

RESEARCH REPORT



NIEER

An exploratory study of the use of time diaries to understand young children's experiences during the pandemic

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Abstract

This brief explores the use of time-diaries to deepen our understanding of the pandemic's impacts on educational activities including differences across children and over time. We shed light on how well time-diary data correspond to more typical survey data and how well diaries allow us to assess differences among children in their daily routines. We find that time diaries provide finer grained and perhaps better information on the amount of time spent in various learning experiences and the degree of which these are enriched by parental involvement than typical questions about parent engagement. Diaries offer information about patterns of engagement spells throughout the day as well as total time. The diary data reinforces survey findings that engagement very limited or nonexistent for many young children this past spring. The results also illustrate the usefulness of diaries for understanding children's daily experiences, in particular the educational content, activities and learning processes in which they engage.

Introduction

The COVID-19 pandemic disrupted schooling in much of the United States. Most 3- to 5-year-olds attending preschool programs had their 2019-20 school year cut short in March 2020, as states across the nation issued orders to stay at home. Preschool participation fell from 61% to 8% during the pandemic, and was only 30% (half of what was before) when counting remote supports for preschoolers (Barnett & Jung, 2020). Parents at home found themselves more stressed and now responsible to take on the roles of teachers and therapists for their children while at the same time experiencing financial hardships and decreases in their family's income (Fisher, Lombardi & Kendall-Taylor, 2020), as well as increased food insecurity (Tulsa SEED study Team, 2020).

In the context of what was happening across the nation, the field launched multiple initiatives to understand what the pandemic means for children's development (AIR, 2020; Fisher, Lombardi & Kendall-Taylor, 2020; Gonzalez, et. al, 2020; Tulsa SEED study Team, 2020). At the National Institute for Early Education Research (NIEER) we initiated a series of efforts to investigate the experiences of families and children. [NIEER's National Parental Learning Activities \(PLA\) survey](#) found most parents reported their children received some remote educational support services when preschool classrooms closed, but support was often minimal. As a qualitative follow to the national survey, and with the goal of taking a deeper look at children's lives during the pandemic, we also undertook an exploratory study using time-diaries. We hoped to shed light on the degree to which this methodological approach could provide an in depth portrait of children's daily experiences that would provide more fine-grained insights regarding remote schooling practices.

Our qualitative study with time diaries was conducted with 31 children (10 in preschool, 11 in kindergarten, 10 in first grade) in nine New Jersey districts. . The study collected information for a 24-hour recall by parents in 15-minute interval.

Each interval was coded by the type of activities children engaged in, with whom and where these activities took place.

Time diary findings are highly consistent with those on the NIEER PLAs survey. Similar findings include the amount of time children spent on TV, video or DVDs activities, the degree to which this predominated over any other type of activity and the degree to which a many children were minimally or not at all engaged in educational activities. The deeper look that the time diary approach suggests young children, spent most of the time at home on their own and without any exercise throughout the day. Very few children were highly engaged in a rich mix of activities. These results suggest a need to continue to explore how well we are engaging children remotely in learning activities, as we continue this new school year with many children experiencing hybrid or remote schooling. The time diary methodology could prove particularly useful for this purpose.

Background

In the United States, in a typical year around 60% of our children attend preschool at age 4, 80% attend Kindergarten (NCES, 2020) and over 90% attend first grade. While preschool and kindergarten attendance have increased over the years (NCES, 2020), they are still far from universal (Friedman-Krauss, 2020). Preschool programs are provided through a combination of public schools, Head Start centers and community providers.

Literature on the early years has found that preschool can reduce inequities across children at school entry with the potential for benefits long term (Camilli, et. al, 2010; Joo, et. al, 2020; McCoy, et. al, 2017; Reynolds & Temple, 2019). School closures across the country and the transition to remote schooling have the potential to strongly disrupt early learning opportunities; setting the stage for increases in inequities for children nationwide (Yoshikawa, et. al, 2020). Studying children's time use is particularly compelling given the significant associations between the time and type of activities children engage in at home and their school year gains (Hsin & Felfe, 2014; McCormick, et. al, 2020). For example, Fiorini and Keane (2014) have shown that children's time engaged in educational activities at home—in particular, educational time with parents—is positively associated with children's cognitive development.

