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Student Achievement Growth During the COVID-19 Pandemic

Insights from Metro-Atlanta School Districts

Tim Sass & Thomas Goldring

Metro Atlanta Policy Lab for Education

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Highlights

- The COVID-19 pandemic has led to substantial reductions in student achievement growth, and these impacts have grown over time.
- The impacts of the pandemic on student achievement growth vary considerably by subject, grade level, and school district.
- Students eligible for free or reduced-price meals—a crude measure of poverty—generally experienced lower achievement growth (relative to similar students prior to the pandemic) than did students who were not eligible for subsidized meals, but the magnitude of the differences varied considerably across grades, subjects, and districts.
- On average, historically marginalized groups, such as Black students, Hispanic students, and English learners, tended to experience greater reductions in achievement growth (relative to similar students prior to the pandemic) than did White and English-proficient students, but these differences varied substantially by grade, subject, and district.
- Students who returned to in-person instruction in fall 2020 experienced greater achievement growth per instructional day than did students who continued to learn remotely, but their growth was still less than that of in-person learners prior to the pandemic.

Policy Recommendations

In the wake of the COVID-19 pandemic, public school districts in Georgia face crucial decisions on how to use federal funds to get students back on track academically. Based on our research and the existing evidence, we recommend:

1. Differential supports and interventions based on each student's achievement growth;
2. High-dosage, small-group tutoring for students who have incurred the most significant impacts;
3. Learning opportunities during the summer and other breaks that are targeted toward students whose learning growth has been significantly diminished, tied to classroom content, and provide strong incentives for participation;
4. Extended learning time during the school day that is tailored toward student needs; and
5. Robust data systems that track who is offered additional learning opportunities, the extent of participation, and student achievement to determine the efficacy of the interventions and to make any necessary midcourse adjustments.

Introduction

The COVID-19 pandemic disrupted formal education on an unprecedented scale.

By order of the governor, public schools in Georgia closed in mid-March 2020 and students transitioned to remote learning for the remainder of school year (SY) 2019–20. Many school districts offered virtual schooling, but the degree to which students could engage in online learning varied considerably, depending in part on access to digital devices and the availability of a reliable internet connection.[1] The pandemic-induced combination of family disruptions, closures of schools, and the swift transition to remote learning reduced achievement growth for many students throughout the United States heading into SY 2020–21.[2]

Most districts in the Atlanta metro area began SY 2020–21 with fully remote instruction. However, as the year progressed, many schools began to offer parents a choice of in-person instruction for their child, either in a hybrid approach with a mix of in-person and remote instructional days or fully face-to-face instruction. Parents could also opt for their students to continue with fully remote instruction.

Initial projections, using national data on the length of school closures and pre-pandemic evidence of summer learning loss, indicated that students would likely start SY 2020–21 with only about two-thirds of the learning gains in reading and less than half the learning gains in math, relative to a typical year.[3] Fortunately, reports from four of the largest formative assessment vendors found that actual reductions in student achievement growth from the start of the pandemic to the fall of SY 2020–21, while significant, were not as large as had been initially feared.[4] More recently, however, a report from the makers of the i-Ready assessment indicated that by the middle of SY 2020–21, the proportion of students who were not prepared for grade-level work was much larger than in prior years, particularly in schools in which a majority of students are Black or Hispanic.[5]

Determining the extent to which student achievement growth has decreased is an essential component of many forthcoming policy decisions.

[1] Herold (2020); Tagami (2020); Walker (2020).
[2] Kuhfeld et al. (2020a); vonHippel (2020).
[3] Kuhfeld et al. (2020b).
[4] Curriculum Associates (2020); Bielinski, Brown, & Wagner (2020); Kuhfeld et al. (2020b); Renaissance Learning (2020).
[5] Curriculum Associates (2021).

Understanding the magnitude of declines in achievement growth will help districts determine what sort of intervention strategies will be sufficient to counteract the losses and what resource levels will be required to meet the challenge.

> Evidence on differences in achievement growth across grades and student groups can be used by policymakers to target interventions to students with the greatest need.

Similarly, knowing how achievement growth varies by instructional mode (remote, hybrid, and face-to-face) will inform decisions about the use of remote instruction, both for the remainder of the pandemic and beyond. There is a pressing need for such evidence. Georgia schools will receive $4.25 billion in funding from the American Rescue Plan Act of 2021[6] and districts must soon make decisions about how to use those funds to remediate the impact of the pandemic on students and support their paths for long-run success.

Methodology

Research Questions

To respond to the urgent need for information to guide evidence-based decisions, we address the following key research questions:

1. What has been the effect of the COVID-19 pandemic on students' achievement growth?
2. How have changes to student achievement growth varied by grade level, subject, and student demographic characteristics?
3. Are students who return to in-person learning likely to improve their achievement growth?
4. What strategies will be most effective in helping students recover from the educational impacts of the pandemic?

Sample Description and Empirical Methods

To analyze the effects of the pandemic on student learning, we use administrative data from three metro-Atlanta school districts for the period from SY 2017–18 to SY 2020–21. We combine information on students' enrollment, grade, and demographic characteristics (including their race, ethnicity, gender, free or reduced price-meal status, English learner status, and disability status) with scores on formative assessments. Formative assessments are low-stakes exams that districts typically administer two or three times per year; they provide a measure of student achievement at multiple points during the school year and have been administered both before and during the pandemic.

