



RESEARCH REPORT

Academic and Socioemotional Impacts of the COVID-19 Pandemic Will Affect Adult Earnings and Degree Attainment

An Update on the Effects of Learning Loss Using the Social Genome Model

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Executive Summary

America's K-12 students are slowly rebounding from both academic and socioemotional disruptions experienced during the worst of the COVID-19 pandemic. As data have become available, it is clear that the pandemic's negative effects are substantial but uneven. In this report, we use estimates from the Social Genome Model to predict how pandemic-related disruptions may affect children into adulthood. Specifically, we project how the pandemic's cognitive and emotional impacts on schoolchildren may affect their degree attainment and lifetime earnings. From our analysis, we find the following:

- **Disparate impacts on adult outcomes for high school students.** National studies show that students who were in middle school during the height of the pandemic have been less able than younger students to rebound from academic disruptions. Using test score data on students who were eighth-graders in 2021-22, we project that these students could earn 3 percent less at age 30 than they would have earned absent the pandemic, and these students could see larger reductions in high school graduation and associate's and bachelor's degree attainment than students who experienced the pandemic at earlier ages.
- **Substantial declines in earnings and lifetime earnings for certain groups.** Black and Hispanic students, and students from households experiencing poverty, had steeper pandemic-related declines in academic test scores (Kuhfeld and Lewis 2022). These declines translate into additional losses in adulthood, particularly for earnings at age 30 and for lifetime earnings. And Black and Hispanic students, who, on average, have lower levels of higher education attainment than white students or students who do not live in poverty, are also estimated to have drops in educational attainment.
- **Pandemic-related socioemotional and mental health changes further undermine outcomes.** The isolation of virtual learning, as well as the stress and anxiety caused by the pandemic and the struggle for racial justice, have contributed to a decline in students' socioemotional skills and mental health (Balayar and Langlais 2021; Lessard and Puhl 2021; Margolius et al. 2020; Verlenden et al. 2021). When we incorporate small declines in students' behavior, mental health, and other measures, we find steeper declines in adult outcomes.

Our work points to the need for continued and sustained work to support students in their academic achievement and in how they relate to themselves and their peers. Policymakers could help by continuing to monitor how federal relief dollars are being spent, focusing on programming aimed at

students most affected by the pandemic, and engaging families and community members to help students attain a full academic and socioemotional recovery.

The Pandemic's Academic and Socioemotional Impacts

As US students return for the 2022–23 school year, many are still recovering from the academic, social, and emotional disruptions of the COVID-19 pandemic. A recent national assessment indicates that elementary school students scored substantially lower in 2022, relative to earlier peer cohorts, in both reading and math.¹ And at the end of the 2021–22 school year, researchers found evidence that elementary and middle school test scores were rebounding from pandemic declines but had not yet fully recovered (Kuhfeld and Lewis 2022). In addition to the impact on student learning, the pandemic also affected students' socioemotional development, increasing the likelihood of anxiety and leading to a reduction in social connectedness and mental health (Balayar and Langlais 2021; Lessard and Puhl 2021; Margolius et al. 2020; Verlenden et al. 2021).

To understand the potential long-run effects of these academic and socioemotional challenges, we use the Social Genome Model (SGM), a projection model built on a matched panel dataset that follows individuals from early childhood into adulthood. This model allows us to look at the long-run effects of changes in academic and socioemotional well-being and to track potential effects into adulthood (measured at age 30). This report is an update and expansion of an earlier brief, published in February 2021, that used predicted academic delays to estimate the pandemic's long-run effects on adult outcomes (Blagg 2021). This new report looks at actual learning loss estimates and uses these estimates to project their effects on later life outcomes using an updated version of the model. In recognition of the pandemic's effects on students' emotional health and peer relationships, we also conduct a simulation that assesses the effects of broad socioemotional declines, such as a worsening behavior in relating to oneself and others, and a reduction in relationship quality.

Background

Shortly after the pandemic began, researchers used projected estimates of learning loss to estimate the long-run effects on economic returns and degree attainment (Azevedo et al. 2020; Blagg 2021; Hanushek and Woessman 2020).² These publications were calls to action for policymakers and educators to focus on K–12 academic needs during the pandemic, with a goal of mitigating harm during disrupted school years. Recent evidence supports the prediction that students saw a substantial slide in student achievement, along with effects on behavioral and socioemotional skills. An updated set of

long-run projections, based on actual assessments, can help policymakers understand the scope and scale of interventions needed to support students as they rebound from the pandemic-related losses.

Results from national and state-level assessments show that students experienced learning delays during the pandemic and that many students are still working to catch up. The National Center for Education Statistics found that in 2022, the nation's 9-year-olds experienced an average 5 scale-point drop in reading (on a scale from 0 to 500 points) and a 7 scale-point drop in math compared with students who took the National Assessment of Educational Progress long-term trend assessment in 2020 before the pandemic.³ In studies of state assessment results, math test score declines tended to be larger than reading score declines (Kilbride et al. 2022; Kogan and Lavertu 2022; Patarapichayatham, Locke, and Lewis 2021). Districts that provided more in-person instruction tended to experience less of a decline in academic achievement scores (Halloran et al. 2021).

Delays in academic achievement were often paired with changes in peer and family interactions, particularly for students who were learning remotely (Agostinelli et al. 2022; Hertz et al. 2022). Exposure to school closures was associated with declines in mental health, particularly for older students and Black and Hispanic students (Hawrilenko et al. 2021; Verlenden et al. 2021). During the pandemic, parents were more likely to indicate that their children were struggling with anxiety, depression, and social disconnection.⁴ Citing the stress of both the pandemic and the ongoing struggle for racial justice that emerged out of protests around the death of George Floyd and others, the American Academy of Pediatrics, the American Academy of Child and Adolescent Psychiatry, and the Children's Hospital Association declared a national state of emergency in children's mental health in October 2021.⁵

Social Genome Model and Methods

The Social Genome Model 2.1 uses matched longitudinal data from the Early Childhood Longitudinal Study-Kindergarten cohort (ECLS-K) and the 1997 National Longitudinal Survey of Youth (NLSY) to estimate the impact of changes in children and adolescents' life circumstances on adult outcomes. The SGM allows us to project the pandemic's long-term impacts on students from different life stages. In this report, we focus on elementary school (grade 3 or age 8), middle childhood (grade 5 or age 11) and early adolescence (grade 9 or age 14). The SGM estimates effects separately by sex and by race and ethnicity. The three race and ethnicity groups in the SGM are Black (non-Hispanic), Hispanic, and white or those who are members of another racial group (non-Hispanic). We cannot develop separate estimates for other racial and ethnic groups because of the small sample sizes in the ECLS-K and the

NLSY. But we recognize the growing evidence around the pandemic’s disproportionate effects on some of these groups. In particular, students who are American Indian or Alaska Native saw some of the steepest academic losses (Kuhfeld and Lewis 2022) and may have experienced a larger emotional⁶ and health toll (Akee and Reber 2021).

We present results on degree attainment and on earnings in adulthood. Attainment of at least a high school diploma is measured at age 24, and attainment of at least an associate’s or bachelor’s degree is measured at age 30. Annual earnings are also estimated at age 30. To project lifetime earnings (cumulative to age 65), we use a linear model, built on estimates from the Urban Institute’s Dynamic Simulation of Income Model, that incorporates information on earnings at age 30, degree attainment, physical health, and demographics.