As children were forced into remote learning, a question emerging in the field is the degree to which their formal education experiences could be replicated or even approximated at home. This is important for all children, but even more so for those with special needs, who at this age receive most of their supports in preschool programs and schools. NIEER's recent national survey of preschoolers' parents in the U.S. suggests remote supports last spring were weak, with enrollment falling to 30% even after including remote experiences, children being supported very little across a variety of activities and with over 20% of children with IEPs receiving none of their supports (Barnett, Jung & Nores, 2020). Similarly, a K-12 Gallup survey early into the pandemic reported 70% engagement with school provided resources, and

11% of children not engaged with any resources (whether from the school, home-grown or from other online programs), making about half of parents apprehensive about the negative impacts of the pandemic on their child's education (Brenan, 2020). A recent survey of school districts found the support provided by remote schooling to be highly variable in daily duration and content (Garet et.al, 2020). One study of the pandemic's impact on K-12 children estimated that by the return to school in September children would have just 63-68% of the typical reading learning gains and 37-50% of the typical math learning gains (Kuhfeld, et. al, 2020).

The NIEER Covid-Time Use Study (NIEER-TS)

The NIEER Covid-Time Study provides in depth detail on children's activities for a convenience sample of 31 children enrolled in preschool through 1st grade whose classrooms were closed for face to face instruction. We follow methods outlined in the Longitudinal Study of Australian Children (Baxter & Hayes, 2007).¹ In essence, it uses diary recall data to quantify individual experiences across activities. The study was conducted through phone interviews in Spanish and English with parents between May 13th and June 19th, 2020 in nine New Jersey districts. Parents were asked to recall children's activities for the previous' day, in 15-minute intervals. Therefore, we summarize information on 2,976 15-minute intervals across 31 children. Like survey studies on parental engagement, a limitation of time-diary data is that while content, type and timing of activities can be coded, the quality of these processes are not captured, which is critical in effectively supporting child development (Hsin & Felfe, 2014). However, time diary data provide a detailed picture of children's experiences (Hofferth & Sandberg, 2001) that can add to our understanding of the pandemic's effects on families and children beyond typical questions regarding whether or how often a child engages in specific activities. Our analyses suggest ways in which the field can use time-diary methods to improve our understanding of child and parental engagement generally including the time while our children are not in schools.

Activities were coded using a protocol that captured information on the type and content of the activity a child was engaged in, including language and literacy, math, social and gross motor activities. It also included information on whom a child was engaged with in an activity, and where (location). The coding protocol was developed by NIEER based on Baxter & Hayes (2007), the eduSnap (Ritchie, Weiser, Mason, & Holland, 2015), and the P-3 parent survey on home learning activities (McCormick, et. al, 2020). We designed the coding with a specific focus on capturing activities relating to the development of unconstrained skills found to be most strongly associated with persistent impacts of early education on children's learning and development. McCormick, et al (2020) describe how parental engagement in home-based learning activities is linked to children's academic skills and find unconstrained activities (e.g. reading rather than learning the alphabet) are associated with children's gains in language and math. Our sample was 52%

¹ It is also informed by, albeit in a much simpler format and with less intensity, the American Time-Use Study and the Child Development Supplement (CDS) of the Panel Study of Income Dynamics (PSID).

female, 26% Spanish-speaking and 35% White (children in these districts were 35% Spanish speaking, 51% female and 28% White). The sample was randomly recruited from families that had recently participated in a NIEER multi-cohort preschool study of district- and classroom-level determinants of children’s developmental trajectories. All analyses reported are for activities in a 24-hour cycle.

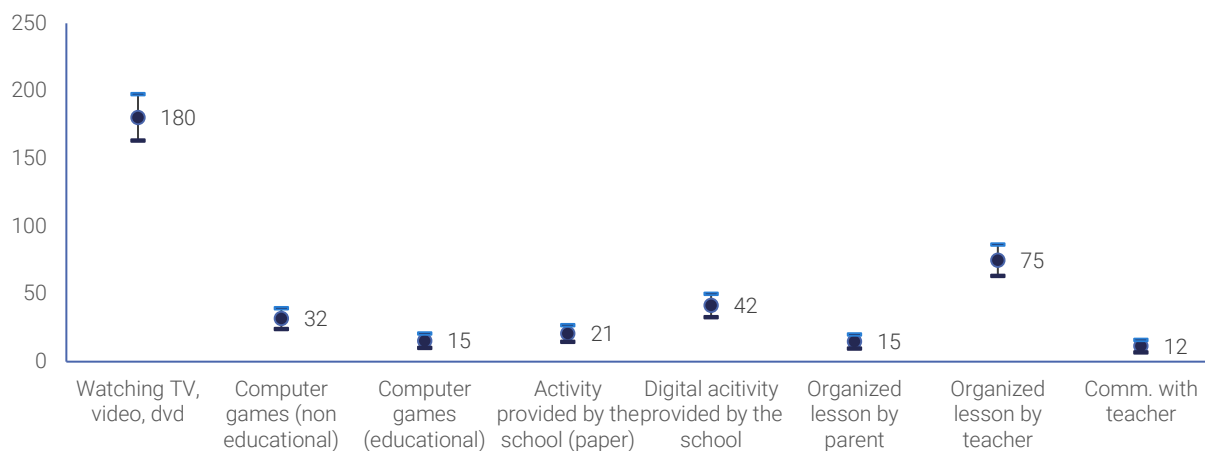
We report analyses of three types of data in this brief: the average number of minutes children spent engaged in various types of activities, the proportion of children engaged and not engaged in these activities, and the proportion engaged by time of day. We discuss these in relation to the NIEERs PLAs survey findings and other findings from the research at large.

