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Fear of Missing Out and Problematic Usage of Smartphones Concerning Adolescents

Aysun TAŞ[1], Süleyman BALCI [2]

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The development of technology and increase of common usage of mobile phone in recent years has caused the desire of the individual to share their lives with other individuals and the desire to be aware of their lives, that is, the fear of missing out regarding developments. By considering that the fear of missing out (FOMO) and problematic cell phone use will affect adolescents, current study aimed to analyze the FOMO and problematic mobile phone use of adolescents with regard to various variables. In present research, descriptive research design was conducted. The data of current study were collected with the FOMO scale and the problematic smartphone usage scale. It was carried out with 673 adolescents who have been studying at high school. The results revealed that the FOMO differs significantly in adolescents in terms of gender and class level and it was concluded that problematic smartphone usage differs significantly with regard to father education level, gender and class level. Moreover, it has been concluded that problematic mobile phone use did not differ with regard to mother and father education level, age, high school type and family income level. Additionally, the results of current research revealed that the FOMO and problematic smartphone usage are positively and significantly related with each other regarding adolescents.

Keywords: Fear of missing out of adolescents, fomo, problematic usage of smartphones, adolescents attending high school

INTRODUCTION

The great development of technological communication tools has made it easier for individuals to reach the subjects they are curious about from more practical and correct sources (Esitti, 2015). With the rapid introduction of the mobile phone into human life after the computer and the internet becoming widespread and accessible, the access and use of information by individuals from all ages at any time has increased (Metin, Pehlivan & Tarhan, 2017). Due to this developments, the facilitating effect of the cell phone usage in the daily life of the individual has increased (Spiratos, 2021) and has gained an important place in human life (Karaaslan & Budak, 2012; Oz et al., 2015). Therefore, it has been observed the rapid increase in the number of individuals using mobile phones.

Applications for mobile phones and advances and innovations in mobile phone technology have made it easier to use online social media applications by taking the communication function even further. With these applications, individuals can follow the lives, current developments and situations of people who are in their social environment or not, simultaneously. With the social media having such significant role in human life, the desire of people to share their life and experiences with other individuals and to be aware of their lives and experiences increases. For this reason, individuals witness the lives of others through social networks with videos, photos, music and situations that disappear after a certain period of time, and constantly update such posts. This causes the individual to worry about missing out developments in social settings (Tayiz, 2018).

As the networks of internet and social media are included in human life and many social networks are accessible from computers, tablets and mobile phones, people are faced with the anxiety of staying away from changes and news about changes of daily life in social media networks, according to Przybylski et al. (2013). The individuals spend lot of time with their mobile phones in social media environments in order to get rid of this anxiety and constantly follow new developments, and this behavior is called as the fear of missing out (Dossey, 2014). According to Blackwell et al. (2017) FOMO (fear of missing out) refers to anxiety state about missing the developments in social networks and being unaware of these developments. Therefore, an individual may spend excessive time on social media in order to relieve their anxiety (Gokler et al., 2016; Van der Schyffl et al., 2022). Behaviors of constantly following and updating social networks are stated as fear of missing out (Fuster, Chamarro, & Oberst, 2017).

The need of the individual's community to understand what each other is doing in a certain period of time, in a concrete or virtual environment, has a different importance for each member (Abel, Buff, & Burr, 2016). The answer to many curious questions about what other people are doing, where they are, and who they are with are tried to be found by using networks of internet media, and by this way, the FOMO emerges with motivations such as following up, benefiting from the experiences of the individuals, and seeing their opportunities (Herman, 2010). Vitelli (2016) stated that one of the reasons why the fear of missing out is very common is that it provides permanent communication in social media environments. Individuals who have FOMO on developments feel anger, anxiety and inadequacy. Having tendency to anger, anxiety and feelings of inadequacy causes the anxiety of missing further developments (Howard, 2022). However, according to

[1] MEB Ankara İl M.E.Md., aysun_hns@hotmail.com, 903123068600, orcid.org/ 0000-0002-9523-3741]
[2] Kırıkkale University, suleymandr@gmail.com, 903183574242, orcid.org/ 0000-0001-9374-8808

Abel, Buff, and Burr (2016) one's self-esteem may also influence the extent of FOMO. The literature review revealed that many factors such as technological communication devices, active use of social media (Gurdin, 2019), the need to meet psychological needs (Kuss & Griffiths, 2017), the need to meet basic needs (Alt, 2015) may be reasons for the fomo. In addition, the excessive period of usage of social media networks is among the reasons that affect the fomo (Gökler et al., 2016).

