



<http://the-NYSAN.org>

**A Review of the Academic, Psychological, and Neurodevelopmental Impacts of the
COVID-19 Pandemic on Students in New York State**

Written by members of the Pediatric Interest and Professional Affairs Committee of the New
York State Association of Neuropsychology (NYSAN)

Authors: Veronica L. Milito-Tagliaferro, PsyD, NCSP, Breanna Vizlakh, PhD, Lindsay G.
Plunkett, PhD, Laura Phillips, PsyD, ABPdN, Linda LaMarca, PhD, & Daniela Montalto, PhD

Acknowledgements: Jessie Beshara, PsyD, Tamar Buechler, PsyD, Amira Hanna, PhD, Daijah
Guillermo, & Chloe Mason

Updated September 2026

Table of Contents

- I. A Review of the Academic, Psychological, and Neurodevelopmental Impacts of the COVID-19 Pandemic on Students in New York State
- II. Factors Exacerbating or Mitigating Learning Loss
- III. Impact by Grade Level
- IV. Impact by Subject Area
- V. Psychological and Neurodevelopmental Implications and Future Directions
- VI. Conclusion
- VII. References

A Review of the Academic, Psychological, and Neurodevelopmental Impacts of the COVID-19 Pandemic on Students in New York State

The COVID-19 pandemic, an unprecedented crisis, initially occurring in March 2020, and having a lasting impact, created global turmoil with millions of lives lost, an upward trend of suicidal ideation, suicide attempts, and mental health needs, a surge of unemployment, and an increase in food insecurity (Kakaei et al., 2022; Yan et al., 2023; United Nations Statistics Division, 2024). In an attempt to mitigate the spread of the virus, schools closed globally, postponing face-to-face instruction and leading to significantly disrupted education. Approximately 1.6 billion school-aged children were affected across over 150 countries (Munoz-Najar et al., 2021). In the United States, most schools that closed in March 2020, remained closed for the rest of the 2019-2020 school year. In fall 2020, there was greater variability, with approximately 43% of schools nationwide opening up for in-person instruction as compared to 30% of schools providing hybrid instruction, and 19% of schools remaining completely virtual (Colvin et al., 2024). In addition, there was notable variability between regions. For example, throughout the 2020-2021 school year, almost 100% of students in states such as Florida, Montana, Nebraska, and Wyoming returned to school in-person, whereas 25% or fewer students in New York, California, Oregon, or Washington D.C. returned to full time in-person instruction.

Even within New York State, school closures varied widely, with 85% of students attending school remotely for the remainder of the 2019-2020 academic year (*NYC Department of Education Response to the COVID-19 Pandemic*, 2022). In fall of 2020, Long Island as well as the western and northern regions of New York began to return to in-person or hybrid instruction, whereas reopenings in New York City were delayed and staggered, with many

students remaining virtual well into the spring of 2021 (Freidus & Turner, 2023). There was even variability within individual school districts, with private schools generally re-integrating into in-person learning earlier than public schools. Generally, urban districts spent more time engaging in remote or hybrid learning, as suburban and rural districts transitioned back to in person learning sooner (Fox et al., 2021).

Factors Exacerbating or Mitigating Learning Loss

For the purposes of this paper, “learning loss” is defined as a slowing or interruption in the acquisition of academic knowledge and skills associated with the COVID-19 pandemic, resulting in a gap between the academic achievement of students whose education was disrupted by the pandemic and the level of achievement typically expected among students in comparable grades or age cohorts under ordinary educational conditions. Students, for the purposes of this paper, refers to school-aged (Kindergarten through 12th grade) students. This paper focuses on and reviews data regarding COVID-19 related learning loss for students between 2020 through 2026.

Learning disruption due to the COVID-19 pandemic had the greatest impact on students who were already the most vulnerable, particularly students of color who were located in urban settings with fewer economic resources and attending low performing schools (Deep et al., 2025; Gee et al., 2023). Data across the United States has found the greatest learning loss following school closures for students of color, students with disabilities, students from low-income households, and students with limited English proficiency (Colvin et al., 2024). These preexisting vulnerabilities were further exacerbated by disparities in access to technology and

digital literacy, as well as differences in the availability of academic support and resources at home (Deep et al., 2025).

