

Investigation of Video Game Playing Behaviors And Visual And Auditory Reaction Times of Middle School Students

Ortaokul Öğrencilerinin Video Oyun Oynama Alışkanlıklarının ve Görsel ve İşitsel Tepki Sürelerinin İncelenmesi

ABSTRACT

This study aims to investigate the relationship between middle school students' habits of playing digital games and their visual and auditory reaction times. A total of 168 middle school students from different classes participated in the research. Prior to the study, students were briefed about the research process. Participants were administered a questionnaire prepared by the researcher, focusing on their gaming behaviors. Subsequently, tests were conducted via computer to measure visual and auditory reaction times. The tests were conducted in a calm environment, free from external influences, for each participant. The data obtained and the responses to the questionnaire were analyzed using the SPSS 22.0 package program. The results indicate a statistically significant difference in the visual reaction times of students who play digital games compared to those who do not ($p < 0.05$), while there was no statistically significant difference in auditory reaction times, despite a favorable increase for those who play digital games ($p > 0.05$). In this context, it can be concluded that digital games may influence visual reaction times.

Keywords: e-sport, video games, reaction, game

ÖZET

Bu çalışma, ortaokul öğrencilerinin dijital oyun oynama alışkanlıkları ile görsel ve işitsel tepki süreleri arasındaki ilişkiyi araştırmayı amaçlamaktadır. Farklı sınıflardan toplam 168 ortaokul öğrencisi araştırmaya katıldı. Çalışma öncesinde öğrencilere araştırma süreci hakkında bilgi verildi. Katılımcılara araştırmacı tarafından hazırlanan, oyun alışkanlıklarına odaklanan bir anket uygulandı. Daha sonra, görsel ve işitsel tepki sürelerini ölçmek için bilgisayar üzerinden testler yapıldı. Testler, her katılımcı için dış etkilerden arındırılmış sakin bir ortamda gerçekleştirildi. Elde edilen veriler ve anket yanıtları, SPSS 22.0 paket programı kullanılarak analiz edildi. Sonuçlar, dijital oyun oynayan öğrencilerin görsel tepki sürelerinde istatistiksel olarak anlamlı bir fark olduğunu göstermektedir ($p < 0.05$), ancak işitsel tepki sürelerinde istatistiksel olarak anlamlı bir farklılık bulunmamıştır, bununla birlikte dijital oyun oynayanlar için olumlu bir artış gözlemlenmiştir ($p > 0.05$). Bu bağlamda, dijital oyunların görsel tepki sürelerini etkileyebileceği sonucuna varılabilir.

Anahtar Kelimeler: e-sport, video games, reaction, game

INTRODUCTION

The widespread use of technological devices in the information and communication age we are in and the subsequent advancement of game technologies have enabled individuals to be active anywhere, anytime, and have led to a shift in interest from traditional games to digital games. Encouraging communication and cooperation by appealing to the sensory organs of individuals through technological tools (Fuchs, 2008) has enabled needs such as socialization to be met through digital environments.

Frasca (2001) defines a digital game as a leisure time activity in which one or more participants connected to game tools perform on a software over an online network, either individually (against artificial intelligence) or mutually. It has been shown by various studies that by evaluating people's leisure time, they get away from busy work and stress, allow them to relax by reducing fatigue and stress, help them cope with problems, increase self-confidence, games with educational content increase course success (Green and Bavelier 2003; Prot et al. 2014), and improve visual-attention skills (Green and Bavelier 2003; Griffiths 2005). Reaction is at the heart of visual-attention skills. Reaction time is the time from the arrival of a sudden and unprioritized signal to the response to this signal (Schmidt, 1988).

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It is a parameter that allows the player/athlete to be more successful by differentiating from other individuals and revealing his/her difference. With the awareness of the positive or negative effects of digital games on people in literature reviews, we aimed to affect the visual and auditory reaction times of digital games in students aged 10-14 years in our study. We determined that the reaction times of students who play digital games will be better as the hypothesis of our study.

