

**PARENTAL KNOWLEDGE AND OTHER FACTORS ASSOCIATED WITH INFANTS'
EXPOSURE TO SCREENS**

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Parental Knowledge and Other Factors Associated with Infants' Exposure
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ABSTRACT

Excessive screen time in children is linked to reduced white matter integrity and developmental delays such as reduced vocabulary. Nevertheless, many parents allow their infants and toddlers to have access to screen devices. The current study examined mothers' awareness of the American Academy of Pediatrics recommendations, parenting information sources utilized, and motivational and contextual factors associated with screen time exposure in mothers who had a child under the age of two. Results indicated that over 60% of mothers were aware of the recommendations, usually citing educational benefits as their rationale for infant screen time use. Most mothers reported they receive information from medical professionals or online platforms. These findings identify factors that researchers, policy makers, and public health professionals should consider when updating and disseminating information to the public in the near future.

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DEDICATION

I would like to dedicate this project to my parents, LuAnn and Michael. Your endless support has meant the world to me, and I would not be where I am today without your consistent guidance and positivity. I love you both more than words can express.

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CHAPTER ONE. INTRODUCTION

Screen time in infancy has become quite prevalent in the last few decades as advances in technology have merged with educational and entertainment products targeting infants. *Screen time* is defined as the use of electronic media. Examples include television, smartphones, computers or tablets. Due to research that indicates that screen time may have detrimental effects on infant development, researchers and pediatricians recommend that children under the age of two be strictly limited in their screen time exposure; or even better, have no sedentary exposure to electronic media at all (Barr, 2010; Brown, 2011; Hutton et al., 2019; Radesky et al., 2015; Radsekey & Christakis, 2016; WHO, 2019).

Screen time may be entertaining for young children, but they are not truly learning from the experience. Empirical studies and meta analyses have shown that children under the age of two gain more developmentally beneficial skills through play time with physical objects than through play time on a device that utilizes a screen (Brown, 2011; Ginsburg, 2007; Hutton et al., 2019; Radesky et al., 2015; Reading, 2007; Vaala & Hornik, 2014; WHO, 2019; Zack et al., 2013). Although concrete knowledge (e.g., skills and repetitive motions called drills) can be easily gained from screen time use, infants are deprived of the creative freedom experienced during free play, and of more adaptive skills that can only be obtained through human interaction (Brown, 2011; Hutton et al., 2019; Linebarger & Vaala, 2010; McClure et al., 2015; Radesky et al., 2015). The usefulness of engaging in screen time activities for children under two is similar to when a child watches fireworks. Fireworks are flashy and fun to look at, but children do not learn fundamental skills from watching them. Screen time is the equivalent of fireworks for children under the age of two. However, unlike fireworks, use of screen-media can occupy a significant amount of time in a young child's life, drawing time away from more worthwhile

activities. A rapidly growing body of literature has revealed the negative effects of exposure to screen time prior to the age of two. These include delays in language development, emotional and self-regulation abilities, and problem-solving capabilities (Brown, 2011; Hutton et al., 2019; McClure et al. 2015, Radesky et al., 2015; Vaala & Hornik, 2014).

In the current study, my research team and I aim to identify the degree that mothers are aware of these negative effects and the recommendations to limit screen-time exposure in infants. We also intend to identify where mothers receive their parenting information from, and what factors are involved in the rates of screen time exposure during infancy.

Language Development

Language is the area of development that has been shown to be most significantly negatively impacted by screen time, based on research to date. There is a clear association between infants' utilization of a screened device (e.g., cell phones, tablets, televisions) and language delays (Barr, 2010; Linebarger & Vaala, 2010). Because infants' vocabulary growth is directly related to the amount of time parents spend speaking to their infants (Hart & Risley, 1995), this language delay appears to be a direct result from reduced interactions with caregivers that occur when a child is engaged in screen time activity. The impact of even one hour of television viewing greatly affects an infant's language capacity as it is estimated that within that one hour, 52 minutes of interaction is lost between the infant and their parent (Brown, 2011). Research has shown that even if a program is playing in the background and is not intended for the child to watch, children still play and interact less with their parents than they would with no background media present (Brown, 2011; Masur et al., 2015). A study conducted by Masur et al. (2015) examined 126 mothers who reported the presence of background media exposure during their infants' play time. The researchers discovered that a majority of mothers reported

background media present during at least half of their infants' play time. These findings are concerning as the parent's attention is not fully focused on the child when background media is present but is split between the child and the television program.

When a parents' attention is not focused on the infant, the child's language learning abilities are hindered due to lack of interaction with the caregiver. Pempek et al. (2014) examined the effects of background television on parent-child play interactions. The researchers observed 49 parents (2 fathers) and 49 infants, ages 12, 24, and 36-months old, interacting together in infant-parent dyads during a one-hour laboratory session in which parents were instructed to act as they would at home. In half of the sessions, a TV was on. Pempek et al. (2014) revealed that during sessions where the TV was on, parents' language directed at their toddlers was reduced, including fewer words and utterances spoken per minute, and that the amount of new words being introduced in conversation was decreased, but length of utterances (i.e., syntactic complexity) was not affected.

It was previously thought that this lost interaction time cannot be made up by having screen time content designed to promote language learning. Although many parents believe that language DVD's are helpful, research suggests that children under the age of 24 months are not able to learn from screen time the way they learn from real life experiences. This phenomenon is known as the *video deficit effect*. As a result, some researchers believe there are no beneficial effects of watching language learning programs for children in this age range (Barr, 2010; Duch et al., 2013; Radesky et al., 2015; Zack et al., 2013).

However, not all studies have found negative effects of screened device exposure for infants. In a study conducted by Vandewater (2011), 251 mothers completed surveys in their own home regarding their infant's screen time use and language development for their children

ages 8 to 15 months. Half of mothers were instructed to show their child an infant-directed language development DVD twice a week for four weeks, and then all mothers filled out the survey again. The experimental group understood more words related to the DVD than infants not exposed, but no differences were found between groups regarding infants' spoken vocabulary. However, it is important to note that researchers did not instruct the parents about whether they should watch the DVD with their child, instead specifying to show the DVD like they would any other DVD in their house. As a result, some parents may have co-viewed with their infant and explained the words as they went, thus increasing parent-child interaction.

Additionally, in another survey study, 97 parents of children between the ages 6 to 36 months answered questions about language development and indicated the amount of time their child utilized screened devices and was read to (Taylor et al., 2017). The results revealed that reading was associated with a larger vocabulary while screened device usage was not associated with vocabulary growth or decline. These researchers conclude that since screened device usage was not associated with a child's vocabulary size, as long as reading time remains the same, screened device usage has no adverse effects on language development in young children. These conclusions align with the principle that the most effective way to increase a child's vocabulary is through person-to-person interaction with the child (Hart & Risley, 1995).

It is for this reason that live human interaction via screen media, such as FaceTime, is reported to be an exception to the "no-screen-time" rule (McClure et al., 2015). *FaceTime*, a videotelephony application developed by Apple, Inc., is a type of live video chat that can be used between two cellular devices or computers. Recently researchers have investigated FaceTime interactions between infants and relatives. Although the American Academy of Pediatrics (Brown, 2011; Radsekey & Chirstaksis, 2016) recommends minimal screen time for children

under the age of two, there is evidence that video chat interactions may not have the same detrimental effects as other types of screen time. McClure et al. (2015) distributed an online survey to 183 parents of children between the ages 6 and 24 months and found that it is popular for parents to engage in FaceTime interactions with various family members. These video chats occur, on average, once a week for 20 minutes (McClure et al., 2015). These screen time experiences are not necessarily bad for infants because they are interactive. The infant experiences a behavior-contingent give-and-take dynamic through the screen with the relative, as well as the parent. Since the infant is receiving a substantial amount of interactive communication, the type of experience that is effective for language learning, these types of screen time experiences can be beneficial for their development.

