Exploring Ostracism as A Risk Factor for Smartphone Addiction in Young People: Resilience and Nomophobia Perspectives

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In today's world, the improper use of smartphones has become a growing problem. Such usage might be problematic as people see it as an escape from threats to their basic psychological needs caused by ostracism. Therefore, the purpose of this study is to examine the relationship between ostracism and the risk of smartphone addiction. In addition, a moderated mediation model was explored to see whether nomophobia moderated the mediating role of resilience in the association between ostracism and the risk of smartphone addiction. The sample consisted of 320 young adults, ranging from 18 to 31 years. Data was gathered by using the Ostracism Experience Scale, the Brief Resilience Scale, Nomophobia Scale and Smartphone Addiction Scale. Results indicated a positive association between ostracism and the risk of smartphone addiction, and this association was mediated by resilience. While ostracism increases the risk of smartphone addiction, resilience emerges as a key ability in mitigating this undesired association. Furthermore, nomophobia moderated the mediating impact of resilience in the relationship between ostracism and the risk of smartphone addiction. Increased nomophobia put this mitigating influence of resilience in the shade. Resilience buffers the undesired relationship between social kiss of death (ostracism) and the risk of smartphone addiction in young individuals, but nomophobia frustrates this functional role of resilience. These findings were discussed in light of the relevant literature.

Keywords: Ostracism, social exclusion, smartphone addiction, resilience, nomophobia

With technological advancements, smartphones have simplified many aspects of human life. Besides that, however, it also causes some problems pertaining to overuse. The excessive use of smartphones has been raising across the world (Olson et al., 2022) with undesired outcomes like behavioral addiction. The concept of smartphone addiction has been suggested as a possible condition characterized by the excessive, compulsive, and unregulated use of one's phone, resulting in a psychological dependency on the device or its content (Kwon et al., 2013). Scholars have concerned about adverse issues originating from the excessive use of smartphones such as poor sleep quality (Demirci et al., 2015), physical health problems (Ratan et al., 2021), and increased anxiety and depressive symptoms (Geng et al., 2021; Zhong et al., 2022). These adverse outcomes have directed the attention of researchers to exploring risk factors for smartphone addiction (e.g., Fischer-Grote et al., 2019; Lee et al., 2017; Osorio-Molina et al., 2021). Within this scope, ostracism may be one of the factors behind the risk of smartphone addiction since limited but a set of studies have underlined how a painful social experience has led individuals to develop technology-based addictions (Arslan & Coşkun, 2022a; Wang et al., 2012).

Ostracism, characterized by being ignored and excluded, is a distressing experience (Arslan, 2018). Ostracism is a phenomenon that refers to being deliberately ignored by others without any express announcement and being deliberately kept apart from others, with or without a reason (Reinhard et al., 2020). According to the temporal need-threat model, it jeopardizes fundamental psychological needs such as self-esteem, belongingness, meaningful existence, and control (Williams, 2009). Following the ostracism experience, certain parts of the brain, responsible for the detection and regulation of pain, get activated (Mead et al., 2011). Research indicates that the sensation of ostracism triggers activation in the dorsal anterior cingulate cortex (dACC) of the brain, a region associated with physical pain (Eisenberger & Lieberman, 2004; Eisenberger et al., 2006). To deal with this pain, individuals attempt to satisfy their threatened needs after being ostracized. For instance, when self-esteem and the need to belong are threatened, targets engage in prosocial behaviors such as joining new groups or attempting to regain group membership status (Arslan, 2021; Coşkun, 2021; Kavaklı, 2019; 2021; Nezlek et al., 2012; Williams, 2009) to protect their psychological functioning and well-being (Arslan & Coşkun, 2023). Nevertheless, socially excluded individuals also develop social anxiety due to fear of reexperiencing ostracism, so they become more likely to isolate themselves from their social surroundings (Pfundmair et al., 2015). In that sense, virtual world might be a good option for these people to find solitude

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whilst satisfying their basic psychological needs online (Arslan, 2020; Wang et al., 2012; Yao & Zong, 2014). In other words, it is relatively simple to satisfy the aforementioned fundamental needs online by diving into an online social world provided by easily accessible smartphones. Consequently, multiple studies have also identified a positive correlation between ostracism and Internet usage (Arslan & Coşkun, 2022a; Kavaklı, 2018; Poon, 2018).

