Decentralization and the Efficacy of Intervention Strategies to Promote Academic Recovery

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Background and Motivation

Motivation

Like students elsewhere, many students in the metro-Atlanta area experienced significant reductions in achievement growth due to the COVID-19 pandemic and subsequent abrupt shift to remote instruction.[1,2] In response, metro-area districts have rolled out a variety of interventions to accelerate learning and get struggling students "back on track." As federal COVID relief funds run out, districts face critical decisions on which programs to continue with local funds and which programs to scale back or eliminate. Thus, evidence on the efficacy of recovery efforts is crucial to determine how best to allocate resources.

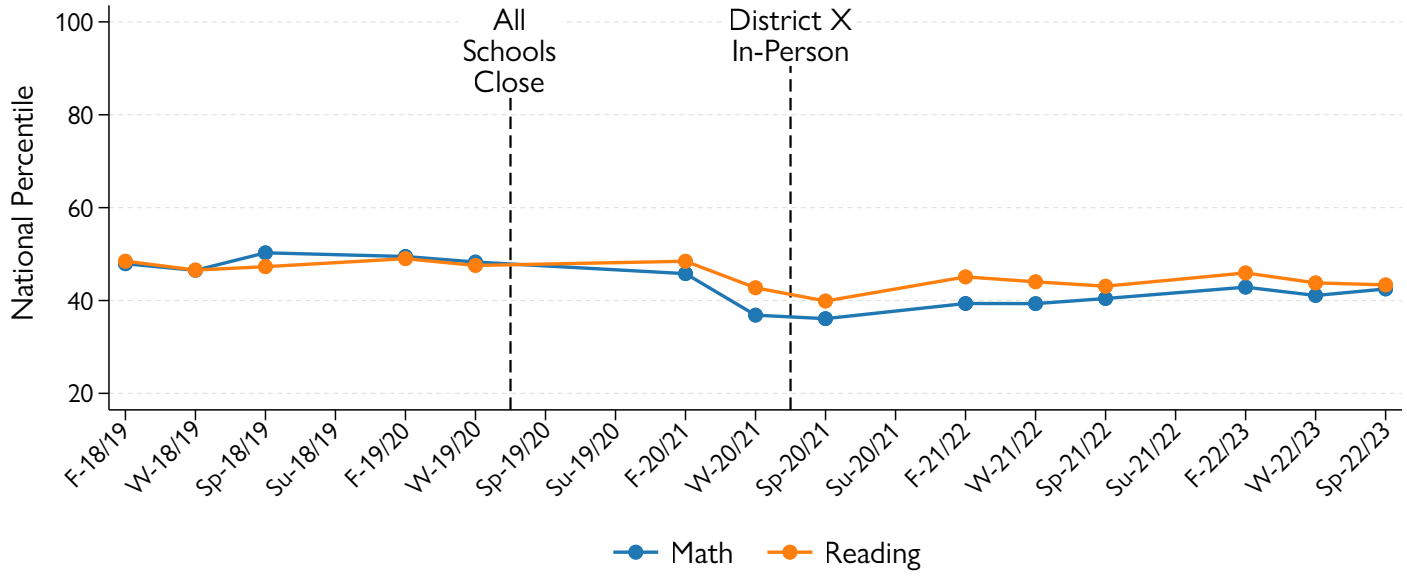
Two previous studies analyzed district-wide summer school programs in the metro area,[3] and another investigated the impact of a district-initiated voluntary, virtual tutoring program.[4,5] The studies find that low participation rates, particularly among students who have experienced the largest declines in achievement growth hampered both the summer school interventions and the voluntary online tutoring program. In contrast to these district-led programs, we study a large school district in the metro-Atlanta area that took a decentralized approach to recovery.

Context

Like all school districts in Georgia, the district we study rapidly closed schools in mid-March 2020, and students received remote instruction for the final nine weeks of school year (SY) 2019–20. The district began SY 2020–21 with universal remote instruction, and students in all grade levels returned to in-person instruction in the middle of the spring semester that year. During SY 2020–21, the district offered students additional online support in all grades.

As illustrated in Figure 1, average student achievement in the district was approximately equal to the national average (i.e., around the 50th percentile) in both math and reading prior to the pandemic. During the first half of SY 2020–21 when instruction was remote for the entire semester, achievement fell (relative to the pre-pandemic national distribution of test scores). During the spring semester of SY 2020–21 when students transitioned back to in-person learning in the middle of the semester, achievement levels continued to decline but at a slower rate. Between the end of SY 2020–21 and the start of SY 2022–23, there was a general upward trend in both math and reading achievement.

Figure 1. Math and Reading National Percentile Ranks for Grade Cohorts 1–6 in SY 2018–19



Notes. The lines represent students who missed no more than one exam between fall SY 2020–21 and spring SY 2022–23.