Self-Regulation

There are multiple other skills that children develop through interaction with caregivers and other children that are termed preacademic skills. These include social skills based on empathy and self-regulation. Self-regulation is defined as the ability to properly regulate one's own emotions, thoughts and actions, and great gains occur during infancy through the preschool years (Geldhof et al., 2010). Self-regulation is important because adaptive, socially appropriate behavior is heavily dependent on self-regulation abilities (Geldhof et al., 2010), and self-regulation is directly related to the ability to direct attention. If a person cannot properly self-regulate, that individual will struggle to stay focused on a task, lack the ability to inhibit automatic responses, and have a decreased capacity for long-term memory and working memory (Geldhof et al., 2010). These skills are largely gained through interaction with others (Radesky et al., 2015). As such, self-regulation can suffer immensely in infancy when human interaction is replaced by other activities.

Screen time supplants the necessary human interaction that is required to develop these fundamental skills (Brown, 2011; Radesky et al., 2015). A study conducted by Inoue et al. (2016) demonstrated that an increased daily amount of television viewing in children ages 4-5 lead to greater self-regulatory behavior management difficulties in both sexes. Another study conducted by Lillard et al. (2015) demonstrated through three different experiments that children ages 4-6 years had a decrease in executive functioning, the cognitive processes that underlie behavioral control (Geldhof et al., 2010), immediately after exposure to a fictional television program for 10-20 minutes. Further, a study conducted by Radesky et al. (2014) demonstrates that an infant's self-regulatory behavior is also greatly related to screen time exposure. Using data from a longitudinal study of 7,450 children, the researchers examined the association between screen time exposure and self-regulation at 9 months and 2 years old. Radesky et al. (2014) discovered that infants with poor self-regulation at 9 months, or infants who were classified as having persistent self-regulation difficulties at 9 months and 2 years, consumed significantly more screen time per day than infants with no or mild self-regulation problems. These findings are important because when infants are attempting to play creatively and are distracted by electronic media, they often do not return to the same train of thought they were engaging before the interruption, disrupting self-regulation skill development. The frequency of interruptions in play during infancy can lead to future problems with attention and focusing (Vaala & Hornik, 2014).

Information Sources

Despite research that demonstrates the negative effects of screen time and recommendations from American Academy of Pediatrics' warning against screen-media use, parents continue to allow and even encourage use by their infants and toddlers. There are several

factors that may contribute to their continued use. A component of this study is to discover the links between parental knowledge and health information sources. This includes determining how much parents know about the American Academy of Pediatrics' recommendation on screen time use in infancy and determining which factors are involved in higher infant exposure to screen time. Specifically, if parents know about the recommendation, where did they learn about it from? If not, what source of information are they utilizing? Since there are numerous empirically backed studies providing evidence discouraging the use of screen time for children under the age of two, one of the main components of this project is determining which sources parents are utilizing to receive their infant knowledge and health recommendations (e.g., apps, doctors, websites, magazines, etc.). By discovering where parents obtain their information, we will be able to acquire a better sense of where researchers and medical professionals should be distributing their research so that it is most beneficial to the public.

Research shows that parents use a variety of sources to gather information regarding their child for both immediate problems and general parenting advice (Criss et al., 2015; Gazmararian et al. 2014; van der Gugten et al, 2016). For example, a study conducted by van der Gugten et al. (2016) interviewed 10 parents (9 mothers) and found that a physician's recommendations were the only source that truly alleviated parental worries, but the internet was typically utilized as a supplementary source to gather information about their child's problematic symptoms. Similarly, Gazmararian et al. (2014) found that all 92 mothers in their focus groups indicated they would prefer to receive information in an in-person context when looking for answers about an immediate problem. Although, it should be noted that a study conducted by Criss et al. (2015) examined 1000 Hispanic mothers in focus groups and those mothers utilized immediate family when in need of information instantly while supplementing with online resources. The Hispanic

mothers explained their preferences under these circumstances by stating that waiting for a medical professional's advice may take too long in a moment of need (Criss et al., 2015).

Similarly, when parents are seeking general parenting information, they tend to utilize a variety of sources (Criss et al., 2015; Gazmararian et al., 2014; Radey et al., 2009). The focus group mothers in the study conducted by Gazmararian et al. (2014) also noted that when mothers were seeking general parenting advice, they preferred both in-person or online sources. Criss et al. (2015) also discovered that the Hispanic mothers in their focus groups utilized advice from health care providers and experienced parents as a primary source of general healthcare information regarding their infants. These research findings align with the study conducted by Radey et al. (2009), which examined parenting practices of 1,240 parents (e.g., over two-thirds of the sample was mothers) with a child aged 10 or younger via a large survey. Radey et al. (2009) reported parents typically gather information from multiple sources when seeking general parenting knowledge, and their advice comes from a mix of professional, non-professional, and media sources. As resources are constantly changing with rapid advancements in technology, the current study aims to provide an update on sources mothers used for information related to infant screen time.

Motivational and Contextual Factors

After establishing where mothers are obtaining their information, we were further interested in investigating their parenting behaviors. A meta-analysis performed by Duch et al. (2013) revealed that approximately 68 percent of children under the age of three utilize screened devices daily. We aimed to discover what the motivations were behind allowing their infants exposure to screened devices. Could the motivational factors be the underlying component responsible for a greater exposure period to screen time? We will examine motivational factors

such as the need to distract the infant in order to complete household chores or using screen time because their children enjoy it. However, there could be other factors involved that predict a higher rate of screen time use in infancy, such as contextual factors. Contextual factors could include the number of accessible devices the parent has within their possession, whether siblings are also using screen time with their younger infant sibling, or family structure. With the rapid advancement of technology, it is now easier to give an infant a screen at any time. For example, smartphones are easily obtainable for the general public, and these devices make it possible to allow child screen time within and outside of the home.

Research indicates that there could be a multitude of factors that increase screen time in infancy ranging from demographic variables to personal parental factors such as mental health. A systematic review conducted by Duch et. al (2013) examined the correlates of higher screen time in children ages 0-3 years old. This study found that the strongest predictors of screen time use were the demographic variables of race, with minorities having a higher rate of screen time exposure, and child's age, which indicated the older the child, the more screen-time they are exposed to (Duch et al., 2013). Additionally, a longitudinal and cross-sectional study that examined a nationally representative sample of American children ages 0-12 found significant predictors depending upon child's age (i.e., 0-4 years old and 9-12 years old) and media type (i.e., television and computers) (Lee et al., 2009), the latter of which may be a stronger predictor now that there are a greater number of screened device types used by children. Lee et al. (2009) reported that the strongest predictors of screen time use based on this data were family conflict, neighborhood quality, and parental limits. The results pertaining to this study indicate that children who experienced higher levels of family conflict in their home were exposed to more screen time in infancy-toddlerhood (Lee et al., 2009). Lastly, Lee et al. (2009) noted that there

was a positive relation between television time and reading between Wave 1 and Wave 2. This suggests that a child's media use habits (i.e., television viewing and reading) are formed early in life, and are reinforced as they age (Lee et al., 2009). Another example of parental influence on screen time exposure is demonstrated by Bank et al. (2012), who found that infants of mothers who had maternal depression after pregnancy were exposed to twice as much screen time as infants of mothers who did not have maternal depression. Another study conducted by Brown & Smolenaers (2018) investigated the motivational factors behind exposing children under the age of two to screen time through a qualitative method. The researchers found that the 11 interviewed parents disclosed a wide variety of motivational factors behind allowing their infants exposure to screens, including child enjoyment, distraction so parents could do chores, availability of screens, and using screens as a coping tool when their child was upset.

Acknowledging that there is a wide range of factors that could predict screen time use among infants, we want to know which factors are the strongest predictors of screen time exposure. This study will add a unique element to the growing literature on this topic because as far as we know, no study has been conducted in the Midwest region of the United States that encompasses the American Academy of Pediatrics' recommendation on screen time use, the examination of the information sources utilized by the same parents about the recommendations through a survey design, while also investigating the motivational and contextual factors involved in greater screen time exposure during infancy. The combination of variables being measured in this study allows for a multifaceted examination of factors, thus allowing for a more complete picture to emerge from the data.

Research Questions

The current study aims to address several questions pertaining to information sources that mothers utilize, adherence to the AAP's recommendations, and the factors associated with higher screen time use in children under the age of two.¹

RQ 1: Do mothers know about the recommendations, and if so, how do they find out?

RQ 2: Do mothers adhere to the American Academy of Pediatrics' recommendations?

RQ 3: What factors are associated with increased screen-time use in infancy?

