

## **Personality and dissociative experiences in smartphone users**

DE PASQUALE, Concetta, SCIACCA, Federica, CONTI, Daniela  
<<http://orcid.org/0000-0001-5308-7961>>, DINARO, Carmela and DI NUOVO,  
Santo

Available from Sheffield Hallam University Research Archive (SHURA) at:

<http://shura.shu.ac.uk/24788/>

---

This document is the author deposited version. You are advised to consult the publisher's version if you wish to cite from it.

### **Published version**

DE PASQUALE, Concetta, SCIACCA, Federica, CONTI, Daniela, DINARO, Carmela and DI NUOVO, Santo (2019). Personality and dissociative experiences in smartphone users. *Life Span and Disability*.

---

### **Copyright and re-use policy**

See <http://shura.shu.ac.uk/information.html>

## Personality and dissociative experiences in smartphone users

Concetta De Pasquale<sup>1</sup>, Federica Sciacca<sup>1</sup>, Daniela Conti<sup>2</sup>,  
Carmela Dinaro<sup>3</sup> & Santo Di Nuovo<sup>1</sup>

### Abstract

*The aim of this study was to explore the relationship between Problematic Smartphone Use (PSU), dissociative experiences and some characteristics of personality. The sample consisted of 400 Italian college students aged between 20 and 24 (M = 21.59, SD = 1.43). The materials included: a questionnaire on the use of smartphones, the Smartphone Addiction Scale (SAS-SV), the Dissociative Experience Scale (DES), and the Ten Item Personality Inventory (TIPI).*

*Results showed that the college students in our sample used their smartphones mainly for messaging (50%), calling (42.5%), accessing the internet (38%), connecting via social networks (33.5%), taking photos (26.5%), gaming (8.5%) and using applications (.5%). According to the results of the SAS-SV, 70% of our sample showed PSU, without gender differences. Regarding the correlation with personality factors, intensive use of smartphones corresponds to lower emotional stability and the*

*Received:* February 8, 2019; *Revised:* May 27, 2019; *Accepted:* June 17, 2019  
© 2019 Associazione Oasi Maria SS. - IRCCS

<sup>1</sup> Department of Educational Sciences, University of Catania.

<sup>2</sup> Sheffield Robotics, Sheffield Hallam University, Faculty of Arts Computing Engineering and Sciences.

<sup>3</sup> Drug Addiction Health Service, SER.T – ASP3 in Catania, Via Fabio, 1, Acireale (CT), Italy.

Correspondence to: Concetta De Pasquale, Department of Educational Sciences, University of Catania, Via Teatro Greco 84, 95124, Catania, Italy. Phone: +39 095 746 6111; E-mail: depasqua@unict.it.

Acknowledgments: The authors gratefully thank all the students who participated in this study. The research was supported by a grant for Departmental Research (FIRD 2017) to the first (CDP) and last author (SD). For the third author (DC), the work was supported by the European Union's H2020 research and innovation program under the Marie Skłodowska Curie Action - Individual Fellowship (CARER-AID) grant agreement no. 703489.

*extraversion or 'energy' factor is predictive near the significance cut-off ( $p = .06$ ), while among the dissociative experiences, passive influence and dissociative amnesia are the best predictors of smartphone addiction. The other variables are less significant ( $p = .07$ ).*

*The results underline the importance of detecting the PSU predictors in college students, in order to prevent psychopathological consequences.*

**Keywords:** Dissociative experience; Personality factors; Smartphone use; University students.

## 1. Introduction

In recent years, the widespread use of new technologies, in both private (Vilhelmson, Thulin, & Eildér, 2017) and professional life (Conti, Di Nuovo, Buono, & Di Nuovo, 2017), has opened up new views in the world of behavioral addictions (Cui, 2016; Hayes, Maughan, & Grant-Peterkin, 2016). Staying constantly in touch by smartphone, sharing experiences on social networks, making new online friends, building deep friendships behind the screen of a device are some of the many actions that new technologies allow us to do. These “new” technologies spread quickly among today's teenagers – defined often as “digital natives” – all profoundly changing the way for communicating and building relationships (Prensky, 2001).

