Associations among average parental educational attainment, maternal stress, and infant screen exposure at 6 months of age

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\textbf{A R T I C L E  I N F O}

\textbf{Keywords:}  
Infant screen time  
Infant screen use  
Parental educational attainment  
Maternal stress

\textbf{A B S T R A C T}

Evidence suggests that increased use of screens early in life may have negative developmental consequences for children. However, little is known concerning parental factors that predict initial screen exposure in infancy. The primary goal of this study was to examine whether parental educational attainment and maternal stress were associated with infant screen exposure by 6 months of age. A diverse sample of mothers (N = 93) was recruited prenatally. In a follow-up visit when the infants were six months of age (N = 82), we examined factors that may be associated with initial infant exposure to screens. First, mothers reported whether they had already exposed their infants to screens. Thereafter, those mothers who reported already having exposed their infants to screens were further queried to determine the extent of infant screen use. Results demonstrated that among infants exposed to screens, mothers reported an average of nearly 3 h of daily screen use. Average parental educational attainment, but not maternal stress, was significantly associated with initial infant exposure. Of those families who endorsed screen exposure by 6 months, 70% reported a screen in the room where the child sleeps, nearly half reported using screens to help calm the infant, and about a third reported using a screen at least sometimes during meals, when going to sleep, and while waiting. Parental education around infant screen use behaviors may be important to help promote child development and outcomes.

1. Introduction

Increased use of screens in infancy may have negative developmental consequences for children as they age. These may include an increased incidence of emotional and behavioral problems in toddlerhood (Lin et al., 2020), interference with regard to word learning at two years of age (Reed, Hirsh-Pasek, & Golinkoff, 2017), and poor performance on developmental screening tests in the preschool years (Madigan, Browne, Racine, Mori, & Tough, 2019).

There are several mechanisms by which screens are theorized to impact child development. The first is described as a “video deficit,” and details the structural and temporal features of screens which impede learning as compared to live, in-person experiences (Anderson & Pempek, 2005). For example, when investigating phoneme recognition in 9-month-old infants, Kuhl, Tsao, and Liu (2003) demonstrated that a control group exposed to Mandarin Chinese via recordings (i.e., video, audio) had no effect on phoneme recognition when compared to a treatment group who had been exposed to the language via interpersonal interaction.

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\url{https://doi.org/10.1016/j.infbeh.2021.101644}

Received 9 December 2020; Received in revised form 18 August 2021; Accepted 24 August 2021

Available online 9 September 2021

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A second mechanism by which screens are theorized to impact child development is thought to occur when screens are used as a “babysitter,” such as when they are used to occupy a child’s attention in the absence of the adult caregiver (He, Irwin, Bouck, Tucker, & Pollett, 2005; Hesketh, Hinkley, & Campbell, 2012). Third, screens may impact development when a caregiver uses a screen in the company of a child, dividing their own attention between the screen and the child (Hiniker et al., 2015; Lemish, Elias, & Floegel, 2020; Radesky, Kistin et al., 2014). Critically, research demonstrates that parental use of screens while in the company of young children can serve as an impediment to the relationship between a parent and a child, disrupting maternal responsiveness (Myruski et al., 2018; Stockdale et al., 2020; Tamis-LeMonda, Bornstein, & Baumwell, 2001) and interfering with parent-child interactions (Kildare & Middlemiss, 2017; Mangan, Leavy, & Jancey, 2018; Radesky et al., 2015). These latter examples of technology-based intrusions in person-to-person connections can be explained more comprehensively as “technofference” (McDaniel, 2015). Defined as the “everyday interruptions in interpersonal interactions or time spent together that occur due to digital and mobile technology devices” (McDaniel & Radesky, 2018b, p. 100), these disruptions to relationships are an important construct to consider with regard to the parent-child dyad.

