

The Prediction Role of Delay of Gratification on Game Addiction in Children

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ABSTRACT

This research investigates the prediction of delaying gratification on game addiction among primary school students who attend the 3rd and 4th-grade. This study, in which the delay of gratification behaviour correlated with game addiction among children, was carried out using a descriptive survey model. The study sample consisted of 318 students who attend 3rd and 4th-grade classes in a primary school in Kocaeli. Of the total 318 participants, 103 (32.4%) were 3rd graders and 215 (67.6%) were 4th graders. The gender ratios of the participants were 48.4% (154) female and 51.6% (164) male students. In the study, the Game Addiction Scale in Children and the Delay of Gratification Scale was implemented as data collection instruments. SPSS 23.0 package program was used for the analysis of the data. Descriptive statistics, correlation and regression analyses were used to analyse the data. Analysis findings showed a significant and positive correlation between game addiction and subfactors in the delay of gratification behaviours with the value of $r=.658$ for internet and TV, $r=.584$ for technology, $r=.501$ for sports, $r=.361$ for money, and $r=.174$ for food. As a result of the regression analysis, it was seen that the delay of gratification behaviours and its subfactors affected game addiction. With these results, the research, aimed to contribute to the disciplines related to psychological counselling and addiction regarding psychometric qualifications.

Keywords: Addiction, game addiction, delay of gratification, behaviour, regression.

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INTRODUCTION

In the past times, nature was a basic playground for children. Yet, the modern era's playground is limited to children's homes due to various factors. It is certain that the excessive use of technology is one of the most important factors that restrict children's activity environment. However, technology offers children many attractive opportunities such as digital games which allow simultaneous interaction via multiplayer games.

Children are playing common games together but they do not see each other physically. This situation prevents face-to-face communication and problem-solving skills, which requires the mastery of collective behaviours. Moreover, these type of digital environment games makes children passive actors on earth. Ultimately, childhood games have changed dimension: from the physical environment to the virtual and passive world. There is no doubt that as the virtual world's popularity increased, the gaming industry has

begun to gain strength. Giant technology brands constantly produce new digital games to attract children's attention. According to Newzoo (2018), details that stand out in the first hundred ranking that earn the most revenue from the gaming industry worldwide; the top three countries are China (34.400 M \$), the USA (31.535 M \$) and Japan (17.715 M \$). Turkey ranks 18th (with 853 M \$) in this statistical research.

The gaming industry is constantly producing digital games in different categories to keep children's interest alive. Ögel (2012) states that computer games, together with the most played type, are classified as follows; action games (labyrinth games, shooting games, car race games), adventure games (collection of objects and solving puzzle games, for instance; Zork, Myst and Riven, Indiana Jones, Where in the World is Carmen Sandiego etc.), fight games (for instance; Mortal Kombat, Virtual Fighter), entertainment games (Okey, backgammon, card games), role-playing games (Ultima, EverQuest, Wizards and Warriors), simulation games (Sim City, Flight Simulators), sport games (FIFA, NBA, Skating, Tennis, Baseball, Golf, Motobike, Championship Manager), strategy games (Civilisation, Age of Empires, Warcraft), mission games (soldier games. For instance; Delta forces, IGI, Battlefield 1942, Dogfighter, Counter-strike, Quake, Mafia, and Medal of Honour). Another crucial factor that attracts children's attention to digital games is making money via high game levels. Children who gain experiences in digital games can sell their game levels. For example, some games such as Knight online can be sold for about 25000 Turkish liras (Ögel, 2012).

When there is a wide range of game categories and kinds, the duration of playing games increases. According to statistics related to the game industry shared by Newzoo (2018), the top three time rankings of games played via Twitch and YouTube applications worldwide are; League of Legends (84.0 million hours), Dota (46.1 million hours) and Counter-Strike: Global Offensive (27.0 million hours). In the I-Gen book, Twenge (2018) shares stunning statistics about the internet, phones, and game addiction from her longitudinal study conducted with the young population from 1970 to this day. According to statistics from her research that evaluates high school students, 8th and 12th-grade students spend approximately 1.5 hours a day playing computer games; this ratio was below one hour in a routine day. Twenge also claims that girls may catch up with boys' playing digital games in the near future due to mobile phone games such as *Candy Crush* which girls intensively play.

