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Research Article

Underlying Factors of Problematic Online Gaming Behavior: Age, Intensity, and Genre

Emine Şendurur[1]
Ondokuz Mayıs University

Polat Şendurur[2]
Ondokuz Mayıs University

Abstract

Modern games offer rich user experiences through the inclusion of multimedia, increased mobile capabilities, high fidelity interfaces, and increased accessibility. Since games are integrated into a wide variety of environments, their effects on people's lives may exhibit a myriad of difference and may sometimes lead to problems that project into real life. In this study, we attempted to understand the problematic online game use of a group of gamers by examining a series of psychological, physical, and demographical factors. We reached the participants through the help of a fan page on a popular social networking site, surveying them online and conducting interviews with volunteers. The results showed that age, game genre, and excessive playing had significant effects on problematic online game usage. Among all age categories, elementary school aged gamers reported higher frequencies of losing self-control while playing. Among all genres, gamers who prefer Massive Multiplayer Online Role-Playing Games were found to experience more problems related to euphoria and conflict. On the other hand, the gamers in this study were aware of the fact that they spent excessive amounts of time playing games as well as the negative effects that playing too much had on their real lives. These excessive gamers also reported conflicts, failure to control themselves, and health related problems.

Keywords

Online gaming • Problematic behavior • Game genres • Game addiction

1 Department of Computer Education and Instructional Technology, Ondokuz Mayıs University, Atakum, Samsun 55139 Turkey. Email: emine.sendurur@omu.edu.tr

2 **Correspondence to:** Polat Şendurur (PhD), Department of Computer Education and Instructional Technology, Ondokuz Mayıs University, Atakum, Samsun 55139 Turkey. Email: polat.sendurur@omu.edu.tr

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Games have a long history both in everyday life and in educational settings. A game may be defined as a system with artificial rules and conflicts played to reach quantifiable outcomes (Juul, 2003; Salen & Zimmerman, 2004). Today, the concept of what makes a game conveys an even richer meaning due to the widespread use of the Internet. Modern games offer rich user experiences through the inclusion of multimedia, increased mobile capabilities, high fidelity interfaces, and increased accessibility. Unlike classical games, digital games provide not one, but a series of fantastic environments.

Digital games flourished during the 1960s, becoming popular as a result of their various game play and designs (Kirriemuir, 2006), which used the most up-to-date technology available at that time. The computerized versions of Tic-Tac-Toe on EDSAC, tennis on Oscilloscope, Spacewar on PDP-1, and ADVENT on Mainframes can be considered as the pioneers of the modern computer games (Kirriemuir, 2006) that begot a countless number of games. Such evolutionary games as Pacman and Super Mario attracted a young audience who would later become the early adopters of console-based games. Although television-based console games are still popular today, mobile or Internet-based games continue to gain popularity due mobile devices' high accessibility.

In digital games, computers track of the rules and allow players to draw the boundaries of a scenario and its outcomes. This frees up the restrictions of time and place and gives users the opportunity to customize their environment (Juul, 2003). Contemporary digital games still incorporate basic elements of classical game models, but the game play itself has changed dramatically. No longer are players required to use a joystick or a control pad. Instead, they are able to use their own body as the main tool of interaction. Moreover, players have the ability to play anytime, anywhere and can even adjust the game's rules (Juul, 2003) through online social networks, choosing to collaborate or to compete with other players (Whitton, 2014). Games made today offer well-devised, challenging scenarios that take time to master. In addition, user-friendly graphical interfaces enhance the overall user experience, which is influential in players' decision to continue or to leave the game. Since online environments are relatively affordable, it is only inevitable that online games become so widespread. Consequently, players may have difficulty controlling their urges and cross reasonable limits of game time, sometimes even becoming excessive.

Excessive Game Playing

Games attract people of all ages and can sometimes bring about problematic usage in individuals. The flow experience is an important contributor of both game acceptance (Hsu & Lu, 2004) and addiction (Chou & Ting, 2003). According to flow theory (Csikszentmihalyi, 1992, 1997), a balance between skills and challenges creates

a flow channel. A person will enjoy the game if a it maintains an optimal balance between skills and challenges throughout the gaming period. Otherwise, if the game is too challenging for poorly-skilled audience, then the player will abandon it due to experiencing high levels of anxiety. Moreover, if the player is highly-skilled but the game is not challenging enough, he will stop playing out of boredom.

