demographics, and fixed effects for each school:

$$Y_{ist} = \alpha + \beta\, Remote_{is} + \gamma\, X_{is} + \nu_s + \epsilon_{ist},$$

where Y_{ist} is the GPA of student i in school s during time period t, β is the estimated disadvantage of attending school in person, $Remote_{is}$ is an indicator for whether a student attended school in person during the 2020-2021 academic school year, X_{is} is a vector of control covariates, including grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, and baseline GPA for each term in the 2019-20 school year, ν_s is a school fixed effect, and ϵ_{ist} is an error term. Reported standard errors were corrected for heteroskedasticity with the Huber-White sandwich estimator.

To estimate moderation effects, we fit a series of models with interaction terms with the $Remote_{is}$ indicator. For grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, and home language, we included an interaction term between $Remote_{is}$ and each level of the moderator. For baseline GPA, we dichotomized the variable as students at or above the median and students below the median and interacted this dichotomous variable with the $Remote_{is}$ indicator. We controlled for all variables that were included in interaction terms.

Students completed a survey reporting their remote vs. in-person status at three points during the 2020-2021 school year. Our main specification uses students' latest response, in the spring of the 2020-2021 year. These surveys were also administered to a random subsample of students in the fall and the winter of the academic year. This allows us to test an underlying assumption of our analyses: that remote vs. in-person enrollment was consistent across the 2020-2021 school year. Supporting this assumption, 76% of

the students surveyed in the fall and 87% of students surveyed in the winter reported the same learning modality as in the spring. Additionally, deviations from this assumption would, if anything, dilute the negative effects of remote schooling, making our estimates conservative.

Results

We present five sections of tables to substantiate our results.

Section I includes regression results from our main specification.

Section II presents moderation analyses, showing the effect of remote schooling on report card grades by grade, gender, race/ethnicity, eligibility for free or reduced-priced meals, English language learner status, special education status, home language, and baseline GPA.

Section III shows the pre-existing differences in the demographic characteristics of students who attended school in person vs. remotely in the 2020-21 school year.

Section IV shows pairwise comparisons between moderation effects for grade, race/ethnicity, and home language.

Section V focus on inferential tests comparing the differences in declines and recoveries across demographic subgroups.

Section VI shows sensitivity analyses, which analyze the effect of remote schooling on a larger sample of data including middle schoolers, on the main analytic sample with a limited set of covariates, on different measures of GPA, and on the subset of students who reported the same learning location across all three surveys.

Section VII shows the distribution of student course grades pre-pandemic, broken down by grade level.

Section I. Main Specification

Table I

Overall GPA by Quarter and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by learning location		Adjusted difference between students that chose remote and students that chose in-person		*p*-value
Quarter	Policy on remote learning	Chose remote	Chose in-person	Original units (standard error)	SD units (standard error)	
Time 5 (Q1 2020-21)	Remote learning optional	84.16	82.40	1.76***	0.16***	<.001
				(0.15)	(0.01)	
Time 6 (Q2 2020-21)		83.07	81.98	1.08***	0.10***	<.001
				(0.17)	(0.01)	
Time 7 (Q3 2020-21)		83.09	83.76	-0.68***	-0.07***	<.001
				(0.16)	(0.02)	
Time 8 (Q4 2020-21)		82.62	84.39	-1.77***	-0.17***	<.001
				(0.17)	(0.02)	
Time 9 (Q1 2021-22)	In-person learning resumes	87.13	85.78	1.35***	0.16***	<.001
				(0.13)	(0.02)	
Time 10 (Q2 2021-22)		85.67	84.15	1.52***	0.17***	<.001
				(0.14)	(0.02)	
Time 11 (Q3 2021-22)		84.64	83.32	1.32***	0.14***	<.001
				(0.16)	(0.02)	
Time 12 (Q4 2021-22)		84.96	83.61	1.34***	0.14***	<.001
				(0.16)	(0.02)	
Sample size		4,439	5,473			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The difference in standard deviation units was calculated using Hedge's *g* with a small sample adjustment.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Section II. Moderation Analyses

Table II.1

Overall GPA by Quarter, Grade, and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by grade level at Time 1 (Q1 2019-20) and learning location						Adjusted difference between students that chose remote and students that chose in-person (standard error)			*p*-value
Quarter	Policy on remote learning	Chose remote			Chose in-person						
		8	9	10	8	9	10	8	9	10	
Time 5 (Q1 2020-21)	Remote learning optional	84.78	83.38	84.20	82.95	81.77	82.33	1.83***	1.61***	1.87***	.718
								(0.25)	(0.24)	(0.28)	
Time 6 (Q2 2020-21)		83.74	82.41	82.70	82.98	81.18	81.37	0.76**	1.23***	1.33***	.293
								(0.27)	(0.27)	(0.31)	
Time 7 (Q3 2020-21)		83.41	82.81	82.81	84.39	83.36	83.23	-0.98***	-0.56*	-0.43	.312
								(0.26)	(0.25)	(0.30)	
Time 8 (Q4 2020-21)		82.75	82.21	82.82	84.85	84.04	84.06	-2.10***	-1.83***	-1.25***	.117
								(0.29)	(0.27)	(0.31)	
Time 9 (Q1 2021-22)	In-person learning resumes	86.89	86.77	88.17	85.35	85.43	87.06	1.54***	1.34***	1.11***	.400
								(0.20)	(0.20)	(0.25)	
Time 10 (Q2 2021-22)		85.37	85.57	86.46	83.65	83.85	85.47	1.72***	1.71***	0.99***	.059
								(0.23)	(0.22)	(0.27)	
Time 11 (Q3 2021-22)		84.41	84.46	85.42	82.83	83.01	84.64	1.58***	1.46***	0.78**	.088
								(0.25)	(0.24)	(0.29)	
Time 12 (Q4 2021-22)		84.55	84.94	85.84	83.01	83.15	85.34	1.53***	1.79***	0.50	.002
								(0.27)	(0.26)	(0.29)	
Sample size		1,489	1,636	1,314	2,301	1,871	1,301				

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across grade. Grade is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table II.2

Overall GPA by Quarter, Gender, and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by gender at Time 1 (Q1 2019-20) and learning location				Adjusted difference between students that chose remote and students that chose in-person (standard error)		*p*-value
Quarter	Policy on remote learning	Chose remote		Chose in-person				
		Female	Male	Female	Male	Female	Male	
Time 5 (Q1 2020-21)	Remote learning optional	86.21	82.11	84.38	80.44	1.83***	1.67***	.592
						(0.19)	(0.23)	
Time 6 (Q2 2020-21)		85.11	80.92	83.61	80.37	1.50***	0.55*	.002
						(0.21)	(0.25)	
Time 7 (Q3 2020-21)		84.91	81.17	85.20	82.34	-0.29	-1.18***	.004
						(0.20)	(0.24)	
Time 8 (Q4 2020-21)		84.47	80.63	85.72	83.07	-1.25***	-2.44***	<.001
						(0.22)	(0.26)	
Time 9 (Q1 2021-22)	In-person learning resumes	88.34	86.06	87.38	84.21	0.96***	1.85***	<.001
						(0.16)	(0.19)	
Time 10 (Q2 2021-22)		86.98	84.46	85.77	82.56	1.21***	1.90***	.011
						(0.18)	(0.21)	
Time 11 (Q3 2021-22)		86.22	83.10	84.99	81.68	1.23***	1.43***	.501
						(0.20)	(0.23)	
Time 12 (Q4 2021-22)		86.45	83.51	85.20	82.04	1.25***	1.47***	.482
						(0.21)	(0.24)	
Sample size		2,681	1,758	2,721	2,752			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across gender. Gender is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table II.3

