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Investigation of the Relationship Between Digital Game Addiction and Cerebral Lateralization and Attention Skill in Individuals Among the Age of 18-20*

18-20 Yaş arası Bireylerde Dijital Oyun Bağımlılığı ile Serebral Lateralizasyon ve Dikkat Becerisi Arasındaki İlişkinin İncelenmesi*

ABSTRACT

In this study, we aimed to examine the relationship between digital game addiction and cerebral lateralization and attention skills in sedentary young people. The individuals making up the sample were selected by randomization method. 100 sedentary subjects between the ages of 18-20 participated in the study voluntarily. Within the scope of the study, the digital game addiction scale and cerebral lateralization and attention tests were applied to the subjects. SPSS 22.0 (SPSS Inc., Chicago, Illinois, USA) program was used for statistical procedures. Values were presented as mean, standard deviation and standard error and were examined at the 0.05 significance level. Shapiro-Wilk test was performed to test normality. A one-way analysis of variance and LSD post-hoc test were used to analyze the differences between groups, and the Pearson correlation test was applied to examine the relationship between the obtained values. According to the results obtained, no statistically significant difference was detected between the applications in terms of digital game addiction and cerebral lateralization averages ($p>0.05$). Similarly, based on the sub-dimensions, it was determined that there was no significant relationship between digital game addiction and attention skills ($p>0.05$). As a result, it can be said that there is no positive effect between digital game addiction and the valuesof cerebral lateralization and attention skills in young people.

Keywords: Digital Game Addiction, Cerebral Lateralization, Attention.

ÖZET

Bu çalışmada, hareketsiz gençlerde dijital oyun bağımlılığı ile serebral lateralizasyon ve dikkat becerileri arasındaki ilişkinin incelenmesi amaçlanmıştır. Örneklemi oluşturan bireyler randomizasyon yöntemi ile seçilmiştir. Çalışmaya 18-20 yaş aralığındaki 100 hareketsiz birey gönüllü olarak katılmıştır. Çalışma kapsamında bireylere dijital oyun bağımlılığı ölçeği ile serebral lateralizasyon ve dikkat testleri uygulanmıştır. İstatistiksel işlemler için SPSS 22.0 (SPSS Inc., Chicago, Illinois, ABD) programı kullanılmıştır. Değerler ortalama, standart sapma ve standart hata olarak sunulmuş ve 0,05 anlamlılık düzeyinde incelenmiştir. Normalliği test etmek için Shapiro-Wilk testi yapılmıştır. Gruplar arası farklılıkların analizinde tek yönlü varyans analizi ve LSD post-hoc testi kullanılmış, elde edilen değerler arasındaki ilişkinin incelenmesinde Pearson korelasyon testi uygulanmıştır. Elde edilen sonuçlara göre dijital oyun bağımlılığı ve serebral lateralizasyon ortalamaları açısından uygulamalar arasında istatistiksel olarak anlamlı bir fark saptanmamıştır ($p>0,05$). Benzer şekilde alt boyutlar bazında dijital oyun bağımlılığı ile dikkat becerileri arasında anlamlı bir ilişki olmadığı belirlenmiştir ($p>0,05$). Sonuç olarak gençlerde dijital oyun bağımlılığı ile serebral lateralizasyon ve dikkat becerileri değerleri arasında pozitif bir etki olmadığı söylenebilir.

Anahtar Kelimeler: Dijital Oyun Bağımlılığı, Serebral Lateralizasyon, Dikkat.

1. INTRODUCTION

Today, computers and the internet, which provide convenience in many areas of life, are also frequently used by adolescents for games and entertainment. Some aspects of digital games, such as enabling communication, enabling people to realize their dreams that they cannot realize in real life, and providing a sense of winning and achievement, make games more attractive for adolescents (Ögel, 2012). It has been reported that playing digital games is normal as long as it is not excessive, and that games even have positive effects such as emotional relief/relaxation, making use of free time and improving problem-solving skills (Prot et al., 2014). However, excessive and uncontrolled gaming gave rise to the term game addiction, and the resulting problems have caused serious concerns all over the world (Kojima et al., 2019). Game addiction is also referred to as "Gaming Disorder", "Online Gaming Addiction" and "Online Gaming Disorder" in the literature. Although definitions vary, it basically describes gaming and the problems that accompany it (WHO). Cerebral lateralization refers to the abilities of different hemispheres of the brain to perform, direct, and control certain neurological functions. This forms the basis of the scientific approaches necessary to understand higher-level cerebral functions and disorders. In the past, it was thought that the hemispheres had a significant asymmetry in the brain, but later with Broca's discoveries it became clear that anatomical asymmetries were defined in finer detail. In humans, linguistic functions appear to be dominant in the left hemisphere and spatial functions in the right hemisphere. Cerebral dominance means that one hemisphere has superiority over the other in performing and controlling certain neurological functions (Tan and Çalışkan, 1987).