For this report, we rely primarily on estimates of learning loss from MAP Growth assessments, developed by the Northwest Evaluation Association to assess learning growth, looking at student achievement at the end of the 2021–22 school year (Kuhfeld and Lewis 2022). These estimates reflect some degree of “rebound” from learning loss during the first full year of pandemic-era learning in 2020–21, but losses are still substantial. Although the evidence around the pandemic’s social and emotional toll on children is clear, we could not find estimates that are directly aligned with the measures that are available in the SGM. Instead, we look at the effects of two simulations of a modest and substantial reduction, in standard deviations, in behavioral skills and mental health. More information on how these standard deviations align with original scale scores in the ECLS-K and NLSY is available in the appendix.

We present the results of four projections:

- **Overall disruption in academic achievement.** We use aggregate estimates of the learning disruption in third grade, fifth grade, and eighth grade (as a proxy for ninth grade or early adolescence, as high school MAP scores are unavailable in Kuhfeld and Lewis [2022]) to estimate long-run outcomes absent additional interventions.
- **Disruption in academic achievement, by race and ethnicity.** We use national estimates of grade-level learning disruption by racial and ethnic group to run separate projections for Black, Hispanic, and white and other groups of students.
- **Disruption in academic achievement, by poverty status.** We use national estimates of grade-level learning disruption for students in high-poverty and low-poverty schools to run separate projections for students from households with low income-to-needs ratios, relative to students from more affluent households.

- **Overall disruption in academic achievement and socioemotional skills.** We estimate the effects of aggregate learning loss combined with a modest decline (0.05 to 0.10 standard deviations) or a substantial decline (0.10 to 0.20 standard deviations) in behavioral and social skills and mental health.

Results

Overall Disruption in Academic Achievement

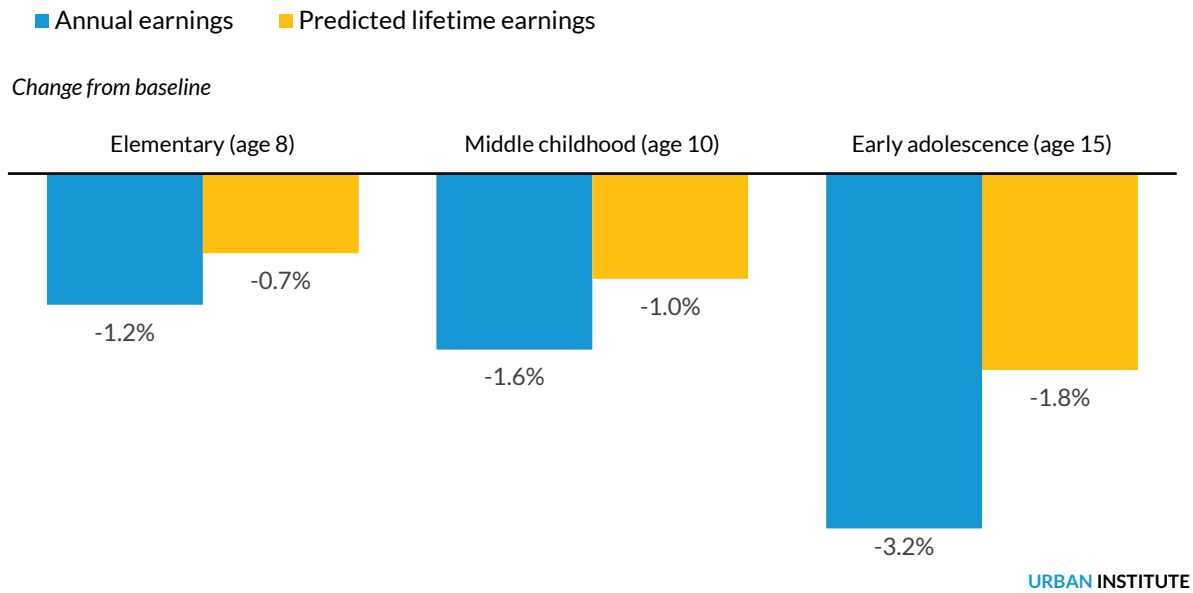
For this projection, we use average estimates of math and reading loss for students who completed grade 3 (elementary life stage), grade 5 (middle childhood), and grade 8 (early adolescence, as a proxy for grade 9) in 2021–22. Similar to other studies, evidence from MAP Growth tests indicates that students experienced steeper declines in math achievement than in reading achievement. The estimates we use for reading range from a decline of 0.10 to 0.12 standard deviations, while for math, the estimates range from a decline of 0.18 to 0.24 standard deviations. Details on the estimates we use for each grade are available in the appendix.

Our results indicate that, even with some rebound in academic achievement, students are still at risk of worse overall adult outcomes. This risk tends to increase with age, as those who are in early adolescence experienced slower rebound rates on the MAP Growth tests and are projected to experience a larger effect at age 30. Specifically, we see that those who are currently in early adolescence are projected to have lower earnings at age 30 and lower lifetime earnings (a 3.2 percentage-point decline and a 1.8 percentage-point decline, respectively) than students in the elementary and middle childhood life stages (figure 1).⁷ To put these results in context, a 1 percent decline in annual earnings for the overall population is equivalent to about \$335 in 2018 dollars. A 1 percent decline in predicted lifetime earnings is about \$6,527 in discounted present value (2018 dollars).⁸

FIGURE 1

Estimated Decline in Age 30 Annual Earnings and Projected Lifetime Earnings

Based on reading and math test score declines in spring 2022



Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

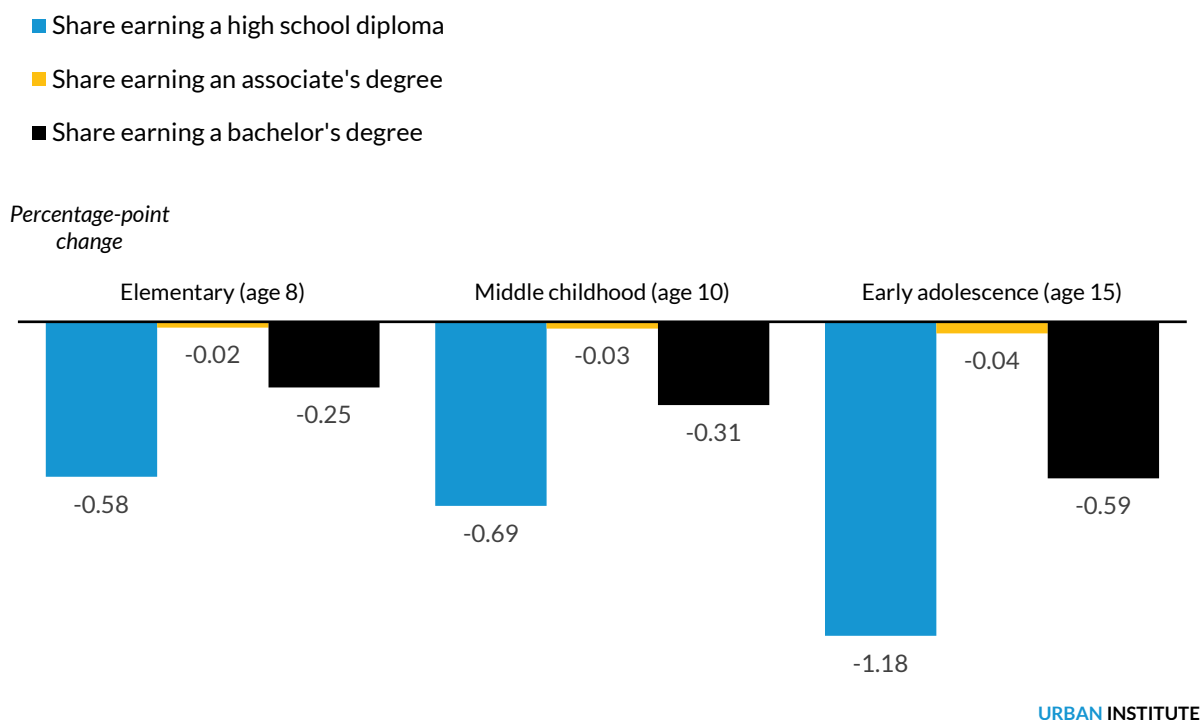
Note: Annual earnings are measured at age 30.

