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Parent time investments in their children's learning during a policy-mandated shutdown: parent, child, and household influences

Britt Singletary [a],[*], Laura Justice [a], Sugene C. Baker [a], Tzu-Jung Lin [a],[b], Kelly M. Purtell [a],[c], Kammi K. Schmeer [d]

[a] Crane Center for Early Childhood Research & Policy, The Ohio State University, 175 E. 7th Avenue, Columbus, OH 43201
[b] Department of Educational Studies, The Ohio State University, 29 W. Woodruff Avenue, Columbus, OH, 43210
[c] Department of Human Sciences, The Ohio State University, 305 W. 17th Avenue, Columbus, OH, 43210
[d] Department of Sociology, The Ohio State University, 1885 Neil Avenue, Columbus, OH, 43210

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ABSTRACT

State-level policies in Ohio during the early months of the COVID-19 pandemic in the United States involved physical school closures and work-from-home requirements when possible. Presumably, these policies and resulting impacts on homes with children would alter parent time investments in their children with respect to home-learning activities. In this study, we assessed parent time investments specific to home-learning activities with their children, and key predictors of these investments. Using data from a comprehensive survey completed by 559 caregivers of children (aged birth to 9 years) during a state-mandated stay-at-home order and widespread school closure, we assessed whether parent time investments in children's learning were associated with: (1) parents' mental health and social connectedness, (2) children's level of emotional distress, and (3) household characteristics including chaos, social needs, and structure. Results indicate significant negative associations between each of parent loneliness, children's emotional distress, and household chaos with parent time investments in children's learning, controlling for parents' socio-demographic and economic status. This suggests that parent time investments during the early stages of the pandemic were limited by a number of factors outside of socioeconomic resources. Further research is needed to understand the long-term effects of home environments, including parent time investments in children's learning, on child development during this unprecedented time in world history.

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1. Introduction

Given the unforeseen nature of the COVID-19 global pandemic, caused by the spread of the SARS–CoV-2 virus, and the related rapid shift in learning from school-based to home-based for many, very little is known about parents' time investments in their children's learning during the stages of the pandemic in which stay-at-home orders were in effect. Understanding the extent of parents' time investments in home-learning activities, as well as how parent, child, and household factors may be associated with these investments, is critical for understanding the current and future development of young children who experienced this unprecedented change in their learning environments. Conceptually, the COVID-19 crisis represents an opportunity to understand how sudden dramatic shifts in children's daily routines may influence parent time investments as well as parent, child, and household factors that may influence these investments. Parent time investments under normal circumstances are significantly associated with young children's learning (Bono, Francesconi, Kelly, & Sacker, 2016), and these appear to be influenced by a range of parent, child, and household factors. For instance, parental employment is associated with their time investments with preschool-aged children, such that part- and full-time employment are associated with less time investments at home (Justice, Purtell, Bleses, & Cho, 2020). In the present study, we address parent-reported time investments in their children's learning during an active stay-at-home order and examine predictors of these investments.

We examine parent time investments in their children's learning by leveraging parent-report data representing families with children aged birth to 9 years (i.e., infant, toddler, preschooler, and early primary school aged children, or "young children" (NAEYC, 2021)) in Ohio during an active stay-at-home order ($N = 559$). Ohio's state-level COVID-19 restrictions began on March 17, 2020 and resulted in many children being restricted

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* Corresponding author.
E-mail address: singletary.31@osu.edu (B. Singletary).

from participating in site-based schooling, shifting their learning environments to their homes (Office of Governor DeWine, March 12, 2020). These restrictions occurred following the declaration of a state of emergency (Office of Governor DeWine, March 09, 2020), which gave the state broadened powers to coordinate activities that may mitigate the effects of the pandemic with respect to population health and the state economy. Accordingly, state-level policies at this time forced closures of a number of businesses (e.g., bars, restaurants, nail parlors) and restricted operations in the non- and for-profit sector (e.g., restricting non-essential medical procedures) (Office of Governor DeWine, March 22, 2020). As a result of these policies, a large number of adults lost their jobs (temporarily or permanently), while simultaneously a number of employers, including universities and banks, requested as many employees as possible to work from home.

Given these broad, rapid disruptions to 'business as usual' life for both children and adults, many parents found themselves simultaneously experiencing temporary or permanent job loss, business closures, and out-of-home travel restrictions due to the stay-at-home order. We speculate that many parents took on heightened and potentially new time investments in their children's learning during this period, such as helping them engage in online learning activities, and that these were influenced by a variety of contextual factors in the home environment.

Parent time investments in children's learning

An extensive body of work has examined parents' time investments in their children, using both behavioral-economic (Baker & Milligan, 2016) and child-development paradigms (Skwarchuk, Sowinski, & LeFevre, 2014). Behavioral-economic research often studies parent time investments, especially variability in these investments, as choices that are made on the basis of differences among children in production functions and the presumed costs of these investments (see Baker & Milligan, 2016). Child development research often studies parent time investments as a function of parental beliefs about the importance of child-learning investments and the influence of these investments on children's development (e.g., Justice et al., 2020). For instance, the latter type of research might focus on the relations between a specific type of parent time investment, such as frequency of home-learning activities, and children's skill development as a function of those activities (McCormick et al., 2020).

Regardless of paradigm, a considerable body of research shows that there is considerable variability among parents in the time they invest in their children, whether measured generally as reports of actual time parents spent with their children, such as through home-diary methods, or more specifically by type of activity, such as frequency of storybook reading (Machida, Taylor, & Kim, 2002; Parker, Boak, Griffin, Ripple, & Peay, 1999; Skwarchuk et al., 2014). Further, such work finds that when parents are more frequently engaged in home literacy (e.g., letter identification, word identification, and shared reading experiences) and numeracy activities (e.g., number identification, verbal counting, and simple calculations) with their children during preschool and kindergarten, children exhibit heightened letter knowledge, phonological awareness, and math fluency relative to children whose parents engage less frequently in these activities (Curenton and Justice, 2008; Manolitsis, Georgiou, & Tziraki, 2013). Such findings transcend various contexts. For instance, in a sample of over 8000 British children between the ages of 3 and 7 years, when mothers invested more time in both educational and recreational activities with their children, such as reading, telling stories, drawing or painting, playing together, or helping with homework, their children exhibited heightened language and socio-emotional skill development compared to mothers investing

less time (Del Bono, Francesconi, Kelly, & Sacker, 2016). A study involving 1000 Australian children between the ages of 4 and 9 years found that time spent engaging in activities with a parent had the largest effect on child cognitive and language development when compared to other daily activities in which these children engaged, such as media time or time spent in activities alone (Fiorini & Keane, 2014).