About the Programs

In SY 2021–22, the district considered ways they could create additional time during the school day to provide interventions for elementary students—with the goal of accelerating student achievement growth. The district convened a focus group of elementary principals, Early Intervention Program (EIP) teachers, other teachers, and other leaders to look at master schedules to narrow schedule options and develop a handful of schedules with built-in time for recovery activities. As a result of this process, the district recommended that elementary schools alter their schedules in SY 2022–23 to dedicate a portion of the school day or "intervention block" to focus on helping students who had been impacted by the pandemic. Principals could choose which schedule they would use.[6] The district gave elementary school leaders discretion over the frequency and duration of the intervention block periods, as well as how they could use the time. Middle schools in the district already had "extended learning time" built into their schedules, but how they used the extra instructional time was also up to the discretion of principals. Some of the middle schools adopted a supplemental intervention block in SY 2022–23 like the one employed by elementary schools.[7]

In addition to the intervention blocks, schools offered a variety of tutoring services in SY 2022–23. Some principals used Title I funds to employ retired

teachers as tutors during the school day. Through a partnership with AARP and the United Way, five elementary schools provided tutoring using community volunteers.[8] This AARP Experience Corps initiative focused on improving reading skills in Grades K through 3. Ongoing after-school programs included tutors as well.

Research Questions

We address two research questions:

1. To what extent are school-level decisions about the frequency, duration, and use of intervention periods and tutoring services correlated with the characteristics of school leaders and the students they serve?

2. Is the intensity of use of intervention periods and tutoring associated with improvements in student achievement growth?

The answers to these questions can shed light on the trade-offs between district- and school-level decision making, as well as the relative efficacy of alternative strategies for accelerating student achievement.

Data and Sample

The available data include typical student-level administrative data, such as race/ethnicity, gender, enrollment, attendance, disciplinary incidents, free or reduced-price meal eligibility, English Learner status, and identified disability status. We measure student achievement by student-level math and reading scores on a nationally normed formative assessment that is administered to all students in Grades K–10 three times per year.[9] We also have demographic and experience data for school principals over the same period. Given the thrice-yearly test administration, we organize the data by semester, with the fall (beginning-of-year) test representing initial achievement in the fall semester, and the winter (middle-of-year) assessment measuring initial achievement in the spring semester. Correspondingly, the winter test scores measure end-of-period achievement in the fall, and we use spring (end-of-year) exam scores to measure end-of-period achievement levels in the spring semester.

We combine the administrative data with data from a principal survey conducted in summer/fall of calendar year 2023. The survey asked school

Table 1. Principal Survey Response by School Grade Configuration

	Survey response		
	No	Yes	Total
Elementary (K–5)	0	75	75
	0.0%	100.0%	100.0%
Middle (6–8)	0	19	19
	0.0%	100.0%	100.0%
High School (9–12)	0	21	21
	0.0%	100.0%	100.0%
K–8	5	1	6
	83.3%	16.7%	100.00%
Other	4	6	10
	40.0%	60.0%	100.0%
Total	9	122	131
	6.9%	93.1%	100.0%

Notes. Row percentages are listed below the cell counts.

leaders about the frequency and duration of intervention periods and how they used the intervention block time at each school. The survey also asked principals whether they offered in-person tutoring at their school. For schools with in-person tutoring, the survey asked principals about the average days per week of tutoring, the average duration of tutoring sessions, and the time of day that tutoring occurred. In addition, the survey asked school leaders to provide information about the tutors and the average student-to-teacher ratio. Due to a pre-existing research-practice partnership with the district, we were able to obtain a 100% survey response rate for schools with traditional grade configurations (see Table 1).[10]

Unfortunately, the principal survey data only provides school-level information on intervention block adoption and the use of in-person tutors. The available data do not allow us to determine the specific interventions received by individual students. Thus, estimates of intervention impacts will tend to be "noisy" measures of the effect of interventions on student learning trajectories.

The available data are from SY 2017–18 to SY 2022–23. In our main analysis, we focus on the year the district implemented the intervention-block strategy, SY 2022–23. Data from SY 2020–21 and SY 2021–22 do not provide useful comparisons due to the COVID-19 pandemic, associated use of remote instruction in SY 2020–21, and undocumented early efforts to assist students

as they returned to in-person instruction. However, we do utilize pre-pandemic data from SY 2017–18 and SY 2018–19 in a "placebo test" to determine if achievement growth in SY 2022–23 was a result of school-level interventions or unmeasured differenced in school quality that existed prior to the pandemic.

We also limit the sample to elementary and middle schools with traditional grade configurations, which provide a 100% survey response rate and facilitates the comparison of schools. For this one year, the combined administrative and survey data include individual-level test scores and school-level intervention-block implementation for over 45,000 students per semester across 94 schools with traditional elementary- and middle-school grade configurations.

Methodology

In the first phase of the analysis, we estimate the relationship between student and principal characteristics and the extent of intervention block use and tutoring. We begin by presenting descriptive statistics on student and principal characteristics, broken out by schools' adoption of intervention blocks and the use of in-person tutoring. Since most schools that adopted the intervention block strategy had a dedicated intervention period each day of the school week, but the length of the period varied across schools, we measure duration by the total number of minutes per week set aside for interventions. We assign schools that did not implement intervention blocks a value of zero. We employ an analogous metric to gauge the intensity of in-person tutoring services.