In relation to Research Question (1), we hypothesized, based on previous research, that mothers exploit multiple sources, but primarily focus on information from pediatricians and online sources in combination with other personal sources such as family members or friends (Criss et al., 2015; Gazmararian et al., 2014; Radey et al., 2009; van der Gugten et al., 2016).

In relation to Research Question (2), we hypothesized that a majority of mothers would not adhere to the AAP's recommendations because they were unaware of the current guidelines (Brown & Smolenaers, 2018; Gazmararian et al., 2014).

In relation to Research Question (3), we hypothesized that there are multiple factors that are associated with the amount of screen time a child is exposed to in infancy including accessibility of screens, busyness of parents (e.g., time constraints, number of adults in the home), particular characteristics of adults in the home (e.g., single parents), exposure by older siblings, perceived educational benefits, and awareness of AAP recommendations (Brown & Smolenaers, 2018; Bank et al., 2012; Duch et al., 2013; Lee et al., 2009).

¹ To maintain consistency with previous research discussed in the literature review, fathers were excluded from our study as the majority of work in this area is only examined with primary caregivers which are usually mothers.

CHAPTER TWO. METHODS

Participants

Participants were mothers of an infant who is 24 months old or younger. Mothers were recruited through three collaborating partners, the Infant Cognitive Development Lab (ICDL), NDSU Extension, and Early Head Start of North Dakota. A total of 222 participants began the survey. However, male participants ($n = 34$), caregivers who did not categorize themselves as primary ($n = 1$), and participants who did not complete questions beyond the demographics section ($n = 7$) were eliminated from the final sample ($N = 178$). Primary caregivers reported their relationship to the child in question as biological mothers or adoptive mothers ($n = 174$), a stepmother ($n = 1$), a grandmother ($n = 1$), an aunt ($n = 1$), and a foster parent ($n = 1$). The primary caregivers' ages ranged from 18 to 56 years old. Participants reported their ethnicity as Caucasian ($n = 153$), Native American or Alaskan Native ($n = 8$), Black or African American ($n = 6$), Asian ($n = 4$), Hispanic or Latino-White ($n = 4$), and Multiracial ($n = 3$). Caregivers reported their relationship classification as married ($n = 115$), single ($n = 24$), significant other – not engaged ($n = 21$), engaged ($n = 14$), and divorced or separated ($n = 4$). After the Institutional Review Board granted approval for the study, the collaborating associates distributed the Qualtrics survey by emailing a link and QR code, displaying flyers around the local area or offices, attending local recruitment events, emailing the NDSU research listserv, or had the survey readily available for eligible mothers on a computer in the ICDL.

Design and Materials

Data was collected via an online Qualtrics survey and responses were collected in various formats, including Likert type scales, multiple choice format, duration in hours, ranking order, and short essay response. The mixed-measures method allowed for mothers to answer the

questions directly and gave them an opportunity to explain their viewpoints, thus collecting quantitative and qualitative data. The survey assessed demographics (e.g., education level, socioeconomic status, age, marital status, race, family structure), child screen time use duration and type (e.g., mobile devices, television, and tablets), motivation for screen-time exposure (e.g., education benefits, and as a reward), parent awareness of screen-time use policies, and preferences for parenting information (i.e., sources parents prefer). The present study utilized a subset of this survey to address the current research questions.

To assess the demographic variables of the participants, we included questions that asked them to identify their ethnicity, income, and education level among other personal characteristics. In order to measure the variable of ‘screen time exposure’, we asked participants to clarify the amount of screen time their child is exposed to. For example, “On an average weekday, how much time does your child spend on a digital device (e.g., cellphone or tablet) or watching television?” and participants were prompted to indicate the amount of time in a multiple-choice format. In order to assess which sources mothers utilized to obtain the AAP’s guidelines, we asked them “How did you find out about the American Academy of Pediatrics’ recommendation?” and gave them multiple choice options to choose from, including the option that indicated they were never made aware of the guidelines. The full survey is in Appendix A.

To gain a better understanding of mother’s motives for exposing their infants to screen time, we utilized a measure titled the *Parental Motivations Scale* produced by Cingel & Krcmar (2013) which was created from a qualitative interview study on parent motivations in relation to screen time for young children conducted by Rideout and colleagues (2003) (see Appendix B).²

² The researchers, Cingel & Krcmar, who produced the Parental Motivations Scale were contacted and granted us permission to utilize the scale in the current study.

We also added exploratory questions to constructs from the original scale that was created by Cingel & Krcmar (2013), as well as added exploratory questions that did not fit into the previous constructs measured by Cingel & Krcmar (2013). All additional questions added were due to the ever-changing updates with technology and society's parenting standards. For example, "I let my child use media... so I can care for another child" was an exploratory question added to the existing chores construct. To reference the exploratory items and see which questions were added to each construct or created a new construct, see Appendix C.

Procedure

Mothers could take the survey in a location of their choice, including the ICDL or Early Head Start offices. Mothers were immediately prompted with a brief paragraph explaining the purpose of the study, and an informed consent page. The survey took approximately 15-25 minutes to complete. Upon completion of the survey, participants were thanked for their time and participation. Caregivers were then provided a code word which they could redeem for a compensation baby item at any of the collaboration sites until supplies ran out.

CHAPTER THREE. RESULTS

RQ 1: Mothers' Awareness of the AAP's Recommendations and Sources Utilized

Descriptive statistics indicate that most mothers were aware of the AAP's screen time recommendation ($n = 107, f = 62.2\%$). However, we conducted further qualitative analysis of the question, "In your own words, what is the current American Academy of Pediatrics' recommendation for use of digital media or television by children under the age of two?" Results of this analysis demonstrate that only 38.4% of mothers ($n = 66$) knew the guidelines confidently and in their entirety (e.g., "No screen time under the age of two" and "video chat with family members is ok, [but] should be limited. Everything [else] should be avoided."). It's important to note that 7.6% of mothers ($n = 13$) were correct, but not confident in their knowledge of the guidelines (e.g., "I believe it says very minimal or none?" and "I have no idea but I would guess none"). In addition, 9.9% of mothers ($n = 17$) had the recommendations partially correct (e.g., "no TV at all" and "limit screen time or not have it at all"). These mothers did not account for all screened device usage or they gave a range of time when the recommendation states none should be utilized by infants (Radesky & Christakis, 2016). The qualitative analysis also revealed that 30.2% of mothers ($n = 52$) did not know the recommendations (e.g., "I don't know" and "less than one-hour day"). Finally, some 9.3% of mothers ($n = 16$) failed to answer the question but revealed their opinions on screen time use in infancy (e.g., "Children learn best through play not media and videos" and "Unrealistic"), while 4.7% of mothers ($n = 8$) gave nonapplicable responses (e.g., "?" or "4-month-old baby").

A majority of mothers read about recommendations online ($n = 41, f = 23.8\%$), closely followed by being informed by a medical professional ($n = 38, f = 22.1\%$), then followed by other sources such as the news, Facebook, or childcare centers, etc. ($n = 20, f = 11.6\%$), someone

other than a medical professional ($n = 6, f = 3.5\%$), or they read about them in a book ($n = 2, f = 1.2\%$). However, a large portion of mothers were not aware of the AAP's recommendations at all ($n = 65, f = 37.8\%$).

RQ 2: Mothers' Adherence to the AAP's Recommendations

Adherence to the AAP's recommendations was coded into a dichotomous variable based on self-reported screen time exposure for infants. Mothers who 'always' or 'most of the time' followed the screen time guidelines were coded as 'adhering', and mothers who followed the guideline 'about half the time', 'sometimes' and 'never' were coded as 'not adhering'. Descriptive statistics reveal that mothers who adhered to the AAP's recommendations were comparable in numbers to mothers who did not adhere (both $n = 86, f = 50.0\%$), while six mothers declined to answer whether they adhered to the guidelines or not. Screen time in hours per day was calculated by adding together the reported estimate of screen time on each of the different types of devices (i.e., television or other devices) infants were exposed to on an average weekday and multiplying this value by five. Then the estimated amount of screen time per weekend day was multiplied by two. Next these two values were added together and divided by seven to give an overall daily average. Because the measure utilized a range of time (i.e., "0-1 hour", "1-2 hours"), results should be interpreted as a median approximation of time with every .5 being the equivalent of 30 minutes of screen time, keeping in mind that there is no true zero. As would be expected, a univariate analysis of variance (ANOVA) revealed a significant difference in infants' average daily screen time use between parents who do adhere and who do not adhere to the AAP's guidelines, $F(1, 169) = 14.39, p < .001, \eta_p^2 = 0.08$, with parents who report adherence to the guidelines reporting lower amounts of infant screen time per day ($M =$

1.01, $SD = 0.04$) compared to mothers of infants who reported not adhering to the guidelines ($M = 1.39, SD = 0.94$).