Excessive internet use could lead to physical and mental health problems. A person goes beyond physical boundaries with digital games. So, the concept of time changes because of digital games, and a child gradually disappears into this infinity time (Ögel, 2012). Autocontrol mechanisms in children develop in childhood stages, and children's self-control skills are affected by both internal and external factors. Technology itself is an external factor that is available for children at every moment. Therefore, one of the disadvantages of digital games for children is the absence of self-control skills (Ögel, 2012).

While the digital world presents all these misleading opportunities to children, they turn into addicts of these passive games unwittingly by giant game industries through countless subliminal messages and advertisements. The most important factor in developing of an addiction is the activation of the brain's region called 'the pleasure path'. In other words, when the path of pleasure in the brain is activated, the person receives gratification. Thorough learning gratification, the brain starts searching for objects that will recreate pleasure (Ögel, 2012). In this context, Horzum (2011) states that game addiction can be defined as over-playing negatively affects health, academic success and daily life. The symptoms of game addiction in children are excessive fatigue, low academic performances, reduced interest in hobbies, alienation from real (non-virtual) friends, disobedience and opposition to society (particularly to family members and teachers) (Ögel, 2012). The majority of children who are addicted to digital games prefer games that involve violence and aggression. One of the main reasons for this is that aggression is nurtured and found in digital games. Furthermore, the excitement, adrenaline and endless adventure created by these games in children cause addiction to become stronger (Arıcak, 2015).

Delay of gratification as the second term of the present study is to give up activities that will provide immediate satisfaction for the sake of significant long-term rewards (Koç, Ayas, Çolak, Güven and Düşünceli, 2014). Although various researchers define this concept, its meaning is essentially the same. Dawd (2017) states that delay of gratification can be considered the opposite of impulsivity. In other words, delay of gratification can be evaluated as future-oriented, goal-oriented and planned behaviours compared to impulsivity. According to Cuskelly, Einam, and Jobling (2001), delay of gratification means that an individual's

ability to lose an immediate goal to gain a preferred goal is more distant in time.

The most popular study related to delay of gratification is the *Marshmallow experiment* conducted by Walter Mischel in the 1960s with kindergarten students. The marshmallow test was conducted with more than 550 kids enrolled at Stanford University Bing Kindergarten between 1968 and 1974. A sample from these participants was followed for long years and evaluated on various criteria every 10 years. Samples from these kids reached the first half of their 40s in 2010, and as of 2014, information such as occupational, marital, physical, financial, and mental health status continues to be collected.

By the time of adolescence, the kindergarten students who had been able to postpone the Marshmallow Test for longer periods of time had more self-control in frightening situations over the past 12 years. They surrendered less to seduction, and they got less distracted when they tried to concentrate; they were more intelligent, self-confident, and relied on their own judgement (Mischel, 2016). When adults reach 25-30 years of age, delay of gratification is more effective in pursuing and achieving their goals, less risky substance use, higher educational levels and significantly lower body mass indexes. Lastly, when adults who have a high level of delay of gratification reached their 40s, effective problem-solving skills, creative thinking skills, and their prefrontal cortex were more active. Going backwards, the ventral striatum (part of the brain related to desire, pleasure, and addiction) of adults who have a lower level in the delay of gratification was more active (Mischel, 2016).

This research aims to examine the association between the delay of gratification behaviour and game addiction in children. A feature that makes this research different from others is discussing the delay of gratification and game addiction in the same study.

The hypothesis sentences of this research are listed as follows;

H1: There is a correlation between the delay of gratification and game addiction in children.

H2: There is a correlation between the subfactors of delay of gratification and game addiction in children.

H3: Money, technology, the internet, and television as subfactors for the delay of gratification can predict game addiction in children.

RESEARCH METHOD

Research Model

This research is a descriptive correlational study. Correlational design is a non-experimental form of research where investigators use correlational statistics to determine and measure an association between two or more scores (Creswell, 2014). The study has been designed descriptively to determine the correlation between the delay of gratification and game addiction in children who attend 3rd and 4th grades. In other words, the study searched whether there is a correlation between the terms delay of gratification and game addiction. However, it was found out that there is a prediction of delaying gratification on game addiction among primary school students who attend the 3rd and 4th grade.

