

## **A Study on the Relationship Between Secondary School Students' Digital Game Addiction Awareness and Participation Motivation to Physical Activity**

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### **Abstract**

This study is conducted so as to investigate the relationship between secondary school students' digital game awareness (SDGA) and participation motivation to physical activity (PMPA). 456 female and 241 male secondary school students studying in the Keçiören district of Ankara participated voluntarily. Personal information form, Digital Game Addiction Awareness Scale (DGAAS) developed by Tekkurşun-Demir ve Cicioğlu (2020) and Participation motivation to physical activity Scale (PMPAS) developed by Tekkurşun-Demir ve Cicioğlu (2018) are employed as data collection set. In the analysis of the data obtained, mean ( $\bar{x}$ ), standard deviation (sd), percentage (%) and frequency (n) values are used. Secondary School. The Pearson product-moment correlation coefficient in Pearson correlation analysis, ANOVA in one-way analysis of variance and T-Test in unrelated samples were used. While statistically significant differences were found the relationship between secondary school students' PMPA, SDGA and gender, educational level of father and daily technology usage ( $p < 0,05$ ), the relationship with gender and educational level of mother was trivial ( $p < 0,05$ ); In sum, study results demonstrate that there is a positive and significant relationship between PMPA of secondary school students and the SDGA. In other words, as students' awareness of digital game addiction increases, participation motivation to physical activity increase.

**Keywords:** Physical Activity (PA), Digital Game (DG), Awareness, Motivation

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## INTRODUCTION

The game is a biological activity that enable people as well as animals to recognize their environment or to better adapt to the environment (Brown, 2014), and it is vital in terms of socialization during the growing up period (Son vd., 2007; Vygotsky, 2004; Yarnal, 2006; Yarnal ve vd., 2008). Considering today conditions, it is known that game considerably changed. Moreover, it has turned into a system where significantly affecting the people, played digitally, and controlled through the commands (Juul, 2005; Adams ve Dormans 2012). The purpose of the digital game is to fulfill various responsibilities, overtop against rivals, and to measure the performance of the players according to various criteria participating in the game (Adams and Dormans 2012; Adams 2014). According to studies conducted in both Turkey and other countries, it is known that the majority of adolescent girls (97%) and adolescent boys (99%) ranged 12-17 play various digital games (Vandewater vd., 2014).

Physical activity simply is to consume energy due to several body movements (Zorba, 2013) and one of the most important actions that positively affect the health of individuals. As Edwards and Thourous stated (2006) PA makes significant contributions to the physical development of children and young people. In other words, making physical activity a habit play a critical role for the surfacing of healthy lifestyles in individuals, especially for youth and children. (Tatar ve Myers, 2010). Turkey Nutrition and Health Survey demonstrate that while 12-14 age groups, the rate of those who do not engage in physical activity was 41.4% and 15-18 was %41.6, this rate increased up to 69.5% for 19-30 age group (Ministry of Health, 2014a).

Awareness is an intangible concept that change from one individual to other. The experiences of the person is only a perception that belongs to themselves and reflects the inner world of people. It is an internal and external phenomenon that emerges in the experiences of the person who directs people to real life (Brown ve Ryan, 2003). In this context, İlhan ve Esentürk (2015) describe the awareness as the ability to make sense of one's life, to know the existence of various situations, and to prioritize important events that they value.

Motivation is an internal impact that creates an impulse towards certain goals and directs the person to the goal. It lead to the person feel positive emotionally as people reach the goal (Demir & Cicioğlu, 2018). It is also safe to say that motivation has impact on participation to physical activity and digital game addiction. In this context, scholars argue that people can determine what purpose they focus on and what behaviors they need to exhibit to achieve it thanks to internal and external motivation (Bandura, 1997; Eccles vd., 1998).

Digital games allow people to organize activities together, strive for a common goal, communicate with each other and relieve stress regardless of the distance between them. It is frequently stated that digital technologies increase the sedentary life and the risk of obesity. However, researchers claim that technology can also be used as a tool to increase physical activity (Hakala et al., 2017). Which is why, we claim that integration of digital games and physical activities can make people physically more active and mental health. The main purpose of this study is to determine the level of secondary school students' awareness of digital game addiction and their motivation to participate in physical activity, whether there is a relationship between the demographic information and physical activity level.

## METHOD

In this section, the research model, research group, data collection tools and data analysis are presented.

## Model of the Research

Descriptive survey model is employed. The survey model is a method that is carried out on the whole of the research group or a sample group in order to reach a general judgment and aims to determine the change and relationship between the variables. (Karasar, 2017).

## Research Group

697 secondary school students studying in Keçiören district of Ankara province voluntarily participated in the research in the 2020-2021 academic year. The demographic information of participants is given in Table 1.

**Table 1. Frequency and Percentage Distributions of Students**

Özellikler	Category	f	%
Gender	Girl	456	65,4
	Boy	241	34,6
Age	Early Adolescence	77	11,0
	Middle Adolescence	593	85,1
	Late Adolescence	27	3,9
Mothers` Education Statu	Primary/Secondary	306	43,9
	High School	267	38,3
	Higher Education	124	17,8
Fathers` Education Statu	Primary/Secondary	239	34,3
	High School	284	40,7
	Higher Education	174	25,0
Daily Technology Use Time	4 hour and less	246	35,3
	Over 4 hours	451	64,7
Regular Physical Activity Status	Yes	361	51,8
	No	336	48,2
Total		697	100

In the study, is is investigated the longness of daily technology usage and whether they do regular physical activity of secondary school students. More than half (64,7%) of participants uses technology more than 4 hours a day. There is trivial difference between the participants who do regular activities and those who do not (51,8% vs 48,2%).

