

The effect of nomophobia on exercise procrastination: The mediating role of self-control

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Published online: August 31, 2025

Accepted for publication: August 15, 2025

DOI:10.7752/jpes.2025.08193

Abstract:

Aim: This study examined the relationship between nomophobia—the fear of being without access to a mobile phone—and exercise procrastination among university students. It also investigated whether self-control mediated this association. Given the growing dependence on digital devices and the decline in physical activity among young adults, understanding these behavioral dynamics is timely and crucial for public health.

Method: The research sample consisted of 467 university students who reported engaging in physical activity regularly. Data collection involved three validated instruments: the Nomophobia Questionnaire (NMP-Q), the Exercise Procrastination Scale (EPS), and the Brief Self-Control Scale (BSCS). All scales demonstrated strong internal reliability, with Cronbach's alpha coefficients ranging from .805 to .949. Statistical analyses were carried out using IBM SPSS (Version 25). **Results:** The analysis revealed a significant positive correlation between nomophobia and exercise procrastination ($r = .525, p < .01$). Moreover, nomophobia was found to significantly predict exercise delay both directly ($B = 0.5375, p < .001$) and indirectly through reduced self-control ($B = 0.1148; 95\% \text{ CI } [0.0693, 0.1718]$). The model explained approximately 34.2% of the variance in exercise procrastination behavior ($R^2 = .3419$), supporting the presence of a partial mediating effect.

Conclusion: The findings highlight the role of nomophobia as a modern behavioral risk factor that may hinder students' motivation to engage in regular physical activity. Notably, self-control emerged as a buffering variable, mitigating the adverse effects of nomophobia on health-related habits. These insights suggest that preventive strategies aimed at improving digital self-regulation and self-control capacities could be beneficial in reducing exercise procrastination among digitally immersed youth. Programs integrating mobile usage awareness with self-discipline training may be particularly effective for this population. Based on these findings, universities and health policymakers may develop digital wellness programs that could include behavioral training aimed at enhancing self-regulation. Future interventions could also combine physical activity promotion campaigns with digital detox practices to increase their effectiveness in digitally saturated environments.

Keywords: Nomophobia, Digital Dependence, Physical Activity Adherence, Behavioral Regulation, University Students

Introduction

The pervasive integration of smartphones into modern life has significantly reshaped how individuals interact and structure their daily routines. Among various demographic groups, university students appear to be especially reliant on these devices, embedding them deeply into academic pursuits and social activities. This heightened dependence has brought attention to nomophobia, a term that describes the discomfort or anxiety people feel when they are separated from their smartphones (Rodríguez-García et al., 2020; Pan et al., 2023). While studies have linked nomophobia to increased stress, concentration difficulties, and disruption of daily habits (Licata et al., 2024), its specific influence on health-enhancing behaviors, especially those related to physical well-being, remains unexplored.

Recent evidence with university samples shows that nomophobia is not only prevalent but functionally consequential: a multicenter study of Egyptian nursing students ($N = 1,626$) found that 40.3% reported *severe* nomophobia (El-Ashry et al., 2024), and a study of Iranian nursing students reported that 72% fell into the moderate-to-severe range, with severity linked to more frequent checking and greater daily internet use (Aslani, Sadeghi, Janatolmakan, Rezaeian, & Khatony, 2024). Beyond prevalence, nomophobia has been shown to *mediate* the relationship between problematic social media/smartphone use and psychological distress among university students (Tung et al., 2025).

It is well documented that engaging in regular physical activity contributes positively to both mental and physical health. Exercise plays a key role in preventing chronic conditions and regulating mood and emotional well-being (Stieger et al., 2023; Zhang et al., 2024). Despite these benefits, many university students struggle to sustain consistent exercise routines. Challenges, such as poor time management, lack of intrinsic

motivation, and the appeal of digital entertainment, frequently hinder participation (Kelly & Walton, 2021; Dang & Jia, 2024). Recently, the concept of exercise procrastination has been defined as the intentional delay of planned physical activity, even when individuals are aware of its negative consequences (Zhang et al., 2024). Empirical studies with college populations indicate that procrastination negatively predicts exercise participation, with motivational and volitional factors transmitting this effect: one study (N = 957) found that time management disposition and exercise motivation jointly mediated the link between procrastination and physical activity (Zhang et al., 2024a), while another identified a chain mediation via exercise commitment and action control (Zhang et al., 2024b). Complementary evidence shows that exercise procrastination contributes to the intention-behaviour gap, with affect functioning as a self-regulatory resource that moderates this process (Miao et al., 2024).