[6] Tagami (2021).

Our empirical approach compares each student's actual test scores with an estimate of their expected achievement level had the pandemic not happened. This process includes three steps.

1. We estimate the determinants of students' fall and winter test scores in years prior to SY 2019–20.
2. We use these historical relationships and actual test scores in the fall and winter of SY 2019–20 (just prior to the pandemic) to forecast what assessment scores in the fall and winter of SY 2020–21 would have been in the absence of the pandemic.
3. We estimate the pandemic-induced difference in achievement growth by comparing actual scores of students taking formative assessments in the fall and winter of SY 2020–21 to projected achievement levels, absent the pandemic.

Because we account for prior test-score histories and observable student characteristics when projecting student achievement, a student's achievement growth is not being compared to that of the average student, but rather to what students with similar characteristics and test-score histories in the same district would be expected to obtain in a "normal" year.

Thus, differences in achievement growth compound differences in achievement levels that existed prior to the pandemic.

Limitations of the Analysis

Our use of formative assessments presents certain challenges. First, not all the districts in this study used the same formative assessment over time. This limited the grade levels we could analyze in one district; in another district, it necessitated converting scores on one exam to the scale of another exam. Second, fewer students took formative assessments in SY 2020–21 compared to earlier years. This means that our findings are representative of the effects of the pandemic on students who took the formative assessments during SY 2020–21, but may not be representative of the impacts on all students who were enrolled in the district when the pandemic began. Third, the precise timing of formative assessments varies across school years, which could distort year-to-year comparison of scores. Fourth, many students took formative assessments at home during the pandemic rather than at school, which was the standard practice before the pandemic. It is possible that parents or others could have assisted students during test-taking at home, which would inflate students' scores.

For ease of interpretation, we often convert changes in test scores over time to the equivalent number of months of learning. This conversion introduces additional fuzziness to the calculation of achievement growth because it relies on definitions for an average month of learning in scale score points, as well as the number of instructional days between testing dates.

The Appendix provides details on the data and methods used in our analyses, discusses the limitations in more depth, and provides robustness checks of the methodology and student samples we use.

Finding 1: Average Impacts on Achievement

By winter of SY 2020–21, average achievement in elementary and middle schools was often months behind where students likely would have been had the pandemic not occurred. Students often fell further behind between the fall and winter of SY 2020–21, sometimes dramatically so.

Estimates of average achievement are based on each student's actual achievement level on a math or reading formative assessment in the fall or winter of SY 2020–21. Growth in achievement is measured relative to the student's achievement level in the winter of SY 2019–20. We compare each student's actual achievement level to their projected achievement level (based on historical relationships and each student's demographic characteristics and test scores in the pre-pandemic part of SY 2019–20). These individual-level differences between actual and projected achievement are then averaged within grades in each district.

A negative value for achievement growth indicates that a student's actual achievement level is less than one would expect in a normal year. For example, a value of –3 months indicates that a student is nearly one-third of a 9.5-month school year behind where they would normally be—had the pandemic not occurred.

A negative value ***does not imply a reduction in knowledge***; rather, it signals that achievement growth has slowed. Moreover, the change in achievement captures ***everything that happened to a student*** during this period that could have affected their learning, much of which is beyond the control of schools.

Figure 1 reports average math achievement on assessments taken in the fall and winter of SY 2020–21 by district and grade level. The key takeaways are as follows: First, average math achievement was often behind where students likely would have been had the pandemic not occurred. Second, students in most upper elementary and middle school grades, with some notable exceptions, fell further behind during the first half of SY 2020–21. Third, the slowdown in achievement growth during the first half of SY 2020–21 was often significantly larger than the slowdown between the start of learning-related disruptions in mid-March 2020 and the fall assessment at the beginning of SY 2020–21.

Figure 2 is analogous to Figure 1, but it reports average reading achievement by district and grade level. A similar pattern of results holds. Average reading achievement was lower than what one would expect had the pandemic not occurred in almost every grade level in the fall and in every grade level in the winter. Additionally, comparing the results in Figure 1 for math and Figure 2 for reading, the slowdown in achievement growth was often larger for reading than for math, although this pattern varied across the districts.

