

ORIGINAL RESEARCH

An Investigation of the Associations between the Quality of Social Relationships and Smartphone Addiction in High School Students

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Main Points

- High school students feel bad if their smartphones are not with them, even for a short time, and they think smartphone addiction resemble substance addiction.
- Social media has been the most important predictor of smartphone addiction.
- According to high school students, their parents spend a lot of time on social media via smartphone and spend less time for their children.
- Smartphone addiction is increasing when there is nothing to do.
- Qualified friendships reduces both the amount of use and smartphone addiction.

Abstract

This study investigated the causal relationships between quality of social relationships and smartphone addiction in high school students. The research used exploratory sequential mixed design and was carried out in two stages: qualitative and quantitative. In the qualitative stage, a focus group interview was conducted to examine students' views on the relationship between quality of social relationships and smartphone addiction. In the quantitative stage, a survey was conducted, using questions developed from findings obtained in the qualitative stage and various measurement tools. Participants included 11th and 12th graders. Eight participants recruited based on smartphone use took part in the qualitative stage, while 620 students were recruited on a voluntary-basis for the quantitative stage. An interview form developed by the authors was used in the qualitative stage, while the Smartphone Addiction Scale-Short Version, UCLA Loneliness Scale-Short Form, Perceptions of Parents Scale, and Social Self-Efficacy Scale were used in the quantitative stage. Content analysis was carried out on qualitative data, and multiple linear regression was conducted on quantitative data. The findings revealed that smartphone addiction was positively associated with loneliness, multipurpose smartphone use, social media, and having nothing to do, and negatively associated with perception of one's mother, perception of one's father, and spending quality time with friends. Social media had the highest contribution to the variance in smartphone addiction.

Keywords: Family and peer relationships, high school students, mixed study, smartphone addiction, social media

This study is derived from the master thesis study, conducted by the first author, where the second and third author are consultants.

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Introduction

Information technologies have significantly changed habits and lifestyles in the past quarter-century. Computers and tablets at home and in the workplace, interactive smartboards in schools, and-of course-smartphones have emerged as the most com-

mon information technology devices of the modern age. Many people-especially young people use these technologies daily, for various purposes (Salehan & Negahban, 2013). Thanks to smartphones, which provide possibilities beyond functions such as making calls and texting, it is possible to easily access information, regardless of time of day or current

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location. Having smartphones that provide entertainment, but are not limited in what they offer, attracts considerable attention from people today (Kwon, Kim, Cho, & Yang, 2013).

Smartphone use has rapidly increased over the last decade. According to the International Data Corporation (IDC), 305 million smartphones were sold worldwide in 2010, and this number reached 1,000,000,994 in 2017. According to data from the Turkish Statistical Institute (TURKSTAT), 61.6 million phones were imported to Turkey between 2014 and 2018. According to another survey conducted by TURKSTAT, the mobile phone/smartphone ownership rate of households in Turkey increased from 53.7% in 2004 to 98.7% by late 2018.

According to Hawi and Samaha (2017), the widespread and intensive use of smartphones has triggered smartphone addiction, which stems from Internet addiction and problematic mobile phone use. This has caused some researchers to switch their attention from Internet addiction and problematic mobile phone use to smartphone addiction. Mobile phone addiction, which seems to be the closest concept to smartphone addiction, is a behavioral addiction characterized by impulse control problems (Kim, Lee, Lee, Nam, & Chung, 2014). Based on available data, behavioral addiction and substance addiction can be said to have several common clinical features, as both types of addiction are characterized by repetitive behavior (Benbir, Poyraz, & Apaydın, 2013). Given the mobility and online features of smartphones, they are likely to become a common social problem, due to tolerance toward addiction, withdrawal, difficulty in performing daily activities, and lack of impulse control (Kwon et al., 2013). Repeated checking of smartphones, excess time devoted to smartphone applications, reduced communication with family members and social circles, and smartphone use that interferes with daily activities and responsibilities can be considered signs of addictive use.

Previous research has indicated that factors such as loneliness, social self-efficacy, and family relationships affect smartphone use (Chiu, 2014; Lee & Lee, 2017; Pathak & Mhaske, 2017). Loneliness has become an increasingly common problem over the few past years, especially for adolescents and young adults (Erözkan, 2009). Individuals want to be accepted and supported by their parents, peers, and members of other social circles during the developmental period of adolescence and young adulthood. When this need is not met, they may choose to withdraw from social circles, and a sense of isolation could cause social and personal ties to deteriorate (Yıldız & Duy, 2014). Individuals with psychosocial problems such as loneliness may prefer to communicate through mobile devices instead of face-to-face, hoping this will lead to less anxiety (Enez-Darçın et al., 2016). Recent studies have shown there is usually a positive association between loneliness and smartphone addiction (Aktaş & Yılmaz 2017; Çakır & Oğuz, 2017; Dikeç, Yalnız, Bektaş, Turhan, & Çevik, 2017; Pathak & Mhaske, 2017).

Social self-efficacy is a protective factor that improves healthy development and social functioning during adolescence, as individuals go through various life experiences (Armum & Chellappan, 2016). As one aspect of effective social skills, social self-efficacy is the readiness to initiate behaviors in social settings (Sherer & Adams, 1983; Smith & Betz, 2000). Social self-efficacy implies individuals believe they are capable of making social contacts and

developing new friendships (Gecas, 1989). In one study, Chiu (2014) found a positive relationship between smartphone addiction and social self-efficacy. Furthermore, a positive relationship has been shown between social extroversion and mobile/smartphone addiction. (Bianchi & Phillips, 2005; Hong, Chiu, & Huang, 2012).