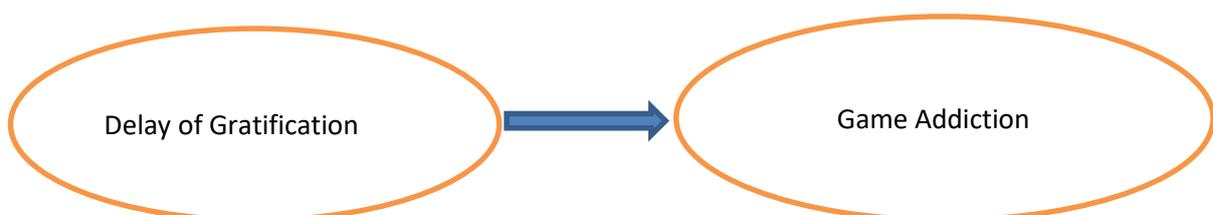


Figure 1. The Research Model of Delay of Gratification and Game Addiction.

Participants

The research participants were 318 primary students, where 154 (48,4%) were females and 164 (51,6%) were males. The participants study in Gebze (district of Kocaeli in Turkey). 103 (32, 4%) were 3rd-grade, and 215 (67,6%) were 4th-grade level primary school students. The participants' were between 10 and 11 years old. Lastly, 264 (83%) of the participants had a computer or tablet. The age of using technological devices via an internet connection has increased even in kindergarten students. Therefore, third and fourth-grade students were preferred as participants. Lower-grade students (e.g. kindergarten, first-grade, and second-grade students) were not selected as participants because of their illiterate and mental developmental periods. Griffiths (2008) claimed that video-game addiction might be age-related adolescent behaviours.

Table 1. Findings related to demographic information of the participants

	Groups	n	%
Grade	3 rd Grade	103	32.4
	4 th Grade	215	67.6
Gender	Female	154	48.4
	Male	164	51.6
Computer	Available	264	83.0
	Absent	54	17.0

It is seen on the demographics table above that most of the participants consist of 4th-grade students (67.6%), and gender ratios are close to each other. Therefore, it can be said that there is homogeneity between the two sexes. Furthermore, most of the participants have a personal computer or a tablet (83.0%).

Data Collection Tools

Demographic Information Form. To determine the demographic characteristics of the primary school students in the study the researcher prepared a Demographic Information Form to benefit from the answers given to the questions about age, gender, class, economic level, and whether they had a computer.

Delaying Gratification Scale (DGS). The Delaying Gratification Scale was developed by Koç, Ayas, Çolak, Güven and Düşünceli (2014). This scale aims to develop a valid and reliable scale to determine the delaying gratification level among university students. The scale was conducted with 336 students (184 females and 152 males) from Sakarya University Faculty of Education. The scale consisted of 33 items with a 5-point Likert scale and 5 factors. The 5 items of the scale were reverse items. Cronbach's Alpha internal consistency was performed for the scales reliability. Internal consistency coefficient values of the scale were between .63 and .94. According to Nunally (1978) this value is an acceptable value for pschometric qualities (Pallant, 2015, p.18).

Computer Game Addiction Scale for Children (CGASFC). Horzum, Ayas, and Çakır-Balta (2008) developed the Computer Game Addiction Scale for Children. The aim of developing this scale was to determine children's addiction to games at primary school levels. The scale was conducted with 460 students from different socioeconomic backgrounds studying in a primary school in Trabzon. The scale consisted of 24 items with a 5-point Likert scale and 5 factors. Cronbach's Alpha internal consistency was performed for scales reliability. The scale's internal consistency coefficient value was .85, and this is an acceptable value for the scale's qualities. Nunally (1978) suggests an internal consistency coefficient value higher than .70 is acceptable.

Data Analysis

After acquiring permissions from the school administration, the instruments were conducted randomly the 3rd and 4th-grade students. Data was collected by the paper-pencil method. After data collection, all results were registered to the computer. SPSS 23.0 program was used to analyse the data statistically. Descriptive, ANOVA, correlational, and regression analyses were some of the statistical analyses methods used for evaluating and determining the relationship between game addiction and delay of gratification. The Durbin-Watson value is 2.055; since the Durbin-Watson value was near 2, a non-autocorrelation was

indicated between variables.

