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Smartphone addiction and its relationship with social anxiety and loneliness

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ABSTRACT

Individuals with psychosocial problems such as social phobia or feelings of loneliness might be vulnerable to excessive use of cyber-technological devices, such as smartphones. We aimed to determine the relationship of smartphone addiction with social phobia and loneliness in a sample of university students in Istanbul, Turkey. Three hundred and sixty-seven students who owned smartphones were given the Smartphone Addiction Scale (SAS), UCLA Loneliness Scale (UCLA-LS), and Brief Social Phobia Scale (BSPS). A significant difference was found in the mean SAS scores ($p < .001$) between users who declared that their main purpose for smartphone use was to access social networking sites. The BSPS scores showed positive correlations with all six subscales and with the total SAS scores. The total UCLA-LS scores were positively correlated with daily life disturbance, positive anticipation, cyber-oriented relationship, and total scores on the SAS. In regression analyses, total BSPS scores were significant predictors for SAS total scores ($\beta = 0.313$, $t = 5.992$, $p < .001$). In addition, BSPS scores were significant predictors for all six SAS subscales, whereas UCLA-LS scores were significant predictors for only cyber-oriented relationship subscale scores on the SAS ($\beta = 0.130$, $t = 2.416$, $p < .05$). The results of this study indicate that social phobia was associated with the risk for smartphone addiction in young people. Younger individuals who primarily use their smartphones to access social networking sites also have an excessive pattern of smartphone use.

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Smartphone; addiction; social phobia; loneliness

1. Introduction

Smartphones provide users with much more than a mobile phone. In addition to offering a camera and both offline and online games, smartphones offer thousands of applications available via the Internet. As the use of smartphones has become widespread, access to the Internet has also increased steadily. According to the Statistical Yearbook of the Netherlands 2014, mobile Internet use via smartphones reached almost 60% by 2013, which was an increase from approximately 20% in 2010 (Statistics Netherlands, The Hague/Heerlen 2014). In a survey conducted in 2014, 64% of American adults reported that they owned a smartphone, and 46% of the owners highlighted that their smartphone was something that 'they could not live without' (Pew Research Center 2015). A questionnaire-based study conducted in 2014 that included 25 Turkish cities and 1500 smartphone users (using 3G mobile Internet at least once per month) revealed that users benefited from the services at rates of 91% for social networking, 86% for instant messaging, 83% for Internet browsing, 71% for playing mobile games, and 67% for downloading novel applications. Additionally, although the mobile

broadband penetration value for Turkey is 37.1%, most Turkish smartphone users are more active (in terms of using mobile services) than smartphone users in other countries (Ericsson Consumer Lab 2014).

Smartphones are user friendly and attractive for users, but they can be detrimental to the user's health if they are used in a problematic or an addictive manner. An epidemiological study revealed that people who use mobile phones excessively were more likely to experience health problems (e.g. headaches, fatigue, impaired concentration, insomnia, and hearing problems). It was also reported that some dimensions of personality such as low self-esteem, extraversion, higher approval motivation, and higher self-monitoring were more frequently seen in people who suffer from mobile phone addiction (Bianchi and Phillips 2005).

Behavioural addictions such as gambling disorder (included under Non-Substance-Related Disorders in The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition) and Internet Gaming Disorder (included under Other Conditions That May Be a Focus of Clinical Attention) are defined as new disorders that significantly cause impairments. Most studies

addressing the excessive use and misuse of smartphones have been conducted in Eastern Asian countries (e.g. Korea, China, and Japan), where higher numbers of smartphone use are observed (Kamibeppu and Sugiura 2005; Wu et al. 2013; Kim et al. 2014; Mok et al. 2014).

A 2011 study determined that 8.4% of Korean people suffered from severe smartphone addiction (The Korean National Information Society Agency 2012). Other publications have defined smartphone addiction as uncontrollable and excessive use of a smartphone, the presence of withdrawal symptoms when control is attempted, and continuous use of a smartphone despite awareness of the consequences (Kamibeppu and Sugiura 2005; Wu et al. 2013; Kim et al. 2014; Mok et al. 2014).

