

EFFECT OF 12-WEEK RECREATIONAL ACTIVITY PROGRAM ON DIGITAL GAME ADDICTION AND PEER RELATIONSHIPS QUALITIES IN CHILDREN

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ABSTRACT

This study aims to examine the effects of 12-week recreational activities on children's digital game addiction and peer relations. One hundred and ten children participated in the study and were divided in an exercise (40 male and 15 female) and control (40 male and 15 female) group. In the research, a personal information form which included the Digital Game Addiction scale and Peer Relationship scale were used. The data were analyzed by using SPSS 20 statistical analysis program. Results of the study highlight that there is a statistically significant difference in digital game addiction in the exercise group in male ($p < 0.05$) but not female adolescents. A significant difference between peer relationships was also determined in the exercise group for both male and female adolescence, which was also observed in the "companionship" and "security" sub-dimensions of the peer relation scale ($p < 0.05$). Accordingly, recreational activities help children to feel protected from contemporary diseases like digital game addiction, reduce the risk of diseases such as obesity by increasing the level of physical activity, and also help children socialize by contributing positively to their relationships with their peers.

Keywords: Recreational activity, Sports, Digital Game Addiction, Peer Relations.

DOI: 10.19193/0393-6384_2021_5_451

Received November 15, 2020; Accepted January 20, 2021

Introduction

Social inclusion has a key role to improve, for example, psychological, mental and social health in order to use any kind of co-operating activities⁽¹⁾. Especially, current studies have shown that physical and psychological health such as exercise enjoyment, mood responses and sleep quality, improves as the level of physical activity increases⁽²⁻⁶⁾. While peer relationships support adolescents to be together in sharing and cooperation, to acquire the knowledge and skills necessary for interpersonal relationships also plays an important role for them, to learn to solve and cope with problems⁽⁷⁻¹¹⁾. Moreover, it develops various stages in parallel with their growth in physical, cognitive, moral, social and emotional

areas⁽¹²⁾. Although peer relations are important in every period of life, especially during adolescence when rapid and intense changes are experienced, these prevail and set up a significant foundation for their identity formation⁽¹³⁾. In addition, individuals consider life worth living under the favor of close friendships they established during adolescence⁽¹²⁾. It can be observed that social experience environments, where intense relationships are experienced, are expanding online and create social experience sharing areas^(14,15). However, there are many positive and negative consequences of the expansion of online social environments⁽¹⁶⁻²⁰⁾.

In the third research supplement of the Diagnostic and Statistical Manual of Mental Disorders 5 (DSMMD-5) published by the American Psychiat-

ric Association (APA) in May 2013, digital gaming addiction and internet gaming disorders were discussed⁽²¹⁾. The highest risk group for the digital gaming addiction is determined during adolescents⁽²²⁻²⁴⁾. According to studies conducted among adolescents, it has been seen that the rate of addiction to digital games is higher for males than for females^(25,26). It can be seen that most of the research on the effects of digital game addiction has been conducted regarding the negative effects of playing videogames^(27,28). There are some concerns that playing digital games may be associated with social isolation, low self-esteem, and aggression among adolescents⁽²⁹⁾. These negative effects cause a decrease in face-to-face communication, isolation from real life, feeling lonely by being away from the people around them, and deterioration in social interactions⁽³⁰⁾. When physical inactivity due to the digital games is added to the some problems of an adverse life style, a poor style of life is created for adolescents^(31,32).

Conversly to the negative aspects of digital games, there are also positive effects which can be considered. In particular, individuals become more open to interaction, their motivation increases, and they have positive effects on attention and problem-solving skills⁽³³⁻³⁶⁾. It is suggested that digital games will be used more broadly with the development of digital technology infrastructures and will improve knowledge and skills also related to exercise⁽³⁴⁾. Although there are evidences on digital-based exercise games leading to more energy consumption compared to others, it is believed that they cannot reach an intensity level that can match actual sports activities, however games based on virtual reality systems can lead to high energy consumption⁽³⁵⁾. As far as we know, many studies in literature have included digital game addiction and peer relationship⁽³⁷⁻³⁹⁾. However, there are no studies covering the effect of recreational activities on digital game addiction and peer relationships. We hypothesized that recreational activities would decrease digital game addiction and increasing peer relationships.