FINDINGS

Participants' Computer Game Addiction Scale for Children total scores with the mean of 42.02 points ranged between 21 and 97 ($S_s = 13.34$). Concerning the delay of gratification scale, scores of the subfactors were between 6 and 30 ($\bar{X} \pm SD$; 15.52 ± 3.65) for food delay, 6 and 25 ($\bar{X} \pm SD$; 12.53 ± 3.59) for delaying earning money, 7 and 31 ($\bar{X} \pm SD$; 12.30 ± 5.54) for delaying technology, 6 and 30 ($\bar{X} \pm SD$; 11.40 ± 4.53) for delaying internet and television, and 8 and 40 ($\bar{X} \pm SD$; 14.62 ± 6.84) for delaying sports activities. The present research analysed the correlation between game addiction and subfactors of the delay of gratification. The correlation analysis table is presented as follows:

Table 2. Correlations between Game addiction and delay of gratification

	Food	Money	Technology	Internet and TV	Sport
Game Addiction	,174**	,361**	,584**	,658**	.501**

* $p < .050$, ** $p < .010$.

There is a moderate relationship between the inability to postpone internet and television ($r = .658$), technology ($r = .584$), sports activities ($r = .501$), and money ($r = .658$) with the game addiction scores of students who participated in the study. On the other side, it was detected that there is a lower level of a significant positive relationship between the inability to postpone food ($r = .174$) and game addiction scores ($p < .01$). These findings show a significant positive correlation between game addiction and the subfactors of the delay of gratification scores. In other words, the further the delay of gratification levels increases, the higher the participants' game addiction levels rise. The linear regression analysis table is presented as follows:

Table 3. Linear regression analysis of game addiction and delay of gratification

	B	Std. Error	Beta	t	p
Constant	8.469	3.090		2.741	.006
Gender	1.259	1.093	.047	1.152	.250
Class	4.785	1.136	.168	4.211	.000
Computer belonging	-2.843	1.392	-.080	-2.042	.042
Food	.208	.145	.057	1.438	.152
Money	.324	.158	.087	2.042	.042
Technology	.566	.128	.235	4.435	.000
Internet and TV	1.111	.162	.377	6.861	.000
Sport activists	.192	.101	.099	1.903	.058

As presented in the table above, class level, computer ownership, as subfactors of delay of gratification in; money, technology, internet and television are significant predictors of game addiction in children. In contrast to that, gender, as subfactors of delay of gratification in food and sports is not a significant predictor of game addiction in children. The results show that 4th-grade students have a high level of dependency on playing the games. In terms of computer ownership, individuals who have a computer have a higher dependency level than children who do not own a private computer. Also, subfactors of delay of gratification in money, technology, the internet, and television affect game addiction among children, meaning that individuals who can not postpone their gratification have higher dependency scores in digital games. Furthermore, linear regression analysis was conducted in terms of delay of gratification subfactors on game addiction stage in children. The results of the analysis are as follows (total model: $F_{8,309}=44.132$, $p < 0.001$, $R^2=.533$, adjusted $R^2=.521$).

DISCUSSION AND CONCLUSION

The focus of this research is game addiction and delay of gratification. In other words, the study looks into whether there is any relationship between the delay of gratification and game addiction. Pleasures are acted on quickly rather than over a long time have a high level of dependency potential (Ögel, 2012). It can

be detectable from this expression that accessible concrete objects can control pleasures easier than long term abstract targets. From this point of view, world statistical internet usage rates direct attention to the internet availability worldwide. According to recent statistical data in 2019, approximately 58.8% of the world population actively uses the internet. In terms of continents, North America is in the first place with 89.4%, and Africa is the last with 39.6% (Internet World Stats, 2019). These ratings can be attributed to economic factors; Africa comes last in that category whereas North American countries have higher economic standards. Toker and Baturay (2015) stated that socio-economic status, gender, online gaming, computer gaming and mothers employment status increased game addiction levels. Consequently, internet usage and playing game on a computer or any other device can be related to playing digital games.

