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# Screen Time and the Effects on Development for Children Ages Birth to Five Years

Jessica M. Dauw

*Saint Cloud State University*, [jmill416@gmail.com](mailto:jmill416@gmail.com)

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**Screen Time and the Effects on Development for Children Ages Birth to 5 Years**

by

Jessica Dauw

A Starred Paper

Submitted to the Graduate Faculty of

Saint Cloud State University

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Starred Paper Committee  
Jane Minnema, Chairperson  
Marc Markell  
Karin Ihnen

### **Dedication**

This paper is dedicated to many people, as I am extremely grateful and blessed to have an army of support! First, I would like to dedicate this paper to my husband, Tim, for always providing me with support and patience throughout the process of fulfilling my Master's Degree. Secondly, I would like to dedicate this paper to all of the young children who have made an impact in my life. My step-children, Ethan and Emily, my niece and nephew, Leighton and Harrison, and all of the young children who influence my work daily and make me want to be a better educator. I would also like to dedicate this paper to my best friend, Becky, who has helped me become a more confident teacher by providing a perfect example of what it is like to raise a child with a disability. I could not have imagined going through this process without her.

I would like to sincerely thank my committee members for serving on my committee and assisting in the completion of my project. I would especially like to thank my advisor, Dr. Jane Minnema, for her continuous reassurance, encouragement, and constructive feedback. Her advice was essential in helping me reach my goal.

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## Chapter 1: Introduction

### Overview

Television and screen time media has become a common and popular past time for many families. Screen time is defined throughout the literature as media accessed through television, cell phones, DVDs, computers, and video games. Although television continues to be the most commonly used form of media, cell phones and tablets are quickly becoming a close second in overall usage (Barr & Lerner, 2014).

In 1999, the American Academy of Pediatrics (AAP) issued a recommendation that children under the age of 2 watch no television, and for children between the ages of 2 and 3, television viewing be limited (Barr, Lauricella, Zack, & Calvert, 2010). The AAP also recommended that parents limit the amount of time children spend watching television to 1 to 2 hours of quality programs per day (Barr et al., 2010). In one study, Courage and Howe (2010) found that only 32% of parents with children younger than age two complied with the AAP guidelines. Parents were encouraged to spend more quality time engaging in interactive activities with their children, such as talking, playing, singing, and reading to enhance and promote cognitive, language, and social development.

The AAP did specify some early childhood activities that can promote young children's typical development in a general sense. More specifically, developmental milestones can be associated with all age spans between birth and adolescence. A comprehensive list of milestones for 2 and 3-year-old children are described in detail in the following paragraphs. A complete list of developmental milestones for children birth through 5 years of age can be found in Appendix C.

For instance, according to the Hawaii Early Learning Profile developmental charts, by the age of 2, children who are typically developing display cognitive skills such as identifying three body parts, understanding personal pronouns and actions/verbs, point to at least seven pictures of familiar objects/people, assemble simple puzzles, sort objects, and match objects to a picture. In regard to language skills, typically developing 2-year-olds have an expressive vocabulary of 50 words, use two-word phrases, use nouns, verbs, and modifiers, and tell about experiences using jargon and words. A child who is 2 years old with typically developing social skills imitates doing housework and other real-life activities and engages in symbolic play with similar but not real props. Children will also engage in parallel play with peers, interact with peers by using gestures, and show a wide variety of emotions such as fear, anger, sympathy, and joy.

Cognitive skills that a typically developing 3-year-old child displays, according to the Hawaii Early Learning Profile developmental charts, include skills such as matching similar pictures of objects, sorting shapes of circle, square, and triangle, completing 3- and 4-piece puzzles, stacking rings on a ring stacker in the correct order, and pointing to the larger or smaller of two objects. Children also understand the concept of two, point to six body parts on a picture of a doll, sort colors, and point to several colors when named. Typical language skills for a 3-year-old include understanding all common verbs and adjectives, understanding some prepositions, using basic grammatical structures, reciting a few nursery rhymes from memory, and relating experiences using short sentences, typically three to four words per utterance. Children are also asking questions that begin with “what,” “where,” or “when,” have an expressive vocabulary that ranges from 300 to 1,000 words and are intelligible to listeners 80% of the time. Typically developing 3-year-olds have social skills such as separating easily from

parents/caregivers in familiar surroundings, showing independence in daily tasks, and obeying and respecting simple rules. Children with typically developing social skills at the age of 3 also participate in interactive games and engage in dramatic play using a doll.

### **Importance and Purpose of Study**

Going into this Starred Paper project, I believed that the opportunity to acquire or maintain such developmental skills can be significantly reduced when children spend a large amount of time daily viewing screen media or viewing media that is considered inappropriate for their age. Given the AAP's recommendation to restrict young children's screen time, it is important to understand the science that supports this assertion. "Ninety percent of brain development happens by the age of 5. The brain actually triples in size, or mass, in the first 12 months of life as many new neural connections develop" (Sousa, 2015, p. 25). Sousa reported that a newborn's brain is only one-third the size of an adult brain but has twice as many brain cells. There are 200 billion brain cells in a new infant's brain and there are 10,000 new connections created every second in infancy (Sousa, 2015). Just as extended time watching television or videos and engaging in electronic media can impact brain development, current research is also showing that language, cognitive, and social skills can be impacted by repeated exposure (Sousa, 2015).

In addition, as a secondary importance of my review of literature, it is necessary to provide educators and parents with current and accurate information regarding the relationship between the amount and the type of screen time and the effects on child development. Disseminating accurate information is especially critical since there seem to be multiple misunderstandings in the community-at-large as to whether screen time can be beneficial or

detrimental for young children's overall development. Thus, the purpose of this study was to determine whether screen time negatively or positively impacts young children's development. As an Early Childhood Special Education teacher, I work with families who have children between the ages of birth through 5 and who are going through an initial special education evaluation. The special education evaluation was initiated because of possible developmental delays that were identified through a developmental screening or because of a diagnosed medical condition that has a high probability of resulting in a developmental delay. Special education evaluations and observations for children under the age of 3 are conducted in the home environment. I have encountered many situations where children are less likely to engage in the evaluation process when the television set is turned on or their parents' cell phones and/or tablets are within sight. Often times, the child will become distraught or frustrated when the television set is turned off or the cell phone or tablet is taken away. Additional time is then required to help the child regulate their emotions and prepare to engage in the evaluation materials. Many of the parents I work with are not aware of the effects on their child's development from spending extended amounts of time engaged in screen media activities or viewing content that is not intended for their age. Therefore, it is critically important that I am aware of the current research in order to share up to date information with families.