In our projection, decreases in math and reading achievement led to steep declines in high school diploma attainment through age 24, with declines ranging from 0.58 to 1.18 percentage points, depending on the life stage at which students experienced the pandemic. Bachelor’s degree attainment is more vulnerable to academic disruptions than associate’s degree attainment, with bachelor’s degree attainment rates by age 30 projected to decline by 0.25 to 0.59 percentage points (figure 2).

FIGURE 2

Estimated Decline in High School Diploma and Higher Education Attainment

Based on reading and math test score declines in spring 2022



Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates of learning disruption from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

Note: High school diploma attainment is measured at age 24, and associate’s and bachelor’s degree attainment are measured at age 30.

In line with previous analysis, we note that test score declines have more of an effect on female students’ adult outcomes than on male students’ outcomes, no matter what age students experienced the pandemic (appendix table A.3). For example, in our projection, women who were in early adolescence in 2021–22 are predicted at age 30 to have annual earnings declines of 3.4 percent (compared with 3.1 percent for men) and to experience steeper declines in higher education attainment (a -0.06 percentage-point change in associate’s degree attainment and a -0.70 percentage-point change in bachelor’s degree attainment, relative to -0.03 and -0.48 percentage points for men).

Disruption in Academic Achievement, by Race and Ethnicity

Given the stark differences in learning disruption and rebound by race and ethnicity, we also ran simulations separately by racial and ethnic group. The white and other race category includes some

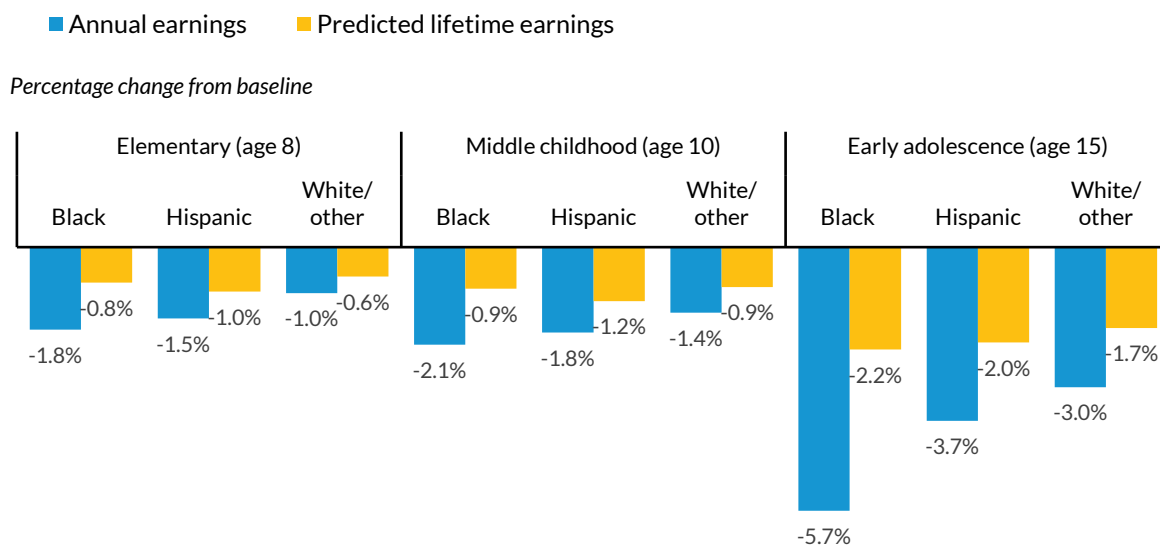
groups who experienced academic disruptions that were on par with those of Black or Hispanic students. To develop the white and other estimate, we built a weighted average of test score changes using estimates for each group (white, Asian, and American Indian and Alaska Native).⁹

Based on MAP Growth scores, Black, Hispanic, and Native American and Alaska Native students experienced steeper achievement declines than white students by spring 2022, relative to their performance in spring 2019 (Kuhfeld and Lewis 2022). For example, Black third-graders experienced a 0.30 standard deviation drop in math and a 0.18 standard deviation drop in reading, and Hispanic third-graders experienced a 0.23 standard deviation drop in math and a 0.15 standard deviation drop in reading. Among students in the white and other category, the weighted average change was -0.16 standard deviations in math and -0.06 standard deviations in reading. Appendix table A.1 outlines the full set of simulations.

Aligned with the disproportionate effects on academic outcomes for Black and Hispanic students, we find that Black and Hispanic students are predicted to experience more substantial declines in annual earnings at age 30 than students who are part of the white and other group (figure 3). These differences are particularly evident in the early adolescence life stage, where Black students are projected to experience a 5.7 percent decline in earnings at age 30 and Hispanic students are projected to experience a 3.7 percent decline, compared with a 3.0 percent decline for students who are white or identify as another race or ethnicity. Changes in predicted lifetime earnings appear to be more consistent across the racial and ethnic groups, though Black and Hispanic students in early adolescence in 2021–22 are still projected to have a larger loss, in percentage terms, in lifetime earnings than those who are white or some other race.

FIGURE 3

Estimated Decline in Age 30 Annual Earnings and Predicted Lifetime Earnings, by Race or Ethnicity
Based on reading and math test score declines in spring 2022



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Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates of learning disruption from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

Notes: Annual earnings are measured at age 30. The white and other category is inclusive of results for white, Asian, American Indian, and Alaska Native students.

