ADDICTA: THE TURKISH JOURNAL ON ADDICTIONS

Received: May 15, 2016
Revision received: July 5, 2016
Accepted: August 23, 2016
OnlineFirst: October 25, 2016

ISSN 2148-7286 • **eISSN** 2149-1305
http://addicta.com.tr/en/
DOI 10.15805/addicta.2016.3.0103 • Autumn 2016 • 3(2) • 193–207

Research Article

Smartphone Addiction and Associated Psychological Factors*

Claire Pearson[1]
University of Derby

Zaheer Hussain[2]
University of Derby

Abstract

The use of smartphone technology has increased drastically resulting in a risk of addiction to certain web applications, such as social networking sites (SNS) that are easily accessible via smartphones. A major concern regarding the increased use of SNS sites is the risk of an increase in narcissism amongst users of SNS. The present study examined the relationship between smartphone use, narcissistic tendencies, and personality as predictors of smartphone addiction. A self-selected sample of 256 smartphone users (M = 29.2; SD = 9.49) completed an online survey. The results revealed that 13.3% of the sample was classified as addicted to smartphones. Regression analysis revealed that narcissism, openness, neuroticism, and age were linked to smartphone addiction. Therefore, it is suggested that smartphones encourage narcissism, even in non-narcissistic users. Future research requires more in-depth qualitative data, addiction scale comparisons, and comparison of use with, and without, SNS access. Further, it is advised that prospective buyers of smartphones be pre-warned of the potential addictive properties of new technology.

Keywords

Smartphone use • Addiction • Narcissism • Social networking sites • Personality • Narcissistic personality disorder

* This paper was presented at the 3rd International Congress of Technology Addiction, Istanbul, May 3-4, 2016.

1 Department of Psychology, University of Derby, Kedleston Road, Derby, DE22 1GB, UK. Email: Claire.pearson4@hotmail.co.uk

2 **Correspondence to:** Zaheer Hussain (PhD), Department of Psychology, University of Derby, Kedleston Road, Derby, DE22 1GB, UK. Email: z.hussain@derby.ac.uk

Citation: Pearson, C., & Hussain, Z. (2016). Smartphone addiction and associated psychological factors. *Addicta: The Turkish Journal on Addictions*, *3*, 193–207. http://dx.doi.org/10.15805/addicta.2016.3.0103

The significant rise in demand for interpersonal, mass communication technology has boosted smartphone evolution over the last two decades. Specifically, from 2010 to 2011, smartphone sales increased by 58% and accounted for 31% of all mobile phone sales (Silva, 2012). By 2013, 51% of adults owned smartphones in the UK (Ofcom, 2013). Smartphone functions are endless and easily accessible thanks to Wi-Fi technology. Devices boast browser access, multiple downloadable applications (apps), cameras, and organization systems. In fact, they are viewed as a mandatory device within industrialized cultures (Kwon et al., 2013). However, there is evidence to suggest that there is an over-dependence on smartphones that can lead to destructive public health inferences (Monk, Carroll, Parker, & Blythe, 2004; Palen, Salzman, & Youngs, 2001; Paragras, 2005; Sarwar, 2013), including antisocial feelings of rejection within families (Rosman, 2006) and negative clinical health implications (Shin & Dey, 2013) such as addiction (Lopez-Fernandez, Honrubia-Serrano et al., 2013).

Rosen, Cheever, and Carrier (2012) defined negative relationships between psychological health and technology overuse as an "iDisorder." In particular, Roos (2001) defined three factors to mobile phone addiction: phones are always switched on, will be used regardless of landline telephone availability, and use causes social or financial difficulties. Smartphones provide an unparalleled level of connectedness; however, the psychological cost is unknown. The depth of such relationships may not be equal to real-life communications and they may be engaged in to raise self-esteem by feeling popular–an indicator of narcissism (Campbell & Miller, 2011). Narcissistic Personality Disorder (NPD), an Axis II disorder in the *Diagnostic and Statistical Manual: Fifth edition* (DSM-V), is defined by self-promotion, vanity, grandiose sense of self-importance, power fantasies, and superficial relationships. Twenge and Campbell (2013) warn of "The Narcissism Epidemic" and report that narcissism rates in America have risen as much as obesity. Smartphones may influence the development of NPD and could potentially influence dependence to online gaming or gambling. Smartphones allow access to gambling and gaming sites (Young, 2000) and ease of access is a key factor in developing dependence (Griffiths & Barnes, 2008).

