



## Attachment Styles, Sense of Identity and Interpersonal Problems as Predictors of Smartphone Addiction and Nomophobia\*

*Akıllı Telefon Bağımlılığı ve Nomofobinin Yordayıcıları Olarak Bağlanma Stilleri, Kimlik Duygusu ve Kişiler Arası Problemler*

### ABSTRACT

It is important to examine the underlying factors in the development of smartphone addiction and nomophobia (no-mobile-phone phobia), which can be considered as an extension of it which has become a mental health and social problem by spreading globally and, for every age group. From this point of view this study examines smartphone addiction and nomophobia in the context of attachment styles, sense of identity and interpersonal problems, which are thought to be related. The sample of this cross-sectional study consisted of 532 participants aged between 18-65 years. Smartphone Addiction Scale-Short Version, The Nomophobia Questionnaire, Relationships Scales Questionnaire, Sense of Identity Assessment Form and Inventory of Interpersonal Problems Circumplex Scales were used as measurement tools. The results of the analyses indicated that smartphone addiction and nomophobia scores showed significant differences according to demographic variables. In this study, the risk of smartphone addiction and nomophobia in the adult population sample was calculated as 53.4% and 61.1%, respectively, and it was thought that these findings would give an idea about the prevalence of these phenomena. According to the correlational analysis results, statistically significant correlations were found between smartphone addiction, nomophobia and predictor variables. In addition, it was concluded that smartphone addiction was significantly predicted by secure attachment, preoccupied attachment, sense of identity and interpersonal problems by 25%, and nomophobia was significantly predicted by sense of identity and interpersonal problems by 9%. The findings obtained from the research are discussed in the light of the relevant literature.

**Keywords:** Smartphone Addiction, Nomophobia, Attachment Styles, Sense of Identity, Interpersonal Problems

### ÖZET

Küresel çapta ve her yaş grubunda yaygınlaşarak bir ruh sağlığı ve toplum sorunu haline gelen akıllı telefon bağımlılığı ile onun bir uzantısı olarak kabul edilebilecek olan nomofobinin (telefonsuz kalma korkusu) gelişiminde, altta yatan faktörleri incelemek önem arz etmektedir. Buradan hareketle, bu çalışmada akıllı telefon bağımlılığı ile nomofobi, kendisiyle ilişkili olabileceği düşünülen bağlanma stilleri, kimlik duygusu ve kişiler arası problemler bağlamında incelenmiştir. Kesitsel bir araştırma olarak yürütülen bu çalışmanın örneklemini, yaşları 18-65 arasında değişen 532 katılımcıdan oluşmaktadır. Ölçüm araçları olarak Akıllı Telefon Bağımlılığı Ölçeği- Kısa Form, Nomofobi Ölçeği, İlişki Ölçekleri Anketi, Kimlik Duygusu Değerlendirme Aracı ve Kişiler Arası Problemler Ölçeği-Döngüsel kullanılmıştır. Analiz sonuçları, akıllı telefon bağımlılığı ve nomofobi puanlarının demografik değişkenlere göre anlamlı farklılıklar gösterdiğine işaret etmiştir. Bu çalışmada, yetişkin toplum örnekleminde akıllı telefon bağımlılığı ve nomofobi riski sırasıyla %53.4 ve %61.1 olarak hesaplanmış ve bu bulguların söz konusu olguların yaygınlığı hakkında fikir verebileceği düşünülmüştür. İlişkisel analiz sonuçlarına göre, akıllı telefon bağımlılığı ve nomofobi ile yordayıcı değişkenler arasında istatistiksel açıdan anlamlı korelasyonlar bulunmuştur. Yani sıra akıllı telefon bağımlılığının; güvenli bağlanma, saplantılı bağlanma, kimlik duygusu ve kişiler arası problemler tarafından %25 oranında, nomofobinin ise kimlik duygusu ve kişiler arası problemler tarafından yaklaşık %9 oranında anlamlı derecede yordandığı sonucuna ulaşılmıştır. Araştırmadan elde edilen bulgular ilgili literatür eşliğinde tartışılmıştır.

**Anahtar Kelimeler:** Akıllı Telefon Bağımlılığı, Nomofobi, Bağlanma Stilleri, Kimlik Duygusu, Kişiler Arası Problemler

### INTRODUCTION

Smartphones, which have become an indispensable product of technological developments; facilitate life by providing various application opportunities in many areas such as communication, entertainment, access to information and education (Haug et al., 2015) and enables to carry out many tasks quickly in a short time (Kayabaş, 2016). However, excessive or unconscious use of smartphones can cause many problems (Kim, 2013), and this problematic use of smartphones is becoming a highly controversial and important issue worldwide (Ching & Tak, 2017). Indeed, it is thought that smartphone addiction (Choliz, 2012) and nomophobia (Bragazzi & Del Puente, 2014) may be candidates for future psychiatric diagnosis classifications. It is a fact that the percentage of use of smartphones is increasing day by day with many national and international studies. For example, according to the results of the research conducted by the Turkish Statistical Institute (TÜİK, 2022), it was reported that while the rate of having a mobile phone / smartphone in the

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household was 53.7% in 2004, this rate increased to 99.3% in 2021. In addition, according to another recent study on the use of mobile phones, 68.6% of the world's population uses mobile phones and approximately four-fifths of mobile phones are smartphones (We Are Social, 2022).

