

Smartphone and Internet Addiction Affect Cognitive Functions in Young Adults

Abu Sadat Md Sayem, Subramani Parasuraman

Faculty of Pharmacy, AIMST University, Bedong, MALAYSIA.

INTRODUCTION

Since Steve Jobs introduced the iPhone in 2007, the sales of smartphones have expanded dramatically. The rise in smartphone usage is evidence of this. According to recent data, more than 6.6 billion people use smartphones worldwide to communicate, browse the web, or simply play video games.¹ In recent years, the duration of smartphone usage has increased among most of the global population due to its wide range of applications.² The excessive use of smartphones with associated dysfunction, withdrawal difficulties, and other phenomena similar to substance addiction is referred to as Problematic Smartphone Use (PSU).³ According to research on PSU, PSU is more likely to affect people who are young, female, and highly educated.¹ PSU is defined as “smartphone use associated with at least some element of dysfunctional use, such as anxiety when the phone was not available, or neglect of other activities”.⁴ PSU is linked to various mental health conditions such as anxiety, depression, and others.⁵ The excessive use of cell phones, often known as “nomophobia”, is a type of technological addiction that is quickly emerging as a serious social issue throughout the world.⁶

The usage of media devices has grown across generations, with smartphones becoming the most used media device globally. People check the weather from their beds, swap stocks and gossip while stopped in traffic, chat with their romantic partners between appointments, make online purchases while waiting in queue and live stream one another's experiences from different parts of the world in real-time.⁷ With the ability to serve as phonebooks, calendars, internet portals, tip calculators, maps, gaming systems, and much more, smartphones appear to be able to carry out a nearly infinite number of cognitive tasks for us as well as satisfy a large number of our emotive impulses.⁸ However, the excessive use of smartphones and the inability to control PSU can affect physical and mental health.³ Despite its numerous benefits, extreme smartphone use can cause problems

in everyday life, such as sleep difficulties, decreased emotional intelligence and empathy, difficulty adapting, and lower academic and professional performance.⁹ Extravagant applications of a smartphone may cause negative impacts on cognitive functions. Some of the reported impacts of excessive smartphone use on human cognitive functions are summarized in Table 1.¹⁰⁻¹⁸

Table 1: Reported findings about the impact of excessive smartphone use on cognitive functions.

Type of Cognitive Functions	Reported Findings
Attention	Frequent smartphone multitaskers perform worse and show more activity in the right prefrontal area during a sustained attention task. ¹⁰
	Frequent media multitaskers report higher levels of daily attention deficits. ¹¹
	No correlation between habitual media multitasking and sustained attentional performance. ¹²
	Notifications of smartphones can disrupt performance similar in magnitude to active smartphone usage during an attention-demanding task. ¹³
	The mere presence of a cell phone can lead to decreased attention and poorer task performance, especially in tasks with high cognitive demands. ⁸
Memory	The effects of smartphone usage on attention, inhibition, and working memory. ¹⁴
	The working-memory performance and attentional impulsivity of regular media multitaskers are found to be worse. ¹⁵
	Regular Facebook users do worse on a free recall assignment. ¹⁶
Analytical Thinking	Problematic smartphone use has a negative impact on the ability to think critically. ⁹
	Analytical thinking has been supplanted by smartphones. ¹⁷
	Excessive media multitasking was linked to a poor mindset, worse academic accomplishment, and inferior executive function skills. ¹⁸



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Research on the relationship between mobile devices and cognitive functions has mostly focused on the impact of shifts in attentional orientation brought on by excessive use of smartphones. For instance, studies on using a mobile device while driving show that it causes performance deficits, such as inattentive blindness and delayed response times.¹⁹ A similar study shows that utilizing social media and smartphones while learning new information decreases comprehension and negatively affects academic achievement.²⁰ There is growing concern that the prevalence of attentional issues, particularly neurodevelopmental disorders in children and adolescents, is increasing as a result of smartphone technology.²¹ One specific demonstration of this concern is that the present generation of youngsters and adolescents are showing signs of having shorter attention spans due to their growing exposure to smartphones which generally starts earlier in their life.²² Additionally, evidence suggests that excessive smartphone use is linked to low self-esteem, impulsivity, cognitive impairment, social networking addiction, shyness, and difficulty with cognitive emotion management.²³

However, performance in self-paced activities, which let people make up for device-related distractions by continuing where they left off, is unaffected by smartphone use.²⁴ When considered collectively, all the research findings show that smartphone excessive use and PSU are linked to cognitive deficiencies that shift conscious attention away from primary activities. Although there is still a lack of empirical studies on how smartphone technology may alter cognitive processes in a variety of domains, smartphones have the potential to have a significant impact on many of these areas. Excessive use of smartphones may decline cognitive abilities and decrease the capacity to participate in social activities. Therefore, understanding how smartphone technology affects us is essential so that we may take the appropriate precautions to lessen any potentially harmful effects on our cognitive functioning.

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Correspondence:

Subramani Parasuraman,
Editor, Journal of Young Pharmacists
Faculty of Pharmacy, AIMST University,
Bedong, MALAYSIA.
Email: jypeditor@gmail.com

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