



ORIGINAL ARTICLE

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## The relationship between internet and game addiction and the levels of physical activity of the secondary education students

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### Abstract

The purpose of this study is the relationship between internet and game addiction and the levels of physical activity of the secondary students. The study is carried out with 409 students attending five different high school types in Bingöl province. Cognitive Behavioral Physical Activity Questionnaire (CBPAQ), Game Addiction Scale (GAS), Internet Addiction Scale (IAS) and Personal Information Form are used as data collection tools. In the study, it is found that there is a positive and high level of meaningful relationship between internet addiction and game addiction but there is no relationship between physical activity and internet and game addiction.

**Keywords:** Internet, game, addiction, physical activity

### Introduction

In all societies, adolescence means the period in which one advances to adulthood which allows maturity to occur, from childhood which does not allow the same. The period of adolescence is the period of growing up in which the preparations are made for the future. This period can also be expressed as the period of psychological, biological, economic and social transformation [1].

During this period of transformation, physical activity plays an important role for adolescents. Physical activity can be described as the bodily movements which result from the contraction of skeletal muscles of our bodies and require consumption of energy more than the normal levels [2]. Each movement, practice and activity which can be made by a person, can be considered under the light of the concept of physical activity [3]. The levels of physical activity, the factors effecting the physical activity during adolescence are closely related to the socioeconomic

status and sex [4]. One of the most important technologies of our time is the internet, since internet is a service which provides science, technology, information, conversation, communication, advertisement, commerce, education and training in a swift and easy manner with minimal costs. As a result of the fact that the internet is used in various fields, the internet stepped out of its designated field and is disseminated and gained new fields and variations. The internet, being a network which can be accessed from all over the world, resulted in computers being used more often, the internet and computer technologies becoming one of the most rapidly developing technologies and in an increase in the services provided via the internet [5]. When we look at the internet usage times, these durations may vary according to their purposes such as conversation, information, education, video games, etc. It is determinant to observe the usage purposes of the internet in order to identify addiction [6].

The fact that the time spent while playing video games is extensive, cause the disruption of the communicative abilities of the individual, limiting their movement skills and effect their abilities to participate in social events. Video games cause addiction, developmental issues and mental health problems for the individual. It increases isolation, causes not being able to control one's emotions, passivity, violence

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against animals, self-harm, tendency for committing crimes, avoiding communication and engaging in violent behaviours [7].

Individuals encountered new disorders such as the fear of missing out on the latest developments of the digital world, fear of being deprived of the device [nomophobia] and fear of being deprived of the internet. Additionally, problematic internet usage is associated with a number of negative conditions such as depression, social isolation, loneliness, lack of tolerance, low self-esteem, attention deficit, neck pain, disruption of domestic relationships and decrease of life expectancy [8].

The fundamental hypothesis of the cognitive-behaviourist approach is that the psychological challenges of the individual influence their manner of analysing the events or incidents they have experienced. Cognitive-behaviourist approach is based on the hypothesis that emotions and opinions are in a mutual cause and effect relationships and that they influence each other significantly [9].

Many studies regarding the topic are conducted on various target groups [10,11]. Internet and video game addiction is associated with topics such as sociodemographic features such as age, sex and class [12,13], social anxiety [14], loneliness and relationship with others [15], subjective well-being [16], academic success and social life [17]. Concerning the topic, studies on physical activity in the literature are usually conducted in association with topics such as life style [18], living standards [19,20], exercise and diabetes [21], obesity [22], dietary habits [23], sedentary life [24], body mass index [25], depression and anxiety [26]. Therefore, the purpose of the research is to examine the relationship between the internet and video game addiction and the physical activity levels of the secondary education students.

## Materials and Methods

### Type of the study

Survey model, a quantitative research method, is used for this research.

### Population and sample of the study

The population of the research consists of the secondary education students enrolled in public or private high schools at 9th, 10th, 11th, 12th grades during the fall period of the 2019-2020 academic year. Its sample consists of 409 students chosen with appropriate sampling methods. As a result of the power analysis conducted in order to designate the sample, the magnitude of the sample is calculated as 380 individuals.

50,4% of the participants are male students. Amongst the participants, 24.2% are Anatolian High School students, 21.8% are Vocational High Schools students, 19.1% are Private High School students, 17.6% are Science High School students, 17.4% are Imam Hatip High School students. The majority of the students consists of 10th and 11th grade students [31.1%]. 25.7% of them are 9th grade students whereas the remaining 12.2% are 12th grade students. The number of students who spend their leisure time on the internet is 35.9%. Amongst the participants, 29.1% spend their leisure time with their friends whereas 22.2% spend it with their families and 12.7% with sports.

