

## Investigation of the Relationship Between Digital Game Addiction Levels and Math Exam Anxiety of Middle School Students

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The aim of this study is to determine the the relationship between the digital game addiction levels of middle school students and their math test anxiety as well as to esablish whether their math test anxiety and digital game addiction levels differ according to various variables. The research has been carried out with the descriptive study model. The sample of the study consists of 276 5th-8th grade students in the 2020-2021 academic year. The digital game addiction scale and the mathematics test anxiety scale was used for data gathering. The scores obtained within this framework have been analyzed using descriptive statistic, t and Pearson r correlation analyses. As a result of the research, we have reached that students' digital game addictions are at a low level and are in the low-risk group, and students sometimes experience math test anxiety. Examining the anxiety sub-factors revealed that while tension is more prevalent among students, test anxiety, effectiveness, and illusion are occasionally experienced by them. While the digital game addiction levels of the boys were higher than the girls, it was seen that there was no difference between the genders in terms of math test anxiety, but the tension dimension was higher in girls. There is a weak positive relationship between digital game addiction and math test anxiety ( $r=0.272$ ).

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## Introduction

Games are activities that have a variety for every age period and serve to entertain people. People are continually entangled with games starting at a young age. Play is the activities that people perform throughout their lives (Öncü & Özbay, 2005). As time progresses, they see, learn and play very different types of games according to their age level and the environment they live in. Games are competitive activities with a specific place and specific rules and to achieve some goals and purposes (Gökçearsan & Durakoğlu, 2014). They learn friendship relations, being honest, respecting their friends, establishing different kinds of friendship, division of labor and helping each other (Köksal, 2015).

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People have had to adapt and modernize themselves in many areas of their lives nowadays as a result of technological advancements in sectors like education, health, communication, computers, etc. Technological developments in many areas have also changed the concept of game, which is a part of life. People have made imaginary digital games with the software they have developed by imitating and imitating the natural games they play or natural events. Thus, the concept of game has gained a different dimension with the developing technology.

Akçay and Özcebe (2012) concluded in a study that children are influenced by their parents, children of parents who play computer games are also more inclined to games, and children of parents who do sports and read books are less inclined. Although technology makes human life easier, addiction is in question because it keeps people away for a long time. One of the situations that today's people experience with the development and spread of technology is digital game addiction (Hazar and Hazar, 2017).

Action, simulation, adventure, sports, fighting, strategy, role-playing, and educational games are all included in digital games (Gros, 2007). On the other hand educational games that are used in the educational environment and that provide learning and reinforcement of the subject and achievement to be taught in the lesson; it helps students learn more with fun and permanently (Akandere, 2013). Primary and secondary school children have a high desire and motivation to play. Playing games is a basic need, as well as a necessity for their physical, mental, social, psychomotor and educational development (Karamustafaoğlu & Kaya, 2017). The need to play games seen in students in this period and digital games that are increasing rapidly today can turn into digital game addiction for children if they are not controlled. Yet, when students use digital games as a supplement to their lectures, they will not only enjoy themselves but also develop into a valuable tool that aids in long-term learning. Educational games provide a competitive environment, can be played repeatedly at any time, are visual and applicable, and not only are they enjoyable for the students who play them, but they also have a positive impact on the students' interest in and attitudes toward the course as well as their progress according to their level (Yıldız, Ağgöl, Çalıklı and Simsek, 2020). The number of instructional gaming applications is growing daily, just as the diversity of digital games is. Educational applications in science, social sciences, mathematics, painting, music and many other fields provide convenience for learning. One of the most needed basic courses in these games is mathematics. Mathematics lesson is one of the most important lessons that shape our lives with the exams we take in every field of our life, in daily life or in education life. The fact that mathematics is an abstract course makes it difficult for students to understand and learn these concepts. For this reason, learning activities that the student will actively do by using educational game materials to embody learning will provide permanent learning (Yıldırım & Can, 2017). Mathematics comes from the ancient Greek word *matisis*, meaning I know, and has a very important place among the sciences. Since ancient cultures, mathematics has always preserved its importance and people have done the right things with mathematical analytical thinking and used mathematical knowledge in many areas (Yetgin, 2017).

For students, the mathematics course has a sifting and weeding out impact in order for them to perform well on their tests. Several tests include mathematical questions. Some students enjoy the lecture, while others dislike it, and some even experience exam anxiety. (Yetgin, 2017). Therefore, anxiety is one of the most important problems used together with mathematics. The learners' dread of maths and their fear of failing contribute to this anxiety since they are afraid of not being able to complete the math lesson. (Baloğlu & Koçak, 2006). In this context, the study was conducted to determine how digital game addiction affected math anxiety.

## **Research Question**

Is there a correlation between the digital game addiction levels of middle school students and their math test anxiety?

1. What are the digital game addiction levels of secondary school students?
2. What are the secondary school students' math test anxiety?
3. Does the level of addiction to digital games vary by gender, grade level, daily playtime, and parental education level?
4. Does exam anxiety for mathematics vary by gender, grade level, amount of daily play, and parental education level?
5. What is the relationship between digital game addiction and math test anxiety?

## **Method**

In order to assess middle school students' degrees of digital game addiction and their math test anxiety, a descriptive study model from quantitative research was chosen for the study. In the relational survey model, a situation that used to be or still continues is described and the possible results are estimated by examining the change and relationship between the variables (Karasar, 2017).

### ***Study Group***

The working group of this research consists of 276 students, including 140 girls and 136 boys, who were in the 5th to 8th grade in the 2020-2021. Convenient sampling method was used in the study. The distribution of the students participating in the research according to the classes is as follows; 21%(n=59) 5th grade students, 28%(n=76) 6th grade students, 32%(n=87) 7th grade students and 20%(n=54) 8th grade students.

### ***Data Collection Tools***

For this study's data collecting, three tools were used. Personal information form, math test anxiety scale and digital game addiction scale for children were used as data collection tools. A form was prepared to learn the students' grade level, gender, parental education level, family income level, tablet, computer, mobile phone, internet connection at home, and average daily playing time. The digital addiction scale for children was developed by Hazar and Hazar (2019) to classify addiction levels by applying it to students aged 10-14; It consists of 24 items and 4 sub-factors in five-point Likert type. These factors are; They are listed as "Excessive Focus and Conflict on Digital Gaming, Development of Tolerance During Playtime and Value Attributed to Play, Postponing Individual and Social Tasks/Homework, Psychological-Physiological Reflection of Deprivation, and Playing". Mathematics test anxiety scale, developed by Şan and Akdağ (2017) to determine secondary school students' math test anxiety levels, consists of 20 items and 3 sub-factors.

### ***Data Collection***

All information was gathered online from volunteers. Students filled out the forms on their own during the study, which was done during the pandemic period's emergency distance education.

### Analysis of Data

Data collected from 276 students were analyzed with SPSS 22nd Package program. In the analysis of quantitative data, descriptive statistics such as frequency, arithmetic mean, percentage, standard deviation of the data were used. In order to understand the distribution of our research, normality tests were performed according to the scale and factor averages and are summarized in Table 1.

**Tablo 1.** Normality test of dependent variables used in the study

Kolmogorov-Smirnov <sup>a</sup>					
	Frequency	N	p	Distortion	Kurtosis
Mathematics Test Anxiety	0.062	276	0.012	0.345	-0.346
F1: Delusion	0.14	276	0	1,003	0.436
F2: Sensuality	0.077	276	0	0.24	-0.921
F3: Tension	0.13	276	0	-0.267	-1,068
Digital Game Addiction	0.151	276	0	1,473	1,973
F1: Extreme Focus	0.184	276	0	1.46	1,682
F2: Tolerance Game Loaded Value	0.124	276	0	0.874	0.061
F3: Individual Task and Homework Postponement	0.223	276	0	1,668	2,393
F4: Psychological Reflection and Immersion	0.215	276	0	1,583	2,181

Digital game addiction, math test anxiety and normality status of the factors of the scales were examined with Kolmogorov-Smirnov test as  $N > 50$ . Since  $p < 0.05$  did not provide a normal distribution, skewness and kurtosis values were checked. Since these values for the mathematics test anxiety scale and its sub-factors ranged from -1.5 to +1.5, the results of our mathematics test anxiety scale were accepted as normal distribution and it was decided to perform parametric analyzes.