FOMO may exacerbate symptoms about psychological disorders such as anxiety and depression related with active and continuous usage of social media (Wegmann et al., 2017). Considering this point of view, it may be said that the FOMO causes some psychological problems (Kuss & Griffiths, 2017). Individuals who are active on social media may feel inadequate and worthless when they do not reach the number of followers they want in their user accounts or if their posts are not liked, followed or respected by other people (Alutaybi et al., 2020).

Besides the function of communicating with others, smartphones has many features such as accessing the social media networks and information quickly, playing online and digital games and listening to music, which may cause an increase in the time period of people's usage of smartphones. With this reason, smartphones has significant role in people's daily life (Thomee, 2018). Problems may arise when mobile phone, which have many benefits and make human life easier, are not used correctly and in compatible with its purpose. According to Kwon et al. (2013) smartphones' problematic usage is a kind of problematic behavior that occurs when the person cannot control one's usage of smartphones, cannot prevent the desire to spend excessive time, postpone one's daily life and responsibilities due to unnecessary time, and significant emotional differences are observed about the individual when the smartphone is not available, and it can reach the level of addiction (Altundağ & Bulut, 2017).

It has been observed that the effect of smartphones on peer groups is also very high. According to Ling and Helmersen (2000), the period in which peer groups affect mostly each other is the period of adolescence. This effect of smartphones on adolescent individuals has made them dependent on the internet and the smartphones. Looking at what causes the problematic usage of smartphones, one of its causes is netlessphobia, which is defined as feeling fear and avoiding situations and environments where there is no internet. People can leave the house in order to be in face-to-face contact with other people or to be outside for working and in this case, they are worried about not being able to connect to the internet. For this reason, they need smartphone with which they can connect to the internet (Öztürk, 2015). If the individual lives lonely life, individual generally resort to mobile phones to escape from loneliness, even if the result is risky, in order to escape or get rid of the troubles of one's life (Laramie, 2007).

Mccoy (2016) argued that the FOMO is more common among young people. When looking at the what are the reasons of the problematic mobile phone usage of among younger people, the first reason is that it is technological device that allows them to create personal boundaries and personal space independent of their parents and to gain their personal independence (Oksman & Turtiainen, 2004). Another reason is the adoption of mobile phone usage as prestigious identity symbol among young people (Özaşcılar, 2012). However, Enez Darcin et al. (2016) argue that the individual may use one's smartphone as tool to get away from his worries, and the individual may consider having a smartphone and being good user of smartphone as sign of popularity.

It is determined that cell phones' excessive usage causes various health problems (Sönmez, Gürlek Kısacık, & Eraydın, 2020) such as blurred vision, permanent effects on eye health, various pain and health problems in the finger, wrist and neck regions due to its usage positions (Kim et al., 2013), headache complaints (Keskin et al., 2018) and mental and emotional problems such as anxiety, fear, restlessness and addiction (Blachnio, Przepiorka, & Fortuna, 2010; Gezgin et al., 2016; Kuss & Griffiths, 2017), low self-esteem and aggressive behaviors (Roser et al., 2016) and attention and concentration difficulties (Cazzulino et al., 2014). Moreover, problematic usage of mobile phone may cause academic and school problems for adolescents who attend school (Yam, Korkmaz, & Griffiths, 2021) such as the student's change of focus and shift to the cell phone during the lesson (Jacobsen & Forste, 2011) and change and restrictions about their social communication skills (Yilmaz, Sar, & Civan, 2015).

In spite of more common use of mobile phones and the recent increase in the demand for social media, according to Gökler et al. (2016) the lack of sufficient number of research on problematic smartphones use in Turkey has made it important to investigate the effects of FOMO and related factors for people. With the spreading disease of the Covid-19 pandemic, the increase in the usage of smartphones along with other digital

technological communication tools in daily life draws attention. The widespread use of smartphones to access to the heavily used social media networks highlights the problematic usage of smartphones. It is thought that determining the effects of problematic usage of smartphones for individuals to take the necessary precautions will contribute significantly to the quality of individuals' life. In the literature, there are various researches which are related with adolescents' and young people's FOMO (Adelhardt, Markus, & Eberle, 2018; Gökler et al., 2016) and their problematic usage of mobile phones (Altundağ & Bulut, 2017; Ektiricioğlu, Arslantaş, & Yüksel 2020; Kwon et al., 2013). However, in the literature review, it could not be reached any study examining together both the problematic smartphones usage and the level of FOMO for adolescents attending high school. For this reason, it is hoped that examining together both the problematic usage of smartphones and the FOMO level of adolescents attending high school will contribute to the literature about the FOMO and problematic usage of mobile phones, and will contribute to future studies on these issues as well. With this expectation, present research investigated the problematic usage of mobile phones and the level of FOMO for adolescents attending high school, and how these variables vary with respect to kind of high school attended, grade, age, education levels of their parents, gender, and income of their family.

