International Journal of Human–Computer Interaction

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/hihc20

# The Moderating Role of Gender in the Relationship between Nomophobia and Social Interaction Anxiety in University Students

Arzu Bulut & Halil Sengul

**To cite this article:** Arzu Bulut & Halil Sengul (2023): The Moderating Role of Gender in the Relationship between Nomophobia and Social Interaction Anxiety in University Students, International Journal of Human–Computer Interaction, DOI: 10.1080/10447318.2023.2191079

**To link to this article:** https://doi.org/10.1080/10447318.2023.2191079

Published online: 21 Mar 2023.

INTERNATIONAL JOURNAL OF HUMAN–COMPUTER INTERACTION
https://doi.org/10.1080/10447318.2023.2191079



# The Moderating Role of Gender in the Relationship between Nomophobia and Social Interaction Anxiety in University Students

Arzu Bulut[a] and Halil Sengul[b]

[a]Department of Health Management, Faculty of Health Sciences, Bandirma Onyedi Eylul University, Balikesir, Turkey; [b]Department of Health Management, Faculty of Health Sciences, Sabahattin Zaim University, Istanbul, Turkey

**ABSTRACT**

Nomophobia is defined as the fear that an individual experiences related to lack of access or use of their smartphone. Studies have reported significant differences on the effects of nomophobia between genders. Moreover, social interaction anxiety is a condition identified as a risk factor for future health problems among university students. The aim of this study is to examine the moderating effect of gender in the relationship between nomophobia and social interaction anxiety. The study's data were collected from 331 university students aged 19 to 42. The study tested the moderating effect of gender in the predictor effect of social interaction anxiety on various nomophobia sub-dimensions. Social interaction anxiety had a significant predictor effect of college students' "inability to access information" and "inability to communicate," but this effect did not vary by gender. On the other hand, the predictor effect of social interaction anxiety on "giving up convenience" and "losing connectedness" did vary by gender.

**KEYWORDS**

Nomophobia; social interaction anxiety; gender; moderating effect; university students

## 1. Introduction

The psychological impact of new technologies on individuals, groups, and society is related to changes in behavior and habits. New technologies affect learning, social cognition, personality, and relationships (Nicolaci-da-Costa, 2002). These technologies include personal computers (PCs), tablets, and mobile phones. Mobile phones have evolved into smartphones, which are devices with advanced computing functions. Thus, smartphones can be described as "mini-computers," due to their unique size and various parts that mirror those of a PC or laptop. Smartphones allow users to browse the web, read emails, use games, and access many more applications (Carroll & Heiser, 2010; Razzaq et al., 2018). Smartphones have created significant changes in people's daily routines and ways of working (Urueña et al., 2018), leading a "mobile revolution" thanks to increasing adoption rates. Smartphone use is projected to increase by 20% globally between 2017 and 2025, meaning that three out of every four mobile phones will be smartphones. In many countries, smartphones account for more than 75% of total mobile phones (GSM Association, 2022).

While the multi-directional communication that smartphones enable has led people to rapidly adopt the technology, various studies have demonstrated that smartphones can create negative ramifications for users. First, research has drawn attention to the repercussions that smartphones can have on users' social life and psychosocial adaptation. Although problematic use poses a risk to individuals, it does not necessarily lead to addictive behavior (Elhai et al., 2018; Panova & Carbonell, 2018).

While members of all age cohorts use smartphones, usage is highest among teenagers and young adults (Ahad et al., 2017). Since smartphones have become increasingly complex and advanced, young people use these technologies more comfortably than other age groups. Consequently, researchers, educators, and employers have sought to address the increasing use of smartphones among young people but have encountered roadblocks due to widespread perceptions of the homogeneity of the youngest generation's digital skills. The notion of the "digital native" has created persistent problems for educating students, in particular. The term "digital native" was introduced in 2001 by Marc Prensky, a popular American author and speaker on education, to refer to young students who have grown up with technology (Evans & Robertson, 2020). At the turn of the millennium, digital natives were viewed as open to new ideas, competent multitaskers, and experiential learners (Prensky, 2001; Tapscott, 2008). Later, Prensky (2010) referred to this group as "learners" due to the dominance of digital devices, such as tablet computers and smartphones, in their daily lives. Digital natives could be defined as a generation that has a closer relationship with and different perspectives on technology than previous generations, since their lives have always been closely intertwined with technology and they generally believe that they should stay up-to-date with the latest technology. These digital natives, which include today's university students, have grown up with mobile

CONTACT Arzu Bulut abulut@bandirma.edu.tr Department of Health Management, Faculty of Health Sciences, Bandirma Onyedi Eylul University, Kurtulus Street, No:98, Bandirma, Balikesir 10200, Turkey

digital devices replacing both desktop computers and landline telephones.

However, studies of people who use smartphones have shown that these devices can create a range of positive and negative feelings and symptoms in users, some of which necessitate further research. "Positive" aspects of these effects for users include comfort and usability. On the other hand, "negative" aspects include pathological addiction, fear, and anxiety due to the inability to use or access devices (King et al., 2010). In addition, because young people access their smartphones throughout the day, these devices may affect their habits or behavior (Dennison et al., 2013). Excessive use of smartphones can affect users' health through creating eye problems, joint and muscle pain, behavioral problems, and even mental health disorders.

Smartphones are devices that allow people to communicate with each other using voice calls, short messaging services (SMS), emails, and social networking sites. People can also use smartphones for entertainment and socializing with others (Wang et al., 2014). Smartphones connect people directly through voice calls or applications, such as Facebook, or indirectly for entertainment purposes; through social applications, they help users build and maintain social capital by providing membership to specific communities.

Smartphone apps are important tools that meet users' needs and interests. However, these apps can facilitate so much engagement and inclusion that users become addicted to them. Smartphones are more than a standard cell phone, since they are both part of a person's social reputation and a cultural tool. Since smartphones are portable and easily taken everywhere, their prevalence is rapidly increasing (Ramirez-Correa et al., 2022). One study showed that 95% of teens own a smartphone and 45% stay online throughout the day on their device (Anderson & Jiang, 2018).

Smartphones are products that can be enjoyed for their attractive features and advanced technological applications. Despite the many advantages of smartphones, numerous studies have clearly demonstrated that overuse can potentially lead to psychological problems (Ang et al., 2018; Yang et al., 2019). As a result of the increasing use of smartphones for various purposes in daily life, inability to access them can create behavioral problems for even casual, ordinary users. For example, studies have suggested that smartphone withdrawal can be a source of stress (Tams et al., 2018) and anxiety (Cheever et al., 2014). The widespread use of smartphones and their impact on human psychology has led to a new, modern-day phobia: nomophobia. Nomophobia (NMP) is the fear of not being able to reach a smartphone (Argumosa-Villar et al., 2017; Yildirim & Correia, 2015). NMP has been shown to be associated with types of addiction, such as smartphone (Yıldız Durak, 2018) and internet addiction (Gezgin et al., 2018). University students are one of the groups most highly affected by NMP, thus making this population an important focus for research on NMP levels and predictive factors.

Moreover, previous studies have indicated the theoretical effects that gender has on nomophobia (Sui et al., 2022; Talan & Kalinkara, 2022), along with the relationship between social interaction anxiety and nomophobia (Kaur et al., 2021; Khan et al., 2021; Santl et al., 2022). In the present study, we aimed to test a relationship that has not been adequately examined in the literature: the moderating role of gender in the effect of social interaction anxiety on the formation of nomophobia.

## 2. Nomophobia

Excessive or problematic technology use has been partially explained by attachment theory, which suggests that people may connect with technological devices and feel uncomfortable after separation (Seol, 2016). There are various types of problematic technology use: nomophobia is one such disorder or problem (Dixit et al., 2010; King et al., 2014). In recent years, smartphones have become a fixture of daily life. Thanks to the variety of applications and benefits they provide, these devices have become indispensable assistants for work, learning, entertainment, and relationships. In addition, smartphones also serve as a way of coping with stressful situations by providing various forms of content (Lee et al., 2014). Although smartphones facilitate connection in people's daily lives, they also create negative consequences when they are overused, as evidenced by many studies. Overuse or problematic use of these devices can negatively affect the human brain and psychological processes (Pera, 2020). In addition, the problematic use of mobile phones has been negatively linked to the psychosocial well-being and mental health of young people. Some studies have shown that excessive smartphone use is associated with depressive symptoms, increased anxiety symptoms, low self-esteem, and emotional dysregulation.

Due to the increasing presence of smartphones in people's lives and their impact on various psychological processes, new phenomena associated with these devices have been defined and studied, including nomophobia. Nomophobia is the fear of not being able to communicate via mobile phone (MP) or the Internet. Nomophobia is a term that refers to a set of behaviors or symptoms related to MP use (King et al., 2014). This phobia is structured into four main dimensions or causes: fear of not being able to communicate with others, fear of not being able to connect to the internet, fear of not having access to information, and fear of giving up comfort (Rodríguez-García et al., 2020).

Nomophobia is considered a disorder of the modern world and has only recently been used to describe the discomfort or anxiety caused by the absence of an MP, PC, or other virtual communication device in individuals who habitually use them (King et al., 2013). The term nomophobia is an abbreviation of the English phrase "no mobile phobia." People with nomophobia may exhibit characteristics such as never turning off their phone, frequently checking for missed messages and calls, taking their phone everywhere, and wanting to answer the phone at inopportune times (Bragazzi & Del Puente, 2014). Nomophobia is a disorder characterized by behaviors with different clinical features, including several psychological symptoms, and indicates a pathological fear that a person will not be able to

connect with new technologies (Kateb, 2017). The fear/anxiety of being separated from cell phone contact is considered a disorder of today's digital and virtual society. In severe cases, nomophobes may deliberately avoid face-to-face interaction. Nomophobes may also experience physical side effects such as panic attacks, shortness of breath, trembling, sweating, increased heart rate, and pain in the joints of the hands, neck, and back (Kanmani et al., 2017).