Since this value was not between -1.5 and +1.5 in the results of our digital game addiction scale and its sub-factors, excessive focus, individual task and homework delay, psychological reflection and immersion, it was accepted that the results of our digital addiction scale were not normally distributed and it was appropriate to conduct nonparametric analyzes (Tabachnick & Fidell, 2013).

### Findings

Prior to the study, a reliability analysis was performed on the data entered into the statistical package program.

**Table 2.** Reliability analysis of research data

	Cronbach's Alpha	Number of Items
Digital Game Addiction Scale Data	,955	24
Mathematics Test Anxiety Data	,916	20

\*p&lt;0,05

As seen in Table 2, as a result of the analysis of the answers, the Cronbach's Alpha value was calculated as 0.955 for digital game addiction data and 0.916 for math test anxiety data. Since these values are between 0.81 and 1, our scales are highly reliable (Kiliç, 2016).

**Table 3.** Percentage and frequencies of digital game addiction according to subgroups

		f	%
Digital The game Dependence Levels	Normal Group(1-24)	16	5.8
	Low Risk Group (25- 47)	162	58.7
	Risky Group (48-71)	66	23.9
	Dependent Group (72-95)	19	6.9
	Highly Dependent Group (96-120)	13	4.7
Total		276	100.0

According to Table 3, the Digital Game Addiction Scale is a 5-point Likert type consisting of 24 items and 4 sub-factors. The total score is a minimum of 24 and a maximum of 120 points. The scale is divided into 5 groups according to their score ranges. When Table 3 values are examined, 16 of the 276 students (5.8%) who participated in the study were in the normal group, 162 (58.7%) in the risk group, 66 (23.9%) in the risk group, and 19 (6.9%) in the dependent group. group and 13 people (4.7%) are in the highly dependent group. According to these data, the majority of the students in the sample (n=162) 58.7% are in the low-risk group for digital game addictions. The other question is "How are middle school students' digital game addiction and math test anxiety?" The descriptive results of the problem are summarized in Table 4.

**Table 4.** Arithmetic mean of dependent variables and factors

	N	$\bar{X}$	SS
Digital Game Addiction	276	1.90	,876
F1: Extreme Focus	276	1.83	,931
F2: Tolerance and Loaded Value	276	2.26	1.09
F3: Assignment Postponement	276	1.69	.90
F4: Reflection-Immersion	276	1.72	.91
Mathematics Test Anxiety	276	2.23	.66
F1: Delusion	276	1.86	.75

F2: Sensuality	276	2.29	.83
F3: Tension	276	2.76	.90

According to the data of Table 4, since the total score average of the answers given to the digital game addiction scale is  $\bar{X}=45.71$  and the average of these individuals out of 5 points is  $\bar{X}= 1.90$ , the digital game addiction of the majority of the students in the sample is not high, but at a low level. It can be said that the averages of the sub-factors are at very low levels as excessive focus  $\bar{X}=1.83$ , tolerance-loaded value factor  $\bar{X}=2.26$ , task-homework delay factor  $\bar{X}=1.69$  and reflection-indulgence factor  $\bar{X}=1.72$ . Considering the mathematics test anxiety data, as a result of the evaluation made out of 4, the total arithmetic mean  $\bar{X}=2.23$  sub-factor averages; Delusion factor mean  $\bar{X} =1.86$ , affective factor mean  $\bar{X}= 2.28$ , tension factor mean  $\bar{X}= 2.76$ . While math test anxiety, affectivity and delusion are sometimes experienced by students, tension is more common among students.

One of the sub-problems of our research is “Does the math test anxiety of secondary school students differ according to gender, grade level, daily playing time, education level of parents, and family income level?” The analysis and results of the problem are summarized below in order.

**Table 5.** T-test results of the differentiation of mathematics test anxiety by gender

	Gender	n	$\bar{X}$	SS	t	sd	p																																
Maths Test Anxiety	Girl	140	2.32	.63	2,284	274	0.23																																
	Male	136	2.14	.68				F1: Delusion	Girl	140	1.87	.75	0.222	274	0.824	Male	136	1.85	.76	F2: Sensuality	Girl	140	2.38	.78	2,041	274	0.42	Male	136	2.18	.86	F3: Tension	Girl	140	2.96	.85	3,885	274	0
F1: Delusion	Girl	140	1.87	.75	0.222	274	0.824																																
	Male	136	1.85	.76				F2: Sensuality	Girl	140	2.38	.78	2,041	274	0.42	Male	136	2.18	.86	F3: Tension	Girl	140	2.96	.85	3,885	274	0	Male	136	2.55	.90								
F2: Sensuality	Girl	140	2.38	.78	2,041	274	0.42																																
	Male	136	2.18	.86				F3: Tension	Girl	140	2.96	.85	3,885	274	0	Male	136	2.55	.90																				
F3: Tension	Girl	140	2.96	.85	3,885	274	0																																
	Male	136	2.55	.90																																			

According to the data in Table 5; When the mean of math test anxiety is examined, it is seen that the mean of girls ( $\bar{X}=2.32$ ) is higher than the mean of boys ( $\bar{X}=2.14$ ), but according to independent sample t-test results, this difference is not statistically significant ( $t(274)=2.284$ ;  $p>0.05$ ).

In the same table, when the mean of the sub-factors of the math test anxiety scale is examined, it is seen that the mean of the girls ( $\bar{X}=1.87$ ) is higher than the average of the boys ( $\bar{X}=1.85$ ) in the delusion factor, but according to the independent sample t-test results, this difference is not statistically significant ( $t(274) = 0.222$ ;  $p>0.05$ ). In the affectivity sub-factor; it is seen that the mean of girls ( $\bar{X}=2.38$ ) is higher than the mean of boys ( $\bar{X}=2.18$ ), but according to independent sample t-test results, this difference is not statistically significant ( $t(274)= 2.041$ ;  $p>0.05$ ). In the tension sub-factor; it is seen that the mean of girls ( $\bar{X}=2.96$ ) is higher than the mean of boys ( $\bar{X}=2.55$ ) and according to independent sample t-test results, this difference is statistically significant ( $t(274)= 3.885$ ;  $p<0.05$ ).

**Table 6.** The results of mathematics test anxiety and its sub-factors by grade level

	Grade Level	N	$\bar{X}$	SS
Maths Exam anxiety	5th grade	59	1.96	,54
	6th grade	76	2.23	,62
	7th grade	87	2.16	,59
	8th grade	54	2.62	,75
	total	276	2.23	,66
F1: Delusion	5th grade	59	1.79	,71
	6th grade	76	1.79	,65
	7th grade	87	1.74	,66
	8th grade	54	2.22	,95
	total	276	1.86	,75
F2: Sensuality	5th grade	59	1.86	,69
	6th grade	76	2.35	,81
	7th grade	87	2.22	,75
	8th grade	54	2.74	,86
	total	276	2.28	,83
F3: Tension	5th grade	59	2.47	,90
	6th grade	76	2.75	,90
	7th grade	87	2.77	,92
	8th grade	54	3.06	,74
	total	276	2.76	,89

According to the results of Table 6, there are differences between the averages. ANOVA test was performed to understand the significance of these differences.

