Keeping Kids Busy: Family Factors Associated with Hands-On Play and Screen Time During
the COVID-19 Pandemic

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Abstract

Parent-child interactions are crucial for child development. The COVID-19 pandemic has negatively affected mental health and increased parenting challenges impacting parent-child functioning. The aim of the current study was to examine the relationship between parent factors and child activities to identify parental needs. A convenience sample of parents ($N = 708$), primarily mothers ($n = 610$; 87.4%) aged 35.59 years old ($SD = 5.59$; range = 21-72), with children ages 2-8 years completed an online questionnaire between April 14-June 1, 2020. Participants mostly resided in Canada and had an income of $>\$100,000$. Parent-child activities were measured as total weekly time and combined time across activities within two categories: hands-on play and screen time. Bivariate correlations informed block-wise linear regression models. For families with childcare needs, parental anxiety was associated with higher total hands-on play ($F(3,142) = 14.01, p < .001$), combined hands-on play ($F(2,85) = 6.82, p = .011$), and combined screen time ($F(2,82) = 6.25, p = .014$). Families without childcare needs indicated parenting stress was associated with lower total hands-on play ($F(3,212) = 7.95, p < .005$) and combined hands-on play ($F(2,110) = 5.67, p = .019$), and higher supervised screen time ($F(3,138) = 6.14, p = .014$). Family structure and indices of socioeconomic status were also predictive of activities across childcare needs and child ages. To promote high-quality parent-child interactions and positive developmental outcomes in the pandemic, policy makers should support childcare needs, parent mental health and stress, and provide evidence-based guidelines for child screen time.

Keywords: screen time, hands-on play, parent-child interactions, COVID-19, parenting

Introduction

Parents play an essential role in child development. Providing supportive and enriching learning environments is crucial for promoting positive cognitive and socioemotional development (Ginsburg, 2007). With the closure of schools, daycares, and child programs due to the novel coronavirus disease (COVID-19), families are facing unprecedented demands on parenting (Cluver et al., 2020). Further, the COVID-19 pandemic has had detrimental effects on maternal mental health and parenting stress, which may impact developmental outcomes over time through altered parenting strategies and behaviours (Cameron et al., 2020; Goodman et al., 2011; Sweeney & MacBeth, 2016; Roos et al., 2020). The combined impact of many more parents working at home (i.e., 4.7 million more since March 2020) and school/daycare closures is also likely to dramatically increase the number of parent-child interactions (Statistics Canada Labour Force Survey, 2020). This provides opportunities for more developmentally enriching parent-child interactions as well as providing increased exposure to negative parent-child interactions. Examining parent-child processes during the pandemic is a key step to guiding programs and policies that can support child developmental outcomes.

Theoretical Underpinnings

Bronfenbrenner's theory of ecological development is a helpful lens for understanding this evolving dynamic. The theory postulates five distinct levels of environmental influence on child development - microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1986; Rosa & Tudge, 2013). Within the COVID-19 pandemic, child development has been impacted across each level, leaving young children particularly vulnerable to the influences of COVID-19-related changes. Changes to school life, home routines, and relationships with peers, family, and the community have altered children's mesosystem.

Further, at the level of the exosystem, changes to parent workplaces and family dynamics may have created additional challenges. Across these levels, these changes may produce developmental stressors, such as social isolation and uncertainty (Loades et al., 2020). However, strong parent-child relationships and developmentally enriching experiences have been shown to protect against stressors (McDonald et al., 2016). It follows that such interactions may also have the potential to protect against pandemic specific stressors too. As such, a first step to determining the impact of the pandemic on family functioning as it relates to parent-child relationships is to examine the specific effect of the pandemic on the amount to which families are engaged in developmentally supportive activities and less supportive activities.

The Role of the Parent-Child Relationship

Parents are a key part of a child's microsystem with influences across emotion regulation, executive functioning, language development and social functioning (Barnett et al., 2012; Fay-Stammbach et al., 2014; Morris et al., 2007; Rowe, 2012). 'Serve and return' parenting, defined by interactions in which children initiate interest in a given activity and parents follow the child's lead through sensitive responding, are believed to be particularly enriching because they help children learn about the world around them and build key social skills (Shonkoff et al., 2016). Opportunities for such high-quality interactions are readily available during hands-on play, such as crafts, building blocks, and imaginary role-play activities (Gardner, 1994). Hands-on play interactions predict children's later conduct behaviours, emotion regulation and understanding, and creativity (Gardner et al., 2003; Linsey & Colwell, 2003; Hoffmann & Russ, 2012). Children's engagement in positive hands-on play is linked to maternal demonstration and initiation of play, maternal knowledge of child development, and parental playfulness (Cote & Bornstein, 2009; McMillin et al., 2015; Menashe-Grinberg & Atzaba-Poria, 2017). However,

parental mental health challenges, higher parenting stress, greater financial strain and lower education are associated with lower quality interactions (Field, 2018; Goodman et al., 2011; Shaffer & Obradović, 2017; Van Gampelaere et al., 2020). Although the increased time at home during the pandemic may offer a unique opportunity to increase the frequency of these positive interactions through hands-on play, it also increases possible exposure to less dyadic parent-child interactions such as when parents are not participating fully or are supervising. Thus, parent-child interactions in the context of the COVID-19 pandemic must be examined to inform interventions and promote positive child developmental outcomes.