Adolescence has become the most critical age period for studying and addressing the psychological and emotional consequences of technological problems such as video game and Internet addiction, as well as nomophobia (Rodríguez-García et al., 2020). A study found that participants aged 17 to 29 showed moderate nomophobia, and some exhibited severe nomophobia behavioral symptoms (Yildiz et al., 2020). One study on this subject in Croatia found moderate nomophobia levels among students (Bodrožić Selak & Neki, 2020), while another indicated a slight increase in the severity of nomophobia symptoms (Gržan, 2021). A systematic review of the prevalence of nomophobia by León-Mejía et al. (2021) concluded that there are gender and age differences in nomophobia, indicating that women and young people are the groups most vulnerable to this condition (León-Mejía et al., 2021). According to a meta-analysis by Humood et al. (2021), the prevalence of severe nomophobia in the general adult population is approximately 21%, with university students being the group most affected by the fear of smartphone disconnection (Humood et al., 2021). Young adults appear more prone to nomophobia than other age groups; thus, this is a significant problem among young smartphone users that represents a behavioral issue that requires multifaceted interventions (Notara et al., 2021). Moreover, Gonçalves et al. (2021) drew attention to gender differences in nomophobia. Their study found that women feel less angry and consequently less disturbed than men when they do not have digital access; that women use social networks, text messaging, and cell phones more frequently than men; that nomophobia has a greater impact on women; and that women are thus more prone to nomophobia than men. They concluded with a suggestion that the differences between men and women should be analyzed using new sample profiles (Gonçalves et al., 2021).

The aforementioned studies show that nomophobia is a problem that is becoming increasingly common, especially among young people, and can cause serious problems. Nomophobia can precipitate anxiety, depression, stress, stunted emotional skills, and loneliness. Sharma et al. (2019) found a significant positive relationship between nomophobia and depression, explaining that adolescents with depressive symptoms are more likely to use social networks to reduce their loneliness levels and improve self-esteem (Sharma et al., 2019). Bekaroglu and Yilmaz (2020) illustrated a relationship between nomophobia and symptoms of harmful psychological conditions, such as anxiety and depression. More specifically, the fear of not being able to use a smartphone may cause stress, anxiety, and depression; and conversely, individuals with stress, anxiety, and depression may be more likely to develop nomophobia (Bekaroglu & Yilmaz, 2020). Research has indicated that individuals with smartphone use problems experience more serious psychological issues due to weak and incompatible emotional regulation strategies (Gržan, 2021). Individuals who have difficulty coping with the emotional states associated with adverse events often turn to the internet and social media, which can lead to potentially addictive behavior resulting in significant levels of nomophobia (Lovibond & Lovibond, 1995). A study conducted on a sample of adolescents found that nomophobia was a significant predictor of loneliness. In addition, the same authors explained that individuals who do not have access to their smartphones experience a sense of loneliness based on their inability to communicate with others and a fear of not being able to socialize (Gezgin et al., 2018). Researchers have elaborated upon this correlation between nomophobia and loneliness in several studies. People who have difficulty communicating one-to-one use online communication more, and this situation alienates them from the real world (Yılmaz, 2018). Loneliness can manifest as alienation from the social environment and the emergence of negative emotions that may lead to decreased motivation. As a result, excessive use of smartphones negatively affects individuals' psychological state and social life (Choi & Lee, 2015). This situation can cause social anxieties to emerge.

## 3. Social interaction anxiety

Social anxiety has been identified as a risk factor for future health problems among college students. Social anxiety is characterized by intense fear, withdrawal, and avoidance of social interaction (Kaur et al., 2021). The Diagnostic and Statistical Manual for Mental Disorders (DSM-5) published by the American Psychiatric Association (APA) defines social anxiety disorder as a fear of negative evaluation related to social situations, coupled with intense anxiety or avoidance (APA, 2013). Social anxiety disorder is one of the most prominent and chronic psychological conditions (Kessler et al., 2005), causing significant difficulties in employment, education, and bilateral relations (Wittchen et al., 2000). Individuals with social anxiety generally have a lower quality of life than their non-socially-anxious counterparts (Barrera & Norton, 2009). Social anxiety can be experienced in various social situations, such as interacting with others, eating, or speaking in public. Anxiety-related fears are often driven by negative self-perceptions and fear of being ridiculed by others, leading to increased social withdrawal and avoidance (Beidel et al., 2007). Individuals with social anxiety tend to exhibit behaviors consistent with their specific situations, such as trembling, sweating, and/or fidgeting during social interactions that are perceived as threatening (Stein & Stein, 2008). More importantly, these behaviors are part of a feedback loop in which socially anxious individuals experience or imagine rejection from others because of their impaired social functioning. This reinforces their fears and negative beliefs about the threatening nature of social interactions (Chambless et al., 2002). People with high social anxiety may transfer most of their social

activities, including developing solid friendships, from the real world to the virtual world, where they feel safer and more comfortable (Shalom et al., 2015).

## 4. Nomophobia, social interaction anxiety, and gender

Studies have reported significant differences between genders regarding the effects of nomophobia (Arpaci et al., 2019; Gonçalves et al., 2021; Yildirim et al., 2016). Albursan et al. (2019) found that the risk of problematic smartphone use is higher in women than in men. Another study showed that women spend more time with smartphones and experience higher anxiety than their male counterparts when they cannot reach their smartphones (Van Deursen et al., 2015). Compared to men, women are more socially oriented (Lee et al., 2014), making social media more attractive to them (Duggan & Brenner, 2013). Gender differences can also arise in the domains of emotional intelligence and social stress. Women are more likely than men to show greater emotional awareness, use more emotive language, and use more comprehensive emotional regulation strategies (Barrett et al., 2000; Nolen-Hoeksema, 2012). Additionally, women are more likely to feel the stressful effects of adverse interpersonal events and therefore experience higher levels of social stress (Troisi, 2001). However, most of the studies on internet addiction and habitual/addictive smartphone have found males to be more susceptible to these problems than females (Choi et al., 2009).

Many researchers have investigated the relationship between mobile phone use and mental health (Elhai et al., 2017; Gao et al., 2016; Lundy & Drouin, 2016), including the potential linkages between social anxiety patterns and mobile communication (Enez Darcin et al., 2016; Gao et al., 2016; Reid & Reid, 2007). Our study aims to reveal the effect of social interaction anxiety on nomophobia, in addition to illuminating the moderating role of gender in this interplay. To do so, we examine the moderating role of gender on the sub-factors of nomophobia in the relationship between social interaction anxiety and nomophobia. In other words, we based our analysis on the assumption that gender could explain the effect of social interaction anxiety on nomophobia. While many previous studies have examined the different levels of nomophobia and social anxiety nomophobia according to gender, little attention has been devoted to the moderating effect of gender in this interplay. Since such an effect has not been studied before, we believe that our study can improve the understanding of the phenomenon and contribute to the existing and developing literature. Moreover, by demonstrating this effect, our research could guide the design of future studies aiming to curtail the development of nomophobia in university students.

## 5. Research model and hypothesis

This study seeks to examine the relationship between social interaction anxiety and nomophobia and to test the moderating role of gender in this relationship. The expected model of the moderating effect hypothesis guiding this study is shown in Figure 1, and the various hypotheses are provided below.

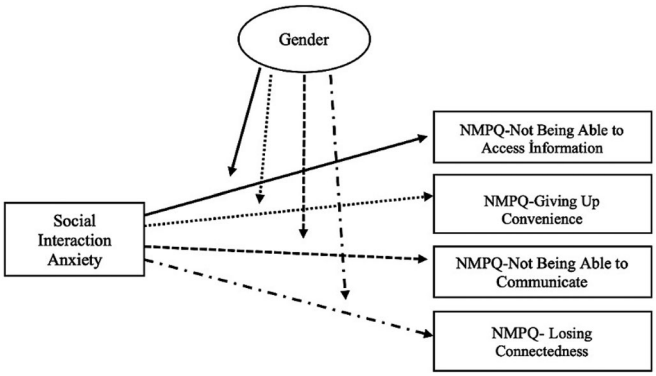


Figure 1. Research model.

**$H_1$:** Social interaction anxiety affects the sub-dimensions of nomophobia positively and significantly.

**$H_{1.1}$:** Social interaction anxiety positively and significantly affects not being able to access information.

**$H_{1.2}$:** Social interaction anxiety positively and significantly affects giving up convenience.

**$H_{1.3}$:** Social interaction anxiety positively and significantly affects not being able to communicate.

**$H_{1.4}$:** Social interaction anxiety positively and significantly affects losing connectedness.

**$H_2$:** Gender is a moderator in the relationship between social interaction anxiety and the sub-dimensions of nomophobia.

**$H_{2.1}$:** Gender is a moderator in the relationship between social interaction anxiety and not being able to access information.

**$H_{2.2}$:** Gender is a moderator in the relationship between social interaction anxiety and giving up convenience.

**$H_{2.3}$:** Gender is a moderator in the relationship between social interaction anxiety and not being able to communicate.

**$H_{2.4}$:** Gender is a moderator in the relationship between social interaction anxiety and losing connectedness.

## 6. Methods

The present study utilized a cross-sectional survey design following quantitative methods. Cross-sectional surveys gather data at a single point in time to make inferences about a population of interest (Cohen et al., 2013). This section describes the study sample and data collection procedures, variables, measures, and analysis strategy.

### 6.1. Study sample and procedure

This study was conducted at the University of Sabahattin Zaim in located in the Istanbul province of Turkey. The study sample included students enrolled in the university's departments of Health Sciences, Business and Management, Law, Humanities and Social Sciences, Engineering, and Education Sciences during the 2021–22 academic year.

The research was conducted between March 1, 2022, to April 30, 2022.

