

**The impact of infant-toddler screen time on self-regulation and behavior problems:
The role of parenting style and socio-economic status**

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Thesis Proposal

Abstract

As young children are growing up in a digitally enmeshed world, there is growing concern about the developmental impacts of screen time. Given the importance of early rapid brain development, understanding the developmental outcomes of screen time in early childhood is critical. Current research suggests that excessive screen time may lead to delays in physical, cognitive, and language development. However, the impact of screen time on socio-emotional development among young children (0-5 years) is not well understood. Given that social-emotional development is foundational to other domains of development, understanding the impact of screen time on young children's social-emotional outcomes is critical. Therefore, the present study considers the impact of screen time on social-emotional outcomes in 12- to 36-month-olds through parent report. Specifically, this study examines the relations among infant-toddler screen time, self-regulation abilities, and behavior problems. Additionally, it examines the intervening effects of parenting style and socio-economic status on screen time and each of the outcome variables.

Keywords: screen time, infant, toddler, social, emotional, parenting

CHAPTER ONE

Introduction

As young children are growing up in a digitally enmeshed environment, there is widespread concern about the effects of screen time (ST) on the developing brain (Detnakintra et al., 2020; Reid Chassiakos et al., 2016; Rideout, 2017, Straker et al., 2018). Early ST refers to the extent to which infants and toddlers (ages 0-5 years) engage in electronic screen media, including smartphones, tablets, video games, television, and computers. Infants and toddlers around the world engage in more ST per day than recommended by public health agencies (Madigan, Racine, & Tough, 2019). The first five years of life is a critical window for rapid brain development, which makes infant-toddler ST particularly risky (Christakis, 2008). Currently, there is negligible evidence of developmental benefit from ST during early years of life (Swartz, 2008). Given that real-world exploration and socially-contingent interactions are necessary for optimal development, the displacement of these activities during ST puts infants and toddlers at risk for adverse developmental outcomes (Reid Chassiakos et al., 2016; Schmidt et al., 2008).

Most research exploring the developmental effects of ST focuses on children and adolescents (ages 8-18 years) with an emphasis on physical, cognitive, and language outcomes (Cerniglia, Cimino, & Ammanti, 2021; Radesky & Christakis, 2016). However, work with young children (0-5 years) is quite limited at this time. Recent evidence suggests that infants and toddlers with excessive ST, particularly from low socio-economic status (SES) areas, are likely to experience social-emotional difficulties, such as mental health problems, emotion dysregulation, externalizing behaviors, and attention problems (Radesky et al., 2014). Given the fundamental impact of parental involvement on infant-toddler development, it is speculated that

parenting style may moderate the potentially negative social-emotional outcomes of early ST. Further research associated with ST during early childhood is necessary to determine both short- and long-term social-emotional effects and, moreover, to cultivate preventative measures to minimize the potential risk of ST on developmental outcomes.

The purpose of the present study is to investigate the impact of early ST on social-emotional development. Specifically, this study examines the relationship between infant-toddler ST and self-regulation and behavior problems. Additionally, it examines the moderating effects of parenting style and SES on ST and each of the outcome variables.

Early Screen Time Guidelines and Prevalence

The American Association of Pediatrics (AAP) and the World Health Organization (WHO) have established clear guidelines for ST for young children. For infants under 12 months of age, the AAP and WHO recommend avoiding all ST. For children ages 2-5 years, the WHO recommends less than 1 hour of ST per day, while the AAP recommends no more than 2 hours of ST per day. Yet, the majority of children worldwide exceed these recommendations and engage in excessive ST (Madigan et al., 2019). For example, in the United Kingdom, 75% of 12-month-olds exceed the guidelines of zero ST, and rates progressively increase to 2 hours per day by 30 months of age (Barber et al., 2017). In Korea, 48% of toddlers watch more than 1 hour every weekday, and 63% watch more than 1 hour per day on weekends (Chang et al., 2018). In Turkey, 75.6% of children ages 0- to 5-years engage in daily ST, while 25.7% of these children use multiple devices simultaneously (Kiliç et al., 2019). In France, 76% of children ages 5-40 months are exposed to touch screen devices daily (Cristia & Seidi, 2015). Globally, studies reveal extensive early exposure and excessive duration of ST for young children.

Reports from the AAP show that young children's use of ST in the United States (U.S.) is

ever-increasing. In 1970, children began watching television at approximately 4-years-old. Now, children begin engaging in ST (e.g., watching television, mobile devices, etc.) at approximately 4-months-old. In 2011, 52% of children ages 0- to 8-years had access to a mobile device. By 2013, this increased to 75% of 0- to 8-year-olds. In 2015, almost all (96.6%) of 0- to 4-year-olds had used electronic devices, while 75% owned their own device; most 2-year-olds used electronic devices daily, while most 1-year-olds (92.2%) accessed devices daily (Reid Chassiakos et al., 2018). Findings from Jacquier et al. (2020) on ST in the U.S. found that infants engage in approximately 1.11 hours per day. A nationally representative survey on ST in the U.S. found that 2-year-olds average 2.3 hours per day (Radesky et al., 2020). Similarly, Twenge and Campbell (2018) found that 2- to 5-year-olds average 2.28 hours per day. Meanwhile, Barr et al. (2020) found that most parents reported children ages 3- to 5-years engage in more than 5 hours per day. It is important to acknowledge that parents often report inaccurate responses for child ST (Barr et al., 2020). Nonetheless, it is generally thought that young children engage in more ST than recommended by AAP and WHO, which leads to concern regarding developmental outcomes.

