

ORIGINAL ARTICLE

Unveiling the Mediating Role of Boredom Proneness in the Relationship Between FoMO and Problematic Smartphone Use among Undergraduates

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Main Points

- Fear of missing out significantly predicts problematic smartphone use among university students.
- Boredom proneness partially mediates the relationship between fear of missing out and problematic smartphone use.
- The findings emphasize the importance of addressing boredom proneness in interventions aimed at reducing problematic smartphone use.
- Intervention programs for university students should focus on managing fear of missing out and developing healthier coping strategies to reduce problematic smartphone use risk.

Abstract

Problematic smartphone use refers to a pattern of behavior that negatively affects individuals' psychological, social, and physical well-being and has therefore become a significant focus of academic research. Individuals engaging in problematic smartphone use often experience withdrawal symptoms when unable to access their smartphones, which can disrupt daily life, academic performance, and social relationships. The development of problematic smartphone use has been linked to several psychological factors, with the fear of missing out emerging as a key predictor. Fear of missing out is conceptualized as an outcome of unmet basic psychological needs, as explained within the framework of Self-Determination Theory. Moreover, previous studies suggest that boredom proneness may also play a role in problematic smartphone use, as individuals prone to boredom tend to use smartphones to seek stimulating or rewarding experiences. Given the adverse consequences of problematic smartphone use, it is crucial to better understand the underlying factors contributing to this behavior. The present study investigated the mediating role of boredom proneness in the relationship between fear of missing out and problematic smartphone use among university students. In this study, these relationships were examined theoretically within the framework of the Person-Emotion-Cognition-Application Interaction model. According to this theoretical perspective, boredom proneness serves as an affective reaction mechanism in the relationship between fear of missing out and problematic smartphone use. A total of 515 university students from a state university participated in this cross-sectional study, completing an online survey via Google Forms. Measures included the Short Boredom Proneness Scale, the Smartphone Addiction Scale – Short Form, and the Fear of Missing Out Scale. Analyses controlled for gender. The mediation pattern held after controlling for gender; female students reported higher problematic smartphone use than males, whereas gender did not predict boredom proneness. The findings revealed that fear of missing out has both a direct and an indirect effect on problematic smartphone use, with boredom proneness serving as a partial mediator in this relationship. These results highlight the importance of targeting both fear of missing out and boredom proneness in intervention and prevention strategies aimed at reducing problematic smartphone use.

Keywords Boredom proneness, FoMO, I-PACE, problematic smartphone use

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Introduction

The trend of digitalization is swiftly accelerating worldwide. Smartphones, being an essential component of contemporary life and regarded as an extension of the self, are pivotal in the digitalization process (Gezgin et al., 2019). We Are Social's February 2025 research indicates that 97.8% of the global population and 96% of individuals in Türkiye utilize smartphones. The pervasive adoption of smartphones is due not only to their function as communication devices but also to the convenience they provide for social interaction, engagement with the opposite sex, information access, entertainment, and the execution of daily tasks. Excessive, problematic, and constant use of smartphones, especially among young individuals, poses specific hazards (Elhai et al., 2017). The primary concern is problematic smartphone use (PSU), which is defined by an inability to regulate smartphone usage and the adverse effects this lack of regulation has on everyday functioning (Fischer-Grote et al., 2019). Problematic smartphone use has emerged as a focal point of academic inquiry in recent years due to its digital behavior pattern, which can result in various adverse outcomes, including impacts on academic performance, social relationships, psychological well-being, and physical health (Paterna et al., 2024; Ru et al., 2025; Soraci et al., 2025).