Notably, whereas behavior economists view parent time investment as often reflecting deliberated choice (e.g., the production function of boys versus girls; see Baker & Milligan, 2016), child-development theories often view parent and household characteristics as contextual factors that are directly or indirectly influential to these time investments, largely drawing upon an ecological theoretical framework (Bronfenbrenner & Morris, 2006). For instance, such work proposes that parent time investments may be conditioned on or influenced by families' socio-demographic characteristics encompassing parent, child, and household correlates.

Parent socio-demographic characteristics and parent time investments

Socio-demographic characteristics such as age, race, education, employment, marital status, and household income are associated with parent time investments in children's learning (for review, see Monna & Gauthier, 2008). For example, characteristics of parents' child-directed talk towards their toddler predicts children's vocabulary skills one year later, but the occurrence of child-directed talk is related to family income and parental education; specifically, parents of higher-income homes and who are more educated exhibit a higher volume of child-directed speech overall (Rowe, 2008). Notably, many of these socio-demographic characteristics are inextricably inter-linked. For example, there is a relation between race and income, such that non-White families are disproportionately affected by poverty as compared to White families (Wight, Chau, & Aratani, 2011).

The effects of sociodemographic characteristics on parent time investments may be difficult to untangle (e.g., Monna & Gauthier, 2008). For example, the mechanisms underlying relations between education and time investment are not always clear, yet scholars suggest that parents who are more highly educated, for instance, may have higher levels of self-efficacy regarding their ability to affect their children's development and thus engage in behaviors they assess as influential to development (Curenton & Justice, 2008). In general, college-educated mothers tend to spend more time participating in educational activities with their children than mothers with less education (Kalil, Ryan, & Corey, 2012). Such differences extend beyond time investments, per se, with caregiver education levels also associated with the quality and depth of teaching within home learning activities (Korat, Klein & Segal-Drori, 2007). Additionally, maternal age at first birth differs significantly alongside maternal education, such that mothers with a bachelor's degree or higher are older on average than mothers with no high school diploma, by over 6 years (Duncan, Lee, Rosales-Rueda, & Kalil, 2018). Maternal age corresponds with improved child outcomes, net of maternal education and income, as older mothers may have more patience and practice with positive parenting behaviors than their younger counterparts (e.g., Berlin, Brady-Smith, & Brooks-Gunn, 2002; Duncan et al., 2018), and thus may exhibit higher quality interactions with their children.

Additionally, and perhaps not surprisingly, parents' employment is significantly associated with their time investments in their children's learning; specifically, parents who are employed tend to have less time at home to interact with their children. For example, in a panel analysis of over 47,000 participants, Heiland, Price, and Wilson (2017) found that maternal employment impacts both mother-child quality time spent together, as well as time spent

reading together, such that working more hours was associated with less maternal time investment in reading activities. The effect of parent employment on time investment in their children is not trivial: findings suggest that the time that full-time working mothers spend in quality interactions with their children may be about 6 hours less than that of non-working mothers (Heiland et al., 2017). Recent cross-cultural work explored the relations between parental employment and child time investments in Danish versus American parents, as Denmark is a welfare state in which most adults are expected to work full-time (Schmeer, Justice, Singletary, Purtell, & Lin, 2020). Employment of nearly 500 parents of children between 3 and 5 years of age varied significantly, with 77% of Danish parents working full-time compared to 60% of American parents; in this study, Danish parents reported significantly fewer time investments in their children with respect to a variety of home-learning activities. Such evidence points to increased parental employment hours negatively influencing their time investments in children's learning, but does not explore whether societal structures (e.g., universal child care in Denmark) may offset these diminished time investments.

Parent time spent with children can also differ based on family structure (e.g., married, cohabiting, versus single), such that children living with 2 biological parents receive the largest parent time investments in comparison to all other family structures (Kalil, Ryan, & Chor, 2014). However, once maternal education and employment are accounted for, the differences in maternal time investment in interactive child-care activities between single, cohabitating, and married mothers may no longer be significant, suggesting that the broader socioeconomic context of the household is more influential in predicting differences in time investments than marital status alone (Kendig & Bianchi, 2008).

Parent, child, and household correlates of parent time investments

Parent time investments are also influenced by a range of parent, child, and household characteristics distinct from socio-demographic factors. Parents' mental health, for instance, can contribute to parent time investments. The Family Stress Model posits that the socioeconomic context influences child development by way of modulating parental mental health, which then influences parenting behaviors (e.g., Conger et al., 2002; Gershoff, Aber, Raver, & Lennon, 2007; McLoyd, 1990; Perkins, Finegood, & Swain, 2013). Parent time investments in their young children decrease when mothers report persistent depression in comparison to those who are not experiencing persistent depression (French & Kimbro, 2011). Moreover, parental distress, particularly in terms of depression, anxiety, and loneliness, can have spillover effects, such that children of distressed parents exhibit more distress behaviors as compared to children of less distressed parents (e.g., Aktar, Nikolić, & Bögels, 2017; Deater-Deckard, 1998; Downey & Coyne, 1990; Luoma, Korhonen, Puura, & Salmelin, 2019).

Previous research suggests that the relations between parent mental health and child emotional distress are likely not unidirectional. Children create an environment around them as a function of their own behaviors and personality attributes, resulting in a bi-directional and transactional relationship between parent mental health, negative parenting behaviors, and child distress and problem behaviors (e.g., Ganiban, Ulbricht, Saudino, Reiss, & Neiderhiser, 2011; Kochanova, Pittman, & McNeela, 2021; McQuillan & Bates, 2017). Thus, as child emotional distress behaviors may influence parenting stress (e.g., Kochanova et al., 2021), and feelings of maternal competence and levels of maternal-child interactions (e.g., Berryhill, 2016), child emotional distress likely influences parent time investments in child learning activities as well. Put simply, children's behaviors can evoke caregiver behaviors towards them, including their time investments overall or the nature of specific home-learning activities.