Figure 1. Average math achievement estimates from winter of SY 2019–20 to fall of SY 2020–21, and from winter of SY 2019–20 to winter of SY 2020–21, by district and grade level

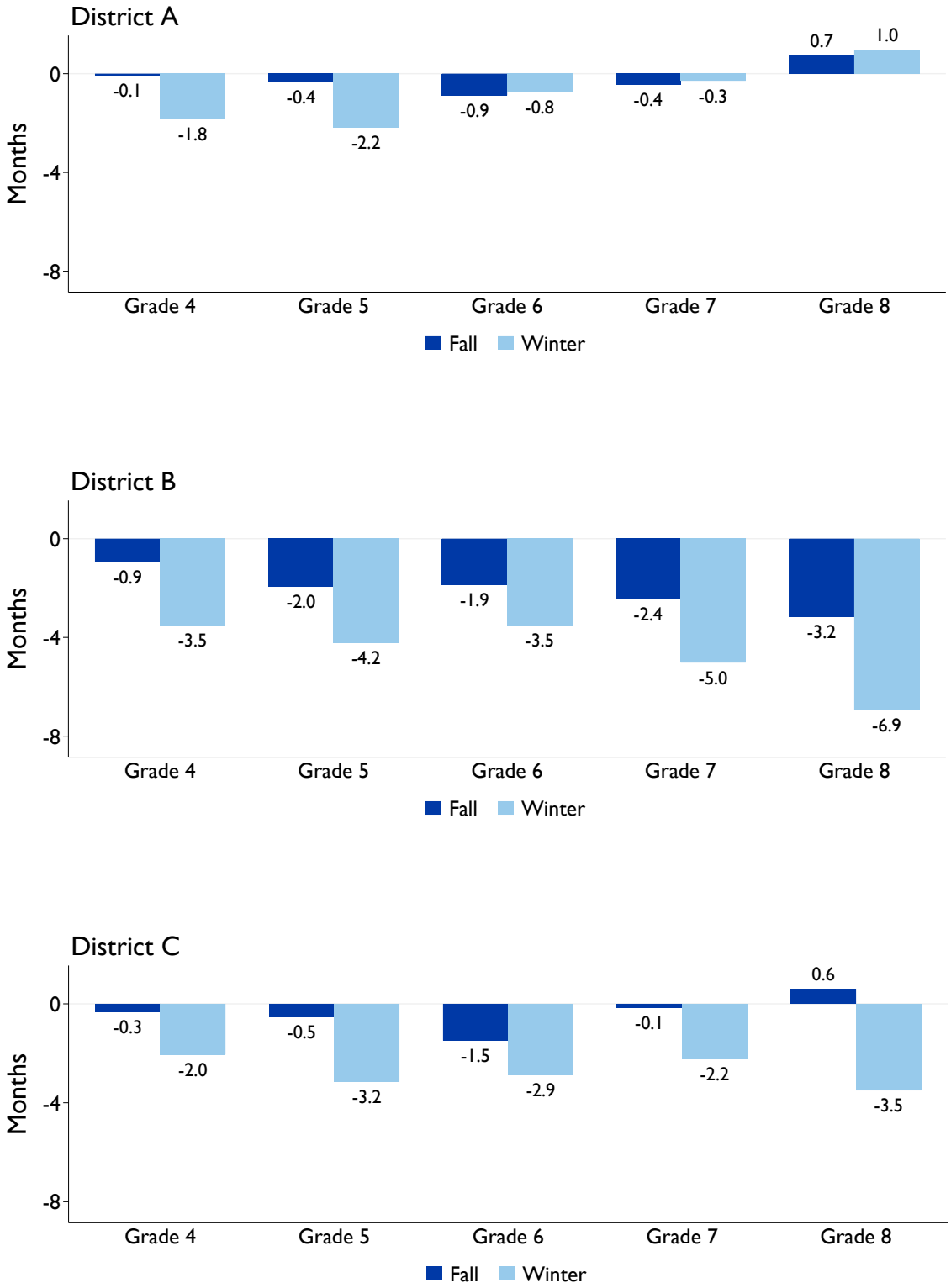
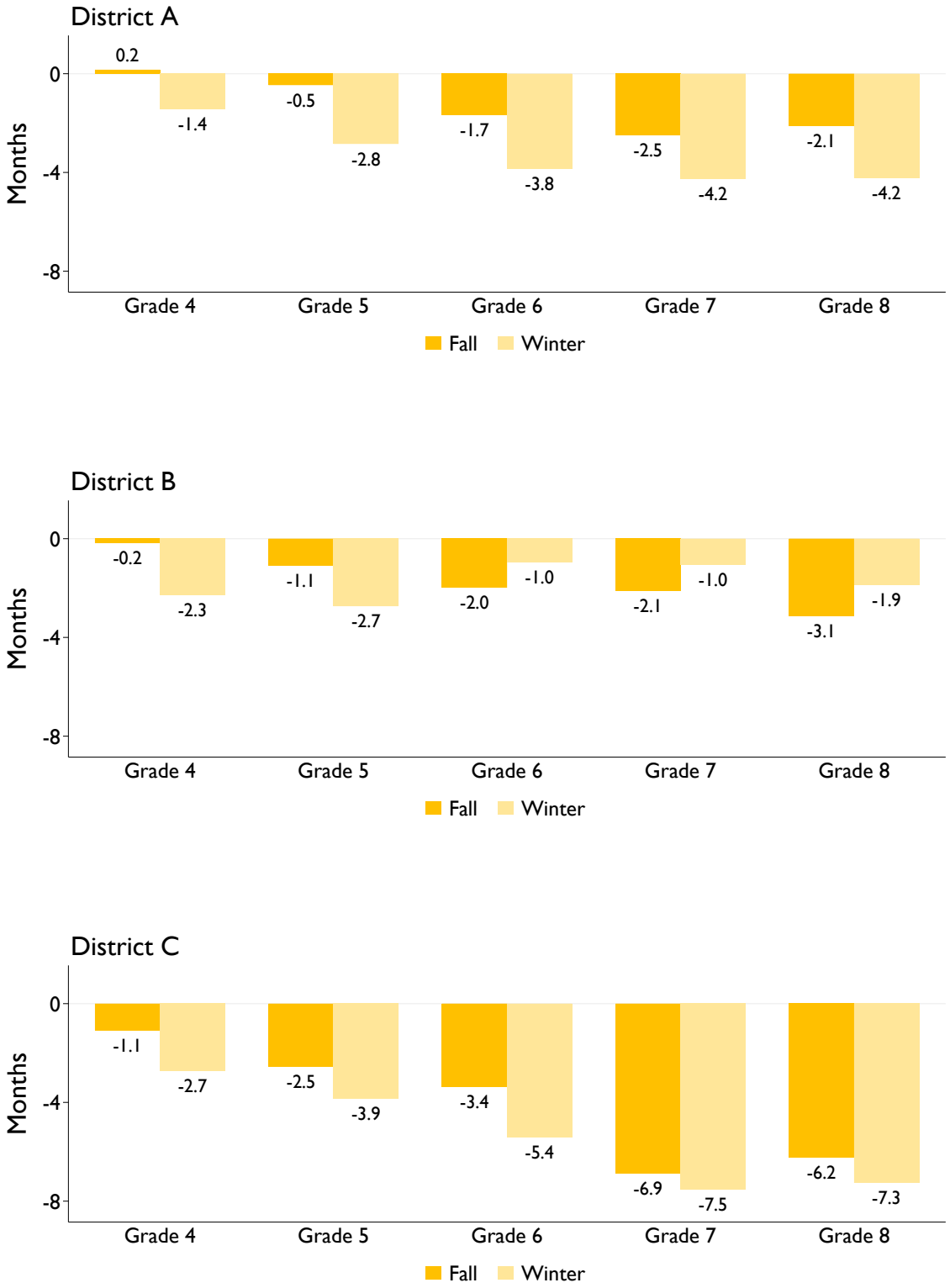