## Data Collection Tools

Digital Game Addiction Awareness Scale(DGAAS) developed by Tekkurşun-Demir ve Cicioğlu (2020) and Participation motivation to physical activity Scale(PMPAS) developed by Tekkurşun-Demir ve Cicioğlu (2018) are employed as data collection set.

**Digital Game Addiction Awareness Scale(DGAAS);** Internal awareness(IA) is consist of 1, 2, 3, 4, 5 items, external awareness(EA) is consist of 6, 7, 8, 9, 10, 11, 12, items. IA sub-dimension shows the level of understanding the inner voice of the individual towards digital game addiction and being aware of the emotions caused by digital game addiction. EA sub-dimension is the level of understanding and awareness of how the individual's digital game addiction affects his relations with the social environment such as friends, work, and school. In sum, DGAAS measures an individual's level of knowledge about digital game addiction, as well as the level of understanding and awareness of its internal and external effects.

**Participation Motivation To Physical Activity Scale(PMPAS);** Individual reasons sub-dimension is consist of 1, 2, 3, 4, 5, 6 items, environmental reasons sub dimension is consist of 7, 8, 9, 10, 11, 12 items, and arbitrariness sub-dimension is consist of 13, 14, 15, 16 items. The total variance of the 16-item measurement tool was 54.69% (Tekkurşun-Demir ve Cicioğlu, 2018). Cutpoints are as follow: 1- 16 very low, 17-32 low, 33-48 medium, 49- 64 high and 65-80 very high.

## Data Analysis

All the data collected from the secondary school students were rigorously examined, incorrect and outlier data were removed, consequently, 697 data of students were determined as valuable to analysis. Descriptive statistics on whether the categories of all independent variables are normally distributed in the **DGAAS** and **PMPAS** total scores and sub-dimension scores were examined. Given that the coefficients of kurtosis and skewness, it was determined that all sub-dimensions of all independent variables were normally distributed in the total score of the scale and its sub-dimensions. In the analysis of data; Pearson correlation test, T-Test for Independent Groups (for comparison between groups), one-way analysis of variance (ANOVA), arithmetic mean ( $\bar{x}$ ), standard deviation (sd), percent (%), frequency (n) were harnessed.

## RESULTS

The study findings are presented with tables in this section.

### *What is the digital game addiction awareness of secondary school students?*

The digital game addiction awareness of secondary school students is shown in Table 2

**Table 2. Descriptive Statistics of Secondary School Students' Digital Game Addiction Awareness**

	N	Minimum	Maximum	$\bar{X}$	S
Internal Awareness	697	5,00	25,00	16,36	4,51
External Awareness	697	12,00	35,00	25,68	5,09
Total	697	22,00	60,00	42,04	8,66

As shown in the table.2, The highest score secondary school students got from the internal awareness sub-dimension of the DGAAS is 25, and the lowest score is 5. The average score the students got from this sub-dimension was 16.36, and the standard deviation was 4.51. The highest score obtained from the External Awareness dimension of the scale is 35, and the lowest score is 12. The mean score from this sub-dimension is 25.68, and standard deviation is 5.09. The highest score obtained from the scale is 60 and the lowest score is 22. The average score is 42.04, and the standard deviation for the whole scale is 8.66. Given that the average scores and the cut-off points of the scale (Tekkurşun-Demir & Cicioğlu, 2020), it was found that secondary school students' internal awareness of digital game addiction was between 11-16, external awareness was between 17-25, and total awareness score was between 29-44 at medium level.

### *What is the motivation of secondary school students to participate in physical activity?*

The PMPA of secondary school students is shown in Table 3.

**Table 3. Descriptive Statistics Results on Secondary School Students' PMPA**

	N	Minimum	Maximum	$\bar{X}$	S
Individual Reasons	697	16,00	30,00	24,18	3,40
Environmental Reasons	697	11,00	30,00	20,89	3,87
Arbitrariness	697	10,00	20,00	15,46	2,72
Total	697	41,00	80,00	60,53	7,68

As shown in table 3., The highest score secondary school students got from individual reasons sub-dimension of the PMPAS is 30, the lowest score is 16. The average score students got from this sub-dimension 24,18 and the standard deviation is 3,40'tur. While the highest score secondary school students got from environmental reasons is 30, the lowest score is 11. The average score students got

from this sub-dimension 20,89 and the standart deviation is 3,87. The highest score secondary school students got from arbitrariness sub-dimension of the PMPAS is 20,00, the lowest score is 10,00 . The mean score from this sub-dimension is 15,46, and standard deviation is 2,72. When whole data of PMPAS is examined, the highest score obtained from the scale is 80 and the lowest score is 41. While the mean score is 60.53, the standard deviation is 7.68. Given that the average scores and the cut-off points of the scale (Tekkurşun-Demir & Cicioğlu, 2018), results demonstrate that the secondary school students have high motivation to participate in physical activity with 49-64 points.