We estimate multivariate regression models of intervention block and tutoring duration as a function of both principal characteristics and school-level mean values of prior reductions in student achievement growth (or "learning loss") that could affect the perceived need for dedicated intervention time. We define "learning loss" as the change in a student's (pre-pandemic) national percentile rank from winter SY 2019–20 to spring SY 2021–22. We also construct a measure of "large" learning loss, which is defined as being in the lowest quintile of the district-wide learning-loss distribution.

The second phase of the analysis compares achievement growth across students and how it varies with the duration of school intervention blocks and tutoring. To do this, we estimate student achievement models that predict end-of-semester student test scores as a function of school-level interventions and beginning-of-semester test scores, while simultaneously controlling for student characteristics. The models also include grade-level and semester "fixed effects,"

meaning that comparisons are made between students with similar observable characteristics and beginning-of-semester test scores who are in the same grade and in the same semester. Specific model specifications are provided in the Appendix.

Finding 1: Intervention Adoption

Intervention block use was nearly universal among elementary schools, but the weekly duration of the blocks varied considerably. There was also substantial variation in both adoption and duration of tutoring among elementary schools. While all middle schools offered tutoring, the use of intervention blocks was mixed. There was considerable variation in the weekly duration of both intervention blocks and tutoring among middle schools.

Table 2 shows the extent of intervention-block adoption by school type for the 94 elementary and middle schools with traditional grade configurations. Elementary schools, which were the focus of the initiative, had nearly universal adoption.

Table 3 shows that there was substantial variation in the duration of time devoted to interventions. Across all elementary schools, duration blocks averaged 157 minutes per week with a maximum duration of 300 minutes per week. In middle schools, the average was 201 minutes per week with a maximum of 450 minutes per week. In contrast, the allocation of the intervention block time across subjects did not vary much; schools typically devoted roughly equal time to instruction in math and reading/English Language Arts in the intervention block periods.

Similarly, as shown in Table 4, there was considerable variation in the weekly duration of in-person tutoring sessions. Among elementary schools, tutoring time varied from zero (no tutoring) to nearly 7 hours per week, with an average of just over two hours per week. While all middle schools offered in-person tutoring, the amount of time per week for tutoring sessions ranged from 30 minutes to over 2.5 hours.

Table 2. Intervention Block and Tutoring Adoption by School Grade Configuration

	No intervention block, no tutoring	Intervention block, no tutoring	No intervention block, tutoring	Intervention block, tutoring	Total
Elementary	2	13	2	58	75
	2.7%	17.3%	2.7%	77.3%	100.0%
Middle	0	0	5	14	19
	0.0%	0.0%	26.3%	73.7%	100.0%
Total	2	13	7	72	94
	2.1%	13.8%	7.4%	76.6%	100.0%

Notes. Calculations are for schools with traditional grade configurations. Row percentages are listed below the cell counts

Table 3. Intervention Block Time Allocation by School Grade Configuration

	Elementary	Middle	Elementary and middle
Average weekly duration (minutes)	157.1	200.7	165.9
Minimum weekly duration (minutes)	0.0	0.0	0.0
Maximum weekly duration (minutes)	300.0	450.0	450.0
Allotted to math (percent)	44.7	44.6	44.7
Allotted to reading/ELA (percent)	50.2	47.3	49.7
Allotted to other subject (percent)	5.1	8.1	5.6

Table 4. Tutoring Time Allocation by School Grade Configuration

	Elementary	Middle	Elementary and middle
Average weekly duration (minutes)	128.9	158.4	134.9
Minimum weekly duration (minutes)	0	30	0
Maximum weekly duration (minutes)	414	240	414

Figures 2A and 2B illustrate the entire distribution of intervention blocks and tutoring time per week, respectively, for elementary and middle schools combined. For intervention blocks, the most common allocation was three hours (180 minutes) per week; 40% of schools had intervention blocks that summed to this amount per week. In contrast, tutoring session duration was more dispersed; no single time allocation was chosen by as much as 20% of schools.

Figure 2A. Distribution of Intervention Block Time Allocation (Elementary and Middle Schools)

