



## **Screen time for young kids: What are growing minds missing?**

Overuse of media devices might impact white matter in developing brains, research shows. But it's less about screens and more about the interactions that young children aren't receiving.

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Robin Chenoweth: If you have ever raised young children, you've probably found yourself in this situation. Jim Lingo, Career Development Manager in the College of Education and Human Ecology, describes the moment.

Jim Lingo: I think most parents know there's always those times of the day where it's just like, you can't even say, like, what just happened? Like, I don't even know. Everyone just turned; honestly, everyone is losing it; everyone ... either they're hungry or tired or something's going on.

Robin Chenoweth: And why are grocery stores a vortex for all that toddler drama?

Jim Lingo: We're just trying to get to the checkout line in Costco.

Robin Chenoweth: Enter the Great Distractor, at the ready in every parent's pocket to play videos or math games or whatever. Technology to the rescue.

Jim Lingo: Like, let's just put on, put on this real quick. We get to the line; we can check out; we get in the car; get him a snack and we can go there.

Robin Chenoweth: I should note that Lingo's wife is a speech language pathologist. So, the couple is really tuned in to how children's brains develop. Their 2- and 4-year-old children don't get much screen time. But let's be honest with ourselves. Having raised a check-out line screamer myself — who's quite in control of her emotions now, I might add — I'd be lying if I said I wouldn't have done the same had smart phones been available when she was 3.

Jim Lingo: My perception probably changed pre-kids to now having kids. If I do see that in a restaurant, they're holding a tablet or a phone, I'm in no means going to pass any judgment now as a parent. ... Every parent is trying to do the best they can and just get through each day when you have multiple kids, too.

Robin Chenoweth: We know that too much screen time — social media, gaming, video scrolling — can hurt adolescents and even adults. But in today's world, technology is inescapable, even for very young children. How does screen time impact children, from birth to five years old, when critical areas of their brains are developing? How much is too much?

Rebecca Dore: We talk about the displacement hypothesis, right? So, what is it displacing?

Robin Chenoweth: Rebecca Dore is director of research at Ohio State's Crane Center for Early Childhood Research and Policy.

Rebecca Dore: What are the important things that could be displaced by screens?

Robin Chenoweth: Things like sleep and exercise, but especially for young children, social interactions that develop language skills, and those tough moments that teach them to regulate their emotions.

Rebecca Dore: If it's displacing these positive, important, healthy behaviors, what's the problem is that kids are lacking those positive, important, healthy, developmentally important behaviors and activities, not that screens are necessarily causing a problem.

Robin Chenoweth: In this episode of the Ohio State University Inspire Podcast, we talk to Dore about the research she has conducted looking at whether screen time affects kindergarten readiness and looking at better ways for parents to use media with their children. We talk to a pediatric medical researcher about how too much screen time might impact white matter in children's brains — which plays a critical role in focus, learning and problem solving. And we hear from four parents about how they handle the significant challenges of parenting young children in this digital age. I'm Robin Chenoweth. Carol Delgrosso is our audio engineer. Maya Stepnick and Jason Amo-Mensah are our student interns. Inspire is a production of the College of Education and Human Ecology. There isn't a lot of research about the impacts of technology use on very young children, but parents are quick to draw comparisons with what they know about technology and adolescence. All parents who we spoke to have taken measures to limit screen time or not allow it for their young kids. But the pandemic thwarted some good intentions.

Jessica Solomon: My name is Jessica, and I have three children, a daughter who's 10, a son who is seven, and a little girl who is three. ... Prior to the pandemic, I had a three-year-old and a six-year-old, and we were very strict about screen time, and we would pretty much

make them go all day for 20 to 60 minutes of TV, basically, or screen usage. And then when the pandemic hit, it just flipped everything on its head. And we just were trying so hard to survive and make it through the day that all just went out the window. ... My daughter, she was in kindergarten, they gave her an iPad that she used a lot.

Robin Chenoweth with Jessica Solomon: At that point your family really started using devices a lot more?