Finally, previous research also suggests that household characteristics likely also influence parent time investments in children's learning activities. For example, the presence of additional adults in the home impacts the overall level of parent time investments experienced by children, such that having an additional adult in the home increases time investments, particularly if that person is a biological parent (Kalil et al., 2014). Additionally, having more children present in the home, particularly younger children, is associated with greater overall parent time investment (especially in terms of basic care) as compared to homes with fewer children in the home (Kalil et al., 2012). Perhaps most notably, household chaos (or the level of noise, confusion, and regularity of routines experienced in the home) has been shown to be significantly associated with negative parenting behaviors and children's problem behaviors (e.g., Coldwell, Pike, & Dunn, 2006; Dumas et al., 2010; for review, see Marsh, Dobson, & Maddison, 2020). Thus, household characteristics may also contribute to variations in parent time investments in children's learning.

Household shocks and parent time investments

Of relevance to the present study is consideration of shocks to households, such as when parents experience involuntary or unexpected job loss. Shocks refer to circumstances in which entities (e.g., persons, households, regions, countries) experience a sudden, unexpected change in conditions that significantly alters that entity. For instance, the flood conditions after Hurricane Katrina created a shock to the entire New Orleans community. In this study, we conceptualize the pandemic conditions and spring of 2020 health-related policies as a shock to households in Ohio, where this study took place. Such shocks included, for instance, loss of employment among caregivers and loss of physical schooling for children. We can expect these shocks and their impacts on employment and schooling to alter parent time investments for a variety of reasons. Evidence finds, for instance, that involuntary job loss for mothers can result in significantly reduced maternal sensitivity during mother-child interactions in early childhood, most likely as a result of increased maternal depression and decreased income (Prickett, 2020). The present study considers a period of multifaceted shock to the household, as not only did families experience involuntary job loss, but also daily family routines shifted while children were unable to attend in-person child care or schooling and parents became more involved in helping guide children's distance learning. For example, schooling shocks led to immense changes in family use of online learning resources, and the intensity of this increased use varied based on geographic location (urban vs. rural), socioeconomic status, and access to reliable Wi-Fi (Bacher-Hicks, Goodman, & Mulhern, 2021). Additionally, state-related policies regarding assistance programs and mental health support impacted associations between household income shocks and experiences of depression and anxiety, such that states with more supportive social policies were able to reduce the prevalence of depression and anxiety in response to income shocks in comparison to those states with less supportive policies (Donnelly & Farina, 2021). Thus, disruptions related to the shutdown likely permeated the entire family ecosystem, at the level of the parent, child, *and* household.

Emerging evidence specific to the impacts of the COVID-19 pandemic suggest that stress experienced during this time may have affected the quality of parent-child interactions during home-based activities. In a survey of over 7000 German parents of children between 1 and 6 years conducted during Germany's lockdown (April–May 2020), parents who reported higher levels of stress also reported lower levels of shared learning activities with their

children as compared to those parents who reported lower levels of stress (Oppermann, 2020). Furthermore, during the early phases of the pandemic, parents who reported worsening mental health symptoms related to anxiety, depression, and perceived stress also reported worsening emotional distress symptoms and/or behavioral problems in their children (Davidson et al., 2020; Gassman-Pines, Ananat, & Fitz-Henley, 2020; Imran, Zeshan, & Pervaiz, 2020; Lee, Ward, Chang, & Downing, 2021; Liu & Doan, 2020; Patrick et al., 2020). Given the dynamic relations between parent, child, and household functioning, it is thus necessary to consider how parent time investments might vary as a function of each part of the family ecosystem in response to COVID-related shocks.

The current study

The present study was conducted to examine parent time investments in their children's home-learning activities during the COVID-19 pandemic during the time period following the initiation of Ohio's shutdown (or after March 15, 2020). Three questions were asked: (1) Whether and to what extent parent time investments in their children's learning varied by parent mental health and social connectedness; (2) Whether and to what extent parent time investments in children's learning varied by children's level of emotional distress; and (3) Whether and to what extent parent time investments in children's learning varied by household characteristics.

2. Methods

2.1. Participants

Parents enrolled in the present study were participants in one of 3 ongoing longitudinal research projects underway at the main study site. We contacted primary caregivers of 216 infants aged birth to 15 months, 527 children aged 4–6- years, and 319 children aged 7–9- years. Parents who had previously provided a valid email address as part of their participation in an ongoing project at the main study site were sent the COVID-specific questionnaire centered around the context of Ohio's shutdown; the questionnaire was not part of the study procedures for those projects in which parents were enrolled, and parents were offered an extra incentive for completing this questionnaire. Of the 1062 parents contacted, about 53% ($n = 559$) responded to the request to complete a COVID-specific questionnaire: 94 with infants aged birth to 15 months, 210 with children aged 4–6- years, and 255 with children aged 7–9- years.

Responding caregivers were primarily the focal child's parent (95.5%), more specifically the child's mother (91.9%) or father (3.6%); a small percentage of respondents were the child's grandparent (2.5%), and a few were foster parents, legal guardians, or other relatives (1.8%). As the majority of participating caregivers were parents, we hereafter use the term "parent" to signify their responses. Descriptive statistics of parent characteristics are shown in Table 1.

2.2. Study procedure

Parents were sent the COVID-specific questionnaire through personalized links using Qualtrics (a secure software program) over a period of about 6 weeks in the spring of 2020. Parents provided their electronic consent prior to starting the survey and received a $15 electronic gift card upon survey completion. This study was approved by the authors' Institutional Review Board.

2.3. Measures

The parent survey included 250 questions regarding family life since the state-mandated shutdown began, organized across 5 major areas: (1) demographic characteristics, (2) family economic well-being, (3) parent stress, (4) parent investment, and (5) target child distress. While we focus on describing only the primary measures used in the current analyses below, the full survey is available upon email request from the corresponding author. Measures of relevance to the primary research questions include: parent time investments in children's learning; parent mental health and social connectedness (i.e., parent anxiety, depression, loneliness, and positive social experiences); child emotional distress (i.e., general emotional distress and COVID-19 trauma behaviors); household characteristics (i.e., household chaos, social needs, and structure); and parent socio-demographic characteristics (i.e., parent age, race, education level, working status, marital status, annual household income). Notably, parents were allowed to report their time investments for any (or all) of their children living at home (with about 83% of the sample reporting they have more than one child living at home), while child emotional distress was only reported for the target child enrolled in one of 3 on-going studies.