**Table 7.** ANOVA test results of the differentiation of mathematics test anxiety and sub-factors according to grade levels

		Sum of Squares	sd	Average of Squares	F	p	Significant Difference
Mathematics Test Anxiety	between groups	13,205	3	4,402	11,141	,000	8 to 5-6-7
	within groups	107,461	272	,395			favor of 8
	Total	120,666	275				
F1: Delusion	between groups	8,935	3	2,978	5,495	,001	8 to 5-6-7
	within groups	147,426	272	,542			favor of 8
	Total	156,362	275				
F2: Sensuality	between groups	22,813	3	7,604	12,389	,000	8 to ( 5,6,7 ) in favor of 8
	within groups	166,959	272	,614			7 to 5 in favor of 7
	Total	189,772	275				6 to 5 in favor of 6
F3: Tension	between groups	9,859	3	3,286	4,204	,006	8 to 5 in favor of 8
	within groups	212,628	272	,782			
	Total	222,488	275				

According to Table 7, students' math test anxiety differed according to their grade levels and this difference was statistically significant ( $F(3,272)= 11,141$ ;  $p<0.05$ ). Considering the sub-factors, delusion ( $F(3,272)= 5.495$ ;  $p<0.05$ ), sensuality( $F(3,272)= 12.389$ ;  $p<0.05$ ) and tension( $F(3.272)= 4.204$ ;  $p<0.05$  ) there is a statistically significant difference. In order to

understand between which grade levels the difference was, the Tukey test, which is one of the post-hoc multiple comparison tests, was used since the group was homogeneous ( $p > 0.05$ ) according to the results of the levane statistics. Mathematics test anxiety in favor of 8th grade students according to Tukey test. Statistics show that math exam anxiety is statistically higher in eighth grade students than in other grades.

**Table 8.** Descriptive results of mathematics test anxiety and sub-factors according to average daily playing time

Average Play Time per Day		N	$\bar{X}$	SS
Maths Exam anxiety	zero hour(none)	22	1.93	.61
	1-2 hours	171	2.13	.62
	between 3-4 hours	55	2.49	.61
	4 hours or more	28	2.56	.75
	total	276	2.23	.66
F1: Delusion	zero hour(none)	22	1.51	.57
	1-2 hours	171	1.77	.72
	between 3-4 hours	55	2.12	.77
	4 hours or more	28	2.17	.80
	total	276	1.86	.75
F2: Sensuality	zero hour(none)	22	2.03	.77
	1-2 hours	171	2.14	.74
	between 3-4 hours	55	2.59	.85
	4 hours or more	28	2.74	1.00
	total	276	2.28	.83
F3: Tension	zero hour(none)	22	2.44	.88
	1-2 hours	171	2.73	.90
	between 3-4 hours	55	2.93	.89
	4 hours or more	28	2.84	.82
	total	276	2.76	.89

According to the results of Table 8, there are differences between the averages. ANOVA test was performed to understand the significance of these differences.

**Table 9.** ANOVA test results of differences in mean daily gaming time of mathematics test anxiety and its sub-factors

		Sum of Squares	sd	Mean Squares	F	p	Significant Difference
Mathematics Test Anxiety	<b>Between groups</b>	10,610	3	3,537	8,741	,000	3-4 hours and 4 hours with zero hours and 1-2 hours
	<b>Within groups</b>	110,056	272	,405			In favor of 3-4hours and above 4
	<b>Total</b>	120,666	275				
	<b>Between groups</b>	10,637	3	3,546	6,618	,000	3-4 hours and 4 hours with zero hours and 1-2 hours

F1: Delusion	<b>Within groups</b>	145,725	272	,536			In favor of 3-4hours and above 4
	<b>Total</b>	156,362	275				
	<b>Between groups</b>	15,889	3	5,296	8,285	,000	3-4 hours and 4 hours with zero hours and 1-2 hours
F2: Sensuality	<b>Within groups</b>	173,883	272	,639			In favor of 3-4hours and above 4
	<b>Total</b>	189,772	275				
	<b>Between groups</b>	4,124	3	1,375	1,712	,165	
F3: Tension	<b>Within groups</b>	218,364	272	,803			
	<b>Total</b>	222,488	275				

\*p<0,05

According to Table 9, students' math test anxiety differed according to the average daily playing time, and this difference was statistically significant ( $F(3,272)= 8,741$ ;  $p<0,05$ ). Considering the sub-factors, there was a statistically significant difference between delusion ( $F(2,273)= 6.618$ ;  $p<0,05$ ), affectiveness( $F(3,272)= 8.285$ ;  $p<0,05$ ); there is no significant difference in the tension factor ( $F(3,272)=0.165$ ;  $p<0,05$ ). In order to understand between which playing times the difference was, the "Tukey" test, which is one of the post-hoc multiple comparison tests, was used since the group was homogeneous ( $p>0,05$ ) according to the high-level statistical results. According to the Tukey test, there is a statistically significant difference in math test anxiety in favor of students who play games for 4 hours or more per day, compared to students who play games for 1-2 hours a day and zero hours (not at all). Likewise, in favor of students who play games for 3-4 hours a day on average, their math test anxiety is statistically significant compared to students who play games for 1-2 hours and zero (no) hours a day. While the same statistical difference is valid in the factors of delusion and affectivity, there is no statistically significant difference in the tension factor.

**Table 10.** Descriptive results of mathematics test anxiety and sub-factors by maternal education level

	<b>Mother Education Level</b>	<b>N</b>	<b><math>\bar{X}</math></b>	<b>SS</b>
Maths Exam anxiety	primary school	99	2.36	.61
	Middle School	45	2.30	.62
	High school	96	2.13	.61
	University	36	2.02	.75
	total	276	2.23	.66
F1: Delusion	primary school	99	2.00	.84
	Middle School	45	1.93	.81
	High school	96	1.73	.62
	University	36	1.71	.67
	total	276	1.86	.75
F2: Sensuality	primary school	99	2.43	.87
	Middle School	45	2.30	.78
	High school	96	2.19	.84
	University	36	2.08	.69

	total	276	2.28	.83
F3: Tension	primary school	99	2.84	.88
	Middle School	45	2.96	.79
	High school	96	2.70	.93
	University	36	2.41	.87
	total	276	2.76	.89

According to the results of Table 10, there are differences between the averages. ANOVA test was performed to understand the significance of these differences.

**Table 11.** ANOVA test results of the differentiation of mathematics test anxiety and its sub-factors according to maternal education level

		Sum of Squares	sd	Average of Squares	F	p	Significant Difference
Maths Test Anxiety	<b>Between groups</b>	4,530	3.00	1,510	3,537	,015	Between primary and university in favor of primary school
	<b>Within groups</b>	116,136	272,00	,427			
	<b>Total</b>	120,666	275.00				
F1: Delusion	<b>Between groups</b>	4,686	3.00	1,562	2,801	,040	
	<b>Within groups</b>	151,675	272,00	,558			
	<b>Total</b>	156,362	275.00				
F2: Sensuality	<b>Between groups</b>	4,381	3.00	1,460	2,143	,095	
	<b>Within groups</b>	185,391	272,00	,682			
	<b>Total</b>	189,772	275.00				
F3: Tension	<b>Between groups</b>	7,165	3.00	2,388	3,017	,030	mid-level In favor of middle school
	<b>Within groups</b>	215,322	272,00	,792			
	<b>Total</b>	222,488	275.00				

According to Table 11, students' math test anxiety differed according to their mother's education level, and this difference was statistically significant ( $F(3,272)=3,537$ ;  $p<0.05$ ). Likewise, there is a statistically significant difference between sub-factors delusion ( $F(3,272)=2.801$ ;  $p<0.05$ ), tension ( $F(3,272)=3.017$ ;  $p<0.05$ ). However, there is no significant difference in affectivity factor ( $F(3,272)=2.143$ ;  $p>0.05$ ). In order to understand between which education levels the difference is, post-hoc multiple comparison tests were used since the group was homogeneous ( $p>0.05$ ) according to the Levene statistical results. Tukey test was performed. According to the Tukey test, there is a significant difference in mathematics test anxiety between students whose mothers have a university education level compared to students whose mothers are primary school graduates. In other words, the mathematics test anxiety of the students whose mothers are primary school graduates are statistically higher than those whose mothers are university graduates. However, there is no significant difference in math test anxiety among those whose mothers are primary, secondary or high school graduates, or among students whose mothers are graduates of secondary or high schools while their mothers are university

graduates. When the sub-factors are examined, while the mother's education level does not affect the math test anxiety in the delusion and affective factors, there is a significant difference in favor of secondary school between the students whose mothers are secondary school graduates and those whose mothers are university graduates in the tension factor.