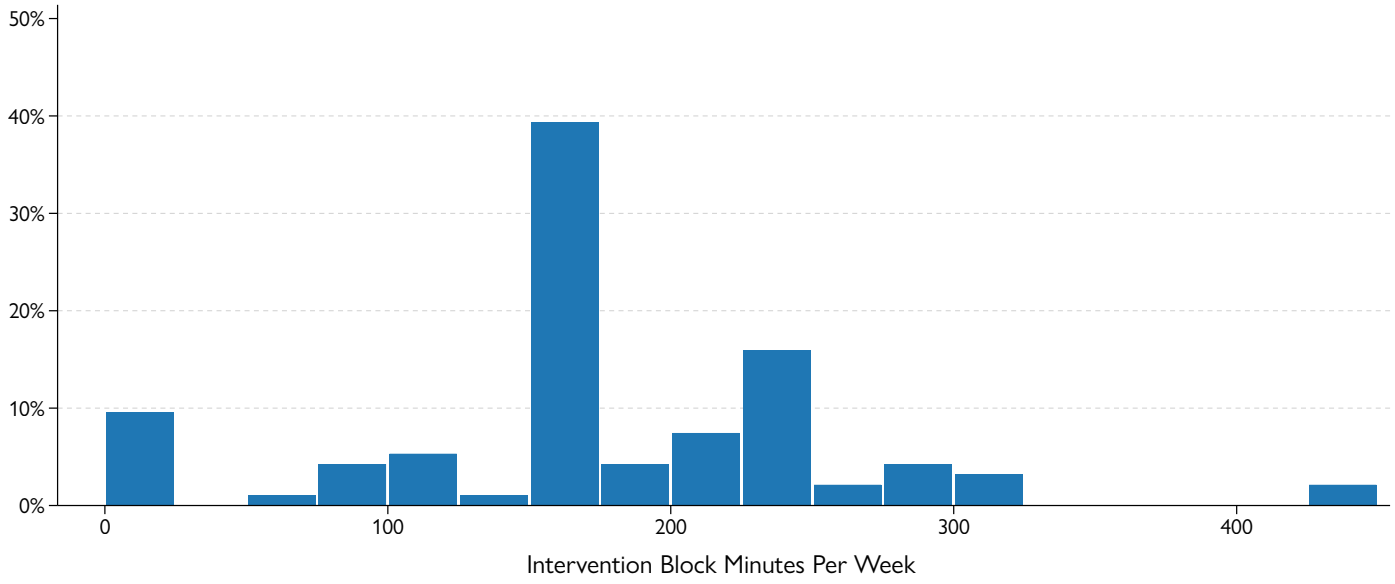
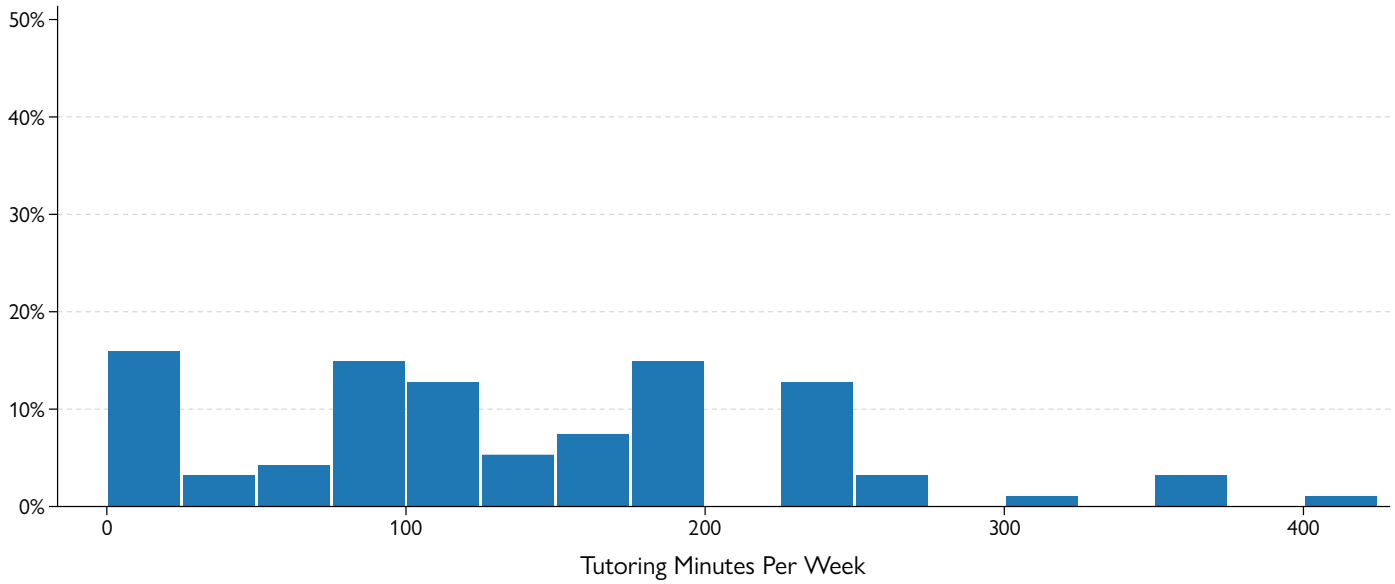


Figure 2B. Distribution of Tutoring Time Allocation (Elementary and Middle Schools)



Finding 2: Tutoring Program Characteristics

Current or former classroom teachers primarily provided in-person tutoring outside of normal school hours. Most tutoring groups had 4 to 20 students per tutor, which does not constitute "small-group" tutoring.

Table 5 shows the types of tutors that the schools employed, by grade configuration. The majority of schools used current classroom teachers as tutors. However, about a quarter of schools used retired teachers exclusively or in combination with current teachers. Whether paid or volunteers, the use of non-teachers as tutors was relatively infrequent—with only about 5% of schools using non-teacher tutors exclusively.