Jessica Solomon: That's correct, and also it seemed our only way to be social, and being an educator myself, I knew that was so important for their development, and if the only way for them to get social interaction with their peers was on a Zoom call or some kind of other messenger service, then I was going to allow that.

Robin Chenoweth: That type of media use actually helped families during the pandemic, Dore said. Her study in 2021 showed that while media use for kindergartners of low-income households increased to as much as six hours during the lockdown, caregivers felt the devices allowed their children to continue learning and, importantly, to maintain relationships with family and friends.

Rebecca Dore: We were really interested in how they were using those screens and devices in ways that were potentially beneficial— that they were using them to accomplish things that they couldn't accomplish the normal ways because we were in this deep lockdown.

Robin Chenoweth: But post-pandemic, Jessica Solomon has found it difficult to get back to what she sees as more reasonable technology use.

Robin Chenoweth with Jessica Solomon: Have you found it's hard to dial back that use now?

Jessica Solomon: Yes. Very hard, very hard. ... It does feel like once you kind of let that horse out of the corral, you can't, like, rein it back in. ... So now the school has given them both devices. Both the older kids have Chromebooks. I don't allow them on social media or to e-mail their friends or message.

Robin Chenoweth with Jessica Solomon: So, they use it just purely for academic purposes?

Jessica Solomon: I think they should, but they also, for some reason, are able to go on YouTube and watch whatever crap — can I say that? — they want.

Robin Chenoweth with Jessica Solomon: Yes, you can say that. (Laughs).

Jessica Solomon: It's so much crap. And I've even asked, how can we lock down these devices? But because they're school devices, they are owned by the school, and those things are not mine to secure.

Robin Chenoweth with Jessica Solomon: I'm wondering what impact the other kids having these devices might have on your three-year-old, because maybe she's seeing them use their devices. Do you think it impacts her wanting to have a device, too?

Jessica Solomon: Absolutely it does. She wants one. And not only does she want one, she feels entitled to one, because the school already has given the older two their own devices.

Alexander Pittman: My name is Alexander Pittman. I graduated from Ohio State in 2024, May, with a PhD in multicultural and equity studies in education. And I am now living in Fort Collins, Colorado, and I am an assistant professor at Colorado State University.

Robin Chenoweth: Pittman has a four-year-old and an eight-year-old.

Alexander Pittman: My wife and I feel like at that age, there's other things that you can do to keep you busy. You have such an imagination, you have toys, you have games, you have books. So, there's really no reason to spend too much time on the screen. ... I am very worried about addiction to the screen, right? I taught high school for 10 years, and that's what my background is in, education and secondary education. And I definitely feel like students were very much attached to their screens and to their phones. And it's very worrisome to me.

Robin Chenoweth with Alexander Pittman: You're trying to prevent that same kind of thing happening with your own children.

Alexander Pittman: As long as I can. ... As an educator, I have my feelings about it. But they use computers a lot at school. They use computers for testing; they use computers for their math, for reading comprehension. So, I think to not allow them to use some kind of screen, or especially a laptop so they can get used to typing and using a mouse and navigating, might actually be doing a disservice, because they have to use those things in school. ... I overall see ... Well, I won't say all screens, but social media as an overall net negative, not a positive. ... I want to preserve my kids' innocence for as long as possible, and I feel like social media and the internet is a gateway to losing that innocence and so, like I understand other people might have different ways of thinking about it, but that's just how we feel.

Robin Chenoweth: Moderation is key, he says. His 8-year-old recently received a Switch gaming device for his birthday but must earn playtime. The four-year-old can't play but likes to watch when his brother does. Sometimes the boys watch movies on car trips.

Alexander Pittman: With my two boys, they are so loud and so rambunctious and so playful and all in a good way that when you give them that screen, it's like you have to call their name three times to get them to, to snap out of it. They lose all of that ... what makes them

“them,” you know? And, so, your gut tells you that's not a good thing when someone goes from that full of life to just locked in on something.