The player keeps playing as long as there is flow zone, which means that he is skilled enough to meet the challenges and continue further in the game. Therefore, both players' demands and games' features are crucial. Flow state can be influenced by self-reaction, among other factors (Chen & Sun, 2016). Game features ranging from direct feedback to in-game assistance to help scaffold cognitive processes explain why people prefer some games over others. Studies generally emphasize the importance of games' structural characteristics. For example, long-time challenges embedded into games are frequently associated with problematic game playing (Griffiths & Nuyens, 2017).

Factors Affecting Excessive Game Playing

Digital games sometimes turn into nightmares due to loss of control. The quality of relationships with others can affect how people develop a problematic attachment to games, with adolescents being at particular risk (Lee & Kim, 2017). Players in their early adolescence spend a considerable amount of time playing such games tend to receive inadequate parental guidance (Brooks, Chester, Smeeton, & Spencer, 2016). Moreover, the management of leisure time at this age group may play an important role, as the environment itself may lead one to adopt excessive or even addictive gaming behaviors (Ekinci, Yalçın, & Soyer, 2017; Lee & Kim, 2017).

Studies showing the relations between gaming behavior and personality may be found in the literature. One predictor of longer game playing is being an extravert (Uz & Cagiltay, 2015). On the other hand, aggression, loneliness, and social escape are also related to addictive game playing patterns (Jeong, Kim, & Lee, 2017; Laconi, Pires, & Chabrol, 2017). People may also project their offline behaviors onto online video games. In other words, a person may be helpful in an online game just because being helpful is a part of his personality (Worth & Book, 2015). The way a player behaves in a virtual world can be a reflection of his online mood, such as whether he enjoys it and exerts effort to complete tasks in it (Birk et al., 2015), just as much as it can constitute an online self-identity (Kim & Kim, 2017).

Games do not always have negative effects. There are considerable amount of results revealing how playing games contribute to the enhancement of learning (Gee, 2003; Papastergiou, 2009), strategic thinking and practical problem solving (Bottino et al., 2007; Hamlen, 2013), the establishment of virtual communities to provide

psychological support or just collaboration (O'Connor, Longman, White, & Obst, 2015), social acceptance (Liu, Yuen, & Rao, 2015), enjoyment (Birk, Toker, Mandryk, & Conati, 2015), and even improved life quality in elderly people (Kaufman, Sauve, Renud, Sixsmith, & Mortenson, 2016). In a 3-year longitudinal study, Bottino, Ferlino, Ott, and Tavella (2007) explored a group of primary school students, finding that they had to generate certain strategies and practice them in a specific order if they wanted to achieve any task within any game. Considering these seemingly contradictory effects of games, one may consider whether the actual structure of games plays a role in the emergence of gaming-related problems. In other words, a game's genre, components, scenario, style of interaction, and many other features may explain the variety in studies' findings.

Game genre is one of the key factors associated with problematic game playing. Although it is very challenging to find direct cause-effect relations, there are studies indicating the relationship between a game's genre and gaming-related problems. For example, gamers who dedicate considerable amounts of time playing role-playing or real-time strategy games may be more vulnerable to adopting impulsive or addictive behaviors (Azizi, Stainer, & Abel, 2018; Lee & Kim, 2017). Not all games genres are associated with problematic gaming behaviors. Players of action and adventure games tend to show gaming disorder patterns in addition to psychopathological patterns whereas players of Massive Multiplayer Online Role-Playing Game (MMORG) s exhibit Internet gaming disorder patterns (Laconi et al., 2017).

Online games include a social dimension due to the nature of easy networking. For example, MMORGs enable players not only to collaborate with each other for to achieve similar objectives but also to exchange a variety of information and to support each other emotionally (O'Connor et al., 2015). Such games as World of Warcraft are found as a significant contributor of informal learning due to their functioning as online learning and training communities (Oliver & Carr, 2009). In a detailed study, Lee, Choi, Kim, Park, and Gloor (2013) examined the psychology of being an online clan member. The authors reported that belonging to a virtual society can encourage gamers to move beyond boundaries of personal lives and thus share many different experiences besides game playing. In short, the social dimension of online games may include factors resulting in excessive game playing (Kim & Kim, 2017).