One of the prominent psychological factors associated with PSU is the fear of missing out (FoMO). Fear of missing out is conceptualized as a pervasive apprehension that others might be having rewarding experiences from which one is absent, and it is defined by a desire to stay continually connected with what others are doing (Przybylski et al., 2013). Within the framework of Self-Determination Theory (SDT), FoMO is regarded as a consequence of unmet fundamental psychological needs, namely autonomy, competence, and relatedness (Ryan & Deci, 2000). As such, individuals experiencing FoMO are more likely to excessively check their smartphones for updates, notifications, or social network sites activity in an attempt to satisfy these needs (Przybylski et al., 2013; Servidio et al., 2021). Numerous studies have indicated a significant positive association between FoMO and PSU (Elhai et al., 2016; Gezgin, 2018; Li et al., 2022; Rozgonjuk et al., 2019), suggesting that FoMO may serve as a critical psychological mechanism underlying excessive and maladaptive smartphone engagement. However, while FoMO has been widely recognized as a direct predictor of PSU, it is equally important to explore the underlying psychological mechanisms through which this association may operate. Prior studies have pointed to various mediating factors such as depression (Liu et al., 2024; Elhai et al., 2016), emotional well-being (Gugushvili, et al., 2020), and anxiety (Elhai et al., 2017) as potential pathways linking FoMO to PSU. Among these, boredom proneness has recently emerged as a particularly salient factor in the digital age, especially among young adults. Therefore, the present study focuses on boredom proneness as a potential mediator to further elucidate the relationship between FoMO and PSU. Consistent with the Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand et al., 2019), trait predispositions and affective states are expected to channel motivational tendencies (e.g., FoMO) into specific patterns of problematic technology use, providing a framework for testing potential mediators. Within this model, FoMO functions as a person-related predisposing factor (trait level), whereas boredom proneness represents an

affective response mechanism that mediates maladaptive behavioral outcomes

Boredom is defined as a state of dissatisfaction and discomfort that arises when individuals wish to engage in meaningful or stimulating activities but are unable to do so (Eastwood et al., 2012). Transient episodes of boredom are common and often situational (Chin et al., 2017), emerging from the interaction between personal characteristics and environmental context (Mercer-Lynn et al., 2014). However, beyond state-level boredom, researchers have also focused on boredom proneness, a trait-like tendency to frequently experience boredom, as initially conceptualized by Farmer and Sundberg (1986). While momentary boredom may sometimes lead to adaptive outcomes (e.g., reflection or creativity), boredom proneness has been consistently linked to maladaptive consequences and reduced well-being (Fahlman et al., 2009).

Individuals with high boredom proneness scores are more likely to report being bored across a range of situations (Mercer-Lynn et al., 2014). Previous studies have shown that boredom proneness is associated with various psychosocial problems (Dahlen et al., 2004; Sommers & Vodanovich, 2000; Struk et al., 2017; Tze et al., 2016; Weybright et al., 2015). In the context of technology use, bored individuals often turn to smartphones as a means of escaping this aversive state through activities such as browsing social networking sites (SNSs), messaging, or online gaming (Lin et al., 2009; Skues et al., 2016). Supporting this view, Wolniewicz et al. (2020) identified a significant relationship between boredom proneness and PSU, with FoMO acting as a mediator. Similarly, Zarei (2020) found that both boredom and FoMO mediated the relationship between depressive symptoms and PSU. In another study, Sarıtaş et al. (2024) reported that FoMO positively predicted feelings of boredom, which in turn mediated the relationship between FoMO and social media addiction. Likewise, Duygun et al. (2022) indicated that leisure boredom significantly predicted social media addiction.

Although many of these studies focus specifically on social media, their findings are generalizable to smartphone use more broadly, given that social media addiction is often conceptualized as a subtype of PSU. In this regard, a growing body of empirical research consistently identifies boredom proneness as a key psychological risk factor for PSU (Bozaci, 2020; Elhai et al., 2017; Leung, 2008; Matic et al., 2015; Schroeter et al., 2015; Yang et al., 2020). Therefore, the present study supports the notion that boredom proneness plays a critical role in explaining PSU among young individuals.