2.4. Parent time investments

Parent time investments in children's learning were captured by a set of items regarding parent investment in children's home-learning activities since March 15, 2020. We used the Home-based Learning Subscale of the Family Involvement Questionnaire (Fantuzzo, Tighe, & Childs, 2000; Manz, Fantuzzo, & Power, 2004). This scale consisted of 13 items assessing parent involvement in home-based learning activities (e.g., reviewing school work, working together on reading/writing skills, or shared creative activities). Parents rated each statement on a 4-point scale based on how frequently they performed that activity with any (or all) of their children living at home, choosing from *rarely* (score = 1) to *always* (score = 4). The internal consistency for this scale was acceptable within our sample ($\alpha = 0.86$). Of the 559 participants, 2 (0.4%) did not respond to any items for this scale, whereas 512 (91.6%) responded to at least 85% of items (i.e., 11 items or more). An average score was calculated for parents who answered at least 11 items, with higher scores indicating higher *parent time investment*.

2.5. Parent mental health and social connectedness

We used 2 measures to capture parent mental health: parent anxiety and depression. To measure *parent anxiety*, we used the Generalized Anxiety Disorder 7-Item Scale (GAD-7; Löwe et al., 2008; Spitzer, Kroenke, Williams, & Löwe, 2006). The GAD-7 consisted of 7 items that assess symptoms of anxiety (e.g., feeling worried, anxious, or unable to relax). Parents rated each statement using a 4-point scale based on how often they felt that way during the last 2 weeks, choosing from *not at all* (score = 0) to *nearly every day* (score = 3). The internal consistency for this scale was acceptable within our sample ($\alpha = 0.94$). Of the 559 participants, 26 (4.7%) did not respond to any items for this scale, while 507 (90.7%) responded to at least 85% of items (i.e., 6 items or more). An average score was calculated for parents who answered at least 6 items, with higher scores indicating higher levels of *parent anxiety*.

To measure *parent depression*, we used the Center for the Epidemiological Studies of Depression Short Form (CESDR-10; Björgvinsson, Kertz, Bigda-Peyton, McCoy, & Aderka, 2013). The CESDR-10 consisted of ten items that assess symptoms of depression (e.g., feeling overly irritable, fearful, or unable to *get going*).

Table 1
Descriptive statistics of parent socio-demographic characteristics.

Variables	n	%	M	SD	Range
Age	544		34.60	7.46	18–65
Race	553				
White		68.61			
Black		24.45			
Other		6.93			
Education	554				
High school diploma/GED or less		27.44			
Some college but no degree		26.17			
AA/AS 2-yr degree		13.36			
Bachelor's degree		16.43			
Some graduate school or higher		16.61			
Working status (before vs since COVID)	547				
Currently working		61.79			
Lost work since COVID		14.99			
Constantly non-working		23.22			
Marital status	550				
Married		53.82			
Cohabiting		14.73			
No partner		31.45			
2019 Household income	505				
Less than $30,000		37.03			
$30,000–$59,999		21.39			
$60,000–$89,999		16.04			
$90,000 or more		25.54			

Note. M = mean. SD = standard deviation.

Parents rated each statement using a 4-point scale based on how often they felt that way during the last week, selecting from *rarely or none of the time [less than 1 day]* (score = 0) to *all of the time [5–7 days]* (score = 3). The internal consistency for this scale was acceptable within our sample ($\alpha = 0.88$). Of the 559 participants, 22 (3.9%) did not respond to any items for this scale, while 513 (91.8%) responded to at least 80% of items (i.e., 8 items or more). An average score was calculated for parents who answered at least 8 items, with higher scores indicating higher levels of *parent depression*.

Two measures were used to capture parent social connectedness: parent loneliness and positive social experiences. *Parent loneliness*, which reflected a lack of social connectedness since Ohio's stay-at-home order went into place, was measured using the UCLA Loneliness Scale version 3 (Russell, 1996). This scale consisted of 20 statements that reflect subjective feelings of loneliness and social isolation (e.g., feeling isolated, left out, or alone). Parents were asked to think about how they felt since March 15, 2020 and rate each statement on a 4-point scale from *strongly disagree* (score = 1) to *strongly agree* (score = 4). The internal consistency for this scale was acceptable within our sample ($\alpha = 0.95$). Of the 559 participants, 17 (3.0%) did not respond to any items for this scale, while 505 (90.4%) responded to at least 80% of items (i.e., 16 items or more). An average score was calculated for parents who answered at least 16 items, with higher scores indicating higher levels of *parent loneliness*.

To measure *parent positive social experiences* during the COVID-19 pandemic shutdown, we provided parents with a list of 7 potential positive experiences (developed by our team for this survey) and asked them to select all items they felt they had a positive experience with since March 15, 2020. Of these 7 items, there were 5 that related to social connectedness which we used for this study, including: "spending more time with family," "connecting with people over the internet," "seeing more people out in my neighborhood," "hearing of or seeing acts of kindness," and "increasing feeling of a shared experience with others." Each item was scored 1 *if selected* and 0 if *not selected*. Of the 559 participants, 30 (5.4%) did not provide data for this item. Parents who responded to this item received a summed score of these 5 items, with higher scores indicating more *parent positive social experiences*.

2.6. Child emotional distress

We measured child emotional distress using 21 items from the Pediatric Emotional Distress Scale (PEDS; Saylor, 2002; Saylor, Swenson, Reynolds, & Taylor, 1999), which captured both general emotional distress and distress specifically associated with the COVID-19 pandemic. We asked parents to respond to this scale specifically regarding their child that was enrolled in one of three ongoing studies at the main study site (i.e., the target child). Parents rated each statement using a 4-point scale based on how frequently their child had behaved that way since March 15, 2020, choosing from *almost never* (score = 0) to *very often* (score = 3).

We created an average score for *child general emotional distress* using all 17 items from the Anxious/Withdrawn (6 items), Fearful (5 items), and Acting Out (6 items) subscales of the PEDS. Some behaviors included: "seems worried," "refuses to sleep alone," and "has temper tantrums" (Saylor, 2002). The internal consistency for this scale was acceptable within our sample ($\alpha = 0.88$). Of the 559 participants, 30 (5.4%) did not respond to any items for this scale, while 514 (91.9%) responded to at least 82% of items (i.e., 14 items or more). Only children of parents who answered at least 14 items received a total average score, with higher scores indicating higher levels of *general emotional distress*.

