

The Impact of Massively Multiplayer Online Role Playing Games (MMORPGs) on Psychological Wellbeing and the Role of Play Motivations and Problematic Use

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Abstract The association between MMORPG play (World of Warcraft) and psychological wellbeing was explored through a cross sectional, online questionnaire design testing the relationship between average hours playing per week and psychological wellbeing. Play motivation including achievement, social interaction and immersion as well as problematic use were tested as mediating variables. Participants ($N=565$) completed online measures including demographics and play time, health, motivations to play and problematic use. Analysis revealed a negative correlation between playing time and psychological wellbeing. A Multiple Mediation Model showed the relationship specifically occurred where play was motivated by Immersion and/or where play was likely to have become problematic. No evidence of a direct effect of play on psychological wellbeing was found when taking these mediating pathways into account. Clinical and research implications are discussed.

Keywords MMORPG · Online games · Problematic gaming · Game motivations · Immersion · Internet game addiction · Escapism

Research into video games has expanded and there has been increasing concern with regard to problematic or excessive use of video games, whereby play interferes with other areas of life and negative consequences occur. Recent studies estimate between 4 and 11 % of ‘gamers’ show some signs of problematic or addictive use including withdrawal, tolerance and negative outcomes (Desai et al. 2010; Grüsser et al. 2007; Mentzoni et al. 2011). Furthermore, there is some evidence that video game play impacts negatively on psychological wellbeing.

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Excessive use of video games has been associated with elevated depression, anxiety, social phobias, lower school performance and lower life satisfaction (Gentile et al. 2011; Mentzoni et al. 2011). Messias et al. (2001) concluded an association between excessive video game use and sadness, suicidal ideation and suicide planning.

More recently research has argued that problematic or excessive play, and the interference with other areas of life, is more prevalent in online role-playing games, most notably Massively Multiplayer Online Role Playing Games (Guinn et al. 2011; Ng and Wiemer-Hastings 2005; Porter et al. 2010; Smyth 2007). Players of Massively Multiplayer Online Role Playing Games (MMORPGs) more often display problematic gaming behaviour, depressive tendencies and lower self-esteem compared to players of alternative types of online game such as First Person Shooters (FPSs), Strategy Games and Browser Games (Stetina et al. 2011).

Impact of Massively Multiplayer Online Role-Playing Games (MMORPGs)

Williams et al. (2008) argue that both male and female MMORPG players reported considerably higher prevalence of depression and substance addiction than typical rates for the US population. Relationships between playing online games and symptoms of depression, anxiety, poor self-esteem and interpersonal problems have also been argued (Lo et al. 2005; Morgan and Cotten 2003; Stetina et al. 2011). Similarly, physical problems such as health and sleep difficulties, personal life problems and academic/professional problems have been described as elevated in MMORPG players (Liu and Peng 2009; Smyth 2007). Despite the relationships argued between MMORPG play and a vast array of negative outcomes, much of the research is correlational, effect sizes are small, and the majority of players experience little or no negative effects (Davies 2005; Liu and Peng 2009; Smyth 2007). Thus, the strength of the relationship between online game play and negative outcomes can be called into question.

Furthermore, the developing research in this area has revealed some positive impact of MMORPGs, such as the development of social skills and relationships through play (Ducheneaut et al. 2006; Williams et al. 2006). Longman et al. (2009) concluded that players derived social support from fellow online gamers which is, in turn, associated with improved wellbeing. In addition, online games have been linked with skill development. Chen (2009) described MMORPGs as providing opportunity for communication, problem solving, teamwork and shared goals, highlighting the potential benefits of these interactions on social relationships, communication skills and some cognitive functions. Ryan et al. (2006) argued that “it may be premature to conclude that computer gaming is negatively related to wellbeing”.

Given the variations in the evidence, it is necessary to consider further the relationship between MMORPGs and psychological wellbeing, as well as additional factors that may be influential in this relationship.

Yee's (2006a) study of over 30,000 MMORPG players observed a wide range in the time that players dedicate to game play, with an average time spent playing of 22 h per week, and 8–9 % of players reporting spending 40 or more hours per week. Thus, large amounts of time are often devoted to this hobby, although only a small proportion of players dedicate extensive periods. This seems feasible that outcomes may be related to the amount of time spent in game play.

Furthermore, previous research may have assumed that the effects of games are the same for all players, which might not be the case. The literature provides some suggestion as to factors that may result in a greater risk of negative outcomes for some individuals and thus factors that may influence the strength or direction of the relationship between play and wellbeing.