As for other substance and non-substance addictions, it is impossible to state that smartphone addiction is a personal problem. Smartphone addiction is similar to Internet addiction in many aspects. Kim et al. (2006) reported that people with intense depression, loneliness, social anxiety, and impulsivity developed an Internet addiction more easily than did others. The consequences of Internet addiction include social isolation, family conflicts, academic failure, job loss, and financial debt (Young et al. 1999). Similar consequences might arise from smartphone addiction, which is also likely to lead to accidents, especially traffic accidents due to their handheld use or use as a navigation tool. Internet addiction is classified into specific subtypes (e.g. games, pornography, and chat rooms), whereas smartphone addiction can be classified as addiction to the use of social networks and various extensions.

Premorbid problems in social communication, such as social anxiety, phobia, and feelings of loneliness, can make individuals vulnerable to excessive use of cyber technology devices, including smartphones. Individuals with psychosocial problems such as social phobia and loneliness would prefer other methods of communication, particularly via mobile technological devices, rather than face-to-face communication because this type of communication can cause less anxiety. In this study, we aimed to determine the levels of smartphone use and addiction and the relationship between smartphone addiction and social anxiety and loneliness in a sample of university students in Istanbul, Turkey. Our study aims were to determine whether higher levels of social anxiety and feelings of loneliness would lead to higher levels of smartphone addiction.

2. Methods

2.1. Study participants

The study participants were students recruited from the Faculty of Health Sciences, Faculty of Engineering and

Natural Sciences, and Faculty of Humanities and Social Sciences at Uskudar University in Istanbul, Turkey. The study procedures were conducted in accordance with the Declaration of Helsinki, and the study protocol was approved by the Institutional Review Board of Uskudar University. All the participants were informed about the study and provided written informed consent. Three hundred and seventy-five students who were smartphone users (out of 414 students) were included in the study. Eight participants with incomplete questionnaires or who refused to meet with one of the researchers were excluded. Data from 367 students were collected using data collecting tools, which took approximately 20 min. The Brief Social Phobia Scale (BSPS), which is a clinician rated scale, was administered by two psychiatrists independently (CON and AED) and took approximately 10 min for each participant.

2.2. Psychological measures

The participants were given a questionnaire (prepared by the researchers) that was designed to obtain socio-demographic information and specific information such as their primary reasons for using smartphones, their favourite place to frequently use their smartphones, their age when they obtained their first cell phone and first smartphone, whether they have social network accounts, and the use of smartphones in their family. Additionally, the participants were requested to complete the Smartphone Addiction Scale (SAS), UCLA Loneliness Scale (UCLA-LS), and BSPS.

2.2.1. Smartphone Addiction Scale (SAS)

The 33-item SAS was developed by Kwon et al. (2013). The SAS has a six-factor structure, and each item is scored on a six-point Likert-type scale. The total score can range from 33 (minimum) to 198 (maximum), with higher scores predicting a risk of smartphone addiction. The internal consistency value (Cronbach's alpha) of the scale is 0.96, and no cut-off scores were indicated in the original scale. The validity and reliability of the SAS for university students was examined in a study conducted in Turkey by Demirci et al. (2014), which confirmed that the scale was reliable and valid in determining the risk of smartphone addiction in young individuals. The internal consistency coefficient value (Cronbach's alpha) for the Turkish version of the scale was 0.947.

2.2.2. UCLA Loneliness Scale (UCLA-LS)

The scale, which was used to evaluate an individual's subjective feelings of loneliness, was developed by Russell, Peplau, and Cutrona (1980). It uses a 4-point

Likert-type scale and consists of 20 items, including 10 positive and 10 negative statements. The total score can range from 20 to 80, and the internal consistency (Cronbach's alpha) coefficient was 0.94. Higher scores refer to higher levels of loneliness. The scale was translated into Turkish by Demir (1989). Cronbach's alpha coefficient of the Turkish version was 0.91.

2.2.3. Brief Social Phobia Scale (BSPS)

The BSPS was developed by Davidson et al. (1991) and consists of 11 items that evaluate the severity of symptoms, treatment-induced changes over time, and both active and inactive treatment differences. The scale is composed of three subscales (fear scale, avoidance scale, and physiological symptoms scale), each with items scored from 0 to 4. Higher scores indicate more severe symptoms. The validity and reliability of this scale was confirmed in a Turkish university student sample by Dilbaz (forthcoming).

