Growing Up Digital: Media Research Symposium

Technologic innovation is a dynamic, disruptive force that has transformed the role of media in the lives of children and adolescents from the limited silos of television, movies, and books to the expansive and ubiquitous universe of digital media. Children and teens are "digital natives," drawn online from infancy to engage in an ever-changing digital ecosystem that is enhanced by mobile media. For the first time in our history, user-friendly and easily accessible screen media are committing our youth to a broad social learning and behavioral experiment.

For over 30 years, the American Academy of Pediatrics (AAP) has studied the impact of various media on children and teens, and used evidence-based research data to advocate for media education to promote healthy and positive media use. The Academy's recommendations include basic parameters such as co-viewing television (TV) programming by parents and children, eliminating electronic screens from bedrooms to optimize sleep hygiene, considering daily screen time limits, discouraging screen use in children under age two, and informing and educating families about media rating systems.[1, 2, 3, 4, 5, 6, 7]

Yet today, even the phrase "screen time" has become an antiquated term. The 2013 Zero To Eight study commissioned by Common Sense Media showed that 38 percent of infants younger than age two use mobile devices like smartphones.[8] A 2015 Pew Research Study reports that 73 percent of 13-17-year-olds have smartphones and 24 percent admit using their phones almost constantly.[9]

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Children, Adolescents, and Media on the AAP Agenda for Children

In 2012, the AAP elevated the issue of children, adolescents, and the media to the utmost importance when it was designated as a strategic priority in the Academy's Agenda for Children. The goal is to promote research, education, and advocacy to better understand media's effects on children and foster positive change through pediatric practice and outreach.

As part of this work the AAP convened the invitation-only *Growing Up Digital: Media Research Symposium,* which was held on May 2-3, 2015 in Rosemont, Illinois. The event, supported by the AAP's Friends of Children Fund, brought together leading social science, neuroscience, and media researchers, educators, pediatricians, thought leaders, and representatives from key partner organizations.

These key stakeholders discussed how children and adolescents currently interact with today's rapidly evolving digital universe and assessed the existing evidence base reveals about how their access and media use affects their physical, cognitive, social, and emotional health. The Symposium's goal was to evaluate the state of known data on this subject, identify areas where additional research is needed to inform the efforts of pediatricians and other health experts, and consider strategies to thoughtfully advise parents based on the available evidence.

Acknowledging the breadth of the subject matter, the Symposium focus was limited to three specific "pillars" reflecting areas of interest:

1. *Education & Early Learning*: the developing brain's responses to virtual learning and the dilemma of interactive media device use by children under age two.
2. *Health & Developmental Impact:* the physical, social, emotional, and educational health advantages and challenges of digital media, including gaming and game theory.
3. *Societal Impact & Digital Citizenship:* the impact of growing up as digital citizens, including the values imparted by social media, security and privacy concerns, media literacy, and digital citizenship.

Presentations and Discussion

Education and Early Learning

Vicky Rideout, MA President of VJR Consulting, delivered the keynote for the *Education and Early Learning* pillar. Ms. Rideout asserted that the Symposium's work was vitally important, because all forms of media have become such a critical part of children's environments. The AAP has a uniquely important and influential role in shaping public opinion on child health and well-being. She urged the AAP to adhere to an evidence-based process in developing clinical recommendations, beginning with a systematic research review on relevant topics. She also stated that screen time should be classified in terms of consumption, creation, and communication, and that the specific content and context of media use should also be considered.

The first panel, *Brain Mechanics, Learning Models, and Virtual Learning*, focused on child development and how learning theories apply to media use. While children under 18-30 months of age are using digital devices, personal interactions with parents and caregivers are more educational.[10] A panelist presented neuroscience research on infant language development, demonstrating that infants under 12 months of age learn from live presentations, but less effectively from video. From 12-24 months of age, children begin learning some language from video, but live presentation is far superior.[11] It is clear that very young children need "contingent interaction" — two-way social interchange — to promote learning. The more screen media mimics live interactions, like video-chat, the more educationally valuable it is likely to be. Another panelist highlighted a study of toddlers from 24-30 months of age who were able to learn novel words via video-chat conversation. By comparison, "yoked" (passive) video presentation did not lead to language learning in these children.[12] Research is exploring novel techniques that may allow improved learning in this age group.[13] Panelists agreed that parent and child's co-viewing and co-participation with media facilitates any educational experience gained from media activities in the youngest children.