Engaged Versus Problematic Play

The concept of ‘online game addiction’ is an increasingly popular topic in the literature. Yee (2006a) summarized that 50 % of 30,000 MMORPG players considered themselves ‘addicted to an MMORPG’. However, there is current controversy as to whether this trend can be conceptualised as an ‘addiction’ and constitutes a psychiatric disorder (Griffiths 2010; Ng and Wiener-Hastings 2005; Widyanto and Griffiths 2006).

Differentiation has been made between the concepts of ‘addiction’ (or ‘problematic use’ as it is more widely titled) and ‘engagement’ (Charlton and Danforth 2007; Seay and Kraut 2007). ‘Engaged’ play involves a significant amount of time being invested while not omitting real-life responsibilities. In contrast ‘problematic’ or ‘addictive’ play occurs where game play impacts on real-life functioning and negative consequences occur. Seay and Kraut (2007) argue that it is this ‘problematic’ play that is associated with higher levels of depression and loneliness and a lack in self-regulation. Engaged play on the other hand shows no relationship with these outcomes.

Despite the debate regarding conceptualisation, it is clear that online game use can become problematic, and that this then can lead to negative outcomes.

Motivations for Play

In addition to the suggestions that problematic use is implicated in the negative outcomes of MMORPGs, the research literature suggests that a player’s motivations for play are important.

Yee (2006b) suggested that people play MMORPGs for a variety of reasons, and described three main motivations; Achievement, Social Interaction and Immersion. These are separated into ten subcomponents and are summarised in Table 1.

The concept of immersion has been considered in an array of literature related to negative consequences of behaviour, in particular gambling behaviour. Griffiths (1990) discussed immersion in terms of states of awareness; arguing that, when immersed in electronic gambling games, players appear to go on ‘auto-pilot’ and lose control over their actions. Diskin and Hodgkins (2001) argued a similar concept within gamblers; where individuals experience a change in attention, with focus becoming narrowed and limited to the activity.

Table 1 From Yee’s (2006b) MMORPG play motivations

Achievement	Social interaction	Immersion
Advancement	Socializing	Discovery
Progress, power, accumulation, status	Casual chat, helping others, making friends	Exploration, lore, finding hidden things
Mechanics	Relationship	Role-playing
Numbers, optimization, templating, analysis	Personal, self-disclosure, find and give support	Story line, character history, roles, fantasy
Competition	Teamwork	Customization
Challenging others, provocation, domination	Collaboration, groups, group achievements	Appearances, accessories, style, color schemes
		Escapism
		Relax, escape from real life, avoid real life problems

Jacobs (1986) further argued that gambling is immersive, in that it has been reported to be used to escape from reality, feelings and underlying trauma. According to Jacobs, this can result in a dissociative type state in which the player experiences difficulty in keeping track of time, controlling the behaviour and feels out of touch with their surroundings. Such findings provide some insight as to why gambling can become problematic and ‘addictive’ in that players find it difficult to stop, and therefore can translate to the same with regard to MMORPGs.

Specifically regarding MMORPGs, literature is limited, however Immersion motivations and a preference for virtual life over real life have been linked to a particular risk of negative outcomes of online gaming, but Achievement and Socializing motivations are not (Caplan et al. 2009; Liu and Peng 2009). Griffiths (2010) details two case studies in which one adult experiences severe negative consequences of his escapist gaming, while another adult, who plays for the same amount of time but for social goals, derives positive experiences and effects on wellbeing. Likewise, Stetina et al. (2011) noted that MMORPG players often report using the game to escape from real-life problems. Although this is described as a coping strategy, it is suggested that this might also lead to problematic outcomes.

Furthermore, there is some suggestion in the literature that Social Interaction motivations and Achievement motivations may provide a means to improved psychological wellbeing. In terms of the social aspects of MMORPGs, literature suggests that meaningful, healthy and supportive relationships of varying strengths can be developed between players and that these relationships are comparable to ‘real life’ relationships (Cole and Griffiths 2007; Ducheneaut et al. 2006; Longman et al. 2009; Williams et al. 2006; Yee 2006a). Moreover Williams et al. (2006) found that 1/3 of players play with real life friends with whom they would have no contact if they did not play (e.g. due to location etc). There is strong and developed evidence for an association between supportive social networks and positive psychological wellbeing (Kawachi and Berkman 2001; Longman et al. 2009; Moak and Agrawal 2009; Thoits 2011).

A sense of achievement and accomplishment may positively affect psychological wellbeing, particularly through improving self-esteem and self-confidence (Kaplan and Maehrb 1999; Seligman 2008). Ryan et al. (2006) argued that ‘competence satisfaction’ (being satisfied with one’s own competencies and achievements) was positively correlated with mood, albeit this being mood directly following play, rather than general mood/wellbeing.

