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## Digital Diets and the Impact of Screen Time on Language Development

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## Digital Diets and the Impact of Screen Time on Language Development

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## Disclosures

### Financial:

- Author, TeachersPayTeachers who receives royalties
- Presenter, *SpeechPathology.com* who receives an honorarium for this workshop

### Non-Financial:

- Member, American Speech-Language-Hearing Association

## Learning Outcomes

After this course, participants will be able to:

- Describe the impact of excessive screen time on human interactions.
- Explain key data from research on the negative impact of screen time on development.
- Describe 2-3 healthy screen time strategies with caregivers.

## Statement of Problem

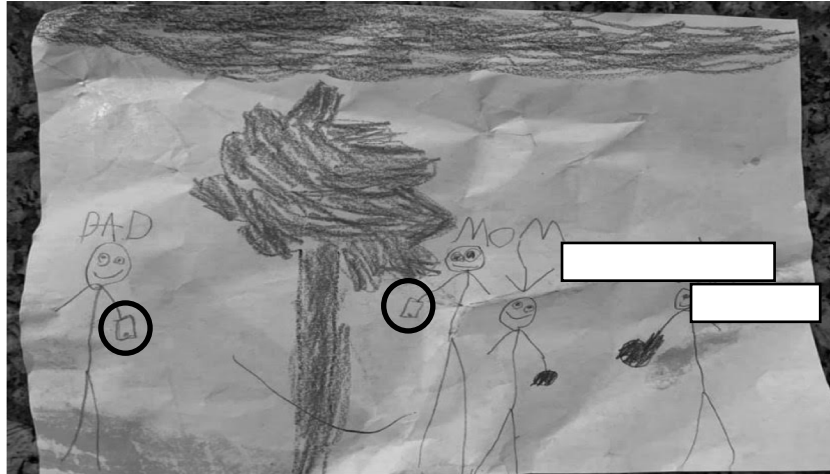
- For every 30 minutes of screen time there is a 49% increased risk of expressive speech delay (Birkin, 2017).
- Children who spend more than 2 hours a day on screens scored lower on language and thinking tests (National Institute of Health, 2018)
- The use of mobile devices in children has risen from 5 minutes a day in 2011 to 48 minutes per day in 2017 (Common Sense Media, 2017)
- Almost 40% of children under the age of two use mobile media (Common Sense Media, 2017)

## AAP Recommendations

- Less than two hours per day for children ages 5-18
- No more than one hour a day for children age 2-5
- None for children younger than 18 months of age
- Excessive screen time can impinge on children's ability to develop optimally; it is recommended that pediatricians and health care practitioners guide parents on appropriate amounts of screen exposure and discuss potential consequences of excessive screen use. (Madigan et al., JAMA Pediatrics, 2019)

continued

What this looks like...



continued

## Increases in Incidence and Prevalence of Autism Spectrum Disorders

- Nationally, 1 in 59 children had a diagnosis of Autism Spectrum Disorder by the age of 8 (2014). This is a 15% increase over 2012.
- In the 2000-2001 school year, the number of children age 3-21 receiving SPED for Autism was 93,000. In 2015, it was 617,000.
- Its not that technology causes ASD, but disproportionate exposure during critical periods can negatively impact the development of social communication, social-emotional skills and behavior.

continued

There are over 700,000 educational apps...but do they actually help children educationally?