To explain such behaviors, models like the Procrastination-Health Model suggest that chronic procrastination may obstruct engagement in health-enhancing actions and lead to elevated stress (Sirois & Pychyl, 2013). Some studies further argue that procrastination in specific areas, such as exercise, may be more detrimental than general tendencies to delay tasks (Kroese & De Ridder, 2016; Kelly & Walton, 2021). In this context, recent findings in sports psychology indicate that both competitive and non-competitive athletes show psychological patterns related to self-control, underlining its central role in sustaining healthy routines (Lorenco-Lima et al., 2025).

A contemporary synthesis also emphasizes self-control as a limited but trainable capacity that underpins sustained goal pursuit across everyday life and sport, with updated evidence on conservation, recovery, and performance effects (Baumeister et al., 2024). Consistent with this, athlete data indicate that higher alexithymia is associated with *lower* trait self-control, underscoring the affect-regulatory foundations of adherence to demanding routines (Graham et al., 2024).

Self-control, defined as the ability to resist immediate impulses in favor of long-term aspirations, is considered a key personal trait linked to both problematic smartphone use and procrastination tendencies (Tangney et al., 2008). Research consistently suggests that individuals with greater self-regulatory capacity are more inclined to establish and sustain healthy behavioral patterns, whereas those with lower self-control often display impulsivity and are more vulnerable to excessive smartphone engagement (De Ridder et al., 2012; Pan et al., 2023). Moreover, diminished self-control has been associated with compulsive digital media consumption and a general reluctance to participate in physically demanding activities (Dang, 2018; Manapat et al., 2019). Educational interventions, such as chess-based cognitive training, have demonstrated improvements in time management, decision-making, and self-discipline, reinforcing the relevance of structured self-control development in academic and athletic contexts (Yarashev et al., 2025).

Extending to health behaviour contexts, mediation models show that self-control (often alongside perceived social support) *transmits* broader environmental risks into actual sports engagement among students, reinforcing its mechanistic role in sustained participation (Guo et al., 2025).

This interaction can be further understood through dual-process self-regulation models, which propose that human behavior results from the interplay between reflective, goal-directed processes and impulsive, emotionally driven reactions (Metcalf & Mischel, 1999). When individuals experience nomophobia, anxiety related to disconnection may activate impulsive pathways that override intended behaviors, such as exercising (De Ridder & Gillebaart, 2017).

Notably, the nomophobia literature has prioritised outcomes, such as psychological distress (e.g., Tung et al., 2025), whereas the exercise procrastination literature has focused on motivational/volitional mediators (e.g., Zhang et al., 2024a; Zhang et al., 2024b; Miao et al., 2024). These strands have rarely been integrated within a single model positioning *self-control* as the bridging mechanism.

Self-Determination Theory (Deci & Ryan, 2000) also offers insights into these mechanisms by highlighting the significance of intrinsic motivation and autonomy in maintaining health behaviors. Nomophobia may interfere with these internal drivers by diverting attention away from personally endorsed goals and toward external digital reassurance. Empirical studies have shown that increased smartphone dependency is associated with reduced attention span and weaker adherence to long-term health behaviors (Stieger et al., 2023). Evidence from physical education further suggests that students' ability to organize, monitor, and evaluate their practice directly reflects self-regulation capacity, which is a critical determinant of consistent exercise engagement (Duivenvoorden et al., 2021).

Taken together—with high and consequential nomophobia in student cohorts (Aslani et al., 2024; El-Ashry et al., 2024) and robust evidence that procrastination undermines physical activity through self-regulatory pathways (Zhang et al., 2024a; Zhang et al., 2024b; Miao et al., 2024)—there is a timely need to test the triadic pathway connecting *nomophobia* → *self-control* → *exercise procrastination* in university populations. This study was conducted with university students in Türkiye/Erzurum recruited from Erzurum Technical University/Faculty of Sports Sciences during 2024-2025 Academic Years, a setting characterized by intensive, smartphone-mediated study and social routines.

Although previous studies have increasingly examined nomophobia and self-control as separate psychological constructs, much less is known about how these two factors relate to one another, particularly in

the context of exercise postponement. One question that remains unanswered is whether self-control might play an intermediary role in the link between nomophobia and the tendency to delay physical activity. Gaining a clearer understanding of this possible connection could help inform strategies aimed at reducing inactivity among individuals who are highly dependent on digital technologies.