An additional consideration for child development is in the context of screen use. During the pandemic, there has been increased demand and reliance on virtual technology to continue schooling and interact with friends and family. While screen time can include opportunities for prosocial and/or educational virtual experiences, there are also concerns regarding the amount and quality of screen time children are engaging in as a function of increased time at home (Shin & Al-Habaibeh, 2020). Before the pandemic, more than two-thirds of children were not meeting national screen time recommendations (i.e., no media for children under 2 years and one hour of media per day for children over 2 years) (American Academy of Pediatrics, 2018; Atkin et al., 2014). Research has shown that child screen use is associated with family factors such as parents' own screen time, parental attitude about child media use, and maternal depression (Duch et al., 2013; Lauricella et al., 2015). For children, excessive screen time has been associated with lower language skills, lower school readiness and classroom engagement, social/emotional challenges, and reduced psychological well-being (Domingues-Montanari, 2017; Madigan et al., 2020; Pagani et al., 2013; Poulain et al., 2018). The possible detrimental effects of screen use may be a result of the reduction of parent-child interactions in favour of independent screen use

and overall lower family functioning (Radesky & Christakis, 2016). However, emerging literature indicates that some technology use, such as educational applications (apps) and video chats to socialize or engage in activities like virtual storybook readings, may be a positive use of screens (Gaudreau et al., 2020; McClure & Barr, 2017; Neumann, 2018). Similarly, child screen time may provide a relatively safe activity for children to engage in, allowing parents to complete their own responsibilities or to facilitate challenging parenting tasks such as mealtime (Elias & Sulkin, 2019). Given the extenuating circumstances of the COVID-19 pandemic, it is important to develop a greater understanding of how families are using screens to inform next steps in supporting healthy child development.

Parenting Challenges – Stress, Mental Health, Technology, and Childcare

Despite documented importance of positive parent-child interactions, parents face obstacles when initiating these exchanges. During the COVID-19 pandemic, changes to children's mesosystems (i.e. relationships between multiple microsystems such as school, daycare, neighbourhood etc.) and exosystems (i.e. parents' work and relationships) may increase parental stress (Bronfenbrenner, 1986). Research collected since the pandemic began shows this to be true, with parents reporting increases in anxiety, depression, and parenting stress (Cameron et al., 2020; Roos et al., 2020). The decrease in parent well-being is of concern, as parenting stress is linked to poorer parenting behaviours, such as negative interactions and decreased ability to provide adequate stimulation and interactions with children (Adamakos et al., 1986; Deater-Deckard, 1998). Parental mental health is an additional barrier to positive parent-child interactions. Parental depression has adverse effects on parent-child interactions resulting in an increased risk of negative child outcomes (Field, 2018; Goodman et al., 2011). Further, there is a strong relationship between parent mental health and stress with child internalizing and

externalizing behaviours, resulting in increased parenting challenges for many parents (Priel et al., 2019; Sweeney & MacBeth, 2016). Research has shown that children who demonstrate more challenging behaviour are more likely to receive increased screen time, indicating that screen time may represent a necessary strategy for modulating parenting stress and capacity (Radesky et al., 2014). Given that the COVID-19 pandemic has increased parenting stress and mental health challenges, screen time may be a strategy more heavily relied on by parents (Cameron et al., 2020). Parent-child play activities may also be negatively impacted by increased mental health challenges through both frequency and/or quality of interactions (Edhborg et al., 2003; Wilson & Durbin, 2010).

An additional consideration is families' childcare needs during the pandemic. With school and daycare closures, we expect that unmet childcare needs are playing a major role in parent-child interactions. Yet, as parents attempt to multi-task their simultaneous identities as members of the workforce and as caregivers, all within the context of an increasingly uncertain time, the impact of the COVID-19 pandemic on parent-child interactions is unknown.

The Present Study

Daycare and school closures combined with work-from-home policies for many parents have produced immense changes in families. Yet, there has been no research to date examining the changes to parent-child interactions as a result of the pandemic. Thus, the primary aim of the current study was to examine differences between time spent engaging in developmentally supportive dyadic activities (i.e., hands-on play) and less supportive activities (i.e., screen time) with family sociodemographic factors, parent mental health and functioning (e.g., depression, anxiety, parenting stress), and COVID-19-related changes. A secondary aim of the study was to identify areas where parents may need extra support to reduce barriers to engagement in

developmentally supportive dyadic activities. Subsequently, this information will inform program development during the current pandemic and beyond.

Methods

Participants

Participants were recruited between April 14, 2020, and June 1, 2020, as an online convenience sample through online advertisements, posters shared on social media platforms, and indirect recruitment through media interviews discussing the pandemic and physical distancing guidelines. Participants were included if they were 18 years or older and parenting at least one child age 2-8 years. As the researchers are based out of the University of Manitoba, recruitment strategies were centred around networking within the city of Winnipeg; however, there were no exclusion criteria based on participant location. Due to the nature of the pandemic, COVID-19-related restrictions (e.g., limit on public gatherings, the closing of non-essential services, self-isolation policies) were differentially more drastic at the start of recruitment. Procedures to restore services began in the latter month of recruitment.

Procedure

REDCap electronic data capture tool hosted at the University of Manitoba was used to obtain informed consent before participants completed the survey (Harris et al., 2009). Participants were entered in a draw for a chance to win one of five \$100 CAD electronic gift certificates. This study was approved by the university research ethics review board.

Measures

Sociodemographic and COVID-19-related Information

Family demographic information, including any changes as a result of the COVID-19 pandemic, was obtained from parents. This information included parent income, education,

marital status, household factors, and employment status. Additional indices of socioeconomic functioning included current financial strain and food insecurity, which were dichotomized into presence or absence. Parents were also asked to identify their relation to each of their children through an open-ended response. Parents indicated whether they had current unmet childcare needs due to the COVID-19 pandemic. This variable was used to differentiate two cohorts of parents during the analyses (see Statistical Analysis).

Mental Health

A self-report Adult Mental Health Disorder Checklist (AMHDC) was utilized to obtain information from parents about their current or historical mental health diagnoses and treatment. This method of assessing mental health is consistent with previous research making use of self-report mental health history (Sanchez-Villegas et al., 2008). Mental health diagnoses in children were assessed through parent-report on the Child Mental Health Disorder Checklist (CMHDC). This author-compiled measure was developed to identify any diagnosed mental health disorders for children participating in the current study. The current study requests that caregivers note any previously diagnosed mental health disorders (e.g. Autism Spectrum Disorder, Down Syndrome, Attention-Deficit Hyperactive Disorder, etc.) for their child to participate.