### **Statement of the Project Problem**

Children are spending more time than ever before engaged in television viewing and screen time activities. The literature has demonstrated that children between the ages of birth to 2 years of age watch, on average, 55 to 75 minutes of television per day and children between the ages of 2 and 4 years of age watch, on average, approximately 90 minutes per day (Blankson,

O'Brien, Leerkes, Calkins, & Marcovitch, 2015). In a similar study, Barr and Lerner (2014) found that as of 2014, 38% of children under the age of 2 had used a mobile device, in comparison to 10% in 2012. The largest increase in usage was in children aged 2 to 4 years whom, as of 2014, 80% had used a mobile phone compared to just 39% in 2012 (Barr & Lerner, 2014).

According to Nielsen's National Television Household Universe Estimates (2016), there were 116.4 homes in the United States with televisions for the 2015-2016 television season. Additionally, 95.2% of homes in the United States have television accessed through broadcast, cable, or internet connection, as compared to 96.1% in the 2014-2015 TV season. Nielsen uses the United States Census Bureau data and other auxiliary sources such as state governments to arrive at Advance TV Universe Estimates in early May, then distributes the final number before the start of each television season. The Pew Research Center (2016) reported that, as of 2015, 92% of American adults own a cell phone, with 68% owning a smartphone, and 45% have a tablet of some type. These numbers have drastically increased in recent years. According to the Pew Research Center, in 2004 only 65% of Americans owned a cellphone, in 2011 only 35% of adults owned a smartphone, and in 2010, only 3% of American adults owned a tablet.

### **Research Question**

In this Starred Paper, I explore how technology can affect a young child's development. Many aspects of a child's development can be affected, and therefore I developed the following research question to address the wide range of developmental outcomes that technology usage affects.

How does the use of screen media affect the developmental outcomes in young children?

## **Literature Search Description**

During my literature search, I used Academic Search Premier, ERIC and PSYCHInfo search databases. I began by using the key terms “screen time and language development,” “screen time and young children,” and “screen time and cognitive development.” I learned rapidly that I needed to expand the list of search terms, so I used terms such as, “brain development,” “infants,” “screen time and social development,” “children,” “behavior,” “television,” “children with disabilities,” “screen time and sleep,” “videos and sleep for young children,” “vocabulary and screen media,” “television and attention,” and “iPads and child development.”

### **Definition of Terms:**

Infant: a child between the ages of 0-18 months (Mendelsohn, Brockmeyer, Dreyer, Fierman, Berkule-Silberman, & Tomopoulos, 2010).

Toddler: a child between the ages of 18-30 months (Mendelsohn et al., 2010).

Media Verbal Interactions: verbal interactions between a caregiver and child during media exposure (Mendelsohn et al., 2010).

Executive Functioning: the product of a complex cognitive regulatory system that helps guide behavior in a goal-direction manner (Barr et al., 2010).

School Readiness: skills such as vocabulary, pre-literacy, numeracy, and spatial skills that are important for early scholastic success (Barr et al., 2010).

Screen Time: media accessed through television, cell phones, DVDs, computers, and video games (Duch, Fisher, Ensari, Font, Harrington, Taromino, & Rodriguez, 2013).

Adult-Directed Television: programs such as news programs, game shows, situation comedies, and nature programs (Barr, et al., 2010).

Child-Directed Television: programs created for preschool audience and younger, including PBS, Nickelodeon, baby videos and Disney movies (Barr et al., 2010).

Television Diary: 24-hour data collection on the amount of time the television was on, the name of the program, and who was in the room when the television was on (Barr et al., 2010).

Assistive Technology: any item, piece of equipment, or product system that is used to increase, maintain, or improve functional capabilities of individuals with special needs (Individuals with Disabilities Education Act, 2014).

Learning Disability: a physical or mental impairment that substantially limits a major life activity (Daly & Perez, 2009).

Aggression: a behavior that is intended to harm another individual who is motivated to avoid harm, excluding accidental acts that lead to harm (Anderson & Bushman, 2001).

Self-regulation: an early developmental task that lays the foundation for inhibiting behavior and managing emotions (Daly & Perez, 2009).

Video Game: a spectrum of products, also called electronic or computer games played on different platforms (Mitrofan, Paul, & Spencer, 2009).

Violence: extreme forms of aggression (Anderson & Bushman, 2001).

Violent Media: media that depicts intentional attempts by individuals to inflict harm on others (Anderson & Bushman, 2001).

Background Television: adult content that is largely incomprehensible to a very young child and to which they ordinarily pay little attention to (Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008).

Play episode length: the time that elapses from the point at which the child comes into contact with a toy until the child ceases active play with that toy (Schmidt et al., 2008).

### **Closing**

In the next chapter I discuss, in a literature review, how children's development is affected by technology. The literature describes the impact screen media has on children's cognitive, language, social and executive functioning skills as well as brain development.

## **Chapter 2: Literature Review**

The purpose of this chapter is to review the literature that examines and discusses the impact that television and other media devices have on early childhood development. The most prevalent literature that my online search yielded addressed the effect of screen time on a child's language and cognitive skills. I found that most often, when an article discussed cognitive skills, it also discussed language skills. For young children, cognitive and language skills are very closely related, especially when viewing child development from a holistic perspective. For children under the age of 3 years, a holistic perspective on developing skill sets recognizes, in this particular case, how language skill usage requires cognitive skills and how completing cognitive tasks requires language skills.