The study used a convenience sampling strategy to provide easier access to participants when selecting participants from different departments of the university (Cohen et al., 2013). The study data were obtained through face-to-face interviews and questionnaires. The researchers contacted the students and asked them to answer the questionnaires if they wanted to participate in the study voluntarily. Before responding to any questions, participants were introduced to the study and assured that their responses would remain anonymous. A total of 370 students completed the face-to-face questionnaires; after removing questionnaires that were incorrect or incomplete, a total of 331 respondents were included in the study sample. The extant research demonstrates many opinions about sample sizes for survey research (Akgül & C¸evık, 2005), with some researchers arguing that sample size should be at least 50 and larger than 100 if possible, while others believe that sample size should be at least five times the number of variables being analyzed. Other researchers contend that sample size should change depending on the analysis method that is used in the research (Albayrak, 2006). Accordingly, the adequacy of the sample in the present study was evaluated in the context of the regression analysis method used; thus, the sample size was considered adequate.

The mean age of participants was 21.3 years (SD = 2.94), with ages ranging from 19 to 42; of the 331 participants, 84 (25.4%) were males and 247 (74.6%) were females. In terms of educational attainment, 55% of the participants' mothers and 38.5% of the participants' fathers had only completed primary school. While 77.9% of the participants' mothers did not work outside of the home, 98.2% of their fathers were employed. About half of the participants (49.5%, $n = 164$) were enrolled in programs in the Health Sciences Department, while the other half (50.5%, $n = 167$) were studying in other fields.

All participants (100%, $n = 331$) reported owning and using a smartphone. The university students had owned mobile phones for an average of 8.44 years (SD = 2.82) and reported using smartphones for an average of 7.38 years (SD = 2.19). In terms of daily usage time, participants spent an average of 5.06 hours (SD = 2.89) on their mobile phones and 3.14 hours (SD = 1.78) on social media.

Participants reported their purposes for smartphones use at the beginning of the questionnaire. Nearly all participants (92.1%, $n = 305$) reported that they used their smartphones to talk with others. The majority of the university students (91.2%, $n = 302$) reported that they used their smartphones to send text messages. Additionally, most of the university students (94.6%, $n = 313$) reported using their smartphones to surf social media. Finally, 90% of the university students ($n = 298$) reported using smartphones to surf the Internet. Additionally, participants reported their use of the following social media apps on their smartphones (in descending order of popularity across the study sample): Instagram (93.4%), Twitter (55.0%), other apps (27.2%), Facebook (19.3%), LinkedIn (14.8%), and TikTok (7.3%).

### 6.2. Data tools

The data collection form used in this study consisted of three parts. The first part, the "Personal Information Form," collected descriptive information from the participants. The second part, the "Nomophobia Scale" developed by Yildirim and Correia (2015) and adapted into Turkish by Yildirim and Correia (2015), measured participants nomophobia symptoms according to four sub-dimensions. The third part, the "Interaction Anxiety Scale" developed by Leary and Kowalski (1993) and adapted into Turkish by Coskun (2009), measured participants' social anxiety levels.

#### 6.2.1. Personal information form

This form collected information on participants' age, gender, university department, parental occupations, parental education, years of cell phone use, years of smartphone use, hours of daily cell phone use, hours of daily social media use, purpose of smartphone use, and social media preferences.

#### 6.2.2. Nomophobia Questionnaire (NMPQ)

This scale, developed by Yildirim and Correia (2015) and adapted into Turkish by Yildirim and Correia (2015), measures the nomophobia behaviors of university students. The NMPQ includes 20 items on a seven-point Likert type scale, with response options ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Therefore, the total score ranges from 20 to 140, with greater scores indicating severe nomophobic symptoms. More specifically, scores $\leq$20 indicate "absence of nomophobia," 20–59 "mild levels of nomophobia," 60–99 "moderate levels of nomophobia," and $\geq$100 "severe levels of nomophobia." The NMPQ consists of 4 sub-dimensions: "not being able to access information" (items 1–4) (i.e., "I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so"), "giving up convenience" (items 5–9) (i.e., "If I were to run out of credits or hit my monthly data limit, I would panic"), "not being able to communicate" (items 10–15) (i.e., "I would feel anxious because my constant connection to my family and friends would be broken") and "losing connectedness" (items 16–20) (i.e., "I would be uncomfortable because I could not stay up-to-date with social media and online networks"). The reliability of the NMPQ is high (Cronbach's alpha = .92). In addition, the Cronbach's alpha values for the four dimensions of the NMP-Q are .90, .74, .94, and .91, respectively, indicating satisfactory high reliability (Yildirim & Correia, 2015).

#### 6.2.3. Social Interaction Anxiety Scale (SIAS)

This instrument, developed by Leary and Kowalski (1993) and adapted to Turkish by Coskun (2009), is a single factor scale comprising 15 items. The SIAS measures social interaction anxiety on a five-point Likert type scale, with response options ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Five of the scale's items are evaluated as

negative and therefore reverse scored. High scores on the SIAS indicate increased social interaction anxiety. The factor loads of all items in the scale are above .45. The total Cronbach's alpha value of the scale is .91, indicating satisfactory reliability (Coskun, 2009).

### 6.3. Data analysis

This study used IBM's SPSS 24.0 (SPSS Inc., Chicago, IL, USA) package program for data analysis. Average distribution assumptions were considered in the study's application of hypothesis tests. First, the mean, frequency, standard deviation, and kurtosis-skewness values of the research variables were examined. Kurtosis and skewness values were checked to confirm that the variables met the normality assumption. Since the normality assumption was met, parametric test statistics were used to analyze the data. An independent sample *t*-test was used to determine the difference between the two groups. Pearson correlation analysis was used to examine the relationship between the scales. A multiple linear hierarchical moderated regression analysis was conducted to test the moderating role of gender in the predictor effect of social interaction anxiety on the lower levels of nomophobia. The significance level was calculated as $\alpha = 0.05$.

### 6.4. Bioethics

The study was approved by the ethics committee of Istanbul Sabahattin Zaim University on January 28, 2022 (approval number 2022/01) and was conducted in accordance with the Declaration of Helsinki (1989). To maximize benefit and minimize risk of harm, the students were informed about the aim and procedures of the study and their informed consent was acquired before they began providing any personal data.

## 7. Finding

### 7.1. Descriptive findings regarding scales

The mean, standard deviation, kurtosis, skewness, and reliability analysis results of the variables are shown in Table 1.

The sub-dimensions of NMPQ and SIAS reliability analyses showed that the Cronbach Alpha values of sub-dimensions of NMPQ ranged from .72 (NMPQ-Giving Up Convenience) to .89 (NMPQ-Total), while the SIAS was .79.

### 7.2. Difference analysis

After initial descriptive analyses, statistical analyses were performed to determine whether the responses to the scale statements differed according to the personal characteristics under investigation. An independent samples *t*-test was performed to determine whether the NMPQ total and subdimension scores and SIAS total scores differed according to gender (Table 2).

In the Spanish version of the NMP-Q created by León-Mejía et al., the cut-off scores by gender and age were found to be 55.44, with a mean score of 55.44 and a standard deviation of 21.21 (in the total range of 20–140 points). The 15th, 80th, and 95th percentiles correspond to "non-nomophobic," "at risk for nomophobia," and "nomophobic," respectively. Following this criterion, the cut-off points for the aforementioned classification categories are 34, 72, and 94 points. The distribution is 32, 68, and 87 points for men; and 36, 78, and 100 points for women, respectively (León-Mejía et al., 2021). In our study, the mean total NMPQ score of all participants was 79.63, with women scoring 79.49 and men scoring 80.04 on average. When we evaluate these results according to the cut-off points, we see that the sample group falls into the nomophobia risk category without gender difference.

We identified a statistically significant association between the gender of participants and nomophobia scales. As a result of the independent groups *t*-test analysis,

**Table 1.** Descriptive statistics and reliability values with Cronbach's alpha coefficient.

| | $\bar{x}$ | SD | Min-Max | Cronbach α | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| NMPQ-Not Being Able to Access Information | 16.70 | 5.94 | 4.00–28.00 | .83 | –.08 | –.66 |
| NMPQ-Giving Up Convenience | 20.02 | 6.43 | 5.00–35.00 | .72 | –.02 | –.56 |
| NMPQ- Not Being Able to Communicate | 27.29 | 8.18 | 6.00–42.00 | .88 | –.35 | –.25 |
| NMPQ-Losing Connectedness | 15.63 | 7.29 | 5.00–35.00 | .85 | .35 | –.81 |
| NMPQ – Total | 79.63 | 20.34 | 28.00–132.00 | .89 | –.18 | –.50 |
| SIAS-Total | 41.70 | 8.85 | 15.00–67.00 | .79 | –.06 | –.10 |

SD: standard deviation.

**Table 2.** Independent samples *t*-test.

| | Nomophobia | | | | | |
|---|---|---|---|---|---|---|
| Gender | Not Being Able to Access Information $\bar{x}$±SD | Giving Up Convenience $\bar{x}$±SD | Not Being Able to Communicate $\bar{x}$±SD | Losing Connectedness $\bar{x}$±SD | NMPQ-Total $\bar{x}$±SD | SIAS-Total $\bar{x}$±SD |
| Female ($n = 247$) | 16.48 ± 5.93 | 20.16 ± 6.49 | 27.95 ± 8.23 | 14.91 ± 6.92 | 79.49 ± 20.14 | 42.13 ± 8.74 |
| Male ($n = 84$) | 17.32 ± 5.97 | 19.61 ± 6.27 | 25.36 ± 7.76 | 17.75 ± 7.94 | 80.04 ± 21.03 | 40.42 ± 9.08 |
| t | 1.12 | −0.68 | −2.53 | 2.93 | 0.21 | −1.54 |
| *p* | .264 | .498 | **.012**$^{**}$ | **.004**$^{*}$ | .833 | .126 |

$^{*}p < 0.01$, $^{**}p < 0.05$.