Panelists emphasized that developmentally optimized media can be beneficial for young children, and is a proven learning tool for children over age two. It may play a key role in bridging the learning "achievement gap" noted among low-income, disadvantaged, and underserved populations. Digital media can be used to facilitate executive function, build self-control and problem-solving skills, and improve children's ability to follow directions. Industry leaders recommended creating media for a dual audience (i.e., both parent and child) to facilitate family participation in media use and model more effective social and learning interactions.

The next panel, *Early Learning and Media Use in the Very Young*, addressed the context of learning and interactivity. While 80,000 apps are currently labeled as "educational," little research has been conducted on their quality; few or-

ganizations review, endorse, and oversee age-appropriate apps.[14] Parents need information about resources to assess the quality of apps purporting to foster interactive engagement and meaningful learning. Experts cautioned that engagement with interactive media requires more than "pushing and swiping" to be educational. Panelists suggested that stakeholders must recognize that there are cultural and educational differences among children and families and they should support parents' role in selecting and using media.

Panelists reiterated that media content matters more than the media platform or time spent with media. If quality content is available, the child's interactions with media can have a positive impact. While new digital applications may offer learning opportunities, the potential for them to displace less-structured opportunities for developmental stimulation (such as free play) remains a concern, particularly in very young children.[15] A body of multidisciplinary work contends that boredom stimulates creativity. It would, therefore, be beneficial for future research to explore what constitutes the best environment for optimal developmental stimulation for young children. The burden of proof lies with research to validate digital technology's benefits.

Health and Developmental Impact

Debra Lieberman, Ph.D., director of the Center for Digital Games Research at the University of California, Santa Barbara presented the keynote in the *Digital Media's Health and Developmental Impact* pillar. She reported that well-designed games can improve learning, skills, self-concepts, and attitude and behavior change. Games can foster safe experimentation, interactive learning, self-efficacy, and deeper understanding of one's health risks — which can ultimately improve health behaviors and outcomes. Games can also be springboards for discussion, leading to stronger relationships and social support. Dr. Lieberman offered examples of well-researched, effective health games that address various health topics and populations, and studies indicating that players put greater effort into games because they pose compelling challenges. She urged the AAP to teach media literacy, develop a research agenda, and advocate for federal funding to support media research and development. She encouraged pediatricians' engagement in the design and implementation of health media and games for children and their families.

The next panel, *Gaming for Good / m-Health,* addressed games' enormous potential for educational and health outcomes, which is just beginning to be researched in children. Although this is a burgeoning field, social science research suggests that digital gaming can improve mood; reduce stress; and promote pro-social skills from games that re-

ward cooperation, support, and helping behaviors.

Panelists noted that digital media offer the same play opportunities as non-digital games: to use one's imagination; identify goals; and create a sense of control, mastery, and community. Games (including digital games) provide children with a realistic expectation to view failure as a learning opportunity and gain the benefits of patience, perseverance, and self-control. Since children's digital media use is normative (and can be powerful and motivating), professionals should take advantage of this medium for health assessment and potential intervention.

The next panel, *Media and Violence: Influence on Social and Emotional Development,* explored the impact of violence and aggression in digital media. Panelists described extensive research validating that media violence is a risk factor for aggressive behavior. Meta-analysis studies reveal that playing violent video games is associated with increased aggressive behavior, hostile affect, physiological arousal, aggressive cognitions, and reductions in pro-social behaviors/desensitization in a majority of study participants.[16, 17, 18, 19, 20] The manifestation of these individual behavioral traits, however, depends on variables including the child's home life, self-esteem, support network, health, and temperament. Unfortunately, it is less clear how to categorize and mitigate these risks and reduce potential harm.

Panelists stressed that parents take an active role in guiding their children's digital media consumption. Improved parental awareness of high-quality media may encourage changes in the gaming marketplace, building consumer demand for healthier products.

