

Examining the Continued Impact of the Pandemic on Student Achievement in GVSU Charter Schools

Kiel McQueen, PhD

December 2021

Using NWEA MAP data across K-12 schools authorized by Grand Valley State University (GVSU), this report examines student learning amid the COVID-19 pandemic.

Key findings include:

- Students made achievement gains in math and reading in 2021 but at a lower rate as compared to prior years.
- Students' achievement in spring 2021 was lower compared to the pre-pandemic period, with larger declines in math as compared to reading.
- About two in five students who tested in the fall were missing from the spring assessment.

Recommendations include:

- Address barriers to access and opportunity for students from historically marginalized communities
- Prioritize early grade students' access to math and reading interventions

Introduction

In March 2021, Basis Policy Research (Basis) released a [report](#) examining the impact of COVID-19 pandemic-related school closures on student achievement in Grand Valley State University (GVSU) charter schools. Findings revealed adverse effects from the pandemic were concentrated in math; achievement in fall 2020 was between 2 to 12 percentile points lower than the previous fall, with differences in math achievement greater in grades three through five. Basis researchers also found that students made gains in both math and reading; however, math growth was lower since the onset of the pandemic as compared to a typical year.

This report continues the ongoing GVSU research agenda examining the impact of the pandemic on student achievement in GVSU charter schools. Here, Basis researchers examines math and reading one full academic year since the onset of the pandemic. In this report, we analyze trends in math and reading achievement in 2020-21 and examine how achievement amid the pandemic compares to prior years. We also explore how overall achievement differs across student groups (i.e., race/ethnicity, grade-level) where possible. Findings from this report intend to provide GVSU, district, and school leaders with insights to support teaching and learning.

Research Questions

This report examines the following research questions:

1. How did GVSU students perform in the past year relative to a typical school year?
2. How does student achievement in spring 2021 compare to prior years?
3. Do students with missing assessment data differ academically from students with non-missing assessment data?

1 | How did GVSU students perform in the past year relative to a typical school year?

Basis researchers examined how students' math and reading growth in grades three through eight in 2020-21 (henceforth titled 2021) compares to students in the same grade in prior years. This approach assumes prior years (i.e., 2018-19) represent a more "typical" year as compared to 2021. Basis researchers calculated mean RIT scores to assess student growth between fall and spring terms in 2018-19 (henceforth titled 2019) and 2021. We restricted the sample to (a) students with complete assessment data¹ (fall 2018/spring 2019 or fall 2020/spring 2021) and (b) students enrolled in GVSU schools who administered the NWEA assessment each term.² The sample includes 7,863 students across 27 GVSU schools from 2019 to 2021. Student demographics by grade are comparable year over year (See Appendix B).

Students made achievement gains in math and reading in 2021 but at a lower rate as compared to prior years.

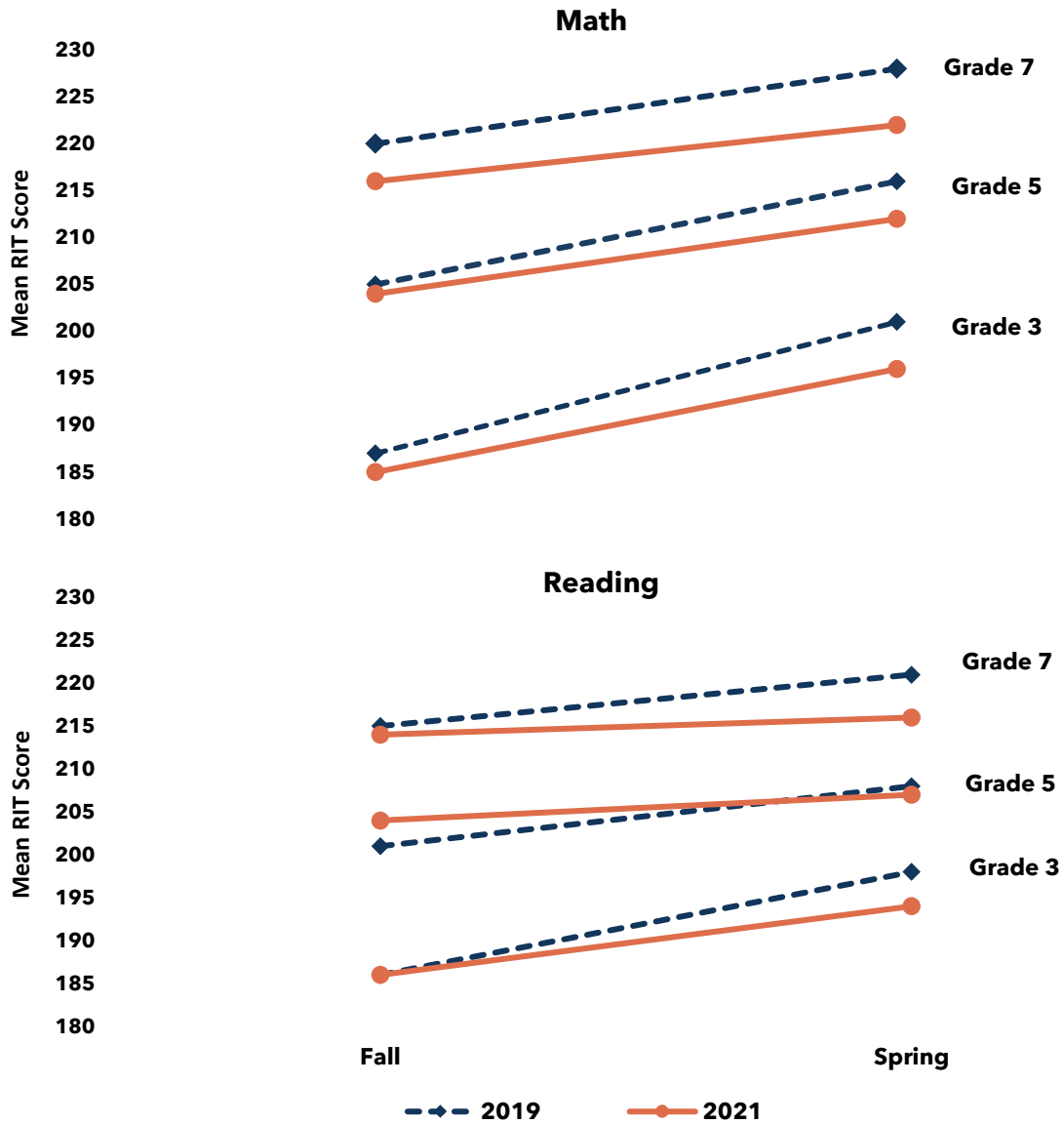
Figure 1 displays mean math and reading RIT scores for select grades (i.e., three, five, seven) and test periods (i.e., fall and spring) in 2019 (dashed lines) and 2021 (solid lines). Results indicate students, on average, demonstrated gains across select grades³ in 2021. For example, third grade students in 2021 improved by 11 and eight points respectively in math and reading in the spring as compared to the fall. However, when compared to the pre-pandemic period, students made smaller gains in the past year. For instance, third, fifth, and seventh grade students in 2019 outpaced students in 2021 by between two to three RIT points in math. The dotted lines (2019) have steeper upward trends and are not parallel with solid lines (2021) indicating pre-pandemic achievement outpaced math and reading gains made in the past year. Finally, the trends presented in Figure 1 remain mostly constant when results are disaggregated by grade-level and race (Appendix A, Figures A1-3).

¹ Students with fall assessment data and missing spring assessment data were excluded from the sample.

² Fall 2018, Spring 2019, Fall 2020, and Spring 2021 represent the four assessment terms included in this report.

³ Students are expected to make larger RIT score gains in earlier grades.

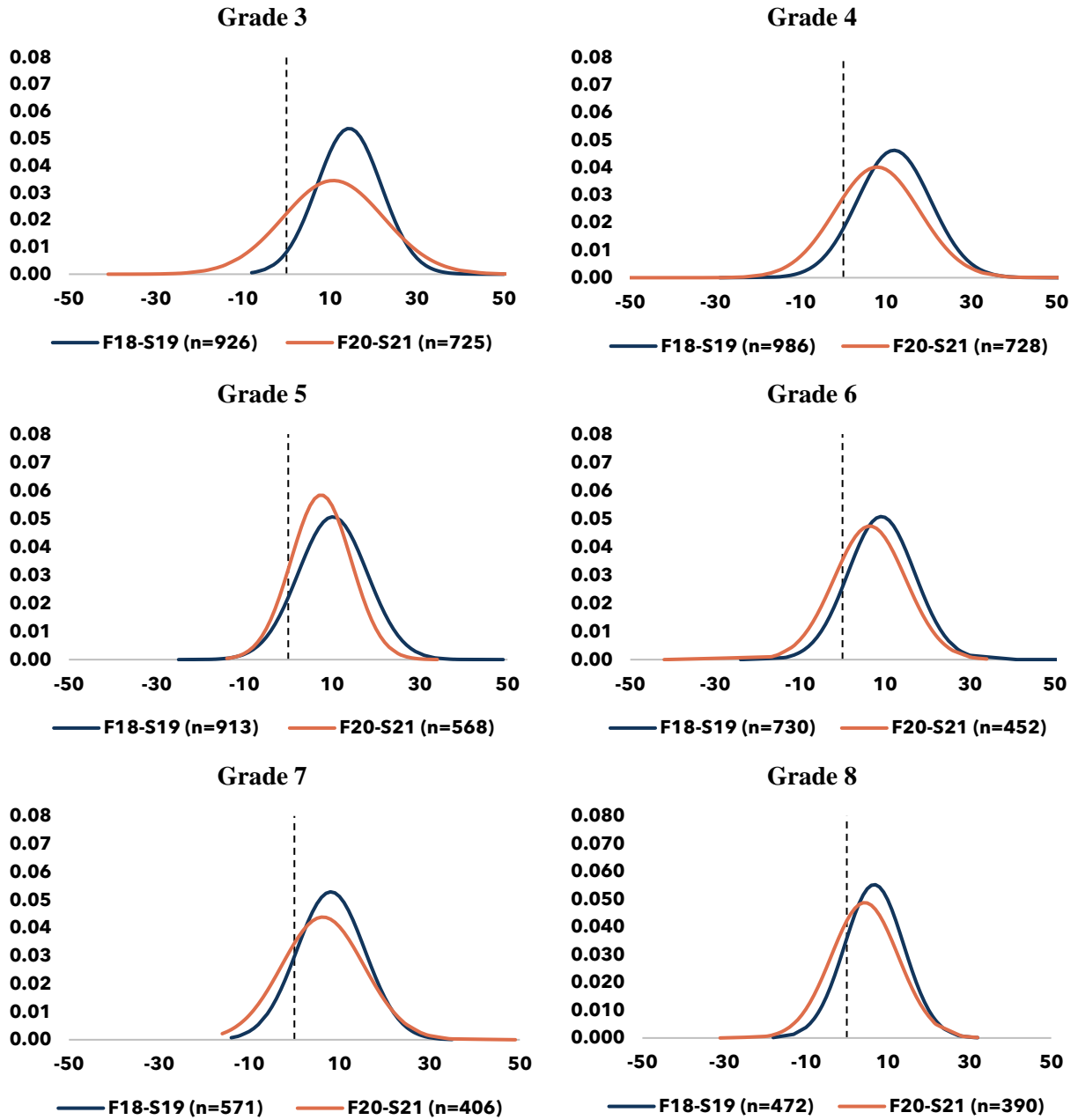
Figure 1: Mean fall and spring math and reading RIT scores by year and select grades



