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An Investigation into the Questionable Practice of Using Excessive Massively Multiplayer Online Game Play as a Marker of Pathological Video Game Dependence among Adolescent and Young Adult Male Players

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Abstract

The present study explored pathological online video game dependence among adolescent and young adult males in the context of excessive massively multiplayer online game (MMOG) play. Psychological criteria distinguishing high engagement from addiction were used, as a means of examining MMOG play in the context of an excessive and addictive activity. This is a distinction that has been lost in the previous research, setting this study apart from other studies investigating frequency of play in the context of video game addiction. A total of 1121 male students in grades 7 through 12 across 12 schools in and around Seoul, South Korea, participated. The study used a 65-item questionnaire developed to examine constructs related to online video game play. Findings revealed no statistically significant differences between those classified as addicted and those classified as highly engaged with regard to items designed to measure frequency of MMOG play. Furthermore, in comparison to those classified as addicted, those classified as highly engaged reported a higher average number of hours per week they felt was an acceptable amount of time dedicated to game play. All in all, the findings revealed that those classified as highly engaged spent a significant portion of their time playing in massively multiplayer online worlds alongside those classified as addicted. These findings help illustrate the difficulties in using frequency of online video game play, even if viewed as excessive, as a criterion for identifying pathological dependence.

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Keywords

Massively Multiplayer Online Games (MMOGs); High Engagement; Addiction; Pathological Dependence; Video Games; Males

1. Introduction

Research suggests that online video gaming is one of the most likely causes behind problematic Internet use (Ducheneaut & Moore, 2004; Liu & Peng, 2009; Meerkerk, van Den Eijnden, & Garretsen, 2006; Morahan-Martin & Schumacher, 2000). In particular, massively multiplayer online games (MMOGs) have been connected to several negative life outcomes (Chuang, 2006; Cole & Griffiths, 2007; Griffiths, Davies, & Chappell, 2003; Ng & Wiemer-Hastings, 2005). For example, Ng and Wiemer-Hastings (2005) found that players of these online games experienced more problematic game usage than their offline game player counterparts. Difficulties encountered by MMOG players include loss of sleep as a result of extended play, as well as various social implications, to include limited involvement in and value placed on offline, face-to-face relationships.

MMOGs are differentiated from other game genres in that players interact with one another in very large fantasy- or science fiction-themed virtual worlds. Taking on the persona of avatars with unique traits, players harvest resources, manufacture goods, and trade, while participating in group activities (Yee, 2006). Indeed, MMOGs have complex nestled reward systems (Yee, 2007), and these well-established virtual worlds have their own subcultures comprising social rules and taboos, as well as informal languages and dialects. According to (Yee, 2006), with new content introduced regularly, the play style of MMOGs may lead to excessive exposure, because players must often commit large amounts of time to playing in order to participate in activities.

So it should not come as a surprise that positive correlations have been reported between frequency of MMOG play and the likelihood of problematic usage of the game genre (Peters & Malesky, 2008). van Rooij (2011) and van Rooij, Schoenmakers, Vermulst, van den Eijnden, and van de Mheen (2010) noted that both Korean and western researchers have reported that this genre is the leading culprit in cases of online video game addiction (Chappell, Eatough, Davies, & Griffiths, 2006; Council on Science and Public Health, 2007a; Lee et al., 2007). van Rooij et al. (2010) further noted that the online feature of these games has probably exacerbated the size and scope of the problem to the extent that both private and public treatment programs and centers have opened to treat game addiction (Lin-Liu, 2006; Sharples, 2009; Britain's First Computer Lab, 2009). In addition, these along with other factors have led to increased focus on the online component of video games in the context of addiction (Hussain & Griffiths, 2009; Peters & Malesky, 2008; van den Eijnden, Spijkerman, Vermulst, van Rooij, & Engels, 2009; Wood, 2008b).