Smartphones are the most convenient way to access the Internet. Internet addiction and the risk of smartphone addiction have been going hand in hand as enhancing mobile technology has dramatically changed our communication system through social media apps, mobile games, and so on, which made young people more preoccupied with online activities through smartphones (Tateno et al., 2019). Keeping this in mind, the current study hypothesized that ostracism would make youth more vulnerable to developing an addiction to smartphones. It offers an easily accessible social world for satisfying thwarted psychological needs caused by ostracism. Furthermore, exploring possible third factors that mitigate and/or aggravate the link between ostracism and the risk of smartphone addiction is also important, especially for future prevention and intervention programs. To this end, potential mediating and moderating roles of resilience and nomophobia were also examined to understand individual differences in the aforementioned relationship.

Resilience and Nomophobia

Resilience is a psychological feature that functions as a buffer against unpleasant and stressful experiences (Arslan & Wong, 2024). Numerous studies have indicated that resilience has a protective effect against negative concepts like depression (Poole et al., 2017; Wu et al., 2017), anxiety (Philippou et al., 2022; Ran et al., 2020), stress (O'Dowd et al., 2018), phobia (Özmen et al., 2023), and so on. On the other hand, ostracism elicits negative outcomes such as negative emotions, hurt feelings, and low need fulfillment (Arslan & Yıldırım, 2021; Legate et al., 2013; Smart-Richman & Leary, 2009). The relationship between resilience and ostracism are likely to be negative as past research underlined (Arslan, 2019; Traş et al., 2019). In fact, resilience operates as a protective mechanism against the life stressors (Arslan, 2023; Arslan & Coşkun, 2022b), including the ones come with being ostracized (Niu et al., 2016; Sun et al., 2021). In other words, resilience stands out as a key ability that might mitigate the detrimental outcomes of ostracism.

To the best of our knowledge, no study has examined the function of resilience as a mediator between ostracism and the risk of smartphone addiction. However, it was already pointed out that positive personality traits such as self-compassion (Kavaklı, 2018) and mindfulness (Molet et al., 2013; Ramsey & Jones, 2015) function a protective role between ostracism and Internet addiction. As another positive skill, resilience may also act as a buffer against the detrimental effects of ostracism (Niu et al., 2016) and protect against internet addiction (Robertson et al., 2018; Zhou et al., 2017). Numerous studies have explored the connections between resilience and online addictions. For instance, Choi and Kim (2018) and Park and Choi (2017) both observed a negative correlation between the risk of smartphone addiction and resilience. Similarly, investigations into other digital addictions, such as Internet addiction, have yielded similar findings. Robertson et al. (2018) found that individuals with

higher resilience tended to exhibit lower levels of Internet addiction. Additionally, several studies suggest that resilience might serve as a protective factor against the development of online addiction such as risk of smartphone addiction (Canale et al., 2019; Cao et al., 2022; Zhou et al., 2017). Thus, it is plausible that resilience, which is negatively associated with both ostracism and online addictions and lowers their harmful impacts, may mediate the ostracism and smartphone relationship.

