

ACADIENCE LEARNING INC.

The Impact of COVID-19 on Student Reading Development

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Among the many actions aimed at ameliorating the COVID-19 pandemic, one of the most widespread was the closure of schools across the United States. Ubiquitous school closures at this scale present many unknowns. Top among these unknowns are the effects that the disruption of learning, followed by the adoption of remote learning for many students, has had on the reading skills of the young learners. Research into the effects that school disruptions have had on student reading skills is forthcoming and necessary to inform instructional and policy decisions about school closures and remote learning.

To examine the impact of the pandemic, we compared the beginning-of-year scores in the current school year (2020-2021) to the previous year (2019-2020). This comparison allows us to directly estimate the difference in reading skills that the typical student experienced in the beginning of 2020 compared to the beginning of 2019. However, it is possible that students who were tested the beginning of this year were not a random sampling of students from across the country and differed in some way from those students who were not tested. To account for these potential differences, we included as an additional predictor the students' previous middle-of-year scores (since few students had data from the end of the 2019-2020 school year). Doing so allowed us to estimate the difference between the beginning of 2020 and beginning of 2019, controlling for previous performance. We were also able to get a sense of whether the impact of the pandemic was particularly large for students who were initially higher or lower performing by looking at how the effect of year changed at higher and lower scores. For instance, the Grade 2 beginning-of-year scores were predicted with the following five terms: (a) Grade 1 middle-of-year Reading Composite Score (RCS), (b) a curvilinear effect of the RCS, (c) a variable representing whether the student was tested in the beginning of 2019-2020 or beginning of 2020-2021 (i.e., year), (d) an interaction between the RCS and year, and (e) an interaction between year and the curvilinear term of the RCS.

Beginning-of-year Acadience Reading Composite Scores were analyzed from Grades 1 through 6. Because we also used previous Acadience Reading scores as a predictor, we did not analyze the RCS from the beginning of kindergarten. Additionally, this means that only students who had Acadience Reading data from at least two school years in the Acadience Data Management system were included in the analysis. Table 1 shows the sample sizes for each grade separated by the school year in which the fall assessment was given. For example, 153,503 students had complete kindergarten middle-of-year data in 2018-2019 and Grade 1 beginning-of-year data in 2019-2020.

Table 1

Sample Sizes by Grade and Year

Grade	2019-2020	2020-2021	Total
First	153,503	108,407	261,910
Second	107,172	94,981	202,153
Third	95,170	78,885	174,055
Fourth	74,022	67,372	141,394
Fifth	62,819	58,267	121,086
Sixth	28,802	26,416	55,218

Table 2 shows the results of our analyses. For all six grades that were examined, there was a statistically significant effect of year of assessment on beginning-of-year RCS, indicating lower overall reading performance during the beginning of 2020-2021. Furthermore, in Grades 1 and 2 the difference between the 2019-2020 and 2020-2021 school years was not uniform, but differed based on previous levels of performance.

Table 2

Results of Predicting Beginning-of-Year Scores from Previous Performance and Year

Term	First	Second	Third	Fourth	Fifth	Sixth
MOY RCS	.54***	1.29***	.95***	.99***	.90***	1.15***
MOY RCS ²	.0029***	-.0013***	.0018***	-.0014***	.00044***	-.0039***
Year	-24.34***	-17.45***	-17.94***	-12.31***	-9.01***	-2.25***
Year*MOY RCS	.032***	-.046***	-.00042	-.028*	.016*	.036
Year*MOY RCS ²	-.0013***	.0018***	-.000029	.000034	-.000029	-.00043
R ²	.584	.774	.766	.803	.814	.800

* $p < .05$. *** $p < .001$. RCS = Reading Composite Score.

To help facilitate the interpretation of the results displayed in Table 2, we plotted the regression curves separated by year of assessment. The graph shown in Figure 1A plots the Grade 1 beginning-of-year RCS as a function of the kindergarten middle-of-year RCS and year of assessment. A larger gap between the curves indicates a larger gap between performance in the beginning of 2020 when compared to the beginning of 2019, and thus a larger effect of the pandemic on reading skills. The Grade 1 comparison is shown below in Figure 1A. The -24.34 value circled in Table 2 indicates that the average student scored over 24 points lower in the beginning of the 2020-2021 school year than the average student in the beginning of the 2019-2020 school year. The interaction terms (the terms labelled “Year*MOY RCS” and “Year*MOY RCS²”) indicate that the effect of year is not uniform across different performance levels, with the largest differences across year being at the high and low ends of the performance spectrum and a somewhat smaller difference in the middle.