**Table 12.** Descriptive results of mathematics test anxiety and sub-factors according to father's education level

	Father Education Level	N	$\bar{X}$	SS
Maths Push-up anxiety	primary school	61	2.57	.65
	Middle School	32	2.33	.54
	High school	117	2.11	.64
	University	66	2.07	.64
	total	276	2.23	.66
F1: Delusion	primary school	61	2.24	.87
	Middle School	32	1.91	.65
	High school	117	1.72	.72
	University	66	1.73	.60
	total	276	1.86	.75
F2: Sensuality	primary school	61	2.66	.81
	Middle School	32	2.36	.86
	High school	117	2.15	.79
	University	66	2.12	.79
	total	276	2.28	.83
F3: Tension	primary school	61	2.93	.85
	Middle School	32	3.01	.83
	High school	117	2.72	.91
	University	66	2.54	.90
	total	276	2.76	.89

According to the results of Table 12, there are differences between the averages. ANOVA test was performed to understand the significance of these differences.

**Table 13.** ANOVA test results of the differentiation of mathematics test anxiety and its sub-factors according to father's education level

		Sum of Squares	sd	Average of Squares	F	p	Significant Difference
Mathematics Test Anxiety	<b>Between groups</b>	10,624	3.00	3,541	8,754	,000	primary-high school and First- uni
	<b>Within groups</b>	110,042	272,00	,405			between in favor of primary school
	<b>Total</b>	120,666	275.00				
F1: Delusion	<b>Between groups</b>	12,442	3.00	4,147	7,838	,000	primary-high school and First- uni
	<b>Within groups</b>	143,920	272,00	,529			between in favor of primary school
	<b>Total</b>	156,362	275.00				
	<b>Between groups</b>	12,536	3.00	4,179	6,413	,000	primary-high school and

		First- uni				
F2: Sensuality	<b>Within groups</b>	177,237	272,00	,652		
	<b>Total</b>	189,772	275.00	between in favor of primary school		
<b>Between groups</b>		7,203	3.00	2,401	3,034	,030
F3: Tension	<b>Within groups</b>	215,284	272,00	,791		
	<b>Total</b>	222,488	275.00			

\*p&lt;0,05

According to Table 18, students' math test anxiety differed according to their father's education level, and this difference was statistically significant ( $F(3,272)=8,754$ ;  $p<0.05$ ). Likewise, sub-factors delusion ( $F(3,272)=7,838$ ;  $p<0.05$ ), affectivity( $F(3,272)=6.413$ ;  $p<0.05$ ) and tension( $F(3,272)=3.034$ ;  $p<0.05$ ) there is a statistically significant difference. In order to understand between which education levels the difference was, the "Tukey" test, which is one of the post-hoc multiple comparison tests, was used since the group was homogeneous ( $p>0.05$ ) according to the levane statistical results. According to the Tukey test, there is a statistically significant difference between students whose fathers are primary school graduates and those whose fathers are high school or university graduates in mathematics test anxiety. There is no significant difference between students whose fathers are secondary school graduates and students whose fathers are primary school, high school or university graduates in terms of math test anxiety. In the sub-factors, there is a significant difference in the delusion dimension compared to the students whose fathers are primary school graduates and those whose fathers are high school or university graduates in the delusion and affective factors. In the tension factor, although there is no significant difference between the graduations of the fathers, it can be said that there is a difference in these levels since the primary school ( $\bar{X}=2.93$ ) and secondary school ( $\bar{X}=3.01$ ) tension score averages are high.

“Digital game addictions of secondary school students; Does it differ according to gender, grade level, daily playing time, education level of parents, family income level?” The analysis and results of the problem are summarized below in order. Since the digital game addiction scale data did not show a normal distribution according to the normality test results, nonparametric tests were used in the tests related to the digital game addiction scale. We applied the Mann-Whitney-U test using the independent groups t-test, which is a nonparametric test, to examine the differentiation between digital game addiction and gender.

**Table 14.** Mann-Whitney-U test results of differentiation of digital game addiction according to gender variable

	Gender	n	Rank Mean (MR)	Rank Sum (ASK)	Z	p
Digital Game Addiction	Female	140	117.17	16404.00	-4,505	0
	Male	136	160.46	21822.00		
	Total	276				
F1: Extreme Focus	Female	140	118.14	16539,00	-4,328	0
	Male	136	159.46	21687.00		
	Total	276				
	Female	140	117.84	16497.50	-4,372	0

F2: Tolerance and Loaded Value	<b>Male</b>	136	159.77	21728.50		
	<b>Total</b>	276				
F3: Assignment Postponement	<b>Female</b>	140	123.62	17306.50	-3,216	0.01
	<b>Male</b>	136	153.82	20919,50		
F4: Reflection-Immersion	<b>Female</b>	140	123.62	17306.50	-3,087	0.02
	<b>Male</b>	136	153.82	20919,50		
	<b>Total</b>	276				

When Table 14 is examined, there is a significant difference in favor of males according to gender ( $z=-4,505$ ;  $p<0.05$ ). When the sub-factors are examined; overfocus ( $z=-4.328$ ;  $p<0.05$ ), tolerance and loaded value ( $z=-4.372$ ;  $p<0.05$ ), task-homework delay ( $z=-3.216$ ;  $p<0.05$ ) and reflection There is a statistically significant difference in favor of men in the dimensions of - indulging in a game ( $z=-3.087$ ;  $p<0.05$ ). In other words, male students are more addicted to digital games than female students. Kruskal Wallis-H test was used to understand whether there is a significant difference between digital game addiction levels and class levels.

**Table 15.** Kruskal Wallis-H test results of differentiation of digital game addiction by grade level

	Grade Level	n	Rank Avg. (MR)	X <sup>2</sup>	sd	p
Digital Game Addiction	<b>5th grade</b>	59	130.51	3,432	3	0.33
	<b>6th grade</b>	76	151.57			
	<b>7th grade</b>	87	131.07			
	<b>8th grade</b>	54	140.81			
	<b>Total</b>	276				
F1: Extreme Focus	<b>5th grade</b>	59	135.55	1,891	3	0.595
	<b>6th grade</b>	76	146.86			
	<b>7th grade</b>	87	130.75			
	<b>8th grade</b>	54	142.45			
	<b>Total</b>	276				
F2: Tolerance and Loaded Value	<b>5th grade</b>	59	126.51	1,992	3	0.574
	<b>6th grade</b>	76	145.50			
	<b>7th grade</b>	87	138.79			
	<b>8th grade</b>	54	141.29			
	<b>Total</b>	276				
F3: Assignment Postponement	<b>5th grade</b>	59	136.61	3,940	3	0.268
	<b>6th grade</b>	76	149.89			
	<b>7th grade</b>	87	126.56			
	<b>8th grade</b>	54	143.77			
	<b>Total</b>	276				
F4: Reflection-Immersion	<b>5th grade</b>	59	141.26	3,239	3	0.356
	<b>6th grade</b>	76	150.33			
	<b>7th grade</b>	87	129.72			
	<b>8th grade</b>	54	132.98			
	<b>Total</b>	276				

\* $p<0,05$

When Table 15 is examined, there is no statistically significant difference between secondary

school students' digital game addictions according to their grade levels ( $X^2(3)=3.432$ ;  $p>0.05$ ). Likewise, overfocusing( $X^2(3)=1.891$ ;  $p>0.05$ ), tolerance and loaded value( $X^2(3)=1.992$ ;  $p>0.05$ ), task-homework delay( $X^2(3)=3.940$ ; There was no statistically significant difference in the sub-factors of  $p>0.05$ ) and reflection-play ( $X^2(3)=3,239$ ;  $p>0.05$ ). Kruskal Wallis-H test was used to understand whether there is a significant difference between digital game addiction levels and daily game playing times.