Figure 2. Average reading achievement estimates from winter of SY 2019–20 to fall of SY 2020–21, and from winter of SY 2019–20 to winter of SY 2020–21, by district and grade level



An important takeaway from figures 1 and 2 is that estimates of slower achievement growth using assessment data from the fall of SY 2020–21 do not capture the full extent of learning-related disruptions due to COVID-19. Many students fell substantially further behind prior cohorts during the first half of SY 2020–21.

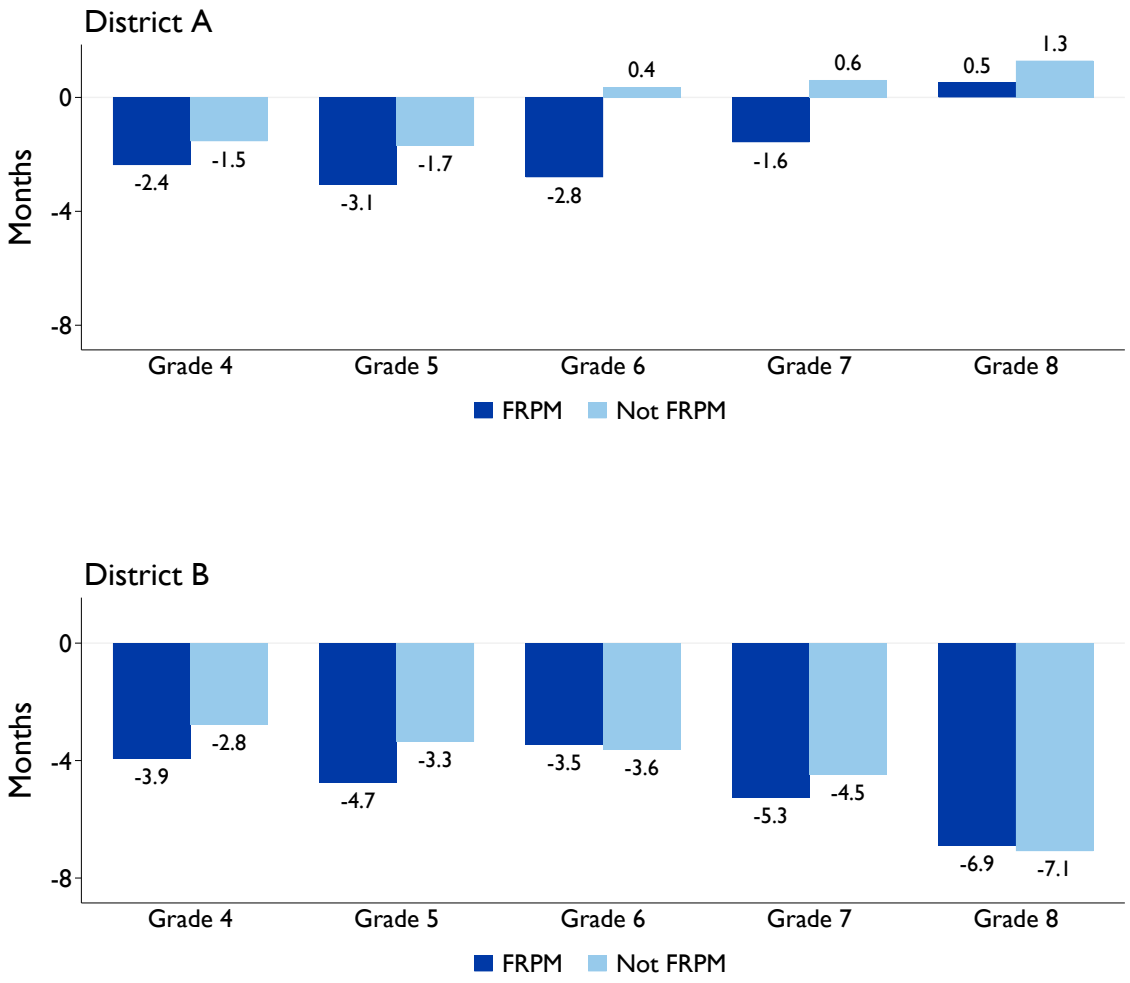
Finding 2: Impacts by Student Demographic Groups