2.3. Statistical analysis

Data analysis was performed using SPSS for Windows, version 15 (SPSS Inc., Chicago, IL, USA). The data are presented as the mean \pm SD for metric discrete variables; the number of cases and percentages were used for categorical variables. Pearson's correlation analysis of the UCLA-LS and BSPS was used in order to determine the degree of smartphone addiction. Moreover, to examine gender characteristics, an additional analysis was conducted in each gender group. The mean differences in SAS scores between groups and comparisons within groups were performed by an independent sample Student's *t* test. One-way analysis of variance (ANOVA) was used to determine whether there were significant differences between the means of two or more independent groups. The degrees of association between metric discrete variables were calculated by Pearson's product-moment correlation coefficients. Multiple regression analyses were conducted to examine the association between the severity of smartphone use and social phobia and loneliness. A *p*-value less than .05 was considered statistically significant.

3. Results

The average age of the 367 students that participated in the study was 19.5 ± 1.15 years. The majority of students were female ($n = 226$, 61.6%) and single ($n = 343$, 93.5%). There were no significant differences in the mean SAS scores in terms of gender and marital status ($p = .258$ and $p = .188$, respectively).

Data on the reasons for using smartphones and the existence of social networking accounts are presented in Table 1. With respect to the reasons for using smartphones, there were significant differences in the mean SAS scores ($p < .001$) when the group that uses their smartphones to access the Internet and for telephoning are compared to the group that uses their smartphones to access social networking sites.

There were no significant differences in the mean SAS scores ($p = .135$) between the group with accounts for social networking sites and the group without accounts for social networking sites. There were no significant differences in mean SAS scores ($p = .184$) with respect to the number of smartphone users in the family between groups. The participants' socio-demographic characteristics and the SAS scores are given in Table 1. The average age at which the participants first had a mobile phone was 13.1 ± 2.16 years, whereas the average age at which the participants had their first smartphone was 17.3 ± 2.02 years. When asked where they most often used their smartphones, the students most frequently answered in their bedrooms (57.5%), in classrooms (18.8%), and in meetings with family or friends (13.9%). Participants also confirmed that they use their smartphones while walking (77.7%), in classrooms, at meetings (59.7%), at the cinema or theatre (28.3%), and while driving a car (12%) (Table 2).

There was no significant correlation between the mean age and the mean SAS scores of the participants ($p = .702$) or between the mean duration of education and the mean SAS scores ($p = .589$). In addition, having a mobile phone or a smartphone at a younger age was

Table 1. Socio-demographical characteristics and SAS scores.

	<i>n</i> (%)	SAS		<i>p</i> -value
	Mean \pm SD	Mean \pm SD		
Age	19.5 \pm 1.15			
Education (years)	13.6 \pm 1.43			
Gender				.258
Female	226 (61.6)	89.7 \pm 24.43		
Male	141 (38.4)	86.25 \pm 27.69		
Marital status				.188
Single	343 (93.5)	87.86 \pm 28.17		
Married	24 (6.5)	96.04 \pm 28.17		
Reason to use a smartphone				<.001
Internet	146 (39.7)	85.71 \pm 28.15*		
SNS	153 (41.6)	95.97 \pm 26.45		
Games	9 (2.4)	75.5 \pm 19.65		
Telephone	59 (16.0)	78.12 \pm 29.23*		
SNS account				.135
No	19 (5.2)	75.81 \pm 26.63		
Yes	348 (94.8)	88.63 \pm 27.99		
Smartphone use in the family				.184
None	36 (9.8)	84.91 \pm 26.63		
One family member	95 (25.8)	84.61 \pm 23.31		
More than one	233 (63.4)	90.39 \pm 30.0		

Note: SNS stands for social networking sites

*The difference in comparison to the group who use smartphones for social network accounts is statistically significant ($p < .001$).

Table 2. Descriptive analysis of the other socio-demographical characteristics.

	Mean (SD)	n (%)
Year of education	13.8 (1.08)	
Age of having the first mobile phone	13.3 (1.86)	
Age of having the first smartphone	17.5 (1.66)	
Number of owned smartphones	2.0 (1.2)	
Where use smartphone mostly		
In bed		211 (57.5)
In restroom		16 (4.4)
In meetings with family and friends		51 (13.9)
While driving		4 (1.1)
In classroom		69 (18.8)
More than one		16 (4.3)
Use smartphone while driving		44 (12.0)
Use smartphone in theatre and cinema		104 (28.3)
Use smartphone while walking		285 (77.7)
Use smartphone in classroom or meetings		219 (59.7)

not correlated with the SAS scores ($p = .138$ and $p = .324$, respectively). There was no significant correlation between the number of the smartphones owned and the mean SAS scores ($p = .269$).

