

ScreenQ: An Efficient, Valid Means to Assess Screen-based Media Use in Children

A new study examines the effectiveness of a measure of screen-based media use in children called the ScreenQ. The study findings will be presented during the Pediatric Academic Societies (PAS) 2018 Meeting.



"In a single generation, the explosion of screen-based media has transformed the experience of childhood, from TV and videos, to an unlimited range of content available at any time via portable devices that can be challenging to monitor," said Dr. John S. Hutton, one of the authors of the study. "The emergence of these technologies has far outpaced our ability to quantify its effects on child development, human relationships, learning and health, fueling controversies among parents, educators and clinical providers. The ScreenQ is a novel measure of screen-based media use in children intended for pediatric clinical use, incorporating evidence-based factors known to influence these effects, including access to screens, frequency and context of use (e.g., meals), content (e.g., violent versus educational) and co-viewing with grownup caregivers."

This study involved 27 healthy children from employee families at an academic medical center (15 boys, 12 girls; mean 57 ± 7 months old, mid/high-SES). A 17-item version of the ScreenQ was developed applying a conceptual model of screen-based media use involving aspects

cited in American Academy of Pediatrics (AAP) guidelines: access, frequency (e.g., age of use), content and interactivity (e.g., co-viewing). Responses were categorical, except for frequency, where numerical response was converted into a categorical score. Higher scores reflect greater risk. Validated measures were administered as criterion-referenced standards, including the EVT and PPVT (language), BRIEF-P (executive function), BASC (behavior), and StimQ-P READ home reading environment survey. Modern theory Rasch methods were used to evaluate items for smoothness, modality, difficulty, polarity, density and outliers. Preliminary indices of internal consistency were estimated using Cronbach's, and of validity using a Spearman-rho correlation coefficient with criterion-referenced standards (<0.05). Items failing one or more of these criteria were eliminated.

The study found that applying these methods, the ScreenQ was reduced to 10 items (three access, two frequency, three content, two interactivity). The reduced version demonstrated strong internal consistency (Cronbach's $=0.63$), good person- and item-level reliability, and variability in Logit endorsability. While non-significant, ScreenQ scores

were negatively correlated with StimQ-P (-0.17), PPVT (-0.17), EVT (-0.17), and positively with BRIEF composite (0.20) and BASC (0.22) scaled scores. Kolmogorov-Smirnov tests revealed near-normality for ScreenQ scores ($p=0.14$), but not for StimQ-P ($p=0.03$).

Preliminary evidence suggests that the ScreenQ is an efficient, valid means to assess screen-based media use in children in the context of AAP guidelines and cognitive-behavioral risks, warranting further development.

A related study by Dr. Hutton, to be presented as a platform at the PAS 2018 Meeting, is the first to use magnetic resonance imaging (MRI) to explore the influence of story format (audio, illustrated, animated) on the engagement of brain networks supporting language, visual imagery and learning in preschool-age children.

AAP recommends that parents begin reading to their children as soon as possible after birth, and provide limits on screen-based media use. In addition to TV, screen-based story platforms with animated features are

increasingly marketed to children, yet the influence of animation on brain development is unknown. The purpose of this study was to determine whether there were differences in the engagement of functional brain networks supporting narrative processing for stories presented in audio, illustrated and animated format.

Key findings suggest a "Goldilocks Effect," where audio may be "too cold" at this age, requiring more cognitive strain to process the story, animation "too hot," fast-moving media rendering imagination and network integration less necessary, and illustration "just right," limited visual scaffolding assisting the child while still encouraging active imagery and reflection.

"They underscore the appeal of illustrated books at this age, raise important questions about the influence of media on early brain development, and provide novel context for AAP reading and screen time recommendations," said Dr. Hutton.

Disclaimer - All information and content on this site are for information and educational purposes only. The information should not be used for either diagnosis or treatment or both for any health related problem or disease. Always seek the advice of a qualified physician for medical diagnosis and treatment.