Aims and Objectives of the Present Study

At the time of data collection for the present study, the dominant MMORPG on the market was World of Warcraft (WoW), with over 12 million players (Blizzard Entertainment 2010) worldwide. Furthermore this game holds the Guinness World Record (2012) for the most popular MMORPG, and appears to have been the most commonly studied MMORPGs on the market. Since this time, number of players has decreased, however this is still one of the most dominant games available. As such, this study focused on World of Warcraft players as the largest collective population with the most comparability to previous research.

World of Warcraft (like most MMORPGs) is made up of two stages of play. Players are required to complete various tasks to develop their character to a maximum level, learn about the character and develop skills in how to play the game. At the time of data collection, the maximum character level was 85. Once at this level, the game continues indefinitely, unlike alternative genres of game that have an end point. It is this post levelling stage that is of interest here as the motivations, aims and experiences of players are very different to those at the levelling stage and it is this stage of play where gaming has been most reported to result in negative outcomes.

Furthermore, much of the research exploring outcome effects has recruited adolescent participants, often from a student population. Adolescent players are more susceptible to problematic use that interferes with ‘real-life’ responsibilities, while older and more experienced players are less affected due to ability to recognise and rectify problematic patterns (Davies 2005; Griffiths et al. 2004). Moreover, Yee’s (2006a) study summarised the demographics of MMORPG players, and concluded the average age of participants to be 26 years and a range of 11 to 68 years old. Similar patterns of demographics have been found in additional research (Griffiths et al. 2003; Williams et al. 2008). Research with adult participants would therefore be likely to be more generalisable to the MMORPG playing population, therefore allowing for more reliable conclusions.

The aim of the present study was therefore to consider the impact of MMORPGs, specifically WoW, on the psychological wellbeing of adult players. This is considered in terms of the relationship between the amount of time spent playing WoW and the impact on psychological wellbeing, with problematic use and Yee’s (2006b) model of play motivations as possible mediating factors to this relationship.

Hypotheses

1. Greater time spent playing MMORPGs will be associated with greater negative impact on psychological wellbeing
2. Problematic use of MMORPGs will mediate the relationship between play time and psychological wellbeing; increasing the negative effect of play time on psychological wellbeing
3. Play motivations will mediate the association between play time and psychological wellbeing; with Immersion motivations increasing the negative impact, while Social and Achievement motivations decreasing the negative impact

Method

Design

A cross sectional, online questionnaire design was used to test the relationship between the average hours per week spent playing and Psychological Wellbeing. Play Motivation and Problematic Use were tested as mediating variables, with Play Motivations being divided into the three components (Achievement, Social Interaction and Immersion).

Participants

Opportunity sampling and snowballing procedures were used to recruit players of World of Warcraft (WoW).

- Participants were required to have at least one character in the game that had reached the maximum level of 85 (see aims and objectives for justification).
- Participants were required to be aged 18 years or older (see aims and objectives for justification)
- Participants were required to be fluent in the English language in order to be able to appropriately and accurately answer the questionnaires.

Measures

Questions regarding demographic data and World of Warcraft (WoW) experience were included to obtain a measure of Play Time and to describe the sample. Several methods of assessing Play Time were used (i.e. hours per week, days per week and hours per day) which were cross referenced to ensure uniformity and valid responding.

Psychological Wellbeing

Goldberg and Hillier's (1979) General Health Questionnaire (GHQ-28) was used as a measure of Psychological Wellbeing. The GHQ-28 contains four subscales; Somatic problems, Anxiety and Insomnia, Social Functioning and Depression. The 28 item version was used as it is the most widely used in both research and clinical practice due to time considerations (Jackson 2007). The Likert scoring method was used with responses ranging from 0 (no difficulties) to 3 (much greater difficulties than usual). In the current study, the Cronbach's Alpha score obtained was 0.91.

Typically, a greater score on the GHQ-28 is indicative of poorer psychological wellbeing. This standard method of scoring is used in describing the sample in order to aid comparisons to other studies. However, in the mediation analysis, GHQ-28 scores have been reversed so that a higher score is indicative of better wellbeing. This is in line with the direction of other variables for ease of interpretation.

Motivations to Play

Yee's (2006b) Motivations for Play questionnaire was used to identify players' motivation to play WoW in terms of the Achievement, Social Interaction and Immersion. The questionnaire is made up of 39 items, with 14 items on the Achievement scale (Advancement 6, Mechanics 4, Competition 4), 11 items on the Social Interaction scale (Socialising 4, Relationships 3, Teamwork 4) and 14 items on the Immersion Scale (Discovery 4, Role-playing 4, Customisation 3, Escapism 3).

The Cronbach's Alpha reliability coefficients in the current study were Achievement (0.86), Social Interaction (0.74) and Immersion (0.83). Questions asked participants about their involvement with specified aspects of gameplay and their level of agreement to statements about gameplay. Each question was scored on a 5point likert scale where 0 implied 'no interest' and 5 implied 'great interest'.