The Center for Epidemiologic Studies Depression (CESD) and Revised (CESD-R)

Parents with children in the age range of 2-8 years old completed either the 20-item CESD ($n= 209$) or the CESD-R ($n= 499$) to measure the frequency of depressive symptoms that they experienced within the past week (Eaton et al., 2004; Radloff, 1977). The CESD was used in the first 351 surveys (in the larger study), while the rest of the surveys used the CESD-R. Both scales were measured through the original CESD Likert scale and its summative score ranges. Therefore, the scales will now be referred to as CESD. Although the results of the self-report

survey are not equivalent to a clinical diagnosis, a clinical cut-off score of ≥ 16 was utilized as an optimal specificity cut-off to identify depressive cases (Eaton et al., 2004; Radloff, 1977). Good to excellent internal consistency was found in the current study (CESD: $\alpha = 0.88$; CESD-R: $\alpha = 0.94$).

Generalized Anxiety Disorder 7-Item Scale (GAD-7)

Parents with children 2-8 years old took part in the seven-item GAD-7 (Spitzer et al., 2006). This measure was used to measure symptoms of parental anxiety experienced by these parents. To identify general anxiety, a clinical cut-off score of ≥ 10 on the GAD-7 was used (Spitzer et al., 2006). Excellent internal consistency in the current study was found ($\alpha = 0.92$).

Parenting Stress Index (PSI)

The PSI was used to assess how demographic characteristics along with both child and parent characteristics contribute to stressful parent-child interactions (Abidin, 2012). Subscales used for children include hyperactivity, demandingness, and adaptability whereas the subscales used for parents include measures of competence, attachment, and health. This measure has often been used as a screening tool to identify issues that may lead to problematic behaviour for the child and/or parent. Internal consistency was excellent in the current study ($\alpha = 0.94$).

Parenting Strategies During COVID-19

Author-compiled measures were developed to evaluate the kinds of activities families are enjoying while staying at home during the COVID-19 pandemic. Activities were measured across two categories: hands-on play and screen time. Hands-on activities included dance or music activities, making meals or snacks together, arts and crafts, and playing with toys together. Combined screen time activities included watching television or movies together, connecting with family or friends over the phone or video chat, and playing games on a

tablet/phone/computer. Time spent in these activities was further measured in two ways: through a single question regarding time investment (e.g., "How many hours per week are you typically spending doing hands-on play with your children?") and through estimated time in the above specified activities. Notably, the single-item assessing screen time measured parent-supervised child screen time (i.e., "How many hours per week are you typically spending doing supervision while children engage in screen time?"), which was used to measure independent child screen activities. Reported time for relevant activities was then summarized into a single value indicating hours per week. For hands-on play, the single-question assessment will be referred to as "total" time spent in each activity category, while summarized score will be referred to as "combined" time. For screen time, the single-question assessment will be referred to as "supervised" screen time, while the summarized score will be referred to as "combined" screen time.

Statistical Analysis

Analyses were conducted using IBM SPSS Statistics Version 25. Dependent variables were analyzed using Little's Missing Completely at Random (MCAR) test to determine the nature of missing data. The test indicated that data was missing at random ($\chi^2 = 33.37, p = .640$), meaning all available data was used in the analyses without required imputation. Analyses were conducted separately for parents with a child in the 2-4 year and 5-8 year categories; parents were included in each category if they had multiple children meeting age criteria. Descriptive statistics were conducted to describe the sample characteristics. Bivariate correlations were then conducted separately based on (1) child age group and (2) childcare needs. Parents indicated whether they had met or unmet childcare needs; due to the nature of the research question, this variable was used to conduct separate analyses. Significant bivariate correlations across the six

outcomes measures were then evaluated using blockwise linear regression. Non-modifiable factors (e.g., income, education, age) were entered into the first block; any variables not significant over and above the contributions of other variables in the model were removed prior to analyzing the second block. Block 2 consisted of all modifiable factors (e.g., depression, anxiety, stress) that demonstrated a significant correlation with the outcome measure.

Results

Participant Characteristics

Participants ($N = 708$) consisted primarily of mothers ($n = 610$; 87.4%) with a smaller portion of father respondents ($n = 70$; 10.0%). A small subset of participants simply indicated “parent” ($n = 15$; 2.1%). Average parental age was 35.59 years old ($SD = 5.59$; range = 21 - 72). Households consisted of 2.03 ($SD = 0.44$) adults and 1.97 ($SD = 0.82$) children on average, and a small portion (5.0%) of parents indicated they were from a single-adult household. As the majority of parents reported multiple children in the household, parents were classified based on child age categories: at least one child age 2 to <5 years ($n = 465$) and 5 to < 8 years old ($n = 386$). As noted previously, parents with multiple children could be included in both categories. Participants were primarily married or common-law (91.4%), had at least a bachelor's degree (32.2%), reported an annual household income of > \$100,000, and were residing in Canada (84.9%), the United States (11.2%) or international countries (4.0%). This sample, therefore, represents a relatively high socioeconomic status (SES), Western population. Within the context of the COVID-19 pandemic, 44.3% of parents indicated that they had unmet childcare needs. While the vast majority of participants (99.7%) had not experienced a diagnosis of COVID-19, 22.5% indicated that they knew someone personally who had been diagnosed. Of these

individuals, 27.0% were hospitalized and 63.5% had recovered at the time of survey completion (Table 1).

Socioeconomic Impact of COVID-19

Almost all parents (99.6%) reported practicing physical distancing at the time of survey completion. Most families reported a household member leaving their home for essential services (94.2%) typically once per week (78.8%). A minority of families (15.5%) reported leaving for non-essential services. In terms of employment, 15.7% of parents reported that they or someone in the household had been laid off due to the COVID-19 pandemic. One in ten (10.1%) parents reported that they or someone in their household had lost at least half of their regular work hours during the pandemic. Financial strain was reported by over one-third of parents (37.9%).

Parent-Child Activities

In the total sample, parents reported an average of $M = 29.07$ ($SD = 18.44$) hours was spent on hands-on play; time across combined hands-on play (e.g., arts and crafts, playing with toys, making meals or snacks, engaging in music or dance) was $M = 19.56$ ($SD = 15.91$) hours. Total time spent supervising child screen activities was estimated at $M = 16.48$ ($SD = 11.06$) hours; combined screen time based on a specific activity (e.g., playing games on tablet/phone/computer, phone or video chat, watching TV or movies) was $M = 17.34$ ($SD = 14.22$). Time spent engaging in each category is described in Table 2 by child age group and childcare needs.