This study seeks to address this research gap by examining the extent to which nomophobia contributes to exercise procrastination and whether self-control plays a mediating role. Grounded in theoretical frameworks, such as the Procrastination-Health Model, dual-process theory, and Self-Determination Theory, the study investigates how digital dependence, self-regulation, and physical activity behaviors interact among university students. The findings may help guide the development of evidence-based programs aimed at reducing the impact of digital distractions on student well-being.

While nomophobia, self-control, and exercise behavior have each been studied individually, few studies have examined their combined influence. In particular, the mediating role of self-control in the link between nomophobia and exercise procrastination has been largely overlooked. By focusing on this pathway, the present study aims to contribute a novel perspective to the literature. It proposes that diminished self-control could be one key route through which smartphone dependence undermines adherence to physical activity. This mediation-based approach offers more profound insights into how technology usage shapes health behavior and may support the design of tailored interventions for young adults.

Problem Statement

Although scholarly interest in nomophobia has increased in recent years, much of the research has tended to focus on its psychological outcomes, such as stress, anxiety, and concentration difficulties. At the same time, studies on exercise procrastination have generally examined motivational or volitional mechanisms in isolation, without explicitly linking them to technology-related anxieties. It may therefore be argued that these two strands of literature have rarely been conceptually integrated within a single framework, particularly when considering the potential mediating role of self-control. This gap could be especially relevant in university populations where smartphone dependence appears to be pervasive and physical inactivity may be a common concern. Thus, it is considered important to explore whether nomophobia might undermine students' ability to sustain regular exercise, and through which psychological mechanisms this influence could occur.

Approach

To address this issue, the present study employed a quantitative cross-sectional design with a large sample of physically active university students in Türkiye. Validated instruments were administered to measure nomophobia (NMP-Q), exercise procrastination (EPS), and self-control (BSCS). The hypothesized mediating role of self-control was tested using Hayes' PROCESS macro (Model 4) with 5,000 bootstrap resamples, controlling for age, gender, daily smartphone use, and baseline physical activity. This analytic strategy enabled the estimation of both direct and indirect effects, providing a precise understanding of how digital dependence translates into exercise delay through diminished self-control.

Based on this framework, the study tests the following hypotheses:

- **H1:** Nomophobia will show a significant negative association with self-control.
- **H2:** Nomophobia will be positively related to exercise procrastination.
- **H3:** Self-control will be inversely associated with exercise procrastination.
- **H4:** The relationship between nomophobia and exercise procrastination will be mediated by self-control.

Material & Methods

Aim of the Study The main objective of this research was to examine the influence of nomophobia on exercise procrastination among individuals who engage in regular physical activity. A further aim was to determine whether self-control is a mediating factor within this relationship.

Research Design This study adopted a correlational design, which enabled the exploration of associations between variables without manipulating any conditions, consistent with the framework outlined by Karasar (2016). The conceptual model was structured to assess both direct and indirect effects, including self-control as a mediating construct. Hayes' PROCESS Macro (Model 4) was utilized to perform the mediation analysis, employing 5,000 bootstrap resamples to ensure robust estimation of the indirect effects. Normality of variable distributions was assumed, which warranted the application of parametric statistical procedures.

Research Group Participants consisted of undergraduate students enrolled in the Faculty of Sports Sciences at Erzurum Technical University and Bayburt University during the 2024–2025 academic term. Convenience sampling was used to recruit individuals who were physically active. Based on a power analysis conducted using G*Power, a sample size of at least 85 was deemed sufficient for the mediation model. Nonetheless, data were collected from 467 participants to enhance the generalizability of findings.

Data Collection Tools *Personal Information Form:* Developed by the researchers to obtain demographic data, such as age, gender, sports discipline, national athlete status, weekly exercise frequency, daily exercise duration, and patterns of mobile phone usage, including purpose and duration.

Üsküdar Nomophobia Scale (NMP-Q): A 25-item instrument designed by Tarhan et al. (2022) using a 5-point Likert format. It measures nomophobia across three domains: Functional Impairment, Excessive Use, and Communication Inability.

Exercise Procrastination Scale (EPS): Originally developed by Kelly and Walton (2021) and later adapted into Turkish by Köse et al. (2024), this 6-item 5-point Likert scale evaluates tendencies to delay physical activity.

Brief Self-Control Scale (BSCS): Originally developed by Tangney et al. (2008) and translated into Turkish by Nebioğlu et al. (2012), this 9-item scale includes two dimensions—Self-Discipline and Impulsivity—assessed on a 5-point Likert scale.