When considering the pandemic’s impact on the likelihood of meeting later benchmarks, the percent of students in each category predicted by middle of kindergarten benchmark status is illustrated in Figure 1B. Students entering first grade in 2020 were less likely to meet the RCS benchmark. Among students who were At or Above Benchmark at the middle of kindergarten in 2018-2019, 80.4% were also At or Above Benchmark at the beginning of Grade 1. For kindergarten students in 2019-2020, this percentage dropped to just 57.4% of students At or Above Benchmark at the beginning of Grade 1. This represents a drop of 23% in students meeting later reading goals from kindergarten to first grade. Furthermore, a mere 7.6% of students who were At or Above Benchmark at the middle of kindergarten in 2018-2019 were Well Below Benchmark at the beginning of 2019-2020. This percentage increases to 24.7% for first graders at the beginning of 2020-2021.

Figure 1A

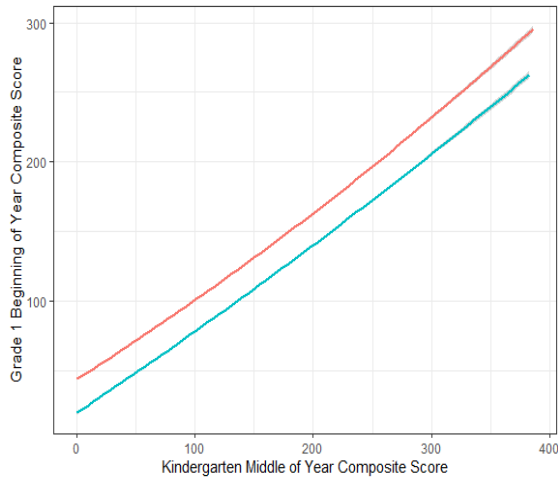


Figure 1B

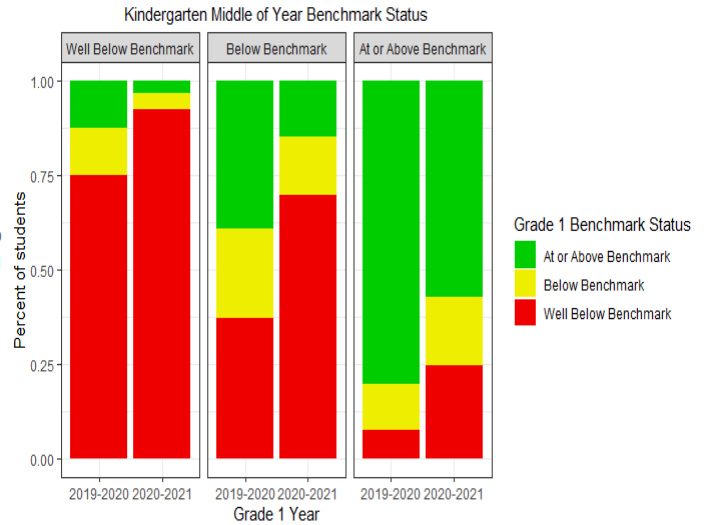


Figure 2A shows the relationship between Grade 1 middle-of-year scores and Grade 2 beginning-of-year scores and year of assessment. The average student in the beginning of 2020 scored about 17 points lower than the average student in the beginning of 2019. However, the interaction between year of assessment and previous performance suggests that the pandemic had an especially large impact on lower- and middle-performing students, with students who were already higher performing showing less of a year effect. Figure 2B shows these results for benchmark status. For students who were At or Above Benchmark at the middle of first grade in 2018-2019, 94.4% were still At or Above Benchmark at the beginning of second grade. This percentage drops to 88.9% for second-grade students in the 2020-2021 school year. The largest difference was observed for students who were Below Benchmark at the middle of Grade 1. At the beginning of Grade 2, 57.1% of these students met the benchmark in 2019-2020, but only 39.5% met the benchmark in 2020-2021.