Findings

Even though children’s preschools and schools were closed their daily routines seemed to unchanged in some respects. Parents reported their children slept on average 11 hours and spent another 2 hours on meals. This is consistent with data from earlier years (Williams, et. al, 2013). Children spent much of the rest of their time on passive screen time (including TV, videos, or playing non-educational games), on average 3 hours per day.

Children spent only 1-2 hours on school related activities that include paper, digital activities or lessons provided by their teacher. Time spent on school related activities was a little higher for children in Kindergarten and first grade than for younger children, averaging slightly over two hours total per day. This is considerably less than would be expected if they were attending programs in person for full school days.

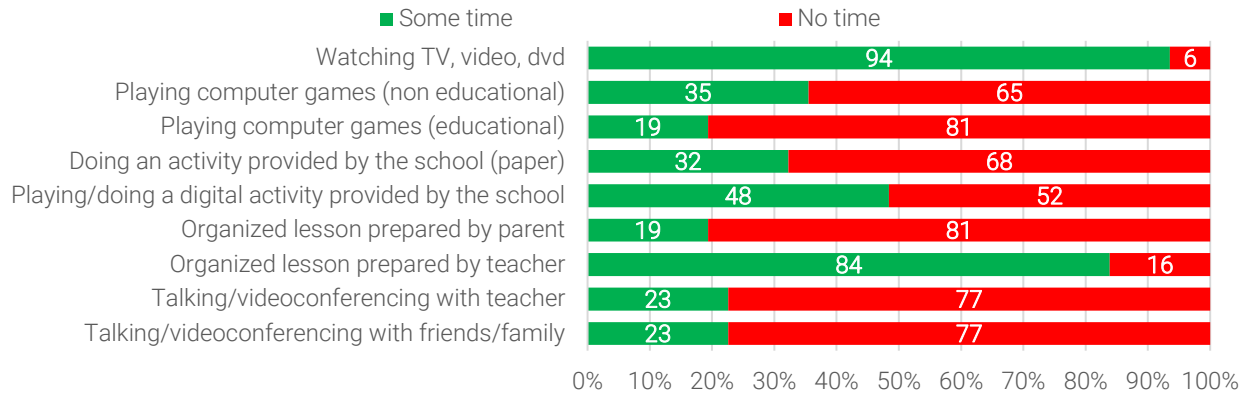
Figure 1. Average minutes per day spent in screen time and school-related activities



We find large variations children’s screen time and educational experiences. Television watching varies from none to more than 10 hours, though passive screen time is the closest thing we find to a universal daily experience, even surpassing school lessons. Children spent from no time to over 3 hours per day in lessons

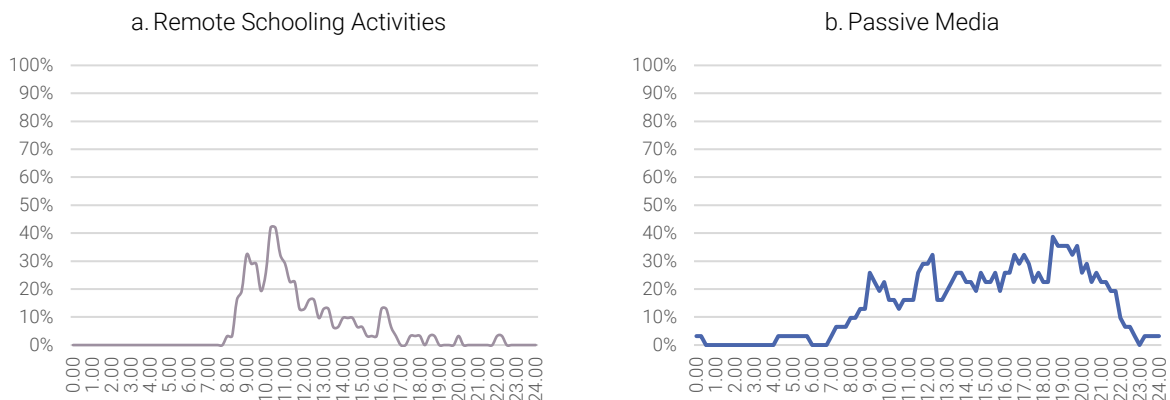
organized by the teacher. Interestingly, while just 16% of parents reported their children spent no time in organized lessons, 77% reported their child spent no time in communication with their teacher.