Many studies have investigated addictive internet use and psychosocial implications (Siomos et al., 2012; Wang, Lee, & Chang, 2003). For instance, Yao and Zhong (2014) conducted a cross-lagged panel survey with 361 students investigating causal priority between psychological health and internet addiction. It was reported that loneliness was increased by excessive internet use and online relationships were not considered a healthy substitute for real-life interactions. Whilst real-life interaction may reduce internet addiction, increased online interactions due to excessive internet use can neutralize the effect. Although different platforms for internet use were not

investigated and no significant effect was found for depression, the study offers a perturbing view of a cruel circle of internet addiction and loneliness. Moreover, Yen, Yen, Wu, Huang, and Ko (2011) investigated differences between real-life and online hostility, and whether these differences were mediated by online activities, depression, and internet use. They reported that internet addiction and depression increases both real-life and online hostility. However, depressed participants showed lower hostility behaviors when online; suggesting the internet as a positive pathway for depression interventions even though the percentage of depressed participants who suffered internet addiction was not reported.

Overuse of mobile phones can have negative effects on psychological health, including depression and chronic stress (Augner & Hacker, 2010), and increased suicidal ideation (Katsumata, Matsumoto, Kitani, & Takeshima, 2008). Research supports the link between depression and excessive texting, social networking, gaming, viewing video clips, emailing, and listening to music, which can all be accessed via a smartphone (Allam, 2010; de Wit, Straten, Lamers, Cuijpers, & Penninx, 2011; Huang, 2010; Kalpidou, Costin, & Morris, 2011). In particular, Lee, Chang, Lin, and Cheng (2014) investigated smartphone use by utilizing questionnaires incorporating compulsive smartphone usage and technostress within the examination of how smartphone users" characteristics affect stress levels. The results from a sample of 325 respondents showed that increased "technostress" and compulsive usage are positively related to social interaction anxiety, locus of control, materialism, and a need for touch. These results suggest smartphone dependence and compulsive usage increases user stress. These results conflict with Park and Lee (2011), who examined the correlation between social relations, psychological health, and smartphone use motivation via an online survey with 279 respondents. It was reported that smartphone use motivations could be grouped into six factors: information, accessibility, time passing, following trends, caring for others, and communication. These factors were significantly related to perceived peer support and social relationships. The results suggest that smartphones can improve emotional and psychological wellbeing if used to fulfill a need to care for others or for supportive communications. Although this study did not specifically measure smartphone usage, the preliminary research implicates smartphones as either friend or foe, dependent upon motivations and control of compulsive usage; similar to internet addiction.

Notwithstanding the possible relationship between smartphones, the internet, and anonymity, research suggests a link between smartphone addiction and social networking sites (SNS). Survey research conducted by Standard University on a sample of 200 students (Hope, 2010) showed that 10% admitted to being addicted to the device and 41% said it would be a tragedy if they were to lose it. In addition, 15% confirmed their iPhone was turning them into a media addict and 30% saw the device

as a "doorway into the world." Despite this, many also reported a negative effect on interpersonal relationships due to their iPhone use; with 7% admitting their partner or roommate felt abandoned due to use.

Unlike traditional online communities and chat rooms, Facebook is not anonymous and actively encourages self-presentation. Salehan and Negahban (2013) found that the increase in mobile phone use corresponds with the rapid growth of SNS use; especially in youths. They further discovered a positive correlation between SNS and mobile phone addiction, indicating SNS use is a predictor of mobile phone addiction. Similarly, Barhuus and Polichar (2011) investigated how people integrate smartphones into their daily lives via semi-structured interviews with 21 participants who completed a daily diary for three weeks. They found that use of SNSs was prominent and four participants downloaded Facebook as their first app. The study also found that the ability to mix-and-match and interconnect smartphone applications makes the technology desirable as this caters to individual needs. This indicates possible addiction co-occurrence of the smartphone and SNS applications even though this was a very small study and cannot be generalized to the entire population.

In particular, narcissists are most likely to use the main functions of SNS (status update and picture adding) as they are drawn to the control over self-presentation (Whang, Jackson, Zhang, & Su, 2012). Rosen, Whaling, Rab, Carrier, and Cheever (2013) have suggested that the increase in narcissism is due to advanced technology and the increasingly ease of access to such technology. They investigated the impact of overused technologies and media on clinical symptoms of multiple mood and personality disorders and proposed that modern media, such as Facebook, increases narcissistic tendencies by encouraging superficial peer relationships, vanity, and self-promotion. Further, Mehdizadeh (2010) collected personality self-reports from 100 Facebook users to examine the manifestation of self-esteem and narcissism on SNS. The Facebook pages of the participants were also coded based on self-promotional content features. The study found that greater online activity was related to higher levels of narcissism and lower levels of self-esteem. However, these studies do not specifically examine the effect of smartphone use on narcissism.

