

# Psychological, Social, and Cultural Aspects of Internet Addiction

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# Chapter 3

## Personality, Internet Addiction, and Other Technological Addictions: A Psychological Examination of Personality Traits and Technological Addictions

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### **ABSTRACT**

*Research into technological addictions, such as Internet addiction, smartphone addiction and social networking addiction has greatly increased. It is important to understand how technological addictions may be related to different personality types and key individual differences associated to personality. This chapter provides empirical and conceptual insights into how technological addictions may be related to different personality types and key individual differences associated to personality. This chapter focuses on a number of technological addictions and illustrates how research and theory in this area has developed in relation to commonly researched personality traits (e.g., extraversion, introversion, neuroticism, conscientiousness, openness to experience, and narcissism) and key individual differences related to personality (e.g., personality disorders). The complex nature of personality and technological addictions is discussed together with areas for future research.*

### **INTRODUCTION**

Recent figures suggest that 40% of the world's population have access to the Internet, worldwide Internet usage has increased with 499 million Internet users in Europe, 647 million users in the Americas, 240 million users in Africa and 1.7 billion users in Asia and the Pacific region (International Telecom-

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munication Union [ITU], 2016). When considering country specific data, 74% of individuals use the Internet in the United States of America (USA), 91% in the United Arab Emirates (UAE), 93% in Japan and 89% in South Korea (ITU, 2016). Although Internet use is usually beneficial and advantageous for most people (Howard, Wilding & Guest, 2016; Heo et al. 2015; Roy & Ferguson, 2016; Wiederhold, 2017), increased availability and high penetration rates across the globe can facilitate the emergence of excessive and addictive behaviors related to Internet use. Furthermore, many people appear to display impulsive, narcissistic and aggressive personalities online which can be nurtured by various Internet technologies (Aboujaoude, 2017).

Internet addiction has been defined as “excessive or poorly controlled preoccupations, urges or behaviours regarding computer use and Internet access that lead to impairment or distress” (Weinstein & Lejoyeux, 2010, p277). Studies have systematically shown that excessive use of the Internet can lead to Internet addiction (Durkee et al. 2012; Pontes & Griffiths, 2016a; Pontes & Griffiths, 2017; Lortie & Guitton, 2013), which comprises a heterogeneous spectrum of Internet-related activities with a potential to cause problems for the individual, such as gaming, shopping, gambling, or social networking. In fact, the phenomenon of Internet addiction has been recognized since the mid-1990s as a new type of addiction and a mental health problem that exhibits signs and symptoms like those of other established addictions. Young (1996) and Griffiths (1996) were among the first researchers to investigate Internet addiction from a scientific perspective by publishing case study accounts of individuals who suffered from this condition based on an adapted criterion for pathological gambling as defined in the *Diagnostic and Statistical Manual for Mental Disorders* (DSM-IV; American Psychiatric Association, 1994). In one of the earliest studies published in the field, Young (1998) investigated a sample of 396 dependent Internet users who endorsed a minimum of five out of eight criteria adapted from the diagnostic criteria for pathological gambling in the DSM-IV, and 100 non-dependent Internet users. The results of this study indicated that on average, the dependent users spent eight times more hours online than the controls, and used chat rooms and Multi User Dungeons (MUDs). With regards to online gaming addiction diagnostic approaches, researchers and clinicians are now utilizing the nine diagnostic criteria for Internet Gaming Disorder that was developed by the American Psychiatric Association in the last revision of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association, 2013). According to the APA (2013), the clinical diagnosis of Internet Gaming Disorder comprises a behavioral pattern encompassing persistent and recurrent use of the Internet to engage in online games, leading to significant impairment or distress over a period of 12 months as specified by the endorsement of at least five out of the following nine criteria: (i) preoccupation with Internet games; (ii) withdrawal symptoms when Internet gaming is taken away; (iii) tolerance, resulting in the need to spend increasing amounts of time engaged in Internet games; (iv) unsuccessful attempts to control participation in Internet games; (v) loss of interest in previous hobbies and entertainment as a result of, and with the exception of, Internet games; (vi) continued excessive use of Internet games despite knowledge of psychosocial problems; (vii) deceiving family members, therapists, or others regarding the amount of Internet gaming; (viii) use of Internet games to escape or relieve negative moods; and (ix) jeopardizing or losing a significant relationship, job, or education or career opportunity because of participation in Internet games (APA, 2013). Given these recent advances, researchers have now developed several standardized psychometric assessment tools to assess both Internet Gaming Disorder (Pontes et al., 2014; Pontes & Griffiths, 2015; Pontes, 2016) and generalized Internet addiction (Pontes & Griffiths, 2016a, 2016b, 2017) based on the nine Internet Gaming Disorder criteria.