Figure 2. Percentage of children spending some versus no time on school and other activities



One aspect that the surveys of parental and child activities do not capture is the timing of children’s activities throughout the day. Combining the time spent in paper-based, digital or prepared lessons by the teachers, we are able to examine (Figure 3) children’s participation patterns over the course of the day in all remote schooling activities and in relation to passive media activities (watching TV, Video or other, or non-educational games). Participation rates in schooling activities peaked sharply in the morning hours. On the other hand, the proportion of children engaged in passive screen was between 20 and 40 percent from 9 am to 9pm except for “peak” schooling time between 10 and 11 am.

Figure 3. Proportion of children engaged in schooling or passive screen activities by hour of the day



Children who engaged in language and literacy activities did so for meaningful amounts of time, but not all children engaged in these activities daily. Children

spent on average 39 minutes per day reading, and language and literacy (L&L) activities were the most learning activities. Nevertheless, 42% of the children spent no time reading a book with a parent or other adult, and 65% did not read alone. These results align with findings from the NIEER PLAs survey showing about 30% of the families reported their children read alone at least several times a week. For other language and literacy activities, we find 42-65% spent no time during the day in phonics or other vocabulary activities. For context, the latest American Time Use Survey (ATUS) parents of children under the age of eight reported spending about 8 minutes per day reading to their children and a similar amount of time on all other activities related to children’s education (U.S. Bureau of Labor Statistics, 2020).

With regard to math, parents report their children spent on average about 40 minutes playing with blocks, shapes, puzzles or building throughout the day and very few minutes in any other activities. As with language and literacy, the averages hide a lot of variability. Most (65%) families reported their child spent no time in any math-related activities. This means either that some children do not engage in these at all or that there may be considerable day-to-day variation in whether a child participates in these activities.

Figure 4. Minutes per day spent on unconstrained language/literacy and math activities