**Table 3.** Pearson correlations among study variables ($n = 331$).

| Variables | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. SIAS[a] | – | .08 | .27*** | .38*** | .37*** | .35*** |
| 2. Gender[b] | | | –.06 | .04 | .14* | .17** |
| 3. NMPQ-Not Being Able to Access Information[c] | | | | .44*** | .32*** | .26*** |
| 4. NMPQ-Giving Up Convenience[d] | | | | | .48*** | .44*** |
| 5. NMPQ-Not Being Able to Communicate[e] | | | | | | .33*** |
| 6. NMPQ-Losing Connectedness[f] | | | | | | – |

[a]SIAS score; [b]It was coded as Male: 0, Female: 1 and converted into a dummy variable; [c]NMPQ-Not Being Able to Access Information score; [d]NMPQ- Giving Up Convenience score; [e]NMPQ-Not Being Able to Communicate score; [f]NMPQ-Losing Connectedness score; *Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed); ***Correlation is significant at the 0.001 level (2-tailed).

women's "not being able to communicate" scores were found to be significantly higher than men's ($t_{(329)} = -2.53$; $p < 0.05$), while men's "losing connectedness" scores were significantly higher than women's ($t_{(128.52)} = 2.93$; $p < 0.01$). No significant association was observed between gender and the other nomophobia sub-dimensions ("not being able to access information" and "giving up convenience").

### 7.3. Moderating effect analysis results

Next, the study tested the moderating effect of gender in the relationship between SIAS scores and NMPQ and sub-dimensions scores across a total of 331 participants: 84 men (25.4%) and 247 women (74.6%).

Before proceeding to the moderating effect tests, the suitability of all the variables to be included in the moderating effect analysis for regression analysis was tested. For this purpose, we first examined whether the predicted and predictor variables were normally distributed, considering the skewness and kurtosis values, and observed that all variables met the normal distribution conditions. The gender of the participants was measured as a nominal variable with two categories ("male" and "female") which was then transformed into a dummy variable. After the data were normally distributed, Pearson correlation values were calculated to observe whether the relationships between the predictor and the predicted variables were moderately strong ($r = .20$ and above) and significant (see Table 3).

The correlation analysis of social interaction anxiety and the NMPQ sub-dimensions, which are predictor variables, revealed the following values: There is a statistically significant relationship between "not being able to access information" ($r = .27$), "giving up convenience" ($r = .38$), "not being able to communicate" ($r = .37$), and "losing connectedness" ($r = .35$) ($p < 0.001$). In our study, the moderating variable, gender, is not greater than $r = 0.20$. This result indicates that there is no significant relationship between the predictor variable and the predicted variable. Since Baron and Kenny (1986) wanted the moderating variable to show no relationship with either the predictor or the criterion variable (the dependent variable), it was decided that the data were suitable for moderating effect analysis (Baron & Kenny, 1986).

After the classical regression analysis, multiple linear hierarchical moderated regression analysis was conducted to test the moderating role of gender in the predictor effect of social interaction anxiety on lower levels of nomophobia. A total of four different moderator regression models were created separately for each sub-dimension of the NMPQ. In this analysis the standard Z scores the NMPQ sub-dimension scores were assigned as the predicted variable for the regression equation in each model; with the Z score of the SIAS total score as the predictor variable in the first block; gender coded as the dummy variable, which was the moderating variable in the second block; and gender and the SIAS total score in the third block. The combined effect variable consisting of the product of the Z score was then entered. The results of this analysis are presented in Table 4.

The results of the analysis demonstrated that social interaction anxiety accounted for approximately 7% ($F_{(1, 329)} = 24.81$, $p < 0.001$) of the change in the NMPQ "not being able to access information" scores. The gender variable ($F_{(1, 328)} = 2.52$, $p > 0.05$) and co-effect variable ($F_{(1, 327)} = .56$, $p > 0.05$) did not significantly predict "not being able to access information" scores; thus, the moderating effect hypothesis was not supported. While social interaction anxiety ($F_{(1, 329)} = 52.45$, $p < 0.001$) and gender ($F_{(1, 328)} = 4.44$, $p < 0.05$) significantly predicted 14% and 0.1% of the change in the NMPQ-not being able to communicate scores, respectively, the common effect variable does not have a significant predictor effect ($F_{(1, 327)} = .10$, $p > 0.05$). In other words, social interaction anxiety significantly affects the "not being able to access information" and "not being able to communicate" sub-dimensions of nomophobia. Still, this predictor effect does not differ by gender.

Social interaction anxiety significantly predicted 14% of the variance in "giving up convenience" scores ($F_{(1, 329)} = 55.35$, $p < 0.001$). On the other hand, although gender did not have a significant predictor effect on "giving up convenience" ($F_{(1, 328)} = .01$, $p > 0.05$), the combined effect of gender and social interaction anxiety predicted 2% of the change in "giving up convenience" scores ($F_{(1, 327)} = 6.15$, $p < 0.01$). In other words, the moderating effect of gender was observed on this predictor effect of social interaction anxiety. The predictor effect of social interaction anxiety on "giving up convenience" varied according to gender. A simple slope test was performed to interpret the significance of this finding. The test indicated a positive and significant relationship between social interaction anxiety and "giving up convenience" in both women ($\beta = 0.30$, $t = 5.53$, $p < 0.001$) and men ($\beta = 0.59$, $t = 5.88$, $p < 0.001$). However, this relationship was more prominent in men than in women (Fisher's $Z$-Test: $Z = 4.63$, $p < 0.001$). The results of this analysis are shown in Figure 2.

**Table 4.** Multiple linear hierarchical moderating effect analysis.

| | *B* | *SE* | *β* | *t* | $R^2$ | *F* | Δ $R^2$ |
|---|---|---|---|---|---|---|---|
| NMPQ – Not Being Able to Access Information | | | | | | | |
| Constant | .14 | .11 | | | | | |
| SIAS | .21 | .10 | .21 | 2.00* | .07 | | |
| Gender | –.19 | .12 | –.08 | –1.51 | .01 | 9.324 | .08 |
| SIASxGender | .09 | .12 | .08 | .75 | .00 | | |
| NMPQ – Giving Up Convenience | | | | | | | |
| Constant | .02 | .10 | | | | | |
| SIAS | .59 | .10 | .59 | 5.97** | .14 | | |
| Gender | –.01 | .12 | –.01 | –.12 | .00 | 20.74 | .16 |
| SIASxGender | –.29 | .12 | –.24 | 2.48* | .02 | | |
| NMPQ- Not Being Able to Communicate | | | | | | | |
| Constant | –.18 | .10 | | | | | |
| SIAS | .39 | .10 | .39 | 3.92** | .14 | | |
| Gender | .24 | .12 | .11 | 2.07* | .01 | 19.13 | .15 |
| SIASxGender | –.04 | .12 | –.03 | –.31 | .00 | | |
| NMPQ-Losing Connectedness | | | | | | | |
| Constant | .37 | .10 | | | | | |
| SIAS | .55 | .10 | .55 | 5.67** | .12 | | |
| Gender | –.49 | .12 | –.21 | –4.19** | .04 | 23.42 | .18 |
| SIASxGender | –.25 | .11 | –.21 | –2.19* | .01 | | |

*$p < 0.05$, **$p < 0.001$, *SE*: Standard error.

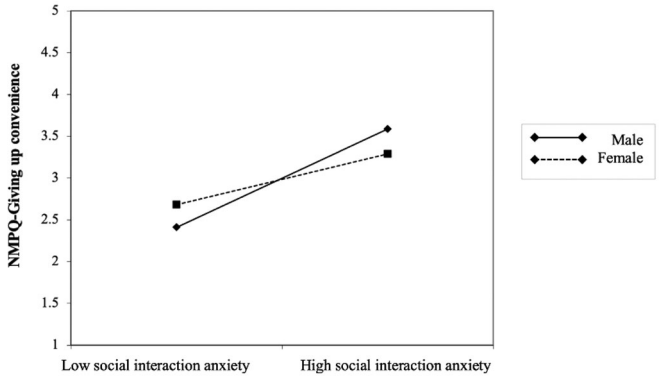


**Figure 2.** Moderating effect of gender on the social interaction anxiety effect on NMPQ-giving up convenience.

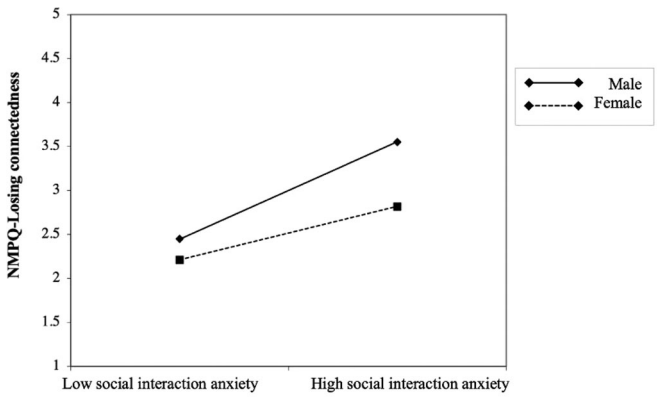


**Figure 3.** Moderating effect of gender on the social interaction anxiety effect on NMPQ-losing connectedness.

Social interaction anxiety ($F_{(1,\ 329)} = 46.78$, $p < 0.001$) explained approximately 12% of the change in "losing connectedness" scores, while gender explained 4% ($F_{(1,\ 328)} = 15.85$, $p < 0.001$); thus, the common effect predicted a 0.1% variance significantly ($F_{(1,\ 327)} = 4.78$, $p < 0.05$). Consequently, the predictor effect of social interaction anxiety on "losing connectedness" varies according to gender. According to the simple slope test performed to examine this change, there was a positive and significant relationship between social interaction anxiety and "losing connectedness" in women ($\beta = 0.30$, $t = 4.79$, $p < 0.001$) and men ($\beta = 0.55$, $t = 5.81$, $p < 0.001$). However, the strength of this relationship is significantly weaker for women than for men (Fisher's Z Test: $Z = 3.95$, $p < 0.001$). The results of this analysis are shown in Figure 3.

