

Pandemic Achievement Loss: NAEP Long-Term Trend and Missouri MAP Assessment Changes

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Key Points

The National Center for Education Statistics (NCES) recently released the National Assessment of Educational Progress (NAEP) Long-Term Trend (LTT) results. This special administration of the LTT assessment exclusively sampled a nationally-representative group of 9-year-old students and was intended to measure achievement changes during the pandemic in mathematics and reading. This brief highlight trends from the NAEP LTT overall and by student characteristics. While we cannot directly connect national findings, we examine the trends in MAP test scores for Missouri's 4th graders (typically 9-year-old students). Findings indicate:

- From 2020 to 2022, NAEP LTT scores dropped by five and seven scale score points for math and reading respectively, an unprecedented decline which is likely linked to the COVID-19 pandemic.
- Nationally, lower-achieving, minority, and lower-SES students were all more likely to demonstrate larger declines in achievement on their assessments than were their peers.
- From 2019 to 2021, Missouri's 4th graders exhibited a seven-percentage point drop in the percent of students proficient or advanced in math; English scores were nearly unchanged.
- In math, nearly 3 out of 4 (71%) 4th grade Black students scored below basic in 2021, compared to approximately 1 out of 2 students (53%) in 2019.
- While declines between 2019 and 2021 were similar among FRL-eligible and FRL-ineligible students in math (10% and 9%), now only 1 in 4 FRL-eligible students score proficient or advanced (compared to approximately 1 in 3 FRL-eligible students in 2019). Nearly half (45.9%) of Missouri students were FRL-eligible in 2021 indicating a significant portion were likely affected by this decline in achievement.

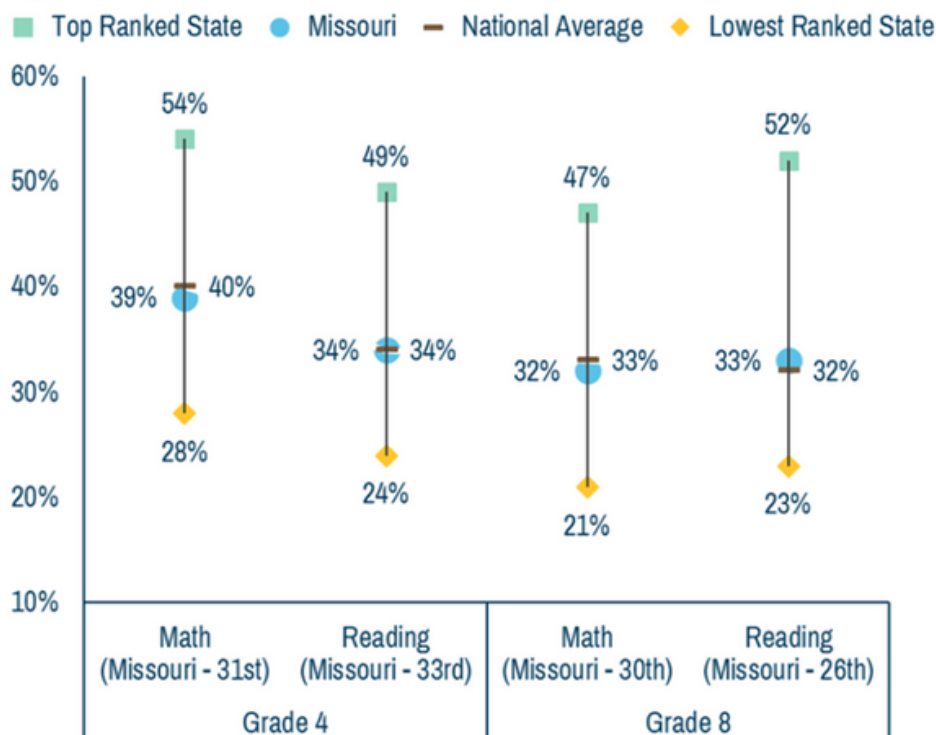


What is NAEP?

