

## Diving Deeper Into the 2021 NAEP Monthly School Survey Results<sup>1</sup>

In response to the [Executive Order on Supporting the Reopening and Continuing Operation of Schools and Early Childhood Education Providers](#), the Institute of Education Sciences (IES) collected data on the progress of U.S. schools toward full-time in-person instruction in the spring of 2021. Data were collected from nationally representative samples of schools serving fourth- and eighth-grade students. Summaries of this data collection have been reported on the [Monthly School Survey Dashboard](#) as well as on a [Highlights](#) website. This study, sponsored by the National Center for Education Statistics (NCES), aims to examine factors in the Monthly School Survey (MSS) that could help explain the variations in in-person school enrollment. Race, school location, and region were the major variables identified as possible explanatory factors for the variations in in-person school enrollment in the MSS data. The relative and combined impacts of these three variables on in-person school enrollment were assessed.

### Key Results: Average Percentages Enrolled In Person

The outcome of the analysis is reported in partial effects and average partial percentages of students enrolled in person.<sup>2</sup> Average partial percentages of in-person enrollment are reported for both fourth-graders (see Table 1a) and eighth-graders (see Table 1b) from January 2021 to May 2021. Among both fourth-graders and eighth-graders, the percentage of in-person enrollment was higher for White students than for other student groups. By location, city schools recorded the lowest in-person enrollment. At the regional level, the Northeast recorded the lowest in-person enrollment. Among all three variables examined (i.e., race/ethnicity, school location, and region), the lowest in-person enrollment occurred in city schools and the highest in-person enrollment occurred in town and rural schools.

### Key Results: Effects of Race, School Location, and Region on In-Person School Enrollment

The analysis revealed that race/ethnicity, school location, and region each had a significant influence on in-person enrollment. However, among all three variables, school location had the greatest impact on in-person school enrollment, followed by region, with race/ethnicity having the least impact. Even so, all three of the variables combined accounted for at most one-third of the variation in in-person school enrollment (i.e., 33 percent for grade 8 in March; see Figure 1b<sup>3</sup>). This implies that other factors beyond those available in the MSS datasets may be responsible for much of the unexplained variance. In addition, an examination of interaction effects shows that lower rates of in-person school enrollment were found in city schools in the Northeast and the West, irrespective of students' race/ethnicity (see Figure 2<sup>4</sup>). This supports the main observation that the influence of race/ethnicity on in-person enrollment was minimal. Rather, the two location variables (i.e., school location and region) were the major factors driving the variation in in-person school enrollment.

### Discussion

Within the MSS 2021 datasets, location appears to be the key variable accounting for much of the observed variation in in-person school enrollment. The location variables (i.e., school location and region) accounted for more variance than the race/ethnicity variable in both the grade 4 and grade 8 datasets; however, the total amount of variance explained by the three variables in the MSS data is relatively low (accounting for, at most, one-third of the observed variance). On average, school location provided more than twice the amount of variance explained by race/ethnicity in both the grade 4 and grade 8 datasets, and region provided nearly twice the amount of variance explained by race. These significant differences suggest that location variables were the major determinant of in-person

<sup>1</sup> This paper is a revision that summarizes findings presented at the AERA Annual Meeting in April 2022. Citation: Amisshah, C. M., Liu, B., & Finnegan, R. (2022). Diving deeper into the 2021 NAEP monthly school survey results. In Y. H. Jia & A. Drescher (Chair), 2021 NAEP monthly school survey: Learning from U.S. schools on their response to pandemic. Symposium at the 2022 AERA Annual Meeting, San Diego, CA.

<sup>2</sup> The average partial percentages of students enrolled in person are the unique percentage scores of the variable when the effects of the other two variables in the analysis are controlled. They illustrate the unique effect of the variable when the effects of other variables are held constant. For example, the average partial percentages of the school location variable were computed by holding the race/ethnicity and region variables constant. Similarly, the average partial percentages of the race/ethnicity variable were computed by holding school location and region variables constant.

<sup>3</sup> Note that values for Total in Figures 1a and 1b refer to the total combined variance of the three variables analyzed.

<sup>4</sup> Readers can quickly scan this result by noting the leftmost light blue bar (the city data) in each cluster of four-bar clusters.

school enrollment during the spring 2021 pandemic period and that students' racial identity had a relatively minimal influence. The advantage of White students over students of color in in-person enrollment may be due to the fact that most students of color tend to live in major cities where the COVID-19 infection rate was high or where local and state policies required schools to close or to transition to remote and/or hybrid instruction. As revealed in the interaction graphs (Figure 3), city schools in the Northeast and the West recorded the lowest rate of in-person enrollment, irrespective of students' racial identity.