Various terms have been used to name the condition of Internet addiction, including compulsive computer use (Black, Belsare, & Schlosser, 1999), Internet dependency (te Wildt, 2011), pathological Internet use (Morahan-Martin & Schumacher, 2000), problematic Internet use (Davis, Flett, & Besser, 2002), virtual addiction (Greenfield, 1999), and Internet addiction disorder (Ko, Yen, Chen, Chen, & Yen, 2005). Internet use has substantially increased with adolescents becoming progressively addicted to social networking sites (SNS) such as Facebook, this assertion is supported by research (Jafarkarimi et al. 2016) showing that 47% of a student sample in Malaysia were classified as addicted to Facebook. There is increasing research evidence to suggest that mental health is impacted by technology (Rosen, Whaling, Rab, Carrier, & Cheever, 2013) and various Internet activities appear to be linked to problematic Internet use (Bruno et al. 2014). Given the relevance of technological addictions (e.g., Internet addiction) as a potential public health issue and the existing conflicting findings concerning the role of personality in technological addictions, this chapter will provide empirical and conceptual insights into how technological addictions may be related to different personality types and key individual differences associated to personality. The present chapter will focus on several technological addictions (e.g. Internet addiction, videogame addiction, SNS addiction, and smartphone addiction) and illustrate how research and theory in this area has developed in relation to commonly researched personality traits (e.g., extraversion, introversion, neuroticism, conscientiousness, openness to experience, and narcissism) and key individual differences related to personality (e.g., personality disorders). It is envisaged that this chapter will help inform future research and will shed light on the intricacies between personality and technological addictions.

## **BACKGROUND**

Internet addiction has been traditionally defined as an uncontrollable and damaging use of the Internet, and conceptually framed as a compulsive-impulsive phenomenon, one of those in the spectrum of impulse-control disorders as discussed in the literature (Beutel et al. 2011). More recently, Pontes and Griffiths (2017) have conducted a large-scale study in a sample of 1,105 Internet users, and were able to empirically conceptualize Internet addiction via four distinct domains: (i) escapism and dysfunctional emotional coping, (ii) withdrawal symptoms, (iii) impairments and dysfunctional self-regulation, and (iv) dysfunctional Internet-related self-control.

Research evidence suggests that Internet addicts experience a number of biopsychosocial symptoms and consequences (Beutel et al. 2011) that can include symptoms traditionally associated with substance-related addictions (Kuss & Billieux, 2016; Rucker, Akre, Berchtold, & Suris, 2015;) and a similar set of common defining criteria, namely salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse (Griffiths, 2005). More specifically, Internet addiction has been linked to social anxiety in young adults (Weinstein, Dorani, Elhadif, Bukovza, & Yarmulnik, 2015), lower levels of family functioning, life satisfaction, and problems in family interactions (Wartberg, Kriston, Kammerl, Petersen, & Thomasius, 2015), attention deficit/hyperactivity disorder and depression (Sariyska, Ruter, Lachmann, & Montag, 2015), higher incidence of substance use, poor emotional well-being, and decreased academic performance in adolescents (Rucker, Akre, Berchtold, & Suris, 2015), increased academic stress (Jun & Choi, 2015), impulsive behaviours (Reed, Osborne, Romano, & Truzoli, 2015), introversion (McIntyre, Wiener, & Saliba, 2015), and higher levels of loneliness, alexithymia, and suicide (Alpaslan, Avci, Soylu, & Guzel, 2015).

Although Internet addiction is not currently recognized as a *bona fide* addiction and numerous scholarly debates have questioned its legitimacy (Block, 2008; Pies, 2009; Starcevic & Aboujaoude, 2016; Starcevic, 2013; Starcevic, 2016), recent review studies have shown that Internet addiction may pose a serious health hazard to a minority of people (Pontes, Kuss & Griffiths, 2015). Moreover, Pontes et al. (2015) recently reviewed a total of 12 robust empirical studies that estimated prevalence rates of Internet addiction in a wide range of cultural backgrounds using nationally representative samples, and found that prevalence rates ranged from a minimum of 1% in Germany (Rumpf et al. 2014) to a maximum of 18.7% in Taiwan (Lin et al. 2014). Pontes et al. (2015) also noted that such disparity in the prevalence rates reported may have been a result of heterogeneity in the assessment of Internet addiction, adoption of arbitrary cut-off points to ascertain prevalence rates (even when researchers adopt the same instrument), and utilization of assessment criteria that are not psychometrically or clinically validated. While studies have indicated that people suffering from Internet addiction are mostly young males with introverted personality (e.g., Mottram & Fleming, 2009; Van der Aa et al. 2009), findings concerning gender differences are mixed, with some studies reporting higher prevalence rates among males (Király et al. 2014), and females (Rücker et al. 2015) and other studies reporting no significant differences across both genders (Blinka et al. 2017; Rumpf et al. 2014).

Internet addiction amongst adolescents has become a serious public health problem in some countries (especially in Asian countries) (Oberst et al. 2017). Since adolescents usually have fixed class schedules, more freedom of time, and less excessive parental intervention, they are more vulnerable to Internet addiction in general (Lai & Kwan, 2014; Yu & Chao, 2016), including addiction to Social Networking Sites (SNSs), which can negatively impact upon their mental health (Bányai et al. 2017) and academic performance (Kirschner & Karpinski, 2010). In fact, a recent report found that 71% of teenage social media users access more than one social media site, and 24% of adolescents are ‘almost constantly’ online due to the widespread use of smartphones (Lenhart et al. 2015). The general prevalence for SNS users remains relatively balanced across both genders, with an ever-growing 93% of American young adults aged 18-29 using social media for communication, and 72% of individuals in this age group also use the Internet to search for online health information, including that of depression (Lenhart, Purcell, Smith, & Zickuhr, 2010).