**Table 1.** Demographical features of participating students

		N	%
<b>Gender</b>	Female	203	49.6
	Male	206	50.4
<b>High school type</b>	Vocational High School	89	21.8
	Anatolian High School	99	24.2
	Private High School	78	19.1
	Science High School	72	17.6
	Imam Hatip High School	71	17.4
<b>Grade</b>	9th Grade	105	25.7
	10th Grade	127	31.1
	11th Grade	127	31.1
	12th Grade	50	12.2
<b>How do you spend your leisure time?</b>	With my family	91	22.2
	With my friends	119	29.1
	With sports	52	12.7
	With the internet [mobile phone, tablet, computer]	147	35.9

## Data Collection Tools

### Descriptive Characteristics Form

This form consists of questions regarding sex, the type of school they attend, their grades and how they spend their leisure times.

### The Cognitive Behavioural Physical Activity Questionnaire [CBPAQ]

“The Cognitive Behavioural Physical Activity Questionnaire [CBPAQ]” was transcribed into Turkish by Eskiler et al. [27]. The CBPA questionnaire is developed to identify the attitudes and behaviours of adolescents between the ages of 13 and 17, concerning the participation in physical activities. The questionnaire of 15 articles consists of three sub-sections, namely, result expectation, self-regulation and personal obstacles. Questionnaire articles scale in 5-point Likert Scale from “1. Strongly Disagree” to “5. Strongly Agree”. Coefficient of consistence of the scale is calculated as 0.84. Cronbach alpha value is calculated as 0,752 for this research.

### The Game Addiction Scale for Adolescents [GASFA – Short Form]

The Game Addiction Scale for Adolescents was transcribed into Turkish by Ilgaz [28] by applying it to the adolescents between the ages of 12 and 18. The short form of the Game Addiction Scale for Adolescents was developed by Anli & Tas [29] in accordance with the DSM V the internet game addiction diagnosis criteria. The scale has a single section and 9 articles consisting of “Never [1], Rarely [2], Sometimes [3], Often [4] and Very Often [5]”. Cronbach alpha value is calculated as 0.81 with the consistence test for the scale. The lowest score received from the scale is 9 whereas the highest is 45. Cronbach alpha value for this research is calculated as 0,89.

### The Internet Addiction Test [IAT]

The Internet Addiction Test was developed by Young 1998. The Internet Addiction Test was transcribed into Turkish by Cakir

& Horzum [30]. Scale consists of the degrees of 1 [rarely], 2 [occasionally], 3 [often], 4 [most of the time] and 5 [always]. The lowest score received from the scale is 19 whereas the highest is 95. One article was removed during the transcription works into Turkish and the scale was transcribed into Turkish with 19 articles. For the evaluation of the scale, 19-44 scores are considered to be normal, 45-70 scores are user under risk and 71-95 scores are addicted. Cronbach alpha value for the consistency and applicability for Turkish is calculated as 0.89. Cronbach alpha value is calculated as 0,851 for this research.

### Data analysis

Statistical analysis of the study was conducted by using SPSS 20.0 [IBM Inc, Chicago, IL, USA] program. The determinant measures are presented in tables as rarity [percentage] for categorical data and as average±st.deviation for numerical data. For the comparison of two independent groups, Mann-Whitney U test and for the comparison of multiple groups Kruskal-Wallis test are used. In order to designate the relationship between the scales, Spearman's Rho correlation analysis is used. For all of the analysis,  $p < 0,05$  is considered to be meaningful.

### Ethical considerations

An approval from Inonu University Health Sciences Scientific Research and Publication Ethics Committee. In the study, as high school students were under the age of 17. The students who participated in the study were assured that their information would be kept confidential and they were free to withdraw from the study at any time.

## Results

In this section, the findings of the research conducted to examine the relationship between internet and game addiction and the levels of physical activity of the secondary students are presented.