With so many addictive applications available on a smartphone, it is difficult to decipher the cause and effect relationship of problematic use. In other words, the multi-faceted functionality of a smartphone may be addictive or it may be that users are addicted to a certain media. For example, if a user is showing signs of internet addiction and smartphone overuse, it is uncertain whether this is a case of co-occurrence or addiction specificity (Sussman et al., 2011). Co-occurrence would refer to the user being addicted to the internet and smartphone; whereas addiction

specificity would refer to the user being addicted to either the internet or smartphone. In addiction specificity, the addictive aspect would be the reason for overuse of the other; so if an individual was addicted to the internet, they may overuse their smartphone in order to have constant access. This individual may seem addicted to their smartphone, but would actually need to address their internet addiction as opposed to smartphone use itself. This distinction must be investigated as it is vital clinicians understand the reasons behind smartphone overuse.

In summary, previous research suggests that narcissism is increasing in individuals and that smartphone addiction and overuse must be empirically investigated. In fact, it is clear there is a lack of research in the area of smartphone use, narcissism, and links to addiction. With such rapid growth in popularity, it is vital that smartphone use and possible clinical implications are investigated to protect users. The current study aims to investigate whether smartphones encourage narcissism. Smartphone addiction, co-occurrence, and addiction specificity will also be investigated. Since it is possible smartphone overuse may have negative clinical connotations leading to addiction and narcissism, the current study also investigated personality as a predictor of addiction. It has been hypothesized that there will be a higher rate of narcissistic tendencies shown in participants who show a dependence level equivalent to an addiction to their smartphone.

Method

Participants

A total of 256 participants completed an online questionnaire. The participants were recruited via opportunity sampling from a UK university and the internet via social networking sites and smartphone forums. The sample consisted of 181 females (71%) and of 75 males (29%). The age range of participants was 17 to 68 years (M = 29.2 years; SD = 9.4 years). Participants noted their occupation as student (35%), followed by healthcare (8%), education (7%), sales/marketing (5%), administration and science/technology (4%), customer service and restaurant (3%), accounting/finance, architecture/design, construction, consulting, and social service (2%) and arts/leisure/entertainment, beauty/fashion, management, operations, and production (1%). 17% of the participants indicated "other" for their occupation. People who did not own a smartphone were excluded from the study.

Materials

Online questionnaire software (Google Documents) was utilized to design the online survey and to collect data. This was consistent with the methodology of previous research (Mehdizadeh, 2010; Park & Lee, 2011; Rosen et al., 2012).

First, the online survey asked basic demographic questions, such as age, gender, and occupation. In order to empirically investigate the phenomenon of smartphone addiction, a comparison was made with the same criteria and methods as addictions that have been clinically established. Internet Addiction (IA) is defined as an impulse control disorder that does not include an intoxicant, and therefore smartphone addiction can be defined in the same manner (Kwon et al., 2013). The online survey used an amended version of Young's (1996) diagnostic questionnaire to measure smartphone addiction. This consisted of eight close-ended questions (e.g., "Do you feel preoccupied with your smartphone?"; "Do you use your smartphone for longer than intended?"; "Have you repeatedly made unsuccessful attempts to control, cut back, or stop smartphone use?"). Participants responded with either yes or no, with yes equal to 1 or no equal to 0 for quantitative analysis. A score of 5 or more was indicative of smartphone addiction. Kwon et al. (2013) also made use of Young's (1996) diagnostic questionnaire to explore smartphone addiction in a Korean sample (n = 197). Their results suggested that the scale items in the questionnaire were both reliable and valid.

In general, research concerning smartphones has focused upon how users consume energy, as opposed to why they consume energy in that manner (Oliver, 2010). For example, how often a particular application is used, but not why or what implications this has on the user. For this reason, the current study used three open-ended questions to investigate how and why the smartphone user adopts their particular behavior (e.g., "Which applications do you utilize most?"; "What makes these particular applications attractive?" and "What problems, if any, does your smartphone cause in your life?").

Raskin and Howard's (1988) Narcissistic Personality Inventory (NPI), amended by Rosen et al. (2012) with permission, was used to measure narcissism. This consisted of 40 pairs of statements which belong to seven subsections. Each subsection is a known trait of narcissism. These are authority, self-sufficiency, superiority, exhibitionism, vanity, exploitativeness, and entitlement. Each statement belongs to either column A or column B. Statements from column A are typically narcissistic and score one point. For example, "I would prefer to be a leader." Statements from column B are not typically narcissistic and therefore do not score any points. For example, "It makes little difference to me whether I am a leader or not." People with Narcissistic Personality Disorder (NPD) are expected to score above 20 points.