**Table 16.** Kruskal Wallis-H test results of differentiation of digital game addiction according to daily game playing time

	Daily Average game time	n	Rank Avg. (MR)	$X^2$	sd	p
Digital Game Addiction	zero hour(none)	22	77.64	45,229	3	0
	1-2 hours	171	124.88			
	between 3-4 hours	55	173.87			
	4 hours or more	28	200.00			
	total	276				
F1: Extreme Focus	zero hour(none)	22	69,00	51.14	3	0
	1-2 hours	171	125.15			
	between 3-4 hours	55	176.65			
	4 hours or more	28	199.70			
	total	276				
F2: Tolerance and Loaded Value	zero hour(none)	22	77.86	36,915	3	0
	1-2 hours	171	128.49			
	between 3-4 hours	55	162.99			
	4 hours or more	28	199.20			
	total	276				
F3: Assignment Postponement	zero hour(none)	22	106.55	34.9	3	0
	1-2 hours	171	123.70			
	between 3-4 hours	55	164.77			
	4 hours or more	28	202.41			
	total	276				
F4: Reflection-Immersion	zero hour(none)	22	105.16	22,758	3	0
	1-2 hours	171	126.99			
	between 3-4 hours	55	168.07			
	4 hours or more	28	176.93			
	total	276				

When Table 16 is examined, there is a significant difference between digital game addictions and daily game playing time( $X^2(3)=45.229$ ;  $p<0.05$ ). Likewise, excessive focus ( $X^2(3)=52.24$ ;  $p<0.05$ ), tolerance and loaded value( $X^2(3)=36.925$ ;  $p<0.05$ ), task-duty delay( $X^2(3)=34.9$ ;  $p<0.05$ ) and reflection-indulgence( $X^2(3) =22,758$ ;  $p<0.05$ ), there is a statistically significant difference in sub-factors. The Games-Howell test, one of the post hoc tests, was used to examine between which groups these differences were. According to this; There is a significant difference between the students who play games for 4 hours or more a day on average and those who play 1-2 hours a day and zero hours (not at all) in favor of those who play for more than 4 hours. There is a significant difference between those who play games for 3-4 hours a day on average, those who play games for 1-2 hours a day and those who play zero hours (not at all) in favor of those who play for 1-2 hours. When the sub-factors are examined, a similar difference is observed in the factors of overfocus, tolerance-loaded value and reflection-indulgence. In the task-homework postponement factor; There is a significant difference

between those who play games for 4 hours or more and those who play 1-2 hours a day and zero hours (not at all) in favor of those who play games for 4 hours. Those who play games for 3-4 hours differ significantly from those who play games for 1-2 hours a day. In other words, students' addiction to digital games increases when they play games for 3-4 hours a day or more. The Kruskal Wallis-H test was used to examine whether there is a significant difference in digital game addictions according to the educational status of the parents.

**Table 17.** Differences in digital game addiction according to mother education level Kruskal Wallis-H test results

	<b>Mother Education Level</b>	<b>n</b>	<b>Rank Avg. (MR)</b>	<b>X<sup>2</sup></b>	<b>sd</b>	<b>p</b>
Digital Game Addiction	<b>Primary school</b>	99	141,70	0,967	3	0,809
	<b>Middle School</b>	45	132,74			
	<b>High school</b>	96	141,28			
	<b>University</b>	36	129,50			
	<b>Total</b>	276				
F1: Extreme Focus	<b>Primary school</b>	99	137,66	0,639	3	0,887
	<b>Middle School</b>	45	131,14			
	<b>High school</b>	96	140,85			
	<b>University</b>	36	143,74			
	<b>Total</b>	276				
F2: Tolerance and Loaded Value	<b>Primary school</b>	99	138,66	1,674	3	0,643
	<b>Middle School</b>	45	129,11			
	<b>High school</b>	96	145,49			
	<b>University</b>	36	131,14			
	<b>Total</b>	276				
F3: Assignment Postponement	<b>Primary school</b>	99	143,67	2,315	3	0,51
	<b>Middle School</b>	45	140,07			
	<b>High school</b>	96	139,07			
	<b>University</b>	36	120,79			
	<b>Total</b>	276				
F4: Reflection-Immersion	<b>Primary school</b>	99	145,35	1,735	3	0,629
	<b>Middle School</b>	45	135,27			
	<b>High school</b>	96	137,46			
	<b>University</b>	36	126,49			
	<b>Total</b>	276				

Table 17 shows that there is no statistically significant relationship between mother education levels and Digital Game Addictions among secondary school pupils ( $X^2(3)=0.967$ ;  $p>0.05$ ).

**Table 18.** Kruskal Wallis-H test results of differentiation of digital game addiction according to father's education level

	<b>Father Education Level</b>	<b>n</b>	<b>Rank Avg. (MR)</b>	<b>X<sup>2</sup></b>	<b>Sd</b>	<b>P</b>
Digital Game Addiction	<b>Primary school</b>	61	144,06	0,809	3	0,847
	<b>Middle School</b>	32	145,34			
	<b>High school</b>	117	135,90			
	<b>University</b>	66	134,65			
	<b>Total</b>	276				

F1: Extreme Focus	<b>Primary school</b>	61	150,71	2,22	3	0,528
	<b>Middle School</b>	32	141,67			
	<b>High school</b>	117	132,48			
	<b>University</b>	66	136,34			
	<b>Total</b>	276				
F2: Tolerance and Loaded Value	<b>Primary school</b>	61	140,52	0,56	3	0,906
	<b>Middle School</b>	32	145,25			
	<b>High school</b>	117	134,71			
	<b>University</b>	66	140,08			
	<b>total</b>	276				
F3: Assignment Postponement	<b>Primary school</b>	61	141,84	0,359	3	0,949
	<b>Middle School</b>	32	138,97			
	<b>High school</b>	117	139,25			
	<b>University</b>	66	133,85			
	<b>Total</b>	276				
F4: Reflection-Immersion	<b>Primary school</b>	61	143,31	1,767	3	0,622
	<b>Middle School</b>	32	152,42			
	<b>High school</b>	117	134,57			
	<b>University</b>	66	134,27			
	<b>Total</b>	276				

When Table 18 is examined, there is no statistically significant difference between secondary school students' father education levels and digital game addictions ( $X^2(3)=0.809$ ;  $p>0.05$ ). One of the sub-problems of our research, "How is the relationship between digital game addiction and math test anxiety?" The analysis results of the problem are summarized in Table 19.

**Table 19.** The relationship between digital game addiction and math test anxiety Spearman test results

		<b>Mathematics Test Anxiety</b>	<b>Digital Game Addiction</b>	<b>F1: Delusion</b>	<b>F2: Affectiveness</b>	<b>F3: Tension</b>
<b>Maths Test Anxiety</b>	r	one	,272 **	,786 **	,886 **	,671 **
	p		0	0	0	0
	n	276	276	276	276	276
<b>Digital Game Addiction</b>	r	,272 **	one	,271 **	,226 **	,140 *
	p	0		0	0	0.02
	n	276	276	276	276	276
<b>F1: Extreme Focus</b>	r	,288 **	,888 **	,295 **	,264 **	0.068
	p	0	0	0	0	0.258
	n	276	276	276	276	276
<b>F2: Tolerance Game Loaded Value</b>	r	,228 **	,916 **	,195 **	,196 **	,157 **
	p	0	0	0.001	0.001	0.009
	n	276	276	276	276	276
<b>F3: Individual</b>	r	,223 **	,812 **	,285 **	,154 *	0.102
	p	0	0	0	0.011	0.091

<b>Task and Homework Postponement</b>	n	276	276	276	276	276
<b>F4: Psychological Reflection and Immersion</b>	r	,228 **	,787 **	,271 **	,154 *	,145 *
	p	0	0	0	0.011	0.016
	n	276	276	276	276	276

When Spearman test results are examined in Table 19, this relationship is positive since there is a significant relationship between digital game addiction and math test anxiety ( $p < 0.05$ ) and the correlation coefficient ( $r = 0.272$ ). In other words, as digital game addiction increases, math test anxiety also increases, and as digital game addiction decreases, math test anxiety also decreases. Focus ( $r = 0.288$ ;  $p < 0.05$ ), tolerance-loaded value ( $r = 0.228$ ;  $p < 0.05$ ), task-homework procrastination ( $r = 0.223$ ;  $p < 0$ ) between test anxiety and digital game addictions sub-factors ,05) and reflection-play ( $r = 0.228$ ;  $p < 0.05$ ), there was a significant positive correlation.