Methods

Participants

One hundred and ten children participated in the study. Participants were randomly assigned to an exercise (40 male and 15 female) or a control (40 male and 15 female) group. Before the study was started, the families of the children were given to fill consent forms and voluntary participation forms.

At each participant was provided the digital game addiction and peer relations scales to complete. School-based recreational exercises were applied to the exercise group for 1 hour per day, 3 days a week for 12 weeks. No exercises were performed by the control group. After 12 weeks, the scales were re-filled as a post-test.

Digital Game Addiction Scale

The Digital Game Addiction Scaleshort form (DGA-SF) was developed by Lemmens et al.[40]to determine the problematic digital game playing behaviours of adolescents aged between 12-18. It is the seven-item short form of DGA-21, which consists of 21 items and 7 sub-dimensions. The validity and reliability values of the original DGA-7 were calculated to be 0.92 through a Cronbach's alpha. The Cronbach's alpha coefficient of the scale, for which the Turkish validity and reliability study was conducted by Irmak and Erdoğan was found to be .72⁽⁴¹⁾. The scale is a 5-point Likert type, with one-factor structure and scored between 1 and 5 (1=never, 5=always) (range: 7-35).

Peer Relationship Scale

The Peer Relationship Scale was used to measure the best friendship relationships of children and adolescents. Berndt & Perry's draft items were scaled by Bukowski et al⁽⁴²⁾. The final version of the scale consists of 23 items and 5 sub-dimensions of Companionship (4 items), Conflict (4 items), Help (5 items), Security (5 items) and Closeness (5 items). Peer relations FQS uses a 5-point Likert-type scale for each of the factors so that each factor can be analyzed and total scores can be used separately. The scale was adapted to Turkish by Atik et al⁽⁴³⁾.

Data Analysis

In the analysis of the data, means and standard deviations were used for descriptive statistics. A Paired-sample t-test was used to compare recreational activity practice for pre-test and post-test comparison. SPSS 22 statistical program was used in the analysis of the data. α level was set at 0.05 for all analysis.

Results

Anthropometric characteristics of adolescents for the exercise and control group stratified for male and female are provided in table 1.

Table 2 shows the school-based exercise pro-

gram's results on male adolescents. There were significant differences in groups (exercise vs. control) in pre-test and post-test in DGA ($p < 0.001$), companionship ($p < 0.009$), help ($p < 0.007$), security ($p < 0.001$) and FQS ($p < 0.005$).

	Male		Female	
	Exercise (n = 40)	Control (n = 40)	Exercise (n = 15)	Control (n = 15)
	X̄ ± SS	X̄ ± SS	X̄ ± SS	X̄ ± SS
Age (year)	12.6 ± 1.10	11.8 ± 1.1	13.1 ± 0.9	13.4 ± 0.7
Height (cm)	154.2 ± 1.8	154.3 ± 1.7	155.3 ± 2.0	155.5 ± 2.0
Weight (kg)	37.1 ± 1.5	37.9 ± 1.5	38.5 ± 1.4	39.0 ± 1.3
BMI (kg/m ²)	21.3 ± 1.7	22.2 ± 1.8	23.1 ± 1.8	23.7 ± 1.7

Table 1: Demographic characteristic of adolescents.

Table 2 shows the school-based exercise program results on female adolescents. There were significant differences in groups (exercise vs. control) in pre-test and post-test, companionship ($p < 0.022$), help ($p < 0.007$), security ($p < 0.001$) and FQS ($p < 0.009$).

		Pre	Post	p	Cohen d	Magnitude
		X̄ ± SS	X̄ ± SS			
DGA	Exercise	1.80 ± 0.54	1.37 ± 0.31	0.001*	0.98	Moderate
	Control	1.78 ± 0.51	1.90 ± 0.53	0.291		
Companionship	Exercise	3.39 ± 0.69	3.80 ± 0.77	0.009*	-0.56	Small
	Control	3.15 ± 0.82	3.30 ± 0.83	0.409		
Conflict	Exercise	2.16 ± 0.80	1.95 ± 0.85	0.267	0.410	
	Control	2.05 ± 0.73	2.20 ± 0.72	0.410		
Help	Exercise	4.27 ± 0.88	4.72 ± 0.47	0.007*	-0.64	Moderate
	Control	3.96 ± 1.00	4.31 ± 0.73	0.099		
Security	Exercise	3.68 ± 0.95	4.72 ± 0.47	0.001*	-1.39	Large
	Control	3.36 ± 1.05	3.54 ± 0.99	0.427		
Closeness	Exercise	4.05 ± 0.95	4.41 ± 0.68	0.063	0.513	
	Control	4.17 ± 0.73	4.26 ± 0.66	0.513		
FQS	Exercise	3.57 ± 0.54	3.84 ± 0.38	0.005*	-0.58	Small
	Control	3.41 ± 0.61	3.59 ± 0.51	0.140		

Table 2: Results of school-based exercise program on DGA, FQS and subscales on male adolescents.