These findings collectively suggest a dynamic interplay between FoMO, boredom proneness, and PSU. However, variations in model directionality and the positioning of mediators across existing studies reflect a theoretical inconsistency in the literature. The present study addresses this gap by integrating SDT and the I-PACE model to build a more coherent conceptual framework. From the SDT perspective, FoMO is viewed as a manifestation of unmet basic psychological needs, particularly relatedness and autonomy. Individuals who feel socially disconnected or lack control over their environment may develop persistent anxiety about missing out on rewarding experiences—what has been conceptualized as trait FoMO (Wegmann et al., 2017). This dispositional characteristic can undermine intrinsic motivation and emotional

stability, increasing the likelihood of disengagement and negative affective states such as boredom proneness. Liu et al. (2025) found that frustration of autonomy and relatedness needs significantly predicted heightened levels of boredom in university students. This reinforces the theoretical view that boredom can emerge as a psychological consequence of thwarted basic needs, especially in educational and social environments that fail to satisfy students' motivational drives.

Building on this, the I-PACE model provides an explanatory framework for how these traits and affective states interact to promote maladaptive technology use. In this framework, trait-level FoMO functions as a distal person-related factor, while boredom proneness acts as an affective state that may mediate the pathway from dispositional anxiety to behavioral outcomes like PSU. Unlike previous models that positioned FoMO as a mediator (e.g., between depressive symptoms and PSU), the current study treats trait FoMO as a foundational psychological predisposition, exploring boredom proneness as the affective mechanism that explains its translation into problematic smartphone behavior. This theoretical reframing not only aligns with both SDT and I-PACE but also contributes to the literature by clarifying the directional nature of these psychological processes. Smartphones, in this context, offer an easily accessible coping mechanism—providing immediate, albeit temporary, relief from internal discomfort and perceived social exclusion. Furthermore, as social participation constitutes a key source of meaning and engagement, individuals with high boredom proneness may turn to their smartphones to fill experiential voids, maintain social connectivity, or alleviate emotional discomfort, thereby increasing the risk of PSU (Elhai et al., 2017; Yang et al., 2020; Zhang et al., 2019).

Taken together, this study aimed to examine the mediating role of boredom proneness in the relationship between FoMO and PSU among undergraduate students. Within the I-PACE model framework, trait-level FoMO represents a distal person-related factor, boredom proneness operates as a state-level affective mediator, and PSU emerges as the resulting maladaptive behavioral outcome. Unlike prior studies that often conceptualized FoMO as a situational response or mediating mechanism, this study conceptualizes trait FoMO as a stable dispositional factor, thereby offering a novel perspective on the psychological processes underlying PSU. In line with SDT and I-PACE, FoMO was conceptualized as a trait-level predisposition (X) and boredom proneness as an affective state (M) mediating its relationship with PSU (Y). This theoretical positioning clarifies the directionality of the model and justifies the mediation pathway tested in the present study. Based on theoretical assumptions from SDT and I-PACE, the following hypotheses were formulated:

H₁: FoMO is positively associated with boredom proneness.

H₂: Boredom proneness is positively associated with PSU.

H₃: FoMO is positively associated with PSU after accounting for boredom proneness.

H₄: Boredom proneness mediates the association between FoMO and PSU.

The conceptual model illustrating the hypothesized relationships is presented in Figure 1.

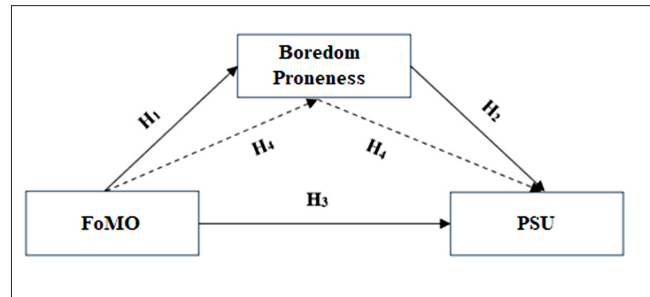


Figure 1. The Proposed Mediation Model. Note: Gender was included as a covariate (coded as 1 = female, 2 = male).