Early Screen Time and Development

Early ST is associated with long-term developmental risks (Allen & Vella, 2015; Pagani et al., 2010). Behaviorally, early activities set the foundation for later lifestyle habits. Likewise, early ST habits set the foundation for subsequent ST-related behavioral outcomes (Pagani et al., 2010; Radesky et al., 2020). It is largely known that optimal infant-toddler development requires exploration of the natural world, play-based activities, and face-to-face interactions with caregivers (Myers, Keyser, & Cors, 2019; Radesky & Christakis, 2016). For instance, hands-on activities and quality interactions during early years are fundamental for developing

interpersonal relationships, self-regulation, sense of self, reaction to fear, and the ability to develop resilience (Topping et al., 2013). Excessive early ST displaces opportunities for these critical learning moments. Therefore, the early years (0-5) are a critical window for caregivers to implement developmentally appropriate ST practices to prevent the prospective adverse effects of excessive ST (Radesky et al., 2020). While research demonstrates strong relations between early ST and negative developmental impacts, it is imperative to understand why.

Displacement of play-time in the natural world due to ST has a cumulative impact on development over time (Schmidt et al., 2008). Research shows that ST overstimulates the nervous system, which affects overall brain functioning (Myers et al., 2019). Even “educational toys” provide sensory overload with a conglomeration of sounds, movement, colors, and lights all occurring simultaneously. An overabundance of sensory activity may seem fun for children, but it can interfere with genuine learning and growth (Neuman, M., & Neuman, D., 2013).

Research suggests that early ST negatively affects several domains of development, including physical, cognitive, and language development. Abundant research focuses on the impact of ST on physical health. For instance, excessive ST leads to increased sedentary behavior and decreased physical activity, resulting in higher risk of childhood obesity (Downing et al., 2015; Fang et al., 2019). ST also negatively affects posture, resulting in neck and back pain (Joergensen et al., 2021). In addition, prolonged exposure to ST results in eye discomfort and headaches, due to blue light exposure, less blinking, and adjusting to lighting changes (Jaiswal et al., 2019). Cognitively, studies show that early ST adversely impacts critical thinking skills, creative problem-solving skills, and executive functioning, as these are learned through human interaction, exploring the natural world, and play-based activities (Christakis, 2008; Myers et al., 2019; Radesky & Christakis, 2016). Regarding language development, early ST

may be especially harmful because the critical sensitive period for language learning is from 0-5 years (Christakis, 2008; Radesky & Christakis, 2016). Studies show that children do not learn language from electronic media (i.e., prerecorded videos) because language acquisition is dependent on socially contingent interactions (Kuhl et al., 2003; Roseberry, Hirsh-Pasek, & Golinkoff, 2014). Children most at risk for language delay are infants engaged in more than 1.2 hours of ST per day, as well as toddlers engaged in more than 2 hours of ST per day (Schmidt et al., 2009; Duch et al., 2013). Specifically, each additional hour of ST is associated with decreases in child vocalizations, duration of vocalizations, conversational turns, and adult word count (Schmidt et al., 2008).

While there is evidence of early ST hindering physical, cognitive, and language development, evidence on the impact of early ST on social-emotional development is limited. Nonetheless, there is a growing concern about potential short-and long-term detrimental effects of early ST on social-emotional development (e.g., the ability to self-regulate and behavioral problems).

Early Screen Time and Social-Emotional Development

Given that social-emotional development is foundational to other domains of development, understanding the impact of early ST is critical. Social and emotional processes are formed in the early years, which lay the foundation for subsequent behavioral outcomes (Funk, Curtiss, & McBroom, 2009). Infants and toddlers must learn emotional and behavioral regulation from interactions with caregivers, not from screen media, for optimal development (Song et al., 2018). Due to the displacement of quality social interaction, early ST may result in negative social-emotional outcomes, including self-regulation difficulties and behavior problems.

Displacement of Social Interaction

It is widely known that young children need social interaction for optimal development (Napier, 2014). ST results in displacement of social interactions, which are fundamental experiences during early childhood (Pagani et al., 2010). Lack of social activities in early childhood leads to emotional and behavioral problems in future years (Lin et al., 2020; Pagani et al., 2010). Therefore, displacement of quality activities and interaction during ST is of utmost concern for infants and toddlers.

Today, young children engage in considerable amounts of solitary ST without face-to-face human interaction (Napier, 2014). Meanwhile, children with increased social-emotional difficulties are more likely to be given mobile devices to calm down (Radesky et al., 2016). Since tablets and smartphones are small, portable, and easily control child behavior, they are often known as, “electronic babysitters” (Lin et al., 2020). The prevalent use of “electronic babysitters” limits opportunities for necessary play-based activities and quality social interaction (Napier, 2014). Behaviorally, providing infants and toddlers ST to help them relax and stop crying may be quick and effective in the short-term, especially for parents and caregivers (Ramam et al., 2017). However, this short-term solution may be detrimental to long-term social-emotional development. For instance, responding to a child’s cry with ST displaces opportunity for a soothing voice, facial expressions, and a gentle touch from caregivers to help with emotion regulation (Raman et al., 2017). Every time a child is given ST to control behavior is a missed opportunity for nurturing, co-regulating experiences with caregivers, which are necessary for learning internal self-regulation techniques (Radesky et al., 2016). Research shows that children at risk for social-emotional delay more frequently engaged in ST during daily routines, especially during playtime, breakfast, and bedtime (Raman et al., 2017). Overall, incorporating ST during daily routines displaces opportunities for quality interaction and interferes with the ability to

learn emotion regulation techniques and prosocial behaviors.

Social-Emotional Outcomes

A growing body of research demonstrates excessive ST for infants and toddlers is associated with negative social-emotional outcomes (Allen & Vella, 2015; Hinkley et al., 2020; Li et al., 2020; Skalická et al., 2015; Twenge & Campbell, 2018). The age at which excessive ST consistently predicts negative outcomes across the social-emotional developmental domain is 29 months (Pagani et al., 2010). Specifically, more than 1 hour of early ST per day is predictive of emotional and behavioral problems, while outcomes progressively worsen with each additional hour per day (Hinkley et al., 2020; Pagani et al., 2010; Twenge & Campbell, 2018). Studies show that early ST negatively impacts overall social-emotional and behavioral well-being.