Data Collection Procedure Data collection was carried out in April 2025 using a structured online questionnaire distributed via Google Forms. The survey link was shared through university mailing systems and academic networks. Participation was entirely voluntary, and electronic informed consent was obtained prior to survey initiation. Participants were assured of anonymity and the confidentiality of their responses.

Data Analysis The statistical analyses were performed using IBM SPSS Statistics (Version 25). Descriptive statistics were first calculated to outline participants' demographic characteristics and provide an overview of the scale distributions. Examination of skewness and kurtosis values indicated that the data met the assumptions of normality, which supported the application of parametric methods. Pearson's correlation coefficients were computed to explore the associations between nomophobia, self-control, and exercise procrastination. To test whether self-control functioned as a mediator in the relationship between nomophobia and exercise procrastination, Hayes' PROCESS macro (Model 4) was employed. This analysis involved 5,000 bootstrap samples to derive confidence intervals for the indirect effects. Statistical significance was set at the conventional alpha level of .05.

Ethical Approval This research adhered to ethical standards for studies involving human participants. Ethical clearance was granted by the Scientific Research and Publication Ethics Committee of Erzurum Technical University (Approval Date: April 21, 2025; Decision No: 6/1). All participants provided electronic informed consent and were assured that their data would be handled anonymously and confidentially. Demographic characteristics of participants are presented in Table 1.

Results

Table 1. Demographic Characteristics of Participants

Variable	Category	n	%
Gender	Male	283	60,6
	Female	184	39,4
Age	18-19 Years	108	23,1
	20-21 Years	114	24,4
	22-23 Years	163	34,9
	≥24 years	82	17,6
Type of Sport Branch	Team	215	46,0
	Individual	252	54,0
National Athlete Status	Yes	108	23,1
	No	359	76,9
Weekly Exercise Frequency	1-2 Days	118	25,3
	3-4 Days	173	37,0
	5-6 Days	112	24,0
	Every Day	64	13,7
Daily Exercise Duration	<1 Hour	101	21,6
	1-2 Hours	261	55,9
	≥3 Hours	105	22,5
Purpose of Mobile Phone Use	Communication	118	25,3
	Playing Games	58	12,4
	Accessing Information	46	9,9
	App Development / Programming	27	5,8
	Following Social Media	133	28,5
	Watching Videos/Movies, Listening to Music	52	11,1
	Creating Social Media Content	33	7,1
Daily Mobile Phone Usage Duration	1-2 Hours	143	40,5
	3-4 Hours	210	59,5
	5-6 Hours	97	27,5
	7-8 Hours	53	15,0
	≥9 Hours	203	57,5
Total		467	100

The final sample included 467 participants. Regarding gender, males constituted the majority of the sample, accounting for 60.6% (n = 283), while females represented 39.4% (n = 184).

Regarding age distribution, the largest proportion of participants fell within the 22–23 age range, representing 34.9% (n = 163) of the sample. This was followed by students aged 20–21 (24.4%, n = 114), 18–19 (23.1%, n = 108), and 24 years or older (17.6%, n = 82).

Regarding the type of sport engagement, over half of the participants (54.0%, n = 252) reported participation in individual sports, while 46.0% (n = 215) were involved in team-based sports, indicating a slight preference for individual activities.

As for national athlete status, 76.9% (n = 359) of the respondents stated that they were not national-level athletes, whereas 23.1% (n = 108) had experience competing at the national level.

In terms of weekly exercise frequency, most participants reported exercising 3–4 times per week (37.0%, n = 173). This was followed by those exercising 1–2 times per week (25.3%, n = 118), 5–6 times per week (24.0%, n = 112), and daily (13.7%, n = 64), reflecting a generally moderate engagement in physical activity.

Concerning daily exercise duration, more than half of the participants (55.9%, n = 261) exercised for 1–2 hours per day. A further 22.5% (n = 105) reported exercising for 3 or more hours, while 21.6% (n = 101) indicated they exercised for less than an hour daily.

When exploring the primary purposes of mobile phone use, the most frequently reported activity was using social media platforms (28.5%, n = 133). Other common uses included communication (25.3%, n = 118), gaming (12.4%, n = 58), watching videos or listening to music (11.1%, n = 52), accessing information (9.9%, n = 46), content creation for social media (7.1%, n = 33), and app development or programming (5.8%, n = 27).

Daily mobile phone usage patterns revealed that the largest group of participants used their devices for 3–4 hours per day (59.5%, n = 210). This was closely followed by those using their phones for nine or more hours daily (57.5%, n = 203). Additionally, 40.5% (n = 143) reported 1–2 hours of daily use, 27.5% (n = 97) reported 5–6 hours, and 15.0% (n = 53) used their phones for 7–8 hours each day.