***Do secondary school students' digital game addiction awareness and participation motivation to physical activity differ according to their gender?***

**Tablo 4. Gender - Independent Samples T-Test Results**

	Gender	N	$\bar{X}$	S	t	sd	p
Internal Awareness	Women	456	17,48	4,02	-9,57	695	,000*
	Men	241	14,24	4,64			
External Awareness	Women	456	26,81	4,50	-8,45	695	,000*
	Men	241	23,55	5,46			
DGAA	Women	456	44,29	7,58	-10,08	695	,000*
	Men	241	37,79	8,99			
Individual Reasons	Women	456	24,23	3,25	-,528	695	,598
	Men	241	24,08	3,66			
Environmental Reasons	Women	456	20,75	3,83	1,227	695	,220
	Men	241	21,13	3,96			
Arbitrariness	Women	456	15,36	2,55	1,386	695	,166
	Men	241	15,66	3,01			
PMPA	Women	456	60,34	7,21	,876	695	,381
	Men	241	60,88	8,50			

\*p<,05

As shown in Table 4, It is observed that the IA scores ( $\bar{X}$  =17,48) of female students are significantly higher than the IA scores ( $\bar{X}$  =14,24) of male students ( $t_{(695)} = -9,57, p < 0,05$ ). Similarly, the EA scores ( $\bar{X}$  =26,81) of female students are significantly higher than the XA scores ( $\bar{X}$  =23,55) of male students ( $t_{(695)} = -8,45, p < 0,05$ ). Furthermore, results reveal that the overall score of DGAA ( $\bar{X}$  =44,29) of female students are significantly higher than the overall score of DGAA ( $\bar{X}$  =37,79) of male students ( $t_{(695)} = -10,08, p < 0,05$ ). It is safe to say female students' internal, external, and total awarenesses of digital game addiction are higher compared with male students.

On the other hand, considering the scores obtained from the Motivation Scale for Participation in Physical Activity and its` sub dimensions, Motivation to Participate in Physical Activity among secondary school students does not differ according to gender.

***Do secondary school students' awareness of digital game addiction participation motivation to physical activity differ according to age groups?***

**Table 5. One-Way Anova Results of the Difference Between Digital Game Addiction Awareness and Motivations for Participation in Physical Activity of Secondary School Students by Age Groups**

	Age**	N	$\bar{X}$	S	Total Sum of Squares	Mean Rank	F (694/2)	p	Post Hoc (LSD)
Internal Awareness	Adolescence	77	16,99	4,80	50,49	25,243 20,334	1,241	,290	--
	Middle Adolescence	593	16,32	4,49	14112,13				
	Late Adolescence	27	15,52	4,14	14162,61				
External Awareness	Adolescence	77	25,21	5,21	52,40	26,198 25,943	1,010	,365	--
	Middle Adolescence	593	25,79	5,10	18004,16				
	Late Adolescence	27	24,67	4,47	18056,56				
Digital Game Addiction Awareness	Adolescence	77	42,19	8,91	97,59	48,797 75,058	,650	,522	--
	Middle Adolescence	593	42,11	8,67	52090,03				
	Late Adolescence	27	40,19	7,71	52187,62				
Individual Reasons	Adolescence	77	23,79	3,34	113,71	56,86 11,40	4,987	,007*	B>C
	Middle Adolescence	593	24,31	3,43	7911,58				
	Late Adolescence	27	22,33	2,15	8025,29				
Environmental Reasons	Adolescence	77	20,23	3,91	105,32	52,66 14,90	3,535	,030*	B>C
	Middle Adolescence	593	21,04	3,88	10337,50				
	Late Adolescence	27	19,41	3,08	10442,82				
Arbitrariness	Adolescence	77	14,99	2,83	64,70	32,35 7,33	4,415	,012*	B>C
	Middle Adolescence	593	15,58	2,71	5084,62				
	Late Adolescence	27	14,26	2,35	5149,32				
Participation Motivation to Physical Activity	Adolescence	77	59,01	7,73	824,94	412,47 57,91	7,123	,001*	B>A B>C
	Middle Adolescence	593	60,93	7,70	40186,87				
	Late Adolescence	27	56,00	4,56	41011,81				

\*p<,05

\*\* A: Adolescence: 14; B: Middle Adolescence: 15-17 C: Late Adolescence: 18-19

Table 5 shows that there is no significant difference between IA scores of students according to their age groups ( $f_{(694/2)}=1,241$ ,  $p=,290>,05$ ) in the Inner Awareness sub-dimension of DGAAS. Similarly, there is no significant difference between the external awareness of the students according to age groups ( $f_{(694/2)}=1,010$ ,  $p=,365>,05$ ) in the External Awareness sub-dimension of DGAAS. Moreover, the total scores of students' awareness of digital game addiction do not differ significantly according to age groups ( $f_{(694/2)}=,650$ ,  $p=,522>,05$ ). Consequently, secondary school students' awareness of digital game addiction does not differ according to age groups including its two sub-dimensions (internal and external awareness).