Figure 2A

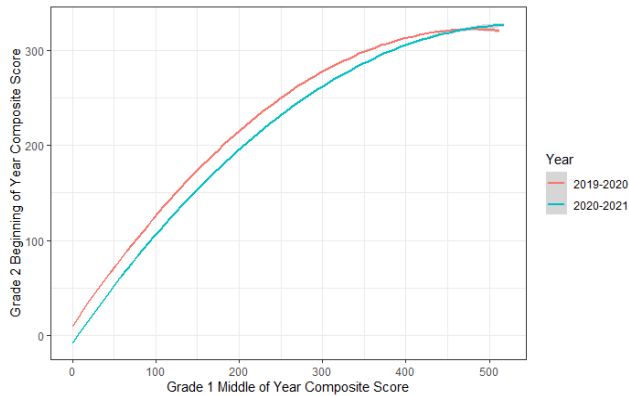


Figure 2B

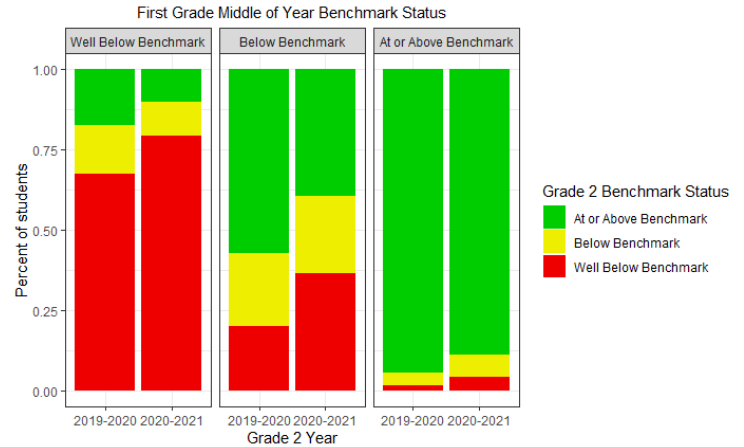


Figure 3A shows the Grade 3 beginning-of-year RCS predicted by Grade 2 middle-of-year RCS and year of assessment. The average third-grade student at the beginning of 2020-2021 scored almost 18 points lower than third graders in the previous year. Additionally, this gap in performance was similar across different levels of previous-year performance. With regard to benchmark status (see Figure 3B), the biggest drop was for students who were Below Benchmark at the middle of second grade, where 39.2% of students were At or Above Benchmark at the beginning of third grade for the 2019-2020 school year. However, only 27.1% of students who were Below Benchmark at the middle of second grade met the benchmark at the beginning of third grade in 2020-2021.

Figure 3A

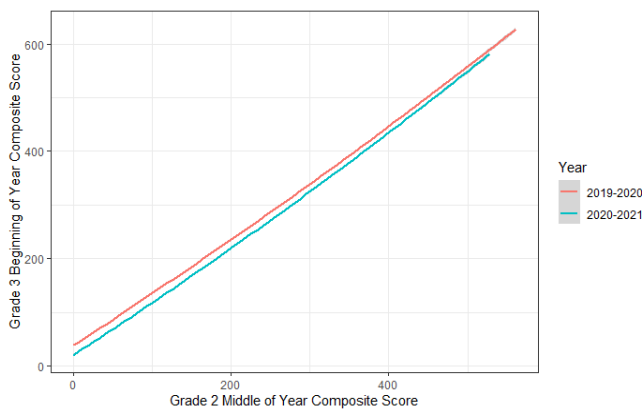


Figure 3B

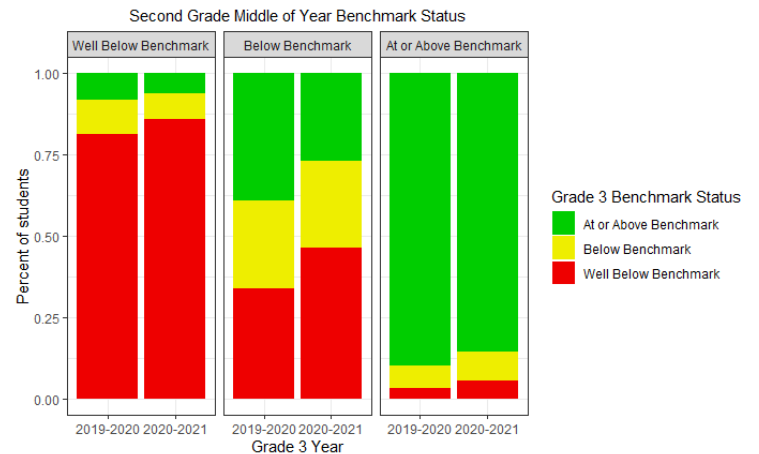


Figure 4A shows the prediction of the beginning-of-year RCS for students in fourth grade by third-grade middle-of-year RCS and year of assessment. The average student during the 2020-2021 school year scored about 12 points lower than similar students at the beginning of 2019-

2020. Additionally, this difference becomes slightly larger at higher performance levels. While not entirely uniform, the difference across years is largely similar across pre-existing performance levels. Figure 4B shows that the percentage of student who were At or Above Benchmark at the middle of Grade 3 and beginning of Grade 4 dropped from 88.6% to 83.1%. However, a bigger drop was with students who were Below Benchmark at the middle of Grade 3. At the beginning of Grade 4 in 2019-2020, 36.1 percent of these students met the benchmark. Only 26.2% of these students met the benchmark at the beginning of Grade 4 in 2020-2021.