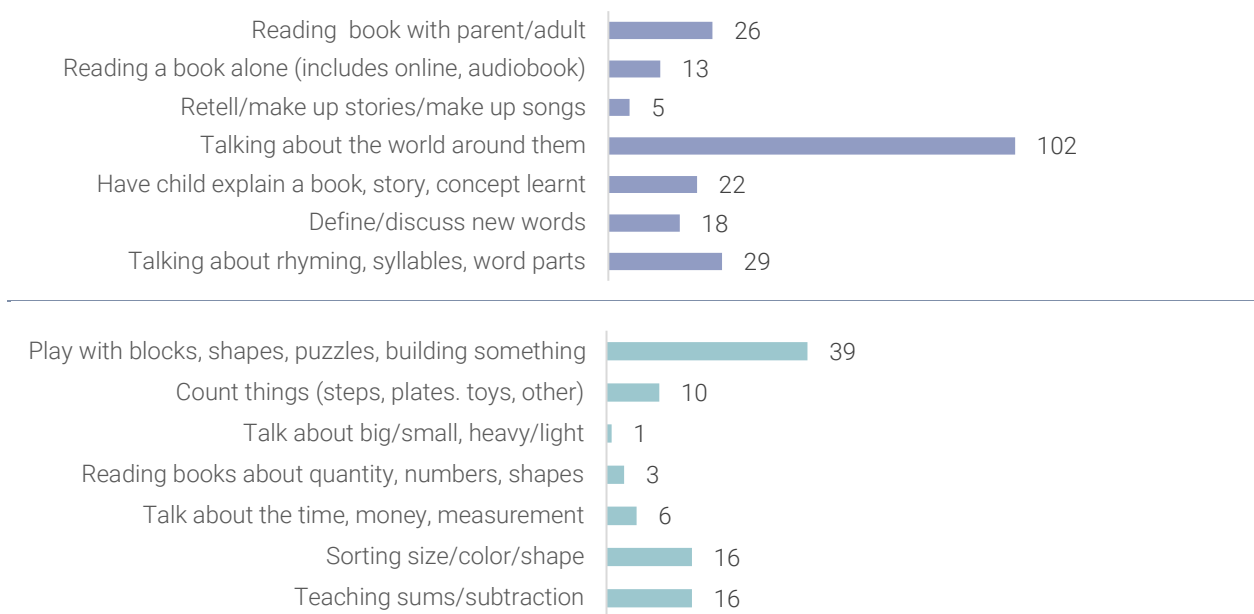
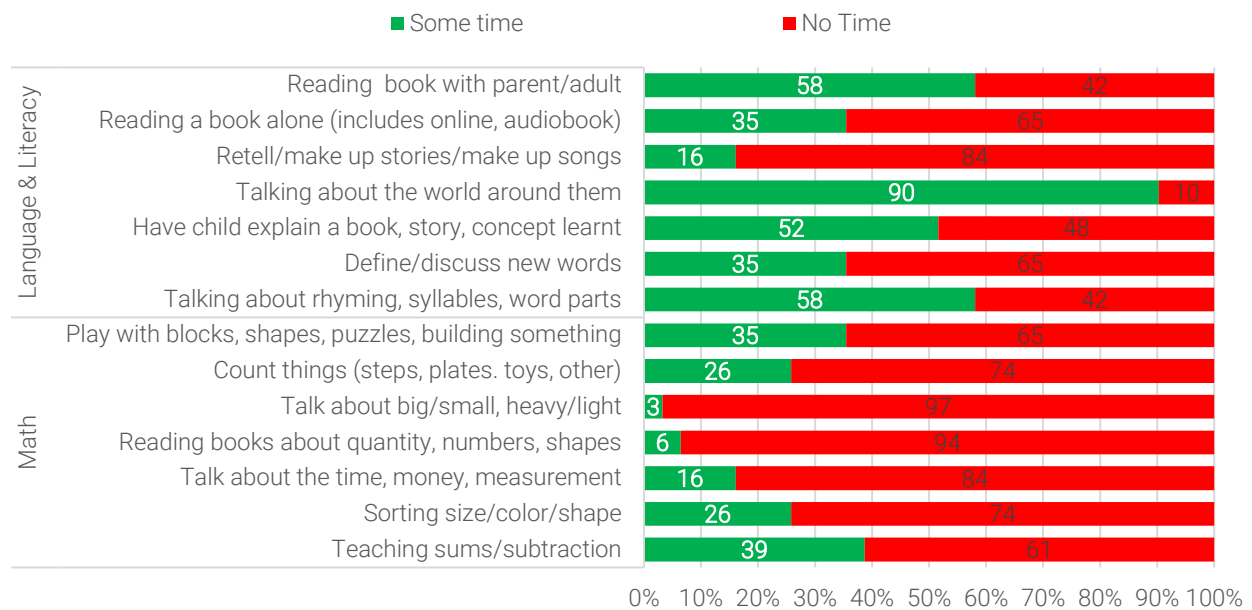
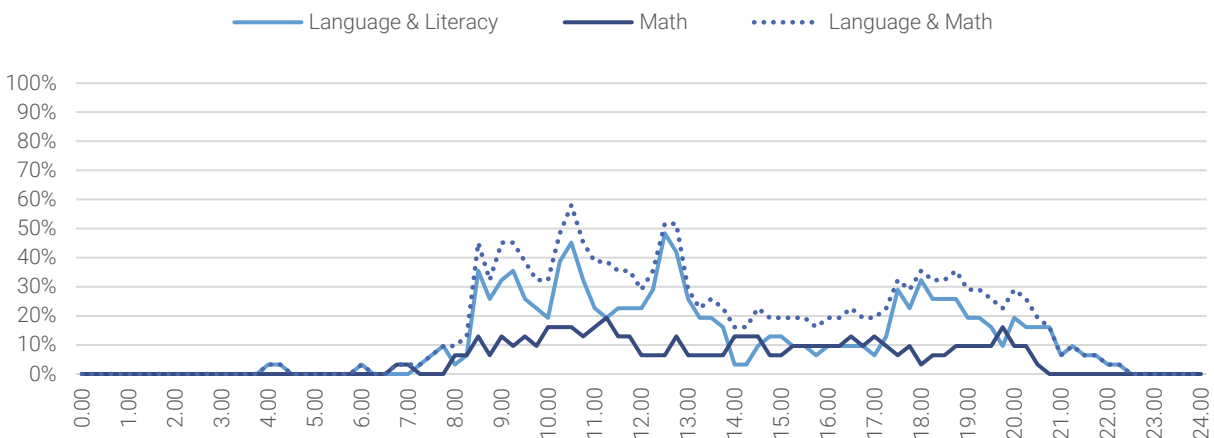