As shown in Table 2 below, analysis of the Nomophobia Scale revealed that participants reported the highest mean score in the Excessive Use subdimension (M = 2.49, SD = 0.958).

Table 2. Descriptive Statistics for Nomophobia, Exercise Procrastination, and Self-Control Scales

Scale	Subdimensions	N	Min.	Max.	Mean	SD	Skewness Stat.	SE	Kurtosis Stat.	SE	Alpha
Nomophobia	Impairment in Functionality	467	1.00	4.60	1.94	.774	.759	.113	.084	.225	.892
	Excessive Use	467	1.00	5.00	2.49	.958	.367	.113	-.219	.225	.913
	Inability to Communicate	467	1.00	5.00	2.30	.949	.429	.113	-.066	.225	.901
	Total Score	467	1.00	4.84	2.21	.776	.395	.113	-.165	.225	.949
Exercise Procrastination	Total Score	467	1.00	5.00	2.33	.964	.445	.113	-.197	.225	.917
Self-control	Self-discipline	467	1.00	4.00	2.78	.492	-.728	.113	1.402	.225	.805
	Impulsivity	467	1.80	4.80	3.15	.706	.142	.113	-.730	.225	.853
	Total Score	467	1.89	4.22	2.98	.434	.186	.113	.025	.225	.826

This was followed by Inability to Communicate (M = 2.30, SD = 0.949) and Impairment in Functionality (M = 1.94, SD = 0.774). The overall mean for the total nomophobia score was 2.21 (SD = 0.776), suggesting a moderate level of nomophobia among the sample. The internal consistency of the scale was excellent, with Cronbach's alpha values of .913 for Excessive Use, .901 for Inability to Communicate, .892 for Impairment in Functionality, and .949 for the total scale.

Moreover, skewness and kurtosis values for all subdimensions were within the ± 2 range, indicating normal distribution and confirming the suitability of parametric statistical tests. The Exercise Procrastination Scale yielded a mean score of 2.33 (SD = 0.964), reflecting a moderate inclination among participants to delay physical activity. The scale exhibited excellent reliability, as indicated by a Cronbach's alpha coefficient of .917. Distributional assumptions were met, with skewness at 0.445 and kurtosis at -0.197, both within the acceptable limits for normality.

About the Brief Self-Control Scale, the Self-Discipline subdimension had a mean score of 2.78 (SD = 0.492), while the Impulsivity subdimension produced a slightly higher mean of 3.15 (SD = 0.706). The composite self-control score across all items was 2.98 (SD = 0.434), pointing to generally moderate to moderately elevated levels of self-control among respondents. Internal consistency metrics were robust: $\alpha = .805$ for Self-Discipline, .853 for Impulsivity, and .826 for the overall scale. Skewness and kurtosis values for both subdimensions and the total score were well within the accepted range, reinforcing the assumption of a normally distributed dataset.

To summarize, participants tended to show moderate levels of nomophobia and exercise procrastination, while demonstrating relatively higher self-control, especially in resisting impulsive behaviors.

The high reliability coefficients and satisfactory distribution characteristics of the instruments support their psychometric soundness and confirm the appropriateness of applying parametric analyses in subsequent inferential tests (Table 3).

Table 3. Pearson Correlation Coefficients Among Subdimensions and Total Scores of Nomophobia, Exercise Procrastination, and Self-Control Scales

	1	2	3	4	5	6	7	8
1	1.000							
2	0.631**	1.000						
3	0.616**	0.743**	1.000					
4	0.859**	0.901**	0.882**	1.000				
5	0.441**	0.483**	0.464**	0.525**	1.000			
6	0.073	0.028	0.043	0.055	-0.012	1.000		
7	-0.360**	-0.382**	-0.329**	-0.407**	-0.459**	-0.074	1.000	
8	-0.288**	-0.330**	-0.275**	-0.339**	-0.420**	0.436**	0.865**	1.000

Pearson correlation coefficients are reported. $p < .05$ is indicated by *; $p < .01$ is indicated by **.

1=Impairment in Functionality. 2=Excessive Use. 3=Inability to Communicate. 4=Nomophobia Total. 5=Exercise Procrastination Total. 6=Self-Discipline. 7=Impulsivity. 8=Self-Control Total

Correlation analysis revealed statistically significant relationships among nomophobia, exercise procrastination, and self-control, providing empirical validation to the proposed associations between smartphone dependency and self-regulatory behavior.

