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ORIGINAL PAPER

National, Sex and Academic Discipline Difference in Smartphone Addiction: A Study of Students in Jordan, Saudi Arabia, Yemen and Sudan

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Abstract

There are an increasing number of studies on smartphone addiction (SA) among students, and also a number of cross-cultural ones. We add to this body of research by presenting, for the first time, a cross-cultural study comparing students in four Middle Eastern countries: Sudan, Jordan, Saudi Arabia, and Yemen. In this context, we also attempt to replicate findings—in other studies—that there are differences in smartphone addiction prevalence along the lines of sex, culture and subject of study. These findings were indeed replicated in a Middle Eastern context. We found significant differences between the Jordanian sample and the other three samples, with Jordanians displaying higher SA. The Sudanese displayed higher SA than the Yemenis, and the Saudis higher than the Sudanese or the Yemeni. We also found that females displayed greater SA than males and humanities students greater SA than science students.

Keywords Smartphone · Addiction · Middle Eastern · Arabic

Introduction

Smartphone addiction (SA) has received considerable attention from researchers in education, sociology, and psychiatry (see Choi et al. 2015; Al-Barashdi et al. 2015). It refers to the increasingly common phenomenon of people being addicted to their smart phones, a phenomenon which has been found to be conceptually distinct from simply being addicted to the internet or addicted to playing computer games (Ayar et al. 2017) and also involving a different profile. Internet addicts tend to be low Extraversion males whereas smart phone addicts tend to be high Extraversion females, sometimes employing forms of social media which are unique to smartphones (De-Sola Gutiérrez et al. 2016). The key symptom of smartphone addiction is that when a person is separated from their smartphone they experience anxiety

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(Choliz et al. 2012), with this anxiety not being alleviated by their being given access to the internet, through which they can contact their friends. This implies that the smartphone itself has become the source of addiction. Other SA symptoms are excessive use (to the extent of losing track of time), persistent failed attempts to use the smartphone less often, relationships of even job being put at risk due to smartphone overuse, increased use of the smartphone when experiencing negative feelings, and a constant need for the newest cell phone, the newest applications and increased use (Singh Bhatia 2008).

There have been a number of previous studies on smartphone addiction, specifically among students. Korean studies found that it is associated with the elevation of behavioural disorders among university students (Kim et al. 2017), reduced academic performance and problems with social relationships (Seo et al. 2016). A Dutch student study concluded that it leads to exhaustion and stress, and negatively affects direct social communication, practical task performance, emotional intelligence, and self-regulation (Bolle 2014). A Chinese study found that it was predicted by anxiety (Hong et al. 2012), as did a study of Spanish undergraduates (Beranuy et al. 2009). A study of Turkish students has found that SA negatively effects self-regulation (Gökçearslan et al. 2016) while it has been found to be negatively associated with self-control among African-American students (Lee 2015). Smartphone use has been shown to be particularly pronounced among humanities, in contrast to social science students, among a large Chinese sample (Long et al. 2016).

Culture has received some attention as a factor relating to SA. For example, most cross-cultural studies in this area has focus on adapting SA scales to different cultures (e.g., Ching et al. 2015; Lopez-Fernandez 2017; Mak et al. 2017). Some other studies, however, make wider cross-cultural comparisons. Lopez-Fernandez (2017) explored the differences between Belgians and Spaniards in SA. It was found that the prevalence of smartphone overuse was 12.5% and 21.5% for Spanish and Belgian samples, respectively. Smartphone addicts from both countries displayed symptoms of withdrawal and intolerance. Lee and Shin (2016) conducted a comparative study of the effect of SA on the work performance of professional drivers in the US and Korea. However, we are not aware of any study which has explored SA cross-culturally in Middle Eastern countries. Studies have only been conducted in Saudi Arabia (Aljomaa et al. 2016; Heilat 2016). The Middle East is growing market for smartphones and it is a distinct cultural area, characterized by Islam and the use of Arabic. As such, pursuing a cross-cultural study on SA in this region is germane not only due its novelty but also because it may uncover specific culturally-contingent dimensions to SA. Moreover, if it replicates the patterns that have been found in cross-cultural studies elsewhere then this adds credence to the idea that they are universal. Accordingly, this study will present research of this nature for the first time, potentially contributing to a deeper understanding of the relationship between smartphone addiction and cultural factors and also widening the national base for which we have data on smartphone addiction. Specifically, we will explore the extent to which there are SA differences between Arabic-speaking countries and also how these are related to factors such as sex and discipline studied. Currently, these areas have been explored, in relation to SA, for Western or Far Eastern societies but there has been no exploration in a Middle Eastern context, so such an exploration will tell us whether these associations are culturally-driven or part of broader psychological patterns.