Material and Methods

This research is cross-sectional in design and uses a correlational survey model to reveal the relationships between variables. Cross-sectional studies aim to examine the current situation and relationships between variables at a specific point in time through data collected during that period (Olsen & George, 2004). The correlational survey model, as one of the quantitative research methods, is an approach aimed at identifying relationships and interactions between continuous or ordinal variables (Büyükoztürk et al., 2017). In this context, the relationships between the variables of boredom proneness, FoMO, and PSU were statistically analyzed using the collected data.

Participants

The cross-sectional study was conducted in May 2025. Data were collected via an online survey administered through Google Forms, which was shared on the MS Teams platform. Participants were recruited through a convenience sampling method from students enrolled in a public university in Türkiye, specifically those attending the elective course “Addictions and Prevention of Addictions” at a public university in Türkiye. All participants were active users of the internet and SNSs, with an average daily social network use time of 4 hours and 19 minutes. The final sample consisted of 515 university students, with a mean age of 22.21 years (standard deviation [SD] = 2.65), ranging from 18 to 45 years. Of the participants, 323 (62.7%) were female and 192 (37.3%) were male. The demographic characteristics of the participants are shown in Table 1.

Data Collection Tools

Fear of Missing Out Scale

The Fear of Missing Out Scale (Przybylski et al., 2013) consists of 10 items that assess the FoMO on developments on SNSs. Response options range from “1 = Does not apply to me at all” to “5 = Applies to me completely.” Higher scores indicate that individuals are more prone to the FoMO. “When I go on holiday, I continue to follow what my friends are doing” is one of the sample items from the FoMO Scale. In this study, the Turkish version of the scale (Gökler et al., 2016) was used. The reliability coefficient of the original scale, determined using Cronbach’s alpha coefficient, is 0.95. In the study, the internal consistency coefficient was found to be 0.861.

The smartphone addiction scale - short form

The Smartphone Addiction Scale - Short Form was developed by Kwon et al. (2013) to measure the risk of smartphone addiction and was adapted into Turkish by Noyan et al. (2015). The scale

Table 1.
Demographic Characteristics of the Participants

Variables	Categories	N	%
Gender	Female	323	62.7
	Male	192	37.3
Grade level	1st year	27	5.2
	2nd year	69	13.4
	3rd year	215	41.7
	4th year	197	38.3
	5th year	7	1.4
Department	Mechanical Engineering	63	12.2
	Nursing	55	10.7
	Finance	33	6.4
	Business Administration	26	5.0
	Public Administration	24	4.7
	Turkish Language and Literature	24	4.7
	Health Management	23	4.5
	Sports Management	22	4.3
	Communication and Design	17	3.3
	History	15	2.9
	Electrical and Electronics Engineering	13	2.5
	Genetic ve Bioengineering	13	2.5
	Food Engineering	13	2.5
	Architecture	13	2.5
	English Translation and Interpreting	12	2.3
	Biology	11	2.1
	Audiology	11	2.1
	Nutrition and Dietetics	10	1.9
	Economics	10	1.9
	Landscape Architecture	10	1.9
	Others (Chemistry, Mathematics, Econometrics etc.)	97	19.1
Frequently used SNS app	Instagram	354	68.7
	X	54	10.5
	TikTok	45	8.8
	WhatsApp	31	6.0
	YouTube	31	6.0
Total participants		515	100.0

Note: SNS = Social networking site.

consists of 10 items; each scored on a scale from 1 = Strongly Disagree to 6 = Strongly Agree; an example item is “I delay planned tasks because of smartphone use.” The total score that can be obtained from the scale ranges from 10 to 60. In the reliability study of the scale, the Cronbach’s alpha coefficient was reported as 0.867, and in this study, it was calculated as 0.895.