Present study examines whether the problematic usage of smartphones and the level of FOMO for adolescents attending high school are significant, and whether these variables differ with respect to kind of high school attended, grade, age, education levels of their parents, gender, and income of their family. For these purposes, the following questions were answered:

1. Is problematic usage of smartphones by adolescents attending high school significantly associated with their FOMO?

2. Are the FOMO of adolescents attending high school different with regard to kind of high school attended, grade, age, education levels of their parents, gender, and income of their family?

3. Are the levels of problematic smartphones usage among adolescents attending high school different with regard to kind of high school attended, grade, age, education levels of their parents, gender, and income of their family?

METHOD

In this research, the method of descriptive research, in which an existing situation is investigated, was used. The research is relational survey model in which whether the problematic usage of smartphones and the FOMO of the adolescents attending high school are significantly related and the situation of these variables is examined according to demographic characteristics. In this model, the variables examined are described separately from each other and it is aimed to analyze the state of the mutual association of the variables and the level of the relationship, if any (Karasar, 2011).

Participants

The participants of current study consist of 673 adolescents who attend their high school education in science, vocational, anatolian high schools and anatolian imam-hatip high schools, which provide education under the Turkey Ministry of Education. The research sample was determined with the "purposive sampling" technique as one of sampling techniques with the unknown probability. The study group is formed by choosing the groups which are suitable and accessible for the study by means of purposive sampling technique (Erkuş, 2017). Factors such as time and financial loss that may arise during the research process may be eliminated with this sampling technique. 673 adolescents attending high school from different provinces in Turkey were reached remotely via Google Forms due to the epidemic disease and life risk related with the Covid-19 pandemic during the time period of the present study and necessary attention was paid to ensure that participants were volunteers attending educational institutions located in socioeconomically different regions. Descriptive statistics related with the demographic features of 673 adolescents of the research sample are given in Table 1.

Table 1. Participants' Descriptive Statistics

	Mean	Sd
Age	15.42	1.23
	n	%
Gender		
Female	435	64.64
Male	238	35.36
Grade Level		
9.	218	32.40
10.	243	36.11
11.	128	19.02
12.	84	12.48
High School Type		
Science	222	32.99
Anatolian	270	40.12
Vocational Technical	124	18.42
Imam Hatip	57	8.47
Education of Mother		
Primary	365	54.23
High School	220	32.69
Pregraduate	22	3.27
Undergraduate	54	8.02
Postgraduate	12	1.78
Education of Father		
Primary	265	39.38
High School	268	39.82
Pregraduate	33	4.90
Undergraduate	86	12.78
Postgraduate	21	3.12
Sosyoeconomic Status		
Low	81	12.04
Moderate	553	82.17
High	39	5.79

When looked at Table 1, the participants' mean of age was determined as 15.42 (Ss = 1.23, Min. = 13.00, Max. = 22.00). 435 participants (64.64%) were female and 238 (35.36%) were male. 218 (32.40%) were 9th grade, 243 (36.11%) were 10th grade, 128 (19.02%) were 11th grade, and 84 (12.48%) were 12th grade. 222 (32.99%) of them are from Science High School, 270 (40.12%) of them are from Anatolian High School, 124 (%18.42) Technic Anatolian H. S. and 57 (%8.46) Imam Hatip H. S.

Regarding the education of mother, 365 (54.23%) had primary education, 220 (32.69%) had high school education, 22 (3.27%) had pregraduate education, 54 (8.02%) had undergraduate education and 12 (1.78%) had postgraduate education. Regarding education of father, of the participants 265 (39.38%) had primary education, 268 (39.82%) had high school education, 33 (4.90%) had pregraduate education, 86 (12.78%) had undergraduate and 21 (3.12%) had postgraduate education. The family socioeconomic status of the participants was mostly at moderate level (n=553, 82.17%).

Data Collection Tools

Descriptive personal information form, Scale of FOMO and Problematic Usage of Mobile Phones Scale were applied for collecting the necessary data. Explanations about these measurement tools is given below.

Fear of Missing Out Scale (FOMOS)

This measurement tool was prepared by Przybylski et al. (2013) and Gökler et al. (2016) carried out its adaptation to Turkish language and its studies of validity and reliability. This tool is Likert type scale with 5-point. The scores of this tool change between 10-50. Regarding its reliability, it was observed that the item-total correlation coefficient values of the items in the scale were in the range of 0.30-0.61, according to the data obtained with the item-total correlation coefficient. The value of Cronbach's alpha of this tool with 10 items

was determined as 0.81. The coefficient value for the test-retest reliability level of this scale by repeating measurement with three weeks period was determined as 0.81 (Gökler et al., 2016). The value of internal consistency (Cronbach's alpha value) related to FOMOS was determined to be 0.78 with the data for this study. According to factor analysis regarding the validity of this scale, factor loadings of its items is ranged between 0.36-0.77 and consists of single factor structure, which explains %39.4 of its total structure. Moreover, it is found that this scale is statistically and positively correlated with the Problematic Mobile Phone Use Scale ($r=0.587$, $p<0.001$) by confirming concurrent validity. Thus, this FOMO Scale has reliable and valid values to measure the FOMO (Gökler et al., 2016).