## Discussion and Conclusion

The digital game addictions of the majority of the students we researched are low-risk and at a low level. Among the sub-factors, over-focusing and children's desire to play digital games are low risk and low level. The tolerance-imposed value factor showed that a group with a medium level of risk gave importance to digital games in their lives, the task-assignment postponement factor showed that the people who postponed their duties for the game were at a low risk and very low level, and the reflection-game immersion factor showed that the group that was immersed in the game and forgot everything was at a low risk and very low level. These results are in parallel with the results of Hazar, Demir, Namlı, and Türkeli (2017), K.Hazar, Özpölat, and Z.Hazar (2020), and Kestane (2019). According to Güvendi, Demir, and Keskin (2019), middle school students are in the risky group in digital game addiction. Yiğit and Günüş (2020), on the other hand, concluded that 40.9% of the students were not addicted, 44% were in the risky group and 15.1% were addicted to digital games.

In the study, when the mathematics exam anxiety average of middle school students was examined, it was seen that more than medium level students sometimes experienced exam anxiety. Sub-factor averages; according to the delusional factor average, a group of less than medium level students are not very interested in mathematics lessons and exams and sometimes have different thoughts from the lesson. According to the mean of the affective factor, a group of more than medium level students psychologically liked the mathematics course and thought that they would get high grades, while according to the mean of the nervousness factor, there were more students who were nervous and stressed during mathematics exams. While mathematics test anxiety, affective and delusion are sometimes experienced by the students in general, nervousness is experienced more frequently by the students. While these results are in parallel with the results of Adal, Yavuz (2017), Tuncer and Yılmaz (2016); Dursun (2008) found the mathematics anxiety of secondary school students at a moderate level.

When the differences of digital game addiction levels according to gender are examined, male students have higher digital game addiction levels than female students and there is a significant difference. There is a significant difference in favor of boys in all sub-factors. When the literature is examined, the results of Pesen and Şanlı (2018), Horzum (2011), Gökçearslan and

Durakoğlu (2014), Güvendi, Demir and Keskin (2019), Hazar et al. (2017), Balkın (2020) are in line with our research results. Çavuş, Ayhan, and Tuncer (2016) found that male university students are more interested in computer games than girls, Yılmaz (2019) found that the addiction level of boys is higher than girls in his research with high school students, Akçay and Özcebe (2012) found that preschool boys play computer games more than girls and this rate increases as they get older.

When the differences of mathematics test anxiety levels according to gender are examined, although the average of girls is higher than boys, this difference is not significant. In other words, math test anxiety does not change according to gender. While there is no significant difference in the sub-factors of delusion and affective factors, there is a significant difference in the nervousness dimension of girls compared to boys. In other words, girls are more stressed and tense than boys during math exam periods. When the literature is examined, the results of the studies conducted by Dursun and Bindak (2011), Bozkurt (2012), Dede and Dursun (2008), Aydın and Keskin (2016), Dursun (2008), S. Kutluca, Alpay and T. Kutluca (2015) are in parallel with the results of our study. Doruk and Kaplan (2013) found that the exam anxiety of girls was higher than boys among prospective primary and elementary mathematics teachers, Softa, Karaahmetoğlu, and Çabuk (2015) found that the exam anxiety of girls in senior high school students was higher than boys, especially in the affective dimension, and Woodart (2004) concluded that female university students had higher anxiety than male students.

When the difference between digital game addiction levels and grade levels was examined, no significant difference was found between the grade levels. In other words, there is no significant difference between 5.6.7.8 grade students in terms of digital game addiction. Age does not affect addiction. As a result of similar studies conducted in this field, Hazar (2016) found that there was no significant difference in the total digital game addiction of 14-year-old students compared to 12-13-year-old students, Köksal (2015) found that there was no significant difference in digital game addiction among secondary school students according to age. Hazar et al. (2020) found that there was a significant difference in favor of 14-year-old students when comparing 10-14 years old, 11-14 years old and 12-14 years old students and concluded that digital game addiction increased as age increased. Akçay and Özcebe (2012) concluded that preschool boys play computer games more than girls and this rate increases as they get older.

When the difference between mathematics exam anxiety and grade levels is examined, there is a significant differentiation. In favor of 8th grade students, there is a significant difference in mathematics exam anxiety compared to 5th, 6th and 7th grade students. When the sub-factors are examined, in the delusion factor, 8th grade students have a significant difference in favor of 8th grade students compared to 5th, 6th, and 7th grade students. In the affective factor, the difference between 8th grade students and 5th, 6th, 7th grade students is significant in favor of 8th grade; the difference between 7th grade students and 5th grade students is significant in favor of 7th grade; and the difference between 6th grade students and 5th grade students is significant in favor of 6th grade. In the tension dimension, there is a significant difference between 8th grade students and 5th grade students in favor of 8th grade. In other words, 8th grade students' math test anxiety is higher than other grades. The results of Bozkurt (2012), Tuncer (2016), Adal and Yavuz (2017), Dursun and Bindak (2011) are similar to the results of our study. Sapma (2013), on the other hand, in his research with high school students, stated that the anxiety of senior high school students was higher than that of lower grades. It can be said that the exams that students take in middle school and senior high school increase the stress of students and increase their math anxiety levels.

There is a significant difference between digital game addictions and sub-factors and daily game playing time. Accordingly, there is a significant difference between students who play games for an average of 4 hours or more per day and students who play games for 1-2 hours and zero hours (none) per day in favor of those who play games for more than 4 hours. There is also a significant difference between students who play 3-4 hours a day on average and those who play 1-2 hours a day and zero hours a day in favor of those who play 1-2 hours a day. When the sub-factors are analyzed, a similar difference is observed in the factors of over-focusing, tolerance-imposed value and reflection-immersion in the game. In the task-assignment procrastination factor, there is a significant difference between those who play games for 4 hours or more and those who play games for 1-2 hours a day and zero hours (never) in favor of those who play games for 4 hours. Those who play 3-4 hours a day show a significant difference compared to those who play 1-2 hours a day. In other words, students' digital game addiction increases when they play 3-4 hours and more games a day. The results of Güvendi et al. (2019), Hazar et al. (2017), Gökçearsan and Durakoğlu (2014) with secondary school students, Balkın (2020) with high school students, and Yılmaz (2019) with teachers and administrators working in secondary education support our research results. Demir and Cicioğlu (2019) found that the average scores of students who play digital games for 0-1 hour a day are significantly different from those who play digital games for 1-2 hours or more, which does not support our research results.

There is a significant difference between math test anxiety and its sub-factors and daily game playing times. There is a significant difference in the sub-factors of anxiety and emotionality, while there is no significant difference in the factor of nervousness.

When the exam anxiety of students who play zero (none) hours or 1-2 hours a day and those who play more than 4 hours a day are compared, there is a significant difference in favor of those who play more than 4 hours a day. Likewise, when the test anxiety of those who play class (none) hours or 1-2 hours a day and those who play 3-4 hours a day are compared, there is a significant difference in favor of those who play 3-4 hours a day. While the same significant difference is valid in the anxiety and affective factors, there is no significant difference in the nervousness factor. There is no significant difference between students who play games for 1-2 hours a day and students who play games for class hours (none). In other words, students who play games for an average of 3-4 hours a day and more than that experience more math test anxiety. When students spend 3-4 hours or more of their free time outside of school by playing games, their course and exam anxiety increases because there is less time allocated for lessons and homework. Since there is no research on this part of the study in the literature, the results we found can be an example for future researchers.