Overall GPA by Quarter, Race/Ethnicity, and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by race/ethnicity at Time 1 (Q1 2019-20) and learning location										Adjusted difference between students that chose remote and students that chose in-person (standard error)					*p*-value
Quarter	Policy on remote learning	Chose remote					Chose in-person										
		White	Black	Hispanic	Asian	Other	White	Black	Hispanic	Asian	Other	White	Black	Hispanic	Asian	Other	
Time 5 (Q1 2020-21)	Remote learning optional	87.21	80.56	82.76	89.56	86.24	86.48	78.37	80.57	87.92	84.01	0.73**	2.18***	2.19***	1.64**	2.23**	<.001
												(0.25)	(0.32)	(0.25)	(0.57)	(0.82)	
Time 6 (Q2 2020-21)		86.24	79.29	81.53	89.27	84.22	86.14	78.23	80.11	86.06	82.90	0.10	1.06**	1.42***	3.21***	1.32	<.001
												(0.27)	(0.36)	(0.27)	(0.64)	(0.94)	
Time 7 (Q3 2020-21)		86.20	79.85	81.43	89.30	84.67	86.94	81.58	81.87	87.78	84.32	-0.74**	-1.73***	-0.44	1.52**	0.35	<.001
												(0.28)	(0.34)	(0.26)	(0.56)	(0.90)	
Time 8 (Q4 2020-21)		85.60	79.32	81.08	89.37	84.53	87.02	82.25	82.93	88.62	84.65	-1.41***	-2.92***	-1.85***	0.75	-0.12	<.001
												(0.31)	(0.35)	(0.27)	(0.58)	(0.97)	
Time 9 (Q1 2021-22)	In-person learning resumes	89.56	84.15	86.20	91.44	88.35	88.63	82.71	84.59	90.55	86.45	0.92***	1.44***	1.62***	0.89*	1.91*	.110
												(0.22)	(0.28)	(0.20)	(0.41)	(0.75)	
Time 10 (Q2 2021-22)		88.31	82.90	84.40	90.44	86.93	87.06	81.08	82.85	89.05	85.56	1.25***	1.82***	1.55***	1.40**	1.37	.673
												(0.24)	(0.30)	(0.23)	(0.48)	(0.75)	
Time 11 (Q3 2021-22)		87.62	81.55	83.20	89.72	86.23	86.58	80.14	81.77	88.32	84.77	1.04***	1.41***	1.43***	1.40**	1.46	.839
												(0.27)	(0.33)	(0.24)	(0.54)	(0.83)	
Time 12 (Q4 2021-22)		87.78	82.13	83.55	90.08	86.09	86.60	80.61	82.20	88.59	84.93	1.17***	1.51***	1.35***	1.49*	1.16	.947
												(0.28)	(0.34)	(0.26)	(0.59)	(0.87)	
Sample size		1,018	1,006	1,834	451	130	1,801	1,196	2,131	210	135						

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across race/ethnicity. Race/ethnicity is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table II.3a

Overall GPA by Quarter, Race/Ethnicity (Collapsed), and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by race/ethnicity at Time 1 (Q1 2019-20) and learning location						Adjusted difference between students that chose remote and students that chose in-person (standard error)			*p*-value
Quarter	Policy on remote learning	Chose remote			Chose in-person						
		Black or Hispanic	White or Other	Asian	Black or Hispanic	White or Other	Asian	Black or Hispanic	White or Other	Asian	
Time 5 (Q1 2020-21)	Remote learning optional	81.97	87.18	89.56	79.78	86.30	87.92	2.19***	0.87***	1.64**	<.001
								(0.20)	(0.24)	(0.57)	
Time 6 (Q2 2020-21)		80.72	86.13	89.27	79.43	85.92	86.06	1.29***	0.21	3.21***	<.001
								(0.22)	(0.26)	(0.64)	
Time 7 (Q3 2020-21)		80.86	86.11	89.30	81.77	86.76	87.78	-0.90***	-0.65*	1.52**	<.001
								(0.21)	(0.27)	(0.56)	
Time 8 (Q4 2020-21)		80.45	85.55	89.37	82.68	86.85	88.62	-2.23***	-1.30***	0.75	<.001
								(0.22)	(0.30)	(0.58)	
Time 9 (Q1 2021-22)	In-person learning resumes	85.46	89.50	91.44	83.91	88.48	90.55	1.55***	1.01***	0.89*	.068
								(0.17)	(0.21)	(0.41)	
Time 10 (Q2 2021-22)		83.86	88.22	90.44	82.21	86.95	89.05	1.65***	1.27***	1.40**	.412
								(0.18)	(0.23)	(0.48)	
Time 11 (Q3 2021-22)		82.60	87.54	89.72	81.18	86.46	88.32	1.42***	1.08***	1.40**	.550
								(0.20)	(0.25)	(0.54)	
Time 12 (Q4 2021-22)		83.04	87.66	90.08	81.63	86.49	88.59	1.41***	1.17***	1.49*	.744
								(0.21)	(0.27)	(0.59)	
Sample size		2,840	1,148	451	3,327	1,936	210				

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across race/ethnicity. Race/ethnicity is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table II.4

Overall GPA by Quarter, Free and Reduced-Price Meal Status (FRPM), and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by FRPM status at Time 1 (Q1 2019-20) and learning location				Adjusted difference between students that chose remote and students that chose in-person (standard error)		*p*-value
Quarter	Policy on remote learning	Chose remote		Chose in-person				
		FRPM	Non-FRPM	FRPM	Non-FRPM	FRPM	Non-FRPM	
Time 5 (Q1 2020-21)	Remote learning optional	80.67	86.51	78.58	84.98	2.09***	1.53***	.063
						(0.25)	(0.18)	
Time 6 (Q2 2020-21)		79.48	85.49	78.27	84.49	1.21***	1.00***	.519
						(0.27)	(0.20)	
Time 7 (Q3 2020-21)		79.71	85.37	80.70	85.83	-0.99***	-0.46*	.096
						(0.26)	(0.19)	
Time 8 (Q4 2020-21)		79.22	84.91	81.53	86.31	-2.31***	-1.40***	.007
						(0.28)	(0.21)	
Time 9 (Q1 2021-22)	In-person learning resumes	84.66	88.80	83.08	87.61	1.59***	1.19***	.115
						(0.21)	(0.15)	
Time 10 (Q2 2021-22)		82.96	87.49	81.21	86.14	1.76***	1.35***	.146
						(0.23)	(0.17)	
Time 11 (Q3 2021-22)		81.76	86.58	80.19	85.44	1.57***	1.14***	.160
						(0.25)	(0.19)	
Time 12 (Q4 2021-22)		82.20	86.81	80.49	85.72	1.72***	1.09***	.051
						(0.27)	(0.19)	
Sample size		1,842	2,597	2,205	3,268			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across FRPM status. FRPM status is as of Time 1 (Q1 2019-20) student record.

FRPM = free and reduced-price meal status.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table II.5

Overall GPA by Quarter, English Language Learner Status (ELL), and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by ELL status at Time 1 (Q1 2019-20) and learning location				Adjusted difference between students that chose remote and students that chose in-person (standard error)		*p*-value
Quarter	Policy on remote learning	Chose remote		Chose in-person				
		ELL	Non-ELL	ELL	Non-ELL	ELL	Non-ELL	
Time 5 (Q1 2020-21)	Remote learning optional	81.47	84.46	79.56	82.71	1.91***	1.74***	.744
						(0.50)	(0.16)	
Time 6 (Q2 2020-21)		81.02	83.29	80.08	82.19	0.94	1.10***	.783
						(0.55)	(0.17)	
Time 7 (Q3 2020-21)		81.33	83.28	81.73	83.99	-0.40	-0.70***	.599
						(0.55)	(0.17)	
Time 8 (Q4 2020-21)		81.71	82.73	82.77	84.56	-1.06	-1.84***	.197
						(0.58)	(0.18)	
Time 9 (Q1 2021-22)	In-person learning resumes	84.57	87.41	83.32	86.05	1.25**	1.36***	.808
						(0.45)	(0.13)	
Time 10 (Q2 2021-22)		83.38	85.92	81.98	84.39	1.40**	1.53***	.799
						(0.49)	(0.15)	
Time 11 (Q3 2021-22)		82.12	84.92	80.62	83.62	1.50**	1.30***	.723
						(0.53)	(0.16)	
Time 12 (Q4 2021-22)		83.12	85.16	81.48	83.85	1.64**	1.32***	.581
						(0.56)	(0.17)	
Sample size		327	4,112	541	4,932			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across ELL status. ELL status is as of Time 1 (Q1 2019-20) student record.