Robin Chenoweth: What does happen in children’s heads when they fall into the tech trance? In fact, between birth and 5 years, children’s brains are highly plastic. More than any other time in their lives, they are building neural connections that are key to life skills like language development and higher cognitive function. And research has shown that interaction with people — not devices — is essential to building those healthy brain circuits and complex skills. And that takes us back to Rebecca Dore’s point about what are children then missing when they use screens too often?

Rebecca Dore: To the extent that we're worried about that displacement idea that, what would kids be doing if they weren't using media, one of the biggest things we worry about, especially a lot of my research focuses on language development. What we worry about it displacing is social interactions with other people. And so for language development, getting that language input from adults and peers and others around them. And so if media is turned on and then that means the adult walks away and isn't involved, then that's sort of taking away some of that language input.

Robin Chenoweth: More on research about using media to promote language development in a minute. First, let’s get cerebral.

John S. Hutton: The brain is an analog organ that's developed over thousands of years to support a couple things that it does really well.

Robin Chenoweth: Dr. John S. Hutton is an associate professor of pediatrics at UT Southwestern Medical Center who has collaborated on research with Ohio State’s Crane Center. He published the first studies using MRI to quantify relationships between digital media and the brain structure of preschoolers. The brain has evolved around certain functions, he says.

John S. Hutton: One is it processes senses — sights and sounds and touch and taste emotions, and it helps us interact with other people. Whether that's looking at faces and whether faces are friendly or not friendly or loving or are not loving. ... So, it's really to do all kinds of things that, really, never involved screens as the brain develops itself. It was more real world, kind of figuring out open-ended risks out in the environment. The idea is that screens sort of simulate a lot of that stuff pretty well. They simulate audio-visual stimulus pretty well. But they don't really do a lot of other stuff very well. ... Kids, they're hearing a lot of a lot of language through a screen, but they're not talking back to it, and it can't really give that sort of back-and-forth interaction that a caregiver might give. They're not having to use their imagination as much because a lot of the products they use have already decided that. They have sort of closed-ended ... You know, you push a certain number of buttons with a certain number of things happen, versus just going out into the world and figuring out how to make up a game or have fun or explore the world.

Robin Chenoweth: Hutton published a study in the Journal of the American Medical Association in 2019 that looked at white matter — fiber tracks that serve as connections between gray matter — in the brains of preschoolers who had used media devices.

John S. Hutton: And the reason they're white is that they're coated in a fatty substance called myelin that's essentially like rubber on an electrical wire that you'll see in your house. ... When babies are born, their white matter is not very white. ... The fibers are immature. They're not really coated, you know, in as much myelin as they will be eventually, because the brain is kind of still figuring out how to do stuff. The more the brain practices, whether it's vision or hearing or reading or jumping rope, the more the fiber tracks are reinforced, and myelin builds up to make those fiber tracks more efficient.

Robin Chenoweth: The study used a measure called the screen queue to determine whether the how long preschoolers used screens to watch non-educational content each day. It based its measure on the American Academy of Pediatrics recommendations — one hour per weekday for 2- to 5-year-olds.

John S. Hutton: What we found was and this is preschool aged children with higher scores on the screen queue had less well-developed white matter microstructure, all over their brain, but primarily in areas that support language and literacy and executive function. ... Our study found that children with higher scores on the screen queue had, and again, less well developed in those areas, just suggesting that that either there was something inherently unhealthy about the screen use — or probably more likely — that screen use interfered with activities that children at that age should be doing to help reinforce the development of these white matter tracks supporting language and executive function and other things.

Robin Chenoweth: The kind and quality of media you choose matters. There are no enforced standards that could help parents, Hutton says.

John S. Hutton: A lot of kids are using, laptops at school, and they bring them home, and there's just a big, kind of blurring of the boundary between educational and non-educational use. ... You look in the App Store, and almost everything for young kids says it's educational in some way, and that tends to create this idea with parents: “Well, that must be good for my child. Maybe it's better than what I could do with them.” ... There's the maxim, you know, for parents, that you are your child's first and best teacher.