RQ 3: Motivational and Contextual Factors Related to Screen Time Use in Infancy

Motivational Factors

In order to determine respondents' motivation for allowing their children screen time during infancy, we had participants fill out a 21-item Likert scale matrix table ranging from strongly disagree (1) to strongly agree (7). The original Preschool Media Use (PMU) scale (α 's = 0.77 - 0.92) created by Cingel & Krmar (2013) consisted of 15 items that made up a total of 5 factors (i.e., to get chores done, for educational purposes, as a reward, to help children relax, and children ask for it) (See Appendix B). Cingel & Krmar's (2013) motivational scale starts out with the prompt "I let my child use media..." and gives parents a variety of options like "...because it is educational" or "...to help alleviate my stress." Reliability analysis revealed that for this sample the Preschool Media Use scale (α 's = 0.82 - 0.93) was very reliable. Questions that we devised, based on input from local mothers' groups, were included as exploratory questions that fit into the factors of chores and educational benefits. Reliability analyses illustrated that when we added these exploratory questions to the educational benefit factor the internal consistency of items remained the same as the items in the original factor ($\alpha = 0.92$). However, when we added the exploratory questions for the chores factor, the reliability increased from the original $\alpha = 0.88$ to $\alpha = 0.92$. This means the exploratory questions added to the original questions created a higher level of internal consistency than the original set of chores questions.

Descriptive statistics of the motivational factors developed by Cingel & Krmar (2013) were analyzed for mothers who reported not adhering the American Academy of Pediatrics guidelines. Looking closely at the motivations of mothers who do not report adhering to the

guidelines is essential in order to understand the associations with greater screen time exposure during infancy. The strongest motivational factor of these mothers was the perceived educational benefits of screen time from the original construct ($M = 4.78, SD = 1.60$), followed by the educational benefits construct that included the exploratory questions ($M = 4.56, SD = 1.56$). The child asking for screen time for enjoyment was the next highest motivational factor ($M = 3.76, SD = 1.66$). The mother needing to do chores ($M = 3.66, SD = 1.69$), followed by the chores factor with added exploratory questions, ($M = 3.62, SD = 1.63$) were the moderately rated motivational factors. The lower-rated motivational factors include giving an infant a screened device as a reward ($M = 3.48, SD = 1.74$), to help the infant relax ($M = 3.47, SD = 1.48$), to not disturb others ($M = 3.30, SD = 1.92$), and to gain quick compliance from the child ($M = 2.60, SD = 1.61$).

Regression analyses were conducted to identify factors that were associated with screen time use during infancy with the dependent variable being the average hours of screen time per day ($N = 178$). None of the motivational factors, whether original (i.e., educational benefit, chores, reward, relaxation, and asking) or exploratory (i.e., education, chores, do not disturb, and compliance), predicted average hours of screen time use per day, $F(9, 163) = 0.69, p = .72, R^2 = 0.48$ (see Table 1).

Table 1*Linear Regressions Between Infant Average Screen Time Per Motivational Factors*

| Motivational Factor | <i>B</i> | <i>SE</i> | β | <i>t</i> | <i>p</i> |
|-----------------------------------|----------|-----------|---------|----------|----------|
| Educational Benefit (Original) | 0.16 | 0.18 | 0.42 | 0.90 | 0.37 |
| Educational Benefit (Exploratory) | -0.20 | 0.19 | -0.50 | -1.03 | 0.30 |
| Ask/Enjoyment | 0.07 | 0.06 | 0.16 | 1.04 | 0.30 |
| Chores (Original) | -0.01 | 0.18 | -0.02 | -0.05 | 0.96 |
| Chores (Exploratory) | -0.02 | 0.18 | -0.06 | -0.14 | 0.89 |
| Reward | 0.04 | 0.05 | 0.11 | 0.93 | 0.35 |
| Relax | 0.02 | 0.07 | 0.04 | 0.25 | 0.80 |
| Do Not Disturb | 0.03 | 0.05 | 0.07 | 0.58 | 0.56 |
| Compliance | -0.03 | 0.06 | -0.07 | -0.51 | 0.61 |

Contextual Factors

The relationship between co-use by infants and siblings was examined. The linear regression results show that use of screened devices by siblings did not predict an infant's exposure to screen time, $F(2, 112) = 0.16, p = .85, R^2 = 0.003$. A linear regression also demonstrated that the total number of adults present in the home (i.e., ranging from 1 to 5) did not predict the amount of screen time exposure for infants, $F(1, 175) = 0.01, p = .82, R^2 = 0.00$. However, when we separated one-parent from two-or-more-parent households we did find differences in the amount of screen time exposure. To code the 'one-parent household' variable, we examined questions regarding relationship status, single parenting, and co-parenting with a parent outside the home to ensure that these households were truly single caregiving residences. Participants were excluded from analysis if their responses were ambiguous or did not clearly indicate the number of adults available to provide care to the children in the home ($n = 5$) (e.g., one participant indicated they were engaged to be married, but did not specify whether their fiancé was living in the same household or elsewhere). A univariate ANOVA illustrated a

statistically significant difference in the amount of average daily screen time an infant is exposed to in a one-parent versus two-parent household, $F(1, 169) = 6.87, p = .01, \eta_p^2 = 0.04$, with one-parent households ($n = 31$) reporting a greater amount of screen time exposure ($M = 1.35, SD = 0.67$) than two-parent households ($M = 1.11, SD = 0.41$).

Descriptive statistics revealed that a majority of mothers reported working full time ($n = 93, f = 52.2\%$), while a portion were working part-time between 26 and 39 hours per week ($n = 22, f = 12.4\%$). Mothers also reported working part-time but under 25 hours per week ($n = 18, f = 10.1\%$), that they were seeking employment ($n = 6, f = 3.4\%$), and or were not seeking employment (e.g., homemaker, student, retired) ($n = 39, f = 21.9\%$). Although the amount of time a mother spent with their child during a typical weekday did not predict how much screen time an infant was exposed to, $\beta = 0.10, p = .09$, the amount of time a mother spent with their child during a typical weekend day did significantly to relate infant screen time exposure, $F(2, 175) = 3.04, p = .05, R^2 = 0.03$, with more time spent with their children on the weekend being associated with a lower amount of overall screen time, $\beta = -0.29, p = .024$.

Analyzing the accessibility of screens via a linear regression demonstrated that the total number of screens present in the household did not predict infant screen time use $F(1, 109) = 1.12, p = .28, R^2 = 0.01$. Lastly, a univariate ANOVA revealed a significant difference in the amount of infant screen time use per day when a television or a tablet were accessible devices in the household. To view the results for all devices accounted for in the survey, see Table 2. For both devices, presence in the household was associated with a lower average screen time. All other devices accounted for (i.e., smartphone, Ipod/MP3 player, laptop/computer, or other), were not associated with significant differences in infant screen time exposure. When participants reported a device in the 'other' category, they were reporting a gaming console such as a

PlayStation4 or hand-held gaming device such as a Nintendo DS. In addition, it should be noted that there are some small sample size for certain items.

Table 2

Univariate ANOVA of Infant Average Screen Time Per Day by Device Accessibility

| Device | In household | | | Not in household | | | $F(1, 157)$ | p | η_p^2 |
|------------|--------------|------|-----|------------------|------|-----|-------------|-------|------------|
| | M | SD | n | M | SD | n | | | |
| Television | 1.34 | 0.44 | 165 | 2.08 | 2.01 | 11 | 7.69 | .006* | .05 |
| Tablet | 1.13 | 0.42 | 117 | 1.34 | 1.01 | 59 | 13.75 | .000* | .08 |
| Smartphone | 1.74 | 1.19 | 164 | 1.16 | 0.62 | 12 | 0.34 | .560 | .00 |
| iPod/MP3 | 1.26 | 0.69 | 156 | 1.19 | 0.69 | 20 | 0.98 | .323 | .01 |
| Computer | 1.13 | 0.44 | 131 | 1.40 | 1.11 | 45 | 0.00 | .999 | .00 |
| Other | 1.73 | 1.36 | 8 | 1.17 | 0.63 | 168 | 0.17 | .679 | .01 |

* $p < .05$

CHAPTER FOUR. DISCUSSION

The overall goal of this study was to discover if parents were aware of the American Academy of Pediatrics recommendations while determining the resources parents utilized to obtain a knowledge of the guidelines. We then examined if mothers adhere to the guidelines and determined the motivational and contextual factors associated with screen time use in infancy. This information can be utilized by pediatricians, public health professionals, and extension offices for educational purposes.