Yee (2006b) argued that the motivations are not mutually exclusive and thus this questionnaire is not a method of categorizing players based their primary motivation, but measuring the extent to which each motivation is important in their play.

Problematic Use

Problematic game use was measured using a WoW Specific Problematic Usage/Engagement Questionnaire (Peters and Malesky 2008); made up of 27 questions scored on a 7-point likert scale ranging from 0 (completely disagree) to 6 (completely agree), with one question reverse scored. The Cronbach's Alpha was 0.68 in the current study.

The measure used was adapted to be WoW specific by the above authors from the original Charlton's Addiction/Engagement Questionnaire (Charlton and Danforth 2007) and is based largely on Brown's (1993) behavioural addiction criteria and other measures of internet

addiction adapted from DSM criteria for pathological gambling (Griffiths and Hunt 1998; Young 1996). These include symptoms of salience, euphoria, tolerance, withdrawal symptoms, conflict, relapse and reinstatement.

The term ‘addiction’ was altered to ‘problematic usage’ by the questionnaire authors to ‘avoid current controversies of whether behavioural addictions exist’. The adapted scale measures problematic usage/engagement on a continuum, whereby a higher score is a higher indication of the likelihood of problematic use, rather than as a method of categorising players into those ‘addicted’ and those ‘not addicted’.

Procedure and Ethical Considerations

Online survey software was used to host the questionnaires and the study was advertised to WoW players through the ‘chat’ function within the game and on the official World of Warcraft Discussion Forums. Interested players were directed to a website where they would find further information, consent criteria and complete the questionnaires. Participants were required to agree with the consent criteria statements in order to continue. No identifiable information was requested, and no IP (Internet Provider) addresses were recorded by the program, respecting confidentiality of participants. No data was stored until participants ‘submitted’ their responses at the end of the questionnaires, therefore the opportunity to withdraw at any point until submitting was available. Participants were prompted to complete unanswered or missed questions at the end of each page before continuing. Furthermore, participants could return to the website to complete the questionnaires at a time convenient to themselves and therefore could consider their decision to take part for as long as they required.

Demographic questions were presented first, followed by GHQ-28, the Play Motivation Questionnaire and the Problematic Usage/Engagement Questionnaire. Completion time was approximately 15–20 min.

Finally, participants were provided with the opportunity to contact the researcher for details of how to obtain advice and support if any distress had been triggered by the questionnaires.

Data Analysis

Descriptive statistics were used to analyse the demographic variables of the sample and a zero order correlation analysed the direct relationship between the independent variable (average hours per week spent playing) and the dependent variable (Psychological Wellbeing). In order to test the potential mediating effects of problematic use and play motivation, a multiple mediator model, as described by Preacher and Hayes (2004, 2008) was used.

Preacher and Hayes (2004, 2008) argue that the Multiple Mediator Model, aside from its ability to calculate multiple mediator values simultaneously, is more reliable in using a non-parametric bootstrapping re-sampling procedure, which calculates bootstrap estimates of the mediated effects. They argue that this method is more robust with respect to deviations from parametric assumptions. They further argue that this method has a higher power than the standard Sobel test and maintains reasonable control over Type-I error rate.

The model being tested is represented in Fig. 1, displaying direct and indirect pathways and including the measures used. The results are also indicated and will be discussed following.