With the increasing use of smartphones, concerns about the phenomenon of smartphone addiction are also increasing (Kwon et al., 2013). Therefore, the importance of studies investigating the prevalence of this phenomenon in the general population is increasing. Some studies conducted in different sample groups in our country have found that smartphone addiction is approximately 37% to 57% (Akin, 2018; Kızıltoprak, 2018; Yapça Kaypaklı, 2017). In a meta-analysis study conducted by Sohn et al. (2019) on the prevalence of problematic smartphone use, it was stated that smartphone addiction was seen between 10-30%. Smartphone addiction is seen as an important risk factor especially at the young age group (Kwon et al., 2013) and most studies on smartphone addiction have focused on adolescents and university students (Nahas et al., 2018). Although smartphone addiction is seen at a significant rate in the young age group (Davey & Davey, 2014), it is thought that it would be appropriate to examine the situation of individuals in other age groups of the community in the context of this problem. Indeed, in a meta-analysis study examining the prevalence of smartphone addiction in the general population, it was reported that smartphone addiction was higher in adults than in adolescents (Meng et al., 2022).

The habit and addiction created by smartphones in individuals (Hooper & Zhou, 2007) paved the way for the emergence of the phenomenon of nomophobia. Nomophobia, which is defined as the fear of being without a phone (Mail Online, 2008), is also expressed as a pathological fear of not being in contact with technology (Bragazzi & Del Puente, 2014; King et al., 2010). Studies on the prevalence of nomophobia have reported that nomophobia is seen between 23% and 73% in participants (Ayar et al., 2018; Jilisha et al., 2019; Sharma et al., 2015). It is stated that the young generation is at risk in terms of nomophobia, which can cause multidimensional problems in individuals' lives, including social, psychological and physical (SecurEnvoy, 2012). Based on all this information, it is very curious how smartphone addiction and nomophobia, which have the potential to be a serious problem that will affect the society, will create an impact and what the possible consequences will be (Anshari et al., 2019; Garcia-Montes et al., 2006).

There are many studies examining smartphone addiction and nomophobia in terms of some demographic variables in the literature. In terms of gender, most of the studies examining whether smartphone addiction and nomophobia vary by gender report that women have a significant difference in smartphone addiction compared to men (Dasgupta et al., 2017; Lee & Lee, 2017). On the other hand, there are also studies that found that women and men do not differ from each other in terms of smartphone addiction and nomophobia (Akin, 2018; Argumosa-Villar et al., 2017). Studies evaluating according to marital status have obtained different results, such as smartphone addiction and nomophobia are more common in single individuals (Nahas et al., 2018; Tor Kadioğlu & Koşar, 2019), more common in married individuals (Shahrestanaki et al., 2020) or do not differ according to marital status (Alavi et al., 2020; Ertan, 2019). Considering the level of education, it was observed that individuals with bachelor's degree showed significantly more smartphone addiction than individuals with lower or higher education levels (Ankara et al., 2020; Shahrestanaki et al., 2020). However, there are also studies indicating that smartphone addiction and nomophobia do not differ in terms of educational level (Alavi et al., 2020; Gezgin et al., 2017).

Smartphone addiction and nomophobia can seriously affect the psychological integrity and daily functioning of individuals (Bhattacharya et al., 2019; Choi et al., 2012). Therefore, it is important to examine the predictors of these two phenomena and to evaluate possible risk factors. When the literature studies were examined, no study was found that examined the relationship between smartphone addiction and nomophobia with attachment styles, sense of identity and interpersonal problems. Moreover, although smartphone addiction and nomophobia have been addressed within the framework of attachment styles in previous studies (Arpacı et al., 2017; Konok et al., 2016), the relationship with sense of identity and interpersonal problems, which are thought to be important factors in the development of these phenomena, has not been sufficiently studied. Therefore, this study aimed to examine the predictive power of attachment styles, sense of identity and interpersonal problems together with smartphone addiction and nomophobia.

### **Smartphone Addiction, Nomophobia and Attachment Styles**

Being in a close relationship with an attachment object from the early stages of life is important in terms of meeting individuals' needs for trust and love. On the other hand, when a healthy intimacy cannot be established and these needs cannot be met, individuals may experience feelings such as anxiety, sadness and anger (Hazan & Shaver, 1994/1998). When functions such as establishing intimacy and feeling security within the attachment systematic are not realised, individuals may persistently try to establish intimacy with a partner.

Apart from this, they may try to establish this attachment relationship with some objects and to alleviate depressive anxiety, just like in Winnicott's (1953) transitional object (Keefer et al. 2012). Similarly, when there is uncertainty about the accessibility and intimacy of people with whom a close relationship is expected, such as the primary attachment figure, there may be a tendency to provide the attachment relationship with these people through objects (Konok et al., 2016). Individuals can develop such alternative attachment strategies to compensate for attachment security against a primary attachment figure (Keefer et al., 2012).

Recent studies suggest that mobile phones/smartphones may be among the compensatory objects of the attachment pattern that is not satisfactorily formed in the early period (Keefer et al., 2012; Liu et al., 2019). Because individuals with anxious attachment have a higher sensitivity to rejection and abandonment, and therefore attachment to objects such as mobile phones can be functional in terms of tolerating these anxiety-inducing situations (Konok et al., 2016). In addition, it is stated that individuals may experience high levels of discomfort and fear when they are away from their mobile phones, just as it can be experienced when separated from the object of attachment in the interpersonal attachment relationship (Arpacı et al., 2017). Actually, this situation seems to overlap with the criteria of nomophobia, that is, the fear of being without a mobile phone (Bragazzi & Del Puento, 2014). Studies in the literature show that attachment anxiety is closely related to mobile phone addiction and nomophobia (Arpacı et al., 2017; Choi & Seo, 2019; Lopez et al., 2022; Parent, 2019), while secure attachment and positive relationship with parents may be protective in developing mobile phone/smartphone addiction (Seo, 2015; Ching & Tak, 2017).

