

Internet addiction affects behavior and development of adolescents, study finds

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Internet addiction influences multiple neural networks, which can affect the behavior and development of adolescents. Credit: Steinar Engeland, from Unsplash (Unsplash License)

Adolescents with an internet addiction undergo changes in the brain that

could lead to additional addictive behavior and tendencies, finds a new study by UCL researchers.

The findings, published in *PLOS Mental Health*, reviewed 12 articles involving 237 young people aged 10–19 with a formal diagnosis of internet addiction between 2013 and 2023.

Internet addiction has been defined as a person's inability to resist the urge to use the internet, negatively impacting their psychological well-being, as well as their social, academic and professional lives.

The studies used [functional magnetic resonance](#) imaging (fMRI) to inspect the functional connectivity (how regions of the brain interact with each other) of participants with internet addiction, both while resting and completing a task.

The effects of internet addiction were seen throughout multiple [neural networks](#) in the brains of adolescents. There was a mixture of increased and decreased activity in the parts of the brain that are activated when resting (the default mode network).

Meanwhile, there was an overall decrease in the functional connectivity in the parts of the brain involved in active thinking (the executive control network).

These changes were found to lead to addictive behaviors and tendencies in adolescents, as well as behavior changes associated with intellectual ability, physical coordination, mental health and development.

Lead author, MSc student, Max Chang (UCL Great Ormond Street Institute for Child Health) said, "Adolescence is a crucial developmental stage during which people go through significant changes in their biology, cognition, and personalities. As a result, the brain is particularly

vulnerable to internet addiction related urges during this time, such as compulsive internet usage, cravings towards usage of the mouse or keyboard and consuming media.

"The findings from our study show that this can lead to potentially negative behavioral and developmental changes that could impact the lives of adolescents. For example, they may struggle to maintain relationships and [social activities](#), lie about online activity and experience irregular eating and disrupted sleep."

With smartphones and laptops being ever more accessible, internet addiction is a growing problem across the globe. Previous research has shown that people in the UK spend over 24 hours every week online and, of those surveyed, more than half self-reported being addicted to the internet.

Meanwhile, Ofcom found that of the 50 million internet users in the UK, over 60% said their internet usage had a negative effect on their lives—such as being late or neglecting chores.

Senior author, Irene Lee (UCL Great Ormond Street Institute of Child Health), said, "There is no doubt that the internet has certain advantages. However, when it begins to affect our day-to-day lives, it is a problem.

"We would advise that [young people](#) enforce sensible time limits for their daily internet usage and ensure that they are aware of the psychological and social implications of spending too much time online."

Mr. Chang added, "We hope our findings will demonstrate how internet addiction alters the connection between the brain networks in adolescence, allowing physicians to screen and treat the onset of internet addiction more effectively.

"Clinicians could potentially prescribe treatment to aim at certain brain regions or suggest psychotherapy or family therapy targeting key symptoms of internet addiction.

"Importantly, parental education on internet addiction is another possible avenue of prevention from a public health standpoint. Parents who are aware of the early signs and onset of internet addiction will more effectively handle [screen time](#), impulsivity, and minimize the risk factors surrounding internet addiction."

Study limitations

Research into the use of fMRI scans to investigate [internet addiction](#) is currently limited and the studies had small adolescent samples. They were also primarily from Asian countries. Future research studies should compare results from Western samples to provide more insight on therapeutic intervention.

More information: Functional connectivity changes in the brain of adolescents with internet addiction: A systematic literature review of imaging studies, *PLOS Mental Health* (2024). [DOI: 10.1371/journal.pmen.0000022](#)

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