Although resilience stands out as a factor that mitigates the harmful consequences of ostracism, nomophobia is likely to have an undesired impact. Nomophobia is a psychological condition characterized by the anxiety of being disconnected from mobile phone communication. In other words, nomophobia is the concern of feeling detached from the digital world (Bhattacharya et al., 2019; Rodríguez-García et al., 2020). The rate of smartphone addiction grows with increased smartphone usage (Ayar et al., 2017; Olson et al., 2022). Nomophobia refers to the profound anxiety, discomfort, and panic that arise from the absence or lack of access to mobile phones. Past research has revealed a positive correlation between nomophobia and the risk of smartphone addiction. (Buctot et al., 2020; Durak, 2019). However, the association between nomophobia and social exclusion has not been identified up until now. Nomophobia can be a significant component when considering the connection between ostracism and smartphone use. The risk of smartphone addiction and nomophobia are interconnected ideas due to their shared characteristics and symptoms (Enez, 2021). Several studies have demonstrated a strong association between nomophobia and the risk of smartphone addiction (Aydın & Kuş, 2023; Buctot et al., 2021; Daraj et al., 2023). Indeed, this study revealed a significant association between nomophobia and the likelihood of developing smartphone addiction. Nevertheless, the likelihood of developing smartphone addiction and nomophobia varies based on the manner in which individuals engage with their mobile devices. Nomophobia is a condition characterized by feelings of anxiety and panic that arise when a person's phone is not accessible, even if they are not actively using it. This condition acts as a signal of security for individuals (Gürbüz & Özkan, 2020; King et al., 2010). It includes anxiety associated with the loss of communication and the inconvenience of missing phone features. Conversely, the risk of smartphone addiction refers to the excessive usage of phones, notwithstanding the negative outcomes it produces. Individuals with smartphone addiction face greater challenges in fulfilling their job, social, and family responsibilities compared to those who experience nomophobia, which is characterized by dread of phone unavailability rather than excessive phone usage (Bragazzi & Del Puente, 2014; Enez, 2021). While these two concepts may appear similar, they possess dissimilarities. Therefore, doing research on these two concepts, which exhibit both parallels and contrasts, can make a valuable contribution to the existing literature. The usage of smartphones to cope with the adversities of ostracism may lead to an increase in smartphone dependency (David & Roberts, 2017; Nuñez et al., 2020). Nomophobia may feed this smartphone addiction as well (Durak, 2019). Therefore, while explaining the predictors of the risk of smartphone addiction, the role of nomophobia should also be considered.

Current Study

The present study investigates the intricate relationships between ostracism and risk of smartphone addiction, and the mediating and moderating   roles of resilience and nomophobia among young individuals. The theoretical framework guiding this research draws from established ostracism theories, specifically the Need-Threat Model (Williams, 2009). Based on this approach, individuals possess four basic human needs. These are self-esteem, need to belong, control, and meaningful existence. Experiencing ostracism can have a detrimental impact on these needs. According to this model, when individuals encounter ostracism and perceive a threat to their need for belonging and self-esteem, they may engage in prosocial behaviors. These actions are aimed at gaining acceptance from the excluding group or forming connections with new groups to address the impaired belonging needs resulting from ostracism and restore their self-esteem. Within this framework, it seems plausible to consider that individuals experiencing ostracism in their daily lives may seek to establish new social connections through smartphones as a means to fulfill their needs for belonging and self-esteem (Vorderer and Schneider, 2017). Ostracism constitutes a distressing experience (Williams, 2009), while smartphone addiction emerges as a widespread societal concern (James et al., 2022; Panova & Carbonell, 2018). For the current research, a potential relationship between ostracism and risk of smartphone addiction is postulated. The psychological distress produced by ostracism can be mitigated through the use of the Internet. This may lead to a higher prevalence of smartphone usage among ostracized people. Even though satisfying psychological needs online via smartphones appears to be a beneficial development, this trend appears to result in excessive smartphone usage (Kavaklı, 2018). This study aims to analyze the relationship between ostracism and the risk of smartphone addiction from multiple perspectives. To achieve this, we investigated the roles of resilience and nomophobia in the nexus between ostracism and the risk of smartphone addiction. Resilience might be conceptualized as a positive skill. Certain individuals who have high resilience skills possess coping mechanisms that enable them to effectively navigate and recover from adverse experiences. The selection of resilience as a focal point in this study is motivated by its documented role in buffering against negative psychological outcomes arising from both ostracism (Jiang et al., 2021; Shi et al., 2022) and also risk of smartphone addiction (Choi & Kim, 2018; Park & Choi, 2017). We have included nomophobia in our research because it is directly related to smartphone activities and complements our investigation into smartphone addiction. Nomophobia introduces a unique emotional aspect, emphasizing the anxiety linked to the absence of a phone, thus providing a nuanced viewpoint on the obsessive usage of smartphones seen in addiction. This addition addresses a significant lack of evidence, allowing for a thorough examination of the roles of ostracism and resilience on various aspects of smartphone-related behaviors. Our study seeks to investigate the complex relationship between the risk of smartphone addiction, nomophobia, and ostracism. We intend to understand how psychological well-being, ostracism, resilience, and different facets of smartphone dependency are interconnected among young adults.