Young children who engage in high levels of ST are more likely to experience emotional problems, behavioral problems, and social difficulties. Emotionally, children with greater ST demonstrate lower self-regulation, less emotional understanding, and less emotional stability (Li et al., 2020; Skalická et al., 2015; Twenge & Campbell, 2018). In addition, children with more ST are at higher risk for anxiety disorders and depression diagnoses later in life (Lin et al., 2020; Twenge & Campbell, 2018). Behaviorally, children with increased ST display less curiosity, more distraction, hyperactivity, inattention, aggression, and conduct problems, as well as an inability to finish tasks (Li et al., 2020; Twenge & Campbell, 2018). In social settings, children with increased ST display poor self-control (e.g., not remaining calm, excessive arguing, and being difficult to get along with), as well as problems at school (e.g., losing their temper, the inability to calm down when excited, and difficulty with transitioning between tasks) (Twenge & Campbell, 2018). Furthermore, children with increased ST are more likely to have peer

problems and difficulty making friends (e.g., peer rejection, being teased, being assaulted, and being insulted) (Pagani et al., 2010; Twenge & Campbell, 2018). Taken together, there is increasing research that demonstrates the negative effects of ST on social-emotional outcomes for young children.

Self-Regulation

ST is associated with self-regulation abilities in early childhood. Developing self-regulation skills in early childhood is especially important because it is highly interrelated with other domains of social-emotional competencies. In general, self-regulation refers to the ability to focus attention, regulate emotions, and control behaviors (Halle & Darling-Churchill, 2016; McClelland & Cameron, 2012). Recent studies show that greater exposure to ST can be detrimental to self-regulation, both short- and long-term (Cerniglia, Cimino, & Ammanti, 2021; Cliff et al., 2018; Inoue et al., 2016; Lawrence, Naragan, & Choe, 2020; Lillard & Boguszewski, 2015; Radesky et al., 2020).

Electronic devices are often used as emotion-regulation tools for young children by parents, which establishes the need for externally-based (as opposed to internally-based) regulation, which eventually leads to dysregulation and maladaptive development (Cerniglia, Cimino, & Ammanti, 2021). Given that parent-child interactions are crucial for the development of internal processes needed for managing self-regulation, research suggests that electronic devices are not effective in teaching young children (0-5 years) self-regulation skills (Lin et al., 2020; Radesky, Schumacher, & Zuckerman, 2015).

Essentially, ST and self-regulation are bidirectionally correlated through an ongoing cycle. Parents use ST to soothe and calm their children, which reduces nurturing parent-child interactions; this leads to more self-regulation problems, which in turn results in more ST

(Radesky et al., 2020). Furthermore, children with difficult temperaments and existing self-regulation problems are more likely to be given electronic devices to help soothe them, which puts them at risk for even worse self-regulation abilities later on (Radesky & Christakis, 2016). This ongoing cycle has the potential to result in long-term maladaptive coping mechanisms.

Longitudinal studies demonstrate the earlier a child is exposed to ST and the longer the duration of early ST the lower self-regulation abilities tend to be. Cliff et al. (2018) found that higher ST at age two years was associated with lower self-regulation at age four years, and lower self-regulation at age four years was associated with higher ST at age six years. Inoue et al. (2016) found that longer television viewing at age three years was significantly related to dysregulation at ages four and five years. Similarly, Cerniglia et al. (2021) found that ST at age four years was negatively associated with self-regulation at age eight years. However, Radesky et al. (2020) found that infants and toddlers with self-regulation problems engaged in significantly more ST. Specifically, infants with poor self-regulation at age nine months later engaged in significantly more ST per day at age two years, compared to infants who had high self-regulation abilities at age nine months. Additionally, those with higher self-regulation problems generally engaged in more than 2 hours of ST per day (Radesky et al., 2020). These studies indicate long-term negative effects of early ST on subsequent self-regulation, which is fundamental for emotional and behavioral development.

Behavior Problems

The AAP warns about the potential detrimental effects of ST on behavioral outcomes. Studies have found that ST is related to a wide variety of behavior problems, including aggression and hyperactivity.

Aggressive Behavior. Compelling evidence demonstrates a strong association between

ST and aggression (Guerrero et al., 2019; Li et al., 2020; Lin et al., 2020; Tomopoulus et al., 2007). A systematic review and meta-analysis found that young children with high amounts of ST are more likely to show aggressive behaviors (Li et al., 2020). Lin et al. (2020) and Neville et al. (2021) looked at the impact of touch screen devices, specifically, and found that 2-year-olds with higher use of touch screen devices show higher levels of aggression. This evidence further holds after controlling for confounding demographic variables (Lin et al., 2020). Interestingly, children from single-child families showed the highest levels of aggression in relation to touch screen device use (Lin et al., 2020). Another study found that noneducational media was related to aggression, while educational media was not related to aggression (Tomopulous et al., 2007). Evidently, the type of ST is associated with aggressive behaviors.

Additional research reported that ST with mature or violent content is particularly related to aggressive behaviors. Correlational studies show associations between violent media viewing and aggression in young children (Murray & Murray, 2008). Meanwhile, Guerrero et al. (2019) found that increased time playing mature-rated video games leads to increased aggression and rule-breaking. Researchers speculate that exposure to mature or violent media may distort young children's sense of self and understanding of the natural world, resulting in aggressive behaviors (Guerrero et al. 2019).

