TURKISH PSYCHOLOGICAL COUNSELING AND GUIDANCE JOURNAL
2024, VOL. 14, NO. 73, 153-170.

Official Journal of Turkish Counseling and Guidance Association

ISSN: 1302 – 1370, E-ISSN: 2822 – 6569 https://doi.org/10.17066/tpdrd.1294345_1

RESEARCH ARTICLE

The Effect of Mobile Phone Attachment and Extended Self on Nomophobia: The Mediating Role of Materialism

Özge ENEZ[a]

[a] Istanbul Medeniyet University, Istanbul, Turkey

ARTICLE HISTORY

Received:09.05.23
Accepted: 22.05.24

KEYWORDS

Extended self, materialism, mediator analysis, mobile phone attachment, nomophobia

ABSTRACT

This study aims to reveal the effect of mobile phone attachment (MPA), extended self, and materialism on nomophobia; investigate the mediating role of materialism on the relationship between smartphone extension and nomophobia, and the relationship between MPA and nomophobia; and adapt the Extended Self Scale to Turkish culture. Data were collected from 289 university students. Exploratory and confirmatory factor analyses, and reliability analyses have confirmed that the Turkish form is a reliable and valid measurement tool. Multiple regression analysis showed that MPA, smartphone extension, materialism predicted nomophobia. Materialism partially mediated the relationship between MPA and nomophobia, and the relationship between smartphone extension and nomophobia. This study suggests that materialistic students form an emotional attachment to the smartphone, and accept it as part of their selves. They use it to enhance their self-perceptions and cope with emotional/daily problems. Such use may cause the fear of being without a smartphone, which is nomophobia.

Today, a smartphone (SP) has become an inseparable part of daily life. Almost 60.42% of people in the world own an SP in 2024 (Bankmycell, 2024). In addition, university students use the SP almost six hours a day and spend more than two hours on social communication applications (Xu et al., 2015). Although the SP makes life easier, irresponsible SP use can cause important psychological problems. One of them is no-mobile phone phobia (nomophobia). Nomophobia is defined as stress, fear, and anxiety caused by not being able to use an SP who use it habitually (Yildirim, 2014).

Some researchers argue that nomophobia is a situational phobia associated with the fear of losing SP connection, being unable to receive calls, texts or emails, and being unable to access the conveniences offered by the SP (King et al., 2010; Yildirim, 2014). Some researchers have evaluated it in the category of addiction (Forgays et al., 2014; Hasmawati et al., 2020; Tran, 2016). This is still a controversial topic. As the term implies, nomophobia encompasses intense anxiety, fear, and distress experienced in the absence of an SP. It may be more accurate to classify nomophobia as a situational phobia (Yıldırım, 2014). Therefore, nomophobia was evaluated as a situational phobia within the scope of this study.

CORRESPONDING AUTHOR Özge ENEZ, ozge.enez@medeniyet.edu.tr, ORCID: 0000-0002-5521-7691, Istanbul Medeniyet University, Istanbul, Turkey.

Theoretical Framework

In formulating the rationale of this study, the uses and gratifications theory (UGT) (Blumler, 1979) and the compensatory internet use theory (CIUT) (Kardefelt-Winther, 2014) were used. Although these theories were developed to explain the internet, media, and information and communication technology (ICT) use regardless of the debates regarding the classification of nomophobia, it is recommended to use these theories to conceptualize nomophobia and investigate its determinants (Durak, 2019; Enez, 2021).

UGT argues that people use the internet and media in line with their emotional, cognitive and personal integrative needs (Blumler, 1979). For example, some individuals use media and the internet for self-development, psychological reassurance, and self-esteem. However, such needs may lead to problematic use of the internet or media and increase the need for their existence (Elhai & Contractor, 2018; Elhai et al., 2019). Since the SP provides constant access to the internet and media content, such needs cannot be met immediately in the absence of it, potentially leading to nomophobia. Thus, UGT can be used to explain the fear experienced in the absence of an SP, conceptualize nomophobia, and determine its determinants (Enez, 2021).

CIUT argues that problematic ICT use is a compensatory process for coping with emotional and psychological problems (Kardefelt-Winther, 2014). Like other digital technologies, SP use can be considered as a maladaptive coping strategy because it provides entertaining activities that offers relief from problems. For example, some individuals play mobile games to distract their attention from their problems (van Deursen et al., 2015). The expectancy of relief provided by the SP may increase the need for it in times of problems, causing nomophobia (King et al., 2010). Therefore, the CIUT framework can be used to conceptualize nomophobia and determine its determinants (Enez, 2021).

Based on these assumptions, the potential predictors of nomophobia (mobile phone attachment, SP extension, materialism), the expected associations of the predictors with nomophobia, and the hypotheses of this study are explained in detail below in the framework of UGT and CIUT.

Predictors of Nomophobia

Mobile Phone Attachment. This study aimed to investigate the effect of mobile phone attachment (MPA) on nomophobia. Attachment theory (Bowlby, 1969) argues that people are born with an attachment mechanism that impacts their behaviours and interpersonal relationships throughout their lives. It leads people to seek closeness to an attachment figure in times of threat and stress. The presence of the attachment figure provides people safety and security but the absence of the figure causes separation anxiety.

Like the attachment bond between a mother and a new-born, people may develop a bond with an object (Konok et al., 2016). Object attachment is a kind of attachment strategy in the absence or unreliability of an attachment figure because the attachment object helps people reduce their negative emotions in times of threat and stress (Keefer et al., 2012). Therefore, a person who thinks that the attachment figure is unreliable may turn to the SP to feel safe and secure (Fowler & Noyes, 2015; Konok et al., 2016; Lou et al., 2022).

UGT argues that individuals need digital technology to meet their affective needs such as controlling negative emotions and obtaining psychological reassurance (Blumler, 1979). CIUT argues that problematic ICT use is a compensatory process for dealing with psychological and emotional problems such as separation anxiety (Kardefelt-Winther, 2014). Therefore, the absence of the object of attachment (the SP in this study) may increase anxiety. Previous studies have supported this assumption by revealing that users feel intense anxiety upon being separated from the SP and feel motivated to get it back (Cheever et al., 2014; Enez & Yalçınkaya-Alkar, 2021; Han et al., 2017; Keefer et al., 2012; Konok et al., 2016; Konok et al., 2017; Nie et al., 2020).

Although past studies have revealed that being separated from the SP causes anxiety, the acceptance of the SP as an attachment object and the effect of the absence of this attachment object on nomophobia is a neglected issue. Accepting the SP as an attachment object and the separation anxiety experienced in its absence may enable understanding anxiety, which is one of the main characteristics of nomophobia. This understanding gained through this study may be guiding in the conceptualization, prevention, and treatment of nomophobia.

Extended Self. The current study also aimed to investigate the impact of SP extension on nomophobia. The extended-self theory (Belk, 1988, p. 139) argues that a person's possessions can become an extension of the person's self, intentionally or unintentionally. When a person frequently uses an object, the brain perceives it

as a part of the body and the self. If individuals accept an object as a part of the self, they seek proximity to it due to the concept of extended self (Belk, 1984; Walsh et al., 2010). Today, one of the most used objects in daily life is the SP. It is used for several purposes such as saving personal information (e.g., phone numbers and passwords) and accessing online identity in social networks. Such use can strengthen the possibility of SP extension (Han et al., 2017; Walsh et al., 2009). Therefore, they may tend to protect their self-identity by keeping the SP with them at all times (Lou et al., 2022).

From the perspective of UGT (Blumler, 1979), people may incorporate the SP into the extended self to meet personal integrative needs (e.g., self-esteem and self-confidence). From the perspective of CIUT (Kardefelt-Winther, 2014), using the SP as a coping mechanism may cause individuals to perceive the SP as a coping ability that they have learned. Consequently, the SP can be perceived as part of the self. In line with these assumptions, past research found that users kept the SP nearby even though they were not actively using it (Aharony et al., 2011; Walsh & White, 2007). Similarly, it was found that the SP was accepted as the extended self and the perception of self-integrity decreased during the period of SP separation (Clayton et al., 2015; Lou et al., 2022).