Games and Real Life

Although it is clear that games are fictitious, they sometimes affect real life. The consequences of playing video games include time consumption, mood or behavioral change, communication, or even direct effects like earning money from game-related activities (Egenfeldt-Nielsen, Smith, & Tosca, 2013; Lee & Kim, 2017; Triberti et al., 2018). This bond between the real and the fictitious can engender problems or

even psychological disorders. In a recent study, it was reported that people suffering from gaming disorder exhibit similar neurobiological patterns as those suffering from pathological gambling (Fauth-Bühler & Mann, 2015).

The virtual society or network can sometimes go beyond online and become offline (Molyneux, Vasudevan, & de Zuniga, 2015) and can even be used to shape offline relations (Kim, Kim, & Oh, 2014). However, this may not be true for all players. In a recent study, Uz and Cagiltay (2015) found that university students might be quite cautious about not only sharing feelings with other players but also playing with people they do not know in real life. Similarly, there is qualitative evidence showing that students still prefer face-to-face over virtual communication (Sanchez, Salinas, & Meyer, 2011).

The Current Study

Excessive amount of online game playing may trigger problems in one's daily life. It is difficult to argue the existence of a direct cause and effect relationship, but studies frequently report strong associations. On the other hand, it is known that not all games lead to problematic usage (Azizi et al., 2018). There are studies in the literature showing the relations between digital game playing and problematic behaviors like aggression (teWildt et al., 2015; Worth & Book, 2015). It seems that there is a tendency to expound on the negative sides of excessive gaming. In this study, we have tried to explore whether excessive gaming behaviors always lead to addiction. We wanted to focus on gamers' perceptions about their own gaming behaviors and their awareness of negative effects on their real lives. In addition, we wanted to understand if age, game genre, and participants' own perceived excessive game playing had a relationship with problematic online gaming. The following research questions were investigated;

1. What are the effects of age, excessive game playing, and preferred game genre on problematic online gaming, including:
    1.1. Euphoria,
    1.2. Health problem,
    1.3. Conflict,
    1.4. Failure of self-control, and
    1.5. Preference of virtual relationship?
2. How do excessive game players define the effects of playing online on their real life?

Method

Research Design

An embedded mixed method design was used in the study. According to Cresswell (2012), qualitative (or quantitative) data are used to support quantitative (or qualitative) data in an embedded design. In general, one type of data serves as the foundation of the study while the other type has a supportive role. The survey study constitutes the quantitative part of our research and was supported by the interview data.

As the quantitative part of the research, a survey study was conducted to develop a broad understanding on gamers' problematic online gaming behaviors. A cross-sectional survey design was utilized to collect data from the participants. Cross-sectional designs require data collection at a specific point in time and can provide valuable information in this short period (Cresswell, 2012, p. 377). Open-ended semi-structural interviews were also held to expand our understanding on problematic online gaming behaviors.

Participants

Purposeful and convenient sampling methods were used to define the participants of the survey study. Since the main aim of this study is to shed light on the problematic online gaming behaviors of excessive gamers, participants were chosen among regular game players. A total of 1,227 participants who played online games were reached through a Facebook online game fan page. Of this total, 76% (*N*=904) were adolescents (between the ages 13-18), 11.9% (*N*=142) were of elementary school age (5-12), and only 7.8% (*N*=103) were adults (see Table 1). A very recent study exploring the relationship between in-game behaviors and nicknames used in an online game (Kokkinakis, Lin, Pavlas, & Wadea, 2016) presented the statistics about the variation of players' ages via information obtained through a well-known massive online game server. According to this information, most of online game users' birth dates were between 1995 and 2000. Our data are quite similar with those statistics. In the supplementary part of the current study, we also conducted interviews with 8 volunteer fans.

