CENTER FOR SCHOOL AND STUDENT PROGRESS

BRIEF

Learning during COVID-19: An update on student achievement and growth at the start of the 2021-22 school year

DECEMBER 2021

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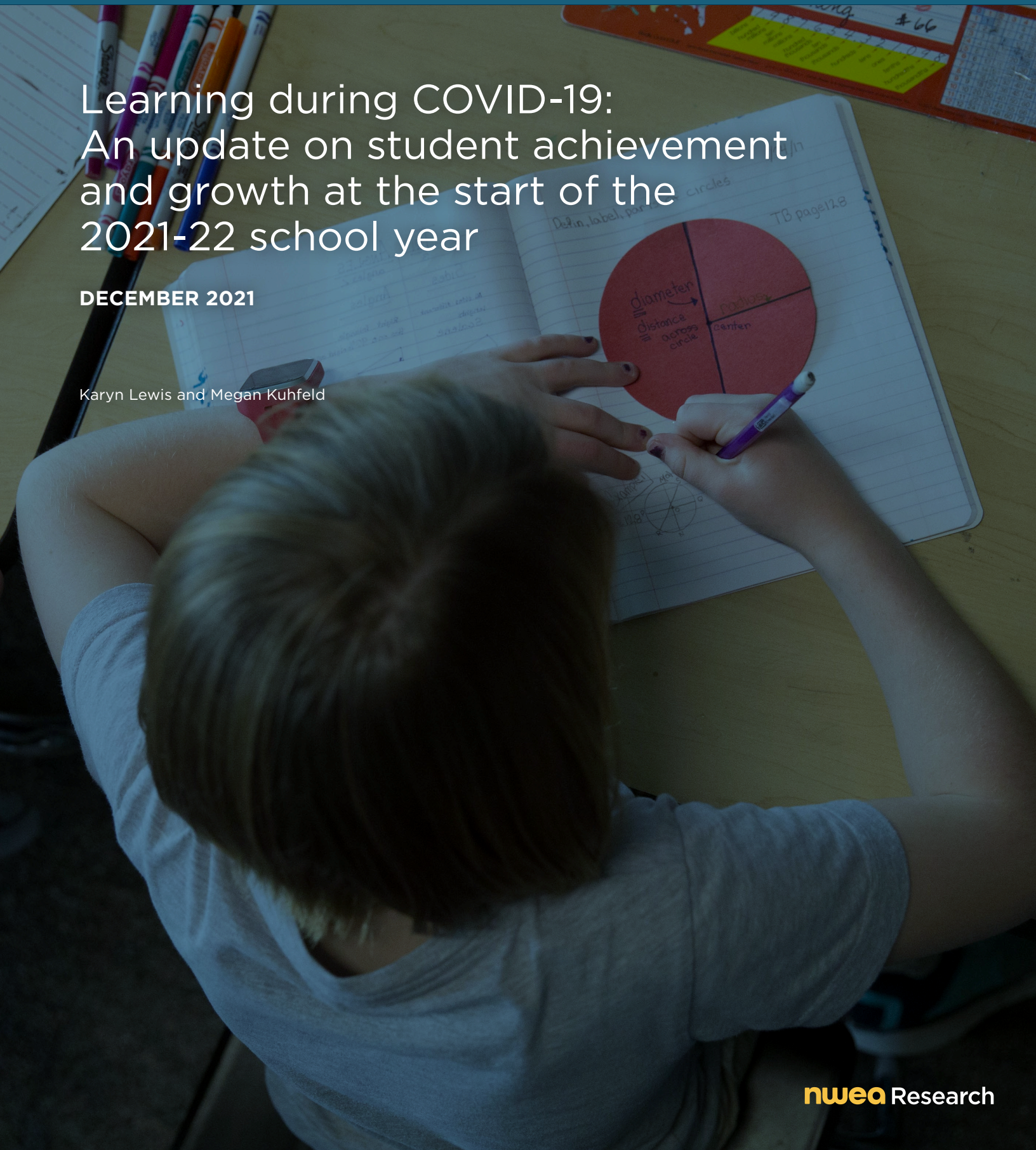

