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The Moderating Role of Fear of Missing Out (FoMO) in the Relationship Between Impulsiveness and Problematic Smartphone Usage

Dürtüsellik ve Problematik Akıllı Telefon Kullanımı Arasındaki İlişkide Gelişmeleri Kaçırma Korkusunun Düzenleyici Rolü

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Abstract

Problematic smartphone usage (PSU) and smartphone addiction are increasing every day. Although the relationship between impulsiveness and PSU has been widely investigated, knowledge on the development of PSU and its relation with other variables such as Fear of Missing Out (FoMO) is limited. Therefore, a moderation model was created in this study to evaluate the relationship between PSU, impulsiveness, and FoMO. The study sample was composed of 684 students studying at four different state universities in Türkiye. Data was gathered with a demographic information form, FoMO Scale, Barratt Impulsiveness Scale Short-Form, and Smartphone Addiction Scale Short-Form. Correlation analyses were conducted to examine the relationship among the variables. The results showed that PSU was positively correlated with FoMO and impulsiveness. Moderation analysis indicated that the relationship between impulsiveness and PSU was moderated by FoMO, suggesting that PSU is not influenced solely by impulsiveness; rather, FoMO is a moderator variable in the relationship.

Keywords: Problematic Smartphone Usage, Impulsiveness, Fomo, Smartphone Addiction

Öz

Problematik akıllı telefon kullanımı ve akıllı telefon bağımlılığı her geçen gün artmaktadır. Dürtüsellik ve problematik akıllı telefon kullanımı arasındaki ilişki birçok araştırma tarafından incelenmiş olmasına rağmen, problematik akıllı telefon kullanımının gelişimi ve gelişmeleri kaçırma korkusu gibi üçüncül değişkenlerle ilişkisini ele alan araştırma sayısı oldukça kısıtlıdır. Bu nedenle bu araştırma kapsamında problematik akıllı telefon kullanımı, dürtüsellik ve gelişmeleri kaçırma korkusu arasındaki ilişkileri incelemek amacıyla oluşturulan model test edilmiştir. Çalışmanın örneklemini Türkiye'de dört farklı devlet üniversitesinde öğrenim görmekte olan üniversite öğrencileri oluşturmaktadır. Veri toplama amacıyla demografik bilgi formu, Gelişmeleri Kaçırma Korkusu Ölçeği, Akıllı Telefon Bağımlılığı Ölçeği Kısa Formu ve Barratt Dürtüsellik Ölçeği Kısa Formu kullanılmıştır. Değişkenler arasındaki ilişkileri saptamak amacıyla korelasyon analizleri yürütülmüştür. Sonuçlar problematik akıllı telefon kullanımının gelişmeleri kaçırma korkusu ve dürtüsellik ile pozitif yönde anlamlı ilişkili olduğunu göstermiştir. Düzenleyici değişken analizi sonuçları gelişmeleri kaçırma korkusunun dürtüsellik ve problematik akıllı telefon kullanımı arasındaki ilişkide düzenleyici rolünün olduğunu göstermiştir.

Anahtar Kelimeler: Problematik Akıllı Telefon Kullanımı, Dürtüsellik, Fomo, Akıllı Telefon Bağımlılığı

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Introduction

Smartphones are frequently used for access to social media, the Internet, for communication, as well as for information retrieval. However, excessive use of smartphones has given rise to concepts such as "smartphone addiction" and "problematic smartphone usage" (PSU) and is currently conceptualized as a behavioral addiction (Özteke Kozan et al., 2019). Worldwide, approximately 1 billion people reportedly used smartphones in 2014, and this rate is projected to reach 3.6 billion by 2024. Additionally, estimates show that approximately 6.4 billion people will use smartphones by 2029 (Statista, 2024). Excessive use of smartphones in a way that disrupts daily tasks and responsibilities creates problems. For instance, the excessive use of smartphones was reported to negatively affect mental health (Kayiş, 2022; Ratan et al., 2021). In addition, a positive relationship between smartphone addiction and variables such as depression, anxiety, stress, and low self-esteem has been suggested (Matar Boumosleh, & Jaalouk, 2017; Wan Ismail et al., 2020). However, many variables are known to increase smartphone usage, one of which may be impulsivity. One of the aims of the current study was to examine the relationship between the impulsivity characteristics of an individual and problematic smartphone use (PSU). On the other hand, additional variables such as FoMO may also influence the relationship between impulsiveness and PSU. Therefore, the overarching aim of the study was to examine the moderating role of FoMO in the relationship between impulsiveness and PSU.

