

READING & LITERACY

Is Too Much Screen Time, Too Early, Hindering Reading Comprehension?



By [Elizabeth Heubeck](#) — January 15, 2024 ⌚ 6 min read



— Laura Baker/Education Week via Canva

Editor's Note: Click on the words highlighted in this story to pull up a definition and short research summary.

Jackie Chaney, an elementary teacher for the past 16 years, currently presides over a classroom of 25 2nd graders. She professes to love this stage in a students' academic career,

one that historically has been marked by growth in literacy, whereby word recognition begins to become automatic, fluency accelerates, and classroom teachers double down on building students' ability to focus and read independently for a sustained period of time.

But in recent years, Chaney has noticed a significant shift in this early literacy journey.

“With the ‘microwave world’ that we live in nowadays, students want that immediate engagement and quick response. They do not want to wait and explore novels, delve into characters and settings, and enjoy the twists and turns of plots,” said Chaney, who teaches at New Town Elementary in Owings Mills, Md.

Chaney's lament is not unique among today's classroom teachers, who are tasked with teaching the foundations of reading to the first generation of true digital natives—children who have been exposed to the bright, blinking, fast-moving screens of electronic devices from birth, or close to it.

It's now becoming a concern for researchers, too, who are seeking to better understand the effects of early exposure to electronic devices on children's capacity to engage in and understand what they read. Their findings to date, though limited, create cause for concern.

“The big question for us as neurobiological researchers is: How much screen exposure and what kids are doing while they're exposed [to screens] affects brain development?” said neurobiologist Tzipi Horowitz-Kraus, whose research expertise focuses on neural circuits that underlie language and reading acquisition.

How early neural connections underpin literacy

To understand how early exposure to electronic devices may affect children's later ability to develop **reading stamina**, it helps to first know what happens in the brain in order to be able to read.

“You need to direct your visual attention to the letter you're seeing. This language network is

also related to phonology—the sounds that letters make. These two processes need to be matched in time, or there will be a lag that manifests in reading difficulties,” said Horowitz-Kraus, an associate professor in the neuropsychology department at the Kennedy Krieger Institute and in the psychiatry and behavioral sciences department at Johns Hopkins University School of Medicine.

This synchrony does not happen immediately. “It takes some time to match what you’re seeing in your mind to the matched letter,” she said. “Over time, and with exposure, most children are able to automatically see and interpret letters and, eventually, chunks of letters.”

Exposure comes in the form of being read to and practicing reading, she said. Students generally reach automaticity between kindergarten and 2nd grade.

When that’s delayed, the cognitive resources to comprehend what’s being read are not available, explained Horowitz-Kraus. And when a child struggles to read and comprehend, it is more difficult to persist in reading—a key driver in reading stamina. This consequence can have a “snowball” effect, making children less likely to persist in developing the skills needed to develop comprehension and, subsequently, reading stamina.

Electronic devices distract, overstimulate their youngest users

Given the importance of those connections, a first concern is that screens can easily distract a young person from focusing on print, noted Horowitz-Kraus. “Screens are super-fun, super-quick, super-stimulating,” she said. “The competition they present is not easy to ignore.”

The introduction to electronic devices is happening at ever-younger ages, said literacy expert Maryanne Wolf. And especially for very young children, those under 4, there’s a secondary concern: overstimulation.

“Go in any mall and you’ll see a 6- to 12-month old, the spinal column and neck having just become erect. They’re watching [a digital screen], becoming overstimulated,” said Wolf, the

director of the Center for Dyslexia, Diverse Learners, and Social Justice at the University of California Los Angeles Graduate School of Education and Information Studies.

Like Horowitz-Kraus, Wolf noted the allure of electronic devices. “They’re more engaging than a print book,” she said. “On the other hand, they provide a passivity of engagement. It is overutilizing what we call the novelty reflex that human beings have. This is the last thing we want for child development, because we’re wanting them to learn to focus. Instead, they are learning to be distracted.”

Even when presented as a host of “learning activities,” electronic devices do not benefit toddlers cognitively, she said. “The screens move too fast for them. At that age, children need an adult to sit beside them to mediate the information, to communicate the information.”

Study shows less brain connectivity among heavy consumers of digital media

Horowitz-Kraus’ research is now beginning to uncover clues suggesting that screen time itself may interfere with reading processes.

In addition to her appointment at Johns Hopkins, Horowitz-Kraus is an associate professor and director of the educational neuroimaging group at Technion–Israel Institute of Technology, where she is among the world’s preeminent researchers studying how children’s brains work when engaged in reading versus electronic media.

In one such study, conducted on a small sample of 19 8- to 12-year-olds, Horowitz-Kraus and her colleagues examined the connectivity of brain regions known to be critical for reading. They first asked parents to report the number of hours their children spent on independent reading versus screen-based media time (including smartphones, tablets, desktop or laptop computers, and television).



... We're wanting [children] to learn to focus. Instead, they are learning to be distracted.

Maryanne Wolf, director, Center for Dyslexia, Diverse Learners, and Social Justice, UCLA Graduate School of Education and Information Studies

Then, the children underwent magnetic resonance imaging, or MRI, testing to assess their “resting-state connectivity” between brain regions known to be critical to reading and cognition.

The imaging scans revealed that time spent reading was “positively correlated with higher functional connectivity between the seed area and left-sided language, visual and cognitive control regions,” the authors wrote in the study, published in the international medical journal [Acta Paediatrica](#). Conversely, brain images of children who had higher reported screen time engagement showed lower connectivity between these regions related to reading.

“The two regions did not communicate together,” Horowitz-Kraus said. “In neuroscience, there is a rule: Fire together, wired together.”

Digital reading is not conducive to building reading stamina

The studies Horowitz-Kraus and other researchers have done to date on the impact of exposure to electronic devices only reveal so much.

“There are limitations in what we know about the ultimate effects of screen time,” she said. “What we, as a society and researchers, need is a longitudinal study that measures and tracks the level of exposure to screens, and what exactly a child is doing on screen, from birth to 18.”

Still, what she has discovered—that brain connectivity known to enhance reading and associated cognition appears to be weaker among children who are reading print less and engaging in screen time more—is concerning, especially when added to other evidence about how reading on the screen compares with print reading.

Multiple studies show that both young children and college-age students seem to remember fewer concrete details when reading online text compared to printed text, although some embedded digital features can be helpful.

Wolf calls the process “skim to inform,” which goes against the deep attention required for the components that make up **reading comprehension**—such as connecting background knowledge to new information, making analogies, drawing inferences, and engaging in the perspectives of others.

“When you scan on screen or learn to read on a screen, you may well skip the development of these processes or their use,” said Wolf. “And their use is the penultimate bridge to the reading sanctuary.”



Elizabeth Heubeck

Staff Writer

Elizabeth Heubeck is a staff writer for Education Week.

Reprints, Photocopies and Licensing of Content

All content on Education Week's websites is protected by copyright. No part of this publication shall be reproduced, stored in a retrieval system, or transmitted by any means, electronic or otherwise, without

the written permission of the copyright holder. Readers may make up to 5 print copies of this publication at no cost for personal, non-commercial use, provided that each includes a full citation of the source. For additional print copies, or for permission for other uses of the content, visit www.edweek.org/help/reprints-photocopies-and-licensing-of-content or email reprints@educationweek.org and include information on how you would like to use the content. Want to seamlessly share more EdWeek content with your colleagues? Contact us today at pages.edweek.org/ew-for-districts-learn-more.html to learn about how group online subscriptions can complement professional learning in your district or organization.

Copyright © 2024 by Editorial Projects in Education, Inc. All rights reserved.