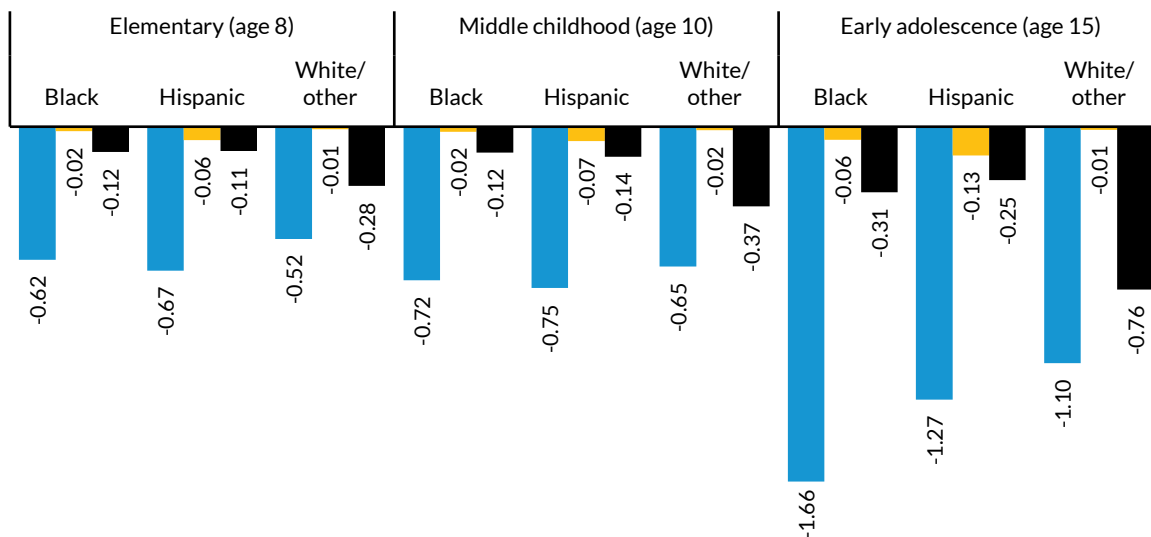
Projections of attainment by race and ethnicity indicate that Black and Hispanic students are predicted to experience steeper declines in high school diploma attainment than other students (figure 4). Hispanic students are predicted to have larger percentage-point declines in associate’s degree attainment, though these declines are small. Even with more academic disruption for Black and Hispanic students, our projection predicts a steeper decline in bachelor’s degree attainment for students who are white or from another racial group. This effect may be, in part, a result of the larger share of white and other students who attain bachelor’s degrees in our projection. In our dataset, 33 percent of white and other individuals attain bachelor’s degrees by age 30, compared with 14 percent of Black individuals and 16 percent of Hispanic individuals. Converting percentage-point declines to percentage changes, Black students who experienced learning loss in early adolescence are projected to have a 2.2 percent decline in bachelor’s degree attainment, while Hispanic students are projected to have a 1.5 percent decline and white and other students are projected to have a 2.3 percent decline.

FIGURE 4

Estimated Decline in High School Diploma and Higher Education Attainment, by Race or Ethnicity
Based on reading and math test score declines in spring 2022

- Share earning a high school diploma
- Share earning an associate's degree
- Share earning a bachelor's degree

Percentage-point change from baseline



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Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates of learning disruption from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

Notes: High school diploma attainment is measured at age 24, and associate’s and bachelor’s degree attainment are measured at age 30. The white and other category is inclusive of results for white, Asian, and American Indian and Alaska Native students.

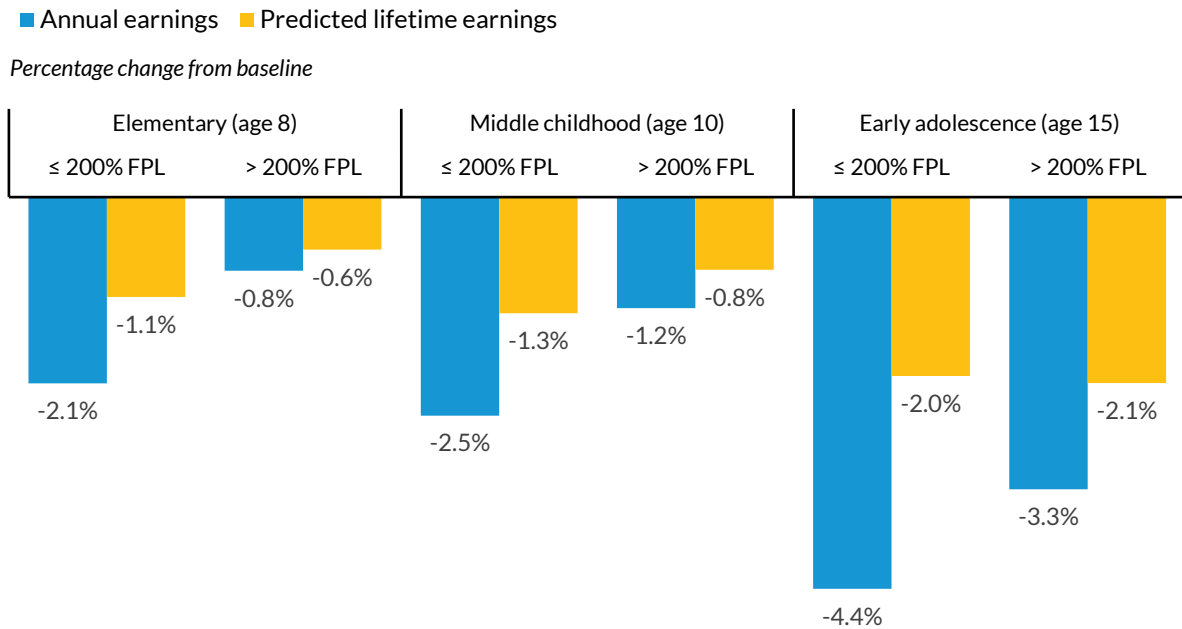
Disruption in Academic Achievement, by Poverty Status

MAP Growth scores are also available for students who are from high-poverty schools (schools with more than 75 percent eligibility for free and reduced-price lunch, according to 2019–20 data from the National Center for Education Statistics Common Core of Data) relative to students from low-poverty schools (less than 25 percent eligibility). Students from high-poverty schools tended to have more learning loss, particularly in math in the elementary grades, where learning loss could be twice as large among students from low-poverty schools. Learning disruption tended to be more even across high- and low-poverty schools for students enrolled in middle school during the pandemic. In our projections, changes in reading test scores ranged from -0.19 to -0.14 standard deviations for the low-poverty group compared with -0.13 to -0.10 standard deviations for the high-poverty group. In math, ranges for the

low-poverty group were -0.31 to -0.27 standard deviations and for the high-poverty group were -0.28 to -0.13 standard deviations (refer to appendix table A.1 for full documentation).

In the SGM, we do not know the overall poverty levels of the schools that students attend, but we do have an estimate of poverty level for each student in the projection.¹⁰ In this instance, we estimate a projection for students from households earning up to 200 percent of the federal poverty level (high poverty), relative to students from households earning above 200 percent of the federal poverty level. This approach may introduce some error. For example, this approach might overestimate learning loss for students from households experiencing poverty but who attend low-poverty schools. But data from other assessments indicate that students from economically disadvantaged households experienced academic disruptions on par with, or more substantial than, students who do not come from economically disadvantaged households. For example, Kogan and Lavertu (2022) find a 0.15 standard deviation decrease in English language growth among economically disadvantaged third-graders relative to a 0.09 standard deviation decline for peers who are not disadvantaged.

FIGURE 5
Estimated Decline in Age 30 Annual Earnings and Predicted Lifetime Earnings, by Poverty Status
Based on reading and math test score declines in spring 2022



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Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates of learning disruption from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

Notes: FPL = federal poverty level. Annual earnings are measured at age 30.

Our results indicate that pandemic-related learning loss will disproportionately affect the annual earnings and lifetime earnings of students who come from households earning up to 200 percent of the federal poverty level (figure 5). Across all life stages, these students are projected to see earnings reductions more than 1 percentage point larger than their higher-income peers. The effects on lifetime earnings is more muted, but elementary students from households earning up to 200 percent of the federal poverty level are still estimated to fall 0.5 percentage points further behind what the earnings might otherwise be, relative to their higher-income peers.

These results carry through to educational attainment, though similar to the effects by race and ethnicity, percentage-point differences may be muted by the variations in typical educational attainment by students from low-income and high-income households (appendix figure A.1). For students who experienced the pandemic during the elementary and middle childhood life stages, students from low-income households are estimated to have larger declines in high school diploma and associate's degree attainment. Declines in bachelor's degree attainment are steeper for students from high-income households, likely because overall attainment rates are higher. In our base projection, 38 percent of those from households earning above 200 percent of the federal poverty level are predicted to attain bachelor's degrees compared with 15 percent for those from households earning up to 200 percent of the federal poverty level.