The final part of the survey consisted of the Mini-Marker Personality Scale. This is a subset of Goldberg's (1981) "Big-5" personality markers and was chosen as it exhibits unusually strong characteristics for an abbreviated inventory (Saucier, 1994). The scale is comprised of 35 items answered on a nine-point Likert scale. Participants were asked to self-report on common human personality traits (e.g., extraverted and

inefficient). Participants were asked to rate each trait from 1 = Extremely inaccurate to 9 = Extremely Accurate. The questions measure five "big" traits: conscientiousness, openness, agreeableness, neuroticism, and extraversion. A score between 0 and 29 was categorized as low, between 30 and 33 was categorized as neutral, and between 34 and 63 was categorized as high.

Design and Procedure

The study utilized an online survey to collect data. The main variables under investigation were levels of smartphone addiction, extraversion, openness, agreeableness, neuroticism, conscientiousness, NPI score, age, and length of ownership.

Invitations to take part in the survey were posted online via social networking sites (e.g., Facebook and Twitter) and smartphone forums (e.g., Crackberry and Android Central). The invitation described the aims of the study and contained a link to the survey. The link directed participants to the consent form and survey, and participants were assured that the data would be kept confidential. Once the participants had completed the survey, they were directed to a debriefing form prior to submitting their data. Participants who were studying at the university were given one participation point for their participation.

Results

Smartphone User Behavior

The mean length of time participants had owned a smartphone was 4.07 years (SD = 2.35). The mean amount of time spent using a smartphone per day was 3.63 hours (SD = 2.83). There was no correlation between gender and daily use ($r(255) = .02$, $p = .75$). However, length of time owned and daily use were positively correlated ($r(255) = .14$, $p = .03$). When asked if they used their smartphones in banned areas, 35% of participants (n = 92) said yes. A chi-square test was performed but no relationship was found between gender and banned use ($X^2(1, n = 254) = .65$, $p = .421$), or occupation and banned use ($X^2(19, n = 254) = 18.59$, $p = .48$). A point biserial correlation showed no relationship between age and banned use ($r(254) = .08$, $p = .233$). Participants were also asked what their three most used applications were. The most popular were SNS applications chosen by 87% of participants (n = 223). The second was instant messaging (IM) applications chosen by 52% of participants (n = 135) and the third was news applications chosen by 51% of participants (n = 132). A complete summary of participant responses can be found in Table 1.

Table 1
The Smartphone Applications Used Most Frequently by Participants

Applications	No of Participants Using Application (%)
SNS	223 (87%)
IM	135 (52%)
News	132 (51%)
Gaming	64 (25%)
Shopping	54 (21%)
Music	51 (19%)
Photo/Video	32 (12%)
TV Catch Up	9 (3%)
Dating	7 (2%)
Fitness/Diet	2 (0.7%)
Other	22 (8%)

Smartphone Addiction

According to Young's (1996) diagnostic questionnaire, 13.3% of participants (n = 34) were classified as addicted to their smartphones. A chi-square test was performed and no relationship was found between gender and smartphone addiction (X^2 (1, N = 256) = .63, p = .43), or occupation and smartphone addiction (X^2 (19, n = 256) = 17.85, p = .532). A point biserial correlation also showed no relationship between age and smartphone addiction (r(256) = .11, p = .08). However, Pearson correlations showed a significant positive relationship for both daily use and smartphone addiction (r(255) = 0.24, p = < .05), and NPI score and smartphone addiction (r(256) = .13, p = .04), but no relationship between length of ownership and smartphone addiction (r(255) = −.01, p = .86).

Narcissistic Personality Disorder

Using the NPI scale, 16.8% of participants (n = 43) were classified as having NPD. A chi square test was conducted (X^2(1, n = 256) = 14.6, p = < .01) to assess whether there is a relationship between gender and NPD. The results were found to be significant in that more males had NPD (30.7%; n = 23) than females (11%; n = 20). A chi square test was also performed to identify any correlations between occupation and NPD, but no relationship was found (X^2(19, N n = 256) = 16.37, p = .63). A point biserial correlation did find a negative correlation between age and NPD (r(256) = −.17, p = < .01); but no correlation between NPD and banned use (r(256) = −.10, p = .105).

Personality

The "Big-5" personality traits measured by the Mini-Markers Scale were neuroticism (M = 31.78; SD = 9.95), extraversion (M = 37.67; SD = 9.44), openness

(M = 43.88; SD = 8.87), agreeableness (M = 47.29; SD = 8.05), and conscientiousness (M = 44.15; SD = 8.77). For each trait, a score below 30 was classified as low, a score between 30 and 33 was classified as neutral, and a score above 33 was classified as high. Scores for each trait are summarized in Table 2.