The National Assessment of Educational Progress (NAEP) is a national standardized test administered by the National Center for Education Statistics (NCES) and designed to evaluate student achievement across multiple academic subjects.¹ There are multiple versions of the NAEP assessment, including subject-specific testing (Main NAEP) and the Long-Term Trend (LTT). We previously highlighted the sampling process and results for the Reading and Math assessments for 4th- and 8th-grade students who participate in the Main NAEP. We also described how the Main NAEP is one of the few assessments allowing cross-state comparisons and examining how Missouri ranks nationally. Because each state uses its own assessment based on content and standards taught, NAEP provides a common metric to compare student achievement across state lines.

Due to the COVID-19 pandemic, the most recent subject assessments occurred in 2019. You can read more about Missouri's results in our prior brief², where we describe the declines across all four tests (4th- and 8th-grade math and reading) and for all student groups tested. Figure 1 shows where Missouri ranked nationally across all four tests in 2019.

Figure 1: Percent of NAEP Students Scoring Proficient & Advanced, 2019



Alongside the subject tests, NAEP also conducts the LTT assessment every four years, monitoring the academic performance of 9-, 13-, and 17-year-old students nationally. Results of LTT assessments go back to the 1970s, allowing for comparisons of student achievement over time.³ The most recent iteration of NAEP LTT assessed only 9-year-olds in 2022, a special administration intended to describe how student achievement was affected by the COVID-19 pandemic and shutdown. Table 1 summarizes differences between the Main NAEP and NAEP LTT assessments.

Table 1 : Comparison of Main NAEP and NAEP LTT Assessments^a

	Main NAEP Assessment	NAEP LTT Assessment
Goals	Measure students' national-level, state-level, and selected urban district performance and progress in several content areas, illustrating change over the past several years	Measure students' national-level performance and progress in mathematics and reading, illustrating long-term change since the 1970s
History	First administration in 1990 (mathematics) for the nation and participating states and other jurisdictions, and since 2002 for selected urban districts	First administration in 1971 (reading)
Sample Selection	Nationally representative sample selected by grade (4th-, 8th-, and 12th-grade); 4th and 8th grade are assessed every time the Main NAEP Assessment is administered	Nationally representative sample selected by age (9, 13, and 17); all ages are not assessed every time the NAEP LTT assessment is administered
Content Areas Assessed	Math, reading, science, civics, arts, economics, technology and engineering, geography, history, and writing	Math and reading
Content Changes	Content changes about every decade to reflect changes in curriculum in the nation's schools	Content assessed has remained relatively unchanged since 1990
Frequency of Assessment	Math and reading every 2 years; other content areas assessed less frequently	Typically every 4 years (since 2004) with some exceptions
Modality of Assessment	Digitally-based	Paper-based
Question Formats	Multiple choice, short answer, and extended answer	Mostly multiple-choice format with a few short answer and extended answer questions
Scoring and Reporting Results	Scores are reported using either a 0-300 or 0-500 scale, depending on the subject; results are reported using scale scores and NAEP achievement levels (NAEP Basic, NAEP Proficient, and NAEP Advanced).	Results are reported using scores on a 0-500 scale; long-term trend also reports descriptive performance levels (150, 200, 250, 300, and 350) that have the same meaning across the three age levels. There are no NAEP achievement levels to correspond with those used in main NAEP.

^aSource: https://nces.ed.gov/nationsreportcard/about/ltt_main_diff.aspx

2022 NAEP LTT Results Show Unprecedented Declines

This special LTT assessment exclusively sampled 9-year-old students who are representative of the United States and includes subgroups by race, gender, socioeconomic status, school location, and school type. The LTT assessment includes both a math and a reading section which are comprised of multiple-choice and short answer questions and are measured on a scale from 0 to 500.⁴

This special administration of NAEP LTT shows significant declines for students during the pandemic. From 2020 to 2022, scores dropped by five and seven scale score points for math and reading respectively (Table 2). The drop in reading scores is the largest since 1990, and the drop in math scores is the first significant decline ever recorded by the NAEP LTT. This indicates an unprecedented decline in math and reading scores for 9-year-old students which is likely linked to the COVID-19 pandemic. Declines in scores are more substantial and troublesome when examining trends by student characteristics.