Another variable linked to smartphone addiction is the quality of relationships between an adolescents and their parents. Adolescence is a period of significant life changes for individuals and their families. In this period, adolescents often challenge rules at home, which can lead to serious conflicts with their parents (Allen, Moore, Kuperminc & Bell, 1998; Lieberman, Doyle, & Markiewicz, 1999). These conflicts may, in turn, negatively affect relationships. Lee and Lee (2012) demonstrated that perceived parenting style affected smartphone addiction. Bae (2015) showed that democratic family attitudes were negatively associated with smartphone addiction. Lee and Lee (2017) further reported that adolescents who developed poor relationships with their parents had higher levels of smartphone addiction. Toda et al. (2008) found no significant difference in mobile phone addiction based on perceived parenting attitudes of fathers; however, they determined that high care/high protection attitudes perceived of mothers lead to significantly higher mobile phone addiction, compared to low care/low protection attitudes.

In many studies addressing smartphone addiction, gender was also examined, and inter-gender differences were observed. Çakır and Oğuz (2017) found that high school girls had higher levels of smartphone addiction. In one study, Lee and Lee (2017) showed adolescent girls were more addicted to smartphones than male peers. However, Durak and Seferoğlu (2018) found mean smartphone addiction scores of male students in middle school to be higher than those of female students. Şar (2013) found that boys had more problematic mobile phone use than girls. Also, no significant relationship was found between smartphone addiction and gender in high school (Meral, 2017), college (Minaz & Bozkurt, 2017), and university students (Süler, 2016). Therefore, as studies have reported different findings regarding gender and smartphone addiction, more research is needed to more clearly understand this relationship.

People often check their smartphones soon after waking up and just before going to sleep (Lee, Chang, Lin, & Cheng, 2014). Individual screen time and smartphone addiction levels can increase based on the purpose of smartphone use. Social media applications are one of the most important elements reinforcing smartphone use. Frequent updates to and notifications from these applications-which allow messaging, sharing photos/videos, and watching videos-increase the length of smartphone use. In several studies, smartphone addiction has been associated with the social media application Facebook (Ryan, Chester, Reece, & Xenos, 2014) and WhatsApp, which is a messaging application (Montag et al., 2015). Enez-Darçın et al. (2016) found that the risk of smartphone addiction was significantly higher in young individuals whose primary purpose was to connect to social networking sites, compared to those whose primary purpose was to browse the Internet and chat with others. Doğan and Tosun (2016) found a significant relationship between social networking site use and smartphone addiction. There are also studies showing that social media applications are the most checked and time-consuming smartphone applications (Meral, 2017; Minaz & Bozkurt, 2017).

Adolescents use smartphones as tools for managing their social status and emotions. Adolescents, who generally have weaker impulse control than adults, are at greater risk of smartphone addiction than adults (Lopez-Fernandez, Honrubia-Serrano, Freixa-Blanxart, & Gibson, 2014). Thus, the target group of the present study was adolescent high school students. Studies mentioned above addressed the relationships of one or more of the variables in question and smartphone addiction; however, the relationship of some variables, such as gender, with smartphone addiction has not yet been clearly shown. Through a new study, which addresses all these variables together, it is thought that socio-psychological factors of smartphone addiction can be more clearly and holistically examined. Furthermore, by addressing this topic using an exploratory sequential mixed methods design, it is predicted that factors that may cause smartphone addiction will be more clearly revealed. Therefore, the present study aimed to obtain high school students' views regarding socio-psychological factors of smartphone addiction and analyze the predictor effects of the following variables: loneliness, perception of one's mother, perception of one's father, social self-efficacy, gender, constant availability of Internet access, multipurpose smartphone use, social media, spending quality time with family, spending quality time with friends, and having nothing to do. Thus, the present study sought answers to the following questions:

1. What are high school students' views on socio-psychological factors of smartphone addiction?
2. Are there significant relationships between smartphone addiction and variables such as loneliness, perception of one's mother, perception of one's father, social self-efficacy, gender, constant availability of Internet access, multipurpose smartphone use, social media, spending quality time with family, spending quality time with friends, and having nothing to do?
3. Is smartphone addiction predicted by variables such as loneliness, perception of one's mother, perception of one's father, social self-efficacy, gender, constant availability of Internet access, multipurpose smartphone use, social media, spending quality time with family, spending quality time with friends, and having nothing to do?

Methods

Study Model

The present study used an exploratory sequential mixed methods design. The process involved a focus group interview and a screening study. Initially, a focus group interview was conducted

with selected individuals from the target group to determine individual, cultural, and socioeconomic variables that may play a role in the emergence of smartphone addiction. Through analysis of this interview, several factors were determined, and these factors were used in a quantitative data collection process through a personal information form. Independent measurement tools were also included in the quantitative phase.

Participants

The qualitative data collection process consisted of a total of eight high school students, including four girls (50%) and four (50%) boys. To determine this group, purposive sampling was used, so that in-depth and detailed information about the situation could be obtained. The study setting was a state high school in a province in the Middle Black Sea Region, during the 2017-2018 academic year. A participant list of 11th and 12th-grade students was created according to intensity of smartphone use, in line with the opinions of the school psychological counselor. Students included on this list were invited to participate in the study, and eight students volunteered.