We also created an average score for *child COVID-19 trauma behaviors* using 4 additional questions from the PEDS Trauma subscale (Saylor, 2002), which were modified for our study to ask about children's behavioral responses to the COVID-19 pandemic specifically. This subscale was only provided to parents with target children aged 3- years or older, and included the following behaviors: "creates games, stories, or pictures about the COVID-19 pandemic," "brings up the COVID-19 pandemic in conversation," "avoids talking about the COVID-19 pandemic even when asked," and "seems fearful of things that are reminders of the COVID-19 pandemic." The internal consistency for this scale was acceptable within our sample ($\alpha = 0.6$). Of the 559 participants, 118 (21.1%) did not respond to any items for this scale (~80% due to age of focal child), while 434 (77.6%) responded to at least 75% of items (i.e., 3 items or more). Only children of parents who answered 3 or more of these statements received an average score, with higher scores indicating higher levels of *COVID-19 trauma behaviors*.

2.7. Household characteristics

Household characteristics comprised household chaos, household social needs, and the number of children and adults in the household. We measured *household chaos* using a shortened version of the Household Confusion, Hubbub, and Order Scale (CHAOS; Matheny, Wachs, Ludwig, & Phillips, 1995). This CHAOS short form (or CHAOS-SF) consisted of 3 statements about household confusion (e.g., having a noisy home- "You can't hear yourself think in our home") and 3 reverse scored statements about order (e.g., having a calm home- "The atmosphere in our house is calm"). Parents were asked to rate how true each statement was in describing their home since March 15, 2020 using a 5-point scale ranging from *definitely untrue* (score = 1) to *definitely true* (score = 5), with reverse scoring occurring where indicated. This shortened version was first formally used by Petrill, Pike, Price, and Plomin (2004)) and has since been used by many others (see Marsh et al., 2020). The internal consistency for this scale was acceptable within our sample (α = 0.70). Of the 559 participants, 555 (99.2%) responded to greater than 80% of items (i.e., 5 items or more). An average score was calculated for parents who answered at least 5 items, with higher scores indicating more *household chaos*.

We measured *household social needs* by asking parents to indicate whether they had been concerned about access to 5 core social needs since March 15, 2020 using a modification of the OSU Public Health Core 5 Social Needs Screening Tool (Bechtel & Jones, 2019a, 2019b). Parents were asked to indicate *yes* (score = 1) or *no* (score = 0) to 5 items. Items included whether parents had been worried about: "… food will run out and you won't be able to get more because of food shortages at the grocery store" (modified item), "… losing your housing or experiencing homelessness," "… having issues with your utilities such as your heat, electric, natural gas, or water," "… a lack of transportation kept you from attending medical appointments or from work, or from getting things you need for daily living," and "…that the Coronavirus may infect you or someone in your family" (modified item). The internal consistency for this scale was acceptable within our sample (α = 0.62). Of the 559 participants, 3 (0.5%) did not respond to any items for this scale, while 551 (98.6%) responded to at least 80% of items (i.e., 4 items or more). A summed score was calculated for parents who answered at least 4 of these questions, with higher scores indicating more concern over *household social needs*.

We also asked parents about their current household structure. Parents reported the number of children living in their homes across 3 age ranges: 4 years old or younger, 5–12-years, and 13–18-years. We calculated a total *number of children in the household* by summing the number provided for each category. We also calculated a *ratio of 0 to 4-year-olds to all children* by dividing the number of children aged 4- years old or younger by the total number of all children reported across age ranges for each household. Parents also reported the *number of adults in the household*, which included all individuals aged 19- years or older living in the home.

2.8. Socio-demographic characteristics

Parent age, race, education level, working status, and marital status, and household income were included as covariates. Parent age was included as a continuous variable, while all other covariates were included as categorical variables. Parent race included 3 categories: White, Black, and other. Parent education level, based on the parent-reported highest level of education, was scored high school diploma/GED or less, some college but no degree, AA/AS 2-year degree, Bachelor's degree, some graduate school of higher. Parent working status, based on a comparison of the parent-reported employment status before March 15 with their current working status, was scored constantly not working, lost work since COVID-19, and currently working. Parent marital status involved 3 categories: no partner, unmarried but cohabiting, and married. Household income, based on the parent-reported 2019 annual household income, was scored less than $30,000, $30,000–$59,999, $60,000–$89,999, and $90,000 or more.

2.9. Analytical overview

All analyses were conducted using STATA 16. To examine associations between parent time investments in their children's learning and parent mental health and social connectedness (Question 1), we used a linear regression model to evaluate differences in parent time investments by parent anxiety, depression, loneliness, and positive social experiences (Model 1, n = 386). To examine associations between parent time investments in children's learning and children's level of emotional distress (Question 2), we used a linear regression model to evaluate differences in parent time investments by child general emotional distress and child COVID-19 trauma behaviors (Model 2, n = 376). To examine associations between parent time investments in children's learning and household characteristics (Question 3), we used a linear regression model to evaluate differences in parent time investments by household chaos, social needs, the number of children living in the home, the ratio of 0–4-year-olds to all children, and the number of adults living in the home (Model 3, n = 439). In each of these models, we controlled for parent age, race, education level, working status, marital status, and annual household income. As parent time investments could apply to more than one child, target child age was not included as a predictive socio-demographic characteristic within our analyses.

For each model, we only included individuals with complete data for all respective outcome, predictor, and covariate variables, resulting in slightly different analytical sample sizes to examine each research question (as indicated above for each model). Finally, we calculated semi-partial Pearson's r values to evaluate effect sizes of significant predictors while controlling for all other variables within the model. We evaluated the magnitude of the effect size using guidance from Funder and Ozer (2019), where r = 0.10 indicates a small but meaningful effect, r = 0.20 indicates a medium effect, and r = 0.30 indicates a large effect.

3. Results

3.1. Descriptive analyses

First, we review the descriptive characteristics of our sample Table 2. shows the descriptive statistics of outcome and predictor data. On average, parents reported high levels of parent time investment in their children's learning, approximating the median for this sample, but surpassing the mid-point of this scale (median = 3.3; mid-point = 2.5).