### **Media Effects on Language and Cognitive Development**

As language development was one area that resulted in the largest search outcome, it was also one of the most difficult to organize information and write about because there were many different research methods that were used to collect data. Thus, these studies yielded multiple opinions about media usage and language development in young children that may be a result of the various research methods employed. In other words, the results of my literature review does not yield a simple set of research-based guidelines that parents and educators can follow when exposing young children to screen time. Rather, the findings point to a much more complicated understanding of whether or not to expose young children to media screen time.

In one study, screen media was found to be beneficial if two key factors were taken into consideration. These necessary two key factors were content and context (Barr & Lerner, 2014). Barr and Lerner testified that learning from screen media can take place if the content is

interactive and provides contingent responses to a child's actions. Another key factor is to ensure screen time is a positively shared experience where parents or caregivers can extend the learning from the screen and apply it to their child's real life experiences (Barr & Lerner, 2014).

In a cross-sectional and longitudinal study of 119 Hispanic infants and toddlers, research found that the children in this sample watched television for an average of 3.29 hours per day, with 2.09 hours being child-directed and 1.29 hours being adult-directed programming (Duch et al., 2013). As the children's age in this study increased, the amount of child-directed television viewing also increased. This study also looked at the types of technology being used in the homes and found that television was the most popular with cell phones being the second most popular form. Duch et al. (2013) reported that 35% of toddlers and 28% of infants used cell phones for a minimum of 30 minutes each day. Through their longitudinal research using the Ages and Stages Questionnaire, Duch et al. (2013) revealed infants and toddlers who spent more than 2 hours per day watching television had delayed scores in the area of language development when compared to children who were exposed to less than two hours of television per day, whose scores were within typical range for their age.

Weerasak Chonchaiya (2008) used a case control study with 56 children who were diagnosed with a language delay at ages 15 to 48 months. This study demonstrated that "children, who began watching television before 12 months of age and watched more than 2 hours of television each day, were six times more likely to have delayed language" (Weerasak Chonchaiya, 2008). Sixty percent of children in this study watched television by themselves indicating that children who watched television by themselves were 8.5 times more likely to have delayed language compared to children who watched television with a caregiver. The

children with language delays started watching television around 10 months of age, which is an age before they had begun using meaningful language.

Alloway, Jones, Williams and Cochrane (2014) conducted a longitudinal study on the relationship between television viewing and vocabulary skills using surveys and one-on-one testing. Children between the ages of 2 and 3 years spent an average of 21.3 hours per week at a British Childcare Center. The findings in this study concluded that in addition to television viewing, there were many other factors that affected the development of vocabulary in young children (Alloway et al., 2014). According to Alloway et al., educational books had more of an impact on vocabulary skills than television. The home environment and parental interaction also played a key factor in vocabulary development. However, Alloway et al. stated that educational television had a positive correlation with higher scores on vocabulary assessments whereas non-educational television was associated with low vocabulary scores. The survey that was conducted found that children who had poor academic performance at age 3 sought out more adult programs and cartoons, both which had fewer learning opportunities in their content compared to educational programs designed for children (Alloway et al., 2014). The results of the study were somewhat inconclusive, stating that there was no clear evidence on whether or not vocabulary development was affected by television viewing (Alloway et al., 2014). One hypothesis by Alloway et al. hypothesized that there was not a positive effect because the television media that was considered educational could have had content that was not comprehensible to the toddlers viewing it. A larger sample could help determine whether there is a positive or negative effect.

My literature search yielded a second longitudinal study of 51 infants and toddlers at 30 months of age from the United States. Data were collected through multiple sources, including parent report, direct observations, developmental tests, and naturalistic play-based assessments. Parents were encouraged to report on the amount of time their child spent watching television as well as the type of program their child watched. The findings from this study concluded that the relationships between viewing and language outcomes were most pronounced for individual programs when compared with total viewing content (Linebarger & Walker, 2005). In most cases, there was a positive relationship between the viewing of television and language outcomes, although a negative relationship was noted while viewing three specific child-intended programs. One possible explanation for this finding is that while some programs are intended for child audiences, the content is too complex or incomprehensible to the viewer (Linebarger & Walker, 2005). The results of this study suggested that age appropriate and educational-based programs may have a beneficial outcome with vocabulary knowledge and expressive language production when watched in conjunction with language-promoting strategies (Linebarger & Walker, 2005).

Verbal interactions and the role in language development was examined through a longitudinal study of 253 low-income mother-infant dyads. The study's purpose was to determine whether or not verbal interactions during media exposure mitigated the assumed adverse impacts on language development. In one study, Mendelsohn et al. (2010) explored information by having the mothers of the 6-month-old babies log the previous 24 hours of media exposure for their infants, including the type of programming, the type of media, and the length of the exposure. Language development was assessed when the child was 14 months of age

using a standardized assessment tool. Overall, the findings in this study suggested that media verbal interactions had a positive impact on verbal skills as compared to children who were exposed to television without verbal interactions from their caregiver while viewing television (Mendelsohn et al., 2010).

In a similar study where the relationship between television viewing and language delays in toddlers were examined, Byeon and Hong (2015) found through a cross-sectional survey of 1778 toddlers ages 24 to 30 months of age that the average Korean toddler watched television for 1.21 hours per day, and toddlers who spent between 2 to 3 hours of television had 2.7 times more risk of language delay than those who watched less than one hour of television. Children who spent more than 3 hours watching television had three times more chance of having a language delay (Byeon & Hong, 2015). In this study, 51.8% of children attended childcare for 40 hours per week, which led to fewer opportunities for quality conversation between parents and children and an increased possibility of being exposed to television (Byeon & Hong, 2015).

A cross-sectional study of children between the ages of 24 and 24 months studied whether or not infants and toddlers could learn words from repeat exposure to an infant directed DVD. Krcmar (2014) revealed that in children younger than 22 months of age, repeated exposure to a child-directed television program (Teletubbies) did not result in learning new words, yet those same children were able to learn similar novel words in live conditions within their natural environment. With each hour of viewing videos or television programs designed for infants and toddlers, there was an association with eight to ten less words in receptive vocabulary for 8 to 16 month olds (Krcmar, 2014). One benefit of repeated exposure to the same program for 5 consecutive days for children younger than the age of 2 was that it increased their attention

to the program, though it decreased attention for children older than 4 (Krcmar, 2014). Krcmar found that in this case, repeated exposure to the same content increased the child's ability to process the content, and therefore increased their attention to the program.