### **Smartphone Addiction, Nomophobia and Sense of Identity**

Considering the information that smartphone use and addiction are more common especially in young age groups (Davey & Davey, 2014), the question of what effect they may have on the formation of a sense of identity comes to the fore (Davis, 2013; Cyr et al., 2015). Because it is known that the youth period, especially adolescence, is extremely important in terms of identity development (Erikson, 1982/2019). In the process of identity acquisition, the internet helps individuals to research different roles and receive feedback on identity through the virtual environments it provides (Ceyhan, 2010; Matsuba, 2006). Similarly, internet-connected smartphones can also be involved in the process of identity development and provide individuals with the opportunity to engage in more research and exploratory behaviours in their uncertainty about which value, which goal and which option to turn to (Akyürek et al., 2019). However, although smartphones offer individuals a wide range of opportunities in terms of identity discovery (Davis, 2013), it is also said that smartphones that are used intensively in this period can become a risk factor for identity development and smartphone addiction (Morrill, 2009).

In virtual environments provided by the internet, individuals can show their ideal identities rather than their personal identities (Ceyhan, 2010). With these ideal identities, which can be created to avoid disturbing situations such as low self-esteem and low self-confidence, individuals can try to provide the satisfaction they cannot achieve in real life in online environments (Sayar, 2016). Since it will be possible to exhibit virtual identity more with the increase in virtual environment activities, it is thought that individuals may be distant from themselves, their families and society in such a situation and may experience confusion between their real and virtual identities (Mercan, 2010). Considering that all these activities and processes are carried out with smartphones, the possibility that individuals may develop more addiction to these devices on the way to building a virtual identity comes to mind (Gezgin et al., 2019). Han et al. (2017) state that individuals can feel their smartphones as an extended element of their self/identity. Because individuals can keep a lot of information and clues about their own experiences, personality and identity on their smartphones, and they can access the information they want to remember at any time they want. For this reason, smartphones contain a number of elements related to the identity of the individual, such as who and what the individual is, what orientation he/she lives in. From this perspective, it is reported that individuals may have difficulty in staying separated from these devices, with which they can identify themselves, remember them and perhaps feel integrated with them, and may be more active in order to maintain closeness with these devices (Gertz et al., 2021; Han et al., 2017). As explained above, due to this possible connection between smartphone and sense of identity, it is thought that individuals' reactions to separation from their smartphones, such as anxiety and fear, may result in a predisposition to nomophobia (Saribay & Durgun, 2020).

### **Smartphone Addiction, Nomophobia and Interpersonal Problems**

In recent years, communication via smartphones, which are widely used especially among adolescents and young adults (Haug et al., 2015), has become preferred over face-to-face communication (Çalışır, 2017). Virtual communication can have a positive effect by facilitating the interpersonal interactions of individuals (Gardner & Davis, 2013/2014), but it can also have a negative effect on relationships by leading to a decrease

in face-to-face interpersonal interaction. It is thought that smartphones may have an important role in the dramatic decline in interpersonal interaction, especially since smartphones started to be widespread (Twenge, 2017/2018). As a matter of fact, there are many empirical studies showed that the deterioration in interpersonal relationships is significantly related to smartphone addiction (Hong, 2015; Lee & Kang, 2019; Seo et al., 2016). Therefore, social media and mobile technologies carry a danger of reducing the quality of face-to-face interaction of individuals and may lead to problems in interpersonal relationships (Cyr et al., 2015). Moreover, being anxious in establishing interpersonal relationships can also cause fear and distress in individuals. For this reason, individuals with anxiety may use their smartphones as an alternative communication device to avoid the anxiety caused by face-to-face communication and continue their interpersonal relationships in this way (Hong et al., 2012). According to another view, the use of technological devices such as smartphones reduces social communication, increases social isolation, and all these may lead to conflicts in the interpersonal interaction. Considering that social relationships may be neglected for people who are addicted to smartphones, it is possible to experience interpersonal problems in a similar way (Chen et al., 2016). As mentioned by Sullivan in his theory, behavioral problems encountered in daily life essentially derive their source from interpersonal relationship problems (Geçtan, 2017). From this point of view, it is thought that it may be important to examine smartphone addiction as a behavioral problem and nomophobia, which can be considered as an extension of it, in the context of interpersonal problems.

In summary, to our knowledge no study has examined attachment styles, sense of identity and interpersonal problems together as predictors of smartphone addiction and nomophobia. Especially the number of studies evaluating the sense of identity in terms of these concepts is limited. In addition, although smartphone addiction and nomophobia are problems that affect the general population, it is seen that studies on these phenomena are mostly carried out within the framework of high school and university students. Therefore, it is thought that evaluating these problems in an adult sample with a wide age range may contribute to the literature. From all these, this study aims to measure the risk of smartphone addiction and nomophobia in a community sample of adults aged 18-65 and to determine whether they differ in terms of some demographic variables. Within the context of the main hypotheses of the study; it is hypothesised that insecure attachment styles (anxious, rejecting and fearful), identity confusion and interpersonal relationship problems will show significant positive relationships with smartphone addiction and nomophobia and will predict these variables.