However, there are important distinctions between interactive and non-interactive (Council on Communications & Media, 2016), and between educational and non-educational (Rideout & Robb, 2020), screen media. When used in instances that maintain relational connections between children and loved ones who may be at a distance from one another (McCure & Barr, 2016), screens may have positive implications for children and families. Further, screens may positively sustain relationships between infants and toddlers between 6 and 36 months of age and their separated caregivers (e.g., incarcerated teen fathers; Barr et al., 2011). Additionally, the social, although virtual, aspects of screens may be leveraged for learning among one-to-two-year-old toddlers, when presented in the company of an adult co-viewer (Myers, LeWitt, Gallo, & Maselli, 2017; Myers, Crawford, Murphy, Aka-Ezoua, & Felix, 2018), despite the aforementioned “video deficit.”

Whether a risk factor for poor development or a means to maintain relationships at a distance, cell phones and screens have become ubiquitous, and children are growing up in “media-saturated environment[s]” (Vandewater et al., 2007, p. 1006). For example, an early report on technology in households with children between the ages of 0–8 years old demonstrated that ownership of screen devices (e.g., a tablet) among families increased year-to-year by 32% between 2011 and 2013 (Rideout, 2013). The ubiquity of screens has fostered a growing body of literature regarding screen use in infancy (Chandra et al., 2016; Cingel & Krcmar, 2013; Krogh et al., 2021; Rideout, 2013), a time of life in which brain development is rapid (Stiles & Jernigan, 2010). Screen use in infancy has been associated with differences in infant sleep (Cheung, Bedford, De Ubabain, Karmillof-Smith, & Smith, 2017; Ribner, Harg, & NewFAMS Study Team, 2019), language (Linebarger & Vaala, 2010; Radesky et al., 2015), and executive function development (McHarg, Ribner, Devine, Hughes, & NewFAMS Study Team, 2020), for example.

The growing body of literature on screen use in infancy suggests that studies focusing on screen time alone may miss important nuances about infant screen use (Byrne, Terranova, & Trost, 2021). The ScreenQ (Hutton, Huang, Sahay, DeWitt, & Ittenbach, 2020) is one example of an instrument that captures not only screen time, but also caregiver behaviors and contextual differences in children’s screen exposure and use. Taking into account the recommendations made by the American Academy of Pediatrics (AAP), the ScreenQ is an advantageous tool in that it provides a nuanced look at the contexts in which children are exposed to screens (e.g., during meals, when upset, while waiting) in addition to quantifying the amount of time a child is exposed to screens.

Caregiver background and experience likely play an important role in shaping children’s screen use. For example, socioeconomic factors and stress may be two factors that contribute to parental choices to use screens with young children. These differences in caregiver background may help to account for which children are exposed to screens with greatest frequency. For example, it has been demonstrated that children younger than 8 from homes characterized as lower-income tend to view screens, on average, two hours more daily screen time than their more affluent peers (Rideout & Robb, 2020). Similarly, associations between parental educational attainment and children’s exposure to media have been widely described. For example, lower parental education tends to be associated with earlier exposure to media (e.g., television, DVDs, computer games; Cingel & Krcmar, 2013) as well as more media consumption (i.e., television, mobile media use; Anand & Krosnick, 2005; Levine, Waite, Bowman, & Kachinsky, 2019; Rideout & Hamel, 2006), before the age of 6. Indeed, children whose parents obtained no more than a high school education tend to view screens, on average, 1.5 h more per day than children of college-educated parents (Rideout & Robb, 2020). These differences in timing of exposure, consumption, frequency and co-viewing may have implications for socioeconomic disparities in child development (Certain & Kahn, 2002; Mendelsohn et al., 2008; Tomopoulos et al., 2010). However, one review found that this pattern is inconsistent, with 58% (7-12 studies) not finding an association between maternal education and screen exposure (Duch, Fisher, Ensari, & Harrington, 2013).