In this context, we investigated (H_1) whether resilience mediated the relationship between ostracism and smartphone addiction, and

(H_2) if nomophobia moderated the mediating role of resilience in the relationship between ostracism and smartphone addiction (see Figure 1).
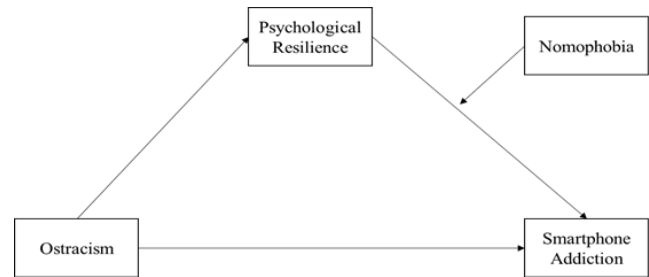
Figure 1. The proposed moderated mediation model

Method

Participants

The study included 320 university students from a public university. This young population was specifically targeted as undergraduate students primarily consist of adolescents and young adults, demographics that exhibit a heightened proclivity towards smartphone preoccupation (Aljomaa et al., 2016). Participants were majorly females with 73%. Their ages ranged between 18 to 31 years (M = 20.32; SD = 2.28). Data were collected through online participation. The study was announced by instructors, and an online survey link was provided to the participants on voluntary base. Sample was reached out through convenient sampling method. An informed consent form was given to the participants before the data collection process. This study was approved by Necmettin Erbakan University Institutional Review Board, number 2023/307 (14/07/2023).

Measures

Demographic Information Form. The ages and genders of the participants were gathered using a standard demographics questionnaire.

Ostracism Scale. Ostracism Experience Scale (OES; Gilman et al., 2013) was used to measure the ostracism level of the participants, which was adapted into Turkish by Sertelin-Mercan (2016). It is an 11-item self-report Likert type measurement tool that assess two types of ostracism, namely exclusion and ignorance. The Turkish adaptation of the scale revealed good levels of reliability and validity, which also yielded a two-factor solution and had good internal reliability (.82 for ignorance and .83 for exclusion subscale; Sertelin-Mercan, 2016). For the current study, no distinction was done regarding the subtypes, and ostracism was treated as a single construct. In the current study the internal consistency coefficient value of the scale was found as .82. Some sample items for the OES are: 'In general, others invite me to join them for weekend activities' and 'Others look through me as if I do not exist.'