When looking at the effects on language and literacy skills from touch screen tablets, there was much less information and research to compare. Neumann and Neumann (2014) conducted a survey to determine what role touch screen tablets had on promoting early literacy skills. The survey was conducted in the United States looking at children from infancy to 8 years of age. In this study, 52% of children had access to a touchscreen tablet, and of that 52%, 11% used a touch screen tablet for at least 43 minutes per day (Neumann & Neumann, 2014). When looking at the usage of touch screen tablets by age, 10% of zero to one year olds, 39% of 2- to 4-year-olds and 52% of 5- to 8-year-olds used tablets each day. This individual survey looked specifically at e-books and literacy apps. Although vague, Neumann and Neumann cited that many apps in this study did not fit criteria to be determined an appropriate app to promote literacy development. What Neumann and Neumann noted in this study was that literacy apps should include: 1) the use multimedia features to support and enhance the text on the screen, 2) allow children to read or listen independently, and 3) be designed to focus attention on highlighted printed words in the text while being read aloud to increase vocabulary and word recognition. It was also noted that literacy apps that children use should be age appropriate, have a high level of interactivity that stimulates all senses, build on previous knowledge, encourage creativity, problem-solving, and critical thinking, and provide feedback to the child as they are engaging with the application.

## **Media Effects on Social Emotional Development**

As Barr and Lerner (2014) described, the presence of background television plays a large role in distracting a child and potentially being detrimental to their learning process from real life experiences. Background television typically included programs that are not intended for children, and are therefore incomprehensible while distracting children from focusing on exploration and play. Barr and Lerner reported that children younger than the age of 3 were exposed to 5 hours and 30 minutes of background television each day. This same study demonstrated that children younger than 2 years of age are most likely to watch inappropriate background television, which is likely due to parents' belief that their child is not paying attention to the television program. Barr and Lerner also found that children spent much less time exploring a toy when the television was on because the sudden noises, loud voices, and flashes of light distracted them from their play. Also, both the quantity and quality of parent-child interactions were compromised because of background television.

In a similar study, Schmidt et al. (2008) looked more closely at the relationship between background television and the toy play behavior of very young children. This study reported, through the Nielson Media Research, that the average American home has their television set on for at least 8 hours per day. One hundred middle class parents completed television viewing diaries where it was found that infants, ages 2½ months to 24 months of age were exposed to an average of 120 minutes of television per day, with 49% of that television time being adult programming (Schmidt et al., 2008). As research has demonstrated, play is related to healthy cognitive and social development in young children. These research findings point to the

detrimental effects of background television due to the interference with the cognitive skills necessary to execute play.

For this study, the 50 children, ages 12, 24, and 36 months, were divided into two separate groups. The first group was called the “TV first” group and the second group was considered the “TV second” group. The 50 children in the TV first group were brought into a play room along with their parent and allowed ample time to become familiar with the toys. Once familiarized, the television set was turned on to a game show program intended for adult audiences for the first 30 minutes, then shut off and the child is left to play for the second 30 minutes. The second group played without the television on for the first 30 minutes and then turned on for the last 30 minutes. Parents were encouraged to watch television or read a magazine that was provided and not to initiate or encourage play with a specific toy. They were to interact with their child minimally unless the child became upset or demanded their attention. Video cameras recorded all of the child’s play behavior.

The results of this study found that when background television was present, there was less overall play, shorter play episodes, and shorter segments of focused play and attention (Schmidt et al., 2008). Television can elicit orienting responses, which draw attention away from play, and a child who orients to a TV screen may suspend play in order to watch television. Schmidt et al. further noted that there are visual or auditory changes on a television approximately every 6 seconds, meaning a child’s play could be disrupted many times in one play session. Findings concluded that the older the child was, the better they were at responding to interruptions. The 3-year-old children were still unable to return to play without prompts. When they did return to play, their play was less intense than it originally had been. Overall, the

total time spent playing was reduced by 5% in the 30 minutes that the television set was on, which does not include the length of focused attention reduced or the slight reduction in play maturity. A second finding in this study was that children were more likely to move from one toy to another more quickly with the presence of background television. When background television was present, children engaged with 65% of the toys while engaging with only 55% of toys when background television was not present.

In a longitudinal study, Barr et al. (2010) compared the relationship among the amount of child-directed versus adult-directed television exposure at ages 1 and 4 and the cognitive outcomes at age 4. The study included 60 participants; 28 boys and 32 girls. All participants were full-term, healthy infants and the majority of the children were from middle class families with 98% of responding parents having a college degree. Barr et al. found 4-year-old children who had higher levels of adult-directed television exposure during infancy were rated by their parents to have lower executive functioning skills compared to those children who had low to moderate amounts of adult-directed television exposure. To back up the parental ratings, results of the Bracken Basic Concept Scale indicated poorer cognitive skills for children who had high amounts of exposure to adult-directed television compared to children who had less exposure to adult-directed television at a younger age (Barr et al. 2010). Therefore, the results of this study supported the statement that high levels of household television viewing in infancy and toddlerhood resulted in poorer outcomes with executive functioning and cognitive skills at age 4.

Another area of development that is found to be affected by the use of screen media is social, emotional and behavioral skills. Although there is literature that supports the idea of

television and other media being detrimental to a child's social development, there is little research that focuses on children younger than 5.

Daly and Perez (2009) found that more than 60% of all television programs show violence, including programs that are intended for young children. It is suspected that by the age of 12, children will have witnessed over 100,000 acts of violence on television (Daly & Perez, 2009). Children who are exposed to media have an increased probability of aggression, with some research suggesting this to be especially true of young boys. When children view aggression and violence, they are more likely to imitate the aggression and when exposed to aggression and violence on a regular basis, children can become desensitized to the violent images (Daly & Perez, 2009).