Source: NWEA Map Growth, fall and spring assessment; author’s analyses.

In addition to examining differences in fall and spring RIT scores, Basis researchers compared the distribution of within-student math and reading growth in 2019 (blue) and 2021 (orange) for students in the same grade. Results in Figure 2 indicate a smaller proportion of students demonstrated positive growth in math the year following the onset of the pandemic. The difference is particularly stark in grades three and four. For example, 10 percent more third grade students in 2021 made no gains (12 percent) between fall and spring terms as compared to the pre-pandemic period (2 percent). Basis researchers found comparable trends for the distribution of within-student reading growth in 2019 and 2021 (See Figure A4 in Appendix A).

Figure 2: Distribution of math RIT score change from winter 2019 to fall 2019 and winter 2020 to fall 2020



Source: NWEA Map Growth, fall and spring assessment; author's analyses

Note: The vertical grey dashed line represents zero growth. This translates to equivalent fall and spring test scores.

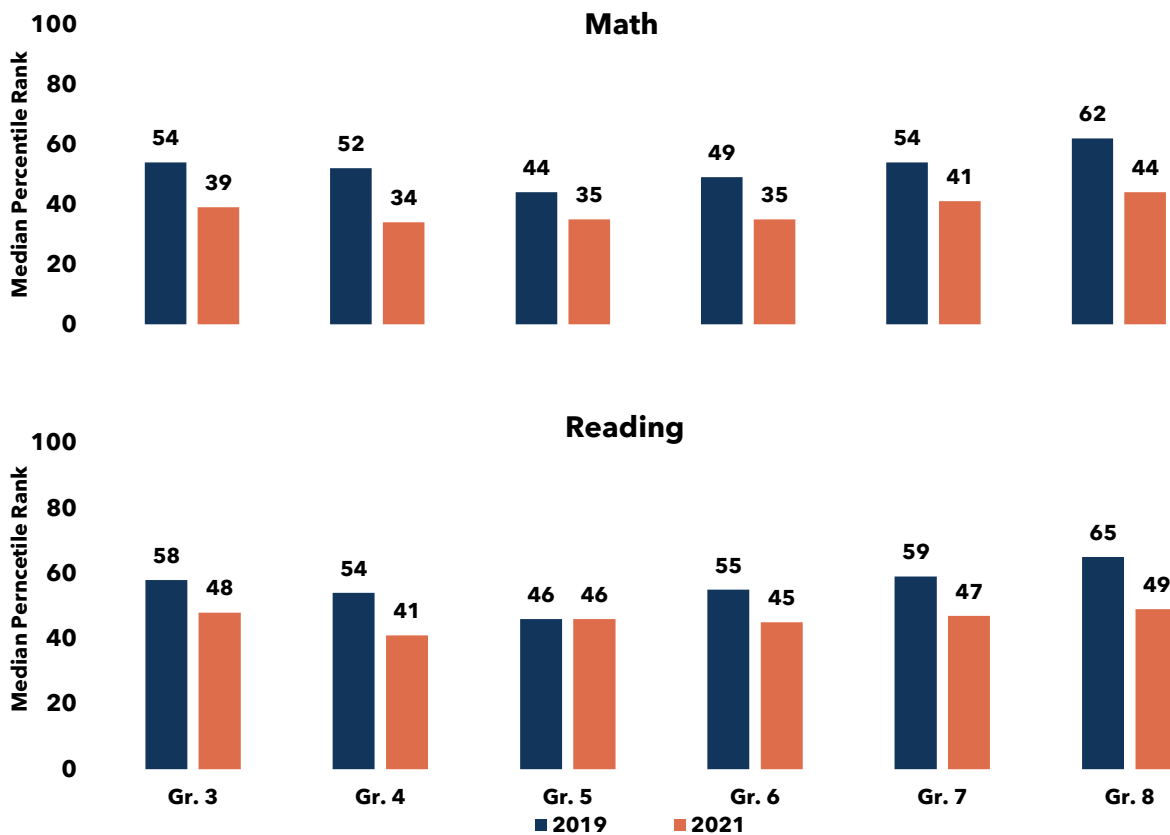
2 | How does student achievement in spring 2021 compare to prior years?

In addition to comparing student growth in 2019 and 2021, Basis researchers sought to understand where students finished the school year relative to prior years. To do so, we calculated median achievement percentiles by grade-level in spring 2019 and 2021. We restricted the sample to (a) students with valid fall and spring NWEA scores and (b) students enrolled in schools with fall and spring assessment data in 2019 and 2021. The sample includes 7,863 students across 27 schools from 2019 to 2021. Finally, student demographics are comparable year over year (See Appendix B).

Students' achievement in spring 2021 was lower compared to the pre-pandemic period, with larger declines in math as compared to reading.

Figure 3 displays the median achievement percentiles in math and reading in spring 2019 and 2021. Math achievement was between nine to eighteen percentile points lower in 2021, on average, for students in grades three through eight as compared to same-grade students in the pre-pandemic period. Moreover, the gap in achievement widened to between eight to eighteen percent in the spring relative to where students started in the fall (See Figure 2 in March 2021 GVSU NWEA [report](#)).

Figure 3: NWEA MAP achievement percentiles in math and reading by grade level in spring 2019 and 2021



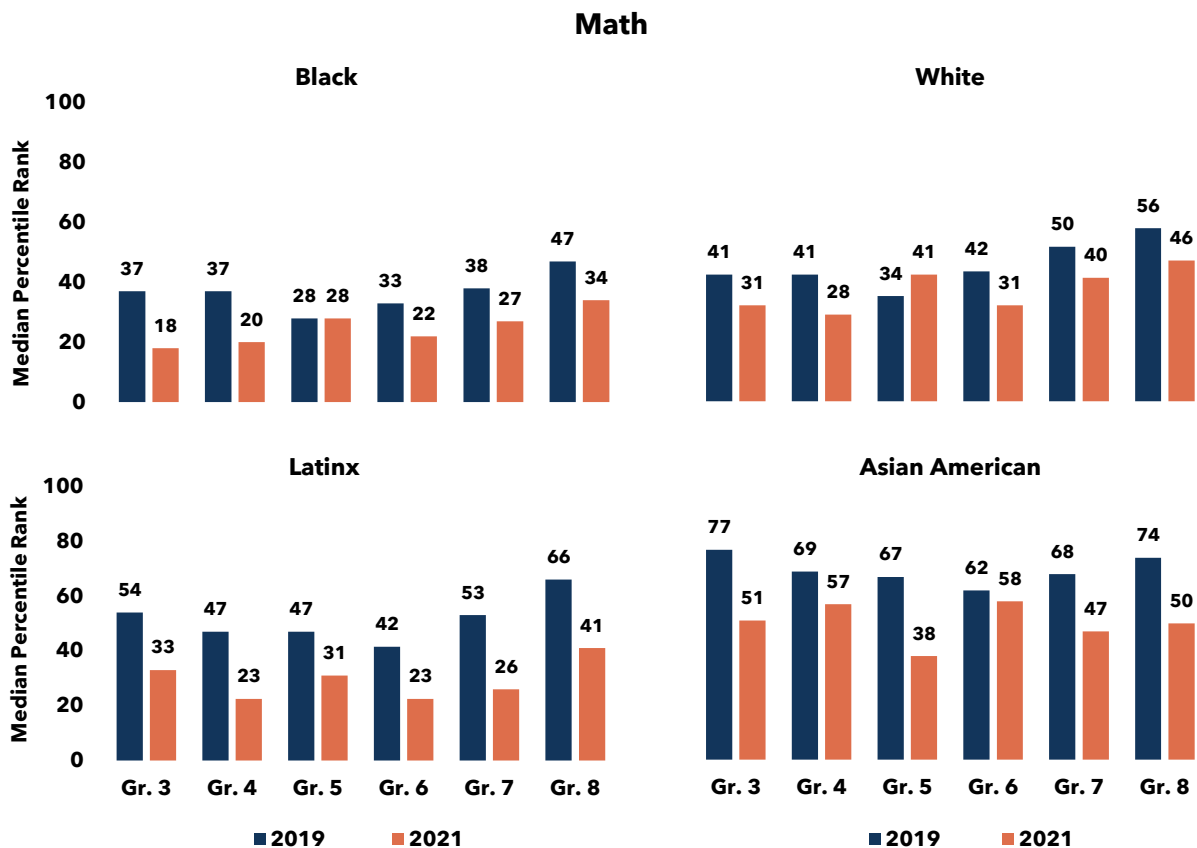
Source: NWEA Map Growth, fall and spring assessments; author's analyses