MATERIAL AND METHOD

A total of 168 individuals between the ages of 10-14, studying at different levels, were voluntarily included in this study. A descriptive information form was prepared to examine the views on computer games. This form was customized by the researcher by making additions to the questions determined based on the previous literature review. Previous studies (Aydın et al., 2017; Tekkurşun & Mutlu, 2019; Irmak & Erdoğan, 2016) were reviewed and a draft form was created with questions appropriate to the objectives of this study. The draft form was presented to the experts, the scope of the form and the comprehensibility of the questions were evaluated, and the necessary corrections were made and finalized.

The form included questions that aimed to determine various variables such as how much the participants play games per day, their online or offline game playing preferences, and which of the single or multiplayer game playing options they are interested in. The information collection form was prepared to be administered to the students in a sitting position in a calm and quiet room away from external influences, followed by a visual reaction time test (VRT: www.humanbenchmark.com) and an auditory reaction test (ART: new.cognitivefun.net). Reaction times were measured five times each and averages in milliseconds were recorded.

Statistical Analysis

SPSS package program (SPSS for Windows, version 22.0, SPSS Inc., Chicago, Illinois, USA) was used to statistically analyze the data obtained at the end of the study. Data were presented as arithmetic mean and standard deviation. The Kolmogorov-Smirnov test was used to test normality and Levene's test was used to test homogeneity. Skewness and kurtosis values were checked for non-normally distributed data sets and data sets within ± 2 were considered to be normally distributed. One way analysis of variance (One way ANOVA), independent sample t test and LSD tests for post hoc testing were applied to analyze the differences between the variables and visual and auditory reaction tests. Statistical results were evaluated at $p < 0.05$ significance levels.

RESULTS

The analysis of the data obtained and the answers given to the survey questions are presented in tables.

Table 1: Statistical analysis of GRZ and IRZ values according to whether the subjects play digital games or not.

		N	Mean	S.D	t	p
VRT	Players	120	296.5	55.96	-2.42	0.018
	Not Playing Games	48	327.17	80.32		
ART	Players	120	381.85	80.55	-1.645	0.102
	Not Playing Games	48	404.77	84.19		

In Table 1, the differences in VRT and ART measurements were analyzed according to whether the subjects played digital games or not. A statistically significant difference ($p < 0.05$) was found between the mean VRT of the subjects who played digital games 296.50 ± 55.96 and the mean ART of the subjects who did not play digital games 327.17 ± 80.32 . There was no statistically significant difference ($p > 0.05$) between the mean ART of the subjects who played digital games 381.85 ± 80.55 and the mean ART of the subjects who did not play digital games 404.77 ± 84.19 .

Table 2: Statistical analysis of VRT and ART values according to gender variable.

		N	Mean	S.D	t	p
VRT	Girl	98	310.76	66.95	1.295	0.197
	Male	70	297.59	62.12		
ART	Girl	98	400.19	84.99	2.232	0.027
	Male	70	371.89	75.17		

In Table 2, the differences in VRT and ART measurements were analyzed according to the gender of the subjects. While no statistically significant difference was found in VRT measurements according to gender variable ($p > 0.05$), a statistically significant difference was found in ART measurements ($p < 0.05$).

Table 3: Statistical analysis of VRT values according to playing time

		N	Mean	S.D	p
VRT	Non-Gamers	47	329	80,17	Non-gamers-less than 1 hour (0.021)
	Less than 1 hour	49	298,53	52,8	
	1-3 hours	53	291,38	49,53	Non-gamers-1-3 hours (0.004)
	3-5 hours	19	302,68	78,92	

In Table 3, the differences in the VRT values of the subjects according to their playing time during the day were analyzed. While there was a statistically significant difference between the subjects who played games for less than 1 hour and those who played games for 1-3 hours ($p < 0.05$), there was no statistically significant difference between the subjects who played games for 3-5 hours during the day and the other groups ($p > 0.05$).

Table 4: Statistical analysis of ART values according to playing time.