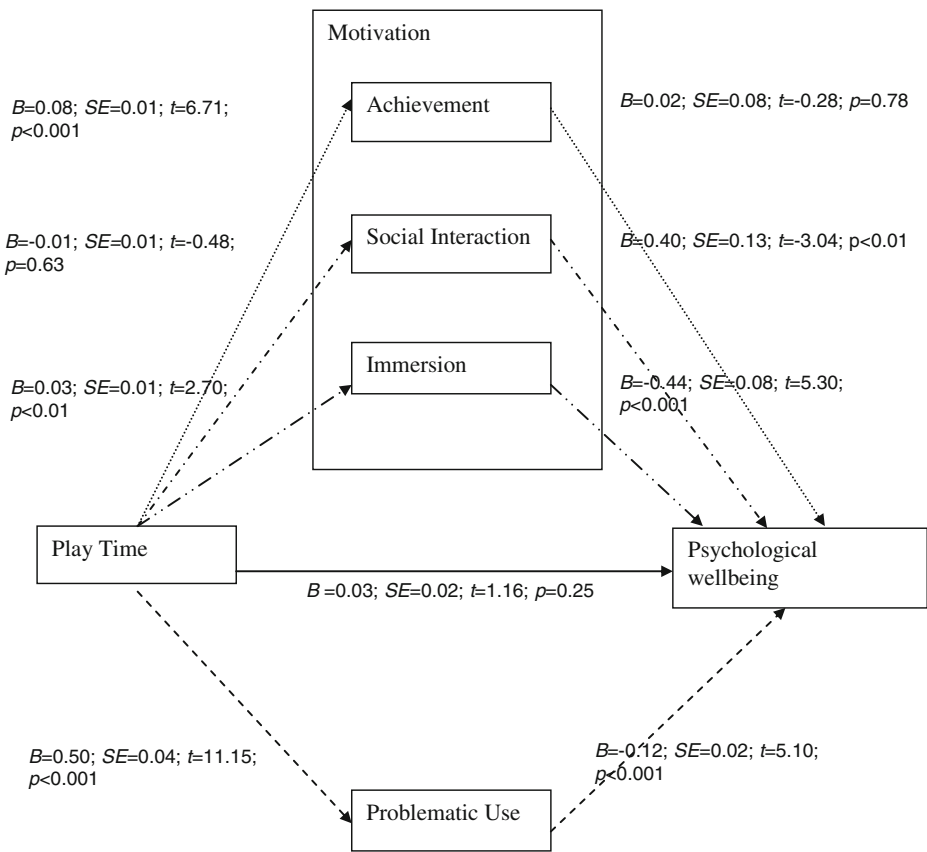


Fig. 1 Visual representation of the mediation model tested and results

Results

Sample Characteristics

Five hundred and sixty five participants took part in this study. Demographic and general information is presented in Table 2. Of the sample, 450 were male (79.6 %) and 115 were female (20.4 %). The average age of participant was 24.6 with a range of 18 to 58. Participants from 45 countries were included in this study, although the majority of participants were from the UK (42 %).

The patterns of WoW play of participants are also summarised in Table 2. The number of years playing the game ranged from 0.5 to 7, where 7 years of playing is the maximum since the release of the game. The mean number of years was 4.2, thus participants were mostly very experienced players. An average of 28.5 h per week were spent playing the game (range 1 to 100 h per week).

Men, on average played WoW for slightly fewer hours per day and slightly fewer hours per week than women (4.68:4.95 and 27.97:30.80 respectively), but played for an average of 4.39 days per week compared to 4.08 days for females. None of these differences were significant at the $p < 0.01$ level when using an independent samples t-test and taking into

Table 2 Summary of demographic variables

		N (%)	
Gender	Male	450 (79.6)	
	Female	115 (20.4)	
Relationship status	Single	353 (62.5)	
	In relationship	42 (7.4)	
	Cohabiting	94 (16.6)	
	Married	63 (11.2)	
	Divorced	9 (1.6)	
	Widowed	2 (0.4)	
	Other	2 (0.4)	
Employment	Full time employed	201 (35.6)	
	Part time employed	43 (7.6)	
	Unemployed	56 (9.9)	
	Student	254 (45)	
	Stay at home parent	3 (0.5)	
	Carer	1 (0.2)	
	Disabled	2 (0.4)	
	Long term sick	4 (0.7)	
	House wife/husband	4 (0.7)	
		Mean (s.d)	Range
Age		24.6 (7.14)	18–58
Play patterns	Hours per week	28.55 (19.22)	1–100
	Years playing	4.3 (1.54)	0.5–7
	Days per week	5.7 (1.5)	1–7
	Hours per day	4.73 (2.64)	1–18

account Levene's Test for Equality of Variance, although the difference in days per week was significant at the 0.05 level ($t(563)=1.99$, $p<0.05$). In terms of age, a significant although slight, negative correlation was calculated with hours played per week ($r=-0.11$, $n=565$, $p<0.01$), suggesting that there was some indication that younger adults played for greater hours. Age, however, only explained 1 % of the variance in hours played per week.

The General Health Questionnaire (GHQ-28) measured the Psychological Wellbeing of the participant group. These findings are summarised in Table 3. For the purpose of descriptive analysis, as mentioned previously, the Total score on the GHQ represents overall wellbeing with higher scores indicating more difficulties. A mean score of 17.76 (SD 10.67) was obtained. A maximum score of 84 is achievable on the GHQ-28 when using the likert scoring method however scores ranged from 3 to 66.

Goldberg and Hillier (1979) argue that the best estimation for a cut-off score for 'caseness' (likelihood of the presence of mental health difficulties) is based on the mean score within the sample, rather than a static predefined score. Thus, in this sample 38.2 % (216) exceeded the cut off score.

The GHQ-28 consists of four scales. For Somatic Problems, participants reported a mean score of 3.85 (SD 2.84); Anxiety and Insomnia yielded a mean score of 4.06 (SD 3.69); Social Functioning had the highest mean score of 6.97 (SD 2.78) and Depression had the lowest mean of 2.88 (SD 4.27).