Discussion

In the current study, it was seen that the means of the digital game addiction in adolescent males decreased after recreational activity. In other words, recreational activities reduced digital game addiction (Table 2). Today, children are socializing with people in the virtual environment instead of playing in playgrounds and on the street and participating in physical activity, and their participation in digital games is increasing⁽⁴⁴⁾.

In addition, with the rapid development of technology, it is considered that adolescents are distancing from physical activities due to their interest in technological tools. Many researchers⁽⁴⁵⁻⁴⁷⁾ stated that participation in regular physical activity has a positive effect on game addiction and that sport activities are important tools to prevent various social problems. Hazar et al⁽⁴⁸⁾ concluded that students who do not regularly participate in sport activities have higher probability of developing digital game

addiction than students who practice physical activities. Also, studies showed that children who do not participate in physical activity have higher levels of digital game addiction⁽⁴⁹⁾ and adolescents who participate in sports activities are less dependent on digital games⁽⁵⁰⁾.

Similarly, Tekkurşun-Demir and Cicioğlu stated that as high school students' motivation to participate in physical activity increases, their desire to play digital games decreases⁽⁵¹⁾. On the other hand, Gülbetekin et al. (2021) showed in their study on children that as the cognitive-behavioral physical activity levels of children increase, their digital game addiction levels decrease⁽⁵²⁾. There are very few intervention studies against game addiction in the literature. In the study of Han et al⁽⁵³⁾, based on the idea that familial factors affect adolescents' game addiction, a negative relationship between the duration of playing online games is observed in the study where 3-week family therapy including recreational activities such as doing sports, swimming, attending art courses, jumping rope, and badminton are applied. Whereas Sakuma et al⁽⁵⁴⁾, in the study with the intervention of "self-discovery camp" consisting of recreational activities like workshops, nature walks and open-air cooking besides medical briefing and personal consultancy techniques which was conducted for 9 days for male individuals with the average age of 16, provided for them to perform healthy and well-regulated living activities and facilitated their interpersonal relations free from internet. In the consequential follow-up study for three months after this intervention program, it was determined that the total playing time of the adolescents decreased significantly.

It was revealed that recreational activity programs applied to adolescent males have small effects on general peer relations and companionship relations, moderate effects on help relations, and large effects on security relations. In addition, although there was no statistically significant difference, recreational activities had reduced negative relationships such as conflict and increased positive relationships such as intimacy. The experiences of adolescents participating in recreational activities encouraged them to be together. It is believed that with joint activities, team spirit is formed and developments in aid and security relations are developed. In the study conducted by Pehlevan and Bal⁽⁵⁵⁾ on 13-15-year-old adolescents, it was found that the mean scores of those who participate in sports are significantly higher in the sub-dimension of com-

panionship in peer relations compared to those who do not participate in sports. Since sport is an integrative and unifying social phenomenon⁽⁵⁶⁾ it can be shown among the reasons why individuals participating in sports have a difference in their companionship with their peers. Weiss et al⁽⁵⁷⁾, reported in their study that the children in between the ages of 8-16 participating in sports enjoy spending time together with their teammates and playing games together. Also improvements in their helping relations in the school environment, that they protect each other from negative behaviors, and that they are able to avoid and resolve conflicts by providing emotional support to each other were observed. Smith⁽⁵⁸⁾ suggests that participating in physical activity is a very effective method for improving friendship and peer relationships.

In other results of this study, no significant differences were found between digital game addictions before and after recreational activities applied to adolescent females. When the literature was examined, no research on only adolescent females was found. Similarly, Dursun and Erarslan-Çapan⁽⁵⁹⁾ concluded in their research that gender predicts digital game addiction significantly in favor of males. Also Karaaslan⁽⁶⁰⁾ stated in his research that as males are more acquainted with technology they are more prone to digital games than females. In general, researches show that adolescent males are more addicted to digital games than adolescent females^(26,61-63). The fact that the results are in this direction may be due to the structure of society and families. Gender roles paved the way for males to act more freely. Thus, males can go to places such as internet cafes, game saloons where digital games are played more easily and spend longer time playing. Conversely, in the present study, it was observed that recreational activities decreased the general peer relations of adolescent females.