Short Boredom Proneness Scale

The scale developed by Struk et al. (2017) aims to assess individuals’ levels of boredom proneness and was adapted into Turkish by Güner et al. (2021). The scale consists of eight items rated on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). The total score ranges from 8 to 56, with higher scores indicating a greater tendency toward boredom. An example item from the scale is: “It is difficult for me to entertain myself.” The internal consistency coefficient (Cronbach’s alpha) of the original scale was reported as .91, and it was calculated as .871 in this study.

Data Collection and Analysis

Data collection took place during the last 2 weeks of May in 2025. Participants were informed about the research. The principle of voluntariness was emphasized, and participation was secured through consent forms. The online research forms took approximately 10 – 15 minutes to complete. Prior to the study, ethics committee approval was obtained from Trakya University Social and Human Sciences Research Ethics Committee (Protocol No.: 2022/03, Decision No.: 842989, Decision Date: May 7, 2025).

In the analysis process, descriptive statistics (e.g., mean, standard deviation), normality assumptions, and internal consistency coefficients were calculated. Then, Pearson product-moment correlation analysis was conducted to investigate the relationships between boredom proneness, FoMO and PSU. In addition, skewness and kurtosis values of the variables were calculated to test the normality assumption, and all values were within the acceptable range of -1.5 to $+1.5$ (Tabachnick & Fidell, 2013), indicating no substantial violations of normality. Then, the PROCESS macro (Model 4) for SPSS version 3.4 (SPSS Inc.; Chicago, IL, USA) (Hayes, 2018) was used to analyze the mediating role of boredom proneness in the relationship between FoMO and PSU. The analysis results of the tested mediation model were interpreted using unstandardized and standardized path prediction (β) scores. In order to provide additional evidence for the significance of the direct and indirect effects of the variables in the tested mediation model, Bootstrap analyses were conducted by resampling 10,000 by selecting a 95% CI. In bootstrap analysis, when the CIs do not cover zero, the examined effect is considered to be significant (Hayes, 2018; Preacher & Hayes, 2008). Moreover, gender was used as a covariate in the mediation model to mitigate any confounding effects arising from the disproportionate distribution of male and female individuals in the sample.

Results

Preliminary Analysis

Table 2 presents the descriptive statistics, reliability, and correlation values for the study variables. The mean score for FoMO was 2.53 (SD = 0.80), with skewness of -0.002 and kurtosis of -0.533 . Boredom proneness had a mean of 3.36 (SD = 1.24), with skewness of 0.018 and kurtosis of -0.428 . Problematic smartphone use showed a mean of 3.04 (SD = 1.09), with skewness of 0.325

Table 2.*Descriptive Statistics, Reliabilities and Correlations Among Study Variables (N = 515)*

Variables	Mean	SD	Skewness	Kurtosis	α	AVE	CR	1	2	3
(1) FoMO	2.53	.800	-.002	-.533	.861	.405	.870	1		
(2) Boredom Proneness	3.36	1.244	.018	-.428	.871	.461	.872	.431**	1	
(3) PSU	3.04	1.088	.325	-.293	.895	.474	.899	.567**	.486**	1

Note: AVE = Average variance extracted (convergent validity); CR = Composite reliability; FoMO = Fear of missing out; PSU = Problematic smartphone use; SD = Standard deviation; α = Cronbach's alpha (internal consistency).

** $p < .001$.

and kurtosis of -0.293 . The skewness and kurtosis values for all variables fall within acceptable ranges, indicating no substantial violations of normality assumptions. Additionally, the Durbin – Watson statistic was calculated as 1.995 , suggesting no significant autocorrelation among the residuals. Multicollinearity diagnostics revealed that the Variance Inflation Factor values for all predictors were 1.288 , well below the recommended threshold of 10 , indicating no multicollinearity concerns. The highest condition index observed was 7.898 , which also confirms the absence of multicollinearity problems. Regarding internal consistency, Cronbach's alpha coefficients ranged from $.861$ to $.895$, demonstrating high reliability for all study variables (Tabachnick et al., 2013).