ELL = English language learner status.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table II.6

Overall GPA by Quarter, Special Education Status (SPED), and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by SPED status at Time 1 (Q1 2019-20) and learning location				Adjusted difference between students that chose remote and students that chose in-person (standard error)		*p*-value
Quarter	Policy on remote learning	Chose remote		Chose in-person				
		SPED	Non-SPED	SPED	Non-SPED	SPED	Non-SPED	
Time 5 (Q1 2020-21)	Remote learning optional	86.15	83.32	84.64	81.47	1.52***	1.85***	.275
						(0.26)	(0.18)	
Time 6 (Q2 2020-21)		85.13	82.19	84.46	80.95	0.66*	1.24***	.078
						(0.28)	(0.20)	
Time 7 (Q3 2020-21)		85.27	82.18	85.86	82.89	-0.59*	-0.71***	.714
						(0.28)	(0.19)	
Time 8 (Q4 2020-21)		84.77	81.72	86.45	83.52	-1.69***	-1.80***	.750
						(0.30)	(0.20)	
Time 9 (Q1 2021-22)	In-person learning resumes	88.86	86.42	87.44	85.09	1.42***	1.32***	.716
						(0.22)	(0.15)	
Time 10 (Q2 2021-22)		87.60	84.86	86.10	83.34	1.50***	1.52***	.940
						(0.24)	(0.17)	
Time 11 (Q3 2021-22)		86.73	83.77	85.45	82.44	1.28***	1.33***	.887
						(0.27)	(0.18)	
Time 12 (Q4 2021-22)		86.91	84.14	85.72	82.74	1.19***	1.40***	.524
						(0.28)	(0.19)	
Sample size		1,184	3,255	1,610	3,863			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across SPED status. SPED status is as of Time 1 (Q1 2019-20) student record.

SPED = special education status.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table II.7

Overall GPA by Quarter, Home Language, and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by home language at Time 1 (Q1 2019-20) and learning location						Adjusted difference between students that chose remote and students that chose in-person (standard error)			*p*-value
Quarter	Policy on remote learning	Chose remote			Chose in-person						
		English	Spanish	Other	English	Spanish	Other	English	Spanish	Other	
Time 5 (Q1 2020-21)	Remote learning optional	84.94	82.03	84.32	83.34	80.06	82.26	1.60***	1.97***	2.06***	.406
								(0.19)	(0.31)	(0.40)	
Time 6 (Q2 2020-21)		83.83	80.95	83.32	82.88	79.72	81.89	0.95***	1.23***	1.43**	.528
								(0.21)	(0.34)	(0.45)	
Time 7 (Q3 2020-21)		83.79	80.86	83.91	84.57	81.62	83.97	-0.78***	-0.75*	-0.06	.279
								(0.20)	(0.33)	(0.42)	
Time 8 (Q4 2020-21)		83.12	80.71	83.86	84.92	82.82	84.82	-1.80***	-2.11***	-0.96*	.099
								(0.22)	(0.34)	(0.43)	
Time 9 (Q1 2021-22)	In-person learning resumes	87.76	85.55	87.06	86.43	84.14	85.77	1.33***	1.41***	1.30***	.953
								(0.16)	(0.26)	(0.33)	
Time 10 (Q2 2021-22)		86.32	83.75	86.15	84.82	82.46	84.15	1.51***	1.29***	2.00***	.304
								(0.18)	(0.28)	(0.37)	
Time 11 (Q3 2021-22)		85.41	82.58	84.83	84.07	81.39	83.35	1.33***	1.20***	1.48***	.844
								(0.19)	(0.31)	(0.41)	
Time 12 (Q4 2021-22)		85.63	83.00	85.43	84.28	81.90	83.62	1.35***	1.09***	1.81***	.393
								(0.20)	(0.32)	(0.43)	
Sample size		2,591	1,154	694	3,500	1,368	605				

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across home language. Home language is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table II.8

Overall GPA by Quarter, Whether Baseline Overall GPA Was at or Above the Median, and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

		Means by whether Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA was above or below the median and learning location				Adjusted difference between students that chose remote and students that chose in-person (standard error)		*p*-value
Quarter	Policy on remote learning	Chose remote		Chose in-person				
		Overall GPA at or above median	Overall GPA below median	Overall GPA at or above median	Overall GPA below median	Overall GPA at or above median	Overall GPA below median	
Time 5 (Q1 2020-21)	Remote learning optional	92.05	78.17	90.72	75.94	1.33*** (0.16)	2.23*** (0.26)	.003
Time 6 (Q2 2020-21)		91.47	76.43	89.96	75.79	1.51*** (0.18)	0.64* (0.28)	.007
Time 7 (Q3 2020-21)		90.89	76.74	90.53	78.51	0.36* (0.18)	-1.77*** (0.27)	<.001
Time 8 (Q4 2020-21)		90.34	76.29	90.92	79.31	-0.58** (0.20)	-3.02*** (0.28)	<.001
Time 9 (Q1 2021-22)	In-person learning resumes	92.20	83.33	91.28	81.51	0.92*** (0.14)	1.82*** (0.21)	<.001
Time 10 (Q2 2021-22)		91.31	81.40	90.12	79.52	1.19*** (0.16)	1.88*** (0.23)	.012
Time 11 (Q3 2021-22)		90.83	79.89	89.67	78.39	1.16*** (0.18)	1.49*** (0.25)	.268
Time 12 (Q4 2021-22)		90.91	80.41	89.77	78.83	1.15*** (0.19)	1.57*** (0.26)	.179
Sample size		2,588	1,851	2,392	3,081			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA, and whether average of Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA was above or below the median. The p-value displayed in the table is based on an F-test with a null hypothesis that the effects of attending remotely are equal for students regardless of whether overall GPA was at or above or below the median. Overall GPA was calculated as an average of Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA student records.

* two-tailed p < .05. ** two-tailed p < .01. *** two-tailed p < .001.

Section III: Baseline Equivalence and Marginal Effects

Table III

Marginal Effects of Baseline Characteristics on the Percent Chance of Choosing Remote Learning During 2020-21 (Main Analytic Sample)

	Unadjusted		Adjusted	
Characteristic at Time 1 (Q1 2019-20)	Marginal effect	*p*-value	Marginal effect	*p*-value
Female (versus male)	10.65%***	<.001	6.45%***	<.001
Race/ethnicity	-	<.001	-	<.001
White, non-Hispanic (reference)	-	-	-	-
Hispanic	10.14%***	<.001	12.86%***	<.001
Black, non-Hispanic	9.57%***	<.001	12.32%***	<.001
Asian, non-Hispanic	32.12%***	<.001	26.14%***	<.001
Other race, non-Hispanic	12.94%***	<.001	12.25%***	<.001
Free or reduced-price meal program	1.24%	0.224	2.77%**	.009
English language learner	-7.79%***	<.001	-11.78%***	<.001
Special education	-3.35%**	0.002	-3.44%**	.002
Home language	-	<.001	-	<.001
English (reference)	-	-	-	-
Spanish	3.22%**	0.006	2.52%	.110
Other language	10.89%***	<.001	6.32%***	<.001
Grade level	-	<.001	-	<.001
8 (reference)	-	-	-	-
9	7.36%***	<.001	7.12%***	<.001
10	10.96%***	<.001	11.59%***	<.001
Overall GPA at Time 1 (Q1 2019-20)	0.77%***	<.001	-0.11%	.357
Overall GPA at Time 2 (Q2 2019-20)	0.80%***	<.001	-0.11%	.388
Overall GPA at Time 3 (Q3 2019-20)	0.90%***	<.001	0.38%***	<.001
Overall GPA at Time 4 (Q4 2019-20)	0.96%***	<.001	0.86%***	<.001
Sample size	9,912		9,912	

Note. The results are based on a probit model. The marginal effects were multiplied by 100, so they represent the effect of each covariate on the percent chance of choosing remote schooling. The *p*-values that appear next to individual variables come from chi-square tests of the null hypothesis that the effect is zero. The *p*-values that appear next to categorical variables come from chi-squared tests of the null hypothesis that the effects are equal across categories.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Section IV: Pairwise Comparisons for Subgroups with Three or More Levels