Figure 5. Percentage of children spending some versus no time on language/literacy or math activities



Looking at patterns of engagement over the day (Figure 6), we see that both language and literacy and math participation rates tend to be higher in the morning and peak at around 60 percent of the sample engaged in either of these, or a combination of these, between 10 and 11 am, then picking up again for a short period after noon. There is a second period of elevated participation between 5 pm and 9 pm.

Figure 6. Proportion of children engaged in Language & Literacy and/or Math activities by hour of the day



We examined a number of other types of important activities including engagement in arts, play, and physical (gross motor) activities. The most common were free play and the arts. Children averaged about 2 hours per day in free play and 90 minutes in

arts and crafts, music and dance. As expected, time spent in these activities was higher for children in preschool than for children in Kindergarten and first grade (not shown), with free play amounting to over 3 hours per day for preschoolers. Physical activity (exercise) h indoor and outdoor combined averaged about 2 hours per day. However, participation was far from uniform or daily, with most children not reported to engage in these physical activities on a given day.

Figure 7. Minutes per day in arts, play, and physical activities

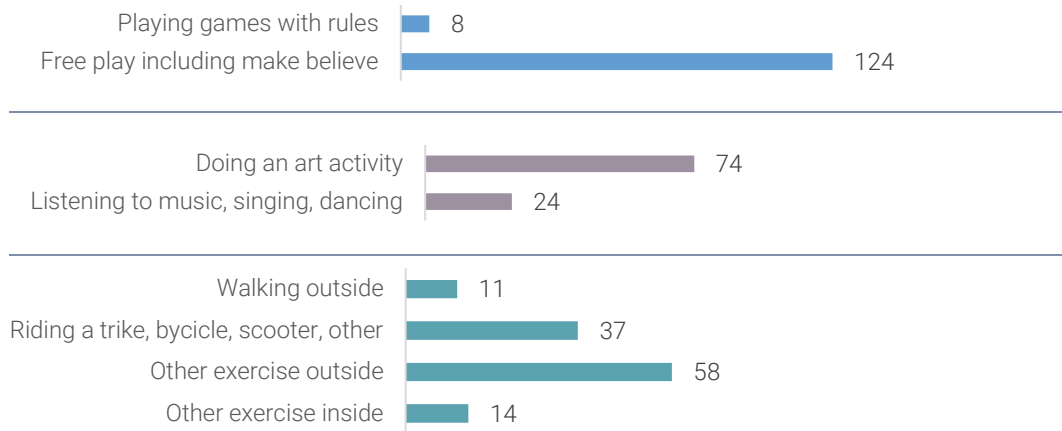
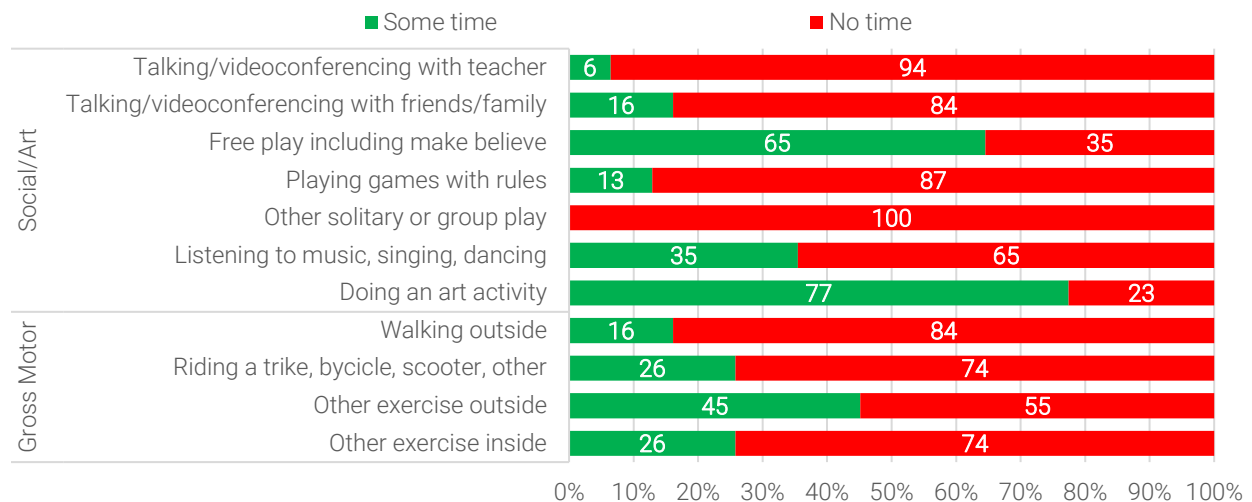


