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THE MEDIATING ROLE OF STRESS IN THE RELATIONSHIP BETWEEN SMARTPHONE ADDICTION AND QUALITY OF LIFE AMONG SPORTS HIGH SCHOOL STUDENTS

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ABSTRACT

This study aims to examine the direct effects of smartphone addiction (SA) on stress and quality of life (PedsQL) and to investigate the mediating role of stress in the relationship between these variables. Conducted among students enrolled in sports high schools, the research seeks to contribute to the understanding of the potential impacts of sports on smartphone addiction and quality of life. The study was carried out with a sample of 344 sports high school students aged 14–18 (129 females, 215 males). Data were collected using the Smartphone Addiction Scale (SAS), Stress Scale, and Pediatric Quality of Life Inventory (PedsQL). The relationships between variables were analyzed using Pearson correlation analysis, while the mediating role of stress was tested through Hayes' PROCESS macro (Model 4). The findings revealed positive and significant relationships between smartphone addiction, stress, and quality of life. Furthermore, stress was found to partially mediate the relationship between smartphone addiction and quality of life. While smartphone addiction indirectly influenced quality of life via stress, its direct effect was also statistically significant. The level of smartphone addiction among sports high school students was observed to be lower compared to other student groups, potentially due to the mitigating influence of sports-related activities. Additionally, the findings indicate that sports participation positively impacted students' stress levels and enhanced their quality of life. These results underscore the significant role of sports in safeguarding the psychological and physical health of adolescents and in mitigating the adverse effects of smartphone addiction. This study contributes to the literature by addressing issues related to quality of life, stress management, and technology addiction among sports high school students. Future research is recommended to conduct longitudinal studies to observe the effects of sports activities on smartphone addiction and stress management over time. Such studies could provide deeper insights into how participation in sports influences addiction and stress levels.

Keywords: Sport science, smartphone addiction, stress, life quality, mediator variable.

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INTRODUCTION

Young people may experience psychological and sociological situations such as silence, introversion, detachment from the environment, boredom, conflict in the family, problems with friends, fear of being disliked, worrying about their future of themselves, and pessimism (Saygılı, 2002). Over the past decade, smartphone ownership and use have been exponentially increased globally (Zargaran et al., 2018). Smartphone addiction is often triggered by psychological conditions such as Internet overuse problem or Internet addiction disorder (Montag et al., 2021). The individual feels the need for an environment where s/he can forget about the problems he will encounter in this period and get away from these problems. Therefore, the adolescents will be able to turn to an environment where they can meet their current needs, including elements of pleasure and entertainment, where they are better understood and accepted, and where their feelings and thoughts are given importance (Sata et al., 2016). Thus, young people will attach importance to the use of smartphones to reach the social media field. The smartphone has become a daily requirement for social communication, entertainment, and shopping, and it has been observed that smartphone use has steadily transformed users' lifestyles. However, there are also various negative as well as positive features that smartphones add to human life. People spend more and more time in front of a smartphone and cannot imagine living without a smartphone (Zhang & Wu, 2022) and consequently, especially young people are at risk of addiction.

Given the health risks of smartphone addiction for young people (Park et al., 2021), it was thought important to do research in this field to better understand individual differences in smartphone addiction and to assess its influence on people's lives. Such studies aid in identifying people at risk of smartphone addiction and informing intervention methods (Zang & Wu, 2022). The smartphone performs several quick and beneficial activities, frequently providing users with emotions of productivity or reproduction and acting as a brief stress reliever (Lukoff et al., 2018). Thus, various benefits, ease of use, overuse and addiction to smartphones may effect the quality of life (Lepp et al., 2014).

Quality of life means the perception of a position of person about the value system and culture in which he lives (Hellström et al., 2004). It relates to the degree to which a person is healthy, comfortable, and able to participate in or enjoy life events, in addition to being tied to one's standards, goals, concerns, and expectations (Jenkinson, 2023). Quality of life is a result of successful development (Vandeleur et al., 2018). In this study, psychosocial health, which is formed by calculating item scores that help to evaluate emotional, social and school functionality, as well as the quality of life, and physical health is also evaluated. As for school quality of life helps students to exist as happy individuals at their school, to feel connected to the school, and to speak highly of the school. This will positively affect other students at the school and the education-teaching process (Arikan & Sarı, 2016; Ozdemir, 2018).