Students eligible for free or reduced-price meals generally experienced slower achievement growth (compared to pre-pandemic trends) than students who were ineligible, but the magnitude of the differences varied considerably across grades, subjects, and districts. Similarly, traditionally marginalized student groups, including Black students, Hispanic students, and English learners, generally experienced larger reductions in achievement growth, but relative impacts differed substantially across grades, subjects, and districts.

Within a given district, subject, and grade, students have been affected unequally by COVID-19. Figure 3 displays average math achievement by eligibility for free or reduced-price meals (FRPM), a crude measure of poverty, for two districts.[7] For both districts, achievement growth from winter SY 2019–20 to winter SY 2020–21 in upper elementary grades (grades 4 and 5) was reduced by about one month more for FRPM-eligible students than for students from more affluent families. Some disparities also exist in middle grades (grades 6 to 8), though the differences are generally much more modest than in the upper elementary grades.

[7] Well over 90 percent of students in District C are eligible to receive free or reduced-price meals and thus comparisons of FRPM-eligible and ineligible students are not very meaningful.

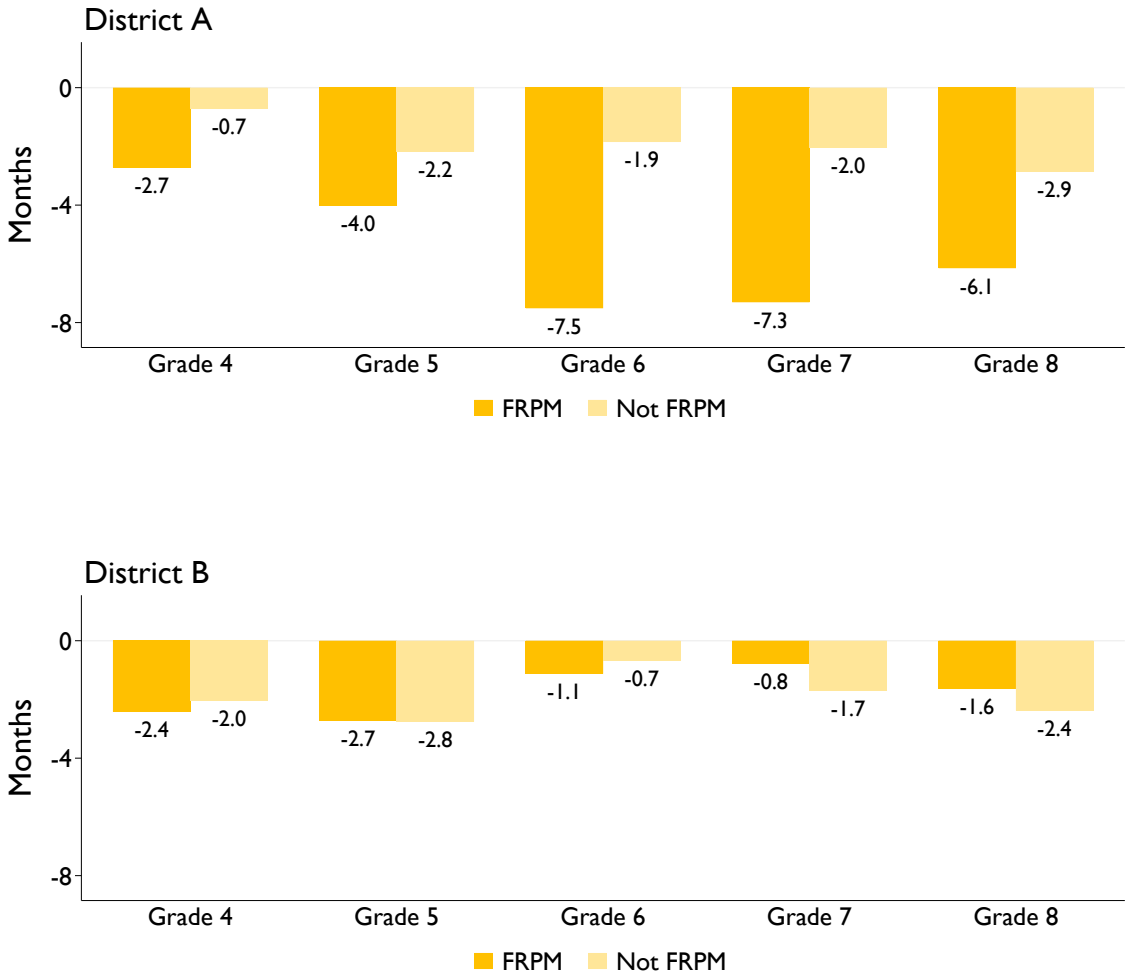
Figure 3. Average math achievement estimates for winter of SY 2019–20 to winter of SY 2020–21, by grade level and free or reduced-price meal eligibility status