Remote learning created a “digital divide” in which there were disparities amongst those with access to the technology necessary to attend and participate in remote learning (e.g., working computer, reliable internet connection), and private tutoring to support learning, as well as students who had an adult at home and available to support them with remote learning (Sonnenschein et al., 2026). Access to in-home support during remote learning varied by race, with 14% of Hispanic children, 19% of Black children, 24% of White children, and 38% of Asian children having someone available at home to assist them (Colvin et al., 2024). Differences also varied across districts as schools with pre-existing home-school technology integration were able to transition to remote learning more quickly, whereas those without pre-existing technology integration took weeks or months to establish a remote learning plan (Patrick et al., 2021). Live remote instruction was more likely to occur in higher income districts and private schools, whereas paper packets, delivered by mail or at times requiring the family to physically pick up the educational materials, were more likely to be used in lower income and rural districts (Deep et al., 2025). In addition, the most vulnerable students who were located in lower income, urban, and low-achieving districts continued virtual learning the longest. In the spring of 2021, two-thirds of White students returned to school in person, whereas fewer than half of students of color returned in person (Colvin et al., 2024).

Within New York, access to high-speed internet to support remote learning followed a similar pattern. Between 17-20% of New Yorkers across all five boroughs of New York City lacked internet access, with the large majority of those falling in low-income communities. In 2020, 11.96% of students in majority Black or Brown districts lacked an electronic device to use

for remote learning, and 9.89% of students lacked internet (*NYSED Survey, 2021*). By comparison, in majority White districts, only 3.68% of students lacked access to an electronic device and 2.28% of students lacked internet access, further emphasizing the digital divide for minority districts (*NYSED Survey, 2021*).

Students with disabilities also experienced greater effects on their learning during the COVID-19 pandemic than neurotypical students (Sonnenschein et al., 2022). Special education and related service hours decreased during remote learning, as did services such as English as a New Language (ENL) or Dual Language (DL) supports. Remote learning was particularly inadequate for students who were younger, with sensory-based disabilities (e.g., deaf or hard of hearing) and those requiring more individualized support (Valicenti-McDermott et al., 2022). In addition, while we know earlier intervention is crucial for maximizing intervention outcomes, psychoeducational and neuropsychological assessments were postponed, further delaying the identification of students requiring support and the provision of appropriate interventions. Students who did receive a psychoeducational or neuropsychological evaluation at the height of the pandemic, did so remotely, potentially impacting the validity of the results (Farmer et al., 2021).

Conversely, key protective factors that helped to mitigate learning loss during the COVID-19 pandemic included access to continuous and synchronous teaching, a structured home environment with access to reliable technology and designated study spaces, schools that emphasized ongoing communication between teachers and families, and districts who provided extended learning time (e.g., over the summer) to mitigate lost learning time (Colvin et al., 2024; Turnbull et al., 2025).

Impact by Grade Level

Research from the 2020-2021 school year and from fall screenings of K-8 students revealed that overall academic achievement was negatively affected by the COVID-19 pandemic, with math and reading performance remaining below pre-pandemic levels through the 2022-2023 academic year (Bielinski et al., 2021; Lewis & Kuhfeld, 2023). K-2 students were a particularly vulnerable group as they lost exposure to fundamental reading instruction. Data shows that students who were in these early grades during the COVID-19 pandemic were at the greatest risk for difficulties with learning to read (Amplify, 2022). For kindergarten students, the percentage of students at greatest risk for reading acquisition difficulties rose from 29% in 2019-2020 to 37% in 2021-2022. Likewise, the percentage rose from 26% to 36% in first grade and 26% to 37% in second grade.

In fall 2021, students in grades 3-5 demonstrated a large drop in standardized reading scores, with middle school grades showing a lesser degree of loss (Kuhfeld et al., 2023). While achievement was generally lower in math than in reading across grade levels, slightly more significant differences were observed in the late elementary school years compared to older students for math achievement (Lewis et al., 2021). By the end of the 2022-2023 school year, this educational gap had worsened, with students needing an additional 4.1 months of school to address reading disparities and 4.5 months to return to pre-COVID math achievement levels (Lewis & Kuhfeld, 2023). Overall, learning loss was seen across grade levels, with substantial loss seen for students in upper elementary school and middle school during the COVID-19 pandemic.