1.1. Video Game Addiction as a Disorder

Research on video game addiction is still a relatively new area of psychological study (Griffiths, 2009), although it has become a topic of debate in recent years. Porter, Starcevic, Berle, and Fenech (2010) point to those who have suggested that video game addiction should be formally recognized as a disorder (Beard & Wolf, 2001; Ng & Wiemer-Hastings, 2005; Shaw & Black, 2008), even though the topic itself is controversial as to whether such an addiction actually exists (Chappell et al., 2006; Griffiths, 2008; Grüsser, Thalemann, & Griffiths, 2007; Wood, 2008b). And although calls have been made by the American Medical Association (Council on Science and Public Health, 2007b) for more research on the subject for possible inclusion as a mental disorder in the *American Diagnostic and Statistical Manual of Mental Disorders* (DSM) (Gentile et al., 2011; Liu & Peng, 2009), the American Psychiatric Association (2010) noted that there was insufficient research to warrant such efforts (Gentile et al., 2011; Liu & Peng, 2009).

This decision in part stems from the fact that the diagnostic assessment of pathological video game play remains largely problematic, with different studies using different scales to assess dependence. With no agreed-upon operational definition for pathological video game play (Charlton, 2002; Charlton & Danforth, 2007; Giles & Price, 2008; Hussain & Griffiths, 2009; King, Delfabbro, & Griffiths, 2010; Lemmens, Valkenburg, & Peter, 2009; Porter et al., 2010; Wan & Chiou, 2007), the criteria are left up to the discretion of those studying the issue. Consequently, there is a lack of reliable evidence on the actual percentage of individuals who are patholog-

ically dependent on video games (Charlton & Danforth, 2007; Hettrick, 2008; Porter et al., 2010; van Rooij, 2011).

Early research emphasized frequency of play (the amount of time spent playing video games) (King et al., 2010) as a marker of pathological dependence (Choo et al., 2010), which has been exacerbated by reported cases of child neglect, failed relationships, and even deaths (Becker, 2002; Bersten, 2002; Khazan, 2006) attributed to online video game play. According to Griffiths (2009), some studies have claimed that online video games are addictive because participants self-reported excessive play upwards of 80 hours per week; however, others contend that how much one plays should not be used as a criterion for pathological video game play Griffiths (2009) in much the same way as how much one gambles is not a criterion for pathological gambling (Choo et al., 2010).

That is, Griffiths (2005a) argued, despite overlap, an *excessive* activity and an *addictive* activity are not the same. An excessive activity may impact an individual's life positively, whereas an addictive activity may do just the opposite Griffiths (2009). In the context of video game addiction, criteria for possible addiction should be based on the degree to which the frequency of play negatively impacts different aspects of players' lives Griffiths (2009). Such a view suggests that excessive video game play does not necessarily mean that the individual is pathologically dependent on the activity (Griffiths, 2009). Without consensus, however, research using ad-hoc addiction criteria continues to mount (Griffiths, 2009).

1.2. Psychological-Based Criteria and Adapted Scales

In an effort to reach a conclusion, some researchers have adapted scales otherwise used for pathological disorders, such as gambling and exercise addictions (Hussain & Griffiths, 2009; Ng & Wiemer-Hastings, 2005; Smahel, Blinka, & Ledabyl, 2008; Wan & Chiou, 2006), to study video game addiction. One of the more popular adaptations is that taken from the DSM criteria for pathological gambling, in which the term "gambling" is replaced with the term "video game playing" (Fisher, 1994; Griffiths, 1997; Griffiths & Hunt, 1998). The argument is that video gaming and gambling have more similarities than differences, and can be described as a non-financial form of gambling (Griffiths, 1991, 2005b). In fact, according to Griffiths (2009), those diagnosed with video game addiction are treated using the same techniques as those diagnosed with gambling addiction (Griffiths, 2008; Keepers, 1990; Kuczmierczyk, Walley, & Calhoun, 1987).