Societal Impact and Digital Citizenship

Michael Rich, MD, Director of the Center on Media and Child Health at Harvard University, delivered the keynote in the *Societal Impact & Digital Citizenship* pillar. He stated that media (including social media) are now a fertile ground for teen development. Teens use media to foster independence, engage in vicarious experiences, discover and validate their identities, and participate in social justice efforts. Online experiences help them build connection, community, and creativity. Traditional adolescent development now involves using (and sometimes misusing) new digital tools. He pointed out that children will make mistakes, in every environment — including media — and can learn from them.

The next panel addressed *The Digital Social Lives of Teens.* Panelists noted that teens do not live in a dichotomy of "real world" versus "online" lives; both are integral to their development. Social media can support teens by providing connections to family and friends, fostering support net-

works, facilitating identity formation, and exposing teens to multiple perspectives. Social media connections exist on a sliding scale of potential effects from positively supporting youth who are struggling with issues — like obesity, illness, sexual identity, or isolation — to negatively modeling harmful behaviors like cutting and eating disorders. One social science researcher asserted that many teens report their online friends are less judgmental and more supportive than their in-person friends.

Panelists advised health care providers to ask teens about their social media use, including what platforms they use, and use motivational interviewing to help patients identify how their digital life helps them reach their goals. Panelists acknowledged that parents cannot realistically monitor the entirety of their teen's media use. Good parenting strategies, like limit-setting, are applicable in a child's online and offline world. They advised parents to establish and teach their teenagers appropriate behaviors that apply in both the real and online worlds.

Researchers described negative outcomes of digital media use, including cyberbullying, self-harm, and sexting. They noted that cyberbullying often resembles in-person bullying in terms of its negative emotional and social impact, but may be worse due to anonymity and the network effect. Panelists noted that youth need to learn the concept of digital citizenship, including on-line etiquette, their social and personal impact, and their lasting digital footprint. To assist with this goal, anti-bullying programs should address all environments and modes where bullying occurs.

Self-harm is another area of concern with digital medial use. Social media sites work diligently to identify and trace self-harm posts (including pro-anorexia or pro-cutting behaviors), although these efforts have been largely ineffective. Teens still go online to exchange tips on concealing and continuing these activities. Health care providers should be aware of these trends and discuss social media use with patients to identify at-risk youth.

Although the media have portrayed sexting as a common problem caused by digital technology, research suggests that very few teens have engaged in it (3 percent of boys and 6 percent of girls aged 13-18 by self-report). Experts noted that health professionals may be more successful in addressing sexting if they view it as another expression of adolescent sexual development and exploration.[21] Sexting signals a need to assess youth for other risk-taking behaviors, and provide guidance on the potential adverse social and legal ramifications, however.

The final panel, *Safety and Citizenship*, addressed digital media's impact on teens' social lives and community. Youth use mobile and digital technology for many purposes, in-cluding building their civic voice and political efficacy. These explorations in the digital world are not very different from those by earlier generations; the platform differs, not the behaviors. While there is both risk and opportunity online, experts acknowledged that risk is not always negative, and opportunities to fail safely can be valuable. Parents should strive to understand social media etiquette and privacy safeguards and pro-actively discuss them with their children.

Overarching Themes

1. *The AAP is a trusted translator.*

Many participants stressed that the AAP is a trusted translator that interprets research about digital media for parents and other stakeholders. Researchers urged the AAP to not shy away from unpopular recommendations and to formulate policy guided by the best available research.

Recommendations included the need for the AAP to:

- Be transparent and acknowledge when data are inadequate;
- Focus on the *context* of digital media use rather than platforms, taking into account whether the use is passive or active, consumptive or creative, and isolating or community-building;
- Recognize one size *doesn't* fit all with respect to digital interactions: many speakers noted that the diversity of youth, families, and communities will influence resilience factors and vulnerabilities.

