ENCYCLOPEDIA on Early Childhood Development

Infants, Toddlers and Learning from Screen Media

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Introduction

Infants and toddlers today have unprecedented access to screen media, including content viewed on television, computers, and gaming consoles, as well as on newer mobile devices (smartphones and tablets).[1,2] Although most of their direct viewing consists of 1 to 2 hours of television and video daily, younger children are also exposed to about 5.5 hours of “background” television, meaning television that is left on for the attention of older children or adults or as background noise without direct attention by any family member.[3] Their experience with mobile devices is more limited, though access is growing rapidly with increasing availability.[1] The popularity of screen media among the youngest viewers has inspired the production of thousands of video programs and apps designed to teach them about language, numbers, music and other abilities that ostensibly foster brain development.[4] Parent endorsement of these products has created a multimillion-dollar industry, although claims about their educational value remain largely unsubstantiated.[5]

Subject

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Infants and toddlers attend to screen media and are responsive to its sensory and perceptual features (movement, pace, bright color, music, and sound effects).[6] Imitating their parents and older children, they will pick up a tablet or smartphone and tap and swipe to navigate the screen. However, this does not mean that they understand or learn from the content.[7] Although infants and toddlers are remarkably capable learners in direct social interaction,[8] their language and story comprehension skills are limited and they are unlikely to follow the narrative content, story line, or content to be learned from a video or app.[6] This contrasts with the potential of screen media to facilitate older children's learning when the content is age appropriate, engaging, and educational.[9]

Problems

When infants and toddlers view screen media, their understanding of what they see is limited. They more easily learn actions, words, and problem solving directly from a person than from the same information on a screen.[10] This learning difference ("video deficit") occurs because very young children are inflexible learners: the features of the learning situation (video) and transfer context (real world) must match exactly for learning to be evident. Objects and characters on screens look and behave differently than their real-world counterparts. Two-dimensionality and size, the failure of TV characters to respond to viewers, and extraordinary visual and sound effects are sources of mismatch.[11,12] Video is a representational medium that differs from reality. Infants and toddlers simply do not understand the medium and do not see it as a "window on the world".[6] During the third year of life, improvements in language, cognition, social awareness and experience with screens make their learning more flexible, and transfer from video to the real world can occur.[10,12]

Research Context

Information currently available to parents and child development professionals on this topic provides mixed messages. As infants' and toddlers' exposure is fairly high, there is concern that time spent with screens might replace learning activities known to benefit development, such as reading, play, and social and language interactions with others. There is also worry that screen media might be harmful to children's developing attention and self-regulation and that this could diminish learning.[13,14] These issues, though unresolved, prompted pediatricians to recommend that children under 2 years be discouraged from viewing any screen media.[15] Those who develop and market baby videos and apps send a different message,[5] pointing to the positive role that well

designed material can play in supporting older children's learning. They offer persuasive testimonials and cite "experts" who explicitly or implicitly affirm that age-appropriate screen media will advance infants' and toddlers' learning and brain development. These conflicting views, along with the sheer number of available videos and apps, make it very difficult for parents to evaluate the pros and cons of screen media for very young children.[4] Against this backdrop, as researchers have conducted many studies using different methods and measures, answers to some of these issues are becoming clear.

Key Research Questions

1. What can infants and toddlers learn from baby media? How does age matter?
2. How does the omnipresence of background television affect infant and toddler learning?
3. Are newer interactive screens more effective as learning tools than more passive television?
4. How much screen media is too much?

Recent Research Results

Many infant-directed videos target word learning, a milestone achievement at this age.[16] Researchers who have carefully evaluated vocabulary learning from video report that both child age and adult scaffolding matters – when parents co-view with their children, direct their attention to the video, talk about the story, ask questions, and otherwise support their children's learning, children between 2 and 4 years of age can learn new words from video.[17-21] However, even when children do learn new words, there can be a video deficit: reduced learning relative to learning from live and interactive instruction. For infants younger than 2 years, there is little evidence of word learning from baby video, even with parent co-viewing.[22-24] Notably, a recent study indicated that 15-month-olds learned American Sign Language baby signs from video, both with and without parent scaffolding.[25]

There is also evidence that background television distracts infants and toddlers from learning during play: they direct many quick looks to the screen and show less focused attention to their toys.[26,27] They also engage less with parents, who respond more slowly to their children's bids for attention and talk to them less often using simpler and briefer utterances.[27] The potential of these reduced interactions are significant, as these provide a major route to young children's learning about language and their world more generally.[28,29]

Some have suggested that the newer mobile devices may hold promise for infant learning, as they are interactive and can be programmed to meet the goals and skills of the individual child.[30,31] For example, there is evidence from older children that well designed e-books can facilitate word learning, emergent literacy, and reading through thoughtful use of multimedia (highlighting or animating relevant parts of picture or text) and possibly hotspots on the screen that when touched, activate interactive features (such as dictionaries, word readouts or learning games).[32-34] Early research on toddlers' learning from video chat and touchscreens has yielded promising results.[35-37] However, the effectiveness of interactive devices with infants and toddlers may still rely on parent scaffolding to help children understand how information on a screen relates to real life.[38,39]

Research Gaps

Several important questions about infant and toddler learning from screen media remain to be answered.[40] Among the most important concern the nature and consequences of their interaction with mobile devices, whether and how they operate them, whether these media are better suited to support learning than are passive media like television, and whether built-in features (hotspots, artificial intelligence) can replace parent scaffolding in facilitating learning. A second issue concerns the potential of mobile devices to target the needs of individual children, and whether they might provide a useful supplement to learning for young children at risk for developmental delays or whose parents may often be unavailable. Finally, there is the thorny question of how much screen media is too much. The answer likely will depend on a judicious consideration of the characteristics of the child, the effectiveness with which good design and an awareness of how infants learn are integrated into the content, and the quality of the supportive learning environment.

Conclusions

There is little evidence that children under 2 or 3 years learn much from viewing screen media, especially if they are viewing alone.[39] Most of their learning comes from interacting with others, listening to storybooks, exploring their surroundings, and playing with toys. Screen media, and especially background television are distracting and can interfere with these important learning opportunities. The expectation that newer interactive mobile devices might be more effective than passive media such as television is a question for future research. There is also some evidence that the amount of time young children spend viewing screen media is associated with poorer

executive functions and self-regulation in the preschool years, even when potentially confounding child and family demographic factors were ruled out. Executive functions are those cognitive processes that control the regulation of attention, thought, emotion, and behaviours and they form a foundation for effective learning in very young children.[40-42]

Implications for Parents, Services and Policy

Although limited exposure to age-appropriate screen media is unlikely to be harmful, the best thing parents can do for very young children is to talk to, read to, and play with them. Parents should be aware that the marketing claims of educational benefits from infant directed media have not been substantiated. A number of websites dedicated to evaluating screen media content provide evidence-based options for viewing and are a valuable resource for parents and educators (see “Resources” tab for examples). If parents opt to provide screen media to their infants and toddlers, co-viewing with them will optimize their learning potential. If very young children view alone, they may be entertained but may not be informed. Finally, it is important to turn screen media off if no one is watching. Background television is a distraction for infants and toddlers and can impede their learning during the serious business of play.

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