Although, the disruption of self-integrity caused by SP extension can trigger an intense fear of separation from the SP, no research was identified investigating the effect of SP extension on nomophobia. Examining this effect can provide a more in-depth understanding of nomophobia. That is, this study may provide information that is not available in the literature. In this way, it may be possible to reduce the emotional, cognitive and physical problems caused by SP extension (Clayton et al., 2015; Devi & Dutta, 2022) and therefore nomophobia.

To determine the predictive effect of SP extension on nomophobia, as there is no Turkish assessment tool to evaluate SP extension, the current study aimed to examine the psychometric properties of the Extended Self Scale -Turkish Form (Clayton et al., 2015) (see Appendix A). (Detailed information is given in the materials section.). The Extended Self Scale was mainly developed to determine the degree to which objects are incorporated into the extended self. Firstly, the scale was designed to measure the car, shirt, gift, and gift giver as the extended self (Sivadas & Machleit, 1994). Then, it was adopted to measure the car, music system, pet, and least favorite possession as the extended self (Sivadas & Venkatesh, 1995). More recently, the scale was designed to measure the SP as the extended self (Clayton et al., 2015), and adaptation studies of this version of the scale were carried out in the present study.

Materialism. This study also aimed to investigate the effect of materialism on nomophobia. The definition of materialism is ‘‘the importance a consumer attaches to worldly possessions’’ (Belk, 1984, p. 291). UGT argues that (Blumler, 1979), people use technological tools to meet personal integrative needs such as self-esteem. Materialists use their possessions to display their values and attitudes, and highlight their social status (Roberts & Pirog, 2013). Therefore, acquired products gain social importance and meaning (Eren et al., 2012). Considering the public visibility of the SP, materialists may believe that the SP shows wealth and social status to others via purchasing a particular brand or through posts on social networks (Long et al., 2021, Lou et al., 2022). Therefore, the absence of the SP may have a destructive psychological effect on materialists due to their personal integrative needs (Karabati & Cemalcilar, 2010).

As argued by CIUT (Kardefelt-Winther, 2014), ICTs are used as a mechanism for coping with problems and poor coping may increase their need to use the SP to deal with difficulties. Materialists tend to use maladaptive coping strategies when they experience difficult life events such as compulsive buying (Ruvio et al., 2014). Consequently, poor coping may trigger nomophobia in materialists. Past research has also revealed that materialism is associated with nomophobia (Enez & Yalçınkaya-Alkar, 2021) and predicts nomophobia (Gentina et al., 2023).

Materialism as a Mediator. The current study also aimed to examine the mediator role of materialism on the relationship between SP extension and nomophobia. Materialists may be more likely to accept the SP as part of the self because they commonly use their possessions to define themselves to others (Karabati & Cemalcilar, 2010; Roberts & Pirog, 2013). If materialists use the SP as a tool to strengthen their self-image and improve the impression they make on others (Eren et al., 2012), their self-integrity may be damaged in the absence of

the SP. That is, SP extension can trigger nomophobia through materialism, which has not been investigated before.

Lastly, this study aimed to examine the mediator role of materialism on the association between MPA and nomophobia. Materialists' need for psychological security and their efforts to meet these needs through objects may cause them to accept the SP as an attachment object (Ainsworth, 1985; Chaplin & John, 2007; Konok et al., 2017). That is, MPA can trigger nomophobia through materialism, which has not been investigated before.

To sum, materialistic tendencies, which negatively affect identity integrity and positive identity perception, among young adults, are increasing day by day (Mazahir et al., 2016). Examining the effect of materialism on nomophobia may contribute to the understanding, prevention, and treatment of nomophobia. Moreover, as materialism is influenced by cultural values (Ogden & Cheng, 2011), it seems important to examine the direct and mediating effects of materialism on nomophobia in Turkish society. Besides, examining the relationship between materialism and nomophobia based on attachment theory (Bowlby, 1969) and the extended-self theory (Belk, 1988) can enrich the theoretical conceptualization of nomophobia and materialism.

Current Study

Based on the information provided above, the current study was conducted to determine the effect of MPA, extended self, and materialism on nomophobia. The current study was also conducted to determine the mediating role of materialism on the association between extended self and nomophobia, and the relationship between MPA and nomophobia. To achieve these aims, this study also aimed to adapt the Extended Self Scale (Clayton et al., 2015; Sivadas & Machleit, 1994) to Turkish culture and determine the psychometric properties of the Extended Self Scale- Turkish form. Therefore, this study aimed to test the following hypotheses.

H1. The Extended Self Scale-Turkish form is a valid and reliable measurement tool for Turkish culture to assess SP extension among university students.

H2. Mobile phone attachment, SP extension, and materialism are significant predictors of nomophobia.

H3. Materialism mediates the association between SP extension and nomophobia.

H4. Materialism mediates the association between mobile phone attachment and nomophobia.

It is possible to say that the present study has the potential to contribute to academic research and clinical practice. This adaptation study is important and required because SP extension has not been examined in research conducted in Turkey. As SP extension causes severe physical, cognitive and psychological problems (Clayton et al., 2015; Lou et al., 2022), this scale allows examining the problems related to SP extension in Turkey. Therefore, it can be a useful tool for researchers, clinicians, policy makers and psychological counselors who want to understand the extent to which extending the SP to one's self-identity contributes to nomophobia or any psychological problem.

Moreover, to the researcher's knowledge, no studies have examined the combined effect of MPA, SP extension, and materialism on nomophobia. Similarly, the mediating role of materialism in the association between MPA and nomophobia, and in the association between and SP extension and nomophobia has not been examined. This study may contribute to the development of the existing literature, as well as help determine the components of the nomophobia prevention and treatment programs. Treatment modalities applied in clinics and prevention programs applied in schools can be developed in the light of current findings.

Method

Participants

Considering the high prevalence of nomophobia among university students (Jahrami et al., 2023), participants were selected among university students. In addition, UGT argues that technology use is associated with the demographic characteristics of people such as age (Elhai & Contractor, 2018; Elhai et al., 2019). For participant selection, a convenient sampling method was preferred. Potential participants were asked whether they had a psychiatric diagnosis in the last 6 months and whether they had used psychiatric drugs. Participants who used drugs and were diagnosed were not included in the study. 289 university students participated in the study. The data were collected only from Istanbul Medeniyet University to prevent the university factor from being a confusing variable.

Materials

Nomophobia Questionnaire (NMP-Q). Yildirim and Correia (2015) developed the NMP-Q and Yildirim et al. (2016) validated it to Turkish culture by. The NMP-Q is a 20-item and 7-point Likert-type scale (1= *strongly disagree* and 7= *strongly agree*), and includes four dimensions: (1) Not being able to communicate, (2) Giving up convenience, (3) Not being able to access information, and (4) Losing connectedness. According to confirmatory factor analysis (CFA), the goodness of fit index (GFI) was .97, the comparative fit index (CFI) was .92, and the root mean square error of approximation (RMSEA) was .08. Cronbach alpha coefficient of the questionnaire was .92 (Yildirim et al., 2016). In this study, the coefficient was .93 for the NMP-Q.