Table 1
Demographics

	Frequency *(f)*	**Percent *(%)***	**Interview Volunteers *(N)***
Age			
Elementary school age (5-12)	142	11.9	1
Adolescence (13-18)	904	76.0	4
Adult (18-40)	103	8.7	3
Gender			
Male	1144	96.1	7
Female	46	3.9	1

Descriptive information pertaining to participants' perceptions on their excessive game playing behavior was presented in Table 2. More than half (55%) defined themselves as game players who spend too much time playing online games.

Table 2
Excessive game playing perception

	Frequency *(f)*	Percent *(%)*
No	529	44.50
Yes	661	55.50

Instrument

Developed by Kim and Kim (2010), the Problematic Online Game Use Scale (POGUS) was used as the main instrument of the study. The reason we chose to use it is due to how it approaches excessive use. In other words, instead of using the word *addiction*, the authors use the word *problematic*. In this way, we assume that problems can occur if gamers are involved in abnormal game play. Another reason for choosing this instrument is the assumption of multi-dimensionality of problematic online game use. In general, addiction is seen as a unidimensional construct, which can limit researchers' ability to explore potential relations among other constructs. In POGUS however, researchers can observe the different types of problematic online game use in relation to other constructs. The POGUS consists of 20 items divided into 5 factors: (i) euphoria, (ii) health problems, (iii) conflict, (iv) failure of self-control, and (v) preference of virtual relationship. *Euphoria* can be defined as a construct of extreme happiness. In a problematic context, it occurs when people play online games because it provides them with the feeling of freedom, increased interest, excitement, and pleasure. *Health problems* constitute the second dimension of POGUS. Excessive time spent playing online games may result in negative health, such as headaches. *Conflict* may occur in various dimensions of gamers' lives. They can experience internal and external conflicts as a result of spending excessive time and energy on games. Their parents, teachers, and partners may suffer from reduced communication. *Self-control failure* is another important dimension and can manifest in many forms. A player unable to exert self-control over himself may want to play increasingly longer periods of time and feel withdrawal-like symptoms when not playing. Finally, the dimension *preference of virtual relationships* includes gamers' trust of and attitudes toward others online.

In addition to the 20 items included in POGUS, we collected demographical information including age, gender, daily time spent playing games, and participants' favorite three games. Moreover, we also asked if they perceived themselves as excessive online gamers. Finally, we conducted semi-structured interviews as a supplementary instrument. The reason for including interviews was to gain gamers' own insights on daily life effects of excessive online game playing. Some of the items in the interview were as follows:

- What is the maximum amount of time you play online in one sitting without interruption?
  - Do you think that playing for such a period of time can bring about health problems? Why or why not?
  - Do you think that playing too much online can prevent you from socializing with others? Why or why not?
- Why do you prefer playing online?
- Would you call yourself a game-addict or something else?
- How would you complete the following sentence? "If I did not play too much, …… would be better/worse in my life." Why?

Procedures

We contacted a popular gamer with 300,000 and 70,000 followers on YouTube and Twitch, respectively. This was a convenient way to access the primary audience of our survey. The owner of the fan page and the fans were informed about the survey's content to solicit their consent. The page owner then published the questionnaire on his fan page. In addition, the researchers and the page owner informed all participants that the information collected would be used strictly for scientific purposes and that their personal information would never be shared with a third party. Since cross-sectional surveys aim to measure a variable at a specific point in time the researchers withdrew the questionnaire after a certain amount of time to ensure that participants had not changed. A total of 1,227 online game players agreed to complete the online questionnaire. After finalizing the data collection process through the questionnaire, eight volunteers, who were followers of the fan page, were interviewed.

Data Analysis

In order to analyze the data and to answer the research questions, a Multivariate Analysis of Variance (MANOVA) was conducted. The five factors of POGU were considered as the dependent variables whereas age, gender, excessive game play, and preferred game genre were included as independent variables. Gender was excluded since there was not an appropriate distribution between males and females. All other assumptions for the MANOVA were checked and the results of the assumption check are presented in the results section. The semi-structured interview data were first transcribed and were then subjected to a content analysis with the help of codes and themes available in the literature.

