

SEED Study to Explore Early Development

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Dr. Jenny Radesky

Experts advise limits on children's media use

Children today have more media choices than ever, with new options introduced all the time. Traditional TV, desktop

computers, and in-home DVD players seem almost quaint compared with the array of content available through tablets, in-vehicle players, smart phones, and gaming devices. Without limits, overuse of media can negatively impact young children's social, emotional, and physical development. Experts say it is particularly important to monitor media use for children with developmental challenges.

In 2016, the American Academy of Pediatrics (AAP) released its newest advice on children's media use, encouraging caregivers to put hands-on playtime first for babies, toddlers, and preschoolers. Young children need "unplugged" playtime in which they can physically explore their surroundings and interact socially with their caregivers, the AAP advised. The first AAP guidelines, from 1999, called for no digital media use for children under 24 months. The newer advice suggests that children ages 2-5 have no more than 1 hour a day of screen time with high-quality content such as Sesame Street or other PBS children's programming. The AAP also says that caregivers should watch with children, to help them understand the content and apply it in real life.

The media landscape has changed drastically since the AAP first offered screen time advice in 1999, said Dr. Jenny Radesky, a University of Michigan behavioral pediatrician who was the lead author of the new AAP policy statement about media use by babies, toddlers and preschoolers. While prior guidelines focused only on time spent using media, the 2016 update is more nuanced. It still addresses time, but also addresses the type of media, the content, and whether the media use is shared between child and caregiver. For example, a caregiver helping a child visit with her grandparents via Skype is different than having that child spend time alone watching a video.

The rapid spread of media options is startlingly evident in data released in fall 2017 by Common Sense Media. The nonprofit group surveyed a nationally representative group of 1,400 U.S. parents about their children's media use in 2011, 2013 and 2017. These children's ages were from birth to 8 years. Common Sense Media found that 95 percent of children live in a home with a mobile device, up from 41 percent in 2011. Kids spend an average of 2 hours and 20 minutes a day on screen media, with 48 minutes of that time on mobile devices.

Dr. Radesky treats young patients with autism and other developmental disabilities. "I started to get very interested in digital media use by young children because I saw how much, in clinic, it was being used as a behavior management tool," she said. Some parents offered a child a digital device as a planned strategy to pass time in the waiting room or to occupy the child while the parent and doctor spoke. Others, however, offered a device as a last-ditch effort to calm an upset child. Dr. Radesky believes that it's better to help a child build internal regulation strategies, rather than calm the child with distraction after a tantrum has begun. However she understands that parents at times may need to use a device to reduce distress. "We've all been there," she says, thinking about times when a parent needs help getting their child through a traffic jam or worship service without a meltdown. But she hopes that parents will become more aware of when and how their children access media -- and that they will avoid using it as a default. Children need opportunities to interact with others and to learn to self-regulate their emotions and behavior. In the midst of a tantrum, giving a child a mobile device misses a key chance to coach a child to control himself.

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Children 18 months and younger	Avoid screen media other than video chatting. If you do introduce digital media, choose high-quality programs that you watch with your child to help them understand.
Children ages 2 to 5 years	Limit screen use to 1 hour a day of high-quality programs that you watch with your child to help them understand what they're seeing and how to apply it to the world.
Children age 6 and older	Be consistent about media time limits and types of media. Ensure media use doesn't interfere with sleep and physical activity.
All children	Create media-free times such as dinner and media-free areas, such as bedrooms.

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Centers for Disease Control and Prevention
National Center on Birth Defects and Developmental Disabilities

More Information:

To learn more about ASD, please visit: www.cdc.gov/autism
To learn more about SEED, please visit: www.cdc.gov/SEED



10 Years of SEED: Moving from Data Collection to Analysis...

In December 2007, SEED enrolled its first study participants. From 2007 to 2012, more than 3,000 children and their caregivers enrolled in the first phase of SEED (SEED 1), and over 2,500 of them completed most study steps.

Once data collection was finished, the SEED Data Coordinating Center at Michigan State University, the CDC, and researchers from all SEED sites carefully reviewed the data to get them ready for study analyses. The full set of SEED 1 data files were ready by 2015 and researchers began working on many different studies to:

- better understand risk factors for autism spectrum disorder (ASD)
- assess the health of children with ASD and other developmental disabilities
- explore the range of developmental characteristics among children with ASD.