Participants involved in the quantitative data collection process were determined randomly, and on a voluntary-basis, among high school students in a province located in the Middle Black Sea Region, during the 2017 – 2018 academic year. Data were collected from 620 students attending the 11th and 12th grades in eight different schools, including five different school types. Of the participants, 363 were girls (58.5%) and 257 were boys (41.5%). Also, 190 students (30.6%) were from Anatolian high schools, 123 (19.8%) from Anatolian Imam Hatip high schools, 120 (19.4%) from social sciences high schools, 95 (15.3%) from science high schools, and 92 (14.8%) from vocational high schools.

Data Collection Tools

Six different data collection tools were used in the present study. The qualitative stage used a focus group interview form developed by the researchers, in line with expert opinions in the fields of psychological counseling and guidance, measurement and evaluation, and educational technology. In addition to the personal information form created by the researchers based on a literature review and the focus group interview, the quantitative stage included the Smartphone Addiction Scale-Short Form, which was developed by Kwon et al. (2013) and adapted to Turkish by Akin, Altundağ, Turan, & Akın (2014), UCLA Loneliness Scale-Short Form which was developed by Hays and DiMatteo (1987) and adapted to Turkish by Yıldız and Duy (2014), Perceptions of Par-

Table 1.
Summary of Measurement Tools Used in the Present Study

	Developed	Adapted	Number of Items	Likert Type	Cronbach's Alpha*	Cronbach's Alpha in the Current Study
Smartphone Addiction Scale	Kwon et al. (2013)	Akın et al. (2014)	10	Five	0.88	0.83
UCLA** Loneliness Scale	Hays and DiMatteo (1987)	Yıldız and Duy (2014)	7	Four	0.74	0.76
Perceptions of Parents Scale	Robbins (1994)	Kocayörük (2012)	21+21	Seven	0.91 and 0.93	0.90 and 0.93
Social Self-Efficacy Scale	Smith and Betz (2000)	Palancı (2004)	25	Five	0.89	0.93

*Obtained in the original study; **UCLA: University of California, Los Angeles

ents Scale which was developed by Robbins (1994) and adapted by Kocayörük (2012), and Social Self-Efficacy Scale which was developed by Smith and Betz (2000) and adapted by Palancı (2004). Table 1 presents a summary of these tools.

The original development of the Social Self-Efficacy Scale targeted university students. As the study group of the current study consisted of high school students, the factor construct of the scale was re-tested. For this purpose, confirmatory factor analysis (CFA) was employed. LISREL was used for CFA. The goodness of fit indexes was evaluated based on the criteria RMSEA<0.10 (Bentler & Bonett, 1980), CFI \geq 0.90 (Bentler, 1990), GFI \geq 0.85 (Jöreskog & Sörbom, 1988). The analysis found the fit indexes to be $\chi^2=799.11$, $p=0.00000$; $\chi^2/sd=2.93$; GFI=0.78; CFI=0.95; IFI=0.95; and RMSEA=0.09. The fit index values, except for the GFI value, indicated the overall scale had an acceptable level of values (Kline, 2005).

Focus Group Interview Form

The focus group interview form was created by the researchers after conducting a literature review, and was developed in line with the opinions of three teachers and three academics in the field of psychological counseling and guidance and three academics in the field of educational technology. It is a six-item, semi-structured tool. During the development process, questions were first prepared based on current literature. Then, a draft form was sent to the experts via e-mail. The experts were asked to rate the form (1-10) in terms of appropriateness for the study's scope, Turkish language, and target group, and to provide their opinions about the form, if any. Following improvements based on these expert evaluations, the final version of the form was created. On the final version of the form, there were six main questions, including "What is smartphone addiction," "Why do you think people become smartphone addicts," and "How do friendships and family relationships affect smartphone use," and eight sub-questions.

Personal Information Form

On the personal information form, participants were asked questions about the purpose of smartphone use, spending quality time

with their family and friends, and smartphone use when they had nothing to do and were alone. This form also included information about age, gender, Internet access, average daily time spent on a smartphone, and average daily time spent by family members on a smartphone.

Data Collection

During the qualitative data collection process, the focus group interview was conducted in the school guidance office and recorded on a voice recorder, with the knowledge and permission of participants. Participants were seated in a u-shaped layout, and were given a pencil and a piece of paper. In the introductory part of the interview, the study's purpose was explained, then participants briefly introduced themselves. During the interview, based on the question and answer method, participants were asked six questions ranging from general to specific. The questions were conversational and appropriate for daily use, and the interview lasted 64 minutes. After the interview, voice recordings were transcribed, and a 6,676-word transcript was obtained.

Quantitative data were collected during the first semester of the 2017 – 2018 academic year, after obtaining necessary permissions. The researcher or competent instructors administered the scales to students in their classrooms. Before administration of the scales, participants were informed about the study's purpose, importance, and data collection tools. Scales were administered to the students in groups of 30, and it took approximately 25-30 minutes for students to complete them.

Data Analysis

Content analysis was employed for qualitative data. Content analysis is a method commonly used in the analysis of written and visual data. Content analysis follows a deductive approach, which is one of the most commonly used methods among qualitative data analysis types (Silverman, 2001). The questions from the focus group interview form were used as the analysis framework. During the focus group interview process, evaluation meetings were held with the first, second, and third authors, and the themes obtained were evaluated by considering consistency with the notes taken by the researchers.