## **PERSONALITY FACTORS AND ADDICTIVE PROCESSES**

### **Issues, Controversies, Problems**

The role of personality in the study of substance-based addictions has been significantly better understood in comparison to behavioral addictions. One of the potential reasons for this might be because the field of substance use disorder is more established at medical and societal levels. Since the field of behavioral addictions, especially technological addictions are relatively recent in comparison to other more established fields, it is paramount to understand how addictive processes related to these new forms addictions might be facilitated or mitigated in the context of personality research as personality in general can contribute to both chemical and behavioral addictions (Andreassen et al. 2013; Grant et al. 2010).

Several personality traits appear to be associated with various Internet-related activities such as SNS, online gaming, and online gambling. The findings of some studies (e.g., Ross et al. 2009; Zywicki et al. 2008) indicate that people with large offline social networks, who are more extroverted, and who have

higher self-esteem, use Facebook for social enhancement. People higher in narcissistic personality traits tend to be more active on Facebook and other SNSs in order to present themselves favourably online because the virtual environment empowers them to construct their ideal selves (Buffardi & Campbell, 2008; Mehdizadeh, 2010). Research suggested that people with different personality traits differ in their usage of SNSs (Correa et al. 2010) and prefer to use distinct functions of SNSs such as Facebook.

Personality traits influence individual's cognitions, motivation, and behaviours in a variety of situations, with SNS use closely related to specific personality traits (Ryan & Xenos, 2011). According to research conducted by Ryan and Xenos (2011), Facebook users tend to be more extraverted and narcissistic, but less conscientious and socially lonely, than non-users. Furthermore, frequency of Facebook use and preferences for specific SNS features appear to vary as a result of certain characteristics, such as neuroticism, loneliness, shyness and narcissism (Ryan & Xenos, 2011). Ross et al. (2009) have supported these findings by suggesting in their work that people with different personality traits use specific functions of Facebook. More recently, studies found that SNS use and certain personality traits may have important implications for work performance. For instance, the study conducted by Kim and Chung (2014) in a sample of 1,452 employees in Korea found that SNS use moderated the association between extraversion and neuroticism with employees' job satisfaction. Additionally, Kim and Chung (2014) found that SNS use increases job satisfaction of employees that are extraverted, while it also affects job satisfaction of those exhibiting low agreeableness.

## **Extraversion**

Extraversion relates to how individuals socialize with each other. Moreover, individuals high on this trait are very sociable, energetic, optimistic, friendly and assertive (Maltby et al. 2010). Extraversion plays an important role in the context of Internet use as the Internet is a highly interactive and social tool, especially in the context of SNS use where users tend to be more open in the way they portray themselves. Since extraversion predicts a variety of positive social behaviors (Eaton & Funder, 2003) and extroverts report increased levels of social support and larger social networks (Swickert, Rosentreter, Hittner & Mushrush, 2002), it is possible that this extends to many online social behaviors as well. People high in extraversion and openness to experience use SNSs more frequently, with the former being true for mature and the latter for young people (Correa et al. 2010). Given that SNS use facilitates social interactions and provides social support for individuals, extraverts have a chance to increase their social connections further through SNS activities (Kim & Chung. 2014). Furthermore, extraverts and individuals open to experiences are members of significantly more groups on Facebook, use socializing functions more (Ross et al. 2009), and have more Facebook friends than introverts (Amichai-Hamburger & Vinitzky, 2010) which defines the former's higher sociability in general.

In terms of addictive SNS use, extraversion (together with depression) has been found to be linked to Facebook addiction (Hwang, 2014). Research by Wang et al. (2015) revealed that extraversion was associated with SNS addiction. Additionally, research by Servidio (2014) examining Internet addiction amongst Italian students found that extraversion was negatively related to Internet addiction. Hsiao et al. (2016) explored the links between personality traits and compulsive mobile application usage. The results showed that extraversion had significant effects on compulsive usage of mobile applications. In terms of smartphone use and Internet addiction, Bianchi and Phillips (2005) reported that extraversion was linked to problematic smartphone use.

Several studies support the notion that gamers exhibit higher extraversion than those who do not play videogames (Teng, 2008; Yee, 2006). This may be because these extraverts have higher chances than less extraverted players to achieve success in games, and improve their self-efficacy (Klimmt & Hartmann, 2006). Moreover, highly extraverted players can enjoy social activities within online games that can match their social motivations (Jansz & Tanis, 2007; Teng, 2008). However, the relationship between extraversion and videogame play may not be straightforward. Collins and Freeman (2013) investigated the role of extraversion, trait empathy, social capital and prosocial tendencies in a sample of 416 gamers and reported that extraversion did not differ significantly between problematic gamers, non-problematic gamers, and non-gamers despite previous reports suggesting that problematic gamers are low in extraversion (e.g., Peters & Malesky, 2008). In terms of smartphone addiction, previous studies have found important correlates with smoking habits and low health practices in males, suggesting that the intensity of smartphone use may be related to unhealthy lifestyles (Toda, Monden, Kubo & Morimoto, 2006). Notwithstanding this, when considering all these studies together, it appears that extraversion plays a role in how people interact with newer forms of technological applications (i.e., SNS and smartphones) even though this personality trait appears to affect videogame play in a distinct way.