In terms of parent mental health and social connectedness, both the mean parent anxiety score and mean parent depression score surpassed the median for this sample but fell below the mid-point for their respective scales (GAD-7: median = 0.71 and mid-point = 1.5; CESDR-10: median = 0.70 and mid-point = 1.5). The mean parent loneliness score approximated the median for this sample but fell below the mid-point of this scale (median = 2.0; mid-point = 2.5). The mean parent positive social experiences score fell slightly below the median for this sample, as well as the mid-point for this item (median = 3.0; mid-point = 3.0). For child emotional distress, on average, parents reported that child emotional distress and COVID-19 trauma behaviors occurred at relatively low levels. Both the mean general child emotional distress score and mean COVID-19 trauma behaviors score surpassed the

Table 2

Descriptive statistics of parent time investments and parent, child, and household predictor variables.

	n	M	SD	range
Outcome variable				
Parent time investments	512	3.25	0.49	1–4
Model 1 predictor variables: Parent mental health & social connectedness				
Parent anxiety	507	0.89	0.83	0–3
Parent depression	513	0.89	0.65	0–2.8
Parent loneliness	505	1.99	0.51	1–3.7
Parent positive social experiences	529	2.66	1.39	0–5
Model 2 predictor variables: Child emotional distress				
Child general emotional distress	514	0.67	0.50	0–2.75
Child COVID-19 trauma behaviors[a]	434	0.40	0.41	0–2
Model 3 predictor variables: Household characteristics				
Household chaos	555	2.52	0.77	1–5
Household social needs	551	1.52	1.23	0–5
Number of children living in home	556	2.72	1.51	0–14
Ratio of 0–4-yr-olds to all children	553	0.31	0.33	0–1
Number of adults living in home	559	2.01	0.86	0–6

Note. M = mean. SD = standard deviation.

[a] Only asked if target child > 3 years of age.

Table 3

Correlations between parent time investments and parent, child, and household predictor variables.

	1	2	3	4	5	6	7	8	9	10	11
1. Parent time investments											
2. Parent anxiety[a]	−0.19***										
3. Parent depression[a]	−0.20***	0.80***									
4. Parent loneliness[a]	−0.25***	0.50***	0.61***								
5. Parent positive social experiences[a]	0.13**	−0.05	−0.07	−0.17***							
6. Child general emotional distress[b]	−0.18***	0.45***	0.46***	0.38***	−0.03						
7. Child COVID-19 trauma behaviors[b]	0.11*	0.23***	0.25***	0.22***	0.00	0.32***					
8. Household chaos[c]	−0.44***	0.40***	0.38***	0.34***	−0.12**	0.39***	0.10*				
9. Household social needs[c]	−0.03	0.23***	0.28***	0.27***	0.00	0.21***	0.21***	0.20***			
10. Number of children living in hom[c]	−0.06	−0.02	−0.03	0.07	0.00	−0.09*	0.08	0.26***	0.14**		
11. Ratio of 0–4-yr-olds to all children[c]	0.02	−0.03	0.00	0.04	−0.02	−0.04	0.12*	−0.04	0.09*	0.09*	
12. Number of adults living in home[c]	−0.13**	0.08	0.04	0.00	−0.02	0.05	0.01	0.07	0.03	0.05	−0.03

[a] Model 1: Predictors related to parent mental health and social connectedness.

[b] Model 2: Predictors related to child emotional distress.

[c] Model 3: Predictors related to household characteristics.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

median for this sample but fell far below the mid-point of their respective scales (General: median = 0.59 and mid-point = 1.5; Trauma: median = 0.25 and mid-point = 1.5). Finally, in terms of household characteristics, the mean household chaos score approximated the median for this sample but fell slightly below the mid-point of this scale (median = 2.5; mid-point = 3). The mean household social needs score surpassed the median for this sample but fell below the mid-point of this scale (median = 1.0; mid-point = 2.5). The mean number of total children in the household was 2.72 and the mean ratio of children aged 0–4-years-old to total children was 0.31.

3.2. Correlational analyses

Preliminary pairwise correlation coefficients of the outcome and predictor variables are shown in Table 3. Parent anxiety, depression, and loneliness each had a modest negative correlation with parent time investments ($p < 0.001$), whereas the level of parent positive social experiences had a weak positive correlation with parent time investments ($p < 0.01$). Child general emotional distress had a weak negative correlation with parent time investments ($p < 0.001$). However, the level of child COVID-19 trauma behaviors had a weak positive correlation with parent time investments ($p < 0.05$). Lastly, we found negative correlations between parent time investments and household chaos ($p < 0.001$) and the number of adults living in home ($p < 0.01$). Household so-

cial needs, the number of children living in home, and the ratio of 0–4-year-olds to all children were not significantly correlated with parent time investments.

3.3. Parent, child, and household influences on parent time investments

The results of 3 linear regression analyses investigating whether parent time investments in children's learning were associated with: (1) parents' mental health and social connectedness, (2) children's emotional distress, and (3) household characteristics are shown in Table 4. The results of the first analysis (Model 1 of Table 4) show that parent loneliness had a significant negative association with parent time investments, of medium effect-size ($b = -0.18$, $SE = 0.06$, $p < 0.01$; semi-partial Pearson's $r = 0.19$), suggesting that loneliness may have negative influences on parent time investments. No significant relation for caregiver anxiety and depression and parent time investments was observed. Overall, Model 1 explained 12.6% of the variance in parent time investments.

The results of the second analysis, examining associations between child emotional distress and parent time investments, are represented as Model 2 of Table 4. Child general emotional distress had a significant negative association with parent time investments, of medium effect-size ($b = -0.21$, $SE = 0.05$, $p < 0.001$; semi-partial Pearson's $r = -0.21$). However, child COVID-19

Table 4
Modeling parent, child, and household associations with parent time investments.