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KEY FINDINGS

- **Student achievement at the start of the 2021-22 school year was lower compared to a typical year, with larger relative declines in math (9 to 11 percentile points) than reading (3 to 7 percentile points).**
- **Achievement was lower for all student groups in fall 2021; however, historically marginalized students and students in high-poverty schools were disproportionately impacted, particularly in the elementary grades we studied.**
- **Student gains across the pandemic (from fall 2019 to fall 2021) lagged norms for pre-pandemic growth, especially in math.**
- **Normative growth trends across the pandemic varied by pre-pandemic achievement status: higher achievers made gains that were more consistent with projected normative growth, whereas lower-achieving students were more likely to fall short of growth projections.**

This brief is a continuation of NWEA's ongoing research agenda focused on understanding how the COVID-19 pandemic has affected student reading and math outcomes.[1] Here, we build on our previous findings[i,ii,iii] to examine students' academic progress at the start of the third school year impacted by the pandemic. The goal of this brief is to summarize student achievement and growth trends at the start of the 2021-22 school year so that educators and policymakers are equipped with the evidence necessary to guide decisions and make adjustments where needed as part of COVID-19 recovery efforts.

Using data from over 6 million students in grades 3-8 who took MAP® Growth™ assessments in reading and math, we examined achievement in fall 2021 relative to fall 2019 (the most recent fall that was unaffected by COVID-19). To gauge unfinished learning across the nation, we used a combination of cross-sectional analyses (comparing students in fall 2021 to same-grade peers in fall 2019) to understand how current achievement compares to typical pre-pandemic achievement and longitudinal analyses (tracking students over time and measuring their progress across the two years) to understand how growth during the pandemic compares to typical pre-pandemic growth.[2]

Fall 2021 math and reading achievement levels continue to lag historical averages, with larger declines in math

To understand how achievement at the start of the 2021-22 school year compares to a typical year, we calculated the median percentile rank (based on NWEA 2020 MAP Growth norms[v]) of students in fall 2021 and fall 2019 as well as the difference in median percentile rank between these two groups. As shown in Figure 1, we observed declines in fall 2021 achievement relative to fall 2019 ranging in magnitude from 3 to 7 percentile points in reading and 9 to 11 percentile points in math. These declines are larger than the declines observed in fall 2020 (when reading scores were approximately equivalent to a typical year and math scores were 5 to 10 percentile points lower) but are roughly consistent with those we observed in spring 2021.[3]

Historically marginalized students and students in high-poverty schools continue to be most impacted, particularly in math and in the elementary grades

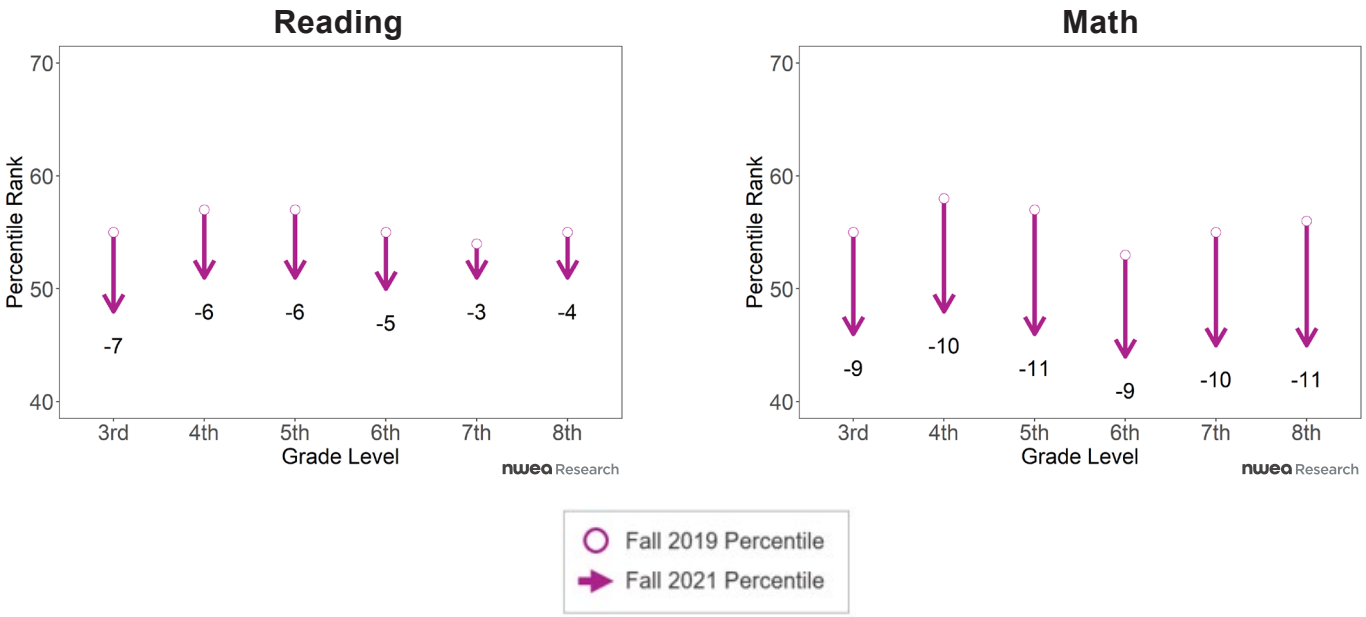
Figure 2 shows differences in percentile rank between fall 2021 and fall 2019 disaggregated by student grade and