Table IV.1

Pairwise Comparisons Between Grade Levels, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

	Policy on remote learning	Grade level	*p*-value		
	Remote learning optional		8	9	10
Time 5 (Q1 2020-21)		8 9 10	— .052 .253	— <.001***	—
			8	9	10
Time 6 (Q2 2020-21)		8 9 10	— .124 .319	— .011*	—
			8	9	10
Time 7 (Q3 2020-21)		8 9 10	— .448 .635	— .132	—
			8	9	10
Time 8 (Q4 2020-21)		8 9 10	— .168 .348	— .025*	—
	In-person learning resumes		8	9	10
Time 9 (Q1 2021-22)		8 9 10	— .999 .118	— <.001***	—
			8	9	10
Time 10 (Q2 2021-22)		8 9 10	— .727 .081	— <.001***	—
			8	9	10
Time 11 (Q3 2021-22)		8 9 10	— .779 .136	— <.001***	—
			8	9	10
Time 12 (Q4 2021-22)		8 9 10	— .463 .033*	— <.001***	—
Sample size		9,912			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on a *t*-test with a null hypothesis that the effects of attending remotely are equal for students of both grades in the comparison. Grade is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table IV.2

Pairwise Comparisons Between Race/Ethnicity Categories, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

	Policy on remote learning	Race/ethnicity	*p*-value				
	Remote learning optional		White	Black	Hispanic	Asian	Other
Time 5 (Q1 2020-21)		White	—				
		Black	<.001***	—			
		Hispanic	.004**	.150	—		
		Asian	.460	.127	.482	—	
		Other	.384	.321	.761	.823	—
			White	Black	Hispanic	Asian	Other
Time 6 (Q2 2020-21)		White	—				
		Black	.001**	—			
		Hispanic	<.001***	.942	—		
		Asian	.003**	.297	.300	—	
		Other	.114	.994	.977	.456	—
			White	Black	Hispanic	Asian	Other
Time 7 (Q3 2020-21)		White	—				
		Black	.662	—			
		Hispanic	.008**	.012*	—		
		Asian	.065	.053	.691	—	
		Other	.086	.067	.649	.931	—
			White	Black	Hispanic	Asian	Other
Time 8 (Q4 2020-21)		White	—				
		Black	.033*	—			
		Hispanic	.169	.002**	—		
		Asian	.383	.045*	.916	—	
		Other	.178	.022*	.497	.625	—
			White	Black	Hispanic	Asian	Other
Time 9 (Q1 2021-22)	In-person learning resumes	White	—				
		Black	.026*	—			
		Hispanic	.118	.432	—		
		Asian	.171	.008**	.027*	—	
		Other	.122	.607	.370	.033*	—
			White	Black	Hispanic	Asian	Other
Time 10 (Q2 2021-22)		White	—				
		Black	.044*	—			
		Hispanic	.163	.490	—		
		Asian	.353	.038*	.095	—	
		Other	.710	.559	.812	.372	—
			White	Black	Hispanic	Asian	Other
Time 11 (Q3 2021-22)		White	—				
		Black	.117	—			
		Hispanic	.017*	.597	—		
		Asian	.816	.249	.124	—	
		Other	.524	.865	.645	.502	—
			White	Black	Hispanic	Asian	Other
Time 12 (Q4 2021-22)		White	—				
		Black	.065	—			
		Hispanic	.024*	.844	—		
		Asian	.734	.161	.117	—	
		Other	.438	.816	.725	.396	—
Sample size		9,912					

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on a *t*-test with a null hypothesis that the effects of attending remotely are equal for students of both races/ethnicities in the comparison. Race/ethnicity is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table IV.3

Pairwise Comparisons Between Home Languages, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

	Policy on remote learning	Home language	*p*-value		
	Remote learning optional		English	Spanish	Other language
Time 5 (Q1 2020-21)		English	—		
		Spanish	.027*	—	
		Other language	.607	.033*	—
			English	Spanish	Other language
Time 6 (Q2 2020-21)		English	—		
		Spanish	.169	—	
		Other language	.838	.222	—
			English	Spanish	Other language
Time 7 (Q3 2020-21)		English	—		
		Spanish	.340	—	
		Other language	.941	.498	—
			English	Spanish	Other language
Time 8 (Q4 2020-21)		English	—		
		Spanish	.613	—	
		Other language	.558	.930	—
	In-person learning resumes		English	Spanish	Other language
Time 9 (Q1 2021-22)		English	—		
		Spanish	.208	—	
		Other language	.356	.081	—
			English	Spanish	Other language
Time 10 (Q2 2021-22)		English	—		
		Spanish	.452	—	
		Other language	.888	.490	—
			English	Spanish	Other language
Time 11 (Q3 2021-22)		English	—		
		Spanish	.926	—	
		Other language	.422	.460	—
			English	Spanish	Other language
Time 12 (Q4 2021-22)		English	—		
		Spanish	.951	—	
		Other language	.804	.799	—
Sample size		9,912			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The *p*-value displayed in the table is based on a *t*-test with a null hypothesis that the effects of attending remotely are equal for students of both home languages in the comparison. Home language is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Section V: Declines and Recoveries

Table V.1

Estimated Decline (Q1 2020-21 to Q4 2020-21) in the Effect of Remote Learning on GPA, by Subgroup (Vulnerable vs. Non-Vulnerable), Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

Subgroup category	Subgroup 1	Subgroup 2	Estimated decline in the effect for subgroup 1 (effect at Q4 2020-21 minus effect at Q1 2020-21 for subgroup 1)	Estimated decline in the effect for subgroup 2 (effect at Q4 2020-21 minus effect at Q1 2020-21 for subgroup 2)	Estimated difference in declines in the effect between subgroup 1 and subgroup 2
Gender	Male	Female	-4.11*** (0.27)	-3.07*** (0.22)	-1.04** (0.33)
Race/ethnicity (collapsed)	Black or Hispanic	White or Other	-4.42*** (0.24)	-2.17*** (0.29)	-2.25*** (0.38)
	Black or Hispanic	Asian	-4.42*** (0.24)	-0.89 (0.58)	-3.53*** (0.62)
	White or Other	Asian	-2.17*** (0.29)	-0.89 (0.58)	-1.28 (0.67)
FRPM status	FRPM	Non-FRPM	-4.40*** (0.30)	-2.93*** (0.20)	-1.48*** (0.36)
Baseline overall GPA compared to median	Overall GPA below median	Overall GPA at or above median	-5.25*** (0.28)	-1.91*** (0.18)	-3.34*** (0.33)
Sample size	9,912				

Note. We calculated the standard errors using 500 bootstrap draws. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. Additionally, the model used to estimate effects for the subgroups formed based on student GPA relative to the median also control for whether the average of Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA was at or above or below the median. The levels of statistical significance displayed in columns 4 and 5 are each based on a *t*-test with a null hypothesis that there is no difference in the effect of attending remotely at Q4 2020-21 vs. remotely at Q1 2020-21 for the respective subgroup. The levels of statistical significance displayed in column 6 is based on a *t*-test with a null hypothesis that the difference in the effect of attending remotely between Q4 2020-21 and Q1 2020-21 is equal for students of both subgroups in the comparison.

FRPM = free and reduced-price meal status.

* two-tailed p < .05. ** two-tailed p < .01. *** two-tailed p < .001.