Quantitative data were analyzed with IBM SPSS (Statistical Package for the Social Sciences) version 22 (IBM Corp.; Armonk, NY, USA). Before statistical analysis, missing data in the measurements were completed by averaging the series. Then, the sum of students' scores obtained from the scales was calculated, and z values of the scores were obtained. Data with a z value greater than 3 or less than -3 were considered extreme values (Çokluk, Şekercioğlu, & Büyüköztürk, 2010). A total of 138 data outside the 3 and -3 limits were excluded from analysis. After this process, Mahalanobis distance analysis was performed, and after this analysis, 3 data whose chi-square values were below .001 were excluded from the set. Finally, 620 data were evaluated.

Regarding whether data met multiple normality assumptions, tables relating to general distribution of standard deviation values and distribution along the regression line were examined. After the removal of extreme values and further examination of the tables, the distribution was found to meet linearity and multivariate normality, which are basic assumptions of multiple linear regression analysis. Further, correlation, tolerance, and variance

Table 2.
Multicollinearity Test Results Relating to Predictor Variables

Variables	CI	Tolerance	VIF
Loneliness	4.35	0.81	1.24
Perception of one's mother	5.46	0.54	1.85
Perception of one's father	7.82	0.55	1.82
Social self-efficacy	9.24	0.80	1.24
Gender	10.44	0.93	1.07
Constant availability of Internet access	12.22	0.89	1.12
Multipurpose smartphone use	14.64	0.74	1.35
Social media	16.80	0.75	1.33
Spending quality time with family	17.73	0.73	1.37
Spending quality time with friends	32.10	0.74	1.36
Having nothing to do	43.52	0.96	1.05

VIF: variance inflation factor; CI: condition index.

inflation factor (VIF) values were investigated between predictor variable. These values are presented in Table 2.

An examination of Table 2 indicated that the tolerance value was greater than 0.20, and VIF values were less than 10. This revealed

Table 3.
Participants' Views on the Definition of Smartphone

	n
Participants' responses based on their own life	7
Being unable to do without your smartphone	4
Intending to keep your smartphone away, but failing to do so	2
Being unable to spend time without your smartphone	1
Participants' responses based on their environmental observations	14
Behaviors observed in parents	2
They constantly spend time on social media	1
They only spend their free time on their smartphones	1
Behaviors observed in the social environment	5
Trying to share every moment and/or memory	1
Being unable to do without a smartphone	1
Having more than one smartphone	1
Spending all free time on a smartphone	1
Engaging with the smartphone while doing something else	1

Table 4.
Participants' Views Regarding Why People Become Smartphone Addicts

	n
Individuals reasons	13
Doing things on a smartphone is fun	6
Smartphones facilitate making friends	4
Smartphones help avoid real-life problems	3
Environmental reasons	16
Lack of things/topics in common among friends	7
Being influenced by others in terms of smartphone use	2
Desire to be liked or gain popularity	1
Insufficient social environment and loneliness	4
Finding communication through smartphone/social media less risky	1
Quality of friendship relationships in real life	1
Parental effect	16
Poor relationships with parents	6
Being ignored by family	1
Individual's efforts to communicate things through social media that s/he cannot directly say to his/her family	3
Being understood by someone on social media	2
Scarcity of common topics among family members	4

there was no multicollinearity problem between predictor variables (Büyüköztürk, 2015).

Results

High School Students' Opinions on Socio-psychological Factors of Smartphone Addiction

This section presents the findings of the focus group interview conducted at the beginning of the present study.

Question 1: What is smartphone addiction?

Participants' answers to this question were grouped under two titles: "answers based on one's own life" and "answers based on one's environmental observations." Additionally, answers based on one's environmental observations were grouped under two titles: "behaviors observed in parents" and "behaviors observed in the social environment." Participants' views on the definition of smartphone addiction are provided in Table 3.

An examination of Table 3 and participants' responses based on their life indicated they never wanted to be without their smartphones, felt bad when they did not have their smartphones with them, and thought smartphone addiction and substance addiction were similar due to these reasons. Some of the answers given to this question are as follows:

Student N (Girl): *The phone is either in my back pocket or in my hand. I can't breathe until it's charged when it runs out of battery. I feel bad and restless if I don't have it with me, due to my addiction.*

Student B (Girl): *Intending to keep your smartphone away, but being unable to do so... For example, I want to look at something on my smartphone while I'm studying, then I realize that I have spent one hour.*

Student A (Girl): *It is the same as drugs. You cannot quit...*

An examination of participants' statements regarding addictive behaviors observed in their parents revealed their parents usually spent time on social media when using their smartphones, consequently spending less time with their children. As for participants' statements regarding addictive behaviors observed in their social environment, behaviors such as trying to share every moment and constantly engaging with smartphones, even while walking down the street, waiting for the bus, or meeting personal needs, were regarded as signs of addiction.

Student M (Boy): *My mother usually listens to music, and my father is usually on Facebook. Our relatives are always on Facebook. They share photos, so my father looks at them. My father stays online for a long time... I see him always charging his phone on the triple socket.*

Student N (Girl): *They are usually engaged in their smartphones outside their work. Or, if our mothers are housewives, they stop whatever they are doing and go online immediately. I mean, they use social media more than we do.*

Student M1 (Boy): *They try to share every moment, but every single moment. I mean, they upload every single photo they take directly without thinking whether it is nice or not.*

Question 2: How do the people around you that you think are addicts communicate with other people?