## **Introversion**

The psychological trait of introversion is one that is inward focused where one is directed towards his/her own thoughts (Jung, 1964; Maltby et al. 2010). Individuals with high levels of introversion are described as reserved, independent rather than followers socially, even-paced rather than sluggish in terms of their pace of work (Maltby et al. 2010). Previous research found consistent links between Internet addiction and loneliness, and that Internet addicts were less satisfied with life, and experienced greater levels of depression and had lower self-esteem (Meerkerk et al. 2010; Pontes, Griffiths, & Patrão, 2014; Pontes, Patrão, & Griffiths, 2014; Pontes, Kuss, & Griffiths, 2015). This finding is of concern for those who are introverted as it has been shown that they use the Internet more frequently for social interaction and have higher rates of compulsive Internet use (McIntyre et al. 2015; van der Aa et al. 2009).

With regards to SNS use, there is evidence suggesting that introverts disclose more personal information on their SNSs profiles (Amichai-Hamburger & Vinitzky, 2010) and may thus be using it for social compensation in order to meet specific psychosocial needs. Additionally, it appears that particularly shy people spend large amounts of time on Facebook and have large amounts of friends on this SNS (Orr et al. 2009). Therefore, SNSs may appear beneficial for those whose real-life networks are limited because of the possibility of easy access to peers without the demands of real-life proximity and intimacy. This ease of access entails a higher time commitment for this group, which may possibly result in addictive use. Research by Van der Aa et al. (2009) amongst a sample of 7,888 Dutch adolescents revealed that compulsive Internet use was associated with loneliness in introverted, low agreeable, less emotionally stable participants. Another recent study found that introversion partially mediated the relationship between compulsive Internet use and social connectedness (McIntyre et al. 2015), further emphasizing the role of introversion in the context of Internet use.

Introversion in the context of videogame play has been found to be associated with massively multiplayer online role-playing games (MMORPGs) and social compensation as these games can help players increase their social capital acquisition (Reer & Krämer, 2017). Furthermore, MMORPGs in general present the potential to help introverts build up new social relationships and gather further social capital. For this reason, introverts who realize these potentials, who take the chance to participate in in-game



social activities such as team play, using videogames as a starting point for social interactions with other gamers, could benefit socially from playing videogames (Reer & Krämer, 2017). Studies examining the effects of introversion on Internet addiction has produced mixed findings in terms of how this personality trait impacts on users' online experiences. On the one hand, introversion appears to be consistently associated with problematic Internet use. However, studies have also shown that introverted individuals can benefit socially from using the Internet and playing videogames for social purposes.

## **Neuroticism**

Neuroticism is one of the key personality traits implicated in excessive and addictive Internet use. Neuroticism measures emotional stability and personal psychological adjustment in individuals (Maltby et al. 2010). Individuals showing high levels of neuroticism usually experience wide swings in their mood and are more volatile in their emotions (Maltby et al. 2010). In a study of Internet addiction amongst a Taiwanese sample, Tsai et al. (2009) surveyed 1,360 University students and found that 17.9% of the sample were classified as Internet addicts, scoring high on neuroticism increased the odds for Internet addiction. Interestingly, men and women with higher levels of neurotic personality traits use SNSs differently, with men using SNSs more frequently than women with neurotic traits (Correa et al. 2010). A study by Ross et al. (2009) revealed that neurotics favoured the wall function of Facebook, whereas those low on neuroticism preferred posting photos. Opposite findings were reported by Amichai-Hamburger and Vinitzky (2010) where highly neurotic individuals were found to be more inclined to post their photos on their Facebook profile than less neurotic individuals.

In regard to addictive use of Internet applications, research by Ehrenberg et al. (2008) showed that more neurotic individuals reported stronger mobile phone addictive tendencies. Hardie and Tee's (2007) online survey study of 96 adults showed that 40% of the sample could be classified as average internet users, 52% of the sample could be classified as problem over-users and 8% as pathologically addicted to the Internet. The problem over-users and addicts spent increasingly more time in online activities, were more neurotic and less extraverted, more socially anxious and emotionally lonely, and gained more support from SNSs than average Internet users. The results also revealed that only neuroticism and perceived support from online SNS were significant predictors of excessive Internet use. Research on a Chinese adolescent sample (n = 2,620) by Cao and Su (2006) exploring psychological features associated with Internet addiction revealed that 2.4% of the sample were classified as Internet addicts who had significantly higher scores on the neuroticism, psychoticism and lie subscales of personality.

More recent studies have also revealed findings linking Internet addiction to neuroticism and related traits. Yan, Li and Sui (2014) investigated the relationship between Internet addiction, personality, stressful life events and family functioning in 892 college students. The researchers reported that compared with non-addicted participants, participants with severe Internet addiction (9%) had lower family functioning, lower extraversion, higher neuroticism and psychoticism, and more stressful life events. Additionally, participants with mild Internet addiction (11%) had higher neuroticism and more health and adaptation problems. Yan et al. (2014) concluded that neuroticism, health and adaptation problems were potential predictors of Internet addiction. Similar findings were reported by Dong et al. (2013) as neuroticism and psychoticism were both linked to Internet addiction.