Hyperactive Behavior. Another behavior problem associated with ST in young children is hyperactivity. Studies show that early television viewing is related to increased hyperactive behaviors (Inoue et al., 2016; Levine & White, 2000). Children as young as 21 months demonstrate hyperactive behavior in relation to both educational and noneducational ST; longitudinal follow-up a year later demonstrated similar results (Tomopulous et al., 2007). Similarly, Allen and Villa (2015) found that increased ST was associated with hyperactivity in

children over 2 years of age; longitudinal follow-ups every two years consistently found that increased ST was related to hyperactivity in children up to 10-years-old. It is important to note that ST may seem particularly calming for hyperactive children, consequently resulting in parental encouragement of ST (Andersen & Pampek, 2015). However, the existing evidence suggests that ST is positively related to hyperactive behavior, both short- and long-term.

Early Screen Time and Parenting

Young children's ST is strongly influenced by parents (Radesky, Schumacher, & Zuckerman, 2015). Likewise, parents strongly impact children's social-emotional development. Research emphasizes the importance of parental influence in managing children's social-emotional outcomes related to ST (Halpin et al. 2021; Radesky & Christakis, 2016). Studies demonstrate that quality of parenting can modify the effects of ST on social-emotional outcomes, particularly through parenting style.

Parenting Style

According to Baumrind (1971), general types of parenting practices and behaviors are categorized into three parenting styles: authoritarian, permissive, and authoritative. Authoritarian parents focus on controlling and managing child behavior with a strict set of rules, no tolerance for disagreement, and often use punishment as disciplinary action. Conversely, permissive parents implement minimal to no restriction of child behavior and allow children autonomy over their choices and actions. Meanwhile, authoritative parents are warm, responsive, and supportive of children with an appropriate balance of affection and discipline (Baumrind, 1971; Estlein, 2016). Studies have shown that authoritarian and permissive parenting styles are both related to negative developmental outcomes, such as aggression, anxiety, self-regulation problems, and behavior problems. On the other hand, authoritative

parenting style is related to positive developmental outcomes, such as social-emotional competence (Kuppens & Ceulemans, 2018; Radesky & Christakis, 2016). Given the magnitude of developmental impact associated with parenting style, it is important to understand how parenting style impacts young children's ST.

Parenting Style and Child Screen Time

Although research is limited, recent studies show that parenting styles are associated with duration of child ST. In general, parents who enforce rules on managing ST are more likely to decrease child ST, while parents who implement few restrictions tend to have children who experience excessive ST (more than 2 hours per day) (Konok, Bunford, & Miklósi, 2019; Radesky et al., 2015). Detnakintra et al. (2020) examined longitudinal effects of parenting style and ST at 18 months with follow-up at ages two, three, and four years. They found that parenting style and ST are bi-directionally correlated. Nurturing authoritative parenting in early years was related to subsequent lower ST for children. Relaxed permissive parenting and strict authoritarian parenting during early years were related to subsequent higher ST for children (Detnakintra et al., 2020). Further research is necessary in order to decipher specific influences of each parenting style on children's ST.

Parenting Style and Social-Emotional Outcomes

Recent evidence suggests that parenting style is indicative of social-emotional outcomes related to ST. Halpin et al. (2021) found that strict authoritarian and relaxed permissive parenting styles were both associated with greater intensity and frequency of ST-related behavior difficulties. In addition, they found that authoritarian and permissive parenting styles were related to lower parental confidence in managing child behavior. It is speculated that high parental confidence in upholding child ST guidelines is related to nurturing authoritative

parenting style, which in turn, results in lower duration of ST and social-emotional difficulties associated with ST (Halpin et al., 2021). Nonetheless, more research is necessary for understanding how parenting style impacts ST-related developmental outcomes.

Parenting Style as a Moderator Variable. Research indicates that parenting style has the ability to modify the impact of ST on child behavior and development (Radesky et al., 2015). For instance, Linebarger et al. (2014) found that authoritative parenting style altered the developmental risks of ST exposure for high-risk children. Essentially, warm and responsive caregiving can happen along with high infant-toddler ST, and the developmental outcomes may still be positive. On the other hand, inconsistent parenting along with high infant-toddler ST results in negative developmental outcomes (Linebarger et al., 2014; Radesky & Christakis, 2016). Therefore, enhancing parenting style may be an effective strategy for reducing developmental risks associated with early exposure to ST (Radesky & Christakis, 2016; Xu et al, 2014).

Early Screen Time and Socio-Economic Status

SES has significant effects on early ST and child development. According to the United States Census Bureau (2020) and the Pew Research Center (2020), household income levels are categorized as low SES (< \$40,100), middle SES (\$40,100 - \$120,400), and high SES (> \$120,400). Research suggests that young children from low SES households disproportionately engage in more ST because it is a safe and affordable activity to keep children busy and entertained when other resources are not available (Carson & Kuzik, 2017; Radesky et al., 2014; Jordan, 2005). Meanwhile, young children from low SES families are already at greater risk for developing social-emotional difficulties, due to the chronic stressors of poverty (Radesky et al., 2016; Cooper, Masi, & Vick, 2009; Tomopolous et al., 2010). Specifically, children from low-

income households are more likely to experience both short-and long-term difficulties with self-regulation and externalizing behaviors, such as hyperactivity, peer problems, and conduct problems (Allen & Vella, 2015; Cooper et al., 2009; Radesky et al., 2020). Interestingly, Radesky et al. (2016) suggests that the strong correlations between social-emotional difficulties and low-SES are partially explained by the parents' increased use of ST to calm their children.

Since children from low-SES areas are already at high-risk for negative developmental outcomes, as well as increased levels of ST, they are particularly susceptible to social-emotional developmental risks associated with early ST exposure. Thus, there is a clear need to address this potential relation.