**Table 2.** Comparison of the scales per sex

Sex	Female [n=203]	Male [n=206]	
	Average±SS		P
<b>CBPAQ Result Expectation</b>	18.80±5.29	18.72±5.30	0.911
<b>CBPAQ Self-Regulation</b>	13.83±4.82	14.75±4.60	0.030*
<b>CBPAQ Personal Obstacles</b>	15.51±4.18	14.75±4.38	0.101
<b>GASFA</b>	18.94±8.63	22.19±7.69	<0.001*
<b>IAT Day to Day Life</b>	19.12±7.18	19.25±6.66	0.626
<b>IAT Duration Increase</b>	13.19±5.06	13.80±4.95	0.161
<b>IAT Issues</b>	9.08±3.70	8.84±3.38	0.664
<b>IAT General</b>	41.40±14.24	41.89±13.19	0.471
<b>CBPAQ General</b>	48.15±9.62	48.23±9.55	0.832

Upon comparison of the answers received per sex in accordance with Mann-Whitney U test, it is observed that only the CBPAQ self-regulation sub-section [ $p=0.030$ ] and GASFA scale [ $p=0.001$ ] presented meaningful difference. Other general scales and sub-section scores presented similar results for female and male students whereas both self-regulation and game addiction scores are observed as meaningfully high in male students.

**Table 3.** Comparison of the scales per school type

High School Type	Vocational High School [n=89]	Anatolian High School [n=99]	Private High School [n=78]	Science High School [n=72]	IHHS [n=71]	p
<b>CBPAQ Result Expectation</b>	17.95±5.56	19.78±4.96	17.63±5.43	19.84±5.06	18.50±5.14	<b>0.006*</b>
<b>CBPAQ Self-Regulation</b>	15.10±4.48	14.23±4.60	13.92±4.70	13.40±4.80	14.70±5.06	0.164
<b>CBPAQ Personal Obstacles</b>	15.24±4.34	15.62±4.44	14.06±4.32	15.67±3.92	14.93±4.26	0.066
<b>GASFA</b>	20.29±7.97	20.29±8.25	20.91±8.03	19.86±8.69	21.67±8.87	0.727
<b>IAT Day to Day Life</b>	19.65±7.33	20.03±6.87	19.88±6.01	17.54±7.30	18.34±6.77	0.081
<b>IAT Duration Increase</b>	13.66±5.12	14.35±4.89	14.06±4.99	12.90±4.48	13.50±4.95	<b>0.027*</b>
<b>IAT Issues</b>	9.08±3.40	9.08±3.75	8.68±3.13	8.51±3.64	9.41±3.76	0.565
<b>IAT General</b>	42.39±14.02	43.46±13.80	42.63±12.48	38.17±14.46	40.65±13.33	0.093
<b>CBPAQ General</b>	48.30±10.44	49.63±8.51	45.61±9.47	48.92±8.79	48.14±10.38	<b>0.024*</b>

Above comparisons made per the type of high school the students attend in accordance with Kruskal-Wallis analysis, a meaningful difference [ $p=0.024$ ] for the CBPAQ general scale per type of high schools is observed. It is also observed that the result expectation sub-section of CBPAQ presented a meaningful difference per type of school variation [ $p=0.006$ ]. Additionally, the score for the desire to increase the duration for the time spent online concerning the internet addiction, presented a meaningful difference per type of school [ $p=0.027$ ]. It is observed that scores for result expectation sub-section are significantly higher for the students

attending Anatolian and Science High Schools compared to the ones attending Vocational and Private High Schools. It is observed that the scores for the desire to increase the duration concerning the scale of internet addiction are significantly higher for students attending Anatolian and Private High Schools. It is found that the total CBPAQ scores for students attending Anatolian High Schools are significantly higher than the other high school types.

Above the comparisons made per the grade of the students by using Kruskal-Wallis analysis, while the scores for video game

**Table 4.** Comparison of the scales per grade

Grade	9th grade [n=105]	10th grade [n=127]	11th grade [n=127]	12th grade [n=50]	
	Average±SS				P
CBPAQ Result Expectation	18.97±5.28	18.18±5.36	18.84±5.37	19.60±4.89	0.319
CBPAQ Self-Regulation	14.23±3.91	13.90±5.18	13.94±4.54	16.36±5.14	<b>0.015*</b>
CBPAQ Personal Obstacles	15.41±4.39	15.01±4.58	14.99±3.83	15.20±4.53	0.832
GASFA	20.68±8.06	21.64±8.49	19.89±8.42	19.36±8.09	0.306
IAT Day to Day Life	18.44±7.39	20.67±6.70	18.79±6.50	18.00±6.21	<b>0.036*</b>
IAT Duration Increase	13.12±5.23	14.38±5.07	13.22±4.79	12.78±4.29	0.128
IAT Issues	8.54±3.37	9.77±3.78	8.51±3.50	8.92±3.15	<b>0.030*</b>
IAT General	40.10±14.23	44.83±13.94	40.52±13.24	39.70±12.04	<b>0.036*</b>
CBPAQ General	48.61±8.76	47.09±10.51	47.78±8.88	51.16±10.01	<b>0.029*</b>

addiction in adolescents presented no meaningful difference per their grade; total scores of IAT [p=0.036] and CBPAQ [p=0.029] presented significant differences. The internet addiction score of 10th grade students presented a meaningful increase compared to the other grades and it is observed that CBPAQ score for 12th grade students presented a significant increase. Additionally, it is

observed that scores of CBPAQ [p=0.015] self-regulation sub-section for 12th grade students as well as sub-section of preferring internet over daily life [p=0.036] for 10th grade students presented a meaningful increase.