Mehroof and Griffiths' (2010) study revealed that neuroticism was associated with online gaming addiction. Other research studies (e.g., Dalbudak & Evren, 2014; Tsai et al. 2009) have reported similar findings showing that neuroticism and Internet addiction are associated. In their cross-cultural study,

Blachnio et al. (2017) reported that in a sample of Ukrainian Internet users, lower emotional stability was associated with Facebook addiction. With the prevalence of mobile devices, people can now connect to SNSs anytime regardless of their physical location. Tang et al. (2016) investigated Facebook addiction by surveying 894 college students in Taiwan and found that only 1% was classified as addicted while approximately 80% of students used Facebook every day and 10% spent more than 8 hours a day using this SNS. Online interpersonal relationships and neuroticism were found to be prominent predictors of Facebook addiction, and other researchers (Osturk & Ozmen, 2016; Yao et al. 2014) have reported that psychoticism and neuroticism were both positively related to Internet addiction. When examining personality and compulsive mobile application use, Hsiao et al. (2016) reported that neuroticism was linked to compulsive use.

Recent research by Li et al. (2016) revealed that 4.8% of participants in their Chinese sample of 651 participants were identified as online game addicts, these addicts had higher neuroticism scores than non-addicts and were apt to use avoidant coping styles. Higher neuroticism has been associated with Internet addiction and SNS addiction (Wang et al. 2015). Muller et al. (2013) took a different stance on investigating Internet addiction, they compared the profiles of 70 patients who met the criteria for Internet addiction against 48 patients suffering from alcohol dependence. It was shown that patients with Internet addiction can be discriminated from others by high neuroticism scores. All together these studies suggest that neuroticism is an important personality trait in the acquisition, development and maintenance of Internet related addictions.

## **Conscientiousness**

Conscientiousness is a strong predictor of health behaviors and better health outcomes and is a trait describing (at higher levels) an individual's degree of self-discipline and control, with people showing high levels of this personality trait being characterized as being highly determined and organized (Maltby et al. 2010). Several studies have emphasized the effect of conscientiousness as a risk factor across different types of addictions, including substance abuse (Montag & Reuter, 2015; Kotov, Gamez, Schmidt, & Watson, 2010), alcoholism (Alminhana & Farias, 2014; Kuntsche, von Fischer, & Gmel, 2008) and smoking (Terracciano & Costa, 2004). Kuss et al. (2013) reported that 3.7% of their study sample (N = 3,105) were potentially addicted to the Internet, one of the risk factors for addiction was low conscientiousness. A recent 2-year longitudinal study (i.e., Stavropoulos, Kuss, Griffiths & Motti-Stefanidi, 2017) that has investigated the role of conscientiousness and class hostility in the development of Internet addiction in a sample of adolescents, found that lower levels of conscientiousness were associated with Internet addiction and this did not change over time, suggesting that the contribution of individual and context Internet addiction factors may differ across both genders.

In a research study by Amichai-Hamburger and Vinitzky (2010) it was revealed that high conscientiousness individuals have a greater number of friends than individuals who scored lower on the trait of conscientiousness. Blachnio et al. (2017) reported that in their Turkish and Ukrainian samples, lower conscientiousness was associated with Facebook addiction. In support of these findings, Wang et al. (2015) reported that lower conscientiousness was associated with Internet and gaming addiction. Research by Muller et al. (2013) showed that lower conscientiousness was a risk factor for Internet addiction. Buckner, Castille and Sheets (2012) explored personality and problem and pathological technology (Internet and text-messaging) use in the workplace. The findings showed that conscientiousness was negatively related to problem Internet use and that conscientiousness may also predict other excessive use tendencies.

Overall, the findings of the aforementioned studies suggest that conscientiousness is an important personality that can act as a protective or risk factor for addictive behaviors related to technology use. More specifically, conscientiousness can facilitate the emergence and maintenance of addictive processes (i.e., at lower levels) or help protect individuals from engaging in addictive behaviors (i.e., at higher levels).

## **Openness to Experience**

Openness to experience at a higher level, is a personality trait describing individuals that are sophisticated, knowledgeable, cultured, artistic, curious, analytical and more liberal in general (Maltby et al. 2010). Openness as a personality trait has been extensively investigated in substance-based addictions (e.g., Kornør, & Nordvik, 2007; Brooner, Schmidt & Herbst, 1994) and it has also been implicated in other behavioral addictions such as pathological gambling (e.g., Hwang et al. 2012; Kaare, Möttus, & Konstabel, 2009) and workaholism (e.g., Aziz & Tronzo, 2011).

Although little is known with regards to the role of openness in technological addictions, studies often present mixed findings. For instance, Andreassen et al. (2013) conducted a comprehensive empirical study in a sample of psychology undergraduate students (N = 218) to investigate the role of the five-factor model of personality in several behavioral addictions including Facebook addiction, videogame addiction, Internet addiction, and smartphone addiction. With regards to openness, the authors found that this trait was inversely associated with Facebook addiction and smartphone addiction. In other words, lower levels of openness was associated with higher levels of addictive Facebook and smartphone use. Additionally, openness did not seem to have an influence on videogame addiction and Internet addiction. This finding does not support the results found in previous studies showing that higher levels of openness is related to increased frequency of SNS use (Correa et al. 2010).