More than 20 SEED studies have now been published. We have compiled brief summaries of all of the published studies in a special supplement to this newsletter. Additionally, we have chosen two studies for special focus articles in this newsletter:

- how self-injurious behaviors impact children with ASD.
- how the SEED data on biomarkers provides insight into the effects of smoking in pregnancy.

Many more SEED 1 studies are currently underway and are expected to be published soon. We will continue to provide summaries of all of our published studies in future newsletters.

And, that's just the beginning. The second phase of SEED data collection (SEED 2) took place from 2012 to 2016. The numbers of families who enrolled in and completed SEED 2 study steps were about the same as for SEED 1. Thus, over 5,100 children and caregivers are included in the combined SEED 1+2 data files. These data files were recently prepared for data analyses, and many new studies are now being initiated. With the expanded SEED 1+2 sample, researchers can conduct more detailed assessments of some risk factors. They will also be able to assess some risk factors and health conditions that occur fairly infrequently and thus, were not possible to look at before.

It's been 10 years, and SEED is still going strong. Our third phase of data collection (SEED 3) is underway, and we are seeing the fruits of our labors with the many studies already published or soon to be published. We thank all the participants for their efforts. Because of you, we are learning so much about how ASD affects families.

What to know when children injure themselves

Some children with autism or intellectual disabilities may hurt themselves by engaging in different types of behaviors, such as head-banging, hair-pulling, arm-biting, scratching and hitting themselves. These "self-injurious behaviors" (SIB) are different from the harmless head banging and rocking that some young, typically developing children engage in to help themselves fall asleep. In typically developing children, these harmless SIB generally disappear by age 3 years.

For most children with developmental disabilities, SIB is mild. But for some children, SIB can be severe and result in cuts, bruises, concussions, and infections. Children with severe SIB may miss out on educational and social activities. SIB can also be very upsetting for the child's family. Parents of children with SIB may feel that they are unable to take their child anywhere or to have visitors.

A recent study by a group of SEED investigators led by Dr. Norbert Soke looked at parent-reported SIB among children with autism spectrum disorder (ASD) and examined different characteristics that may be more common in children who display SIB. Dr. Soke found that the parents of about 28% of children with ASD said their children currently displayed some forms of SIB and 47% reported that their child had SIB now or in the past.

There are many reasons why children may engage in SIB. In SEED, Dr. Soke found that both having current SIB and ever having SIB were associated with problems performing activities of daily living, as well as gastrointestinal, sleep, and behavioral problems (e.g., aggression, hyperactivity). These findings have also been reported by others in the past.

The causes of SIB are not fully understood. Both biological (e.g., genetics and illness) and non-genetic factors (e.g., difficulty interacting and communicating with others) may be involved. Children who have trouble coping with frustration because of their inability to perform routine activities and who have limited communication skills may use SIB to express frustration. Similarly, some children may use SIB to express pain, such as when a child pinches his stomach in response to abdominal pain. SIB may also occur when a child hurts himself in order to avoid something he doesn't want to do or to get something he wants. Children who are tired or distressed may be prone to SIB.

Identifying and treating SIB early may reduce the likelihood of more severe problems later. However, parents and professionals may not recognize early signs of SIB as a potential problem. Some parents have told us that when their child's SIB is frequent but not severe, they can lose track of how often it occurs.



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Because medical providers who see the child infrequently may not be aware of the problem, it is important for parents to let their children's providers know SIB is occurring. It's also worth asking staff at children's educational and therapy programs if they also see the behavior. Sometimes parents are worried that calling attention to their child's self-inflicted injuries may result in them being viewed as negligent or abusive. However physicians, educators and therapists who know about autism are not always aware that SIB is a common problem among children with ASD.