All of the scales and sub-sections of scales presented meaningful

**Table 5.** Comparison of the scales per the manner by which the students spend their leisure time

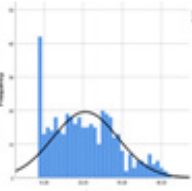
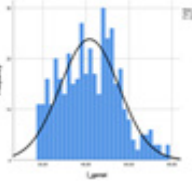
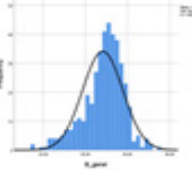
Spending Leisure Time	With my family [n=91]	With my friends [n=119]	With sports [n=52]	With the internet [n=147]	
	Average±SS				P
CBPAQ Result Expectation	18.17±5.37	19.05±5.08	21.69±3.69	17.85±5.55	<b>&lt;0.001*</b>
CBPAQ Self-Regulation	14.19±4.76	14.75±4.66	17.08±4.31	13.01±4.45	<b>&lt;0.001*</b>
CBPAQ Personal Obstacles	15.42±4.15	15.66±4.19	12.77±4.22	15.35±4.26	<b>0.001*</b>
GASFA	18.04±7.08	18.33±7.93	19.80±6.18	24.22±8.76	<b>&lt;0.001*</b>
IAT Day to Day Life	17.02±6.00	18.05±6.76	16.15±5.97	22.52±6.60	<b>&lt;0.001*</b>
IAT Duration Increase	12.15±4.42	12.64±4.83	12.06±3.93	15.54±5.05	<b>&lt;0.001*</b>
IAT Issues	8.55±3.48	8.37±3.20	7.84±3.05	10.08±3.73	<b>&lt;0.001*</b>
IAT General	37.72±12.42	39.06±13.22	36.06±11.02	48.15±13.32	<b>&lt;0.001*</b>
CBPAQ General	47.78±10.29	49.47±9.48	51.54±5.51	46.22±9.91	<b>0.003*</b>

difference per the manner by which they spend their leisure time [p<0.001]. CBPAQ scores are observed as significantly lower for the students spending their leisure time on the internet [46.22±9.91] and significantly higher for the students spending their leisure time on sports [51.53±5.51]. Additionally, it is observed as higher for the students spending time with their families or friends, compared to the students spending their times on the internet. The internet addiction scale score is observed as seriously lower for the students spending their times with their families or on sports whereas it is observed as significantly higher for the students spending their time on the internet [48.14±13.31]. Similarly, scores from GASFA

presented as significantly higher [24.22±6.60] for the students spending their time on the internet.

Above the examination of Table 6, positive and high correlation levels between IAT and GASFA are observed [Rho=0.519; p<0.001]. As the internet addiction increases, video game addiction also increases. It is observed that there are no meaningful correlations between GASFA and CBPAQ. Similarly, it is also observed that there are no meaningful correlations between IAT and CBPAQ scales.

**Table 6.** Correlation between the scales

Spearman's Rho Correlation	Adolescent Game Addiction	Internet Addiction	Cognitive Behaviourist Physical Activity
<b>Adolescent Game Addiction</b>	Rho		-0,050
		0,519	0,316
<b>Internet Addiction</b>	Rho	0,519	-0,025
		<0,001*	0,609
<b>Cognitive Behaviourist Physical Activity</b>	Rho	-0,050	-0,025
		0,316	0,609

## Discussion

The purpose of this study is to examine the relationship between the physical activity levels of the secondary education students and the internet and video game addiction.

Upon the examination of the results received from the research per sex variant, a meaningful relationship between the physical activity levels of the students and the internet and video game addiction, is observed. The self-regulation sub-section of CBPAQ scale is found as to be significantly higher for male students. The results of this research which suggests that male students received more meaningfully higher scores than female students, is consistent with the other studies present in the literature of the field [20,26,31].

