

ORIGINAL ARTICLE

Smartphone addiction among adults: The role of smartphone use, fear of missing out (FoMO), and self-efficacy among Turkish adults

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Main Points

- The relationship between the variables of smartphone addiction in adults was tested using structural equation modeling.
- Fear of missing out (FoMO) was found to be an important variable affecting smartphone addiction among adults.
- No significant relationship was found between self-efficacy and FoMO.
- Using social networking sites affected the amount of time spent using smartphones, which was the main reason for smartphone usage.
- Smartphone addiction differed according to age groups.

Abstract

Due to its computer-like features and applications, smartphone use has become a globally popular activity. Moreover, smartphones have become an important part of individuals' daily lives. However, using smartphones excessively may result in smartphone addiction for a small minority of individuals. Consequently, the present study investigated the role of smartphone and social network site use, fear of missing out, and perceived self-efficacy in smartphone addiction among adults. In total, 488 adults (aged 20 – 65 years) participated in the study. The participants were recruited utilizing convenience sampling. Data were collected using an online questionnaire, and the relationship between the variables was tested using structural equation modeling. The results of the structural equation modeling showed that both smartphone use and fear of missing out positively affected smartphone addiction. The effect of social networking site use on smartphone use was significant. The findings of the present study found that fear of missing out and the time spent on smartphones explained 31% of the variance of smartphone addiction among adults, and smartphone usage predicted smartphone addiction. Based on the findings, excessive smartphone use and a higher level of fear of missing out appear to play a role in smartphone addiction. Social networking site use is also associated with an increase in the time spent on smartphones. Smartphone addiction prevention activities should focus on young adults. For future studies, psychological issues other than fear of missing out could be taken into consideration when examining the contributory factors of smartphone addiction.

Keywords: FoMO, self-efficacy, smartphone addiction in adults, SNS use, time spent on smartphones

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Introduction

Since smartphones have become integrated into individuals' lives, users' quality of life has increased in different ways including their professional, educational, and social relationships (Lin et al, 2017). However, despite these many advantages, excessive use of smartphones can cause some problems among a minority of individuals, including smartphone addiction (Ting & Chen, 2020). Cho and Lee (2017) reviewed many studies and concluded that smartphone addiction can exist among both adolescents and adults. Problematic smartphone use has become more commonplace among adults (Nahas et al, 2018), particularly in relation to the amount of time that they spend on their smartphones (Pew Research Center, 2018).

Social networking site (SNS) use has become inextricably linked with smartphone use (Kuss & Griffiths, 2017; Salehan & Nagehban, 2013). Moreover, the time spent on SNSs is an important factor in smartphone addiction among adults (Kuss et al, 2018; Zhitomirsky-Geffet & Blau, 2016). The motivation to stay connected on SNSs to follow what others are doing on social media may be facilitated by the fear of missing out (FoMO) (Gil et al, 2015). Wolniewicz et al (2018) found that FoMO has a strong relation with problematic and social smartphone use. On the other hand, FoMO is also known as one of the predictors of smartphone addiction among adults (Elhai et al, 2016). Individuals who have higher FoMO need to check their SNS accounts more frequently than others without FoMO (Oberst et al, 2017). The use of SNSs and FoMO is positively associated (Abel et al, 2016). Furthermore, a study has shown a negative relationship between self-efficacy and FoMO (Erdogan & Sanli, 2019).

Nahas et al (2018) and Luk et al (2018) claimed that there had not been much research on smartphone addiction among older adults. Although there is a significant amount of literature on smartphone addiction among young people, there are few data on this topic for older adults. The present study aimed to address this gap by investigating how smartphone use, social networking site use, FoMO, and perceived self-efficacy contribute to smartphone addiction in adults aged 50 years and above.

Literature Review

Smartphone Addiction among Adults

Among various information and communication technology (ICT) products, smartphones are the devices that adults use most frequently (Ma et al, 2016). Smartphone use rate is growing rapidly, and Europe is at the forefront of this increase (Albertini & Gehner, 2018). According to a study, 36% of adults complained about spending too much time on their smartphones (Pew Research Center, 2018). A recent meta-analysis by Olson et al (2022) including 83 samples (from 81 studies) comprising 33,831 participants from 24 countries, reported that, between 2014 and 2020, problematic smartphone use increased worldwide and the highest rates of problematic smartphone use were in China and Saudi Arabia, followed by Malaysia, Brazil, South Korea, Iran, Canada, and Turkey (Olsen et al, 2022). However, they did not report a pooled prevalence rate.