The Brief Resilience Scale (BRS). To measure the level of resilience, the Brief Resilience Scale was used. This 6-item Likert type self-report measurement tool was developed by Smith et al. (2008) and adapted into Turkish by Doğan (2015). This one-factor scale achieved good psychometric properties in its adapted version with its construct and convergent validity as well as with good internal reliability (.83; Doğan, 2015). Participants are asked to indicate to which extend they agree with items like 'I tend to bounce

Table 1. Descriptive statistics and bivariate intercorrelations

	Bivariate Correlations				Descriptive Statistics				
	1	2	3	4	*M*	*SD*	*a*	Skew.	Kurt.
1.Ostracism	—				2.18	.58	.82	.53	.57
2.Resilience	-.25**	—			3.02	.83	.83	.044	-.01
3.Smartphone Addiction	.24**	-.35**	—		3.04	1.15	.91	.18	-.58
4.Nomophobia	.04	-.29**	.66**	—	3.11	.76	.92	-.15	-.48

back after hard times.', and higher scores indicated higher resilience. In the current study the internal consistency coefficient value of the scale was found as .83.

Nomophobia Scale. To measure the severity of nomophobia, The Nomophobia Questionnaire (NMP-Q; Yildirim & Correia, 2015) was used. The NMP-Q (20-item on a 7-point Likert type scale) addresses four dimensions of nomophobia: not being able to communicate, fear of losing connectedness, lack of access to information, and losing convenience. It was translated into Turkish by Yildirim et al. (2016), and they reported high reliability score with the Cronbach's alpha value of .92 in addition to achieving satisfactory construct validity (Yildirim et al., 2016). Some sample items for the scale are: 'I would be worried because my family and/or friends could not reach me' and 'I would feel anxious because I could not check my email messages'.

Smartphone Addiction Scale. The Smartphone Addiction Scale-Short Version (SAS-SV), developed by Kwon et al., 2013 and adapted by Noyan et al., 2015, was used to measure the risk for smartphone addiction. It is a 10-item Likert type measurement tool that higher scores obtained from the scale indicates higher risk for smartphone addiction. For the current study, the Cronbach's alpha value was found as .91. Participants were requested to rate items like 'How bad do you feel when you cannot use your smartphone?'

Data Analysis

A three-step data analysis procedure was applied to test the study hypotheses. In the first step, preliminary analyses regarding descriptive statistics, normality assumptions, and correlations were examined. There was no missing value in the data, and univariate normality assumptions were checked based on the rule of thumb for skewness and kurtosis values < |2| (Tabachnick & Fidell, 2013). A Pearson correlation analysis was computed to see the correlations between ostracism, resilience, nomophobia, and smartphone addiction. In the second step, whether resilience mediated the relationship between ostracism and smartphone addiction was questioned by using the PROCESS macro (Model 4; Hayes, 2018). Bootstrap approach using 5000 resamples with 95% confidence intervals (CIs) was benefited for the test of standardized indirect effect. In the final step, the proposed moderated mediation model was examined to see whether nomophobia moderated the mediating role of resilience regarding the ostracism and smartphone association (PROCESS macro, Model 14; Hayes, 2018). All the data analysis procedure was carried out by using SPSS version 25.
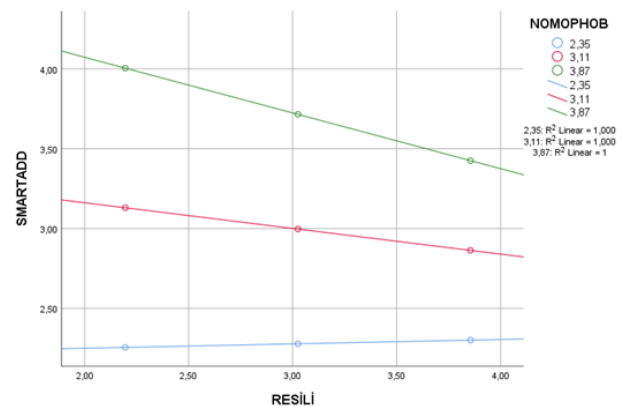
Results

Preliminary Analyses

Regarding the quality and reliability of the data, some preliminary analyses were carried out. Considering characteristics of the measurement tools, scales in the study yielded good internal

reliability indices ranged between .82 and .92, and they had relatively normal univariate distribution based on their skewness and kurtosis values (within < |2|; Tabachnick & Fidell, 2013). In addition, Pearson correlations showed that ostracism was negatively correlated with resilience ($r = -.25$, $p < .01$), and positively with smartphone addiction ($r = .24$, $p < .01$). However, no significant association was observed between ostracism and nomophobia ($p > .05$).