Figure 8. Percentage of children spending some versus no time on social and gross motor activities



The time diary also provides information on where activities took place and with whom. Given the status of the stay-at-home order in New Jersey at the time of the study, it is not surprising that children spent 90% of their time inside their own homes. Nearly all the rest of their time was outdoors.

Even though children were between 4 and 8 years of age, they spent over 50% of the time on their own (driven mainly by the time sleeping), another 29% of the time with siblings or other children, and 28% with their mom or step-mom (this includes activities also with other siblings or children, or with the parent alone). When assessing the time interval between 8.30 am and 2 pm when children would more likely have been in school under normal circumstances (and other similar intervals), we find children spent 31% of their time doing activities on their own (See Figures 9 and 10).

In relation to time spent with parents, we find that the total time spent doing activities with one or both the parents amounted to about 31% of the time which is equivalent to 7.5 hours, (6 and a half with the mother engaged). This estimate is quite close to the estimates of average time spent engaged or accessible by mothers of children ages 6-11 in all types of activities (educational, play, media, meals and others) as reported in the PSID, which was 5.5 hours per day (Fomby & Musick, 2018).

Figure 9. Percentage of time children spent doing activities alone or with other people in their homes

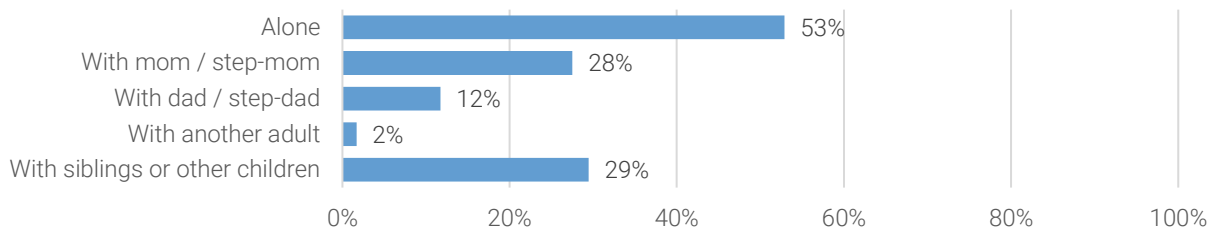
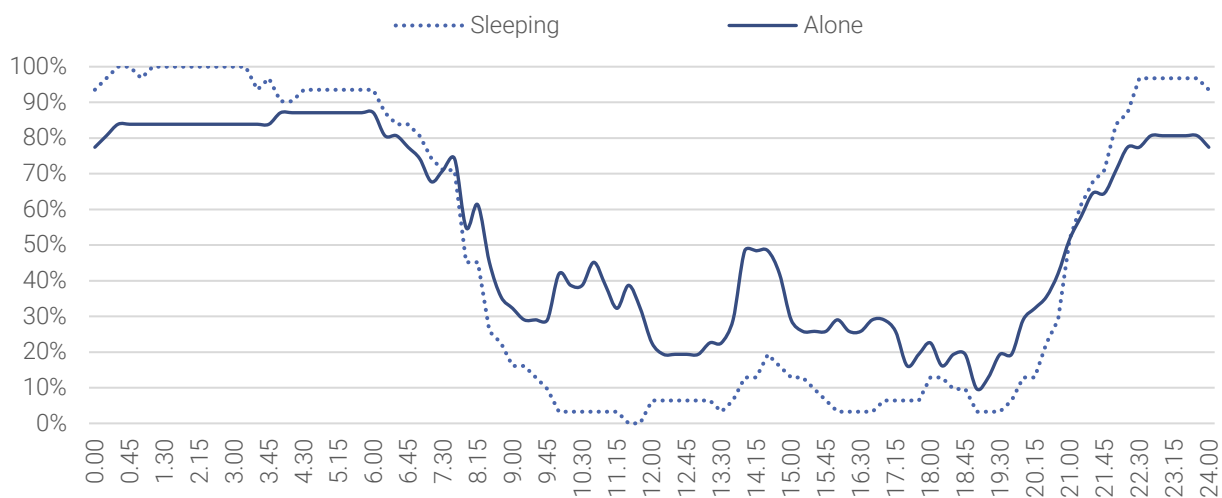


Figure 10. Proportion of children alone versus sleeping by hour of the day



Discussion

This brief summarized an exploratory effort to assess whether time diary data further contributes to our understanding of differences in children’s remote educational experiences. We found that time diaries provided a picture of children’s daily activities that was very similar to that obtained from activity questionnaires such as those used by the PLA NIEER survey. Diaries provided much useful additional information that cannot be obtained from survey activity questions. That is, time diaries provide insights into the timing and nature of their engagement and allow differentiating the degree to which those engaged were meaningfully so and across a mix of activities.