Kuss et al. (2013) reported that a combination of online gaming and openness to experience increased Internet addiction risk. Amichai-Hamburger and Vinitzky (2010) reported that individuals who scored higher on the trait of openness to experience used more features from the personal information section of Facebook than individuals who scored lower on the trait of openness to experience. This finding suggested that people exhibiting higher levels of openness are more expressive when using Facebook. More recently, Blachnio et al. (2017) reported that in their Polish sample, lower openness was associated with Facebook addiction and Wang et al. (2015) also found that low openness was significantly associated with gaming addiction. Servidio (2014) reported that there was a positive association between openness and Internet addiction. Ko et al. (2010) reported that novelty seeking, which is part of openness, was related to Internet addiction, the authors concluded that college students with a high rate of novelty-seeking might appreciate Internet activities with higher motivation and excitement; this behavioural involvement may make students prone to problematic Internet use. Taken together, these research studies suggest that further research should be carried out to ascertain the role of openness in technological addictions as findings appear mixed. Furthermore, these studies also show that specific structural characteristics of SNS, such as the Facebook personal information section, may encourage openness (Vaknin, 2003).

## **Narcissism**

Narcissism as a personality trait can be defined as a pattern of traits and behaviors suggesting an obsession with the self to the exclusion of all others, and the egotistic pursuit of gratification, dominance, and ambition (Vaknin, 2003). Furthermore, narcissism can also be defined as an individual difference

reflecting an excessive love or admiration of oneself or grandiose and inflated sense of self (Campbell, Rudich & Sedikides, 2002). Narcissism as a personality has been associated with addictions in general (La Barbera et al. 2009) and has been widely investigated in behavioral addictions such as exercise dependence (e.g., Miller & Mesagno, 2014) and technological addictions such as Internet addiction (e.g., Odacı & Çelik, 2013) and online gaming addiction (e.g., Kim, Namkoong, Ku & Kim, 2008).

Similarly, to previous studies on individual differences related to different personality traits in technological addictions, findings from studies investigating the specific link between narcissism and technological addictions remain inconclusive. For instance, studies investigating SNS use found that people presenting higher levels of narcissistic personality traits tend to be more active on SNSs in order to present themselves favorably online (Buffardi & Campbell, 2008; Mehdizadeh, 2010). Furthermore, the relationship between narcissism and Facebook activity may be related to the fact that narcissists have an imbalanced sense of self, fluctuating between grandiosity with regards to explicit agency and low self-esteem concerning implicit communion and vulnerability (Cain et al. 2008).

A more recent study conducted by Eşkisü, Hoşoğlu and Rasmussen (2017) examining the relationship between narcissism and Facebook usage in a sample of 492 Turkish students found that students spending more time on Facebook and who had a greater number of friends and used Facebook to meet new people displayed high levels of narcissism, leading the authors to suggest that SNS use might provide an outlet for users high in narcissism to present and reinforce their inflated self-image. Andreassen, Pallesen and Griffiths (2017) examined the association between addictive use of social media, narcissism and self-esteem amongst a sample of 23,532 Norwegian participants. The results showed that addictive social media use was related to lower age, being a woman, not being in a relationship, lower education, being a student, lower income, having narcissistic traits, and negative self-esteem. When online games are brought into the discussion, research (Kim et al. 2008) suggests that narcissistic personality traits may predispose some individuals to become addicted to online games. Wu et al. (2016) examined personality disorders and gender differences amongst college students ( $n = 556$ ) with Internet addiction, their study revealed that males with Internet addiction showed a higher frequency of narcissistic personality disorder, whereas females showed higher frequency of borderline narcissistic, avoidant, or dependent personality disorder when compared with those without Internet addiction.

Overall, the existing findings suggest that high frequency technology use and technology addiction appear to be linked with increased levels of narcissism. However, this finding is not straightforward as recent studies have failed to replicate this finding in the context of generalized Internet addiction (e.g., Odacı & Çelik, 2013), suggesting that the interplay between narcissism and technological addiction is rather complex and may be mediated by additional variables.

## **OTHER KEY PERSONALITY TRAITS, INDIVIDUAL DIFFERENCES AND PERSONALITY DISORDERS**

There are other personality traits other than the Big-Five traits that merit further consideration as they may help to understand how technological addictions can be explained by additional personality traits often neglected by research. For instance, Floros et al. (2014) assessed the underlying links between personality, defense styles, Internet addiction and psychopathology. The results of this study showed that impulsivity, sensation seeking, neuroticism/anxiety, and aggression-hostility contributed to the prediction

## ***Personality, Internet Addiction, and Other Technological Addictions***

of variability in Internet addiction. In contrast to these findings, Lavin et al. (1999) reported that dependent Internet users scored significantly lower on sensation seeking than non-dependent Internet users.

Research by Servidio (2014) reported that agreeableness was negatively related to Internet addiction. Interestingly, Yang and Tung's (2007) research highlighted that people can have personalities that are characterized by dependence, shyness, depression, and low self-esteem. Such personalities have a higher tendency to become addicted to the Internet. In support of these findings Chak and Leung (2004) reported shyness was linked to Internet addiction. In a Turkish study of Internet addiction, Odaci and Celik (2013) found positive associations between shyness and Internet addiction. To add to this finding, research by Huan, Ang and Chye (2014) demonstrated that social anxiety mediated the relationship between shyness and loneliness and problematic Internet use.