Correlates of Hands-on Play

For parents of preschool-aged children (age 2-4 years old) with unmet childcare needs, total hands-on play was positively associated with employment loss and parental anxiety, as well

as negatively related to the number of children in the home. Combined hands-on play was associated with a greater number of children in the home and lower parent education for these parents (Table 3). Total time spent engaging in hands-on play was positively correlated with parental age and identifying as a father, and it was negatively associated with the number of children in the house and parenting stress for parents of preschool-aged children without childcare needs (Table 4). Combined hands-on activity time was similarly related to parent role and the number of children in the home for these parents. For parents of school-aged children (age 5-8 years old) without childcare needs, being married was related to increased total time engaging in hands-on play; combined hands-on play was associated with employment loss, lower parent education, and lower parenting stress. Lastly, for parents of school-aged children identifying unmet childcare needs, total time was correlated with increased food insecurity and parental anxiety, while combined time was associated with a greater number of children in the home and increased anxiety.

Blockwise linear regression was conducted for each outcome variable with significant bivariate predictors. For preschool parents without childcare needs, total hands-on play was associated with number of children in the home, parental age, and parenting stress while combined time was significantly associated with parent sex and number of children (Table 5). Total time engaging in hands-on play was associated with marital status ($\beta = 0.15$, $F(1,201) = 4.66$, $p = .032$) in school-aged children of parents without childcare needs, while combined time was associated with parent education ($\beta = -0.33$, $F(2,110) = 13.50$, $p < .001$) and parenting stress ($\beta = -0.21$, $F(2,110) = 5.67$, $p = .019$). For parents with unmet childcare needs, number of children in the home was negatively associated with total time ($\beta = -0.18$, $F(3,142) = 5.35$, $p = .022$) and positively related to combined time ($\beta = 0.24$, $F(2,115) = 7.02$, $p = .009$) for preschool

children. Parent education was also inversely associated with combined time ($\beta = -0.19$, $F(2,115) = 4.51$, $p = .036$), and increased parental anxiety was associated with more time spent engaging in total hands-on play ($\beta = 0.30$, $F(3,142) = 14.01$, $p < .001$). For parents of school-aged children with unmet childcare needs, number of children ($\beta = 0.37$, $F(2,85) = 13.75$, $p < .001$) and parental anxiety ($\beta = 0.26$, $F(2,85) = 6.82$, $p = .011$) were associated with combined time; there were no significant relationships with total time when significant bivariate variables were included together (Table 6).

Correlates of Screen Time

For parents of preschool children without childcare needs, supervised screen time was negatively associated with the number of children in the home and positively related to the presence of food insecurity and parenting stress. Combined screen time was negatively related to the number of children in the home and household income for preschool parents without childcare needs. For parents of preschool-aged with unmet childcare needs, supervised screen time was negatively correlated with parent education and positively associated with child mental health history, parent mental health history, and current parenting stress. Combined screen time was positively associated with parental age, parental anxiety, and parent not identifying as a mother, and negatively related to marital status. For parents of school-aged children without childcare needs, supervised screen time was not significantly related to independent variables. However, combined screen activity was associated with the presence of employment loss, lower parental education, and lower annual household income. For parents of school-aged children with unmet childcare needs, supervised screen time was associated with lower annual household income. Combined screen time was positively associated with parent sex (i.e., not identifying as

a mother), the number of adults in the home, presence of financial strain, presence of food insecurity, and parental anxiety, as well as negatively related to parent education.

Blockwise linear regression was conducted for each outcome variable with significant bivariate predictors. For parents of preschool children without childcare needs, number of children in the home ($\beta = -0.19$, $F(3,138) = 5.35$, $p = .022$), food insecurity ($\beta = 0.23$, $F(3,138) = 8.04$, $p = .005$), and parenting stress ($\beta = 0.20$, $F(3,138) = 6.14$, $p = .014$) were all significantly related to supervised screen time (Table 5). Combined screen time was similarly related to number of children ($\beta = -0.33$, $F(2,94) = 11.71$, $p = .001$) and household income ($\beta = -0.29$, $F(2,94) = 9.01$, $p = .003$). There were no significant relationships between bivariate predictors of both supervised and combined screen time for parents of school-aged children without childcare needs. For parents of preschool children indicating unmet childcare needs, parent education ($\beta = -0.21$, $F(3,133) = 6.49$, $p = .012$) was the only variable significantly related to supervised screen time. Combined screen time activity was significantly related to parent sex ($\beta = 0.37$, $F(2,82) = 13.37$, $p < .001$) and parental anxiety ($\beta = 0.25$, $F(2,82) = 6.25$, $p = .014$). For parents of school-aged children with unmet childcare needs, household income ($\beta = -0.18$, $F(1,156) = 5.22$, $p = .024$) was significantly associated with supervised screen time, while parental anxiety ($\beta = 0.30$, $F(1,67) = 6.40$, $p = .014$) was significantly related to dyadic time.

Discussion

To our knowledge, this study is the first to describe parent-child interactions during the COVID-19 pandemic and provide insight into parent and family factors that may influence these interactions. Almost half of the families in the current study reported unmet childcare needs in the context of the pandemic. Given the importance of childcare considerations when describing parent-child interactions, pandemic-related parent-child functioning was evaluated across met

and unmet childcare needs. Notably, while there were some shared factors associated with parent-child interactions across families with and without unmet childcare needs, distinct factors associated with parent-child interactions also emerged.

Preschool-aged children spent an average of 52 hours across both types of hands-on play, 17 hours doing combined screen time, and 15 hours in parent-supervised screen time. While school-aged children spent an average of 42 hours across both types of hands-on play, 17 hours doing combined screen time, and 18 hours of parent-supervised screen time. While the current study did not have a longitudinal sample to assess changes over time, comparisons to published data would suggest that parents are spending more time in hands-on play during the pandemic. Results from a pre-pandemic normative sample found that American families reported spending 2.31 hours per week in hands-on play, while a Canadian normative sample found that families spent 2.5 hours a week on childcare activities including physical care, reading to, or talking with children (Statistics Canada, 2015; United States Bureau of Labor Statistics, 2019). This is substantially less than the roughly 30 hours of hands-on play per week that families recruited during the pandemic reported in our survey. This highlights the direct impact the pandemic has had on familial parent-child microsystems. These alterations are underscored by the high amount of time parents are engaging in parent-child interactions, including hands-on play, combined screen time, and supervising screen time activities.

