

Theories on Addiction of Smartphone and Internet

Subjects: Behavioral Sciences

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Excessive use of smartphones has been associated with a number of negative consequences for individuals. Some of these consequences relate to many symptoms of behavioral addiction. Addiction is defined as a pleasure-inducing behavior that through repeated exposure gradually leads to loss of control and further negative consequences.

Keywords: smartphone addiction ; self-control deficits ; cognitive effects

1. Introduction

From 2007, since the launch of the iPhone by Steve Jobs, the sale of smartphones has increased exponentially. This is reflected in the growing number of smartphone users. Currently there are very few people in industrialized countries who do not have a mobile phone. Recent statistics suggest that over 6.6 bn people around the world use a smartphone to communicate, surf the web or just play video games ^[1]. The widespread availability of smartphones has led to their overwhelming use in the world, leading to interest from researchers. In recent years, tests have been conducted in an attempt to investigate various phenomena such as TV addiction ^[2], excessive use of computer games ^[3], gambling disorders over the web ^[4] and, generally, internet addiction ^[5]. The excessive use of smartphones, also known as 'nomophobia', has proven to be a form of technological addiction that is rapidly becoming a major social problem around the world ^{[6][7][8][9][10]}. Today, addiction is defined as a pleasure-inducing behavior that through repeated exposure gradually leads to loss of control and further negative consequences ^[11].

Mahapatra ^[12] found that loneliness and self-regulation deficits are the main antecedents for smartphone addiction, and family and personal conflicts and poor academic performance are the significant negative consequences of excessive use of smartphones. A systematic review on problematic smartphone use (PSU) ^[13] suggests that people who are young, female, and highly educated are more prone to PSU. It ^{[14][15][16]} has also shown the effects of smartphone use in everyday life situations. It has negative effects on sleep when used in the bedroom ^[17], and has negative effects on procrastination when used in the classroom ^[18]. Finally, it puts the driver and pedestrians at risk when used while driving ^{[18][19][20]}.

2. Smartphone Addiction

Smartphone addiction is similar to most addictive disorders, but the fact that a smartphone is small, easily handled and portable makes the risks more insidious and pervasive ^{[21][22]}. As with many other forms of addictive behaviors, learning mechanisms play a central role. Duke & Montag ^{[23][24]} outline conditioning principles that likely contribute to PSU. Since these behaviors become automatic and therefore largely unconscious, they are hard to interrupt. However, conditioning principles, such as those described, work better with some people than with others ^{[23][24]}. Those who are vulnerable to intermittent reinforcement principles may be affected at a higher level. In this context, the smartphone can be compared with a slot machine. The slot machine does not reward a person every time he/she pushes a button; instead, the individual is rewarded from time to time, without any discernible pattern ^[24]. The same process can be observed with the smartphone. Smartphones reward us on an intermittent, unpredictable level, with funny messages via WhatsApp or e-mails, leading to a robust smartphone usage pattern ^[24].

3. Smartphone Withdrawal

In people that show excessive smartphone use, smartphone restriction might elicit negative effects for certain individuals. These negative effects may be regarded as withdrawal symptoms traditionally associated with substance-related addictions ^[11]. To address this timely issue, Eide et al. ^[11] examined 127 participants aged 18–48 years, assigned to one of two conditions: a restricted condition or a control condition. During the 72 h of smartphone restriction, participants completed the aforementioned Smartphone Withdrawal Scale (SWS), the Fear of Missing Out Scale (FoMOS) and the

Positive and Negative Affect Schedule (PANAS) three times a day [11]. Their results showed that participants in the smartphone restriction condition increased withdrawal symptoms and a fear of missing out. In general, the negative consequences of excessive smartphone use refer to symptoms such as withdrawal and hindered user productivity, social relationships, physical health, or emotional well-being in daily life [25][26].

4. Theories on Smartphone and Internet Addiction

Moretta et al. [27] recently published a detailed review on the problematic use of smartphones and the internet. It was suggested to theoretically integrate smartphone-related problematic behaviors with internet problematic behaviors as, in this way, behavior can be focused on and not the device itself. In line with this, the first author who proposed a cognitive-behavioral model of pathological or problematic internet use (PIU) was Davis [28]. In his model, there are two components that act: one is distal, namely the individual's psychopathology, and the other is proximal, i.e., maladaptive cognitions associated with internet usage [28]. Caplan [29] later proposed a revision of Davis' model and included some cognitive/behavioral variables, such as the preference for online social interactions, related to negative outcomes associated with internet and smartphone use. Specifically, he found that communicating through a device reduces the distress triggered by face-to-face social interactions but led to defective self-regulation [29]. Such poor self-regulation would in turn generate negative consequences in the lives of people. After this model, Brand et al. [30] proposed that impaired functioning of prefrontal control mechanisms would be associated with defective self-regulation and coping strategies, which would lead individuals to turn to the online world. People with low levels of executive functioning are vulnerable to intermittent reinforcement principles connected to internet-related activities. These processes are key factors in the transition from voluntary/goal-directed actions (with an appraisal of action consequences) to habitual actions (seemingly automatic and uncontrolled), which is at the basis of addictive behaviors [31][32][33][34][35][36][37][38]. Another model, the Interaction of Person-Affect-Cognition-Execution (I-PACE), proposes that PIU behaviors may be explained by looking at interactions between predisposing factors (e.g., impulsivity, anxiety, depression, general distress), moderators (e.g., coping style, self-regulatory capacities, and internet-related attentional and cognitive biases), and mediators such as reduced inhibitory control in combination with reduced executive functioning and diminished decision making [39][40][41]. As previously mentioned, due to accessibility and portability, the connection between the internet and smartphone use is more insidious and pervasive [21][22]. In line with Duke & Montag [23], it was suggested that participants with high levels of smartphone addiction may have automatized behaviors that have become automatic and therefore largely unconscious; for this reason, they are hard to discontinue. Given this, the relationship between PSU and withdrawal symptoms should be considered, both at behavioral and cognitive levels [42].

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