RESEARCH LETTER

School Learning Format and Children’s Behavioral Health During the COVID-19 Pandemic

The COVID-19 pandemic has interrupted the education of more than 1 billion children worldwide, with many experiencing shifts between remote, hybrid, and in-person learning.1 As the COVID-19 pandemic and interruptions to learning continue, we need to understand their consequences for children’s behavioral health to inform response efforts. We used longitudinal data to examine how children’s behavioral well-being differed by learning format.

Methods | From January 4 to May 23, 2021, online surveys were administered 4 times to 405 parents of children participating in the broader Early Learning Study at Harvard, a population-based cohort study of children in Massachusetts approved by the institutional review boards of Abt Associates and Harvard University.2 All parents provided written consent to participate. Parents reported their child’s gender and race and ethnicity. Parents were asked to select 1 or more racial or ethnic groups from the following list: American Indian or Alaskan Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or other Pacific Islander, and White.

In each wave, parents indicated their child’s current learning format from a checklist of options (remote, hybrid, or in person). Parents then reported their child’s behavioral health on 3 measures: (1) their perception of their child’s general behavioral health in the last month (on a 5-point scale from much better than usual to much worse than usual); (2) the number of maladaptive behavioral changes in the prior month (of 12 options; eg, more aggressive or more withdrawn); and (3) the frequency of dysregulated behaviors (eg, difficulty switching activities or limited attention) using 11 items of the Behavior Rating Inventory of Executive Function3 rated on a 4-point scale from never to all the time.

We used regression analyses with child fixed effects to estimate mean within-child differences in outcomes associated with learning formats. By comparing children’s outcomes in each wave with their own outcomes in other waves, the approach accounted for all time-invariant factors explaining between-child differences in learning experiences. Analyses also included several time-varying covariates likely to account for differences in both learning formats and child outcomes across time. We used a significance threshold of $P < .05$ (2-sided) for regression analyses. All analyses were conducted in Stata, version 17 (StataCorp), with the exception of Figure 1, which was generated in R, version 4.0.3 (The R Project for Statistical Computing). Additional details are in the eMethods in the Supplement.

Results | Of 405 sampled parents, 348 (85.9%) reported on 356 children’s behaviors in at least 1 of 4 surveys. Children had a mean (SD) age of 7.4 (0.6) years as of January 1, 2021. A total of 186 children (52.3%) were female, 170 (47.8%) were male, and parents reported that 70 children (19.8%) were Asian, 90 (25.5%) were Black or African American, 92 (26.1%) were Hispanic or Latino, and 208 (58.9%) were White. Approximately one-quarter (94 children [26.6%]) identified as more than 1 race or ethnicity.

Most children (203 [57.0%]) switched learning formats at least once across the 4 waves (Figure 1). Child fixed-effects analyses indicated that children’s behavioral outcomes tended to be worse during remote schooling than during in-person schooling (Figure 2). Parents reported that when learning remotely, their child exhibited worse general behavior (coefficient, 0.5 points; 95% CI, 0.3-0.7 points), more maladaptive behavioral changes (coefficient, 0.5 points; 95% CI, 0.1-0.9 points), and more dysregulated behaviors (coefficient, 0.1 points; 95% CI, 0.0-0.2 points) than when learning in person. Children experiencing hybrid learning fell in between; they exhibited better general behavior than when remote (coefficient, −0.2 points; 95% CI, −0.5 to 0 points) and worse behavior than when in-person (coefficient, 0.3 points; 95% CI, 0.1-0.4 points).

Figure 1. Children’s Learning Format by Survey Wave

Bars for each wave illustrate the number of children in each learning format at that time as reported by parents on a categorical checklist with the following options and definitions: fully remote (all virtual/remote/computer-based learning), hybrid (attending in-person in the school building some days/times but learning remotely/virtually on other days/times), or fully in-person (back in the school building full-time). Lines between bars represent children moving between learning formats across waves and are weighted by the number of children in each path such that thicker lines represent more children. The color of the lines between bars represents the children’s learning format in the prior wave.
Discussion | In this cohort study, parents reported that their children’s behaviors at home were worse during remote learning than during in-person learning. Although our analyses accounted for all between-child factors, they did not account for all time-varying factors that might explain children’s learning format and parents’ perception of their well-being at any given time. Therefore, results should not be interpreted to mean that remote learning caused worse behavioral health; rather, the results illustrate that parents perceived their children’s behaviors as having shifted systematically through the COVID-19 pandemic’s educational interruptions. The ongoing and ever-changing public health situation means that clinicians and others working directly with children and families should address not only the likely academic consequences of the COVID-19 pandemic4,5 but also its consequences for children’s social, emotional, and behavioral well-being.

Emily C. Hanno, PhD
Lily S. Fritz, MSc
Stephanie M. Jones, PhD
NONIE K. LESAUX, PHD

Author Affiliations: Graduate School of Education, Harvard University, Cambridge, Massachusetts.

Accepted for Publication: October 27, 2021.


Corresponding Author: Emily C. Hanno, PhD, Graduate School of Education, Harvard University, 14 Appian Way, Cambridge, MA 02138 (ehannon@g.harvard.edu).

Author Contributions: Dr Hanno and Ms Fritz had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: All authors.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Hanno.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Hanno, Fritz.

Obtained funding: Jones, Lesaux.

Administrative, technical, or material support: All authors.

Supervision: Jones, Lesaux.

Conflict of Interest Disclosures: None reported.

Funding/Support: This study was supported by funding from the Saul Zaentz Charitable Foundation to the Saul Zaentz Early Education Initiative at the Harvard Graduate School of Education (Drs Jones and Lesaux).

Role of the Funder/Sponsor: The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Additional Contributions: We thank Abt Associates for their ongoing collaboration and support of data collection for the Early Learning Study at Harvard. We thank the families and children for their continued participation in this study.