The term “TechAbuse” is used to indicate a pathological behavior characterized by the excessive use of new technologies and the difficulty or inability to relate appropriately to outside the virtual world (Picard, 2007). Currently, most users do not think freely or independently, but in terms of what may affect their circle of virtual friends; they tend to share content that can be appreciated by as many people as possible, in order to obtain the social approval (McElhaney, Antonishak, & Allen, 2008; Rantasalo, 2017). For this reason, the over-use of the network primarily happens via smartphone. However, the shift from the common (and useful) use of technological objects - such as the smartphone in everyday life - to a real addiction, requires studies aimed at discovering the specific characteristics which can trigger “abuse” and some possible psychopathological consequences. Several studies highlight that Problematic Smartphone Use (PSU) is associated with different worrisome physical and psychological issues, with adverse effects on psychological well-being, interpersonal relationships, physical health, and work productivity (Yang, Yen, Ko, Cheng, & Yen, 2010; Lepp, Barkley, & Karpinski, 2014; Jung, Lee, Kang, Kim, & Do, 2016; Duke & Montag, 2017). In a recent study, Panova and Lleras (2016), show the relationship between smartphone use and mental health and found that excessive or “maladaptive” use of our smartphones might lead to higher incidences of depression and anxiety in users. Moreover, other researchers have suggested that undergraduate students with depression and high anxiety scores should be carefully monitored for smartphone addiction problems (Demirci, Akgönül, & Akpınar, 2015).

Considering that the PSU shares many of the characteristics of drug and alcohol addiction, Beison and Rademacher (2016) hypothesized that a

family history of alcoholism and the level of education of the father are good predictors of PSU. Indeed, the relationship between an alcoholism positive family history and PSU suggests that compulsive disorders are due, in part, to a similar dysregulation of brain reward pathways leading to hyporesponsiveness to rewarding stimuli and aberrant behaviors. Specifically, a dopamine D2 receptor deficiency, which is important for coding, can predispose individuals to a higher risk of developing addictive and compulsive behavior (Beison & Rademacher, 2016; Mohammadbeigi, Mohammadsalehi, Moshiri, Anbari, Ahmadi, & Ansari, 2017). Several studies (Chiu, 2014; Enez Darcin, Noyan, Nurmedov, Yilmaz, & Dilbaz, 2016) have introduced the term “smartphone addiction” on the basis of similarities in symptoms displayed by excessive smartphone users and substance abusers (e.g., loss of control, cognitive salience, and mood regulation). Nevertheless, currently, the evidence that PSU constitutes a genuine addiction is limited, especially regarding issues such as tolerance and withdrawal (Billieux, Maurage, Lopez-Fernandez, Kuss, & Griffiths, 2015).

To the best of our knowledge, the studies focusing on the relationship between smartphone addiction and dissociative experience in normal adults are lacking, while some findings do exist in literature concerning teenagers (De Pasquale, Sciacca, & Hichy, 2015).

Research on PSU and personality in non-pathological persons is an area that has received increasing attention. Bianchi and Phillips (2005) reported that PSU is a function of age, extraversion, and low self-esteem. The study of Takao and colleagues demonstrated that high approval motivation has a close relationship with PSU (Takao, Takahashi, & Kitamura, 2009). Furthermore, narcissism has been the focus of studies of social media and smartphone use. In a research by Pearson and Hussain (2015) carried out on 256 smartphone users, it was found that 13.3% of the participants were classified as “addicted to their smartphones” and that higher narcissism scores and neuroticism levels were associated to this addiction. Also, the studies of Augner and Hacker (2012) reported that low emotional stability is associated with PSU.

A web-mediated disease is a subtle and elusive disorder typical of the third millennium that manifests itself through dissociative states caused by information received from video terminals. These conditions could be found in cases of social withdrawal (Tonioni & Corvino, 2011), experiences of depersonalization and derealization (Putnam, 1991) somatic anxiety, psychosexual disorders, compulsive behavior (Zanon, Bertin, Fabbri Bombi,

& Colombo, 2002; Craparo, 2011), and other dissociative experiences such as absorption and psychogenic amnesia (Kihlstrom, 2005). Dissociative Amnesia (DA) is characterized by one or more episodes of the inability to remember important personal information, usually too excessive to be explained by ordinary forgetfulness. Absorption and Imaginative Involvement (AbII) concerns being immersed in a certain activity to the point of becoming completely unaware of the surrounding environment. The Depersonalization-Derealization (DD) disorder occurs when there is persistently or recurrent experiences of feeling detached from, as if one were an outside observer of, one's mental processes or body experiences and experience of unreality of surroundings. Instead, the Passive Influence (PI) is the tendency to consider that one's own feelings, thoughts and behavior are involuntarily imposed by an external source (American Psychiatric Association, 2013).