Smartphone addiction directly or indirectly causes many various problems both inside and outside the classroom (Choi et al., 2012). Young people can also show indications of sleep disturbances, depression, and stress associated with excessive smartphone use (Thomee et al., 2011). In recent years, there have been many

studies investigating the relationship between psychological factors, especially depression and stress with smartphone addiction and showing similar results (Bian & Leung, 2015; Chen et al., 2021; Yuan et al., 2021). However, these studies were generally carried out on a sample of university students. In this study, examining the stress levels of Sports High School students as a mediator between smartphone addiction and quality of life will help to explain how sports reverberate in stress levels, which is a negative perception.

Previous studies have shown that smartphone addiction causes an increase in stress and a decrease in quality of life. However, this research predicts that sport plays an important role in coping with adverse conditions. Therefore, to confirm the mediating role of stress and support our predictions, the working hypotheses were tested with a sample of students studying in sports high school. Given the foregoing, the purpose of this study is to examine the links between smartphone addiction, stress, and quality of life, with the assumption that stress acts as a moderator between smartphone addiction and quality of life. Accordingly, the final hypotheses are defined as follows:

Hypothesis 1. The direct effects on the stress of smartphone addiction (SA) in Sports High School students are statistically significant.
Hypothesis 2: The direct effects of the smartphone addiction (SA) of Sports High School students on the quality of life (PedsQL) are statistically significant.
Hypothesis 3: Stress is a mediator variable in the relationship between SA and the PedsQL of Sports High School students. The indirect effect on the PedsQL of SA of students is statistically significant..

METHOD

Research Model

The data was obtained from sports high school to test the hypotheses. Sports high schools, in addition to the general goals of secondary education, are those that aim to provide physical education and basic knowledge and skills in the field of sports and to train qualified people in the field of physical education and sports widely. The data began to be collected from Aegean region sports high school students in 2022. The digital platform used to collect and host the data, research and evaluation was funded by the researchers. Participation was voluntary, and participants were not bid any incentive to participate in the study. In this research, which is based on a deductive approach, the survey is the main data collection tool. Because this method enables relations between structures of the researcher, especially, examining and explaining the cause-effect relations (Saunders et al., 2007). The researchers used the situational processing model to investigate the association between smartphone addiction, stress, and quality of life. The transaction model is an SPSS script that includes a large number of models suitable for measuring both direct and indirect effects (Hayes, 2012). Model 4, known as the mediation model, was used in this study. The model was used to examine the relationship between SA and PedsQL. Figure 1 shows the mediating role of "stress" in the relationship between students' "smartphone addiction (SA)", which is the independent variable of the study, and "quality of life (PedsQL)" as their dependent variable.

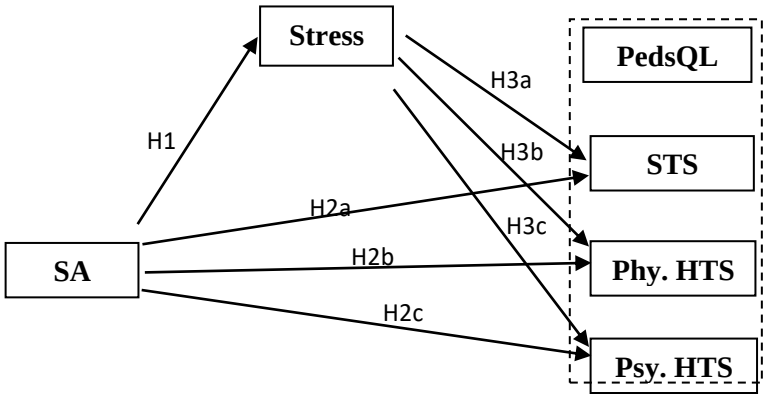


Figure 1 – Research Model

Population and Sample

There were 344 participants (245 boys and 129 girls), Sports High School students aged between 14 and 18 years (M= 15.89, Sd. = 2.25) from Sports High School in the region of Egean. These students represented all four grade levels of sports high school education: 103 first graders, 92-second graders, 88 third graders, and 61 fourth graders. The selection of the sample was done according to random sampling. Participants under the age of 18 gave informed consent, while parents of participants under the age of 16 gave formal informed consent.