Table V.2

Estimated Decline (Q1 2020-21 to Q4 2020-21) in the Effect of Remote Learning on GPA, by Subgroup, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

Subgroup category	Subgroup 1	Subgroup 2	Estimated decline in the effect for subgroup 1 (effect at Q4 2020-21 minus effect at Q1 2020-21 for subgroup 1)	Estimated decline in the effect for subgroup 2 (effect at Q4 2020-21 minus effect at Q1 2020-21 for subgroup 2)	Estimated difference in declines in the effect between subgroup 1 and subgroup 2
Race/ethnicity	White	Black	-2.15*** (0.31)	-5.11*** (0.37)	2.96*** (0.47)
	White	Hispanic	-2.15*** (0.31)	-4.04*** (0.28)	1.90*** (0.42)
	White	Asian	-2.15*** (0.31)	-0.89 (0.55)	-1.26* (0.62)
	White	Other	-2.15*** (0.31)	-2.35* (0.92)	0.20 (0.96)
	Black	Hispanic	-5.11*** (0.37)	-4.04*** (0.28)	-1.06* (0.48)
	Black	Asian	-5.11*** (0.37)	-0.89 (0.55)	-4.22*** (0.64)
	Black	Other	-5.11*** (0.37)	-2.35* (0.92)	-2.76** (0.99)
	Hispanic	Asian	-4.04*** (0.28)	-0.89 (0.55)	-3.16*** (0.62)
	Hispanic	Other	-4.04*** (0.28)	-2.35* (0.92)	-1.70 (0.96)
	Asian	Other	-0.89 (0.55)	-2.35* (0.92)	1.46 (1.06)
ELL status	ELL	Non-ELL	-2.97*** (0.58)	-3.58*** (0.17)	0.61 (0.58)
SPED status	SPED	Non-SPED	-3.21*** (0.30)	-3.65*** (0.21)	0.44 (0.35)
Home language	English	Spanish	-3.40*** (0.21)	-4.08*** (0.35)	0.67 (0.40)
	English	Other	-3.40*** (0.21)	-3.02*** (0.43)	-0.38 (0.49)
	Spanish	Other	-4.08*** (0.35)	-3.02*** (0.43)	-1.06* (0.53)
Grade	8	9	-3.92*** (0.30)	-3.43*** (0.27)	-0.49 (0.38)
	8	10	-3.92*** (0.30)	-3.11*** (0.31)	-0.81 (0.43)
	9	10	-3.43*** (0.27)	-3.11*** (0.31)	-0.32 (0.39)
Sample size	9,912				

Note. We calculated the standard errors using 500 bootstrap draws. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The levels of statistical significance displayed in columns 4 and 5 are each based on a *t*-test with a null hypothesis that there is no difference in the effect of attending remotely at Q4 2020-21 vs. remotely at Q1 2020-21 for the respective subgroup. The levels of statistical significance displayed in column 6 is based on a *t*-test with a null hypothesis that the difference in the effect of attending remotely between Q4 2020-21 and Q1 2020-21 is equal for students of both subgroups in the comparison.

ELL = English language learner status; SPED = special education status.

* two-tailed p < .05. ** two-tailed p < .01. *** two-tailed p < .001.

Table V.3

Estimated Recovery (Q4 2020-21 to Q1 2021-22) in the Effect of Remote Learning on GPA, by Subgroup (Vulnerable vs. Non-Vulnerable), Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

Subgroup category	Subgroup 1	Subgroup 2	Estimated recovery in the effect for subgroup 1 (effect at Q1 2021-22 minus effect at Q4 2020-21 for subgroup 1)	Estimated recovery in the effect for subgroup 2 (effect at Q1 2021-22 minus effect at Q4 2020-21 for subgroup 2)	Estimated difference in recoveries in the effect between subgroup 1 and subgroup 2
Gender	Male	Female	4.29*** (0.27)	2.21*** (0.22)	2.08*** (0.32)
Race/ethnicity (collapsed)	Black or Hispanic	White or Other	3.79*** (0.22)	2.31*** (0.28)	1.47*** (0.35)
	Black or Hispanic	Asian	3.79*** (0.22)	0.14 (0.56)	3.65*** (0.59)
	White or Other	Asian	2.31*** (0.28)	0.14 (0.56)	2.18*** (0.62)
FRPM status	FRPM	Non-FRPM	3.90*** (0.28)	2.58*** (0.20)	1.32*** (0.33)
Baseline overall GPA compared to median	Overall GPA below median	Overall GPA at or above median	4.84*** (0.27)	1.50*** (0.18)	3.34*** (0.32)
Sample size	9,912				

Note. We calculated the standard errors using 500 bootstrap draws. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. Additionally, the model used to estimate effects for the subgroups formed based on student GPA relative to the median also control for whether the average of Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA was at or above or below the median. The levels of statistical significance displayed in columns 4 and 5 are each based on a *t*-test with a null hypothesis that there is no difference in the effect of attending remotely during 2020-21 on Q1 2021-22 GPA vs. on Q4 2020-21 GPA for the respective subgroup. The level of statistical significance displayed in column 6 is based on a *t*-test with a null hypothesis that the difference in the effect of attending remotely during 2020-21 between Q1 2021-22 and Q4 2020-21 is equal for students of both subgroups in the comparison.

FRPM = free and reduced-price meal status.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table V.4

Estimated Recovery (Q4 2020-21 to Q1 2021-22) in the Effect of Remote Learning on GPA, by Subgroup, Adjusted for Baseline Demographics and GPA (Main Analytic Sample)

Subgroup category	Subgroup 1	Subgroup 2	Estimated recovery in the effect for subgroup 1 (effect at Q1 2021-22 minus effect at Q4 2020-21 for subgroup 1)	Estimated recovery in the effect for subgroup 2 (effect at Q1 2021-22 minus effect at Q4 2020-21 for subgroup 2)	Estimated difference in recoveries in the effect between subgroup 1 and subgroup 2
Race/ethnicity	White	Black	2.34*** (0.30)	4.36*** (0.36)	-2.02*** (0.46)
	White	Hispanic	2.34*** (0.30)	3.47*** (0.26)	-1.13** (0.39)
	White	Asian	2.34*** (0.30)	0.13 (0.60)	2.20** (0.67)
	White	Other	2.34*** (0.30)	2.03* (0.87)	0.31 (0.92)
	Black	Hispanic	4.36*** (0.36)	3.47*** (0.26)	0.89* (0.44)
	Black	Asian	4.36*** (0.36)	0.13 (0.60)	4.23*** (0.72)
	Black	Other	4.36*** (0.36)	2.03* (0.87)	2.33* (0.96)
	Hispanic	Asian	3.47*** (0.26)	0.13 (0.60)	3.33*** (0.64)
	Hispanic	Other	3.47*** (0.26)	2.03* (0.87)	1.44 (0.91)
	Asian	Other	0.13 (0.60)	2.03* (0.87)	-1.90 (1.04)
ELL status	ELL	Non-ELL	2.31*** (0.59)	3.20*** (0.17)	-0.89 (0.60)
SPED status	SPED	Non-SPED	3.11*** (0.31)	3.12*** (0.21)	-0.02 (0.35)
Home language	English	Spanish	3.14*** (0.23)	3.52*** (0.34)	-0.38 (0.39)
	English	Other	3.14*** (0.23)	2.25*** (0.42)	0.88 (0.47)
	Spanish	Other	3.52*** (0.34)	2.25*** (0.42)	1.27* (0.53)
Grade	8	9	3.64*** (0.28)	3.17*** (0.27)	0.47 (0.37)
	8	10	3.64*** (0.28)	2.36*** (0.30)	1.28*** (0.38)
	9	10	3.17*** (0.27)	2.36*** (0.30)	0.81* (0.39)
Sample size	9,912				

Note. We calculated the standard errors using 500 bootstrap draws. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The levels of statistical significance displayed in columns 4 and 5 are each based on a *t*-test with a null hypothesis that there is no difference in the effect of attending remotely during 2020-21 on Q1 2021-22 GPA vs. on Q4 2020-21 GPA for the respective subgroup. The level of statistical significance displayed in column 6 is based on a *t*-test with a null hypothesis that the difference in the effect of attending remotely during 2020-21 between Q1 2021-22 and Q4 2020-21 is equal for students of both subgroups in the comparison.