The Problematic Smartphone Usage Scale (PSUS)

Problematic usage of smartphones scale was prepared by Bianchi and Philips (2005) and its Turkish version's reliability and validity studies were conducted by Sar and Isıklar (2012). This measurement tool includes 27 likert type items with 5-point. Its Cronbach alpha's value was 0.88, and its test-retest reliability value was 0.98. As the weekly amount of time spent on the smartphones increases, the scores obtained from this tool also increase. From the data in current study, the internal consistency level (Cronbach alpha value) for PSUS was determined as 0.93. As a result of the Confirmatory Factor Analysis conducted to determine the validity of the Problematic Mobile Phone Use Scale, the single-factor structure showed a good fit and the fit index values were; $x^2=737.99$, (df=303, p=.00000), $\chi 2/sd=2.43$, RMSEA=.065, NFI=.90, NNFI=93 CFI=.94, IFI=.94, RFI=.88 , GFI=.86, AGFI=.85, SRMR=.10. Factor loadings of its items were found to be between 0.30 and 0.67. According to these values, it was determined that the Turkish form of the Problematic Mobile Phone Scale is a reliable and valid measurement tool (Şar & Işıklar, 2012).

Analysis of Data

The permissions to apply the FOMOS and the PSUS were obtained for the data of present study by e-mail from the researchers who developed these scales. Moreover, the permission was obtained from Turkey Ministry of Education in order to apply descriptive information form, FOMO scale, problematic usage of smartphones scale for students attending high schools under Turkey Ministry of Education (date and number: 07.01.2022/40838000). Because of life threatening danger disease caused by the Covid 19 pandemic experienced during the data collection process, the online format of data collection tools were prepared and applied online and the data were obtained by remote application on the internet. The scales were applied to 673 students from different provinces in Turkey between January 2022 and March 2022, remotely via Google Forms.

Before applying the data collection tools during online application, volunteer participants were given explanations related with the aim and scope of the present research and informed consent of participants were taken. It was clearly stated that collected data of the participants would be kept confidential and not shared with others. These explanations are given in written form as the online form. Identity information of the participants was not requested. First of all, after applying the personal information form with questions about demographic information to the participants, PSUS (Mobile phone problematic usage test) and FOMOS were applied sequentially, and the participants were said to tick the most suitable option for them.

Analyses of the data collected for the study were carried out with the SPSS statistics computer program. Normality tests were conducted to investigate the normality level of the data obtained from participants. Then, levels of skewness and kurtosis were calculated. It has been determined that these values regarding the collected data of the research are between -0.55 and 0.82 and values of skewness and kurtosis of the data set were between +1.0 and -1.0 and were at an acceptable level for the normality of the data. In addition, parametric statistics were applied for the data analysis, since the normal distribution of histogram graphics of the data set (Tabachnick & Fidell, 2013).

Frequency and distribution were determined for the analysis of the students' demographic characteristics. Descriptive statistics of data were calculated for all variables. To determine the difference between the mean scores of the categorical variables consisting of two groups, t- test statistics for independent samples and one-way analysis of variance (Anova) were applied to determine the difference between the mean scores of the categorical variables with more than two groups. Analysis of Pearson Correlation was applied for the level of relationship between continuous variables.

FINDINGS

The findings related to the statistics of the study data are given in this section. Table 2 indicates descriptive statistical values of the data obtained from the participants by means of FOMOS (Fear of Missing Out Scale) and PSUS (Problematic Usage of Smartphones Scale).

Table 2. Values of Skewness and Kurtosis Regarding the Data Obtained by FOMOS and PSUS (n= 673)

	Minim.	Maxim.	Mean	Sd	Skew.	Kurtos.
FOMOS	10.00	46.00	23.84	6.92	0.36	-0.26
PSUS	27.00	128.00	57.56	19.27	0.82	0.09

As indicated in Table 2, the mean scores of the data obtained from the tools were found to be 23.84 (Ss = 6.92, Min = 10.00, Max. = 46.00) for FOMOS and 57.56 (Ss = 27.00, Min = 0.00, Max. = 128.00) for PSUS.

Findings Regarding Relationship Between Problematic Usage of Smartphones and FOMO of Adolescents

Table 3 indicates The Pearson Correlation Analysis values related with the level of correlation between the participants' Problematic Mobile Phone Usage Scale (PSUS) and FOMO Scale (FOMOS) mean scores.

