

Psychological Predictors of Problematic Involvement in Massively Multiplayer Online Role-Playing Games: Illustration in a Sample of Male Cybercafé Players

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Key Words

MMORPG · Internet · Addiction · Video games · Self-regulation · Impulsivity · UPPS · Motivation · World of Warcraft

Abstract

Background: Massively Multiplayer Online Role-Playing Games (MMORPGs) are video games in which a large number of players interact with one another in a persistent virtual world. MMORPGs can become problematic and result in negative outcomes in daily living (e.g. loss of control on gaming behaviors, compromised social and individual quality of life). The aim of the present study is to investigate psychological predictors of problematic involvement in MMORPGs. **Sampling and Methods:** Fifty-four males who played MMORPGs regularly were recruited in cybercafés and screened using the UPPS Impulsive Behavior Scale (which assesses 4 facets of impulsivity) and the Motivation to Play Online Questionnaire (which assesses personal motives to play online). Negative consequences due to excessive time spent on the Internet were assessed with the Internet Addiction Test. **Results:** Multiple regression analysis showed that problematic use of MMORPGs is significantly predicted by: (1)

high urgency ($b = 0.45$), and (2) a motivation to play for immersion ($b = 0.35$). **Conclusion:** This study showed that, for certain individuals (who are characterized by a proneness to act rashly in emotional contexts and motivated to play to be immersed in a virtual world), involvement in MMORPGs can become problematic and engender tangible negative consequences in daily life.

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Introduction

The popularity of Massively Multiplayer Online Role-Playing Games (MMORPGs) has grown exponentially in recent years. Examples of such games are the well-known *World of Warcraft*, and titles such as *Age of Conan*, *Star Wars Galaxies* and *Travian*. An MMORPG is a kind of computer role-playing game in which a large number of players interact with one another in a persistent virtual world. A persistent virtual world is a ‘world’ that exists independently of the players. Thus, in an MMORPG, the world continues to exist when the user is not logged in, and both events and interactions between other players occur while the user is absent from the persistent world.

In an MMORPG, the player assumes the role of a fictional character (often in a heroic-fantasy world) and takes control of many of that character's actions. Character creation generally involves various components such as the selection of an avatar (i.e. a visual representation of the character in the virtual world), a gender, a race (e.g. elves or orcs, in a heroic-fantasy-based world such as *World of Warcraft*), a profession (e.g. warrior, sorcerer or priest, in a heroic-fantasy-based world such as *World of Warcraft*) and an alignment (i.e. a morality). The concept of 'advancement' is an important characteristic of MMORPGs, implying that a player's character will acquire new powers and skills as rewards for succeeding in certain missions or quests (e.g. defeating an opponent). Another fundamental feature of MMORPGs is social interactions. Indeed, in MMORPGs it is always possible for players to communicate easily with one another (via a chat-like window interface), allowing participation in different types of social network: (1) groups of characters (e.g. temporary collaboration between a few complementary characters for the duration of a specific mission or quest); (2) guilds or clans (persistent hierarchical organizations of characters with common objectives, backgrounds or alignments), and (3) ideological alliances (e.g. agreements between guilds or clans) [1].

In recent years, a growing number of studies have focused on problematic involvement in MMORPGs [2, 3]. In particular, Smyth [3] recently showed in a longitudinal study that MMORPG players, compared with arcade, console or solo computer players, reported significantly more hours spent playing, worse health (e.g. less physical exercise, more cigarettes smoked), worse sleep quality and greater interference in 'real-life' socializing and academic work at a 1-month follow-up. Several studies have focused on the psychological predictors of problematic involvement in online gaming. Most of these studies have considered overuse of MMORPGs within the framework of the concept of 'online games addiction' (generally defined as the tendency to spend an excessive amount of time on online games while displaying several symptoms of pathological behaviors, such as loss of control, cravings and intrapersonal/extrapersonal problems) [4, 5]. Among these studies, Peters and Malesky [6] administered a questionnaire targeting problematic engagement in the game *World of Warcraft* and a short version of the Big-Five personality inventory to a sample of players and found that excessive involvement in this game is associated with high neuroticism, low agreeableness, low extraversion and low conscientiousness, whereas no correlation was found with openness. In another study, Kim et

al. [7] showed that players considered to be 'addicted' on the basis of a questionnaire about online gaming [adapted from Young's Internet Addiction Test (IAT) [8]] reported highly aggressive and narcissistic personality traits and low self-control abilities. In this context, the construct of impulsivity might be of interest, as high impulsivity has been related to high neuroticism, aggressive and narcissistic traits, as well as to low conscientiousness and self-control abilities [9–11].