ELL = English language learner status; SPED = special education status.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Section VI: Sensitivity Checks

Table VI.1

Sensitivity Check Using Overall GPA by Quarter and Learning Location, Adjusted for Baseline Grade, Gender, Race/Ethnicity, and GPA (Sample of All Students)

		Means by learning location		Adjusted difference between students that chose remote and students that chose in-person		*p*-value
Quarter	Policy on remote learning	Chose remote	Chose in-person	Original units (standard error)	SD units (standard error)	
Time 5 (Q1 2020-21)	Remote learning optional	83.36	81.85	1.51***	0.13***	<.001
				(0.11)	(0.01)	
Time 6 (Q2 2020-21)		82.15	81.46	0.70***	0.06***	<.001
				(0.12)	(0.01)	
Time 7 (Q3 2020-21)		82.23	83.54	-1.31***	-0.13***	<.001
				(0.11)	(0.01)	
Time 8 (Q4 2020-21)		82.12	84.65	-2.53***	-0.24***	<.001
				(0.12)	(0.01)	
Time 9 (Q1 2021-22)	In-person learning resumes	86.93	85.53	1.40***	0.17***	<.001
				(0.09)	(0.01)	
Time 10 (Q2 2021-22)		85.41	83.92	1.49***	0.16***	<.001
				(0.10)	(0.01)	
Time 11 (Q3 2021-22)		84.34	83.10	1.24***	0.13***	<.001
				(0.11)	(0.01)	
Time 12 (Q4 2021-22)		84.83	83.46	1.36***	0.14***	<.001
				(0.11)	(0.01)	
Sample size		7,923	13,028			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, and Time 2 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The difference in standard deviation units was calculated using Hedge's *g* with a small sample adjustment.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.2

Sensitivity Check Using Core GPA instead of Overall GPA, by Quarter and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample Students With Non-Missing Core GPAs)

		Means by learning location		Adjusted difference between students that chose remote and students that chose in-person		*p*-value
Quarter	Policy on remote learning	Chose remote	Chose in-person	Original units (standard error)	SD units (standard error)	
Time 5 (Q1 2020-21)	Remote learning optional	82.50	80.63	1.87***	0.16***	<.001
				(0.17)	(0.01)	
Time 6 (Q2 2020-21)		81.58	80.08	1.50***	0.13***	<.001
				(0.18)	(0.02)	
Time 7 (Q3 2020-21)		81.45	81.56	-0.11	-0.01	.544
				(0.18)	(0.02)	
Time 8 (Q4 2020-21)		81.07	82.35	-1.28***	-0.11***	<.001
				(0.20)	(0.02)	
Time 9 (Q1 2021-22)	In-person learning resumes	84.99	83.27	1.72***	0.19***	<.001
				(0.15)	(0.02)	
Time 10 (Q2 2021-22)		83.67	81.86	1.81***	0.18***	<.001
				(0.17)	(0.02)	
Time 11 (Q3 2021-22)		82.64	81.01	1.63***	0.16***	<.001
				(0.18)	(0.02)	
Time 12 (Q4 2021-22)		83.13	81.40	1.74***	0.16***	<.001
				(0.19)	(0.02)	
Sample size		4,361	5,420			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) core GPA. The difference in standard deviation units was calculated using Hedge's *g* with a small sample adjustment.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.3

Sensitivity Check Using Math GPA instead of Overall GPA, by Quarter and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample Students With Non-Missing Math GPAs)

		Means by learning location		Adjusted difference between students that chose remote and students that chose in-person		*p*-value
Quarter	Policy on remote learning	Chose remote	Chose in-person	Original units (standard error)	SD units (standard error)	
Time 5 (Q1 2020-21)	Remote learning optional	80.51	78.59	1.92***	0.13***	<.001
				(0.26)	(0.02)	
Time 6 (Q2 2020-21)		80.42	78.94	1.47***	0.10***	<.001
				(0.27)	(0.02)	
Time 7 (Q3 2020-21)		79.33	79.63	-0.30	-0.02	.261
				(0.27)	(0.02)	
Time 8 (Q4 2020-21)		78.92	80.78	-1.86***	-0.12***	<.001
				(0.30)	(0.02)	
Time 9 (Q1 2021-22)	In-person learning resumes	81.89	80.61	1.28***	0.10***	<.001
				(0.26)	(0.02)	
Time 10 (Q2 2021-22)		81.37	80.05	1.32***	0.10***	<.001
				(0.26)	(0.02)	
Time 11 (Q3 2021-22)		79.56	78.47	1.09***	0.08***	<.001
				(0.29)	(0.02)	
Time 12 (Q4 2021-22)		80.39	79.00	1.39***	0.09***	<.001
				(0.30)	(0.02)	
Sample size		3,680	4,653			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) math GPA. The difference in standard deviation units was calculated using Hedge's *g* with a small sample adjustment.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.4

Sensitivity Check Using ELA GPA instead of Overall GPA, by Quarter and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample Students With Non-Missing ELA GPAs)

		Means by learning location		Adjusted difference between students that chose remote and students that chose in-person		*p*-value
Quarter	Policy on remote learning	Chose remote	Chose in-person	Original units (standard error)	SD units (standard error)	

Time 5 (Q1 2020-21)	Remote learning optional	84.18	82.40	1.78***	0.14***	<.001
				(0.22)	(0.02)	
Time 6 (Q2 2020-21)		82.61	81.33	1.28***	0.10***	<.001
				(0.24)	(0.02)	
Time 7 (Q3 2020-21)		82.78	83.48	-0.70**	-0.06**	.003
				(0.24)	(0.02)	
Time 8 (Q4 2020-21)		81.92	83.63	-1.71***	-0.13***	<.001
				(0.26)	(0.02)	
Time 9 (Q1 2021-22)	In-person learning resumes	86.90	84.89	2.01***	0.19***	<.001
				(0.21)	(0.02)	
Time 10 (Q2 2021-22)		85.46	83.20	2.26***	0.19***	<.001
				(0.23)	(0.02)	
Time 11 (Q3 2021-22)		84.67	82.61	2.06***	0.17***	<.001
				(0.23)	(0.02)	
Time 12 (Q4 2021-22)		84.28	82.25	2.03***	0.16***	<.001
				(0.25)	(0.02)	
Sample size		3,824	4,868			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) ELA GPA. The difference in standard deviation units was calculated using Hedge's *g* with a small sample adjustment.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.5

Overall GPA by Quarter and Learning Location, Adjusted for Baseline Demographics and GPA (Sample of Students in Grades 6 or 7 in 2019-20)

		Means by learning location		Adjusted difference between students that chose remote and students that chose in-person		*p*-value
Quarter	Policy on remote learning	Chose remote	Chose in-person	Original units (standard error)	SD units (standard error)	
Time 5 (Q1 2020-21)	Remote learning optional	82.66	81.49	1.17***	0.10***	<.001
				(0.15)	(0.01)	
Time 6 (Q2 2020-21)		81.41	81.10	0.30	0.03	.068
				(0.17)	(0.01)	
Time 7 (Q3 2020-21)		81.42	83.41	-1.99***	-0.19***	<.001
				(0.16)	(0.02)	
Time 8 (Q4 2020-21)		81.39	84.89	-3.50***	-0.34***	<.001
				(0.17)	(0.02)	
Time 9 (Q1 2021-22)	In-person learning resumes	86.74	85.38	1.36***	0.16***	<.001
				(0.12)	(0.01)	
Time 10 (Q2 2021-22)		85.17	83.79	1.38***	0.15***	<.001
				(0.13)	(0.01)	
Time 11 (Q3 2021-22)		84.08	82.99	1.09***	0.11***	<.001
				(0.14)	(0.01)	
Time 12 (Q4 2021-22)		84.69	83.40	1.28***	0.13***	<.001
				(0.15)	(0.02)	
Sample size		3,436	7,478			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, and Time 2 (Q2 2019-20) through Time 4 (Q4 2019-20) overall GPA. The sample is limited to students that were in grades 6 or 7 in 2019-20. The difference in standard deviation units was calculated using Hedge's *g* with a small sample adjustment.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.6

Overall GPA by Quarter, Grade, and Learning Location, Adjusted for Baseline Demographics and GPA (Sample of Students in Grades 6 or 7 in 2019-20)