Impulsiveness and PSU

Impulsiveness is a multifaceted construct characterized by acting on a whim without considering the consequences. Impulsivity involves rapid, unplanned responses and includes factors such as lack of planning, lack of perseverance, urgency, and sensation seeking (Ravert & Donnellan, 2021). Impulsiveness is a concept that is also associated with risky behaviors and addictions (Cho & Kim, 2014; Collado et al., 2014; Jo et al., 2018). According to Gray's (1970) Reinforcement Sensitivity Theory, personality traits such as impulsivity and anxiety are related to approach and avoidance motivations. Such behaviors are referred to as behavioral approach system (BAS), and behavioral inhibition system (BIS) (Braddock et al., 2011; Şişman, 2012). One of the reasons why impulsive individuals turn to risky behaviors or addictions is their search for reward; such individuals may possess persistently active BAS. According to Gray's (1990) Reinforcement Sensitivity Theory, BAS is responsive to signals indicating potential rewards, absence of punishment, and avoidance of punishment. BIS aims to prevent experiences that may be negative and painful for the individual. BAS, on the other hand, is more related to reward, and individuals are motivated to exhibit goal-oriented behavior in the hope of a reward. For this reason, high BAS activation is said to be associated with impulsivity (Braddock et al., 2011). The possible direct relationship between smartphone addiction and impulsivity might be explained in this context. Individuals with high levels of impulsivity may act with the motivation to seek rewards, along with high BAS. Activities such as smartphone use, social interaction through smartphones, and social media usage are perceived to be associated with rewards. Therefore, high impulsivity may lead to increased smartphone usage and is supported by the literature (Cho & Kim, 2014; Jo et al., 2018; Kayiş, 2022; Kim et al., 2014; Pérez de Albéniz Garrote et al., 2021). Kayiş (2022) reported that impulsiveness was positively related to smartphone addiction and that impulsivity positively predicted smartphone addiction. Grant et al. (2019) and Jo et al. (2018) similarly reported that PSU and smartphone addiction can be positively related to impulsivity. However, additional variables that may also influence the possible relationship between impulsiveness and PSU are likely to exist.

The Moderating Role of FoMO

Social networks are increasing rapidly and are used by a large number of individuals. Social media and the Internet are widely accessed via smartphones, which can exacerbate PSU. With easy access to the Internet via smartphones, individuals often try to share and access the latest information. The desire to keep up with the latest news and posts in social media and the Internet, and social life has created a concept called fear of missing out (FoMO) (Przybylski et al., 2013). Individuals may spend more time on social media and the Internet out of FoMO on the latest developments and the news, (Gökler et al., 2016). The desire to follow what is happening via the Internet increases the use of smartphones, supporting a positive association between FoMO and smartphone usage (Li et al., 2020a, 2022). Additionally, impulsiveness was also found to be positively associated with FoMO (Li et al., 2020b, 2021). FoMO is thus related to both impulsiveness and PSU, and may play a moderating role in the direct relationship between impulsiveness and PSU. Additionally, the relationship between impulsiveness and PSU may differ according to the FoMO levels. As stated above, individuals with high BAS may show PSU; additionally, individuals with high levels of FoMO as well as high impulsivity may increase their smartphone usage. Increased use of smartphones by individuals with high levels of FoMO may mitigate the latter, which may also be perceived as a reward. They may also decrease BIS over impulsive PSU. Overall, FoMO can enhance the perception of potential rewards offered by smartphones, such as social connections, contacts, and updates, thereby reinforcing impulsive behaviors led by BAS. FoMO

can diminish the efficacy of BIS in suppressing impulsive actions, as the desire to engage in rewarding activities surpasses the ability to exert inhibitory control. When the level of FoMO is low, the relationship between impulsivity and PSU may still continue, even in a less powerful manner.