As specified, there is evidence in the literature confirming the relationship between Internet Addiction (IAD) and Dissociative Symptoms (DS) (Bernardi & Pallanti, 2009) and between the PSU and anxiety and depression (Elhai, Dvorak, Levine, & Hall, 2017).

According to these premises, the aim of this study was to investigate the relationship between high-risk of smartphone addiction, transitory dissociative experiences and specific personality traits in college students without established psychopathology.

## 2. Method

### 2.1. Instruments

The protocol used for the study consisted of five questionnaires.

In a preliminary phase, all the participants answered to a socio-demographic questionnaire (age, gender, and university department), a questionnaire about smartphone use, and the Symptom Checklist-90 Revised (SCL-90 R) (Derogatis, 1994). The SCL-90 R scale is a 90-item self-report symptom inventory widely used for a screening of recent psychopathology (De Pasquale, Pistorio, Lauretta, Fatuzzo, Fornaro, Conti *et al.*, 2014; Pistorio, Veroux, Sinagra, Basile, & De Pasquale, 2017).

It assesses nine dimensions and three global scores, and includes: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism; the three global measures are the global severity index, the positive symptom distress

index, and the positive symptom total. The internal consistency coefficients (Derogatis, 1994) ranged from .90 for depression and .77 for psychoticism, the two dimensions whose thresholds for risk of pathology were mainly considered for exclusion purposes in our study, besides the global scores.

In order to assess smartphone addiction, we used the Italian version of Smartphone Addiction Scale for Adolescents and Young Adults – Short Version (SAS-SV). It is 10-item self-report questionnaire assessed on a 6-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = slightly disagree; 4 = slightly agree; 5 = agree; 6 = strongly agree). It shows different scores for males and for females. In particular, the males are classified as “addicted” when they have scores greater than or equal to 31; a high-risk of addiction is detected by scores ranging from 23 to 30. The females are considered “addicted” when they have scores greater than or equal to 33, at high-risk of addiction with scores ranging from 23 to 32. The Cronbach's alpha reliability of the test is equal to .85 in an Italian sample (De Pasquale, Sciacca, & Hichy, 2017).

The participants answered the Italian version of dissociative experience scale for adolescents and young adults (A-DES) (De Pasquale, Sciacca & Hichy, 2016). It consists of 30 questions about the dissociative experiences that the subject might experience in everyday life. It is divided into 4 subscales: Dissociative Amnesia (DA), Absorption and Imaginative Involvement (AbII), Depersonalization and Derealization (DD) and Passive Influence (PI). Participants were asked to respond based on the frequency with which they experienced a specific situation (from 0 = never to 10 = always). The A-DES reliability (Cronbach's alpha) is equal to .95 and the reliabilities of the subscales are: DA = .76, AbII = .66, DD = .85, PI = .74 and split-half correlation was DA = .63, AbII = .48, DD = .67, PI = .57 (De Pasquale *et al.*, 2016).

To assess personality we used the Ten Items Personality Inventory (TIPI) (Gosling, Rentfrow, & Swann, 2003). It consists of 10 items that describe the subject representing personality traits according to the Big Five Factors theory: Extroversion/Energy (E), Agreeableness (A), Conscientiousness (C), Emotional Stability (ES) and Openness to Experiences (OE). Participants were asked to indicate the degree of agreement for each of the features presented by a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). The Cronbach's alphas of the two-items scales are: E = .68, A = .40, C = .50, ES = .73 and OE = .45 (Gosling, Rentfrow, & Swann, 2003).

## 2.2. *Participants and recruitment*

A sample of 454 university students recruited from different Departments at the University of Catania (Italy) completed the questionnaires. The participants were recruited via posts on the Facebook groups of the local university and advertisements on the university departments. We excluded 23 participants with evident psychopathological problems (depression and psychosis), detected by the administration of SCL-90 R.