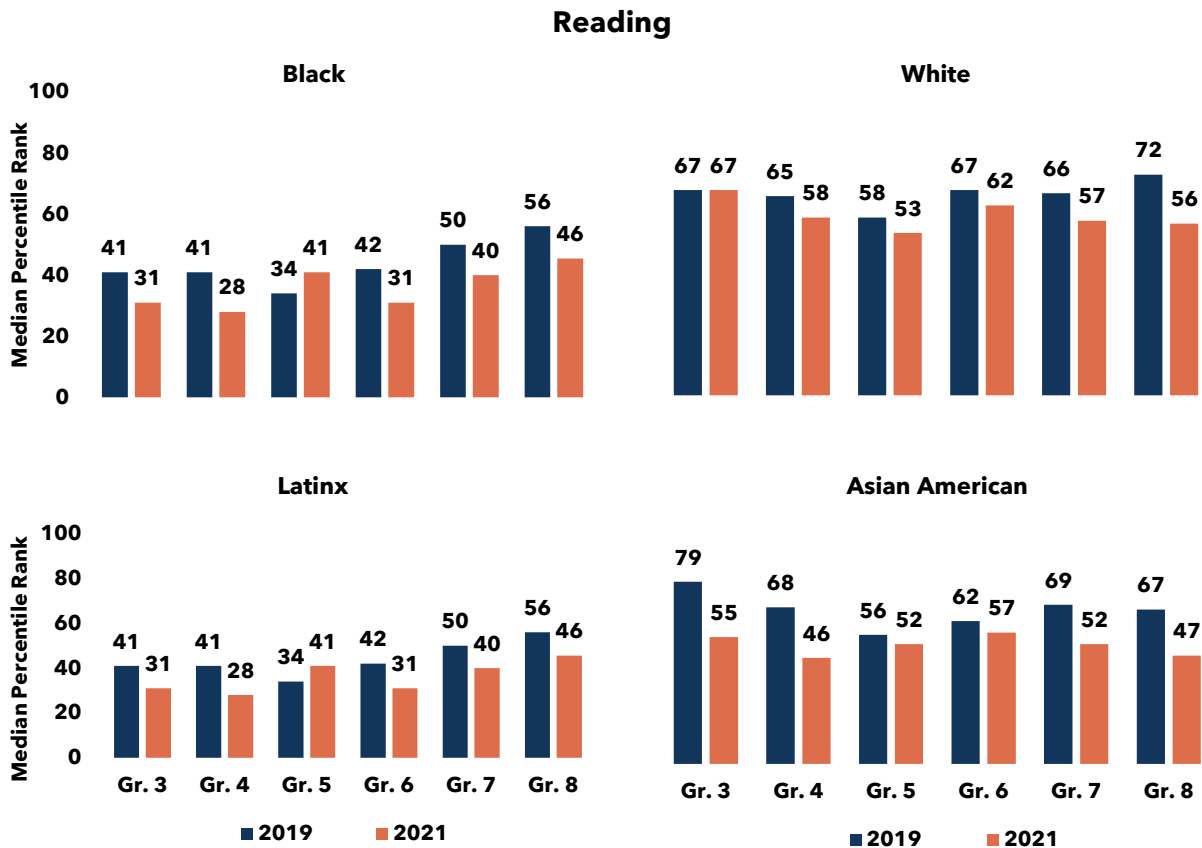
Figure 3 also reveals reading achievement was lower in all grades except grade five. Achievement differences were between 10 to 16 percentile points lower, on average, in grades three, four, six, seven, and eight. This finding is particularly concerning given that students had similar reading achievement in fall 2020 as compared to prior years (See Figure 2 in March 2021 GVSU NWEA [report](#)). Finally, results displayed in Figure 3 are comparable to findings from NWEA’s nationwide analysis of fall to spring assessment data (Lewis et al., 2021).

Students from historically marginalized communities had larger declines in math and reading relative to White peers.

Figure 4 displays changes in median percentile rank in math and reading from 2019 to 2021 disaggregated by race. All student groups experienced declines in math and reading achievement the year following the onset of the pandemic. However, the magnitude of decline was uneven across groups, with students from historically marginalized communities and earlier grades (e.g., fourth grade and fifth grade) experiencing the largest declines. For example, Black and Latinx third grade students declined by between 19 to 21 percentile points in math since 2019 as compared to 10 percent for White third grade students. Results in Figure 4 are consistent with our earlier report indicating that students from historically marginalized communities and earlier grades were adversely impacted from pandemic-related school closures (See Figure 3 in March 2021 GVSU NWEA [report](#)).

Figure 4: NWEA MAP achievement percentiles in math and reading by race and grade level in spring 2019 and 2021



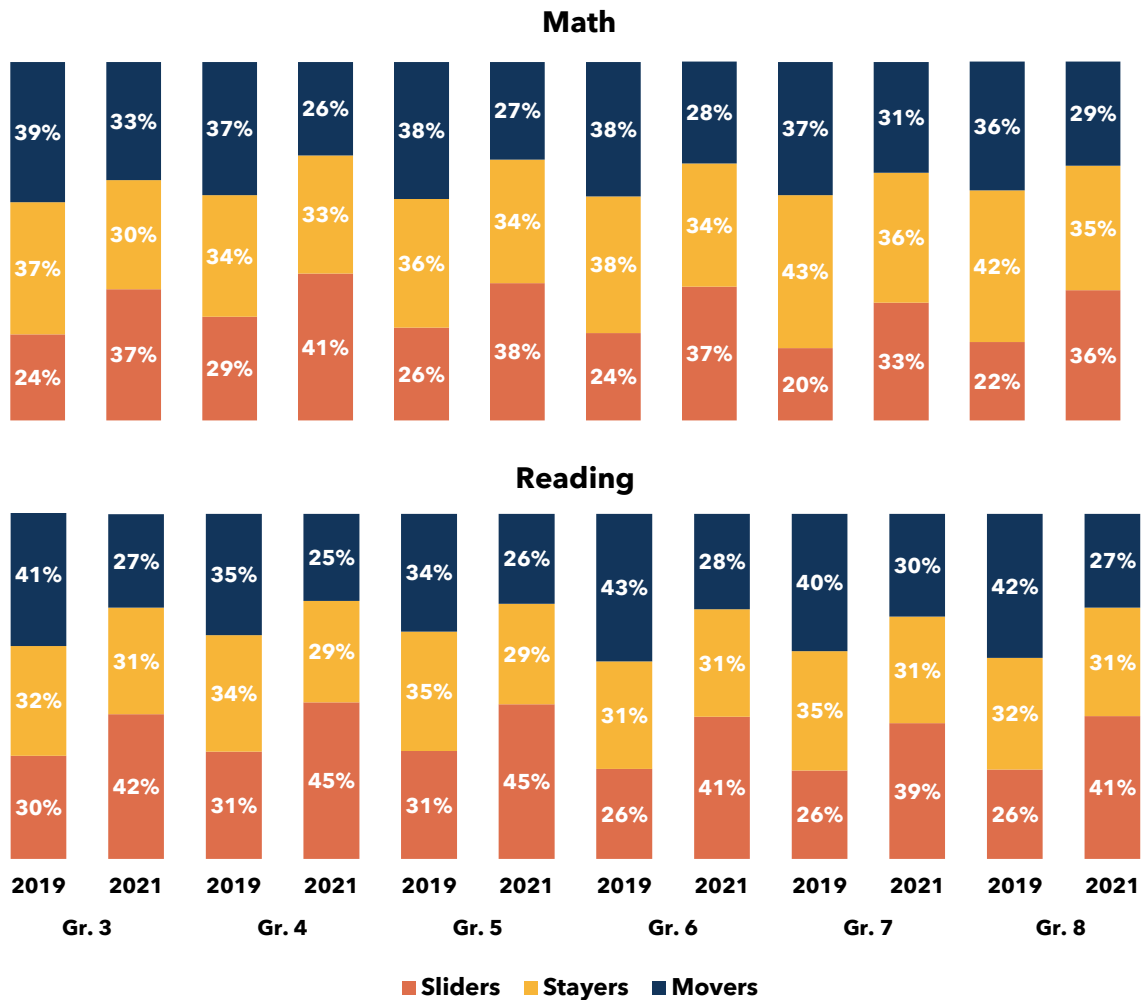


Source: NWEA Map Growth, spring assessments; author’s analyses.

Fewer students improved their percentile rank in math and reading in 2021 as compared to the pre-pandemic period.

Alternatively, we examined differences in student growth patterns to understand if students changed their relative position in the NWEA percentile distribution in the first full year since the onset of the pandemic. Figure 5 displays the percentage of students in each grade who moved down a decile or more (“sliders”), stayed in the same decline (“stayers”), or moved up a decile or more (“movers”) from fall to spring in math. Results indicate between 11 to 14 percent more students moved down at least one decile in 2021 as compared to 2019 (See Figure 5). For instance, 24 percent of students in grade four in 2019 slid down at least one decline with that number increasing to 37 percent in the year following the onset of the pandemic.