After the participation of adolescent females in recreational activities, there are significant increases in companionship and safety relations observed. These increases, which are affected by recreational activities, are moderate in companionship relations and large in security relations (Table 3). Pehlevan and Bal⁽⁶⁴⁾ found out in their study that adolescent females at ages between 13-15 have significantly higher mean scores in conflict, protection and intimacy relationships. An applied study conducted with 32 (groups of 11 experimental, 10 placebo and 11 control) adolescents in eight sessions, showed that the group activities aimed at improving friend-

ship relations are significantly effective in increasing the peer relationship scores of the adolescents in the experimental group⁽⁶⁵⁾. With the cooperation of the Ministry of National Education and the Green Crescent Foundation in our country, the Turkey Anti-Addiction Training Program was established to raise awareness and prevent technology addiction⁽⁶⁶⁾. Similarly, within the scope of the Youth Projects of the Ministry of Youth and Sports of the Republic of Turkey, in the 3 year program "Preventing Internet Addiction in Secondary Education" initiated by the Female Health Professionals Education and Solidarity Foundation, activities including chess, theatre and other social activities have been implemented to improve and consolidate social adaptation and the protection of mental and physical health of young people between the ages of 15-18, who reside in the risk group of internet addiction⁽⁶⁷⁾. It is reported by both the media and organizations that these programs have produced positive results.

		Pre X ± SS	Post X ± SS	P	Cohen d	Magnitude
DGA	Exercise	1,46 ± 0,38	1,67 ± 0,56	0,233	-1,05	Moderate
	Control	1,70 ± 0,51	1,76 ± 0,64	0,798		
Companionship	Exercise	3,00 ± 0,63	3,68 ± 0,67	0,022*	-1,05	Moderate
	Control	2,85 ± 0,65	3,17 ± 0,91	0,369		
Conflict	Exercise	1,98 ± 0,39	2,37 ± 1,01	0,253	-1,05	Moderate
	Control	2,02 ± 0,55	2,25 ± 0,92	0,408		
Help	Exercise	4,21 ± 1,02	4,55 ± 0,45	0,037	-1,77	Large
	Control	4,17 ± 1,08	4,12 ± 1,11	0,892		
Security	Exercise	3,20 ± 0,98	4,55 ± 0,45	0,001*	-1,77	Large
	Control	3,55 ± 0,96	3,57 ± 1,12	0,971		
Closeness	Exercise	4,23 ± 0,54	4,53 ± 0,66	0,170	1,28	Large
	Control	4,03 ± 0,91	3,99 ± 0,94	0,914		
FQS	Exercise	4,41 ± 0,47	3,87 ± 0,37	0,009*	1,28	Large
	Control	3,39 ± 0,61	3,48 ± 0,64	0,749		

Table 3: Results of school-based exercise program on DGA, FQS and subscales on female adolescents.

When the literature in the field is examined, it can be seen that one of the most important methods of coping with both substance and behavioral addictions is sport and exercise^(68,69). However, Landale and Roderick⁽⁷⁰⁾ stated that sport and physical activities are not included sufficiently in the fight against addiction programs despite it is known that sports can be an important tool in the fight against substance and behavioral addictions and that it has psychological and physical benefits on humans.

In conclusion, recreational activities have important effects on adolescents in terms of digital game addiction and peer relationships. These effects showed that there are some differences between adolescent males and females. Digital game addiction, which shows difference in adolescent males with participation in recreational activities, does not show any effect on females. In terms of peer relations, post-recreational companionship and safety relations

changed positively in both male and female participating in exercise activities. In addition, adolescent males' helping relations also increased post-activity. However, while the general peer relations of adolescent males increase after participation in recreational activities, a decrease was observed in adolescent females. Considering all these aspects, it is recommended to diversify recreational activities between genders. Moreover, organizing interesting, low-cost recreational activities that enable active participation for adolescents both in school and out-of-school periods and in which families can participate would be useful in regulating digital game addiction and peer relations.