Table 3 Summary of test variables

		Mean (s.d)
GHQ-28	Total	17.76 (10.67)
	Somatic	3.85 (2.84)
	Anxiety & insomnia	4.06 (3.69)
	Social	6.97 (2.78)
	Depression	2.88 (4.27)
Problematic use	Total	76.87 (22.52)
Play motivation	Achievement	22.79 (5.82)
	Social Interaction	18.61 (3.22)
	Immersion	17.79 (5.22)

There were no significant correlations between Psychological Wellbeing and age in this sample. However, significant gender differences were reported. On the Somatic scale women had a mean score of 4.57 (SD 3.22) and men a mean score of 3.66 (SD 2.7), $t(157)=-2.8$, $p<0.01$. For the Anxiety and Insomnia scale women had a mean score of 5.58 (SD 4.55) and men had a mean score of 3.67 (SD 3.33), $t(146.7)=-4.23$, $p=0.001$, and on the Depression scale women scored a mean of 3.47 (SD 4.91) and the men scored a mean of 2.67 (SD 4.1), $t(156)=-2.16$, $p<0.05$. On the Total scale of the GHQ-28, women scored 21.30 (SD 12.25) and men scored 16.86 (SD 10.04), $t(155.3)=-3.59$, $p=0.001$. On each of the scales females scored significantly higher than males. On the social scale, again, females' scores (mean 7.40, SD 3.21) were greater than males (mean 6.86, SD 2.65) but this difference was not significant.

Effect of Play Time on Psychological Wellbeing

The effect of World of Warcraft (WoW) play time on psychological wellbeing was assessed in terms of the relationship between the number of hours spent playing WoW in an average week and the reversed Total score on the GHQ-28. The GHQ-28 score was reversed in order for ease of interpretation i.e. that a higher score indicated higher wellbeing. A significant negative correlation ($r=-0.18$, $n=565$, $p<0.001$) was calculated suggesting that those who played for more hours per week tended to have lower psychological wellbeing. The effect size of 0.03 indicates that this association explains 3 % of the variance.

Significant negative correlations were also calculated with the Somatic ($r=-0.11$, $n=565$, $p<0.01$), Anxiety and Insomnia ($r=-0.16$, $n=565$, $p<0.001$) and Depression ($r=-0.19$, $n=565$, $p<0.001$) sub-scales of the GHQ-28, although again these are small correlation coefficients. The relationship between the Social Functioning scale of the GHQ-28 and hours per week spent playing was significant at the $p<0.05$ level ($r=-0.08$, $n=565$, $p<0.05$). These results suggest that those who spend more time playing WoW reported poorer psychological wellbeing on all subscales of the GHQ-28, however the weakest relationship was found within the Social Functioning subscale.

Mediation Analysis

The mediation model presented in Fig. 1 was tested using the multiple mediator model described by Preacher and Hayes (2004, 2008) and analysed using SPSS via this method. Four mediated paths were modelled (Achievement Motivation, Social Interaction Motivation, Immersion Motivation and Problematic Use). This method uses a bootstrap methodology to

obtain more robust results as described previously, however the beta values via the bootstrap methodology were identical to the asymptotic beta values and thus asymptotic values are reported here.

The overall model showed a significant fit with the data ($F(5,559) = 18.87$; $p < 0.001$) and accounted for approximately 14 % of the variance on the GHQ-28. The total mediation model was significant ($B = 0.07$; $SE = 0.01$; $z = 5.39$; $p < 0.0001$).

The individual path coefficients and associated significance tests are shown in Fig. 1. In terms of overall mediation effects, the Achievement Motivation was not significant ($B = 0.01$; $SE = 0.01$; $z = 0.28$; $p = 0.78$). Similarly, the path mediated by Social Interaction Motivation did not show significant overall effect ($B = -0.01$; $SE = 0.01$; $z = 0.47$; $p = 0.64$). However, the path mediated by the Immersion Motivation did yield a significant overall effect ($B = -0.01$; $SE = 0.01$; $z = 2.41$; $p < 0.05$). In terms of the path mediated by Problematic Use, again a significant overall effect was calculated ($B = -0.06$; $SE = 0.01$; $z = 4.66$; $p < 0.001$).

These results indicate that Problematic Use and the Immersion Motivation significantly mediate the relationship between WoW Play Time and Psychological Wellbeing. The negative beta values identify that the negative impact of Play Time on Psychological Wellbeing is increased for those who report higher tendencies towards immersion or problematic use. However, the relationship between Play Time and Psychological Wellbeing is not significantly mediated by the motivations of Achievement and Social Interaction.