Reliability and Validity

Kim and Kim (2010) reported some information on the reliability and validity of the instrument utilized in the current study. According to their study, each item has a minimum .64 loading to its related factor. They reported reliability coefficient values for the factors ranging between .78 and .87. Since the original language of the instrument was English, we were supposed to guarantee the validity and reliability of the translated version. First of all, a language expert translated the items into Turkish. Then another language expert performed a back translation. The original version and translated version of items were compared. Language experts did not find significant differences between the two versions. In addition, Cronbach's alpha coefficients for the Turkish version of POGUS were sought. The value for the whole instrument was .80 whereas Cronbach's alpha values for the factors of Euphoria, Health problem, Conflict, Self-Control Failure, and Preference for Virtual Relationships were found to be between .70 and .74.

Results

Statistical information about the effect of different variables on problematic online gaming is presented in this section in addition to the descriptive of dependent variables. Table 3 includes different descriptive values of POGUS's subscales.

Table 3
Descriptive Information of POGU's Sub-scales

	Min	Max	Mean	SD	Variance
Euphoria	4.00	20.00	14.43	3.51	12.31
Health Problem	3.00	15.00	5.83	2.60	6.76
Conflict	5.00	25.00	13.33	4.60	21.23
Self-Control Failure	5.00	25.00	14.48	4.65	21.63
Preference of virtual Relationships	3.00	15.00	9.04	3.17	10.06

The Effects of Age, Excessive Game Playing, and Preferred Game Genre on Problematic Online Gaming

All of the participants shared their preferred online game. Each of these games was researched and confirmed to exist from different well-known online game stores such as Steam and Kinguin. Table 4 summarizes participants' game genre preferences based on their statements. The top three preferred game genres (i.e., adventure, shooter, and MMORGs) were included in statistical analysis as they are whereas the remaining game genres were grouped under *others*.

Table 4
Game Genre Preferences

	f	*Percent*
Adventure	523	43.9
Shooter	331	27.8
Massively Multiplayer Online Role-Playing Games (MMORGs)	131	11.0
Others	205	17.2
Platform	14	1.20
Puzzle	2	.20
Role playing	62	5.20
Strategy	62	5.20
Race	8	.70
Simulation	12	1.0
Sport	32	2.7
Missing	13	1.10

Using IBM SPSS 21.0, a Factorial Multivariate Analysis of Variance (MANOVA) was conducted on the data gathered through POGUS. The aim of the analysis is to understand the effects of age, perception of excessive game playing, and preferred game genre on participants' problematic online gaming behaviors. The necessary assumptions were checked to ensure that the data were appropriate for a MANOVA. To establish independence of observation, no participant was included in more than one category or group. Each dependent variable was continuous and the sample size was adequate for the MANOVA.

Linearity of the relationship among dependent variables is another assumption that should be tested for before performing the analysis. Scatter plot matrices were produced by splitting data according to the categories consisting of independent variables. No violations of linearity, univariate normality, or multivariate normality assumptions were observed in the scatter plot matrices. Levene's tests for each dependent variables showed that the dependent variable Euphoria ($F_{euphoria}(39,1096)=1.73$, $p < .05$) had violated homogeneity of variance, and this was considered one of the study's limitations.

Before reporting the two-way MANOVA, the interaction effects of independent variables (IVs) on dependent variables (DVs) were interpreted. The results indicated that IVs do not have a statistically significant interaction effect on ($F_{age*overgame}(12,2214)= .62$, $p = .82$, *Pillai's Trace* = .01; $F_{age*genre}(36,4863)= .60$, $p = .97$, *Pillai's Trace* = .02; $F_{overgame*genre}(18,3131)=1.33$, $p = .16$, *Pillai's Trace* = .02; $F_{age*overgame*genre}(36,4863)= .95$, $p = .56$, *Pillai's Trace* = .03).

Table 5 summarizes the statistical results indicating the IVs' main effects on DVs. Age ($F_{age}(12,2214)= .2.66$, $p = .00$, $\eta^2= .014$), perception of over gaming ($F_{overgame}(6,1107)= 6.56$, $p = .00$, $\eta^2= .034$), and game genre ($F_{genre}(18,3131)= 1.61$, $p = .00$, $\eta^2= .01$) were significant in terms of their main effects on DVs. Univariate results with necessary α adjustments are also presented in the same table. Age was found to have

a significant effect on *Self-Control Failure* ($p < .017$). Post-hoc results demonstrated that the elementary school aged participants were significantly more likely than adults to lose control when playing online games ($M_{schoolage} = 15.99$, $M_{adult} = 13.47$, $p < .017$).