1 We use words such as "impact" and "affected" for simplicity, not to suggest causality. Our goal is not to identify the myriad factors that explain how the pandemic impacted achievement, but rather to document current achievement patterns relative to pre-pandemic trends.

2 To reduce the degree to which changes in the NWEA partner base may affect observed results, we restricted our sample of schools to a consistent set of US public schools that tested at least 10 students in a given grade in both fall 2019 and fall 2021. See the accompanying technical appendix[iv] for more details.

3 Our published reports use the shifting samples of schools and students who take MAP Growth over time (depending on the number of schools and students testing across terms). Therefore, previous reports reflect slightly different testing populations and comparisons across reports should be made with some caution.

Figure 1. MAP Growth percentile rank differences between same-grade students in fall 2019 (circles) and students in fall 2021 (arrows) in reading (left panel) and math (right panel)



Note. The circles represent the median percentile rank for the pre-pandemic (fall 2019) cohort; the arrow tip represents the median percentile rank for the fall 2021 cohort; and the value outside the arrow indicates the change in median percentile rank between fall 2019 and fall 2021.

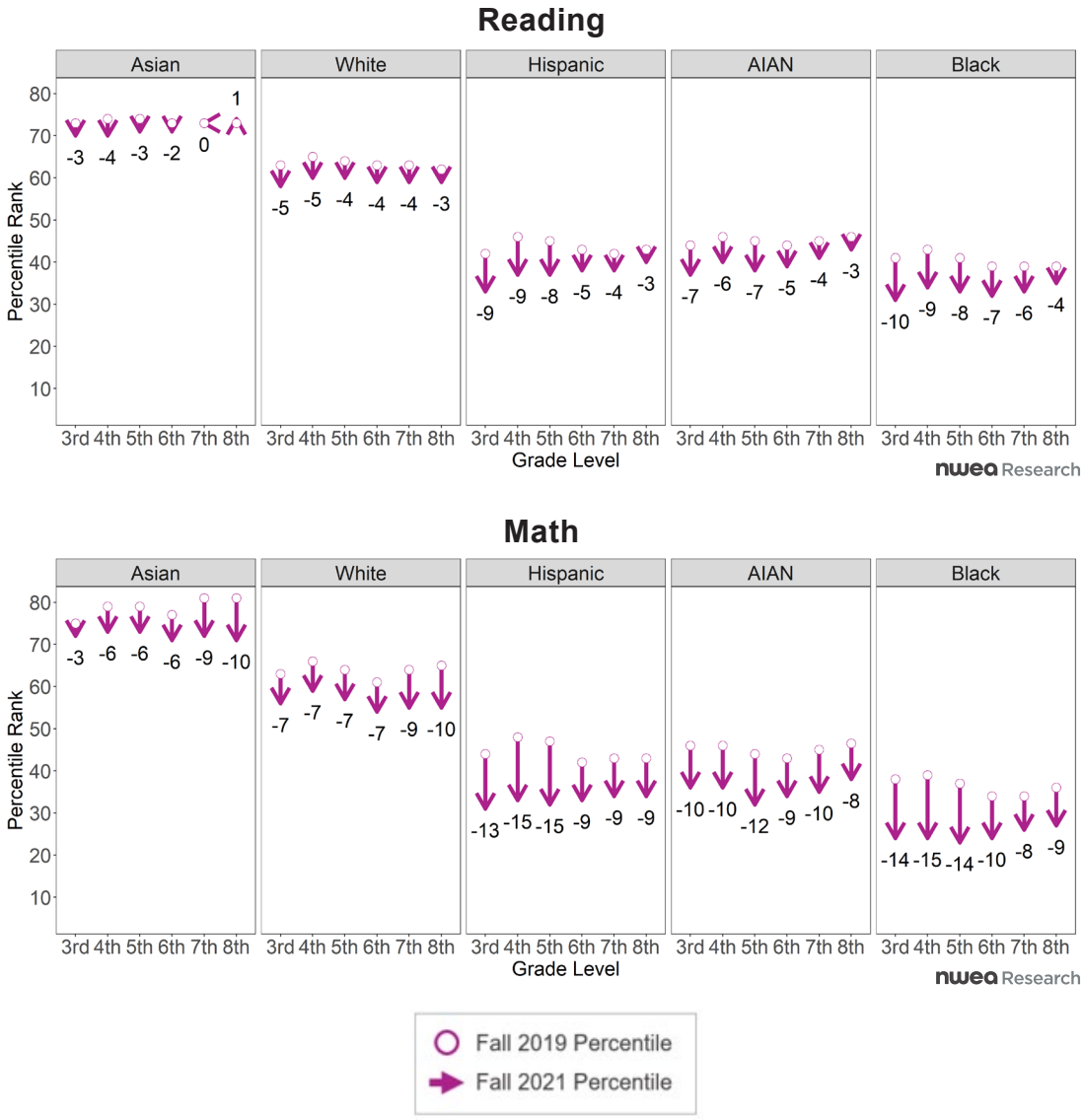
race/ethnicity. This allows us, for example, to situate reading achievement for Black third-graders in fall 2021 (where median achievement is at the 31st percentile) relative to the reading achievement of Black third-graders in fall 2019 (where median achievement was at the 41st percentile) and calculate the difference between the two groups (in this case, a relative decline of 10 percentile points).