An examination of participants’ answers to this question indicated they thought these people refrained from face-to-face communication and communicated with others on their smartphones even in the same environment, and also felt that people who have difficulty communicating in person could communicate more easily via smartphone. Some of the answers to this question are provided below:

Student N (Girl): They don’t talk. For example, some talk to their parents through WhatsApp, instead of talking face-to-face... There is another issue; we meet with our friends so that we can have a nice time. After five minutes, you see everyone is busy with their smartphones. Even when we want to say something, we send messages directly through the smartphone. So, there is no face-to-face talk, even if we are in the same environment.

Student M1 (Boy): Those who cannot normally bring two words together in face-to-face occasions talk on smartphone applications.

Question 3: Why do you think people become smartphone addicts?

When participants’ responses to this question were examined, the reasons for addiction appeared to be divided into individual and social reasons. Social reasons were further divided into environmental and familial reasons. Participants’ opinions regarding why people become smartphone addicts are shown in Table 4.

When Table 4 and participants’ statements regarding individual reasons were examined, it was observed that participants thought doing things on smartphones was fun, social media applications facilitated making friendships, and smartphones were sometimes an opportunity to escape real-life problems. Some of the answers to this question are provided below:

Student A (Girl): It can be very difficult to establish relationships with people. For example, you may not get along well, you may

fight, but there’s no such thing on the phone. You can both do what you want and also have fun; better than talking to a person face-to-face...

Student A (Girl): I think it might be used for getting rid of the problems....For example, you’re arguing with someone, for example with your parents. You pick up your smartphone right away; there is a lot of fun going on there, and then, I forget the argument...

An examination of participants’ responses regarding the impact of the social environment revealed that scarcity of things in common/topics among friends influenced smartphone addiction. Participants reported being affected by each other regarding the use of smartphones; furthermore, wanting to be liked, become popular, and meet new people were thought to lead to smartphone addiction. Some participants stated that people with a wider social circle would use smartphones more, while others stated that lonely people would be more prone to smartphone addiction. Additionally, there were participants who stated having quality friendships would reduce smartphone addiction.

Student B (Girl): You meet with your friends from secondary school, but because you are not in the same environment and your environments are different, you get engaged in your smartphone inevitably, but when you meet with your high school friends, you have things to talk about, because you are in the same environment... I mean, you don’t need a smartphone a lot.

Student F (Boy): There is also another issue like this. For example, when I pick up my smartphone, everyone around me picks it up, but this does not happen when nobody picks up their phone. We sit and chat very nicely.

Student B (Girl): A friend of mine has a wide circle and wants to gain popularity. She wants to say “I’m here” with the photos she shares. But people with few friends, people with a limited environment; they do not have friends. They say “what changes if I’m not there.”

Student M1 (Boy): I think people who have friends and who have a wide social environment cannot find time to use them. Since they always have time to spend with their friends, they only look at social media on their smartphones in the evenings. But lonely people use it more often because they have no friends but their mobile phones.

An examination of participants’ responses regarding parental factors indicated their smartphone use increased during periods when their relationships with their parents were impaired. It was understood from participants’ statements that when their relationships with their parents were bad, they went to their rooms and shared negative things about their parents on social media and received positive feedback (what they wanted to hear). However, some participants stated that their smartphone use did not decrease when their relationships with their parents were good. Although the lack of common topics of discussion among family members increased the use of smartphones, some participants said that even if there were common topics, chatting with family members would not take long. Some participants stated their smartphone use would increase when they were not taken into consideration by their parents.

Table 5.
Results of Correlation Analysis between Independent Variables and Smartphone Addiction

	Smartphone Addiction
Loneliness	0.08*
Perception of one’s mother	-0.16**
Perception of one’s father	-0.11**
Social self-efficacy	-0.07
Gender	0.08
Constant availability of Internet access	0.03
Multipurpose smartphone use	0.21**
Social media	0.25**
Spending quality time with family	-0.07
Spending quality time with friends	-0.19**
Having nothing to do	0.21**

*p<0.05; **p<0.01

Student M2 (Boy): *Even if I don't have my smartphone with me for a year, even if I stay apart from my mobile phone for a year, I don't care because I am with my family....however, there is one thing, for example, my mobile phone use increases when I argue with someone from my family, or when we contradict.*

Student F (Girl): *I want to listen to music on my smartphone when I fight with my parents. [Also] I surf Instagram....But when there is a nice atmosphere, for example, when we celebrate a birthday or when we are together, I feel good.*

Student B (Girl): *When I don't get on well with my family, I use my mobile more often, but even when things go well or when there's something I am interested in, I pick up the phone to check the time, even while we are talking.*

Student N (Girl): *My mother is always busy with her smartphone. I try to say my opinion about a subject, and since she doesn't take me into consideration, I end up with going to my room and staying alone with my phone. So, I think it increases smartphone use.*

Relationship between Socio-psychological Variables and Smartphone Addiction

This section includes correlation and multiple linear regression analyses conducted to test the relationship between smartphone addiction and variables such as loneliness, perception of one's mother, perception of one's father, social self-efficacy, gender, multipurpose smartphone use, social media, constant availability of Internet access, spending quality time with family, spending quality time with friends, and having nothing to do.