Upon examining the scores received by students from video game addiction, it is observed that video game addiction scores of male students are higher than those of female students. Upon examining the literature of the field, it is also observed that there are studies which support the result of male students having higher scores than female students [32,33]. These results may be interpreted as male students having higher interest in digital games, the internet and technology than female students.

Upon the examination of the study concerning internet addiction, no meaningful differences are found by sex. It is found in Aslan & Yazici's [34] study in which the internet addictions of the students are examined regarding sociodemographic features, that there are no meaningful differences between sexes.

In some of the reviewed studies, studies in which male students have higher internet addiction scores than female students are encountered [16,35,36].

It is observed that there is a significant difference between the physical activity and internet addiction levels regarding the type of high schools the secondary education students attend. While it

is observed that result expectation sub-section of CBPAQ scale for students are higher for those in Anatolian and Science High Schools whereas it is also observed that other sub-sections of the scale are also close to the meaningful levels. It is observed that the general CBPAQ score is higher for the students of Anatolian High Schools than the students of other types of high schools.

It is observed that the internet addiction levels of the students of secondary education present a difference regarding the types of high schools. It is observed that the desire to increase the duration concerning the internet addiction is significantly higher for the students of Private and Anatolian High Schools. Studies supporting this result are identified [37,38].

Upon the examination of results presenting the relationship between the physical activity levels of the secondary education students and the internet and video game addiction regarding the grades of the students, while no meaningful differences are found between the scores received by the secondary education students for the internet addiction scale, it is observed that there are meaningful differences between general scores of internet addiction and physical activities.

It is observed that the scores for physical activities are higher for the students of the 12th grade. Kangalgil, Hunuk & Demirhan [39] in their research examining the attitudes of primary, high school and university students regarding physical education and sports, they found that the attitudes of the students present statistically significant difference by their grades.

It is observed that internet addiction is significantly higher for students studying at the 10th grade. Tas, Eker & Anli [38] in their research examining the internet and video game addiction of the secondary education students, found that students of the 11th grade presented a higher level of internet and video game addiction. However, no meaningful difference for the video game addiction of the students has been found regarding their grades.

The fact that the secondary education students are in preparation for the higher education entrance exams while they are at the 12th grade, may explain why the internet addiction levels are lower for the 12th grade students. It is possible that the students push the internet usage into the background for reasons such as studying and their concern for the future. The reasons regarding the lower internet usage amongst 9th grade students, may be explained with new schools, different environments and the process of adapting to new social relationships.

Upon the examination of the scores received by the secondary education students regarding the scales for the manner by which they spend their leisure time, meaningful differences are observed in all scales. It is observed that physical activity is significantly lower for the students who spend their leisure times on the internet whereas it is significantly higher for the students who are interested in sports. While the internet addiction is significantly lower for the students who spend their leisure times with their families, it is observed that it is significantly higher for the students who spend their leisure times on the internet. It is observed that video game addiction is seriously higher for the students who spend their leisure times on the internet. Emre [40], found that game addiction accounts for 53% reactive-proactive aggression.

In their research conducted on high school students, Simsek, Akca & Simsek [41] found that students with bad friendship relationships present addiction features. This result is in correlation with the conducted study. There are also studies which are not consistent with the conducted study.

It is observed that there is a positive, high level and directly proportional relationship between the internet addictions and video game addictions of the secondary education students. In other words, video game addiction increases with the internet addiction. However, no relationship between the physical activity and the internet addiction is found. Similarly, it is observed that there is no significant correlation between physical activity and video game addiction.

## Conclusion

While a positive, high level and significant relationship between the internet addiction and game addiction is observed in the research, it is also observed that there is no significant relationship between the levels of physical activity and the internet and game addiction. It is observed that the levels of physical activity and game addiction present a significant difference for the students based on their sexes. It is suggested that there are no significant differences for the game addiction based on the school types and grades of the students. It is observed that there are significant differences between the score they received from the scales for the manner by which they spend their leisure times. Some suggestions can be made; by supporting the data concerning physical activity, the internet and video game addiction with quantitative data, underlying reasons for such results can be investigated. This study is limited to 409 students who continue their high school education in the city of Bingol. The study is limited with scores obtained from Cognitive Behavioral Physical Activity Questionnaire (CBPAQ), Game Addiction Scale (GAS) and Internet Addiction Scale (IAS).

*This article was produced from the first author's master's thesis*

## Conflict of interests

*The authors declare that they have no competing interests.*

## Financial Disclosure

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## Ethical approval

*Ethical approval is received from the Inonu University Health Sciences Scientific Research and Publications Ethics Board with decision numbered 2019/293.*

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