Figure 5: Percentage of students shifting relative position in math and reading percentile in 2019 compared to 2021



Source: NWEA Map Growth, fall and spring assessments; author's analyses

Lastly, when we explore the percentage of sliders, stayers, or movers from one year to the next in reading, approximately 12 to 15 percent more students moved down at least one decile from fall 2020 to spring 2021 as compared to the year prior to the pandemic (See Figure 5). For example, 26 percent of students in sixth grade in 2019 slid down at least one decile with the number increasing by 15 percent in 2021. Results in Figure 5 deviate from findings presented in the March 2021 GVSU NWEA [report](#) that found the percentage of sliders, stayers, and movers from winter to fall terms were mostly comparable (Lewis et al., 2021). Finally, results are mostly comparable when disaggregated by race (See Figure A5-8, Appendix A).

3 | Do students with missing assessment data differ academically from students with non-missing assessment data?

One concern with testing amid the pandemic is whether the student sample is representative of all students enrolled in a GVSU charter school. If students excluded from the sample are different from students included in the analysis, then results could be biased and not representative of the broader student population. Thus, it is possible we overestimate student growth and academic achievement and the *actual* impact of the pandemic on student achievement may be more severe than what we report. To address this issue, Basis researchers restricted the sample to (a) students enrolled in schools with fall and spring assessment data in 2019 and 2021, (b) students with valid fall 2020 assessment data, and (c) students with either non-missing or missing spring 2021 assessment data. We then calculated attrition rates to measure the percentage of students tested in the fall but were *missing* from spring testing. Basis researchers also calculated median achievement by grade-level in fall 2020 for students with non-missing and missing spring assessment data.

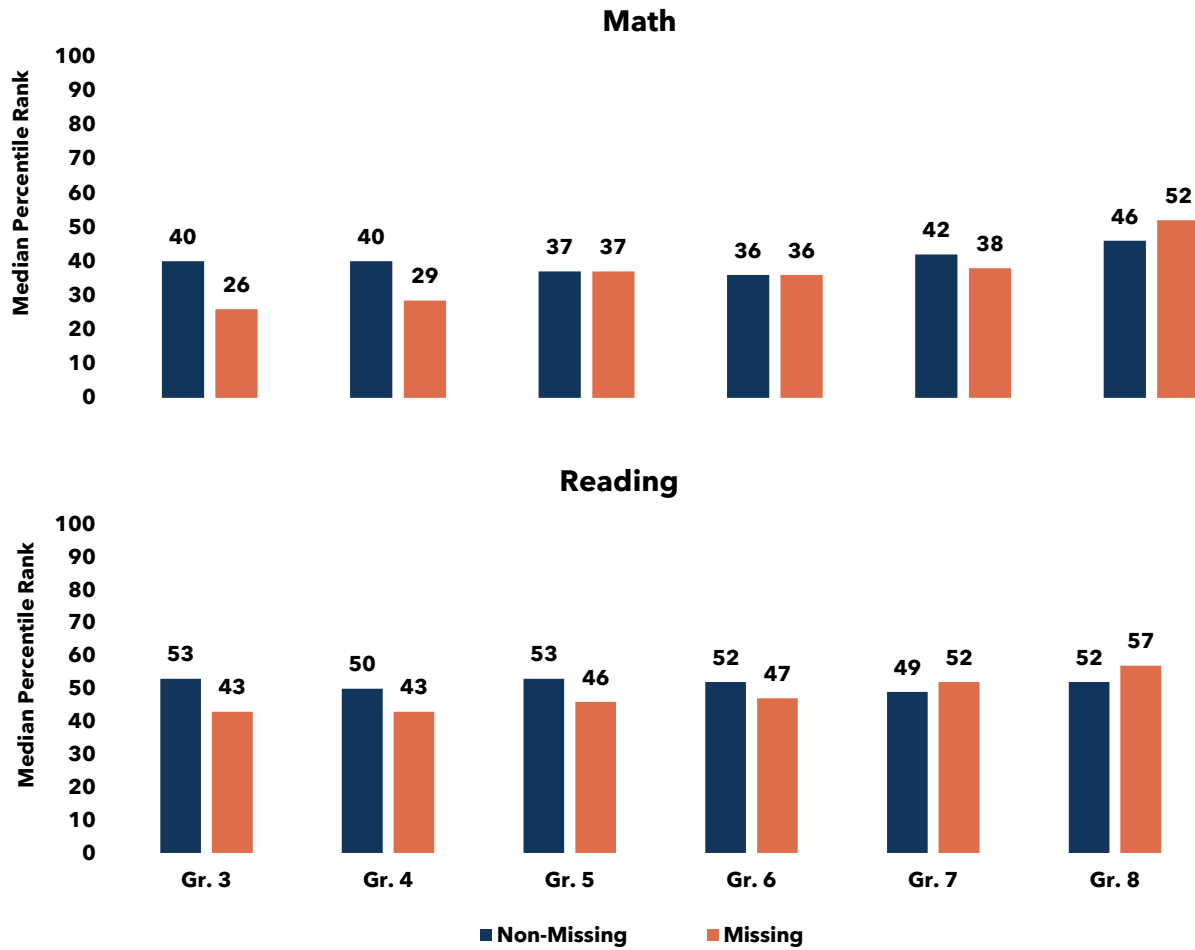
About two in five students who tested in the fall were missing from the spring assessment.

Basis researchers identified 5,560 students in grades three through eight meeting the restriction criteria previously described. Approximately 40 percent of students who tested in the fall were *missing* from the spring assessment. This equates to about two in five students who tested in the fall were excluded from the current analysis. The attrition rate is almost double the attrition rate presented in a recent NWEA research brief (Lewis et al., 2021). Moreover, Black and Latinx students had disproportionately high attrition rates with almost half of students missing from the spring assessment. This finding affirms the reality that students from historically marginalized populations were more likely to experience barriers to access and learning that likely precluded them from spring testing (Lewis et al., 2021).

Grade three and four students with missing spring data were between 7 to 14 percentile points lower in math and reading in the fall.

Figure 6 displays the median achievement percentile by grade-level in math and reading in fall 2020 for students with non-missing and missing spring 2021 assessment data. Students with missing assessment data enrolled in grades three or four were significantly below same grade-level peers with non-missing data. Students with missing data were between 11 to 14 percentile points lower in math and between seven to ten percentile points lower in reading. Differences between students with non-missing and missing data were mostly mixed in other grades, with some slight differences across grades.

Figure 6: NWEA MAP achievement percentiles in math and reading by grade level in fall 2020 for students with non-missing and missing spring 2021 data

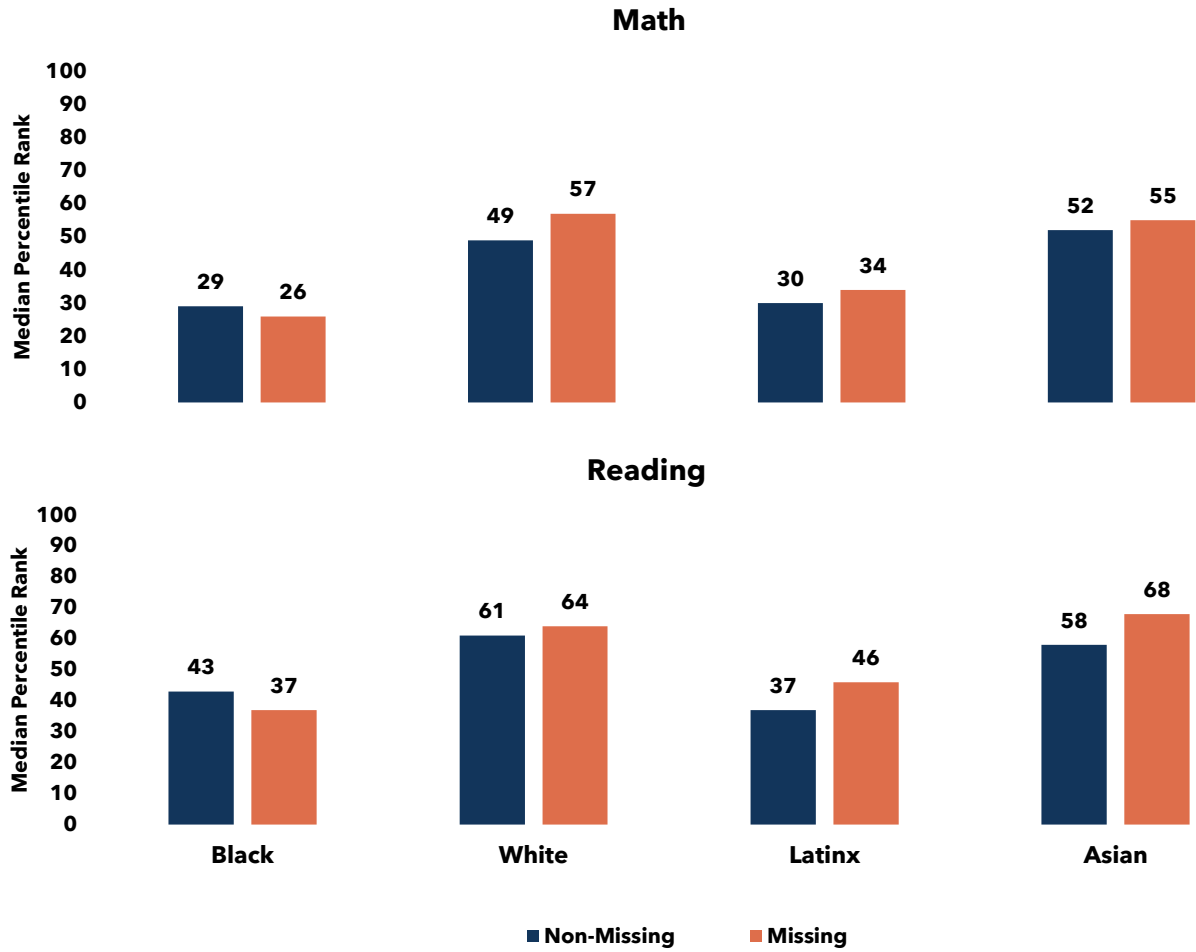


Source: NWEA Map Growth, fall assessments; author’s analyses

Black or African American students with missing data were between 3 to 6 percentile points lower in the fall than similar students with non-missing spring data.

