The Impacts of Screen Time on Mental, Emotional, and Relational Health in Children Ages 0-10

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Part I: Literature Review

As the world continues to move digitally, children are spending increasing time on screens, whether a television, computer, mobile phone, tablet, or other device, especially as the COVID-19 pandemic pushes school, entertainment, and social connections online. The American Academy of Pediatrics (AAP) reports children today begin interacting with screens at four months old (Chassiakos, Radesky, Christakis, Moreno, & Cross, 2016). Further, Common Sense Media reports U.S. children's average daily screen time is nearly two and a half hours for those ages eight and under (Rideout, 2017) and just under five hours for ages eight to twelve (Rideout & Robb, 2019). However, screen time is self-reported, likely leading to inaccuracies and discrepancies in reporting. Nonetheless, increasing screen time raises concerns for the mental, emotional, and relational health impacts of this screen time on children. Thus, the AAP created a set of guidelines, including co-viewing with children, no screen time other than video chatting under 18 months, less than an hour for children ages two to five, and consistent limits for those over six (American Acadamy of Pediatrics, 2016). Research, however, has conflicting results on the true impact of screen time on mental, emotional, and relational health.

Some research indicates emotional health and emotional understanding—the ability to understand, explain, and predict one's own and others' emotions—is negatively impacted by increased screen time, while other studies indicate no association. More screen time at age four predicts lower levels of emotional understanding at age eight, while screen time at age six does not predict emotional understanding at age eight (Skalická, Wold Hygen, Strenseng, Kårstad, & Wichstrøm, 2019). Similarly, increased screen time is associated with poor emotional wellbeing in girls but not boys (Griffiths, Dezateux, Dowda, & Pate, 2010) and with lower emotional stability (Twenge & Campbell, 2018). Contradicting these studies, others found no association

between screen time and emotional wellbeing, in addition to no gender difference (Parkes, Sweeting, Wight, & Henderson, 2013), and did not identify screen time as a risk factor for social-emotional development (McDonald, Kehler, & Tough, 2018). Although study results vary, they do not suggest screen time improves emotional health. As such, evidence supporting the AAP's guidelines are present, even if they are cautious.

Research also has contradicting findings for screen time's impact on relational health and behavior, which is an indicator of social competence. Increased screen time is associated with an increase in conduct problems with no gender difference in some studies (Parkes et al., 2013) and for just girls in other studies (Griffiths et al., 2010), and it is associated with poorer social skills (Guerrero, Barnes, Chaput, & Tremblay, 2019; Mistry, Minkovitz, Strobino, & Borzekowski, 2007), particularly with compliance (Hinkley, Brown, Carson, & Teychenne, 2018). Television screen time is also associated with behavior problems (McDonald et al., 2018; Mistry et al., 2007), including rule breaking and aggression (Guerrero et al., 2019). Quality parent-child interactions are also reduced with increased screen time (Courage & Setliff, 2010). Contrary to these findings, a study found no associations between screen time and peer relationship problems or prosocial behavior (Parkes et al., 2013). Adding more uncertainty, another study indicates some screen time may actually have small but positive impacts on caregiver attachment (Przybylski & Weinstein, 2019), and watching television with friends may help build interpersonal skills, although if friends are not present social isolation results (Bickham & Rich, 2006). Parent-child interaction can also be a mediating factor, helping limit the negative impact of screen time on psychosocial wellbeing (Jiang, Ho, Ip, & Zhang, 2018). These findings together indicate relational health, if associated at all, is negatively impacted by screen time

when alone, but there may be positive impacts if others are participating as well, aligning with the AAP's suggestions for co-viewers.