Impulsivity comprises a heterogeneous cluster of lower-order components [12]. Whiteside and Lynam [9] clarified the multidimensionality of impulsivity by administering the most widely used measure of impulsivity in a large sample of undergraduate students. A factor analysis conducted on these scales resulted in a 4-factor solution, which was the basis for the creation of a scale called the UPPS Impulsive Behavior Scale. The 4 dimensions of impulsivity measured by the UPPS are (1) urgency, defined as the tendency to experience strong reactions, frequently under the condition of negative affect; (2) premeditation, defined as the tendency to take into account the consequences of an act before engaging in that act; (3) perseverance, defined as the ability to remain focused on a task that may be boring and/or difficult, and (4) sensation seeking, considered as a tendency to enjoy and pursue activities that are exciting, and openness to trying new experiences. A growing number of studies based on Whiteside and Lynam's [9] conception of impulsivity have highlighted specific relationships between the various components of impulsivity and several maladaptive behaviors such as problem gambling [13], compulsive buying [14], and problematic use of mobile phones [15, 16]. Accordingly, this multidimensional conception of impulsivity could be of considerable interest in the investigation of factors potentially leading to problematic involvement in MMORPGs.

Research has emphasized that the motivations for playing online games (i.e. the various reasons that an individual plays an MMORPG) play a crucial role in online game-related behaviors (e.g. usage patterns, in-game behaviors, excessive involvement) [1, 17]. In a recent study, Yee [17] collected data related to motivations to engage in online games from 3,000 MMORPG players through online surveys and found that there are 3 major types of motivation to play online: (1) *achievement* in the game; (2) *social* interaction, and (3) *immersion* in the virtual world. Interestingly, Yee's study also showed that specific motivations to play online predicted higher scores on a scale assessing negative consequences that resulted from time spent on the Internet. The motivations identified

as being related to probable problematic engagement in MMORPGs (as reflected by adverse consequences of on-line activities in daily living) are escapism (a subcomponent of the immersion facet that corresponds to the tendency to play MMORPGs to avoid thinking about real-life problems) and advancement (a subcomponent of the achievement facet related to the desire to become powerful and progress rapidly in the game). In accordance with the potential role of escapism motives in problematic engagement in MMORPGs, Wan and Chiou [18] emphasized in their research findings that individuals whose use of MMORPGs is problematic frequently play to relieve dissatisfaction. Thus, it could be supposed that an individual's motivations to play an MMORPG may have a role in the development of problematic involvement in the game.

The aim of the present study is to further investigate the role of both (1) impulsivity facets and (2) personal motivations to play online in problematic MMORPG use. Indeed, although a growing number of studies have investigated the prevalence and sociodemographical correlates of video game addictions in various populations [5, 19], the psychological factors associated with their problematic use remains largely unexplored. Better comprehension of the psychological factors leading to an overuse of MMORPGs would, however, allow one to improve both clinical interventions and prevention policies. For the purpose of the current study, and in accordance with the recent conceptualization of online game addictions [4, 5], problematic engagement in MMORPGs was defined as a pattern of use causing negative outcomes in daily living (e.g. loss of control on gaming behaviors, compromised social and individual quality of life).

Method

Participants and Procedure

The study was conducted with the collaboration of 2 cybercafés in Geneva. The owners of the cybercafés were briefed about the goals of the study and agreed that participants could be recruited via advertisements in their establishments. Volunteer customers of the cybercafés were individually screened. The participants filled in the questionnaires in a quiet area of the cybercafé, so they would not be disturbed by the other customers. The inclusion criteria were (1) being a regular player of MMORPGs and (2) being a fluent French speaker. All participants gave their informed consent and received an information form about the duration and content of the study prior to their participation. The anonymity of the participants was guaranteed as informed consent forms were kept separate from the completed questionnaires. No compensation for participation was given. A total of 59 volunteer participants (57 males and 2 females) took part in the study. Three

participants were excluded from the study as the games they reported playing could not be considered as MMORPGs (e.g. *Counter Strike*, *Medieval Total War*). The participants were screened with a French adaptation of the Motivation to Play in Online Games Questionnaire [17], the French version of the UPPS Impulsive Behavior Scale [20], and the French version of the IAT [21]. The participants also filled in a general questionnaire in which they had to indicate (1) if they had a computer at home; (2) for how many years they had been playing MMORPGs, and (3) how many hours per day they played MMORPGs.