Awareness and Resources

In relation to research question one, parental awareness of the AAP's guidelines and which sources they utilized to obtain their knowledge of the guidelines, we found that approximately 62 percent of participants indicated awareness of the guidelines advising parents that infants under the age of 24 months should not be exposed to any screen time. Upon further investigation of participants' understanding of the AAP's guidelines via qualitative analysis of responses, we discovered a 23.6% discrepancy between the mothers who indicated they were aware of the guidelines and the mothers who fully and confidently restated the recommendations (i.e., 38.4%). However, when we add in mothers who were correct but not confident (7.6%) and mothers who were partially correct (9.9%), the discrepancy decreased to 6.1%. These findings indicate that although a majority of mothers are initially indicating they are aware of the AAP's guidelines, a fewer number of mothers entirely and confidently understand the screen time recommendations for children under the age of two. These findings illuminate the need to reiterate the guidelines in a more concise manner in hopes of increasing mothers' recollection of the guidelines. Also, they indicate that maternal awareness is not simply an "either-or" proposition, but that there is a range of understanding related to the AAP recommendations.

Mothers' understanding of the AAP's recommendations may also benefit from more elaborate explanations of why screen time should be avoided during infancy, rather than just simply stating that it should be avoided.

Of mothers who were aware of the recommendations, many discovered the guidelines via an online source or were informed by a medical professional. The purpose of gaining information regarding the source type that parents utilize most when looking for parenting information was to determine where to best disseminate the empirically-based information to the sources that caregivers are currently exploiting, in hopes of consequently making the reliable information available to as many parents as possible. Thus, these findings are useful to medical professionals as they should continue to inform mothers about this guideline via in-person communication. Public health or extension officials can also utilize this information as they should be cognizant that online sources are more popular than handouts or books. Since online sources were the most frequently reported information source, public health and extension personnel may find that focusing effort on maintaining or revamping online materials may be a more effective way to disseminate information than other methods. However, it should be noted that we cannot accurately advise which specific type of online source is best with the data analysis that has been completed for this project. In the future, we will analyze the remaining qualitative data (e.g., 44. "What is/are your preferred online source(s) (website, podcast, app, etc.) of information?").

It is worth noting that approximately 38% of mothers in this sample were unaware of the AAP's recommendations, which suggests there are substantial misconceptions or a continuing lack of awareness around the topic of screen time use during infancy. In relation to the population of the United States of America, which currently has a population of around 330

million people (U.S. Census Bureau, n.d.), that would mean that approximately 125 million people would be unaware of the American Academy of Pediatrics' recommendation of no screen time for infants under the age of two years old. This finding demonstrates that current methods of conveying important parenting messages can be improved upon or expanded.

Adherence to Guidelines

Regarding research question two, reported adherence to the AAP's recommendations, we discovered some concerning outcomes. Although over sixty percent of mothers were aware of the AAP's guidelines regarding infant screen time, only fifty percent of the participants reported that they adhered to the guidelines 'always' or 'most of the time.' This finding indicates that knowing of the recommendations is simply not enough to persuade mothers to follow the guidelines in their household. Part of this discrepancy could be caused by false advertising of the benefits of screen time use during infancy, or the feasibility of implementing the screen time restriction in their homes. Since technology is such a prominent component of how our society functions every day, the task of restricting or eliminating access to screens for infants may seem daunting or unrealistic to parents. For this reason, it was important to us to investigate parents' motivations.

Motivational and Contextual Factors

In relation to research question three, the motivational and contextual factors associated with screen time use in infancy, we explored a variety of different potential factors that could have had an effect on amount of screen time exposure. The results discussed below are those that were found to be statistically significant or were unexpected.

Perceived Educational Benefit

Our results revealed that the highest motivational predictor for the mothers allowing their infants screen time was perceived educational benefit. Although all motivational factors are important to consider, the illusion of infants gaining educational benefits from screen time is troubling. When parents are giving their infants screen time with the belief that they are gaining knowledge from the exposure, they may genuinely believe they are promoting the wellbeing of their child instead of hindering it. Research clearly indicates that infant children exposed to an excess amount of screen time have reduced white matter integrity, which leads to reduced language and emergent literacy skills resulting in developmental delays in the child's future (Hutton et al., 2019). Other findings have also demonstrated that infants are unable to transfer the skills they learn on a screened device to the real world, which furthers the argument that sedentary screen time be avoided (Barr, 2010; Zack et al., 2013). These studies, among others, are the underlying elements that informed the AAP's recommendation against screen time use during infancy (Radesky & Christakis, 2016). Recently, the World Health Organization (WHO) has also taken a stance against sedentary screen time exposure during infancy and released its own statement persuading parents to eliminate screen exposure in their infant's environment (WHO, 2019). Taken together, the empirical research findings that illuminate the adverse effects of screen time on an infant's development, the policies published by prestigious entities, and our finding that perceived educational benefits is the strongest motivating factor for mothers allowing their infants screen time, it is imperative that researchers, medical professionals, and public health specialists continue to convey not only the message that screen time should be avoided for infants, but also why it should be avoided during this critical period of development.

Infant Enjoyment and Distraction

The next two highest motivational factors for allowing an infant screen time use was for the infant's enjoyment of the screened device-based activities, followed by allowing them screen time so the mother could get chores done around the house. Surprisingly, the chores construct was only a moderate motivational factor for allowing infants screen time exposure. Although it appears through casual observation that parents tend to use screen time as an 'electronic babysitter' for their child, parents may perceive their choice of giving their child screened device through a different lens. It is a possibility that parents could really be allowing screen time use for infants in order to distract the infant so they can be productive in other areas, but justifying it as allowing their infant's use because they believe it is educational. Thus, parents could perceive that they are effectively multitasking by believing their infant is learning from the screen time exposure while also allowing themselves the opportunity to put their energy into different areas (e.g., cleaning, checking email, cooking dinner, etc.) or taking a break from parenting.

Adults Present in the Home

In the case of one-parent households, the results revealed a greater average amount of screen time exposure for infants by at least 30 minutes per day compared to two-parent households. This could be due to the one-parent being busier when in the presence of the infant, thus allowing the infant more screen time exposure since they are the only caregiver present at home. However, screen time exposure was not related to the total number of adults in the home. This is likely due to the fact that the sample size was small, a majority of the participants indicated they were in two-parent households, and we had a very few participants indicate that they lived with 3 or more adults in the home.

Time Spent with Infants

Interestingly, the amount of time a parent spent with their child during the weekday was not associated with the average amount of screen time per day that an infant was exposed to. This could be due to a majority of participants reporting that they worked full or part-time between 26-39 hours per week. Thus, when the mother is not home with the infant for a long duration of time during the weekday, it makes logical sense that it would not affect their infant's average daily screen time exposure. In contrast, the amount of time a parent spent with their infant on the weekend was significantly related to a lower amount of average daily screen time exposure by at least 30 minutes per day.

Devices in Household

Even though total number of screens that were available to the child did not relate to the amount of screen time an infant was exposed to, certain devices present in the home were associated with average screen time use per day. Specifically, having a tablet or television present in the home was associated with parents reporting a significantly lower average amount of screen time an infant was exposed to per day. At first glance this appears to be a contradictory finding, as one would assume those two types of devices being present in the home would be associated with greater screen time exposure for infants. However, a possible explanation of this finding is that having a television or tablet in the home may make a parent more mindful of their infant's screen time use. For example, if an infant begins to request screen time through actions, gestures, or words, these behaviors may draw parents' attention to just how much time their infant is actually accessing screen devices.