Extended Self Scale. The scale was developed by Sivadas and Machleit (1994). It is a 6-item and 7-point Likert-type scale (1= *strongly disagree* and 7= *strongly agree*). Across the product/person categories (i.e., car, shirt, gift, gift giver), Cronbach alpha coefficients were .90, .90, .90, and .91, respectively. According to the CFA results of the scale designed to measure the car as the extended self, GFI was .87 and RMSEA was .05 (Sivadas & Venkatesh, 1995). The coefficient of the scale designed to measure the phone as the extended self was .89 (Clayton et al., 2015). Since there is no Turkish version of the scale, an adaptation study of the scale was carried out in the current study. In this study, Cronbach alpha coefficient of the questionnaire was .90. (See results section)

Mobile Attachment Questionnaire (MAQ). The MAQ was developed by Konok et al. (2017) and validated to Turkish culture by Enez and Yalçınkaya-Alkar (2021). The Turkish version of the MAQ is a 13-item and a 5 points Likert-type scale (1= *not at all characteristic of me* and 5= *very characteristic of me*). It has four sub-dimensions: (1) Separation insecurity, (2) Separation anxiety, (3) Safe haven, and (4) Secure base. CFA showed that the incremental fit index (IFI) was .95, the adjusted goodness of fit index (AGFI) was .88, CFI was .95, and RMSEA was .07. Cronbach alpha coefficient of the questionnaire was .90 (Enez & Yalçınkaya-Alkar, 2021). In the current study, the coefficient was .89.

The Short Version of the Material Values Scale (MVS). Richins (2004) developed the MVS and Karabati and Cemalcilar (2010) validated to Turkish culture. The MVS has 18 items and 3 sub-dimensions: (1) Centrality, (2) Success, and (3) Happiness. It is a 5-point Likert-type scale (1=*totally disagree* and 5=*totally agree*). CFA showed that CFI was .84 and RMSEA was .06. Cronbach alpha coefficient of the scale was .80 (Karabati & Cemalcilar, 2010). In the current study, the coefficient was .86.

Procedure

Participation was voluntarily and an informed consent form was given to the potential participants before data collection. Data were collected via Google Forms during the 2022-2023 academic year. Power analysis in the GPower software program was used to calculate the required sample size for analyses. The alpha level probability was determined as 0.05 and the beta level probability was determined as 0.10 (Cunningham & McCrum-Gardner, 2007). The effect size was kept at a medium level (Cohen, 1988). Power analysis indicated that 253 participants are needed for this study. 289 participants were taken as the optimal sample size for this study.

Statistical Analyses

The data were coded into the Statistical Package for Social Sciences 23 (SPSS 23) program. First, descriptive analyses were performed. Second, it was checked whether the assumptions required for the analyses were met (normality, linearity, autocorrelation, multicollinearity, homoscedasticity). Third, exploratory factor analysis (EFA) and reliability analyses in SPSS, and CFA in Analysis of Moment Structures (AMOS) were conducted to assess the validity and reliability of the Extended Self Scale-Turkish form. Fourth, Pearson correlation analysis was conducted to investigate the associations among the study variables. Fifth, to predict nomophobia from the study variables, multiple linear regression analysis (enter method) was used. Lastly, mediation analyses were performed using SPSS Process Macro Version 3 (Model 4- Simple mediation model) to investigate the mediator effect of materialism.

Results

Of the total sample (*N*= 289), 191 (66.1%) were female and 98 (33.9%) were male. Their ages ranged from 17 to 37 years (*M*= 21.15, *SD* = 2.99). 20.1% of participants had a low (21 ≤ NMP-Q-TR < 60), 59.2% had a moderate (60 ≤ NMP-Q-TR < 100), and 20.8% had a severe level of nomophobia (100 ≤ NMP-Q-TR ≤ 140) (Yildirim et al., 2016).

Before hypothesis testing, the following assumptions were controlled. The kurtosis and skewness values were between +1.96 and -1.96 (Tabachnick & Fidell, 2007), indicating normally distributed data. The values were given in Table 1. Linearity assumption was tested using scatterplots and no violations were observed. The tolerance statistics were above 0.1. The variance inflation factor (VIF) values were smaller than 10 for all variables, indicating no multicollinearity in the data. The values were given in Table 3. Homoscedasticity assumption was also confirmed using linear regression plots of standardized predicted values versus standardized residuals. Durbin-Watson statistic was 1.87, showing that the values of the residuals were independent and there was no autocorrelation (acceptable range changes between 1.50 and 2.50) (Field, 2013). According to the results of outlier detection analysis based on Mahalanobis distance, no outliers were determined. Since participants were required to answer all questions in the questionnaires sent via Google Forms, there was no missing data.

Table 1. Descriptive statistics of the variables

Variables	*M*	*SD*	Range	Minimum	Maximum	Skewness	Kurtosis
Nomophobia	4.04	1.15	6	1	7	.01	-.54
MPA	3.30	.82	4	1	5	-.17	-.48
SP extension	2.77	1.36	6	1	7	.49	-.61
Materialism	2.93	.63	4	1	5	-.30	.01

Note. M = Mean, SD = Standard deviation, MPA= Mobile phone attachment.

The Psychometric Properties of The Extended Self Scale- Turkish Form

H1. The Extended Self Scale-Turkish form is a valid and reliable measurement tool for Turkish culture to assess SP extension among university students.

According to the findings, H1 was confirmed. First, EFA in SPSS 23 was performed to examine the structural validity of the Extended Self Scale on Turkish university students. The Kaiser-Meyer-Olkin (KMO) value indicated that the sample was factorable (*KMO* = .86) (acceptable value > .60) and Bartlett's test of sphericity was significant ($\chi 2$ (15) = 1088.85, $p < .001$) (Tabachnick & Fidell, 2007). No item was deleted because the loads of items ranged between .71 and .86. The corrected item-total correlations ranged between .69 and .81. 66.45% of the variance was explained by these items. These results approve the factor structure of the Extended Self Scale-Turkish version.

According to CFA, the chi-squared test (χ^2 / df) was 2.03, indicating adequate fit of the model (acceptable fit indices $2 \leq \chi^2 / df \leq 3$) (Kline, 2011). RMSEA was .06. The value was in the acceptable range (acceptable fit indices .05 ≤ RMSEA ≤ .08) (Browne & Cudeck, 1993). CFI was .99 (perfect fit indices .95 ≤ CFI ≤ 1.00), IFI was .99 (perfect fit indices .95 ≤ IFI ≤ 1.00), AGFI was .95 (perfect fit indices .90 ≤ AGFI ≤ 1.00), and GFI was .99 (perfect fit indices .95 ≤ GFI ≤ 1.00). These values were in the perfect fit range (Browne & Cudeck, 1993; Schermelleh-Engel & Moosbrugger, 2003). Cronbach alpha coefficient of the questionnaire was .90, indicating excellent internal consistency (acceptable value > .70) (Streiner, 2003).

For reliability assessment, the Turkish form was split in half. The Spearman-Brown coefficient was .88. The Cronbach alpha coefficient was .87 for the first three items and .91 for the last three items. The correlation between forms was .79 (acceptable value > .70) (Taber, 2018). To test the test-retest reliability, the Extended Self Scale - Turkish form was completed again four weeks after the first data collection by 37 randomly selected participants. The test-retest correlation coefficient was statistically significant ($r = .77$, $p< .001$), and Cronbach alpha coefficient was .87 (acceptable value > .80) (Tabachnick & Fidell, 2007). The results suggest that the Turkish form has acceptable reliability and validity. (See Appendix A)

Regression Analysis

H2. Mobile phone attachment, SP extension, and materialism are significant predictors of nomophobia

Table 2. Correlations with confidence intervals

Variable	1	2	3
1. MPA			
2. SP extension	.45*** [.35, .54]		
3. Materialism	.43*** [.33, .52]	.40*** [.3, .49]	
4. Nomophobia	.73*** [.67, .78]	.47*** [.37, .56]	.42*** [.32, .51]

Note. ***p<.001, MPA= Mobile phone attachment, SP= Smart phone. Values in square brackets indicate the BCa 95% confidence interval for each correlation.

As seen in Table 2, according to the bivariate Pearson correlation analysis, nomophobia was positively correlated with MPA (r = .73, R^2= .54, 95% BCa CI [.67, .78], p< .001), SP extension (r = .47, R^2= .22, 95% BCa CI [.37, .56], p< .001), and materialism (r = .42, R^2= .18, 95% BCa CI [.32, .51], p< .001).