DSM-V (2013) has considered gaming addiction risk factors in two classes considering related research. According to these studies, environmental and genetic factors are evaluated as two separate groups. Adolescents are genetically the riskiest group to bear a disorder related to behavioural addiction. On the other hand, the availability of a computer or internet connection is a potential risk element in environmental terms. Moreover, internet gaming addiction can lead to school failures, if authorities do not enforce necessary precautions.

Recent studies in Twenge's *I-Gen* book (2018) show that high school students in the 12th grade spend an average of 2-2.5 hours on texting, about 2 hours on online activities, 1.5 hours on electronic games, and ½ hour on chatting in a day. These results mean that young students consume an average of 6 hours a day using their mobile phones. This proportion is equal to an average adult's sleep duration on a normal day. Results are not different for 8th-grade students as their mean was 5 hours a day (p. 83). Twenge's research was a longitudinal study from the 1970s to 2015. Adolescents of the 1970s were reading a book or a magazine almost every day. These proportions were 16% for adolescents in 2015. These results showed the extents of the difference between adolescents in the baby boomer generation and internet generation (the word of Twenge *I-Gen*) in 2015.

Horzum (2011) found that game addiction has a significant difference in participants' gender, socio-economic status and class level. According to this research, boys, and girls from high socio-economical levels have a lower game addiction level than 4th-grade students, students from low and mid-level socio-economic status and 3rd and 5th-grade students. Lastly, it was found that there is no significant difference between having a computer (for playing games) and game addiction. This analysis demonstrates that students who are addicted to games can play digital games for a long time even if they do not own a private computer.

A meta-analysis of the literature review by Kuss and Griffith (2012) was based on the literature review. According to the research, 30 studies were assessed to classify game addiction in children and adolescents; these included game addiction based on the criteria for pathological gambling (n=18), the criteria for substance abuse (n=3), a combination of both pathological gambling and substance abuse (n=3), parental referral (n=2), and other miscellaneous classification criteria (n=4). All these parameters in the meta-analysis study suggest that problematic online gaming can be considered a behavioural addiction rather than an impulse control disorder. Consequently, addiction to digital games can be controlled by healthy children and adolescents if they can modify their problematic behaviours related to excessive gaming. However, Saka and Aktürk (2012) conducted a research study on game addiction with 511 middle school students from Konya province of Turkey. The research results showed that boys have a higher level of addiction (X=49.75) than girls (X=40.48). However, there was a significant difference in terms of socioeconomic status (p = 0,001). Students from high and low socioeconomic backgrounds have a lower level of addiction scores than those from middle socioeconomic classes.

The American oriented Entertainment Software Association (2018) share interesting statistical data about video games, conducted with 4000 people every year since 2000. America spent a total of 36 billion dollars the video game industry in 2017. Computing and video games companies provide job opportunities to approximately 220.000 people in 50 states in American. According to ESA (2018), *Call of Duty: WW II* is the most common video game bought by video game companies in 2017. Results have demonstrated that fighting games constitute %35 and action games constitute %28 of total video games. 30% of people who play video games are younger than 18 years old. 70% of American people believe that video games positively affect the children's lives, as 55% of video gamers have explained that they connect with their peers via these kinds of

games and 46% of them with their parents. Yet, the good news is that 70% of video gamers' parents have controlled children's game duration. Research by Chakraborty (2015) expresses no significant differences between girls and boys in an academic delay of gratification and emotional quotient. Besides, there is a positive but low correlation between the academic delay of gratification and emotional quotient ($r=.279$).

Ögel (2012) expressed that computer games are an easy way of dependency because of their feature of skipping levels. As children reach a new target level, they start to acquire a routine, which becomes less exciting in time. Consequently, they want to pass the present level because of the gratification system's tolerance line, just as in the remedial dose tolerance. However, this wish to pass a level raises time spent playing online games. Eventually, gamers will intensely interact with the game, especially in long uncontrolled time durations. If the gamers are exposed to a prohibition from the played game, they will be unhappy because of the delay of gratification.

