Using Mobile Device Sampling To Objectively Measure Screen Use in Clinical Care

Libby Matile Milkovich, MD,[a,b] Sheri Madigan, PhD[c,d]

The widespread cultural adoption of media devices (eg, smartphones and tablets) in the last decade has changed the nature of screen time and consumption in young children. The single-user platforms of media devices promote solitary use[1] and allow access to streaming videos, gaming, and the Internet: anytime and anywhere. Moreover, unlike traditional television viewing, mobile devices use gamification and persuasive design to grab and maintain the user's attention.

Media viewing is an environmental factor that has a direct impact on young children's health and development.[2–7] Unfortunately, the large majority of preschoolers are exceeding screen time guidelines[8] at a time when their learning capacity is vast. Accordingly, pediatricians have a role in guiding families in adopting healthy device habits.[9] Traditionally, clinicians have relied on caregiver reports of child screen use to guide clinical recommendations, but these reports may be inaccurate,[10] casting doubt on their utility for evaluating problematic media habits. What if clinicians could more accurately capture children's mobile device use to help families gain awareness on how digital media use may be impinging on children's health and development?

In this issue of *Pediatrics*, Radesky et al[11] are the first to trial an objective measurement of young children's mobile device use, referred to as "mobile device sampling." They used 2 modalities based on the device's operating system to gather data on device use by children between the ages of 3 and 5 years: a passive monitoring app for Android users and the battery feature in iOS devices, which captured the amount of time the device was used as well as apps used over a 7- to 10-day period. Comparing the mobile device sampling to retrospective reports from the caregivers about children's mobile device use, they concluded that caregiver-reported duration of children's unshared mobile device use had low accuracy. Specifically, approximately one-third (29%) of caregivers were accurate reporters of child screen use, whereas one-third of caregivers either over- (35%) or underreported (36%) screen usage by ±60 minutes a day.

An important caveat before a fuller discussion of the clinical implications of these findings is that the typical home has 5 Internet-connected devices (eg, tablet, smartphone, computer, etc),[12,13] possibly allowing for discrepancy in reporting use when only 1 device is monitored. Thus, although passively collecting data on mobile devices is a momentous step forward methodologically for accurately collecting screen use data, it likely does not capture the full breadth of exposure in the child's digital media ecology.[14]

In addition to revealing the inaccuracy of caregiver self-report, several additional clinically relevant trends were revealed in the study by Radesky et al.[11] First, ~15% of children were on

[a]*Division of Developmental and Behavioral Health, Department of Pediatrics, Children's Mercy Hospital, Kansas City, Missouri;* [b]*Department of Pediatrics, School of Medicine, University of Missouri-Kansas City, Kansas City, Missouri;* [c]*Department of Psychology, Faculty of Arts, University of Calgary, Calgary, Alberta, Canada; and* [d]*Alberta Children's Hospital Research Institute, Calgary, Alberta, Canada*

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Address correspondence to Libby Matile Milkovich, MD, Division of Developmental and Behavioral Health, Department of Pediatrics, Children's Mercy Hospital, 2401 Gillham Rd, Kansas City, MO 64108. E-mail: emilkovich@cmh.edu

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their device ≥4 hours per day (not accounting for other device use), which far exceeds the screen time guidelines of ≤1 hour per day of high-quality programming for preschoolers.[15] Second, unregulated video streaming services (YouTube and YouTube Kids) were the most commonly used apps (~44–113 minutes per day on average). Video streaming apps are not recommended for this age group,[16–18] making the high duration of use and popularity of these apps clinically concerning. Third, the authors report that some preschoolers were accessing and using gaming apps, as well as apps with violent content (eg, *Terrorist Shooter* and *Flip the Gun*), which have been correlated with increased aggression and interest in guns.[19,20] Taken together, these findings point to the need for pediatricians to be aware of their pediatric patients' device use.

Methodologically, the study by Radesky et al[11] moves the field forward to more accurately understanding children's mobile device use data. But what does mobile device sampling mean for pediatricians who seek to accurately understand their patients' media use to facilitate guidance on managing their digital media ecology?

Mobile device sampling can accurately reveal trends in a patient's duration and content of media use, which could help a pediatrician identify specific targets for intervention. Removing reporting bias improves the clinician's ability to formulate relevant interventions, creating opportunities for conversations about the reality of implementing technology use interventions. For example, if the content of app use is gaming related, violent, or developmentally inappropriate, the pediatrician can guide caregivers and children to access and use age-appropriate content. Similarly, when the duration of use exceeds the screen use guidelines, pediatricians can work with caregivers in developing and sustaining a family media plan.[21] Mobile device sampling could also be used to accurately track intervention progress over time.

The potential benefits of mobile device sampling need to be balanced with the caregiver's acceptance of this potentially useful clinical method. Moreover, the feasibility of adopting this method clinically needs further consideration given the pediatrician's time constraints with patients. Therefore, future research should be used to address the acceptability and feasibility of mobile device sampling to elucidate its appropriateness for clinical use.

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