Then, a multiple linear regression analysis was used to predict nomophobia from MPA, SP extension, and materialism. The results showed that the three-predictor regression model significantly predicted nomophobia (F (3, 285) = 124.6, p< .001), confirming H2. The model accounted for 56.7% of the variability, as indexed by the R^2 statistic (R= .753, R^2=. 576). The standardized regression coefficients showed that the importance order of predictors on nomophobia was MPA (β= .63, t= 13.64, p< .001), SP extension (β= .15, t= 3.26, p= .001), and materialism (β= .09, t= 2.06, p= .04). The results were given in Table 3.

Table 3. Results of the multiple linear regression analysis

Predictors	B	SE	β	t	p	95% CI for B		Correlations		Collinearity Statistics	
						Lower	Upper	Zero-order	Partial	Tolerance	VIF
Constant	.32	.24		1.36	.17	-.14	.78				
SP extension	.13	.04	.15	3.26	.001	.05	.20	.47	.19	.75	1.34
MPA	.87	.06	.63	13.64	<.001	.75	1.00	.73	.63	.72	1.39
Materialism	.17	.08	.09	2.06	.04	.01	.33	.42	.12	.76	1.31
Model Fit	F (3, 285) = 124.6, p< .001, R= .753, R^2= .567										

Note: MPA= Mobile phone attachment, SP= Smart phone, VIF= The variance inflation factor, CI= Confidence interval

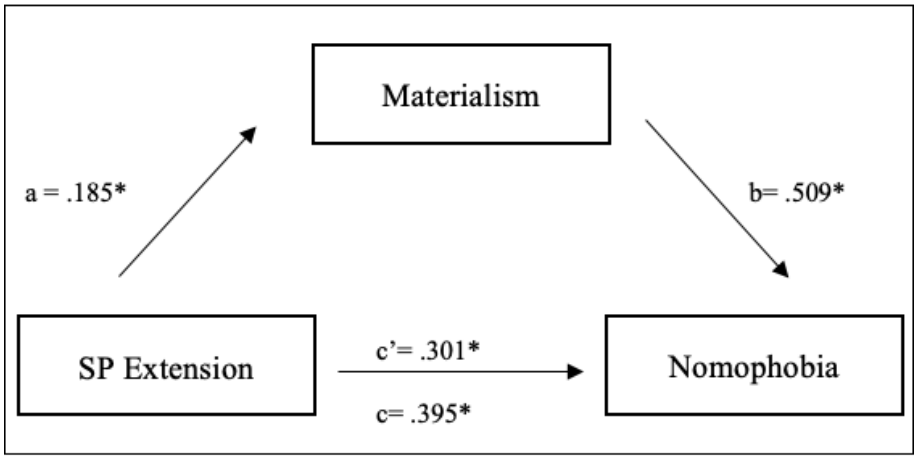
Mediator Analyses

H3. Materialism mediates the association between SP extension and nomophobia.

H4. Materialism mediates the association between mobile phone attachment and nomophobia.

To test the hypotheses, simple mediation analyses were performed. A bootstrapping method was used in SPSS Process Macro Model 4 (Simple mediation model) (Hayes, 2013). As a measure of indirect effect, 5000 bootstrap bias-corrected 95% confidence intervals (BCa CI) were used. In the analyses, the unstandardized beta coefficients were reported.

Figure 1. Mediator effect of materialism on the relationship between SP extension and nomophobia



Note: *p< .001

As seen in Figure 1, the direct path for the mediation model showed that SP extension predicted materialism (path a) (B =.185, t= 7.31, p < .001). SP extension accounted for 15.7% of the variability in materialism (R= .396, R^2=. 157). The results also showed a significant direct effect of SP extension on nomophobia (path c') (B =.301, t= 6.54, p < .001). Similarly, materialism significantly predicted nomophobia (path b) (B =.509, t= 5.16, p < .001).

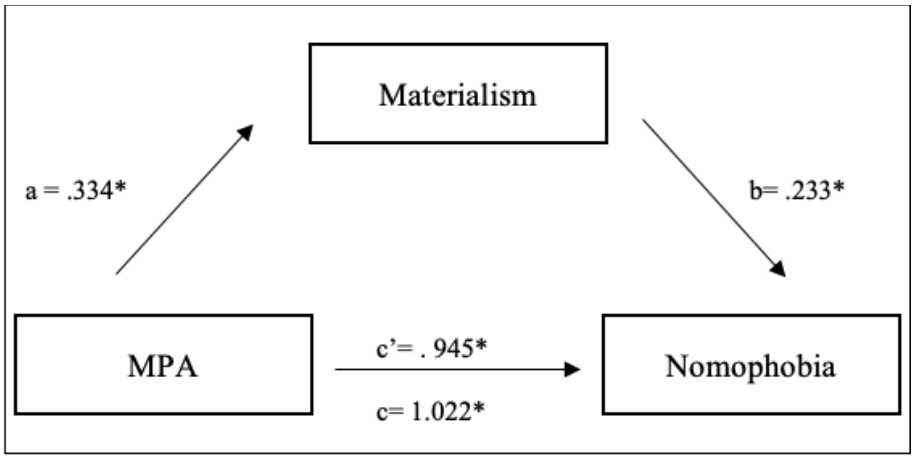
The model also significantly predicted nomophobia (F (2, 286) = 57.06, p< .001) and accounted for 28.5% of the variability in nomophobia (R= .534, R^2=. 285). The total effect of SP extension on nomophobia was significant (path c) (B =.395, t= 8.96, p < .001) and accounted for 21.8% of the variability in nomophobia (R= .468, R^2=. 218). Lastly, the results revealed a significant indirect effect of SP extension on nomophobia (path a*b) (B =.094, 95% BCa CI [.05, .14]). That is, materialism partially mediated the relationship between SP extension and nomophobia, supporting H3. The results were presented in Table 4.

Table 4. Mediator effect of materialism on the relationship between SP extension and nomophobia

Variable / Effect	**B**	**SE**	***t***	***p***	**95% bias-corrected bootstrap CI**	
					Lower	**Upper**
SP extension→ Materialism (path a)	.185	.03	7.31	<.001	.14	.23
Materialism → Nomophobia (path b)	.509	.10	5.16	<.001	.32	.70
SP extension→ Nomophobia (path c')	.301	.05	6.54	<.001	.21	.39
Effects						
Direct	.301	.05	6.54	<.001	.21	.39
Total	.395	.04	8.96	<.001	.31	.48
Indirect*	.094	.02			.05	.14

Note: SP= Smart phone, CI= Confidence interval

Figure 2. Mediator effect of materialism on the relationship between MPA and nomophobia



Note: *p< .001

As seen in Figure 2, the direct paths for the mediation model showed that MPA predicted materialism (path a) (*B* =.334, *t*= 8.15, *p* < .001) and accounted for 18.8% of the variability in materialism (*R*= .434, R^2= .188). The direct effect of MPA on nomophobia was statistically significant (path c') (*B* =.945, *t*= 15.42, *p* < .001). Likewise, materialism significantly predicted nomophobia (path b) (*B* =.233, *t*= 2.92, *p* = .003).

The model also significantly predicted nomophobia (*F* (2, 286) = 175.64, *p*< .001) and accounted for 55.1% of the variability in nomophobia (*R*= .742, R^2= .551). The total effect of MPA on nomophobia was statistically significant (path c) (*B* =1.022, *t*= 18.28, *p* < .001) and accounted for 53.8% of the variability in nomophobia (*R*= .733, R^2=. 538). The results also showed a significant indirect effect of MPA on nomophobia (path a*b) (*B* =.077, 95% BCa CI [.02, .13]). That is, materialism partially mediated the relationship between MPA and nomophobia, supporting H4. The results were given in Table 5.