Our findings highlight the dramatic changes that parents and children experienced in family dynamics during the first 3 months of the COVID-19 pandemic. Pre-pandemic research from the American Academy of Pediatrics noted parents and children were spending a diminished time in hands-on play, further highlighting the increased amount of parent-child interactions in our sample (Ginsburg, 2007; Yogman et al., 2018). Similarly, pre-pandemic

Canadian families reported supervising just over 13 hours of screen time a week, compared to over 16 hours in our sample (ParticipACTION, 2018). These increases may be in part due to families spending more time at home remote-learning and working (Bhamani et al., 2020).

Our study examined indicators of SES across childcare needs to better understand how various families were experiencing the effects of the pandemic. Indices of lower SES (e.g., parent education, household income, food insecurity) emerged across childcare needs and child age groups as significant factors associated with more time spent with children including hands-on play, combined screen time, and supervised screen time. In general, parents of lower SES may be more likely to have worked in industries that were directly hit by the COVID-19 pandemic, such as the hospitality industry or retail, allowing more time at home to be spent engaging in dyadic activities (Flemming, 2015; Gursoy & Chi, 2020; Lemieux, 2020). Given the generally increased child exposure to the home environment and parent-child interactions, it may be helpful to promote parent access to behaviour management strategies (e.g., pre-teaching, praise) (Daley et al., 2014). These can both promote positive parent-child relationships and mitigate the development of coercive interactions, which can cause additional stress and lead to child mental health and behaviour problems over time.

Parents without childcare needs and lower parenting stress levels reported more time spent during hands-on play across child age groups. This finding follows the same trend as pre-pandemic research that identified a relationship between lower parenting stress and increased playful mother-child interactions (e.g. playing with toys or singing together) (Zhang et al., 2019). In the screen time domain, parents without childcare needs experiencing higher levels of parenting stress reported more screen time for preschool-aged children. This finding is unsurprising, as parents are experiencing unique challenges and demands during the pandemic,

and therefore may be utilizing child screen time to cope with the pandemic's unique circumstances. Although screens may be helpful to allow momentary parental relief, research indicates that early childhood screen habits are reflected in later screen use (Xu et al., 2016). Further, higher screen use in childhood is predictive of lower academic performance and well-being outcomes (Hinkley et al., 2014; Mundy et al., 2020). Therefore, interventions aimed to support parents in choosing high-quality screen time or substituting screens for hands-on play, even in the context of higher parenting stress, should be considered. Public health officials may also consider parenting stress as a candidate target to reduce when aiming to promote child well-being during increased time at home during the pandemic.

For parents with unmet childcare needs, higher parental anxiety was associated with more time spent in hands-on play across child age groups. Such dyadic engagement may be a means through which parents are coping with anxiety, consistent with a distraction or pleasurable activity (Carver, 1997). However, there may be elements of play that are less supportive in the context of parental anxiety, such as reduced parental scaffolding, more over-controlling behaviours, and less warm and sensitive behaviours (Nicol-Harper et al., 2007; Schrock & Woodruff-Border, 2010; Whaley et al., 1999). Of importance to consider is that prior research is in non-pandemic samples and we do not know the extent to which play quality is impacted by short term pandemic-related anxiety, versus more chronic anxiety. Therefore, more information is needed about the quality of hands-on interactions for parents with clinically elevated levels of anxiety during the pandemic.

A closer look at family dynamics revealed that families without childcare needs indicated that the reporting parent in multi-adult families was able to spend more time in hands-on play with school-aged child(ren) compared to families with single parents. The number of children in

the home was also associated with family activities such that, in families without childcare needs, parents of preschool-aged children indicated that having more children in the household was related to less hands-on play and more supervised screen time. Conversely, families with unmet childcare needs reported that having more children in the household was related to less total hands-on play and more combined hands-on play. In summary, families with more children reported less weekly hands-on play, but more family-based play activities (e.g. dance or music activities, making meals or snacks together, arts and crafts, and playing with toys together). It was also noted that non-mothers described engaging in more hands-on play, compared to mothers. However, this finding is preliminary due to the small sample size of non-mothers in our study. It is possible that a shift in family roles and routines due to the pandemic, with one or both parents working from home, may in part explain the reported involvement of fathers in more childcare demands (Alon et al., 2020). Further, men's employment is often in sectors that are more affected by recessions, such as manufacturing and trades, compared to sectors such as education and health care where women are more likely to work (Alon et al., 2020).

Intervention Considerations

Given our findings, there are three main avenues public health officials may wish to support families with young children during the COVID-19 pandemic. First, exposure to parents experiencing mental health challenges, such as anxiety, can have detrimental effects on young children's well-being (Bauer et al., 2013; Shonkoff & Fisher, 2013). Yet, research indicates that children's well-being is fostered when parent mental health is supported with intervention, limiting the intergenerational health risk to children (Fredriksen et al., 2018; Thanhäuser et al., 2017). As such, it is crucial that parental mental health needs are identified and timely services are available. For instance, cognitive-behavioural therapy is one such intervention that has a

well-established evidence-base for treating anxiety (Carpenter et al., 2018; Hofmann & Smits, 2008; Ekers et al., 2008). Further, research indicates that parenting stress is directly related to responsive parenting, which in turn influences child cognitive development and prosocial child behaviours (Ward & Lee, 2020). Therefore, evidence-based programs aimed to reduce parenting stress, including parenting programs such as 1-2-3 Magic, should be made widely available during this time (Bloomfield & Kendall, 2012). Under situations like the current COVID-19 pandemic, additional considerations regarding parent capacity to access mental health services and parenting programs are necessary, given the increased demands on parenting already. Promoting access and use of such services to parents while minimizing barriers to treatment is crucial as a future research direction and policy consideration. For example, during the current pandemic, mental health services are being offered via videoconference. This reduces the barrier offered by in-person sessions when physical distancing needs to be adhered, as well as increases access for busy families; however, parents may face additional barriers to service access, such as limited childcare with daycare and school closures. Parent-specific considerations would be beneficial in the creation of mental health service use and access policies during the pandemic.