Figure 7 displays the median achievement percentile by race in math and reading in fall 2020 for students with non-missing and missing spring 2021 assessment data. Black students missing from the spring assessment were between three to six percentile points lower in the fall than similar students with non-missing data. The difference is exacerbated in grades three and four, with Black students with missing spring data between 6 to 10 percentile points lower in math and reading. In contrast, White, Latinx, and Asian American students with missing spring assessment data had, on average, higher fall achievement percentiles as compared to students with non-missing data.

Figure 7: NWEA MAP achievement percentiles in math and reading by race/ethnicity in fall 2020 for students with non-missing and missing spring 2021 data



Source: NWEA Map Growth, fall assessments; author’s analyses

Discussion

Findings from this report provide further evidence on how the pandemic has adversely affected students' academic achievement. Results indicate students made achievement gains in math and reading in 2021 but at a lower rate compared to prior years. This finding is particularly problematic in math given how students' achievement was already lower in the fall as compared to prior years. Consequently, students' achievement in spring 2021 was lower compared to the pre-pandemic period with the gap widening in math by between nine to eighteen percent. Additionally, and of equal concern, reading achievement declined by between 10 to 16 percentile points in 2021 despite starting the year with comparable achievement to prior years.

Findings also reveal the prevalence of historical inequities across student groups. While achievement declined across racial groups, students from historically marginalized communities had larger declines in math and reading relative to their White peers. Black and Latinx third grade students declined by between 19 to 21 percentiles points in math since 2019 as compared to 10 percent for same-grade White students. This finding reinforces the urgency for providing equitable learning opportunities and supports needed to improve academic outcomes.

This study used restrictive criterion to produce samples mostly comparable year over year; however, findings should be interpreted within the context of the study's main limitations. Specifically, about two in five students who tested in the fall were missing from the spring assessment. The attrition analysis also revealed grade three and grade four students with missing spring data were between seven to fourteen percentile points lower in math and reading in the fall as compared to same grade students who participated in the spring assessment. Moreover, Black students with missing data were between three to six percentile points lower in the fall than similar students with non-missing spring data. Thus, it is likely this report overestimates student growth and academic achievement and the true impact of the pandemic on student achievement is more pronounced than what we report. Considering these findings and limitations, we suggest the GVSU CSO and its stakeholders consider the following recommendations when planning future research or network support.

Address barriers to access and opportunity for students from historically marginalized communities.

Black and Latinx students had disproportionately high attrition rates with almost half of students missing from the spring assessment. This finding highlights the reality that students from historically marginalized communities are more likely to experience barriers to access and learning that could preclude students from spring testing. The GVSU CSO and its stakeholders should work with and listen to students and families to understand local barriers in place that impede access and opportunity. With greater insight into the local challenges students and families face, the CSO and its stakeholders can begin planning how they can collectively address these issues to better support students and families from historically marginalized communities.

Prioritize early grade students' access to math and reading interventions.

While math and reading achievement declined across grades, the decline is particularly noticeable in grades three through four. A larger percentage of students in grades three and four made little to no growth in math and reading in the past year as compared to the year prior to the pandemic. Moreover, the present gap in math achievement continues to widen in grades three and four. Thus, it is imperative the

GVSU CSO and its stakeholders consider how to expand students' access to content-focused interventions. This could include, to the extent possible, expanding the amount of within-in school instructional time focused on math and reading. Moreover, students from historically marginalized communities need equitable access to math and reading interventions.

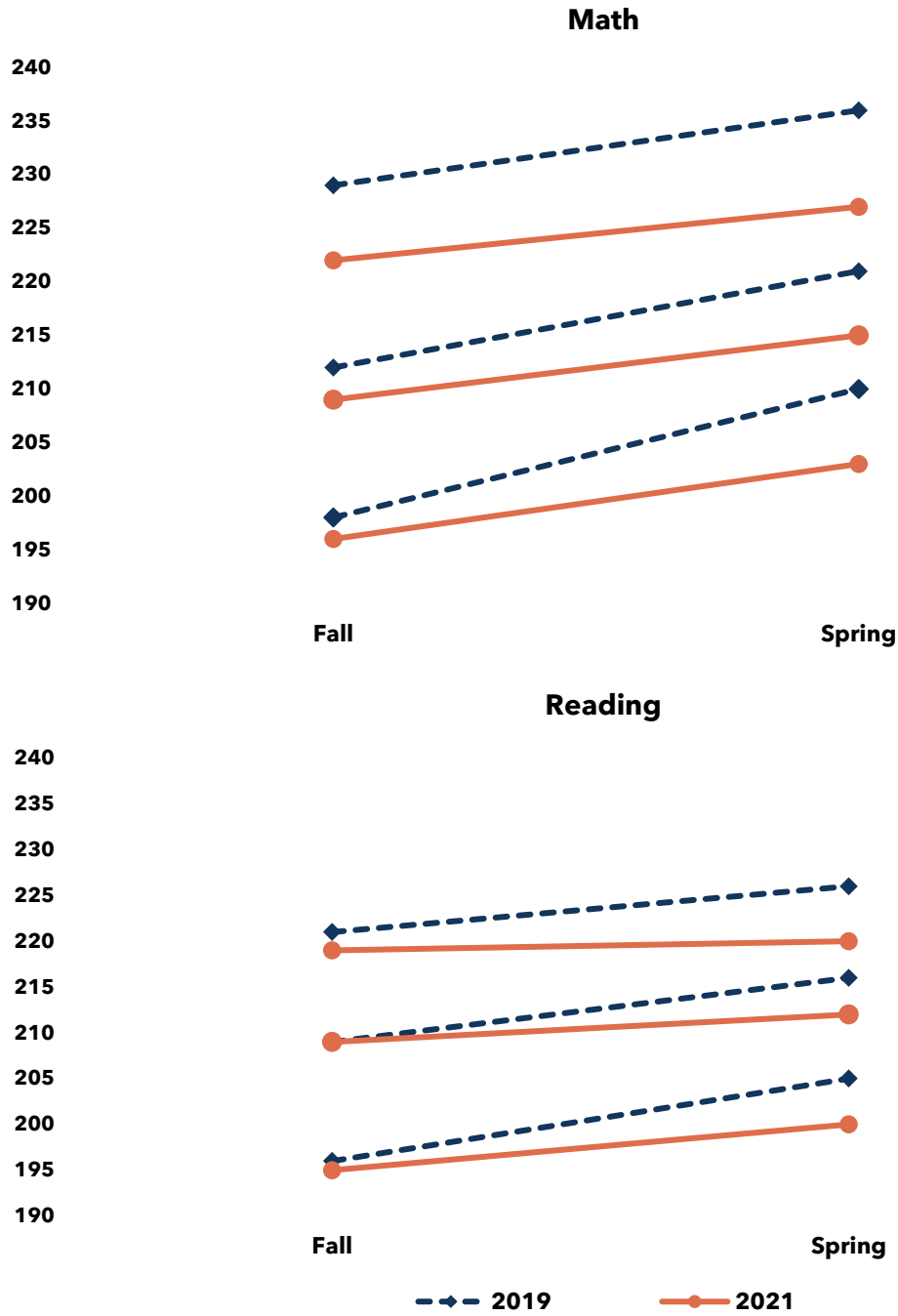
References

Lewis, K., Kuhfeld, M., Ruzek, E., McEachin, A. (2021). Learning during COVID-19: Reading and math achievement in the 2020-21 school year. NWEA.