Table 5. Mediator effect of materialism on the relationship between MPA and nomophobia

Variable / Effect	B	SE	*t*	*p*	95% bias-corrected bootstrap CI	
					Lower	Upper
MPA→ Materialism (path a)	.334	.04	8.15	<.001	.14	.23
Materialism → Nomophobia (path b)	.233	.08	2.92	.003	.08	.39
MPA → Nomophobia (path c')	.945	.06	15.42	<.001	.82	1.07
Effects						
Direct	.945	.06	15.42	<.001	.82	1.07
Total	1.022	.06	18.28	<.001	.91	1.13
Indirect*	.077	.03			.02	.14

Note: MPA= Mobile phone attachment, CI= Confidence interval

Discussion

The Extended Self Scale- Turkish Form

In the current study, the Extended Self Scale was adopted to Turkish culture. Although the scale was developed to measure various objects as the extended self (Sivadas & Machleit, 1994), the version designed to measure the SP as the extended self (Clayton et al., 2015) was adopted in this study. The structural validity of the Turkish form through EFA confirmed a one-factor and six-item structure for the Turkish version, which is consistent with the original form. As the loads of items ranged from .71 to .86 and the corrected item-total correlations ranged from .69 to .81, all items were kept in the scale.

Similar to the findings of current research (.90), Clayton et al. (2015) showed that the coefficient of the scale designed to measure SP extension was .89. The versions of the scale developed for other objects (e.g., the car, shirt, music system, pet) also have similar Cronbach alpha coefficients (ranging between .88 and .93) (Sivadas & Machleit, 1994; Sivadas & Venkatesh, 1995). Such findings can be considered as supporting evidence that the internal consistency of the Expanded Self Scale-Turkish form is high (Streiner, 2003).

Although Clayton et al. (2015) did not provide information about the goodness of fit indices in their paper, the indices met the model fit requirements for the Turkish form. In this study, the chi-squared test and RMSEA were in the acceptable fit range, and CFI, AGFI and GFI were in the perfect fit range (Browne & Cudeck, 1993; Kline, 2011; Schermelleh-Engel & Moosbrugger, 2003). In this study, better fit values were obtained compared to the fit values obtained by Sivadas and Venkatesh (1995). For example, on the scales designed to measure the car and the least favorite possession as extended self, GFI values were .87 and RMSEA values were .05. These findings indicate that the construct validity of the current scale is higher than other versions.

Although past research did not provide information about its reliability (Clayton et al., 2015; Sivadas & Machleit, 1994; Sivadas & Venkatesh, 1995), test-retest statistic (.87) can be seen as proof of its reliability over time (acceptable value > .80) (Tabachnick & Fidell, 2007). Likewise, split-half statistics can be seen as proof of its reliability to assess SP extension (acceptable alpha value > .70) (Taber, 2018). The findings support the cross-cultural utility of the scale, indicating that the six-item scale is unidimensional, internally consistent, and reliable. Therefore, the Turkish form can be considered a promising assessment tool for the extended self among university students, confirming the hypothesis (H1).

Mobile Phone Attachment

This study has shown that MPA is positively correlated with nomophobia and a significant predictor of nomophobia. Past studies have revealed that individuals form an attachment tie with the SP (Cheever et al., 2014; Enez & Yalçınkaya-Alkar, 2021; Keefer et al., 2012; Konok et al., 2016; Konok et al., 2017; Nie et al., 2020). These findings indicate that like the attachment figure, the SP as an attachment object may provide psychological security and relief to young adults.

From the perspective of UGT (Blumler, 1979), the SP helps to satisfy affective needs such as a sense of security. From the perspective of CIUT (Kardefelt-Winther, 2014), individuals may need the SP to control psychological and emotional problems such as separation anxiety. SP use can be considered as a maladaptive coping strategy, as it provides several entertaining activities that potentially offer relief from separation anxiety (Elhai et al.,2017). Such benefits of the SP may increase the possibility of accepting the SP as an attachment object. Consequently, the absence of it can increase separation anxiety and proximity-seeking behavior, potentially ending with nomophobia (Han et al., 2017).

Moreover, other objects cannot be alternative attachment objects to decrease interpersonal attachment separation anxiety because the SP allows communication with primary attachment figures. In the presence of it, people can reach the primary attachment figure regardless of time and place. Therefore, they may feel more intense separation anxiety in the absence of it than in other objects (Konok et al., 2017; Nie et al., 2020).

Extended Self

The results have shown that SP extension is positively correlated with nomophobia and a significant predictor of nomophobia. Similar to the previous research (Clayton et al., 2015), this research has revealed that the SP is incorporated into the extended self. The extended-self theory (Belk, 1988) argues that if an object is thought to reflect a person's self-concept, this object is incorporated into the self and the person seeks proximity to this object to preserve self-integrity (Belk, 1984; Clayton et al., 2015; Han et al., 2017; Walsh et al., 2010).

The SP is a personalized possession that reflects the social status, values, and ideas of the owner (Han et al., 2017). If university students believe that the SP reflects their self-concept, they may feel distressed in the absence of it (Walsh et al., 2010). Moreover, an SP is used as an external memory because it is used to store and access personal information such as photos and passwords (Vincent et al., 2005). Therefore, information saved on the SP can increase the possibility of SP extension (Han et al., 2017). Likewise, since it is used to save social contacts (e.g., phone numbers and mail addresses) and access online identity on social media, it is perceived as an extension of social identity (Konok et al., 2016; Walsh et al., 2009).

Additionally, SP use as a coping mechanism may cause the SP to be accepted as a coping ability (Kardefelt-Winther, 2014). This perception may cause the SP to be accepted as an important part of the self and disruption of self-integrity in the absence of it. Therefore, accepting the SP as part of the psychical and social self may increase proximity-seeking behavior (Han et al., 2017). That is, based on these explanations and the assumptions of UGT (i.e., meeting personal integrative needs) (Blumler, 1979) and CIUT (i.e., coping) (Kardefelt-Winther, 2014), SP extension may lead to nomophobia.

Materialism

Similar to the findings of past research (Enez & Yalçınkaya-Alkar, 2021; Gentina et al., 2023), this study has revealed that materialism is positively correlated with nomophobia and a significant predictor of nomophobia. Materialists equate possessions with power and success. Also, they tend to believe that possessions offer pleasure and enhance subjective well-being (Karabati & Cemalcilar, 2010; Long et al., 2021). Such individuals like to own objects not only for their functional benefits but also to interpret themselves and strengthen their social identity (Long et al., 2021, Lou et al., 2022). As they pay more attention to the self-expressive benefits of possessions, the possessions used in public become more important to them than the ones used in private such as books (Karabati & Cemalcilar, 2010; Richins, 1994).

Due to the public visibility of the SP, it is often used to highlight wealth and identity via purchasing a particular brand or posts on social networks (Long et al., 2021). Materialistic university students may have a more positive attitude towards the SP as a symbol of social status in their peer group, making them more prone to SP use (Ouyang et al., 2020). If the SP enhances social status and identity, its absence can have a devastating effect on materialistic youths (Karabati & Cemalcilar, 2010). These assumptions are also in parallel with the assumptions of UGT (Blumler, 1979). That is, using technological tools to meet personal integrative needs such as self-esteem. Therefore, they may experience the fear of not being able to use the SP when necessary, leading to nomophobia.

Moreover, since materialists tend to use maladaptive coping strategies in times of stress (Ruvio et al., 2014), they may need the presence of the SP instead of facing problems in more adaptive ways. For example, in line with CIUT's assumptions (Kardefelt-Winther, 2014), they may believe that shopping applications are necessary to cope with problems. Therefore, materialists may experience fear of not being able to benefit from the conveniences provided by online shopping applications such as momentary discounts on shopping sites. Thus, the privileges and values of materialists may have a significant impact on the onset and maintenance of nomophobia.