Method

Participants in the study were in total 2008 university students: 438 from the Jordanian University in Jordan (220 male and 218 female), 642 from Khartoum University in Sudan (341 male and 301 female), 370 from Sana'a University in Yemen (154 male and 216 female), and 558 from King Saud University in Saudi Arabia (198 male and 360 female). Participants' ages ranged from 17 to 28, with an average of 22.1 and standard deviation of 4.6. They were selected from different of colleges (science, health, and humanities) and different study levels. These samples were comparable as in each country we used students from the largest university, from both the science and humanities faculties. The age range was comparable in each sample.

The Smartphone Addiction Scale developed by Aljomaa et al. (2016) was used in the present study. It consists of 80 items distributed under five dimensions: overuse of smartphones (11 items), the technological dimensions (13 items), the psychological-social dimension (25 items), preoccupation with smartphones (17 items), and the health dimension (14 items). As part of this, smartphone usage hours were inquired about and they were divided into three levels: <2 h, 2–4 h, and more than 4 h.

Furthermore, correlation coefficients between scale items and the whole scale were also computed by Aljomaa et al. These coefficients ranged from 0.32 to 0.91. Correlation coefficients among scale dimensions ranged from 0.54 to 0.91. All items were statistically significant. Scale reliability was established by the test–retest method The scale was administered to a pilot sample ($N=60$) twice with an interval of 2 weeks. Pearson's Correlation Coefficients for scale dimensions ranged from 0.89 to 0.92 and correlation coefficient for the whole scale was 0.95. The internal consistency of the scale was also established using Cronbach's alpha. These statistics yielded correlation coefficients ranging from 0.84 to 0.94 for scale dimensions and 0.97 for the whole

scale. In the present study, scale reliability was established using Cronbach's alpha. This yielded reliability coefficients of 0.833, 0.954, 0.953, and 0.970 for the Jordanian, Sudanese, Yemeni, and Saudi samples, respectively. The overall reliability coefficient was 0.961.

Scores are given according to a 5-point Likert scale ranging from 5 "always true of me" to 1 "never true of me" in response to relevant statements. Examples of these statements are: 'I intend to spend some time with my smartphone and I find out that I have spent much more time' and 'I feel anxious and tense if I do not check my smartphone regularly' (see Appendix in Supplementary material for the full questionnaire). The maximum score one can obtain is 400, and the minimum is 80. The accepted cut off for addiction using this instrument is 70% or more of the answers indicating addiction. Scores above that point are taken to mean that the subject is a smart phone addict (see Aljomaa et al. 2016). Hence, the cut-off point used to discriminate between smartphone addicts and participants with normal smartphone usage is 280 points (out of 400). The scale was originally prepared in Arabic which is the native language of the four countries to which the scale has been applied.

The research team distributed the scale to the participants from the four countries during the second semester of the academic year 2016–2017. The participants were instructed about the aims of the study and how to complete the scale. After receiving the completed scales, the researchers scored them and prepared scores for statistical analysis.

Results

The proposed cut-off point (70%, i.e., 280 out of 400; Aljomaa et al. 2016) was used to distinguish between smartphone addicts and respondents with normal smartphone usage. Table 1 shows the results according to this criterion.

As can be seen in Table 1, the highest prevalence of SA was in found Jordan (59.8%) followed by Saudi Arabia (27.2%), Sudan (17.3%), and Yemen (8.6%). The overall prevalence in the four countries was (27.7%).

A one-way analysis of variance was computed to explore differences in SA by country. Because these differences proved to be statistically significant, Bonferroni's test was used to determine where the specific differences lay. Table 3 presents these results.

Smartphone usage hours were divided into three levels: <2 h, 2–4 h, and more than 4 h. Percentages of usage hours were then computed for the different samples. These results are shown in Table 2.

It is clear from Table 2 that there are high percentages of students who use smartphones for more than 4 h a day. These percentages were 91.3%, 51.4%, 47%, and 21.1% for the Jordanian, Sudanese, Yemeni, and Saudi samples, respectively. The average for the total sample was 50.9.