The treatments for SIB vary depending on its cause. Treating an underlying medical problem (e.g., gastrointestinal, sleep, and sensory issues) may reduce SIB. If the cause is emotional or behavioral, a behavior therapist can suggest ways to limit the behavior. Typically the behavior therapist will conduct a functional analysis to uncover relationships between the SIB and the child's physical and social environment. If a child is responding to an aspect of the physical environment such as a noisy room, steps can be taken to reduce the noise and possibly increase the child's ability to tolerate the activity around him. Where frustration or anxiety are found to contribute to SIB, a calming activity may be helpful. Developing strategies that prevent the SIB can also be valuable. For example, when a child reacts with SIB to certain types of situations, finding strategies to minimize the emotional reaction can be helpful. In addition, psychiatric medications may help reduce irritability and anxiety, which can reduce emotional upsets and SIB. Interventions that focus on improving the child's communication skills or the use of alternative ways to communicate may also reduce SIB in some children.

Advice for parents about SIB ---

When are Head Banging and Rocking a Problem?

<https://my.clevelandclinic.org/health/articles/pediatric-body-rocking>

Challenging Behavior in Autism

<https://iancommunity.org/aic/challenging-behavior-autism-self-injury>

Applied Behavior Analysis (ABA)

<https://www.autismspeaks.org/what-autism/treatment/applied-behavior-analysis-aba>

Medicines for Treating Autism's Core Symptoms

<https://www.autismspeaks.org/what-autism/treatment/medicines-treating-core-symptoms>

Soke, GN., Rosenberg, SA., Rosenberg, C., Vasa, Roma, Lee, L-C, and DiGuseppi, C. (2017). Self-injurious behaviors in children with autism spectrum disorder enrolled in the Study to Explore Early Development. *Autism*, 1-11.

SEED Results: Preschoolers' DNA reflects moms' smoking in pregnancy

A study of SEED data published in the *Journal of Environmental Research* found that certain markers on preschoolers' DNA hint at whether their mothers smoked during pregnancy. These are called epigenetic biomarkers. The point of the study was not to assess whether smoking raises the risk for ASD, but rather to develop a way to measure things that happened during pregnancy.

In the study, Dr. M. Daniele Fallin, the lead investigator at the Maryland SEED site, co-investigator Dr. Christine Ladd-Acosta and their colleagues tested the DNA of 531 SEED preschoolers. They compared epigenetic biomarkers in the DNA to mothers' answers about smoking in pregnancy. They found the biomarkers could predict mothers' smoking 81 percent of the time.

The research focused on smoking for two reasons. First, moms generally recall if they smoked during pregnancy, even years later. Second, past studies using DNA obtained from babies at the time they were born had found evidence that prenatal smoking leaves epigenetic marks. The SEED study took this a step further by showing that those markers were still present years later. Thus, it is possible to predict whether a mother smoked during pregnancy based on the DNA of a child as old as 5 years.

"If you have a blood sample, you may be able to ask research questions that you could never ask before," Fallin says. For example, it may be possible to tell whether a child's mother was exposed to unknown infections or toxic chemicals during pregnancy – such as chemicals in drinking water or from materials such as plastics. These types of exposures can be difficult or costly to obtain using existing research methods. Ladd-Acosta says, "If we can use this method to learn about past exposures, we may be able to better understand how diseases develop and help to prevent them."

The journal's editors chose the study as their top paper for 2016. The study is Ladd-Acosta C, Shu C, Lee BK, Gidaya N, Singer A, Schieve LA, Schendel DE, Jones N, Daniels JL, Windham GC, Newschaffer CJ, Croen LA, Feinberg AP, Daniele Fallin M. Presence of an epigenetic signature of prenatal cigarette smoke exposure in childhood. *Environmental Research* 2016 Jan;144(Pt A):139-148.



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Center for Autism and
Developmental Disabilities
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Highlights of SEED Progress

SEED 3 is beginning to grow!

The families joining SEED 3 are adding to the knowledge gathered in SEED 1 and SEED 2! More than 5,100 families finished the first two phases of the Study to Explore Early Development. The data from new families who finish SEED 3 will help us get a better idea of what puts children at risk of developing autism spectrum disorder.



1 leaf = 100 families
who finished

SEED 1

SEED 2

SEED 3

Goal = 21 leaves

Watch for future newsletters to see how SEED grows and visit www.cdc.gov/seed to see all the editions of the SEED newsletter.