Materialism as a Mediator

According to the results, H3 has confirmed and materialism mediates the association between SP extension and nomophobia. It is possible to say that materialist university students are more likely to see the SP as part of the self because they commonly use their possessions to define themselves to others (Karabati & Cemalcilar, 2010; Roberts & Pirog, 2013). In particular, some brands (e.g., iPhone, Samsung) may carry a status symbol

in society. Therefore, they may tend to buy such brands to support their self-expression and strengthen their self-esteem (Roberts & Pirog, 2013).

In addition, the online world has become a platform where personal possessions and consumption styles are shared virtually among individuals (Lehdonvirta, 2010). The online social self may become a dominant part of the self in materialists. Consequently, they may tend to accept the SP as the extended self. Perceiving the SP as an extension of the social self may increase anxiety about the loss of the self in the absence of it, triggering nomophobia. That is, materialism may mediate the association between nomophobia and SP extension.

Lastly, the results have confirmed H4 and materialism mediates the association between MPA and nomophobia. Objects are beneficial to comprehend one's surroundings and feel secure in an uncertain world (Morrison & Johnson, 2011). Materialists tend to feel psychological insecurity and are highly motivated to restore security (Chaplin & John, 2007). As attachment objects provide security (Ainsworth, 1985; Konok et al., 2017) and considering that materialists value objects rather than interpersonal relationships, they may be tend to accept the SP as an attachment object (Karabati & Cemalcilar, 2010; Richins, 1994; Wehmeyer, 2008). Separation anxiety in its absence may intensify the symptoms of nomophobia in materialistic university students. Thus, materialism may mediate the association between MPA and nomophobia.

Conclusion and Implications

To conclude, this study has revealed that the Turkish version of the Extended Self Scale is a reliable and valid measurement to assess SP extension. To date, there was no Turkish assessment tool to evaluate SP extension. From now on, SP extension can be investigated in research conducted in Turkey. It is also a useful tool for clinicians who want to understand the extent to which extending the SP to oneself contributes to problematic SP use or any psychological problem. Understanding the relationship between students' self-perceptions and the SP can also support positive self-development and guide the psychological counseling services in schools for early diagnosis and prevention of other psychological problems that may arise. That is, the Turkish version of the Extended Self Scale will contribute to future academic research and practice.

This study has also revealed that MPA, SP extension, and materialism predict nomophobia. Based on the findings, it is possible to make suggestions about the treatment and prevention of nomophobia. Although the needs explained in UGT (Blumler, 1979) may cause nomophobia, it may not be logical to interfere with the needs of students. Instead, they should be directed to satisfy their needs in the real world instead of the virtual world. For example, instead of online activities and virtual relationships, experiencing the pleasure of face-to-face social activities in the school environment and strengthening peer relationships can prevent nomophobia. It can be recommended to increase the time allocated to these activities while organizing school programs.

Based on the assumptions of CIUT (Kardefelt-Winther, 2014) and the current findings, it is possible to assume that university students use the SP as a coping tool to relieve emotional discomfort and deal with psychological problems. Although the SP helps students to manage their problems, such use may lead to the belief that difficulties cannot be handled without the SP (Kardefelt-Winther, 2014; van Deursen et al., 2015). In treatment and intervention programs designed for nomophobia, it might be beneficial to focus on how to reduce maladaptive coping behaviors and to improve students' coping skills. Psychoeducation on adaptive coping methods can be added to the prevention programs organized in schools.

This study also suggests that students use the SP to enhance their self-perceptions. If the SP is needed to protect self-integrity and increase self-esteem, positive self-perception development techniques can be included in the prevention programs carried out at schools. This component may be particularly important for adolescence, when there is intense self-construction and identity confusion.

Moreover, students should be encouraged to give importance to interpersonal relationships and moral values rather than material possessions. If students establish meaningful interpersonal relationships, they may not experience anxiety due to the absence of the SP. In such ways, both nomophobia might be prevented and the effectiveness of the treatment modalities might be enhanced.

Based on the assumptions that students accept the SP as an object of attachment and attachment style is determined by early relationships (Bowlby, 1969), it may be useful to provide psychoeducation to parents about secure attachment in prevention programs. As attachment objects are used to provide a sense of security (Keefer et al., 2012), supportive relationships established with peers and teachers at school can contribute to the prevention of nomophobia. Thus, a psychoeducation program for administrators and teachers can be organized to create a positive school environment.

Lastly, it is possible to make some suggestions for future research on nomophobia. Previous research has mostly used quantitative study design and standard measurement tools to examine nomophobia (Jahrami et al., 2023). To a better understanding of nomophobia, conducting studies using new and/or relatively rarely used research methods can be recommended. One of these methods is the experience sampling method (ESM). In ESM, people are asked to repeatedly report their current behaviors, symptoms, and feelings over a period of time within a real-life context (Myin-Germeys et al., 2009). Like other psychopathologies, nomophobia symptoms may fluctuate during the day. It may be possible to examine such fluctuations, and identify the internal and situational determinants of these fluctuations using ESM (Enez, 2023).

The community-based participatory research method (CBPR) can also be recommended. In CBPR, research projects are conducted in local settings in which community members collaborate with researchers. By doing so, community members define the issues that need to be considered, provide information about such issues, and serve as advisors throughout the entire project (Hacker 2013). The top-down suggestions from young adults on nomophobia, MPA, SP extension, and materialism may help develop more effective treatment and prevention programs.

The online photovoice technique (OPV) can also be used to understand the meaning of nomophobia, MPA, SP extension and materialism, and the relationship between them from the perspective of young adults. This technique is based on the analysis of photographs and the stories about them, which show the meaning of these psychological constructs for the person (Tanhan & Strack, 2020). Likewise, the interpretative phenomenological analysis (IPA) can be used to investigate the perspective of young adults on these psychological constructs. IPA aims to explore how people make sense of their world, and what their personal experiences mean to them (Smith & Osborn, 2008). As OPV and IPA may provide a more holistic understanding of nomophobia, MPA, SP extension and materialism, these methods can enhance the literature and practice.

Limitations

The limitations of the current research need attention. Data were collected from one university and more than half of the participants were women. These may affect the generalizability of the results. As the participants were university students, future studies should focus on various age groups. Due to the nature of the cross-sectional study design, the results are based on self-reports. Future studies may add biological measures to measure participants' nomophobia-induced anxiety and stress levels.

It is also important to note that due to the design of the current study, causal relationships between independent variables and nomophobia were not tested and participants were not interviewed about the causes of their nomophobia symptoms. The possible reasons stated here are only the researcher's inferences based on the relevant literature. Thus, these assumptions should be examined with longitudinal or experimental studies. Moreover, researchers should collect more detailed information through interviews.

Funding Disclosure: The author received no financial support for the research, authorship, and/or publication of this article.

Conflicts of Interest: The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability: The data are available upon request from the corresponding author.

Ethical Disclosure: Ethical approval was obtained from the Istanbul Medeniyet University Social and Human Sciences Ethics Committee.

References

Aharony, N., Pan, W., Ip, C., Khayal, I., & Pentland, A. (2011). Social fMRI: Investigating and shaping social mechanisms in the real world. *Pervasive and Mobile Computing*, *7*(6), 643-659. https://doi.org/10.1016/j.pmcj.2011.09.004

Ainsworth, M. (1985). Attachments across the life span. *Bulletin of the New York Academy of Medicine*, *61*(9), 792-812.

Bankmycell. (2024, March 13). How many phones in the world?. https://www.bankmycell.com/blog/how-many-phones-are-in-the-world

Belk, R. (1984). Three scales to measure constructs related to materialism: Reliability, validity, and relationships to measures of happiness. *Advances in Consumer Research*, *11*, 291-297.

Belk, R. (1988). Possessions and the extended self. *Journal of Consumer Research*, *15*, 139-168.

Blumler, J. (1979). The role of theory in uses and gratifications studies. *Communication Research*, *6*(1), 9-36. https://doi.org/10.1177/009365027900600102

Bowlby, J. (1969). *Attachment and Loss Volume I Attachment*. New York: Basic Books.