The Present Study

The overarching aim of the current study was to investigate the moderating role of FoMO in the relationship between impulsiveness and PSU from the perspective of BIS and BAS and the Reinforcement Sensitivity Theory, in addition to examining the direct relationship between impulsiveness and PSU. Previous studies have examined the relationship between impulsiveness and various addictions, including smartphone addiction (Cho & Kim, 2014; Dalbudak et al., 2013; Jo et al., 2018; Kayiş, 2022). However, to the best of our knowledge, there is no research examining whether FoMO plays a moderator role in the direct relationship between impulsiveness and PSU.

Understanding the role of FoMO in this relationship is important for several reasons. Considering the widespread use of smartphones, it is important to understand the psychological factors and individual characteristics that contribute to its addictive use. PSU can lead to negative consequences such as decreased productivity, deterioration in social relationships and mental health problems. Impulsiveness is a variable associated with behavioral and other addictions (Choi et al., 2014; Loree et al., 2015). However, whether impulsivity alone is the cause of PSU is currently unclear.

FoMO is a recently described condition that is defined as the desire to keep up with the latest news and posts in social media and the Internet. It can lead to the development of anxiety which may compel individuals to compulsively check their smartphones to stay informed. The BIS/BAS perspective comprehensively explains the system underlying impulsiveness. A high BAS level causes reward-seeking and goal-directed behavior, while a low BIS level causes decreased inhibition. FoMO, on the other hand, can strengthen BAS-focused actions and behaviors while weakening BIS-based inhibition, which may also increase in PSU. In the current study, we examined whether FoMO can increase the effect of impulsiveness on the PSU. Thus, individuals with high levels of FoMO may use smartphones more in order to reduce the fear and anxiety that they will miss out on latest developments. This may also strengthen the relationship between impulsiveness and PSU. We aimed to examine the following hypotheses (H) to gain a deeper understanding of the underlying mechanisms that contribute to PSU.

H1: Impulsivity and PSU are significantly and positively associated.

H2: FoMO plays a role as a moderator variable in the relationship between impulsiveness and PSU.

Methods

Participants

Data were gathered in the current study from six hundred eighty-four university students (201 males, 29.3%; 483 females, 70.5%; *M* = 20.60, *SD* = 2.43) studying at four different state universities in Türkiye. The age of the participants ranged between 18 and 39 years. Prior to data collection, the participants were provided an informed consent form containing information about the study, which they then signed. Inclusion requirements for the study included a minimum age of 18 years, consent to participate, using a smartphone, and completion of all items in the questionnaire. The participants were asked if they had any history of psychiatric diseases. None of the participants reported a history of psychiatric disorders.

Table 1

Age Groups of Participants

Age Range	Number of Participants (n)	Percent (%)
18-20	407	59.50
21-25	258	37.71
26+	19	2.77

Measures

Smartphone Addiction Scale Short-Form

The smartphone addiction level of the participants was measured with the Smartphone Addiction Scale Short-Form, Turkish version. The scale was developed by Kwon et al. (2013). Adaptation of the scale to the Turkish was carried out by Noyan et al. (2015). The scale has ten items and a 6-point Likert-type scale ranging from (1) *completely disagree* to (6) *completely agree* and a one-factor structure. Higher scores indicate greater smartphone addiction. Both the Cronbach alpha and McDonald Omega reliability coefficients of the scale were found to be .88 in this research.

Fear of Missing Out Scale (FoMOs)

The FoMO level of the participants was measured with the Fear of Missing Out Scale, Turkish version. The scale was developed by Przybylski et al. (2013). Adaptation to the Turkish was carried out by Gökler et al. (2016). The scale has ten items and 5-point Likert type scale ranging from (1) *not at all true of me* to (5) *extremely true of me* and a one-factor structure. Higher scores indicate greater levels of FoMO. The Cronbach Alpha reliability coefficient of the scale was calculated as .82, and the McDonald Omega reliability coefficient as .83.