In this context, this thesis aims to examine the potential effects of digital game addiction on cerebral lateralization and attention skills in individuals between the ages of 18-20. While the number of studies on the effects of digital games on young individuals is increasing, this study aims to provide a more in-depth analysis to understand the complex relationship between addiction, cerebral lateralization and attention skills.

2. METHOD

2.1. Research Design and Sampling

100 sedentary young male subjects in the 18-20 age group participated in the study. The individuals making up the sample were selected by randomization method. As inclusion criteria, the subjects were required not to have any chronic disease and not to participate in regular sports activities. Within the scope of the study, the digital game addiction scale was applied to the subjects and they were subjected to lateralization and attention tests.

2.2. Collection of Data

2.2.1. Lateralization test

Edinburgh Inventory Oldfield Questionnaire will be applied to individuals to determine handedness.

According to the Geschwind scoring regarding the frequency of the hand used in each task, all valuesfrom 0 to +100 (those who mark all questions as right hand) and from 0 to -100 (those who mark all questions as left hand) will be determined. This survey will include questions about which hands they use most for 10 types of tasks. Scoring will be made based on the frequency of the hand used in each task. Questions in the survey; (1) writing (2) drawing (3) throwing a ball (4) holding scissors (5) brushing teeth (6) holding a knife (7) holding a fork (8) holding a shovel handle (9) striking a match and (10) It includes questions about which hand is used to open the lid of a box. Answer options include "always with the right hand" (+ 10 points), "usually with the right hand" (+ 5 points), "with both hands" (0 points), "usually with the left hand" (-5 points), and " always with the left hand" (-10 points). The results will be evaluated according to Geschwind's score (GS). The (-) values obtained after the survey will indicate left-handedness, and the increase in (-) value will indicate the degree of left-handedness dominance. Otherwise, (+) values will indicate right-handedness, and an increase in (+) values will indicate the degree of right-handedness dominance. The given values will be examined as lateralization coefficient (LK) (Menteşe, 2019).

2.2.2. Digital game addiction scale

The Digital Game Addiction Scale for University Students, developed by Hazar and Hazar in 2019, was used as a data collection tool in the study. This scale, which consists of 21 items, consists of three sub-dimensions: "Over-focus and procrastination, Conflict, Deprivation and Search, Emotion Change and

Immersion". The expressions in the scale were evaluated using a 5-point Likert-type scale. While the lowest score that can be obtained from the scale is "21", the highest score is "105". In grading the scale scores; It is classified as "1-21: Normal group, 22-42: Low-risk group, 43-63: Risky group, 64-84:

Dependent group, 85-105: Highly addicted group" (Hazar and Hazar, 2019).

2.2.3. Attention Test

Developed by Benjamin Bourdon, the test contains various letters designed in a chaotic manner. The individual is asked to find the letters "a, b, d and g" in the existing letters in 2 minutes. The individual can add various signs to indicate the letter he finds. There are 660 letters in total in the Bourdon attention test. The test can be taken by every individual, regardless of age, who can understand and identify the letters.

The evaluation was made based on the letters correctly marked by the test subjects (Kaymak, 2003).

2.3. Statistical Method

SPSS 22.0 (SPSS Inc., Chicago, Illinois, USA) program was used for statistical procedures. Values were presented as mean, standard deviation and standard error and were examined at the 0.05 significance level. Shapiro-Wilk test was performed to test normality. A one-way analysis of variance and LSD post-hoc test were used to analyze the differences between groups, and the Pearson correlation test was applied to examine the relationship between the obtained values.

3. FINDINGS

Statistical analyzes of the data obtained in our study are presented in this section. Necessary statistical procedures were performed by presenting the data with mean and standard deviation.

Table 4.1. Ungrouped presentation of scale scores obtained from participants

	N	Min.	Max.	Avg.	Std.
Lateralization Score	109	-60.00	100.00	48.72	23.99
Attention Score	109	25.00	105.00	59.29	16.02
Overall Digital Game Addiction Score	109	21.00	101.00	45.25	16.06
Digital Game Addiction Scale Sub-Dimensions					
Over-focus, procrastination	109	11.00	53.00	24.76	8.69
Conflict, Deprivation and Quest	109	6.00	30.00	11.38	5.54
Emotion Change and Immersion	109	4.00	18.00	9.11	3.78

In Table 4.1, the participants' lateralization average is 48.72 and their attention average is 59.29. and the average of digital game addiction is 45.25.