SES as a Moderator Variable

Research speculates that SES may modify the developmental impact of ST on social-emotional outcomes in young children. For instance, Allen and Villa (2015) found evidence of SES as a potential moderator of cross-sectional and longitudinal correlations between ST and well-being. Findings suggest that children from low-SES families are at greater risk for adverse developmental effects of excessive ST, including self-regulation and behavioral difficulties. On the other hand, children from middle- to high-SES families may have extra resources (i.e., increased social support) to help reduce the adverse effects of excessive ST (Allen & Vella, 2015). Fundamentally, SES may have a strong enough effect to alter social-emotional outcomes of early ST.

Present Study

As young children are growing up in a digitally enmeshed world, there is growing concern about the developmental impacts of early ST. Given the importance of early rapid brain development, understanding the developmental outcomes of ST in early childhood is critical. Current research suggests that excessive ST may lead to delays in physical, cognitive, and language development. However, ST research with young children (0-5 years) on socio-emotional outcomes is quite limited. Given that social-emotional development is foundational to other domains of development, understanding the impact of ST on young children's social-emotional outcomes is critical. Therefore, the present study considers the impact of ST on social-emotional outcomes in 12- to 36-month-olds through parent report. Specifically, this study examines the relations among infant-toddler ST, self-regulation abilities, and behavior problems. Additionally, it examines the intervening effects of parenting style and SES on ST and each of the outcome variables.

The following hypotheses will be addressed in the present study:

H1: ST is negatively related to a child's self-regulation abilities.

H2: ST is positively related to a child's behavior problems.

H3: ST is related to quality of parenting style.

H4: ST is negatively related to SES.

H5: Parenting style will moderate the relationship between ST and self-regulation abilities.

H6: Parenting style will moderate the relationship between ST and behavior problems.

H7: SES will moderate the relationship between ST and self-regulation.

H8: SES will moderate the relationship between ST and behavior problems (See Figure 1).

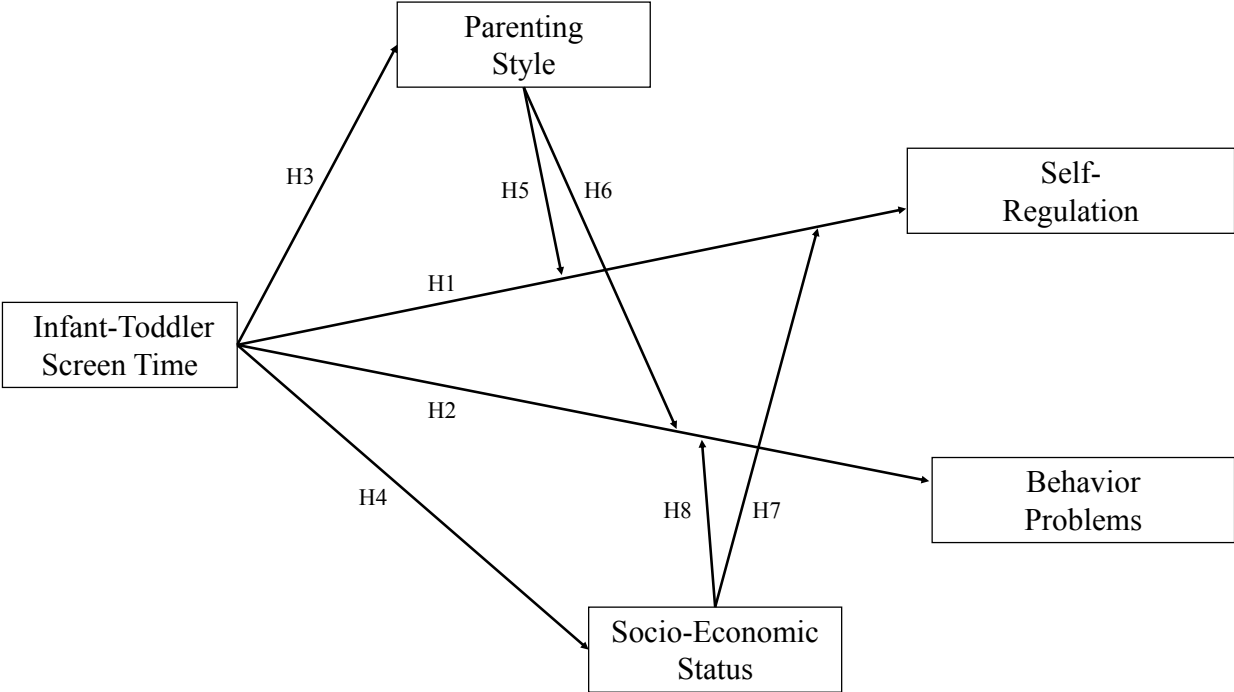


Figure 1. Proposed model and illustration of hypotheses.

CHAPTER TWO

Method

Participants

All participants will be at least 18-years-old and must be a parent or caregiver of a young child (infant-toddler) between ages 12 to 36 months (1-3 years). Participants will be recruited from a university campus through professional networking amongst students, faculty, and colleagues. Flyers will be distributed (via email) to faculty members and campus childcare professionals to share with potential recruits. Additional recruitment of participants will be completed through virtual snowball sampling techniques, such as social media platforms. A Gpower analysis determined that 88 participants are needed for statistical power for the proposed model (Faul & Erfelder, 1992).

Materials

The present study will consist of an online survey that will include informed consent, a demographics questionnaire, and a series of survey items to measure each variable.

Demographics Questionnaire

Demographic items will include questions regarding age, biological sex, gender, ethnic background, marital status, education level, occupation, total number of persons living in the household, and total household income (Refer to Appendix A).

Screen Time Questionnaire

The ST Questionnaire consists of four items regarding amount of daily ST, type of content, and level of parent-child interaction during ST. Amount of ST will be determined by an item adapted from Inoue et al. (2016) and Twenge and Campbell (2018). The item asks, “On an average day, about how much time does your child spend in front of an electronic screen media

device, such as a smartphone, tablet, computer, video game, and television?” Responses include: 1 = “none”, 2 = “less than 1 hour per day”, 3 = “1 - 2 hours per day”, 4 = “2 - 3 hours per day”, 5 = “3 - 4 hours per day”, 6 = “4 - 5 hours per day”, and 7 = “5 hours or more per day”. Please refer to Appendix B for full survey items.