Table 2

Frequency and Percentage of the "Big-5" Personality Traits, as rated by the Mini-Markers Scale; Categorized as High, Neutral, and Low scores

Trait	Low	Neutral	High
Conscientiousness	14 (5.5%)	11 (4.3%)	231 (90.2%)
Agreeableness	5 (2%)	11 (4.2%)	240 (93.8%)
Openness	13 (5.1%)	21 (8.2%)	222 (86.7%)
Extraversion	49 (19%)	27 (10.5%)	180 (70.3%)
Neuroticism	105 (41%)	46 (18%)	105 (41%)

Smartphone Addiction Predictors

Further exploratory analysis was conducted to assess which variables may be related to smartphone addiction. The predictors of conscientiousness, openness, neuroticism, extraversion, agreeableness, NPI score, age, and length of ownership were used to conduct a multiple regression analysis. An analysis of standard residuals was conducted, which showed no outliers in the data (Std. Residual Min = −1.95; Std. Residual Max = 3.14). Tests to confirm that the data met the assumption of collinearity indicated that multicollinearity was not a concern. The data also met the assumption of non-zero variances (see Table 3 for tolerance, variance inflation factors (VIF), and variance scores). The data met the assumption of independent errors (Durbin-Watson value = 1.87). By using the enter method, it was found that the predictor variables explain a significant amount of variance in smartphone addiction scores ($F(8, 246) = 5.44$, $p = < .001$; $R^2 = .15$; Adjusted $R^2 = .12$). The analysis showed that openness ($\beta = -.14$, $t(254) = -2.12$, $p < .05$), neuroticism ($\beta = .28$, $t(254) = 4.50$, $p < .05$), age ($\beta = -.15$, $t(254) = -2.45$, $p < .05$), and NPI score ($\beta = .21$, $t(254) = 2.86$, $p < .05$) significantly predicted smartphone addiction. However, conscientiousness ($\beta = .02$, $t(254) = .29$), agreeableness ($\beta = .03$, $t(254) = .46$), extraversion ($\beta = -.06$, $t(254) = -.98$), and length of ownership ($\beta = .28$, $t(254) = .21$) did not significantly predict smartphone addiction (see Table 4).

Table 3

The Multiple Regression Analysis Tolerance and VIF Scores For Predictor Variables

Variable	Tolerance	VIF	Variance	Mean	SD
Conscientiousness	.92	1.08	76.86	44.15	8.77
Agreeableness	.79	1.27	64.73	47.29	8.05
Openness	.76	1.32	78.75	43.88	8.87
Extraversion	.81	1.23	89.09	37.67	9.44
Neuroticism	.90	1.11	98.95	31.78	9.95
Age	.89	1.12	89.98	29.17	9.49
Length of Ownership	.93	1.08	5.52	4.07	2.35
NPI Score	.67	1.48	51.91	12.93	7.21

Table 4

Multiple Regression Analysis of Factors Influencing Smartphone Addiction

Variable	B	SE	β	*t*	*p*
Conscientiousness	.004	.014	.018	.290	.772
Agreeableness	.007	.016	.030	.455	.649
Openness	−.031	.015	−.143	−2.121	.035
Extraversion	−.013	.013	−.064	−.976	.330
Neuroticism	054	.012	.278	4.496	.000
Age	−.031	.013	−.152	−2.447	.015
Length of Ownership	.010	.050	.013	.206	.837
NPI Score	.055	.019	.205	2.862	.005

Note. ($F(8, 246) = 5.44$, $p = < .001$; $R^2 = .15$; Adjusted $R^2 = .12$) $p = < .05$.

Discussion

The primary aim of the current study was to examine the relationship between narcissism, personality, and smartphone addiction. Results indicated that 13.3% of participants showed a dependence on their smartphone and could be classified as addicted to smartphone use. A significant positive relationship was found between narcissism levels and smartphone addiction. This suggests that the more narcissistic a person is, the more likely they are to be addicted to their smartphone. This finding supports previous research that links narcissism with addictive disorders (Lakey et al., 2008; Rose, 2007; Stinson et al., 2009). These results build upon previous research in the area of smartphone addiction, which has shown that 10% of participants were addicted to smartphones and 34% displayed addictive symptoms (Hope, 2010). A significant positive relationship between daily use and smartphone addiction was also revealed. This indicates that daily smartphone users are more likely to be addicted, which is consistent with previous research (Shin & Dey, 2013). SNS applications were found to be the most popular used by participants, which fits with the narcissism theory (Twenge & Campbell, 2013) as research suggests SNS applications significantly encourage narcissism (Keating, 2014; Mehdizadeh, 2010).