Figure 2 shows that median achievement declined for nearly all groups in reading and math, although the relative declines are larger in math. However, the pattern of these differences is uneven across student groups. Specifically, Asian American and white students showed declines of a smaller magnitude relative to Hispanic, American Indian and Alaska Native (AIAN), and Black students. Consistent with our findings in the spring of 2021,[i] we observed differences across race/ethnicity groups that are more pronounced for younger students, with the largest relative declines concentrated in the elementary grades.

Figure 3 shows percentile rank changes by school poverty level.[4] Here we saw that students in more economically disadvantaged schools were the most impacted by the pandemic. This unequal impact is particularly evident in the elementary grades, where we saw declines for students in high-poverty schools that are notably larger than the declines for same-grade students in low-poverty schools.

4 School poverty data comes from the 2019-20 Common Core of Data files released by the National Center for Education Statistics.[vi] We present data for schools defined as low poverty (less than 25% of students receiving free- and reduced-price lunch) and high poverty (more than 75% of students receiving free- and reduced-price lunch).

Figure 2. MAP Growth percentile rank change by race/ethnicity in reading (top panel) and math (bottom panel)



Note. The circles represent the median percentile rank for the pre-pandemic (fall 2019) cohort; the arrow tip represents the median percentile rank for the fall 2021 cohort; and the value outside the arrow indicates the change in median percentile rank between fall 2019 and fall 2021.