Data Collection Tools

The data for this study were collected using the **Smartphone Addiction Scale (SAS)**, the **Stress Scale**, and the **Pediatric Quality of Life Inventory (PedsQL)**. These tools were selected for their validity and reliability in measuring the constructs of interest.

Smartphone Addiction Scale (SAS)

The original 33-item smartphone addiction scale produced by Kwon, Lee, et al. (2013) was reconfigured in the study done by Kwon, Kim, et al. (2013). Sata and Karip (2017) conducted adaptation research into Turkish culture for teenagers. SAS is a self-assessment technique that uses a single sub-dimension to assess teenage smartphone addiction. The measure has ten items and is evaluated on a 6-point Likert scale. This scale may provide a range of points ranging from 10 to 60. The Cronbach Alpha coefficient of the original scale calculated for dependability was 0.91. For this investigation, Cronbach's Alpha coefficient was calculated to be 0.89.

Stress Scale (Automatic Thinking)

The adaptation of the Stress Scale (Automatic Thinking) developed by Flett et al. (2019) to Turkish culture was carried out by Uylas and Arslan (2020). The scale has seven items and one dimension. The scale is graded on a

5-point Likert type. The scale yields the lowest possible score of 7 and the highest possible score of 35. High scores indicate high-stress levels. The Cronbach's Alpha coefficient was discovered to be.81 due to the reliability investigation. The Cronbach's alpha internal consistency coefficient for this study was 87.

Pediatric Quality of Life Inventory (PedsQL)

Varni et al. (1999) created the PedsQL, quality-of-life scale to assess the health-related quality of life of children and adolescents aged 2 to 18. It questions the areas of physical health, emotional functionality and social functionality, which are the characteristics of the state of health defined by the World Health Organization. In addition, school functionality is also questioned. Scoring is done in three parts. The scale total score (STS) is computed first, followed by the physical health total score (Phy. HTS), and then the psychosocial health total score (Psy. HTS), which are indicating emotional, social, and school functioning (Varni et al. 2001). The higher the overall PedsQL score, the greater the perceived health-related quality of life (Varni et al. 2001). Cronbach's alpha was calculated to be 0.93. For this investigation, Cronbach's alpha coefficient was 0.86.

Data Analysis

The research data were analyzed using SPSS 25.00, the Hayes Process, and the AMOS statistical package software. The level of statistical significance for the research data was set at 0.05. Descriptive data were analyzed using frequency (f), percentage (%), and weighted average (x) values. After obtaining the frequencies, a normality test and reliability analysis were conducted on the data to ensure its dependability. The data was found to exhibit a normal distribution (±1.5) as a result of the normality study. Cronbach's alpha and confirmatory factor analysis were employed to assess the reliability and validity of the measures. Descriptive statistics, including means and standard deviations, as well as correlations, were examined to investigate the data and relationships between variables. The Hayes PROCESS bootstrap test was conducted to determine the mediating role of stress.

FINDINGS

The hypothesis was that H1 and H2 examined the direct effect of SA on stress and PedsQL, while H3 suggested that stress would mediate the relationship between SA and PedsQL. The research used Bootstrap to obtain the bias-corrected confidence interval (CI) in determining the importance of mediation (Hayes, 2012).

Before examining the hypotheses, Confirmatory Factor Analysis (CFA) was performed using the AMOS 24.0 software package to test the discriminant validity of the key variables (Table 1). Table 1 results show that the scale has an acceptable fit for analysis and the population also has reasonable approximation errors.

Table 1. The Goodness of Fit Index for All Measures

Model	$\chi 2_{(df)}$	χ2/df	$\Delta\chi 2_{(df)}$	CFI	RMR	GFI	RMSEA
SA	$56{,}028_{(28)}$	2,00	$1226{,}29_{(17)}$	.97	.074	.96	.054
Stress	$12{,}709_{(9)}$	1,41	$887{,}687_{(12)}$	.99	.026	.98	.035
PedsQL	$355{,}805_{(253)}$	1,70	$2248{,}827_{(44)}$	.93	.061	.91	.045