Infant-Toddler Social and Emotional Assessment (ITSEA)

The ITSEA is a parent-report measure of social-behavioral problems and competencies for young children ages 12-36 months (Carter & Briggs-Gowen, 2005). The ITSEA examines four primary domains (Dysregulation, Externalizing, Internalizing, and Competence) with 17 subscales and a total of 166 items. Only items from the Dysregulation and Externalizing Domains will be employed in this study. As a result, 57 items from the ITSEA will be utilized; 34 for Dysregulation and 23 for Externalizing.

Self-regulation abilities will be assessed by the Dysregulation Domain of the ITSEA, which reflects the extent to which a child manages intense emotional responses (Carter & Briggs-Gowen, 2005). The Dysregulation Domain contains four subscales: negative emotionality (13 items), sensory sensitivity (7 items), eating (9 items), and sleep (5 items). A sample item from the Dysregulation Domain is, “Hard to soothe when upset.”

Behavior problems will be assessed by the Externalizing Domain of the ITSEA, which reflects the extent to which a child acts out in the external world. The Externalizing Domain contains three subscales: activity/impulsivity (6 items), aggression/defiance (11 items), and peer aggression (6 items). A sample item from the Externalizing Domain is, “Hits, shoves, kicks, or bites children, not including siblings.” Participants will rate ITSEA items on a 3-point Likert scale where 0 = “not true”, 1 = “somewhat true/sometimes”, and 2 = “very true/always”. Please refer to Appendix C for full survey items.

Child self-regulation scores will be calculated by the sum of scores of all items within the Dysregulation Domain. Only one item (“accepts new foods right away”) will be reverse-scored. Higher scores of the Dysregulation Domain will indicate lower self-regulation abilities, while lower scores will indicate higher self-regulation abilities. Likewise, child behavior problem scores will be calculated by the sum of scores of all items within the Externalizing Domain. Higher scores of the Externalizing Domain will indicate higher behavior problems, while lower scores will indicate lower behavior problems. Before conducting analyses, scores will be converted to *t*-scores, as recommended by the ITSEA Examiner’s Manual (Carter & Briggs-Gowen, 2006).

Psychometric analyses of the ITSEA from a standardized sample ($N = 600$) demonstrates adequate to excellent reliability and validity among domains and subscales (Carter & Briggs-Gowan, 2005). Cronbach’s alpha coefficients yielded acceptable to high internal consistency for the overall measure ($.85 \leq a \leq .90$), the Dysregulation Domain ($.62 \leq a \leq .83$), and the Externalizing Domain ($.66 \leq a \leq .79$). Pearson’s correlations yielded high to very high test-retest reliability for the overall measure ($.76 \leq r \leq .91$), the Dysregulation Domain ($.81 \leq r \leq .92$), and the Externalizing Domain ($.81 \leq r \leq .90$). Validity evidence for the internal structure was calculated using confirmatory factor analysis, as well as domain and subscale intercorrelations. The confirmatory factor analysis demonstrated support for theoretically related items. Intercorrelations between domains and subscales showed moderate to strong relations for the Dysregulation Domain and subscales ($.32 \leq r \leq .47$) and the Externalizing Domain and subscales ($.50 \leq r \leq .69$) (Carter & Briggs-Gowan, 2005).

Parenting Practices Questionnaire (PPQ)

Parenting style will be assessed by the PPQ, a parent-report measure based on

Baumrind's conception of authoritative, authoritarian, and permissive parenting styles (Robinson et al., 1995). The PPQ consists of three dimensions with 62 items total; 27 for Authoritative, 20 for Authoritarian, and 15 for Permissive. Authoritative items tap four aspects of this parenting style: warmth and involvement (11 items), reasoning/induction (7 items), democratic participation (5 items), and good natured/easy going (4 items). An Authoritative sample item is, "I give comfort and understanding when my child is upset." Similarly, the Authoritarian items measure four aspects of this parenting style: verbal hostility (4 items), corporal punishment (6 items), nonreasoning, punitive strategies (6 items), and directiveness (4 items). An Authoritarian sample item is "I spank when my child is disobedient." Lastly, the Permissive items evaluate three aspects of the parenting style: lack of follow through (6 items), ignoring misbehavior (4 items), and self-confidence (5 items). A Permissive sample item is, "I find it difficult to discipline my child."

Participants will rate PPQ items on a 5-point Likert Scale where 1 = "never", 2 = "once in a while", 3 = "about half of the time", 4 = "very often", and 5 = "always". Please refer to Appendix D for full survey items. Parenting style will be calculated by adding up scores of items for each category and dividing by the total number of items within that category. The highest score will indicate the predominant parenting style (i.e., authoritative, authoritarian, or permissive).

Psychometric analyses of the PPQ from a standardized sample ($N = 1251$) demonstrated good to excellent internal consistency reliabilities with the following Cronbach's alpha coefficients: Authoritative ($\alpha = .91$); Authoritarian ($\alpha = .86$); Permissive ($\alpha = .75$). Validity evidence for dimensions and internal structures were calculated using principle axes factor analysis and oblimin rotation, with Authoritative items accounting for 47.4% of variance,

Authoritarian items accounting for 46.8% of variance, and Permissive items accounting for 40.3% of variance. These results demonstrate support for theoretically related items, suggesting that dimensions and subsets of items are consistent with Baumrind's three parenting styles. In addition, subsets (of items) for each dimension are shown to be predictive of distinctive developmental outcomes (Robinson, Mandleco, Olsen, & Hart, 1995).