Table 3. Findings Regarding Pearson Correlation Values of the Relationship Between PSUS and FOMOS Scores

	PSUS	FOMOS
PSUS	-	
FOMOS	0.46**	-

* p<0.05, ** p<0.01

As shown in Table 3, it was determined that FOMOS and PSUS scores are significantly and positively correlated (r = 0.46, p < 0.01). By considering this value, it may be said that as the level of problematic usage mobile phones of the participants increases, the fomo level increases as well.

Findings Regarding the FOMO of Adolescents By Gender

Table 4 indicates findings of t-test, which was conducted to determine whether there is significant difference about FOMO Scale (FOMOS) scores of male and female participants.

Table 4. Findings Regarding T-Test of FOMOS Scores About the Participants' Differentiation By Gender

	Male (n=238)		Female (n=435)			
Variables	mean	Sd	mean	Sd	t	p
FOMOS	22.79	6.57	24.41	7.05	-2.91	0.004**

* p<0.05, ** p<0.01

As observed in Table 4, there is significant difference between the mean scores of FOMOS of male and female participants [t(671) = -2.91, p = 0.004]. The FOMOS mean score of male adolescents (Mean = 22.79, Sd = 6.57) was determined to be significantly lower than that of female adolescents (Mean= 24.41, Sd = 7.05). This means that the level of male adolescents' fomo is lower than that of females.

Findings Regarding Relationship Between Fomo Level and Age of Adolescents

The findings related with Analysis of Pearson Correlation, which was applied to examine the relationship between the age of the participants and their level of fomo, are given in Table 5.

Table 5. Analysis Value of Pearson Correlation Regarding Relationship Between FOMO and Age

	Age	FOMOS
Age	-	
FOMOS	-0.06	-

* p<0.05, ** p<0.01

Findings in Table 5 show that the relationship between FOMOS and age (r = -0.06, p > 0.05) is not significant. By considering this finding, it may be said that there is insignificant relationship between fomo and age of participants.

Findings About The Fear of Missing Out Level of Adolescents With Regard To Mother Education, Father Education, Family Income, High School Type and Grade

The findings of the Anova, which was applied to determine whether there is significant difference between the participants' scores of FOMO Scale (FOMOS) with regard to father education, mother education, family income, high school type and grade, are presented in Table 6.

Table 6. Findings of Anova Concerning Participants' Scores of FOMOS With Regard To Education Level of Father and Mother, Income Level of Family, High School Type and Grade Level

	FOMOS	N	Mean	Sd	F	p	η2	Difference
Grade Level	9	218	23.31	6.70	2.85	0.037*	0.01	b>a, d
	10	243	24.77	7.14				
	11	128	23.78	6.60				
	12	84	22.58	7.10				
Type of High School	Science	222	24.14	6.85	1.03	0.380	0.00	
	Anatolian	270	23.92	6.82				
	Vocational	124	22.89	7.31				-
	Imam Hatip	57	24.32	6.84				
Mother Education Level	Primary	365	23.55	6.56				
	High School	220	24.14	7.20				
	Pregraduate	22	24.64	8.30				
	Undergrad.	54	23.83	7.45	0.55	0.699	0.00	-
	Postgraduate	12	25.67	7.82				
Father Education Level	Primary	265	23.34	6.71				
	High School	268	24.34	6.96				
	Pregraduate	33	23.97	6.98				-
	Undergrad.	86	23.59	7.12	0.76	0.554	0.00	
	Postgraduate	21	24.38	8.26				
Family Income Level	Low	81	23.78	7.06				
	Moderate	553	23.69	6.74	2.08	0.125	0.01	-
	High	39	26.03	8.84				

*

p<0.05, **p<0.01

Table 6 indicates that there are significant differences regarding the participants' scores of mean about FOMOS according to grade level [F(3, 669)= 2.85, p = .037, η2 = 0.01]. In the LSD test, which was applied to find which grade levels were significantly different, the FOMOS mean scores of 10th grade participants (Mean = 24.77, Sd = 7.14), was determined to be significantly higher than that of the 9th grade (Mean = 23.31, Sd = 6.70) and the 12th grade participants (Mean = 22.58, Sd = 7.10). According to this finding, it may be said that level of fear of missing out of 10th grade adolescents have higher than that of 9th and 12th grade adolescents.

In addition, Table 6 indicates that there is insignificant difference concerning the participants' FOMOS mean scores with regard to high school type (p > 0.05), mother education [F(4, 668) = 0.55, p = 0.699], father education [F(4, 668)= 0.76, p = 0.554] and family income [F(2, 670) = 2.08, p = 0.125]. Considering these findings, it means that level of fomo of adolescents does not differ according to type of high school, education of father and mother and income of family.