Overall Disruption in Academic Achievement and Socioemotional Skills

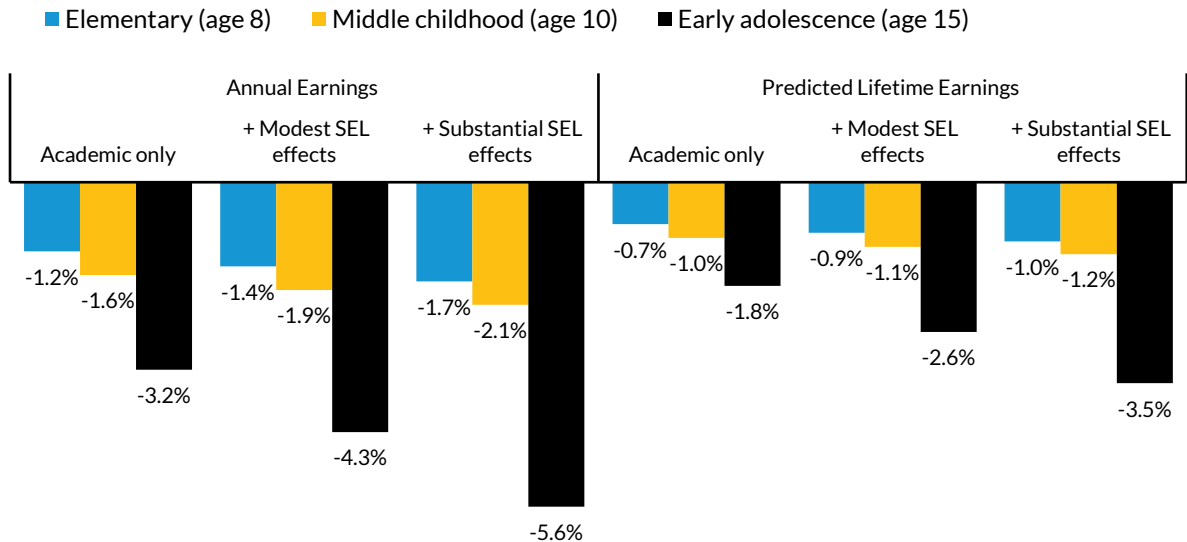
If students experienced disruption in their peer relationships and mental health in addition to their academic disruptions, we might expect that effects on adult outcomes are further compounded. To assess the implications of these socioemotional disruptions, we model both a “modest” and a “substantial” shift in behavior and emotional well-being among our three student cohorts along with academic disruption. We compare these results with academic disruption alone. We know that the isolation of remote instruction, the stress of the pandemic, and the struggle for racial justice disproportionately affected some student groups more than others, but for simplicity of results, we estimate academic and socioemotional impacts for the overall population.

Because evidence on socioemotional outcomes during the pandemic do not directly align with measures used in the SGM, we opt for an approach where each socioemotional or behavioral measure is decreased by a modest or more substantial amount. Although conventionally these factors are measured using Likert scales, we convert each factor into a weighted standard deviation scale for use in the SGM. For example, for the modest decrease in the elementary life stage, we change internalizing

behaviors (e.g., depression and anxiety) and externalizing behaviors (e.g., aggression and bullying) by 0.05 standard deviations. At the median, this is equivalent to an increase of about 0.03 scale points on a scale of 1 to 4 for these behavior measures (a higher score indicates more behavior issues). In the elementary life stage, we also decrease peer relationships by 0.10 standard deviations (about 0.08 scale points on a 1-to-4 scale) and interpersonal skills by 0.10 standard deviations (0.06 scale points on a 1-to-4 scale). For the substantial impact of socioemotional measures, we double these effects. Appendix table A.2 provides a full description of the modest and substantial changes we introduced at each life stage. The appendix also has a description of each socioemotional factor and an illustration of how the standard deviation changes scale to the original Likert measure.

Based on our projections, we find that changes in socioemotional outcomes increase the effects of academic disruptions on adult outcomes. A modest socioemotional decline would further reduce annual earnings at age 30 by 0.2 to 1.1 percentage points (with more substantial effects for those in early adolescence), while a substantial decline would further reduce earnings by 0.5 to 2.4 percentage points. Impacts on lifetime earnings are less dramatic but still evident (figure 6).

FIGURE 6
Estimated Decline in Age 30 Annual Earnings and Projected Lifetime Earnings
Based on reading and math test score declines and socioemotional declines in spring 2022



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Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates of learning disruption from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

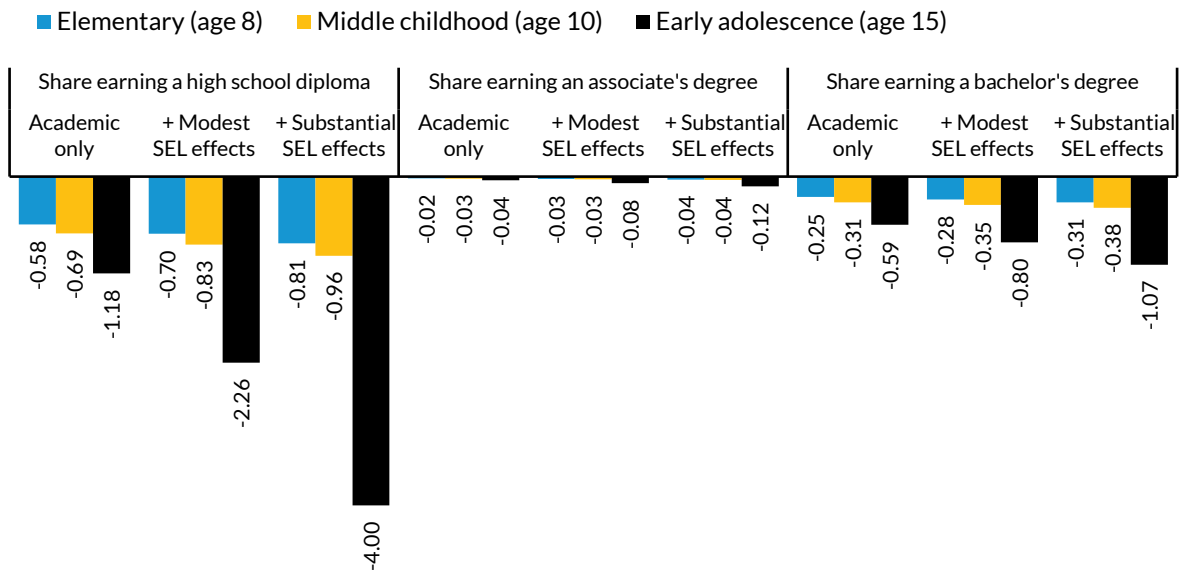
Notes: SEL = socioemotional learning. Annual earnings are measured at age 30.

When we apply these socioemotional projections to our estimates of diploma and degree attainment, we see substantial additional effects, particularly for high school diploma and bachelor's degree attainment. Similar to the earnings and income estimates, we see the largest effects for those in early adolescence. This strong association, particularly with high school degree attainment, may be attributable to multiple factors, such as the risk that additional negative peer behaviors result in exclusionary discipline. In addition, at the early adolescence life stage, we directly project the effects of an additional two (modest) or five (substantial) days of absences to reflect growing evidence around chronic absenteeism in the wake of the pandemic (figure 7).¹¹

FIGURE 7

Estimated Decline in Educational Attainment

Based on reading and math test score declines and socioemotional declines in spring 2022



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Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates of learning disruption from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

Notes: SEL = socioemotional learning. High school diploma attainment is measured at age 24, and associate’s and bachelor’s degree attainment are measured at age 30.