This study included 70 children from seven different preschools; 32 females and 38 males, ages 36 to 60 months of age. On average, these children watched 19.3 hours of television each week. A variety of rating scales, surveys and observations were used to assess each child's behavior during play. Play behaviors were coded into four groups; prosocial, assertive, verbally aggressive and physically aggressive. Results indicated that children with poor self-regulation skills were more likely to engage in verbal aggression and overall aggressive behaviors (Daly & Perez, 2009). Children who scored higher on a violence rating scale were found to be more aggressive as compared to children with lower scores and children who were rated with good self-regulation skills were more likely to engage in prosocial behaviors. The findings also linked children who spent larger amounts of time watching television to high levels of physical and verbal aggression, and children who watched television alone were more likely to be more verbally aggressive as compared to peers who watched less television or watched television with

an adult (Daly & Perez, 2009). Overall, it was found that regardless of the television viewing habits, children who had poor self-regulation skills were more likely to act aggressive. Without self-regulation skills, it is difficult for children to refrain from acting out in situations that trigger negative arousal (Daly & Perez, 2009).

A small, case-control study found that children with social emotional difficulties watched more television that included aggressive content than the control group. Viewing shows such as cartoons, regardless of the content, increase verbal aggression in one study, but had no such effects in a similar study. This study had contradictory findings, supporting the need for further research (Mitrofan, Paul, & Spencer, 2009).

In a meta-analytic review, Anderson and Bushman (2001) found that 10% of children between the ages of 2 and 18 play video games for more than 1 hour per day. Violent video games are the most heavily marketed and consumed when compared to any other type of video game sold and even brief exposure to violent video games and violent television and movie scenes can cause a substantial increase in aggression (Anderson & Bushman, 2001). Because the amount of literature on the effects of violent video games is so limited, many psychological processes identified in television and movie literature also applies to video games. Findings in this meta-analytic review suggest that violent media increases aggression by teaching observers how to aggress by increasing arousal or creating an aggressive state and that situational input variables, such as how recent the exposure, influence the aggressive behavior (Anderson & Bushman, 2001). As the violent behaviors are rehearsed, they become more complex and more difficult to change (Anderson & Bushman, 2001). This meta-analytic review included 33 studies, totaling 3,033 participants. The findings found that high levels of video game violence

were associated with heightened aggression and even short term exposure to media violence can have at least a temporary increase in aggression (Anderson & Bushman, 2001). The study also suggests that even video games that do not contain violence can cause aggression, perhaps by causing an increase in frustration, anger or hostility (Anderson & Bushman, 2001).

An additional area of social development that should be considered when looking at the impact of screen media is sleep. In a cross-sectional study with observational data, media diaries were obtained for 612 children ages 3 to 5. Of these 612 children, 10% had a television in their bedroom (Garrison, Liekweg, & Christakis, 2011). Children's sleep patterns and behaviors were measured through the Children's Sleep Habits Questionnaire, completed by their parent.

Twenty-one percent of children in this study were reported to have at least two sleep problems, and 18% of families reported their child to have at least one sleep problem five to seven nights per week (Garrison et al., 2011). Parents reported that the main reason children are viewing television or movies before bed is to help them fall asleep, however, parents were unaware that viewing television at bedtime results in increased autonomic activation due to hyper arousal and disrupted melatonin production due to the brightly lit screens. The most frequently reported sleep problem was difficulty with sleep-onset, where children who viewed television at night actually had a more difficult time falling asleep (Garrison et al., 2011).

Nicholas Kardaras, Ph. D., the author of *Glow Kids: How Screen and Addiction is Hijacking Our Kids and How to Break the Trance*, has conducted a vast amount of research around screen media and the detriments it poses for young children. Kardaras (2016) opened his book by describing how the release of dopamine that occurs during each use of electronic media is similar to the release of dopamine that occurs when one uses heroin or cocaine. He described

how the thrill and excitement that children experience during their media usage releases a small amount of dopamine that leaves them wanting more. When children are predisposed to addictive personalities, this activity makes them more vulnerable to getting addicted to digital dopamine stimulants (Kardaras, 2016). When children are hyper aroused, their pituitary gland is also stimulated through the hypothalamus, which in turn puts the child into the “fight or flight” mode of thinking. Constant adrenal stress can cause health and behavioral issues. Immune systems can be compromised, blood pressure can be elevated, and children can experience episodes of aggression and irritability and lose sleep (Kardaras, 2016). Kardaras explained that it takes time to calm a hyper aroused nervous system for adults, and even longer for children whose frontal cortex is not fully developed.

### **Conclusion**

Chapter 2 of my Starred Paper reviewed the literature that is pertinent to understanding the effects of media screen time on the development of young children. To better understand screen time effects, I implemented an Action Research Project that I describe in the following chapter.

## **Chapter 3: Action Research Study**

### **Overview**

The two main purposes of this Starred Paper were first, to understand the science of brain development and how it is affected by the use of screen media, and second, to provide parents and colleagues with the most current research-based information regarding the effects of screen media on typical child development. The overarching research question that I developed for this literature review is: How does the use of screen media affect the developmental outcomes in young children?

My review of the literature does in part answer the research question that I posed for my Starred Paper. What was missing, at this point in time, was a fuller understanding of how many young children are watching what types of screens at what amounts of time. To better share research-based information with my colleagues and the families that I currently work with, I conducted an action research study that looked at screen time tendencies for young children who reside in my local geographic region.

### **Action Research Study Project**

#### **Research Question**

In my geographic locale, what is the exposure to media devices that young children experience?

#### **Research Design**

The method of action research design that I chose is a survey design.

**Instrument**

To help answer my research question, I conducted an action research project by sending out a researcher-developed electronic survey for participants to complete in regards to the type and amount of screen media usage, if any, in their everyday routine. The survey contained questions of both closed items and open items that allowed the responder to share information regarding their child's age, television viewing habits, and overall media usage. The survey was pilot tested to ensure clarity of the questions and ease of completing the survey for all participants.