References

- 1) Wilson C, Secker J. Validation of the Social Inclusion Scale with Students. 2015;3(4):11.10.17645/si.v3i4.121
- 2) Soylu Y. The psychophysiological effects of the COVID-19 quarantine in the college students. *Physical Education of Students*. 2021; 25: 158-63.10.15561/20755279.2021.0303
- 3) Turgut M, Soylu Y, Metin SN. Physical activity, night eating, and mood state profiles of athletes during the COVID-19 pandemic. *Progress in Nutrition*. 2020; 22.10.23751/pn.v22i2-S.10567
- 4) Kilit B, Arslan E, Akca F, Aras D, Soylu Y, et al. Effect of Coach Encouragement on the Psychophysiological and Performance Responses of Young Tennis Players. *International journal of environmental research and public health* [Internet]. 2019; 16(18).
- 5) Gentile A, Boca S, Şahin FN, Güler Ö, Pajaujiene S, et al. The Effect of an Enriched Sport Program on Children's Executive Functions: The ESA Program. *Frontiers in psychology*. 2020; 11: 657-.10.3389/fpsyg.2020.00657
- 6) Thomas E, Alesi M, Tabacchi G, Silva CMD, Sturm DJ, et al. Cognitive and Physical Activity-Related Aspects of Children Associated to the Performance of the Crunning Movement. *J Funct Morphol Kinesiol*. 2021; 6(1).10.3390/jfmk6010009
- 7) Gentile A, Boca S, Demetriou Y, Sturm D, Pajaujiene S, et al. The Influence of an Enriched Sport Program on Children's Sport Motivation in the School Context: The ESA PROGRAM. *Frontiers in psychology*. 2020; 11: 601000-.10.3389/fpsyg.2020.601000
- 8) Thomas E, Bianco A, Tabacchi G, Marques da Silva C, Loureiro N, et al. Effects of a Physical Activity Intervention on Physical Fitness of schoolchildren: The Enriched Sport Activity Program. *Int J Environ Res Public Health*. 2020; 17(5).10.3390/ijerph17051723
- 9) Beyaztürk D., Ş. A, Dinçer FÇ. Çocuklukta Akran İlişkileri ve Arkadaşlık. *Eurasian Journal of Educational Research* 2007; 26: 13-26
- 10) Sidorowicz K, Hair EC. Assessing Peer Conflict and Aggressive Behaviors: A Guide for Out-Of-School Time Program Practitioners. *Child Trends* 2009;43
- 11) Bianco A, Bellafiore M, Battaglia G, Paoli A, Caramazza G, et al. The effects of indoor cycling training in sedentary overweight women. *J Sports Med Phys Fitness*. 2010; 50(2): 159-65
- 12) Vitaro F, Boivin M, Bukowski WM. The role of friendship in child and adolescent psychosocial development. *Handbook of peer interactions, relationships, and groups. Social, emotional, and personality development in context*. New York, NY, US: The Guilford Press; 2009; 568-85.
- 13) Marcia JE. Identity and intervention. *Journal of Adolescence*. 1989; 12(4): 401-10.https://doi.org/10.1016/0140-1971(89)90063-8
- 14) Quinn A, Boneva B, Kraut R, Kiesler S, Cummings J, et al. Teenage Communication in the Instant Messaging Era. *Computers, Phones, and the Internet: Domesticating Information Technology*. 2012.10.1093/acprof:oso/9780195312805.003.0014
- 15) Okudan B, Karakullukçu Ö. The Impact of University Level Sports Education on Social Media Addiction. *Asian Journal of Education and Training*. 2021;7:7-12.10.20448/journal.522.2021.71.7.12
- 16) Erbaş Ü, H. G. Participation in Physical Activity and Social Media Addiction in Students. *International Journal of Psychology and Educational Studies* 2020; 7(4): 52-60
- 17) Karagülle AE, B. Ç. Ag Toplumunda Sosyalleşme ve Yabancılaşma. *The Turkish Online Journal of Design Art and Communication*. 2014; 4(1):1-9
- 18) Kowert R, Oldmeadow JA. Playing for social comfort: Online video game play as a social accommodator for the insecurely attached. *Computers in Human Behavior*. 2015; 53: 556-66.10.1016/j.chb.2014.05.004
- 19) Oh HJ, Ozkaya E, LaRose R. How does online social networking enhance life satisfaction? The relationships among online supportive interaction, affect, perceived social support, sense of community, and life satisfaction. *Computers in Human Behavior*. 2014; 30: 69-78.10.1016/j.chb.2013.07.053
- 20) Snodgrass J, Dengah İi H, Lacy M, Bagwell A, Van Oostenburg M, et al. Online gaming involvement and its positive and negative consequences: A cognitive anthropological "cultural consensus" approach to psychiatric measurement and assessment. *Computers in Human Behavior*. 2017; 66.10.1016/j.chb.2016.09.025
- 21) Vahia VN. Diagnostic and statistical manual of mental disorders 5: A quick glance. *Indian journal of psychiatry*. 2013; 55(3): 220-3.10.4103/0019-5545.117131
- 22) Carnagey NL, Anderson CA, Bushman BJ. The effect of video game violence on physiological desensitization to real-life violence. *Journal of experimental social psychology*. 2007; 43(3), 489-496.
- 23) Kuss DJ, van Rooij AJ, Shorter GW, Griffiths MD, van de Mheen D. Internet addiction in adolescents: Prevalence and risk factors. *Computers in Human Behavior*. 2013; 29(5): 1987-96.https://doi.org/10.1016/j.chb.2013.04.002
- 24) Gentile DA, Lynch PJ, Linder JR, Walsh DA. The effects of violent video game habits on adolescent hostility, aggressive behaviors, and school performance. *J Adolesc*. 2004; 27(1): 5-22.10.1016/j.adolescence.2003.10.002