Figure 4A

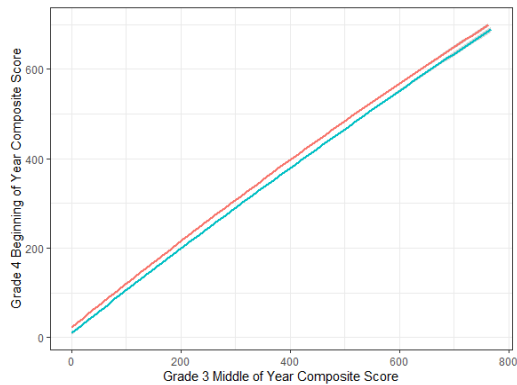


Figure 4B

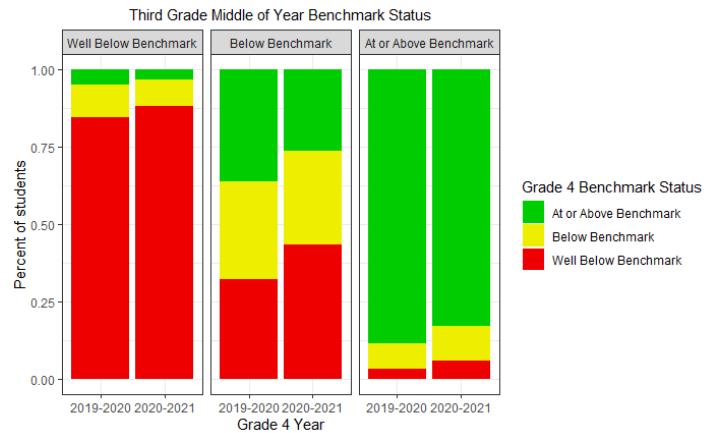


Figure 5A shows the prediction of the Grade 5 beginning-of-year RCS from previous Grade 4 performance and year of assessment. The average fifth grader at the beginning of the year in 2020-2021 scored about 9 points lower than the average fifth grader at the beginning of 2019-2020. Although there was a tendency for this effect to increase at higher performance levels, the increase was small. Observable changes were also noted in the percentage of students meeting later benchmarks, shown in Figure 5B. The percentage of students who were At or Above Benchmark at both the middle of Grade 4 and the beginning of Grade 5 dropped from 82.3% to 75.5% across the 2019-2020 and 2020-2021 school years. The percentage of students who were Below Benchmark at the middle of Grade 4 and met the benchmark at the beginning of Grade 5 dropped from 25.1% to a mere 16.4% from the 2019-2020 to 2020-2021 school years.

Figure 5A

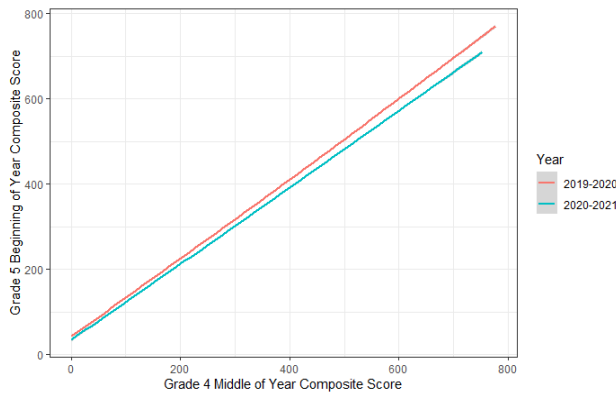
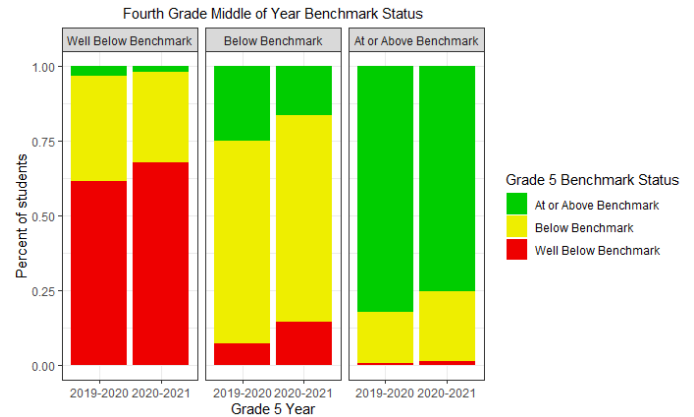