As illustrated in Figure 4, reading achievement growth among FRPM-eligible students in District A was substantially lower than for ineligible students, with a disparity of up to five-and-a-half months in sixth grade. By contrast, the achievement-growth gap in District B was much smaller across all grade levels. This does not necessarily mean than District B was more effective in educating students experiencing low-income during the pandemic. A number of factors could have been at play, including differences in the demographic characteristics of students, differences in the formative test employed, and the fact that the proportion of students tested in District B fell substantially in the winter of SY 2020–21. These issues are analyzed in detail in the Appendix.

In addition to comparisons by FRPM-eligibility status, we also analyzed variation in changes to student achievement growth by students' race and ethnicity, gender, disability status, and English learner status. Graphical depictions of these comparisons by grade, subject, and district are provided in the Appendix.

Figure 4. Average reading achievement estimates for winter of SY 2019–20 to winter of SY 2020–21, by grade level and free or reduced-price meal eligibility status



For racial and ethnic comparisons, our findings generally mirror those from the breakdowns by FRPM-eligibility status. Overall, Black students and Hispanic students tended to experience larger reductions in achievement growth (relative to pre-pandemic trends) than did White students. However, observed differences vary substantially by subject, grade, and district. Thus, one should ***avoid drawing broad conclusions about variations in pandemic impacts by student race or ethnicity***.

For comparisons of English learners to English-proficient students, the findings are more consistent across grades, subjects, and districts than for differences by family income or race and ethnicity. For math, in each of grades 4 to 7 ***across all three districts, average changes to achievement growth are larger for English learners than for English-proficient students***. The specific magnitudes do vary, but differences are generally in the range of zero to two months of learning. For reading, average reductions in achievement growth are larger for English learners in all three districts in grades 6 and 7. Likewise, losses are greater for English learners in grades 4 and 5 in both districts B and C; in District A there is essentially no difference. As with other sorts of

comparisons, observed cross-district differences in pandemic impacts do not necessarily imply differences in the efficacy of English learner programs during the pandemic. The composition of English learners (e.g., country of birth and refugee status) varies considerably across districts.

Interestingly, female students generally experienced smaller reductions to student achievement growth than did their male peers. These differences were more pronounced in middle school than in elementary school. One plausible explanation is that peer interactions differ in an online environment, leading girls to feel more comfortable. Alternatively, girls may be more mature than boys in the middle grades and possess more of the self-discipline required for learning in a remote environment. Another possible explanation is that girls may be more resilient to hardship than boys.[8] However, understanding the actual mechanisms behind these observed gender differences will require further research.

Finally, we expected we would find that, on average, students experiencing disability would have fared much worse during the pandemic than their peers who do not experience disability. In general, this is not the case. We do not find a consistent pattern of larger average losses for students experiencing disability. Rather, differences are frequently small or even favor students who experience disability in some cases. One possible explanation for these unexpected results is that parents or other caregivers of children experiencing disability may have been more likely to help their children during test-taking at home. However, we cannot rule out the possibility that some students with disabilities may have actually benefitted from learning in an online environment.

Finding 3: Effect of Returning to In-Person Learning

Students who returned to in-person instruction in the fall of SY 2020–21 experienced greater achievement growth per instructional day than students who continued to learn remotely, but their growth was still less than that of in-person learners prior to the pandemic.

Only one of the three participating districts, District A, offered in-person learning opportunities for students during the fall semester of SY 2020–21. In that district, all students started the semester with virtual instruction. This was followed by a phase-in of hybrid models in September and early October. It was not until mid-October that parents could choose full-time in-person instruction for their child. Most students who participated in fully in-person instruction ended up spending 30–50 percent of instructional days between their fall and winter assessments learning remotely (and 50–70 percent of instructional days learning in-person).

[8] Bertrand & Pan (2013); Autor et al. (2016).