Smartphone addiction is a general term used to describe different types of problematic behavior on the smartphone, rather

than addiction to a physical device (i.e., users are addicted to the applications and activities on the smartphone, not the smartphone itself) (Jameel et al, 2019; Kuss & Griffiths, 2017). Smartphone addiction is defined as the compulsive or problematic use of smartphones, which can negatively affect the daily life of the user and cause negative outcomes such as psychological, financial, physical, social and family problems (Gökçearsan et al, 2016; van Deursen et al, 2015). Since smartphone devices are ubiquitous, they can be carried by individuals 24/7, which is one of the factors that maintain smartphone addiction (Jeong et al, 2020; Whitaker & Brown, 2020). A recent meta-analysis reported that internet addiction among adults increased between 2017 and 2020, but it was also noted that FoMO also triggers internet addiction (Lozano-Blasco et al, 2022).

Uses and gratifications theory is concerned with how an individual's psychological needs influence their media use and the satisfaction of those needs. Singh and Munderia (2022) argue that smartphones often fulfill individuals' pleasure-seeking tendencies, leading to addiction. According to Katz et al. (1973), the uses and gratifications theory can help explain why individuals seek out and obtain gratification from social media use, with gratifications varying based on individual characteristics (Kircaburun et al., 2020). When using smartphones, individuals satisfy various needs, such as staying connected with others, not missing out on information, or having fun. The present study examined the role of social media (SNS) use and individual characteristics (self-efficacy and FoMO) in satisfying these needs, using the theoretical framework of uses and gratifications theory.

Smartphone addiction is prevalent among different age groups including adults (Cho & Lee, 2017). However, smartphone addiction among adults differs according to their age. Previous studies have shown that as adults get older, they spend less time on their smartphone due to factors such as having lower levels of social stress (Van Deursen et al, 2015). Also, as adults get older, their level of self-control increases, and they have lower levels of problematic smartphone use (Busch et al, 2021). For example, a study by Jo et al (2017) compared adolescents (aged 14 to 18 years), early adults (aged 19 to 25 years), and older adults (aged 26+ years) in terms of smartphone use, with adolescents having the highest rate of predisposition to smartphone addiction (Jo et al, 2017). In another study, the 20-34 years age group had the highest rate of problematic smartphone use compared to other age groups (3-11 years, 12-19 years, 35-50 years, and 50+ years) (Csibi et al, 2021).

Time Spent on Smartphones and Smartphone Addiction

Smartphone addiction is determined by taking different criteria into consideration. Griffiths (2005) stated that all addictions comprise key components, and these components are "salience, mood modification, tolerance, withdrawal, conflict, and relapse." Another possible criterion is time spent on the activity. Other researchers claim that the time spent on smartphones is a diagnostic indicator of smartphone addiction (Gökçearsan et al, 2016; Horvath et al, 2020; Lin et al, 2015, 2016). For instance, using a smartphone for more than 4 hours per day leads to a significant difference in smartphone addiction levels (Aljomaa et al, 2016). In a study by Jameel et al (2019), the average time spent on smartphones by participants who were addicted was 9.1 hours a day

compared to 2.9 hours among nonaddicted participants. Similarly, another study showed that once smartphone use increases, smartphone addiction level increases too (Bal & Balci, 2020).

Social Networking Site Use Time and Smartphone Use Time

Social networking sites are communication tools that meet the basic need for individuals to connect with each other and to stay in touch with groups within the community (Das & Sahoo, 2011). By using mobile SNSs, users will be able to quickly respond to their online social network members (Yang, Liu & Wei, 2015). The use of SNSs has increased dramatically since the mid-2000s and has permeated the lives of young adults (Kuss & Griffiths, 2017). Social networking sites allow individuals to (i) have a public or semi-public profile, (ii) communicate with other users they are connected to, and (iii) view and comment on their connection lists (Boyd & Ellison, 2007). Moreover, the intensity of SNS use affects the intensity of smartphone use (Park et al, 2013). Individuals typically use their smartphones to access SNSs and this has become a popular leisure activity (Luqman et al, 2021). Social networking site application use has also been found to be a predictor of smartphone addiction (Kuss et al, 2018; Salehan & Negahban, 2013). In short, accessing SNS applications through smartphones increases the SNS addiction potential (Guo et al, 2021).