Mental health, which is impacted by both emotional and relational health, has conflicting research outcomes as well, similar to the others. Increased screen time has a negative impact on psychosocial wellbeing (Jiang et al., 2018) and overall wellbeing (Twenge & Campbell, 2018), and it leads to an increase in thought problems (Guerrero et al., 2019), withdrawal (Guerrero et al., 2019), depression (Nakamura, et al., 2012; Twenge & Campbell, 2018; Guerrero et al., 2019), and anxiety (Twenge & Campbell, 2018; Guerrero et al., 2019). Other studies contradict these findings, however, indicating wellbeing–measured by attachment, resilience, curiosity, and positive affect–is not impacted by increased screen time (Przybylski & Weinstein, 2019), and regardless of screen time, few negative mental health outcomes exist, especially when children participate in sports as well (Griffiths et al., 2010). While some mediating factors exist, the majority of research indicates at least some negative mental health outcomes, providing evidence to support the AAP's guidelines.

This body of research has many strengths, but there are also limitations and weaknesses. It adjusts for covariates well, particularly with gender, age, ethnicity, socioeconomic status, parents' education level, and family functioning. Many studies also look for gender differences, which is an important distinction. Further strengthening the research is its global prevalence, including studies in the United States, Canada, the United Kingdom, Norway, Australia, Japan, and China. The key weakness in this research, however, is the reliance on self-reported screen time. Parents often report on behalf of their children, likely causing over- and under-estimations of actual screen time. The contradictory nature of study results may be partially explained by these inaccuracies in screen time reporting. Future research should correct this possible

misreporting by using screen time tracking methods on devices. Additionally, many studies look at specific types of screen time, rather than evaluating it as a whole. However, children often engage in many forms of screen time, not just one, and research methods need to be adjusted accordingly. Lastly, studies evaluate different indicators of mental, emotional, and relational health, possibly leading to additional discrepancies and result differences. Cumulatively, this research provides quality foundational understandings, but much remains to be studied.

One of these areas is the gap in the research as mental, relational, and emotional health relates to screen time for academic purposes versus recreational purposes. Many studies differentiated passive and interactive screen time by separating device use like watching television and playing video games, but academic and recreational use has not been differentiated. Technology is becoming increasingly relevant in schools, as many students have one-to-one device programs and the COVID-19 pandemic is forcing online learning, making this issue increasingly prevalent. Are the mental, emotional, and relational impacts on children different depending on the type of screen time–academic or recreational? Can children spend as much time as they need academically on screens and still avoid the potential negative impacts of screen time, given recreational use is limited? Or, do all types of screen time need to be limited?

Part II: Research Proposal

Dear School Board,

With the increasing screen time among children–especially during the COVID-19 pandemic–and the apparent negative impacts of screen time on children's mental, emotional, and relational health discovered in previous studies, it is pertinent to continue research in this area, particularly as it relates to education. Screen time was high prior to the COVID-19 pandemic, but it has continued to increase during the pandemic, as children rely even more on screens for both educational and recreational purposes with school, entertainment, and social connections moving online. Thus, it is important to not only understand the impacts of screen time as a whole but how the impacts vary depending on the type of screen time–educational or recreational, allowing a healthy balance to be created. For this study, educational screen time is defined as any screen time resulting from school assignments or studying, while recreational screen time includes all other time spent on screens. To begin understanding the impacts of educational and recreational screen time on children's mental, emotional, and relational health, a mixed-methods study–including application-based screen time tracking, questionnaires, and interviews–is proposed and should be backed by the school board because findings will help parents and educators better support students in their technology habits and ultimately improve children's health outcomes.

Study participants will include elementary students, four to ten years old, from elementary schools across the school district–with the permission of this school board. Students, and their families, may opt-into this two-semester study upon receiving their district-issued one-to-one device in exchange for study results and a $100 Visa gift card. From this point, they will work closely with researchers to prepare for study participation. With participants from across the school district who have a variety of backgrounds and family lives, there will be a valuable

sample for this research because, presumably, both high and low screen time participants will be included, creating a good sample to evaluate the impacts of educational and recreational screen time on mental, emotional, and relational health.