The study's variables were analyzed using descriptive statistics and Pearson bivariate correlation (Table 2). Table 2 shows that there are significant relationships between all variables. A moderately significant positive correlation was found between SA and stress ($r_{(344)}$=.504, p<.01). It has been determined that there is a moderately significant positive correlation between SA and PedsQL (STS) ($r_{(344)}$=.419, p<.01). There was a moderate positive correlation between SA and PedsQL (Phy. HTS) ($r_{(344)}$=.332, p<.01). It was determined that there was a moderate positive correlation between SA and PedsQL (Psy. HTS) ($r_{(344)}$=.397, p<.01). It has a moderately significant positive correlation between stress and PedsQL (STS) ($r_{(344)}$=.631, p<.01). It has a moderately significant positive relationship between stress and PedsQL (Phy. HTS) ($r_{(344)}$=.435, p< .01). It has a moderately significant positive correlation between stress and PedsQL (Psy. HTS) ($r_{(344)}$=.632, p< .01).

Table 2. Descriptive Statistics and Pearson Bivariate Correlation

	M	*Sd.*	1	2	3	4	5
1. SA	*30.16*	*9.933*	1				
2. Stress	*21.92*	*6.147*	.504**	1			
3. STS	*55.72*	*13.465*	.419**	.631**	1		
4. Phy. HTS	*17.15*	*5.228*	.332**	.435**	.794**	1	
5. Psy. HTS	*38.57*	*9.838*	.397**	.632**	.946**	.556**	1

*Not: *p<0.05, **p<0.01*

The results of the mediator effect of stress between SA and PedsQL (STS) are shown in Table 3 and Figure 2. According to Table 3 and Figure 2, while SA scores significantly increase PedsQL (STS) scores (b=.18; t=2.81, p<.001), it also has a significant impact on stress scores (b=.31; t= 10.78, p<.001). It was also found that stress predicted PedsQL (STS) in this relationship (b= 1.23; t=11.69, p<.001). Moreover, it was seen that the 95% confidence interval [.292, .487] of the indirect effect did not include 0 and the indirect effect was 0.384, which is significant (p<0.05), in the path of SA→Stress→PedsQL (STS). Therefore, there is a mediating effect in the model path (Fig. 2).

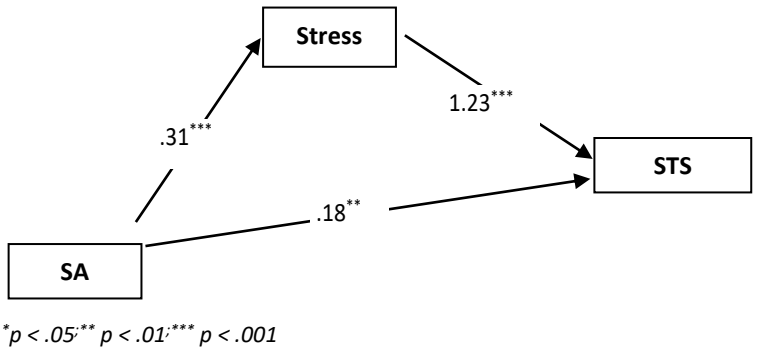


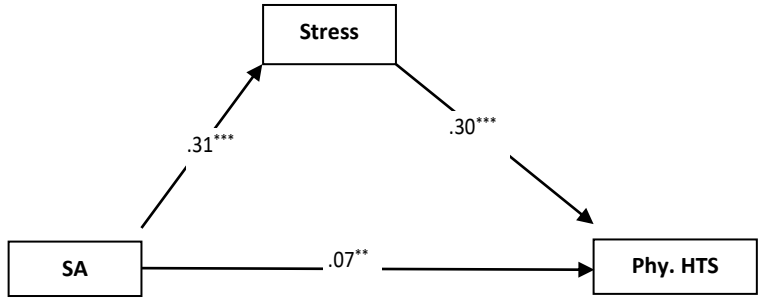
Figure 2. The Mediating Effect of Stress in Relation between SA and PedsQL (STS)

Table 3. The Mediating Role of Stress in Relation between SA and PedsQL(STS)

Variables	Stress			PedsQL (STS)		
	b	se	%95 CI	B	se	%95 CI
SA	.31***	.02	[.255, .369]	.18**	.06	[.055, .312]
Stress				1.23***	.10	[1.025, 1.439]
	R^2 = .254, $F_{(1,213)}$=116.253, p=.000			R^2 = .412, $F_{(1,316)}$=119.221, p=.000		