Policy Recommendations

These results present a sobering look at the work that remains to be done to help school-age children recover from the pandemic. These results echo findings from others around concerns for older students, who have less time in school to recover from disruptions, for Black and Hispanic students, and

for students from low-income households. The potential effects of academic losses are substantial and are likely to be compounded by the pandemic's effects on students' socioemotional well-being. School districts can play a role in both of these recoveries. Studies looking at strong socioemotional learning programs note how these programs are not separate from academic instruction and are a part of a classroom's daily practices (Huguley et al. 2022; Jones and Bouffard 2012). Policymakers who want to continue to help students recover from the pandemic have several pathways for supporting schools:

Continue to track and understand spending of federal dollars for COVID-19 mitigation and recovery. K-12 education received more than \$180 billion in aid through the Coronavirus Aid, Relief, and Economic Security Act (\$13.2 billion), the COVID relief package (\$54 billion), and the American Rescue Plan (\$122 billion).¹² Funds from the American Rescue Plan had to be obligated by fall 2024, but the US Department of Education has allowed states to request up to 18 additional months to obligate funding.¹³ Information on how schools are using the dollars is still emerging, but school districts are largely spending funds on staffing and academic recovery (around 27 percent and 25 percent) and on facilities and operations (23 percent).¹⁴ To support academic recovery and to fully integrate socioemotional learning programs, it is vital that schools and districts have adequate funding to support these efforts (Jones and Bouffard 2012; Yoder et al. 2020). Many schools lack mental health professionals who can support students who are struggling with mental health issues (Huguley et al. 2022). Schools could invest in training teachers in socioemotional learning to ensure that the implementation, which is an important factor in determining program effectiveness, is done well (Dusenbury and Weissberg 2017).

Look at options for tracking and following both academic and socioemotional changes, particularly for high school students. Data are important for assessing and predicting future student outcomes, and policymakers could provide schools more resources to track their students' academic and socioemotional changes and document the effectiveness of the interventions they implement (Jones and Bouffard 2012; Kendziora and Yoder 2016; Mahoney et al. 2021; Yoder et al. 2020). In particular, policymakers could consider additional tracking of academic data in high school, in addition to socioemotional data for students in all years.

Consider targeting academic support funding for high school students and students who have been slow to rebound from the pandemic disruption. Our study indicates that some student groups are particularly at risk for how the pandemic would affect their adult outcomes. Our simulations point to concerns for high school students, who have less time to rebound. And students from low-income backgrounds, and Black and Hispanic students, are also at increased risk for lower earnings and educational attainment. In addition to providing flexibility around spending federal COVID relief dollars

to mitigate the pandemic's impacts, the Biden administration has pushed for increasing Title I (funding for students from low-income households) and funding for students with disabilities.¹⁵ Particular attention is needed to ensure that funding for K–12 education can remain steady in the long run and that students are not subject to a substantial decline in resources attributable to economic changes or the spend-down of federal dollars.¹⁶

Continue to engage families and communities in students' recovery. Research indicates that the most effective socioemotional learning programs are not solely focused on teachers and students. It is important to provide students well-rounded support, including family and community engagement. For example, high school transition programs that involve parents, students, and staff have a greater impact on student outcomes, increasing achievement levels and lowering dropout rates, than those that did not (Cohen and Smerdon 2009). Encouraging family involvement at home and in the classroom improves students' behavior and helps with socioemotional learning (Dusenbury and Weissberg 2017; Mahoney et al. 2021).

The effects we project in the SGM are not written in stone. Continued intervention and support, particularly for student groups most affected by the pandemic, can help students recover and excel as they move through school and into higher education and the workforce.

Appendix

TABLE A.1

Academic Learning Loss Estimates in Math and Reading, by Race or Ethnicity and Poverty Status

Model life stage	Grade source	Group	Mathematics	Reading
Elementary (age 8)	3rd grade	Overall	-0.18 SD	-0.12 SD
Middle childhood (age 10)	5th grade		-0.22 SD	-0.10 SD
Early adolescence (age 15)	8th grade		-0.24 SD	-0.12 SD
Elementary (age 8)	3rd grade	Black	-0.30 SD	-0.18 SD
		Hispanic	-0.23 SD	-0.15 SD
		White/other	-0.16 SD	-0.06 SD
Middle childhood (age 10)	5th grade	Black	-0.32 SD	-0.13 SD
		Hispanic	-0.26 SD	-0.10 SD
		White/other	-0.19 SD	-0.09 SD
Early adolescence (age 15)	8th grade	Black	-0.26 SD	-0.15 SD
		Hispanic	-0.26 SD	-0.13 SD
		White/other	-0.25 SD	-0.11 SD
Elementary (age 8)	3rd grade	High poverty	-0.29 SD	-0.19 SD
		Low poverty	-0.13 SD	-0.10 SD
Middle childhood (age 10)	5th grade	High poverty	-0.31 SD	-0.14 SD
		Low poverty	-0.18 SD	-0.10 SD
Early adolescence (age 15)	8th grade	High poverty	-0.27 SD	-0.15 SD
		Low poverty	-0.28 SD	-0.13 SD

Source: Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

Note: SD = standard deviation.

TABLE A.2

Academic and Socioemotional Learning Loss Estimates, by Life Stage

Model life stage	Factor	Low estimate	High estimate
Elementary (age 8)	Mathematics		-0.18 SD
	Reading		-0.12 SD
	Internalizing behavior	-0.05 SD	-0.1 SD
	Externalizing behavior	-0.05 SD	-0.1 SD
	Parent-child relationship	-0.10 SD	-0.2 SD
	Self-control	-0.10 SD	-0.2 SD
Middle childhood (age 10)	Mathematics		-0.22 SD
	Reading		-0.10 SD
	Internalizing behavior	-0.05 SD	-0.1 SD
	Externalizing behavior	-0.05 SD	-0.1 SD
	Peer relationships	-0.10 SD	-0.2 SD
	Self-control	-0.10 SD	-0.2 SD
Early adolescence (age 15)	Mathematics		-0.24 SD
	Reading		-0.12 SD
	Positive peer behavior	-0.05 SD	-0.1 SD
	Negative peer behavior	-0.05 SD	-0.1 SD
	Mental health	-0.10 SD	-0.2 SD
	Number of days absent from school	+2 days	+5 days