Another adaption involves Brown's (1997) behavioral model of addiction, which uses the diagnostic criteria of salience, euphoria, tolerance, withdrawal, relapse, and conflict. While studying behavioral addiction as defined by Brown (1991, 1993, cited in Charlton, 2002) and adopted by Griffiths (1995, 1996), Charlton (2002) observed a distinction between mild and strong criteria. He proposed that only strong (or core) criteria—behavioral salience, withdrawal, relapse, and conflict (interpersonal and intrapersonal)—represented addiction (Charlton & Danforth, 2007), whereas mild (or peripheral) criteria—cognitive salience, euphoria, and tolerance—represented the non-pathological construct of high engagement. Further, Charlton proposed that individuals progress through a phase of high engagement before they reach addiction; thus, only core criteria should be used when identifying cases of computer-related addiction, or at a minimum, given greater importance (Charlton & Danforth, 2007).

Similar conclusions were later made with regard to online video game play, by clearly distinguishing between addicted and highly engaged players. Namely, in a study conducted by Charlton and Danforth (2007), an analysis of response frequencies supported the existence of a developmental process by which peripheral criteria are met before core criteria.

Strides have been made toward defining psychological criteria for classification of video game addiction. However, the lack of a generally agreed-upon operational definition stemming from disagreement on what constitutes pathological game play, and whether video game addiction should even be seen as a pathological issue (Wood, 2008a, 2008b), continues to fuel ad-hoc addiction criteria, to include markers, such as frequency of play.

1.3. Purpose of the Present Study

The aim of the present study was to explore pathological online video game dependence among adolescents and young adults, based on those who have suggested that there is a need to empirically address the conceptual distinction between how much one plays these games and addiction (Choo et al., 2010). Specifically, we compared the frequency of play between highly engaged and addicted MMOG male players. Male players were chosen because males have been found to be more attracted to video games than females (Weinstein, 2010).

Subscribing to the school of thought that excessive online video game play does not necessarily mean pathological dependence on an activity (Griffiths, 2009), as well as the belief that players progress through a phase of high engagement before they reach addiction (Charlton, 2002), we attempted to illustrate the difficulty in differentiating those involved in an excessive activity from an addictive activity, thus exemplifying the questionable practice in using frequency of play as the criterion for pathological online video game addiction. Most important, we attempted to show the need for coming up with agreed-upon psychological criteria for classifying video game addiction.

Brown's (1991, 1993, cited in Charlton, 2002) model, as described by Charlton and Danforth (2007), was chosen as the criteria to identify addiction cases because it distinguishes between addicted and highly engaged players, thus offering a way in which to examine MMOG players in the context of an excessive and addictive activity. This is a distinction that has been lost on previous research, setting the present study apart from other studies investigating frequency of play in the context of video game addiction.

Furthermore, the present study focused exclusively on online video games. MMOGs were chosen because of findings suggesting that problem video game players are likely to play this genre of online game as well as findings suggesting that players participate in these games for extended periods of time (Lee et al., 2007; Meenan, 2007; Ng & Wiemer-Hastings, 2005; Peters & Malesky, 2008; Yee, 2006). The present study was part of a larger body of research focused on understanding online video game play in a rich gaming culture. South Korea was selected because of the widespread popularity of these games and the excessive number of reported addiction cases in that country. The purpose of the present study was not to debate video game addiction, but instead to provide new data that may be useful to researchers, practitioners, and most important, mental health professionals, in sorting out reality from conjecture in terms of frequency of play as a construct in pathological online video game dependence.

Finally, given the debate surrounding the existence of video game addiction (Chappell et al., 2006; Griffiths, 2008; Grüsser et al., 2007; Wood, 2008b), we understand that the term "addiction" is controversial and that there may be more appropriate language to convey the same meaning. However, because the present study was, in part, founded upon the work of Charlton and Danforth (2007), and consequently Brown (1991, 1993, cited in Charlton, 2002), we used the term "addiction" for the sake of consistency with these and similar studies.