## METHODS

### Participants

In this study, which was carried out with quantitative research method and within the framework of predictive relational design, the relationships between the existing variables were examined and the level of prediction of the predictor variables to the predicted variables was investigated. The sample of the study was recruited through convenience sampling method. The participants consisted of 532 adult individuals aged between 18-65 from the general population. Of the 532 participants, 368 (69.2%) were female and 164 (30.8%) were male. The participants, whose ages ranged between 18-65, were grouped into certain age categories according to their ages. Accordingly, 40.8% of the participants were between the ages of 18-25 and the average age of the whole sample was calculated as 30.26 (SD = 11.10). In addition, 58.1% of the participants have a bachelor's degree and 59.8% of them are single (Table 1).

**Table 1:** Sociodemographic Characteristics of Participants (N = 532)

Variables	N	%
<b>Age Groups</b>		
18-25	217	40.8
26-40	218	41.0
41-65	97	18.2
<b>Gender</b>		
Female	368	69.2
Male	164	30.8
<b>Education Levels</b>		
High school and lower	38	7.1
Undergraduate	309	58.1
Postgraduate	185	34.8
<b>Marital Status</b>		
Married	214	40.2
Single	318	59.8



## Measures

**Demographics Information Form:** The questions in this form consist of questions related to some demographic information of the participants such as age, gender, marital status. It also includes questions that assess the participants' smartphone usage habits such as how many hours they use their smartphones during the day, how many times a day they check their smartphones, and whether they use their smartphones before going to sleep.

**Smartphone Addiction Scale-Short Version (SAS-SV):** It was developed by Kwon et al. (2013) to assess the level of smartphone addiction. The SAS-SV, which consists of a total of 10 items and a single factor, is a 6-point Likert-type scale and its scoring varies between 1=strongly disagree and 6=strongly agree. Higher scores indicate an increased risk of smartphone addiction. The cut-off score of the scale was reported as 31 for males and 33 for females in the Korean sample (Kwon et al., 2013). In a study conducted in a Turkish sample, the cut-off score of the scale was determined as 29.5 for both genders (Şata & Karip, 2017). The Turkish adaptation study of the SAS-SV was conducted by Noyan et al. (2015) on a sample of university students. In this adaptation study, Cronbach's alpha coefficient value was calculated as .87. Within these results, it was stated that the SAS-SV is a valid and reliable measurement tool for measuring the level of smartphone addiction (Noyan et al., 2015).

**The Nomophobia Questionnaire (NMP-Q):** It was developed by Yıldırım and Correia (2015) to assess the level of nomophobia. The scale consists of twenty items and is graded with 7-point Likert type. The items are rated 1=strongly disagree to 7=strongly agree (Yıldırım et al., 2016). The total score that can be obtained from the scale items varies between 20-140. High scores are associated with the severity of nomophobia. In addition, nomophobia levels were evaluated as 20 points = absence of nomophobia, 21-60 points = mild nomophobia, 61-100 points = moderate nomophobia, and 101-140 points = severe nomophobia (Yıldırım & Correia, 2015). In the Turkish adaptation of the NMP-Q, Cronbach's alpha coefficient was found .92 for the full scale (Yıldırım et al., 2016).

**Relationships Scales Questionnaire (RSQ):** It is a 30-item scale developed by Griffin and Bartholomew (1994) to assess adult attachment styles. The 17 items of the scale assess the four attachment prototypes of secure, preoccupied, dismissing and fearful attachment. The scale, which evaluates the participants' attitudes towards themselves and their close relationships on a 7-point Likert scale, is scored on a scale of 1=does not define me at all to 7=defines me completely. The attachment style with the highest average score among the four attachment styles is accepted as the basic attachment style of the individual. In the Turkish validity and reliability study conducted by Sümer and Güngör (1999), it was found that the internal consistency coefficients of the subscales of the scale ranged between .27 and .61 Cronbach's alpha.

**Sense of Identity Assessment Form (SIAF):** The scale was developed by Dereboy et al. (1994a, 1994b), which is based on the identity development in Erikson's (1968) theory and the identity crisis that can be seen in this period. The scale aims to measure the problem areas that individuals experience in the development of sense of identity. It consists of a total of 28 items and is rated on a 5-point Likert-type scale. Increasing scores indicate that individuals have more problems in terms of identity confusion. The Cronbach's alpha coefficient for the reliability of the SIAF was calculated as .89 (Dereboy et al., 1994b) and it was stated that it is a psychometrically valid and reliable scale in evaluating the development of the sense of identity (Dereboy & Çelen, 2012).

**Inventory of Interpersonal Problems Circumplex Scales (IIP-C):** The scale developed by Horowitz et al. (2003) consists of 32 items and is a 5-point Likert-type scale. Turkish adaptation study was conducted by Akyunus and Gençöz (2016). The scale consists of 8 sub-dimensions related to interpersonal relationships: Domineering, Intrusive, Overly Nurturant, Overly Accommodating- Exploitable, Nonassertive, Socially Avoidant, Cold and Vindictive. High total scores obtained from the IIP-C are associated with difficulty in interpersonal functioning, high levels of stress and interpersonal problems. In the Turkish adaptation study, it was reported that the internal consistency coefficient of the scale was .86 and the internal consistency coefficients of the subscales ranged from .66 to .84 Cronbach's alpha (Akyunus & Gençöz, 2016).