Compared to digital game addiction awareness scores, participation motivation to physical activity scores differ significantly according to age groups. There is a significant difference between the motivation scores of the students according to their age groups in the Individual Reasons sub-dimension of PMPA ( $f_{(694/2)}=4,987$ ,  $p=,007<,05$ ). According to the result of the detailed analysis (LSD test); it has been determined that individual reasons motivation scores of students who are in middle adolescence ( $\bar{X}=24,31$ ) were higher than the students who are in late adolescence ( $\bar{X}=22,33$ ). Similarly, there is a significant difference between the motivation scores of students according to age groups in the Environmental Reasons. Similarly, there is a significant difference between the motivation scores of students according to age groups in the Environmental Reasons. According to the result of the detailed analysis (LSD test); it was found that the motivation scores of middle-adolescent students due to environmental reasons ( $\bar{X}=21,04$ ) was higher than the students who are in late adolescence ( $\bar{X}=19,41$ )

Finally, there is a significant difference between the motivation scores of the students according to the age groups in the Arbitrariness sub-dimension ( $f_{(694/2)}=4,415$ ,  $p=.012<,05$ ). Detailed analysis (LSD test) results shows that the students in the middle adolescence period have higher motivation scores ( $\bar{X}=15,58$ ) than the students in the late adolescence period ( $\bar{X}=14,26$ ). There is a significant difference between the total score of PMPA according to age groups ( $f_{(694/2)}=7,123$ ,  $p=.001<,05$ ). The result of the detailed analysis (LSD test) shows that the students in middle adolescence have higher PMPA scores ( $\bar{X}=60,93$ ) than both students in early adolescence ( $\bar{X}=59,01$ ) and late adolescence ( $\bar{X}=56,00$ ). In sum, it is observed that secondary school students' scores of PMPA differ significantly according to age groups, including all sub-dimensions.

***Do secondary school students digital game addiction awareness and participation motivation to physical activity differ according to their mother's educational status?***

**Table 6. One-Way Anova Results of the Difference Between Digital Game Addiction Awareness and Participation Motivation to Physical Activity of Secondary School Students by Educational Level of Mother**

	Mother Educational Status	N	$\bar{X}$	S	Total Sum of Squares	Mean Rank	F (694/2)	p
Internal Awareness	Primary School	306	16,42	4,19	2,99			
	Secondary School	267	16,28	4,76	14159,62	1,495	,073	,929
	Higher Education	124	16,40	4,76	14162,61	20,403		
External Awareness	Primary School	306	25,76	5,04	43,16			
	Secondary School	267	25,40	5,07	18013,40	21,581	,831	,436
	Higher Education	124	26,09	5,27	18056,56	25,956		
DGAA	Primary School	306	42,18	8,39	65,58			
	Secondary School	267	41,68	8,77	52122,05	32,787	,437	,646
	Higher Education	124	42,49	9,11	52187,62	75,104		
Individual Reasons	Primary School	306	24,08	3,40	5,25			
	Secondary School	267	24,25	3,29	8020,05	2,624	,227	,797
	Higher Education	124	24,26	3,62	8025,29	11,556		
Environmental Reasons	Primary School	306	21,01	3,67	34,30			
	Secondary School	267	20,96	3,93	10408,52	17,150	1,143	,319
	Higher Education	124	20,41	4,26	10442,82	14,998		
Arbitrariness	Primary School	306	15,25	2,61	27,12			
	Secondary School	267	15,58	2,79	5122,20	13,561	1,837	,160
	Higher Education	124	15,73	2,81	5149,32	7,381		
PMPA	Primary School	306	60,34	7,51	31,65			
	Secondary School	267	60,79	7,74	40980,16	15,824	,268	,765
	Higher Education	124	60,40	7,98	41011,81	59,049		

A: Primary School (1-8), B: Secondary School(9-12), C: Higher Education (Bachelor or above)

Table 6 indicate that there is no significant difference between neither the internal awareness ( $f_{(694/2)}=.073$ ,  $p=.929>,05$ ) nor external awareness scores ( $f_{(694/2)}=.831$ ,  $p=.436>,05$ ) of digital game addiction and the educational level of mothers of students. Moreover, There is no significant difference between educational level of mothers of students and the total awareness scores of game addiction ( $f_{(694/2)}=.437$ ,  $p=.646>,05$ ). Consequently, it can be claimed that the relationship between the educational level of mothers of students and internal awareness, external awareness and digital game addiction awareness are trivial.

Similarly table 6 demonstrate that there is no significant relationship between neither individual reasons ( $f_{(694/2)}=.227$ ,  $p=.797>,05$ ) nor environmental reasons ( $f_{(694/2)}=1,143$ ,  $p=.319>,05$ )

nor Arbitrariness sub-dimensions of PMPA ( $f_{(694/2)}=1,837$ ,  $p=,160>,05$ ) and the educational level of mothers of students. According to the findings, there is no significant difference between the educational level of mothers of secondary school students and their participation motivation to physical activity as well as all sub-dimensions.

***Do secondary school students digital game addiction awareness and participation motivation to physical activity differ according to their fathers` educational status?***

**Table 7. One-Way Anova Results of the Difference Between Digital Game Addiction Awareness and Participation Motivation to Physical Activity of Secondary School Students by Educational Level of Fater**