Table 2: Changes in NAEP LTT Scale Scores for 9-Year Old Student Groups

Student Characteristic	Mathematics			Reading		
	2020 Scale Score	2022 Scale Score	Change	2020 Scale Score	2022 Scale Score	Change
Overall	241	234	-7	220	215	-5
90th Percentile	286	283	-3	267	265	-2
10th Percentile	191	178	-12	164	155	-10
Black	225	212	-13	205	199	-6
Hispanic	232	223	-8	210	204	-6
White	250	244	-5	228	223	-6
NSLP Eligible	229	221	-8	207	200	-6
NSLP Ineligible	254	249	-5	232	229	-3

Note: Differences in values are due to rounding as reported by NAEP

Trends by Student Performance Level

Examining results by student performance level, reading scores for students in the 90th percentile declined by two scale score points (267 to 265), while reading scores for students in the 10th percentile declined by ten scale score points (164 to 155). Additionally, for students in the 90th percentile of math achievement, scores declined by three scale score points (286 to 283). Conversely, for students in the 10th percentile of math achievement, scores declined by 12 scale score points (191 to 178). These findings indicate a phenomenon where the reduction in both reading and math achievement was exacerbated for already lower-performing students leading to a widening academic achievement gap.

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Trends by Student Race/Ethnicity

While the differences in declines for reading assessments on the NAEP LTT between 2020 and 2022 were negligible for white students as compared to Black and Hispanic students with all scores declining by six scale score points, differences in math achievement were substantial. For the math assessment, achievement scores for White students declined by five scale score points while scores for Black and Hispanic students declined by 13 and eight points respectively. These results indicate a greater negative influence of COVID-19 on student math achievement for Black and Hispanic students than their White peers.

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Trends by Student National School Lunch Program Eligibility

Along with prior performance and student race/ethnicity, NAEP results are also available for those eligible for the National School Lunch Program (NSLP). NSLP is commonly referred to as Free/Reduced-Price Lunch (FRPL) and is a common tool to proxy for socioeconomic status, comparing those who are NSLP-eligible to those who are ineligible. NSLP-ineligible students demonstrated a decline in reading scores of three scale score points between 2020 and 2022, while NSLP-eligible students demonstrated a drop of six points during the same time frame. NSLP-ineligible students experienced a decline of five scale score points in math, while NSLP-eligible students' scores declined by an average of eight scale score points.

In sum, student achievement, race and ethnicity, and socioeconomic status were all associated with differential declines in student achievement on math and reading scores on the NAEP LTT assessment. Specifically, lower-achieving, minority, and lower-SES students were all more likely to demonstrate larger declines in achievement on their assessments than were their peers.