Browne, M., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. Bollen and J. Long (Eds.), *Testing structural equation models* (pp. 136–162). SAGE.

Chaplin, L., & John, D. (2007). Growing up in a material world: Age differences in materialism in children and adolescents. *Journal of Consumer Research*, *34*, 480–493. https://doi.org/10.1086/518546

Cheever, N., Rosen, L., Carrier, L., & Chavez, A. (2014). Out of sight is not out of mind: The impact of restricting wireless mobile device use on anxiety levels among low, moderate and high users. *Computers in Human Behavior*, *37*, 290-297. https://doi.org/10.1016/j.chb.2014.05.002

Clayton, R., Leshner, G., & Almond, A. (2015). The extended iself: The impact of iPhone separation on cognition, emotion, and physiology. *Journal of Computer-Mediated Communication*, *20*, 119-135. https://doi.org/10.1111/jcc4.12109

Cohen, J. (1988). *Statistical Power Analysis for The Behavioural Sciences.* Mahwah: Lawrence Earlbaum Associates.

Cunningham, J., & McCrum-Gardner, E. (2007). Power, effect and sample size using GPower: Practical issues for researchers and members of research ethics committees. *Evidence Based Midwifery*, *5*, 132-136.

Devi, U., & Dutta, R. (2022). A review paper on prevalence of nomophobia among students and its impact on their academic achievement. *Journal of Positive School Psychology*, *6*(3), 5397-5405.

Durak, H. (2019). Investigation of nomophobia and smartphone addiction predictors among adolescents in Turkey: Demographic variables and academic performance. *The Social Science Journal*, *56*(4), 492-517. https://doi.org/10.1016/j.soscij.2018.09.003

Elhai, J., & Contractor, A. (2018). Examining latent classes of smartphone users: Relations with psychopathology and problematic smartphone use. *Computers in Human Behavior*, *82*, 159-166. https://doi.org/10.1016/j.chb.2018.01.010

Elhai, J., Dvorak, R., Levine, J., & Hall, B. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of Affective Disorders*, *207*, 251-259. https://doi.org/10.1016/j.jad.2016.08.030

Elhai, J., Levine, J., & Hall, B. (2019). The relationship between anxiety symptom severity and problematic smartphone use: A review of the literature and conceptual frameworks. *Journal of Anxiety Disorders*, *62*, 45-52. https://doi.org/10.1016/j.janxdis.2018.11.005

Enez, Ö. (2021). *The Phobia of the Modern World: Nomophobia:"Conceptualization of Nomophobia and Investigation of Associated Psychological Constructs"*. eKitap Projesi.

Enez, Ö. (2023). Anksiyete ve Yalnızlığın Durumsal Nomofobi Üzerindeki Etkisinin Deneyim Örnekleme Yöntemi Kullanılarak Araştırılması [Investigation of the effect of anxiety and loneliness on state nomophobia using experience sampling method]. *Gümüşhane Üniversitesi Sosyal Bilimler Dergisi, 14*(3), 766-785. https://doi.org/10.36362/gumus.1168706

Enez, Ö., & Yalçınkaya-Alkar, Ö. (2021). Assessing mobile phone attachment: Validation of the Mobile Attachment Questionnaire in Turkish university students and examination of related variables. *Psychological Reports*, *125*(3). https://doi.org/10.1177/0033294121100511

Eren, S., Eroğlu, F., & Hacioglu, G. (2012). Compulsive buying tendencies through materialistic and hedonic values among college students in Turkey. *Procedia - Social and Behavioral Sciences*, *58*, 1370-1377.

https://doi.org/10.1016/j.sbspro.2012.09.1121
Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). SAGE.
Forgays, D., Hyman, I., & Schreiber, J. (2014). Texting everywhere for everything: Gender and age differences in cell phone etiquette and use. *Computers in Human Behavior, 31*, 314-321. https://doi.org/10.1016/j.chb.2013.10.053
Fowler, J., & Noyes, J. (2015). From dialing to tapping: University students report on mobile phone use. *Procedia Manufacturing, 3*, 4716-4723. https://doi.org/10.1016/j.promfg.2015.07.568
Gentina, E., Maille, V., & Li, Z. (2023). A cross-national study of nomophobia among Brazilian, Chinese, French, and U.S. young people: The role of materialism. *Journal of Cross-Cultural Psychology, 54*(5), 547-573. https://doi.org/10.1177/00220221231176060
Hacker, K. (2013). *Community-Based Participatory Research*. SAGE Publications. https://doi.org/10.4135/9781452244181
Han, S., Kim, K., & Kim, J. (2017). Understanding nomophobia: Structural equation modeling and semantic network analysis of smartphone separation anxiety. *Cyberpsychology, Behavior, and Social Networking, 20*(7), 419-427. https://doi.org/10.1089/cyber.2017.0113
Hasmawati, F., Samiha, Y., Razzaq, A., & Anshari, M. (2020). Understanding nomophobia among digital natives: Characteristics and challenges. *Journal of Critical Reviews, 17*, 122-131. http://dx.doi.org/10.31838/jcr.07.13.22
Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis a regression-based approach.* Guilford Press.
Jahrami, H., Fekih Romdhane, F., Pandi-Perumal, S., BaHammam, A., & Vitiello, M. (2023). Global research evidence on nomophobia during 2008-2022: A bibliometric analysis and review. *Psychology, Health & Medicine*. https://doi.org/10.1080/13548506.2023.2268888
Karabati, S., & Cemalcilar, Z. (2010). Values, materialism, and well-being: A study with Turkish university students. *Journal of Economic Psychology, 31*, 624-633. https://doi.org/10.1016/j.joep.2010.04.007
Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior*, 31, 351-354. https://doi.org/10.1016/j.chb.2013.10.059
Keefer, L., Landau, M., Rothschild, Z., & Sullivan, D. (2012). Attachment to objects as compensation for close others' perceived unreliability. *Journal of Experimental Social Psychology, 48*(4), 912-917. https://doi.org/10.1016/j.jesp.2012.02.007
King, A., Valenca, A., & Nardi, A. (2010). Nomophobia: The mobile phone in panic disorder with agoraphobia: Reducing phobias or worsening of dependence? *Cognitive and Behavioral Neurology, 23*(1), 52-54. https://doi.org/10.1097/WNN.0b013e3181b7eabc
Kline, R. (2011). *Principles and practice of structural equation modeling.* The Guilford Press.
Konok, V., Gigler, D., Bereczky, B., & Miksoli, A. (2016). Humans' attachment to their mobile phones and its relationship with interpersonal attachment style. *Computers in Human Behavior, 61*, 537-547. https://doi.org/10.1016/j.chb.2016.03.062
Konok, V., Pogany, A., & Miklosi, A. (2017). Mobile attachment: Separation from the mobile induces physiological and behavioural stress and attentional bias to separation-related stimuli. *Computers in Human Behavior, 71*, 228-239. https://doi.org/10.1016/j.chb.2017.02.002
Lehdonvirta, V. (2010). Online spaces have material culture: Goodbye to digital post-materialism and hello to virtual consumption. *Media, Culture, and Society, 32*(6), 883-889. https://doi.org/10.1177/0163443710378559
Long, J., Wang, P., Liu, S., & Lei, L. (2021). Materialism and adolescent problematic smartphone use: The mediating role of fear of missing out and the moderating role of narcissism. *Current Psychology*. https://doi.org/10.1007/s12144-019-00526-0
Lou, J., Han, N., Wang, D., & Pei, X. (2022). Effects of mobile identity on smartphone symbolic use: An attachment theory perspective. *International Journal of Environmental Research and Public Health, 19*(21), 14036. https://doi.org/10.3390/ijerph192114036
Mazahir, S., Masood, A., & Musarrat, R. (2016). Increased materialistic trends among youth. *Journal of Educational, Health and Community Psychology, 5*(3), 56-77.