Further, interventions aimed at increasing high-quality and positive parent-child interactions specifically should be reviewed and broadly implemented during the pandemic for families in need. Evidenced-based and widely disseminated parenting interventions for consideration are Parent-Child Interaction Therapy and Triple P-Positive Parenting Program. These programs have positive effects on reducing parent-related stress, difficult child behaviours, and increasing positive parenting strategies (Thomas & Zimmer-Gembeck, 2007; Thomas et al., 2017). While the effectiveness of these interventions on reducing external

COVID-19-related stressors is unknown, they have the potential to mitigate mechanisms impeding parent-child functioning during the pandemic.

The recommendations from the American Academy of Pediatrics (2018) to minimize media consumption for young children were difficult for many families to achieve pre-pandemic for a variety of reasons (Atkin et al., 2014). Within the context of the COVID-19 pandemic, screen use has likely increased as a function of shifting social connection and online learning. From a developmental perspective, engaging in these activities through screens, as opposed to not at all, is likely preferable (Skora Horgan & Poehlmann-Tynan, 2020). Further, families are navigating unprecedented times for parenting. While reductions in screen time may be warranted in some cases, it is necessary to recognize the utility of means through which parents and families seek relief and restoration from the many external and family-related stressors during the pandemic. Supporting parents in choosing high-quality media such as educational apps that are informed by the science of learning should be considered (Hirsh-Pasek, 2015). More broadly, the strategic use of screen time for socially engaged activities, such as video chats with family and friends, should be encouraged when families are not physically able to be together (McClure & Barr, 2017). Little is known about the extent to which screen use during the pandemic will be linked to developmental outcomes for children of any age. Future research should closely evaluate child screen use prospectively to allow for the early identification of problematic use related to the pandemic.

Strengths and Limitations

Limitations include cross-sectional data, limiting the ability to explore causal relationships and provide insight into pre- and post-pandemic functioning. A further methodological limitation of the study was the use of self-report questionnaires, as all variables

were provided through parent-report. However, the online means of the current study allowed for the large sample size collected over a relatively short amount of time during a global shutdown. Further, while data was included from all interested parents, the sample included more mothers and individuals of higher SES. Nevertheless, the study provides a snapshot into parent and family factors linked to parent-child interactions during the pandemic at a time when school and daycare closures were in effect.

Despite these limitations, the study provides insight into how a large sample of 708 parents, including both mothers and fathers, are managing their current demands and what types of interactions they are engaging in with their children during the COVID-19 pandemic. The study was completed under an expedited timeline to capture important information to inform supports and programs needed for parents and their young children. As a result, this study provides important and novel insight into the functioning of families during the pandemic, and it provides a foundation for future research and intervention considerations as the pandemic unfolds.

Future Directions

Future research should continue to evaluate family functioning in the context of changing external COVID-19-related factors and pressures. Examining screen use and hands-on play across a more global sample, developmental stages, and a more representative distribution of SES would further inform the nature of parent-child activities in different family contexts. Additionally, future research should consider investigating if supervised screen time in families is due to increased time children are spending with screens or if it is a reflection of parents being home during the pandemic and supervising screen time more. It would also be beneficial to

conduct a follow-up study to investigate the evolving parenting strategies used and resources needed as the COVID-19 landscape rapidly changes over the coming months.

Conclusions

Worldwide, families have experienced the effects of the COVID-19 pandemic on various scales. The current study highlights the family factors associated with screen use and hand-on parent-child activities, which are expected to have different developmentally supportive implications for young children. To promote high-quality parent-child interactions and positive child development, future research efforts and interventions should support families across parental mental health, parenting stress, family demographic factors, and childcare needs. Further, additional research about the relative value of different types of screen use is needed to guide media usage during a time where the world is generally more reliant on technology. In doing so, positive developmental outcomes may be encouraged despite the many changing pressures on the pre-pandemic developmental supports.

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Table 1*Characteristics of the Sample*

Characteristic	%	Valid N
Maternal Education Level		
Some high school	0.9	6
High school diploma or equivalent	8.0	56
College/Technical School	19.2	135
Bachelor's degree	32.2	227
Above bachelor's degree	39.9	280
Partner Education Level		
Some high school	2.3	15
High school diploma or equivalent	13.0	86
College/Technical School	27.4	181
Bachelor's degree	30.4	201
Above bachelor's degree	27.0	178
Household Employment Status during COVID-19		
Hours consistent	45.1	302
More than half of regular hours	10.4	70
Less than half of regular hours	10.1	68
Laid off	15.7	105
Salaried	18.7	125
Total Annual Household Income		
≤ \$20,000	3.0	20
\$20,001 - \$40,000	5.9	39
\$40,001 - \$60,000	7.4	49
\$60,001 - \$80,000	13.8	91
\$80,001 - \$100,000	15.7	104
>\$100,000	54.2	358
Marital Status		
Married/Common Law	91.4	640
Divorced/Separated	3.6	25
Single (never married)	5.0	35
Number of children		
0	0.1	1
1	26.7	189
2	55.2	390
3+	17.8	127
Previous Maternal Mental Health Diagnosis/Treatment		
Apply for Federal Insurance Benefits		

Extremely likely	18.9	130
Likely	8.9	61
Neutral	9.0	62
Unlikely	29.2	201
Extremely unlikely	34.0	234
Mother in a Vulnerable Population		
Underlying medical condition	7.0	49
Compromised immune system	5.6	39
Partner in a Vulnerable Population		
Underlying medical condition	6.4	45
Compromised immune system	2.0	14
Child in a Vulnerable Population		
Underlying medical condition	7.4	52
Compromised immune system	2.7	19
Medical Services Impacted by COVID-19	41.5	290
Racial/Ethnic Minority Background	17.6	86

Table 2*Descriptive Statistics for Hands-on Play and Screen Time Activities by Child Age Group*