More specifically, total nomophobia scores were moderately and positively correlated with exercise procrastination ($r = 0.525$, $p < .01$), indicating that individuals with stronger nomophobic tendencies are more inclined to postpone engaging in physical activity. This relationship remained consistent across all three subdimensions of the nomophobia scale: Excessive Use ($r = 0.483$, $p < .01$), Impairment in Functionality ($r = 0.441$, $p < .01$), and Inability to Communicate ($r = 0.464$, $p < .01$). These results suggest that behaviors indicative of smartphone overdependence—including compulsive use, disruption to daily tasks, and anxiety over communication loss—may act as psychological barriers to forming and sustaining exercise routines.

Regarding self-regulation, significant negative associations were observed between nomophobia and self-control, particularly concerning the impulsivity dimension. Higher total nomophobia scores were associated with increased impulsivity ($r = -0.407$, $p < .01$), implying that individuals with heightened nomophobic behavior tend to act more rashly and with less forethought. Similarly, negative correlations were found between impulsivity and all three subcomponents of nomophobia: Impairment in Functionality ($r = -0.360$, $p < .01$), Excessive Use ($r = -0.382$, $p < .01$), and Inability to Communicate ($r = -0.329$, $p < .01$), further reinforcing the link between mobile phone dependence and diminished behavioral inhibition.

A significant negative correlation was also found between nomophobia and the total self-control score ($r = -0.339$, $p < .01$), indicating that individuals with higher levels of nomophobia tend to exhibit lower overall self-regulatory capacity. However, the self-discipline subscale of the self-control measure did not show any statistically significant relationship with either nomophobia or exercise procrastination (all $p > .05$), suggesting that impulsivity may play a more pivotal role in the behavioral consequences of mobile phone overuse than persistence in goal-directed behavior.

As hypothesized, exercise procrastination was significantly and negatively correlated with both the overall self-control score ($r = -0.420$, $p < .01$) and the impulsivity subdimension ($r = -0.459$, $p < .01$). These findings emphasize the role of self-regulation as a key determinant of health-related behaviors. Participants with higher self-control were less likely to delay physical activity, aligning with literature that positions self-control as a protective factor against procrastination in health contexts.

In summary, the results indicate that nomophobia, especially in its manifestations of excessive use and functional impairment, is closely tied to increased exercise delay and diminished self-control. These patterns highlight the value of developing intervention strategies that strengthen impulse control and reduce mobile phone overreliance to promote healthier lifestyle behaviors in digitally engaged populations (Table 4).

Table 4. Results of the Mediation Analysis: The Effect of Nomophobia on Exercise Procrastination through Self-Control (PROCESS Model 4)

Model	Path	B	SE	t	p	95% CI (Lower–Upper)	R ²	F	P (Model)	
Model 1 (Mediator Model)	Constant	3.4110	0.0574	59.4053	.000	[3.2981, 3.5238]	-	0.1151	60.4612	.000
	X → M	-0.1899	0.0244	-7.7757	.000	[-0.2379, 0.1419]				
Model 2 (Dependent Variable Model)	Constant	2.9512	0.3221	9.1636	.000	[2.3183, 3.5840]	-	0.3419	120.5387	.000
	X → Y (direct effect)	0.5375	0.0497	10.8161	.000	[0.4398, 0.6351]				
	M → Y	-0.6044	0.0888	-6.8101	.000	[-0.7788, 0.4300]				
Model 3 (Total Effect)	Constant	0.8895	0.1151	7.7268	.000	[0.6633, 1.1158]	0.2761	177.3884	.000	
	X → Y (total effect)	0.6523	0.0490	13.3187	.000	[0.5560, 0.7485]				
Indirect Effect (Bootstrap 5000)	X → M → Y	0.1148	0.0259	—	—	[0.0693, 0.1718]				

X = Nomophobia; M = Self-Control; Y = Exercise Procrastination; B = Unstandardized coefficient; SE = Standard error; CI = Confidence interval; Bootstrap resampling = 5000.

The mediation analysis proceeded in three stages using Hayes' PROCESS Macro (Model 4), assessing both direct and indirect effects among nomophobia, self-control, and exercise procrastination.

Model 1 examined the predictive relationship between nomophobia (X) and self-control (M). The analysis revealed a statistically significant negative association ($B = -0.1899$, $p < .001$; 95% CI $[-0.2379, -0.1419]$), indicating that participants who reported higher levels of nomophobia tended to demonstrate lower self-control. The model as a whole was statistically significant ($F = 60.4612$, $p < .001$), accounting for approximately 11.5% of the variance in self-control ($R^2 = .1151$). These findings support Hypothesis 1 (H1), which anticipated a negative link between nomophobia and self-regulation capacity.