Although there is no significant difference between digital game addictions and monthly income levels of students, there is a significant difference only in tolerance and imputed value dimensions. In the tolerance and imputed value sub-factor, there is a significant difference between students with a monthly income of 0-2500TL and students with a monthly income of 2501-5000TL in favor of students with a monthly income of 2501-5000TL. In other words, students with medium monthly income value digital games more than students with low monthly income. Kınay (2019) found that there was no significant difference between family income level and digital game addiction; Çavuş, Ayhan, and Tuncer (2016) found that income level and computer game addiction differed. Kestane (2019) concluded that students with high income levels studying in private schools have higher levels of digital game addiction than students studying in public schools because it is easy to have digital tools. Göldağ (2017),

Ekinci, Yalçın, Özer, and Kara (2017) concluded that the higher the income level of high school students, the higher their digital addiction. Odabaşı (2016) concluded that university students with low income are more addicted to games.

Although there is no significant difference between mathematics exam anxiety and monthly income levels of students, there is a significant difference in the tension sub-dimension. There is a significant difference between students with an average monthly income of 0-2500 TL and students with an average monthly income of 5001 or more. This difference is in favor of students with an average monthly income of 0-2500 TL. In other words, students with low average monthly income experience more tension than students with high average monthly income. While Uysal (2007) found that middle school students' mathematics anxiety was not affected by economic status, which is in parallel with our research results; Adal and Yavuz (2017) found that students with good economic status experienced more mathematics anxiety than students with low economic status. Arı, Savaş, and Konca (2010) found that 7th grade students with very good income levels had lower math anxiety than those with medium and lower income levels.

There is no significant difference between digital game addiction and its sub-factors and the educational levels of parents, and educational levels do not affect digital game addiction. While the results of Hazar et al. (2020), Kestane (2019), Hazar (2016) support the results; Şahin and Tuğrul (2012), Çavuş et al. (2016) and Köksal (2015) concluded that computer and game addiction increased as the mother's education level increased, while it did not make a difference in the father education level. Göldağ (2019) concluded that there is an inverse relationship between mother and father education levels and digital game addiction in high school students; Gökçearsan and Durakoğlu (2014) concluded that there is a linear relationship. The reason underlying these differences may be that the effect of the environment in which parents with the same education levels live also affects children's digital game addiction levels and produces different results.

Mathematics test anxiety differed according to maternal education level. While there was a significant difference in the sub-factors of anxiety and nervousness, there was no significant difference in the factor of emotionality. There is a significant difference in mathematics test anxiety of students whose mother's education level is university compared to students whose mother's education level is primary school. In other words, the math test anxiety of students whose mothers graduated from primary school is higher than that of students whose mothers graduated from university. However, there is no significant difference in mathematics test anxiety between students whose mothers graduated from primary school, middle school, high school or between students whose mothers graduated from middle school or high school while their mothers graduated from university. When the sub-factors are examined, while maternal education levels do not affect mathematics test anxiety in the anxiety and affective factors, there is a significant difference between students whose mothers graduated from middle school and students whose mothers graduated from university in favor of middle school in the tension factor.

Mathematics test anxiety and its sub-factors showed a significant difference according to father's education level. There is a significant difference in mathematics test anxiety between students whose fathers graduated from primary school and students whose fathers graduated from high school or university. There is no significant difference in mathematics test anxiety between students whose fathers graduated from secondary school and students whose fathers

graduated from primary school, high school or university. In the sub-factors, in the anxiety and affective factors, students whose fathers graduated from primary school differed significantly in the anxiety dimension compared to students whose fathers graduated from high school and university. In the tension factor, although there was no significant difference between the graduation levels of the fathers, it can be said that there is a difference at these levels because the mean tension scores of primary and secondary school are high. Poyraz (2012) and Uysal (2007) concluded that children of parents with higher levels of education experience less test anxiety. Yetgin (2017) concluded that exam anxiety decreased as the mother's education level increased, but there was no differentiation with the father's education level. Kutluca et al. (2015), Baylan (2020), Softa et al. (2015), Sapma (2013) concluded that mathematics test anxiety did not differ with the level of education of the mother and father. Tuncer and Yılmaz (2016), on the other hand, found that mathematics anxiety was not affected by the mother's education level, while there was a difference between primary school and university in the father's education level.

When the relationship between digital game addiction and math test anxiety was examined, a significant, positive relationship was found with a correlation coefficient ( $r=0.272$ ). There is a significant positive correlation between test anxiety and digital game addictions sub-factors of focusing, tolerance-imposed value, task-assignment procrastination and reflection-game immersion. When the relationship between digital game addiction and test anxiety sub-factors is examined, there is a significant and positive correlation between delusion, affectivity and nervousness. In other words, as digital game addiction increases, math test anxiety increases, and as digital game addiction decreases, math test anxiety decreases. The reason for this is that as digital game addiction increases, students will spend more time at the game and spend less time on their lessons, so students who cannot use time in a planned way will have more test anxiety.

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### References

- Akandere, M. (2013). *Eğitici okul oyunları*. Ankara: Nobel Yayıncılık.
- Akçay, D., & Özcebe, H. (2012). Okul Öncesi Eğitim Alan Çocukların ve Ailelerinin Bilgisayar Oyunu Oynama Alışkanlıklarının Değerlendirilmesi. 12(2), s. 66-71.
- Hazar, K., Özpolat, Z., & Hazar, Z. (2020, Mart 17). Ortaokul Öğrencilerinin Dijital Oyun Bağımlılığı Düzeylerinin Çeşitli Değişkenlere Göre İncelenmesi (Niğde İli Örneği). *The Journal of Physical Education and Sport Sciences Beden Eğitimi ve Spor Bilimleri Dergisi* E-ISSN: 2717-6347, 18(1).
- Balkın, A. (2020). Lise Öğrencilerinin Dijital Bağımlılık Düzeyi İle Eleştirel Düşünme Eğilimleri Arasındaki İlişkinin İncelenmesi. Yayımlanmamış Yüksek Lisans Tezi, Aydın Üniversitesi, İstanbul.
- Baloğlu, M. ve Koçak, R. (2006). Matematik kaygısındaki farklılıkların çok değişkenli bir araştırması. *Kişilik ve Bireysel Farklılıklar*, 40 (7), 1325-1335.