Outcome Variable	2 to 4 years			5 to 8 years		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Total hands-on play	31.33	18.66	0.00 – 105.00	25.23	17.20	0.00 – 105.00
Unmet childcare needs	32.48	19.48	0.00 – 105.00	26.78	18.31	0.00 – 105.00
No needs	30.69	18.10	0.00 – 84.00	23.79	16.01	0.00 – 84.00
Combined hands-on play	21.05	17.18	0.50 – 131.00	17.04	13.82	0.00 – 77.00
Unmet childcare needs	19.87	15.54	1.00 – 77.00	16.58	15.11	0.00 – 77.00
No needs	22.24	18.58	0.05 – 131.00	17.43	12.92	0.50 – 59.50
Supervised screen time	15.42	9.80	0.00 – 70.00	17.53	11.73	0.00 – 84.00
Unmet childcare needs	16.08	9.74	0.00 – 56.00	18.98	11.90	0.00 – 56.00
No needs	14.96	10.00	0.00 – 70.00	16.09	11.25	0.00 – 84.00
Combined screen time	17.45	14.53	0.00 – 97.00	16.83	15.01	0.00 – 97.00
Unmet childcare needs	26.52	15.72	0.50 – 97.00	17.87	17.79	0.25 – 97.00
No needs	18.41	13.64	0.00 – 76.00	16.35	13.07	0.00 – 63.00

Table 3*Bivariate Correlations of Sociodemographic and Predictor Variables by Child Age Group for Parents Indicating Childcare Needs*

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Total hands-on	-	.10	.21*	.23	-.04	-.07	-.10	.01	.10	-.11	.26*	.05	-.01	-.11	.09	.11	-.15	.21*	.07
2. Supervised screen time	-.09	-	-.02	.24*	.08	-.07	-.10	.08	.07	-.11	.12	.08	-.15	-.18*	.09	.12	.12	.07	.09
3. Combined hands-on	.19*	-.09	-	.51**	.04	-.02	.34**	-.11	-.16	-.12	.13	.13	-.19	-.12	.01	.20	-.09	.22*	.05
4. Combined screen time	-.08	.24*	.37**	-	.38**	.30*	.15	.21	.34**	-.11	.31*	.12	-.33**	-.17	.13	.04	.01	.30*	.12
5. Parent sex	-.06	.00	.11	.40**	-	.45**	-.00	.31**	.01	.03	.22*	-.08	-.14	-.21**	.09	.07	-.05	.11	.04
6. No. adults	.02	-.05	.08	.19	.10	-	.03	.30**	-.06	.47**	.08	-.11	-.04	.08	.02	-.03	-.08	.06	.03
7. No. children	-.21**	.06	.26**	.16	.03	.15*	-	-.08	.02	-.00	-.07	.08	-.14	.01	.09	.14	.06	-.09	.00
8. Parent age	-.06	-.07	.08	.27*	.14*	.07	-.04	-	.04	.03	.38**	-.00	.09	.13	.15	-.14	-.15	.01	-.01
9. Financial strain	.08	.00	.03	.21	.03	.04	-.03	.05	-	-.17*	.45**	.28**	-.25**	-.38**	.08	.08	.01	.22*	.14
10. Marital status	-.02	-.09	-.05	-.25*	-.01	.20**	.08	.01	-.22	-	-.04	.01	.112	.40**	.01	-.08	-.03	-.17	-.12
11. Food insecurity	-.01	.04	.12	.14	.03	-.15	-.10	.12	.28**	-.13	-	.27**	-.33**	-.38**	.14	.04	.07	.45**	.25*
12. Employment loss	.17*	.00	.02	-.02	-.05	-.02	.01	-.11	.29**	-.08	.22*	-	-.28**	-.19*	.02	.05	.09	.16	.01
13. Parent education	-.03	-.24**	-.21*	-.20	-.02	.06	-.19**	.30**	-.14	.16*	-.12	-.10	-	.37**	.00	-.09	-.04	-.18	-.10
14. Household income	-.12	-.10	-.03	.03	-.07	.16*	-.05	.29**	-.28**	.47**	-.31**	-.30**	.32*	-	-.02	-.11	-.04	-.19	-.09
15. Child MH history	.08	.14*	.05	.14	.09	.04	.06	.07	.12	-.09	-.01	.07	-.12	-.07	-	.14	.29*	.12	.14
16. Parent MH history	.08	.20*	.17	.19	.09	.01	-.00	-.01	.16	.07	.09	-.00	-.11	-.05	.10	-	.16	.30**	.37**
17. Parenting stress	.04	.17*	-.11	-.02	.02	.12	.04	-.13	.05	.00	-.01	-.03	-.10	-.07	.16*	.20*	-	.34**	.53**
18. Parental anxiety	.30**	-.00	.16	.31**	.09	.16*	-.09	-.13	.25**	-.05	.15	.00	-.16*	-.10	.06	.32**	.27**	-	.65**
19. Parental depression	.06	.12	.00	.14	.01	.09	-.09	.05	.23**	-.10	.17	-.01	-.09	-.08	.14	.43**	.37**	.57**	-

Note. Below diagonal = age 2 to 4 years, Above diagonal = age 5 to 8 years; * $p \leq .05$, ** $p \leq .01$.

Abbreviations: MH = Mental health (history); No. = Number.