Table 4.2. Comparison of attention scores of lateralization groups

		N	Avg.	Std.	p	Significant Difference
Attention Score	Dominant Right	60	59.13	16.64	0.200	-
	Both Hands	43	61.02	15.29		
	Dominant Left	6	48.50	11.96		

Comparison of attention scores of lateralization groups is given in Table 4.2. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between the lateralization groups in terms of attention scores ($p>0.05$).

Table 4.3. Comparison of digital game addiction and sub-dimensions scores of lateralization groups

		N	Avg.	Std.	p	Significant Difference
Over-focus Procrastination	Dominant Right	60	23.61	8.051	0.220	-
	Both Hands	43	25.77	8.80		
	Dominant Left	6	29.00	13.07		
Conflict, Deprivation and Quest	Dominant Right	60	11.02	5.17	0.277	-
	Both Hands	43	11.40	5.65		
	Dominant Left	6	14.83	8.04		
Emotion Change and Immersion	Dominant Right	60	8.82	3.68	0.386	-
	Both Hands	43	9.26	3.92		
	Dominant Left	6	11.00	3.85		
Overall Digital Game Addiction Score	Dominant Right	60	43.45	14.76	0.212	-
	Both Hands	43	46.42	16.43		
	Dominant Left	6	54.83	23.84		

Table 4.3 shows the comparison of digital game addiction and sub-dimensions scores of the lateralization groups. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between the lateralization groups in terms of digital game addiction and its sub-dimensions scores (p>0.05).

Table 4.4. Comparison of lateralization scores of attention groups

		N	Avg.	Std.	p	Significant Difference
Lateralization Score	Low	29	50.17	26.30	0.909	-
	Middle	68	47.94	24.73		
	High	12	49.58	12.33		

A comparison of the lateralization scores of the attention groups is made in Table 4.4. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between dominant right-handed, dominant left-handed and ambidextrous participants (p>0.05).

Table 4.5. Comparison of digital game addiction and sub-dimensions scores of attention groups

		N	Avg.	Std.	p	Significant Difference
Over-focus Procrastination	Low	29	26.07	9.72	0.465	-
	Middle	68	24.62	8.39		
	High	12	22.42	7.91		
Conflict, Deprivation and Quest	Low	29	11.38	6.56	0.868	-
	Middle	68	11.51	5.03		
	High	12	10.58	6.10		
Emotion Change and Immersion	Low	29	9.31	3.99	0.655	-
	Middle	68	9.19	3.79		
	High	12	8.17	3.38		
Overall Digital Game Addiction Score	Low	29	46.76	18.32	0.601	-
	Middle	68	45.32	15.11		
	High	12	41.17	16.17		

Table 4.5 shows the comparison of attention groups' digital game addiction and sub-dimension scores. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between the lateralization groups in terms of digital game addiction and its sub-dimensions scores (p>0.05).

Table 4.6. Comparison of lateralization scores of digital game addiction groups

		N	Avg.	Std	p	Significant Difference
Lateralization Score	Low Addiction	43	50.23	21.57	0.269	-
	Medium Addiction	56	49.64	22.56		
	High Addiction	10	37.00	38.09		
	Total	109	48.72	23.98		

Table 4.6 shows the comparison of lateralization scores of digital game addiction groups. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between the lateralization groups in terms of attention scores (p>0.05).

Table 4.7. Comparison of attention scores of digital game addiction groups

		N	Avg.	Std.	p	Significant Difference
Attention Score	Low Addiction	43	60.09	16.55	0.230	-
	Medium Addiction	56	60.16	14.66		
	High Addiction	10	51.00	20.03		
	Total	109	59.29	16.01		

A comparison of attention scores of digital game addiction groups is given in Table 4.7. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between the lateralization groups in terms of attention scores (p>0.05).

Table 4.8. Correlation of lateralization, attention and digital game addiction scores obtained from participants

		1	2	3	4	5	6
1 Lateralization	r	1	,065	-,122	-,146	-,111	-,142
	p		,504	,208	,129	,252	,139
2 Attention	r		1	-,177	-,062	-,091	-,138
	p			,066	,524	,349	,151
3 Over-focus, procrastination	r			1	**,740**	**,608**	**,940**
	p				**,000**	**,000**	**,000**
4 Conflict, Deprivation and Search	r				1	**,615**	**,891**
	p					**,000**	**,000**
5. Emotion Change and Immersion	r					1	**,777**
	p						**,000**
6.Overall Digital Game Addiction Score	r						1
	p						

Table 4.8 shows the comparison of participants' lateralization, attention and digital game addiction scores. According to the results of a one-way analysis of variance, it was determined that there was no significant difference ($p>0.05$).