Parents experiencing stress may rely on devices for relief or reprieve from the obligations and responsibilities of parenting (McDaniel & Radesky, 2018c, 2018c; McDaniel, 2019; Radesky et al., 2016, 2018). For example, parents who offer cell phones to children in their care have reported a decrease in familial tension and stress, using the hand-off of the cell phone as a means of coping (Radesky, Silverstein, Zuckerman, & Christakis, 2014; Radesky et al., 2016). Yet, even this means of using technology as a coping mechanism can be fraught with varying tensions for caregivers (Radesky et al., 2016), perhaps causing further stress.

The present investigation attempts to fill a gap in the previous literature, by focusing on particular characteristics and experiences of caregivers that may serve as predictors of infant screen exposure. First, we examine, in a socioeconomically diverse sample of convenience, the extent to which parental education and family stress are associated with infant screen exposure by 6 months of age. Second, we examine, among infants already exposed to screens at 6 months, the extent to which these factors are associated with increased screen use. We further describe the particular screen-related conditions and behaviors reported by families. Here we define screens to include handheld devices (e.g., tablets, smartphones) and televisions (Hutton et al., 2020).

We hypothesized that lower average parental educational attainment and greater levels of maternal stress would each independently associate with (1) higher likelihood of initial screen exposure by 6 months of age, and (2) among those infants exposed to screens, increased use (e.g., more devices, longer durations) at 6 months of age.
2. Methods

2.1. Participants

The present study was embedded in the context of an ongoing longitudinal study examining the association between early experience and child development from birth to 3 years of age. Informed consent was obtained from all participants in this investigation in accordance with the Declaration of Helsinki, as well as Institutional Review Board protocols, ensuring participants’ rights and privacy. The research was conducted in accordance with APA ethical standards in the treatment of the study sample.

As a part of the design of the larger study, an ethnically, racially, and socioeconomically diverse sample of pregnant women in the New York City metropolitan area was recruited. Socioeconomic diversity was defined with respect to parental educational attainment, which, in this sample, ranged from 7 to 22 years (M = 14.5, SD = 3.3). Recruitment was conducted via electronic message posts, Facebook posts, Instagram posts, participation in community events, a local hospital, flyers distributed in neighborhoods and word of mouth. Potential participants were screened over the phone to confirm eligibility. Inclusion criteria for the pregnant mothers included: being 18 years of age or older, carrying a singleton, the fetus having no known neurological or developmental issues, speaking English or Spanish, and being at least 35 weeks pregnant. Once eligibility was confirmed, mothers were invited to participate in the prenatal visit in our lab or their home. A total of 93 mothers completed the prenatal visit and enrolled in the longitudinal study.

After the birth of the child, eligibility for successive study visits was confirmed for subsequent participation (i.e., gestational age greater than or equal to 37 weeks, no known neurodevelopmental issues at birth). The present study examined average parental educational attainment prenatally (N = 93), and mother-infant dyads were assessed with regard to maternal stress and initial infant screen exposure and use. Of the 93 mothers recruited prenatally, 11 did not return for the 6 month visit, resulting in a sample size of 82.

2.1.1. Sample characteristics

For this study, participation consisted of two visits within 7 months: the prenatal visit took place at 35 weeks gestation or later, and the 6-month visit took place when the infants were approximately 6 months of age.

Participant demographics (N = 82; 41.5 % male) are presented in Table 1.

2.2. Measures

2.2.1. Average parental educational attainment

Parental educational attainment was reported by the infant’s mother during the prenatal visit. Maternal education was available for all participants who completed the prenatal assessment and the 6-month assessment (N = 82). Maternal and paternal educational attainment was averaged to create the average parental educational attainment variable used in these analyses. Where only maternal educational attainment was available (n = 4), it was used alone. Average parental educational attainment ranged from 7 to 22 years (M = 14.5, SD = 3.3).