All three subscales and the total score of the BSPS showed positive correlations with all six subscales and total scores of the SAS. The total UCLA-LS score was positively correlated with the total SAS score and three

subscales scores, including daily life disturbance, positive anticipation, and cyber-oriented relationship (see Table 3).

In multiple regression analyses, total BSPS and UCLA-LS scores were entered as independent variables, whereas total SAS total scores and all six subscale scores were dependent variables in seven models. The total BSPS score was a significant predictor of the total SAS score ($\beta = 0.303$, $t = 5.992$, $p < .001$) and of all six SAS subscale scores ($p < .01$, only for the SAS overuse subscale; $p < .001$ for all other subscales). In the regression analysis, the total UCLA-LS score was a significant predictor for only the SAS cyber-oriented relationship subscale score ($\beta = 0.130$, $t = 2.416$, $p < .05$) (Table 4).

4. Discussion

The main findings of this study revealed that young people who use their smartphones primarily to access social networking sites had a significantly higher risk for smartphone addiction compared to their peers who use smartphones mainly for Internet surfing or making phone calls. There were significant positive correlations

Table 3. Correlational analysis of total and subscales scores of the SAS with BSPS and UCLA-LS scores.

	Subscales of SAS							SAS total score
	Daily life disturbance	Positive anticipation	Withdrawal	Cyberspace oriented relationship	Overuse	Tolerance		
BSPS – fear	r 0.274**	0.161**	0.235**	0.238**	0.122*	0.198**	0.263**	
BSPS – avoidance	r 0.267**	0.172**	0.253**	0.199**	0.126*	0.189**	0.259**	
BSPS – physiological	r 0.285**	0.198**	0.250**	0.243**	0.126*	0.191**	0.280**	
BSPS – total	r 0.312**	0.198**	0.280**	0.255**	0.142**	0.220**	0.303**	
UCLA-LS – total	r 0.142**	0.113*	0.076	0.179**	0.004	-0.008	0.122**	

* $p < .05$

** $p < .01$.

Table 4. Stepwise linear regression analysis.

Model	Independent variables	B	t	p	F	df	R ²	Model p
1	BSPS total score	0.303	5.992	.000	35.902	1	0.092	<.001
	UCLA-LS score	0.040	0.756	.450				
2	BSPS total score	0.312	6.203	.000	38.477	1	0.098	<.001
	UCLA-LS score	0.036	0.670	.503				
3	BSPS total score	0.198	3.820	.000	14.594	1	0.039	<.001
	UCLA-LS score	0.975	1.360	.175				
4	BSPS total score	0.280	5.506	.000	30.316	1	0.078	<.001
	UCLA-LS score	0.004	0.082	.935				
5	BSPS total score	0.255	4.978	.000	24.779	1	0.065	<.001
	UCLA-LS score	0.130	2.416	.016				
6	BSPS total score	0.142	2.709	.007	7.340	1	0.048	<.001
	UCLA-LS score	-0.049	-0.873	.383				
7	BSPS total score	0.220	4.258	.000	18.131	1		<.001
	UCLA-LS score	-0.092	-1.69	.092				

Notes: Model 1: dependent variable SAS – total score;

Model 2: dependent variable SAS – daily life disturbance subscale score;

Model 3: dependent variable SAS – positive anticipation subscale score;

Model 4: dependent variable SAS – withdrawal subscale score;

Model 5: dependent variable SAS – cyber relationship subscale score;

Model 6: dependent variable SAS – overuse subscale score;

Model 7: dependent variable SAS – tolerance subscale score.

between the total SAS score and the SAS subscale scores as well as between the total BPS score and the BPS subscale scores. The UCLA-LS scores were significantly positively correlated with some of the subscale scores and the total SAS score. Multiple regression analyses were used to identify potential independent factors for the total SAS scores and subscale scores. In the regression analyses, the total BPS score had significant predictive power for the total SAS score and all SAS subscales, and UCLA-LS scores had significant predictive power for the SAS cyber-oriented subscale scores. To the best of our knowledge, this study is the first to determine the relationship of smartphone addiction with loneliness and social phobia in university students.