Table 4

Bivariate Correlations of Sociodemographic and Predictor Variables by Child Age Group for Parents Indicating No Childcare Needs

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Total hands-on	-	.08	.31	.16	.08	-.01	.08	-.03	-.10	.15*	-.06	.14	-.08	-.02	-.04	.03	-.10	-.02	-.01
2. Supervised screen time	-.02	-	-.01	-.36**	.04	-.07	-.11	-.02	.01	.07	-.08	-.05	-.05	-.07	.03	.13	.05	.04	.07
3. Combined hands-on	.24**	.07	-	.33**	-.05	.06	-.13	-.13	.04	-.02	.013	.23*	-.31**	-.10	-.07	.06	-.19*	-.09	-.04
4. Combined screen time	-.03	.59**	.32**	-	.10	-.06	-.20	-.15	.02	-.05	.07	.25*	-.21*	-.25*	.02	.04	.08	.07	.07
5. Parent sex	.17**	.07	.23**	.04	-	.05	-.03	.10	-.03	-.05	-.11	-.08	.03	-.03	.10	.07	.10	.10	.03
6. No. adults	.10	.01	-.03	-.08	.09	-	.15*	.07	.03	.28**	-.11	.11	.07	.07	.06	.05	.08	-.01	.02
7. No. children	-.17**	-.16*	-.19*	-.25*	-.00	-.07	-	-.06	.10	.15*	.15	.09	-.06	-.05	.13	.08	.13	-.00	.00
8. Parent age	.18**	.02	-.03	-.03	.41**	.21**	.07	-	-.14*	.11	-.22*	-.12	.34**	.39**	.07	-.02	-.14	-.11	-.11
9. Financial strain	.02	.05	-.02	-.02	-.08	-.11	.08	-.12	-	-.17*	.38**	.21**	-.20**	-.43**	.08	-.00	.14	.15	.17*
10. Marital status	.06	-.08	-.10	-.19	.06	.39**	.02	.10	-.06	-	-.29**	.01	.05	.29**	.03	-.10	-.01	-.10	-.01
11. Food insecurity	.04	.19*	-.02	.08	-.08	-.04	.15	-.18*	.32**	-.06	-	.21*	-.24**	-.37**	.07	.13	.08	.14	.10
12. Employment loss	.06	.05	-.00	-.01	.05	.10	.04	-.01	.18**	-.07	.24**	-	-.21**	-.25**	.13	-.05	.06	.12	.15
13. Parent education	.03	-.08	-.15	-.12	.12	.19**	-.06	.31**	-.23**	.11	-.20	-.12	-	.27**	-.04	-.07	-.09	-.09	-.18*
14. Household income	-.05	-.09	-.07	-.23*	-.01	.09	-.07	.27**	-.32**	.17**	-.34**	.18**	.26**	-	-.15*	-.16	-.12	-.06	-.16
15. Child MH	-.02	.01	.00	.02	-.03	.03	.09	.09	.01	-.09	.14	.06	-.01	-.10	-	-.04	.04	.10	-.05
16. Parent MH	.00	.15	.00	.11	-.01	-.05	.07	-.05	.03	-.15	.06	.11	-.12	-.14	-.02	-	.39**	.16	.20*
17. Parenting stress	-.22**	.14*	-.11	.08	-.02	-.10	.11	-.07	.11	.03	.01	.15*	-.09	-.15*	.06	.34**	-	.48**	.35**
18. Parental anxiety	-.01	.02	-.01	-.01	-.01	-.07	.02	-.16*	.17*	-.09	.15	.18*	-.04	-.06	-.05	.30**	.36**	-	.53**
19. Parental depression	-.14	.09	-.09	.00	-.04	-.15*	-.06	-.18*	.18*	-.11	.07	.20**	-.18*	-.16	-.12	.35**	.50**	.60**	-

Note. Below diagonal = age 2 to 4 years, Above diagonal = age 5 to 8 years; * $p \leq .05$, ** $p \leq .01$.

Abbreviations: MH = Mental health (history); No. = Number.

Table 5*Final Linear Regression Models for Families Indicating No Childcare Needs by Child Age*

Predictor Variable	2 to 4 years				5 to 8 years			
	β	SE	t	p	β	SE	t	p
<i>Total hands-on play</i>								
No. of children	-0.21	1.57	-3.17	.002				
Parental age	0.22	0.21	3.38	.001				
Parenting stress	-0.18	0.12	-2.82	.005				
Marital status					0.15	4.40	2.16	.032
<i>Combined hands-on play</i>								
Participant sex	0.24	4.64	2.73	.007				
No. of children	-0.19	2.07	-2.20	.030				
Parent education					-0.33	0.83	-3.67	<.001
Parenting stress					-0.21	0.11	-2.38	.019
<i>Supervised screen time</i>								
No. of children	-0.19	1.10	-2.31	.022				
Food insecurity	0.23	3.39	2.84	.005				
Parenting stress	0.20	0.08	2.48	.014				
<i>Combined screen time</i>								
No. of children	-0.33	1.70	-3.42	.001				
Household income	-0.29	0.37	-3.00	.003	-0.18	0.40	-1.64	.104
Parent education					-0.10	1.04	-0.90	.370
Employment loss					0.15	2.88	1.40	.165

Note. No. = Number.

Table 6*Final Linear Regression for Families Indicating Unmet Childcare Needs by Child Age*

Predictor Variable	2 to 4 years				5 to 8 years			
	β	<i>SE</i>	<i>t</i>	<i>p</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
<i>Total hands-on play</i>								
No. of children	-0.18	1.97	-2.31	.022				
Employment loss	0.11	3.34	1.43	.155				
Food insecurity					0.20	6.45	1.71	.092
Parental anxiety	0.30	3.23	3.74	<.001	0.15	4.66	1.30	.198
<i>Combined hands-on play</i>								
No. of children	0.24	1.83	2.65	.009	0.37	1.72	3.71	<.001
Parent education	-0.19	0.93	-2.12	.036				
Parental anxiety					0.26	3.66	2.61	.011
<i>Supervised screen time</i>								
Parent education	-0.21	0.55	-2.55	.012				
Household income					-0.18	0.24	-2.28	.024
Parent MH history	0.17	1.75	1.97	.051				
Parenting stress	0.06	0.10	0.72	.474				
<i>Combined screen time</i>								
Parent sex	0.37	3.51	3.66	<.001				
Parental anxiety	0.25	3.44	2.50	.014	0.30	5.28	2.53	.014

Note. MH = Mental health; No. = Number.

KEEPING KIDS BUSY DURING COVID-19

Figure 1

Parent-Child Interaction Time with Standard Error Bars for Parents of Children Age 2 to 4 Years Old with Respect to Childcare Needs

KEEPING KIDS BUSY DURING COVID-19

Figure 2

Parent-Child Interaction Time with Standard Error Bars for Parents of Children Age 5 to 8 Years Old with Respect to Childcare Needs