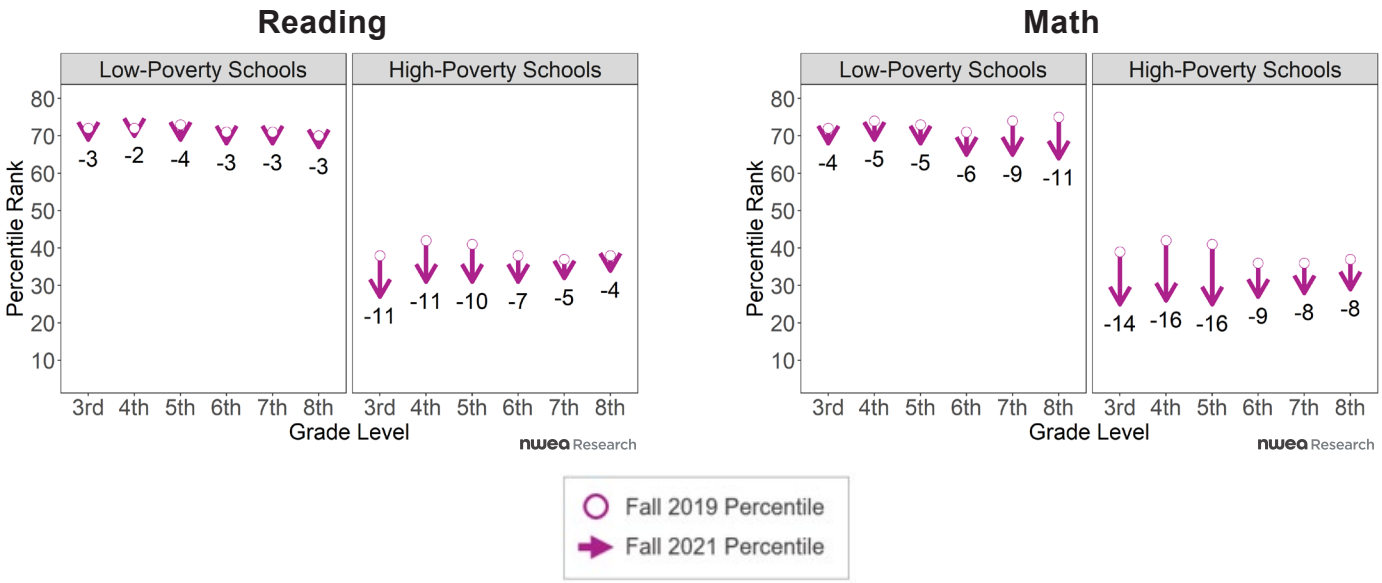
Student gains between fall 2019 and fall 2021 were lower relative to typical growth patterns, particularly in math

Situating test score gains from fall 2019 to fall 2021 relative to pre-pandemic norms for typical skip-year growth offers additional insight into how students have progressed during the COVID-19 pandemic.[5] Figure 4 plots median skip-year conditional growth percentiles (CGPs) for reading and math gains between fall 2019 and fall 2021. The skip-year CGPs compare an individual student's observed two-year growth to projected growth calculated based on a pre-pandemic sample of students who had the same starting achievement, where a CGP of 50 indicates that student growth was consistent with pre-pandemic projections.[6] We observed that skip-year growth in both subjects fell below pre-pandemic national averages (represented by the dashed line at the 50th percentile), and math gains lagged further

5 The same methodology and reference sample used to calculate NWEA single-year growth norms[v] was extended to calculated norms for "skip-year" growth.[vii] Skip-year growth norms track a nationally representative sample of students across two years to understand typical student progress spanning three grade levels (for instance, from the fall of third grade to the fall of fifth grade).