## 8. Discussion and conclusion

Information and communication technologies are becoming increasingly widespread in all areas of society to mediate a multitude of daily actions and produce new routines in career fields, social relationships, and leisure time. This technological proliferation creates clear benefits for our daily lives, but also produces new pathologies, addictions, and phobias. Attachment theory provides one explanation for these new-found difficulties that people experience due to technology. Recent studies have found significant associations between different attachment styles and problematic use of the internet, mobile phones, video games, and social media (Assunção et al., 2017; Blackwell et al., 2017; Fullwood et al., 2017). The impact of the virtual world on daily life surged during the COVID-19 pandemic, thanks to the decrease in socialization precipitated by social distancing and lockdowns. Long stays at home could have led parents to introduce their young children to smartphones at an earlier age than originally intended, thus increasing the problematic consequences triggered by excessive internet use. One such consequence is nomophobia, which refers to the anxiety caused by people not being able to access their smartphones at a particular time. Nomophobia levels are negatively related to the age at which a person first uses a smartphone; that is, since nomophobia is associated with excessive smartphone use, the younger an individual is when they receive their first smartphone, the more likely they will be to develop nomophobic symptoms.

Our study adds the following important points to the extant research on nomophobia, gender, and social

interaction anxiety. First, according to the cut-off scores established by previous researchers (i.e., León-Mejía et al., 2021), the students in our study sample were in the nomophobia risk group. Trends of increasing nomophobia are quite evident among college students and should be handled with care to prevent harmful future consequences. Previous studies on the prevalence of nomophobia in university students support the results of our research (Bartwal & Nath, 2020; Bhattacherjee et al., 2017; Kaur et al., 2021). A survey of adults found that 57.95% of men and 66.34% of women reported experiencing moderate to severe nomophobia (Galhardo et al., 2020), while another study found that 58% feared not being able to access their smartphones (Roberts & David, 2022). Although excessive cell phone use is not included in the DSM-5, it appears to meet most criteria for substance abuse disorder (Bhatia, 2008). Therefore, researchers and practitioners should consider the possibility that nomophobia could transform into smartphone and/or internet addiction, and respond to this possibility by creating educational websites that reduce students' anxiety levels by addressing nomophobic situations (Dixit et al., 2010).

Second, when examining the sub-dimensions of nomophobia, we observed the highest scores in the areas of not being able to communicate with family and friends and losing connection. This result confirms the findings of previous studies (Olivencia-Carrión et al., 2018; Rosales-Huamani et al., 2019).

An independent groups *t*-test analysis revealed that women's "not being able to communicate" scores were significantly higher than men's ($t[329] = -2.53$; $p < 0.05$). On the other hand, men's "losing connectedness" scores were significantly higher than women's ($t[128.52] = 2.93$; $p < 0.01$).

Third, our findings indicate a significant difference between men's and women's NMPQ sub-dimension scores. Women's "not being able to communicate" scores were significantly higher than men's, while men's "losing connectedness" scores were significantly higher than women's. However, the evidence in literature regarding gender differences is ambiguous, with some studies aligning with the results of our research (Alahmari et al., 2018; Bhattacherjee et al., 2017; Demir, 2019; Gao et al., 2020; Gnardellis et al., 2023; Yildirim et al., 2016), while others claim that no gender differences exist (Arpaci et al., 2017; Farooqui et al., 2018; Harish & Bharath, 2018; Lin et al., 2018). Compared to men, women have more robust social networks are therefore more likely to use smartphones for socializing. Also, unlike men, women talk more through their mobile devices. Therefore, women are more likely to develop some form of mobile addiction due to social stress and how they use smartphones (Van Deursen et al., 2015).

Our fourth result revealed that social interaction anxiety had a positive effect on nomophobia, and that this effect was higher in males (Ayar et al., 2018). Social phobia may lead individuals to use virtual environments to establish relationships, feel safe, and avoid anxiety symptoms (King et al., 2013), thereby increasing nomophobic behaviors. One possible explanation is that social anxiety may increase the likelihood of using a smartphone. Socially anxious individuals might then spend more time on their cell phones and interact less with their peers in real life.

Our fifth result demonstrated that social interaction anxiety accounted for approximately 7% of the change in one of the sub-factors of nomophobia, "not being able to access information." However, the moderating effect hypothesis was not supported, as the gender variable and the co-effect variable did not significantly predict the "not being able to access information" scores. This result offers a clear contribution to the literature, which lacks evidence on the moderating role of gender in the effect of social interaction anxiety on nomophobia.

In our sixth result, about 14% of the change in "not being able to communicate" scores (another NMPQ subdimension) was significantly predicted by social interaction anxiety and 0.1% by gender. At the same time, the combined effect variable did not have a significant predictor effect. In other words, social interaction anxiety significantly affects college students' fears of "not being able to access information" and "not being able to communicate" when separated from their smartphones. Still, this effect does not differ by gender. Young people who experience anxiety in social interaction frequently use smartphones with an internet connection to reduce their anxiety levels by using social media (Pempek et al., 2009). Kaur et al. (2021) found that students with high levels of social interaction anxiety also had high levels of nomophobia, and vice versa (Kaur et al., 2021). We believe that in this century, when society is increasingly digital and places importance on individuality, university students are more likely to experience stress and avoid interaction with society. However, virtual environments provide these young people with opportunities to express their feelings in more comfortable ways, with lower social stakes. This can lead to nomophobia by encouraging them to create a virtual/online world of their own, which creates a sense of threat and anxiety when access to that world is taken away.

In our seventh result, we found that social interaction anxiety significantly predicted 14% of the variance in "giving up convenience" scores. On the other hand, although gender did not significantly influence the university students' perceptions of "giving up convenience," the combined effect of gender and social interaction anxiety significantly predicted the change in the scores in this sub-dimension. In other words, the moderating effect of gender is observed on this predictor effect of social interaction anxiety, and the effect of social interaction anxiety on "giving up convenience" varies according to gender. While this significant joint effect was positive in both women and men, the strength of this relationship was higher in men than in women. A previous study conducted by Altan (2019) that high school girls' scores on the sub-factors of "losing connectedness," "giving up convenience," and "not being able to communicate" were significantly higher than those of their male counterparts. Similar results were obtained in previous studies investigating the prevalence and effects of nomophobia, as well as its associated addictions, in university students and adults (Uğuz, 2019; Yılmaz et al., 2018). Additional research in the

extant literature has analyzed the impact of social interaction anxiety on nomophobia, as well as gender's effect on both general nomophobia and its sub-factors. However, no study has investigated which specific sub-factors of nomophobia are affected by gender in the effect between social interaction anxiety and nomophobia; thus, our study provides a unique contribution to the literature in this area.

Our eighth result demonstrates that social interaction anxiety explained approximately 12% of the change in respondents' "losing connectedness" scores on the NMPQ and the gender variable explained approximately 4%, respectively, while the combined effect significantly predicted a variance of 0.1%. Accordingly, the predictor effect of social interaction anxiety on losing connectedness varies according to gender. While there is a positive and significant relationship between social interaction anxiety and "giving up convenience" in women and men, the strength of this relationship is significantly weaker in women. Apak and Yaman (2019) found a low and positive correlation between the total nomophobia and social phobia scores in a study conducted on university students (Apak & Yaman, 2019). Uysal et al. (2016) revealed a low but significant relationship between nomophobia and social phobia disorder, concluding that nomophobia predicted 2.6% of social phobia (Uysal et al., 2016). Examining the literature reveals that our research results echo those of previous studies. Stewart and Mandrusiak's (2007) study examining social interaction anxiety by gender indicated a 25% social phobia level in men and 20% in women, which supports our findings. King et al. (2013) reported that nomophobia and social communication anxiety are related and suggested that social communication anxiety symptoms intensify nomophobic behaviors. Consequently, individuals experiencing these two conditions become dependent on virtual environments to establish social relationships, feel safe, and avoid anxiety-related symptoms (King et al., 2013).

Moderation analysis provides a way to evaluate whether an intervention has similar effects across groups. For example, if a program is proposed for a group of men and women, moderation analysis could be used to demonstrate that the intended effects of the program are achieved for both genders. Similarly, the consistency of an intervention's effect across subgroups provides important information about the generalizability of that intervention. In contrast to generalizability, it is also important to identify the groups where an intervention has the largest impact or no impact at all. This information can then be used to target groups for intervention and thus tailor that intervention to best maximize its effects. The moderating effect of gender identified in this study will be helpful in future interventions to prevent the spread of nomophobia among university students. This study's specific findings on the differences in the sub-factors of nomophobia according to gender can guide such interventions.

In today's world nomophobia is increasing remarkably, especially among young people. Thus, it is important to raise awareness about the dangers of mobile phone overuse, since most college students keep smartphones on their person and use them frequently. Students who tend to interact through virtual environments on their mobile phones should be supported through face-to-face socialization and experiences with friends and family, thus preventing the development of nomophobia by reducing social interaction anxiety. In addition, university administrators can develop mechanisms to curtail cell phone overuse among students. Students should be informed about increasing nomophobia trends and harmful health consequences. To provide support to students, universities should develop policies regarding nomophobia and social interaction anxiety screenings and timely referral of students with nomophobia to counseling services. Additionally, student leaders could counsel students on preventing and managing nomophobia. The combined interventions of these various stakeholders could form a powerful force against harmful effects of excessive cell phone use. To support these efforts, future studies should examine the impact of psychosocial interventions on reducing nomophobia and social interaction anxiety among university students. Researchers can address this growing mental health concern by designing studies that question the cause-and-effect relationship of nomophobia. In addition, it is especially important to prevent nomophobia through programs that train people, especially young people, on the correct use of technology. To produce the most effective results, future interventions in this area should consider the gendered differences highlighted in the results of the current study.