Table 6 provides information on when tutoring occurred, broken down by grade configuration. While 20% of elementary schools only offered in-person tutoring during normal school hours, only 5% of middle schools offered tutoring during the school day. Across elementary and middle schools, over 60% of schools only offered in-person tutoring outside the normal school day, and about 20% had a combination of tutoring during the normal school day and outside of normal school hours.

Table 7 shows the incidence of tutoring by group size. While definitions of small-group tutoring vary, research finds that tutoring is typically most effective when there are no more than three or four students per tutor.[11] Among elementary schools, only about 10% had tutoring groups of three or fewer students. The proportion of schools with "small-group" tutoring was somewhat larger among middle schools but still less than 16%. Combining elementary and middle schools, nearly 90% of schools had four or more students per tutor.

Table 5. Tutor Type by School Grade Configuration

Tutor Type	Elementary	Middle	Elementary and middle
Current classroom teacher only	53.3%	57.9%	54.4%
Non-teacher external paid tutor only	3.3%	5.3%	3.8%
Retired teacher only	16.7%	10.5%	15.2%
Community volunteers only	1.7%	0.0%	1.3%
Classroom and retired teachers only	8.3%	5.3%	7.6%
Other combinations	16.7%	21.1%	17.7%

Table 6. Tutoring Setting by School Grade Configuration

Tutor Type	Elementary	Middle	Elementary and middle
During school only	20.0%	5.3%	16.5%
Outside of school only	60.0%	68.4%	62.0%
During and outside of school	20.0%	26.3%	21.5%

Table 7. Tutoring Group Size by School Grade Configuration

Group size	Elementary	Middle	Elementary and middle
Small-group	10.2%	15.8%	11.5%
1 student per tutor	1.7%	5.3%	2.6%
2–3 students per tutor	8.5%	10.5%	9.0%
Not small-group	89.8%	84.2%	88.5%
4–9 students per tutor	62.7%	31.6%	55.1%
10–20 students per tutor	27.1%	52.6%	33.3%
21+ students per tutor	0.0%	0.0%	0.0%

Notes. Small groups are between 1 and 3 students per tutor. Not small groups are four or more students per tutor.

Finding 3: Factors Associated with Intervention Choice

There are few significant differences in the characteristics of students who attend schools with intervention blocks or in-person tutoring and students whose schools did not offer those interventions. Neither student or principal characteristics nor the extent of prior learning losses are associated with the use/duration of either intervention blocks or in-person tutoring.

As illustrated in Table 8, we observe only a few significant differences in the characteristics of students attending schools with intervention blocks and those without. The only difference that is significant at a 95% confidence level is that schools which adopted intervention blocks had more than double the proportion of English Learners than did schools without intervention blocks. Most importantly, students in schools that chose to adopt intervention blocks had similar reductions in math and reading achievement growth (i.e., "learning loss") on average compared to students in schools without intervention blocks. Schools that created intervention blocks also had similar proportions of students that had experienced "large" learning losses in math (i.e., bottom quintile of the learning-loss distribution). This suggests that intervention block adoption was not driven by the extent of prior learning loss.

We also find few differences in the characteristics of students who attended schools that offered in-person tutoring and those that did not. The only difference that is significant is that schools that offered tutoring had a smaller proportion of non-Hispanic White students and a larger percentage of Hispanic students. None of learning loss measures were significantly different between schools offering in-person tutoring and those that did not.

As noted above, however, intervention block adoption was near universal in elementary schools, and differences in the intensity of intervention block use, which we measured by the reported weekly duration of intervention blocks (minutes per day multiplied by the number of intervention block days per week) largely drives variation in treatment. Likewise, all middle schools offered tutoring, but the weekly minutes of tutoring did vary substantially across middle schools. Thus, in our impact analysis, we use the weekly minutes of intervention blocks and tutoring sessions as our measure of intervention "treatment."

Table 8. Mean Student Characteristics by School Intervention Block and Tutoring Use for Elementary and Middle Schools

	Intervention block			Tutoring		
	No block mean	Block mean	Difference	No tutoring mean	Tutoring mean	Difference
Black	0.668	0.573	-0.095	0.472	0.603	-0.131
White	0.107	0.101	-0.006	0.235	0.076	0.159**
Hispanic	0.140	0.219	0.079	0.136	0.226	-0.090**
Other race/ethnicity	0.085	0.107	0.022	0.157	0.226	0.062*
Students with identified disability	0.131	0.107	-0.024*	0.124	0.106	0.018
English Learners	0.098	0.208	0.110**	0.142	0.208	-0.066
Free- or reduced-priced-meal eligible	0.616	0.631	0.015	0.508	0.653	-0.145*
Prop. with "large" learning loss: math	0.223	0.264	0.041	0.235	0.265	-0.030
Average learning loss: math	-9.107	-9.860	-0.753	-11.453	-11.033	-0.420
Prop. with "large" learning loss: reading	0.224	0.212	-0.012	0.199	0.215	-0.016
Average learning loss: reading	-4.764	-3.976	0.788	-3.884	-3.630	-0.254

Notes. *p<.10, **p<.05, ***p<.01. "Learning loss" is the change in a student's (pre-pandemic) national percentile rank from winter SY 2019–20 to spring SY 2021–22. "Large" learning loss is defined as being the lowest quintile of the district-wide learning-loss distribution.