Sources: Megan Kuhfeld and Karyn Lewis, "Student Achievement in 2021–2022: Cause for Hope and Continued Agency" (Portland, OR: Northwest Evaluation Association, 2022); and authors' projections of potential socioemotional effects, informed by Katie Lannan, "Chronic Absenteeism Rate Rose in Disrupted School Year," WBUR News, May 5, 2021, <https://www.wbur.org/news/2021/05/05/massachusetts-pandemic-schools-absences>; Michelle Healy, "Missing Students: The Pandemic Has Exacerbated Chronic Absenteeism across the Country," National School Boards Association, March 11, 2022, <https://www.nsba.org/ASBJ/2022/april/missing-students>; Linda Jacobson, "The Numbers Are Ugly: Chronic Absenteeism among California Elementary Students Could Be Surging by More than 200 Percent," *The 74*, November 11, 2020, <https://www.the74million.org/article/the-numbers-are-ugly-chronic-absenteeism-among-california-elementary-students-could-be-surging-by-more-than-200-percent/>; Leah Kuntz, "Child and Adolescent Mental Health: A National Emergency," *Psychiatric Times*, October 25, 2021, <https://www.psychiatrictimes.com/view/child-and-adolescent-mental-health-a-national-emergency>; Bhoj B. Balayar and Michael R. Langlais, "Parental Support, Learning Performance, and Socioemotional Development of Children and Teenagers during the COVID-19 Pandemic," *Family Journal* 30, no. 2 (April 2022): 237–46; Leah M. Lessard and Rebecca M. Puhl, "Adolescent Academic Worries amid COVID-19 and Perspectives on Pandemic-Related Changes in Teacher and Peer Relations," *School Psychology* 36, no. 5 (September 2021): 285–92, <https://doi.org/10.1037/spq0000443>; Max Margolius, Alicia Doyle Lynch, Elizabeth Puffall Jones, and Michelle Hynes, "The State of Young People during COVID-19: Findings from a Nationally Representative Survey of High School Youth" (Washington, DC: America's Promise Alliance, 2020); Jorge V. Verlenden, Sanjana Pampati, Catherine N. Rasberry, Nicole Liddon, Marci Hertz, Greta Kilmer, Melissa Heim Viox, Sarah Lee, Neha K. Cramer, Lisa C. Barrios, and Kathleen A. Ethier, "Association of Children's Mode of School Instruction with Child and Parent Experiences and Well-Being during the COVID-19 Pandemic—COVID Experiences Survey, United States, October 8–November 13, 2020," *Morbidity and Mortality Weekly Report* 70, no. 11 (March 2021): 369–76, <https://doi.org/10.15585/mmwr.mm7011a1>; Francesco Agostinelli, Matthias Doepke, Giuseppe Sorrenti, and Fabrizio Zilibotti, "When the Great Equalizer Shuts Down: Schools, Peers, and Parents in Pandemic Times," *Journal of Public Economics* 206 (February 2022): 104574, <https://doi.org/10.1016/j.jpubeco.2021.104574>; Marci F. Hertz, Greta Kilmer, Jorge Verlenden, Nicole Liddon, Catherine N. Rasberry, Lisa C. Barrios, and Kathleen A. Ethier, "Adolescent Mental Health, Connectedness, and Mode of School Instruction during COVID-19," *Journal of Adolescent Health* 70, no. 1 (January 2022): 57–63, <https://doi.org/10.1016/j.jadohealth.2021.10.021>; Matt Hawrilenko, Emily Kroshus, Pooja Tandon, and Dimitri Christakis, "The Association between School Closures and Child Mental Health during COVID-19," *JAMA Network Open* 4, no. 9 (September 2021): e2124092, <https://doi.org/10.1001/jamanetworkopen.2021.24092>; and Emma Dorn, Bryan Hancock, Jimmy Sarakatsannis, and Ellen Viruleg, "COVID-19 and Education: The Lingering Effects of Unfinished Learning," McKinsey & Company, July 27, 2021, <https://www.mckinsey.com/industries/education/our-insights/covid-19-and-education-the-lingering-effects-of-unfinished-learning>.

Notes: SD = standard deviation. In the model, all factors are set such that a negative intervention is a poorer outcome. For example, a -0.05 standard deviation change in internalizing behavior is a decline in the exhibition of internalizing behavior, such as depressive or anxious behaviors.

TABLE A.3

Estimated Decline in Earning and Attainment Outcomes, by Gender

Based on reading and math test score declines in spring 2022

Model Life Stage	Gender	Percentage Change in Earning Outcomes		Percentage-Point Change in Attainment Outcomes		
		Annual earnings	Predicted lifetime earnings	Share earning a high school diploma	Share earning an associate's degree	Share earning a bachelor's degree
Elementary (age 8)	Female	-1.5%	-0.8%	-0.59 p.p.	-0.03 p.p.	-0.28 p.p.
	Male	-1.0%	-0.7%	-0.57 p.p.	-0.01 p.p.	-0.21 p.p.
Middle childhood (age 10)	Female	-2.0%	-1.1%	-0.77 p.p.	-0.04 p.p.	-0.38 p.p.
	Male	-1.4%	-0.9%	-0.61 p.p.	-0.01 p.p.	-0.25 p.p.
Early adolescence (age 15)	Female	-3.4%	-1.8%	-1.19 p.p.	-0.06 p.p.	-0.70 p.p.
	Male	-3.1%	-1.7%	-1.16 p.p.	-0.03 p.p.	-0.48 p.p.

Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates of learning loss from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

Note: p.p. = percentage points.

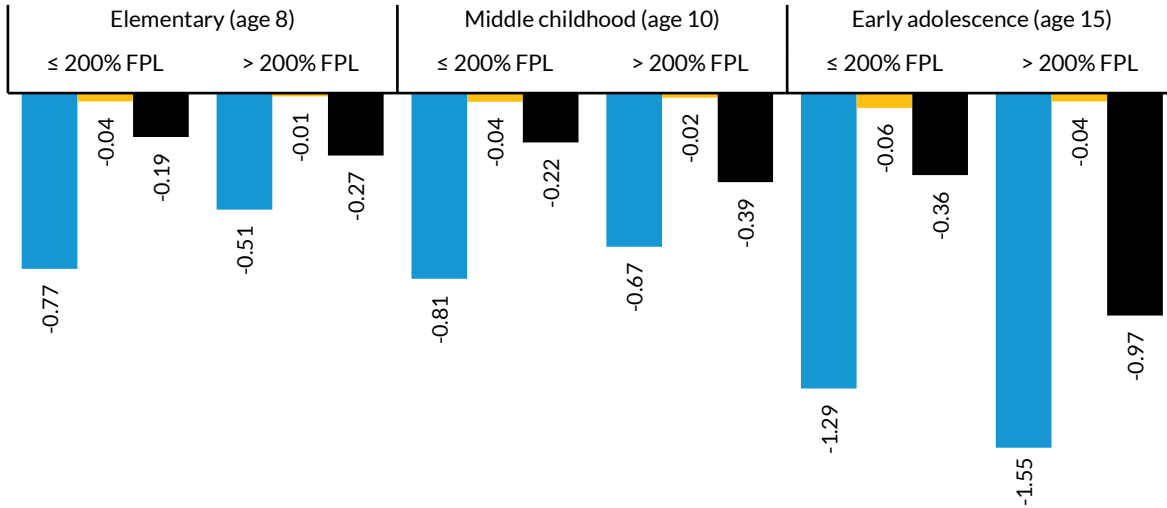
FIGURE A.1

Estimated Decline in High School Diploma and Higher Education Attainment, by Poverty Status

Based on reading and math test score declines in spring 2022

- Share earning a high school diploma
- Share earning an associate's degree
- Share earning a bachelor's degree

Percentage-point change from baseline



Source: Urban Institute analysis using the Social Genome Model 2.1, based on estimates of learning loss from Megan Kuhfeld and Karyn Lewis, “Student Achievement in 2021–2022: Cause for Hope and Continued Agency” (Portland, OR: Northwest Evaluation Association, 2022).

Notes: FPL = federal poverty level. High school diploma attainment is measured at age 24, and associate’s and bachelor’s degree attainment are measured at age 30.