The correlation analysis revealed significant, positive, and moderate-level relationships among the study variables. Specifically, FoMO showed a positive and moderate correlation with boredom ($r = .431, p < .01$) and PSU ($r = .567, p < .01$). Similarly, boredom proneness was positively and moderately correlated with PSU ($r = .486, p < .01$). These findings indicate that higher levels of FoMO and boredom proneness are associated with increased levels of PSU.

Mediation Analysis

In this study, a mediation model was conducted to examine the mediating role of boredom proneness in the relationship between FoMO and PSU, while controlling for gender (coded as 1 = female, 2 = male). The findings are presented in Figure 2 and Table 3. Results showed that FoMO had a significant positive effect on boredom proneness ($B = 0.666, SE = 0.06, p < .001; \beta = 0.428$), indicating that increases in FoMO are associated with higher levels of boredom proneness. Gender was not a significant predictor of boredom proneness ($B = -0.037, p = .72$). After including the mediator, FoMO still had a significant direct effect on PSU ($B = 0.568, SE = 0.05, p < .001; \beta = 0.417$). Boredom

proneness also significantly predicted PSU ($B = 0.257, SE = 0.03, p < .001; \beta = 0.294$). In addition, gender significantly predicted PSU ($B = -0.302, SE = 0.08, p < .001; \beta = -0.134$), indicating that female students reported higher PSU scores compared to males. The total effect of FoMO on PSU was significant ($B = 0.739, SE = 0.05, p < .001; \beta = 0.543$). The indirect effect of FoMO on PSU through boredom proneness was also significant ($B = 0.171, BootSE = 0.03, 95\% \text{ CI } [0.112, 0.241]; \beta = 0.126$), based on 10,000 bootstrap samples. Since the CI did not include zero, the mediation effect was confirmed. These findings support H_1, H_2, H_3 , and H_4 , indicating that boredom proneness partially mediates the relationship between FoMO and PSU.

Discussion

This study aimed to investigate the mediating role of boredom proneness in the relationship between FoMO and PSU among Turkish university students. The findings confirmed the fourth and main hypothesis (H_4), indicating that boredom proneness significantly mediates the relationship between FoMO and PSU. This suggests that boredom proneness functions as a key psychological mechanism through which FoMO contributes to PSU. However, the direct effect of FoMO on PSU remained significant even after accounting for boredom proneness, indicating partial mediation. Therefore, while boredom proneness explains a significant portion of the link between FoMO and PSU, other unmeasured mechanisms may also play a role in this association. After controlling for gender, the mediation effect of boredom proneness remained significant, suggesting that the indirect effect of FoMO on PSU through boredom proneness was not confounded by gender. Interestingly, gender significantly predicted PSU, with female students reporting higher levels compared to males, whereas no gender differences were found in boredom proneness. This finding is consistent with previous studies indicating that female students tend to exhibit higher levels of PSU, possibly due to differences in social media engagement patterns.

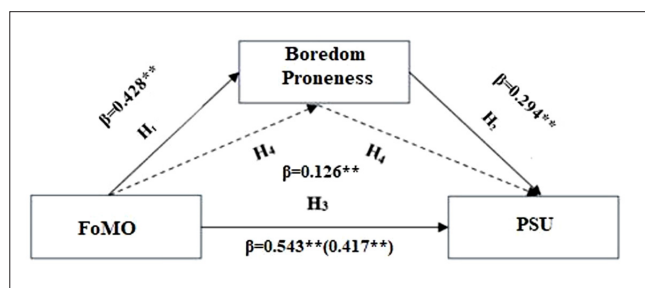


Figure 2. Results of the Mediation Model with Standardized Coefficients (* $p < .01$, ** $p < .001$). Note: Gender was included as a covariate (coded as 1 = female, 2 = male).