Findings Regarding Problematic Mobile Phone Usage of Adolescents Attending High School By Gender

Table 7 indicates the data of the t-test which were applied to find if there are significant differences regarding the mean scores of female and male adolescents of Problematic Smartphone Usage Scale (PSUS).

Table 7. T-Test Findings Regarding the Participants' Differentiation of PSUS Scores With Regard To Gender

	Male (*n*=238)		**Female** (*n*=435)			
Variables	**Mean**	**Sd**	**Mean**	**Sd**	**t**	**p**
PSUS	55.42	16.55	58.74	20.52	-2.28	0.023*

* p<0.05, **p<0.01

As observed in Table 7, there are gender differences in the PSUS mean scores of adolescents [t(580) = -2.28, p = 0.023] and male adolescents' mean score of PSUS (Mean = 58.74, Sd = 20.52) is significantly lower than that of female adolescents (Mean = 55.42, Sd = 16.55). According to this data, female adolescents have higher level of problematic smartphone usage than that of males.

Findings Regarding Problematic Smartphone Use of Adolescents By Age

Table 8 gives the findings related to analysis values of Pearson Correlation, which was conducted to test the relationship between level of problematic smartphone usage (PSUS) and age of the adolescents.

Table 8. Findings of Pearson Correlation Analysis Regarding Relationship Between PSUS And Age

	Age	PSUS
Age	-	
PSUS	0.06	-

* p<0.05, ** p<0.01

Table 8 indicates that there is no significant relationship between problematic usage of smartphones scale scores and age of adolescents (r = 0.06, p > 0.05).

Findings Regarding Problematic Smartphone Use Of Adolescents With Regard To Family Income, Education Of Mother and Father, High School Type and Grade Level

The findings of the Anova applied for examining if there is significant difference regarding Problematic Usage of Mobile Phones Scale (PSUS) scores according to the participants' family income, mother education, father education, high school type and grade has also been given in Table 9.

* p<0.05, ** p<0.01

As shown in Table 9, it was determined that there are significant differences about the adolescents' PSUS mean scores according to grade level [F(3, 669) = 9.04, p < .001, η2 = 0.04]. According to the Bonferroni test, which was applied to examine which grade level is significantly different, the PSUS mean score of the 10th grade participants (Mean = 62.02, Sd = 21.05) was significantly higher than that of the 9th grade participants (Mean = 52.92, Sd = 16.40). According to this finding, it may be said that problematic smartphone usage of 10th grade participants is higher than problematic smartphone usage of the 9th grades.

In addition, Table 9 shows that there is insignificant difference according to family income level [F(2, 670) = 0.23, p = 0.796], high school type [F(3, 668) = 1.77, p = 0.151] and mother education [F(4, 668).) = 0.93, p = 0.446]; and there is significant difference according to father education [F(4, 668) = 2.77, p = 0.026, η2 = 0.02] regarding the adolescents' PSUS mean scores. According to Bonferroni test, which was used for examining which mean score of the participants was significantly different with regard to father education, PSUS mean score of the adolescents whose fathers had high school education (Mean = 59.23, Sd = 19.30) were determined to be significantly higher than that of the adolescents whose fathers had primary education (Mean = 54.64, Sd = 17.89). According to these findings, it means that smartphone problematic usage level of the participants', whose fathers have high school education, is higher than that of participants whose fathers have primary education and there is insignificant difference regarding the participants' smartphone problematic usage according to mother education, family income and high school type.

Table 9. Findings of ANOVA Regarding Participants' Scores of PSUS In Terms of Mother Education, Father Education, Family Income, High School Type And Grade Level

	PSUS	N	Mean	Sd	F	p	η2	Difference
Grade Level	9	218	52.92	16.40	9.04	< .001**	0.04	b>a
	10	243	62.02	21.05				
	11	128	57.91	19.69				
	12	84	56.19	17.30				
Type of High School	Science	222	58.47	17.82	1.77	0.151	0.00	
	Anatolian	270	58.70	21.08				
	Vocational	124	54.52	17.53				
	Imam Hatip	57	55.30	18.87				
Mother Educat. Level	Primary	365	56.46	18.74				
	High School	220	58.93	19.92				
	Pregraduate	22	56.41	13.93	0.93	0.446	0.01	-
	Undergrad.	54	58.61	20.15				
	Postgraduate	12	63.58	26.41				
Father Educat. Level	Primary	265	54.64	17.89				
	High School	268	59.23	19.30				
	Pregraduate	33	57.70	15.58				
	Undergrad.	86	60.21	21.33	2.77	0.026	0.02	b>a
	Postgraduate	21	62.24	27.36				
Family's Income Level	Low	81	57.26	19.35				
	Moderate	553	57.75	19.31	0.23	0.796	0.00	-
	High	39	55.64	18.76				