Measures

UPPS Impulsive Behaviour Scale

The French version of the UPPS [20], translated from Whiteside and Lynam [9], consists of 45 items that evaluate the 4 different facets of impulsivity, labeled urgency (12 items, e.g. 'When I feel bad, I will often do things I later regret in order to make myself feel better now', Cronbach's $\alpha = 0.87$); (lack of) premeditation (11 items, e.g. 'I am a cautious person', Cronbach's $\alpha = 0.79$); (lack of) perseverance (10 items, e.g. 'I concentrate easily', Cronbach's $\alpha = 0.70$), and sensation seeking (12 items, e.g. 'I will try anything once', Cronbach's $\alpha = 0.78$). Items on the scale are scored from 1 = 'I agree strongly' to 4 = 'I disagree strongly'.

Motivation to Play in Online Games Questionnaire

A French version of the Motivation to Play in Online Games Questionnaire (MPOGQ) was developed for the purpose of this study. The MPOGQ comprises 39 items that evaluate the various possible motivations for playing MMORPGs. The items of the MPOGQ were translated into French from the original version [17]. The French items were then translated back into English by a French-English translator. Problematic translations were discussed and agreement was reached. As this questionnaire has not been validated in French, an exploratory factor analysis was conducted on our data. A Velicer's Minimum Average Partial test [22] performed on the correlation matrix recommended extracting 5 factors. A factor analysis was then computed with 5 factors. All factors have an eigenvalue >1 . Taken together, the total percentage of variance explained is equal to 44.86%. The factor structure of our version of the MPOGQ is not identical to the original English scale [17], which could tentatively be attributed to the fact that participants included in our study are a specific subtype of MMORPG players, namely, persons playing in cybercafés. Nevertheless, the 5 factors correspond to 5 different motivations to play online that had already been identified in MMORPG players [23]. The first scale is labeled *Achievement* (10 items, Cronbach's $\alpha = 0.83$) and corresponds to motives related to the desire to gain power, progress rapidly, and accumulate in-game symbols of wealth or status, as well as having an interest in analyzing the underlying rules and system in order to optimize character performance. The second scale is labeled *Competition* (4 items, Cronbach's $\alpha = 0.74$) and refers to the desire to challenge and compete with others. The third scale is *Social* (7 items, Cronbach's $\alpha = 0.79$) and refers to an interest in helping and chatting with other players, or to the desire to form meaningful long-term relationships with others. The fourth scale is *Teamwork* (4 items, Cronbach's $\alpha = 0.59$) and reflects the satisfaction of being part of a group effort. The fifth scale, *Immersion* (14 items, Cronbach's $\alpha = 0.85$), comprises a variety of different aspects such as the desire to find out and know things that most players do not know about, the tendency to cre-

ate a persona with a background story and the desire to interact with other players to create an improvised story, an interest in customizing the appearance of the character, or the tendency to use the online environment to avoid thinking about real-life problems. All items are scored on a Likert scale corresponding to scores of 1–5.

Internet Addiction Test

As no self-report instrument to directly assess problematic involvement in online games has been validated in French, we decided to use the French IAT [21]. This questionnaire was chosen to measure problematic engagement in MMORPGs, as high scores reflect negative outcomes resulting from time spent online¹. The French IAT, adapted from Young [8], consists of 20 items assessing the negative consequences of overuse of the Internet (compromised social and individual quality of life, compensatory usage of the Internet, compromised scholarly/academic/working careers, compromised time control, excitatory usage of the Internet; Cronbach's α of the whole scale = 0.88). All items are scored on a Likert scale (never, rarely, occasionally, often, always) corresponding to scores of 1–5. The maximum score (the most problematic Internet use) is 100. A score ≥ 50 suggests frequent problems due to Internet use.

Results

Descriptive Statistics

Of the 56 participants who took part in the survey, only 2 were females. Thus, gender comparisons were impossible and the 2 females were excluded from the study. The final sample is thus composed of 54 male participants aged from 18 to 38 years ($M = 23.43$, $SD = 5.08$), with a mean of 13.31 years of education ($SD = 2.49$). Sixteen participants (29.6%) were undergraduate students, 30 participants (55.6%) were employed, 5 participants (9.2%) were currently unemployed, and 3 participants (5.6%) did not report their professional situation. Of the