The first hypothesis was also supported in the study. Consistent with H_1 , individuals who experience higher levels of FoMO were more likely to report increased feelings of boredom proneness. This may be due to the tension and dissatisfaction associated with unmet psychological needs, such as autonomy and relatedness, as posited by Self-Determination Theory (Ryan & Deci, 2000). A study conducted by Al-Saggaf (2021) revealed that situational phubbing increases as status boredom and status FoMO increase. However, this study addressed situational FoMO and, unlike the current study, defined FoMO as a partial mediator between situational boredom and situational phubbing. Additionally, some studies have suggested that spending a significant amount of

Table 3.

Coefficients for the Mediation Model; Total, Direct and Indirect Effects of Boredom Proneness on Problematic Smartphone Use, and 95% Bootstrap CIs

	Coeff. (B)	SE	<i>t</i>	<i>p</i>	95% CI Lower	95% CI Upper	Std. Coeff. (β)
Mediation Path (X → M)							
Constant (M: Boredom Proneness)	1.7216	0.2376	7.2454	<.001	1.2548	2.1885	–
FoMO → Boredom Proneness	0.6659	0.0630	10.5668	<.001	0.5421	0.7897	0.4281
Gender → Boredom Proneness	–.0374	.1042	–.3593	.7195	–.2421	.1672	–.0146
Outcome Model (X, M, C → Y)							
Constant (Y: PSU)	1.1502	0.1858	6.1904	<.001	0.7852	1.5152	N/A
FoMO → PSU (Direct)	0.5675	0.0518	10.9575	<.001	0.4657	0.6692	0.4172
Boredom Proneness → PSU (Mediator)	0.2570	0.0329	7.8075	<.001	0.1923	0.3216	0.2938
Gender → PSU	–.3020	.0776	–3.8932	<.001	–.4545	–.1496	–.1343
Total Effect (X → Y)							
FoMO → PSU (Total)	0.7386	0.0496	14.8916	<.001	0.6412	0.8360	0.5430
Indirect Effect (X → M → Y)							
FoMO → Boredom Proneness → PSU	0.1711	0.0331	N/A	N/A	0.1117	0.2409	0.1275

Note: Coeff = Unstandardized coefficient; FoMO = Fear of missing out; M = Mediator variables; PSU = Problematic smartphone use; SE = Standard error; X = Independent variable; Y = Dependent variable.

time on SNSs may help reduce distress (Rauch & Schanz, 2013; Stockdale & Coyne, 2020). These findings confirm the relationship between FoMO and boredom proneness through intensive SNSs use. In a study that examined these two variables from different perspectives, it was stated that bored individuals are more likely to think that they missed out on a rewarding experience because they were unable to enjoy themselves cognitively (Holte & Ferraro, 2020). While previous studies have frequently conceptualized FoMO as a mediator between boredom proneness and technology-related behaviors (Al-Saggaf, 2021), the present study adopts a different theoretical approach by positioning FoMO as the independent variable and boredom proneness as the mediator. Grounded in the I-PACE model, this structure reflects the notion that FoMO itself arises from unmet psychological needs and may give rise to emotional states such as boredom proneness. Whereas prior models framed boredom proneness as a precursor to FoMO, this study proposes that individuals with trait FoMO may be more prone to feelings of boredom proneness due to their inability to find satisfaction or meaning in offline activities. This distinction underscores the theoretical nuance of the current model and offers a novel pathway from FoMO to PSU through boredom proneness, thereby contributing to the literature.

The second hypothesis (H_2) was also confirmed, showing that boredom proneness is positively associated with PSU. This supports previous findings suggesting that boredom can prompt individuals to engage in maladaptive digital behaviors in an attempt to escape aversive emotional states (Elhai et al., 2017; Leung, 2008; Yang et al., 2020; Wolniewicz et al., 2020). Supporting this, a study by Lepp et al. (2017) investigated the role of leisure boredom, a concept closely aligned with general boredom tendencies, in a sample of university students. The authors found that higher levels of leisure boredom were associated with more frequent self-reported smartphone use. Although the term refers specifically to

boredom experienced during leisure time, the findings highlight that difficulties in finding satisfying or meaningful leisure activities may contribute to PSU. Furthermore, boredom proneness has been shown to be closely related to sensation-seeking tendencies (Dahlen et al., 2004), which may drive individuals to seek stimulation via digital means such as smartphones. Social participation, often regarded as a fundamental source of meaning in individuals' lives, can be facilitated through smartphone use (Yang et al., 2020). In this light, it is plausible that individuals who struggle to satisfy their psychological needs, such as experiencing a lack of autonomy, relatedness, or engagement, may turn to smartphones to compensate for these deficits.