Individuals' gratification system should not depend on only one factor. In this context, environmental richness also has a significant role. As an alternative method, if the natural environment's richness increases, the possibility of dependency will decrease. As a consequence, the availability of alternative factors prohibits exposure to the digital world. Luerksen, Gyurak, Ayduk, Wendelken, and Bunge (2015) investigated the delay children's of gratification behaviours through a magnetic resonance device. It was observed that there is a link between focusing on the stimuli and a strong functional pairing between a brain region that supports approaching behaviours and several regions that support self-control within the prefrontal-parietal cortex.

A doctoral dissertation study (Corwin, 2016) investigated the relationship between attention deficit and hyperactivity disorder with the delay of gratification. In consequence of the thesis study, the author found that the symptoms of attention deficit and hyperactivity disorders significantly affect the reduction of physical delay of gratification skill. Another thesis by Watson (2015) is related to self-control, delay of gratification, and future thinking. A sample of 174 undergraduate students conducted a self-report survey three times bimonthly. Longitudinal mediation path models were constructed to determine whether self-control would function as a mediator between the delay of gratification at Time 1 and consideration of future consequences at Time 3. Outcomes demonstrated that the delay of gratification predicted higher self-control.

Although digital games have unfavourable conditions, some studies demonstrate that there are favourable sides to playing games. According to Entertainment Software Association (2018), the five most important reasons why parents play video games with their children are as follows; (i) we have fun together, (ii) my child bonds with me, (iii) it provides an opportunity for me to socialise with my child, (iv) it is also entertainment for me, and (v) it allows me to be able to monitor my child's internet usage. Additionally, Ögel (2012) stated that strategy games give children reasoning skills and critical analytical thinking skills. Some strategy games that are played with a group provide an opportunity socialisation for children, as well. These games also raise children's problem-solving skills and decision-making skills.

Similarly, games are also a socialising environments for children of this age. For example, children who play the same kind of digital games interact with each other by speaking about the same topic during break times. However, there is a disadvantage of this situation for children who do not play digital games. These children can be isolated from peer groups since they stay off-topic. Moreover, over time they can be addicted to digital games to establish a sense of belonging to a group. The focus is not on the prohibition of digital games, but the control of game duration. Under these circumstances, digital games offer more benefits than harm.

As long as digital games are used consciously by children, they can contribute to their mental well-being and different developmental stages. To solve the problem of addiction, there are various perspectives presented by some researchers. Game addiction can be taken under control by talking to the children's families without resorting to self-control interventions. Furthermore, environmental factors can be altered to heal game addiction in children such as changing places of technological devices and limiting playing times. Griffiths (2009) states that parents should check the contents of the children's games. Parents can help their children prefer educational games rather than violent games. Apart from that, children can play computer games within a group rather than as a solo-gamer. Finally, parents can limit their children's play time. Twenge (2018) suggests limiting cell phones usage of children in primary school. However, parents should present

children with natural environments to take responsibility and acquire social skills.

Furthermore, whether technology is a good or bad medium depends on how people communicate through it. If an individual can control and use it effectively, technology becomes a beneficial medium. Otherwise, people can be controlled by technology in terms of consumption of time as an addict. Yet, if addicted people implement all micro and macro preventions, addiction to technology can be resolved healthily way. Based on this study, some suggestions regarding the concepts of game addiction and delay of gratification can be listed as follows; children are supervised by parents when they are playing games in the digital environment (Horzum, Güngören, and Kaymak, 2016). Parents and children interaction can be increased with physical games in the home atmosphere. A schedule can be prepared among family members to regulate the time of playing games. Lastly, children who are addicted to playing game can be educated by parents, teachers or experts in the fields of therapy in terms of self-control skills to adjust the times of playing online games, physical games, and other daily activities.

Suggestions

- Digital games have a vital position in the life of modern age children in primary school. Therefore, in this study, the effects of digital games were investigated within the delay of gratification in children from positive and negative perspectives.
- Another result of this research manifested that game addiction can be a serious problem in children, especially in primary school. Technology as a medium is certainly not responsible for these negative effects digital games have on children. The focal point of the problem in game addiction is the problem of restricting children. Developed delay of gratification mechanisms in children can provide benefits to game addiction.
- Moreover, self-control skills are a good solution for children to limit their digital game playing time.
- Lastly, parents have a cornerstone duty in children's game addiction and delay of gratification skills. Therefore, a healthy collaboration between children and parents can lead to a conscious use of technology.

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