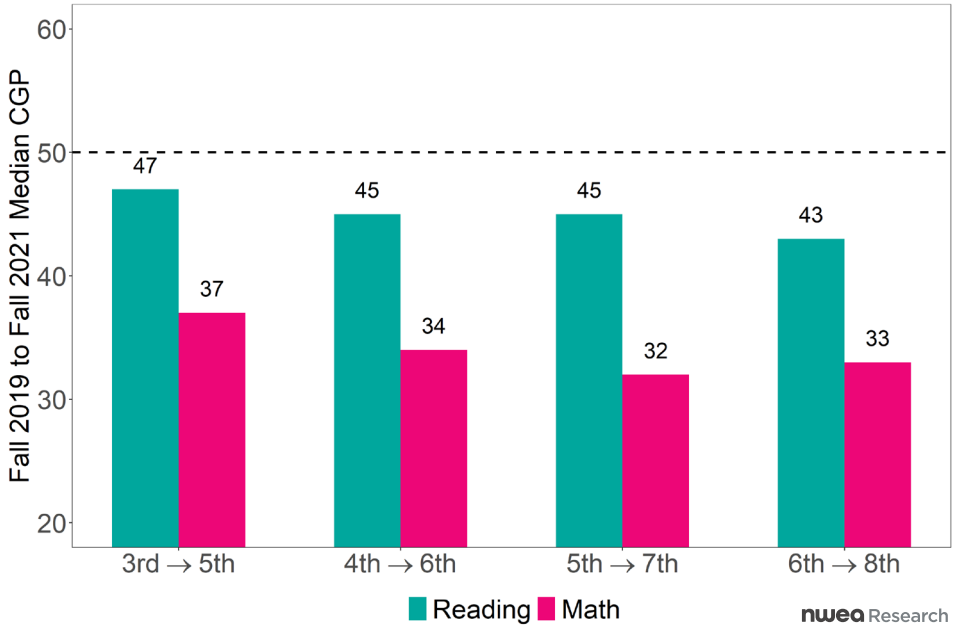
6 Growth projections account for instructional time between test events. They are also calculated separately by grade level and assume students follow a typical grade progression (e.g. third to fifth grade between fall 2019 and fall 2021).

Figure 3. MAP Growth percentile rank change by school poverty level in reading (left panel) and math (right panel)



Note. The circles represent the median percentile rank for the pre-pandemic (fall 2019) cohort; the arrow tip represents the median percentile rank for the fall 2021 cohort; and the value outside the arrow indicates the change in median percentile rank between fall 2019 and fall 2021.

Figure 4. MAP Growth skip-year conditional growth percentiles by grade and subject



Note. The dashed line at the 50th percentile denotes the national pre-pandemic average for skip-year fall-to-fall growth.

behind compared to reading gains. For instance, for the sample of students we followed across the pandemic period, we observed median skip-year growth at the 37th CGP in math for students moving from third grade to fifth grade, which is 13 percentile points below the pre-pandemic average for growth across this grade span. Reading gains across this same grade span were at the 47th percentile, which falls only 3 percentile points below the pre-pandemic average.

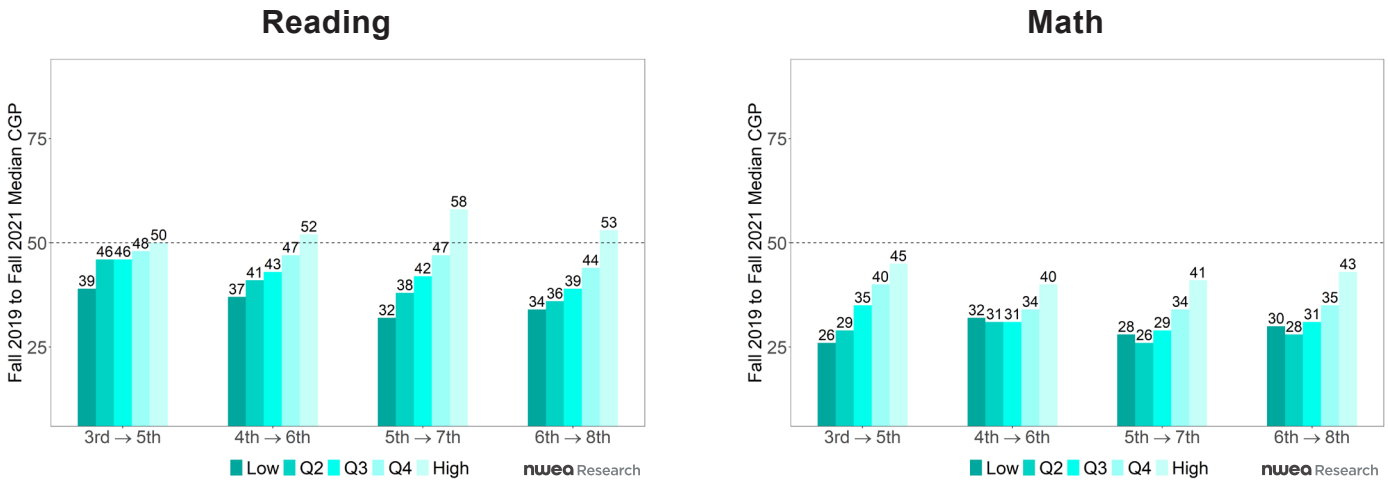
Students with lower pre-pandemic achievement showed lower normative gains than high achievers

