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## Addictive Behaviors

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## Editorial

## Technological addictions: Conceptualisation, measurement, etiology and treatment

Nowadays, Internet and mobile phone use are widespread worldwide. Forty percent of the world population use the Internet, whereas six times more individuals are online today compared to the last decade (International Telecommunication Union, 2012, 2013). Advancements in digital technologies have resulted in various positive applications, including (but not limited to) promoting (mental) health, education, leisure, communication and global connectivity. However, extensive research conducted over the last two decades also evidenced that the use of digital technologies may come at a price, and accumulating evidence resulting from empirical research emphasized that a number of negative consequences are linked to the overuse of these technologies, such as subjective distress and psychopathological symptoms, health problems, professional and social disruptions, symptoms traditionally associated with substance-related addictions (see Billieux, Maurage, Lopez-Fernandez, Kuss, & Griffiths, 2015; Kuss, Griffiths, Karila, & Billieux, 2014, for reviews). Accordingly, technological innovations of the 21st Century have not only brought about significant lifestyle changes which some critically refer to as leading to us being “alone together” (i.e., brought together virtually by technology, but physically alone due to overengagement with technology) (Turkle, 2013), and in some instances may lead to the development of addictive usage patterns.

Initial publications on the topic, which often took the form of clinical case description or theoretical papers (Griffiths, 1996; Young, 1996), largely assumed that deregulated use of digital technologies should be considered as a “behavioural” or “non-chemical” addiction (Marks, 1990), based on their similarities with substance-related addictions, including cognitive salience, mood modification, tolerance and withdrawal-like manifestations, conflict, and relapse (Griffiths, 2005). Various terms emerged in the literature to describe pathological use of digital technologies, such as “Internet addiction” (Young, 1998), “compulsive Internet use” (Greenfield, 1999), or “mobile phone addiction” (Chóliz, 2010). It has also been proposed that these various disorders could fall within the remit of technological addictions, which have been defined as “non-chemical behavioural addictions which involve human-machine interaction”, and includes both passive and active behaviours which are maintained via reinforcing characteristics and may lead to the development of an addiction (Griffiths, 1995, p. 15). Over the course of the last 20 years, a myriad of empirical studies has been published suggesting Internet use-related disorders can be considered addictive behaviours, including research on the development of diagnostic criteria (Tao et al., 2010) and screening instruments (Lortie & Guitton, 2013), (2) epidemiology (Kuss, Griffiths, et al., 2014a), neurobiology (D’Hondt, Billieux, & Maurage, 2015; Kuss & Griffiths, 2012) and psycho(patho)logical correlates (Kuss & Lopez-Fernandez, 2016),

or treatment (Kuss & Griffiths, 2015; Winkler, Dorsing, Rief, Shen, & Glombiewski, 2013).

At the same time, several theoretical models of digital technology addictions have been formulated. Among the most recognised and established models, certain are symptom-centred, such as the “components model” (Griffiths, 2005; Kuss, Shorter, van Rooij, Griffiths, & Schoenmakers, 2014; Kuss, Shorter, van Rooij, van de Mheen, & Griffiths, 2014). According to this model, similar to substance-related addictions, technological addictions are the result of biopsychosocial processes, and share neurobiological and psychosocial risk factors, the presence of (stressful) psychosocial events and shifts in mood induced by the addictive behaviours, as well as natural history, treatment non-specificity and addiction hopping, suggesting technological addictions can be understood within a syndrome model of addictions (Shaffer et al., 2004), and are characterized by the presence of six core symptoms, namely salience, mood modification, tolerance, withdrawal, conflict and relapse. In outlining the etiology of technological addictions, other researchers developed models that focused more on the underlying psychological (Davis, 2001; King & Delfabbro, 2014) or neurobiological processes (Dong & Potenza, 2014).

Although the mental health problems associated with problematic use of digital technologies are no longer debatable, several controversies and ongoing debates reveal that to date no scientific consensus has emerged regarding the conceptualisation and diagnosis of these disorders. Most scholars in the field consider these disorders should be understood within the biomedical model of addictive disorders (Block, 2008; Ko, 2014; Potenza, 2015). However, others (Billieux, Thorens, et al., 2015) suggest such a position is limiting as it fails to consider the heterogeneity and multi-determined nature of technology overuse-related disorders. One popular alternative view is that excessive involvement in digital technologies is a consequence of maladaptive coping through escapist usage motivations (Billieux et al., 2013; Kuss, Louws, & Wiers, 2012) or dissociative mechanisms, engaged in to face adverse life events or pre-existing psychopathology (Kardefelt-Winther, 2014; Schimmenti & Caretti, 2010).

Another important debate in the field relates to whether or not a constructs such as “Internet addiction” or “compulsive Internet use” can still be considered viable. Indeed, these constructs are umbrella terms that group a wide range of different activities that may have distinct functions for the individual (e.g., online video games, sexual activities, or social networking). It has been suggested that these terms are inadequate and fail to describe the conditions in a useful way as Internet was considered to act as a medium that fuels other addictive behaviours (Starcevic & Aboujaoude, 2016). It has also been suggested that the

criteria used to diagnose technological addictions are susceptible to resulting in over-pathologization when applied to high engagement leisure activities, such as video gaming and social networking (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015; Charlton & Danforth, 2007; Griffiths et al., 2016).

In 2013, the American Psychiatric Association (APA) decided to include behavioural addictions in the new edition of the diagnostic manual (DSM-5) for the first time. Pathological gambling was reclassified as gambling disorder (American Psychiatric Association, 2013), making it the first officially recognised behavioural addiction, signifying a move away from its previous classification as impulse-control disorder in previous versions of the DSM (American Psychiatric Association, 2000). This change in the classification of gambling disorder was fostered by decades of accumulating evidence supporting neurobiological and cognitive alterations, and effective treatment approaches for gambling disorders which are comparable to those in substance-related disorders (Clark, 2010; Goudriaan, Oosterlaan, de Beurs, & van den Brink, 2006; Potenza, 2008). In the wake of these important changes, *Internet Gaming Disorder* has been included in Section 3 (i.e., emerging measures and models), as a condition in need of further study.

Overuse of digital technologies is now recognised as a public health concern (WHO, 2014) and a growing number of patients are seeking treatment to manage problematic technological behaviours, such as excessive involvement in online games, cybersex, or online social networking (Kuss & Lopez-Fernandez, 2016; Thorens et al., 2014). Officially recognising technological addictions (similar to recognising any other potential mental/behavioural disorder) is relevant from a diagnostic point of view for a number of reasons. First, using the same criteria and cut-offs for particular disorders will increase reliability across studies whereby researchers can ensure they study the same thing across different cultures and samples, which will be useful for epidemiological research and randomized controlled trials on (psycho)therapeutic approaches. Second, once it is officially recognised, a diagnosis could provide health and economic incentives for insurance and healthcare providers to fund treatment for those who need it without the requirement of providing proxy-diagnoses (i.e., diagnosing other [primary or secondary] disorders) for the purpose of treatment funding in some countries (Kuss & Griffiths, 2015). Third, officially recognising technological addictions may lead affected individuals to come forward and seek treatment, similarly to what has been observed when gambling disorder was listed as a psychiatric disorder in the third edition of the DSM. It is timely to publish a special issue on technological addictions to generate new evidence, promote debates among scholars, and increase scientific knowledge about these disorders. Such a process will help to approach a scientific consensus regarding the conceptualisation and classification of these disorders, and be beneficial for prevention policies and treatment for affected individuals.

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