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Mobile and Interactive Media Use by Young Children: The Good, the Bad, and the Unknown

Jenny S. Radesky, MD, Jayna Schumacher, MD, Barry Zuckerman, MD

The use of interactive screen media such as smartphones and tablets by young children is increasing rapidly. However, research regarding the impact of this portable and instantly accessible source of screen time on learning, behavior, and family dynamics has lagged considerably behind its rate of adoption. Pediatric guidelines specifically regarding mobile device use by young children have not yet been formulated, other than recent suggestions that a limited amount of educational interactive media use may be acceptable for children aged <2 years.[1] New guidance is needed because mobile media differs from television in its multiple modalities (eg, videos, games, educational apps), interactive capabilities, and near ubiquity in children's lives. Recommendations for use by infants, toddlers, and preschool-aged children are especially crucial, because effects of screen time are potentially more pronounced in this group. The aim of this commentary is to review the existing literature, discuss future research directions, and suggest preliminary guidance for families.

EARLY CHILDHOOD INTERACTIVE MEDIA USE: EVIDENCE AND THEORY

Educational Value

Although well-researched television programs such as *Sesame Street* or *Blue's Clues* can promote early academic skills in preschool-aged children, children <30 months cannot learn from television and videos as they do from real-life interactions.[2] Interactive media, on the other hand, allow for contingent responses to children's actions and thus may facilitate more retention of taught material. For example, socially contingent media (ie, with appropriate content, timing, and intensity) such as videophone apps are just as effective as real-life encounters in teaching language to 24 month olds,[3] but otherwise, published research on whether infants and toddlers can learn from interactive screens is scant.

Promising research suggests that interactive media such as learn-to-read apps and electronic books (e-books) may increase early literacy skills[4] by providing practice with letters, phonics, and word recognition. E-books can be useful in promoting vocabulary development and reading comprehension and could be more engaging for young children via digital scaffolds (eg, oral narration, synchronous text highlighting, and embedded sound effects, animations, or games). However, such extraneous e-book

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enhancements have also been shown to distract children's attention from the story and to interfere with comprehension.[3] In other words, the visual design, sound effects, and touchscreen interface of interactive media can either engage young children or distract them from educational content. A balance between the 2 is necessary to facilitate learning.

Distraction From Distress

The ability of mobile media to effectively distract and entertain young children is also a potential benefit of their use. Indeed, smartphones and tablets are increasingly used to help distract children during anesthesia induction or medical/surgical procedures.[5] However, the use of mobile media to occupy young children during daily routines such as errands, car rides, and eating out[6] is becoming a common behavioral regulation tool: what the industry terms a "shut-up toy." Because young children need to develop internal mechanisms of self-regulation, it needs to be determined whether mobile device use, although helpful in the short term, could be detrimental to later social-emotional outcomes when used as the principal way in which children are taught to calm themselves down.

Displacement of Activities

One mechanism by which heavy television exposure negatively affects child development is by displacing language- and play-based interactions with caregivers.[7] The instant accessibility and portability of mobile devices make them potentially more likely to displace human interactions and other enriching activities. Because thousands of apps are marketed as "educational" (without evidence for this claim), parents may feel comfortable with this relative increase in screen time. Although interactive media are well suited to teach concrete knowledge (so-called skills and drills), other important preacademic skills such as self-regulation, empathy, social skills, and problem-solving are primarily learned through children exploring the natural environment, interacting with peers and caregivers, and playing in unstructured, creative ways. Moreover, interactive media use by young children may displace sensorimotor activities (eg, manipulation, climbing, building) that support development of visual-motor skills important to later success in math and science.

Parents' use of interactive media also has the potential to distract from parent-child interactions. Parent media use usually involves work, errands, or social or other content requiring significant information processing, which makes it harder to balance attention between devices and managing child behavior.[6] On the other hand, videophone apps may enhance interpersonal connections by allowing children to maintain face-to-face interactions with distant family members or during military deployment.

Context and Parent Engagement

Like traditional media use, child use of mobile and interactive media does not occur in a vacuum. Many factors, including parenting style, socioeconomic status, and child temperament, modify the positive and negative effects of media on children's behavior and development. Most important is parent-child (or teacher-child[3]) interaction during media use: ie, how we use technology rather than the technology's qualities per se. Mobile and interactive media have great potential to promote learning through joint engagement between caregivers and children, by demonstrating ideas for parent-child activities, or by modeling teaching strategies (eg, dialogic reading, phonetic, or sound blending skills) with which low-literacy parents may not be familiar.

Research Needs

Existing research is limited, and many questions remain, such as

- At what age and what content can young children start learning from interactive media compared with experiences in the real world?
- What tablet enhancements facilitate the most learning at different developmental stages?
- Do children from low-literacy families benefit more from apps that engage the caregivers in the child's learning experience?
- Do children with self-regulation problems, whose parents might use media more to calm them down, have better or worse outcomes as a result?

PRELIMINARY GUIDANCE FOR PARENTS

Although much remains to be researched, clinicians can specifically raise the issue of interactive/mobile media use with parents of young children; in fact, parent or child mobile device use in the office commonly presents opportunities for teachable moments. As with television, it is crucial to ask how parents decide which technology and content is best for their children and how they monitor and set rules for use. Violence on mobile media should be avoided, and when encountered, children should be helped to understand it. Providers can recommend age-appropriate, educational content and suggest the use of resources such as PBS Kids (www.pbskids.org), Sesame Workshop (www.sesameworkshop.org), or Common Sense Media (www.commonsensemedia.org) to guide media choices. Parents should be encouraged to try a game or app first, play it with the child, and ask the child about it afterward to see what he or she is learning. Clinicians should strongly emphasize the benefits of parents and children using interactive media together to enhance its educational value.

In addition, asking about mobile/interactive media use provides a window into how parents help their

children learn to calm down and is an opportunity to discuss how media can either support or displace important parent-child interactions and play. Digital resources provided by early childhood organizations such as Resources for Early Learning (www.resourcesforearlylearning.org) or Zero to Three (www.zerotothree.org) can provide parents with ideas for other developmentally appropriate activities to pursue with their child, and provide alternative strategies for teaching a child to self-regulate when distressed or bored.

Television has had a clearly documented impact, both positive and negative, on children. Mobile devices, because of their portability and interactive components, are introducing media into all aspects of children's experience and deserve serious attention and research. Until more is known, pediatric providers can offer guidance on preserving quality, connected family interactions, whether through "unplugged time" or a designated family hour, and how to establish healthy childhood media habits from early childhood.

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