A personality trait that has not been researched extensively is that of self-directedness. Low self-directed humans can be described by low self-esteem, low satisfaction with their own personalities and problems in handling everyday life (Hahn, Reuter, Spinath, & Montag, 2017). Sariyska et al. (2014) conducted a cross-cultural comparison study of seven countries and reported that self-directedness was negatively correlated with Internet addiction in all samples. A more recent study conducted by Hahn et al. (2017) in samples of adult monozygotic and dizygotic twins and non-twin siblings found that self-directedness accounted for 20% to 65% of the genetic variance in specific Internet addiction facets through overlapping genetic pathways. Although the relationship between personality and Internet addiction is complex, it has been established that it is influenced by both genetic and environmental factors (Hahn & Spinath, 2017). However, only a few studies have investigated Internet addiction using genetic-based designs. With regards to Internet addiction, if the environmental factors do not vary in a relevant way, all phenotypic variation related to environmental variation will be cancelled out, and the only variation left will be associated with genetic differences (Hahn & Spinath, 2017).

Another critical personality trait that has received little scientific attention in the technological addictions literature is agreeableness. This personality trait relates to characteristics of the individual that are relevant for social interaction, with higher levels on this trait being often described as trusting, helpful, softhearted, and sympathetic (Maltby et al. 2010). The study of agreeableness in the context of technological addictions is of utmost importance given that addiction to technology often represents poor communication and interpersonal skills with increased levels of preference for online social interaction (Caplan, 2003; Kim, 2017; Yu et al. 2017). It has also been suggested by communication researchers (e.g., Tokunaga, 2015) that maladaptive Internet use is unmistakably a communication research problem. In light of this, many studies have linked technological addiction with agreeableness. Collins, Freeman and Chamarro-Premuzic (2012) investigated the associations between personality traits and MMORPGs and found that problematic players were found to score lower in agreeableness, leading the authors to suggest that agreeableness may be implicated in the development and maintenance of problematic MMORPG use. A recent study on Internet use in Slovakia found that agreeableness was negatively associated with Internet addiction and that this personality trait explained 5% of the unique variance in Internet addiction (Holdoš, 2016).

Deficient self-regulation is a key individual difference that has been implicated in the development of problematic Internet use as it reflects the interplay between compulsive behavioral symptoms and obsessive cognitive symptoms of generalized problematic Internet use (Caplan, 2010). LaRose, Lin and Eastin (2003) defined deficient self-regulation "as a state in which conscious self-control is relatively diminished" (p. 232). LaRose et al. (2003) have also suggested that the process of technology addiction may be interpreted as the struggle to maintain effective self-regulation over problematic media behavior.

Caplan (2010) conducted a study in a sample of 424 undergraduate students and found that deficient self-regulation predicted negative outcomes arising from one's Internet use, a finding that has been corroborated by several studies (Assunção & Matos, 2017; Haagsma, Caplan, Peters, & Pieterse, 2013; Pontes, Caplan, & Griffiths, 2016; Gámez-Guadix, Calvete, Orue, & Las Hayas, 2015).

Research on technological addictions has also investigated the role of abnormal personality in addition to healthy personality. Personality disorders are an example of abnormal personality and can be conceptualized as extreme variants of normal personality domains (Saulsman & Page, 2004). A recent study conducted by Zadra et al. (2016) found that in individuals meeting the diagnostic criteria for Internet addiction showed higher frequencies of personality disorders compared to regular Internet users. Moreover, it was also found that cluster C personality disorders (i.e., avoidant, dependent, and obsessive-compulsive personality disorders) were more prevalent in males than females, and that rates of remission of Internet addiction were found to be lower in participants presenting with cluster B personality disorders (i.e., antisocial, borderline, histrionic, and narcissistic personality disorders). Research by Laconi, Andreoletti, Chauchard, Rodgers and Chabrol (2016) revealed that cluster A personality traits (schizoid and schizotypal) and cluster B personality traits (borderline and antisocial) played important roles in problematic Internet use among men. Borderline personality disorder (BPD) (i.e., emotionally unstable personality disorder characterized by unstable relationships with other people, unstable sense of self and emotions) was linked to Internet addiction in recent research by Wu, Ko, Tung, and Li (2016). The researchers set out to examine whether BPD features would increase the risk for Internet addiction severity in a sample of 1,826 Taiwanese college students. The results showed that BPD was significantly correlated with Internet addiction severity a year later.

## **SOLUTIONS AND RECOMMENDATIONS**

There is evidence showing that different personality traits are associated with different online activities (Wang et al. 2015). Thus, psychosocial interventions for the prevention of addiction needs to consider the sensitivity of individual differences. At the clinical level, many studies have revealed that Internet addiction is related to unique patterns of behavior, especially amongst clinical patients (Muller et al. 2013), so treatment approaches that meet the specific requirements of people suffering with Internet addiction is required. One suggested approach to treatment is to assess an individual's coping style and cognitions and improve biased thinking (e.g., cognitive distortions) to reduce symptoms of Internet addiction (Brand, Laier & Young, 2014; Gervasi et al. 2017). Similarly, Noh and Kim (2016) also propose a focus on cognition when administering treatment. Skills based treatments which incorporate rational problem-solving skills and practical life skills are among the best treatments for alcohol dependency (Kwee, Komoru-Venovic & Kwee, 2010) and could be adapted to help prevent addiction to technology by educators, parents, and social media developers. These treatments could involve face-face sessions or even short online tutorials. Such treatments would equip individuals with important long-term competencies that can be adapted to tackle various addictive behaviours.