2. *Parents should model responsible media use and establish family media plans that support balance, boundaries, and communication.*

Experts agreed that parents can model appropriate technology use to their children. Parent-led family media plans should include clear boundaries about children's media content (including TV) from an early age as well as sound time management practices fostering life balance. Parents should let their children teach them about media and participate with them. Media should be viewed as a tool rather than a babysitter, reward, or punishment. Parents' ability to connect with their children offline is crucial, as well.

3. *Content matters.*

Participants identified potentially positive and negative outcomes from digital media use. For example, panelists noted that digital media can either help or inhibit young children's development of executive function skills, depending on how media are used. Digital media that distract from social interactions (e.g., background TV, parents' media over-use) clearly impair learning, while other media (e.g., Skype, Facetime) can promote social interactions and learning.

4. *Diversity matters.*

Speakers noted that digital media today reflect the real world as children perceive it. Cultural diversity must, therefore, be built into digital media, not added later as an afterthought. Cultures should be represented richly and with integrity and dignity. This is another potential opportunity for children to learn about the world through screen media.

5. *Growing up digital presents opportunities and risks.*

Today's youth see no boundaries between their real and "virtual" lives; digital media extend, rather than displace, their interpersonal relationships. These media can promote cooperation and team-building in unprecedented ways. On the other hand, digital media can foster unhealthy and negative personal and social outcomes. Teaching teens appropriate use optimizes positive outcomes. Speakers noted a growing concern about problematic digital media overuse (i.e., risky, excessive, or impulsive use), which is often associated with other mental health morbidities like depression and anxiety;[22] these mental health co-morbidities should be investigated and addressed.

6. *Gaming, gamification, and m-Health*
   can be powerful learning tools.

Media and games are powerful tools for learning because they help youth work towards rewards; experience failure (which is critical for learning); engage in experimentation and rehearsal for real life experiences; and help build a scaffolding of skills. Significant data demonstrate that games can improve pro-social behavior, activity, and disease management. Yet, the relationship between media violence and aggressive/violent behavior also remains strong and warrants attention.

7. S*creen media can adversely affect sleep.*

One troubling health effect of digital media is that it can negatively impact sleep. [23] Many children take screens into their bedrooms: one-third of children under age three have a TV in their bedroom[24] and 72 percent of 6-to-17-year-old children have at least one screen in their bedroom.[25] Because the light from screen media disrupts melatonin secretion, using screens before bedtime and keeping them in the bedroom overnight may delay sleep onset; shorten sleep duration; and interfere with achieving deep, restful sleep.[26] Sleep deprivation is strongly associated with obesity and poor academic performance. Digital media use's correlation with poor sleep reinforces many AAP media policy recommendations to avoid technology at bedtime and throughout the night.

8. *Screen media has the potential for overuse.*

Potentially addictive behaviors related to Internet use and gaming are another concern. Some teens can demon-

strate classic addiction behaviors with media use: increasing tolerance, withdrawal symptoms that disappear when they are allowed back online, excessive use, and a willingness to risk negative consequences (i.e., withdrawing from community) to engage in the activity. Clinicians should screen children who display signs of dependency and social or functional impairment.

Recommendations for Parents

Speakers offered many helpful recommendations for parents and other stakeholders during the Symposium, including:

- **Set limits at every age.** Limit-setting is key in digital media use — just like in diet, behavior, sleep, and parenting in general. Parenting strategies are the same across various environments, including screen media.
- **Avoid displacement.** When using digital media, caregivers should consider what it is displacing, and strive to maintain protected time for conversation, play, and creativity.
- **Address digital etiquette.** Children and young adults must learn that online interactions should follow the same social guidelines as face-to-face encounters. Conversations about appropriate content, etiquette, empathy, and safety should occur early to provide a foundation for *all* digital media use.
- **Engage in using digital media together.** Parents were advised to let their children show them what they are doing online; this helps children feel empowered and helps the parent learn while both are engaged. While classic parent-child activities like reading a story or playing a game look different in digital formats, it remains important to value time spent together.
- **Create definitive media-free zones.** Create *media-free zones* such as during meal times and at bedtime, and set aside specific days or hours as "media-free" periods. Parents should also eliminate background TV, which dramatically reduces conversation or "talk time" with children.
- **Model media behaviors.** Adults need to be attentive to their own personal digital media use (or over-use). Parents and other caregivers may ignore their children when using their own devices, and parental behavior provides strong modeling for children's behavior, including adult digital media use.