Table 5
Results of the Multivariate Analysis of Variance

		ANOVA					
	MANOVA	Hour	Euphoria	Health Problem	Conflict	Self-Control Failure	Preference of Virtual Rel.
Variable	F()	F()	F()	F()	F()	F()	F()
Age	2.66*	.20	.92	2.07	2.86	6.15**	.52
Over-game	6.55*	5.74*	.04	26.91*	8.47*	17.71*	2.63
Genre	1.62*	2.94	4.16***	.25	3.33***	2.19	2.70

Note. MANOVA=Mutivariate analysis of variance, ANOVA=Analysis of variance, *$p < .05$, **$p < .017$ (this value was calculated for the necessary alpha adjustment for the variable of age), ***$p < .0083$ (this value was calculated for the necessary alpha adjustment o or the variable of genre).

Participants' perceptions about whether they spend an excessive amount of time playing online games were found to have a significant effect on the variables hour ($M_{no} = 4.38$, $M_{yes} = 5.73$, $p < .05$), health problems ($M_{no} = 5.22$, $M_{yes} = 6.32$, $p < .05$), conflict ($M_{no} = 12.16$, $M_{yes} = 14.22$, $p < .05$), and self-control failure ($M_{no} = 13.12$, $M_{yes} = 15.52$, $p < .05$). Participants' game genre preferences also shed light on problematic online gaming behaviors. The variables of euphoria and conflict were found to be significantly affected by participants' genre preferences. According to Post-hoc results, participants preferring to play MMORGs ($M_{MMORG} = 15.79$) have significantly higher euphoria scores than those preferring all other game genres ($M_{adventure} = 14.19$, $p < .0083$; $M_{shooter} = 14.73$, $p < .0083$; $M_{others} = 13.67$, $p < .0083$). The euphoria scores of shooter-type game players were also significantly higher than those preferring the other game genres ($p < .0083$). Similarly, the conflict scores of MMORG players was the highest of all genres ($M_{MOBA} = 14.80$) and significantly higher than adventure ($M_{adventure} = 13.07$, $p < .0083$), and others ($M_{others} = 12.78$, $p < .0083$).

Real Life Effects of Playing Online

By including this qualitative research question, we sought to explore the reflections of excessive gamers in their own words. We asked them questions to understand how they perceived their online gaming behaviors and their real life consequences. All of the interviewees played an excess of four hours a day and were a follower of the above-mentioned fan page. Table 1 summarizes the information gleaned from participants (N=8).

According to participants' own statements, the maximum online playing duration was between 14 to 19 hours. While some participants (N=2) called themselves "game addicts," the rest (N=6) did not associate their gaming behaviors with addiction because they did not lose control over their gaming behaviors. On the other hand, they all

accepted that their online gaming behaviors were different than normal. They defined excessive online game playing in terms of certain criteria, including:

- Thinking of a game when not playing it (*N*=3),
- Spending too much time on games (*N*=2),
- Spending money on virtual characters (*N*=1),
- Isolating oneself or being unresponsive (*N*=1), and
- Feeling anxiety while not playing (*N*=1).

However they defined themselves, they did not deny the negative effects of excessive playing. Those effects were listed under four main themes: *(i)* health, *(ii)* psychological, *(iii)* social, and *(iv)* school issues. Eye rash/redness was the most commonly faced health problem among all participants (*N*=6). Headaches (*N*=1), backaches (*N*=1), arthralgia (*N*=1), and insomnia (*N*=1) were the other health problems cited by excessive gamers. In terms of psychological issues, the most mentioned effect was the feeling of exorbitant ambition (*N*=5). A tendency toward being introverted (*N*=2) and experiencing undue stress (*N*=2) were two other psychological effects. Like psychological effects, participants reported that social effects were very obvious. They were all aware of how they isolated themselves as a result of excessive game playing (*N*=4). They had difficulties communicating with people in daily life (*N*=2) and hardly found time for real friends (*N*=4). Similar patterns also existed in their school life. They suffered from a lack of concentration (*N*=2) and decreased motivation to attend school (*N*=2) in addition to poor grades (*N*=1).