2. Method and Materials

2.1. Ethical Clearance and Informed Consent

Permission to conduct the study was acquired from school officials, and informed consent was sought from parents. No compensation was provided to participating students; however, each school was offered an honorarium of $100 USD for each 100 students who willfully took part in the study. In addition, participants were treated in accordance with the American Psychological Association's (2002) Ethics in Research with Human Participants.

2.2. Setting

The study was conducted in the area surrounding Seoul, South Korea. Students from 11 mechanical and/or agricultural trade vocational-track high schools and one academically based middle school participated.

2.3. Participants

A total of 1500 students in grades 7 through 12 were invited to take part. From these, 1332 volunteered to participate (middle school students, n = 180; high school students, n = 1140; missing responses, n = 12). The mechanical/agricultural trade vocational-track schools were chosen because these institutions are predominantly comprised of male students.

Among the students, 84.2% (n = 1121) reported being male, whereas 14.4% (n = 192) reported being female (missing 1.4%, n = 19). Of the male participants, 84.6% (n = 948) were 18 years old or younger, with 15.4% (n = 173) reporting to be 19 years of age or older. In addition, 60.7% (n = 680) of the participants belonged to a dual-income household, with 58.4% (n = 665) having an annual family income less than $39,999 (USD, using the exchange rate of 1 won to 0.00093 dollars).

2.4. Materials

The instrument used for data collection consisted of a 65-item questionnaire developed to examine a number of constructs (e.g., perceptions toward video game play, social relationships, and health) related to online video game play, to include addiction. The questionnaire was divided into three parts. First, participants were asked about their online video game play preference and frequency. Second, participants were asked to rate their agreement on statements using a five-point Likert scale ("strongly agree", "agree", "neutral", "disagree", and "strongly disagree") related to their online video game habits, to include items related to addiction. Lastly, participants were asked to provide demographic information.

Given the focus of the present study (i.e., investigating the questionable practice of using frequency of play as a marker of pathological video game dependence), not all items were used in the statistical analysis. But instead, only those items specific to the measure of addiction (13 items; see **Table 1**) and frequency of game play (5 items; see **Table 2**) are presented. Items designed to measure perceptions toward video game play, social relationships, and health, for instance, are not part of the findings.

2.5. Procedure

The paper-and-pencil questionnaire was administered by school staff. Participants recorded their answers directly on the questionnaire by checking the appropriate response to each item or by writing a response in the appropriate space. Participants were allowed to answer the items in any order, skip items, and withdraw at any time. All responses were self-reported. The instrument was presented in Korean.

3. Results

3.1. Differentiating High Engagement from Addiction

Participants were classified as addicted or highly engaged based on their responses to items in the questionnaire that were mapped to the six criteria—salience, euphoria, tolerance, withdrawal, relapse, and conflict—of Brown's (1991, 1993, cited in Charlton, 2002) model, as described by Charlton and Danforth (2007). These items are shown in **Table 1**, followed by a brief description of each.

In the context of video game addiction, salience is reported when play takes over everyday life, dominating thoughts (cognitive) and actions (behavioral); euphoria is reported when play changes mood, heightening phys-

Table 1. Items modeled from Charlton and Danforth (2007) based on Brown's behavioral addiction criteria.

Criteria		Items
Peripheral	Salience (cognitive)	I often think about online video games when I am not playing.
	Euphoria	I sense a "high" when playing online video games.
	Tolerance	I must play online games for longer periods of time to get the same enjoyment.
	Salience (behavioral)	I skip sleep to play online video games.
		I delay using the bathroom to play online video games.
		I skip bathing and other personal hygiene to play online video games.
		I skip meals to play online video games.
Core	Withdrawal	I feel frustrated, restless, and/or irritable when I cannot play online video games.
	Relapse	I failed trying to quit playing online video games.
	Conflict (interpersonal)	I have lied to others about how much time I spend playing online video games.
		I feel that I am scheduling my life around my online video game play.
		Playing online video games has caused me relationship problems.
		Playing online video games has caused me academic problems.

Table 2. Item responses for time spent playing online video games.