Impact by Subject Area

Learning disruption due to the COVID-19 pandemic also varied by subject area. Leading up to the COVID-19 pandemic, average i-READY reading scores for kids in fourth and eighth grade across the United States improved slightly from 1992 to 2019 (Bahena & Morales, 2023). Likewise, math scores steadily improved from 1990 to 2019. However, these gains were lost after the start of the COVID-19 pandemic in March 2020. While reading, writing, and math performance were all impacted, the greatest impact was found to be in math (Dorn et al., 2021). Fall screening data from 2019 and 2020 for K-8 students confirmed that math losses were greater than those in reading, with the median school district experiencing a loss of 52% of a year's worth of achievement growth in math, compared to a 23% loss in reading (Bielinski et al., 2021; Fahle et al., 2022). On average, students began the 2020–2021 school year about three months behind in mathematics, based on typical progress estimates (Colvin et al., 2024). Both high poverty and low poverty schools demonstrated a loss in academic progress; however, according to Northwest Evaluation Association's (NWEA) Measures of Academic Progress (MAP) Growth scores by the end of 2021, students in high poverty schools lost 40% of a year's learning, while students in low poverty schools lost 27% of an academic year's learning (Colvin et al., 2024). According to the National Assessment of Educational Progress (NAEP, 2023) in 2022, there was a decline in math scores (7 points on average) across the nation for the first time ever, with even greater decline seen among lower performing student groups; the pre-existing math achievement gap between Black and White students widened by eight points. In addition, data from the NWEA MAP Growth math test scores demonstrated a decline in math achievement for eighth grade students from 2020 to 2021 that persisted into tenth grade in spring 2023, demonstrating the lasting academic impact of the pandemic (Kuhfeld et al., 2025).

While less pronounced, there was also a decline in reading achievement, demonstrating a similar pattern to math performance decline. In 2021, according to NWEA MAP data, fall 2021 reading scores remained 0.09 - 0.18 standard deviations below fall 2019 scores, with declines especially significant for elementary school students and minority students (Colvin et al., 2024). The largest decline in reading scores (five points on average) was demonstrated in 2022 according to NAEP testing. For fourth and eighth graders, reading outcomes in 2022 were significantly lower than in 2019 for students with and without disabilities. Reading achievement gains for the 2022–2023 school year also lagged behind pre-pandemic trends (Fahle et al., 2023). Increased declines in reading have persisted over time and standardized testing have yet to demonstrate a complete rebound in achievement (Kuhfeld et al., 2025).

Less research has focused on the impact of the COVID-19 pandemic and remote learning on writing. According to literature about the impact of virtual learning on students' graphomotor functioning, children who attended kindergarten and first grade during the COVID-19 pandemic, demonstrated poorer scores on graphomotor tests as compared to a pre-pandemic cohort (Rosenblum et al., 2024). Research conducted on students in elementary school revealed a decline in written expression performance from fall 2019 to fall 2020 for first graders with regard to written expression (e.g., use of supporting details, discussion of topic), organization, grammar, and use of mechanics (Reed et al., 2023). Second graders demonstrated improvement in their writing skills (grammar, mechanics, answering the prompt, providing supporting details) from fall 2019 to fall 2020; however they experienced a decline in the organization and planning of their writing and still performed lower compared to second graders from the previous year.

According to the National Assessment of Educational Progress (NAEP) comparing 2019 data to 2022 data, fourth grade students from New York experienced a decline in both math and

reading that was twice that of the national average (New York State Office of the State Comptroller, 2024). The decline in math scores in this subset of students was also twice any decline seen in the past 20 years. For eighth grade students, while reading remained steady, there was a significant decline in math proficiency during this same span of time (New York State Office of the State Comptroller, 2024). Interestingly, according to the most recent NAEP scores from 2024, the average mathematics score for fourth grade students increased from the average mathematics score in 2022. However, New York students continued to perform below the national average (National Center for Education Statistics, 2024). Likewise, with regard to reading, fourth grade students' average performance in 2024 improved slightly as compared to the 2022 average. For eighth grade students, there was again a decline in average math scores for New York students in 2024 as compared to 2022, and average scores remained lower than the national average. There was also a decline in reading performance, though average reading performance was slightly higher than the national average (National Center for Education Statistics, 2024). Overall, the data collected represent historic declines in academic performance that have not been observed in the past two decades, underscoring the profound impact of the COVID-19 pandemic on student learning. These findings further highlight the need for sustained academic recovery to help students regain, and ultimately exceed, the levels of achievement demonstrated by pre-pandemic cohorts.