As indicated in Table 3, there were significant differences in SA between (1) the Jordanian sample and the other three samples in favor of the Jordanian sample, (2) the Sudanese sample and the Yemeni sample in favor of the Sudanese sample, (3) the Saudi sample and the Sudanese sample in favor of the Saudi sample, and (4) the Saudi sample and the Yemeni sample in favor of the Saudi sample.

A t-test for independent samples was used to explore sex differences in SA within each country and among the four countries. These results are shown in Table 4.

From Table 4, it is clear that there were significant differences ($p=0.001$) between male and female participants in the whole sample in SA in favor of female participants, meaning females were higher in SA. As for individual countries, there were significant ($\alpha \leq 0.05$) differences between male and female participants in the Jordanian ($p=0.041$), Yemeni ($p=0.001$), and Saudi ($p=0.003$) samples in favor of female participants. No significant differences were detected between male and female participants in the Sudanese sample.

A two-way analysis of variance was computed with sex and country as independent variables. F-value for interaction

Table 1 Prevalence of SA in the four countries

Country	Total number	No. of addicts	%
Jordan	438	262	59.8
Saudi Arabia	558	152	27.2
Sudan	642	111	17.3
Yemen	370	32	8.6
Total	2008	557	27.7

Table 2 Rate of usage in the four countries

Country	Usage hours	Prevalence	%
Jordan	Less than 2 h	–	0
	2–4 h	38	8.7
	More than 4 h	400	91.3
Sudan	Less than 2 h	134	20.9
	2–4 h	178	27.7
	More than 4 h	330	51.4
Yemen	Less than 2 h	128	34.6
	2–4 h	68	18.4
	More than 4 h	174	47.0
Saudi Arabia	Less than 2 h	181	32.4
	2–4 h	259	46.4
	More than 4 h	118	21.1
All four countries	Less than 2 h	443	22.1
	2–4 h	543	27.0
	More than 4 h	1022	50.9

was 5.788 (p = 0.001). This indicated that there was significant interaction between culture (i.e., country) and sex.

It can be seen from Table 5 that Humanities students show greater evidence of SA than do science students.

Discussion

Using four Middle Eastern samples, females display higher levels of SA than males, there are inter-cultural differences in SA prevalence, and humanities students do indeed display higher levels of addiction than science students. These findings are congruous with a series of studies on student SA from other countries which have found, likewise, that females are higher in SA than males (Long et al. 2016; Kadir et al. 2015; Kim and Lee 2012; Takao et al. 2009), there are intercultural differences in its extent (Sethuraman et al. 2018; Lopez-Fernandez 2017; Lopez-Fernandez et al. 2017), and humanities students are more addicted than science ones (Long et al. 2016; Al-Barashdi et al. 2015, literature review). In terms of understanding why these differences exist, Extraversion has been shown to predict addictive behavior (Nettle 2007) and females are higher in Extraversion than males cross-culturally (Soto et al. 2011). With regard to the difference between science and humanities students, there is evidence that humanities students are lower in conscientiousness and higher in neuroticism and Extraversion (De Fruyt and Mervielde 1996), all of these traits being associated with addictive behavior (Nettle 2007).

With the level of knowledge that we have, we can only really speculate on the reasons for national differences and future research needs to be conducted in this regard. Not all the samples are sex-balanced, but this cannot be the whole explanation because Jordan's sample is relatively sex-balanced, yet it still displays the highest rate of SA. Part of the reason may be differences in the prevalence of smartphone ownership between countries. As of 2013, 72.8% of Saudis had smartphones (Fox 2013, 27th August). As of 2016, 95% of Jordanis owned cellular phones (Ghazal 2014, 26th February) of which 70% are smart phones (Ghazal 2016, 7th January). As of 2016 there were 17.54 million mobile subscriptions in Yemen (Statista 2018). However, only 4% of Yemenis who use the internet actually used their phones to access the internet, according to a survey in 2013 (Social and Research Development Centre 2013). It was reported in 2014 that 41% of Sudanese have mobile phones (Hamid 2014). The extent of 4G Wi-Fi coverage in Saudi Arabia is 63% while in Jordan it is 62% (Open Signal 2016). Wi-Fi is a rarity in Sudan and Yemen and where it does exist it is of poor quality and is slow. Thus, it may be that Jordan has higher SA simply because more Jordanians own mobile phones and have reliable access to the internet. However, it has been shown that SA is