Furthermore, the results indicated that young males were most likely to have NPD. This is supported by a plethora of previous research indicating NPD as a predominantly male disorder (Stinson et al., 2008). Despite there being no correlation between gender and banned use or gender and addiction, this indicates that males are at a higher risk of the narcissism inducing aspects of smartphone technology. A positive relationship was found between daily use and length of ownership. Yet, there was no correlation between length of ownership and addiction. This suggests that although length of ownership has no direct influence on smartphone addiction, the longer a user owns their smartphone, the more daily use increases and the more likely they are to become addicted. This is an aspect for future research to investigate further. It may be that the appeal of the smartphone and its many features becomes harder to resist over time. If future explorations could define a clinically safe amount of daily use that may prevent addiction, users could then be pre-warned and be proactive in protecting themselves from becoming addicted.

A secondary aim of the present study was to examine personality as a predictor of smartphone addiction. The study found that conscientiousness, agreeableness, and extraversion are not predictors of smartphone addiction, but openness and neuroticism were. The results suggest that increased neuroticism and decreased openness are associated with a higher likelihood of smartphone addiction. This is a worrying finding as neuroticism has been linked to severe mental health issues, including mood disorders, substance abuse, eating disorders, and affective disorders (Widiger, 2011). Further research that identifies neurotic smartphone users through the Mini-Markers' Scale and examines their psychopathology (i.e., mood, affective, and substance use disorder history), reasons for smartphone use, and level of smartphone addiction may provide more insight into the depth of the clinical implications for this finding. Participants used multiple applications, of which SNS applications were the most popular choice, this concurs with previous research (Barhuus & Polichar, 2011; Salehan & Negahban, 2013). The multi-functionality of the device offers many different methods of communication. In particular, participants placed high value upon the communication functions of smartphones and their ability to keep them in touch with the world.

There are a number of limitations to the present study. The online self-report data used in this study suffers from the issue of reliability; for example, participants may have over-estimated their smartphone use. However, the issue of reliability of responses is not limited to online studies as it affects all types of self-report research (Wood, Griffiths, & Eatough, 2004). This study made use of an amended version of Young's (1996) diagnostic questionnaire to measure smartphone addiction. A specific measure of smartphone addiction is needed since the effectiveness of this instrument for measuring smartphone use is unknown, as it has not previously been used for this purpose.

Future research could compare narcissism levels between smartphone users and non-smartphone users. Twenge, Konrath, Foster, Campbell, and Bushman (2008) claimed that narcissism has influenced the way we use technology. Further research needs to investigate this claim to discover why people are becoming more narcissistic and what the motivations are for narcissism. The current study revealed a relationship between smartphone addiction, NPD, neuroticism, openness, and age; but more research is required in order to comprehensively examine the multi-functionality of the smartphone and its psychological effects. Public marketing and promotion of smartphones should consider psychological wellbeing and prospective buyers should be warned of possible addiction issues. With smartphone use appearing, at the very least, to be a co-conspirator of narcissism, and users being aware of adverse consequences but still insisting smartphones enrich their lives, action to protect users from overuse may be warranted. If adverse effects of smartphones are well advertised, users might understand that despite using the device for improving communications, it can easily lead to narcissistic actions that can potentially breakdown familial relationships. Users need to know that even if not clinically addicted, smartphone overuse can negatively affect interpersonal relationships and psychological wellbeing. This way, consumers can make an informed choice regarding their technology use and be aware of measures to protect themselves.

References

Allam, M. F. (2010). Excessive internet use and depression: Cause-effect bias? *Psychopathology, 43*(5), 121–126.

Anderson, C. (2000). Video games and aggressive behavior in the laboratory and in life. *Journal of Personality and Social Psychology, 78*(4), 772–790.

Angres, D., & Bettinardi-Angres, K. (2008). The disease of addiction: Origins, treatment and recovery. *Disease-a- Month, 54*(10), 696–721.

Augner, C., & Hacker, G. (2010). Associations between problematic mobile phone use and psychological parameters in young adults. *International Journal of Public Health, 57*(2), 437–441.

Barkhuus, L., & Polichar, V. E. (2011). Empowerment through seamfulness: Smart phones in everyday life. *Personal and Ubiquitous Computing*, *15*(6), 629–639.

Benfield, J. A., & Szlemko, W. J. (2006). Internet-based data collection: Promises and realities. *Journal of Research Practice*, *2*(2), Article-D1.

Campbell, W., & Miller, J. (2011). *The handbook of narcissism and narcissistic personality disorder*. New Jersey, NJ: John Wiley & Sons.