¹ The IAT is a measure of the negative consequences resulting from online activities in general, rather than a measure of the consequences of time spent playing online games. However, from the daily time spent playing MMORPGs by our sample (3.8 h), it seems that the major portion of time spent on the Internet by our current sample was devoted to playing MMORPGs. Nevertheless, we decided to recruit an additional sample of persons who use the Internet but do not play online games and to compare their IAT scores. A significant difference in the IAT between MMORPG players and nonplayers would be supplementary support (in addition to the elevated time spent online) for using IAT scores to measure negative consequences of MMORPG involvement. In view of this, 46 supplementary male volunteers were screened with the IAT and the UPPS. We computed t tests to compare the groups for age [$t(98) = -0.41$, $p = 0.68$], educational level [$t(94) = -1.62$, $p = 0.11$], UPPS urgency [$t(98) = 1.54$, $p = 0.13$], UPPS lack of premeditation [$t(98) = 1.89$, $p = 0.06$], UPPS lack of perseverance [$t(98) = 0.53$, $p = 0.59$], UPPS sensation seeking [$t(98) = 0.71$, $p = 0.48$] and IAT scores [$t(98) = 2.13$, $p = 0.03$], which showed that MMORPG players and nonplayers differ only in their IAT scores.

54 MMORPG players in our sample, 47 (87.04%) had a computer at home. The mean number of years since they began to play MMORPGs was 3.57 ($SD = 2.59$), and the mean hours they played MMORPGs per day was 3.8 ($SD = 2.14$). The mean hours devoted daily to MMORPGs in our sample are comparable to other data obtained for regular players (e.g. $M = 3.2$, $SD = 2.14$, [1]; $M = 4.2$, $SD = 2.11$, [6]). The 2 MMORPGs most commonly played by the participants were (1) World of Warcraft (75.93% of the sample) and (2) Age of Conan (29.63% of the sample). Several other MMORPGs were reported but only a few participants mentioned them (e.g. *Travian*, *Dofus*, *Ultima Online*).

The mean score for the IAT was 34.87 ($SD = 12.90$). Nine participants (16.67% of the sample) reported that their engagement with the Internet had significant negative tangible consequences for their lives based on the common cutoff of the IAT ($IAT \geq 50$). This proportion is higher than results found in comparable data. Indeed, in a sample of Swiss participants from the community, only 3.85% had an IAT score ≥ 50 [21]. The IAT correlates significantly with hours spent playing MMORPGs daily, $r = 0.38$, $p < 0.01$, but is unrelated to the number of years an individual has been playing MMORPGs, $r = 0.15$, $p = 0.32$.

Psychological Predictors of Problematic Involvement in MMORPGs

Because our sample was small in relation to our number of predictors, statistical precautions were taken. A multiple regression analysis was performed using Mallows' Cp [24]. The Cp statistic can be used as a criterion in selecting a model with a large number of predictors and replaces the traditional stepwise regression. Cp tends to find the best subset that includes only the important predictors of the dependent variable. These statistical considerations permitted us to consider the most parsimonious model. We also decided to use robust analyses to control for the over-influence that a few observations could have on our model. Robust analyses made it possible to decrease the effect of potential influencing observations on our sample by reducing their impact on parameter estimation, so we could be more confident about the generalizability of our parameters [25]. Nine variables were entered in the regression analysis: the 4 facets of impulsivity (UPPS) and the 5 different motives to play online (MPOGQ). Mallows' Cp analyses indicated that the best model comprises the 4 following predictors: immersion (MPOGQ), urgency (UPPS), lack of premeditation (UPPS) and lack of perseverance (UPPS). Exploration of

the residuals suggested that they were normally distributed. The regression emphasized that urgency and motivation to play online for immersion are the only significant predictors (see table 1).

Discussion

The aim of the present study was to investigate psychological predictors of excessive involvement in MMORPGs. Multiple regression analysis showed that problematic use of MMORPGs is predicted by: (1) high urgency, and (2) a motivation to play for immersion.

First, urgency, defined as the tendency to act rashly when experiencing negative affect states [9], is the only facet of impulsivity that significantly predicts problematic engagement in MMORPGs. Interestingly, this facet of impulsivity has already been found to play an important role in the occurrence of addiction-related disorders, whether or not they are related to substance use. More precisely, urgency has been related to drug abuse [26], problem drinking [27], craving for cigarettes [28], eating disorders [27], compulsive buying [14], problematic use of and dependence on the mobile phone [15, 16] and pathological/problem gambling [13]. Our claim is that high-urgency players who experience negative affect states (e.g. irritation, dysphoric mood, anxiety) will have difficulty keeping themselves from playing in situations in which this behavior has been automatized (e.g. playing to relax when arriving at home after work) or when faced with a conditioned stimulus strongly associated with the act of playing online (e.g. seeing a cybercafé), as the urgency facet of impulsivity has been linked to a difficulty inhibiting automatic or prepotent behavioral responses [29, 30]. Moreover, we hypothesized that problematic MMORPG players may not be able to prevent themselves from playing, because it can be a way for them to relieve negative affect in the short term, despite the potential occurrence of negative long-term consequences (e.g. guilt, negative feedback from acquaintances, negative professional/academic outcomes). This latter assumption is supported by recent data showing that high urgency is associated with increased difficulties making choices based on their future consequences in a laboratory decision-making task [31, 32]. From this perspective, poorer decision-making abilities may be related to the absence of consideration of the potential negative outcomes of excessive involvement in MMORPGs (e.g. professional/academic problems, impact on health due to less physical activity or less sleep, loss of friendships in real life, etc.).