Barratt Impulsiveness Scale Short-Form (BIS-11-SF)

The level of impulsiveness of the participants was measured via the Barratt Impulsiveness Scale Short-Form, Turkish version. The scale was first developed by Barratt (1959) and the version used today was developed by Patton et al., (1995). The short form of the scale was organized by Spinella (2007), and adaptation to the Turkish was carried out by Tamam et al., (2013). The scale has 15 items and a 4-point Likert-type scale ranging from (1) *rarely/never* to (4) *almost always/always* and a three-factor structure. The scale also gives a total impulsivity score, which was used in the current study. A higher total impulsivity score is indicative of a greater level of impulsiveness. The Cronbach Alpha reliability coefficient and the McDonald Omega reliability coefficient of the scale were calculated as .81.

Procedure

Data for the current study was collected online. Ethical approval was obtained from Necmettin Erbakan University Ethical Committee (Approval Date: 14.06.2024, Approval Number: 2024/502). Prior to data collection, questionnaires were designed with the order effect in consideration. The participants were asked to fill out a consent form first, and individuals who volunteered for the study gave their consent before they could complete the questionnaires. The data were acquired from four different Turkish state universities. As an incentive, five-course credit points were given to the participants who volunteered. The overall time needed to complete the questionnaire was around fifteen minutes. A Pearson correlation analysis was conducted to investigate the relationship between the variables. Next, a moderation model, which was created for this research, was tested with the help of Jamovi, an open-access statistical program.

Results

Table 2

Descriptive Statistics

	Min	Max	M	SD	Skew.	Kurt.
IMP	19	49	31.4	5.76	.36	-.15
FoMO	10	50	27.1	7.39	.17	-.04
PSU	10	60	30.6	10.4	.21	-.46

Note. M: mean, SD: standard deviation, IMP: impulsiveness, FoMO: fear of missing out, PSU: problematic smartphone usage

The skewness and kurtosis values of all variables refer to normal distribution. Correlation analysis showed that impulsiveness is positively associated with both FoMO (r = .32, p<.001) and problematic smartphone usage (r = .38, p<.001). PSU is also positively related with FoMO (r = .46, p<.001). Descriptive statistics and correlation analysis results are presented in Table 2 and Table 3 respectively.

Table 3

The Relationship Between Impulsiveness, FoMO, and Problematic Smartphone Usage

	1	2	3	α	ω
1. IMP	-	.32***	.38***	.81	.81
2. FoMO		-	.46***	.82	.83
3. PSU			-	.88	.88

Note. IMP: impulsiveness, FoMO: fear of missing out, PSU: problematic smartphone usage, *p<.05, **p<.01, ***p<.001, α: Cronbach Alpha Coefficient, ω: McDonald Omega Coefficient

Table 4

Moderation Estimates

			95% Confidence Interval			
	Estimate	SE	Lower	Upper	z	*p*
IMP	.48	.06	.36	.59	8.07	*.001*
FoMO	.54	.05	.45	.63	11.73	*.001*
IMP x FoMO	-.02	.01	-.03	-.01	-2.18	*.029*

Note. IMP: impulsiveness, FoMO: fear of missing out

This study assessed the moderating role of FoMO on the relationship between impulsiveness and PSU. Impulsiveness (*B* = .48, *p*<.001) and FoMO (*B* = .54, *p*<.001) are positively predict PSU. Moreover, the interaction of impulsiveness and FoMO is also statistically significant. These results mean that the association between impulsiveness and PSU was moderated by FoMO (*B* = -.02, *p*<.05). To examine FoMO moderating roles, simple slope analysis was shown on the graphs and Table 5.