- 25) Greenberg BS, Sherry J, Lachlan K, Lucas K, Holmstrom A. Orientations to Video Games Among Gender and Age Groups. *Simulation & Gaming*. 2010; 41(2): 238-59.10.1177/1046878108319930
- 26) Horzum MB. İlköğretim Öğrencilerinin Bilgisayar Oyunu Bağımlılık Düzeylerinin Çeşitli Değişkenlere Göre İncelenmesi. 2011; 36(159)
- 27) Granic I, Lobel A, Engels RCME. The benefits of playing video games. *American Psychologist*. 2014; 69(1): 66-78.10.1037/a0034857
- 28) Weinstein A, Lejoyeux M. New developments on the neurobiological and pharmaco-genetic mechanisms underlying internet and videogame addiction. *Am J Addict*. 2015; 24(2): 117-25.10.1111/ajad.12110
- 29) Colwell J, Payne J. Negative correlates of computer game play in adolescents. *Br J Psychol*. 2000; 91 (Pt 3): 295-310.10.1348/000712600161844
- 30) Hazar Z, Hazar M. Digital Game Addiction Scale for Children Çocuklar İçin Dijital Oyun Bağımlılığı Ölçeği. *Journal of Human Sciences*. 2017; 14: 203.10.14687/jhs.v14i1.4387
- 31) Carvalhal MM, Padez MC, Moreira PA, Rosado VM. Overweight and obesity related to activities in Portuguese children, 7-9 years. *Eur J Public Health*. 2007; 17(1): 42-6.10.1093/eurpub/ckl093
- 32) Vandewater EA, Shim MS, Caplovitz AG. Linking obesity and activity level with children's television and video game use. *J Adolesc*. 2004; 27(1): 71-85.10.1016/j.adolescence.2003.10.003
- 33) Anderson CA, Warburton WA. The impact of violent video games: An overview. *Growing up fast and furious: Reviewing the impacts of violent and sexualised media on children*. Annandale, NSW, Australia: The Federation Press; 2012; 56-84.
- 34) Papastergiou M. Exploring the potential of computer and video games for health and physical education: A literature review. *Computers & Education*. 2009; 53(3): 603-22.https://doi.org/10.1016/j.compedu.2009.04.001
- 35) Skip Rizzo A, Lange B, Suma EA, Bolas M. Virtual reality and interactive digital game technology: new tools to address obesity and diabetes. *J Diabetes Sci Technol*. 2011; 5(2): 256-64.10.1177/193229681100500209
- 36) Thomas E, Bianco A, Bellafiore M, Battaglia G, Paoli A, et al. Determination of a strength index for upper body local endurance strength in sedentary individuals: a cross sectional analysis. *SpringerPlus*. 2015; 4: 734
- 37) Mohammadkhani P, Alkasir E, Pourshahbaz A, Jafari-Dehkordi F, soleimani sefat E. Internet Addiction in High School Students and Its Relationship With the Symptoms of Mental Disorders. *Iranian Rehabilitation Journal*. 2017; 15: 141-8.10.18869/nrip.irj.15.2.141
- 38) Gunuc S. Peer Influence in Internet and Digital Game Addicted Adolescents: Is Internet / Digital Game Addiction Contagious? *Int J High Risk Behav Addict*. 2017; 6(2): e33681.10.5812/ijhrba.33681
- 39) Tsai S-M, Wang Y-Y, Weng C-M. A Study on Digital Games Internet Addiction, Peer Relationships and Learning Attitude of Senior Grade of Children in Elementary School of Chiayi County. *Journal of Education and Learning*. 2020; 9: 13.10.5539/jel.v9n3p13
- 40) Lemmens JS, Valkenburg PM, Peter J. Development and Validation of a Game Addiction Scale for Adolescents. *Media Psychology*. 2009; 12(1): 77-95.10.1080/15213260802669458