	Father Educational Status	N	$\bar{X}$	S	Total Sum of Squares	Mean Rank	F (694/2)	p	Post Hoc (LSD)
Internal Awareness	Primary School	239	16,84	3,93	113,17	56,582	2,795	,062	--
	Secondary School	284	16,31	4,75	14049,45	20,244			
	Higher Education	174	15,78	4,81	14162,61				
External Awareness	Primary School	239	26,16	4,80	158,66	79,329	3,076	,047*	A>C
	Secondary School	284	25,76	5,34	17897,90	25,789			
	Higher Education	174	24,91	5,00	18056,56				
DGAA	Primary School	239	43,00	7,84	533,18	266,589	3,582	,028*	A>C
	Secondary School	284	42,07	9,13	51654,44	74,430			
	Higher Education	174	40,70	8,81	52187,62				
Individual Reasons	Primary School	239	24,32	3,20	8,75	4,374	,379	,685	--
	Secondary School	284	24,06	3,46	8016,55	11,551			
	Higher Education	174	24,16	3,56	8025,59				
Environmental Reasons	Primary School	239	21,07	3,71	24,68	12,341	,822	,440	--
	Secondary School	284	20,92	3,84	10418,14	15,012			
	Higher Education	174	20,58	4,14	10442,82				
Arbitrariness	Primary School	239	15,23	2,56	30,49	15,242	2,067	,127	--
	Secondary School	284	15,47	2,75	5118,83	7,376			
	Higher Education	174	15,78	2,87	5149,32				
PMPA	Primary School	239	60,62	7,33	3,70	1,851	,031	,969	--
	Secondary School	284	60,45	7,90	41008,11	59,089			
	Higher Education	174	60,52	7,81	41011,81				

\* $p<,05$

A: Primary School (1-8), B: Secondary School(9-12), C: Higher Education (Bachelor or above)

According to table 7; although the relationship between the internal awareness of DGAA ( $f_{(694/2)}=2,795$ ,  $p=,062>,05$ ) and the educational level of fathers of students was non significant, there is significant relationship between the external awareness of DGAA( $f_{(694/2)}=3,076$ ,  $p=,047<,05$ ) and the educational level of students` fathers. In this context, the detailed analysis revealed (LSD test) that the external awareness scores of the students whose fathers are primary school graduates ( $\bar{X} =26,16$ ) are higher than whose fathers are higher education( $\bar{X} =24,91$ ).

There is a significant relationship between the students' total scores of DGAA and educational levels of students` fathers. According to the detailed analysis results (LSD test), DGAA scores of the students whose fathers are primary school graduates ( $\bar{X} =43,00$ ) are higher than whose fathers are higher education ( $\bar{X} =40,70$ ). Consequently, it is safe to say that although secondary school students' internal awareness of digital game addiction does not differ according to their father's education level, the relationship between their father's education level and both external awareness and total awareness is significant.

On the other hand, table 7 present that there is no significant relationship between neither individual reasons ( $f_{(694/2)}=,379$ ,  $p=,685>,05$ ) nor environmental reasons ( $f_{(694/2)}=,822$ ,  $p=,440>,05$ ) nor Arbitrariness sub-dimensions of PMPA ( $f_{(694/2)}=2,067$ ,  $p=,127>,05$ ) and the educational level of students` fathers. Moreover, there is no significant relationship between the total score of PMPA and

educational level of students' fathers ( $f_{(694/2)}=,031$ ,  $p=,969>,05$ ). The findings show that there is no significant relationship between secondary school students' PMPA scores as well as its' sub-dimensions and their father's educational level.

***Do secondary school students' digital game addiction awareness and their participation motivation to physical activity differ according to their daily use of technology?***

**Tablo 8. One-Way Anova Results of the school students' digital game addiction awareness and their participation motivation to physical activity differ according to their daily use of technology?**

	Daily Use of Technology	N	$\bar{X}$	S	t	sd	p
Internal Awareness	4 hours and below	246	17,48	4,07	4,938	695	,000*
	Over 4 hours	451	15,75	4,62			
External Awareness	4 hours and below	246	27,23	4,46	6,074	695	,000*
	Over 4 hours	451	24,84	5,22			
DGAA	4 hours and below	246	44,72	7,65	6,173	695	,000*
	Over 4 hours	451	40,59	8,84			
Individual Reasons	4 hours and below	246	24,72	2,96	3,138	695	,002*
	Over 4 hours	451	23,88	3,58			
Environmental Reasons	4 hours and below	246	20,92	3,90	,189	695	,850
	Over 4 hours	451	20,86	3,86			
Arbitrariness	4 hours and below	246	15,57	2,38	,787	695	,432
	Over 4 hours	451	15,40	2,89			
PMPA	4 hours and below	246	61,22	6,84	1,756	695	,080
	Over 4 hours	451	60,15	8,08			

\* $p<,05$

Table 8 shows that there is a significant difference between internal awareness scores of students who use technology for 4 hours or below ( $\bar{X} =17,48$ ) and students who use technology more than 4 hours ( $\bar{X} =15,75$ ) in favor of students who use technology for 4 hours or below ( $t_{(695)}= 4,938$ ,  $p=,00<,05$ ). Similarly, it is found that external awareness scores of students who use technology for 4 hours or below ( $\bar{X} =27,23$ ) are significantly more than students who use technology 4 hours over ( $\bar{X} =24,84$ ) ( $t_{(695)}= 6,074$ ,  $p=,00<,05$ ). Lastly, there is a significant difference between the total score of DGAA of students' technology use 4 hours or below ( $\bar{X} =44,72$ ) and students who use technology more than 4 hours ( $\bar{X} =40,59$ ) in favor of students who use technology for 4 hours or below ( $t_{(695)}= 6,173$ ,  $p=,00<,05$ ). In sum, students whose daily technology use is 4 hours or less have higher internal awareness, external awareness and total awareness of digital game addiction compared to those use technology more than 4 hours in a day.