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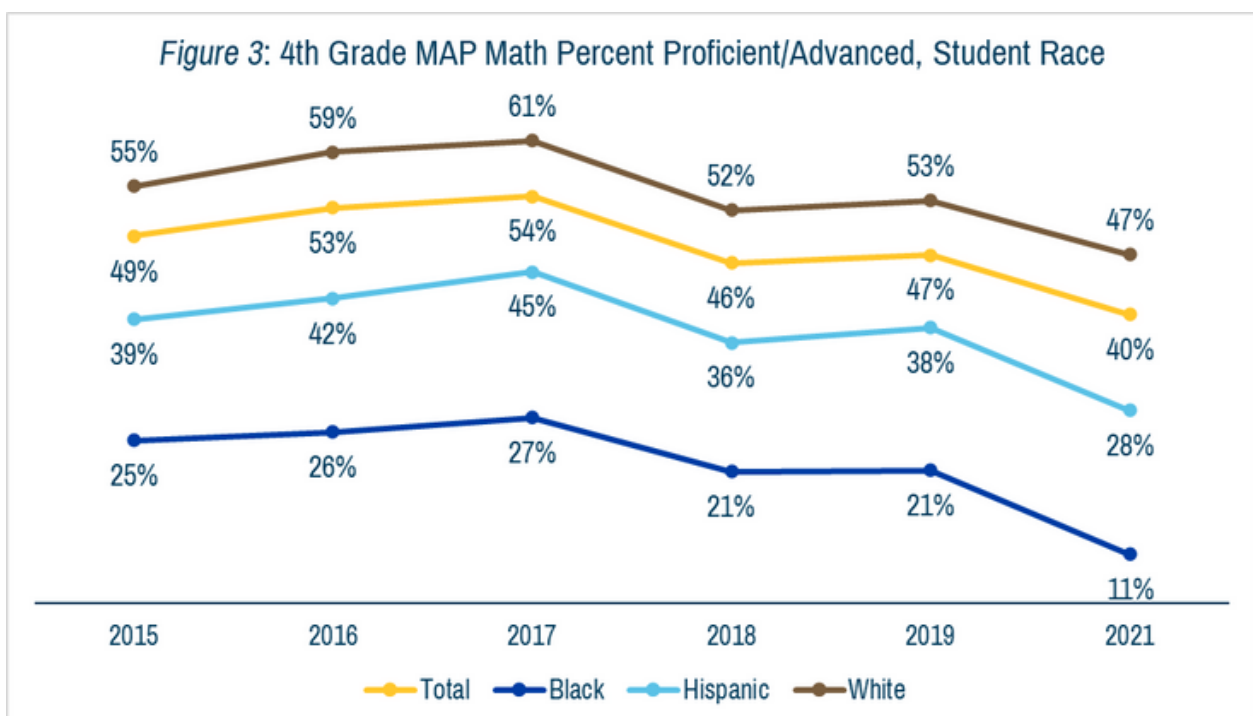
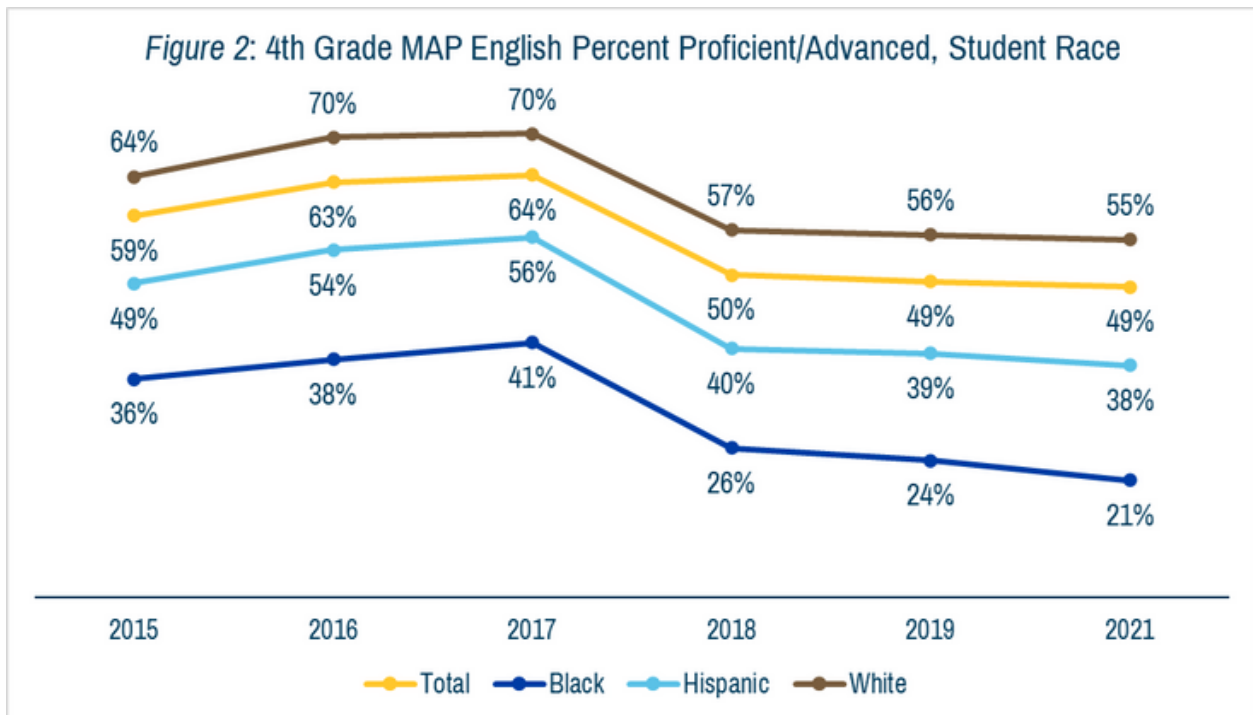
Missouri 4th Grade MAP Scores Continue to Decline