This exclusion was due to the risk that the answers of participants with scores over the threshold for depression or psychosis could undermine the results of research since these two psychopathological conditions tended to modify generally the contact with reality (Fish, Casey, & Kelly, 2007).

From the residual sample of 431 participants fulfilling the research inclusion criteria, 31 were excluded because they did not complete all the sentences on demographic characteristics.

The final sample of the study included 400 college students; 156 males (39%) and 244 females (61%), all aged between 20 and 24 ( $M = 21.59$ ,  $SD = 1.43$ ). The sample was enrolled in several Departments including humanistic and scientific disciplines, 88% of the sample was recruited via advertisements on the university departments.

The study was approved by the ethical committee of the Department of Educational Sciences, University of Catania (Italy), before the beginning of the study. All students gave written informed consent before being included in the study.

## 3. Data analysis

The statistical analyses included t-test for group differences, Pearson's correlation coefficient and stepwise regression analysis for possible predictors.

All statistical analyses were carried out using the Statistical Package for Social Science (SPSS), version 24 for Windows.

## 4. Results

### 4.1. *Questions about using the smartphone; gender and SAS scores*

The results of the study showed that smartphones are used for more than just one purpose. In particular, the students from our sample used their

smartphones for messaging (31%), calling (26%), connecting to social networks (21%), taking photos (17%), using games and applications (5%).

A preliminary analysis of the differences between genders in SAS-SV scores was not significant in either the 10 items (all differences  $p > .05$ ) or the total score (males:  $M = 29.21$ ,  $SD = 9.97$ ; females:  $M = 27.03$ ,  $SD = 1.58$ ;  $t = 1.58$ ,  $p = .11$ ). Considering this result, the total sample was considered for further analysis.

The results in the SAS-SV, according to the thresholds proposed by the authors, showed that 70% of our sample had a high-risk of smartphone addiction. In particular, 150 students (112 males, 38 females) could be classified as “addicted”.

In relation to specific items the high-risk subsample, compared to low-risk subsample, obtained significantly ( $p < .01$ ) higher scores in all the SAS-SV items, as shown in Table 1.

Table 1 - Comparison of low and high-risk subsamples in SAS-SV

SAS-SV	Low-risk subsample $N = 122$		High-risk subsample $N = 278$		$t$	$p$
	$M$	$SD$	$M$	$SD$		
1. Missing planned work due to smartphone use	1.85	1.04	2.65	1.28	6.07	< .01
2. Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use	1.72	.99	2.77	1.33	7.81	< .01
3. Feeling pain in the wrists or at the back of the neck while using a smartphone	1.32	.86	1.98	1.34	5.74	< .01
4. Won't be able to stand not having a smartphone	2.18	1.50	4.47	1.25	15.84	< .01
5. Feeling impatient and fretful when I am not holding my smartphone	1.85	1.19	3.76	1.28	14.03	< .01
6. Having my smartphone in my mind even when I am not using it	1.07	.31	2.25	1.24	10.36	< .01
7. I will never give up using my smartphone even when my daily life is already greatly affected by it	1.80	1.12	3.85	1.28	15.30	< .01
8. Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook	1.61	1.02	3.43	1.39	13.00	< .01

9. Using my smartphone longer than I had intended	2.37	1.36	4.46	1.13	15.97	< .01
10. The people around me tell me that I use my smartphone too much	1.37	.71	3.06	1.59	11.25	< .01
Total score	16.27	3.70	32.63	6.88	24.73	< .01

#### 4.2. SAS scores, dissociative experiences and personality

The specific dissociative experiences evaluated with the A-DES test in the total sample (overall score:  $M = 41.35$ ,  $SD = 35.95$ ) are distributed as follows in the single domains: DA – Dissociative amnesia ( $M = 8.82$ ,  $SD = 9.53$ ), AbII - Absorption and Imaginative Involvement ( $M = 11.75$ ,  $SD = 8.87$ ), PI - Passive Influence ( $M = 6.18$ ,  $SD = 5.44$ ), DD - Depersonalization and Derealization ( $M = 15.79$ ,  $SD = 17.40$ ).

In particular, the A-DES descriptive analysis of subsamples showed a significant increase ( $p < .01$ ) of dissociative experiences in SAS-SV High-risk subsample, as shown in Table 2.