Notwithstanding the above findings, it is crucial to point out that the variables examined here addressed a relatively small proportion of the variance in in-person school enrollment. The highest amount of explained variance was about 33 percent in the March grade 8 dataset. Even in that case, the remaining 67 percent of unexplained variance highlights the need to examine other variables in COVID-19-related datasets, beyond the MSS data. Relevant COVID-19-related variables to consider may include infection rate, lockdowns, and state/local policies. Future research work should consider linking the MSS data to COVID-19-related data to build a more robust model to account for more of the variance related to in-person school enrollment. It should also be noted that these results are limited by the nature of the data collection and potential missing responses from schools, which varied across months. Data on response rates are available on the MSS website.

**Table 1a: Average partial percentages of in-person school enrollment among fourth-grade students: January 2021–May 2021**

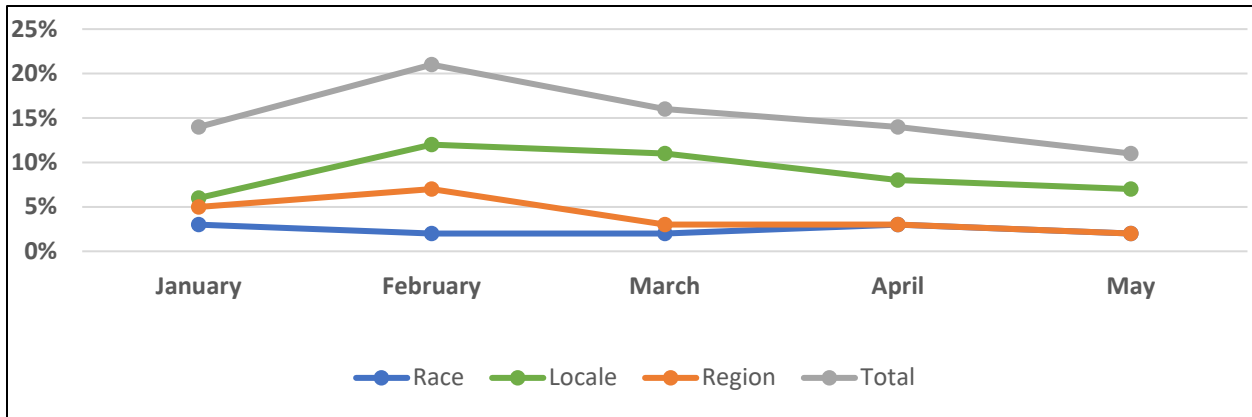
Race		School Location		Region	
White	71	City	46	Northeast	54
Black	62	Suburb	60	South	70
Hispanic	66	Town	79	Midwest	73
Asian	59	Rural	74	West	63
American Indian/Alaska Native	69				
Native Hawaiian/ Pacific Islander	58				
Two or More Races	68				

**Table 1b: Average partial percentages of in-person school enrollment among eighth-grade students: January 2021–May 2021**

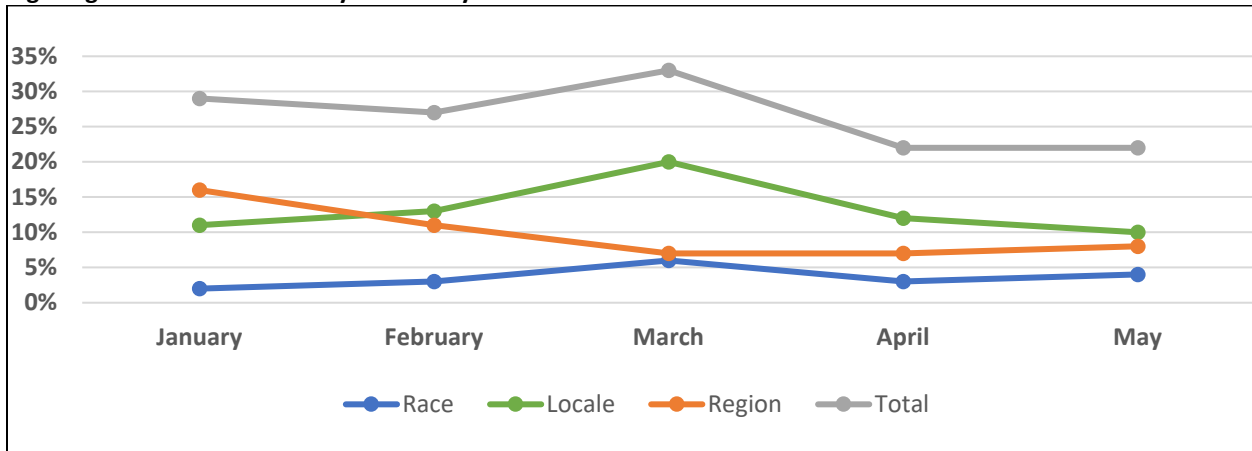
Race		School Location		Region	
White	64	City	37	Northeast	39
Black	58	Suburb	53	South	64
Hispanic	61	Town	72	Midwest	68
Asian	54	Rural	71	West	62
American Indian/Alaska Native	57				
Native Hawaiian/ Pacific Islander	57				

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, Monthly School Survey, 2020–21 school year.