	Model 1[a]: Parent correlatesb (SE)	Model 2[b]: Child correlatesb (SE)	Model 3[c]: Household correlatesb (SE)
Parent anxiety	0.00 (0.05)		
Parent depression	−0.03 (0.06)		
Parent loneliness	−0.18 (0.06)**		
Parent positive social experiences	0.03 (0.02)		
Child general emotional distress		−0.21 (0.05)***	
Child COVID-19 trauma behaviors[d]		0.22 (0.06)***	
Household chaos			−0.27 (0.03)***
Household social needs			0.00 (0.02)
Number of children living in home			0.00 (0.01)
Ratio of 0–4-yr-olds to all children			−0.07 (0.08)
Number of adults living in home			−0.03 (0.03)
Parent age	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Parent race (Ref = White)			
Black	0.15 (0.07)*	0.11 (0.07)	0.16 (0.06)**
Other	0.02 (0.10)	0.12 (0.10)	0.06 (0.09)
Parent education (Ref = HS diploma/GED or less)			
Some college but no degree	−0.06 (0.07)	0.00 (0.07)	0.01 (0.06)
AA/AS 2-yr degree	−0.08 (0.08)	−0.03 (0.08)	0.01 (0.07)
Bachelor's degree	−0.13 (0.08)	−0.16 (0.08)	−0.13 (0.07)
Some graduate school or higher	0.00 (0.08)	0.01 (0.08)	0.03 (0.07)
Parent working status (Ref = Constantly non-working)			
Lost work since COVID	0.01 (0.08)	−0.04 (0.08)	−0.05 (0.07)
Currently working	−0.05 (0.06)	−0.07 (0.06)	−0.03 (0.06)
Parent marital status (Ref = No partner)			
Cohabiting	0.03 (0.08)	0.10 (0.08)	0.14 (0.07)*
Married	−0.01 (0.07)	−0.03 (0.07)	0.11 (0.06)
2019 Household income (Ref = < $30,000)			
$30,000-$59,999	−0.12 (0.07)	−0.15 (0.07)*	−0.18 (0.06)**
$60,000-$89,999	−0.09 (0.09)	−0.08 (0.09)	−0.14 (0.08)
$90,000 or more	−0.09 (0.09)	−0.10 (0.09)	−0.20 (0.08)*
R^2	0.126***	0.143***	0.253***

Note. SE = standard error. Ref = reference group. HS = high school.
[a] Only includes complete cases, n = 386.
[b] Only includes complete cases, n = 376.
[c] Only includes complete cases, n = 439.
[d] Only asked if target child > 3 years of age.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

trauma behaviors had a significant positive association with parent time investments, also of medium effect-size ($b = 0.22$, $SE = 0.06$, $p < 0.001$; semi-partial Pearson's $r = 0.19$). Overall, Model 2 explained 14.3% of the variance in parent time investments.

The results of the third analysis, evaluating associations between household chaos, social needs, structure, and parent time investments, are represented as Model 3 of Table 4. Household chaos had a significant negative association with parent time investments, of large effect-size ($b = -0.27$, $SE = 0.03$, $p < 0.001$; semi-partial Pearson's $r = -0.42$). Household social needs, the total number of children, the ratio of 0–4-year-old children to total children, nor the total number of adults were significantly associated with parent time investments. Overall, Model 3 explained the largest proportion of variance in parent time investments out of our 3 tested models, explaining 25.3% of the variance in parent time investments.

4. Discussion

A state-mandated shutdown in Ohio during the early months of the COVID-19 pandemic involved physical school closures and work-from-home advocacy, when possible, which largely disrupted child's learning expectations and normal family routines. In this study, we assessed key predictors of parent time investments in children's home-learning activities using data from a comprehensive survey completed by 559 parents of young children. We asked whether and to what extent parent time investments varied by parent mental health and social connectedness, children's

level of emotional distress, and household characteristics. Our results demonstrated that parent loneliness (Model 1), child emotional distress and child COVID-19 trauma behaviors (Model 2), and household chaos (Model 3) were associated with parent time investments in children's home-learning activities during the COVID-19 pandemic shutdown period.

4.1. Influences on parent time investments during Ohio's shutdown

Parent loneliness (i.e., feeling of lack of social connectedness) was significantly predictive of parent time investments in their children's learning during the shutdown period, exerting a medium effect on parent time investments. It is possible that parent loneliness during the stay-at-home order was the most salient mental health problem for some parents, particularly because parents had to quickly improvise ways to assist their children with distance learning strategies with little strategic support from schools and/or community members. Notably, as loneliness has been shown to be significantly associated with neglectful parenting (Gaudin, Polansky, Kilpatrick, & Shilton, 1993), the fact that parents experiencing higher levels of loneliness also invested less in parent time investments in children's learning is perhaps not surprising. As loneliness has effects on child internalizing behaviors in the long term (Luoma et al., 2019), it will be important for our longitudinal projects to follow-up with these associations using direct child assessments in the post-pandemic period, if possible, in order to determine if this relationship has a long-term effect on child outcomes.

In terms of child correlates, child emotional distress negatively impacted parent time investments in children's learning, while child COVID-19 trauma behaviors positively impacted parent time investments, with each exerting a medium effect on these investments. Because of the potential transactional nature between child emotional distress behaviors and parenting behaviors (e.g., Berryhill, 2016; Ganiban et al., 2011; Kochanova et al., 2021), this result is perhaps unsurprising as well. General child emotional distress may impede parents from investing time in learning activities with their children, but COVID-19 trauma behaviors may elicit more parent time investments; however, because this is an observational, correlational study, it is not possible to determine the directionality and timing of these relationships. For example, the association between general child emotional distress and parent time investments may have been a sustained pattern since before the stay-at-home-order. Regardless of whether this relationship existed prior to the shutdown, children with parents who are more involved in their learning may also be less distressed in general but may be more inclined to express behaviors related to the COVID-19 pandemic during this shutdown period. The positive association between COVID-19 trauma behaviors and parent time investments may have occurred because parents who were more involved also paid more attention to their child's signals related to COVID-19, particularly given the societal messages (e.g., from media) that encouraged parents to pay attention to COVID-19-related child distress behaviors.

Household chaos had a strong negative association with parent time investments, exerting the largest effect on parent time investments out of all our significant correlates (based on effect size). Again, as household chaos is generally a well-established predictor of child developmental outcomes and parent-child and family functioning (see Marsh et al., 2020 for review), this relationship is perhaps unsurprising. Parents experiencing greater household chaos may not have been able to invest as much time in learning activities with their children. As our survey collected data relatively rapidly following the initiation of the state-wide shutdown, it is possible that chaos was particularly salient for parents during this time, as they had not yet had enough time to institute new rules and routines following the shock of movement of children away from schools and child care facilities. However, we do not have pre-pandemic household chaos measures for participating families to determine whether chaos shifted during the shutdown. Therefore, it is difficult to say whether this relationship was heightened due to stressors increasing chaos during this time, or whether this relationship was similar to pre-pandemic times.

4.2. Additional findings, limitations, and future directions

A primary goal of this study was to explore factors contributing to parent time investments during a state-mandated closure during the COVID-19 pandemic. We found that parent loneliness, child emotional distress and child COVID-19 trauma behaviors, and household chaos each negatively influenced parent time investments in children's home-learning activities. Study results also pointed to several interesting phenomena.