While we cannot directly compare Missouri's MAP assessment results to these NAEP LTT scores, it does offer some context to changes in performance. Specifically, we can observe changes among 4th-grade students in Missouri, the grades typically serving 9-year-old students to offer some insights into whether changes observed among 9-year-old achievement in Missouri was markedly different than what was observed nationally.

Since 2017, Missouri's 4th grade students have experienced declines in the percentage of students scoring Proficient or Advanced. Between 2015 and 2017, there had been a gradual increase in the percentage of students scoring proficient or advanced, until a sharp decline starting in 2017 following the state's adoption of a new version of the MAP assessment.⁵ From 2019 to 2021, Missouri's 4th graders exhibited a seven-percentage point drop in the percent of students proficient or advanced in math. English scores were nearly unchanged from 2019 to 2021, as 49 percent of all 4th graders in Missouri scored proficient or advanced pre- and post-pandemic. These declines were driven mostly by the percentage of students scoring proficient, as more students were scoring basic or below basic from 2019-2021.

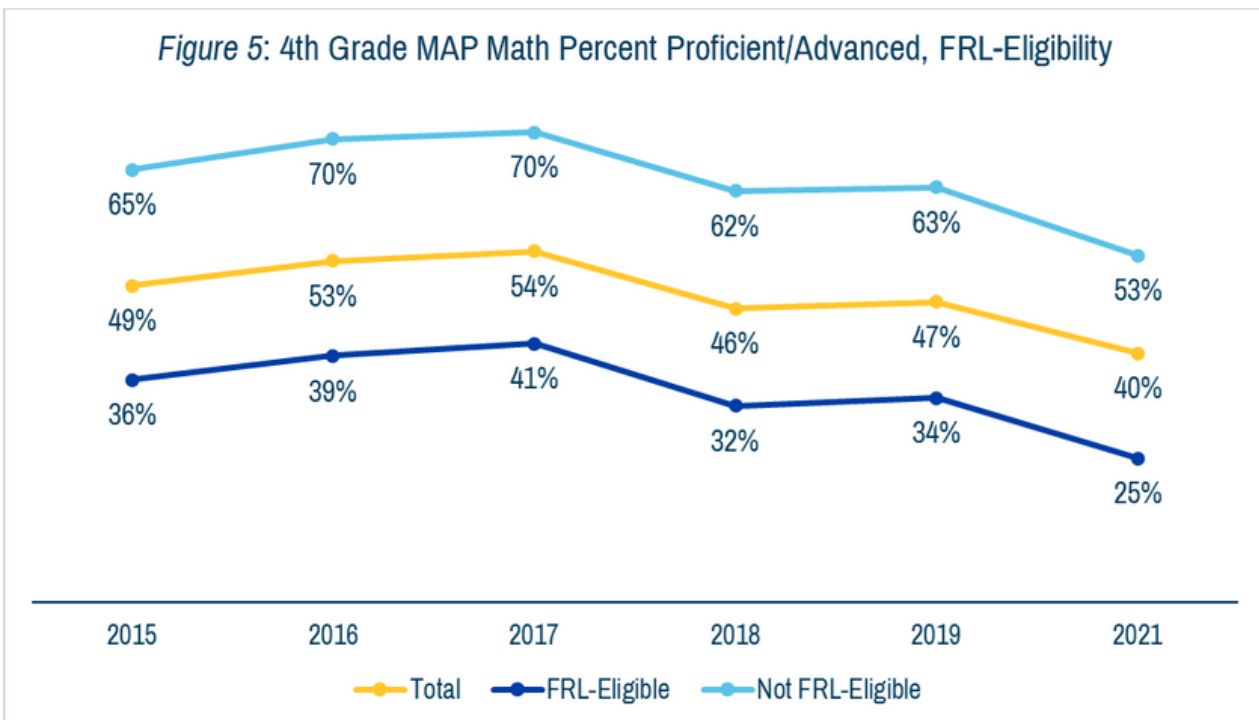
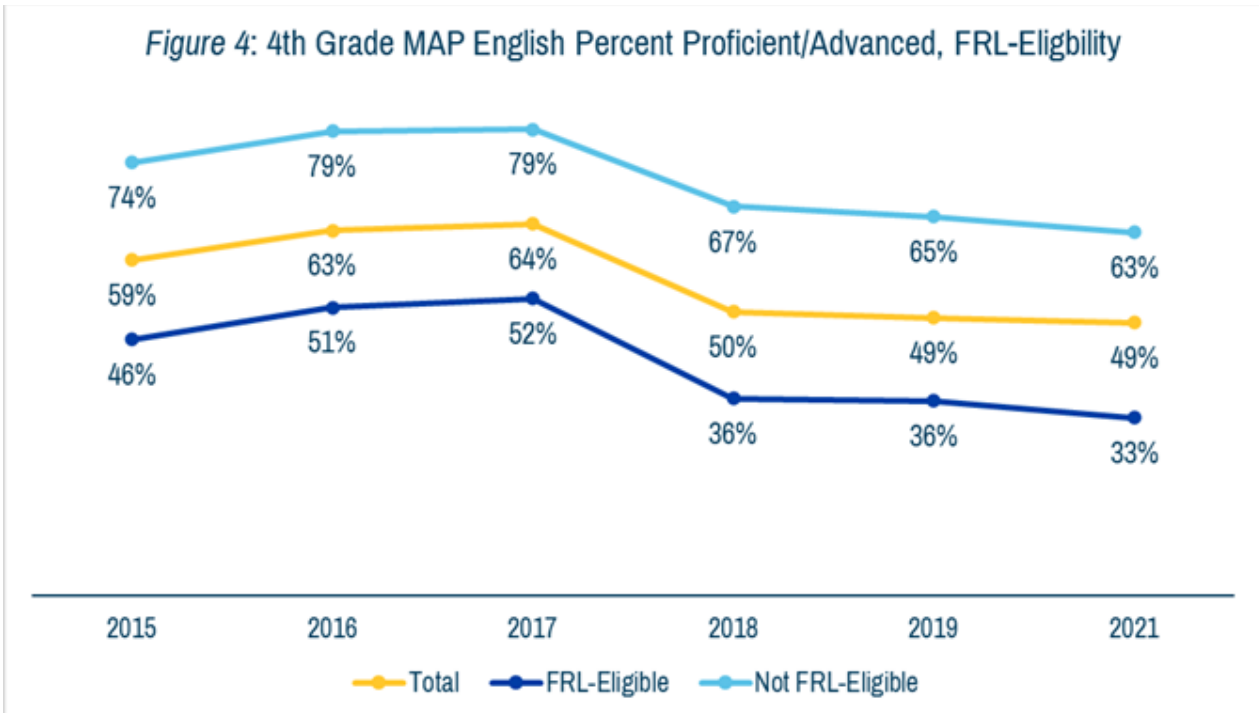
Trends by Student Race/Ethnicity

Examining trends by student race, we see that Black students were most likely to experience declines. The percentage of Black 4th grade students' earning English scores of proficient or advanced dropped three percentage points from 2019 to 2021, while Hispanic and White students each fell by one percentage point (Figure 2). In math, White students' scores dropped six percentage points, while the percentage of Black and Hispanic students scoring proficient or advanced declined 10 percentage points each (Figure 3). Perhaps more concerning, the percentage of Black and Hispanic students scoring below basic increased dramatically. Nearly three out of four (71%) 4th grade Black students scored below basic in 2021, compared to approximately 1 out of 2 students (53%) in 2019.