Despite being aware of the consequences and negative effects, the participants still did not want to change their behaviors for a series of reasons. They love spending time playing games (*N*=5) and thus experienced relief while playing (*N*=1). They feel pleasure while playing (*N*=5). They also stated that online games are quite realistic (*N*=1) with highly interactive features (*N*=1) for generating strategies (*N*=1). They claimed that there are endeavors and sacrifices built upon game environments (*N*=2). Moreover, they see those environments as communication tools (*N*=2).

From their own admission, participants confessed certain aspects of their lives would be better if they spent less time playing online games. They stated that their social life (*N*=2), academic achievement (*N*=2), self-development (*N*=1), and sleeping hours (*N*=1) would be better if they did not play excessively. They thought that having real hobbies and participating in sports would be easier if they did have the time to do so (*N*=2). On the other hand, they asserted that their computer related skills (*N*=1) as well as their states of minds (*N*=1) would be worse than now if they were not experienced in the game world.

Discussion and Conclusion

We reached a group of gamers through a Facebook fan page and requested them to complete an online survey. We analyzed the collected data both qualitatively and quantitatively. It is known that games are preferred for various reasons, including for entertainment and learning purposes. Moreover, games are attractive tools as long as players' moods are kept within flow boundaries of gamers. Nevertheless, games can sometimes lead to problems and can affect real life situations. Longer periods spent on games, feeling bad when not involved in a game, over thinking about the game, ignoring necessary daily routines, and showing the symptoms of behavior disorders are the most frequently reported examples. In this study, we tried to understand our participants' problematic online gaming behaviors by examining a series of psychological, physical, and demographical factors.

Gender was initially included among the IVs when conducting the MANOVA to reveal their effects. Gender was later excluded from the analysis because it violated MANOVA assumptions. On the other hand a description of participants showed that the percentage of female gamers is less than five percent, indicating that gender too blurred of an area to investigate its real effect. Although there are many studies showing men' s tendencies to play for longer periods of time (Ogletree & Drake, 2007) and identifying different ICT usage patterns (Sanchez et al., 2011), there are also studies reporting no gender differences in terms of other variables, such as motivation, effective learning, and gaming behavior (Butler, Someya, & Fukulara, 2014; Papastergiou, 2009). In fact, consistent with our own findings, various studies have reported that the majority of gamers are male (Griffiths, Davies, & Chappell, 2004), especially those engaging in MMORGs (Lewis, 2016). This might be the reason for the lack of significance across gender groups, namely, the numbers of participants are unequal.

Supporting the current literature, certain factors of problematic online gaming behavior were found to be affected by the gamers' *ages*, but with a small effect size. As post-hoc analyses revealed that elementary school age gamers (i.e., those between 5 and 12 years) lose self-control more frequently than do adult gamers while playing online games. Our interview findings showed that this age group has a considerable amount of leisure time, which may even result in 14 to 19 hours of game play per day. In a previous study, Wallenius, Punamäki, and Rimpela (2007) found the relationship between the aggressive behaviors of elementary school age gamers and violence in games, which is related to our findings. The reason why this age group is at risk might be because of their self-regulation skills. Due to being in school for a considerable amount time that is only compounded with after-school homework, they may fail to allocate time for leisure activities. In this case, parents seem to fail, too, because parents' modeling and facilitation are crucial to ensure an appropriate use of games (Brooks et al., 2016). Younger gamers dedicate themselves more frequently

and more intensely compared to older ones (Butler et al., 2014; Festl, Scharkow, & Quandt, 2013; Smahel, Blinka, & Ledabyl, 2008) and thus may need more guidance. On the other hand, age does not affect the other problematic online behavior patterns discussed in our study.