Figure 5B



Finally, Figure 6A shows the prediction of Grade 6 beginning-of-year RCS from the Grade 5 middle-of-year RCS and year of assessment. Sixth grade showed by far the smallest gap in performance across years of assessment. The average student scored about 2 points lower at the start of 2020-2021. Furthermore, this effect was not any larger for lower- or higher-performing students. While still statistically significant, scores at the beginning of sixth grade showed the smallest difference between years. This suggests that the pandemic had the most profound impact on the reading skills of younger students and that the impact was smaller at later grades. As shown in Figure 6B, the largest drop in students meeting the benchmarks from Grade 5 to 6 was observed for students who were Below Benchmark at the middle of Grade 5. At the beginning of Grade 6 in 2019-2020, 78.8% of these students were At or Above Benchmark. Only 67.6% of these students met the benchmark at the beginning of Grade 6 in 2020-2021.

Figure 6A

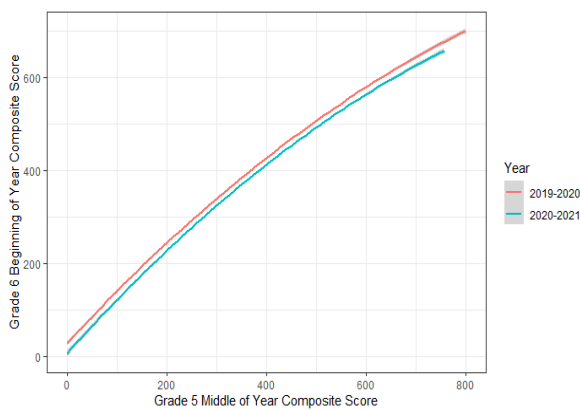
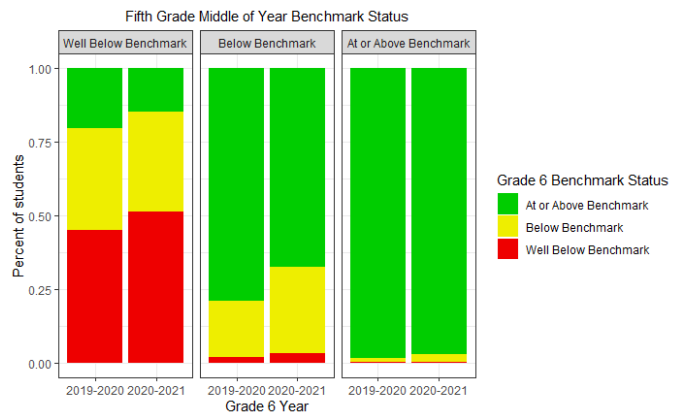


Figure 6B



Overall, our analyses found that students performed significantly lower on reading measures in the beginning of 2020 compared to the beginning of 2019. We found that this drop in performance is not merely an issue of schools disproportionately testing those students with higher or lower reading skills. The impact of the pandemic appears to be largest in earlier grades and smaller at higher grades. These findings suggests that the largest impact was on foundational early literacy skills assessed in earlier grades. The impact of the pandemic was also observed in the percentage of students meeting later reading benchmarks. At every grade level, students assessed in 2020-2021 were less likely to be At or Above Benchmark and more likely to be Below or Well Below Benchmark compared to students assessed in 2019-2020.

It is possible that by the time students reached later grades, their level of skill allowed them to further advance their reading skills through independent reading (i.e., reading to learn rather than learning to read). Once students reach later grades, many are reading for their own enjoyment, so a dramatic change in their schooling may have had less of an impact on their overall reading performance. Another way to think of this declining impact on reading skills is to frame it as the percentage of schooling disrupted. For students who were in first grade in 2020-2021, the lack of in-person instruction during the spring of 2019-2020 may represent as much as a quarter to a third of their overall schooling for that year. Alternatively, students entering sixth grade in 2020-2021 had an impact representing about 10% of their overall instruction undergo this disruption.

What remains unknown is the lasting impact on reading skills that will be experienced by these students. We don't know whether the observed drop in overall reading performance will have a lasting effect that will manifest itself for years or if the eventual resumption of in-person instruction will allow these students to “snap-back” and catch up to typical levels of performance. The answer to this question likely will not be clear for some time, but what is apparent is that the COVID-19 pandemic has had a substantially negative impact on student reading scores, particularly among younger students.