When the results obtained from the Scale of Participation Motivations to Physical Activity(PMPA) are examined, PMPA differed significantly in favor of students who use technology for 4 hours or below ( $\bar{X} =24,72$ ,  $\bar{X} =23,88$ ) in a day in the Individual Reasons sub-dimension ( $t_{(695)}= 3,138$ ,  $p=,002<,05$ ) , however, there was no significant difference between students who use technology for 4 hours or below ( $\bar{X} =20,92$ ) and those whose daily technology use is more than 4 hours ( $\bar{X} =20,86$ ) in the Environmental Reasons sub-dimension ( $t_{(695)}=,189$ ,  $p=,850>,05$ ), in Arbitrariness sub-dimension ( $t_{(695)}=,787$ ,  $p=,432>,05$ ) as well as in total score of PMPA ( $t_{(695)}=1,756$ ,  $p=,080>,05$ ). These results demonstrate that students' PMPA did not differ according to their daily technology use, except Individual Reasons.

***Do secondary school students' digital game addiction awareness and their participation motivation to physical activity differ according to regular physical activity status?***

**Tablo 9. One-Way Anova Results of the secondary school students' digital game addiction awareness and their participation motivation to physical activity differ according to regular physical activity status?**

	Regular Physical Activity Status	N	$\bar{X}$	S	t	sd	p																																																																				
Internal Awareness	Yes	361	16,58	4,46	1,328	695	,185																																																																				
	No	336	16,13	4,56				External Awareness	Yes	361	25,92	4,85	1,265	695	,206	No	336	25,43	5,34	DGAA	Yes	361	42,50	8,36	1,436	695	,151	No	336	41,56	8,95	Individual Reasons	Yes	361	24,80	3,25	5,073	695	,000*	No	336	23,51	3,42	Environmental Reasons	Yes	361	21,12	3,87	1,635	695	,103	No	336	20,64	3,87	Arbitrariness	Yes	361	15,91	2,67	4,512	695	,000*	No	336	14,99	2,69	PMPA	Yes	361	61,82	7,46	4,675	695	,000*
External Awareness	Yes	361	25,92	4,85	1,265	695	,206																																																																				
	No	336	25,43	5,34				DGAA	Yes	361	42,50	8,36	1,436	695	,151	No	336	41,56	8,95	Individual Reasons	Yes	361	24,80	3,25	5,073	695	,000*	No	336	23,51	3,42	Environmental Reasons	Yes	361	21,12	3,87	1,635	695	,103	No	336	20,64	3,87	Arbitrariness	Yes	361	15,91	2,67	4,512	695	,000*	No	336	14,99	2,69	PMPA	Yes	361	61,82	7,46	4,675	695	,000*	No	336	59,14	7,67								
DGAA	Yes	361	42,50	8,36	1,436	695	,151																																																																				
	No	336	41,56	8,95				Individual Reasons	Yes	361	24,80	3,25	5,073	695	,000*	No	336	23,51	3,42	Environmental Reasons	Yes	361	21,12	3,87	1,635	695	,103	No	336	20,64	3,87	Arbitrariness	Yes	361	15,91	2,67	4,512	695	,000*	No	336	14,99	2,69	PMPA	Yes	361	61,82	7,46	4,675	695	,000*	No	336	59,14	7,67																				
Individual Reasons	Yes	361	24,80	3,25	5,073	695	,000*																																																																				
	No	336	23,51	3,42				Environmental Reasons	Yes	361	21,12	3,87	1,635	695	,103	No	336	20,64	3,87	Arbitrariness	Yes	361	15,91	2,67	4,512	695	,000*	No	336	14,99	2,69	PMPA	Yes	361	61,82	7,46	4,675	695	,000*	No	336	59,14	7,67																																
Environmental Reasons	Yes	361	21,12	3,87	1,635	695	,103																																																																				
	No	336	20,64	3,87				Arbitrariness	Yes	361	15,91	2,67	4,512	695	,000*	No	336	14,99	2,69	PMPA	Yes	361	61,82	7,46	4,675	695	,000*	No	336	59,14	7,67																																												
Arbitrariness	Yes	361	15,91	2,67	4,512	695	,000*																																																																				
	No	336	14,99	2,69				PMPA	Yes	361	61,82	7,46	4,675	695	,000*	No	336	59,14	7,67																																																								
PMPA	Yes	361	61,82	7,46	4,675	695	,000*																																																																				
	No	336	59,14	7,67																																																																							

\*p<,05

Table 9 shows that there is no significant relationship between Regular Physical Activity Status and neither internal awareness ( $t_{(695)}=1,328$ ,  $p=,185>,05$ ) nor external awareness ( $t_{(695)}=1,265$ ,  $p=,206>,05$ ) of secondary school students. In total, it is not found any relationship between Regular Physical Activity Status and Digital Game Addiction Awareness(DGAA) scores ( $t_{(695)}=1,436$ ,  $p=,151>,05$ ). Briefly, these results demonstrate that secondary school students' DGAA scores as well as its sub-dimensions did not differ according to their Regular Physical Activity Status.