Socioeconomic status could also be another factor to consider, specifically for the tablet finding, as when the parent has the economic resources available to own a tablet, they may be

more likely to give the infant a tablet over a smartphone. Tablets designed for young children come with the capability of enabling parental controls, thus allowing parents to set limits on the amount of time their child is exposed to that screened device. The socioeconomic component of the data is beyond the scope of this project but will be analyzed at a later date.

Policy

Many media companies' advertisements target children in the infancy age range, and uninformed parents assume that their children learn from many products that promote the use of devices with screens. In other countries false advertising, as in this case with the ability of children to learn from devices with screens, is banned. Health organizations around the globe have made statements that discourage parents from exposing their children under the age of two to screen time, including the United States of America, Australia, Canada, and France (WHO, 2019; Radesky & Christakis, 2016; Vaala & Hornik, 2014). Unfortunately, this information has not always been effectively communicated to parents. The only country that has taken drastic measures to ensure the reduction of infant media exposure is France. In 2008, the French High Audiovisual Council made the informed decision to ban their television companies from advertising and airing shows aimed at children under the age of three (Radesky, Schumacher & Zuckerman, 2015). The research shows programs delivered via a device with a screen that target young children do not hold any educational value, but since their marketing is so influential, it is overriding the researchers' and medical field's recommendations. (Radesky, Schumacher & Zuckerman, 2015; Vaala & Hornik, 2014). The information gap surrounding this topic is an imminent problem and needs to be explored further immediately as the empirical research has demonstrated adverse effects of screen time exposure on an infant's development (Hutton et al., 2019; Radesky et al., 2015).

However, there are contradictory statements regarding screen time use during infancy that are also making the decision around screen time use for infants confusing and problematic for parents. The Royal College of Pediatrics & Child Health (RCPCH) in the United Kingdom has made policy statements that counter the guidelines set by the AAP and WHO. The RCPCH (2019) believes the evidence presented on the adverse effects of screen time exposure for infants and young children is often overstated. Instead, the RCPCH (2019) directs parents to make their own decision regarding screen time use in their families based upon the needs of each individual child, but acknowledge the expert recommendation of avoiding screens one hour prior to bedtime. Understandably, the contradictory statements made by prestigious entities around the world regarding screen time use for infants is making the choice for parents challenging as they need to choose a resource that they trust.

Limitations

The small and centralized sample of the study was a limitation factor. The results may not be generalizable to the national population as all participants were recruited in the Midwest region of the United States. We also limited the participant options by restricting the eligibility to only primary caregivers that were female. There is also a possibility of social desirability influencing the adherence results in which mothers may have over-reported adherence to the guidelines or under-reported use of screen time. Measures were taken to account for this possibility as we asked participants to estimate the amount of screen time their infants are exposed to before the AAP guideline adherence question. Lastly, the measure that was utilized when asking participants to record infant screen time use was flawed as a range of time in hours (e.g., 0-1 hours) was reported by participants. This did not allow participants to indicate the difference between no screen time and one hour of screen time, which made interpretation of the

screen time variables an estimation instead of an exact time period. This problem was addressed in the new version of the survey by eliminating the range of time and will allow future participants to indicate ‘zero screen time’ as a response if applicable.

Future Implications

The findings from this study shed light on some alarming realities for society, namely that a large portion of parents are not aware of the detrimental effects associated with screen time use before the age of two. Of more concern is that some parents who are aware of the AAP’s guidelines are still not adhering to them. To relate this back to the current population of the United States, that would mean that approximately 40 million people are aware of the AAP’s guidelines, but are choosing to not adhere (U.S. Census Bureau, n.d.). The most frightening finding of all is the fact that some parents believe exposure to screen time before the age of two is actually beneficial to their child’s wellbeing and development. According to our motivational factor analysis, perceived educational benefit is the top motivator for allowing infants screen time. Thus, some parents are incorrectly concluding that screen time use for their young children is providing them with opportunities to enhance their child’s learning. Yet, researchers and policy makers recognize that these conclusions are made based on false information, as empirical studies have demonstrated the adverse effects related to screen time exposure before the age of two years (Barr, 2010; Brown, 2011; Hutton et al., 2019; Radesky et al., 2015; Radesky & Christakis, 2016; WHO, 2019). Screen time replaces activities wherein infants could be exploring, learning, and interacting with their environment, which relates to enhancing their overall development (Brown, 2011; Hutton et al., 2019; Radesky et al., 2015; Radesky & Christakis, 2016). By allowing an infant continued sedentary screen time, the child is losing out

on those opportunities, as well as not gaining any experience that can be transferred from the screen to the real world (Barr, 2010; Zack et al., 2013).

Now that we know the reasons parents allow infants screen time, as well as where parents obtain information in regard to the screen time policies, we will be able to target the sources that they are utilizing to disseminate the correct information. Specifically, we should create or maintain any online resources that correctly relay the empirical findings pertaining to screen time use in infants. We should also communicate to medical professionals that parents are listening to their advice and expertise when they are engaging in conversations about their children, thus medical professionals should be sure to not omit this critical information during infant health appointments. Another possibility would be to begin to develop a reliable online resource that distributes credible information to expecting and current parents, or we could promote the advertisement of currently existing credible online resources. However, it is imperative that researchers, public health specialists and medical professionals continuously investigate and evaluate technology use in infants due to the constantly evolving nature of technology in our society.

Taxpayers are putting enormous amounts of money into research, and unfortunately much of this research, including infancy research, is not relayed to the public. The cause of lack of communication between researchers, public health specialists, medical professionals and the public may be due to the fact that there is not a popular credible source that people can utilize to attain empirically supported information. Alternatively, it is possible that the existing credible online resources are not being adequately advertised to the public. It is vital that parents know that screen time is depriving their young children of gaining the indispensable skills discussed

above. When parents are faced with the option of screen time with their infant, or free play, making the right and informed decision could go a long way for their infant's development.

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APPENDIX A. FULL VERSION OF SCREEN TIME SURVEY

Q1 NDSU North Dakota State University
 Department of Human Development and Family Science
 1310 Centennial Blvd, EML Hall 283

NDSU Dept. 2615
P.O. Box 6050
Fargo, ND 58108-6050
701.231.8268

Dear participant:

My name is Shea Lammers. I am a graduate student in the Human Development and Family Science Department at North Dakota State University, and I am conducting a research project to learn more about mothers' preferred parenting and health information sources regarding their young children, which sources they trust and find credible, and what their motivations are for utilizing and selecting these sources. We also ask parents to identify and describe some of their parenting behaviors. It is our hope that this research will aid those who are concerned with children's wellbeing.

Because you are a caregiver with a child under the age of two, you are invited to take part in this research survey. Your participation is entirely your choice, and you may change your mind or stop participating at any time, with no penalty to you. If you need assistance when filling out the survey, please contact the Infant Cognitive Development Lab at North Dakota State University at 701-231-8873 or your local Early Head Start Program location in the state of North Dakota.

It is not possible to identify all potential risks in research procedures, but we have taken reasonable safeguards to minimize any known risks.

Upon survey completion, you will be given a code word. You may use this code word to pick up a compensation baby item at the Infant Cognitive Development Lab at North Dakota State University, the Extension Office at North Dakota State University, or at various Early Head Start locations throughout the state of North Dakota as long as supplies last.

It should take about 15-30 minutes to complete the online survey. Questions ask about characteristics of you and your family, your preferences regarding health and parenting information, and parenting behaviors. If you need assistance completing the survey, please contact the Infant Cognitive Development Lab at North Dakota State University at 701-231-8873.

This study is anonymous. That means that no one, not even members of the research team, will know that the information you give comes from you.

If you have any questions about this project or wish to receive a copy of the results, please contact me at shea.lammers@ndsu.edu, or contact my advisor, Dr. Rebecca Woods by phone at 701-231-9791 or by email rebecca.woods@ndsu.edu.

You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8995, toll-free at 1-855-800-6717, by email at ndsu.irb@ndsu.edu, or by mail at: NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

Thank you for your taking part in this research.

- Yes (1)
- No (2)

Skip To: End of Survey If Q1 = No
End of Block: Block 9

Start of Block: Default Question Block

Q2 Are you a parent of child under the age of two (has not yet turned two)?