In Table 9, we report regression estimates of the factors associated with the intensity of intervention block and tutoring use, broken down by grade group. None of the measurable factors are associated with the minutes per week of intervention block use in elementary schools or in the combined elementary/middle school sample.[12] This lessens concerns about potential selection bias emanating from factors driving both the intensity of intervention block use and subsequent student achievement growth. However, we do observe a marginally positive relationship between the duration of tutoring per week and school-average prior learning loss in reading.

Table 9. Estimates of the Factors Associated with Intervention Block and Tutoring Minutes per Week

	Elementary		Elementary/Middle	
	Intervention Block	Tutoring	Intervention Block	Tutoring
School mean student characteristics				
Black	-22.995	-62.308	6.356	-41.432
	(164.333)	(250.978)	(223.169)	(230.025)
White	-32.737	-206.764	-174.75	-246.064
	(247.791)	(378.439)	(343.426)	(353.977)
Hispanic	33.742	-127.720	75.475	-78.596
	(113.529)	(173.386)	(147.951)	(152.497)
Has identified disability	-202.061	-227.811	28.629	-32.479
	(211.047)	(322.321)	(270.169)	(278.469)
English Learner	-71.655	115.250	-79.519	70.256
	(117.805)	(179.918)	(159.711)	(164.618)
Eligible for free/reduced-price meal	39.137	-79.565	-24.353	-39.835
	(98.219)	(150.000)	(133.203)	(-137.295)
School prior learning loss				
Prop. with “large” learning loss: math	37.771	29.462	231.067	-115.406
	(329.315)	(502.947)	(411.743)	424.392
Average learning loss: math	3.324	-7.537	10.533	-4.987
	(6.872)	(10.495)	(8.958)	(9.233)
Prop. with “large” learning loss: reading	-89.048	468.255	254.722	467.369
	(316.129)	(482.808)	(428.311)	(441.469)
Average learning loss: reading	-3.422	16.771	1.833	13.083*
	(5.591)	(8.538)	(7.444)	(7.673)
Principal characteristics				

Notes. *p<.10, **p<.05, ***p<.01. “Learning loss” is the change in a student’s (pre-pandemic) national percentile rank from Winter SY 2019–20 to Spring SY 2021–22. “Large” learning loss is defined as being the lowest quintile of the district-wide learning-loss distribution.

Table 9. Estimates of the Factors Associated with Intervention Block and Tutoring Minutes per Week

Age	2.372	-1.077	2.548	0.603
	(1.517)	(2.317)	(1.849)	(1.906)
Female	-5.466	-35.083	-9.551	-20.876
	(17.960)	(27.429)	(21.160)	(21.810)
Experience (years)	-0.991	0.338	-2.048	-0.021
	(1.122)	(1.714)	(1.506)	(1.552)
Black	(omitted)	(omitted)	53.846	-62.955
			(97.977)	(100.987)
White	-2.722	-4.278	59.926	-87.990
	(25.185)	(38.464)	(104.337)	(107.543)
Constant	118.950	216.704	64.144	203.226
	(172.484)	(263.426)	(245.403)	(252.942)
R-squared	0.076	0.299	0.112	0.265
Observations	73	73	92	92

Notes. *p<.10, **p<.05, ***p<.01. "Learning loss" is the change in a student's (pre-pandemic) national percentile rank from Winter SY 2019–20 to Spring SY 2021–22. "Large" learning loss is defined as being the lowest quintile of the district-wide learning-loss distribution.

Finding 4: Impacts on Student Achievement Growth

Increases in the time devoted to intervention blocks are associated with improvements in math and reading achievement growth for struggling students, though magnitudes of the gains are modest. We find that increases in the weekly duration of tutoring sessions do not boost math or reading achievement for struggling students.

Tables 10 and 11 provide estimates of the determinants of achievement growth in math and reading, respectively. Two variants of the model are estimated. In the "no interaction" specification, the effect of intervention block and tutoring intensity is assumed to be equal for all students. In the "with interaction" specification, we allow the effect to differ for students who began SY 2022–23 in the bottom quintile of the (pre-pandemic) national distribution of test scores.