**Figure 1a: Percentage of variance in in-person school enrollment explained by race/ethnicity, school location, and region among fourth-grade students: January 2021–May 2021**

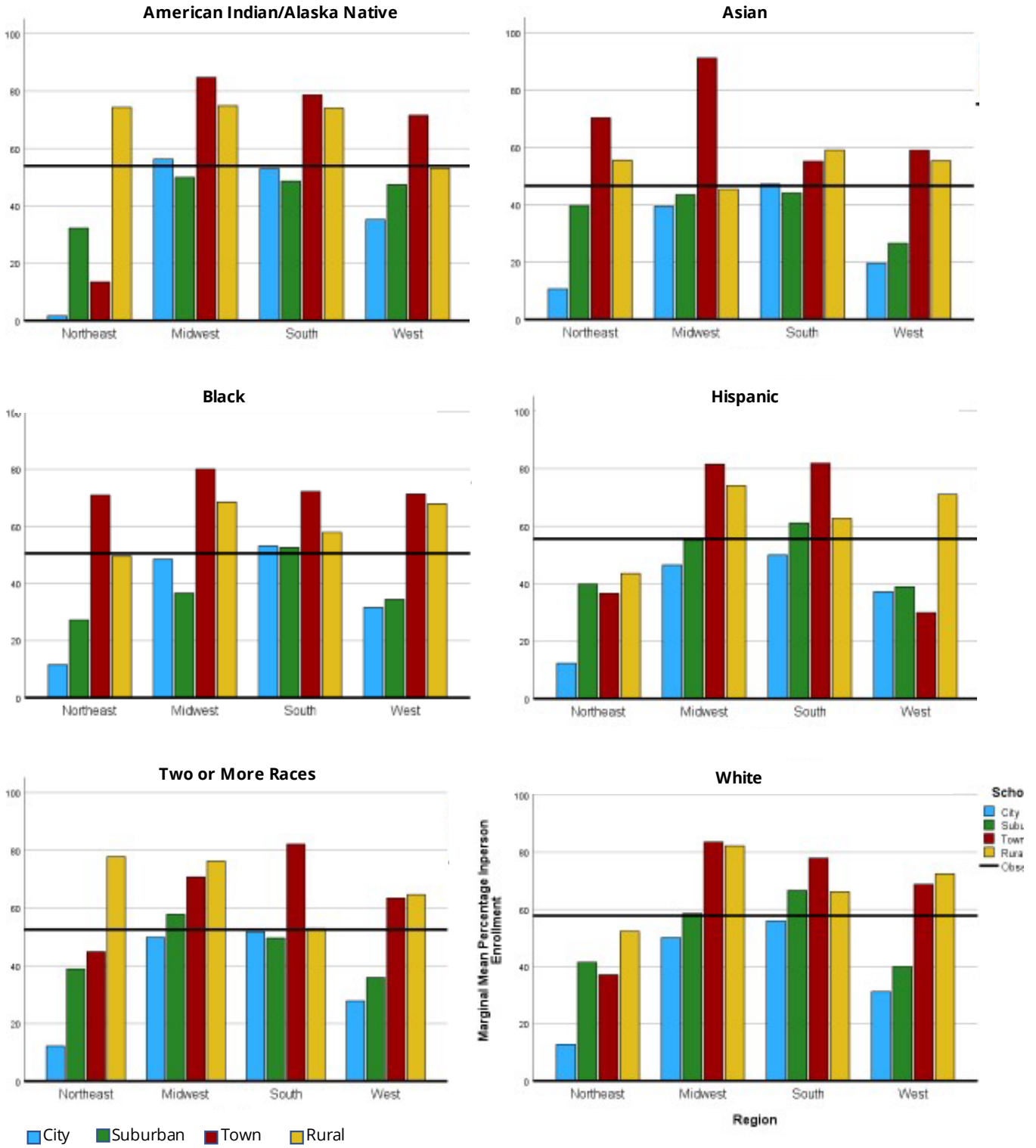


**Figure 1b: Percentage of variance in in-person school enrollment explained by race/ethnicity, school location, and region among eighth-grade students: January 2021–May 2021**



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, Monthly School Survey, 2020–21 school year.

Figure 2: Interaction effects of school location and region on grade 4 in-person school enrollment across race/ethnic groups: January 2021



NOTE: The y axis represents the average partial percentages of students enrolled in person.