Robin Chenoweth: A study by the Crane Center’s Rebecca Dore looked at low-income preschoolers across a school year to see if screen use impacted their kindergarten readiness. It wasn’t all terrible news. Educational media didn’t help or hurt the children, at least academically.

Rebecca Dore: What's, I think, really valuable about looking at these gains across a school year is that we can see whether media use is actually related to how much children are growing in these skills.

Robin Chenoweth with Rebecca Dore: When you're looking at kindergarten readiness, what are they looking at? They're looking at alphabet knowledge, or is it behavioral aspects?

Rebecca Dore: Vocabulary skills, and then letter-word identification, so literacy skills, like you said, alphabet knowledge, a math measure. And that's where we really didn't see many of those relationships on more academic measures that we typically think of for kindergarten readiness. ... There were very few effects, very few relationships between the amount of media kids were using and their gains on those academic skills across that preschool year. ... But you're right, there are other aspects of kindergarten readiness that are these social and behavioral skills. Task orientation, the ability to, like, stay on task and focus on a task for an extended period of time. Assertiveness, the ability to speak up and defend your beliefs. Behavior control, refraining from being disruptive in a classroom environment. Social skills, being able to engage in social interactions and make friends. And that's actually where we saw some of our effects around these more social and behavioral skills in this sample.

Robin Chenoweth: Young kids who used media more than two hours a day struggled more with the social behavioral aspects of school. Which aligns with what some parents have noticed about their young children. Here's Breana Smith, administrative assistant in the College of Education and Human Ecology and a recently certified Montessori teacher, on why she and her spouse decided to eliminate most screens for their four-year-old.

Breana Smith: We started off, actually, with more technology than now, because there's a lot of things that I feel like you try to do as a parent that tells you, "This will work for your child." And a lot of that is through media. "Have your child watch, you know, *Baby Einstein*," and all these things. Or we had like, *My Child Can Read*, those type of like, DVDs and stuff. I really started to reduce it a lot over time, because I could see his temper, or all his tantrums, were increasing the more he was watching TV.

Robin Chenoweth: Have you ever been tempted to give him your phone when he gets squirmy or acts up in a public situation?

Breana Smith: Even from a young age, we were really making sure that if we went into public spaces, we wanted him to get used to being in those spaces and being aware of his surroundings and just what we're doing, so he would get used to being able to sit still. I always loved going out to restaurants and things like that, and I would take him anywhere and have him sit with us and have him learn to sit and pay attention.

Robin Chenoweth: Of course, every child brings their own unique personality and quirks into a restaurant or onto an airplane. My daughter once shrieked in a diner after I began

eating my lobster, because she said I was “hurting her friend.” But research does lend some credence to Smith’s approach. Rebecca Dore.

Rebecca Dore: If they're handed an iPad or a device every time that they're going to be bored or tired or frustrated — if it's used for calming and used for distraction when otherwise they would be developing these, like, emotion regulation skills — that could also potentially be a challenge.

Robin Chenoweth: John Hutton.

John S. Hutton: A huge evolutionary task for them is to learn how to calm themselves down when they get bored, or they get fussy or they get frustrated. And we know that screens are very calming in that way. They'll sort of distract the child from what they're feeling. And that's probably blunting that opportunity to sort of develop fiber tracks in the brain that are related to self-regulation.

Rebecca Dore: There's a lot of things to think about there, but there is some evidence that when devices are used in that way, it can be disruptive of the ability because they're not using that time or those opportunities to develop those emotion regulation skills. So thinking about it from a intentional use of media, as opposed to a reactionary use of media. Like, I'm going to make dinner, and I know in 15 minutes I'm going to give my kid the iPad, as opposed to, “Oh no! She's crying. I'm gonna give her the iPad because she's crying, and I think that's gonna make her leave me alone.”

Robin Chenoweth: The American Academy of Pediatrics says that kids 2-5 should be limited to one hour of non-educational media per weekday. Dore’s study found that two hours per day could impact social emotional skills. A study during the pandemic considered six hours excessive but included screen time for school. Maybe you are as confused as I am about how long to set that timer. I asked Rebecca Dore.