Fear of Missing Out and Smartphone Addiction

Fear of missing out is defined as “a pervasive apprehension that others might be having rewarding experiences from which one is absent characterized by the desire to stay continually connected with what others are doing” (Przybylski et al, 2013, p. 1841). Individuals with high FoMO need to monitor their social media accounts more frequently than those who do not have FoMO (Oberst et al, 2017). Social media platforms are important tools that drive smartphone use (Sha et al, 2019). Since it is common to use social networking sites from smartphones, individuals with high FoMO monitor their phones frequently to remain connected to social networks (Elhai et al, 2016). Similarly, a study by Fuster et al (2017) also reported that SNS use and mobile phone addiction were associated with FoMO.

Some studies have shown that FoMO is associated with smartphone addiction (Fuster et al, 2017; Gezgin, 2018). A study conducted with adults found that FoMO is one of the most important variables in explaining problematic smartphone use (Elhai et al, 2016). Moreover, Wolniewicz et al (2018) found that FoMO had a strong relationship with both problematic and social smartphone use. Another study conducted with participants between the ages of 18 and 66 years showed that internet addiction and FoMO were positive predictors of smartphone addiction (Chotpitayasonondh & Douglas, 2016). Gezgin (2018) found that FoMO, daily SNS use on a smartphone, and smartphone ownership time predicted smartphone addiction.

Fear of Missing Out and Social Networking Site Use

Using SNSs allows users to create online profiles and have a presence in cyberspace (Boyd & Ellison, 2008). However, social media may lead individuals to compare their lives to what they see online, and this may make them feel incomplete or that they are missing out (Abel et al, 2016). As expected, those with a high level of FoMO “gravitate towards social media” (Przybylski et al, 2013, p.1841). There is a significant relationship between the use of SNSs and FoMO (Buglass et al, 2017; Fuster et al, 2017). For

instance, the increased use of SNSs is an indicator of increased FoMO. For example, the variables related to SNS behavior, such as user network size, profile data (including the “status updates” or “email address” displayed on Facebook profile), and disclosure (willingness to self-disclose emotionally on Facebook) were found to be positively associated with FoMO (Buglass et al, 2017).

Fear of missing out may cause a desire to constantly check SNSs. A study conducted among Facebook users showed that users felt pressure to access the site regularly because of their higher level of FoMO (Fox & Moreland, 2015). According to research by Baker et al (2016), there is a positive association between the time spent on social media and FoMO. Some studies have also shown that FoMO is associated with the increased use of Facebook (Buglass et al, 2017), Facebook intrusion (Błachnio & Przepiórka, 2018), problematic Facebook use (Dempsey et al, 2019), and phubbing via problematic Instagram use (Balta et al, 2018).

Perceived Self-Efficacy and Fear of Missing Out

Individuals are not equally affected by FoMO, and it is thought that individuals’ efforts and determination to overcome the obstacles they face have an important effect on the level of FoMO (Erdogan & Sanli, 2019). Self-efficacy is an individual’s belief in their capacity to have a control over challenging demands (Bandura, 1977). This definition was later expanded into “people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” (Bandura, 1994, p.2).

A study undertaken among university students in Turkey showed that there was a negative relationship between self-efficacy and FoMO. When the self-efficacy level was high, FoMO was low (Erdogan & Sanli, 2019). A study by Deniz (2021) also reported a negative relationship between social self-efficacy and FoMO. In support of this finding, another study reported that increased levels of self-efficacy have an impact on the reduction of FoMO (Korkmaz et al, 2022). Although there are different studies relating to FoMO in the literature, there are few studies examining perceived self-efficacy and FoMO. Therefore, the present study attempts to fill this gap in the literature.

The Present Study’s Model and Hypotheses

The proposed model of the present study is shown in Figure 1. Based on the literature, a number of hypotheses are proposed:

- H₁: There would be a positive relationship between smartphone use and smartphone addiction.
- H₂: There would be a positive relationship between SNS use time and smartphone use time.
- H₃: There would be a positive relationship between FoMO and smartphone addiction.
- H₄: There would be a positive relationship between FoMO and social networking site use.
- H₅: There would be a negative relationship between self-efficacy and FoMO.

Material and Methods

Participants

The sample comprised 488 Turkish adults (226 males [46%] and 262 females [64%]) who were recruited using a convenience