In Model 2, both nomophobia (X) and self-control (M) were entered simultaneously to predict exercise procrastination (Y). Nomophobia was a significant positive predictor of exercise procrastination ($B = 0.5375$, $p < .001$; 95% CI $[0.4398, 0.6351]$), suggesting that individuals with stronger nomophobic tendencies are more prone to delaying physical activity. Conversely, self-control exhibited a significant negative effect on exercise procrastination ($B = -0.6044$, $p < .001$; 95% CI $[-0.7788, -0.4300]$), implying that those with higher self-control were less likely to engage in avoidance behavior. This model explained 34.2% of the variance in exercise procrastination ($R^2 = .3419$, $F = 120.5387$, $p < .001$), reflecting a robust explanatory capacity. These outcomes provide empirical support for both Hypothesis 2 (H2) and Hypothesis 3 (H3).

Model 3 assessed the total (unmediated) effect of nomophobia on exercise procrastination. The analysis yielded a significant and positive total effect ($B = 0.6523$, $p < .001$; 95% CI $[0.5560, 0.7485]$), reinforcing the conclusion that greater nomophobic tendencies are associated with a higher likelihood of postponing exercise. This model accounted for 27.6% of the variance in procrastination behavior ($R^2 = .2761$, $F = 177.3884$, $p < .001$), again indicating a strong relationship between digital dependency and delayed health behaviors.

Finally, the indirect effect of nomophobia on exercise procrastination via self-control was tested using 5,000 bootstrap resamples. The resulting indirect effect was significant ($B = 0.1148$; 95% CI $[0.0693, 0.1718]$), with the confidence interval excluding zero, therefore confirming partial mediation. In other words, self-control significantly transmitted a portion of nomophobia's impact on exercise procrastination. Therefore, Hypothesis 4 (H4)—which proposed the mediating role of self-control—was also supported by the data.

Discussion

The results of this study contribute to the literature suggesting that interactions with digital technologies cannot be solely reduced to habitual behavior, and instead should be evaluated within the framework of complex psychological processes and behavioral patterns. Nomophobia, defined as the anxiety experienced when separated from mobile devices, points to frequent usage habits and a deep-rooted psychological dependency. The effects of this phenomenon extend beyond digital routines, encompassing mental health and levels of physical activity (Elhai et al., 2017; Kuss & Griffiths, 2017; Greenberg et al., 2021). The present findings highlight nomophobia as a significant factor in exercise procrastination, thus offering a new perspective to the smartphone addiction literature.

In particular, two dimensions of nomophobia, fear of disconnection and excessive device usage, emerged as the strongest predictors of exercise delay behavior. These factors suggest that individuals form functional and emotional bonds with their phones. From the perspective of attachment theory, smartphones may

serve as symbolic attachment objects fulfilling individuals' needs for stability and security (Bowlby, 1988; King et al., 2013; Yildirim & Correia, 2015). This bond may be one of the reasons why individuals struggle to maintain healthy lifestyle behaviors.

The effects of nomophobia are not limited to postponing physical activity; it may also impair executive functions. Cognitive functions, such as time management, planning, and task completion, are reported to be lower among individuals with high levels of nomophobia (Duke & Montag, 2017). Previous literature indicates that smartphone dependency disrupts time perception, interferes with scheduled activities, and ultimately contributes to the postponement of behaviors like exercise (Chen et al., 2021). These negative effects are not merely short-term but may represent more persistent cognitive impairments caused by prolonged digital exposure.

Another key contribution of this study lies in its focus on impulsivity and self-control. Consistent with prior research, highly impulsive individuals were found to have higher nomophobia scores and were more likely to procrastinate exercise (Baumeister et al., 2007; Billieux et al., 2008). These findings suggest that such individuals are inclined toward immediate rewards and have difficulty sustaining long-term goals. Constant access to digital content further reinforces this behavior. Additionally, the negative effects of mobile phone use on cognitive performance, especially reaction time, have been confirmed in experimental settings involving physically active individuals (Balkó et al., 2017). On the other hand, individuals with higher self-control were more resistant to these distractions, resulting in lower digital dependency and less exercise procrastination (Tangney et al., 2008; Hofmann et al., 2012). This is consistent with findings obtained in previous studies suggesting that the ability to self-regulate exercise intensity is associated with improved motivation and performance outcomes, particularly when individuals are trained in monitoring their own physical effort (Listkova et al., 2023). Similar patterns have been observed among junior athletes, where emotional intelligence—particularly self-regulation—was strongly associated with volitional self-control capacities (Popovych et al., 2025).