Robin Chenoweth with Rebecca Dore: How does a parent know when enough is enough? ... Do we know what an appropriate or safe amount of time for kids is?

Rebecca Dore: It's so hard because we don't, really, and it's such a ... it would be a hard thing to study. Because we don't want to randomly assign some children to get six hours of media day and randomly assign other children to get zero and then follow them for five years and see what happens. Right? No one would let us do that study. So, I do worry that by focusing too much on that specific time limit, we're causing a lot of stress and anxiety for parents that isn't necessarily really getting them to think about these important ideas. Things like displacement, and the type of media kids are using, and how kids are using media — that I think are more... could be more beneficial for families in terms of how they're using media in their lives.



Robin Chenoweth with Rebecca Dore: How would a parent go about doing making sure that there's a balance, so the kids are getting those social interactions that they need?

Rebecca Dore: There are times when parents and families are using media and instrumental ways, and I don't think we have great evidence that when that is happening in moderation, that that is necessarily a bad thing. Again, because if you're hanging out with a toddler all day, you run out of things to talk about. But if you then watch this episode about butterflies and chrysalises, and all of a sudden, we're playing butterflies and chrysalises, and that's, you know, vocabulary that I wouldn't necessarily be using with my toddler if we hadn't watched that media together. And so, it's both watching it with them, but also talking about it before and after, right? Incorporating that the media that they're enjoying, into your everyday lives and your conversation, that can both help them learn about the world and help them better understand what they saw, but also can help sort of extend that interaction.

Robin Chenoweth: And here's the silver lining. Research shows that when parents watch media with young children, and then talk with them about it, the negative effects are mitigated because of the interaction.

Rebecca Dore: Again, because we know that media can have these positive effects in families when it is used in ways that reduces parent stress, eases parent child communication, right? Like so, I think it's all about moderation, and all about making sure that they are getting those important things that we know are developmentally beneficial in other areas of their life.

Robin Chenoweth: Jim Lingo

Jim Lingo: We try to be intentional with like, okay, whatever show we're watching, they're like, singing songs or they're dancing, or they're learning the alphabet or they're counting. It's something that seems more, you know, we would put in quotes, educational, opposed to something that would be more like, mindlessly just watching a situation happen in front of them.

Robin Chenoweth: Jessica Solomon.

Jessica Solomon: It's a tool in your toolbox for when you need it. It shouldn't be your first ...

Robin Chenoweth with Jessica Solomon: Go-to.

Jessica Solomon: Yeah, that's how I feel. Again, there's a limit. I want them to interact with their environment and know how to talk to people in their environment and navigate their environment. I mean, the world is a jungle, and you have to learn how to navigate it. ... As long as we're still looking at each other and smiling at each other and tickling each other and, you know, eating together and cooking together and walking to school. As long

as those things aren't suffering, as long as we're still making time for those things, then I think it's okay.

Alexander Pittman: In terms of the development, I mean, I think anything in moderation is okay.

Robin Chenoweth: Alexander Pittman.

Alexander Pittman: That is the biggest key for me is ... what have you been doing up until this point that you now want to watch something? Have you been coloring? Have you been playing with your guys? You know, his action figures, we call them his "guys."

Robin Chenoweth with Alexander Pittman: (Laughs.)

Alexander Pittman: Like, have you been playing with your guys to have, like, that imagination play? If you're doing those other things and then you watch, you know, 15 minutes of your brother playing video games, or even an episode of Curious George, and then you go back to playing with your guys or whatever ... Then, to me, that's fine. But I think the problem is where there's no interest... "I don't want to play with guys anymore. All I want to do is, you know, be on the screen." And so that is something that we just try and guard against. To me, that's part of the innocence, being able to get lost in your play, where you're playing with your monster trucks, and you're playing so hard, like, it's like nobody's watching you. And you can make the noises and roll on the floor and whatever. And I think that once you get so attached to the screen, you lose some of that imagination play, and I don't want them to lose that for as long as we can avoid it.

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