- The Waldorf School in Silicon Valley, whose population is made up primarily children whose parents are tech executives, does not allow any tech despite being located in the heart of technology innovation
- Both Steve Jobs and Bill Gates are reported to have raised their children “tech free”

## Dopamine

- Dopamine plays a major role in reward motivated behavior and it serves, to some extent, as part of a survival function
- However, technology/games/apps provide a short cut to this rewards process, floods us with dopamine and serves NO biological function
- Evolutionarily speaking – humans haven’t yet adapted to this excessive amount of dopamine



continued

## Frontal Lobe Development

- Frontal lobe damage results in difficulties with many tasks, including...
  1. problem solving
  2. verbal and non-verbal abilities
  3. memory
  4. initiation
  5. judgement
  6. impulse control
  7. social behavior
  8. facial expression
  9. difficulty in interpreting feedback from the environment
  10. risk taking

continued

## Hypothalamic Pituitary Adrenal Axis

- “Fight or Flight”
- Dr. Dimitri Christakis conducted a study in 2012 looking at the impact of overstimulation (similar to stimulation from technology) during the early developmental period demonstrated...
  - Increased risk taking and increased frenetic activity
  - Difficulty distinguishing a new object out of a choice of two with 75% more time spent on novel objects (i.e. learning) by those who were not exposed to overstimulation

## Myelin

- Humans are born with a lifetime supply of brain cells (neurons). At birth, a newborn's brain weighs 33 grams. In the first two years, it triples in size – not due to the development of more brain cells, but the development of synapses. These synapses become faster and more efficient because of the myelin covering them.
- Both overstimulation and under stimulation can damage myelin
- A 2012 study by the Chinese Academy of Sciences discovered that those with internet addictions had myelin abnormalities in the areas of the brain related to executive function, decision making and emotional regulation.

## Play Skills

- Interacting with other humans through play provides opportunities to experience emotional and social situations with other humans, practice controlling negative emotions, and learning how to solve conflicts and negotiate with others.
- Gayler and Evans (2001) found that the level of involvement in pretend play by preschoolers *with their parents* was positively linked with their capacity for emotional regulation because of the guidance and coaching parents offer during play.

## Theory of Mind

- Development of Theory of Mind is negatively impacted when humans don't have the opportunity to develop this skill through interactions with other humans by looking at facial expressions, interpreting body language, engaging in conversation that reveals what others may be thinking.
- To think about what another person may be thinking you have to spend time interacting with people.

## Emotional and Self-Regulation

- Emotional regulation is the ability to move appropriately across various emotional states
- Self-Regulation provides us with the capacity to do so
- When children don't get practice interacting socially with other children, they have less opportunities to exercise emotional regulation with peers who provide them with feedback to know whether their behavior was appropriate or not. The less they regulate their emotions (because they lack the practice), the more they stand out to peers and have difficulty establishing relationships with them

## Speech and Language

- “30 Million Word Gap”
- Conversations between children and parents are the most influential contributors to vocabulary before school entry (Hart & Risley, 1995)
- The **amount** of talk children had been exposed to through the age of three predicted their language skills and school test scores at age nine and ten (Hart & Risley, 1995)

## Literacy

- Reading digitally vs. reading paper books
  - For children 3<sup>rd</sup> grade and up negative impacts (of digital vs paper books) were found in the ability to sequence details, understand plot, and make inferences
- Why would comprehension be impacted in children age 3 to 5 when reading books presented digitally?

## Red Flags

There is reason for concern when children...

- are not able to balance screen time with time spent in human interactions
- demonstrate extreme irritability or aggression when screens are removed
- view their world from the lens of a specific game/app/video OR if they rush through any required tasks in order to return to that world
- exhibit poor sleep patterns
- struggle to have the same amount of attention, problem solving skills and stamina for activities that are not technology related

## Red Flags (continued)

- show symptoms of impaired social interactions with peers
- have difficulty controlling their emotions
- need technology to calm down
- consistently request technology over other free time and play activities

*When these concerns occur, there is a need to reset a hyper-aroused nervous system. To accomplish this, the brain often needs four to six weeks of time spent without any screens.*

## Digital Diets

- The term “digital diet” is meant to imply that what we put in our brain is what contributes to healthy brain development
- Help parents understand why there is a need for screen time limits
- Share the AAP guidelines
- Establish “tech free” times and locations
- Replacement activities (a.k.a. what we used to do BEFORE we had omnipresent screens)

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Thank You!

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