An additional way to understand which students have been most impacted by the pandemic is to consider if there are differences in student growth patterns across the pandemic span based on students' pre-pandemic achievement level. To address this, we grouped students' fall 2019 achievement percentiles into quintile bins (1st-20th percentile, 21st-40th percentile, etc.) based on NWEA 2020 MAP Growth norms[v] and then calculated median skip-year CGPs across these quintile bins.

As Figure 5 shows, there is a clear stair-step pattern between quintile bins, indicating that lower-achieving students were further below their projected growth trajectories compared to higher-achieving peers. For instance, in reading, students in the highest fall 2019 achievement quintile (81st to 99th percentile) made gains across the pandemic that were at or above national pre-pandemic averages (i.e., between the 50th and 58th median CGP depending on grade). In contrast, students in the lowest fall 2019 achievement quintile (1st to 20th percentile) made skip-year gains that were between the 32nd and 39th CGP (depending on grade). Growth at approximately the 50th percentile is necessary for students to maintain their achievement status over time; thus, we can expect that high achievers in reading were more likely to maintain their high-achieving status over the past two years, whereas lower achievers were more likely to show declines in reading achievement from fall 2019 to fall 2021, resulting in widening gaps between high- and low-achieving students.

In contrast to reading, median math CGPs lagged well behind pre-pandemic norms all across the achievement spectrum. While the implications of below-average CGPS are more significant for lower- versus higher-achieving students, these findings point to a collective step backwards for all students in terms of math growth and highlight the urgent need to support students' math development.

Figure 5. MAP Growth skip-year conditional growth percentiles by fall 2019 achievement quintile in reading (left panel) and math (right panel)



Note. The bars reflect median skip-year CGPs which are calculated by comparing a student's growth to the growth of pre-pandemic academic peers (e.g., students prior to the pandemic in the same grade with similar prior test scores), allowing for meaningful differentiation of performance for students across the full distribution. The dashed line at the 50th percentile indicates the level of skip-year growth that is equivalent to pre-pandemic averages. The shading of the bars indicates fall 2019 achievement quintile (i.e., low = 1st to 20th percentile, Q2 = 21st to 40th percentile, Q3 = 41st to 60th percentile, Q4 = 61st to 80th percentile, high = 81st to 99th percentile) based on MAP Growth 2020 norms.

Who is missing from our data?

One caveat to consider with these fall 2021 data is whether or not they are reflective of all the students we serve. In our prior COVID-19 reports, we noted systematic patterns of missingness in our data showing that the demographic makeup of assessments collected in the 2020-21 school year was different from that of prior years because of higher rates of attrition for some student groups (see our attrition analysis brief[viii] and the July 2021 technical appendix[ix]). To examine this in our current fall 2021 data, we calculated attrition rates to measure the percentage of students who tested in fall 2019 but did *not* test in fall 2021. We found that the overall two-year attrition rate in fall 2021 was about 35% (that is, roughly 35% of students who tested in fall 2019 were missing from this fall's assessment data) which is higher than normal (the overall attrition rate between fall 2017 and fall 2019 was 25%). Additionally, attrition rates in fall 2021 were consistently higher among students of color compared to white students, though this pattern was observed prior to the pandemic as well. However, unlike in previous years, attrition rates did not appear to vary based on students' prior achievement. The higher rates of attrition this year may mean that we have not fully captured the true patterns of academic achievement and gains between fall 2019 and fall 2021, though it is less clear whether our results are under or overestimates. We present a more detailed look at the missing data patterns in our technical appendix.[iv]