Lastly, consistent with H_3 , FoMO was found to have a significant positive effect on PSU, echoing a substantial body of literature highlighting FoMO as a strong predictor of PSU. This finding is consistent with previous literature identifying FoMO as a strong predictor of PSU (Elhai et al., 2025; Gezgin, 2018; Gezgin et al., 2025; Hussain et al., 2024; Liu et al., 2024). These results may also help explain the widespread use of SNSs among university students, who often express themselves through such online behaviors. As highlighted by Li et al. (2022), when basic psychological needs are not adequately fulfilled in daily life, and the motivation to engage with social networking platforms is strong, individuals may become increasingly vulnerable to heightened levels of FoMO and excessive smartphone use or even PSU. The current findings are consistent with this perspective, further reinforcing the idea that unmet psychological needs may lead individuals to rely on smartphones as a means of self-expression, social connection, and emotional regulation.

In conclusion, this study contributes to research on PSU by demonstrating that boredom proneness acts as a partial mediating mechanism in the relationship between FoMO and PSU. Utilizing

the I-PACE model, this study proposes a new framework for understanding the relationship between FoMO and PSU. The findings indicate that FoMO, conceptualized as a multidimensional construct encompassing both state and trait characteristics (Wegmann et al., 2017), may manifest as PSU in this study through the trait component. According to the I-PACE model, individual predispositions (FoMO) may influence addiction-like behaviors through emotional responses (boredom proneness). Despite its cross-sectional design limiting causal relationships, the results suggest that university students experiencing higher levels of FoMO, and consequently greater boredom proneness, may be more prone to problematic technology usage patterns. The results highlight the importance of developing comprehensive psychoeducational approaches that target not only FoMO but also university students' tendencies toward boredom in intervention and prevention programs for such digital behaviors. Furthermore, future research should include repeat studies using psychometric tools that can measure trait FoMO and test the causal relationships between these variables more robustly using longitudinal research designs, thereby contributing to the strengthening of the theoretical framework.

Limitations

Notwithstanding the valuable contributions of the present study, it is important to acknowledge its limitations. Firstly, the cross-sectional design restricts the ability to infer causality among the variables. Despite the theoretical underpinnings and statistical substantiation of the mediation model, the utilization of longitudinal or experimental designs would be more appropriate for establishing temporal precedence and directionality. Secondly, it is important to note that all data were collected through self-report instruments, which may be susceptible to biases such as social desirability and common method variance. Future research could benefit from incorporating objective behavioral measures or multi-informant approaches to enhance data validity. Thirdly, the study sample comprised just Turkish university students, potentially constraining the generalizability of the findings to other cultural or age demographics. The sample had a greater percentage of female participants (62.7%); nevertheless, gender was statistically controlled as a covariate, so guaranteeing that the observed connections among FoMO, boredom proneness, and PSU were not confounded by gender disparities. To evaluate the model's robustness and cross-cultural applicability, it is advisable to duplicate the study across various populations and contexts. Finally, although the phenomenon of boredom proneness was examined as a potential mediator, other potentially influential psychological constructs, such as impulsivity, difficulties in emotional regulation, or feelings of loneliness, were not included in the model. It is possible that these factors may offer additional explanatory power in future studies.

Data Availability: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval: Ethical approval for this study was obtained from Trakya University Social and Human Sciences Research Ethics Committee (Protocol No.: 2022/03, Decision No.: 842989, Decision Date: May 7, 2025).

Informed Consent: Written informed consent was obtained from the participants who agreed to take part in the study.

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