2.2.2. Maternal stress

Maternal stress was collected at the 6-month visit using the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). The PSS is a 10-question self-report questionnaire that assesses the degree to which the respondent has perceived situations as stressful within the last month. Mothers reported on each item on a 0–4 scale, where 0 indicated never having the described feelings and 4 indicated very often having the described feelings. Items were reverse coded as appropriate. Out of the 82 mothers who completed the

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Participant demographics.</th>
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<tbody>
<tr>
<td><strong>Demographics</strong></td>
<td><strong>M</strong></td>
</tr>
<tr>
<td>Maternal Age</td>
<td>31.3</td>
</tr>
<tr>
<td>Average Parental Education</td>
<td>14.6</td>
</tr>
<tr>
<td>Race &amp; Ethnicity</td>
<td>%</td>
</tr>
<tr>
<td>White</td>
<td>35.4</td>
</tr>
<tr>
<td>Black or African American</td>
<td>20.7</td>
</tr>
<tr>
<td>Asian</td>
<td>4.9</td>
</tr>
<tr>
<td>American India or Alaska Native</td>
<td>4.9</td>
</tr>
<tr>
<td>Other</td>
<td>30.5</td>
</tr>
<tr>
<td>Refused</td>
<td>3.7</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>54.9</td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>45.1</td>
</tr>
<tr>
<td>Preferred Language</td>
<td>%</td>
</tr>
<tr>
<td>English</td>
<td>76.8</td>
</tr>
<tr>
<td>Spanish</td>
<td>23.2</td>
</tr>
<tr>
<td>Range of Parental Educational Years</td>
<td>n</td>
</tr>
<tr>
<td>Mother</td>
<td>8–22</td>
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<tr>
<td>Father</td>
<td>2–22</td>
</tr>
</tbody>
</table>
6-month visit, one participant declined to respond to the PSS questionnaire, leaving a total of 81 mothers with valid PSS scores.

2.2.3. Initial screen exposure and use

Initial infant screen exposure and use were assessed during the 6-month visit via a parent-report questionnaire. First, mothers were asked whether their child had yet been exposed to screens (yes or no). A total of 82 mothers completed the yes/no screen exposure question. If mothers reported that their child had been exposed to screens, they were then asked to complete the ScreenQ (Hutton et al., 2020).

The ScreenQ is a 15-item survey that asks the respondent to answer questions relating to the level and incidence of exposure (e.g., How many hours in a 24-h period does your child watch TV or other screen devices?), as well as the type of usage/involvement of caregiver in the child’s viewing (e.g., How often do you speak to your child while they are watching TV or other screen devices?). The ScreenQ was designed with the AAP recommendations on screen use (Council on Communications & Media, 2016) as a starting point. That is, the ScreenQ measured parental adherence to these recommendations by assigning a score of 0 to answers indicating that parents did not expose their children to screens. A score of 1 or 2 was assigned as adherence to these recommendations lessened. The maximum value for each question was particular to each question posed (see supplemental materials).

We administered an adapted version of the ScreenQ (see supplemental materials), removing questions that, given the infants’ age at the time of this visit, were not appropriate (e.g., whether the child has their own portable device they can carry and watch or play on; Hutton et al., 2020). Standard scoring of the ScreenQ was implemented. In older children, higher ScreenQ scores have been modestly correlated with lower emergent literacy and expressive vocabulary skills (Hutton et al., 2020). A total of 43 mothers (52%) responded affirmatively that they had exposed their children to screens, and therefore completed the modified ScreenQ. To be included for analyses, mothers were required to answer at least 9 of the 11 questions, which resulted in the exclusion of three participants, leaving a total of 40 mothers for analysis.

2.3. Analytic strategy

To investigate the two central questions, data were analyzed as follows (IBM SPSS Statistics, Version 26). First, associations between all measures of interest were investigated using two-tailed Pearson correlations. Next, to investigate our first research question, a binary logistic regression was performed. For this regression, average parental educational attainment and maternal stress served as independent variables, and the binary yes/no response to whether each infant had been exposed to screens by 6 months of age served as the dependent variable. Finally, to investigate our second research question, a linear regression was performed among only the participants who answered yes to the question about screen exposure. For this regression, average parental educational attainment and maternal stress served as independent variables, and the ScreenQ total score served as the dependent variable.