It should be noted that the path coefficient for the direct effect of Play Time on Psychological Wellbeing was not significant when the mediated paths were included in the model ($p = 0.25$). Thus, the zero order correlation between hours per week spent playing and reversed GHQ-28 ($r = 0.178$, $n = 565$, $p < 0.001$) can be accounted for by the mediation variables. This suggests that there is no 'direct' effect of WoW Play Time on Psychological Wellbeing.

Discussion

The aim of this study was to consider the relationship between playing Massively Multiplayer Online Role-Playing Games (MMORPGs) and psychological wellbeing and to consider whether problematic use of MMORPGs and players' motivations for playing this type of game mediated this relationship. Results suggest a small relationship between time spent playing the game and psychological wellbeing, but that problematic use and immersion into the game mediate this relationship. These findings are discussed in more detail.

A significant negative correlation was found between average hours per week playing World of Warcraft (WoW) and reversed GHQ-28 total score, indicating that increased play time was associated with poorer psychological wellbeing. However, despite this correlation being significant, the r -value (-0.18) suggests only 3 % of the variance in psychological wellbeing is explained.

The significant correlation, but small effect size supports the idea that there is a risk of negative outcomes for some players; however it appears that the risk for the majority of players is small, supporting previous comparable conclusions (Davies 2005; Liu and Peng 2009; Smyth 2007). Further it suggests that the amount of time spent playing is not the most important factor. Consideration of the mediating factors of this relationship may help to explain this and identify those who are at increased risk of negative outcomes.

The model developed by Yee (2006b) was used to consider if motivations to play MMORPGs were implicated in this relationship and literature has suggested that motivation for Immersion leaves players at particular risk of negative outcomes (Caplan et al. 2009;

Griffiths 2010; Liu and Peng 2009). Similarly, the current literature highlights a difference between ‘engaged use’ and ‘problematic use’ of games (with problematic use often being termed ‘gaming addiction’, where game play impacts on real-life functioning; while engaged use involves a significant amount of time being invested while not omitting real-life responsibilities). Literature suggests that problematic play leads to negative outcomes, while engaged play does not (Charlton and Danforth 2007; Seay and Kraut 2007).

These findings have been supported in the current study; concluding that, where play is motivated by Immersion, the negative impact of play time on psychological wellbeing is greater. Also that, where play has become problematic, the same effect is observed. Importantly, as there is no observed direct effect of play time on psychological wellbeing when these mediating factors are taken into account, it is further concluded that engaged play (i.e. increased amounts of play time) does not independently impact negatively on psychological wellbeing. Thus also supporting the arguments of Charlton and Danforth 2007 and Seay and Kraut 2007, that there is a difference between ‘engaged’ and ‘problematic’ play of MMORPGs.

Conversely, there have been some suggestions that achievement motivated play and socially motivated play could prove beneficial (Kaplan and Maehr 1999; Kawachi and Berkman 2001; Moak and Agrawal 2009; Ryan et al. 2006; Thoits 2011; Seligman 2008), however this was not supported in the current study.

Further research into how and why being motivated to play MMORPGs by the immersive characteristics leads to increased risk of negative outcomes would offer further insight into the findings, however there are some links to previous literature. As highlighted earlier, when an activity is immersive, players may experience altered states of awareness, loss of control over actions, difficulty in keeping track of time and feeling out of touch with the environment (Diskin and Hodgins 2001; Griffiths 1990; Jacobs 1986), which may all lead to poorer engagement with ‘real life’ when immersed in MMORPGs. This may then, in turn, lead to poorer psychological wellbeing in terms of low mood, anxieties and poor relationships and social functioning.

Further to this, a particular aspect of Immersion is a motivation to use MMORPGs as a method of Escapism; meaning to become immersed in a virtual world so as to avoid the ‘real world’. It is possible that this concept may infer some underlying difficulties with psychological wellbeing leading to increased play time (the opposite direction of the conclusions inferred by the current study), in order for increased avoidance of problems. However it is still likely that, if this were the case, there would be continued negative effect of play on wellbeing due to avoidance of psychological difficulties resulting in exacerbation of these. Thus still supporting conclusions highlighted here.

In terms of the role of problematic MMORPG use in mediating the effect of play on psychological wellbeing, the expected profile of someone who may score high on this scale should be considered. Problematic use, as measured in the current study, was based on the principles of behavioural addiction including salience, euphoria, tolerance, withdrawal symptoms, conflict, relapse and reinstatement, whilst engaged use is considered as increased dedication and play time, without the presence of the above.

Players scoring high on Problematic Use would be likely to be preoccupied with the game and feel uncomfortable when not playing, experience conflict between wanting to play and other responsibilities and experience conflict with others in relation to their play. They are likely to experience mood modification when playing but have to play for increasing lengths of time to obtain this, and struggle to refrain from playing for any length of time. Players of this profile may feel compelled to play and thus feel that their play is out of control. It may be a combination of these effects that relates to the impact on psychological wellbeing. Previous research has suggested that feelings of loss of control specifically influence the negative feelings associated with problem gambling (Sharpe 2002).