For achievement growth in math (Table 10), we find no evidence of a positive association between intervention block duration per week and student achievement growth for students as a whole—except for a small marginally significant positive impact of tutoring duration for middle school students. However, there is a positive and statistically significant association between intervention block duration and achievement growth for struggling students in middle school (those who start the school year in the bottom 20% of the pre-pandemic test-score national rankings). If we compare a middle school with a 200-minute-per-week intervention block (about equal to the average of 201 minutes per week) to a school without an intervention block, while accounting for student characteristics, the math achievement growth differential for struggling students would be ((2.0 x –0.006) + (2.0 x 0.014)) or 0.016 standard deviations of a test score. This is equivalent to boosting a student at the 20th national percentile by about one-half of a percentile point per semester. The estimated effect for elementary students (the primary target group) is similar. However, the estimate is less precise, and we cannot safely rule out the possibility that the impact on elementary students is zero. We do not find positive effects of in-person tutoring on math achievement growth for struggling students in either elementary or middle schools.

Table 10. Estimates of the Factors Associated with Math Student Achievement Growth for Elementary and Middle Schools

	Elementary		Middle		Elementary/Middle	
	No interaction	With interaction	No interaction	With interaction	No interaction	With interaction
Began year in bottom quintile		-0.188***		-0.157***		-0.183***
		(0.021)		(0.021)		(0.013)
Intervention block weekly minutes (100s)	-0.010	-0.016	0.000	-0.006	-0.001	-0.009
	(0.014)	(0.012)	(0.006)	(0.006)	(0.006)	(0.006)
Intervention block weekly minutes (100s) x bottom quintile		0.016		0.014***		0.018***
		(0.011)		(0.005)		(0.005)
Tutoring weekly minutes (100s)	0.003	0.000	0.015*	0.013	0.004	0.001
	(0.008)	(0.009)	(0.008)	(0.009)	(0.007)	(0.008)
Tutoring duration x bottom quintile		0.008		0.007		0.008
		(0.007)		(0.009)		(0.006)
Beginning-of-semester score	0.885***	0.848***	0.921***	0.884***	0.891***	0.855***
	(0.005)	(0.004)	(0.005)	(0.006)	(0.004)	(0.004)
Beginning-of-semester score squared	0.003*	0.008***	0.025***	0.029***	0.007***	0.011***
	(0.002)	(0.001)	(0.003)	(0.003)	(0.002)	(0.002)
Additional controls for						
Number of instructional days	✓	✓	✓	✓	✓	✓
Student demographics	✓	✓	✓	✓	✓	✓
Grade level	✓	✓	✓	✓	✓	✓
Semester	✓	✓	✓	✓	✓	✓
Constant	✓	✓	✓	✓	✓	✓
R-squared	0.809	0.811	0.828	0.830	0.817	0.818
Observations	66,081	66,081	29,724	29,724	95,805	95,805

Notes. *p<.10, **p<.05, ***p<.01

Table 11. Estimates of the Factors Associated with Reading Student Achievement Growth for Elementary and Middle Schools

	Elementary		Middle		Elementary/Middle	
	No interaction	With interaction	No interaction	With interaction	No interaction	With interaction
Began year in bottom quintile		-0.199***		-0.123**		-0.183***
		(0.030)		(0.039)		(0.021)
Intervention block weekly minutes (100s)	-0.017*	-0.026**	-0.001	-0.011	-0.001	-0.007
	(0.009)	(0.013)	(0.011)	(0.008)	(0.007)	(0.007)
Intervention block weekly minutes (100s) x bottom quintile		0.031*		0.028**		0.018**
		(0.017)		(0.011)		(0.008)
Tutoring weekly minutes (100s)	0.001	0.000	0.019	0.042**	0.001	0.003
	(0.007)	(0.008)	(0.021)	(0.018)	(0.007)	(0.007)
Tutoring duration x bottom quintile		0.001		-0.071**		-0.005
		(0.009)		(0.029)		(0.009)
Beginning-of-semester score	0.854***	0.821***	0.885***	0.835***	0.858***	0.821***
	(0.005)	(0.005)	(0.009)	(0.009)	(0.005)	(0.005)
Beginning-of-semester score squared	0.002	0.008***	0.028***	0.033***	0.008**	0.013***
	(0.002)	(0.002)	(0.005)	(0.005)	(0.002)	(0.002)
Number of instructional days						
Additional controls for						
Student demographics	✓	✓	✓	✓	✓	✓
Grade level	✓	✓	✓	✓	✓	✓
Semester	✓	✓	✓	✓	✓	✓
Constant	✓	✓	✓	✓	✓	✓
R-squared	51,172	51,172	23,052	23,052	74,224	74,224
Observations	0.779	0.780	0.755	0.758	0.774	0.775

Notes. *p<.10, **p<.05, ***p<.01

The intervention impact estimates for reading achievement growth are similar. In the models that allow differential effects on struggling students, we find that intervention block weekly duration is positively associated with achievement growth in reading for struggling students in both elementary and middle school, though the effects are modest. For a student at the 20th national percentile, the effect of going from no intervention block to a 200-minute-per-week intervention block is ((2.0 x –0.026) + (2.0 x 0.031)) = 0.010 standard deviations. For a middle school student, the effect is ((2.0 x –0.011) + (2.0 x 0.028)) = 0.034 standard deviations. This works out to about a one national percentile point increase (moving from the 20th to the 21st percentile) for struggling middle school students and less than a third of a national percentile point increase for a struggling elementary school student per semester. None of the estimates for weekly duration of in-person tutoring sessions show a positive effect on reading achievement for students who started the year in the bottom 20% of the pre-pandemic national test-score distribution.