Myin-Germeys, I., Oorschot, M., Collip, D., Latester, J., Delespaul, P., & van Os, J. (2009). Experience sampling research in psychopathology:Opening the black box of daily life. *Psychological Medicine, 39*, 1533-1547. https://doi.org/10.1017/S0033291708004947

Morrison, K., & Johnson, C. (2011). When what you have is who you are: Self-uncertainty leads individualists to see themselves in their possessions. *Personality and Social Psychology Bulletin*, *37*, 639–651. https://doi.org/10.1177/0146167211403158

Nie, J., Wang, P., & Lei, L. (2020). Why can't we be separated from our smartphones? The vital roles of smartphone activity in smartphone separation anxiety. *Computers in Human Behavior*, *109*, 106351. https://doi.org/10.1016/j.chb.2020.106351

Ogden, H. & Cheng, S. (2011). Cultural dimensions and materialism: Comparing Canada and China. *Asia Pacific Journal of Marketing and Logistics, 23*(4), 431-447. https://doi.org/10.1108/13555851111165011

Ouyang, M., Cai, X., Yin, Y., Zeng, P., Chen, Y., Wang, X., Xie, X., & Wang, P. (2020). Student-student relationship and adolescent problematic smartphone use: The mediating role of materialism and the moderating role of narcissism. *Children and Youth Services Review, 110*, 104766. https://doi.org/10.1016/j.childyouth.2020.104766

Richins, M. (1994). Special possessions and the expression of material values. *Journal of Consumer Research*, *21*, 522-533. https://doi.org/10.1086/209415

Richins, M. (2004). The material values scale: Measurement properties and development of a short form. *Journal of Consumer Research*, *31*, 209-219. https://doi.org/10.1086/383436

Roberts, J., & Pirog, S. (2013). A preliminary investigation of materialism and impulsiveness as predictors of technological addictions among young adults. *Journal of Behavioral Addictions*, *2*, 56–62. https://doi.org/10.1556/JBA.1.2012.011

Ruvio, A., Somer, E. & Rindfleisch, A. (2014). When bad gets worse: The amplifying effect of materialism on traumatic stress and maladaptive consumption. *Journal of the Academy of Marketing Science*, *42*, 90–101. https://doi.org/10.1007/s11747-013-0345-6

Schermelleh-Engel, K., & Moosbrugger, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, *8*, 23-74. https://doi.org/10.23668/psycharchives.12784

Shrum, L., Wong, N., Arif, F., Chugani, S., Gunz, A., Lowrey, T., Nairn, A., Pandelaere, M., Ross, S., Ruvio, A., Scott, K., & Sundie, J. (2013). Reconceptualizing materialism as identity goal pursuits: Functions, processes, and consequences. *Journal of Business Research*, *66*(8), 1179-1185. https://doi.org/10.1016/j.jbusres.2012.08.010

Sivadas, E., & Machleit, K. (1994). A scale to determine the extent of object incorporation in the extended self. In C. Park & D. Smith (Eds.), *Proceedings of the American Marketing Association Winter Conference:Vol. 5* (pp. 143-149). American Marketing Association

Sivadas, E., & Venkatesh, R. (1995). An examination of individual and object-specific influences on the extended self and its relation to attachment and satisfaction. *Advances in Consumer Research, 22*, 406-412.

Smith, J. & Osborn, M. (2008). Interpretative phenomenological analysis. In J. Smith (Ed.), *Qualitative psychology: A practical guide to research methods* (2nd ed., pp. 53-80). Sage.

Streiner D. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of personality assessment, 80*(1), 99–103. https://doi.org/10.1207/S15327752JPA8001_18

Tabachnick, B., & Fidell, L. (2007). *Using multivariate statistics* (5th ed.). Boston: Allyn & Bacon/Pearson Education.

Taber, K. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273–1296. https://doi.org/10.1007/s11165-016-9602-2

Tanhan, A., & Strack, R. W. (2020). Online photovoice to explore and advocate for Muslim biopsychosocial spiritual wellbeing and issues: Ecological systems theory and ally development. *Current Psychology, 39*(6), 2010-2025. https://doi.org/10.1007/s12144-020-00692-6

Tran, D. (2016). Classifying nomophobia as smart-phone addiction disorder. *UC Merced Undergraduate Research Journal*, *9*, 1-22. https://doi.org/10.5070/M491033274

Vincent, J., Haddon, L., & Hamill, L. (2005). The influence of mobile phone users on the design of 3G products and services. *Journal of the Communications Network*, *4*, 69-73.

Walsh, S., & White, K. (2007). Me, my mobile, and I: The role of self- and prototypical identity influences in the prediction of mobile phone behavior. *Journal of Applied Social Psychology*, *37*(10), 2405-2434. https://doi.org/10.1111/j.1559-1816.2007.00264.x

Walsh, S., White, K., & Young, R. (2009). The phone connection: A qualitative exploration of how belongingness and social identification relate to mobile phone use amongst Australian youth. *Journal of Community & Applied Social Psychology*, *19*(3), 225-240. https://doi.org/10.1002/casp.983

Walsh, S., White, K., & Young, R. (2010). Needing to connect: The effect of self and others on young people's involvement with their mobile phones. *Australian Journal of Psychology*, *62*(4), 194-203. https://doi.org/10.1080/00049530903567229

Wehmeyer, K. (2008). User-device attachment? Scale development and initial test. *International Journal of Mobile Communications* *6*(3). https://doi.org/10.1504/IJMC.2008.017511

Xu, D., Qian, L., Wang, Y., Wang, M., Shen, C., Zhang, T., & Zhang, J. (2015). Understanding the dynamic relationships among interpersonal personality characteristics, loneliness, and smart-phone use: Evidence from experience sampling. *International Conference on Computer Science and Mechanical Automation (CSMA)*, Hangzhou, China. https://doi.org/10.1109/CSMA.2015.11

van Deursen, A.., Bolle, C., Hegner, S., & Kommers, P. (2015). Modeling habitual and addictive smartphone behavior: The role of smartphone usage types, emotional intelligence, social stress, self-regulation, age, and gender. *Computers in Human Behavior*, *45*, 411-420. https://doi.org/10.1016/j.chb.2014.12.039

Yildirim, C. (2014). *Exploring the dimensions of nomophobia: Developing and validating a questionnaire using mixed methods research* [Master's thesis, Iowa State University]. Iowa State University Digital Repository. https://dr.lib.iastate.edu/handle/20.500.12876/28192

Yildirim, C., & Correia, A. (2015). Exploring the dimensions of nomophobia: Development and validation of a self-reported questionnaire. *Computers in Human Behavior*, *49*, 130-137. https://doi.org/10.1016/j.chb.2015.02.059

Yildirim, C., Sumuer, E., Adnan, M., & Yildirim, S. (2016). A growing fear: Prevalence of nomophobia among Turkish college students. *Information Development*, *32*, 1322-1331. https://doi.org/10.1177/02666669155990

Appendix

Appendix A

Extended Self Scale-Turkish Form

1: Kesinlikle katılmıyorum 2: Katılmıyorum 3: Kısmen katılmıyorum

4: Karasızım 5: Kısmen katılıyorum 6: Katılıyorum

7: Kesinlikle katılıyorum

1. Telefonum sahip olmak istediğim kimliğe ulaşmama yardımcı oluyor. (My phone helps achieve the identity I want to have.)

2. Telefonum, olduğum kişi ile olmaya çalıştığım kişi arasındaki farkı daraltmama yardımcı oluyor. (My phone helps me narrow the gap between what I am and what I try to be.)

3. Telefonum kimliğimin merkezi bir öğesidir. (My phone is central to my identity.)

4. Telefonum olduğum kişinin bir parçasıdır. (My phone is part of who I am.)

5. Telefonum benden alınırsa kimliğim elimden alınmış gibi hissederim. (My phone is stolen from me I will feel as if my identity has been snatched from me.)

6. Kimliğimin bir kısmını telefonum oluşturuyor. (I derive some of my identity from my phone.)