Item		Groups		
		Addicted	Highly Engaged	Non-Highly Engaged
How often do you play online video games?	Less than 4 times a week	4 (13.3%)	-	72 (11.6%)
	Once a week	1 (3.3%)	4 (10.5%)	117 (18.8%)
	3-6 times per week	8 (26.7%)	12 (31.6%)	251 (40.4%)
	Daily	16 (53.3%)	19 (50%)	117 (18.8%)
	Other	-	3 (7.9%)	64 (10.3%)
	Missing Responses	1 (3.3%)	-	-
How much time do you typically spend per session playing online video games without taking any breaks?	Less than 1 hour	2 (6.7%)	1 (2.6%)	84 (13.5%)
	Between 1 and 3 hours	8 (26.7%)	11 (28.9%)	342 (55.1%)
	Between 3 and 6 hours	12 (40%)	17 (44.7%)	141 (22.7%)
	Between 6 and 10 hours	6 (20%)	6 (15.8%)	28 (4.5%)
	More than 10 hours	2 (6.7%)	3 (7.9%)	18 (2.9%)
	Missing Responses	-	-	8 (1.3%)
How many of those hours are spent playing your favorite online video game?	Less than 1 hour	2 (6.7%)	1 (2.6%)	84 (13.5%)
	Between 1 and 3 hours	12 (40%)	18 (47.4%)	352 (56.7%)
	Between 3 and 6 hours	8 (26.7%)	14 (36.8%)	110 (17.7%)
	Between 6 and 10 hours	5 (16.7%)	3 (7.9%)	17 (2.8%)
	More than 10 hours	3 (10%)	2 (5.3%)	10 (1.6%)
	Missing Responses	-	-	48 (7.7%)
The amount of time I spend playing online video games is similar to other people I know[a].	Agree	15 (50%)	19 (50%)	123 (19.8%)
	Neutral	9 (30%)	12 (31.6%)	231 (37.2%)
	Disagree	5 (16.7%)	7 (18.4%)	264 (42.5%)
	Missing Responses	1 (3.3%)	-	3 (.5%)
What do you believe is an acceptable amount of time for online video gaming during a week? (Hours)	Mean	15.98077	21.91667	10.50602
	Median	14.50000	14.00000	5.00000
	Mode	21.000	10.000	3.000
	Minimum	1.000	1.000	.000
	Maximum	60.000	105.000	360.000

[a]Aggregated frequency of responses ("strongly agree" + "agree" and "disagree" + "strongly disagree").

icological arousal, described as feelings of elation or a "high"; tolerance is reported when play must increase to achieve the same enjoyment; withdrawal is reported when lack of play results in negative feelings, such as frustration and irritability; relapse is reported when the attempts to reduce or eliminate play have failed, often reverting to earlier behavior; and finally, conflict is reported when play results in negative consequences, manifesting as opposition to others (interpersonal) or to oneself (intrapersonal) (Charlton, 2002; Griffiths, 1996).

To be classified as addicted, participants had to rate high (i.e., "strongly agree" or "agree") on the core items shown in **Table 1**. That is, one of the four items measuring behavioral salience; the one item measuring withdrawal; the one item measuring relapse; and one of the four items measuring conflict. "Neutral" in the positive

endorsement of an item was not accepted. An equation was developed using the *Statistical Package for the Social Sciences* (SPSS) to select the cases based on the abovementioned criteria. For example, with regard to the four items measuring behavioral salience, an "OR" operator was used. So long as a rating of "strongly agree" or "agree" on one (or more) of the four items measuring behavioral salience was found, along with having a high rating on the measures of withdrawal and relapse, the addiction cases were chosen. In addition, participants were classified regardless of their ratings on the peripheral criteria items (Charlton & Danforth, 2007), given that Charlton (2002) speculated that individuals progress through a phase of high engagement before they reach addiction. Use of the aforementioned criteria revealed an addiction rate of 2.7% (n = 30).