**Procedure**

The survey was delivered via email marked as an important status and included a date by which the survey should be returned. If a response was not received within 1 week of delivery, a follow up telephone call was placed to the participant to ensure survey completion. All of the participants in this convenience sample completed the electronic survey for a return rate of 100%.

**Participants**

A convenience sample of 10 parents of young children ( $n = 16$ ) who use technology were given a survey via email to complete. Of the 16 children, 10 were boys and six were girls. Amongst the parent responders were nine mothers and one father. In this sample, one responder was between the ages of 20 and 25; one was between the ages of 26 and 30; seven were between the ages of 31 and 35; and one was between the ages of 36 and 40. The level of education for the parents ranged from one participant having had some college, four participants having received an Associate's or Bachelor's degree, and five participants having received a Master's Degree or

above. The age range of the children in this study was 10 months to 71 months, with the average age of the children being 37.9 months.

## **Results**

To better understand these children's technology use, I thought it was appropriate to first understand the parents' technology usage. Through this survey, I found that the parents spent an average of 4.7 hours engaged in some form of electronic media each day, with 2 hours being the minimum and 12 hours being the maximum. Seven of the participants indicated that they use technology at home equally for work and recreation, while two participants said they used technology at home primarily for recreation and one participant indicated that they use technology at home primarily for work.

Nine of the participants shared that their child/children had access to a television, six shared that their child had access to a cell phone, six had access to an iPad or tablet, and no children were reported to have access to video games. Finally, one participant reported that they had access to "other" technology, a technological-based program designed specifically for children (Leap Pad from Leap Frog).

While the average age of the children in this study was 37.9 months, the average age for when children were first exposed to or first began to use technology was 14.4 months, with 7 months being the youngest and 21 months being the oldest. Participants reported that on average, their children are engaging with some form of technology for 70 minutes per day, with a range of zero to 120 minutes. Children in this study spend an average of 11.6 minutes per day engaged in technology alone while they spent an average of 64.3 minutes per day engaged in technology with an adult. When asked to think about background television that is present in

their home, participants in this study reported that an average of 96 minutes of background television was present in their home each day, with a range of zero minutes to 6 hours each day. Fourteen of the 16 children in this study were in childcare or preschool at least part time, while the other two are at home with their mother full time.

When examining the qualitative survey information regarding the benefits and challenges of technology usage for children, I was able to develop three themes of results from the responses. The most popular theme when looking at the benefits of technology usage for young children, parents (n=8) reported they believed technology provides their children educational opportunities. For example, children are able to access their favorite book or nursery rhyme in other formats, they have the ability to learn about a topic of interest instantaneously, and the ability to find videos and apps that are specific to certain developmental skills a child may need to acquire. Additionally, as a second theme of results, another benefit of using technology is the entertainment it provides to children, which was reported by five parents. Children are able to view videos and pictures of friends and family who live out of town, watch favorite videos, or play interactive games. Finally, the last theme of results that this survey yielded was that the parents were able to have time to themselves. Specifically, one respondent shared that her children were allowed to watch a movie while she prepared dinner for the family or while she was cleaning. Another participant indicated that her children were allowed to access to technology while she was engaged in electronic media for her school work.

Understanding the challenges that parents face involving screen media use and their children, parents had more specific examples of challenges than they did benefits of child-use of technology. The most common theme, reported by five participants, was that they had a difficult

time setting limits on the amount of time their child spends engaged in electronic media and technology. Similarly, another popular response, reported by four respondents, was that the children became upset or angry when their time limit had ended.

Other challenges, reported by a less frequent number of participants, included children having access to unsavory information without their parents' knowledge. Examples are children having access to YouTube on cell phones or tablets, which can lead to programs that are inappropriate for their age or pose no educational benefits. Participants also indicated that when their children are spending time engaged in electronic media they are limiting the amount of time they could be engaged in physical activities, social activities, and purposeful play with their toys.

### **Action Research Study Discussion**

Throughout the process of collecting data from the survey, the feedback I received was predominantly positive. Participants shared that the survey was easy to complete and the questions were not too intrusive. Yet, some challenges were experienced during my data collection as well. First, multiple participants wrote a note at the bottom of the survey that it was difficult for them to average out their child's media usage on any given day because they were unaware of the specific amount of time their child was engaged in technology while they were in childcare or school. Therefore, they thought that their responses were more specific to a weekend day or a full day home with the parent. Secondly, one participant shared that they believed their survey information was skewed because she was on maternity leave and she and her children spend more time engaged in electronic media when at home, which was much more frequently since the recent birth of her third child.

Thinking about my specific survey questions, there was one question that I did not find useful when initially looking at the results. I asked what the participants' occupation was and I did not find any themes that were related to a certain type of occupation. After reviewing the information, I concluded that, in this study, the parent's occupation did not play a role in the type of content or amount of time their child spent engaged in electronic media. Instead, I found it more useful to know their level of education. Nine of the 10 parent participants in this study held a Bachelor's or Associate's Degree or above. Only one parent participant indicated that their level of education was "some college." The average amount of time that children spent engaged in electronic media in this study was 70 minutes per day. This number is less than what was described in my literature review. Perhaps the parents' education level in my sample was associated with the amount of time they allowed their child to engage in electronic media. Given this finding, I would recommend that a more rigorous study be conducted to verify this finding from my action research study.

### **Study Limitations**

The first limitation to my study was that it was only a small action research project, and therefore the number of participants was limited as well as the geographic region. Because the number of participants and the geographic area was limited, the findings cannot be generalized for the entire geographic region because only a small population was surveyed.

A second limitation to my study was that I did not have an equal number of infants and toddlers and an equal number of boys and girls in my sample. I believe that if I had an equal number of infants and toddlers and boys and girls, I could make more accurate connections between the literature and the findings in my action research study. In addition, information

such as the child's age when they met developmental milestones and if they had any type of developmental disability could be useful in future research to determine if there were correlations between the age children began watching television and using screen media, the amount they are exposed to screen time, and their developmental outcomes.