Summary

At the start of the 2021-22 school year, we continue to see that students' math and reading achievement lags typical levels. Last year (2020-21), we reported that students began the year with reading achievement roughly comparable to a typical year, but that math achievement was between 5 to 10 percentile points lower, with students in earlier grades experiencing larger declines.[ii] By the end of the 2020-21 school year, we found that students' reading achievement also showed evidence of declines (between 3 to 6 percentile points) and math declines had widened (between 8 to 12 percentile points) relative to pre-pandemic levels.[i] As we have shown in this update, we continue to observe relative declines in reading and math achievement at the start of the 2021-22 school year. However, the magnitude of these declines (3 to 7 percentile points in reading and 9 to 11 percentile points in math) is roughly consistent with those we observed in the spring of 2021. In other words, we find continued evidence of significant unfinished learning, but the gaps between current and pre-pandemic achievement appear to have stabilized and have not widened since spring.

In addition to comparing student achievement this fall to historical trends, we also used longitudinal analyses to gauge how growth in reading and math during the last two years of the pandemic compares to the level of growth we might expect under more typical circumstances. We find that reading gains between fall 2019 and fall 2021 neared pre-pandemic growth rates; however, math gains were well below average. This finding suggests that school-related disruptions continue to have a more significant impact on students' acquisition of math skills/content compared to reading and highlights the need for continued focus on supporting the development of math skills.

We continue to find uneven impacts of the pandemic across student groups. The largest achievement declines were observed for Hispanic, AIAN, and Black students, and for students attending high-poverty schools. These declines are of greater magnitude in math than reading and for younger students. We also find uneven impacts for students depending on their achievement prior to the onset of the pandemic: lower achievers showed lower normative growth between fall 2019 and fall 2021 compared to higher achievers in reading and math. All together, these findings offer further evidence highlighting the inequitable nature of unfinished learning across the pandemic and shine light on the groups and subject areas that should be targeted for additional supports as COVID recovery efforts continue in the 2021-22 school year and beyond.

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Details on the methodology behind these analyses can be found in:

Kuhfeld, M., & Lewis, K. (2021). Technical appendix for: Learning during COVID-19: An update on student achievement and growth at the start of the 2021-22 school year. NWEA.

Suggested citation:

Lewis, K., & Kuhfeld, M. (2021). Learning during COVID-19: An update on student achievement and growth at the start of the 2021-22 school year. NWEA.

ABOUT THE AUTHORS

Dr. Karyn Lewis is a senior research scientist for the Center for School and Student Progress at NWEA. Her research interests focus on the interplay between students' academic achievement and growth, their social-emotional development and well-being, and how they experience their school's climate. Prior to joining NWEA, she was a senior researcher at Education Northwest/REL Northwest where she led a diverse portfolio of applied research, technical assistance, and evaluation projects centered around social-emotional learning. Dr. Lewis is a former Data Fellow with the Strategic Data Project at the Harvard Center for Education Policy Research. She completed a National Science Foundation funded postdoctoral fellowship at the University of Colorado Boulder and earned a PhD from the University of Oregon in social psychology.

Dr. Megan Kuhfeld is a senior research scientist for the Collaborative for Student Growth at NWEA. Her research seeks to understand students' trajectories of academic and social-emotional learning (SEL) and the school and neighborhood influences that promote optimal growth. Dr. Kuhfeld completed a doctorate in quantitative methods in education and a master's degree in statistics from the University of California, Los Angeles (UCLA).

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For more than 40 years, NWEA® has been a pioneer in educational research and assessment methodology with a focus on improving learning outcomes for every student. NWEA continues this discovery through dedicated research that explores foundational issues in education, practical challenges in today's schools, and the evolving role of technology in the lives of students. As a mission-based not-for-profit educational research organization, NWEA's research agenda reflects our commitment to attacking big challenges in education and measurement and empowering education stakeholders with actionable insights.

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