3. Results

In the sample of 81 mothers with valid education and perceived stress data, maternal education was not associated with perceived stress ($r = -0.060, p = 0.594$).

Fig. 1. Average Parental Educational Attainment of Infants Not Exposed vs. Exposed to Screens by 6 Months of Age (N = 82).
Note: Error bars show 95% confidence intervals.
A binary logistic regression revealed that average parental educational attainment (B = -0.288, p = 0.001), but not maternal stress (B = 0.008, p = 0.826), was significantly associated with infant screen exposure by 6 months of age. Less highly educated mothers were more likely to report having exposed their infants to screens by 6 months of age, when controlling for maternal perceived stress. Mothers who had not yet exposed their infants to screens by 6 months averaged 16.1 years of education (SD = 3.8), whereas mothers who had exposed their infants to screens by 6 months averaged 13.3 years of education (SD = 2.3) (see Fig. 1).

For the 40 participants with valid modified ScreenQ scores, bivariate correlations demonstrated that higher average parental educational attainment was significantly related to lower ScreenQ total score (r(38) = -0.317, p = 0.047). PSS was not significantly associated with a lower ScreenQ total score (r(38) = -0.152, p = 0.348). A linear regression model examining parental education and stress together was only marginally significant (F(2,37) = 2.659, p = 0.083), with higher average parental education associated with less screen use (B = -0.516, p = 0.044).

Child age in weeks, household size, and maternal employment were all examined as covariates for both the binary logistic and linear regression models. None was related to screen use, nor did they substantively change the estimates of the association between parental educational attainment and screen use in either the binary or linear regression models. Therefore, they were dropped for parsimony given the small number of participants.

An item-level descriptive examination of ScreenQ response is presented in Table 2. See supplemental materials for a complete list of questions and possible responses, adapted from the original measure (Hutton et al., 2020).

Of participants who endorsed screen exposure by 6 months of age, 70 % reported a screen in the room where the child sleeps; about a third reported using a screen at least sometimes during meals, when going to sleep, and while waiting; and nearly half reported using screens to help calm the infant. Among infants exposed to screens, mothers reported an average of 2.9 h of daily screen use (SD = 3.3). Moreover, 57.5 % of participants reported that their infants viewed screens for between 1 and 3 h per day, and another 35 % reported that their infants viewed screens in excess of 3 h per day. The majority report at least sometimes talking to their infant about what is happening on the screen.

4. Discussion

This study investigated the extent to which parental educational attainment and maternal stress were independently associated with infant screen use. In this socioeconomically diverse sample of mothers and their 6-month-old infants, we found that lower average parental educational attainment was significantly associated with a higher likelihood of infant exposure to screens by 6 months of age. Maternal stress was not significantly associated with higher infant screen use. Of participants who endorsed screen exposure by 6 months of age, 70 % reported a screen in the room where the child sleeps, approximately a third reported using a screen during meals and when going to sleep, and nearly half reported using screens to help calm the infant. The majority of mothers report at least sometimes talking to their infant about what is happening on the screen.

Screens present both positive (Barr et al., 2011; McClure & Barr, 2016; Myers et al., 2017; Myers et al., 2018) and negative (Kildare & Middlemiss, 2017; Lin et al., 2020; Madigan et al., 2019; Mangan et al., 2018; Myruski et al., 2018; Reed et al., 2017; Tamis-LeMonda et al., 2001) implications for children. While there is no consensus in recommendations to limit screen exposure for children in developed countries (Ribner & McHarg, 2021), the AAP recommends limiting the use and exposure of screens for children under the age of 2, with the exception of video chatting (as opposed to passive viewing), after considering the potential risks and benefits (Council on Communication and Media, 2016). Even in these instances, it is recommended that the use of screens take place in the company, and under the guidance, of an adult, to avoid overuse (Council on Communication and Media, 2016). Yet, despite these recommendations, many children do interact with screens well before the age of 2 (Asplund et al., 2015; Chandra et al., 2016; Rideout & Robb, 2020; Trinh et al., 2020). Indeed, here we found that, in a convenience sample of socioeconomically diverse families of infants,