Appendices

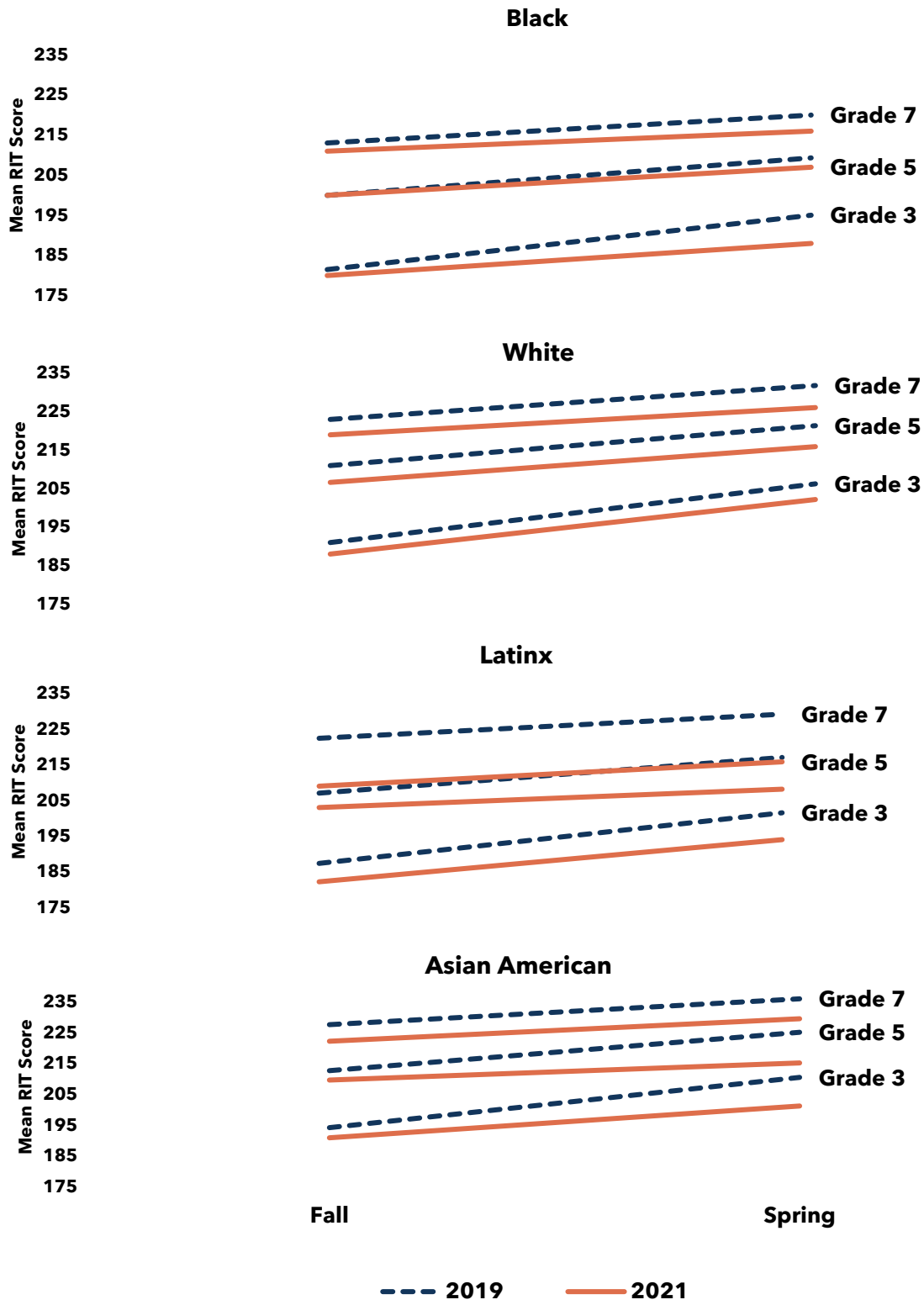
Appendix A: Figures

Figure A1: Mean fall and spring math and reading RIT scores by year and select grades



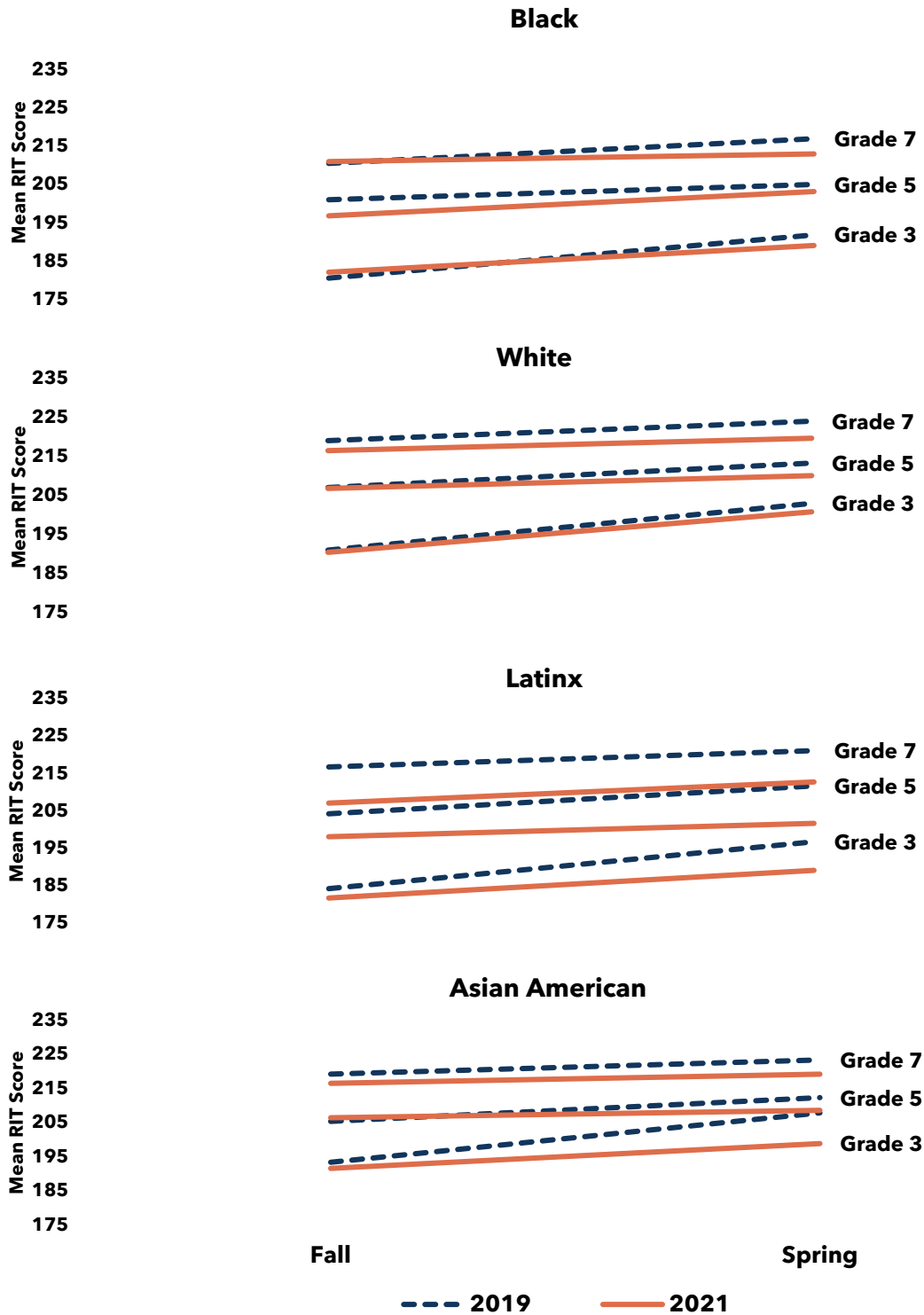
Source: NWEA Map Growth, fall and spring assessment; author's analyses

Figure A2: Mean fall and spring math RIT scores by race, year, and select grades



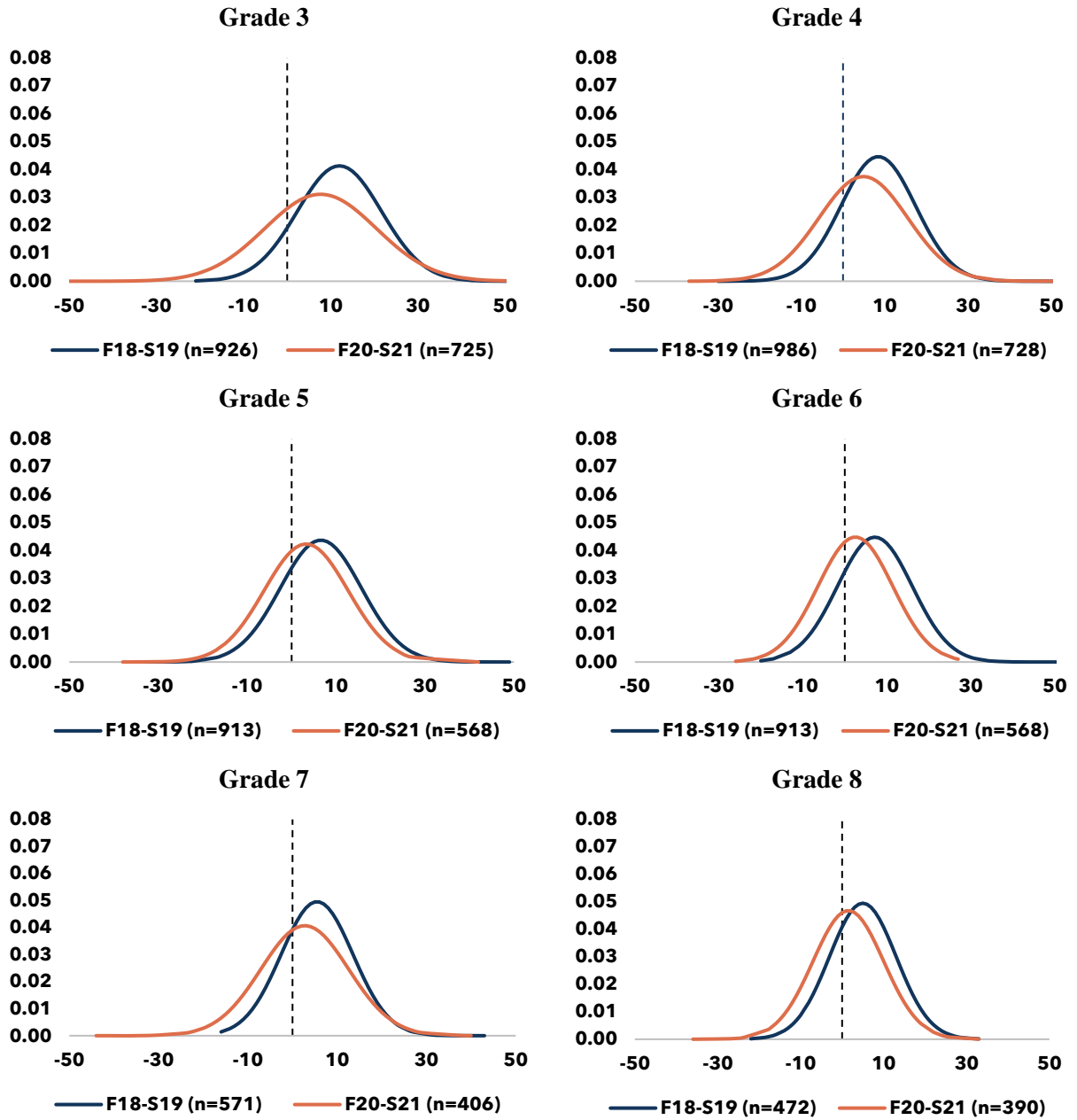
Source: NWEA Map Growth, fall and spring assessment; author's analyses