Table 2 - Comparison of Low and High-risk subsamples on Dissociative Experience (A-DES)

A-DES	Low-risk subsample $N = 122$		High-risk subsample $N = 278$		$t$	$p$
	$M$	$SD$	$M$	$SD$		
Dissociative Amnesia	5.51	6.00	10.58	10.45	5.00	< .01
Absorption and Imaginative Involvement	8.91	6.80	13.27	9.45	4.59	< .01
Passive Influence	4.35	4.56	9.63	7.52	7.19	< .01
Depersonalization and Derealization	11.10	10.31	18.56	19.74	3.94	< .01
Total score	30.75	24.47	50.42	41.11	4.91	< .01

Table 3 showed the correlations (Pearson  $r$ ) between the variables of the test A-DES and SAS-SV scores separately in low and high-risk subsamples. Specifically, the correlation between dissociative experiences and the use of smartphones in high-risk subsample was significant. Low-risk subsample didn't present significant correlations in the dissociative subscales.

Table 3 - *Correlations (Pearson r) between A-DES scores and SAS-SV*

		SAS-SV	
		Low-risk subsample	High-risk subsample
		N = 122	N = 278
A-DES	Dissociative Amnesia	.12	.30**
	Absorption and Imaginative Involvement (AbII)	.23	.79**
	Passive Influence (PI)	.14	.77**
	Depersonalization and Derealization (DD)	-.01	.81**

\*\*  $p < .05$

The stepwise regression analysis, conducted on 400 participants to detect if personality factors can be considered specific predictors of high-risk of smartphone addiction, showed that only the lower emotional stability significantly predicts the risk, as shown in Table 4.

Table 4 - *Linear Model of Predictors TIPI variable of SAS-SV scores with 95% Bias Corrected and Accelerate Confidence Intervals Reported in Parentheses*

TIPI	SAS-SV ( $R^2 = .30$ )				
	Unstandardized coefficient		$\beta$	$t$	$p$
	$B$ (95% BCa)	$SE B$			
Constant	33.13 (24.96 to 41.29)	4.14	.00	8.01	< .01
Emotional Stability	-1.16 (-1.96 to -.36)	.40	-.22	-2.87	< .01
Extraversion	.77 (-.03 to 1.58)	.41	.16	1.89	.06
Agreeableness	.41 (-.89 to 1.70)	.66	.05	.62	.53
Conscientiousness	-.66 (-1.75 to .43)	.55	-.09	-1.19	.23
Openness to Experience	-.43 (-1.31 to -.45)	.45	-.07	-.96	.34

$R^2$  coefficient of determination,  $B$  unstandardized beta,  $BCa$  bias-corrected and accelerated bootstrap interval,  $SE B$  standard error for the unstandardized beta,  $\beta$  standard coefficient,  $t$  test statistic,  $p$  probability value.

## 5. Discussion

Technologies have changed lifestyles, behavior, ways of feeling and thinking for both the individual and the community and have to be considered among the most important factors of social, cultural and psychological change.

Smartphones have become an integral part of our lives without considering the cognitive and social consequences that the problematic use of smartphones, often not reasoned, can produce already from the pediatric age (Hwang & Jeong, 2015; Moon, Kim, & Moon, 2016; Kushlev, Proulx, & Dunn, 2017).

Our study showed that 70% of our sample had a consistent risk of smartphone addiction. In particular, 150 students (112 male) were registered as “addicted”. This result is in line with normal distribution in the population. Specifically, smartphone addiction is the result of the dramatic worldwide increase in smartphone use, both in the primary communication functions (e.g. chatting, messenger services, phone calls, blogging, and social networking services), and in various smartphone-accessible behavioral addictions (e.g. videogames and shopping) (Carbonell, Chamorro, Oberst, Rodrigo, & Prades, 2018).

The presence of significant relationships between “high-risk” of smartphone addiction and transitory dissociative experiences, studied with A-DES scale, was very interesting.

The smartphone would thus become a means of exclusion, marginalization, to take refuge in a parallel, virtual life that one thinks is better than the real one. This behavior can be risky and lead to a real social withdrawal, up to a state of distortion of the external reality and distortion of the perception of oneself, as shown in our results.