		F	p
ART	Between Groups	1.233	0.299
	Within Group		
	Total		

In Table 4, the ART values of the subjects according to their playing time during the day were analyzed and according to the results of one-way analysis of variance, no statistically significant difference was found between the groups ($p > 0.05$).

Table 5: Statistical analysis of VRT and ART values according to the number of players.

		N	Mean	S.D	t	p
VRT	Single Player	33	297.30	44.15	0.172	0.864
	Multiplayer	88	295.58	60.01		
ART	Single Player	33	373.91	69.51	-0.643	0.522
	Multiplayer	88	384.47	84.14		

In Table 5, VRT and ART measurements were analyzed according to the number of players. There was no statistically significant difference between single-player and multiplayer digital game preferences in terms of visual and auditory reaction time ($p > 0.05$).

Table 6: Statistical analysis of VRT and ART values according to whether digital games are played over the internet or not.

		N	Mean	S.D	t	p
VRT	Online	99	293.06	57.4	-1.249	0.214
	Offline	22	309.5	47.85		
ART	Online	99	376.71	77.25	-1.425	0.157
	Offline	22	403.55	91.37		

In Table 6, VRT and ART measurements were analyzed according to whether the digital games were played online or not. There was no statistically significant difference between online and offline game preferences of the subjects in terms of visual and auditory reaction time ($p > 0.05$).

DISCUSSION

Our study was conducted to examine the relationship between digital game playing behaviors and visual and auditory reaction times of middle school students. According to the findings, there was a difference between the students who played and did not play games in favor of the students who played games in the visual reaction time measurement, while there was a result in favor of the students who played games among the auditory reaction times, but this result was not statistically significant.

In the gender variable, there was no statistically significant difference between male and female students in terms of visual reaction times, while a statistically significant difference was found in favor of early students in auditory reaction times.

When the duration of playing games was examined, a statistically significant difference was found in favor of those who played games between those who played less than 1 hour during the day and those who played digital games between 1-3 hours and those who never played games in the visual reaction time variable. In the auditory reaction time variable, no statistically significant difference was found between the groups according to the results of one-way analysis of variance. According to the number of players and game type, no statistically significant difference was found between the groups in both groups.

In line with these findings, we can say that the visual and auditory reaction times of students who play digital games are more developed than students who do not play games. We see that students who play a lot of digital games during the day, such as 3-5 hours, have higher visual and auditory reaction times than those who play games for fewer and limited hours.

When the literature is reviewed, the effects of digital games have been investigated in various fields such as digital game addiction (Irmak & Erdoğan, 2016), digital games as a sector (Karahisar, 2013), mental effects of digital games (Mustafaoğlu & Yasacı, 2018), the relationship between digital games and physical activity levels (Hazar et al., 2017), violence and digital games (Vatandaş, 2021), e-sports and digital games (Can & Demir, 2020). Prot et al. (2014) stated that the effects of digital games are very complex and include more dimensions than good or bad dimensions. For example, although digital games with violent content that can increase aggression by using weapons are seen as scary by families, they can turn into a desirable game for armed forces that provide military training with digital games (Prot et al., 2014). Although there are various studies in the literature, studies on visual and auditory reaction times are quite limited. The findings of our study suggest that digital games have effects on visual and auditory reaction times. In a comparison of visual reaction time parameters between 50 girls and 50 boys between the ages of 17 and 20, it was observed that the reaction times of boys were shorter (Karia et al., 2012). The findings obtained in our study also support the literature in this regard.

Çalışkan and Sayaca (2019) found that hand reaction speed in individuals who play digital games is more developed than individuals who do not play games. Our research also supports this study. Akça (2022) found that e-athletes had better reaction time than goalkeepers in his study. According to this result, we can say that digital games positively affect reaction times.

As a result, it was predicted that digital games can be used for this purpose in children who want to improve their reaction time. According to studies on addiction (Güvendi et al., 2019; Dursun & Çapan, 2018; Aydoğdu, 2018), we think that the controlled and careful use of digital games in children is also important apart from these findings.

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