Table 6.
Results of the Regression Analysis Conducted to Predict Participants' Smartphone Addiction

Variable	B	SE	β	p
(Constant)	26.48	3.93	-	0.00**
Loneliness	0.08	0.09	0.03	0.40
Perception of one's mother	-0.07	0.03	-0.14	0.01*
Perception of one's father	0.00	0.02	0.00	0.98
Social self-efficacy	-0.02	0.02	-0.05	0.27
Gender (girl)	-2.05	0.69	-0.11	0.00**
Constant availability of Internet access	0.48	0.69	0.03	0.49
Multipurpose smartphone use	0.58	0.22	0.12	0.01*
Social media	4.00	1.00	0.17	0.00**
Spending quality time with family	0.34	0.37	0.04	0.35
Spending quality time with friends	-1.18	0.33	-0.16	0.00**
Having nothing to do	1.06	0.26	0.16	0.00**

*p<0.05; **p<0.001; SE: standard error.

Correlations between Variables

The results of Pearson Product-Moment Correlation analysis between the independent variables discussed in the present study and smartphone addiction are presented in Table 5.

An examination of relationships between the variables indicated there was a positive, significant relationship between smartphone addiction and loneliness, multipurpose smartphone use, social media, and having nothing to do. There was a negative, significant relationship between smartphone addiction and perception

Table 7.
Results of the Hierarchical Regression Analysis

Model	Predictor	B	SE	β	ΔR^2
1	Social media	5.78	0.91	0.25*	0.06
	Constant	19.48	0.82		
2	Social media	5.18	0.90	0.22*	0.03
	Having nothing to do	1.24	0.26	0.18*	
3	Social media	4.86	0.90	0.21*	0.02
	Having nothing to do	1.14	0.26	0.17*	
4	Spending quality time with friends	-1.14	0.29	-0.15*	0.02
	Constant	20.10	1.77		
5	Social media	4.93	0.89	0.21*	0.01
	Having nothing to do	1.12	0.26	0.16*	
6	Spending quality time with friends	-1.04	0.29	-0.14*	0.01
	Perception of one's mother	-0.07	0.02	-0.14*	
7	Constant	28.37	2.80		0.01
	Social media	3.81	1.00	0.16*	
8	Having nothing to do	1.09	0.26	0.16*	0.01
	Spending quality time with friends	-1.03	0.29	-0.14*	
9	Perception of one's mother	-0.07	0.02	-0.14*	0.01
	Multipurpose smartphone use	0.51	0.21	0.10*	
10	Constant	26.27	2.93		0.02
	Social media	4.04	0.99	0.17*	
11	Having nothing to do	1.07	0.26	0.16*	0.02
	Spending quality time with friends	-1.08	0.28	-0.14*	
12	Perception of one's mother	-0.08	0.02	-0.15*	0.02
	Multipurpose smartphone use	0.55	0.21	0.11*	
13	Gender (girl)	2.25	0.67	0.13*	0.02
	Constant	25.19	2.92		

p<0.001*; SE: standard error.

of one's mother, perception of one's father, and spending quality time with friends. These findings also provided statistical basis for the regression analyses regarding the review model.

Multiple Linear Regression Analysis Results

Multiple linear regression analysis was performed to test the extent to which the independent variables in the review model could predict changes in smartphone addiction. The results of this analysis are presented in Table 6.

Table 6 shows that the model explained 17% of the variance in smartphone addiction. However, only six of the independent variables defined in the model contributed significantly to this. Therefore, there were six significant predictors of smartphone addiction: perception of one's mother, gender (girl), multipurpose smartphone use, social media, spending quality time with friends, and having nothing to do. An examination of regression coefficients in terms of signs revealed that four of these six variables had positive effects on smartphone addiction and two had negative effects. When standardized regression coefficients (β) were examined to obtain a relative idea about the predictive power of these variables, social media was found to contribute the most to changes in smartphone addiction. This was followed sequentially by having nothing to do, spending quality time with friends, perception of one's mother, multipurpose smartphone use, and gender (girl). After conducting Pearson's moment correlation analysis, social self-efficacy, gender, constant availability of Internet access, and spending quality time with family (whose connection with smartphone addiction could not be identified), were subjected to regression analysis, due to the findings from the qualitative phase of the study and strong emphasis on these variables in the literature. However, to eliminate this limitation and more clearly see the contribution of these predictors in explaining the variance in smartphone addiction, stepwise regression analysis was performed.

Hierarchical Regression Analysis Results

Variables found to contribute significantly to smartphone addiction variance in the hierarchical regression analysis were included in the analysis, according to their relative importance rank as laid out by multiple linear regression analysis. The results are presented in Table 7.

Table 7 shows the relative importance rank determined by multiple linear regression analysis regarding the power of predictor variables to explain the change in smartphone addiction. Accordingly, social media was shown to make the most significant contribution to smartphone addiction variance, explaining 6% of the variance alone. The second variable was having nothing to do, which had a contribution level of 3%. This was followed by spending quality time with friends (2%), perception of one's mother (2%), gender (girl; 2%), and multipurpose smartphone use (1%).

Discussion

Discussion of Qualitative Findings

The present study addressed the causal relationship between quality of social relationships and smartphone addiction in high school students. In the qualitative phase of the study, which was conducted using an exploratory sequential mixed methods design, a focus group interview was conducted to investigate students'

views on the relationship between quality of social relationships and smartphone addiction. At the end of this interview, the study group's opinions regarding smartphone addiction were discussed within a framework of individual, environmental, and familial reasons.