- 41) Irmak AY, S. E. Dijital Oyun Bağımlılığı Ölçeği Türkçe formunun geçerliliği ve güvenilirliği. *Anatolian Journal of Psychiatry/Anadolu Psikiyatri Dergisi*. 2015;16
- 42) Bukowski WM, Hoza B, Boivin M. Measuring Friendship Quality During Pre- and Early Adolescence: The Development and Psychometric Properties of the Friendship Qualities Scale. *Journal of Social and Personal Relationships*. 1994; 11(3): 471-84.10.1177/0265407594113011
- 43) Atik ZE ÇA, Çok F, Doğan T, Karaman NG. Akran İlişkileri Ölçeği'nin Türkçeye uyarlanması: Geçerlik ve güvenilirlik çalışması. *Kuram ve Uygulamada Eğitim Bilimleri*. 2014; 14(2): 433-46
- 44) Horzum MB, Ayas T, Ö. Ç. Çocuklar için Bilgisayar Oyun Bağımlılığı Ölçeği. *Türk Psikolojik Danışma ve Rehberlik Dergisi* 2014; 3(30): 76-88
- 45) Kim N. Effects of Sport for Preventing Violence and Computer Game Addiction in Youth. *International Journal of u- and e- Service, Science and Technology*. 2016; 9: 279-84
- 46) Ekinci NE, Ustun UD, Ozer O. An Investigation of the Relationship between Digital Game Addiction, Gender and Regular Sport Participation. *Journal of Education Culture and Society*. 2016; 7(2): 298-303.10.15503/jecs20162.298.303
- 47) Thomas E, Bianco A, Raia T, Messina G, Tabacchi G, et al. Relationship between velocity and muscular endurance of the upper body. *Hum Mov Sci*. 2018; 60: 175-82.10.1016/j.humov.2018.06.008
- 48) Hazar Z, Tekkurşun Demir G, Namlı S, Türkeli A. Ortaokul Öğrencilerinin Dijital Oyun Bağımlılığı ve Fiziksel Aktivite Düzeyleri Arasındaki İlişkinin İncelenmesi . *Beden Eğitimi ve Spor Bilimleri Dergisi*. 2017; 11(3), 320-332
- 49) Güvendi B, Tekkurşun Demir G, Keskin B. Ortaokul öğrencilerinde Dijital Oyun Bağımlılığı ve Saldırganlık-Dijital Game Addiction And Aggression in Secondary School Students. 2019; 11.10.26466/opus.547092
- 50) Ekinci N, Yalcin I, Özer Ö, Kara T. An investigation of the digital game addiction between high school students. *Journal of Human Sciences*. 2017; 14: 4989.10.14687/jhs.v14i4.4936
- 51) Demir, GT, CİCİOĞLU Hİ. Fiziksel aktiviteye katılım motivasyonu ile dijital oyun oynama motivasyonu arasındaki ilişkinin incelenmesi. *Sportmetre Beden Eğitimi Ve Spor Bilimleri Dergisi*. 2019; 17(3), 23-34.
- 52) Gülbetekin E, Güven E, O. T. Adolesanların Dijital Oyun Bağımlılığı ile Fiziksel Aktivite Tutum ve Davranışlarını Etkileyen Faktörler. *Bağımlılık Dergisi* 2021; 22(2)
- 53) Han DH, Kim SM, Lee YS, Renshaw PF. The effect of family therapy on the changes in the severity of on-line game play and brain activity in adolescents with on-line game addiction. *Psychiatry Res*. 2012; 202(2): 126-31.10.1016/j.psychres.2012.02.011
- 54) Sakuma H, Mihara S, Nakayama H, Miura K, Kitayuguchi T, et al. Treatment with the Self-Discovery Camp (SDiC) improves Internet gaming disorder. *Addict Behav*. 2017; 64: 357-62.10.1016/j.addbeh.2016.06.013
- 55) Pehlivan Z, Sİ. B. Grubu Çocuklarda Spora Katılımın Akran İlişkileri ve Sosyal Destek Alma Üzerine Etkisi. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi* 2018; 23(4): 191-203
- 56) Coakley J. *Sports in Society : Issues and Controversies*. 2008.