On the other hand, as expected, Table 9 reveal that there is a significant difference between individual scores of students who do regular physical activity ( $\bar{X}=24,80$ ) and students who do not ( $\bar{X}=23,51$ ) in favor of students who do regular physical activity ( $t_{(695)}= 5,073$ ,  $p=,000<,05$ ) according to individual reasons. Similarly, according to Arbitrariness sub-dimension, there is a significant difference between individual scores of students who do regular physical activity ( $\bar{X}=15,91$ ) and students who do not ( $\bar{X}=14,99$ ) in favor of students who do regular physical activity ( $t_{(695)}= 4,512$ ,  $p=,000<,05$ ). However, interestingly, the relationship between environmental reasons and Regular Physical Activity Status was insignificant ( $t_{(695)}=1,635$ ,  $p=,103>,05$ ). Finally, when the total scores obtained from the Participation Motivation to Physical Activity were examined, there is a significant difference between individual scores of students who do regular physical activity ( $\bar{X}=61,82$ ) and students who do not ( $\bar{X}=59,14$ ) in favor of students who do regular physical activity ( $t_{(695)}= 4,675$ ,  $p=,000<,05$ ). Consequently, Participation Motivation to Physical Activity of secondary school students differs significantly according to their Regular Physical Activity Status except in Environmental Reasons.

***Is there a relationship between secondary school students' Digital Game Addiction Awareness(DGAA) and Participation Motivation to Physical Activity(PMPA)?***

**Tablo 10. Pearson Correlation Analysis Results on the Relationship between secondary school students' Digital Game Addiction Awareness(DGAA) and Participation Motivation to Physical Activity(PMPA)**

	Participation Motivation to Physical Activity	
	r	p
Digital Game Addiction Awareness	,295	,000*

\*p<,05

Pearson Correlation Analysis is employed to observe whether there is a significant relationship between secondary school students' Digital Game Addiction Awareness(DGAA) and Participation Motivation to Physical Activity(PMPA). As seen in table 10, there is a significant positive relationship between to two scale scores ( $r=,295$ ;  $p=,000<,05$ ). Notwithstanding, the correlation coefficient results show that this relationship is weak since the coefficient is between 0.20 and 0.39 (Taşpınar, 2017, s. 194).

## DISCUSSION AND CONCLUSION

Accumulated research point out the development of a behavioral addiction due to excessive internet use (Kuss and Griffiths, 2012). Literature also clearly demonstrate that digital game addiction lead to adverse mental health problems in adolescents (Purwaningsih and Nurmala, 2021). However, most studies that seek to ascertain digital game addiction focus on male samples (Männikkö et al., 2020). This is why it is assumed that male students are more under the game addiction risk because they spend more of their free time on digital games such as e-sports. Therefore, both female and male students are included in this study in order to observe whether game addictions is gendered because Do and Hong claim that gender is the one of the variables affecting addiction (2020)

Gürel (2021) found that secondary School students' motivation to play digital games and their motivation to participate in physical activity were higher among male students compared to female. Similarly, Godinho et al. (2014) and Can ve Tekkurşun-Demir (2020) found that the digital game addiction scores of male were higher than female e-sports players. This study results shows that digital games addiction awareness among male students was higher compared with female students. Notwithstanding, given the number of females who play digital games is regularly increasing, that is 45% of US in 2018, up from 38% in 206 (Statistica, 2017) as females engage in digital games more, it can be advocated that digital game addiction awareness among females will proliferate.

There is a scarcity on studies that address the impact of digital addiction on physical activity (Aziz et al., 2021). It is basically hypothesized that the more play electronic games the more physical inactivity (e.g. Alshehri and Mohamed, 2019). On the other hand, there is consensus on females are consistently less active compared to males at all ages. Consequently, it can be claimed that participation motivation to physical activity(PMPA) among females should be less than males. According to Egli et al.(2011), while internal factors (individual reasons) have more impact on male students, external factors(environmental reasons) play more role on female students. However, this study results show that there was no statistically significant difference between male and females secondary school students in terms of PMPA as well as its` sub-dimensions.

When the secondary school students` digital game addiction awareness is examined according to the age group variable, it was found that there was no statistically significant difference in terms of the scores they got from all scales and each sub-dimensions. However, the relationship between age and all sub-dimensions of participation motivation to physical activity differentiated in favour of middle adolescence compared with late adolescence. In addition, the it is observed that the participation motivation of middle adolescence students is higher than early and late adolescence students according to all PMPA scale total score. These results can be speculated due to the fact that middle adolescence students may be willing to participate in more physical activities during the transition period, they enjoy participating in activities with their friends and have a high motivation to have a good time. Moreover, As students approach the end of adolescence, it may become more

common for students to withdraw into their own inner worlds due to the predominance of egocentrism. Can and Tekkurşun Demir (2020) found a positive moderate relationship between the age of the athletes and their digital game addiction scores, and a moderately significant negative relationship between digital game awareness and age. On the contrary, It has been determined by Gurel(2021) that has no relationship between age and students' motivation to play digital games and motivation to participate in physical activity. According to relevant literature, our study shows parallelism with other studies, however, different results can be due to the fact that they were applied to different sample groups.

It is seen that there is no statistically significant difference between to the mother's education level variable and neither digital game addiction awareness nor participation motivation to physical activity terms of the scores they get from the scale and its sub-dimensions. Gurel(2021) found that students whose mothers hold a bachelor's degree had higher scores than students whose mothers were primary school graduates in the success and revival sub-factor of the digital game motivation scale. It was found that the students whose mothers hold a bachelor's degree were scored higher than those whose mothers were primary and secondary school graduates in terms of participation motivation to physical activity (ibid). It was found that the students whose mothers hold a bachelor's degree were scored higher than those whose mothers were primary school graduates in terms of individual reasons sub-dimension (Gurel, 2021). The study of Çakıcı (2018) on the relationship between digital game addiction and anger expression styles in adolescents found that the students whose mothers were primary school graduates and hold a bachelor degree were scored higher than those whose mothers graduated from secondary school in terms of digital game addiction. Given that literature has a contradictory results, the reason for this can be explained by the fact that it was applied in different sample groups, different geopolitical environments and different times.