- Yes (1)
- No (2)

Skip To: End of Survey If Q2 = No

Q3 What is your gender?

- Male (1)
- Female (2)

Skip To: End of Survey If Q3 = Male

Q4 Are you the person who has greatest responsibility for the daily care of the child at home?

- Yes (1)
- No (2)

Skip To: End of Survey If Q4 = No

Q5 What is your relationship to this child?

- Biological mother or adoptive mother (1)
- Stepparent (2)
- Grandparent (3)
- Relative (aunt, sister, etc) (4)
- Other caregiver (5) _____

Q6 How old is your child? (If you have more than one child under the age of two, please answer the survey questions about the oldest child)

- newborn (1)
- 1 month (2)
- 2 months (3)
- 3 months (4)
- 4 months (5)
- 5 months (6)
- 6 months (7)
- 7 months (8)
- 8 months (9)
- 9 months (10)
- 10 months (11)
- 11 months (12)
- 12 months (13)
- 13 months (14)
- 14 months (15)
- 15 months (16)
- 16 months (17)
- 17 months (18)
- 18 months (19)

- 19 months (20)
 - 20 months (21)
 - 21 months (22)
 - 22 months (23)
 - 23 months (24)
-

Q7 Does your child require special needs care?

- Yes: (1) _____
 - No (2)
 - Other (3) _____
-

Q8 How many other children do you have in your home?

- 0 (1)
 - 1 (2)
 - 2 (3)
 - 3 (4)
 - 4 (5)
 - 5+ (6)
-

*Display This Question:
If Q8 != 0*

Q9 Is the child you are answering your survey about a twin?

- Yes (1)
 - No (2)
-

Display This Question:
If Q8 != 0

Q10 How old are the other children in your home (Please indicate all ages, and separate by commas)?

Q11 What is your age?

Q12 Which of the following best describes your race or ethnicity?

- Caucasian or White (1)
- Black or African American (2)
- Native American or Alaskan Native (3)
- Pacific Islander or Hawaiian (4)
- Asian: specific (5) _____
- Indian (6)
- Hispanic/Latino-White (7)
- Hispanic/Latino-Nonwhite (8)
- Middle-Eastern/North African (9)
- Multiracial (10) _____
- Other (11) _____

Q13 What is your current partnership status?

- Single (never married) (1)
 - Significant other, not engaged (2)
 - Engaged (3)
 - Married (4)
 - Remarried (5)
 - Divorced/ Separated (6)
 - Widowed (7)
-

*Display This Question:
If Q13 = Single (never married)*

Q14 Are you currently a single mother?

- Yes (1)
 - No (2)
 - Other (3) _____
-

Q15 Are you currently co-parenting with another parent who is not living with you and your child?

- Yes (1)
 - No (2)
 - Other: (3) _____
-

Q16 How many adults currently live in your home (including yourself)?

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- Other: (5) _____

Display This Question:
If Q13 != Single (never married)

Q17 Are any of the adults in your home present for less than 5 days a week in a typical week?

- Yes (1)
 - No (2)
 - Other (3) _____
-

Q18 What is your highest level of education?

- Less than high school degree (please indicate the last grade completed) (1)

 - High School Degree/GED (2)
 - Some College (no degree) (3)
 - Associates Degree (4)
 - Bachelor's Degree (5)
 - Advanced Degree: (6) _____
 - Other: (7) _____
-

Display This Question:
If Q13 != Single (never married)

Q19 What is the highest level of your significant other's education?

- Less than high school degree (please indicate the last grade completed) (1)

- High School Degree/GED (2)
- Some College (no degree) (3)
- Associates Degree (4)
- Bachelor's Degree (5)
- Advanced Degree: (6) _____
- Other: (7) _____

Q20 What is your current employment status?

- Employed Full-time (40+ hours per week) (1)
 - Employed 26 to 39 hours per week (2)
 - Employed less than 25 hours per week (3)
 - Seeking employment (4)
 - Not seeking outside employment (includes full-time homemaker, student, retired, etc.) (5)
-

Q21 What is your occupation?

*Display This Question:
If Q13 != Single (never married)*

Q22 What is your significant other's employment status?

- Employed full-time (40+ hours per week) (1)
 - Employed 26 to 39 hours per week (2)
 - Employed less than 25 hours per week (3)
 - Seeking employment (4)
 - Not seeking outside employment (includes full-time homemaker, student, retired, etc.) (5)
-

*Display This Question:
If Q13 != Single (never married)*

Q23 What is your significant other's occupation?

Q24 What is your family's average annual income?

- \$0-\$5,000 (1)
- \$5,001-\$10,000 (2)
- \$10,001-\$15,000 (3)
- \$15,001-\$20,000 (4)
- \$20,001-\$25,000 (5)
- \$25,001-\$40,000 (6)
- \$40,001-\$60,000 (7)
- \$60,001-\$80,000 (8)
- \$80,001-\$100,000 (9)
- More than \$100,000 (10)

End of Block: Default Question Block

Start of Block: Block 7

Q25 My child...

- Mostly remains in my care (1)
- Goes to a child care center (2)
- Goes to an in-home, family-based child care (3)
- Is regularly watched by a family member or friend (4)

Skip To: End of Block If Q25 = Mostly remains in my care

Q26 How much time per week is your child cared for by someone other than you?

- 6 hours or less (1)
 - 6-12 hours a week (2)
 - 12-20 hours a week (3)
 - 20 hours or more (4)
-

Q27 Can you estimate the amount of time per day that your child spends watching television while under the care of this person?

- 0-1 hour (1)
 - 1 hour-2 hours (2)
 - 2 hours-3 hours (3)
 - 3 hours-4 hours (4)
 - 4 hours or more (5)
 - I can't accurately estimate the amount of time per day (6)
 - Other: (7) _____
-

Q28 Can you estimate the amount of time per day that your child spends on a digital device (e.g., a tablet or cellphone) while under the care of this person?

- 0-1 hour (1)
- 1 hour-2 hours (2)
- 2 hours-3 hours (3)
- 3 hours-4 hours (4)
- 4 hours or more (5)
- I can't accurately estimate the amount of time per day (6)
- Other: (7) _____

End of Block: Block 7

Start of Block: Block 3

Q29 How much time do you have to spend with your child on a typical weekday?

- 0-1 hour (1)
 - 1 hour-2 hours (2)
 - 2 hours-3 hours (3)
 - 3 hours-4 hours (4)
 - more than 4 hours (5)
 - Other: (6) _____
-

Q30 How much time do you have to spend with your child on a typical weekend day?

- 0-1 hour (1)
 - 1 hour-2 hours (2)
 - 2 hours-3 hours (3)
 - 3 hours-4 hours (4)
 - more than 4 hours (5)
 - Other: (6) _____
-

Q31 On an average weekday, how much time does your child spend watching TV shows or movies while under your supervision?

- 0 hours-1 hour (1)
 - 1 hour-2 hours (2)
 - 2 hours-3 hours (3)
 - 3 hours-4 hours (4)
 - more than 4 hours (5)
-

Q32 On an average weekday, how much time does your child spend on a digital device (e.g., cellphone or tablet) while under your supervision? (Not including video-chat with a family member).

- 0 hours-1 hour (1)
 - 1 hour-2 hours (2)
 - 2 hours-3 hours (3)
 - 3 hours-4 hours (4)
 - more than 4 hours (5)
-

Q33 On an average weekend day, how much time does your child spend watching TV shows or movies at home while under your supervision?

- 0 hours-1 hour (1)
 - 1 hour-2 hours (2)
 - 2 hours-3 hours (3)
 - 3 hours-4 hours (4)
 - more than 4 hours (5)
-

Q34 On an average weekend day, how much time does your child spend on a digital device (e.g., cellphone or tablet) while under your supervision? (Not including video-chat with a family member).

- 0 hours-1 hour (1)
- 1 hour-2 hours (2)
- 2 hours-3 hours (3)
- 3 hours-4 hours (4)
- more than 4 hours (5)

End of Block: Block 3

Start of Block: Block 6

Display This Question:
If Q8 != 0

Q35 Does an older sibling use a digital device (e.g., tablet, cellphone, etc.) with your child?

- Yes (1)
 - No (2)
 - It depends: (3) _____
-

Display This Question:
If Q8 != 0

Q36 Does your child watch a show on a television or tablet with a sibling when they are watching a show?