		Means by grade level at Time 1 (Q1 2019-20) and learning location				Adjusted difference between students that chose remote and students that chose in-person (standard error)		*p*-value
Quarter	Policy on remote learning	Chose remote		Chose in-person				
		6	7	6	7	6	7	
Time 5 (Q1 2020-21)	Remote learning optional	82.65	82.66	81.19	81.82	1.47***	0.84***	.030
						(0.21)	(0.21)	
Time 6 (Q2 2020-21)		81.37	81.46	80.79	81.45	0.57*	0.01	.075
						(0.23)	(0.23)	
Time 7 (Q3 2020-21)		81.32	81.53	83.00	83.86	-1.67***	-2.34***	.033
						(0.22)	(0.23)	
Time 8 (Q4 2020-21)		81.31	81.47	84.70	85.09	-3.39***	-3.62***	.486
						(0.24)	(0.23)	
Time 9 (Q1 2021-22)	In-person learning resumes	87.13	86.31	85.87	84.84	1.26***	1.47***	.362
						(0.15)	(0.19)	
Time 10 (Q2 2021-22)		85.89	84.38	84.66	82.83	1.23***	1.55***	.215
						(0.16)	(0.20)	
Time 11 (Q3 2021-22)		84.79	83.29	83.82	82.06	0.97***	1.23***	.347
						(0.18)	(0.22)	
Time 12 (Q4 2021-22)		85.40	83.89	84.35	82.35	1.05***	1.54***	.096
						(0.19)	(0.23)	
Sample size		1,783	1,653	3,933	3,545			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, and Time 2 (Q2 2019-20) through Time 4 (Q4 2019-20) overall GPA. The sample is limited to students that were in grades 6 or 7 in 2019-20. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across grade. Grade is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.7

Overall GPA by Quarter, Gender, and Learning Location, Adjusted for Baseline Demographics and GPA (Sample of Students in Grades 6 or 7 in 2019-20)

		Means by gender at Time 1 (Q1 2019-20) and learning location				Adjusted difference between students that chose remote and students that chose in-person (standard error)		*p*-value
Quarter	Policy on remote learning	Chose remote		Chose in-person				
		Female	Male	Female	Male	Female	Male	
Time 5 (Q1 2020-21)	Remote learning optional	84.51	80.94	83.39	79.72	1.12***	1.22***	.746
						(0.19)	(0.23)	
Time 6 (Q2 2020-21)		83.15	79.73	82.63	79.68	0.52*	0.04	.142
						(0.22)	(0.24)	
Time 7 (Q3 2020-21)		83.14	79.73	84.84	82.07	-1.71***	-2.33***	.048
						(0.21)	(0.25)	
Time 8 (Q4 2020-21)		82.91	79.94	86.32	83.56	-3.41***	-3.62***	.524
						(0.22)	(0.25)	
Time 9 (Q1 2021-22)	In-person learning resumes	87.79	85.85	86.75	84.12	1.05***	1.73***	.004
						(0.16)	(0.18)	
Time 10 (Q2 2021-22)		86.37	84.12	85.22	82.46	1.15***	1.66***	.047
						(0.17)	(0.20)	
Time 11 (Q3 2021-22)		85.42	82.89	84.54	81.54	0.88***	1.35***	.094
						(0.19)	(0.22)	
Time 12 (Q4 2021-22)		85.99	83.55	84.99	81.92	1.00***	1.62***	.034
						(0.20)	(0.22)	
Sample size		1,978	1,458	3,607	3,871			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, and Time 2 (Q2 2019-20) through Time 4 (Q4 2019-20) overall GPA. The sample is limited to students that were in grades 6 or 7 in 2019-20. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across gender. Gender is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.8

Overall GPA by Quarter, Race/Ethnicity, and Learning Location, Adjusted for Baseline Demographics and GPA (Sample of Students in Grades 6 or 7 in 2019-20)

		Means by race/ethnicity at Time 1 (Q1 2019-20) and learning location										Adjusted difference between students that chose remote and students that chose in-person (standard error)					*p*-value
Quarter	Policy on remote learning	Chose remote					Chose in-person										
		White	Black	Hispanic	Asian	Other	White	Black	Hispanic	Asian	Other	White	Black	Hispanic	Asian	Other	
Time 5 (Q1 2020-21)	Remote learning optional	86.55	79.50	80.57	88.13	84.51	86.21	77.32	79.23	87.54	83.12	0.34	2.18***	1.34***	0.59	1.39	<.001
												(0.24)	(0.35)	(0.24)	(0.50)	(0.95)	
Time 6 (Q2 2020-21)		85.25	78.09	79.36	87.53	81.98	85.75	77.36	78.81	86.31	82.54	-0.50	0.72	0.55*	1.22*	-0.56	.008
												(0.27)	(0.38)	(0.26)	(0.57)	(1.07)	
Time 7 (Q3 2020-21)		85.19	78.09	79.52	87.61	81.67	86.97	80.62	81.50	88.68	84.49	-1.78***	-2.53***	-1.98***	-1.07*	-2.82**	.157
												(0.28)	(0.37)	(0.25)	(0.50)	(1.04)	
Time 8 (Q4 2020-21)		84.94	78.58	79.42	87.67	81.71	87.94	82.91	83.05	89.72	86.19	-3.00***	-4.34***	-3.63***	-2.05***	-4.48***	.002
												(0.30)	(0.38)	(0.27)	(0.52)	(1.07)	
Time 9 (Q1 2021-22)	In-person learning resumes	89.26	84.75	85.30	91.60	88.03	88.13	83.19	83.79	90.64	87.22	1.13***	1.56***	1.51***	0.96*	0.81	.407
												(0.21)	(0.28)	(0.19)	(0.38)	(0.71)	
Time 10 (Q2 2021-22)		87.70	83.14	83.65	90.49	86.80	86.77	81.31	82.13	89.36	85.29	0.93***	1.83***	1.51***	1.13**	1.51*	.146
												(0.23)	(0.30)	(0.21)	(0.43)	(0.73)	
Time 11 (Q3 2021-22)		86.79	82.23	82.32	90.00	85.09	85.94	80.88	81.18	88.81	84.43	0.86***	1.35***	1.14***	1.19**	0.66	.756
												(0.25)	(0.33)	(0.23)	(0.45)	(0.84)	
Time 12 (Q4 2021-22)		87.19	82.84	83.13	90.42	85.26	86.27	81.40	81.60	89.24	84.94	0.93***	1.43***	1.53***	1.19*	0.32	.396
												(0.26)	(0.33)	(0.24)	(0.50)	(0.99)	
Sample size		881	676	1,430	357	92	2,351	1,357	3,310	286	174						

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, and Time 2 (Q2 2019-20) through Time 4 (Q4 2019-20) overall GPA. The sample is limited to students that were in grades 6 or 7 in 2019-20. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across race/ethnicity. Race/ethnicity is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.9

Overall GPA by Quarter, Race/Ethnicity (Collapsed), and Learning Location, Adjusted for Baseline Demographics and GPA (Sample of Students in Grades 6 or 7 in 2019-20)

		Means by race/ethnicity at Time 1 (Q1 2019-20) and learning location						Adjusted difference between students that chose remote and students that chose in-person (standard error)			*p*-value
Quarter	Policy on remote learning	Chose remote			Chose in-person						
		Black or Hispanic	White or Other	Asian	Black or Hispanic	White or Other	Asian	Black or Hispanic	White or Other	Asian	
Time 5 (Q1 2020-21)	Remote learning optional	80.28	86.42	88.13	78.68	86.00	87.54	1.60***	0.43	0.59	<.001
								(0.20)	(0.23)	(0.50)	
Time 6 (Q2 2020-21)		78.99	85.02	87.53	78.39	85.53	86.31	0.60**	-0.51	1.22*	.001
								(0.22)	(0.27)	(0.57)	
Time 7 (Q3 2020-21)		79.09	84.93	87.61	81.25	86.80	88.68	-2.15***	-1.87***	-1.07*	.127
								(0.21)	(0.27)	(0.50)	
Time 8 (Q4 2020-21)		79.16	84.69	87.67	83.01	87.82	89.72	-3.85***	-3.12***	-2.05***	.002
								(0.22)	(0.29)	(0.52)	
Time 9 (Q1 2021-22)	In-person learning resumes	85.14	89.17	91.60	83.61	88.06	90.64	1.53***	1.10***	0.96*	.149
								(0.16)	(0.20)	(0.38)	
Time 10 (Q2 2021-22)		83.50	87.65	90.49	81.89	86.67	89.36	1.61***	0.98***	1.13**	.065
								(0.17)	(0.22)	(0.43)	
Time 11 (Q3 2021-22)		82.30	86.67	90.00	81.09	85.83	88.81	1.21***	0.84***	1.19**	.466
								(0.19)	(0.24)	(0.45)	
Time 12 (Q4 2021-22)		83.04	87.05	90.42	81.54	86.18	89.24	1.50***	0.87***	1.19*	.147
								(0.20)	(0.26)	(0.50)	
Sample size		2,106	973	357	4,667	2,525	286				