Chak, K., & Leung, L. (2004). Shyness and locus of control as predictors of internet addiction and internet addiction. *CyberPsychology & Behaviour, 7*(5), 559–570.

Chuang, Y. (2006). Massively multiplayer online role-playing game-induced seizures: A neglected health problem in internet addiction. *CyberPsychology & Behavior, 9*(4), 451–456.

de Wit, L., Straten, A., Lamers, F., Cujipers, P., & Penninx, B. (2011). Are sedentary television watching and computer use behaviors associated with anxiety and depressive disorders? *Psychiatry Research, 186*(2-3), 239–243.

Griffiths, M., & Barnes, A. (2008). Internet gambling: An online empirical study among student gamblers. *International Journal of Mental Health and Addiction, 6*(2), 194–204.

Hope, D. (2010). iphone addictive, survey reveals. *Live Science*. Retrieved June 19, 2014 from http://www.livescience.com/6175-iphone-addictive-survey-reveals.html

Huang, C. (2011). Internet use and psychological well-being: A meta-analysis. *Cyberpsychology, Behavior and Social Networking, 13*(2), 241–249.

Kalpidou, M., Costin, D., & Morris, J. (2011). The relationship between Facebook and the well-being of undergraduate college students. *Cyberpsychology, Behavior and Social Networking, 14*(4), 183–189.

Katsumata, Y., Matsumoto, T., Kitani, M., & Takeshima, T. (2008). Electronic media use and suicidal ideation in Japanese adolescents. *Psychiatry and Clinical Neuroscience, 62*(6), 744–746.

Kwon, M., Lee, J., Won, W., Park, J., Min, J., Hahn, C., … Kim, D. (2013). Development and Validation of a Smartphone Addiction Scale (SAS). *PLoS one, 8*(2), e56936.

Lakey, C., Rose, P., Campbell, W., & Goodie, A. (2008). Probing the link between narcissism and gambling: The mediating role of judgment and decision-making biases. *Journal of Behavioural Decision Making, 21,* 113–137.

Lane, W., & Manner, C. (2011). The impact of personality traits on smartphone ownership and use. *International Journal of Business and Social Science*, *2*(17), 22–28.

Lee, Y., Chang, C., Lin, Y., & Cheng, Z. (2014). The dark side of smartphone usage: Psychological traits, compulsive behaviour and technostress. *Computers in Human Behaviour, 31*, 373–383.

Lopez-Fernandez, O., Honrubia-Serrano, L., Freixa-Blanxart, M., & Gibson, W. (2013). Prevalence of problematic mobile phone use in British adolescents. *Cyberpsychology, Behavior, and Social Networking*, *17*(2), 91–98.

Mccartt, A., Hellinga, L., & Bratiman, K. (2006). Cell phones and driving: Review of the research. *Traffic Injury Prevention, 7*(2), 89–106.

Mehdizadeh, S. (2010). Self-presentation 2.0: Narcissism and self-esteem on Facebook. *Cyberpsychology, Behaviour and Social Networking, 13*(4), 357–364.

Monk, A., Carroll, J., Parker, S., & Blythe, M. (2004).Why are mobile phones annoying? *Behaviour & Information Technology, 23*, 33–41.

Muir, H. (2004). The violent video games people play. *New Scientist*, *184*(7), 26.

Ofcom. (2013). Communications market report. *Key Points: The Market in Context, 10,* 4–5.

Oliver, E. (2010, June). The challenges in large-scale smartphone user studies. In *Proceedings of the 2nd ACM International Workshop on Hot Topics in Planet-scale Measurement* (p. 5). ACM.

Palen, L., Salzman, M., & Youngs, E. (2001). Discovery and integration of mobile communications in everyday life. *Personal and Ubiquitous Computing*, *5*(2), 109–122.

Paragras, F. (2005). Being mobile with the mobile: Cellular telephony and renegotiations of public transport as public sphere. *Mobile Communications, 31*(2), 113–129.

Park, N., & Lee, H. (2011). Social implications of smartphone use: Korean college students' smartphone use and psychological well-being. *Cyberpsychology, 15,* (9), 491–497.

Patten, C., Kircher, A., Ostlund, J., & Nilsson, L. (2004). Using mobile telephones: Cognitive workload and attention resource allocation. *Accident, Analysis & Prevention, 36*(3), 341–350.

Raskin, R., & Howard, T. (1988). A principal-components analysis of the Narcissistic Personality Inventory and further evidence of its construct validity. *Journal of Personality and Social Psychology, 54*(5), 890–902.

Roos, J. P. (2001, August). *Postmodernity and mobile communications*. Paper presented at the European Sociological Association 5th Conference of the ESA, Helsinki, Finland.