It was noted that every media interaction is an opportunity and a possible teachable moment. Parents should recognize that teens are likely to make mistakes online — as they do offline — and that such mistakes present opportunities for learning and growth.

Recommendations for Pediatricians

Participants noted that pediatricians have a unique opportunity to begin conversations in the exam room that can lead to important dialogues between parent and child about how to become better digital citizens. Unfortunately, only 16 percent of pediatricians ask families about their media use, a percentage that has not increased over the past two decades.[27] Parents need help identifying good versus less-optimal content and digital media's role in developing children's lives. Content, context, engagement, and learning are critical components of positive outcomes, and these should be the measured parameters.

Pediatricians can help parents understand that children have to learn self-regulation and can support parents in setting limits on overuse of all types — including overuse of digital media. Advice on achieving this goal and minimizing family distress can be valuable. Pediatricians can also help parents to become effective advocates with their children's schools for media literacy education and interactive learning-effective programming.

In addition to AAP policy statements, the *Adolescent Medicine: State of the Art Reviews (AM:STARs)* on social networking and new technologies provides useful information for pediatricians.[28] Additional resources pediatricians can recommend to help families evaluate digital media content include those provided online by Common Sense Media, Children's Technology Review, Center for Digital Games, Center on Media and Child Health, and Too Small to Fail. The AAP will continue its long-standing efforts to assist pediatricians and caregivers in addressing children's digital media use.

Recommendations for Educators

Educators can play a key role in teaching media literacy to their students. As technology rapidly enters the classroom, educators may guide students to engage in appropriate, positive, and safe ways to utilize these helpful digital resources.

Future Directions

There is a clear need to direct more research funding to issues surrounding children's exposure to and use of digital media. Many unknowns remain regarding media's role in children's development. Among the many digital media topics that will benefit from additional research include the impact of multitasking, data privacy, demographic targeting, operationalizing digital literacy, digital media use's impact on short- and long-term memory, and what learning looks like with a digital interface. Pediatricians and other child advocates can advocate for and support the production, selection, and implementation of high-quality media for children and adolescents. They can, additionally, establish evidence as the norm by identifying research priorities and research partners.

The Symposium participants committed to form a new entity under the auspices of the AAP — the Children's Digital Media Alliance (CDMA) — to extend and enhance the relationships and conversations that occurred at the Symposium. This multidisciplinary collaboration will facilitate a broadly informed approach to developing future AAP policy statements and issue briefs on children's and adolescents' digital media use. Additionally, children's digital media use will be the subject of a one-day seminar at the AAP's 2016 National Conference and Exhibition (NCE).

In order to address this critical area of child and adolescent development, future AAP activities will include efforts to:

- Evaluate and provide updated guidance for caregivers, educators, and other stakeholders on the use of digital media among children and adolescents, including use among children under age two. Recommendations will be based on the best available evidence, but it is clear that parents will need thoughtful guidance before long-term outcome data are available;

- Develop clear and practical tools to help families plan and oversee digital media use, including information on how to curate content and a balanced digital media "diet;"

- Support research on early brain development and other topics related to digital media use, on the part of federal agencies (i.e., National Institutes of Health [NIH], National Science Foundation [NSF]), philanthropic entities, academia, and think tanks;

- Collaborate with hardware and software industries to continue efforts to promote Internet safety for all children and teens;

- Continue working with pediatricians and other health professionals to address the health impact of digital media use on children and adolescents.

Children now spend more time with digital media than with any other single influence. It falls to pediatricians to address the impact of this evolution on both parents and children. Pediatricians are both trusted and well-positioned to play a key role in helping children, families, and other stakeholders to promote and facilitate positive digital media experiences. The AAP can reinforce that parenting strategies remain the same across all environments and platforms, both online and offline. The AAP's Strategic Plan on media signals the organization's long-term commitment to research, advocacy, and outreach efforts to ensure the optimal health of children growing and learning in an evolving digital world.

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