How Screen Time Affects Children's Language and Communication Development

LENA Analysis

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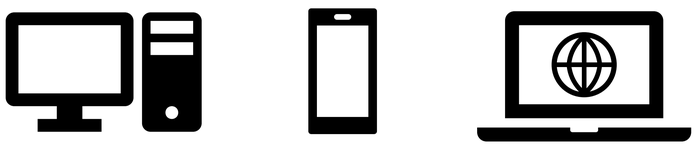
Introduction

Children today are growing up in a vastly different world than those just 20 years prior. With technology's deep-seated roots in modern society, young children spend unprecedented portions of their day fiddling with iPhones, tapping at iPads, and staring at computer or TV screens (Singer & Singer, 2012) 1. Indeed, so much of these children's time is spent with their eyes mindlessly glued to screens that it leaves professionals, parents, and caregivers wondering: is it possible that this screen time could negatively affect a child's early development?



Prevalence

- A nationally-representative survey revealed that sixty-eight percent of children below two years of age are, on average, exposed to at least 2 hours of screen time per day, exceeding the recommended time of one hour per day advised by the American Academy of Pediatrics ("Media Use by Children Younger than 2 Years", 2011) 2.
- Caregivers of children from the ages of 2-17 report that their children spend approximately 1 hour and 37 minutes a day on their computer, not including time spent on video games or all other screen media (Singer & Singer, 2012) 1.

Language and Communication Developmental Outcomes from Screen Time Exposure

Children learn to talk and communicate through engaging in interactions with other communication partners. The first several years of a child's life is a crucial time for brain development, during this time is when the brain is most receptive to learning a new language as well as building communication pathways that are crucial for the child's lifelong language development (Meehan, et al., 2019) 3.

- Children who are younger than two years of age require hands on exploration and social interactions with caregivers for successful maturation because they are still developing cognitive, language, sensorimotor, and social-emotional skills (Chassiakos, et al., 2016) 4.
- Children under the age of two who are exposed to high rates of television and video game exposure are more likely to have language, cognitive, and social/emotional delays ("Media Use by Children Younger than 2 Years", 2011) 2.
- Children who watch over two hours of television each day before the age of 12 months are approximately six times more likely to develop language delays (Chonchaiya & Pruksananonda, 2008) 5.
- In children aged three to five who watched at least two hours of television a day before the age of three, received lower scores on measures of cognitive development and academic achievement, including reading and math (Duch, et al., 2013) 6.

Methodology

An experimental study was created by using Language ENvironment Analysis (LENA) technology to measure the daily auditory environments of children between the ages of 1.5 years and 5.5 years.

- All 4 participants in this study were:
  - -Caucasian
  - -Accompanied by no health concerns or conditions
  - -Parents were financially stable and/or in the middle class
  - -Parents reported effort in trying to monitor screen time
- The vest and LENA technology was put on each child in the morning by his/her parents and worn for one full day until bedtime.
- All participants were in the home setting when wearing the LENA.

Results

When solely focusing on the association between screen time and communication, the households that had less electronic media exposure demonstrated higher linguistic outcomes. In this specific simulation, the children who had less exposure to screen-time engaged in a significant amount of conversational turns and had greater amounts of vocal productions. Additionally, the children who had less electronic media in their daily recording environment were also engaged with more significant conversation, including a greater amount of adult words and meaningful language, throughout the day.

Child	Electronic/ Screen time (%)	Adult Word Count (%)	Conversation turns (%)	Vocal Productivity (%)	Meaningful Language (%)
Kate, 5.8 years	1%	15, 419; 78th percentile	770 turns, 82nd percentile	No data	21%
Viv, 4 years	8%	11,664; 45th percentile	896, 90th percentile	017, 67th percentile	17%
Nora, 2.8 years	3%	13,994; 67th percentile	869, 89th percentile	112, 78th percentile	22%
Lydia, 1.5 years	8%	9,554; 25th percentile	367, 44th percentile	107, 67th percentile	14%

"We're talking about dietary recommendations that need to be created, a media diet for young brains, and the science at this time doesn't have the evidence to make those recommendations,"

- Dr. Anne Glowinski, associate director of the division of child and adolescent psychiatry at the Washington University School of Medicine in St. Louis.

Application to Deaf/ Hard of Hearing (D/HH) Population

If children with typical hearing are negatively affected by the distractions and missed opportunities that screen time produces, children who are D/HH would also be similarly affected, if not more so. Children who are D/HH require even *more* spoken language and even *less* distraction to build language.

A similar study that can be specifically applied to the D/HH population found comparable results when reviewing the effects of electronic media on linguistic input and communication.

- The auditory environments of 28 children with mild to severe hearing loss were observed and analyzed using LENA technology (Ambrose et al, p 139-147, 2014) 7.
- The frequency of conversational turns was positively associated with children's communication outcomes, while screen time/electronic media was negatively associated with receptive communication abilities in these children (Ambrose et al, p 139-147, 2014) 7.
- The frequency of positive adult interactions was decreased in environments with increased amounts of electronic media (Ambrose et al, p 139-147, 2014) 7.

Conclusion

These findings are significant because, according to recent research presented on the LENA organization's website, "conversational turns are one of the most predictive metrics of language outcome" (LENA.org).

- In 2018, researchers at Harvard and MIT identified a relationship between conversational turns and vocal productivity and the development of the language centers of the brain. Their findings indicated that these conversational turns "strengthen the white matter 'information highways' in the brain, allowing the whole brain to work together better." (Romero et al, 2018) 8.
- The child whose eyes and attention are solely focused on a TV screen for more than two hours a day would lack the tools and opportunities to build necessary pathways for brain function and language learning. Thus, one can infer from these results that an environment without screen time or background screen time is optimal for language and communication development.
- A 2017 study found that brain connectivity in children increases with the amount of time spent reading books and decreases by the length of exposure to screen time (Horowitz-Kraus et al, 2017) 9.

This simulation, and the various studies that supported its creation, can be further expanded upon and used to increase awareness about communication development. These results can encourage parents to increase talk and conversation across multiple environments to unlock the full social and communicative abilities of their child, in addition to motivating them to reduce screen time within the home in order to provide every advantage possible for language development.

References