## Procedure

While 459 of the data were collected via Google Forms, 73 of the data were collected by hand with a paper and pencil application. At the beginning of the application form, there was a preliminary information about the research and a participant voluntary consent form. The data of the study were collected between December 2019 and February 2020. In the online data collection process, the participants were reached through social media platforms (Whatsapp, Instagram, Twitter) and the participants were directed to the online form link by

providing the necessary information. The participant group to whom the scale forms were delivered directly (by hand) consisted of a group of undergraduate students at İstanbul University who approved to participate in the study.

## Data Analysis

Before analysing the data, kurtosis and skewness values were examined to determine the normal distribution assumption of the data set. Based on the fact that the kurtosis and skewness values of all measurements were between  $\pm 2$  ranges and the number of cases was over 200, it was accepted that the assumption of normal distribution was met (Tabachnick & Fidell, 2013). Therefore, it was decided to use parametric statistical analysis methods. The sociodemographic characteristics of the participants and their scores from the measurement tools were calculated by descriptive statistical analyses (mean, standard deviation, etc.). Independent sample t-test and one-way ANOVA test were used to compare categorical variables. Tukey test was used to determine statistically significant differences in multiple group comparisons where variances were homogeneous. Pearson correlation analysis was used to test the relational hypotheses of the study, and Multiple Hierarchical Regression Analysis was used to determine to what extent nomophobia and smartphone addiction were predicted by predictor variables. All data obtained in this study were analyzed using SPSS 27.0 package program (IBM, Corp., NY) and statistical significance level was accepted as  $p < .05$ .

## RESULTS

The study included 532 participants who indicated that they use smartphones. As shown in Table 2, 45.5% of the participants stated that they use their smartphones 3-4 hours a day, 28.9% of them check their smartphones 10-20 times a day and 84.4% of them use their smartphones before going to sleep.

**Table 2:** Information on Smartphone Usage (N = 532)

Variables	N	%
<b>Daily Usage Duration</b>		
Less than 1 hour	26	4.9
1-2 hours	143	26.9
3-4 hours	242	45.5
5 hours and more	121	22.7
<b>Daily Smartphone Check</b>		
Less than 10	52	9.8
10-20 times	154	28.9
20-30 times	132	24.8
30-40 times	87	16.4
More than 40	107	20.1
<b>Smartphone Use Before Sleeping</b>		
Yes	449	84.4
No	83	15.6

The distribution of cases at risk for smartphone addiction and nomophobia was calculated within the framework of the study sample. Although some cut-off scores have been specified in previous studies in the literature regarding the SAS-SV, these have been presented within the limited groups such as students. In this study, in order to make an evaluation within the scope of the community sample, the median value of the participants' smartphone addiction scores on the SAS-SV was calculated as 27 and this value was accepted as the cut-off score. Accordingly, participants with a score of 27 points and above were considered as a risky group in terms of smartphone addiction. Therefore, the proportion of individuals at risk for smartphone addiction was found to be 53.4% in this study conducted with a community sample. When calculated separately by gender, it was found that the risk of smartphone addiction was 56.5% in female and 46.3% in male participants. In addition, according to the degree of severity of nomophobia in the Nomophobia Scale assessment, the moderate and extreme nomophobia group, which is considered to be at risk for nomophobia, constituted approximately 61% of the current sample (Table 3).

**Table 3:** Distribution of Smartphone Addiction and Nomophobia Risk (N = 532)

Variables	N	%
<b>Smartphone Addiction</b>		
27 points below	248	46.6
27 points and above	284	53.4
<b>Nomophobia</b>		
Mild level	207	38.9
Moderate and severe level	325	61.1

The results of the analyses conducted to compare smartphone addiction and nomophobia scores according to gender, age groups, marital status and educational status are given in Table 4. Accordingly, it is seen that the

level of smartphone addiction is significantly higher in women ( $p < .01$ ); in the 18-40 age range ( $p < .001$ ); in singles ( $p < .05$ ) and in individuals with a bachelor's degree ( $p < .05$ ). Similarly, nomophobia scores of the participants were found to be statistically significantly higher in women ( $p < .05$ ); 18-40 age range ( $p < .001$ ) and singles ( $p < .05$ ). It was determined that the education level did not show any significant difference in terms of nomophobia scores ( $p > .05$ ).

**Table 4:** T-Test and One-Way ANOVA Results for Comparison of Demographic Variables (N = 532)

Variables	Smartphone Addiction			Differences	Nomophobia		
	N	Mean ± SD	p		Mean ± SD	p	Differences
<b>Gender</b>							
(1) Female	368	28.40 ± 9.86	.009**	1>2	2.85 ± 2.24	.029*	1>2
(2) Male	164	25.99 ± 9.68			2.28 ± 1.95		
<b>Age Groups</b>	<b>N</b>	<b>Mean ± SD</b>			<b>Mean ± SD</b>		
(1) 18-25 ages	217	28.90 ± 9.82	.000***	1>3	4.40 ± 2.61	.000***	1>3
(2) 26-40 ages	218	28.29 ± 9.86		2>3	2.20 ± 1.92		2>3
(3) 41-65 ages	97	23.45 ± 8.89			2.59 ± 2.25		
<b>Education Level</b>	<b>N</b>	<b>Mean ± SD</b>			<b>Mean ± SD</b>		
(1) High school and lower	38	10.51 ± 5.86	.046*	2>3	2.28 ± 1.71	.358	-
(2) Undergraduate	309	13.88 ± 7.18			2.97 ± 2.42		
(3) Postgraduate	185	13.88 ± 7.18			2.97 ± 2.42		
<b>Marital Status</b>	<b>N</b>	<b>Mean ± SD</b>			<b>Mean ± SD</b>		
(1) Married	214	26.61 ± 10.14	.043*	2>1	2.66 ± 2.14	.035*	2>1
(2) Single	318	28.37 ± 9.62			2.71 ± 2.27		