## 9. Limitations and future work

The present study has a few key limitations that should be considered when interpreting and applying its results. The study was limited in scope, as it only involved data from students studying at a single university in Turkey. Future researchers could collect data from different regions of the country or from students at different universities. While our study sample consisted of university students, smartphone often begins at a much younger age; thus, a broader study involving students of different ages, including both students both at the secondary level and younger, could yield more detailed results. Furthermore, the self-reported survey approach that we utilized could have led to some inaccurate or biased responses. Future studies could consider experimental or longitudinal designs to uncover causal relationships between the variables. Finally, as evident from the existing literature, social interaction anxiety is associated with nomophobia, but the moderating role of gender has not been adequately examined; therefore, future researchers can build more comprehensive models by including the moderating role of gender.

## Acknowledgements

We are grateful to the participant for their support.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## ORCID

Arzu Bulut http://orcid.org/0000-0001-7362-5667
Halil Sengul http://orcid.org/0000-0001-5745-0369

## References

Ahad, A. D., & Anshari, M. (2017). Smartphone habits among youth: Uses and gratification theory. *International Journal of Cyber Behavior, Psychology and Learning (IJCBPL), 7*(1), 65–75. https://doi.org/10.4018/IJCBPL.2017010105

Akgül, A., & C¸evık, O. (2005). *Istatistiksel Analiz Teknikleri*. Emek Ofset Ltd.

Albayrak, A. S. (2006). *Uygulamalı C¸ok Değis¸kenli İstatistik Teknikleri*. Asil Yayın Dağıtım.

Albursan, I. S., Al Qudah, M. F., Dutton, E., Hassan, E. M. A. H., Bakhiet, S. F. A., Alfnan, A. A., Aljomaa, S. S., & Hammad, I. H. (2019). National, sex and academic discipline difference in smartphone addiction: A study of students in Jordan, Saudi Arabia, Yemen and Sudan. *Community Mental Health Journal*, *55*(5), 825–830. https://doi.org/10.1007/s10597-019-00368-x

American Psychiatric Association. (2013). *The diagnostic and statistical manual of mental disorders* (5th ed.). APA.

Anderson, M., & Jiang, J. (2018). Teens, social media & technology 2018. *Pew Research Center*, *31*(2018), 1673–1689. http://www.pewinternet.org/2018/05/31/teens-social-media-technology-2018/

Ang, C. S., Chan, N. N., & Lee, C. S. (2018). Shyness, loneliness avoidance, and internet addiction: What are the relationships? *The Journal of Psychology*, *152*(1), 25–35. https://doi.org/10.1080/00223980.2017.1399854

Alahmari, M. S., Alfaifi, A. A., Alyami, A. H., Alshehri, S. M., Alqahtani, M. S., Alkhashrami, S. S., Alqahtani, A. S., Alghamdi, A. A., Alqahtani, A. S., & Mostafa, O. A. (2018). Prevalence and risk factors of nomophobia among undergraduate students of health sciences colleges at King Khalid University, Saudi Arabia. *International Journal of Medical Research Professionals*, *4*(1), 429–432. https://doi.org/10.21276/ijmrp.2018.4.1.088

Altan, B. (2019). *Nomofobi ile aleksitimi arasındaki ilişkide bilinçli farkındalık ve üst bilişin aracı rolünün incelenmesi* (Unpublished masters' thesis). İstanbul Aydın Üniversitesi Sosyal Bilimler Enstitüsü.

Apak, E., & Yaman, Ö. M. (2019). The prevalence of nomophobia among university students and nomophobia's relationship with social phobia: The case of Bingol University. *Addicta*, *6*(3), 609–627. https://doi.org/10.15805/addicta.2019.6.3.0078

Argumosa-Villar, L., Boada-Grau, J., & Vigil-Colet, A. (2017). Exploratory investigation of theoretical predictors of nomophobia using the Mobile Phone Involvement Questionnaire (MPIQ). *Journal of Adolescence*, *56*(1), 127–135. https://doi.org/10.1016/j.adolescence.2017.02.003

Arpaci, I., Baloğlu, M., & Kesici, Ş. (2019). A multi-group analysis of the effects of individual differences in mindfulness on nomophobia. *Information Development*, *35*(2), 333–341. https://doi.org/10.1177/0266666917745350

Arpaci, I., Baloğlu, M., Kozan, H. İ. Ö., & Kesici, Ş. (2017). Individual differences in the relationship between attachment and nomophobia among college students: The mediating role of mindfulness. *Journal of Medical Internet Research*, *19*(12), e8847. https://doi.org/10.2196/jmir.8847

Assunção, R. S., Costa, P., Tagliabue, S., & Mena Matos, P. (2017). Problematic Facebook use in adolescents: Associations with parental attachment and alienation to peers. *Journal of Child and Family Studies*, *26*(11), 2990–2998. https://doi.org/10.1007/s10826-017-0817-2

Ayar, D., Gerçeker, G. Ö., Özdemir, E. Z., & Bektas, M. (2018). The effect of problematic internet use, social appearance anxiety, and social media use on nursing students' nomophobia levels. *Computers, Informatics, Nursing*, *36*(12), 589–595. https://doi.org/10.1097/CIN.0000000000000458

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182. https://doi.org/10.1037//0022-3514.51.6.1173

Barrera, T. L., & Norton, P. J. (2009). Quality of life impairment in generalized anxiety disorder, social phobia, and panic disorder. *Journal of Anxiety Disorders*, *23*(8), 1086–1090. https://doi.org/10.1016/j.janxdis.2009.07.011

Barrett, L. F., Lane, R. D., Sechrest, L., & Schwartz, G. E. (2000). Sex differences in emotional awareness. *Personality and Social Psychology Bulletin*, *26*(9), 1027–1035. https://doi.org/10.1177/0146167200261100

Bartwal, J., & Nath, B. (2020). Evaluation of nomophobia among medical students using smartphone in north India. *Medical Journal Armed Forces India*, *76*(4), 451–455. https://doi.org/10.1016/j.mjafi.2019.03.001

Beidel, D. C., Turner, S. M., Young, B. J., Ammerman, R. T., Sallee, F. R., & Crosby, L. (2007). Psychopathology of adolescent social phobia. *Journal of Psychopathology and Behavioral Assessment*, *29*(1), 46–53. https://doi.org/10.1007/s10862-006-9021-1

Bekaroglu, E., & Yılmaz, T. (2020). Nomophobia: Differential diagnosis and treatment. *Psikiyatride Guncel Yaklasimlar, 12*(1), 131–142. https://doi.org/10.18863/pgy.528897

Bhattacherjee, S., Dasgupta, P., Dasgupta, S., Roy, J. K., Mukherjee, A., & Biswas, R. (2017). Nomophobic behaviors among smartphone using medical and engineering students in two universities of West Bengal. *Indian Journal of Public Health*, *61*(3), 199. https://doi.org/10.4103/ijph.IJPH_81_16

Bhatia, M. S. (2008). Cell phone dependence—A new diagnostic entity. *Delhi Psychiatry Journal, 11*(2), 123–124. http://medind.nic.in/daa/t08/i2/daat08i2p123.pdf

Blackwell, D., Leaman, C., Tramposch, R., Osborne, C., & Liss, M. (2017). Extraversion, neuroticism, attachment style and fear of missing out as predictors of social media use and addiction. *Personality and Individual Differences*, *116*(2017), 69–72. https://doi.org/10.1016/j.paid.2017.04.039

Bodrožić Selak, M., & Neki, P. N. (2020). Ph.D. Thesis. University of Zadar, Department of Psychology. Retrieved July 30, 2022, from https://urn.nsk.hr/urn:nbn:hr:162:307687

Bragazzi, N. L., & Del Puente, G. (2014). A proposal for including nomophobia in the new DSM-V. *Psychology Research and Behavior Management*, *7*(2014), 155–160. https://doi.org/10.2147/PRBM.S41386

Carroll, A., & Heiser, G. (2010). An analysis of power consumption in a smartphone. In *2010 USENIX Annual Technical Conference (USENIX ATC 10)* (Vol. 14, pp. 21–21).

Chambless, D. L., Fauerbach, J. A., Floyd, F. J., Wilson, K. A., Remen, A. L., & Renneberg, B. (2002). Marital interaction of agoraphobic women: A controlled, behavioral observation study. *Journal of Abnormal Psychology*, *111*(3), 502–512. https://doi.org/10.1037/0021-843X.111.3.502

Cheever, N. A., Rosen, L. D., Carrier, L. M., & 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*(2014), 290–297. https://doi.org/10.1016/j.chb.2014.05.002

Choi, J., Oh, S., & Horowitz, R. (2009). Distributed learning and cooperative control for multi-agent systems. *Automatica*, *45*(12), 2802–2814. https://doi.org/10.1016/j.automatica.2009.09.025

Choi, J., & Lee, J. K. (2015). Investigating the effects of news sharing and political interest on social media network heterogeneity. *Computers in Human Behavior*, *44*(2015), 258–266. https://doi.org/10.1016/j.chb.2014.11.029

Cohen, L., Manion, L., & Morrison, K. (2013). *Research Methods in Education*. Routledge.