## **FUTURE RESEARCH DIRECTIONS**

The present chapter has revealed that there are some dissimilar findings amongst research studies. Billeux, Schimmenti, Khazaal, Maurage and Heeren (2015) have argued that there is a tendency to easily overpathologise some everyday behaviours and consider them behavioural addictions. They argue that most research fails to consider the factors of functional impairment and stability of the dysfunctional behavior. Future addiction research should consider these factors. Further analysis of technology users who are classed as introverts and their network of friends is an area which will delve light on their risks of developing technological addictions such as Internet addiction. The trait of neuroticism warrants further investigation, particularly in the context of SNS use as it has been found that neuroticism affects how individuals use SNSs (Skues, Williams, & Wise, 2012; Ryan & Xenos, 2011; Eşkisu, Hoşoğlu & Rasmussen, 2017). For instance, Ross et al. (2009) found that SNSs users with higher levels of neuroticism were less willing to share personal information on Facebook but preferred posting on their timeline more frequently compared to uploading pictures onto their profiles.

Higher usage associated with narcissists, neurotics, extraverts and introverts may implicate that each of these groups of users are particularly at risk for developing an addiction to Internet applications. The use of different Internet applications tends to have an influence on whether one will experience problematic use. A large number of studies that has been reviewed tends to support initial research (e.g., Leung, 2004) showing that specific online activities can lead to addictive use. This finding appears to support more recent empirical studies that have found that the Internet may be just a means used by individuals to fuel addiction to specific Internet applications and services (Griffiths & Szabo, 2014; Pontes, Szabo, & Griffiths, 2015).

It is important to note that technological addictions present with distinct cultural features and addiction to specific Internet applications can be experienced differently across different cultures. Blachnio et al. (2017) showed that different personality traits were associated with Facebook addiction across three different cultures (i.e., Turkish, Polish and Ukrainian cultures). Future research must consider these findings. There are other influential variables that also need to be considered as research (Yao et al. 2014) has shown that parental behavior can affect the risk of being addicted to the Internet. Furthermore, future studies should investigate the role of specific personality traits in terms of prevention of relapse in technological addictions as research on substance abuse has shown that the risk of relapsing is increased for patients both low in conscientiousness and high in neuroticism, suggesting that these two broad personality dimensions are relevant to the development and maintenance of addiction processes (Fisher, Elias, & Ritz, 1998).

## **CONCLUSION**

The present chapter focused on several technological addictions (e.g. Internet addiction, videogame addiction, SNS addiction, and smartphone addiction) and personality traits (e.g., extraversion, introversion, neuroticism, conscientiousness, openness to experience, and narcissism) alongside specific individual differences related to personality (e.g., personality disorders). After reviewing the scientific literature on personality and technological addictions, it can be argued that greater use of technology and addiction

to technology is associated with specific personality traits, disorders, and characteristics. Although the relationship between technological addictions and personality traits has been consistently identified by a large number of empirical studies, it is likely that the causal pathway between these two constructs may be bi-directional (i.e., one can potentiate the other) and not exclusively unidirectional (i.e., one causing the other). The bi-directional approach to understanding the relationship between technological addictions and personality traits is supported by the lack of robust evidence as well as the fact that the vast majority of studies employed cross-sectional designs and non-probability sampling techniques. This finding may implicate that individuals presenting specific personality features may be particularly at risk for developing technological addictions. For instance, personality traits such as neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness were found to explain between 6% and 17% of the variance in different types of technological addictions such as Facebook addiction, videogame addiction, Internet addiction, and smartphone addiction (Andreassen et al. 2013). Research and theory in personality and technological addictions has developed considerably but further research is needed into investigating the intricate relationship personality and technological addiction.

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## **Personality, Internet Addiction, and Other Technological Addictions**

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## **KEY TERMS AND DEFINITIONS**

**Conscientiousness:** A personality trait that is characterized with being highly determined and organized.

**Extraversion:** A personality trait which refers to how individuals socialize with each other. Extraverts tend to be sociable, energetic, optimistic, friendly and assertive.

**Introversion:** A personality trait which when displayed in individuals would make one inward focused, focusing more on internal thoughts, feelings and moods.

**Massively Multi-Player Online Role-Playing Games:** Internet connected video games in which very large numbers of people interact with one another within a virtual world.

**Multi-User Dungeons:** A multi-player real time virtual world, usually text-based.

**Narcissism:** A personality trait can be defined as a pattern of traits and behaviors suggesting an obsession with the self to the exclusion of all others, and the egotistic pursuit of gratification, dominance, and ambition.

**Neuroticism:** A personality trait that measures emotional stability and personal psychological adjustment in individuals. Individuals scoring high in neuroticism are more likely to experience negative mood states such as anxiety, anger, and frustration.

**Openness to Experience:** A personality trait, people with high levels of openness to experience tend to be sophisticated, knowledgeable, cultured, artistic, curious, analytical and more liberal in general.

**Wall Function of Facebook:** An area on a profile or page where friends and 'fans' can post their thoughts and opinions for everyone to see.