- Yes (1)
 - No (2)
 - It depends: (3) _____
-

Q37 Please indicate by checking the box if you have the following item(s) in your household. If yes, indicate how many of each item.

- Television (1) _____
- Tablet (2) _____
- Smartphone (3) _____
- Ipod/MP3 player with apps (4) _____
- Computer/laptop (5) _____
- Other: (6) _____

End of Block: Block 6

Start of Block: Block 1

Q38 Please answer the following questions regarding the statement "I let my child use digital media..." (i.e., television, tablets, cellphones)

Please answer in reference to the question above

| | Strongly Disagree (1) | Disagree (2) | Somewhat Disagree (3) | Neither Agree nor Disagree (4) | Somewhat Agree (5) | Agree (6) | Strongly Agree (7) |
|----------------------------------------------------------|--------------------------|-----------------------|--------------------------|-----------------------------------------|-----------------------|-----------------------|-----------------------|
| never (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..for educational benefits (2) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ...as a reward for my child's good behavior (3) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..because they ask me for it (4) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..to help my child relax (5) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..so I can do chores around the house (6) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..so I can care for another child (7) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..so they can learn something (8) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..as a reward (9) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..as a part of a daily routine (10) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..to alleviate my stress (11) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..because it is educational (12) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..only if they are well behaved (13) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..because they like it (14) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..so they can watch their favorite show (15) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please answer in reference to the question above

| | Strongly Disagree (1) | Disagree (2) | Somewhat Disagree (3) | Neither Agree nor Disagree (4) | Somewhat Agree (5) | Agree (6) | Strongly Agree (7) |
|---------------------------------------------------------|--------------------------|-----------------------|--------------------------|-----------------------------------------|-----------------------|-----------------------|-----------------------|
| ..to give them some down time (16) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..to allow myself free time (17) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..so I can do other things (20) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..to get quick compliance from my child (21) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..to benefit their future skill set (22) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ..to keep them quiet (not disturb others) (23) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

End of Block: Block 1

Start of Block: Block 2

Q39 What is your preferred method to gather parenting and medical information regarding your child? (Please select all that apply)

- Medical or health professional (pediatrician, general practitioner, etc.) (1)
- Online sources (website, app, podcast, etc.) (2)
- Parenting books/parenting magazines (3)
- Advice from a parent/family member (4)
- Advice from a friend (5)
- Childcare provider (6)
- Community professional (e.g., counselor, clergy, social worker, etc.) (7)
- Parenting class (8)
- Other: (9) _____

Q40 Please indicate the following medical professional you prefer to receive this information from:

- Does not apply (1)
 - Pediatrician (2)
 - General Practitioner (Family Doctor, etc.) (3)
 - Nurse (4)
 - Other: (5) _____
-

Q41 Which family member do you ask for advice from the most?

- Does not apply (1)
 - My spouse or partner (2)
 - My mother (3)
 - My spouse or partner's mother (4)
 - My father (5)
 - My spouse or partner's father (6)
 - My sibling(s) (7) _____
 - Other Relatives or In-Laws: (8) _____
-

Q42 Which friend do you ask advice from the most?

- Does not apply (1)
 - My friend who is a parent (2)
 - My friend with medical expertise (3)
 - My friend who knows about children, but isn't a parent (4)
 - Other: (5) _____
-

Q43 Which community professional do you ask for advice from the most?

- Does not apply (1)
 - Counselor (2)
 - Social Worker (3)
 - Clergy (4)
 - Other: (5) _____
-

Q44 What is/are your preferred online source(s) (website, podcast, app, etc.) of information?

Q45 What is/are your preferred parenting magazine(s) and/or parenting books?

Q46 Please indicate the parenting class you receive this information from:

End of Block: Block 2

Start of Block: Block 4

Q47 Please rank the following sources of information in order from those that you trust most (1) to least (8).

- _____ Advice from a family member (1)
- _____ Advice from a friend (2)
- _____ Online source(s) (3)
- _____ Medical professional (4)
- _____ Parenting books/ magazines (5)
- _____ Childcare provider (6)
- _____ Community professional (e.g., clergy, social worker, counselor, etc.) (7)
- _____ Parenting class (8)

Q48 Please rate how much you trust each of these sources as an accurate source of information on parenting and/or child health information:

Please answer in regards to the question above:

| | Low (1) | Medium-Low (2) | Medium (3) | Medium-High (4) | High (5) |
|---------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Advice from a family member (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Advice from a friend (2) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Online source(s) (3) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Medical professional (4) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | | | | | |
|---------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Parenting books/magazines (5) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Childcare provider (6) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Community professional (e.g., clergy, social worker, counselor, etc.) (7) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Parenting class (8) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

End of Block: Block 4

Start of Block: Block 8

Q49 In your own words, what is the current American Academy of Pediatrics' recommendation for use of digital media or television by children under the age of two?

End of Block: Block 8

Start of Block: Block 5

Q50 How did you find out about the American Academy of Pediatrics' recommendation?

- I did not know about the recommendation (1)
- A medical professional informed me (2)
- Someone other than a medical professional informed me: (3)

- I read it online (4)
- I read it in a book (5)
- Other: (6) _____



Q51 The American Academy of Pediatrics states that children under the age of two should **not** use any digital media or watch television. Some parents may adhere to this recommendation, and many parents do not. How often do you adhere to this recommendation?

- Never (1)
- Sometimes (2)
- About half the time (3)
- Most of the time (4)
- Always (5)

Skip To: Q54 If Q51 = Never
Skip To: Q52 If Q51 = Always
Skip To: Q53 If Q51 = About half the time
Skip To: Q53 If Q51 = Sometimes
Skip To: Q53 If Q51 = Most of the time

Q52 Can you please explain why you adhere to the recommendation:

Skip To: End of Block If Condition: Can you please explain why ... Is Not Empty. Skip To: End of Block.

Q53 Can you please explain why you partly adhere to the recommendation:

Skip To: End of Block If Condition: Can you please explain why ... Is Not Empty. Skip To: End of Block.

Q54 Can you please explain why you do not adhere to the recommendation:

Skip To: End of Block If Condition: Can you please explain why ... Is Not Empty. Skip To: End of Block.

End of Block: Block 5

APPENDIX B. INDIVIDUAL ITEMS OF THE PARENTAL MOTIVATIONS SCALE

(CINGEL & KCRMAR, 2013)

| | Strongly Disagree | Disagree | Somewhat Disagree | Neither Agree nor Disagree | Somewhat Agree | Agree | Strongly Agree |
|----------------------------------------------|----------------------|----------|----------------------|----------------------------------|-------------------|-------|-------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I let my child use media... | | | | | | | |
| ...for educational benefits. | | | | | | | |
| ...so they can learn something. | | | | | | | |
| ...because it is educational. | | | | | | | |
| ...as a reward for my child's good behavior. | | | | | | | |
| ...as a reward if they don't act up. | | | | | | | |
| ...only if they are well behaved. | | | | | | | |
| ...because they ask me for it. | | | | | | | |
| ...because they like it. | | | | | | | |
| ...so they can watch their favorite show. | | | | | | | |
| ...to help my child relax. | | | | | | | |
| ...as part of a daily routine. | | | | | | | |
| ...to give them some down time. | | | | | | | |
| ...so I can do chores around the house. | | | | | | | |
| ...to help alleviate my stress. | | | | | | | |
| ...to allow myself free time. | | | | | | | |

**APPENDIX C. INDIVIDUAL ITEMS OF THE SCREENING AND EXPLORATORY
QUESTIONS**

| | Strongly Disagree | Disagree | Somewhat Disagree | Neither Agree nor Disagree | Somewhat Agree | Agree | Strongly Agree |
|------------------------------------------------------------------------------|----------------------|----------|----------------------|----------------------------------|-------------------|-------|-------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I let my child use media... | | | | | | | |
|never (screening variable) | | | | | | | |
| ..so I can care for another child (added to chores construct) | | | | | | | |
| ..so I can do other things (added to chores construct) | | | | | | | |
| ..to get quick compliance from my child (new construct) | | | | | | | |
| ..to benefit their future skill set (added to educational benefit construct) | | | | | | | |
| ..to keep them quiet (new construct-not disturb others) | | | | | | | |