Table 1. Standardized regression coefficients for the IAT regressed on urgency, lack of perseverance, lack of premeditation and immersion

Scales	β	SE	t	Sig.
(Intercept)	-0.32	0.72	-0.44	
UPPS urgency	0.45	0.15	3.02	**
UPPS lack of perseverance	0.42	0.27	1.56	
UPPS lack of premeditation	-0.31	0.23	-1.33	
MPOGQ immersion	0.32	0.12	2.60	*

Mean scores on all variables were considered through the regression analyses. ** $p < 0.01$; * $p < 0.05$.

Interestingly, it has recently been shown that 'positive urgency' (defined as the tendency to act rashly while in a positive mood) [33] is a predictor of risky behaviors such as problem gambling and heavy alcohol consumption [34, 35]. This suggests that certain MMORPG players may also have difficulty avoiding playing online in contexts of positive affect (e.g. euphoria). As positive urgency was not assessed here, further research is needed to explore this hypothesis.

The second significant predictor of problematic MMORPG use is being motivated by immersion in a virtual world. Players who are motivated by immersion use the virtual world of the MMORPG as a way to escape from real life (e.g. by playing the role of a fictional character or discovering a virtual world). Thus, we think that individuals who have a high level of urgency and a high motivation to play for immersion are 'at risk' as they may develop a problematic behavior consisting of automatically immersing themselves in the virtual world of the MMORPG with a desire to avoid thinking about real-life problems, especially when dealing with negative affect. Moreover, it is highly likely that this behavior will result in negative outcomes for the players (e.g. guilt or shame due to the fact that they are fleeing the real world by immersing themselves in a virtual world, procrastination, etc.), which will in turn promote a state of negative affect likely to trigger immersion and escapism-related behaviors. This proposal is in accordance with the view that problematic involvement in MMORPGs, like other behavioral addictions (e.g. pathological gambling, compulsive buying), may serve to reduce or relieve intense experiences of negative affect [18, 36, 37].

A limitation to the present study is the fact that all participants were recruited in cybercafés and therefore represent a subsample of the population of MMORPG players.

For example, it has been shown that social anxiety is frequently associated with excessive time spent in online activities [38]. Thus, it is possible that some individuals suffering from social anxiety in real life are motivated to play essentially to socialize (via a virtual interface) and that this type of player is not likely to be encountered in a cybercafé (which is a social environment) but simply prefers to play at home. For such players, social motives (related to meeting people in a virtual world) might possibly be predictors of problematic engagement in MMORPGs. The fact that the study included persons playing in cybercafés (rather than MMORPG players in general) could also have played a role in the discrepancy between the factorial structure of the MPOGQ we found and that of the original scale [17]. Indeed, we found that 'teamwork' and 'competition' items load on distinct factors, which possibly reflect a specific interest of the persons playing in cybercafés in these aspects of the game. In particular, it might be supposed that they probably often played in a group in the same cybercafé (with members of the same guild or alliance) to optimize the efficacy and the competitiveness of their team. Another potential limitation is the fact that we used only self-reported questionnaires, which are sensitive to social desirability bias and might be at least in part flawed [39]. Consequently, further studies might benefit from using a social desirability questionnaire to control for potential response bias.

This study should be considered as a step in better understanding the psychological predictors of problematic involvement in MMORPGs. However, further studies are required to investigate the various psychological mechanisms underlying the facets of impulsivity that predict problematic involvement in MMORPGs (e.g. prepotent inhibition and decision-making tasks). In addition, the development of questionnaires focusing specifically on the negative outcomes of MMORPG use could be a relevant alternative to questionnaires that assess negative outcomes of time spent on the Internet in general (such as the IAT). Finally, more studies are needed to investigate gender differences in problematic involvement in MMORPGs.

In conclusion, the present study indicated that, for certain individuals (who have a high level of urgency and are motivated to play to be immersed in a virtual world), involvement in MMORPGs could become problematic.

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