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, and Time 2 (Q2 2019-20) through Time 4 (Q4 2019-20) overall GPA. The sample is limited to students that were in grades 6 or 7 in 2019-20. The *p*-value displayed in the table is based on an *F*-test with a null hypothesis that the effects of attending remotely are equal for students across race/ethnicity. Race/ethnicity is as of Time 1 (Q1 2019-20) student record.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.10

Sensitivity Check Using Overall GPA by Quarter and Learning Location, Adjusted for Covariates Available for Students in Grades 6 or 7 in 2019-20 (Grade, Gender, Race/Ethnicity, and Time 2 (Q2 2019-20) Through Time 4 (Q4 2019-20) GPA) (Main Analytic Sample)

		Means by learning location		Adjusted difference between students that chose remote and students that chose in-person		*p*-value
Quarter	Policy on remote learning	Chose remote	Chose in-person	Original units (standard error)	SD units (standard error)	
Time 5 (Q1 2020-21)	Remote learning optional	84.24	82.40	1.84***	0.17***	<.001
				(0.15)	(0.01)	
Time 6 (Q2 2020-21)		83.04	81.98	1.06***	0.09***	<.001
				(0.17)	(0.01)	
Time 7 (Q3 2020-21)		83.11	83.76	-0.66***	-0.06***	<.001
				(0.16)	(0.02)	
Time 8 (Q4 2020-21)		82.77	84.39	-1.61***	-0.15***	<.001
				(0.17)	(0.02)	
Time 9 (Q1 2021-22)	In-person learning resumes	87.22	85.78	1.43***	0.17***	<.001
				(0.13)	(0.02)	
Time 10 (Q2 2021-22)		85.73	84.15	1.58***	0.18***	<.001
				(0.14)	(0.02)	
Time 11 (Q3 2021-22)		84.69	83.32	1.36***	0.14***	<.001
				(0.16)	(0.02)	
Time 12 (Q4 2021-22)		85.03	83.61	1.42***	0.14***	<.001
				(0.16)	(0.02)	
Sample size		4,439	5,473			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, and Time 2 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The difference in standard deviation units was calculated using Hedge's *g* with a small sample adjustment.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Table VI.11

Overall GPA by Quarter and Learning Location, Adjusted for Baseline Demographics and GPA (Main Analytic Sample Students who Took the Fall 2020, Winter 2021, and Spring 2021 Character Lab Thriving Index Surveys and Reported the Same Learning Location Across all Three Time Points)

		Means by learning location		Adjusted difference between students that chose remote and students that chose in-person		*p*-value
Quarter	Policy on remote learning	Chose remote	Chose in-person	Original units (standard error)	SD units (standard error)	
Time 5 (Q1 2020-21)	Remote learning optional	87.48	86.46	1.02***	0.11***	<.001
				(0.25)	(0.03)	
Time 6 (Q2 2020-21)		86.81	87.56	-0.75**	-0.08**	.003
				(0.25)	(0.03)	
Time 7 (Q3 2020-21)		86.38	87.32	-0.95***	-0.10***	<.001
				(0.27)	(0.03)	
Time 8 (Q4 2020-21)		85.37	87.30	-1.93***	-0.19***	<.001
				(0.31)	(0.03)	
Time 9 (Q1 2021-22)	In-person learning resumes	89.17	88.07	1.10***	0.16***	<.001
				(0.21)	(0.03)	
Time 10 (Q2 2021-22)		87.76	86.53	1.24***	0.16***	<.001
				(0.24)	(0.03)	
Time 11 (Q3 2021-22)		87.02	85.99	1.03***	0.12***	<.001
				(0.26)	(0.03)	
Time 12 (Q4 2021-22)		87.21	86.11	1.10***	0.12***	<.001
				(0.29)	(0.03)	
Sample size		1,869	1,229			

Note. The models control for Time 1 (Q1 2019-20) grade, gender, race/ethnicity, eligibility for free or reduced-price meals, English language learner status, special education status, home language, school, and Time 1 (Q1 2019-20) through Time 4 (Q4 2019-20) overall GPA. The sample is limited to main analytic sample students that took the fall 2020, winter 2021, and spring 2021 Character Lab Thriving Index surveys and reported the same learning location across all three time points. The difference in standard deviation units was calculated using Hedge's *g* with a small sample adjustment.

* two-tailed $p < .05$. ** two-tailed $p < .01$. *** two-tailed $p < .001$.

Section VII: GPAs during the 2019-20 school year

Figure VII.1

Overall GPA by Quarter and Grade Level From Time 1 (Q1 2019-20) Through Time 4 (Q4 2019-20)

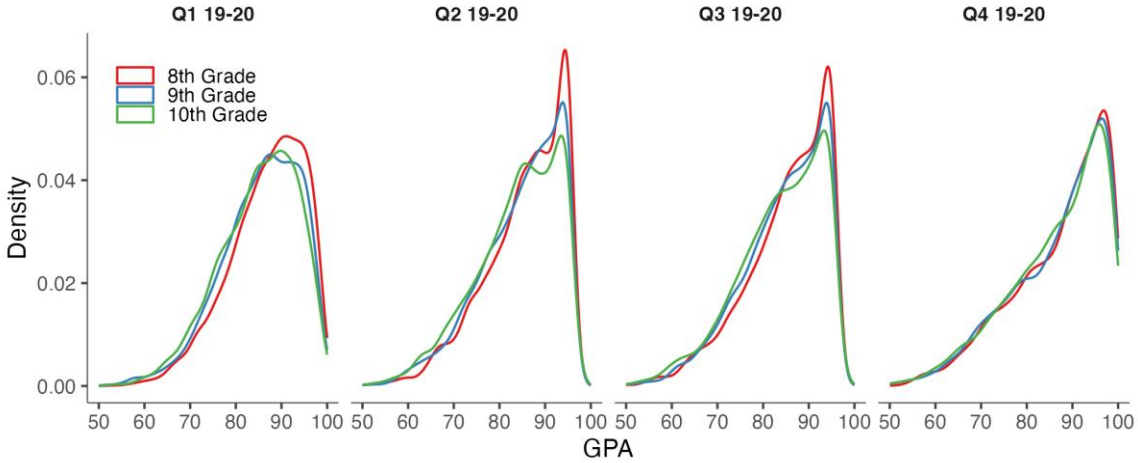
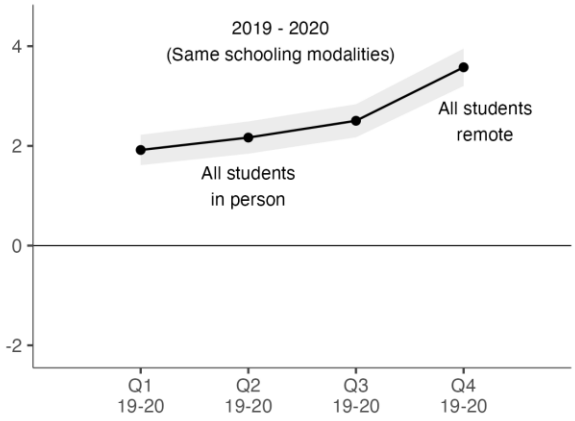


Figure VII.2

Differences in Overall GPA (on a 100-Point Scale) Between Students who Eventually Chose Remote (vs. In-Person) Schooling From Time 1 (Q1 2019-20) Through Time 4 (Q4 2019-20), Adjusted for Demographics and School ID.



Note. Shaded areas represent 95% confidence intervals. Estimates control for demographics and prior course grades. Positive y-axis values indicate that students who chose remote schooling in the 2020-21 school year earned higher course grades than classmates who instead chose in-person schooling; negative y-axis values indicate the converse.