Definition of Smartphone Addiction

An analysis of participants' statements regarding the definition of smartphone addiction based on behaviors they observed in their own lives revealed that participants did not want to be without their smartphones, felt bad when their smartphone was not with them, and thought smartphone addiction resembled substance addiction. Some applications that frequently send notices can cause excessive smartphone use. This leads to habitual smartphone use, and after a while, can trigger smartphone addiction (Van Deursen, Bolle, Hegner, & Kommers, 2015). As smartphones have become an integral part of everyday life for some people, it has been found that people with smartphone addiction experience separation anxiety when their smartphone is not with them (Cheever, Rosen, Carrier, & Chavez, 2014; King et al., 2013).

An examination of participants' statements regarding the definition of smartphone addiction based on behaviors they observed in their parents indicated their parents spent more time on social media with their smartphones and allocated little time for their children. A previous study on adults showed that, as age increases, smartphone use often decreases (Van Deursen et al., 2015).

As for participants' responses regarding the addictive behaviors they observed in their social environments, these behaviors, such as trying to share every moment or using smartphones while walking down the street, waiting for the bus, and even meeting their personal needs, were considered signs of addiction by participants. Today, the use of smartphones for reasons other than communicating, such as browsing the Internet, taking photos, writing, drawing, and playing online games, can lead to smartphone addiction, which is emerging as a new problem (Şar, Ayas, & Horzum, 2015).

Why People Become Smartphone Addicts

When participants' answers regarding why people become smartphone addicts were examined, it was observed that participants thought doing things on a smartphone was fun, social media applications facilitated making friendships, and smartphones sometimes provided an opportunity to escape real-life problems. Social media applications allow individuals to start and maintain new relationships (Boyd & Ellison, 2008). Furthermore, social media applications and some dating sites for adolescents can be preferable for meeting new people, sharing problems, or escaping real-life problems through fun activities. This may increase smartphone use to an addictive level.

An examination of participants' responses regarding why people become smartphone addicts in terms of social-environment impact revealed that a scarcity of topics in common among friends influenced smartphone addiction. Participants were observed to be influenced by each other regarding smartphone use. Further, wanting to be liked, become popular, or meet new people—which are made possible through social media applications—may lead to smartphone addiction. Some participants stated that people who have wider social circles might use smartphones more often,

while others said people who have limited social circles or are lonely would exhibit more smartphone addiction behaviors. Additionally, some participants stated that having a quality friends' group would reduce smartphone addiction. Lee and Lee (2017) found that those who use smartphones to gain the acceptance of their peers had higher levels of addiction. Bae (2015) determined that high friendship satisfaction reduced addictive smartphone use. However, Lee et al. (2014) also found that social anxiety and coercive smartphone use were positively related. While it is assumed that individuals with wider social circles will actively use social media, therefore increasing their smartphone addiction, individuals with limited social circles are assumed to use their smartphone more often to reduce the negative effects of loneliness. When there are few common topics to talk about among friends, individuals will possibly prefer spending time with their smartphones instead of conversing with others.

An analysis of participants' responses to the question of "why people become smartphone addicts" in terms of parental effects revealed that smartphone use increased during periods when they had poor relationships with their parents. Some participants indicated that when their relationships with their parents were bad, they went to their rooms and shared negative things about their parents on social media and received positive feedback. However, some participants stated their smartphone use did not decrease when their relationships with their parents was good. Although a lack of common topics for discussion among family members is a factor that increases smartphone use, some participants found that even if there were common subjects, talking with family members would not take long. Some participants noted their smartphone use would increase if they were not taken into account by their parents. Lee and Lee (2017) found that those with high levels of loyalty to their families had low levels of smartphone addiction. Bae (2015) reported that smartphone addiction was low in homes where a democratic parenting style dominated. Furthermore, Chiu (2014) stated that family stress was a positive predictor of smartphone addiction. Adolescents may go to their rooms and spend more time on their smartphones as a reaction to their families during times of conflict. The fact that individuals who do not have common topics to talk about with their families and who are not understood by their families seek consolation on social media and other online platforms-and that they can easily do this through their smartphones-are considered factors that can increase smartphone addiction.

Discussion of Quantitative Findings

In the quantitative analyses of the present study, significant predictors of smartphone addiction were found to be perception of one's mother, gender (girl), multipurpose smartphone use, social media, spending quality time with friends, and having nothing to do. Hierarchical regression analysis showed that smartphone addiction was predicted, sequentially, by social media, having nothing to do, spending quality time with friends, perception of one's mother, gender (girl), and multipurpose smartphone use.

The current study found that social media was the most important predictor of smartphone addiction. Social media applications can be places where people exchange information, share their statuses, and entertain themselves (Clemons, 2009). There are studies in which social media has shown a positively significant correlation with smartphone addiction. Enez-Darçın et al. (2016)

revealed that smartphone addiction scores of university students who mainly intended to access social media were significantly higher. Minaz and Bozkurt (2017) found that university students mostly used their smartphones to connect to social networking sites. Also, Salehan and Negahban (2013) found that the use of social media applications significantly predicted smartphone addiction. The fact that smartphones are portable and allow for taking photos and recording videos, and sharing these photos/videos quickly, increases access to social media applications from smartphones.

Another variable that significantly predicted smartphone addiction was having nothing to do. Lee and Lee (2017) stated that adolescents used their smartphones to pass the time and save themselves from boredom. High school students in Turkey have been observed to devote considerable time to school and various courses. Many of these students have limited time to spend on smartphones; however, it is thought that smartphone use may increase when lessons at school are not strict or when students have difficulties concentrating on courses.