These data are also confirmed by the significant correlation in high-risk sub-sample of smartphone addiction. There is the possibility that the persons deeply immersed in the virtual world present reduced attentive skills, impaired social cognition and the ability to judge and criticize the surrounding reality (Hadar, Hadas, Lazarovits, Alyagon, Eliraz, & Zangen, 2017). The prolonged use of the smartphone could create a defect in the ability to adhere to reality with possible psychopathological risks (Lyssenko, Schmahl, Bockhacker, Vonderlin, Bohus, & Kleindienst, 2017). Results emerging from the administration of TIPI allow some reflections on the importance of personality factors in a possible preventive intervention on the risk of addiction. Some recent works have already emphasized the role of

self-control as a preventive factor smartphone addiction (Cho, Kim, & Park, 2017; Lachmann, Duke, Sariyska, & Montag, 2017). Our data confirm the possible predictive value of less emotional stability in the total sample.

For this reason, the challenge in dealing with mental health and psychophysical wellbeing is to identify specific characteristics of personality correlated with problematic behavior such as addictions, for a more authentic and healthier expression of self-identity (Lane & Manner, 2011; Stachl, Hilbert, Au, Buschek, De Luca, Bischl *et al.*, 2017).

## 6. Conclusions

Some limits of our study have to be outlined. The sample was composed of students, and humanistic disciplines were over-represented. Moreover, the significant number of the participants who were found to be “addicted” using the SAS-SV criteria would require a diagnostic investigation integrating a clinical diagnosis according to DSM-5. Given the perceived danger of an “epidemic” of smartphone addiction disorder, it is necessary to establish the true incidence of the phenomenon with epidemiologically correct criteria. For this reason, we preferred to include in a single subgroup high-risk and addicted participants, to avoid overestimation of the phenomenon.

In conclusion, this study suggests the importance of studying possible risk factors and of enhancing the emotional stability personality dimension as protective factors of consequences of smartphone addiction. A future challenge is to extend this study to different form of addiction, in order to build a general model of the risk for designing effective interventions (Di Nuovo, De La Cruz, Conti, Buono & Di Nuovo, 2014; Choi, Kim, Choi, Ahn, Choi, Song, *et al.*, 2015; Kim, Min, Min, Lee & Yoo, 2018), aimed at fostering protective factors for different behavioral addictions, including smartphone excessive use.

## References

- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders (5<sup>th</sup> ed.)*. Washington DC: Author.
- Augner, C., & Hacker, G. W. (2012). Associations between problematic mobile phone use and psychological parameters in young adults. *International Journal of Public Health, 57* (2), 437-441.

Beison, A., & Rademacher, D. J. (2016). Relationship between family history of alcohol addiction, parents' education level, and smartphone problem use scale scores. *Journal of Behavioral Addictions, 6* (1), 84-91.

Bernardi, S., & Pallanti, S. (2009). Internet addiction: a descriptive clinical study focusing on comorbidities and dissociative symptoms. *Comprehensive Psychiatry, 50* (6), 510-516.

Bianchi, A., & Phillips, J. G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology & Behavior, 8* (1), 39-51.

Billieux, J., Maurage, P., Lopez-Fernandez, O., Kuss, D. J., & Griffiths, M. D. (2015). Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Current Addiction Reports, 2* (2), 156-162.

Carbonell, X., Chamarro, A., Oberst, U., Rodrigo, B., & Prades, M. (2018). Problematic use of the internet and smartphones in university students: 2006-2017. *International Journal of Environmental Research and Public Health, 15* (3): 475. doi:10.3390/ijerph15030475.

Chiu, S. I. (2014). The relationship between life stress and smartphone addiction on Taiwanese university student: A mediation model of learning self-efficacy and social self-efficacy. *Computers in human behavior, 34*, 49-57.

Cho, H. Y., Kim, D. J., & Park, J. W. (2017). Stress and adult smartphone addiction: Mediation by self-control, neuroticism, and extraversion. *Stress and Health, 33* (5), 624-630.

Choi, S. W., Kim, D. J., Choi, J. S., Ahn, H., Choi, E. J., Song, W. Y., Kim, S., & Youn, H. (2015). Comparison of risk and protective factors associated with smartphone addiction and Internet addiction. *Journal of behavioral addictions, 4* (4), 308-314.