Table 5

Simple Slope Estimates

			95% Confidence Interval			
	Estimate	SE	Lower	Upper	z	*p*
Moderate	.48	.06	.36	.59	8.05	.001
Low (- 1SD)	.54	.08	.43	.75	7.23	.001
High (+1SD)	.36	.08	.21	.51	4.64	.001

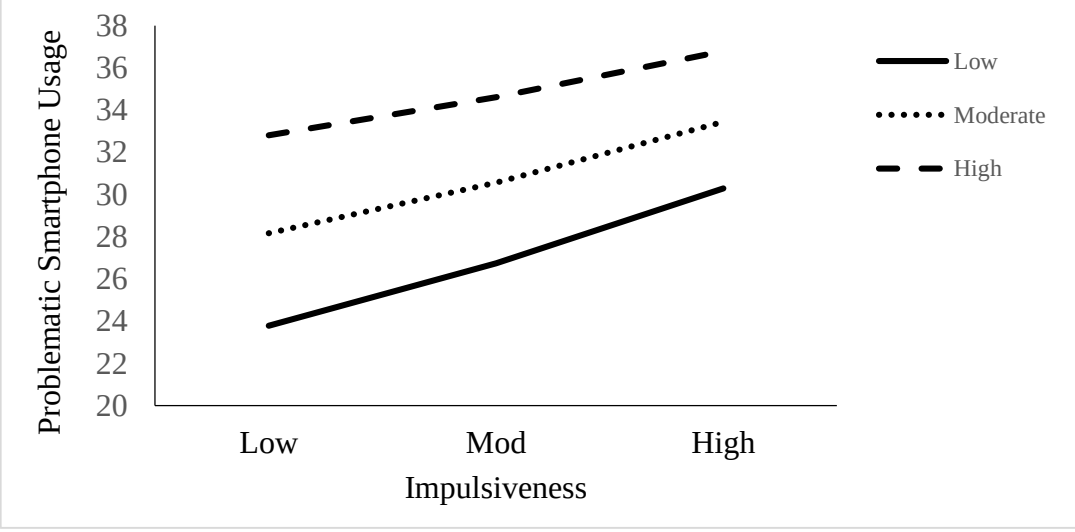

Figure 1. *The Moderating Role of FoMO*

In order to understand the moderating effect of FoMO, impulsiveness on PSU was presented at different levels of FoMO (low-moderate-high). Simple slope analysis revealed a statistically significant association between impulsiveness and PSU across all levels of FoMO. However, the intensity of this connection showed a slight increase as the levels of FoMO increased. At low levels of FoMO, impulsiveness positively correlated with PSU; this correlation strengthened at middle levels and became more significant at high levels of FoMO. The findings indicate that higher levels of FoMO could enhance the impact of impulsiveness on PSU (see also Figure. 1).

Discussion

PSU and impulsiveness are known to be associated; nevertheless, other factors are also likely to affect this association. The current study aimed to investigate how the FoMO affects the association between impulsiveness and PSU. We observed that impulsiveness was positively correlated with PSU, supporting our first hypothesis (H1) and is corroborated by data from previous studies (Kayiş, 2022; Kim et al., 2014; Pérez de Albéniz Garrote et al., 2021).

High levels of impulsivity may increase the likelihood of PSU. Additionally, impulsive individuals may be relatively more likely to engage in reward-providing behaviors such as smartphone usage. The relationship between impulsiveness and PSU can be explained by the approach and avoidance motivations emphasized in Reinforcement Sensitivity Theory. This theory posits that impulsive individuals who possess persistently active BAS may engage in smartphone, social media and Internet usage or risky behaviors. According to Gray's (1990) Reinforcement Sensitivity Theory, BAS entails the absence of punishment and avoidance of punishment; additionally, individuals are motivated to exhibit goal-oriented behavior in the possibility of reward. For this reason, high BAS activation is associated with impulsivity (Braddock et al., 2011). Therefore, impulsive individuals with high BAS may use smartphones excessively in their search for rewards, which are provided by social media and Internet usage. Smartphones can be used for many different purposes such as playing games, establishing social relationships, and developing new relationships, which can satisfy different psychological needs such as competence, relatedness and autonomy (Ryan & Deci, 2000; Ryan et al., 2006), which, in turn, can be an important reward for impulsive individuals with high BAS activity. Perception of such rewards may also exacerbate the use of smartphones, justifying the relationship between impulsiveness and PSU.