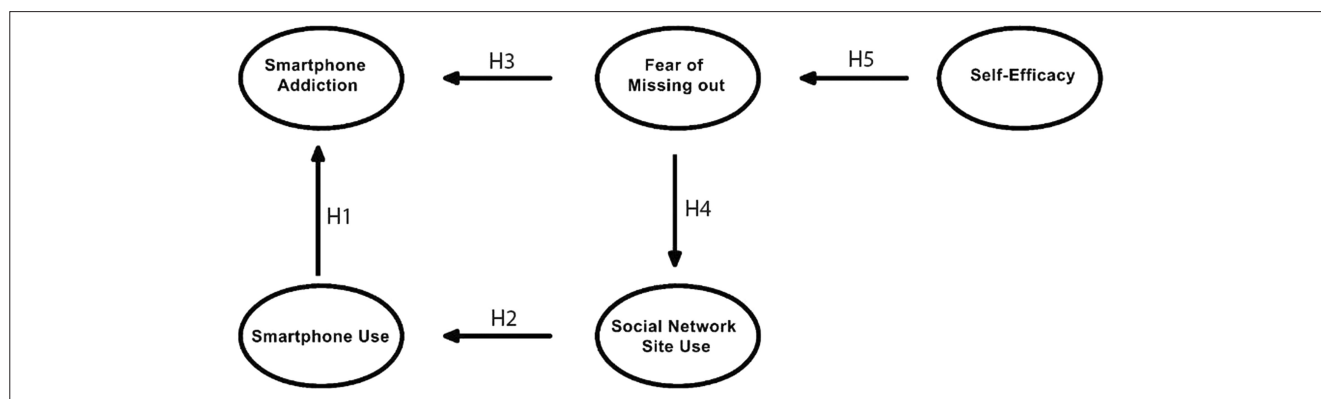


Figure 1. Proposed Model of the Study.

sampling method. To assess the differences in age groups, the classification by Csibi and colleagues (2021) was used: young adult (20 – 34 years), adult (35 – 50 years), and older adult (51+ years). As shown in Table 1, the participants’ ages ranged between 20 and 65 years; 57.9% were married, 34.4% were single, and 8% were divorced. In relation to education, 47.7% had a Bachelor’s degree, and 39.5% had a postgraduate degree. Almost three-quarters of the participants were employed (72.3%). The participants’ most frequently used smartphone features were SNSs for sharing content/surfing (55.1%), text messaging (52.5%), and making

telephone calls (41.0%). The participants’ average time spent on their smartphones daily was 3.8 hours, of which 2.8 hours comprised SNS use.

Procedure and Data Analysis

The data were collected between March 2021 and April 2021 using an online survey hosted on *Google Forms*. The link to the survey was shared for 30 days with potential participants through *WhatsApp* and social networking groups which were selected through convenience sampling. The participants were recruited from different cities in Turkey, but the majority of them lived in Ankara. All participants were Turkish and voluntarily participated in the study. Before starting the survey, instructions and the aim of the study were explained to the participants, and each participant provided informed consent for their participation. Anonymity and confidentiality of the data were provided to all participants. The participants were assured that they could leave the study at any time without any penalties, and the data would only be used only for academic purposes. The language of the survey was Turkish, and the Turkish version of the scales was used (see below “Instruments” section). The survey took approximately 15 minutes to complete. There were no missing data because the surveys could not be submitted unless all questions were completed. The study was approved (E-5939418-604.01.02-23390) by the Institutional Ethics Committee of Atılım University in Ankara.

In the present study, structural equation modeling (SEM) was employed to investigate the relationships between latent variables. The researchers used the LISREL 8.80 program to test the proposed model. Initially, they tested the data for assumptions, validity, and reliability to evaluate how well it matched the measurement model. Next, the SEM analysis was performed to determine the hypothesis results. Finally, the researchers examined the differences between age groups by utilizing analysis of variance (ANOVA).

Instruments

The survey comprised two sections. The first section included questions related to the demographic characteristics of the participants (age, gender, relationship status, educational and employment status, age, daily use time spent on smartphones, and SNSs). The second section included psychometric scales assessing smartphone addiction, FoMO, and perceived self-efficacy.

Table 1.

Demographic Characteristics of the Sample

Variables	Group	n	%
Marital status	Married	281	57.9
	Single	168	34.4
	Divorced	39	8.0
Educational level	Primary/secondary school	3	.6
	High school	27	5.5
	Associate degree	32	6.6
	Bachelor’s	233	47.7
	Postgraduate	193	39.5
Employment status	Employed	353	72.3
	Unemployed	135	27.7
Frequently used smartphone features	Sharing content/surfing on SNSs	269	55.1
	Messaging	256	52.5
	Making phone calls	200	41.0
		Average	SD
Age	20 – 29 years (n = 131)	26.5	1.5
	30 – 50 years (n = 247)	38.0	5.4
	51+ years (n = 110)	60.4	5.51
Daily time spent on smartphone (hours)		3.8	2.6
Daily time spent on smartphone for social media use (hours)		2.8	2.0

Note: SD = standard deviation; SNSs = social networking sites.