Trends by National School Lunch Program Eligibility

Examining trends by students' eligibility for Free/Reduced-Price Lunch (a proxy for income), we find both student groups experienced slight declines in the percent scoring proficient or advanced in English (Figure 4). However, there were much sharper declines in math, as students identified as ineligible for FRL dropped 10 percentage points and eligible students dropped nine percentage points (Figure 5).



As Missouri's 4th grade MAP results show, our declines in performance in math were especially alarming. The percentage of students achieving proficient or advanced had been in a steady decline since 2017 (notably, a year Missouri opted to change to the new MAP assessment). However, scores in 2021 show sharp drops in math, especially among Black students. Also, while declines were similar among FRL-eligible and FRL-ineligible students in math, now only 1 in 4 FRL-eligible students score proficient or advanced (compared to approximately 1 in 3 in 2019). Importantly, nearly half (45.9%) of Missouri students were FRL-eligible indicating a significant portion were likely affected by this decline in achievement.⁶

Conclusions

The new results of the LTT NAEP assessment shows evidence of learning loss that are, perhaps unsurprisingly, exacerbating existing racial and socioeconomic achievement gaps. From pre-pandemic to post-shutdown, 9-year-olds nationwide showed dramatic drops in both reading and math. These declines in performance were most apparent among students of color and low-income students when compared to their White and more affluent peers.

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In Missouri, we observe near universal sharp declines in math achievement. Similar to the national conversation, Black and Hispanic 4th graders in Missouri have borne the negative affects of COVID-induced learning loss at a much greater rate than their White peers. Prior to the shutdown, Missouri's 4th graders had begun to show some evidence of rebounding from the most recent statewide assessment change in 2017. However, that has since disappeared for nearly all students across the state, as scores in 2021 fell to their lowest point in the last 5 years.

Both nationally and in Missouri, it is clear there has been adverse effects on student achievement over the last few years. As we prepare for the release of the 2021-22 results here in Missouri and the next iteration of Main NAEP, it will be vital to continue to unpack whether declines in achievement have been slowed or if we continue see the effects of the shutdown. It is as important now as it has ever been for practitioners, policymakers, and community members to collaborate to clearly plan, articulate, and implement actionable and measurable goals to ensure schools are being provided the tools and resources to rebound quickly and equitably.

About the Authors

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Richard Hall, Ph.D., is a postdoctoral research associate with the SLU PRiME Center and St. Louis Public Schools partnership.

References

¹U.S. Department of Education. (2021). Institute of Education Sciences, National Center for Education Statistics. An overview of NAEP. https://nces.ed.gov/nationsreportcard/subject/about/pdf/naep_overview_brochure_2021.pdf

²Preis, S. J. (May 2019). Missouri's Learning Standards and Assessments: Reflecting on the past, looking to the future. SLU PRiME Center. Retrieved from: <https://www.sluprime.org/policy-brief-database/mo-standards>

³National Assessment of Educational Progress. (2022). 1970-2022 trends (long term trends assessment). <https://nces.ed.gov/nationsreportcard/lt/>

⁴ibid.

⁵See note 2.

⁶Missouri Department of Elementary and Secondary Education. (2022). Missouri Comprehensive Data System. "Enrollment & Demographics." Retrieved from: <https://apps.dese.mo.gov/MCDS/Home.aspx>

Data Sources

Main NAEP Results: https://www.nationsreportcard.gov/data_tools.aspx

NAEP Long-Term Trend: <https://www.nationsreportcard.gov/highlights/lt/2022/MO>

MAP Assessment & Missouri Student Demographics: <https://apps.dese.mo.gov/MCDS/Home.aspx>