Notes on SEL Indicators

Elementary: ECLS-K

- **Peer relationships** is originally reported on a scale of 1 to 4 (4 indicates better relationships). At the midpoint, a 0.21 standard deviation increase is equivalent to a 0.17 scale-point increase in peer relationships.
- **Internalizing problem behaviors** is originally reported on a scale of 1 to 4 (4 indicates more behaviors). At the midpoint, a 0.31 standard deviation decrease is equivalent to a 0.17 scale-

point decrease in internalizing problem behaviors. This measure is inverted (higher indicates fewer internalizing behaviors) in the SGM.

- **Externalizing problem behaviors** is originally reported on a scale of 1 to 4 (4 indicates more behaviors). At the midpoint, a 0.13 standard deviation decrease is equivalent to a 0.08 scale-point decrease in internalizing problem behaviors. This measure is inverted (higher indicates fewer externalizing behaviors) in the SGM.
- **Interpersonal skills** is originally reported on a scale of 1 to 4 (4 indicates better skills). At the midpoint, a 0.30 standard deviation increase is equivalent to a 0.20 scale-point increase in interpersonal skills.

Middle Childhood: ECLS-K

- **Peer relationships** is originally reported on a scale of 1 to 4. At the midpoint, a 0.27 standard deviation increase is equivalent to a 0.17 scale-point increase in peer relationships.
- **Internalizing problem behaviors** is originally reported on a scale of 1 to 4 (4 indicates more behaviors). At the midpoint, a 0.31 standard deviation decrease is equivalent to a 0.17 scale-point decrease in internalizing problem behaviors. This measure is inverted (higher indicates fewer internalizing behaviors) in the SGM.
- **Externalizing problem behaviors** is originally reported on a scale of 1 to 4 (4 indicates more behaviors). At the midpoint, a 0.12 standard deviation decrease is equivalent to a 0.07 scale-point decrease in externalizing problem behaviors. This measure is inverted (higher indicates fewer externalizing behaviors) in the SGM.
- **Interpersonal skills** is originally reported on a scale of 1 to 4 (4 indicates better skills). At the midpoint, a 0.31 standard deviation increase is equivalent to a 0.20 scale-point increase in interpersonal skills.

Early Adolescence: NLSY-97

- **Peer positive relationships** is originally reported on a scale of 4 to 20 (20 indicates better relationships). At the midpoint, a 0.35 standard deviation increase is equivalent to a 1 scale-point increase in peer positive relationships.

- **Peer negative relationships** is originally reported on a scale of 5 to 25 (25 indicates worse relationships). At the midpoint, a 0.21 standard deviation decrease is equivalent to a 1 scale-point decrease in peer negative relationships. This measure is inverted (higher indicates fewer peer negative relationships) in the SGM.
- **Mental health** is originally reported on a scale of 0 to 15 (15 indicates worse mental health). At the midpoint, a 0.39 standard deviation decrease is equivalent to a 1 scale-point decrease or worsening in mental health. This measure is inverted (higher indicates an increase in mental health) in the SGM.

Notes

- ¹ “Reading and Mathematics Scores Decline during COVID-19 Pandemic,” Nation’s Report Card, accessed November 21, 2022, <https://www.nationsreportcard.gov/highlights/lrt/2022/>.
- ² See also Emma Dorn, Bryan Hancock, Jimmy Sarakatsannis, and Ellen Viruleg, “COVID-19 and Student Learning in the United States: The Hurt Could Last a Lifetime,” McKinsey & Company, June 1, 2020, <https://www.mckinsey.com/industries/education/our-insights/covid-19-and-student-learning-in-the-united-states-the-hurt-could-last-a-lifetime>.
- ³ “Reading and Mathematics Scores Decline,” Nation’s Report Card.
- ⁴ Emma Dorn, Bryan Hancock, Jimmy Sarakatsannis, and Ellen Viruleg, “COVID-19 and Education: The Lingering Effects of Unfinished Learning,” McKinsey & Company, July 27, 2021, <https://www.mckinsey.com/industries/education/our-insights/covid-19-and-education-the-lingering-effects-of-unfinished-learning>.
- ⁵ Leah Kuntz, “Child and Adolescent Mental Health: A National Emergency,” Psychiatric Times, October 25, 2021, <https://www.psychiatrictimes.com/view/child-and-adolescent-mental-health-a-national-emergency>.
- ⁶ Rhitu Chatterjee, “American Indians and Alaska Natives Are Disproportionately Affected by the Pandemic,” NPR, October 29, 2021, <https://www.npr.org/2021/10/29/1050379856/american-indians-and-alaska-natives-are-disproportionately-affected-by-the-pande>.
- ⁷ Because of how the model is constructed, correlations between later-life outcomes and variables measured in childhood tend to be captured less precisely than those with variables measured in early adolescence and older ages. As such, the stronger correlations between learning loss in early adolescence and adult outcomes than between learning loss at younger ages and those outcomes may be an artifact of how the model is constructed.
- ⁸ Undiscounted lifetime earnings would be about twice as much.
- ⁹ The MAP Growth samples included a small share of students for whom race and ethnicity was not specified (6 to 7 percent of the sample in each grade and year). These students are not included in our analysis of differences by race and ethnicity.
- ¹⁰ Measured in middle childhood.
- ¹¹ Katie Lannan, “Chronic Absenteeism Rate Rose in Disrupted School Year,” WBUR News, May 5, 2021, <https://www.wbur.org/news/2021/05/05/massachusetts-pandemic-schools-absences>; Michelle Healy, “Missing Students: The Pandemic Has Exacerbated Chronic Absenteeism across the Country,” National School Boards Association, March 11, 2022, <https://www.nsba.org/ASBJ/2022/april/missing-students>; and Linda Jacobson, “‘The Numbers Are Ugly’: Chronic Absenteeism among California Elementary Students Could Be Surging by More than 200 Percent,” The 74, November 11, 2020, <https://www.the74million.org/article/the-numbers-are-ugly-chronic-absenteeism-among-california-elementary-students-could-be-surging-by-more-than-200-percent/>.
- ¹² Phyllis W. Jordan, “What Congressional Funding Means for K-12 Schools,” FutureEd, September 29, 2022, <https://www.future-ed.org/what-congressional-covid-funding-means-for-k-12-schools/>.
- ¹³ Robert J. Rodriguez, “AASA Response Letter,” letter to Daniel Domench, May 13, 2022, [https://aasa.org/uploadedFiles/AASA_Blog_The_Total_Child\(1\)/AASA%20Response%20Letter%205_13_22.pdf](https://aasa.org/uploadedFiles/AASA_Blog_The_Total_Child(1)/AASA%20Response%20Letter%205_13_22.pdf).
- ¹⁴ Bella DiMarco and Phyllis W. Jordan, “Financial Trends in Local Schools’ Covid-Aid Spending,” FutureEd, July 7, 2022, <https://www.future-ed.org/financial-trends-in-local-schools-covid-aid-spending/>.

¹⁵ Matt Barnum, "Congress Rejected Biden's Bid to Double Title I. Now He's Asking Again," Chalkbeat, March 28, 2022, <https://www.chalkbeat.org/2022/3/28/23000407/biden-budget-proposal-title-i-schools>.

¹⁶ David DeSchryver, "How Will the Recession Impact K-12 District Budgets?" Whiteboard Advisors, accessed November 21, 2022, <https://whiteboardadvisors.com/recession-concerns-and-school-budget-decisions/>.

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