A final study limitation is not having study control of the participants' daily routine. Each child's day was different according to the number of hours in childcare or preschool and the type of childcare. Parents reported that they found it difficult to respond with an average number because they were unaware of the amount of time and/or the type of screen media their child was exposed to while they were not in their presence. Therefore, the parents reported estimated amounts of time for a day while they are at home with their children, and their time in childcare was not accounted for.

In the following chapter, I have synthesized the findings from my literature review and my action research study. With the findings summarized, I was able to draw conclusions between the literature review and the action research results.

## **Chapter 4: Conclusion and Summary**

The primary purpose of this research paper was to explore the effects of electronic media on young children's development. I was able to answer my research question through both a literature review and an action research project that I conducted within my community.

The general conclusions that I was able to derive from my literature review are as follows. First, television can have benefits to a child's development if watched with specific guidelines. The most important guidelines that were outlined include the content of television the children are viewing and the context in which they are watching it (Barr & Lerner, 2014). Content is an imperative factor for children's viewing habits. The content should be appropriate for the child's age and developmental level. Furthermore, it should be comprehensible to the child. The context also plays a key role in the outcome of children's development. Barr and Lerner (2014) found specific evidence that children had higher comprehension rates when they were engaged in electronic media with an adult or older child who could understand the content and reiterate the message or reinforce the skills that were presented.

A diverse population of children was studied throughout this literature review with similar findings demonstrated amongst all of the groups. It can be concluded that television and screen media use does not have harmful effects or positive benefits to specific cultural groups, but rather the environment in which children are using screen media and the content they are exposed to plays more of a role in children's developmental outcomes.

### **Media Effects on Language and Cognitive Development**

In contrast, the effects that screen media have on a young child's language and cognitive development were found to be more detrimental than beneficial. In total, I reviewed nine articles

that had research-based evidence regarding screen time and cognitive and language development. The most popular theme of these nine articles was that content and context were the two most important influences on a child's development (Barr & Lerner, 2014). They suggested that in order for screen media to have educational benefits, the program must be interactive meaning that it must provide contingent responses to the child's actions. Also, it should be a shared positive experience where caregivers can relate the screen's meaning to the child's real life experiences (Barr & Lerner, 2014).

Duch et al. (2013) demonstrated through a cross-sectional study of 119 Hispanic infants and toddlers that television was the most common form of media used with cell phones following closely as a second form of media. These researchers also completed a longitudinal study that revealed children who were exposed to more than two hours of television per day had delayed communication scores on the Ages and Stages Developmental Questionnaire (Duch et al., 2013).

In a similar cross-sectional study conducted by Weerasak Chonchaiya (2008), 56 children with a diagnosed language delays were six times more likely to have a delay if they began watching television before the age of one and watched more than two hours per day. The average age for a child in this study to begin watching television was ten months (Weerasak Chonchaiya, 2008).

When looking at specific vocabulary skills, Alloway et al. (2014) found inconclusive results when trying to determine whether television or books had more of an impact on vocabulary development. Books and educational television programs were found to have a larger impact on a child's ability to acquire new vocabulary than non-educational programs

(Alloway et al., 2014). Similarly, Linebarger and Walker (2005) found in their research that specific child-directed programs had a positive association with language development, as long as it had content that was comprehensible to the viewer. The research that Krcmar (2014) conducted paralleled what Linebarger and Walker (2005) stated. Krcmar (2014) claimed that repeated exposure to the same content increased the child's ability to process the information. When children use screen media, another key factor in a child's language development is the verbal interactions that occur during the viewing period. Garrison et al. (2010) found that verbal interactions between a caregiver and child while watching television had a positive impact on verbal skills as compared to children who were exposed to television without verbal interactions with a caregiver.

I was able to find an article that addressed screen media's effects on young children's literacy development. Neumann and Neumann (2014) described the important features a literacy app should have when a child is using a tablet during screen media usage. Also, Neumann and Neumann described an app as beneficial when it was interactive, provided feedback, and allowed children to read or listen independently while printed words were simultaneously highlighted to enhance word recognition.

### **Media Effects on Social Emotional Development**

To me, the most impressive finding in this section discussed the impact that background television has on a child's attention. Specifically, background television was found to distract young children from their play by "grabbing" their attention with lights or sounds on a screen, which in turn made it more difficult for children to return to their play (Barr & Lerner, 2014).

Because their play was interrupted by the screen, children were found to have less purposeful play when in the presence of background television (Schmidt et al., 2008).

Additionally, the literature suggested that children were more likely to engage in aggressive behaviors after they have viewed aggressive television programs or aggressive video games (Daly & Perez, 2009). My search also determined that children who had an attention deficit were more likely to want to engage in screen time and had a more difficult time disengaging (Daly & Perez, 2009).

The final area of social development that was discussed was sleep. Through their literature review, Garrison et al. (2011) showed that children who viewed television at night were more likely to sleep restlessly. Restless sleep was attributed to the brightly lit screens that interrupted melatonin production (Garrison et al., 2011).

In summary and in contrast to my literature review that I conducted for my Master's Project, my Action Research Project yielded the following general findings. First, the children in my action research group spent less time engaged in electronic media than the average amount of time children spent as reported within my literature review. Secondly, the children in my action research group began watching television and engaging in electronic media at an older age than the children throughout the literature review research.

In the final chapter of this Starred Paper, I conclude with how these findings influence my daily life, both personally and professionally. By doing so, I will add my personal opinions that will drive my position on this important topic.

## Chapter 5: Position Statement

I am currently an Early Childhood Special Education (ECSE) teacher, step-parent to two adolescents, and aunt to two adorable young children. I could not help but think of all of these children when I was researching and learning all of the impacts, both positive and negative, that screen media can have on child development. The information that I learned through completing this research project has been extremely eye-opening.

When I initially became interested in this topic, I had the mindset that all of the literature I would find would say how detrimental screen time and electronic media is to a young child's development. I was surprised to learn that the research that has been published is fairly equal in terms of screen time being damaging or beneficial to young children's development. One of the specific findings that I was most stunned to learn was children could acquire vocabulary and expressive language skills when appropriately engaged in electronic media.