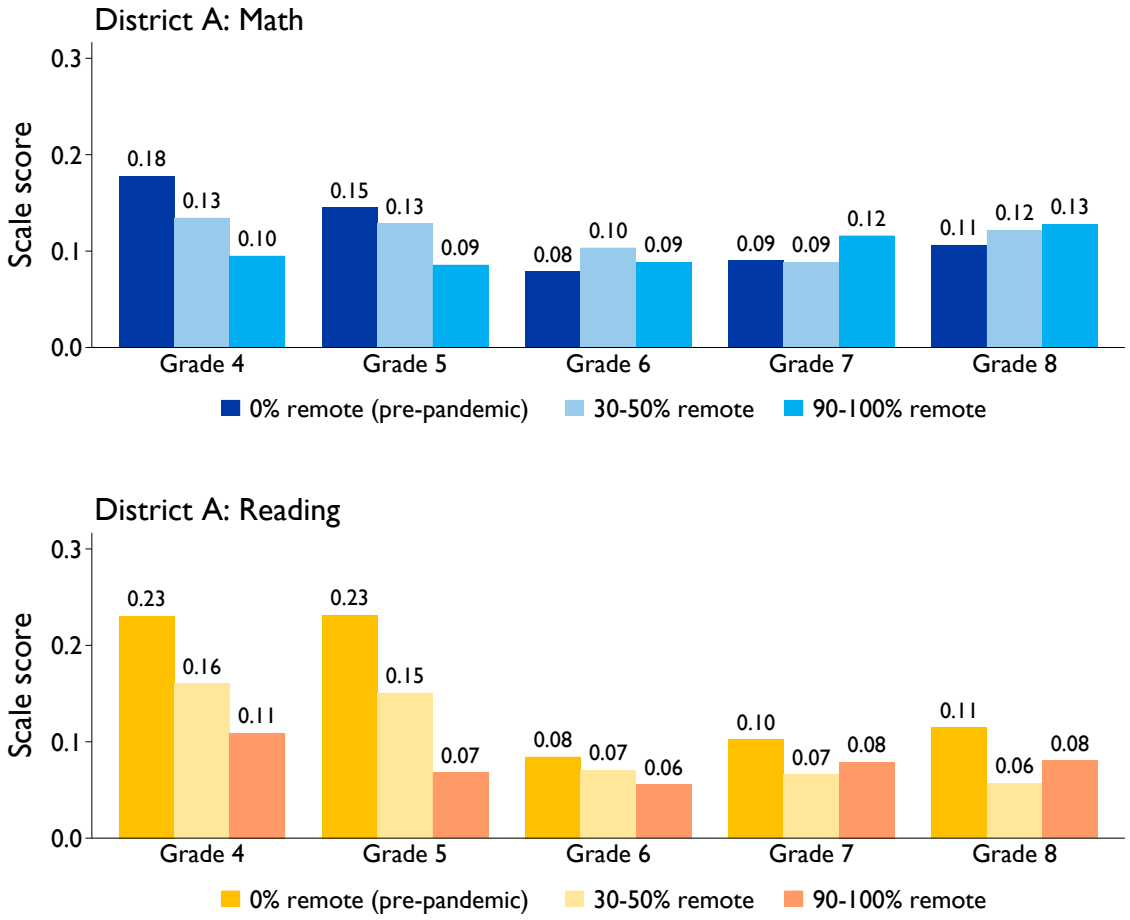
To analyze differences in student achievement growth across instructional modes, we rely on the original exam scale scores, rather than convert scores into months of learning. Because we are interested in relative achievement growth across instructional modes within a single district, the months-of-learning measure is unnecessary, and we avoid any additional uncertainty associated with the conversion from one metric to another. We also measure changes in test scores on a per-day basis, to account for variability in the timing of in-person instruction and differences in the dates when individual students took their fall and winter assessments. Finally, as a point of reference, we include the average achievement growth per instructional day from fall to winter testing for the most recent pre-pandemic year, SY 2019–20, when essentially all instruction was in-person and there were no pandemic-related disruptions in students' lives.

Figure 5 shows average achievement growth per instructional day for students whose mode of instruction in the fall of SY 2020–21 was between 30 percent and 50 percent remote learning or between 90 percent and 100 percent remote learning. Average achievement growth per instructional day was generally higher for students who returned to in-person instruction during the fall semester of SY 2020–21, especially among elementary grades. The difference was highest for grade 5 reading, in which average achievement growth for students who returned to in-person instruction was double that of students who were 90–100 percent remote. Middle school grades tended to have a smaller difference in achievement growth across instructional modes, with slightly better average achievement gains for entirely remote learners in grades 7 and 8.

Students who received in-person instruction for 50–70 percent of their instructional days generally experienced greater achievement gains in both math and reading than did students who learned remotely all, or nearly all, of the time. However, it is still l***ikely that the achievement growth of students participating in in-person reading instruction during the pandemic was less than for students receiving in-person reading instruction prior to the pandemic***. Even if we extrapolate the gains from in-person learning at 50–70 percent of instructional days to a hypothetical 100 percent in-person learning (i.e., in-person instruction for the entire fall semester), fall-to winter student achievement growth in reading would have been less than in the pre-pandemic period, ranging from 36 percent of achievement growth per day in SY 2019–20 for grade 8 to 95 percent of pre-pandemic achievement growth per day in grade 6.