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

The correlation coefficients between the research variables are presented in Table 5. According to the analysis results, smartphone addiction scores were positively correlated with nomophobia scores ( $r = .61, p < .01$ ), interpersonal problem level ( $r = .41, p < .01$ ) and inadequate sense of identity development ( $r = .46, p < .01$ ). In addition, smartphone addiction showed a significant negative relationship with secure attachment ( $r = -.21, p < .01$ ), a significant positive relationship with fearful attachment ( $r = .17, p < .01$ ) and preoccupied attachment ( $r = .26, p < .01$ ). There was no statistically significant relationship between smartphone addiction and dismissing attachment ( $r = .07, p > .05$ ). When the correlation of nomophobia scores with other variables of the study was evaluated, it was found that nomophobia level showed a significant positive relationship with interpersonal problem level ( $r = .26, p < .01$ ) and inadequate sense of identity development ( $r = .28, p < .01$ ). In addition, nomophobia showed significant negative correlations with secure attachment ( $r = -.19, p < .01$ ), and significant positive correlations with fearful attachment ( $r = .18, p < .01$ ), preoccupied attachment ( $r = .13, p < .01$ ), and dismissing attachment ( $r = .13, p < .01$ ) among attachment styles (Table 5).

**Table 5:** Correlation Coefficients Between Variables (N = 532)

Variables	SAS-SV	NMP-Q	Secure	Fearful	Preoccupied	Dismissing	SIAF	IIP-C
SAS-SV	1							
NMP-Q	.61***	1						
Secure	-.20***	-.19***	1					
Fearful	.17***	.17***	-.29***	1				
Preoccupied	.26***	.13**	-.04	.03	1			
Dismissing	.07	.13**	.02	.38***	.04	1		
SIAF	.46***	.29***	-.34***	.29***	.29***	.10*	1	
IIP-C	.41***	.26***	-.28***	.23***	.35***	.10*	.57***	1

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . SAS-SV = Smartphone Addiction Scale-Short Version; NMP-Q = The Nomophobia Questionnaire; SIAF = Sense of Identity Assessment Form; IIP-C = Inventory of Interpersonal Problems Circumplex Scales.

Regression analysis was performed to determine the level of prediction of smartphone addiction and nomophobia by attachment styles, sense of identity and interpersonal problems (Table 6). In this step, in order to strengthen the predictive power of the regression analysis, variables with a significant correlation strength of .20 and above with smartphone addiction scores were included in the analysis. Attachment styles (secure and preoccupied attachment) in the first stage, sense of identity in the second stage and scale scores of interpersonal problems in the third stage were added to the regression analysis. According to the results of the analysis, secure attachment negatively ( $\beta = -.195, p < .001$ ) and preoccupied attachment positively ( $\beta = .249, p < .001$ ) together explained approximately 10% of the variance of smartphone addiction ( $F_{(2,529)} = 30.737, p < .001$ ). In the second step of the regression analysis, the variable of SIAF expressing identity confusion was added to the model. The SIAF variable contributed approximately 13% variance to the model ( $\beta = .402, p < .001$ ) and the second model accounted for 23% of the variance explaining smartphone addiction ( $F_{(3,528)} = 53.979, p < .001$ ). Finally, in the third step, the IIP-C variable, which measures interpersonal problems, was included in the model. While the contribution of IIP-C to the model was approximately 2% ( $\beta = .182, p < .001$ ), this three-stage model explained 25% ( $F_{(4,527)} = 45.216, p < .001$ ) of smartphone addiction in total.

**Table 6:** Multiple Hierarchical Regression Analysis Results for the Prediction of Smartphone Addiction (N = 532)

Model	Predictors	B	Standard Error	$\beta$	t	R <sup>2</sup>	Adjusted R <sup>2</sup>
1	Constant	27.66	2.41		11.48		
	Secure Attachment	-2.09	.44	-.20	-4.73***	.104	.101
	Preoccupied Attachment	2.28	.38	.25	6.06***		
2	Constant	16.01	2.62		5.57		
	Secure Attachment	-.68	.44	-.06	-1.56	.235	.230
	Preoccupied Attachment	1.26	.36	.14	3.46***		
	SIAF	.18	.02	.40	9.49***		
3	Constant	9.90	2.86		3.46		
	Secure Attachment	-.46	.43	-.04	-1.06	.256	.250
	Preoccupied Attachment	.92	.37	.10	2.48*		
	SIAF	.14	.02	.32	6.66***		
	IIP-C	.10	.03	.18	3.84***		

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . SIAF = Sense of Identity Assessment Form; IIP-C = Inventory of Interpersonal Problems Circumplex Scales.

According to the multiple regression analysis conducted to determine the variables predicting nomophobia, identity confusion predicted nomophobia at a rate of 8% ( $\beta = .29$ ,  $p < .001$ ), while the addition of interpersonal problems predicted nomophobia at a rate of 9% ( $F_{(2,529)} = 27.558$ ,  $p < .001$ ) (Table 7).