- BTK, (2019, Ağustos). Dijital Oyunlar Raporu. Mart 17, Güvenli Web: <https://www.guvenliweb.org.tr/dosya/2qtoV.pdf> adresinden 17 Mart 2020 tarihinde alındı.
- BTK, (2017, Ağustos). Dijital Oyunlar Raporu. Güvenli Web: <https://www.guvenliweb.org.tr/dosya/82MsL.pdf> adresinden 17 Mart 2020 tarihinde alındı.
- Çelebi Öncü, E., & Özbay, E. (2005). *Okul öncesi Çocuklar İçin Oyun*. 1. Basım. Ankara, Kök Yayıncılık.
- Dijital Oyunlar Raporu. (2017). <https://www.guvenliweb.org.tr/dosya/82MsL.pdf> adresinden alınmıştır.
- Doruk, M, Kaplan, A.(2016). Sınıf Ve İlköğretim Matematik Öğretmeni Adaylarının Matematik Kaygılarının İncelenmesi. *Kastamonu Eğitim Dergisi*, 21(4), 1505-1522.
- Dursun, Ş., & Bindak, R.(2011). İlköğretim II.kademe öğrencilerinin matematik kaygılarının incelenmesi. *Cumhuriyet Üniversitesi Edebiyat Fakültesi Sosyal Bilimler Dergisi*, 35(1), 18-21.
- Ekinci, N. E., Yalçın, I., Özer, Ö., & Kara, T. (2017). An Investigation of the Digital Game Addiction between High School Students. Online Submission, 14(4), 4989-4994.
- Gökçearslan, Ş. & Durakoğlu, A. (2014). Ortaokul öğrencilerinin bilgisayar oyunu bağımlılık düzeylerinin çeşitli değişkenlere göre incelenmesi. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, (23), 419-435.
- Hazar, K., Özpolat, Z., & Hazar, Z. Ortaokul Öğrencilerinin Dijital Oyun Bağımlılığı Düzeylerinin Çeşitli Değişkenlere Göre İncelenmesi (Niğde İli Örneği). *Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi*, 18(1), 225-234.
- Hazar, Z., Demir, G. T., Namlı, S., & Türkeli, A. (2017). Ortaokul öğrencilerinin dijital oyun bağımlılığı ve fiziksel aktivite düzeyleri arasındaki ilişkinin incelenmesi. *Beden eğitimi ve spor bilimleri dergisi*, 11(3).
- Hazar, Z., & Hazar, M. (2017). Digital Game Addiction Scale for Children Çocuklar İçin Dijital Oyun Bağımlılığı Ölçeği. *Journal of Human Sciences*, 14(1), 203-216.
- Jeong, E. J., & Kim, D. H. (2011). Social activities, self-efficacy, game attitudes, and game addiction. *Cyberpsychology, Behavior, and Social Networking*, 14(4), 213-221.
- Karamustafaoğlu, O., & Kaya, M. (2017). Eğitsel oyunlarla “yansıma ve aynalar” konusunun öğretimi: yansımali koşu örneği. *Journal of Inquiry Based Activities*, 3(2), 41-49.
- Karasar, N. (2017). *Bilimsel araştırma yöntemi* (32. Baskı). Ankara: Nobel yayın dağıtım, 81-83.
- Kestane, M. (2019). Dijital Oyun Bağımlılığının İlköğretim İkinci Kademe Çağındaki Öğrencilerin Akademik Başarısı İle İlişkisi. Yayımlanmamış yüksek lisans tezi, Biruni Üniversitesi, İstanbul.
- Köksal, B. (2015). Ortaöğretim kurumlarında okuyan öğrencilerde dijital oyun bağımlılık düzeyleri, internet bağımlılık düzeyleri ile bağlanma stilleri arasındaki ilişkinin incelenmesi. Yayımlanmamış yüksek lisans tezi, Üsküdar Üniversitesi, İstanbul.

- Kutluca, T., Alpay, F. N., & Kutluca, S. (2015). 8. Sınıf öğrencilerinin matematik kaygı düzeylerine etki eden faktörlerin incelenmesi. *Dicle üniversitesi Ziya Gökalp eğitim fakültesi dergisi*, (25), 202-214.
- Baylan, F.N. (2020). 2000-2017 Yillari Arasinda Matematik Kaygisi İle İlgili Türkiye ' de Yağılan Çalışmaların Bazı Değişkenlere Göre İncelenmesi. Yayınlanmamış yüksek lisans tezi, Selçuk Üniversitesi, Konya.
- Odabaşı, Ş. (2016). Üniversite öğrencilerinin online oyun bağımlılığı düzeylerinin öznel mutluluk düzeylerine ilişkisi (Master's thesis, Sakarya Üniversitesi).
- Öncü, E., & Özbay, E. (2005). E. Öncü, & E. Özbay içinde, *Okul Öncesi Çocuklar İçin Oyun* (s. 9).
- Pesen, A., & Şanlı, T.(2018) .Ortaokul Öğrencilerinde Bilgisayar Oyun Bağımlılığı Düzeyinin Çeşitli Değişkenlere Göre İncelenmesi. *AJIT-e: Bilişim Teknolojileri Online Dergisi*, 9(34), 105-117.
- Sapma, G. (2013). Matematik Başarısı İle Matematik Kaygısı Arasındaki İlişkinin İstatistikî Yöntemlerle İncelenmesi. Yayınlanmamış yüksek lisans tezi, Marmara Üniversitesi, İstanbul.
- Softa, H, Karaahmetoğlu, G, Çabuk, F. (2015). Lise Son Sınıf Öğrencilerinin Sınav Kaygısı Ve Etkileyen Faktörlerin İncelenmesi. *Kastamonu Eğitim Dergisi*,23(4),481 -1494. Retrieved from <https://dergipark.org.tr/en/pub/kefdergi/issue/22597/241359>.
- Şahin, C., & Tuğrul, V. M. (2012). İlköğretim öğrencilerinin bilgisayar oyunu bağımlılık düzeylerinin incelenmesi. *Zeitschrift für die Welt der Türken/Journal of World of Turks*, 4(3), 115-130.
- Tabachnick and Fidell. (2013) *Using Multivariate Statistics* (sixth ed.) Pearson, Boston (2013).
- TDK, (2020). Güncel Türkçe Sözlük, <https://sozluk.gov.tr/> adresinden 2 Aralık 2020 tarihinde alındı.
- TÜİK, (2020, Ağustos). Türkiye İstatistik Kurumu. [https://data.tuik.gov.tr/Bulten/Index?p=Hanehalki-Bilisim-Teknolojileri-\(BT\)-Kullanim-Arastirmasi-2020-33679](https://data.tuik.gov.tr/Bulten/Index?p=Hanehalki-Bilisim-Teknolojileri-(BT)-Kullanim-Arastirmasi-2020-33679) adresinden 15 Mart 2020 tarihinde alındı.
- TÜİK, (2019,Ağustos). Türkiye İstatistik Kurumu. <http://www.tuik.gov.tr/PreHaberBultenleri.do;jsessionid=0NsLptLTvGJsFgx12LKV3hFSg4Y1BRp7vj2ZTCnYD8K68tn4QH6h!-2132347204?id=30574> adresinden 15 Mart 2020 tarihinde alındı.
- TÜİK, (2020, Ağustos). Türkiye İstatistik Kurumu. <https://data.tuik.gov.tr/Search/Search?text=bili%C5%9Fim%20teknoloji> adresinden 29 Kasım 2020 tarihinde alındı.
- Yetgin, O. (2017). Ortaöğretim Öğrencilerinin Matematik Kaygisi Ve Öğrenmeye İlişkin Tutumlarının İncelenmesi. Yayınlanmamış yüksek lisans tezi, Adıyaman Üniversitesi, Adıyaman.
- Yıldırım, M., & Can, S. (2017). Eğitsel Oyunlarla Fen Dersine “Var Mısın Yok Musun”? *Atatürk Üniversitesi Kazım Karabekir Eğitim Fakültesi Dergisi*, (35), 14-30.
- Yıldız, E., Ağgül, Ö., Çalıklar, Ş., & Şimşek, Ü. (2020). Eğitsel Oyun ve İşbirlikli Öğrenmenin 6.Sınıf öğrencilerinin Akademik Başarılarına, Sosyal Becerilerine ve Öğrenme Motivasyonlarına Etkisi. *Anemon Muş Alparslan Üniversitesi Sosyal Bilimler Dergisi*, 8(6), 1703-1716.

- Yılmaz, B. (2019). Ortaöğretim Kurumlarındaki Öğretmen ve Yöneticilerin Dijital Bağımlılık Düzeylerinin İncelenmesi:Ankara İli Çankaya İlçesi Örneği. Yayımlanmamış yüksek lisans tezi, Gazi Üniversitesi, Ankara.
- Yılmaz, Ç. (2011). 6, 7 ve 8. Sınıf öğrencilerinin matematik güdüsü,kaygısı, öz yeterlik inancı ve öz kavramı ile matematik dersine yönelik tutumları arasındaki ilişkiler (Şereflikoçhisar örneği). Yayımlanmamış yüksek lisans tezi, Ankara Üniversitesi, Ankara.
- Yiğit, E. (2017). Çocukların dijital oyun bağımlılığında ailelerin bazı değişkenler açısından incelenmesi. Yayımlanmamış yüksek lisans tezi, Yüzüncüyıl Üniversitesi, Van.