Conti, D., Di Nuovo, S., Buono, S., & Di Nuovo, A. (2017). Robots in education and care of children with developmental disabilities: A study on acceptance by experienced and future professionals. *International Journal of Social Robotics, 9* (1), 51-62.

Craparo, G. (2011). Internet addiction, dissociation, and alexithymia. *Procedia-Social and Behavioral Sciences*, 30, 1051-1056.

Cui, X. (2016). The internet of things. In S. Moran (Ed.), *Ethical Ripples of Creativity and Innovation* (pp. 61-68). Palgrave Macmillan, London.

De Pasquale, C., Pistorio, M. L., Lauretta, I., Fatuzzo, P., Fornaro, M., Conti, D., Di Nuovo, S., Sinagra, N., Giaquinta, A., Zerbo, D., & Veroux, M. (2014). Somatopsychic correlates and quality of life of the dialyzed patient: a cross-sectional study. *Transplantation proceedings*, 46 (7), 2199-2202).

De Pasquale, C., Sciacca, F., & Hichy, Z. (2015). Smartphone Addiction and Dissociative Experience: An Investigation in Italian Adolescent Aged between 14 and 19 Years. *International Journal of Psychology & Behavior Analysis*, 1: 109.

De Pasquale, C., Sciacca, F., & Hichy, Z. (2016). Validation of the Italian version of the dissociative experience scale for adolescents and young adults. *Annals of general psychiatry*, 15: 31.

De Pasquale, C., Sciacca, F., & Hichy, Z. (2017). Italian validation of smartphone addiction scale short version for adolescents and young adults (SAS-SV). *Psychology*, 8 (10), 1513-1518.

Demirci, K., Akgönül, M., & Akpınar, A. (2015). Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *Journal of behavioral addictions*, 4 (2), 85-92.

Derogatis, L. R. (1994). *Symptom Checklist-90-R: Administration, scoring, and procedures manual*. Minneapolis, MN: NCS Pearson.

Di Nuovo, S., De La Cruz, V., Conti, D., Buono, S., & Di Nuovo, A. (2014). Mental imagery: Rehabilitation through simulation. *Life Span and Disability*, 17 (1), 89-118.

Duke, É., & Montag, C. (2017). Smartphone addiction, daily interruptions and self-reported productivity. *Addictive behaviors reports*, 6, 90-95.

Elhai, J. D., Dvorak, R. D., Levine, J. C., & Hall, B. J. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of affective disorders*, 207, 251-259.

Enez Darcin, A., Kose, S., Noyan, C. O., Nurmedov, S., Yilmaz, O., & Dilbaz, N. (2016). Smartphone addiction and its relationship with social anxiety and loneliness. *Behaviour & Information Technology*, 35 (7), 520-525.

Fish, F. J., Casey, P. R., & Kelly, B. (2007). *Fish's clinical psychopathology: signs and symptoms in psychiatry*. RCPsych Publications.

Gosling, S. D., Rentfrow, P. J., & Swann Jr, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in personality*, 37 (6), 504-528.

Hadar, A., Hadas, I., Lazarovits, A., Alyagon, U., Eliraz, D., & Zangen, A. (2017). Answering the missed call: Initial exploration of cognitive and electrophysiological changes associated with smartphone use and abuse. *PLoS one*, 12 (7): e0180094.

Hayes, J. F., Maughan, D. L., & Grant-Peterkin, H. (2016). Interconnected or disconnected? Promotion of mental health and prevention of mental disorder in the digital age. *The British Journal of Psychiatry*, 208 (3), 205-207.

Hwang, Y., & Jeong, S. H. (2015). Predictors of parental mediation regarding children's smartphone use. *Cyberpsychology, Behavior, and Social Networking*, 18 (12), 737-743.

Jung, S. I., Lee, N. K., Kang, K. W., Kim, K., & Do, Y. L. (2016). The effect of smartphone usage time on posture and respiratory function. *Journal of physical therapy science*, 28 (1), 186-189.

Kihlstrom, J. F. (2005). Dissociative disorders. *Annual Review of Clinical Psychology*, 1, 227-253.

Kim, H. J., Min, J. Y., Min, K. B., Lee, T. J., & Yoo, S. (2018). Relationship among family environment, self-control, friendship quality, and adolescents' smartphone addiction in South Korea: Findings from nationwide data. *PloS one*, *13* (2): e0190896.