Psychological and Neurodevelopmental Implications and Future Directions

The COVID-19 pandemic and associated school closures introduced unprecedented psychosocial stressors for school-aged children. The increase in caregiver stress, the disruption of crucial family and social support systems, and the loss of long-anticipated milestone events (e.g., school graduation ceremonies) all contributed to a significant rise in the rates of mental

health concerns, particularly anxiety and depression, among school aged-children (Oblath et al., 2024). The social and emotional impact of school closures has been notable, given the positive correlation between school-based socialization opportunities and psychological wellbeing and the increased risk of mental health difficulties associated with social isolation (Colvin et al., 2024). These difficulties were further compounded by the loss of caregivers or other relatives due to illness and death as a result of COVID-19, with research estimating that over 200,000 children in the United States lost a caregiver (Treglia et al., 2023). Moreover, the proportion of caregivers reporting economic challenges, including financial, food, and housing insecurity, increased during the pandemic (Oblath et al., 2024). Students also experienced the interruption of school-based social services, including those for mental health (Pfefferbaum, 2021). Collectively, these hardships disproportionately impacted vulnerable populations, particularly families of color, economically disadvantaged families, and those with preexisting psychiatric diagnoses, neurodevelopmental disorders, and physical or cognitive disabilities (Pfefferbaum, 2021; Colvin et al., 2024). In particular, preexisting mental health difficulties were disproportionately exacerbated for school-aged children among these populations (Pfefferbaum, 2021; Oblath et al., 2024). Corresponding to the widespread psychological impact of the pandemic, a national state of emergency for youth mental health was declared in October of 2021 by the American Academy of Pediatrics (AAP), the American Academy of Child and Adolescent Psychiatry (American Academy of Pediatrics et al., 2021), and the Children's Hospital Association (CHA) (Oblath et al., 2024). Moreover, there was a documented increase in the rate of suicidal ideation and suicide attempts in youth between the ages of 11 to 21 years, compounded by a shortage in the availability of public mental health services as well as the disruption of school-based mental health services (Hill et al, 2021).

Notably, the neurodevelopmental impact of the pandemic and associated school closures has continued to persist over time (Colvin et al., 2024). When comparing this unprecedented crisis on crucial developmental periods to other similar global events, research in fact suggests that consequences may be lifelong (Colvin et al., 2024). One way to attempt to understand the scope and long-lasting effects of the disruptions the pandemic imposed on brain development is to consider the developmental period at which they took place. For example, opportunities for social play with peers is known to facilitate the development of early behavioral and emotional self-regulation skills for toddlers. In the early elementary years, participation in academics and extracurricular activities fosters the development of planning and organizational skills. In adolescence, there are increased opportunities to further these executive functioning skills and also establish interpersonal relationships with peers and mentors as well as a sense of personal responsibility. Therefore, the psychosocial and academic impact of school-based closures seems contingent upon the child's developmental stage during the pandemic, in combination with the duration of remote or hybrid learning.

In addition, while the trajectory of critical learning periods and the corresponding impact from COVID-19 disruption differed among age groups, the general pattern for skill acquisition involves the development of foundational capabilities as the base upon which higher-order functions develop (Colvin et al., 2024). Consequently, children whose lives were disrupted in early elementary school, were at the critical time for developing the necessary building blocks of reading, writing, and mathematical skills, and, as a result, are thought to be at greater risk for difficulties with higher-order academic skills as they continue in development (Colvin et al., 2024). In contrast, adolescents whose foundational academic skills are thought to have been

spared, seem to be at greater risk for weaknesses in social and functional adaptive skills (Colvin et al., 2024).

Conclusion

Ultimately, the COVID-19 pandemic involved the disruption of traditional schooling on an unprecedented level. Within the state of New York alone, there was considerable variability among and even within school districts with regard to the duration of remote instruction. This disruption in academic instruction disproportionately impacted students of color, students from economically disadvantaged families, students in grades K-2, and those with preexisting physical or cognitive disabilities as well as neurodevelopmental and psychiatric diagnoses. Additional factors included caregivers' and students' level of English proficiency and digital literacy skills. Moreover, students from these vulnerable populations were disproportionately impacted by the social and psychological effects of the pandemic, including the disruption of family and social support systems and the loss of caregivers or other relatives. With regard to learning loss, while there were documented declines across foundational subjects, the greatest impact was found in the domain of mathematics. Learning loss also varied by grade level, with students in grades K-2 particularly vulnerable due to a loss of reading intervention exposure. Protective factors that mitigated the loss included access to continuous and synchronous academic instruction, extended-year programming, consistent communication between caregivers and school staff, and a structured home environment.