*Not: *p < .05;** p < .01;*** p < .001, SA=Smartphone addiction, PedsQL (STS)= Pediatric Quality of Life Scale Total Score, b = Standardised regression coefficients, se= Standard error, ***p<,001, %95 CI= %95 Confidence interval, R^2 = coefficients of determination, n=344 k=5000 Bootstrap sample.*

The results of the mediator effect of stress between SA and PedsQL (Phy. HTS) are shown in Table 4 and Figure 3. According to Table 4 and Figure 3, while SA scores significantly increase PedsQL (Phy. HTS) scores (b=.07; t=2.70, p<.01), it also has a significant impact on the stress scores (b=.30; t= 6.43, p<.001). It was also found that stress predicted PedsQL (Phy. HTS) in this relationship (b= .30; t=6.43, p<.001). In the ATB → Stress → PedsQL (Phy. HTS) pathway, it was seen that the 95% confidence interval [.064, .130] for the indirect effect did not include 0 and the indirect effect was 0.095, which is significant (p<0.05). Therefore, it can be said that there is a mediating effect on the pathway (Fig. 3).



*p < .05;** p < .01;*** p < .001

Figure 3. The Mediating Effect of Stress in Relation between SA and PedsQL (Phy. HTS)

Tablo 4. The Mediating Role of Stress in Relation between SA and PedsQL(Phy. HTS)

Variables	Stress			PedsQL (Phy. HTS)		
	B	se	%95 CI	b	se	%95 CI
SA	.31***	.02	[.255, .369]	.07**	.02	[.022, .137]
Stress				.30***	.04	[.212, .399]
	R^2 = .254, $F_{(1,213)}$=116.253, p=.000			R^2 = .206, $F_{(1,316)}$=44.344, p=.000		

*Not: *p < .05;** p < .01;*** p < .001, SA=Smartphone addiction, PedsQL (Phy. HTS)= Pediatric Quality of Life Physical Scale Total Score, b = Standardised regression coefficients, se= Standard error, ***p<,001, %95 CI= %95 Confidence interval, R^2 = coefficients of determination, n=344 k=5000 Bootstrap sample.*

The results of the mediator effect of stress between SA and PedsQL (Phy. HTS) are shown in Table 5 and Figure 4. According to Table 5 and Figure 4, while SA scores significantly increase PedsQL (Psy. HTS) scores (b=.10; t=2.17, p<.05), it also has a significant impact on the stress scores (b=.31; t= 10.78, p<.001). It was also found that stress predicted PedsQL (Psy. HTS) in this relationship (b= .92; t=12.00, p<.001). İt was seen that the 95% confidence interval [.217, .367] of the indirect effect did not include 0 and the indirect effect was 0.289 in the

path of SA→ Stress → PedsQL (Psy. HTS), which is significant (p<0.05). Accordingly, it can be said that there is a mediating effect on the pathway. Based on these results, it shows that stress mediates the relationship between SA and PedsQL, and the hypothesis of H3a, H3b and H3c is supported by empirical results (Fig. 4).

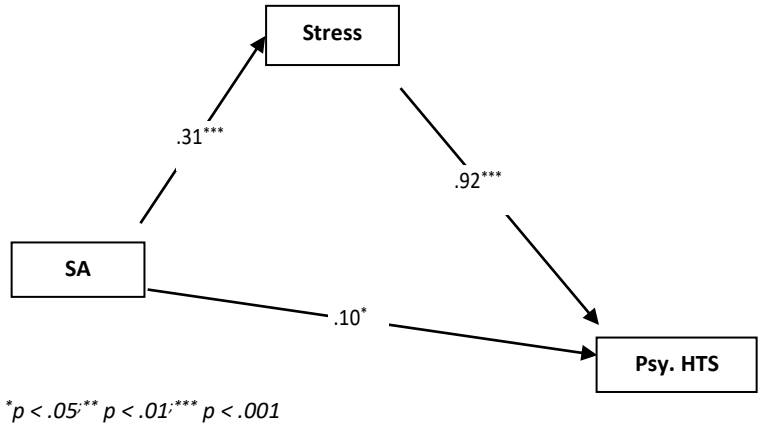


Figure 4. The Mediating Effect of Stress in Relation between SA and PedsQL(Psy. HTS)