First, overall parent time investments for our sample were relatively high, despite the significant negative associations with symptoms of parent loneliness, child emotional distress, and household chaos. The mean parent time investment score (3.25 ± 0.49; Table 2) surpassed the mid-point for this scale (2.5), with over 90% of parents earning a score above 2.5. This relatively high level of parent time investment may simply reflect the increased time spent at home that everyone in this sample was experiencing during this time due to school closures and the stay-at-home order. However, as we do not have pre-pandemic measures of parent time investments to which to compare these

shutdown period measures, we are unable to say if these investments changed due to the shutdown, or if these parent time investments reflected existing patterns within our sampled households. If possible, post-pandemic comparisons of parent time investments with our sampled families after schools transition back to full-time face-to-face learning may allow us to determine if the level of parent time investments was associated specifically with the shock of school closures.

Second, measures of parent mental health and social connectedness and child emotional distress within our sample generally suggest that our families were faring relatively well during these early stages of the pandemic shutdown. Despite a sizeable portion of our sample experiencing job loss (15%) and the average household experiencing at least one household social need since March 15, 2020, these household shocks associated with the COVID-19 pandemic shutdown did not seem to have a significant association with parent time investments in any of our models (Table 4). Perhaps the full impact of job loss on parent time investments was obfuscated in our sample because we only measured the primary parent's change in employment status and did not account for job loss experienced by the household as a whole. Further, more generous than normal unemployment benefits during this time may have offset shocks associated with job loss. In terms of household social needs, 82% of our sample reported 2 or fewer worries, with far fewer experiencing 4 (6.4%) or 5 (2.5%) worries, suggesting that there may not have been sufficient variation in this variable. It will be important for our longitudinal projects to follow-up on the associations (or lack thereof) between these variables and parent time investments once we enter the post-pandemic period, if possible, to determine if relationships may arise following the passage of time stuck at home with children largely continuing with hybrid or distance learning through the 2020–2021 school year.

Third, the overall variance in parent time investments explained in our models was relatively low, particularly for Models 1 and 2, suggesting that other factors of the family ecosystem were contributing to variations in parent time investments in children's learning during the shutdown period which we did not seem to capture. For example, as mentioned above, we may not have fully captured the financial shocks experienced by the household and/or the level of assistance that families were receiving to potentially offset these shocks. Again, follow-up studies with our longitudinal projects that integrate pre-pandemic, shutdown, and post-pandemic data may allow us to better untangle the family ecosystem factors contributing to variations in parent time investments. However, the medium to large effect-sizes of parent loneliness, child emotional distress, and household chaos on parent time investments do suggest that while these correlates do not explain *all* of the variation in parent time investments, they are important factors contributing to variations in parent learning investments.

While these results offer insight into the relations between parent, child, and household correlates and parent time investment in children's learning, there are several noteworthy limitations to this work. First, our study's reliance on single informant reports is not ideal, as it may conflate the relationship between parent time investments and parent and child correlates (e.g., Hoyt, 2000; Ringoot et al., 2015). However, direct assessments of child distress were not available as this study was undertaken during Ohio's shutdown period, when face-to-face interactions between target children and other potential informants (i.e., researchers, teachers, and/or child care providers) were not possible. Future analyses using COVID-19 pandemic-era data which were able to utilize other measures of child well-being or multiple informants (for example, reports from both mothers and fathers, or self-reported data from children old enough to supply this information (Ringoot et al., 2015)) may replicate and further validate our study's findings regarding child emotional distress and parent time investments.

Furthermore, as our study uses a selective, convenience sample limited to those who were willing to respond to our survey within limited geographic areas of Ohio, we are unable to generalize to larger populations. Additionally, we rely on concurrent reports of family conditions and parent and child behaviors, such that we are unable to make causal inferences or specify temporal ordering. It is also important to note that because these data are cross-sectional in nature, it is possible that the directionality of these associations is different, or that other processes are underlying the association. For example, the children who showed more COVID-19 trauma behaviors may be more exposed to knowledge about the pandemic because of the higher levels of parent time investments in their children's learning. Increased parent time investments may expose children to more opportunities to invoke COVID-19 trauma behaviors. Further longitudinal research is needed to fully disentangle the directionality of these processes. Despite these limitations, our study was strengthened by capturing important socioeconomic and racial diversity present across the United States (United States Census Bureau, 2019).

While the data for this study were collected during an unprecedented period of upheaval, these initial findings may point toward implications for post-pandemic family life. While further studies will be necessary to parse out the directionality of the relationships between parent, child, and household characteristics and parent time investments, we make several general suggestions to consider regarding parent time investments in the post-pandemic years. First, to alleviate parent distress, particularly feelings related to loneliness and feeling socially disconnected, schools should work to foster a broader sense of community for families. Previous studies suggest that building school-family partnerships and finding ways to increase parents' sense of community belonging and participation can improve parent time investments and child learning outcomes (Bryan, 2005; Bryan & Henry, 2008; Kim & Bryan, 2017). If schools can build rapport between families and schools, and across families within schools, then parents may not only learn how to provide better learning support for their children at home, but also may increase parents' social capital, which in turn may reduce their feelings of loneliness and/or mental health problems such as anxiety and depression. Second, to alleviate child emotional distress, which may negatively impact parent time investments, schools should closely monitor behaviors related to child emotional distress and collaborate with families to teach children social-emotional coping skills to deal with feelings of distress and periods of change. School-family partnerships have also been shown to be a good approach to aiding children in their social-emotional learning (Albright & Weissberg, 2010), suggesting that a focus on building such partnerships could be benefit both parent and child mental health.

5. Conclusion

The COVID-19 pandemic and subsequent local government-mandated shutdowns drastically changed family life for many households with young children. The closure of schools and day care facilities particularly impacted the ways in which parents were expected to be involved in their young children's learning, largely pushing teaching responsibilities into the laps of parents staying home with their children. We investigated myriad factors likely to influence parent time investments, including parent, child, and household characteristics. Our results suggest that parent loneliness, child emotional distress, and household chaos were the most significant influencers in reducing parent time investments. This study suggests that finding ways to encourage greater community and school support and connection for both parents and young children during times of crisis may help alleviate negative influences that may detract from parent time investments in child learning.

Data availability statement

Research data are not shared.

Disclosures

Declaration of interest: None.

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