Another important finding of the current study is related to the effects of participants' own *perceptions* about over gaming on the amount of hours spent playing online games and on several problematic aspects of online game use. Interestingly, participants are aware of how much time they spend playing games and do not deny the abnormality of the hours they allocate. The data from smaller group focused on the interviews confirmed that participants were aware of their excessive gaming habits as well as the negative consequences. This finding should be interpreted carefully since spending too much time may not always result in addiction. Contrary to other studies claiming the frequent gamers' tendency toward addiction (Chen & Leung, 2016), this might simply be a sign of high engagement when accompanied with low problematic use (Zaitoff, 2016). In this study, the inclusion of the interview data revealed that participants are aware that excessive use has significant effects on one's health (especially eye related ones), conflict (including isolation), and self-control failure (allocating too much time). In other words, those thinking that they play online games too much also reported that they suffered from either conflicts in daily life (Egenfeldt-Nielsen et al., 2013) or a failure to control their actions (Chen & Leung, 2016). Unlike the findings of Desai, Krishnan-Sarin, Cavallo, and Potenza (2010), where they attempted to reveal relations between gender and real-life problems, we found the effects of over gaming self-perceptions on health problems not to be linked to gender. Although online game addiction sometimes has similar neurobiological patterns with such addictions as gambling (Fauth-Bühler & Mann, 2015), the excessive gamers in this study do not deny the abnormalities in their excessive behaviors. In short, to some extent, our findings support the findings of previous similar studies, including in regard to problematic video gaming (Porter, Starcevic, Berle, & Fenech, 2010), mobile social gaming (Chen & Leung, 2016), and Internet gaming (Rho et al., 2016).

Online games offer a wide variety of genres, ranging from adventure to strategy. The findings point that game genre has significant effects on certain problematic online game behaviors that include euphoria and conflict. In regard to euphoria, participants playing *MMORGs* reported to experience greater levels of excitement, relief, interest, and freedom than did those playing *shooter, adventure*, and *other* games. In addition, those who preferred *shooter* games reported experiencing more patterns of euphoria compared to those preferring *other* game genres. Previous studies indicate that people playing first-person shooter games have a propensity toward problematic online game behaviors (Festl et al., 2013; teWildt et al., 2015). In regard to conflict, *MMORG* players were found to experience more conflicts in either their private or

daily lives than did those preferring *adventure* or *other* genres. MMORGs as a genre enables competition (Lewis, 2016), collaboration (Lee et al., 2013; Molyneux et al., 2015), public and private sharing of feelings, experiences, learning, and so on (Lee et al., 2013; O'Connor et al., 2015; Oliver & Carr, 2009; Yee, 2006). The process is crucial in such games, which can turn into addiction (Lewis, 2016), as well as building social networks like learning and training communities (Oliver & Carr, 2009). As Butler et al. (2014) stated, the multiplayer feature accompanied with both a friendly user experience and an appropriate state of flow available in all MMORGs serves to increase the frequency of usage. Therefore, the results in regard to euphoria and conflict as confirmed through the interview findings may not be surprising. To this end, since several of the interviewees stated that games can be effective communication tools, social interaction may be quite high in such games, and this is yet another reason leading gamers to prefer them over others (DeSchutter, 2011).

Well-designed games can ensure the frequent use of gamers as long as the flow state appeals to the person targeted. No matter how intangible the rewards of the games may be, they reaching them may become gamers' primary objective in life, thus bringing about real-life consequences. These could be as positive (e.g., feelings of success, happiness, sharing, and belonging)or negative. Among the negative aspects, elementary school aged children were found to be vulnerable losing self-control when playing online. One should be careful while interpreting the results of this study, because gamers' perceptions of their own online gaming behaviors and of the genres of games they play may not always reveal problematic usage. Although we found that certain types of games led to more problematic behaviors, it might simply be a means to cope with daily stress along with a little bit high engagement in online games similar to any other leisure time activity, such as watching TV. Nevertheless, this study focuses on a fan group, and thus the findings might, with caution, be generalized.

In the light of this study, some theoretical and practical implications can be offered. There is a tendency in the literature to create two opposing ends, one negative (game as an addiction) and the other positive (game as a leisure activity). On the negative end, games are perceived as tools with negative consequences in life due to their potential for addiction. On the positive end, they are considered to be tools for learning and entertainment with positive contributions in education and well-being. Instead of this view, we can adopt a more practical view by including self-regulation. In such a case, neither virtual nor real life suffers due to high self-regulation skills, even for those gamers who spend exorbitant amounts of time playing games. The incorporation of self-regulation skills training can help students, especially those of elementary school age, to manage their online and offline time and resources.

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