Coşkun, H. (2009). Etkileşim kaygısı ölçeği: Geçerlik ve güvenirlik çalışması. *Türk Psikoloji Yazıları*, *12*(23), 41–49. http://194.27.34.65:8080/xmlui/bitstream/handle/20.500.12491/3432/hamitcoskun-3432.pdf?sequence=1&isAllowed=y

Demir, Ü. (2019). Investigation of nomophobia levels of university students according to intelligent phone use: A case of the Comu faculty of education. *Uluslararası Eğitim Bilim ve Teknoloji Dergisi*, *5*(2), 106–118. https://dergipark.org.tr/en/download/article-file/895603

Dennison, L., Morrison, L., Conway, G., & Yardley, L. (2013). Opportunities and challenges for smartphone applications in supporting health behavior change: qualitative study. *Journal of Medical Internet Research, 15*(4), e2583. https://doi.org/10.2196/jmir.2583

Dixit, S., Shukla, H., Bhagwat, A. K., Bindal, A., Goyal, A., Zaidi, A. K., & Shrivastava, A. (2010). A study to evaluate mobile phone dependence among students of a medical college and associated hospital of central India. *Indian Journal of Community Medicine*, *35*(2), 339. https://doi.org/10.4103/0970-0218.66878

Duggan, M., & Brenner, J. (2013). *The demographics of social media users*, 2012 (Vol. 14). Pew Research Center's Internet & American Life Project.

Elhai, J. D., Levine, J. C., Dvorak, R. D., & Hall, B. J. (2017). Non-social features of smartphone use are most related to depression, anxiety and problematic smartphone use. *Computers in Human Behavior*, *69*(2017), 75–82. https://doi.org/10.1016/j.chb.2016.12.023

Elhai, J. D., Tiamiyu, M. F., Weeks, J. W., Levine, J. C., Picard, K. J., & Hall, B. J. (2018). Depression and emotion regulation predict objective smartphone use measured over one week. *Personality and Individual Differences*, *133*(2018), 21–28. https://doi.org/10.1016/j.paid.2017.04.051

Enez Darcin, A., Kose, S., Noyan, C. O., Nurmedov, S., Yılmaz, O., & Dilbaz, N. (2016). Smartphone addiction and its relationship with social anxiety and loneliness. *Behaviour & Information Technology*, *35*(7), 520–525. https://doi.org/10.1080/0144929X.2016.1158319

Evans, C., & Robertson, W. (2020). The four phases of the digital natives debate. *Human Behavior and Emerging Technologies*, *2*(3), 269–277. https://doi.org/10.1002/hbe2.196

Farooqui, I. A., Pore, P., & Gothankar, J. (2018). Nomophobia: An emerging issue in medical institutions? *Journal of Mental Health*, *27*(5), 438–441. https://doi.org/10.1080/09638237.2017.1417564

Fullwood, C., Quinn, S., Kaye, L. K., & Redding, C. (2017). My virtual friend: A qualitative analysis of the attitudes and experiences of smartphone users: Implications for smartphone attachment. *Computers in Human Behavior*, *75*(2017), 347–355. https://doi.org/10.1016/j.chb.2017.05.029

Galhardo, A., Loureiro, D., Raimundo, E., Massano-Cardoso, I., & Cunha, M. (2020). Assessing nomophobia: Validation study of the European Portuguese version of the Nomophobia Questionnaire. *Community Mental Health Journal*, *56*(8), 1521–1530. https://doi.org/10.1007/s10597-020-00600-z

Gao, Y., Li, A., Zhu, T., Liu, X., & Liu, X. (2016). How smartphone usage correlates with social anxiety and loneliness. *PeerJ*, *4*, e2197, 1–12. https://doi.org/10.7717/peerj.2197

Gao, Y., Dai, H., Jia, G., Liang, C., Tong, T., Zhang, Z., Song, R., Wang, Q., & Zhu, Y. (2020). Translation of the Chinese version of the nomophobia questionnaire and its validation among college students: Factor analysis. *JMIR mHealth and uHealth*, *8*(3), e13561. https://doi.org/10.2196/13561

Gezgin, D. M., Hamutoglu, N. B., Sezen-Gultekin, G., & Ayas, T. (2018). The relationship between nomophobia and loneliness among Turkish adolescents. *International Journal of Research in Education and Science*, *4*(2), 358–374. https://doi.org/10.21890/ijres.409265

Gonçalves, L. L., Bortolanza, S. C., Padua, M. K., Nardi, A. E., & King, A. L. S. (2021). Nomophobia in the last decade: A systematic review. *Mental Health Addiction Research*, *6*(3), 1–7. https://doi.org/10.15761/MHAR.1000203

Gržan, D. (2021). *Fobija modernog doba–nomofobija i njen odnos sa psihopatološkim simptomima i nesanicom* (Doctoral dissertation). University of Zadar. Department of Psychology.

GSM Association. (2022). The mobile economy 2022. Retrieved November 30, 2022, from https://www.gsma.com/mobileeconomy/wp-content/uploads/2022/02/280222-The-Mobile-Economy-2022.pdf.

Gnardellis, C., Notara, V., Vagka, E., Gialamas, V., & Lagiou, A. (2023). Validity of the Greek NMP-Q and sociodemographic determinants of Nomophobia Among University Students. *International Journal of Human–Computer Interaction*, 39(4), 842–850. https://doi.org/10.1080/10447318.2022.2049139

Harish, B. R., & Bharath, J. (2018). Prevalence of nomophobia among the undergraduate medical students of Mandya Institute of Medical Sciences, Mandya. *International Journal of Community Medicine and Public Health*, *5*(12), 5455–5459. https://doi.org/10.18203/2394-6040.ijcmph20184833

How Many People Have Smartphones In the World? (2022). Retrieved July 28, 2022, from https://www.bankmycell.com/blog/how-many-phones-are-in-the-world

Humood, A., Altooq, N., Altamimi, A., Almoosawi, H., Alzafiri, M., Bragazzi, N. L., Husni, M., & Jahrami, H. (2021). The prevalence of nomophobia by population and by research tool: A systematic review, meta-analysis, and meta-regression. *Psych*, *3*(2), 249–258. https://doi.org/10.3390/psych3020019

Kanmani, A., Bhavani, U., & Maragatham, R. S. (2017). Nomophobia – An insight into its psychological aspects in India. *The International Journal of Indian Psychology*, *4*(2), 5–15. https://doi.org/10.25215/0402.041

Kateb, S. A. (2017). The prevalence and psychological symptoms of nomophobia among university students. *Journal of Research in Curriculum Instruction and Educational Technology*, *3*(3), 155–182. https://doi.org/10.21608/jrciet.2017.24454

Kaur, A., Ani, A., Sharma, A., & Kumari, V. (2021). Nomophobia and social interaction anxiety among university students. *International Journal of Africa Nursing Sciences*, *15*(2021), 100352. https://doi.org/10.1016/j.ijans.2021.100352

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 617–627. https://doi.org/10.1001/archpsyc.62.6.617

Khan, S., Atta, M., Malik, N. I., & Makhdoom, I. F. (2021). Prevalence and relationship of Smartphone addiction, nomophobia, and social anxiety among College and University Late Adolescents. *Ilkogretim Online*, *20*(5), 968–976. https://doi.org/10.17051/ilkonline.2021.05.394

King, A. L. S., Valença, A. M., Silva, A. C., Sancassiani, F., Machado, S., & Nardi, A. E. (2014). "Nomophobia": Impact of cell phone use interfering with symptoms and emotions of individuals with panic disorder compared with a control group. *Clinical Practice & Epidemiology in Mental Health*, *10*(1), 28–35. https://doi.org/10.2174/1745017901410010028

King, A. L. S., Valenca, A. M., Silva, A. C. O., Baczynski, T., Carvalho, M. R., & Nardi, A. E. (2013). Nomophobia: Dependency on virtual environments or social phobia? *Computers in Human Behavior*, *29*(1), 140–144. https://doi.org/10.1016/j.chb.2012.07.025

King, A. L. S., Valença, A. M., & Nardi, A. E. (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

Leary, M. R., & Kowalski, R. M. (1993). The interaction anxiousness scale: Construct and criterion-related validity. *Journal of Personality Assessment*, *61*(1), 136–146. https://doi.org/10.1207/s15327752jpa6101_10

Lee, Y. K., Chang, C. T., Lin, Y., & Cheng, Z. H. (2014). The dark side of smartphone usage: Psychological traits, compulsive behavior and technostress. *Computers in Human Behavior*, *31*(2014), 373–383. https://doi.org/10.1016/j.chb.2013.10.047

León-Mejía, A. C., Gutiérrez-Ortega, M., Serrano-Pintado, I., & González-Cabrera, J. (2021). A systematic review on nomophobia prevalence: Surfacing results and standard guidelines for future research. *PLoS One*, *16*(5), e0250509. https://doi.org/10.1371/journal.pone.0250509

León-Mejía, A., Calvete, E., Patino-Alonso, C., Machimbarrena, J. M., & Gonzalez-Cabrera, J. (2020). Nomophobia Questionnaire (NMP-Q): Factorial structure and cut-off points for the Spanish version. Cuestionario de Nomofobia (NMP-Q): Estructura factorial y puntos de corte de la versión española. *Adicciones*, *33*(2), 137–148. https://doi.org/10.20882/adicciones.1316

Lin, C. Y., Griffiths, M. D., & Pakpour, A. H. (2018). Psychometric evaluation of Persian Nomophobia Questionnaire: Differential item functioning and measurement invariance across gender. *Journal of Behavioral Addictions*, *7*(1), 100–108. https://doi.org/10.1556/2006.7.2018.11

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335–343.