Procedure

The proposed study will collect data from a convenience sample. Participants will be asked to complete a survey on an external web-link through an online database (Qualtrics). Once directed to Qualtrics, participants will be asked to complete an informed consent form, a basic demographics questionnaire, and the measures described above.

Proposed Analysis

Once surveys are collected, data will be cleaned, assumptions and outliers will be assessed, and missing data will be examined. In order to address H1- H4, Pearson correlations and Biserial correlations will be calculated. In order to test the moderation effects for H5-H8, a moderated multiple regression and path analysis will be conducted in Statistical Package for the Social Sciences (SPSS) version 26.

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Appendix A: Demographics Questionnaire

Please fill out the following basic demographic information:

1. Your age: _____ years
2. Your infant/toddler's age: _____ months
3. What was your biological sex assigned at birth?
 - Male
 - Female
 - Intersex
 - Prefer not to answer
4. What is your gender identity?
 - Woman
 - Man
 - Non-binary
 - Prefer not to answer
 - Prefer to self-describe: _____
5. What was your infant/toddler's biological sex assigned at birth?
 - Female
 - Male
 - Intersex
 - Prefer not to answer
6. What is your ethnic background? (Check all that apply)
 - Asian - Eastern
 - Asian - Indian

- Black/African American
- Hispanic/Latino
- Middle Eastern
- Native American
- White /Caucasian
- Mixed race
- Other _____

7. What is your current marital status?

- Single
- Live with partner
- Separated
- Married
- Divorced
- Widower

8. Please indicate your highest level of education completed:

- Less than high school
- High school diploma
- Some college
- Associates or vocational degree
- Bachelor's Degree
- Some graduate school
- Graduate or professional degree

9. What is your current occupation? _____

10. Please indicate the total number of persons living in your household: _____

11. Please indicate your **total family household income** (previous year) before taxes.

- Less than \$30,000
- \$30,000 - \$49,999
- \$50,000 - \$74,999
- \$75,000 - \$99,999
- \$100,000 - \$149,999
- \$150,000 - \$200,000
- More than \$200,000

Appendix B: Screen Time Questionnaire
(adapted from Inoue et al., 2016 and Twenge & Campbell, 2018)

Please answer the following questions to the best of your ability:

1. On an average day, about how much time does your infant/toddler spend in front of a screen media device, such as a smartphone, tablet, computer, video game, and/or television?
 - none
 - less than 1 hour per day
 - 1-2 hours per day
 - 2-3 hours per day
 - 3-4 hours per day
 - 4-5 hours per day
 - 5 hours or more per day

2. On an average day, what type(s) of screen media content does your child engage in?
(Check all that apply)
 - Watching videos
 - Reading
 - Listening to music
 - Playing games
 - Browsing internet
 - FaceTime/Video-chatting
 - Social media
 - Making art or music
 - None

3. How often do you co-view screen media with your child?
 - None of the time
 - Some of the time
 - All of the time

4. In what ways do you interact with your child during screen time? (Check all that apply)
 - No interaction
 - Physical contact (e.g. sitting on lap)
 - Discussion of content
 - Observe child interacting with the screen

Appendix C: Infant-Toddler Social and Emotional Assessment (ITSEA):
Externalizing Domain and Dysregulation Domain
(Briggs-Gowan & Carter, 1998)

Instructions: Many statements describe normal feelings and behaviors, but some describe feelings and behaviors that may be problems. Please do your best to respond to every item.

Please choose ONE response that best describes your child's behavior in the LAST MONTH.

Please rate each item based on the following scale:

Not True/ Rarely	Somewhat True/ Sometimes	Very True/ Often
0	1	2

Externalizing Domain (23 items)

Activity/Impulsivity Subscale (6 items)

1. Gets hurt so often that you can't take your eyes off him or her.	0	1	2
2. Restless and can't sit still.	0	1	2
3. Gets very wound up or silly when playing.	0	1	2
4. Constantly moving.	0	1	2
5. Is very loud, shouts, or screams a lot.	0	1	2
6. Goes from toy to toy faster than other children his or her age.	0	1	2

Aggression/Defiance Subscale (11 items)

7. Is destructive, breaks, or ruins things on purpose.	0	1	2
8. Hits, bites, or kicks me (or other parent).	0	1	2
9. Acts aggressive when frustrated.	0	1	2
10. Acts bossy.	0	1	2
11. Misbehaves to get attention from adults.	0	1	2
12. Is disobedient or defiant (for example, refuses to do as I ask).	0	1	2

13. Is sneaky / hides misbehaviors.	0	1	2
14. Is stubborn.	0	1	2
15. Has temper tantrums.	0	1	2
16. Swears.	0	1	2
17. Hurts animals on purpose.	0	1	2

Peer Aggression (6 items)

18. Hits, shoves, kicks or bites children (not including siblings).	0	1	2
19. Tests other children to see if they will get angry.	0	1	2
20. Picks on or bullies other children.	0	1	2
21. Teases other children.	0	1	2
22. Won't let other children play with his or her group.	0	1	2
23. Hurts other children on purpose.	0	1	2

*Dysregulation Domain (34 items)**Eating Subscale (9 items)*

24. Gags or chokes on food.	0	1	2
25. Refuses to eat.	0	1	2
26. Refuses to eat foods that require chewing.	0	1	2
27. Spits out food.	0	1	2
28. Accepts new foods right away.	0	1	2
29. Good eater.	0	1	2
30. Picky eater.	0	1	2
31. Refuses to eat certain foods for 2 days or more.	0	1	2
32. Holds food in cheeks.	0	1	2

Negative Emotionality Subscale (13 items)