Table 3 One-way analysis of variance for SA according to country

Variable	Source of variance	Sum of squares	df	Mean squares	f-value	Sig.	Effect size
Country	Between groups	1177609.060	3	392536.353	157.311	0.000	0.2
	Within groups	5000556.648	2004		2495.288		
	Total	6178165.709	2007				

Table 4 T-test values for sex differences in SA

Country	Sex	N	M	SD	t-value	Sig.	Effect size
Jordan	Female	218	281.38	8.683	2.047	0.041	0.024
	Males	220	297.15	13.530			
Sudan	Female	301	226.18	49.703	0.122	0.903	–
	Male	341	225.65	59.693			
Yemen	Female	216	219.83	52.968	4.560	0.000	0.480
	Male	154	195.65	46.267			
Saudi Arabia	Female	360	247.84	63.924	3.024	0.003	0.263
	Male	198	231.90	50.787			
All four countries	Female	1095	243.04	55.406	3.307	0.001	0.16
	Male	913	234.84	55.274			

Table 5 T-test values for humanities and science students differences in SA

Variable	Academic discipline	N	M	SD	t-value	Sig.	Effect size
Academic discipline	Humanities	1488	247.89	53.916	12.142	0.000	0.262
	science	520	214.76	52.537			

positively associated with addiction-proneness more generally (e.g. Boumosleh and Jaalouk 2017) and with specific kinds of personality profile (Lopez-Fernandez et al. 2017). Thus, another possibility may be international differences in addiction proneness, something which we would expect to be underpinned by factors such as international differences in average personality profile (see Meisenberg 2015). Consistent with this hypothesis, smartphone use has been found to be higher in southern than in northern Europe (Lopez-Fernandez et al. 2017) and there is proxy evidence that southern Europeans may be lower than northern Europeans on measures of impulse control (see Dutton, In Press).

Some researchers have been critical of the increasing recognition of technology addictions. Kuss et al. (2016) argue that the concept of 'internet gaming addiction' is problematic and that it is 'conceptually meaningful' to distinguish between 'internet addiction' and 'gaming addiction'. Pontes et al. (2015) have stressed that many subjects appear to be addicted to applications that are on the internet (or on their smartphones), such as games or messaging applications, rather than to 'the internet' itself. In this sense, it can be argued that the internet is a facilitator of addiction rather than an addiction in itself and it has been found that 28% of the variance in 'internet addiction' can be explained by normal 'gratifications,' which may themselves be addictive, such as reward-seeking, status seeking and socializing (Song et al. 2004). In contributing to research on SA in this study we appreciate, therefore, that its conceptual validity has been debated. But, on the other hand, many researchers do regard it as valid (e.g. Alter 2017), it is commonly discussed in the media, and so adding to its documentation will help us to better understand what is actually happening and the nature of the underlying causes.

Another problem with concepts such as internet addiction (and by implication smartphone addiction) is measurement. Many people use the internet, and even their smart phones, with great frequency, due to the nature of their work. In their spare time, they shop, read books, and do all manner of other practical or gratifying activities via the Internet. Thus, we have to be very clear with regard to when internet use is actually addiction. However, it can be argued that these kinds of issues pertain to any addiction, but this does not render the concept of 'addiction', meaning a compulsive need for or use of something, meaningless. A line has to be drawn with regard to when something becomes a 'compulsion' and this is reflected in the measurement scale employed.

Limitation and Future Research

In the interests of furthering our understanding of SA, we have presented the best data available to us but, obviously, there are certain limitations. As we have already observed, some of the samples were more sex-balanced than others. There are also substantial economic differences between the countries from which we were able to obtain samples, a factor which impacts the extent of smartphone use and thus the nature of smartphone addiction. Accordingly, in examining SA in the Arab world it would be useful to repeat this study utilizing only Arab nations which are strongly economically comparable, such as the various United Arab Emirates. In addition, the instrument employed is less than optimal, because it asks subjects to subjectively rate themselves. It would thus be helpful to repeat this research employing a peer-rated instrument or a means of more objectively measuring addiction, such as monitoring behavior among subjects deprived of a smartphone. In addition, more research is needed to understand why there are international differences in SA, controlling for the extent of access to smartphones. Modal personality differences are one possibility and this hypothesis can hopefully be tested.

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Compliance with Ethical Standards

Conflict of interest The authors declare that there is no potential conflict of interest pertaining this submission to *Current Psychology*.