**Table 7:** Multiple Hierarchical Regression Analysis Results for the Prediction of Nomophobia (N = 532)

Model	Predictors	B	Standard Error	$\beta$	t	R <sup>2</sup>	Adjusted R <sup>2</sup>
1	Constant	48.37	3.21		15.08		
	SIAF	.34	.05	.29	6.86***	.082	.080
2	Constant	39.29	4.62		8.50		
	SIAF	.25	.06	.21	4.12***	.094	.091
	IIP-C	.19	.07	.14	2.72**		

Note: \*\* $p < .01$ , \*\*\* $p < .001$ . SIAF = Sense of Identity Assessment Form; IIP-C = Inventory of Interpersonal Problems Circumplex Scales.

## DISCUSSION AND CONCLUSION

In this study, it was aimed to examine the relationship between smartphone addiction and nomophobia with attachment styles, sense of identity and interpersonal problems. The results showed that smartphone addiction and nomophobia have statistically significant correlations with attachment styles, sense of identity and interpersonal problems. Moreover, secure and preoccupied attachment, identity confusion, and interpersonal problems explained 25% of the variance of smartphone addiction, and identity confusion and interpersonal problems explained approximately 9% of the variance of nomophobia. All these results support the previous study findings in the literature. In terms of the predictive power of attachment styles, similar to the previous research findings, it was concluded that smartphone addiction and nomophobia were significantly less observed in individuals with secure attachment styles and more in individuals with insecure attachment styles (preoccupied, dismissing, fearful). As a matter of fact, there are many research results demonstrated that disruptions in the attachment relationship may be an important factor for the emergence of smartphone addiction (Keefer et al., 2012; Konok et al., 2016). Further, some studies indicate that when a secure attachment relationship cannot be achieved, the individual can compensate by replacing the attachment object (e.g., caregiver, mother, etc.) with objects such as mobile phones/smartphones (Ching & Tak, 2017; Liu et al., 2019).

The anxiety experienced by individuals who cannot meet their needs when they are away from the object of attachment can be likened to the situation of nomophobic individuals who experience anxiety and fear when they are away from their smartphones (Arpacı et al., 2017). In support of all the explanations mentioned above, the results obtained from this study can be interpreted as secure attachment style may be protective and insecure attachment styles may be risk factors in terms of smartphone addiction and nomophobia. As a matter of fact, the results of the regression analysis showed that secure attachment style was a negative predictor of smartphone addiction and preoccupied attachment style was a positive predictor of smartphone addiction. Although all three insecure attachment styles (preoccupied, dismissing, fearful) showed a significant relationship with smartphone addiction, only preoccupied attachment was found to be a predictor of smartphone addiction. This result can be explained by the similarity between the nature of preoccupied attachment style and the situation caused by smartphone addiction. In other words, while the perception of positive self is low in preoccupied individuals, the perception of positivity towards others is high. Preoccupied attached individuals need confirmation from others in order to feel good about themselves, and this may increase the likelihood of being dependent on others in some way. Considering that smartphones can substitute for attachment objects (Keefer et al., 2012), it is possible that preoccupied attached individuals show their positive attitudes and dependence on others through their smartphones. Therefore, it is thought that the



predictive value of preoccupied attachment obtained in this study can be explained in the context of such an attachment mechanism.

Individuals who cannot have a solid identity structure may make different attempts to determine or construct their identities. At this point, mobile phones/smartphones, which are indispensable products of the technological age, can also be included in identity discovery processes (Davis, 2013). According to the results of this study, smartphone addiction and nomophobia levels were found to be significantly higher in individuals whose sense of identity was not fully developed, who had not yet found themselves or who had not yet established their identity. In other words, it can be said that individuals who struggle to develop a sense of identity may be more likely to develop smartphone addiction and be nomophobic. Studies in the literature also indicated that similar results were obtained to this finding in our study (Alavi et al., 2018; Akyürek et al., 2019). As mentioned before, this positive relationship between identity confusion and smartphone addiction may have emerged because smartphones mediate the process of identity discovery. Thus, the individual experiencing identity confusion is in search of identity, and smartphones may help the individual in the search for identity-related roles and self-discovery (Davis, 2013). Considering that smartphones can lead to addiction (Wood & Neal, 2007), it is possible that the process of searching for identity through smartphones may result in smartphone addiction. Moreover, with the presence of constantly developing technology, it has become easier to reach different role models from all over the world (Arnett, 2015). Regarding the sense of identity, the fact that many role options from both national and foreign cultures are open for individuals may cause individuals with identity confusion to experience a more complex situation in choosing the appropriate identity for themselves (Dereboy, 1993). Therefore, it can be thought that individuals who are addicted to smartphones may have higher levels of identity confusion. There is a limited number of empirical studies on the relationship between smartphone addiction, nomophobia and sense of identity in the literature. For this reason, there is a need for more research that can be descriptive about the direction and nature of these relationships. It is thought that the results of this study may contribute to the prediction of these relationships.

For the inferential relationship between nomophobia and sense of identity, the subscales of the Nomophobia Scale were used. Because the dimension of "losing connectedness", which is one of the four subscales of this scale, actually refers to the feelings of losing one's identity in the online environment (Yıldırım, 2014; Yıldırım & Correia, 2015). In terms of the relationship between nomophobia and sense of identity, it can be said that losing smartphones or staying away from them for any reason can lead to various feelings of losing the "online identity" that can be considered as a part of identity. For instance, individuals experience the comfort of being the person they want to be with these online identities (Sarıbay & Durgun, 2020). It can be thought that breaking away from this virtual identity may lead to dissatisfaction and cause distress for individuals. Besides, smartphones can store a wide variety of information about our lives and memories. This information that belongs to us also contains elements related to our identity. Supporting this idea, Han et al. (2017) drew attention to the relationship between nomophobia and sense of identity and stated that smartphones can be seen as an extended part and extension of identity. Therefore, it is possible that individuals do not want to leave their smartphones, and when they do, they may experience fear and anxiety of losing a part of their identity.