One of the most important pieces of information that I learned and that I will be able to share in my field of work is that the benefits of technology and screen time rely heavily on the content and context in which they are used. As an ECSE teacher, I believe it will be especially important to inform parents that the content of television and video games has a critical impact on their child's learning and thus, should be age appropriate. The context in which children engage in electronic media is also an essential factor to their well-being. Children had better developmental outcomes when they were engaged in technology in the company of an adult (Barr & Lerner, 2014).

The largest surprise that I encountered was how Kardaras (2016) described the similarities between the dopamine release during screen time use and the dopamine release when

using illicit drugs. I truly believe that many people, including myself before reading his book, are not aware of the physiological affects screen time can have on a person's body. This scientific fact is especially alarming when considering the development of a young child and the vulnerability that exists. Without any awareness or intent to do so, parents can be creating an addiction in their children.

I now feel that I can confidently express my concerns and beliefs about children using screen media with my family and friends. I am prepared to answer questions with logical and research-based evidence and be able to suggest books or literature at people's desire. As a step-parent to young teenagers and a teacher of young learners, I believe that it is my duty to share these findings with those around me to ensure a safe and reliable environment for optimal learning. My personal belief that is that children should have limited exposure to television and screen media and use play as their primary avenue of learning. After all,

“Play is often talked about as if it were a relief from serious learning. But for children play is serious learning. Play is really the work of childhood.”

–Mr. Fred Rogers

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### Appendix A: Action Research Survey

#### Understanding Children's Technology Use

Please complete the following survey items to the best of your ability. This survey will be used as part of a class requirement to complete my Master's program.

1. Do you use electronic media (television, cell phone, iPad/tablet, computer) at home for:
  - primarily for work
  - primarily for recreation
  - equally for both work and recreation
  
2. How many hours do you spend per day engaged with electronic media while at home?  
 \_\_\_\_\_ hours/day
  
3. What kind of technology does your child have access to? (Select all that apply)
  - Television
  - Cell phones
  - iPad/Tablet
  - Video Games
  - Other \_\_\_\_\_

4.

NAME OF CHILD	AGE	AGE THEY FIRST USED TECHNOLOGY	MINUTES PER DAY THEY USE MEDIA	HOW MANY MINUTES DO THEY USE ALONE?	HOW MANY MINUTES DO THEY USE WITH ADULT?

5. Please check your age:

- 20 – 25 years.
- 26 – 30 years.
- 31 – 35 years.
- 36 – 40 years.
- 40 – 50 years.
- above 50 years.

6. What is your occupation? \_\_\_\_\_

7. What is your level of education?  
 High School  
 Some college  
 Associate's/Bachelor's Degree  
 Master's Degree or above
8. What are the benefits for your child/children in using technology?
9. What are the challenges with your child using technology?
10. On average, how much background television is present in your home?  
\_\_\_\_ Minutes per Day

Thank you for completing this survey that is part of my class requirement.

**Appendix B: Draft Email**

To Whom It May Concern:

You are receiving this email because you have agreed to participate in an action research study as partial fulfillment of a class I am enrolled in through St. Cloud State University. Please take the time to answer the following questions and return to me as soon as possible. To respect your privacy, names will not be used when I use the information to report on the findings. If I have not received a response within seven days, I will follow up with a phone call to you.

Thank you, and I look forward to receiving your responses.

Sincerely,

Jessica

## **Appendix C: Developmental Milestones–Hawaii Early Learning Profile**

### 1-Year-Old

- Cognitive
  - Finds hidden objects under three superimposed screens
  - Understands the meaning of “no”
  - Places round piece in formboard
  - Nests three cans/cups
  - Understands pointing
  - Looks at place where ball rolled out of sight
  - Recognizes several people in addition to immediate family
  - Places cylinders in matching hole
- Language
  - Shows understanding of words by appropriate behavior
  - Babbles in response to human voice
  - Says “dada” or “mama”, specifically
  - Babbles intricate inflection
  - Uses single-word sentences
  - Uses expressive vocabulary of one to three words
  - Says “no” meaningfully
  - Uses a variety of consonant sounds in babbling
- Social
  - Extends toys to show others

- Tests parental reactions during mealtime and bedtime
- Engages in simple relational play
- Explores environment enthusiastically
- Likes to be in constant sight and hearing of adult
- Gives toy to familiar adult spontaneously
- Displays independent behavior

#### 4 –Year-Old

- Cognitive
  - Name actions when looking at a picture book
  - Identify and count quantities of one, two, three and four
  - Use imaginary objects during play
  - Draw recognizable face with eyes, nose and mouth
  - Identify objects based on function
  - Place three pictures in sequence
- Language
  - Answer questions logically
  - Describe actions in pictures in present tense
  - Understands prepositions of in front, in back, around and through
  - Use conjunctions in sentences
  - Carry out two simple unrelated successive commands in order
  - Names common objects and actions
  -

- Social

- Claims ownership of own possessions
- Engages in cooperative play with other children
- Attempts new activities
- Tries again when a change or disappointment occurs
- Quiets down after active period
- Waits for turn at least two times
- Sits without moving when involved in an activity
- Follows directions and obeys an authority figure

5 – Year – Old

- Cognitive

- Identifies and counts quantities of at least six
- Places four pictures in sequence
- Locates big, bigger, biggest and small, smaller, smallest in groups of objects
- Sorts items by category
- Works in small group for 10-25 minutes
- Tells as many solutions as possible for a given problem situation
- Names capital and lower case letters when shown printed letters

- Language

- Repeats what happened in a story previously read
- Names main idea after listening to a story
- Answers “why” questions by giving a reason

- Rephrases others' comments in a discussion
- Uses "will" to form future tense
- Describes events of past and future experience in logical, sequential order
- Social
  - Stays on topic during a conversation
  - Displays good sportsmanship
  - Remains quiet when others are talking
  - Follows defined rules whether or not an adult is present
  - Adjusts behavior to fit rules and routines of different situations
  - Independently tries new activities