In the current study, FoMO was found to be positively correlated with both impulsiveness and PSU, which is also corroborated by existing studies (Alinejad et al., 2022; Li et al., 2020b, 2021; Tao et al., 2023). Furthermore, we observed that the relationship between impulsiveness and PSU was moderated by FoMO, thereby supporting our second hypothesis (H2). To the best of our knowledge, the moderator role of FoMO in the relationship between impulsiveness and PSU has not been reported to date. Therefore, a comparison with published studies is not feasible. Nonetheless, other studies investigating similar relationships do support our findings (Li et al., 2020b, 2021; Tao et al., 2023). The moderating role of FoMO in the relationship between impulsiveness and PSU can also be explained from the perspective of BIS/BAS and the Reinforcement Sensitivity Theory. Impulsive individuals in particular (Dempsey et al., 2019) feel the need to overcome the anxiety caused by FoMO from the perception of being isolated from various developments. This anxiety may cause individuals to obsessively check their smartphones in order to stay connected to the Internet and stay informed. The BIS/BAS approach can substantiate the underlying impulsive behavior. A high BAS level promotes reward-seeking and goal-directed behavior, whereas a low BIS level decreases inhibition. FoMO, on the other hand, can enhance BAS-focused actions and behaviors while reducing BIS-based inhibition. Mitigation of the anxiety resulting from FoMO can also be a reward for an impulsive individual. Therefore, individuals who are impulsive and have high FoMO levels appear to have higher PSU compared to individuals with low or moderate levels of FoMO. Indeed, the findings of the current study suggest that increasing FoMO levels enhances the association between impulsiveness and PSU.

The findings may have significant implications for clinical practice. FoMO moderates the relationship between impulsivity and PSU; thus, interventions aimed at FoMO may mitigate the adverse effects of impulsivity on smartphone usage. Cognitive-behavioral interventions may target the reduction of anxiety linked to FoMO by enhancing awareness and encouraging healthy smartphone usage and social media practices (Afdilah et al., 2020; Fitri et al., 2024). Psychoeducational programs may be designed to enhance awareness of impulsivity and its effects on problematic behaviors, especially in young adults who are particularly vulnerable to PSU. Considering the influence of FoMO on heightened smartphone usage, individuals might gain from implementing strategies that enhance social connections in offline environments. Programs aimed at promoting face-to-face interactions rather than dependence on social media may mitigate FoMO. Furthermore, awareness studies or interventions may assist individuals in recognizing and comprehending the manipulative characteristics of information dissemination on social media platforms, thereby promoting more mindful usage (Hunt et al., 2018; Hwang et al., 2012; King et al., 2013; Li et al., 2020b). Interventions may include methods that help people satisfy their psychological needs, like competence, autonomy, and relatedness, in real life, so they are less likely to see their smartphones as a source of reward.

Despite making significant contributions to the literature, the current study has some limitations. First, the study participants were all university students, which limits the findings' generalizability to all age groups. Moreover, the majority of participants were between the ages of 18 and 25, but the study did include a minor number of participants over the age of 25. This may restrict the generalizability of the findings for all age groups. The inclusion of participants above the age of 25 can be viewed as a limitation, particularly given the implications of age on problematic smartphone use. Because the effects of factors may differ between age groups, future research should use a more well-defined age range. Second, the

study's cross-sectional design makes it difficult to determine causation or directionality between variables. Third, the lack of data on the exact goals of smartphone use limits a more detailed assessment of PSU trends. Future research could address these limitations by using longitudinal designs, broadened samples, and in-depth analyses of smartphone usage motivations. One of the other limitations of this study is the non-homogeneous gender distribution of the participants. As is common in social science research, gender imbalance may restrict the findings' generalizability. In the future, a more balanced gender distribution may allow us to better understand the differences between genders in these factors.

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