Lundy, B. L., & Drouin, M. (2016). From social anxiety to interpersonal connectedness: Relationship building within face-to-face, phone and instant messaging mediums. *Computers in Human Behavior*, *54*(2016), 271–277. https://doi.org/10.1016/j.chb.2015.08.004

Nicolaci-da-Costa, A. M. (2002). Technological revolutions and subjective transformations. *Psicologia: Teoria e Pesquisa*, *18*(2), 193–202. https://doi.org/10.1590/S0102-37722002000200009

Nolen-Hoeksema, S. (2012). Emotion regulation and psychopathology: The role of gender. *Annual Review of Clinical Psychology*, *8*(1), 161–187. https://doi.org/10.1146/annurev-clinpsy-032511-143109

Notara, V., Vagka, E., Gnardellis, C., & Lagiou, A. (2021). The emerging phenomenon of nomophobia in young adults: A systematic review study. *Addiction & Health*, *13*(2), 120. https://doi.org/10.22122/ahj.v13i2.309

Olivencia-Carrión, M. A., Ferri-García, R., del Mar Rueda, M., Jiménez-Torres, M. G., & López-Torrecillas, F. (2018). Temperament and characteristics related to nomophobia. *Psychiatry Research*, *266*(2018), 5–10. https://doi.org/10.1016/j.psychres.2018.04.056

Panova, T., & Carbonell, X. (2018). Is smartphone addiction really an addiction? *Journal of Behavioral Addictions*, *7*(2), 252–259. https://doi.org/10.1556/2006.7.2018.49

Pempek, T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology*, *30*(3), 227–238. https://doi.org/10.1016/j.appdev.2008.12.010

Pera, A. (2020). The psychology of addictive smartphone behavior in young adults: Problematic use, social anxiety, and depressive stress. *Frontiers in Psychiatry*, *11*, 573473, 1–10. https://doi.org/10.3389/fpsyt.2020.573473

Prensky, M. (2001). Digital natives, digital immigrants part 2: Do they really think differently? *On the Horizon*, *9*(6), 1–6. https://doi.org/10.1108/10748120110424843

Prensky, M. R. (2010). *Teaching digital natives: Partnering for real learning*. Corwin press.

Ramirez-Correa, P., Rondán-Cataluña, F. J., Arenas-Gaitán, J., & Mello, T. M. (2022). Is your smartphone ugly? Importance of aesthetics in young people's intention to continue using smartphones. *Behaviour & Information Technology*, *41*(1), 72–84. https://doi.org/10.1080/0144929X.2020.1795259

Razzaq, A., Samiha, Y. T., & Anshari, M. (2018). Smartphone habits and behaviors in supporting students self-efficacy. *International Journal of Emerging Technologies in Learning (iJET)*, *13*(02), 94–109. https://doi.org/10.3991/ijet.v13i02.7685

Reid, D. J., & Reid, F. J. (2007). Text or talk? Social anxiety, loneliness, and divergent preferences for cell phone use. *CyberPsychology & Behavior*, *10*(3), 424–435. https://doi.org/10.1089/cpb.2006.9936

Roberts, J. A., & David, M. E. (2022). Me, My Smartphone, and I: Development of the Smartphone Orientation Scale (SOS). *International Journal of Human–Computer Interaction*, *38*(13), 1267–1275. https://doi.org/10.1080/10447318.2021.1990521

Rodríguez-García, A. M., Moreno-Guerrero, A. J., & Lopez Belmonte, J. (2020). Nomophobia: An individual's growing fear of being without a smartphone – A systematic literature review. *International Journal of Environmental Research and Public Health*, *17*(2), 580. https://doi.org/10.3390/ijerph17020580

Rosales-Huamani, J. A., Guzman-Lopez, R. R., Aroni-Vilca, E. E., Matos-Avalos, C. R., & Castillo-Sequera, J. L. (2019). Determining symptomatic factors of nomophobia in Peruvian students from the national university of engineering. *Applied Sciences*, *9*(9), 1814. https://doi.org/10.3390/app9091814

Santl, L., Brajkovic, L., & Kopilaš, V. (2022). Relationship between Nomophobia, various emotional difficulties, and distress factors among students. *European Journal of Investigation in Health, Psychology and Education*, *12*(7), 716–730. https://doi.org/10.3390/ejihpe12070053

Seol, J. (2016). San Francisco, CA: San Francisco State University, Self-disclosure in American friendships: Links with collectivism and adult attachment styles. Retrieved July 28, 2022, from https://sfsu-dspace.calstate.edu/bitstream/handle/10211.3/181604/AS362016PSYCHS46.pdf?sequence=1.

Shalom, J. G., Israeli, H., Markovitzky, O., & Lipsitz, J. D. (2015). Social anxiety and physiological arousal during computer mediated vs. face to face communication. *Computers in Human Behavior*, *44*(2015), 202–208. https://doi.org/10.1016/j.chb.2014.11.056

Sharma, M., Mathur, D. M., & Jeenger, J. (2019). Nomophobia and its relationship with depression, anxiety, and quality of life in adolescents. *Industrial Psychiatry Journal*, *28*(2), 231. https://doi.org/10.4103/ipj.ipj_60_18

Stein, M. B., & Stein, D. J. (2008). Social anxiety disorder. *The Lancet*, *371*(9618), 1115–1125. https://doi.org/10.1016/S0140-6736(08)60488-2

Stewart, D. W., & Mandrusiak, M. (2007). Social phobia in university students: A developmental perspective. *Journal of College Student Psychotherapy*, *22*(2), 65–76. https://doi.org/10.1300/J035v22n02_06

Sui, A., Sui, W., & Irwin, J. (2022). Exploring the prevalence of nomophobia in a Canadian university: An environmental scan. *Journal of American College Health*, 1–8. https://doi.org/10.1080/07448481.2022.2070712

Talan, T., & Kalinkara, Y. (2022). An Investigation of the Cyberloafing and Nomophobia Levels of University Students. *International Journal of Research in Education and Science*, *8*(2), 430–450. https://doi.org/10.46328/ijres.2708

Tams, S., Legoux, R., & Léger, P. M. (2018). Smartphone withdrawal creates stress: A moderated mediation model of nomophobia, social threat, and phone withdrawal context. *Computers in Human Behavior*, *81*(2018), 1–9. https://doi.org/10.1016/j.chb.2017.11.026

Tapscott, D. (2008). *Grown up digital* (p. 384). McGraw-Hill Education.

Troisi, A. (2001). Gender differences in vulnerability to social stress: A Darwinian perspective. *Physiology & Behavior*, *73*(3), 443–449. https://doi.org/10.1016/S0031-9384(01)00459-0

Uğuz, G. (2019). *Kişilik özellikleri ve nomofobi ilişkisi: Kamu hastanelerinde çalışan hemşireler ile bir araştırma* [Doctoral dissertation]. Yüksek Lisans Tezi. İstanbul Üniversitesi-Cerrahpaşa, Lisansüstü Eğitim Enstitüsü, Hemşirelikte Yönetim Anabilim Dalı, İstanbul.

Urueña, A., Arenas, Á. E., & Hidalgo, A. (2018). Understanding workers' adoption of productivity mobile applications: A fuzzy set qualitative comparative analysis (fsQCA). *Economic Research-Ekonomska Istraživanja*, *31*(1), 967–981. https://doi.org/10.1080/1331677X.2018.1436451

Uysal, S., Ozen, H., & Madenoglu, C. (2016). Social phobia in higher education: the influence of nomophobia on social phobia. *The Global e-Learning Journal*, *5*(2), 1–8. https://doi.org/10.4103/0970-0218.66878

Van Deursen, A. J., Bolle, C. L., Hegner, S. M., & Kommers, P. A. (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*(4), 411–420. https://doi.org/10.1016/j.chb.2014.12.039

Wang, D., Xiang, Z., & Fesenmaier, D. R. (2014). Adapting to the mobile world: A model of smartphone use. *Annals of Tourism Research*, *48*(C), 11–26. https://doi.org/10.1016/j.annals.2014.04.008

Wittchen, H. U., Fuetsch, M., Sonntag, H., Müller, N., & Liebowitz, M. (2000). Disability and quality of life in pure and comorbid social phobia: Findings from a controlled study. *European Psychiatry*, *15*(1), 46–58. https://doi.org/10.1016/S0924-9338(00)00211-X

Yang, X., Zhou, Z., Liu, Q., & Fan, C. (2019). Mobile phone addiction and adolescents' anxiety and depression: The moderating role of mindfulness. *Journal of Child and Family Studies*, *28*(3), 822–830. https://doi.org/10.1016/j.annals.2014.04.008

Yildirim, C., & Correia, A. P. (2015). Exploring the dimensions of nomophobia: Development and validation of a self-reported questionnaire. *Computers in Human Behavior*, *49*(2015), 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 university students. *Information Development*, *32*(5), 1322–1331. https://doi.org/10.1177/0266666915599025

Yıldız Durak, H. (2018). What would you do without your smartphone? Adolescents' social media usage, locus of control, and loneliness as a predictor of nomophobia. *The Turkish Journal on Addictions*, *5*(3), 543–557. https://doi.org/10.15805/addicta.2018.5.2.0025

Yildiz, E. P., Çengel, M., & Alkan, A. (2020). Investigation of nomophobia levels of vocational school students according to demographic characteristics and intelligent phone use habits. *Higher Education Studies*, *10*(1), 132–143. https://doi.org/10.5539/hes.v10n1p132

Yılmaz, M., Köse, A., & Doğru, Y. B. (2018). Akıllı Telefondan Yoksun Kalmak: Nomofobi Üzerine Bir Araştırma. *AJIT-e Online Academic Journal of Information Technology*, *9*(35), 31–47. https://doi.org/10.5824/1309-1581.2018.5.003.x

## About the authors

**Arzu Bulut** is assistant professor at the Department of Health Management, University of Bandirma Onyedi Eylul. Her research interests are in the areas of health management and organizational behavior. She has large number of published articles in national and international peer-reviewed journals and participation in international and national conferences.

**Halil Sengul** is an associate professor at the Department of Health Management, Istanbul Sabahattin Zaim University. His research interests are in the areas of health policies and value-based healthcare. He has published numerous articles in national and international peer-reviewed journals and participated in international and national conferences.