Spending quality time with friends was found to be another variable that significantly predicted smartphone addiction. A review of the literature indicated similar findings. Lee and Lee (2017) found that individuals with high levels of commitment to their friends had lower levels of smartphone addiction. Additionally, Bae (2015) determined that people who had high levels of satisfaction with friendships had low levels of smartphone addiction. In one study, Wang et al. (2017) reported that adolescents with good peer relationships had a reduced risk of smartphone addiction. However, Chen et al. (2016) stated in their study on young adults that interpersonal problems were a significant mediator between smartphone addiction and negative emotions.

Perception of one's mother was one variable that significantly predicted smartphone addiction. However, perception of one's father was not found to contribute significantly to the variance in smartphone addiction. Previous studies showed that adolescent-parent relationships and parental attitudes affected smartphone addiction (Bae, 2015; Chiu, 2014; Lee & Lee, 2017). Toda et al. (2008) found no significant difference in mobile phone addiction according to perceived parenting attitudes of fathers, but found significantly higher connections between mobile phone addiction and high care/high protection attitudes of mothers compared to low care/low protection attitudes.

Gender was another variable that significantly predicted smartphone addiction. Female students were found to have higher smartphone addiction scores. This finding was consistent with the results of some earlier studies. Çakır and Oğuz (2017) stated that female high school students had higher smartphone addiction levels than male peers. Doğan and Tosun (2016) found that levels of female students' problematic smartphone use were higher than those of male students. Lee and Lee (2017) found that the levels of girls' smartphone addiction were higher than that of boys. Kwon and Paek (2016) reported that females' smartphone addiction scores were higher than those of males. In some studies, however, males' smartphone addiction levels were higher (Durak & Seferoğlu, 2018; Şar, 2013). There were also previous studies that did not show a significant difference in smartphone addiction levels by gender (Meral, 2017; Minaz & Bozkurt, 2017).

Multipurpose smartphone use was the last variable that significantly predicted smartphone addiction in the present study. According to data collected through personal information forms, participants' most common use of smartphones was listening to music. However, social media has been shown to be the best predictor of smartphone addiction. Various studies have shown that social media increases smartphone addiction risk (Doğan & Tosun, 2016; Enez-Darçın et al., 2016).

According to the results of the present study, loneliness was not found to make a significant contribution to the variance in smartphone addiction. Studies on high school students (Çakır & Oğuz, 2017; Dikeç et al., 2017; Şar, 2013) and university students (Aktaş & Yılmaz 2017; Bian & Leung, 2015; Enez-Darçın et al., 2016; Pathak & Mhaske, 2017) have shown that increases in loneliness increased smartphone addiction. The lack of a significant relationship between loneliness and smartphone addiction in the present study is thought to have been due to the research model.

No significant relationship was found between social self-efficacy and smartphone addiction in the present study. However, Chiu (2014) found a positive and significant relationship between social self-efficacy and smartphone addiction in a study conducted with university students. To contribute to the discussion, studies on social extroversion and mobile phone addiction were also discussed in the current study. Bianchi and Phillips (2005) showed there was a positive relationship between social extroversion and problematic mobile phone use, while Hong et al. (2012) reported a positive relationship between social extroversion and mobile phone addiction.

Spending quality time with family was not shown to make a significant contribution to the variance in smartphone addiction. Lee and Lee (2017) found that individuals with high levels of loyalty to their families had low levels of smartphone addiction. Chiu (2014) stated that a high level of family stress was a positive predictor of smartphone addiction. This is thought to have stemmed from the fact that in adolescence, friendships are generally more prominent than family relationships.

Limitations and Directions

The qualitative results of the present study revealed that parental indifference influenced intensive smartphone use for high school students, and they often preferred going to their rooms and spending time on their smartphones when they had problems with family members. Due to spending most of their time on their smartphones, there was also a lack of communication among family members. To decrease time spent on smartphones, families could allocate "phone-free hours," and could spend this time on quality activities such as reading, which could make time spent together more valuable. Furthermore, it would be appropriate for families to receive information from experts regarding safe use of the Internet, social media, and technology in general. The quantitative results of the study indicated that spending quality time with friends was a protective factor for smartphone addiction. Conducting group work sessions could be practical for supporting students who have difficulty managing their social life and making quality friendships, as well as helping them to avoid smartphone addiction. Results from both the qualitative and quantitative dimensions of the current study revealed that high school students used their smartphones more intensively

when they had nothing to do. Thus, for high school students to use their free time more effectively, students' interests and abilities should be discovered, and they should be directed toward social and sports activities in schools, thereby reducing the time allocated to smartphones.

Regarding the study's limitations, only one focus group interview was conducted to determine socio-psychological variables possibly associated with smartphone addiction. An important reason for this limitation was the permission processes carried out with the related institutions and organizations. However, to overcome this limitation, some measures were taken, such as meticulous selection of students who would take part in the interview and keeping the duration of the interview long (64 minutes). Another limitation was that study data were collected from a single province, due to permission processes and a limited budget. In the future, carrying out similar studies on different participant groups with the same target group characteristics would be useful to increase the generalizability of the results of the current study.

Ethics Committee Approval: The approval was received for this study from the City Directorate of National Education.

Informed Consent: We worked together with the volunteer students who participated in this study.

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