Individuals with greater self-control not only regulate their technology use more effectively but also maintain regular exercise habits more consistently. These results support earlier studies that suggest self-control influences not only digital behaviors but also broader health-related behaviors (Inauen et al., 2016; Zajacova et al., 2005). Therefore, interventions aimed at enhancing self-control can offer dual benefits, reducing nomophobia symptoms and promoting physical health.

The findings also emphasize the importance of cultural and social factors. Among young people, the fear of missing out (FoMO) significantly contributes to the urge to remain constantly online, pushing healthy behaviors like exercise into the background (Przybylski et al., 2013; Alt, 2015). Some studies have found that digital presence can overshadow face-to-face social interactions, reducing individuals' levels of social participation (Franchina et al., 2018; Barry et al., 2017).

Additionally, prolonged smartphone use may lead to various physiological and cognitive consequences, including attention deficits, poor sleep quality, and mental exhaustion, all of which negatively affect motivation and mental capacity for physical activity (Wilmer et al., 2017; Montag et al., 2015; Demirci et al., 2015). These cumulative effects may lead to lasting disruptions in overall health behaviors.

The emotional roots of excessive phone use must also be considered. For some individuals, mobile devices are used as coping tools for loneliness, stress, or academic pressure (Matar Boumosleh & Jaalouk, 2017; Elhai et al., 2018). The phone becomes more than just a communication device; it functions as a form of emotional support, potentially leading to the neglect of physically beneficial behaviors. Thus, nomophobia can be viewed as a behavioral issue and a reflection of inadequate emotional coping mechanisms.

However, the reverse relationship should not be overlooked. Regular physical activity is known to have positive effects on emotional regulation, impulse control, and psychological resilience (Oppezzo & Schwartz, 2014; Salmon, 2001). In this context, exercise may serve as a means to physical well-being and a strategic intervention that acts as a psychological buffer against digital device overuse. Exercise habits can help young individuals curb technology dependence and cultivate greater self-discipline.

Limitations

The primary limitation of this study is the homogeneity of the sample group. Data were collected exclusively from physically active university students. This limits the generalizability of the findings to individuals of different age groups or lifestyles. The relationships between nomophobia, self-control, and exercise behaviors may vary across diverse sociocultural populations. Therefore, this limitation should be carefully acknowledged when interpreting the results.

Future Research Directions

Further studies should include broader age groups and participants from diverse lifestyle backgrounds. This would enable a more comprehensive evaluation of the impact of digital dependency on health behaviors. Moreover, to determine causal links between nomophobia and self-control, experimental and longitudinal studies are needed.

Conclusions

This study provides insightful explanatory findings regarding the relationships among nomophobia, self-control, and exercise procrastination in university students. Symptoms of nomophobia, such as anxiety over disconnection and compulsive phone use, appear to drive individuals to delay physical activity. These findings are consistent with previous research highlighting the negative impact of excessive digital use on both psychological well-being and routine health-related behaviors.

Self-control has emerged as a central mediating variable in these relationships. Individuals with stronger self-control skills were less affected by nomophobia and more successful in sustaining regular exercise routines. These results support theories suggesting that self-control is a protective factor against environmental distractions.

The results also point toward broader social implications. Smartphones have evolved beyond mere communication tools to fulfill emotional roles in modern life. Therefore, promoting digital awareness and improving emotional regulation skills are especially crucial for young individuals.

From a practical standpoint, these findings underline the need for integrated and comprehensive health strategies. Educators and health professionals should develop programs that promote not only exercise habits but also self-control training to establish digital balance. For example, integrating regular exercise with digital mindfulness practices may be effective in combating both physical inactivity and digital addiction. Public health interventions should address the mental aspects of digital dependency and its physical health consequences.

Finally, this study underscores the significance of viewing nomophobia not merely as a form of technology addiction but as a multidimensional construct with behavioral and psychological effects. Strategies aimed at enhancing self-control may help individuals manage their digital dependency and adopt healthier behaviors. In an increasingly digital world, achieving this balance is not just beneficial and has become essential.

Conflicts of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding Statement

This research received no financial support from any public or private funding agency.

Author Contributions

MM contributed to the study design, methodology, and statistical analyses. MT and BÇS were responsible for the literature review. YEÇ and SA handled data collection. All authors contributed to the discussion, conclusion, and final recommendations. All authors read and approved the final version of this manuscript.

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