Smartphone Addiction Scale

The researchers used the 33-item Smartphone Addiction Scale (SAS) to assess smartphone addiction which was originally developed by Kwon et al (2013) and adapted into Turkish by Demirci et al (2014). The SAS asks respondents to rate statements such as "My life would be empty without my smartphone" on a 6-point scale ranging from "strongly disagree" to "strongly agree". Scores on the SAS range from 33 to 198, with higher scores indicating a greater likelihood of smartphone addiction. The Turkish adaptation of the SAS reported a seven-factor structure through factor analysis, with item factor loadings ranging from .349 to .824. The scale demonstrated high internal consistency, with a Cronbach's alpha coefficient of .947. The SAS also showed significant correlations with other measures, and test – retest reliability was found to be high, with a correlation coefficient of .814. The Guttman coefficient for split-half reliability analysis was calculated to be .893 (Demirci et al, 2014).

Fear of Missing Out Scale

The 10-item FoMO scale (Turkish version: Przybylski et al, 2013; Can & Satici, 2019;) was used to assess FoMO. Items (e.g., "I get anxious when I don't know what my friends are up to") are rated on a 5-point scale from 1 (not at all true) to 5 (absolutely true). The total scores range from 10 to 50, and higher scores indicate a higher level of FoMO. It was reported that the Turkish version of the SWLS was well fit to the data ($\chi^2/df = 2.679$, GFI = .95, CFI = .91, SRMR = .050, and RMSEA = .069) and has acceptable internal consistency (Cronbach's alpha = .82).

Generalized Perceived Self-Efficacy Scale

The 10-item Generalized Perceived Self-Efficacy Scale (GPSES) (Jerusalem & Schwarzer, 1992; Turkish version: Erci, 2006) was used to assess generalized perceived self-efficacy. Items (e.g., "I can always manage to solve difficult problems if I try hard enough") are rated on a 4-point scale from 1 (not at all true) to 4 (exactly true). Based on the results of the factor analysis conducted on the Turkish adaptation of the scale, the items' factor loadings were found to range from .64 to .79. The scale also showed high internal consistency with a Cronbach's alpha coefficient of .89. Furthermore, the Turkish version of the scale demonstrated significant correlations with other scales, with a correlation coefficient of .78. The test-retest reliability of the scale was also found to be high, with a correlation coefficient of .83 (Erci, 2006).

Daily Use of Social Networking Sites Through Smartphone

In order to explore the daily smartphone use duration of the participants, two questions were asked. The first question was "How many hours do you spend on your smartphone in a day?" The second question was "How many hours do you spend on social networking sites on your smartphone in a day?" Only the total amount of time spent on daily social media use on smartphones was collected.

Validity

Multivariate Normality and Structural Equation Modeling

Results

One of the issues to be considered in SEM analysis is determining whether the data are incomplete. There were no incomplete or incorrectly completed surveys in the analysis in the present

study. For the multivariate normality hypothesis, which is one of the most important hypotheses of SEM, the Mardia value was calculated to be 1728.0 and $p < .001$ in the result of multivariate normality test conducted using LISREL based on the Mardia (1970) test. The dataset was therefore shown to be adequate for multivariate normality hypothesis. For this reason, it was agreed to utilize the Robust Maximum Likelihood (RML) method for estimating the parameters.

Evaluation of the Scale Model Within Valid Limits

The cohesion of the scale model was tested through the RML method using LISREL 8.80. First, all parameter values obtained by RML were significant at the 1% level (t -values were between 3.36 and 17.95). Using the calculated cohesion criteria, it was found that the model was within acceptable limits $(1025/369) = 2.78 < 3.00$ (Hayduck, 1987), normed fit index (NFI) = .94 > .9 (Bentler & Bonett, 1980), comparative fit index (CFI) = .96 > .9 (Bagozzi & Yi, 1988), root mean square error of approximation (RMSEA) = .06 < .08 (Bagozzi & Yi, 1988).

Average Variance Extracted and Composite Reliability Results

First, the composite reliability (CR) value needed to be higher than .7 for each composite (Hair et al, 1998). Second, the average variance extracted (AVE) value needed to be higher than .5 for each composite (Fornell & Larcker, 1981). In the present study, the AVE values of FoMO and smartphone addiction were calculated as .40 and .46, respectively, but these values were acceptable because Fornell and Larcker (1981) state AVE higher than .40 is acceptable and that the validity is sufficient if the CR value is higher than .60 (Huang et al, 2013). In the study, the CR values were calculated to be .85 or more. As aforementioned, while two of the AVE coefficients had values lower than .5, the AVE coefficient for self-efficacy was found to be .58.