Armour and Jones (1998) found that the more individuals are influenced by the family for sport and/or physical activity the individual is more enthusiastic to participate. It can be claimed that as the education level of parents is enhanced, parents should be more supportive in order to encourage their children to participate in physical activity because its` utilities which is widely known such as health, socialization. However, this study results show that there was no statistically relationship between fathers` education status and participation motivation to physical activity. Gürel (2021) found that students whose fathers hold a bachelor degree were scored higher than students whose fathers are primary school graduates in terms of individual reasons sub-dimensions

Gurel`s (2021) study also show that although there is no difference between students in the internal awareness sub-dimension of the digital game addiction scale in terms of fathers` education status, it has been observed that he students whose fathers are Primary School graduates, and those whose fathers hold a bachelor degree were scored higher than students whose fathers graduated from secondary schools in terms of external awareness and total score of all scale. On the other hand, Çakıcı (2018) found that there was no significant difference in the relationship between digital game addiction and anger expression patterns in adolescents in terms of father education level variable. According to relevant literature, our study shows parallelism with other studies. In this context, it is safe to claim that our study support other studies conducted in this field.

According to Digital2020: Turkey report (DataReportal – Global Digital Insights", 2021); while total population increased only %1.2(almost 1 million) in between January 2019 and January 2020internet use increased %4 (2.4 million), mobile phone connection increase %3.4 (2.6 million), active social media users increased %4.2(2.2 million). Predictably, this is a consequence of increase in the volume of people who reaching puberty and gaining independence to use technology. It can inherently be expected that the increase in daily use of technology may lead to go up digital game addiction and a decline in physical activity. When the awareness of secondary school students about digital game addiction is examined according to the daily technology use variable, it is seen that the students who use technology for 4 hours or less have higher scores on internal awareness, external awareness, and the total score of the scale than students who use technology for more than 4 hours. Similarly, when the participation motivation to physical activity of secondary school students to

participate in physical activity is examined according to the daily technology use variable, it is seen that the students who use technology for 4 hours or less in the individual reasons sub-factor of the PMPA scale were scored than students who use technology for more than 4 hours. However, it was observed that there was no statistically significant difference in the scores obtained from the environmental reasons and arbitrariness sub-dimensions as well as the whole scale. This might be derived from that students' exposure to more technology has a negative effect on their digital awareness and participation motivation to physical activity due to reasons such as seeking self-fulfillment in digital games and seeking to do activities that they cannot perform in real life.

Gürel (2021) found that students who play digital games for 1 hour a day have higher participation motivation to physical activity than students who play digital games for 1-2 hours and more than 2 hours in a day. In the study of digital game addiction and awareness of athletes and e-sports players, Can and Tekkurşun Demir (2020) determined that there is a statistically significant difference in the playing time of the athletes who play daily digital games (as their digital game time increases, their addiction increases but awareness decreases). In the study of the relationship between internet addiction and healthy lifestyle behaviors of secondary school students, Altun Kürek and Özçoban (2020), found that there is a statistically significant difference between students' average daily internet use and goals when they are not studying.

When the awareness of secondary school students about digital game addiction was examined according to the variable of regular physical activity, it was seen that there was no statistically significant difference in terms of the scores they got from the scale and its sub-dimensions. When secondary school students to participation motivation to physical activity are examined according to the variable of doing regular physical activity, it is seen that the physical activity participation motivation scores of the students who do regular physical activity are higher than students who do not do regular physical activity in the individual reasons sub-dimension. However, the relationship between environmental reasons and participation motivation to physical activity was trivial. On the other hand, it was seen that the students who do not do regular physical activity have higher scores participation motivation to physical activity than the students who do regular physical activity in the arbitrariness sub-dimensions and the whole scale.

Although psychological variables vary according to causal factors for physical activity participation, what exactly determines participation motivation to physical activity is rarely known (Roychowdhury, 2018). Gürel found that the students who participate in physical activity for a maximum of 60 minutes a day have higher scores than the students who participate in physical activity for 1-2 hours and more than 2 hours in the sub-dimension of the motivation to play digital game scale. Erbaş and Gümüş (2020) determined that there is a statistically significant positive correlation between students' social media addiction and individual reasons in participation motivation to physical activity. Marufoğlu (2020) found no statistical difference in the effect of digital game addiction on physical activity and sleep habits in secondary school students. In our study, it was determined that there is a positive and significant relationship between the digital game addiction awareness of secondary school students and their participation motivation to physical activity. This can be interpreted as that the more students' awareness of digital game addiction increases, the more their participation motivation in physical activity also increases. It should be noted that this study was conducted in a short time period and by collecting data once. Therefore, it is further needed to conduct longitudinal and/or long-term studies that can reveal the effects of the independent variables in the research on the awareness of digital game addiction and participation motivation to physical activity, and correlation between two variables.

## RECOMMENDATIONS

1. In this study, a research was conducted for secondary school students, the study can also be done with students studying at university, master's and doctorate.

2. Quantitative research model was used in this study, the same study can be done by using qualitative research model, so that the study can be investigated more comprehensively.

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