Tablo 5. The Mediating Role of Stress in Relation between SA and PedsQL(Psy. HTS)

Variables	Stress			PedsQL (Psy. HTS)		
	B	**se**	**%95 CI**	**B**	**se**	**%95 CI**
SA	.31***	.02	[.255, .369]	.10*	.04	[.010, .198]
Stress				.92***	.07	[.775, 1.079]
	R^2 = .254, $F_{(1,213)}$=116.253, p=.000			R^2 = .408, $F_{(1,316)}$=117.342, p=.000		

*Not: *p < .05;** p < .01;*** p < .001, SA=Smartphone addiction, PedsQL (Psy. HTS)= Pediatric Quality of Life Psychosocial Scale Total Score, b = Standardised regression coefficients, se= Standard error, ***p<,001, %95 CI= %95 Confidence interval, R^2 = coefficients of determination, n=344 k=5000 Bootstrap sample.*

When the non-standardized regression weights of the model are examined; It is seen that it explains smartphone addiction's stress (b = 0.33), PedsQL (STS) (b = 0.18), PedsQL(Phy. HTS) (b = 0.07) and PedsQL (Psy. HTS) (b = 0.10). According to standardized regression weights, SA stress (β = .50) PedsQL (STS) (β = .41); While it explains more than PedsQL (Phy. HTS) (β = .33) and PedsQL (Psy. HTS) (β = .39), quality of life explains PedsQL (Psy. HTS) (β = .39) more than PedsQL (Phy. HTS) (β = .33). Moreover, the values of b, β, t and P among the variables in the model are presented Table 6.

Table 6. The Direct Impact on Stress and Quality of Life of Smartphone Addiction

Relations	B	Se	*β*	t	p
SA→ Stress	.31	.02	.50	10.78	.000***
SA → STS	.18	.06	.41	8.52	.000***
SA → Phy. HTS	.07	.02	.33	6.50	.000***
SA→ Psy. HTS	.10	.04	.39	7.99	.000***

Not: b= Standardised regression coefficients β= Unstandardised regression coefficients

As seen in Table 6, the effects of smartphone addiction are statistically significant on stress (b=.31, t=10.78, P=.000), PedsQL (STS) (b=.18, t=8.52, P=000), PedsQL (Phy. HTS) (b=.07, t=6.50, P=.000) and PedsQL (Psy. HTS) (b=.10, t=7.99, P=.000).

CONCLUSION and DISCUSSION

This study investigated the mediating role of stress in the relationship between smartphone addiction and quality of life. Previous studies, studies were conducted under various headings related to SA, stress and PedsQL in different sample groups, but there are no such studies in Sports High Schools. Therefore, it is significant to examine smartphone addiction and its effects, which has become a crucial problem worldwide in Sports High School which aims to train qualified people in the field of physical education and sports. In addition, assessing the direct effect of smartphone addiction on quality of life is necessary to evaluate the threats of smartphone addiction to health and quality of life. Moreover, the mediation affect of the stress levels of Sports High School students between these two variables was a matter of curiosity.

In the first hypothesis of the study, the direct effect of smartphone addiction on stress was determined based on smartphone addiction and stress studies (see, Goldag, 2019; Sanusi et al., 2021). Studies in the example revealed similar results and associations between SA and stress in different sample groups. Therefore, it has been tried to examine whether the relationship between SA and stress, revealed by the results of these experimental and theoretical studies, is valid in Sports High School students.

When the fit coefficients of the hypothetical model were examined, it was seen that there was a positive relationship between SA and stress. The contribution of smartphone addiction in predicting stress levels also was statistically significant. These findings are supported by a moderate positive correlation between the two variables. Smartphones can be used for entertainment or escape from the real world, as they can help people cope with low psychosocial health conditions such as stress (Wang et al., 2015). However, individuals may develop technology addiction that increases stress instead of dealing with it. Excessive phone use by young people can cause concentration problems, impatient behaviour and pessimism over time. These harmful developments can lead to mental health impairments such as stress, anxiety, and depression. The finding of Turel et al. (2011) that technology addicts always exhibit high levels of depression or anxiety also supports this idea. Moreover, many studies have reported a positive relationship between SA and stress (Dogan & Tosun, 2016; Sebastian et al., 2020; Zhai et al., 2020).