Table 2

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Item Response Count and Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 n (%)</td>
</tr>
<tr>
<td>Screen in room where child sleeps</td>
<td>12 (30)</td>
</tr>
<tr>
<td>Screen used during meals</td>
<td>28 (70)</td>
</tr>
<tr>
<td>Screen used while waiting</td>
<td>27 (67.5)</td>
</tr>
<tr>
<td>Total daily hours</td>
<td>3 (7.5)</td>
</tr>
<tr>
<td>Screen used when going to sleep</td>
<td>28 (71.8)</td>
</tr>
<tr>
<td>Screen used to calm</td>
<td>22 (56.4)</td>
</tr>
<tr>
<td>Screen content as slow or fast paced</td>
<td>33 (86.8)</td>
</tr>
<tr>
<td>Screen content as educational or entertainment</td>
<td>32 (82.1)</td>
</tr>
<tr>
<td>Co-use, TV/videos</td>
<td>28 (71.8)</td>
</tr>
<tr>
<td>Co-use, games/apps</td>
<td>28 (93.3)</td>
</tr>
<tr>
<td>Talk while using screen</td>
<td>17 (42.5)</td>
</tr>
</tbody>
</table>

Notes: 1. The items of the adapted questionnaire are listed in the order in which they were presented to participating mothers. 2. Not all items have the same response option format; however, in every case, a response of 0 reflects adherence with AAP Guidelines for the given item, and higher scores reflect greater non-adherence. See Supplemental Materials for a full list of items and possible answer choices. 3. N/A = dichotomous items for which only two response options were appropriate (Hutton et al., 2020).
more than half reported having exposed their 6-month-old infants to screens. Furthermore, of those exposed to screens, more than half viewed screens for between 1 and 3 h per day, and more than a third viewed screens in excess of 3 h per day.

It is important to better understand which infants are more likely to be exposed to screens, as well as when and under what conditions screens are being offered to infants. Further examination of individual items of the completed ScreenQ questionnaires offers such a glimpse.

The data reveal that nearly half of screen-using participants report doing so when trying to calm their children. About one in three use screens during meals, when putting infants to sleep, and when waiting. Calming, feeding, putting to sleep, and entertaining infants while they wait are all tasks that require parental attention and action. The extent to which screen use this early in life during these early and formative caregiver-child interactions may impact later development is unknown. Positively, what is being offered to infants in these scenarios is largely slow-paced and educational in nature, and offered in the company of an adult caregiver. However, while the majority of mothers do report talking to their children at least sometimes about what they are viewing on the screen, more than 10% of infants are viewing screens with little to no adult language offered as accompaniment.

These analyses mirror prior studies highlighting the ways in which older children and adults interact with one another and in the presence of screens—whether, but distracted from one another, perhaps, as a result of screens (Abels, Vanden Abeele, Van Telgen, & Van Meijl, 2018; Hiniker et al., 2015; Kushlev & Dunn, 2019; Moser, Schoenebeck, & Reinecke, 2016; Radesky et al., 2018). This may prove especially problematic for infants, given that infants rely on their adult caregivers for cues and reciprocal interaction (Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009; Wagner et al., 2016).

Although we hypothesized that both parental educational attainment and maternal stress would be associated with screen exposure and use, we found that average parental educational attainment alone was predictive of which 6 month-olds are initially exposed to screens. Contrary to our hypotheses, maternal perceived stress was not associated with infant screen exposure or use. While the PSS, a self-report measure of average stress experienced in the previous 30 days, did demonstrate variability among mothers, it is possible that it does not capture certain types of stress which may have been associated with infant screen exposure and use. Specifically, the PSS does not measure parenting stress; as such, perhaps another instrument would have proven more sensitive to the unique types of stress parents face. Alternatively, perhaps the families in the present investigation had other social supports not accounted for in our examination, which helped to alleviate their levels of stress at times when they might have offered screens (Koeske & Koeske, 1990; Raikes & Thompson, 2005). Finally, given the relatively small sample size, it is possible that we did not have the statistical power to detect an association between perceived stress and screen exposure/use that would have been detected in a larger sample.