Resilience was also negatively associated with smartphone addiction ($r = -.35$, $p < .01$) and nomophobia ($r = -.29$, $p < .01$). Finally, as expected, a strong positive correlation was captured between nomophobia and smartphone addiction ($r = .66$, $p < .01$). All descriptive statistics and bivariate correlations were listed under Table 1.

Figure 2. Moderating effect of nomophobia on the relation between resilience and smartphone addiction

Mediation and Moderated Mediation Analyses

In the second step, mediation analysis results demonstrated that ostracism had a significant negative association with resilience ($\beta = -.25$, $SE = .11$, $p < .001$), and a positive relation with smartphone addiction ($\beta = .16$, $SE = .08$, $p < .001$). Moreover, resilience negatively predicted smartphone addiction ($\beta = -.31$, $SE = .08$, $p < .001$), and it also mediated the relationship between ostracism and smartphone addiction ($\beta = .15$, $SE = .04$, CI = (.082, .244). All the variables together explained 15% of variance in smartphone addiction.

Following the mediation analysis, whether nomophobia moderated the mediation explored in the mediation analysis in the step two was examined. The moderated mediation analysis results revealed that ostracism had significant direct paths to both resilience ($b = -.36$, $SE = .08$, $p < .001$) and smartphone addiction ($b = .39$, $SE = .08$, $p < .001$). Resilience ($b = .60$, $SE = .23$, $p < .001$) and nomophobia ($b = 1.68$, $SE = .23$, $p < .001$) had significant direct

Table 2. Unstandardized coefficients for the moderated mediation model

Antecedent	M (resilience)				Y (Smartphone addiction)			
	Coeff.	SE	t	p	Coeff.	SE	t	p
X (Ostracism)	-.36	.08	21.75	.000	.39	.08	4.85	.000
M (Resilience)	-	-	-	-	.60	.23	2.59	.009
W (Nomophobia)	-	-	-	-	1.68	.23	7.34	.000
M x W	-.25	.07	-3.42	.000	-	-	-	-
Constant	-	-	-	-	-2.61	.81	-3.21	.001
	R^2= .06, R^2 change = .02 F = 21.76; p < .01				R^2= .51 F = 83.65; p < .01			

Conditional indirect effect of ostracism on smartphone addiction through resilience

Nomophobia	Effect	Boot SE	Boot LL 95% CI	Boot UL 95% CI
-1 SD (2.35)	-.01	.03	-.0681	.0391
M (3.11)	.06	.03	.0128	.1144
+1 SD (3.87)	.13	.04	.0517	.2263

paths to smartphone addiction, as well. Furthermore, resilience mediated the ostracism and smartphone addiction relationship. Considering the interaction effect, interaction of resilience *x* nomophobia was significant (*b* = -.25, *SE* = .07, *p* < .001). Index of moderated mediation also showed that indirect role of ostracism on smartphone addiction was through resilience was moderated by nomophobia (*b* = .09, CI = .03, .16). Checking out the simple slope effect, indirect path from ostracism to smartphone addiction through resilience was captured when nomophobia level was moderate and high, but not when it was low (see Figure 2). These simple slope values for high (+1 *SD*), moderate, and low (-1 *SD*) were respectively (*b* = .13, CI = .05, .23), (*b* = .06, CI = .01, .11), (*b* = -.01, CI = -.07, .04). Overall, the study results revealed that resilience mediated the association between ostracism and smartphone addiction despite the aggravating effect of nomophobia on smartphone addiction (Table 2).