- 57) Weiss MR, Smith AL, Theeboom M. "That's What Friends Are For": Children's and Teenagers' Perceptions of Peer Relationships in the Sport Domain. *Journal of Sport and Exercise Psychology*. 1996;18(4): 347.10.1123/jsep.18.4.347
- 58) Smith A. Perceptions of Peer Relationships and Physical Activity Participation in Early Adolescence. *Journal of sport & exercise psychology*. 1999; 21:329-50.10.1123/jsep.21.4.329
- 59) Dursun A, Çapan B. Ergenlerde Dijital Oyun Bağımlılığı ve Psikolojik İhtiyaçlar. İnönü Üniversitesi Eğitim Fakültesi Dergisi. 2018; 128-40.10.17679/inuefd.336272
- 60) Aydoğdu Karaaslan İ. Dijital oyunlar ve dijital şiddet farkındalığı: ebeveyn ve çocuklar üzerinde yapılan karşılaştırmalı bir analiz. *Uluslararası Sosyal Araştırmalar Dergisi*. 2015; 8(36), 806-818.
- 61) Li H, Wang S. The role of cognitive distortion in online game addiction among Chinese adolescents. *Children and Youth Services Review*. 2013; 35(9): 1468-75. <https://doi.org/10.1016/j.childyouth.2013.05.021>
- 62) Şahin C, Tuğrul VM. İlköğretim öğrencilerinin bilgisayar oyunu bağımlılık düzeylerinin incelenmesi. *Journal of World of Turks*. 2012; 4: 115-30
- 63) Şahin D, ÖG. K. Okul Dönemi Çocuklarının Bilgisayar Oyun Bağımlılığı ile Davranış Problemleri Arasındaki İlişkinin İncelenmesi. *Milli Eğitim Dergisi* 2021; 50(230): 13-28
- 64) Pehlivan Z, Sİ B. 13-15 Yaş Grubu Çocuklarda Spora Katılımın Akran İlişkileri ve Sosyal Destek Alma Üzerine Etkisi. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi* 2018; 202(2): 126-31
- 65) Demir Y, Kutlu M. The effect of group guidance activities at improving friendship relationships to adolescents' friendship relationships Arkadaşlık ilişkilerini geliştirmeye yönelik grup rehberliği etkinliklerinin ergenlerin arkadaşlık ilişkilerine etkisi. *Journal of Human Sciences*. 2017; 14: 3213.10.14687/jhs.v14i4.4717
- 66) TBM. Türkiye Bağımlılıkla Mücadele Programı. Kültür Sanat Basımevi 2021 [Available from: https://Tbm.Org.Tr/Media/1152/04_Lise_Tekno.Pdf].
- 67) GSB. Yüz Yüze Orta Öğretimde İnternet Bağımlılığı Önleme Projesi 2014 [Available from: <https://Gpdp.blog.Gsb.Gov.Tr/Post/Yuz-Yuze-Orta-Ogretimde-İnternet-Bagimlilik-Onleme-Projesi>].
- 68) Davis RA. A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior*. 2001; 17(2): 187-95. [https://doi.org/10.1016/S0747-5632\(00\)00041-8](https://doi.org/10.1016/S0747-5632(00)00041-8)
- 69) Lee EJ. A case study of Internet Game Addiction. *Journal of Addictions Nursing*. 2011;22(4)
- 70) Landale S, Roderick M. Recovery from addiction and the potential role of sport: Using a life-course theory to study change. *International Review for the Sociology of Sport*. 2014; 49(3-4): 468-84.10.1177/1012690213507273

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