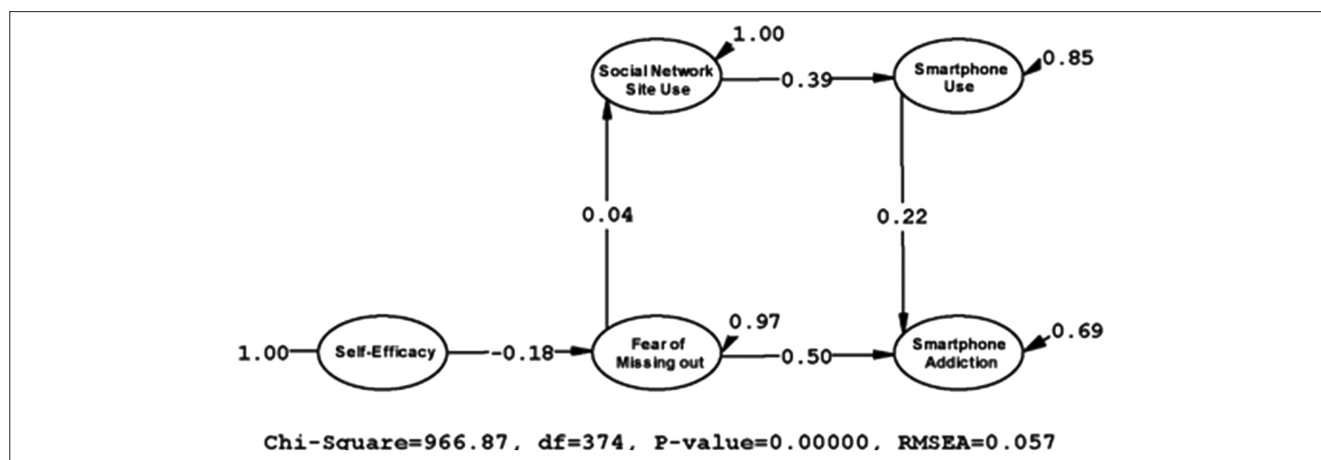
Results

The proposed research model (Figure 1) was tested. As a result, the test structural model was observed to be within acceptable limits ($\chi^2/SD = 967/374 = 2.59 < 3.00$ [Hayduk, 1987], normed fit index = .94 > .9 [Bentler & Bonett, 1980], comparative fit index = .96 > .9 [Bagozzi & Yi, 1988], and root mean square error of approximation = .057 < .08 [Bagozzi & Yi, 1988]). The t -test and hypothesis results are shown in Table 2, and Figure 2 shows the structural equation model path.

Table 2.
Hypotheses and Structural Equations

Hypotheses	Coefficient	t -value	Result
H ₁ : SU → SA	.22	3.55***	Supported
H ₂ : SNS use → SU	.39	3.27***	Supported
H ₃ : FoMO → SA	.50	7.90***	Supported
H ₄ : FoMO → SNS use	.04	.32 ^{AD}	Not supported
H ₅ : SE → FoMO	-.18	-1.34 ^{AD}	Not supported

Note: *** $p < .01$ ($t > 2.58$). ^{AD} t -values are not significant. FoMO = fear of missing out; SA = smartphone addiction; SE = self-efficacy; SNS use = social networking site use; SU = smartphone use. SA = .39*SNS use; $R^2 = .15$; SNS use = .036*FoMO, $R^2 = .0013$; FoMO = -.18*SE, $R^2 = .031$; SA = .22*SU + .50*FoMO, $R^2 = .31$.



The results in Table 2 show that H₁, H₂, and H₃ were all supported. More specifically, in support of H₁, smartphone use had a positive association with smartphone addiction, and a one-unit increase in smartphone use corresponded with an increase of .22 units in smartphone addiction. In support of H₂, SNS use had a positive association with smartphone use, and one-unit increase in SNS use corresponded with an increase of .39 units in smartphone use. In support of H₃, FoMO had a positive relationship with smartphone addiction, and a one-unit increase in FoMO corresponded with an increase of .50 units in smartphone addiction. However, H₄ and H₅ were not supported. More specifically, self-efficacy did not have an association with FoMO, and FoMO did not have an association with SNS use. When the equations between the latent variables shown in Table 2 are examined, SNS use explained 15% of the variance in smartphone addiction. Moreover, FoMO and smartphone use explained 31% of the variance in smartphone addiction.

Differences by Age Groups

One-way ANOVA was conducted to examine the differences between the average smartphone addiction scores by age group (between 20 and 34 years, between 35 and 50 years, and 51 years and older). The homogeneity of variances, which is the basic assumption in ANOVA, was examined with the Levene test.