Discussion

The present work investigated the underlying mechanisms between ostracism and risk of smartphone addiction in young adults. The findings revealed that being ostracized left individuals vulnerable to risk of smartphone addiction, which threatens social, psychological, and physical health (for a review see Notara et al., 2021). Similarly, early research findings also emphasized how ostracism gives rise to technology-based addictions like smartphone addiction (Sun et al., 2021), Internet addiction (Arslan & Coşkun, 2022a), problematic social media use (Lim, 2019), and so on. Ostracism is a painful experience, so people sometimes choose to keep their lives in isolation so as not to re-experience social exclusion (Pfundmair et al., 2015). In that sense, young people start excessively spending their time on virtual world in which they feel safer in it compared to real social life (Caplan, 2007). Consequently, social anxiety and loneliness, whether caused by ostracism or not, are critical risk factors for social problems like excessive use of smartphones (Bian & Leung, 2015).

In addition to the adverse outcomes of ostracism on social problems, the current study also came up with mitigating and aggravating factors, namely resilience and nomophobia. The results indicated that resilience played a mediating role in the relationship between ostracism and risk of smartphone addiction. That is, resilience served as a buffer against the distress of ostracism, subsequently reducing excessive smartphone use. Early research has already touched upon the protective role of resilience against ostracism (Arslan, 2019; Niu et al., 2016) and its preventive role against risk of smartphone addiction (Shen, 2020), but the present study recently shed light to individual differences in ostracism and risk of smartphone addiction through resilience. That is to say that youth with high resilience are less likely to develop addiction to smartphone even they suffer from ostracism.

Furthermore, it was found that nomophobia was an adverse factor against the buffering role of resilience on the risk of smartphone addiction. Today's young population has been growing under a world of digital technologies with advancements in easily accessible smartphones. They develop attachment to their social network through smartphones as well as form the content and control of their social relations through these technological devices (Throuvala et al., 2019). Thus, habitual checking of mobile phones gets more prevalent, which may result in smartphone addiction (Elhai et al., 2016) as also shown in this current research. Although no direct relationship was observed between ostracism and nomophobia, it served as an aggravating factor for smartphone addiction. Moreover, its negative association with resilience was also confirmed similar to early findings (e.g., Arpaci & Gundogan, 2020). Therefore, while understanding the dynamics between ostracism and risk of smartphone addiction, role of nomophobia should also be taken into consideration. Especially, nomophobia should be studied along with risk of smartphone addiction whilst discovering negative and positive antecedents of this technology-based addiction as they seem to develop hand in hand together.

To sum up, resilience buffers the undesired relationship between social kiss of death (ostracism) and risk of smartphone addiction in young individuals, but nomophobia frustrates this functional role of

resilience. From very young ages, individual and group level psychological prevention and intervention programs should focus on flourishing psychological health through developing resilient minded people. By doing so, individuals will be more likely to bounce back from negative life events like ostracism, and they will have more capacity to grow constructively on these life challenges, which will enable them to proactively face future adversities such as nomophobia and risk of smartphone addiction. These insights obtained from this research are believed to help all stakeholders in the field to come up with solutions to fight against nomophobia and risk of smartphone addiction that harm the physical and psychological health of young people.

Despite its contributions to the related literature and field, the current research is not without some limitations. First of all, the sample is limited to university students, but human and smartphone interaction initiates at very early ages. Hence, including other age groups, especially children and adolescents, is suggested for future research so that more generalizable findings can be captured. Even considering other possible third factors such as socio-economic status will also increase the generalizability of findings. In addition, current work implemented a cross-sectional research design, so it is lack of cause-and-effect relationship. In that sense, benefiting other types of research designs like experimental and longitudinal studies is needed.

Compliance with Ethical Standards

Ethical Standards

All study procedures involving human participants followed institutional and/or national research committee ethical standards and the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by Necmettin Erbakan University Institutional Review Board, number 2023/307 (14/07/2023).

Declaration of Conflicting Interests

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