## Appendix A

### Instrument

The MSS was the instrument for data collection. It collected school-level data for fourth- and eighth-graders across the United States, using the NAEP school sample design. It consisted of 10 survey questions that inquired about mode of school instruction, enrollment, attendance, and other school-related activities during the January–May 2021 COVID-19 pandemic period. The analysis of this study was based only on MSS question 2, which inquired about mode of school enrollment by student groups. As a result, schools that did not respond to MSS question 2 were excluded from the analysis.

### Data Processing

Raw scores were transformed into percentage scores for each student group. Enrollment percentage scores together with school weights were used as a dependent measure for the analysis. The school weights were computed based on the NAEP sample design. The independent variables were race/ethnicity, which was measured in seven levels (White, Black, Hispanic, Asian, American Indians/Alaska Native, Native Hawaiian/Pacific Islander, and Two or More Races); school location, which had four levels (city, suburban, town, and rural); and region, which also had four levels (Northeast, South, Midwest, and West).

### Computing Enrollment Percentage Scores

**Percentage of In-Person Enrollment (A).** For each given school, subgroup in-person enrollment ( $a$ ) was divided by total subgroup school enrollment. A percentage score was then obtained by multiplying the proportion by 100.  $A = (a/\text{total}) \times 100$ .

**Percentage of Hybrid Enrollment (B).** For each given school, subgroup hybrid enrollment ( $b$ ) was divided by total subgroup school enrollment. A percentage score was then obtained by multiplying the proportion by 100.  $B = (b/\text{total}) \times 100$ .

**Percentage of Remote Enrollment (C).** For each given school, subgroup hybrid enrollment ( $c$ ) was divided by total subgroup school enrollment. A percentage score was then obtained by multiplying the proportion by 100.  $C = (c/\text{total}) \times 100$ .

Therefore,  $A + B + C = 100$ .

### Statistical Analysis

Repeated measures analysis of variance (ANOVA) was conducted on the schools' percentage of students enrolled in person using race/ethnicity as a within-group variable. School location and region were added to the model as between-group variables. Percentages of in-person enrollment of the student groups together with school weights served as the dependent measure. Given that not all seven student groups are represented in all schools, there was a significant number of missing data. Therefore, including all seven levels in the repeated measures ANOVA led to a significant reduction in sample size. To control for this limitation, pairwise comparison was conducted using White students as the reference group against whom other student groups were compared. This approach ensured the optimum sample for the analysis.

**Appendix Table 1: Percentage of variance in in-person school enrollment explained by race/ethnicity, school location, and region among fourth-grade students: January 2021–May 2021**

	January	February	March	April	May
<b>Race/ethnicity</b>	3%	2%	2%	3%	2%
<b>Locale</b>	6%	12%	11%	8%	7%
<b>Region</b>	5%	7%	3%	3%	2%
<b>Total</b>	14%	21%	16%	14%	11%

**Appendix Table 2: Percentage of variance in in-person school enrollment explained by race/ethnicity, school location, and region among eighth-grade students: January 2021–May 2021**

	January	February	March	April	May
<b>Race/ethnicity</b>	2%	3%	6%	3%	4%
<b>Locale</b>	11%	13%	20%	12%	10%
<b>Region</b>	16%	11%	7%	7%	8%
<b>Total</b>	29%	27%	33%	22%	22%

**Appendix Table 3: Interaction effects of school location and region on grade 4 in-person school enrollment across race/ethnic groups: January 2021**

Region	Locale	White	Black	Hispanic	Asian	Indian	Hawaiian	Biracial
Northeast	City	12.7	11.6	12.3	10.7	1.7	3.0	12.2
Northeast	Suburban	41.5	27.3	39.8	39.7	32.2	6.6	38.9
Northeast	Town	37.1	71.0	36.6	70.3	13.5	22.7	44.9
Northeast	Rural	52.3	49.6	43.5	55.5	74.3	18.2	77.8
Midwest	City	50.1	48.5	46.5	39.4	56.3	12.2	49.9
Midwest	Suburban	58.6	36.6	55.0	43.5	49.9	57.2	57.8
Midwest	Town	83.6	80.1	81.6	91.2	84.8	94.5	70.8
Midwest	Rural	82.2	68.5	74.1	45.4	74.9	36.2	76.3
South	City	55.9	53.1	50.0	47.3	53.0	62.1	51.8
South	Suburban	66.6	52.6	61.1	44.1	48.7	67.0	49.6
South	Town	77.9	72.3	81.9	55.2	78.7	70.7	82.1
South	Rural	66.1	57.9	62.7	59.0	74.0	52.2	52.9
West	City	31.2	31.6	37.2	19.6	35.2	4.8	27.8
West	Suburban	39.9	34.4	38.9	26.6	47.4	36.5	35.9
West	Town	68.8	71.3	29.9	59.0	71.6	24.8	63.5
West	Rural	72.4	67.9	71.1	55.3	53.1	77.6	64.7