4. DISCUSSION

In the data obtained in our study, a comparison of the attention scores of the lateralization groups is given. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between the lateralization groups in terms of attention scores ($p>0.05$). In our study, a comparison of the digital game addiction and sub-dimensions scores of the lateralization groups is given. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between the lateralization groups in terms of digital game addiction and its sub-dimensions scores ($p>0.05$). On the other hand, in our study, the lateralization scores of the attention groups were compared. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between dominant right-handed, dominant left-handed and ambidextrous participants ($p>0.05$). In addition, a comparison of the digital game addiction and sub-dimension scores of the attention groups was given in our study. According to the results of a one-way analysis of variance, it was determined that there was no significant difference between the lateralization groups in terms of digital game addiction and its sub-dimensions scores ($p>0.05$). Similarly, a comparison of the lateralization scores of the digital game addiction groups we performed is given. According to the results of a one-way analysis of variance, it was determined that there was no significant difference in attention scores between the lateralization groups ($p>0.05$). In our study, a comparison of the attention scores of the digital game addiction groups is given. According to the results of a one-way analysis of variance, it was determined that there was no significant difference in attention scores between the lateralization groups ($p>0.05$).

Again, in our study, a comparison of lateralization, attention and digital game addiction scores is given. According to the results of a one-way analysis of variance, it was determined that there was no significant difference ($p>0.05$).

The dominant belief from ancient times until today was that computer games improve visual-spatial attention and hand-eye coordination and facilitate the acquisition of computer skills. However, new research examining the behavior and brain activities of children playing digital games has found that these games are not as innocent as thought. These studies have revealed that digital games create addiction and negatively affect both children's behavior and brain development (Hazar, 2016).

In a study conducted by Yen et al. (2009) on internet addiction, it was stated that the most common factor accompanying internet addiction is lack of attention (Yen et al., 2009).

In his study in 2013, Kaya stated that human life has become virtual in many areas and one of these areas is games (Kaya, 2013).

In his study in 2010, Kars emphasized that with the development of technology, children's playing habits have changed and they spend their free time with digital games (Kars, 2010).

On the other hand, in a study conducted by Loffing and his team, where they examined 18 volleyball players using video analysis, it was stated that left-handed athletes had better visual perception abilities than right-handed volleyball players because they were superior in predicting the direction of shots made from near and far distances, and therefore, left-handers came to the fore (Loffing et al., 2012).

Ziyagil and Gürsoy also supported studies investigating the effects of handedness on sports branches. In their research at two different world wrestling championships held in Istanbul and Greece in 2010, they reported that dominant left-handed wrestlers won more matches, achieved higher degrees and received more medals (Ziyagil et al., 2010).

Shah, Johnston and Sheilds conducted studies on handedness among 5,000 Australian 4- to 5-year-old children. In the study, they examined children's learning skills, social and emotional development, gross and fine motor skills, and the effects of lateralization on receptive and expressive language skills. As a result, they stated that left-handed children performed lower than right-handed children in all developmental assessments (Johnston et al., 2007).

In a study on the dominant hand, Sachlikidis and Salter carried out the kinematic analysis of the shooting techniques of elite cricketers under the ages of 17 and 19 with their dominant and non-dominant arms. In the study, they found that the athletes' hits increased during fast throws with their dominant arm, but such an increase was not observed in their non-dominant arms, and they pointed out that the shooting performance of both hands could be improved (Sachlikidis and Salter, 2007).

In a research conducted by Çingöz, he emphasized that left-handed athletes are at the forefront. It has been observed that among left-handed athletes, women who are interested in karate and taekwondo are more successful in terms of dominant hand preference and winning medals (Çingöz, 2017).

In their study, Bsiach and his team compared selective visual reaction time performances according to handedness. Although there was no significant difference, they determined that dominant right-handed individuals responded faster. Additionally, they did not find a significant difference in reaction asymmetry (Bisiach et al., 1982).

When studies on lateralization in the literature were examined, studies examining the relationship between handedness, digital game addiction and attention in sedentary individuals were found to be limited. The fact that no significant results were obtained in our study and the lack of effect of handedness in some of the tests partially supports the literature. As a result, it can be said that there is no positive effect between digital game addiction and the values of cerebral lateralization and attention skills in young people.

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