Kushlev, K., Proulx, J. D., & Dunn, E. W. (2017). Digitally connected, socially disconnected: The effects of relying on technology rather than other people. *Computers in Human Behavior*, *76*, 68-74.

Lachmann, B., Duke, É., Sariyska, R., & Montag, C. (2017). Who's addicted to the smartphone and/or the Internet? *Psychology of Popular Media Culture*. doi: 10.1037/ppm0000172.

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.

Lepp, A., Barkley, J. E., & Karpinski, A. C. (2014). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students. *Computers in Human Behavior*, *31*, 343-350.

Lyssenko, L., Schmahl, C., Bockhacker, L., Vonderlin, R., Bohus, M., & Kleindienst, N. (2017). Dissociation in psychiatric disorders: a meta-analysis of studies using the dissociative experiences scale. *American Journal of Psychiatry*, *175* (1), 37-46.

McElhaney, K. B., Antonishak, J., & Allen, J. P. (2008). "They like me, they like me not": Popularity and adolescents' perceptions of acceptance predicting social functioning over time. *Child development*, *79* (3), 720-731.

Mohammadbeigi, A., Mohammadsalehi, N., Moshiri, E., Anbari, Z., Ahmadi, A., & Ansari, H. (2017). The prevalence of phantom vibration/ringing syndromes and their related factors in Iranian' students of medical sciences. *Asian journal of psychiatry*, *27*, 76-80.

Moon, J. H., Kim, K. W., & Moon, N. J. (2016). Smartphone use is a risk factor for pediatric dry eye disease according to region and age: a case control study. *BMC ophthalmology*, *16* (1): 188.

Panova, T., & Lleras, A. (2016). Avoidance or boredom: Negative mental health outcomes associated with use of Information and Communication Technologies depend on users' motivations. *Computers in Human Behavior*, 58, 249-258.

Pearson, C., & Hussain, Z. (2015). Smartphone use, addiction, narcissism, and personality: A mixed methods investigation. *International Journal of Cyber Behavior, Psychology and Learning (IJCPL)*, 5 (1), 17-32.

Picard, P. (2007). *Tech abuse in teen relationships*. Chicago, IL: Teen Research Unlimited.

Pistorio, M. L., Veroux, M., Sinagra, N., Basile, G., & De Pasquale, C. (2017). Alexithymia in Kidney Transplantation Patients. In *Transplantation proceedings*, 49 (4), 642-645.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the horizon*, 9 (5), 1-6.

Putnam, F. W. (1991). Dissociative disorders in children and adolescents: A developmental perspective. *Psychiatric Clinics*, 14 (3), 519-531.

Rantasalo, T. (2017). *"Sometimes I just want to show how pretty sandwich I made": the self-presentation habits of Facebook users* (Master's thesis). Retrieved from <https://trepo.tuni.fi/bitstream/handle/10024/101114/GRADU-1495027021.pdf?sequence=1&isAllowed=y>.

Stachl, C., Hilbert, S., Au, J. Q., Buschek, D., De Luca, A., Bischl, B., Hussmann H., & Buhner, M. (2017). Personality traits predict smartphone usage. *European Journal of Personality*, 31 (6), 701-722.

Takao, M., Takahashi, S., & Kitamura, M. (2009). Addictive personality and problematic mobile phone use. *CyberPsychology & Behavior*, 12 (5), 501-507.

Tonioni, F., & Corvino, S. (2011). Internet addiction and web-mediated psychopathology. *Recenti progressi in medicina*, 102 (11), 417-420.

Vilhelmson, B., Thulin, E., & Ell  r, E. (2017). Where does time spent on the Internet come from? Tracing the influence of information and communications technology use on daily activities. *Information, Communication & Society*, 20 (2), 250-263.

Yang, Y. S., Yen, J. Y., Ko, C. H., Cheng, C. P., & Yen, C. F. (2010). The association between problematic cellular phone use and risky behaviors and low self-esteem among Taiwanese adolescents. *BMC public health*, 10: 217.

Zanon, I., Bertin, I., Fabbri Bombi, A., & Colombo, G. (2002). Dissociative Trance and Internet Addiction: study on a sample of web users. *Journal of Psychopathology*, 8, 381-390.