According to the Levene test result, the variances were not homogeneous. Since the variances were not homogeneous, the Welch *F*-test was used instead of the *F*-test to compare the group averages. ANOVA test results are shown in Table 3.

Variance analysis results showed that there was a significant difference between the group means (Table 3). Post hoc tests were conducted to find out in which group or groups this difference originated. Since the variances were not homogeneous, Tamhane’s test was used as a comparison method. According to the post hoc test results, users aged 51 years and older differed significantly from those aged between 20 and 34 years and those aged between 35 and 50 years. In addition, users aged 51 years and older were less addicted to their smartphones than other age groups.

Discussion

The present study found that time spent with a smartphone had a significant association with smartphone addiction. Therefore, H₁ was supported, and this supports the findings of previous research (e.g., Bae, 2017; Gökçearslan et al, 2016). As smartphone use increases, the level of smartphone addiction also increases (Bal & Balci, 2020). Other studies have also reported that time

Table 3.
ANOVA Test Results for Age Categories

	Age Categories	N	Average	ANOVA	
				Welch F	p
Smartphone addiction score	Between 20 and 34 years	220	2.3	11.618	<.001
	Between 35 and 50 years	158	2.1	Levene test for homogeneity of variance	
	51 years and over	110	1.9	3.6	.029
Comparisons between groups					
			Difference between average	Standard error	p
51 years and over	Between 20 and 34 years		-.33026*	.07797	<.001
51 years and over	Between 35 and 50 years		-.19858*	.08291	.045

Note: *Averages are different at a *p* < .05 significance level. Dependent variable: Score for smartphone addiction. Comparison method: Tamhane’s. Only those results with significant differences were listed. ANOVA = analysis of variance.

spent on smartphones is one of the indicators of smartphone addiction (Cha et al, 2018; Lin et al, 2016). The study also found that time spent on SNSs had a significant association with the time spent on smartphones. Therefore, H₂ was supported, and this supports the findings of previous research showing that the intensity of SNS use affects the intensity of smartphone use (Park et al, 2013; Koç & Turan, 2021). Since smartphones are the most used devices in accessing SNSs it is not surprising that there was a significant association between smartphone addiction and excessive SNS use (Hussain et al, 2017; Korhan & Ersoy, 2016; Kuss & Griffiths, 2017). These results suggest that excessive use of smartphones can lead to problems such as overuse and addiction. The sample of the present study comprised adults. Therefore, it can be said that not only young people and university students but also adults' greater time spent on a smartphone is associated with smartphone addiction.

Moreover, a positive significant association was found between the level of FoMO and smartphone addiction among adults; therefore, H₃ was supported. Previous studies have also indicated that there is a higher level of relationship between FoMO and smartphone addiction among adults (Elhai et al, 2016; Li et al, 2022; Servidio et al, 2021) and with problematic smartphone use (Busch et al, 2021). Contrary to expectations, the present study found that FoMO had no significant association with SNS use time; therefore, H₄ was not supported. In contrast to this finding, previous studies have shown that increased use of SNSs is an indicator of increased FoMO levels (e.g., Buglass et al, 2017). According to Baker et al (2016), a high level of FoMO had a positive association with the time spent on social media. When the authors were collecting the data, the participants had been isolated, and there were shut-downs, and travel bans due to the COVID-19 pandemic. The pandemic might have been the reason for there being no relationship between FoMO and SNS usage. As Casale and Flett (2020) noted: *"Given that social experiences are reduced or forbidden in the pandemic period, on one hand, and FoMO is a form of anxiety related to others' social rewarding experiences, on the other, one might argue that FoMO levels might decrease in a pandemic time. As a consequence, unhealthy behaviors and negative outcomes related to high levels of FoMO should show a decrement as well"* (p. 90). Individuals suffering from high levels of FoMO may feel a constant need to stay connected with others and keep up with the latest news and events in their social circles. Individuals may check their phones frequently to avoid missing out on any updates or messages from their peers, which may lead to compulsive smartphone use. It is critical to recognize the signs of addictive behavior and take appropriate action, such as setting phone usage limits, engaging in other activities, and seeking professional help if necessary.

The findings showed that the level of self-efficacy had a nonsignificant association with FoMO; therefore, H₅ was not supported. This is in contrast with the previous research showing that there was a negative and significant association between self-efficacy and FoMO (Erdogan & Sanli, 2019). In a study which indicated that FoMO was quite common among some groups, nearly three-quarters of young adults stated that they had experienced FoMO (Przybylski et al, 2013). This finding implies that self-efficacy may not play a significant role in predicting or influencing their levels of FoMO. The difference in result in the present study may be due to the individual characteristics of the participants in the study

group. Other factors, such as social pressure or anxiety, may, for example, have a stronger influence on an individual's levels of FoMO than their level of self-efficacy, which could be explored by future research.