Figure A3: Mean fall and spring reading RIT scores by race, year, and select grades



Source: NWEA Map Growth, fall and spring assessment; author's analyses

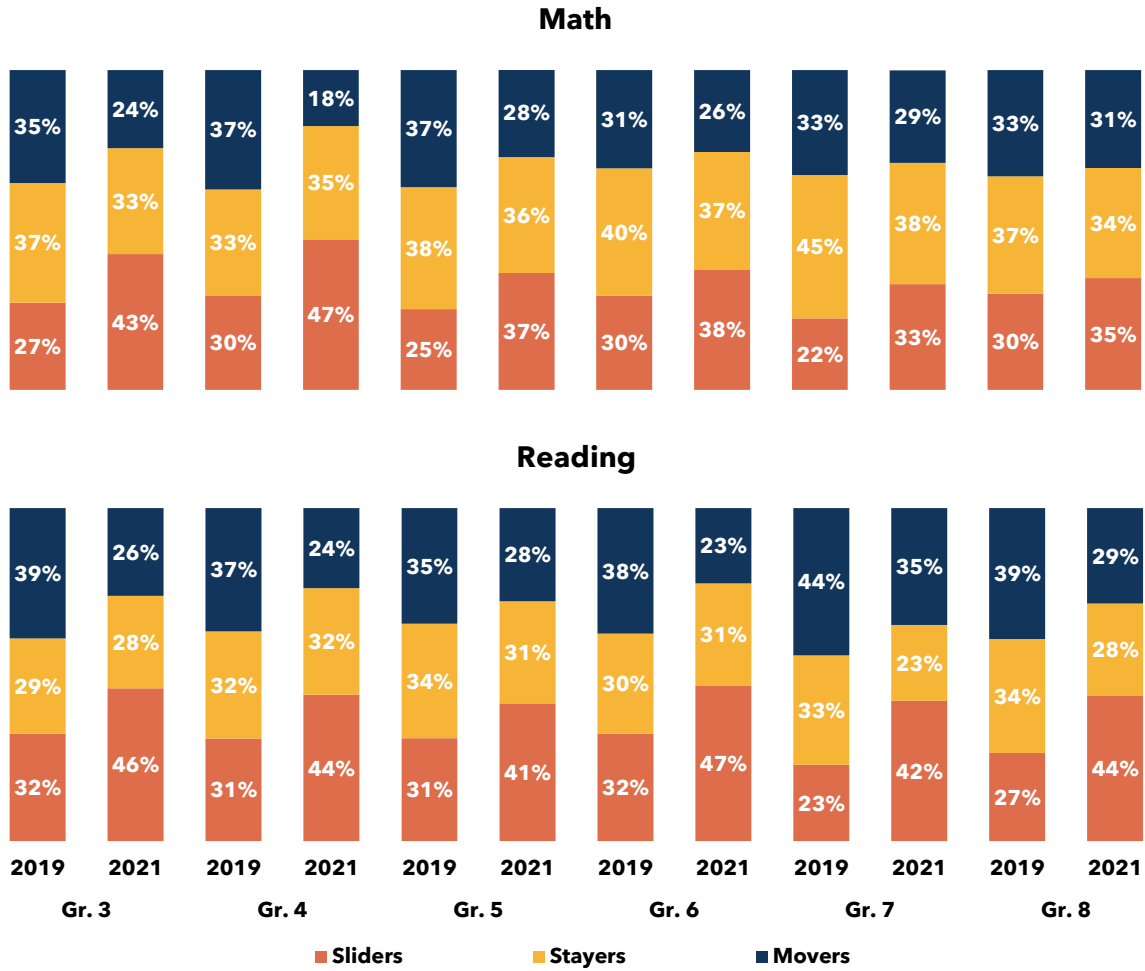
Figure A4: Distribution of reading RIT score change from winter 2019 to fall 2019 and winter 2020 to fall 2020



Source: NWEA Map Growth, fall and spring assessment data; author's analyses

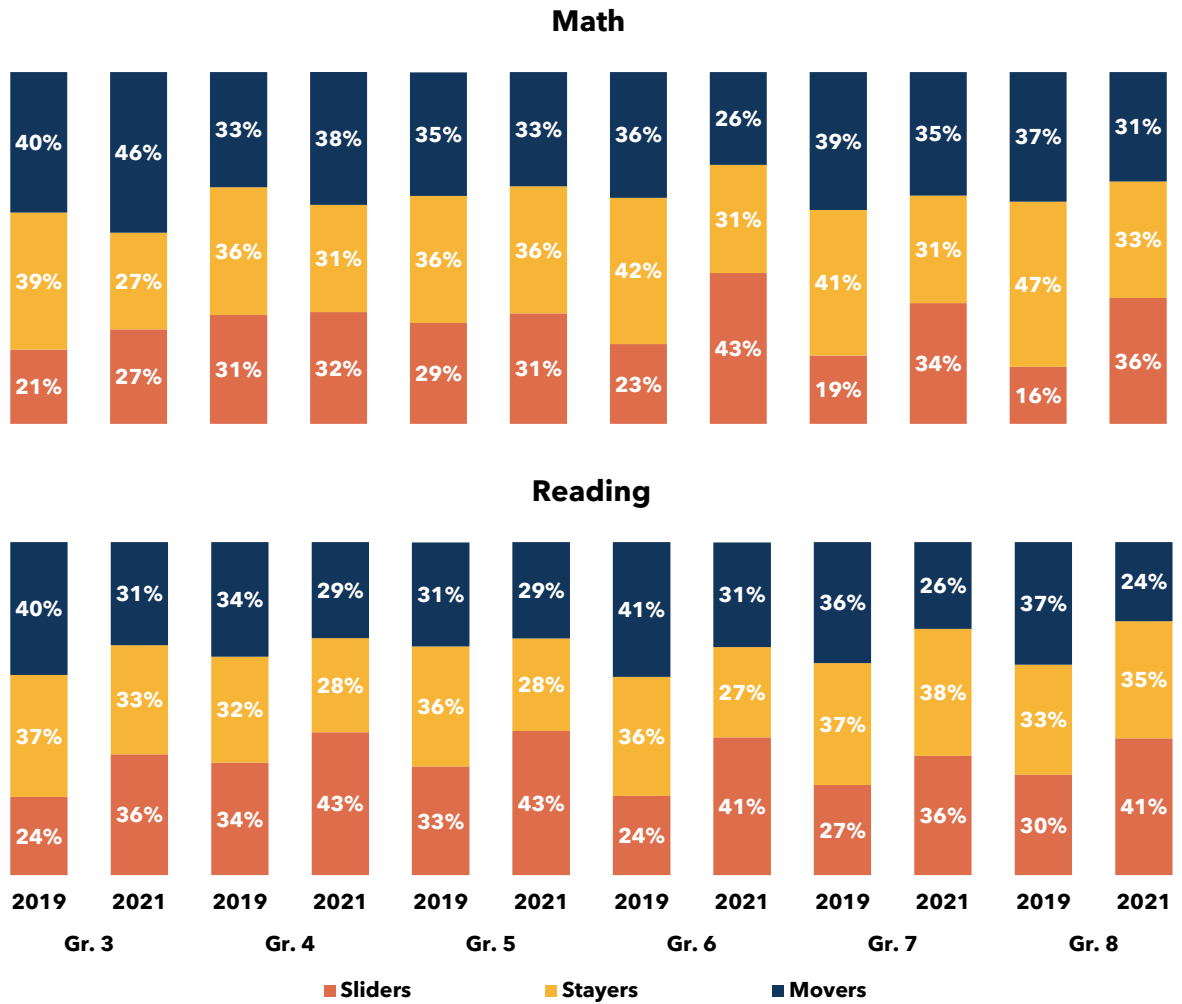
Note: The vertical grey dashed line represents zero growth. This translates to equivalent fall and spring test scores

Figure A5: Percentage of Black students shifting relative position in math and reading percentile in 2019 compared to 2021