To be classified as highly engaged, participants had to rate high (i.e., "strongly agree" or "agree") on the peripheral items shown in **Table 1**. That is, the one item measuring cognitive salience; the one item measuring euphoria; and the one item measuring tolerance. Again, "neutral" in the positive endorsement of an item was not accepted. In addition, these participants did not endorse any of the core criteria listed in **Table 1** (Charlton & Danforth, 2007). That is, none of them had reached the stage of addiction. Use of the aforementioned criteria revealed a high engagement rate of 3.4% (n = 38).

Finally, for the purposes of comparison, a classification of "non-highly engaged" participants was also tested. These individuals are defined as those who rated low or indecisive (i.e., "strongly disagree", "disagree", or "neutral") on items used to classify highly engaged players. That is, those individuals who played on a regular basis, but not to the same excess as those classified as highly engaged. The classification using the aforementioned criteria revealed a non-high engagement rate of 55.4% (n = 621).

3.2. Frequency of Online Video Game Play

Participants were asked to answer five items that addressed the frequency of their online video game play. These items along with responses of the three groups of participants, addicted, highly engaged, and non-highly engaged, are shown in **Table 2**.

A Kruskal-Wallis H test was used to assess if the medians on the items comprising the construct of frequency of play was the same across participants classified as addicted, highly engaged, and non-highly engaged. The test, which was corrected for tied rank, revealed that the three groups showed statistically significant differences across all five items. Mann-Whitney U follow-up tests were conducted to evaluate pairwise differences between the three groups across the five items controlling for Type I error across tests by using the Holm's sequential Bonferroni approach.

The follow-up tests revealed that the addicted and highly engaged did not show statistically significant differences across the items. That is, no statistically significant difference was found between those classified as addicted and those classified as highly engaged with regard to the following questions: "How often do you play online video games?" (U = 490.000, $p > .05$), "How much time do you typically spend per session playing online video games without taking any breaks?" (U = 564.000, $p > .05$), "How many of those hours are spent playing your favorite online video game?" (U = 502.000, $p > .05$), and "The amount of time I spend playing online video games is similar to other people I know" (U = 515.500, $p > .05$).

Instead, statistically significant differences were found between the addicted and the non-highly engaged and between the highly engaged and the non-highly engaged. The addicted played (M = 387.26) more frequently than the non-highly engaged (M = 315.21; U = 6807.500, $p < .05$); the same was true for the highly engaged (M = 428.63) compared to the non-highly engaged (M = 316.39; U = 7519.000, $p < .01$). Further, the addicted spent more time per session (M = 442.37) than the non-highly engaged (M = 316.64; U = 5614.000, $p < .01$); the same was true for the highly engaged (M = 456.96) versus non-highly engaged (M = 318.43; U = 6708.500, $p < .01$). The addicted also spent more hours playing their favorite game (M = 456.77) than the non-highly engaged (M = 315.40; U = 5152.000, $p < .01$); the same was true for the highly engaged (M = 437.82) compared to the non-highly engaged (M = 319.07; U = 7398.500, $p < .01$). Finally, the addicted were more in agreement (M = 193.53) than the non-highly engaged (M = 330.12; U = 5177.500, $p < .01$) with regard to the statement that their play time was comparable to those they know. The same was true for the difference between the highly engaged (M = 204.16) and the non-highly engaged (M = 336.15; U = 7017.000, $p < .01$).

4. Discussion

The aim of the present study was to illustrate the difficulty in differentiating those involved in an excessive ac-

tivity from an addictive one, and in doing so, exemplify the questionable practice of using frequency of play as a criterion for pathological online video game addiction. The need for such a study was based on previous research on problem video game play suggesting that excessive play does not necessarily mean dependence (Griffiths, 2009) and that such exposure, or high engagement, may be a stepping stone on the path to addiction (Charlton, 2002).