DISCUSSION and CONCLUSION

When examined the findings of present study, it was found that the adolescents' problematic smartphone usage level is positively and significantly associated with the level of their FOMO. This finding means that as the level of problematic mobile phone usage of adolescents increases, their level of FOMO also increases. In the literature review, it was seen that there are studies that obtained results which is similar to this finding. For example, Hizarci (2018) in the study with postgraduate students determined that the level of problematic usage of the smartphones is positively and significantly correlated with the level of FOMO. There are other studies supporting this result (Gökler et al., 2016; Yalçın Çınar, 2017). However, Howard (2022) found no significant predictive relationship between FOMO and cell phone addiction. The differences regarding these research results may be related with the differences about their sample group in terms of size and age level.

The finding of present research showed that female adolescents' FOMO level is meaningfuly higher than that of males. In the studies reached in the literature review, it was found by Kartol and Peker (2020) that female participants have higher FOMO level in social environments. Result of this research are similar to the findings of present study. The fact that female adolescents attending high school have higher FOMO level is related to their higher desire of being appreciated and admired; therefore, it may be said that the expectation of being liked and followed on social networks may be higher for female adolescents attending high school. However, studies with different results in the literature draw attention. While FOMO level was determined to be higher regarding males (Przybylski et al., 2013), it was found that there are insignificant differences by gender in the research carried out by Gökler et al. (2016) with students attending university. The different results of these researches can be associated with the difference about their sample group in terms of size and age level. With regard to the results of the study, it was obtained that the FOMO level of the participants was not significantly related to age. It can be said that similar results obtained by Hosgor et al. (2017), Jood (2017) and Terzi (2019) reached in the literature review support this result.

According to research findings, it was found that there are no differences regarding the FOMO level of the adolescents attending high school in terms of high school type. This result contributes to the literature, since no study is available in the literature review regarding this result. The research findings showed that the FOMO of adolescents attending high school differs according to grade and FOMO level of 10th grade adolescents is significantly higher than those of 9th and 12th grades. In addition, the studies reached in the literature have obtained different results. For example, it was concluded that the level of FOMO does not indicate differences by the grade level in the study conducted by Turhan (2019), and level of FOMO regarding young people is higher than that of the adult groups in the studies of Gezgin et al. (2016) and Stead and Bibby (2017). Moreover, it was determined by Yalçın Çınar (2017) that the FOMO of the participants in the 1st grade is higher than that of the participants in the 4th grade. These findings do not support the research result. These results may be relevant to the reason that adolescents, who were attending middle school during the period of Covid-19 pandemic started high school without completing the adaptation process and continued the remote socialization behavior they created during the Covid-19 pandemic period through social media networks.

Research findings indicate that there is insignificant difference regarding the level of FOMO of adolescents attending high school with regard to education of father and mother and their family income. Yalcin Cinar (2017) found that fomo level of adolescents is not significantly different according to their parents' education and family income. Similarly, in the studies conducted by Bor (2018), Hızarcı (2018) and Gezer (2020), it was determined that there is insignificant difference in the FOMO level in terms of the education of mother and father and their family income. Thus, these research results are similar to the results of present study. Unlike the results of present research, Karas's (2019) study determined that individuals' FOMO level is significantly different according to their income.

Research findings showed that level of problematic cell phone usage of female and male adolescents attending high school is significantly different and the mean score of female adolescents' problematic smartphone use is significantly higher. This finding means that the problematic cell phone use of female adolescents attending high school is significantly higher than that of males. Similarly, Doğaner (2017) and Gula (2016) found that female adolescents had higher level of problematic smartphone usage than that of males. Therefore, these results of researches support the finding of current study. However, there are studies in literature that have found different results. Tekin (2012) and Hao et al. (2022) determined that problematic smartphone usage level of male and female adolescents is not significantly different and Ünal (2015) determined that smartphone

addiction level of males and females is not significantly different. These different results can be related to the differences about the characteristics of the sample group with which present research was conducted.

Findings of current research showed that problematic mobile phone usage of adolescents attending high school is significantly different according to the grade level and 10th grade students' problematic cell phone use is higher than that of 9th grade adolescents. The research conducted by YIlmaz, Sar and Civan (2015) found that 12th grade students had more problematic mobile phone use than that of 9th grade students, which supports the findings of this study. However, the finding by found Tekin (2012) that problematic smartphone use of university level students does not indicate difference according to grade level, does not support this research finding.