For math, the evidence suggests that in-person instruction was at least as effective in the first half of SY 2020–21 as it was in the first half of SY 2019–20 in most grades, although the rate of learning was substantially lower for in-person math instruction in grade 7 in the first half of SY 2020–21 than during the first half of SY 2019–20, pre-pandemic. This finding implies that enhanced in-person learning opportunities in the spring of SY 2020–21 will lead to improvements in achievement growth. However, even students who return to campus will likely have greater cumulative achievement losses in math than they did at the end of the fall term.

Figure 5. Average achievement growth per instructional day in SY 2020–21, by grade level and mode of instruction



Discussion of Findings

It has been generally assumed that the COVID-19 pandemic and subsequent school closures slowed student learning in metro-Atlanta public schools, but to date there has been only speculation about the impact on student achievement growth. In this report, we provide the first hard evidence on the effects of the pandemic on student achievement growth. We find that up to the start of SY 2020–21, losses were moderate, generally no more than two to three months of learning in most cases. However, these losses mounted during the first half of SY 2020–21: Across most measures, students are three to six months or more behind where they would have been had the pandemic not occurred. Further, the reductions in achievement growth have been very uneven. There is substantial variation in the effects of the pandemic across subject areas, grade levels, and student demographic characteristics.

The return to in-person learning in the second half of SY 2020–21 will help stem the dramatic slowdown in achievement growth. However, our analysis of learning growth differences across instructional modes suggests that relatively slower growth in reading achievement—especially for middle-school students—is likely to continue during the second half of the year. This means that by the end of the school year, large numbers of public school students in the metro-Atlanta area will likely have experienced pandemic-related losses in achievement growth equivalent to the learning that normally occurs over half a school year or more.

School districts now face the challenge of how best to mitigate the reductions in student achievement that have occurred. The American Rescue Plan Act of 2021 and other federal relief efforts will provide districts with significant financial resources to introduce programs to help students return to their pre-pandemic learning trajectories. Yet money alone will not solve the problem. Now more than ever, it is crucial to utilize evidence to guide programmatic and policy decisions.

> The evidence in this report and the accompanying Appendix can be used to inform decisions about what grades and subject areas to target and which students will need the greatest level of support.

Prior research can also guide the selection of remediation strategies and the matching of strategies to the level of need. Last summer, we published a curated summary of the evidence on the efficacy and cost effectiveness of commonly used remediation strategies.[9] Reviews have also been conducted by other groups of researchers and reached similar conclusions.[10]

The strategy that has yielded by far the greatest impact on student achievement and has the clearest evidence for its efficacy is high-intensity small-group tutoring aligned with classroom content. However, this strategy comes with the highest price-tag.[11] Consequently, it needs to be ***selectively targeted toward students who have incurred the greatest reductions in achievement growth***. There is also good evidence that extending the length of the school day during the regular academic year can accelerate achievement growth broadly, especially in reading.

A third promising strategy is the provision of learning opportunities during summer or other breaks in the typical academic calendar. As with tutoring, alignment of content with student needs and regular class curricula is key. Moreover, lack of student participation in these programs can be a significant impediment to the efficacy of this remediation strategy. Consequently, providing strong incentives for enrollment and continued engagement in these programs is important.

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[9] Pan and Sass (2020).

[10] See, for example, Allensworth and Schwartz (2020).

[11] Guryan et al. (2021) study a successful individualized, intensive, in-school tutoring intervention in Chicago Public Schools. The cost was $3,500 to $4,300 per participant per year for 45-50 minutes of tutoring per day.

Districts should use federal funding to invest in three evidence-based policies: supporting high-intensity, small group tutoring, extending the school day, and creating significant incentives for students to attend sumer school.

No matter what remediation strategies are selected, they will not work perfectly for all students immediately, and there will be opportunities to make improvements along the way. In order to make such mid-course corrections, it is essential to roll out programs in such a way that targeted students and a reasonable comparison group of non-participants can be clearly identified. It will also be necessary to keep track of participation and continue to measure student outcomes along the way. These planning and data collection efforts will yield more efficient use of scarce resources and bolster the ability of districts to ensure an academic recovery over the coming years for the students most gravely affected by the COVID-19 pandemic.

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About the Authors

Tim R. Sass is a Distinguished University Professor in the department of economics at Georgia State University and the W.J. Usery Chair of the American Workplace in the Andrew Young School of Policy Studies. He is also the faculty director of the Metro Atlanta Policy Lab for Education (MAPLE). His research interests include the teacher labor supply, the measurement of teacher quality, and school choice.

Thomas Goldring is the director of research at the Georgia Policy Labs. He supports the faculty directors in managing research projects and providing analytical and technical support across GPL's three components. He has researched issues in K-12 education, including educational accountability, school finance, and graduation rates; early childhood education; career and technical education; post-secondary education; and education and mortality.

About the Georgia Policy Labs

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. We are a passionate team of faculty, staff, and students committed to showing what policies and programs work, which do not, and sharing evidence-based recommendations for better outcomes. Housed in the Andrew Young School of Policy Studies at Georgia State University, we have three components: the Metro Atlanta Policy Lab for Education (metro-Atlanta K-12 public education), the Child & Family Policy Lab (supporting children, families, and students through a cross-agency approach), and the Career & Technical Education Policy Exchange (a multi-state consortium exploring high-school based career and technical education). Learn more at gpl.gsu.edu.