To determine if the estimated effects may be biased, we also conducted "placebo" tests, where we re-estimated the achievement models using data from the pre-pandemic years SY 2017–18 and SY 2018–19. If the effects we observe for SY 2022–23 are reflecting the interventions in place and not some other unobserved factor that is correlated with intervention implementation, then intervention use in SY 2022–23 should not have any "effects" on student achievement growth prior to the pandemic. As shown in the Appendix, intervention block weekly duration in SY 2022–23 is not significantly correlated with student achievement growth in math or reading in either SY 2017–18 or SY 2018–19 for the elementary-school-only and middle-school-only samples. It is, however, correlated with achievement growth in reading for struggling students in the combined elementary sample for both SY 2017–18 and SY 2018–19. Thus, one should view the combined sample estimates for reading (last two columns of Table 11) with caution.

Conclusions and Policy Recommendations

Like many school districts across the country, the average student in the district we study experienced a substantial reduction in achievement growth with the use of remote instruction during the COVID-19 pandemic. While student achievement growth has improved since the return to in-person instruction, many students still lag behind their pre-pandemic national achievement rankings. In an effort to boost student achievement growth, the district urged schools

to set aside time in the school day for academic recovery ("intervention blocks"), and many schools also provided tutoring sessions (mostly outside of normal school hours) for students. The time allotted to intervention blocks and tutoring, as well as the curricular content, was left up to the discretion of principals.

To understand the extent of these interventions, we surveyed school principals and received a 100% response rate from leaders of schools with traditional grade configurations. While the survey responses provided information on the implementation of interventions at the school level, there was no data at the student level on who received which interventions and for how long.

We find that the amount of time per week that schools devoted to intervention blocks and tutoring did not vary systematically with the proportion of students who experienced large reductions in student achievement growth or with the characteristics of the principal.

We estimate that in-school intervention time (intervention blocks) was associated with improvements in both math and reading achievement growth, although the effects were modest. Going from no intervention block to setting aside 200 minutes per week is estimated to boost scores for struggling middle school students in math by about one-half of a national percentile per semester. In reading, the gains are about one-third of a national percentile point for elementary students and a full one percentile point for middle school students.

In no case do we find that increases in average tutoring session weekly duration are associated with increases in student achievement growth for struggling students. There are two likely explanations for the lack of a measurable positive impact. First, the tutoring groups were likely too large to be effective. Prior studies show that individual or small-group tutoring can be highly effective, but the vast majority of studied programs have one or two students per tutor.[13] In the district we study, less than 3% of elementary/middle schools had one-on-one tutoring, and only 11.5% had tutoring groups of one to three students per tutor. Second, nearly two-thirds of elementary/middle schools only offered tutoring outside of normal school hours, and only about one in six schools exclusively offered in-school tutoring. Previous research finds that after-school programs are only about half as effective as tutoring programs during normal school hours.[14]

Our analysis brings forth two broad sets of recommendations. First, districts should consider building better monitoring systems when they roll out

interventions. We were fortunate to have an excellent response rate to our principal survey. However, not being able to determine program participation at the individual student level hindered our ability to get precise estimates of program impact in general and to study potentially heterogeneous impacts across sub-groups of students. Second, the findings highlight the potential shortcomings of a decentralized implementation of intervention strategies, suggesting a more centralized intervention may produce better outcomes. While school leaders know the needs of their students better than district-level leaders, school-level administrators may have less information about the efficacy of potential interventions and face greater challenges in organizing implementation and tracking student participation.

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Endnotes

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5. A small number of recent studies analyze the effects of recovery initiatives in other states.

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6. In SY 2023-24 the district required the use of intervention blocks by elementary schools.

7. High schools did not have a specific intervention block. Also, formative assessments are typically not administered in Grades 11 and 12, so we omit high school students from our analysis.

8. Volunteers were age 50 and older had to have a high school diploma or GED.

9. In addition to math and reading, the district also tests students in language usage and science.

10. The K-8 schools in the district are predominantly charter schools. The other schools with non-traditional grade configurations are either magnet schools or schools serving special populations.

11. Robinson, C., Kraft M., Loeb, S., & Schueler, B. (2021). *Design principles for accelerating student learning with high-impact tutoring*. Brief #16, EdResearch for Action, Brown University.

12. Estimates were not conducted separately for middle schools since there were too few middle schools (19) to obtain precise estimates.

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The Georgia Policy Labs is an interdisciplinary research center that drives policy and programmatic decisions that lift children, students, and families—especially those experiencing vulnerabilities. We produce evidence and actionable insights to realize the safety, capability, and economic security of *every* child, young adult, and family in Georgia by leveraging the power of data. We work alongside our school district and state agency partners to magnify their research capabilities and focus on their greatest areas of need. Our work reveals how policies and programs can be modified so that every child, student, and family can thrive.

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