One of the main reasons for seeking psychotherapeutic help is problems in interpersonal relationships (Horowitz, 1979). In the age of technology, it seems more possible to encounter these problems both in social life and in clinical practice. Because the widespread use of smartphones has led to a decrease in face-to-face communication and interaction and an increase in virtual communication (Twenge, 2017/2018). The decrease in face-to-face interpersonal relationships can also lead to interpersonal problems for various reasons (Gardner & Davis, 2013/ 2014). From this point of view, the current study examined the relationship between smartphone addiction and nomophobia and interpersonal problems. The results of the analyses conducted in this context indicate that individuals who experience more problems in their interpersonal relationships have higher levels of smartphone addiction and nomophobia and that interpersonal problems predict these phenomena. These results can be explained as individuals who experience interpersonal problems try to compensate for this need for communication and closeness by using their smartphones (Hong et al., 2012). On the other hand, this result can also be interpreted as a deterioration in individuals' social relationships as a result of becoming dependent on their smartphones (Cyr et al., 2015). It is thought that more studies are needed to better estimate the direction and strength of the relationship between these variables.

As one of the aims of the study, the distribution of individuals at risk of smartphone addiction and nomophobia was analysed. In the current sample, it was observed that the risk of smartphone addiction was approximately 53% and nomophobia was 61%. Studies on smartphone addiction in the literature show that this addiction is mostly seen in young age groups including secondary school, high school and university students,

and many studies have been conducted in these groups (Anshari et al., 2019; Ching & Tak, 2017; Kwon et al., 2013). However, considering the smartphone usage in the general population (Statista, 2022; TÜİK, 2022) and the significant prevalence of smartphone addiction (Nahas et al., 2018), the findings obtained from this study are considered to be important to evaluate the situation in a group with a wide age range. Indeed, the results of the study show that there is a significant risk for smartphone addiction and nomophobia in the adult population. Finally, it was examined whether smartphone addiction and nomophobia scores differed according to the demographic data of the participants. Although some studies evaluating smartphone addiction and nomophobia according to gender showed no difference or some studies in favour of men, most studies indicate a high level in favour of women (Dasgupta et al., 2017; Erdem et al., 2017; Lee & Lee, 2017). In this study, similar to previous studies, smartphone addiction and nomophobia levels were found to be significantly higher in women. Hong et al. (2012) stated that women may experience inadequacy in interpersonal relationships due to high anxiety and low self-esteem levels, and smartphones may be more preferred for these interactions. From this point of view, it is possible that smartphones, which provide a kind of "safe space" for socialising and establishing interpersonal relationships, are used more by women and therefore they are more likely to develop smartphone addiction.

Individuals in the younger age group are more interested and curious about smartphones and use these devices more as a means of education, socialising and entertainment. Therefore, it can be said that they may be more likely to be addicted to these devices. The results of this study, which support previous research findings (Jilisha et al., 2019; Nahas et al., 2018), show that there is a significant negative relationship between age and smartphone addiction and nomophobia levels. When smartphone addiction and nomophobia levels were examined in terms of marital status, it was observed that single individuals had higher scores than married individuals, but this data obtained has low statistical power. Considering that smartphone addiction and nomophobia are frequently seen in the young population consisting of students, it can be said that this result is an expected result in line with previous studies (Ankara et al., 2020; Tor Kadioğlu & Koşar, 2019). When it was examined whether smartphone addiction and nomophobia differed according to educational level, it was observed that there was no difference in terms of nomophobia, and the only difference in terms of smartphone addiction was between undergraduate and graduate levels. Similar to the literature, it was found that individuals at the undergraduate level had significantly higher smartphone addiction scores than individuals with postgraduate education (Shahrestanaki et al., 2020).

### **Limitations and Suggestions for Future Research**

This research has some limitations. Firstly, since the research data were obtained through self-report scales, the possibility that the participants may have given biased answers should be taken into consideration. Moreover, although the sample size is considered statistically sufficient, the fact that the participants are not in balancing numbers in terms of demographic variables (e.g. gender) constitutes a separate limitation regarding the representation of the population. In this correlational study, smartphone addiction and nomophobia were considered as theoretically predicted variables. However, it is necessary to also consider the possibility that the results obtained may also indicate that smartphone addiction and nomophobia may be risk factors that have a detrimental effect on attachment styles, sense of identity and interpersonal relationships. Since the majority of the studies in the literature have been conducted with high school and university students, this study may be helpful in predicting smartphone addiction and nomophobia in the adult population. In addition, very few studies have investigated the relationship between sense of identity and interpersonal problems with smartphone addiction and nomophobia. Based on the results of this study, it is thought that attachment and identity formation, which are the basic structures of the developmental process, may be determining factors in the emergence of smartphone addiction and nomophobia, and interpersonal relationship characteristics may develop as a continuation of this basis. However, it is thought that it is necessary to examine these relationships in more detail by testing different models including these variables in future studies. By this way, it will be possible to develop a perspective and take precautions against the factors that may be important in understanding the increasing prevalence of smartphone addiction and nomophobia in the society and reducing their negative effects.

**Informed Consent:** Informed consent was obtained from the patients who participated in the study.

**Author Contributions:** Concept, Design, Critical Review: First Author, Second Author; Data Collection and Processing, Analysis and Interpretation, Literature Review, Writing: First Author; Supervision: Second Author.

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