Strengths and Limitations

Strengths and limitations of the study are considered. The initial aim of this study was to establish the relationships between MMORPG play and psychological wellbeing, and thus a correlation design was most appropriate. However, conclusions regarding causality cannot be made. It may be as feasible to conclude that mental health problems precede the use of MMORPGs as it is to conclude that playing MMORPGs precedes mental health difficulties, however previous literature supports the direction of conclusions applied. Gentile et al. (2011) conducted a longitudinal study and found that depression, anxiety and social phobia were outcomes of pathological gaming rather than risk factors. This conclusion provides some support for the direction of the relationship. Further research is required to ascertain this more certainly.

The sample of current MMORPG players was large and similar to previous demographic studies in terms of age, gender, employment and relationship status (Griffiths et al. 2003; Williams et al. 2008; Yee 2006a) thus, more likely to be generalisable to the typical MMORPG population. However, 42 % of the sample was from the UK and thus results may differ from those from different geographic locations where gaming plays different roles in day-to-day life. It is also important that the study is replicated with players of alternative MMORPGs. Also in terms of generalisability, the data may be skewed by the exclusion of participants under the age of 18, although previous literature suggests that this age group make up only a small proportion of typical MMORPG players and the effects of games on this group may be very different (Davies 2005; Griffiths et al. 2004). Further studies should replicate this design including all age groups and including only children and adolescents to ascertain the impact of age on the findings.

As a self-report design, consideration must be given to the integrity of responses to questionnaires and intention to 'fake good' due to stigma sometimes assumed about MMORPG players. Although this is possible, close inspection of the data showed responses on all of the scales were varied and well spread. There was no evidence of a floor or ceiling effect as would be expected if there were high incidence of under or over reporting.

It should be noted that, as a cross sectional design, the data collected represents only one time point. Various factors related to the timing of the data collection may have some influence on the results. First, the new expansions of the game (new levels, new content etc) had been only recently released at the time of data collection which may have increased the amount of time players were spending in game as well as their specific motivations and engagement with the game at the time. Secondly, it was noted that the data collection period was concurrent to exam period in universities. Given that 45 % of the sample were students, this may also have impacted on the above factors. Additionally a longitudinal study could identify any changes in patterns across time.

Summary of Conclusions and Implications

In spite of the acknowledged limitations of this study, the multiple mediation model tested showed significant and robust results. The findings indicate that the problematic use of MMORPGs and being motivated to play by Immersion mediates the relationship between hours per week spent playing MMORPGs and psychological wellbeing. Furthermore, when taking these mediating pathways into account there is no direct relationship between play and psychological wellbeing. In conclusion, increased MMORPG play is associated with poorer psychological wellbeing, specifically where there is greater motivation for immersion or where there is greater experience of problematic use, however increased play alone does not lead to poorer psychological wellbeing.

It is probable that the lack in direct relationship between play and poor psychological wellbeing explains how many players are able to be 'engaged' in the game and enjoy the game with little adverse effect, while a small number have trouble.

Clinical implications of these findings are important to consider for those working in many service settings. It is common practice in clinical assessment to consider the use of adaptive and maladaptive coping strategies, including the possible use of alcohol or drugs to escape and avoid real life problems. The results of this study suggest that it may be equally as important in the current climate of ever-increasing technology use, to consider the use of immersive gaming as an avoidance strategy.

Additionally, given the finding that there is no direct relationship between playing MMORPGs and psychological wellbeing, it is important to think about the implications for the stigma that is sometimes attached to players. Players often communicate their concerns about the effects of this stigma, and it may prevent players seeking help and support when and where their play may have become problematic. Given that this study, along with others (Griffiths et al. 2003; Williams et al. 2008; Yee 2006a), has shown the stereotype to be misguided and that negative outcomes are not as prominent as feared, it is important to aim to reduce this stigma and improve access to support and intervention.

The implications of this study for future research include the need to consider these results and conduct valuable longitudinal research in order to make valid and robust conclusions regarding cause and effect of the relationships shown in this study. It may also be useful to develop this study in order to further consider the tested model. Despite being grounded in the literature, the current model remains relatively simple in terms of the four mediating pathways. Further studies could consider additional relationships and more complex pathways between these variables and consider any circularity within these (e.g. motivation for immersion influencing psychological outcomes, but psychological outcomes also influencing this motivation). Finally, it may be beneficial for this study to be replicated at various time points and with alternative games to World of Warcraft for better generalisability to the gaming population as a whole.

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