With regard to the long-term impact of COVID-19 school closures, ongoing longitudinal research will be necessary in order to fully understand the breadth of the impact on school-aged children. However, there is already existing evidence for the long-term psychological and physiological impact of adverse life experiences, trauma, and chronic stress. Moreover, given the

relationship between the provision of formal academic instruction and intellectual development, it will be necessary to monitor the affected cohorts over time. It will be especially important to investigate the potential discrepancies between children with preexisting developmental, neurological, and psychological risk factors versus their typically developing peers. Clinical providers will also need to consider the long-term psychological implications associated with disrupted academic instruction, reduced peer socialization opportunities, and grief and loss. This includes potential delays in social and pragmatic communication skills, difficulties with emotional and behavioral self-regulation, lower self-confidence and self-esteem, and deficits in higher-order executive functioning skills. Treatment may include an emphasis on bolstering emotional coping skills and compensatory strategies for inattention and executive functioning, developing functional adaptive skills for independence in completing activities of daily living, and providing explicit social skills training to improve communication and reciprocity.

Academically, it is also important to consider the implications of the reliance on technology as a primary instructional tool. While digital tools were a necessity to maintain the continuity of learning during the COVID-19 pandemic, and although assistive technology is a useful and often necessary tool to increase accessibility to educational materials and instruction, over-reliance on technological tools may hinder the development of fundamental academic and critical thinking skills. Overall, the existing evidence suggests that many children who were directly impacted by the COVID-19 pandemic will continue to experience altered developmental trajectories, and it will therefore likely be necessary for caregivers, educators, and clinical providers to adapt their methods of intervention and support accordingly.

References

- American Academy of Pediatrics, American Academy of Child and Adolescent Psychiatry, & Children's Hospital Association. (2021, October 19). *AAP-AACAP-CHA declaration of a national emergency in child and adolescent mental health*. American Academy of Pediatrics.
<https://www.aap.org/en/advocacy/child-and-adolescent-healthy-mental-development/aap-aacap-cha-declaration-of-a-national-emergency-in-child-and-adolescent-mental-health/>
- Amplify. (2022). Amid academic recovery in classrooms nationwide, risks remain for youngest students with least instructional time during critical early years.
https://amplify.com/wp-content/uploads/2022/02/mCLASS_MOY-Results_February-2022-Report.pdf
- Bahena, S., & Morales, C. (2023, April 5). *K–8 pandemic learning trends: Reading & math, 2017–2022*. Center for Education Efficacy, Excellence, and Equity, Northwestern University.
- Bielinski, J., Brown, R., & Wagner, K. (2021). No Longer a Prediction: What New Data Tell Us About the Effects of 2020 Learning Disruptions [White paper]. Illuminate Education.
- Colvin, M., Reesman, J. L., & Glen, T. (2024). *Neurodevelopment in the Post-pandemic World: The Altered Trajectory of Children's Education, Mental Health, and Brain Development*. Oxford University Press.
- Deep, P. D., Ghosh, N., Chen, Y., & Gaither, C. (2025). The Impact of Socioeconomic Disadvantages on Academic Achievement during COVID-19 School Disruptions. *Journal of Education and Learning*, 14(5), 57-73.
- Fahle, E., Kane, T. J., Patterson, T., Reardon, S. F., & Staiger, D. O. (2022). Local achievement

impacts of the pandemic. *Education Recovery Scorecard*.

https://educationrecoveryscorecard.org/wp-content/uploads/2022/10/Education-Recovery-Scorecard_Key-Findings_102822.pdf.

Farmer, R. L., McGill, R. J., Dombrowski, S. C., Benson, N. F., Smith-Kellen, S., Lockwood, A.

B., Powell, S., Pynn, C., & Stinnett, T. A. (2021). Conducting psychoeducational assessments during the COVID-19 crisis: The danger of good intentions. *Contemporary School Psychology*, 25(1), 27-32.

Fox, A. M., Lee, J. S., Sorensen, L. C., & Martin, E. G. (2021). Sociodemographic

characteristics and inequities associated with access to in-person and remote elementary schooling during the COVID-19 pandemic in New York State. *JAMA Network Open*, 4(7), e2117267.

Freidus, A., & Turner, E. O. (2023). Contested justice: Rethinking educational equity through

New York City's COVID-19 school reopening debates. *Educational Evaluation and Policy Analysis*, 45(3), 437-463.

Gee, K. A., Asmundson, V., & Vang, T. (2023). Educational impacts of the COVID-19 pandemic

in the United States: Inequities by race, ethnicity, and socioeconomic status. *Current Opinion in Psychology*, 52, 101643.