When the fit coefficients for the study's second hypothesis were examined, it was seen that there was a positive relationship between SA and PedsQL. In the presence of the mediator variable, the direct effect of SA on PedsQL also was found to be significant. The positive findings of the relationship between SA and PedsQL show that as the level of smartphone addiction increases, the quality of life also increases. Smartphone addiction, a significant problem worldwide, is expected to negatively affect the quality of life due to the development of technology. The quality of life, however, generally focuses on positive mental health, so it is thought that the perceived general health of students in the presence of sports is not adversely affected by the psychological degenerative factors created by addiction. In addition, it can be concluded that the addiction level of the students did not turn into clinical cases, and the use of smartphones for general purposes (e.g., entertainment, games) positively affects their quality of life. Moreover, it is thought that since students spend

most of their time on physical activities such as sports, training and exercise, they spend less time with smartphones, and this usage is generally related to personal needs and evaluating their spare time. In this case, it can be said that sports prevent students from developing harmful addictions, albeit indirectly. Studies on this subject generally show a negative relationship between SA and quality of life (Li et al., 2020; Ulukan & Ulukan, 2022). However, it can be said that sports and exercise are the main reasons for the normal levels of smartphone addiction of Sports High School students and their increased quality of life.

In the last hypothesis of the study, it is predicted that stress will mediate the relationship between SA and the PedsQL of Sports High School students. In other words, it was assumed that SA would increase stress, and as a result, the PedsQL of students would decrease. It, however, was predicted also that this assumption would not be as expected in sports high school students. Research findings also supported this prediction.

The findings suggest that stress mediates the relationship between SA and PedsQL. Therefore, the last hypothesis of the study was accepted. In addition, it was found that stress predicted PedsQL(STS), (Phy. HTS), and (Psy. HTS) in this relationship. Stress, which is known to affect the psychological and physiological health of people negatively, is a significant problem that needs to be solved in high schools. Many studies have examined the relationship between SA, stress and PedsQL, and reported that excessive phone use causes acute personal distress in students and reduces their quality of life (Bian & Leung, 2015; Extremera et al., 2009; Gökcearslan et al., 2018; Vujic & Szabo, 2022).

Here, the fact that smartphone addiction has a direct effect on the quality of life, as well as its indirect effect on stress, suggests that the sports, exercise or physical activities that students are interested in have a positive effect on their psychological and physiological health. It can be said that students' success in the sports branches they do develop positive stress against the positive situations and events they are in. Positive stress increases the excitement and internal motivation of people and enables them to focus on their goals. Abolghasemi and Varaniyab (2010) reported that perceived positive stress is positively related to life satisfaction in students regardless of the circumstances. Our findings reveal that sports are significant in preventing addiction to smartphone use. In addition, considering the positive effect of sports on psychological and physiological health, it can be said that even if students use their smartphones excessively, it does not create negative stress. On the contrary, it has been observed that stress increases the quality of life in the presence of sports. This situation suggests that students' success in activities such as competitions develops positive stress in the students against the events.

The results of this study showed that there is a direct effect as well as a positive relationship between SA and stress and PedsQL, and the existence of a mediating positive relationship between SA and PedsQL. There was a zero-degree relationship between SA and PedsQL on the one hand, and stress and quality of life on the other. This result is a significant finding for studies conducted in schools because there is a great lack of studies on this subject, especially in sports high schools. In addition, since it tests the mediation processes on the quality of life of smartphone addiction, it can be said that it will contribute to the literature in this field. More studies are

needed to investigate the effect of different negative situations between smartphone addiction and quality of life in the presence of sports. Considering that the mediating effect of stress is partial, investigating other factors that will act as a mediator in other studies will make a significant contribution to the understanding of the relationship between addiction and the quality of life, especially in the presence of sports.

SUGGESTIONS

Long-term follow-up studies can be conducted to see how smartphone addiction, stress, and quality of life evolve over time. Research can be conducted to examine the effects of smartphone addiction and quality of life on academic success. A study can be conducted to examine the relationship between athletes' sleep patterns and smartphone use. Studies can be conducted to investigate the relationship between smartphone addiction and social media usage.

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