Informed Consent All participants were provided informed consent prior to participation to the study. All study procedures were conducted in accordance with appropriate institutional ethical review boards.

References

Al-Barashdi, H., Bouazza, A., & Jabur, N. (2015). Smartphone addiction among university undergraduates: A literature review. *Journal of Scientific Research & Reports, 4*, 210–225. https://doi.org/10.9734/JSRR/2015/12245.

Aljomaa, S., Al Qudah, M., Albursan, I., Bakhiet, S., & Abduljabbar, A. (2016). Smartphone addiction among university students in the light of some variables. *Computers in Human Behavior, 61*, 155–164. https://doi.org/10.1016/j.chb.2016.03.041.

Alter, A. (2017). *Irresistible: The rise of addictive technology and the business of keeping us hooked*. London: Penguin.

Ayar, D., Bektas, M., Bektas, I., Akdeniz Kudubes, A., Selekoglu, Y., Sal, S., & Selik, I. (2017). The effect of adolescents' internet addiction on smartphone addiction. *Journal of Addictions Nursing, 4*, 2010–2214.

Beranuy, M., Oberst, U., Carboner, X., & Chamarro, A. (2009). Problematic internet and mobile phone use and clinical symptoms in college students: The role of emotional intelligence. *Computers in Human Behavior, 25*(5), 1182–1187. https://doi.org/10.1016/j.chb.2009.03.001.

Bolle, C. (2014). *"Who is a smartphone addict?" The impact of personal factors and type of usage on smartphone addiction in a Dutch population*. Master's thesis. University of Twente Enschede, Netherlands.

Boumosleh, J., & Jaalouk, D. (2017). Smartphone addiction among university students and its relationship with academic performance. *Global Journal of Health Science*. https://doi.org/10.5539/gjhs.v10n1p48.

Ching, S., Yee, A., Ramachandran, V., Lim, S., Sulaiman, W., Foo, Y., & Hoo, & Fa. (2015). Validation of a Malay version of the smartphone addiction scale among medical students in Malaysia. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0139337.

Choi, Y., Koo, J., & Kim, E. (2015). Gender differences in addictive smartphone use among Korean adolescents. *Korean Sociology, 12*, 143–160. https://doi.org/10.21562/kjs.2015.12.49.6.143.

Chóliz, M., Pinto, L., Phansalkar, S. S., et al. (2012). Mobile-phone addiction in adolescence: The test of mobile phone dependence (TMD). *Progress in Health Sciences, 7*, 650. https://doi.org/10.3389/fpsyg.2016.00650.

De Fruyt, F., & Mervielde, I. (1996). Personality and interests as predictors of educational streaming and achievement. *European Journal of Personality, 10*, 405–425.

De-Sola Gutiérrez, J., Rodríguez de Fonseca, F., & Rubio, G. (2016). Cell-phone addiction: A review. *Frontiers in Psychiatry, 7*, 175.

Dutton, E. (In Press). *Race differences in ethnocentrism*. Budapest: Arktos Publishing.

Fox, Z. (2013, 27th August). The 15 countries with the highest smartphone penetration. https://Mashable.com.

Ghazal, M. (2014, 26th February). 95% of Jordanians own mobiles; 47% use the internet. *The Jordan Times*. http://www.jordantimes.com/news/local/95-jordanians-own-mobiles-47-use-internet.

Ghazal, M. (2016, 7th January). Number of internet users in Jordan rises to 6.3 million. *The Jordan Times*. http://www.jordantimes.com/news/local/number-internet-users-jordan-rises-63-million.

Gökçearslan, Ş, Mumcu, F., Haşlaman, T., & Çevik, Y. (2016). Modelling smartphone addiction: The role of smartphone usage, self-regulation, general self-efficacy and cyberloafing in university students. *Computers in Human Behavior, 63*, 639–649. https://doi.org/10.1016/j.chb.2016.05.091.

Hamid, T. (2014). Mena embraces smart phones. *The National*. https://www.thenational.ae/business/mena-embraces-smartphones-1.313688.

Heilat, M. Q. (2016). Smart phone use addiction and its relationship with thinking styles among outstanding and under probation female students at Princess Alia University College. *Educational Journal, Elazhar University, 169*, 533–562.

Hong, F., Chiu, S., & Huang, D. (2012). A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese university female students. *Computers in Human Behavior, 28*(6), 2152–2159. https://doi.org/10.1016/j.chb.2012.06.020.