Furthermore, the present study findings indicate that there are significant differences about adolescents' problematic mobile phone use according to father education level and problematic mobile phone use of adolescents whose fathers have high school education is higher than that of adolescents whose fathers have primary education. While Oz et al.'s (2015) finding that adolescents whose father education is primary school or below have higher problematic mobile phone use than that of adolescents whose father education is secondary school and above supports the findings of this study, while studies carried out by Kahyaoğlu Sut et al. (2016) and Tekin (2012) found that problematic smartphone use is not different according to father education, which does not support the results of present research.

Moreover, the research findings determined that adolescents' problematic mobile phone usage is not significantly different according to age, high school type, mother education and family income. The study conducted by Tekin (2012) found that problematic mobile phone usage of medical students is not different according to age. Demirhan, Randler, and Horzum (2016) and Wang et al. (2015) found that age and problematic smartphone use were not significantly correlated, which supports the results of current study due to their similar findings. Unlike these results, Augner and Hacker (2012) and Bianchi and Philips (2005) found that problematic smartphone use and age level were negatively and significantly correlated; Choliz (2012) and Roser et al. (2016) stated that as the problematic usage of smartphones increased, there was significant increase about the age of the participants and Ünal (2015) determined that age and the addiction level of smartphone usage is not significantly correlated

In terms of high school type, Oz et al. (2015) determined that technical vocational high school students' problematic usage of smartphones is significantly higher than that of students of other high school types. The finding by Kahyaoğlu Sut et al. (2016) that there are no significant differences in smart mobile phone addiction in terms of mother and father education level, and the finding by Tekin (2012) that problematic mobile phone use is not different according to mother education, supports the finding of current study. The finding, that smartphone addiction level of adolescents is not different according to family income, were found by Dirik (2016), Süler (2016), Tekin, Güneş and Çolak (2014) and the finding, that problematic smartphone usage of medical students does not differ in terms of family income, were found by Tekin (2012), are similar to the findings of this research and support the results of present research.

The findings of present research indicated that the problematic use of smartphones by adolescents attending high school is positively and significantly correlated to their FOMO level; female adolescents' FOMO level is significantly higher than that of male adolescents; 10th grade students' FOMO level is significantly higher than that of the 9th and 12th grades; the FOMO level is not significantly correlated with age; and the FOMO level of adolescents is not different according to the education level of the parents, their family income and the type of high school the adolescents attend. These results is similar with and supported by the results of Bor (2018), Hizarci (2018), Gezer (2020) and Yalçın, Çınar (2017). Moreover, it was determined that male adolescents' problematic mobile phone use was significantly higher than that of female adolescents; the problematic smartphone usage of the 10th grade adolescents is higher than that of the 9th grade adolescents; the problematic smartphone usage of adolescents whose fathers have high school education level is higher than that of adolescents whose fathers have primary education and the problematic smartphone usage of adolescents is not different with regard to age, education of mother, income of family and high school type the students attend. These findings are similar with and supported by the results of Doğaner (2017), Gula (2016), Oz et al. (2015) and Yılmaz, Sar, and Civan (2015). It is thought in general that the differences in the results in this study compared to the results obtained in the literature may be related to the fact that the applied groups have different characteristics in terms of the number of participants and age levels.

As suggestion, the problematic smartphone usage and FOMO of adolescents were analyzed in present study. It is possible to carry out the researches for comparing the level of FOMO and the problematic use of smartphones with participants that include students at primary and secondary school level and individuals in other developmental stages, such as adults. In addition, it is noteworthy in the study that problematic smartphone usage is positively correlated to the FOMO, and therefore, as the level of FOMO increases for adolescents attending high school, their problematic smartphone usage increases. In relation to this result, activities such as distance or face-to-face training, individual or group guidance and seminars may be provided to adolescents attending high school by psychological counselors or educators for the conscious use of smartphones for supporting adolescents attending high school to be productive smartphone users or to reduce their problematic smartphone usage.

Declarations

Conflict of Interest

No potential conflicts of interest were disclosed by the author(s) with respect to the research, authorship, or publication of this article.

Ethics Approval

The formal ethics approval was granted by the Social and Human Sciences Research and Publication Ethics Committee of Kırıkkale University. We conducted the study in accordance with the Helsinki Declaration in 1975.

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Research and Publication Ethics Statement

The study was approved by the research team's university ethics committee of the Kırıkkale University (Approval Number/ID: 20/09/2021-9. Hereby, we as the authors consciously assure that for the manuscript the following is fulfilled:

- This material is the authors' own original work, which has not been previously published elsewhere.
- The paper reflects the authors' own research and analysis in a truthful and complete manner.
- The results are appropriately placed in the context of prior and existing research.
- All sources used are properly disclosed.

Contribution Rates of Authors to the Article

1st author contributed 50%, 2nd author 50%.

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