It is conceivable that parents with lower educational attainment may be less privy to, and therefore less informed by, more formal messaging like the AAP’s recommendation (Council on Communication and Media, 2016) on screen use and limits. For example, access to healthcare varies along socioeconomic lines (Olah, Gaisano, & Hwang, 2013), and many mothers who lack social supports experience “mistrust and fear of judgement” from their pediatricians (Heneghan, Mercer, & DeLeone, 2004, p. 460). Thus, it is possible that mothers characterized as disadvantaged may be less likely to receive information about screen time and less likely to trust this information if they do receive it. Outreach efforts that target specific behaviors, such as removing screens from the room where the child sleeps, and eliminating screen time during meals and at bedtime, may be more effective than efforts that more generally declare the dangers of screens.

As with any investigation, limitations of the present study exist. First, the sample was small, particularly for analyses that involved only the half of participants who reported infant screen exposure. Second, maternal stress was measured using a self-report questionnaire, designed to account for only the last 30 days prior to its administration. A direct measure of stress in the moment of screen use decision-making would likely be more informative. It is also possible that a physiological measure of stress, such as cortisol, may have been informative, given that psychological and endocrine responses to stress may not be aligned (Scholtz et al., 2008). Third, we have limited information on the type of screen diet to which the infants were exposed. It will be imperative in future work to assess this, as it is likely that outcomes will vary according to whether infant screen exposure consists primarily of video-chats versus other types of media. Fourth, the extent to which parental decision-making is rooted in parental knowledge about child development is unclear (Rowe, Harden, & Stapleton, 2016).

These limitations offer an opportunity to build on and extend the questions of this investigation. Future investigations ought to examine any changes with regard to initial screen exposure and use in successive samples. Importantly, future investigations also ought to examine other family characteristics that might be associated with infant screen exposure and use. As well, future investigations should examine associations among infant screen exposure, screen use, and emotional, language, cognitive and brain development.

It is important to note that why parents might choose to expose their infants to screens is not readily accounted for in the present investigation. Future investigations should examine parental knowledge about screen use. Additionally, it may be wise to interview families qualitatively to better understand the reasons why they choose to expose their infants to screens. In this way, we begin to address the lived experiences of families, rather than merely highlighting certain aspects of parenthood that center on what some parents do “wrong.” This distinctly different approach to the questions of these analyses may allow us to better inform effective strategies to promote healthy child development.

Last, the COVID-19 pandemic continues to impact our research as of the time of this writing. The present investigation was begun before the pandemic took its greatest toll on the United States, and as such, there is regrettably no measure of the extent to which the pandemic has led to differences in screen use in families.

5. Conclusion

In sum, we demonstrated that average parental educational attainment, but not maternal stress, is associated with initial infant
screen exposure. Of families who endorsed screen exposure by 6 months, screen use was relatively common during meals, when going to sleep, while waiting, and to help calm the infant. Future work will further investigate these links, with the hope of informing prevention and intervention strategies as well as educational and policy measures.

Funding

This publication was supported by the National Institutes of Health (R01HD093707-01) and Teachers College, Columbia University.

The noted funders had no role in the study design, the analyses, or the writing of this manuscript.

Author statement


Declaration of Competing Interest

None. None of the authors has competing interests to declare.

Acknowledgments

The authors gratefully acknowledge the families who have so generously contributed their time and efforts to this investigation. Special acknowledgement and gratitude is owed to Olivia Paige Colón, Project Manager, who worked tirelessly to contact families and to collect data during this pandemic which has made these processes exceedingly challenging. Thanks are due, as well, to Chen Li, for statistical assistance.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.infbeh.2021.101644.

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