Excessive social media use during the COVID-19 pandemic exacerbated adolescent mental health challenges

January 21 2024, by Emma G Duerden and Michaela Kent

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How does time spent online, and especially social media, affect the brains and behaviors of children and youth?

Social media platforms are seemingly designed to capture the attention of users and produce habitual checking of apps and notifications. In recent years, our lives have become increasingly dominated by social media, either as a source of information, entertainment, or just a way to connect with others.

In Canada alone, more than 30 million social media accounts are currently registered, with teenagers one of the highest user groups.

During the COVID-19 pandemic, young people were drastically affected by the sudden shift to a digital world and the explosion of a reliance on screens. School closures, coupled with social isolation, led to dramatic increases in daily screen time use and exacerbated mental health challenges for many young people.

Research shows strong links between screen time and mental health concerns, including anxiety and depression, although few longitudinal studies have been conducted in the pandemic or post-pandemic eras to determine causal relationships. The stress of lockdowns and the absence of typical support networks left adolescents more vulnerable than ever to the negative effects of social media.

Now, in the years following the pandemic lockdowns, it's imperative that we study and address the impact excessive screen time can have on brain development.

Reward and punishment

A key facet of social media is that it engages brain systems involved in reward and punishment, which could place children and adolescents at risk for adverse brain development. During childhood and adolescence, our brains are still going through dramatic periods of development, making them more susceptible to the impact of excessive screen time.

Children and youth have very active reward systems in the brain. Natural rewards can cause a brief release of "feel good" chemicals in the brain like dopamine. Social media can offer constant levels of rewards that are higher than normal and affect brain chemistry, leading to children seeking out more rewards, even to addictive levels.

The part of our brain that monitors risky but rewarding activity—the prefrontal cortex—does not fully mature until we reach our 30s. The fact that this brain area has not fully developed in children and teens might affect their ability to control scrolling behaviors and monitor emotional triggers.

Coupled with changes in brain chemistry, this could lead to excessive screen time use. The timeline of the prefrontal cortex's development could also explain why adults are less likely to face the same consequences of the negative effects of social media.

Additionally, some studies have reported changes in cortical and subcortical brain activation and structure in children and teenagers that were associated with high screen time use. These studies have reported changes in the brain's reward and punishment centers.

Another example of this comes from a longitudinal study that followed children for three years, showing delayed development of regions involved in social connectedness and understanding the thoughts and feelings of others.

Different impacts

However, not all research points to screen time as being associated with changes in brain development. A large-scale imaging study that was designed to examine childhood experiences throughout the United States—including smoking, video games and sleep—in nearly 12,000

children showed no association between screen time and brain development.

There may be several explanations for the dissonance between the large-scale child development study and smaller studies that were designed to look at screen time. For example, potentially heavy users of screen time chose to participate in smaller, more focused studies. In turn, children who are most at risk for the adverse effects of screen time may represent a smaller fraction of the data in a large cohort.

Given the widespread use of social media, it's no surprise that not all children and youth are impacted in the same way. Adolescents and young adults who have pre-existing mental health concerns, particularly anxiety, may be most at risk to the harmful effects of social media use on the brain and behavior.

Those who experience anxiety may use social media more frequently to seek validation and reassurance, or as a maladaptive coping mechanism to avoid in-person interactions and real-world stressors.

More longitudinal research is needed to better understand mental-health risk factors for adverse outcomes associated with excessive social media use as well as the long-term effects on brain development.

Adapting to a digital world

As we move forward and adapt to an increasingly digital world, clear guidelines are needed concerning the amounts, types and content of screen time that are most harmful to children's development, as well as the associated risk and resilience factors, which are informed by science.

For this reason, it is more important than ever that researchers design studies that allow us to understand what is happening to children's and

adolescents' brains and their behaviors, and how that is affecting long-term outcomes.

In the meantime, educators and parents should engage in open dialogue to help children and teenagers understand the consequences that excessive screen time might have on brain development and mental health. Teenagers should also be given strategies and learn about setting boundaries to help them manage screen time responsibly.

It is crucial that we encourage healthy relationships with technology to minimize the potential for long-term societal issues and concerns in the future.

Provided by The Conversation