Rose, P. (2007). Mediators of the association between narcissism and compulsive buying. *Psychology of Addictive Behaviours, 21*(14), 567–581.

Rosen, L. D., Cheever, N. A., & Carrier, L. M. (2012). *iDisorder: Understanding our obsession with technology and overcoming its hold on us*. New York, NY: Palgrave Macmillan.

Rosen, L. D., Whaling, K., Rab, S., Carrier, L., & Cheever, N. (2013). Is Facebook creating idisorders? The link between clinical symptoms of psychiatric disorders and technology use, attitudes and anxiety. *Computers in Human Behavior, 29*(3), 1243–1254.

Rosman, K. (2006). Blackberry orphans: The growing use of e-mail gadgets is spawning a generation of resentful children: A look at furtive thumb-typers, the signs of compulsive use and how kids are fighting back. *Wall Street Journal*, W1.

Salehan, M., & Negahban, A. (2013). Social networking on smartphones: When mobile phones become addictive. *Computers in Human Behavior, 29*(6), 2632–2639.

Sarwar, M. (2013). Impact of Smartphones on Society. *European Journal of Scientific Research, 98*(2), 216–266.

Saucier, G. (1994). Mini-markers: A brief version of goldberg's unipolar big-five markers. *Journal of Personality Assessment, 63*(3), 506–516.

Shin, C., & Dey, A. K. (2013, September). Automatically detecting problematic use of smartphones. In *Proceedings of the 2013 ACM international joint conference on Pervasive and ubiquitous computing* (pp. 335–344). ACM.

Silva, V. (2011). iPhone sales boost smartphone market in 2011. *Gartner.* Retrieved October 24, 2013 from http://www.cio-asia.com/tech/mobile-and-wireless/iphone-sales-boost-smartphone-market-in-2011-gartner/

Siomos, K., Floros, G., Fisoun, V., Evaggelia, D., Farkonas, N., Sergentani, E., … Geroukalis, D. (2012). Evolution of internet addiction in Greek adolescent students over a two-year period: The impact of parental bonding. *European Child & Adolescent Psychiatry, 21*(4), 211–219.

Stinson, F., Dawson, D., Goldstein, R., Chou, S., Huang, B., Smith, S., … Grant, B. (2009). Prevalence, correlates, disability, and comorbidity of DSM-IV narcissistic personality disorder: Results from the Wave 2 National Epidemiological Survey on alcohol and related conditions. *Journal of Clinical Psychiatry, 69*(7), 1033–1045.

Twenge, J., & Campbell, W. (2013). *Living in the age of entitlement: The narcissism epidemic.* New York, NY: Atria Books.

Twenge, J. M., Konrath, S., Foster, J. D., Campbell, W. K., & Bushman, B. J. (2008). Egos inflating over time: A cross-temporal meta-analysis of the Narcissistic Personality Inventory. *Journal of Personality, 76*, 875–902.

Wang, J., Jackson, L., Zhang, D., & Su, Z. (2012). The relationships among the Big Five Personality factors, self-esteem, narcissism and sensation-seeking to Chinese University students' uses of social networking sites (SNSs). *Computers in Human Behavior, 28*(6), 2313–2319.

Whang, L., Lee, S., & Chang, G. (2003). Internet over-user's psychological profiles: A behaviour sampling analysis on internet addiction. *Cyber Psychology & Behavior, 6*(2), 143–150.

Widiger, T. (2011). Personality and psychopathology. *World Psychiatry, 10*(2), 103–106.

Wood, R. T. A., Griffiths, M. D., & Eatough, V. (2004). Online data collection from video game players: Methodological issues. *CyberPsychology & Behavior, 7*, 511–518.

Wu, A., Cheung, V., Ku, L., & Hung, E. (2013). Psychological risk factors of addiction to social networking sites among Chinese smartphone users. *Journal of Behavioral Addictions, 10*(6), 1–7.

Yao, M., & Zhong, Z. (2014). Loneliness, social contacts and Internet addiction: A cross-lagged panel study. *Computers in Human Behaviour, 30,* 164–170.

Young, K. (1996). Internet addiction: The emergence of a new clinical disorder. *Cyber Psychology and Behaviour, 1*(3), 237–244.

Young, K. S. (2000). Therapeutic issues with internet addicted clients. *New Therapist*, *7*, 12–13.

Young, K., Griffin-Shelley, E., Cooper, A., O'mara, J., & Buchannon, J. (2000). Online infidelity: A new dimension in couple relationships with implications for evaluation and treatment. *Sexual Addiction & Compulsivity: The Journal of Treatment & Prevention, 7*(1-2), 59–74.