The Association Between Screen Time in Infancy and Developmental Delays in Childhood

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Researching the effects of screen time on children between the ages of 1 and 4 can benefit both parents and children. Babies who were exposed to the highest levels of screen time were children of young parents, first-time mothers, low-income and household education levels, or mothers suffering from postpartum depression (Richtel, 2023). Further, parents who struggle with young kids may use screens as a distraction to get things done. Many parents may be unaware of the negative developmental effects associated with high levels of screen time, which can lead to developmental delays across numerous domains. However, not all parents have the privilege to interact face-to-face with their baby consistently. This research will help parents understand how screen time can affect their child's future development and find new ways of interacting with and entertaining a baby, that does not involve screen time.

This research aims to teach parents how screen time can affect their child's development and provide new ideas for engaging with a child that does not involve screen time. Children's development can be measured across multiple domains. Takahashi et al. (2023) studied the dose-response association between screen time exposure at one year of age and five domains of developmental delays at ages two and four. These five domains included communication, gross motor, fine motor, problem-solving, and personal and social skills. Screen time data at age one were collected via a questionnaire and developmental delays at ages two and four were measured using the Ages & Stages Questionnaire, Third Edition (ASQ-3). Takahashi et al. (2023) found that greater screen time was associated with developmental delays across all domains. This evidence supports the idea that high screen time scores will lead to developmental delays. The findings by Takahashi et al. further suggest that children exposed to an average of four hours of screen time or more per day experienced developmental delays in communication and

problem-solving skills at ages 2 and 4 years. McArthur et al. (2022) found corresponding results when they examined the association between hours of screen time and children's developmental and behavioral outcomes. Screen time exposure was measured using one item from the Nutrition Screening Tool for Every Preschooler (NutriSTEP), and child behavior outcomes were measured using the National Longitudinal Survey of Children and Youth behavioral scales in which four domains were assessed: physical aggression, emotional disorder/anxiety, and separation anxiety. McArther et al. found that children who were exposed to screens for two hours or more a day experienced increased behavioral problems, delayed achievement of milestones, and poorer vocabulary development. This evidence further supports the idea that high amounts of screen time are associated with developmental delays, specifically in communication. Supanitayanon et al. (2020) examined the association between the age of onset of media exposure, the cumulative effect of high media exposure, and verbal interaction during screen time in the first 2 years of life to determine its impact on 4-year-old cognition. Cognition data were measured via the early learning composite (ECL) at ages 2, 3, and 4 years, while positive parenting was measured using a questionnaire. Supanitayanon et al. (2020) found that introducing screens and verbal interaction during screen time during the first two years of life was associated with better cognitive development. This evidence somewhat contradicts previous research stating that early exposure to screens will harm cognitive development. The findings by Supanitayanon et al. (2020) show that including verbal interaction during screen time can be beneficial to language development and positive cognitive development. Barragan‐Jason et al. (2021) examined the association between screen time exposure, delayed gratification, and social integration by exposing students between the ages of 4 and 6 to screen time for different amounts of time to measure patience and

social interaction. Screen time and sociodemographics were measured via a questionnaire before children performed two tasks in which delayed gratification was measured by asking the child two questions. Barragan‐Jason et al. (2021) found that children with higher screen exposure had worse social integration in school and were less likely to show patience. This research supports the findings of previous studies, which state that screen time will negatively affect communication skills, but relies on a different age group.

Not only can screen time have an effect on behavior, but also on the inhibitory control network (ICN). Chen et al. (2023) studied the association between screen exposure and children's ICN. The behavioral inhibition system corresponds to motivation to avoid aversive outcomes and the behavioral activation system corresponds to motivation to gain rewards. Screen time data were measured via a self-report questionnaire about screen utilization and activities time was measured using a parent-reported Sports and Activities Involvement Questionnaire. Chen et al. (2023) found that longer periods of screen time are negatively associated with the strength of the frontostriatal circuitry, which involves motor and cognitive functions, leading to prolonged development of the ICN. This evidence further supports the idea that high screen time levels will lead to developmental delays, but also suggests high screen time can lead to protracted development of the ICN. Keşşafoğlu et al. (2024) examined the relationship between watching fantastical content and the development of executive function (EF) skills. Children were shown either a clip of a fantastical or non-fantastical show. The following test included four tasks: the Backward Word Span task (measures working memory), the Simon Says task (measures inhibitory control), the Flexible Item Selection task (measures cognitive flexibility), and the Children’s 2-D Mental Transformation task (measures mental rotation skills). Keşşafoğlu et al.

(2024) found that children who watched the fantastical cartoon performed worse on working memory and inhibitory control tasks than children who watched the non-fantastical show. This evidence further supports previous research which states that screen use will prevent the development of the ICN.

Güneş et al. (2023) examined the pre-, peri-, and postnatal factors, and screen time in patients with Autism Spectrum Disorder (ASD) to evaluate risk factors specifically for people with ASD. A sociodemographic data form was used to measure parental factors, prenatal factors, perinatal factors, postnatal factors, and daily total screen time. Güneş et al. (2023) found that prenatal maternal psychological stress, prenatal and postpartum depression, and excess screen exposure may be related to an increased risk for ASD. This evidence brings in new research that adds to the negative effects of screen time on babies, with numerous other factors influencing it.

By engaging with this research, parents can understand how screens will affect their little ones cognitively and socially. The most important aspect, especially for busy parents, is to find balance and be in control as much as possible. Screen time is not inherently going to negatively affect a child as long as there is a limit. Although screen time scores were highest among a specific demographic of parents (Richtel, 2023), finding ways to control what, when, where, and how much screen time their child receives will leave lasting benefits. It is important to remember that face-to-face interactions are a privilege that not all parents have, and keeping children away from screens can require a lot of patience, energy, and willpower. One suggestion is to ask whoever can help before relying on screens. Although not everyone has the privilege of living near family or friends, asking a family member or trusted friend to interact with your child to distract them will give an exhausted parent a much-needed break and allow for communication

between the baby and multiple caregivers. Face-to-face interaction during the first two years of life is crucial in forming the foundation for language and communication skills. Another way to avoid high screen time levels during infancy is to learn rhymes, songs, and dances that distract a baby. Although reciting a story or song to a baby face-to-face would be most beneficial, if a parent needs a distraction for their child performing a dance or song multitasking, such as dancing in front of a baby while mopping the floor, can provide a middle ground that allows for parents to be productive without risking their child's developmental health.

Research on screen time and developmental delays can apply to multiple domains but focuses on cognitive development and executive functioning skills. Piaget discussed the six substages of sensorimotor development in which infants learn about the world through their senses and motor abilities, which provide a foundation for cognitive development. Once a child is two years old and has entered Piaget's preoperational stage of development, pretend play and symbols represent words, images, and ideas. These are two crucial stages for infants forming language, communication, and other executive functioning skills which is why screen time can negatively affect future cognitive development. Face-to-face interactions between caregivers and their infants are important in forming these connections.

This project has shaped my understanding of early cognitive development by applying Piagetian concepts to an increasing statistic of early childhood screen use. With screens becoming more prevalent, young children are accessing technology at earlier stages and parents are using screens as a distraction for their children. I learned about the connection between face-to-face interactions, communication, and language skills, and how screens can interrupt said connections. I was unaware of the periods of screen time and their effects on infants and learned

that there are long-lasting cognitive effects from high exposure to screens during this sensitive period. Although this knowledge does not directly affect me right now, it has helped shape my understanding of early cognitive development and will be helpful when I am ready to have a family in the future.

AI Disclaimer: I did not utilize AI to produce this paper.

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