Hill, R. M., Rufino, K., Kurian, S., Saxena, J., Saxena, K., & Williams, L. (2021). Suicide

ideation and attempts in a pediatric emergency department before and during COVID-19. *Pediatrics*, 147(3), e2020029280.

Kuhfeld, M., Robinson, G., Isaacs, J., Postell, S., Lee, J.-E., & Ottmar, E. (2025). High School

Math Course-Taking: Shifts in Access and Achievement Post-COVID-19. AERA Open, 11. <https://doi.org/10.1177/23328584251353514> (Original work published 2025)

Lewis, K., & Kuhfeld, M. (2023). Education's Long COVID: 2022-23 Achievement Data Reveal Stalled Progress toward Pandemic Recovery. *Center for School and Student Progress at NWEA*.

National Assessment of Educational Progress (NAEP). (2021). NAEP 2021 School Survey.

National Center for Education Statistics, Institute of Education Sciences, U.S.

Department of Education.

https://nces.ed.gov/nationsreportcard/subject/about/pdf/2021_may_school_survey_dashboard.pdf

National Assessment of Educational Progress (NAEP). (2023). What are the differences between long-term trend NAEP and main NAEP? National Center for Education Statistics, Institute of Education Sciences, US Department of Education.

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

National Center for Education Statistics. (2024). *New York: Mathematics – Grade 8, 2024* [Data table]. The Nation's Report Card. U.S. Department of Education, Institute of Education Sciences.

https://www.nationsreportcard.gov/profiles/stateprofile/overview/ny?cti=pgtab_ot&sub=mat&chort=2&year=2024r3&st=mn&sfj=np&sj=ny

New York State Office of the State Comptroller. (2024, June). *Nation's report card underscores New York's need for academic recovery*.

<https://www.osc.ny.gov/reports/nations-report-card-underscores-new-yorks-need-academic-recovery>

NYSED survey: 8% of NY students without devices during pandemic, racial disparities. NYCLU.

(2021, May 5).

<https://www.nyclu.org/press-release/nysed-survey-8-ny-students-without-devices-during-pandemic-racial-disparities>

NYC Department of Education Response to the COVID-19 Pandemic. Office of the New York State Comptroller. (2022, August).

<https://www.osc.ny.gov/files/reports/osdc/pdf/report-8-2022.pdf>

Oblath, R., Dayal, R., Loubeau, J. K., Lejeune, J., Sikov, J., Savage, M., ... & Spencer, A. E.

(2024). Trajectories and correlates of mental health among urban, school-age children during the COVID-19 pandemic: a longitudinal study. *Child and Adolescent Psychiatry and Mental Health*, 18(1), 32.

Patrick, S. K., Grissom, J. A., Woods, S. C., & Newsome, U. W. (2021). Broadband access, district policy, and student opportunities for remote learning during COVID-19 school closures. *AERA Open*, 7, 23328584211064298.

Pfefferbaum, B. (2021). Challenges for child mental health raised by school closure and home confinement during the COVID-19 pandemic. *Current psychiatry reports*, 23(10), 65.

Reed, D. K., Ma, J., & Gerde, H. K. (2023). Resiliency and vulnerability in early grades writing performance during the COVID-19 pandemic. *Assessing Writing*, 57, 100741.

Rosenblum, S., Eghbaria-Ghanamah, H., Adi-Japha, E. (2024). *The differential association of COVID-19 remote digital instruction period with second-grade students' graphomotor, handwriting, visual, and sequential memory skills*. *Learning and Instruction*, 91, 101898.

Sonnenschein, S., Stites, M., & Krasniqi, B. (2026). Factors affecting children's learning during COVID-19. *Learning and Individual Differences*, 125, 102819.

Treglia, D., Cutuli, J. J., Arasteh, K., & Bridgeland, J. (2023). Parental and other caregiver loss due to COVID-19 in the United States: Prevalence by race, state, relationship, and child age. *Journal of Community Health*, 48(3), 390-397.

Turnbull, K. L., Jaworski, B., Cubides Mateus, D. M., Coolman, F. L., LoCasale-Crouch, J., Moon, R. Y., Hauck, F., Kellams, A., & Colson, E. R. (2025). Maternal perspectives on COVID-19 kindergarten learning impacts: a qualitative study of families with low income. *Discover Education*, 4(1), 34.

Valicenti-McDermott, M., O'Neil, M., Morales-Lara, A., Seijo, R., Fried, T., & Shulman, L. (2022). Remote learning experience for children with developmental disabilities during COVID-19 pandemic in an ethnically diverse community. *Journal of child neurology*, 37(1), 50-55.