33. Cries or has tantrums until he or she is exhausted.	0	1	2
34. Has trouble adjusting to changes.	0	1	2
35. Often gets very upset.	0	1	2
36. Cries if he or she doesn't get own way.	0	1	2
37. Hard to soothe when upset.	0	1	2
38. Wakes up grouchy or in a bad mood.	0	1	2
39. Has trouble calming down when upset.	0	1	2
40. Impatient or easily frustrated.	0	1	2
41. Is able to wait for things he or she wants.	0	1	2
42. Cries a lot.	0	1	2
43. Irritable or grouchy.	0	1	2
44. Is whiny or fussy when he or she is not tired.	0	1	2
45. Gets angry or pouts.	0	1	2

Sensory Sensitivity Subscale (7 items)

46. Won't touch some objects because of how they feel.	0	1	2
47. Bothered by loud noises or bright lights.	0	1	2
48. Dislikes some foods because of how they feel.	0	1	2
49. Bothered by certain odors (smells).	0	1	2
50. Bothered by how some things feel on his or her skin (for example, clothing seems, certain fabrics, etc.)	0	1	2
51. Easily startled.	0	1	2
52. Bothered by being in motion (for example, swinging,			

spinning, being tossed in the air, or bouncing).	0	1	2
<i>Sleep Subscale (5 items)</i>			
53. Wakes up at night and needs help to fall asleep again.	0	1	2
54. Has trouble falling asleep or staying asleep.	0	1	2
55. Sleeps through the night.	0	1	2
56. Must be held to go to sleep.	0	1	2
57. Wants to sleep in someone else's room or bed.	0	1	2

(*Note.* All 57 items will be randomized for the participant online survey)

Appendix D: Parenting Practices Questionnaire
(Robinson et al., 1995)

Instructions: Rate how often you exhibit this behavior with your child. Please do your best to respond to every item. Please choose ONE response for each item based on the following scale:

Never	Once in a While	About Half of the Time	Very Often	Always
1	2	3	4	5

Authoritative Dimension (27 items)

Warmth and Involvement (11 items)

1. I encourage my child to talk about the child's troubles. _____
2. I know the names of my child's friends. _____
3. I give praise when my child is good. _____
4. I show sympathy when my child is hurt or frustrated. _____
5. I give comfort and understanding when my child is upset. _____
6. I am responsive to my child's feelings or needs. _____
7. I tell my child that I appreciate what the child tries or accomplishes. _____
8. I am aware of problems or concerns about my child in school. _____
9. I express affection by hugging, kissing, and holding my child. _____
10. I apologize to my child when making a mistake in parenting. _____
11. I have warm and intimate times together with my child. _____

Reasoning/Induction (7 items)

12. I tell my child expectations of behavior before the child engages in an activity. _____
13. I give my child reasons why rules should be obeyed. _____

14. I help my child to understand the impact of behavior by encouraging my child to talk about the consequences of the child's own actions. _____
15. I talk it over and reason with my child when the child misbehaves. _____
16. I explain to my child how I feel about the child's good and bad behavior. _____
17. I explain the consequences of my child's behavior. _____
18. I emphasize the reasons for rules. _____

Democratic Participation (5 items)

19. I allow my child to give input into family rules. _____
20. I take my child's desires into account before asking the child to do something. _____
21. I encourage my child to freely express himself/herself even when disagreeing with parents. _____
22. I take into account my child's preferences in making plans for the family. _____
23. I channel my child's misbehavior into a more acceptable activity. _____

Good Nature/ Easy Going (4 items)

24. I joke and play with my child. _____
25. I am easy going and relaxed with my child. _____
26. I show patience with my child. _____
27. I show respect for my child's opinions by encouraging my child to express them. _____

Authoritarian Dimension (20 items)

Verbal Hostility (4 items)

28. I yell or shout when my child misbehaves. _____
29. I argue with my child. _____
30. I explode in anger towards my child. _____

31. I disagree with my child. _____

Corporal Punishment (6 items)

32. I guide my child by punishment more than by reason. _____

33. I spank when my child is disobedient. _____

34. I grab my child when the child is being disobedient. _____

35. I use physical punishment as a way of disciplining my child. _____

36. I slap my child when the child misbehaves. _____

37. I shove my child when the child is disobedient. _____

Non-Reasoning, Punitive Strategies (6 items)

38. I punish by taking privileges away from our child with little explanation. _____

39. I appear to be more concerned with my own feelings than my child's feelings. _____

40. I punish by putting my child off somewhere alone with little if any explanations. _____

41. When two children are fighting, I discipline children first and ask questions later. _____

42. I use threats as punishment with little or no justification. _____

43. When my child asks why he/she has to conform, I state: because I said so, or I am your parent, and I want you to. _____

Directiveness (4 items)

44. I scold and criticize to make my child improve. _____

45. I tell my child what to do. _____

46. I scold or criticize when my child's behavior doesn't meet my expectations. _____

47. I demand that my child does things. _____

Permissive Dimension (15 items)

Lack of Follow Through (6 items)

48. I spoil my child. _____
49. I state punishments to my child and do not actually do them. _____
50. I threaten my child with punishment more often than actually giving it. _____
51. I carry out discipline after my child misbehaves. _____
52. I give into my child when the child causes a commotion about something. _____
53. I bribe my child with rewards to bring about compliance. _____

Ignoring Misbehavior (4 items)

54. I withhold scolding and/or criticism when my child acts contrary to my wishes. _____
55. I allow my child to annoy someone else. _____
56. I ignore my child's misbehavior. _____
57. I allow my child to interrupt others. _____

Self Confidence (5 items)

58. I find it difficult to discipline my child. _____
59. I appear confident about parenting abilities. _____
60. I am afraid that disciplining my child for misbehavior will cause the child to not like his/her parents. _____
61. I set strict well-established rules for my child. _____
62. I appear unsure about how to solve my child's misbehavior. _____

(Note. All 62 items will be randomized for the participant online survey)