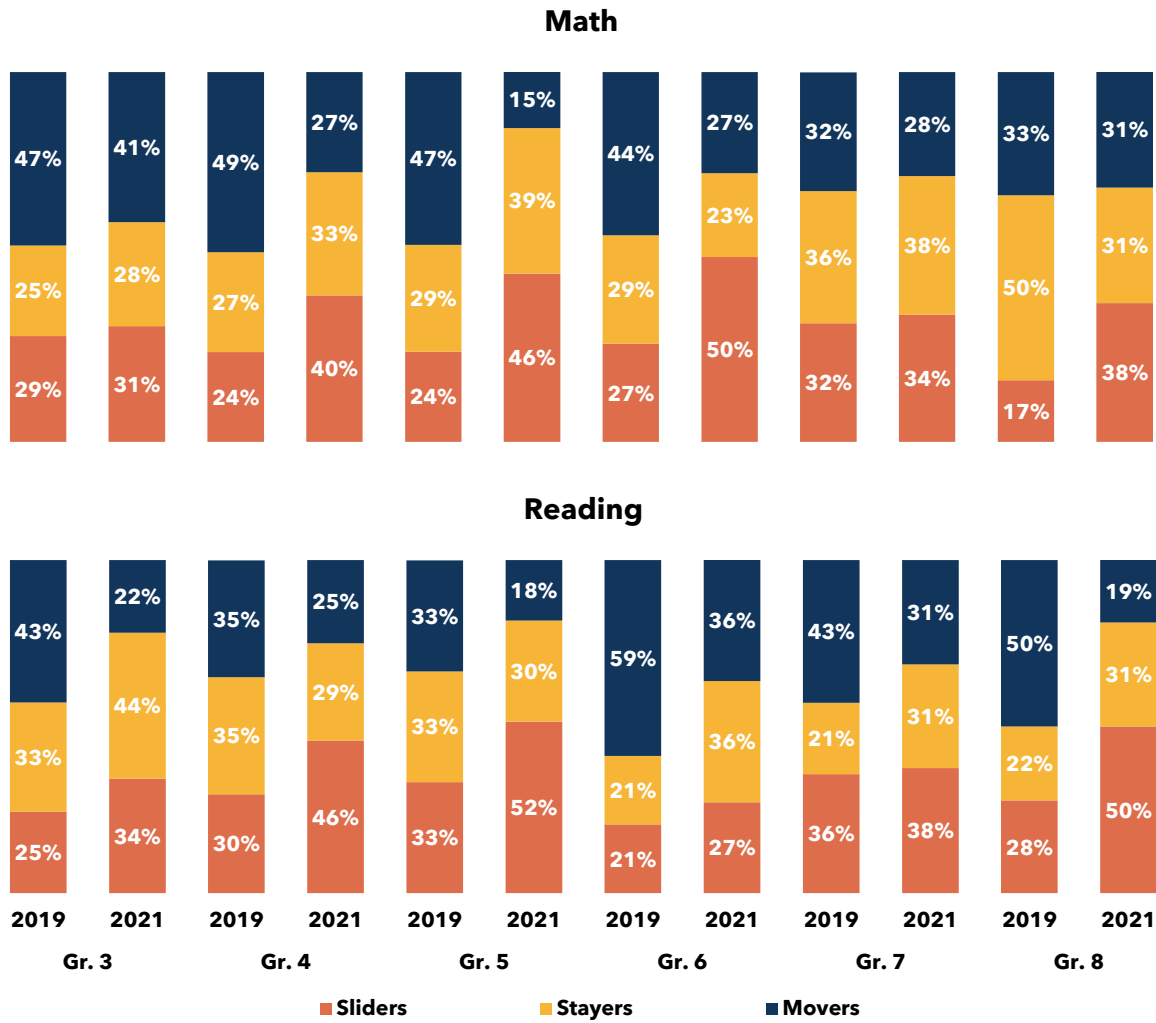
Source: NWEA Map Growth, fall and spring assessments; author's analyses

Figure A6: Percentage of White students shifting relative position in math and reading percentile in 2019 compared to 2021



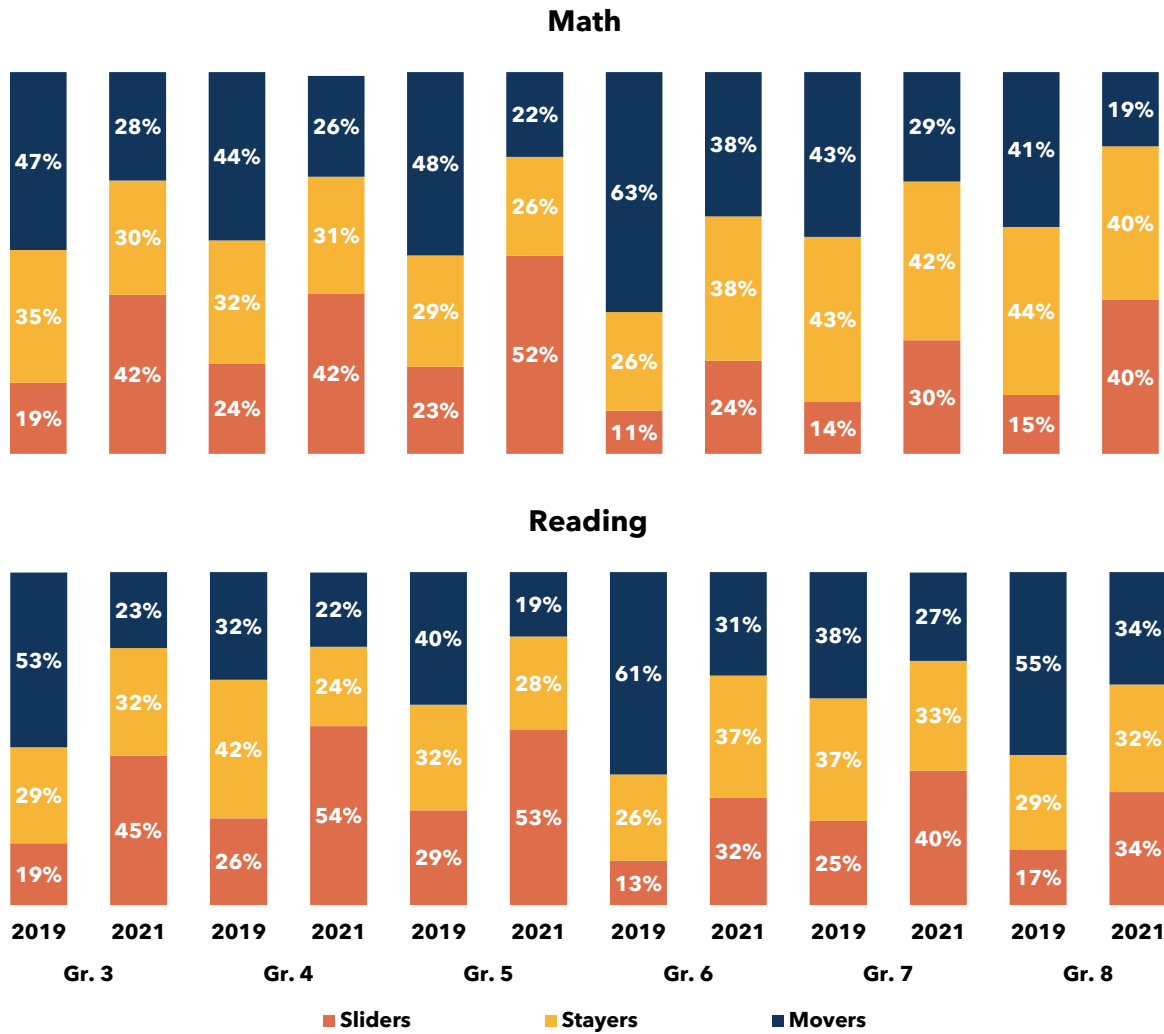
Source: NWEA Map Growth, fall and spring assessments; author's analyses

Figure A7: Percentage of Latinx students shifting relative position in math and reading percentile in 2019 compared to 2021



Source: NWEA Map Growth, fall and spring assessments; author's analyses

Figure A8: Percentage of Asian American students shifting relative position in math and reading percentile in 2019 compared to 2021



Source: NWEA Map Growth, fall and spring assessments; author's analyses

Appendix B: Methods

Data Sources: Findings are based on student-level NWEA MAP data provided by the GVSU CSO. The CSO shared fall and spring assessment data from 2018-19 and 2020-21, resulting in four testing administrations. Spring 2020 NWEA assessment data is missing due to pandemic-related school closures. Assessment data included students' school name, term (i.e., fall, spring), subject, RIT (Rasch unIT) score and test percentile. Finally, Basis researchers applied NWEA 2020 norms to 2018-19 assessment data to ensure students' percentile ranks were based on the same norms.

Sample. In total, 27,955 students in grades three through eight had at least one valid math and reading test score across four NWEA administrations. We further restricted the sample to (a) students with valid math and reading test scores in both fall and spring administrations and (b) students enrolled in schools administering the NWEA in each term. This analytic sample sought to reduce the extent changes in observed results is influenced by differences in students and schools tested over time. In total, the analytic sample includes 7,863 students across 27 GVSU schools from fall 2018 to spring 2021. The sample of students with complete data in 2018-19 and 2020-21 by grade-level was mostly comparable in terms of gender and race.

Measures. Basis researchers used NWEA MAP Growth reading and mathematics assessment scores in this report. We include student (Rasch unIT) scores for fall and spring assessments and corresponding achievement percentiles. Achievement percentiles for each test administration were calculated using NWEA 2020 MAP Growth norms.

Analytic Strategy. Below we describe the analytic strategy for each research question included in this report.

1 | How did GVSU students perform in the past year relative to a typical school year?

Basis research calculated mean RIT score by grade-level in fall 2018, spring 2019, fall 2020, and spring 2021. We then calculated mean change in RIT scores by grade-level between fall and spring test administrations to determine how student growth in 2020-21 compares to 2018-19. Moreover, we compared the distribution of students' RIT score differences between the pre- (fall 2018 to spring 2019) and mid-COVID periods (fall 2020 to spring 2021). This approach highlights students' raw growth but likely conceals growth for older students due to younger students growing at higher rates on NWEA assessments.

2 | How does student achievement in spring 2021 compare to prior years?

Basis researchers calculated the median student percentile in spring 2019 and spring 2021 by grade-level and subject to answer this research question. We also explored changes in normative achievement status by grouping students into deciles (e.g., 1-10th percentile, 11-20th percentile, 21-30th percentile) using their percentile ranks in fall and spring terms. We then calculated the percentage of students who stayed the same in the same decile in spring 2021 compared to fall 2020 ("stayers"), the percentage of students moving up at least one decile in spring 2021 relative to fall 2020 ("movers"), and percentage of students moving down at least one decile in spring 2021 ("sliders"). We applied the same process to fall 2018 and spring 2019 NWEA data to serve as a reference point. Moreover, we analyzed results by grade-level and student race.

3 | Do students with missing assessment data differ academically from students with non-missing assessment data?

Basis researchers identified students by grade-level with non-missing (fall and spring assessments) and missing (fall assessment, missing spring) NWEA data in 2020-21. We calculated median percentile rank by grade-level for students with complete and missing data to understand whether students with complete data were significantly different academically or demographically from students with missing data.