The results contribute to the body of literature on video game addiction. Our findings revealed no statistically significant differences between the highly engaged and the addicted with regard to the constructs used to measure frequency of online video game play. Instead, not surprisingly, statistically significant differences were found between the addicted and the non-highly engaged and the highly engaged and the non-highly engaged, showing that clear differences exist between those who are not highly engaged in such play and those who are, but that such differences become blurred when making comparisons between those classified as highly engaged and those deemed to show signs of pathological dependence.

For example, as shown in **Table 2**, similar percentages were found between the addicted and the highly engaged with regard to the question "How often do you play online video games?" That is, the addicted (53.3%, n = 16) and the highly engaged (50%, n = 19) reported a close percentage in terms of daily play. With regard to "How much time do you typically spend per session playing online video games without taking any breaks?" the addicted (6.7%, n = 2) and highly engaged (7.9%, n = 3) also reported similar percentages when playing more than 10 hours. In fact, the addicted (50%, n = 15) and the highly engaged (50%, n = 19) both reported the same percentage with regard to "The amount of time I spend playing online video games is similar to other people I know." The largest disparity between the addicted and the highly engaged was found with regard to "How many of those hours are spent playing your favorite online video game?" Here the addicted reported higher percentages in terms of playing between 6 and 10 hours (16.7%, n = 5) and more than 10 hours (10%, n = 3) than the highly engaged (7.9%, n = 3 and 5.3%, n = 2, respectively).

Perhaps the most interesting finding to emerge involves the average number of hours per week players deemed acceptable. Whereas the addicted reported an average of 16 hours, the highly engaged reported 22. Furthermore, the maximum number of hours reported by an addicted participant was 60 (2.5 days) compared to a highly engaged participant who reported 105 (4.4 days). Although it could be argued that these maximum number of hours are outliers, these findings, along with others in the present study, help illustrate the difficulty in separating those involved in an excessive activity versus an addictive activity, and the questionable practice of using frequency of video game play as criterion for pathological dependence. That is, had the amount of play been used as the sole marker of video game addiction in the present study, the highly engaged would have been identified as addicted regardless of whether the video game play had been a detriment or had a positive influence on the lives of these players. Instead, based on the approach adopted from Brown's (1991, 1993, cited in Charlton, 2002) model, as described by Charlton and Danforth (2007), to delineate addiction from high engagement, our findings suggest that those highly engaged spent a significant portion of their time playing in massively multiplayer online worlds alongside those addicted. These findings help illustrate the difficulty in using frequency of play as a measure of problematic video game play because time by itself does not distinguish excessive play from that of a possible pathological affliction, nor does it take into consideration other pertinent factors, such as whether or not video game play has become an obstruction (or positive influence) in a player's life.

The findings presented herein should be interpreted with care given that the study was heavily contextualized, with outside factors possibly contributing to the results. The matter of gender cannot be overlooked. Even though male participants were chosen by design, gender may have played a significant role with regard to the findings. The study should, therefore, be repeated in the context of female MMOG players. The study focused specifically on adolescents and young adults. While this was also by design, future research with older MMOG players might yield interesting results, as Griffiths and colleagues (2003) found that more than 60% of players were older than 19 years of age. In addition, the single middle school was academically-based, whereas the high schools were vocational, and consequently, the students from these institutions might vary considerably in the amount of available free time in which to play games (based on their academic load), introducing bias into the data. Future studies may consider analyzing these groups individually. Finally, although the present study focused on online video games, with an emphasis on MMOGs, no specific game title was targeted, possibly introducing bias, in that participants responded in the context of *their* experiences with online video games *they* had played.

5. Conclusion

We conclude by stressing the significance of our findings for researchers, practitioners, but more importantly, mental health professionals. Although we have attempted to show the need for arriving at agreed-upon psychological criteria for the classification of video game addiction, the intent of the present study was not to enter the debate on the conceptualization of problem video game play as a psychological disorder. Instead, the study extends the body of research on online video game addiction by illustrating the challenges and questionable practice of using frequency of video game play, even if viewed as excessive, as a sole marker of pathological dependence.

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