Social networking is the practice of expanding the number of one's social contacts for social communication and business interactions. A preference for social networking is mainly associated with the need for socialising among young people. According to Salehan and Negahban (2013), the use of mobile social networking applications is a significant predictor of mobile phone addiction. One can probably assume that young people with the need to socialise might prefer to frequently access their social network accounts via smartphones, as was reported in this study.

As expected, in individuals with increased social anxiety symptoms, the risk of addiction to a smartphone increased because social anxiety causes the avoidance of real-time relationships. Furthermore, virtual socialisation can alleviate the fear or concern of demonstrating physical signs of physiological arousal symptoms, which are core symptoms of social anxiety. Communication via smartphone provides the opportunity to feel free and to behave without the perception of pressure in people with social anxiety. Pierce also reported that there is a positive relationship between 'feeling uncomfortable talking with others face-to-face' and 'talking with others online' and 'talking via text messaging' (2009).

In the present study, which included three hundred and sixty-seven university students, approximately 95% had an account on any social networking site, and 41% of them identified accessing their accounts as the main reason to use a smartphone. Although the reasons for excessive smartphone use may differ, both social anxiety and loneliness were found to be related to excessive smartphone use in this study. People with social anxiety may prefer texting, while people with feelings of loneliness prefer other activities with their smartphones rather than texting (Internet surfing, games, etc.), as was reported previously (Reid and Reid 2007; Takao, Takahashi, and Kitamura 2009). The feeling of loneliness was correlated with a high risk of smartphone addiction among the entire study sample. Thus, the feeling of

loneliness might be associated with social anxiety, and the feeling of loneliness might be a consequence of using a mobile phone excessively instead of having face-to-face communications (Tan, Pamuk, and Donder 2013). In contrast, excessive smartphone use might be a self-treatment for people who experience the feeling of loneliness while they are trying to cope with bothersome feelings, as smartphones can provide them a different form of socialisation.

We found that the students who participated in the study had their first mobile phone or smartphone at young ages. More than half of the students that participated in the study used smartphones in bed at night time. We evaluated this pattern as a risky behaviour for sleep disorders with respect to sleep hygiene, although this study did not address a comprehensive assessment of sleep quality and patterns of the study participants. Seventy-five per cent of the participants stated that they use smartphones while walking, whereas 12% stated that they use smartphones while driving, which is a risky behaviour. More than half of the participants stated that they use smartphones during classes or meetings, whereas approximately one-third of the participants stated that they use smartphones during cultural activities (e.g. watching movies or theatre), thus indicating that this behaviour might have compromised their education and academic success.

This study has some limitations. First, the generalisation of the findings of this study to the general population is limited by the sample number and by the facts that all participants were students of a private university and that we did not analyse gender differences. Another limitation is the fact that the cross-sectional nature of the study would not allow us to link the causality between smartphone use and associated social anxiety/loneliness. Further prospective, longitudinal studies would help to establish a probabilistic causal relationship.

We conclude that although smartphones, the popularity and prevalence of which has increased in the last decade, typically make people's daily lives easier, the use of smartphones may become problematic in social life. Furthermore, smartphone addiction is a real risk, especially for the younger population struggling with social anxiety/phobia. Is it reasonable to define the continuous availability and accessibility of information on the Internet via smartphones as an addiction? Is the problematic and excessive use related to the phone itself or to the accessibility of the Internet or the availability of social networking sites via the phone? Alternatively, could all of the above statements be correct, and are they all related to smartphone use? Although these questions remain to be answered, it is possible to observe that many socially isolated individuals appear to remain

focused on their smartphones at home, in classrooms, inside vehicles, in parks, and in cafes. Because technology-enabled distraction is a modern-day life problem, development of the literature with further studies will facilitate the use of smartphones as a tool for making people's lives easier and allow for the examination of associated problems that can negatively influence their lives (physically, socially, and academically). We recommend that the social environment of young people should be watched carefully for symptoms of social phobia and feelings of loneliness to avoid the adverse consequences of smartphone addiction.

Disclosure statement

No potential conflict of interest was reported by the authors.

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