The time survey sheds light on what engagement looks like for children and families. While a large percentage of families and children were not having opportunities to engage with various types of activities, those that did so, did so meaningfully for language and literacy, arts or free choice.

Unlike survey methods, the time diary study also provides insights into children’s engagement throughout the day. While the percent of children engaged on Language and Literacy or Math activities was only around 50% or less, engagement seemed to peak in the morning hours, when remote supports were more likely available. In contrast, children seemed engaged with passive screen time steadily throughout the day.

Our findings suggest that research on children’s activities generally, and on the impact of the pandemic, specifically, could benefit greatly from the use of time diaries. Such studies should be sufficiently large to support subgroup analyses for urban, suburban and rural households, for dual working households or single parent households, or other demographic breakdowns. Such time diary studies could help the field understand how to best support children and their parents through the day to improve learning opportunities and physical activity. Important reasons for studying children’s time allocations include the association between time spent reading and other meaningful learning activities and children’s development, as well as the association between passive screen time and lower academic achievement (Baxter & Hayes, 2007; McCormick, et. al, 2020). Also, this study suggests that during the pandemic “lockdown” less than half of the children engaged in daily language and literacy, art and gross motor activities.

The data from this study—while not generalizable—reinforce findings from other studies that support for young children’s learning and physical activity has been harmed by school closures. Understandably, it is difficult for parents to make up for lost preschool and school opportunities. More needs to be learned about the extent to which technology access, connectivity, parental time, and other resource constraints create problems. If schools reach out to families to identify needs (including through the use of time diaries) they may be better able to partner with parents to support young children’s learning and development when classrooms are closed. In addition, the findings point to stronger engagement in language and

literacy and weaker engagement in math. More needs to be learned about the degrees to which this is happening and how districts may strengthen home learning experiences in math or related areas.

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Methodological Summary

This time-series collected information on a 24-hour recall by parents on 15-minute intervals, for which interviewers coded the type of activities established for the study, where these activities took place and with whom. The study collected this information via interview for 31 children (10 in preschool, 11 in kindergarten, 10 in first grade) in nine New Jersey districts implementing the state's preschool program. Children were randomly selected among those for which we had direct contact information (phone or email) due to their participation in a larger study on the quality, leadership and child developmental consequences of public preschool. All these children had active consents.

Interviews with families asked about the 24 hours on the day prior to the interview. These were conducted Tuesday through Saturday in order to capture activities on a week day. A total of 31 families were interviewed in English or Spanish, as needed. Ten of these were followed up in a second interview repeating the time diary, within about 2 weeks later. Data collection start on May 13th, 2020 and concluded on June 19th, 2020. Ten of the children were enrolled in preschool, eleven in Kindergarten and another ten in 1st grade.

A total of 3,936 intervals of 15 minutes each were coded across the 41 interviews. A total of 2,976 intervals were coded within the first wave (first call) with each family, and the remainder represent the interviews in the second wave. Codes were developed by NIEER on the basis of the eduSnap (Ritchie, Weiser, Mason, & Holland, 2015), The Longitudinal Study of Australian Children (Baxter & Hayes; 2007) and the P-3 parent survey on home learning activities (McCormick, et. al, 2020) with a specific focus on activities relating to unconstrained skills.

This report includes analyses over the 24-hour frame. Trends are consistent when assessing the time diary data using intervals between 9am-12pm or 8.30am-2pm. To calculate average minutes, when an activity was reported within a 15-minute interval, we assumed a child spent the entire interval on this activity. In addition, averages are calculated for all children including those who did not engage in an activity. All analyses in this brief include only the 31 interviews in the first round and

excludes the 10 interviews in the second round are not reported, but these were analyzed for consistency of results.

The small sample does not support making inferences on how children spent their time in terms of activities while experiencing remote schooling. This study is exploratory and intended to provide additional perspectives in children's experiences under the pandemic.