Kadir, D., Mehmet, A., & Abdullah, A. (2015). Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *Journal of Behavioral Addictions*. https://doi.org/10.1556/2006.4.2015.010.

Kim, N., & Lee, K. (2012). Effects of self-control and life stress on smart phone addiction of university students. *Journal of the Korea Society of Health Informatics and Statistics, 37*, 72–83.

Kim, Y., Lee, N., & Lim, Y. (2017). Gender differences in the association of smartphone addiction with food group consumption among Korean adolescents. *Public Health, 145*, 132–135.

Kuss, D., Griffiths, M., & Pontes, H. (2016). Chaos and confusion in DSM-5 diagnosis of internet gaming disorder: Issues, concerns, and recommendations for clarity in the field. *Journal of Behavioral Addictions*. https://doi.org/10.1556/2006.5.2016.062.

Lee, E. (2015). Too much information: Heavy smartphone and Facebook utilization by African American young adults. *Journal of Black Studies, 46*(1), 44–61. https://doi.org/10.1177/0021934714557034.

Lee, W., & Shin, S. (2016). A comparative study of smartphone addiction drivers' effect on work performance in the U.S. and Korea. *The Journal of Applied Business Research, 32*(2), 507–516.

Long, J., Liu, T., Liao, Y., Qi, C., He, H., Chen, S., & Billieux, J. (2016). Prevalence and correlates of problematic smartphone use in a large random sample of Chinese undergraduates. *BMC Psychiatry, 16*, 408–420. https://doi.org/10.1186/s12888-016-1083-3.

Lopez-Fernandez, O. (2017). Short version of the smartphone addiction scale adapted to Spanish and French: Towards a cross-cultural research in problematic mobile phone use. *Addictive Behaviors, 64*, 275–280. https://doi.org/10.1016/j.addbeh.2015.11.013.

Lopez-Fernandez, O., Kuss, D., Roma, L., Morvan, Y., Kern, L., et al. (2017). Self-reported dependence on mobile phones in young adults: A European cross-cultural empirical survey. *Journal of Behavioral Addictions*. doi.https://doi.org/10.1556/2006.6.2017.020.

Mak, K., Nam, J., Kim, D., Aum, N., Choi, J., Cheng, C., & Watanabe, H. (2017). Cross-cultural adaptation and psychometric properties of the Korean Scale for Internet Addiction (K-Scale) in Japanese high school students. *Psychiatry Research, 249*, 343–348. https://doi.org/10.1016/j.psychres.2017.01.044.

Meisenberg, G. (2015). Do we have valid country-level measures of personality? *Mankind Quarterly, 55*, 360–382.

Nettle, D. (2007). *Personality: What makes you who you are*. Oxford: Oxford University Press.

OpenSignal.com. (November 2016). The state of LTE.

Pontes, H. M., Kuss, D. J., & Griffiths, M. D. (2015). The clinical psychology of Internet addiction: A review of its conceptualization, prevalence, neuronal processes, and implications for treatment. *Neuroscience and Neuroeconomics, 4*, 11–23.

Seo, D., Park, Y., Kim, M., & Park, J. (2016). Mobile phone dependency and its impacts on adolescents' social and academic behaviors. *Computers in Human Behavior, 63*, 282–292. https://doi.org/10.1016/j.chb.2016.05.026.

Sethuraman, A., Rao, S., Charlette, L., Thatkar, P., & Vincent, V. (2018). Smartphone addiction among medical college students in the Andaman and Nicobar Islands. *International Journal of Community Medicine and Public Health, 5*, 4273–4277.

Singh Bhatia, M. (2008). Cell phone dependence—a new diagnostic entity. *Delhi Psychiatry Journal, 11*, 123–124.

Social and Research Development Centre. (2013). *Internet usage habits in Yemen: Findings of an internet survey*.

Song, I., Larose, R., Eastin, M., & Lynn, C. (2004). Internet gratifications and internet addiction: On the uses and abuses of new media. *Cyber Psychology and Behavior*. https://doi.org/10.1089/cpb.2004.7.384.

Soto, C., John, O., Gosling, S., & Potter, J. (2011). Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample. *Journal of Personality and Social Psychology, 100*, 330–348.

Statista. (2018). Number of mobile cellular subscriptions in Yemen. https://www.statista.com/statistics/501168/number-of-mobile-cellular-subscriptions-in-yemen/.

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