

# Study shows link between teens' copious amounts of screen time and ADHD

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What with all the swiping, scrolling, snap-chatting, surfing and streaming that consume the adolescent mind, an American parent might well watch his or her teen and wonder whether any sustained thought is even possible.

New research supports that worry, suggesting that teens who spend more

time toggling among a growing number of [digital media](#) platforms exhibit a mounting array of attention difficulties and impulse-control problems.

In a group of more than 2,500 Los Angeles-area high school students who showed no evidence of attention challenges at the outset, investigators from the University of Southern California, University of California at Los Angeles and UC San Diego found that those who engaged in more digital [media](#) activities over a two-year period reported a rising number of symptoms linked to attention deficit hyperactivity disorder.

The association between digital media use and ADHD symptoms in teens was modest. But it was clear enough that it could not be dismissed as a statistical fluke. On average, with each notch a teen climbed up the scale of digital engagement, his or her average level of reported ADHD symptoms rose by about 10 percent.

The results do not show that prolific use of digital media causes ADHD symptoms, much less that it results in a level of impairment that would warrant an ADHD diagnosis or pharmaceutical treatment.

Indeed, it's possible the relationship is reversed—that attention problems drive an adolescent to more intensive online engagement.

But at a time when 95 percent of adolescents own or have access to a smartphone and 45 percent said they are online "almost constantly," the new study raises some stark concerns about the future of paying attention. It was published Tuesday in the *Journal of the American Medical Association*.

The findings come as mental health professionals are rethinking their understanding of ADHD, a psychiatric condition that was long thought

to start in early childhood and last across a lifetime. Marked by impulsivity, hyperactivity and difficulty sustaining attention, ADHD is estimated to affect about 7 percent of children and adolescents.

But the disorder is increasingly being diagnosed in older teens and adults, and in some it waxes and wanes across a lifespan. Whether its symptoms were missed earlier, developed later or are brought on by changing circumstances is unclear.

The new research, involving 2,587 sophomores and juniors attending public schools in Los Angeles County, raises the possibility that, for some, ADHD symptoms are brought on or exacerbated by the hyper-stimulating entreaties of a winking, pinging, vibrating, always-on marketplace of digital offerings that is as close as the wireless device in their pocket.

"We believe we are studying the occurrence of new symptoms that weren't present at the beginning of the study," said USC psychologist Adam M. Leventhal, the study's senior author.

The study "is just the latest in a series of research findings showing that excessive use of digital media may have consequences for teens' well-being," said San Diego State University psychologist Jean M. Twenge, who has conducted research on teens and smartphone use but was not involved in the new work.

Twenge's research, published this year in the journal *Emotion*, explored a sharp decline in U.S. teens' happiness and satisfaction since 2012. Combing through the data from 1.1 million teens, Twenge and her colleagues found dissatisfaction highest among those who spent the most time locked onto a screen. As time spent in offline activities increased, so did happiness.

Leventhal and his colleagues assessed the digital engagement of their 15- and 16-year-old subjects five times over a two-year period—when they first entered the study and four more times at six-month intervals. They asked the students to think back over the last week and report whether and how much they had engaged in 14 separate online activities. Those included checking social media sites, browsing the web, posting or commenting on online content, texting, playing games, video chatting, and streaming TV or movies.

Depending on how many of those activities a student reported and how frequently he or she reported engaging in them, the researchers assigned the student a "cumulative media-use index" between 1 and 14.

Four out of five students acknowledged "high frequency use" of at least one activity, including 54 percent who told researchers they checked social media "many times per day." Just over two-thirds engaged in high-frequency use of up to four online activities at some point during the study's course.

Students were also asked whether they had experienced 18 ADHD symptoms, including problems with organization, completing work, staying still or remaining on task. If they acknowledged having any six of them, they were considered to be "ADHD symptom-positive." At various points in the study, anywhere from 4.8 percent to 6.9 percent of the subjects met this criteria.

The additional risk that came with climbing the ladder of "media use intensity" was pretty modest: about 10 percent for each step up.

But compared to the lightest users, the teens who engaged most intensively were more than twice as likely to be symptom-positive. Among the 495 students who reported no high-frequency media use at baseline, 4.6 percent were categorized as symptom-positive at some

point. Among the 114 who engaged in seven digital activities many times a day, 9.5 percent were seen to be symptom-positive during the follow-up. And for the 51 students who reported high-frequency use of all 14 digital activities, 10.5 percent met the symptom criteria.

That twofold increase in the odds of being symptom-positive "is not a small effect," Twenge said. In effect, it suggests that if a teen who is a high-intensity digital user could be weaned from his devices, he might drive down his risk of significant ADHD symptoms by as much as half.

"Most of the time, a lifestyle change that halves the risk of a poor outcome is more than worth undertaking," Twenge said. In the annals of disease prevention research, "the vast majority of interventions are less effective."

Moreover, she added, digital media use is something a teen can change. Genes and traumatic life experience—both factors in a person's risk for ADHD—are not so amenable to behavior modification.

The study authors acknowledged that some of the students may have had attention problems that did not raise any flags at the outset but were significant enough to drive their outsized use of digital media. Since ADHD is linked to sensation-seeking behavior, and digital media use is highly stimulating, subjects with "subclinical" attention problems might have become the study's heaviest digital users. As the study unfolded, their symptoms may simply have become more pronounced.

To rule out other influences, the team adjusted the raw data to account for factors that are already strongly linked to ADHD, including male gender (boys are more than twice as likely as girls to have been diagnosed with ADHD), a family history of substance use, depressive symptoms and delinquency. The findings still held.

In an editorial that accompanies the study, University of Michigan pediatrician Dr. Jenny Radesky wrote that the "always on" quality of digital media may rob the adolescent brain of the ability to rest and refresh in what brain scientists call the "default mode." Teens pining for the next hit of digital affirmation may lose the ability to tolerate boredom, she wrote, and an unending stream of notifications may reduce a child's ability "to stay focused on challenging, nonpreferred tasks."

But that may not fully explain the study's results. If manic digital engagement is displacing sleep and exercise, that would readily explain a child's slipping executive function, wrote Radesky, a behavioral developmental specialist.

Dr. Lawrence Diller, a child psychiatrist and ADHD specialist who has practiced for more than four decades in Walnut Creek, Calif., expressed skepticism as well.

"It's attractive to think that somehow exposure to constantly changing media information might somehow either make an adolescent inattentive or distractible," he said. "But I don't think that's what's happening here."

Diller said he suspected that kids spending a lot of time on social media and gaming aren't that interested in school or the chores their parents have assigned them, so they've simply found an alternative outlet for their energies.

"I'd be very interested in seeing these kids in five to 10 years," said Diller, author of the books "Running on Ritalin" and "Remembering Ritalin." "Their life situation has changed and I'd bet you find that the gaming and social media tails off. They have other things they want to get to.

"It's seductive to think that TV and video games and [social media](#) change

the brain," he added. "Maybe they do. But if that's the case, the brain can change back."

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