The findings showed that smartphone addiction differed among age groups. Emerging adults aged 20 – 34 years, adults aged 35 – 50 years, and adults aged over 50 years were compared in terms of smartphone addiction, and a significant difference was found between ages. Smartphone addiction was highest among emerging adults (20 – 34 years), followed by those in the 35 – 50 years group. Similarly, in accordance with the findings of the present study, the 20 – 34 years age group had the highest rate of problematic smartphone use compared to other age groups in a previous study (i.e., Csibi et al, 2021). The study by Csibi et al found that smartphone users aged over 50 years were less addicted to their smartphones than younger age groups. Van Deursen et al (2015) also reported that older individuals spent less time with their smartphones to have social interactions, and as a result of this, they were less likely to have smartphone addiction. Since emerging adults in their twenties and early thirties have grown up with technology and smartphones as a constant in their lives, they may be more likely to use smartphones for social media, entertainment, and communication, and they may find it difficult to disconnect from their devices. As Csibi et al (2021) found, individuals over the age of 50 may be less likely to use smartphones frequently because they did not grow up with them and may prefer other modes of communication and entertainment.

Limitations and Directions/Suggestions for Future Research

The present study has some limitations. First, data were collected using convenience sampling; therefore, the results of the present study cannot be generalized. Second, self-report data were used to collect the average daily use of smartphones and SNS use on smartphones as well as for all the psychometric scales. Such data are subject to various methods biases (e.g., memory recall, social desirability, common method biases, etc.). Third, data concerning the amount of time spent on SNSs on nonsmartphone devices were not collected (because the study wanted to examine the relationship between smartphone use and social media use). Amount of time spent daily on social media sites might have been higher if social media sites were also accessed via tablets, laptops, and/or computers. Fourth, time spent on smartphones and social media use was based on self-report and may therefore have been unreliable. In a study examining smartphone addiction, Lin et al (2015) found that participants reported a significantly lower period of time when interviewed with a psychiatrist present than their actual use data showed. In relation to measuring use time, it is possible to directly collect data using screen time data provided by the smartphone, but in the present study, due to the COVID-19 pandemic, the surveys were completed by the participants using online channels and the research team had no access to such data.

Fear of missing out is an important variable affecting smartphone addiction among adults, and FoMO has a significant relationship with SNS use time. SNS use time explained 15% of the variance in smartphone addiction. Therefore, creating awareness of FoMO will contribute to deepening the understanding of the concept among individuals. To do this, digital literacy courses could

be revised by including information relating to the causes and consequences of FoMO. In the long-term, this awareness might decrease the duration of SNS usage and smartphone addiction.

Fear of missing out and smartphone use explained 31% of the variance in smartphone addiction. Moreover, the findings showed that 73% of all time spent on smartphones comprised social networking activities. According to the results of another study, excessive SNS use and higher level of FoMO was positively associated with smartphone addiction, but in the same study, it was also concluded that smartphone addiction could also increase SNS use and FoMO (Li et al, 2022).

Fear of missing out is a predictor of smartphone addiction (Zhang & Rau, 2021). It would therefore be beneficial to investigate which social network applications affect the duration of use among adults and to introduce interventions to decrease the amount of time spent using them. Smartphone addiction among young adults should be particularly examined, given that they are the adult age group most at risk. Additionally, it is suggested that psychological issues other than FoMO be taken into consideration when modeling smartphone addiction.

Excessive smartphone use and a higher level of FoMO appear to play contributory roles in smartphone addiction among Turkish adults. FoMO is one of the predictors of time spent on SNSs, which is one of the main activities that contributes to excessive (and, in some cases, problematic) smartphone usage. To overcome smartphone addiction, intervention program developers should concentrate on factors that inhibit FoMO. Inhibiting FoMO would likely decrease SNS use which would subsequently result in a decrease in smartphone usage. The present study showed that young adults are at the highest risk for smartphone-related addictive behavior; therefore, to prevent this, targeted actions such as professional counseling for smartphone addiction and smartphone addiction prevention programs could be implemented. The Ministry of Health or other related nongovernmental organizations could organize workshops to find possible solutions for the smartphone addiction among young adults. For future studies, psychological issues other than FoMO could be taken into consideration when examining the contributory factors of smartphone addiction.

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