This study calls for screen time to be objectively counted, using a screen time tracking application installed on the participants' devices, including televisions, computers, mobile phones, tablets, and other devices. Previous studies have used self-reporting methods for screen time data collection, often asking parents to self-report on their child's behalf. However, this introduces significant error, as screen time can easily be over- or under-reported. To reduce this self-reporting error, the application installed on each participant's devices will track (1) the time spent on the screen, (2) which applications were used and for how long, (3) the type of content interacted with–educational or recreational–and, (4) who used the device, in case the devices are being shared. When the participant logs into their device, they will be asked who is using the device and what their intended purpose is–educational or recreational. Additionally, each time they switch applications, as they would on a smart phone or tablet, participants will select their intended purpose–educational or recreational–again, in case this changed with the newly-opened application. Without any action from the participant, the screen time tracking application will record the amount of time spent on the screen and on which applications. It is important for the participant to select the intended purpose–educational or recreational–in addition to the screen time tracking application recording which applications are used because the same application can have both educational and recreational purposes, such as a browser or Zoom. These four data points will be compiled by researchers to calculate total educational and recreational screen time. However, if for some reason this screen time tracking method fails, participants will also log their screen time in a simple spreadsheet, including device used, applications used, duration of

screen time, and type of content–educational or recreational. This allows researchers to cross-reference the two data collection methods and protects the study against technological failures.

To evaluate participants mental, emotional, and relational health, a series of questionnaires will be used. The Strengths and Difficulties Questionnaire (SDQ, 2015) will evaluate emotional symptoms, peer relationship problems, and prosocial behavior as indicators of emotional and relational health (American Academy of Pediatrics, 2012). Additionally, the Spence Children's Anxiety Scale (Spence) will evaluate anxiety, and the Pediatric Symptom Checklist (Pediatric Symptom Checklist) will evaluate internalizing problems (American Academy of Pediatrics, 2012), which indicate sadness and low self-esteem. These two questionnaires combined will serve as an indicator of mental health. Study participants will complete these questionnaires three times throughout the two-semester study: prior to the first semester, after the first semester, and after the second semester. Additionally, study participants and their families will be asked two interview questions each time the questionnaires are given: How do you think screen time impacts your/your child's (1) overall feelings and (2) time and quality of time spent with friends and family? These questions provide qualitative data to develop a more complete understanding of children's mental, emotional, and relational health and the impacts of screen time. Further, it serves as a secondary source of information, in case issues arise with the questionnaires. Following the study's completion, screen time, questionnaire, and interview data will be compiled and analyzed statistically to draw conclusions on the impacts of educational and recreational screen time on children's mental, emotional, and relational health.

Although this proposed study will make significant strides in understanding the impacts of screen time on children's mental, emotional, and relational health by looking at educational

and recreational screen time separately and by using an objective measure of screen time, there are still limitations. In reporting screen time, participants may interpret educational and recreational use differently, despite guidelines, or may want to report more educational than recreational use, resulting in screen time being miscategorized. These mistakes will be difficult to identify, especially if the applications used have both educational and recreational purposes. Further, if the objective screen time reporting method fails, the self-reporting method has many limitations similar to previous studies, including participants' tendency to over- or under-report screen time. Another limitation is this study is aimed at students who receive a district-issued device for school purposes. Because not all children receive this technology, it may be difficult to broadly apply the study's findings. Additionally, these educational devices may be given to students who would not otherwise receive their own device, resulting in increased screen time. This screen time will also likely be educational, as it is an academic device and the school district blocks many recreational uses, skewing the screen time data collected in each category.

Despite limitations, the findings in this study will enhance the public good by helping parents and educators better support children in their technology habits–finding a healthy balance between educational and recreational use–and ultimately improving children's mental, emotional, and relational health outcomes. When giving children devices, the intention is to provide a tool to aid in their success, but it is important to also recognize the unintended consequences of these tools. Further, it is the responsibility of parents and educators to, when providing these devices, also teach children how to use them responsibly. This proposed research will begin to uncover the unintended consequences of screen time and will provide empirical evidence from which responsible device-use guidelines can be developed. As a result, parents, educators, and children will have research-based recommendations from which to budget screen

time without compromising mental, emotional, and relational health. Ultimately, this will create "screen smart" children who have the skills to use screens responsibly, and it will promote mental, emotional, and relational health in children, improving their overall health outcomes. It is for these reasons that researchers ask for the school board's support in completing this study.

Sincerely,

Hannah McDonald, University of Denver Student

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