Social Anxiety, Perceived Real and Virtual World Social Support, and Problematic Use Among Massively Multiplayer Online Role-playing Game Players

Honors Thesis

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Abstract

The current study examines social anxiety, real and virtual world social support, and problematic Internet use (PIU) among players of massively multiplayer online role playing games (MMORPGs), internet-based games that are ongoing and involve many players represented as online characters. MMORPGs have become increasingly popular in recent years, and with this increased popularity, concerns have been raised regarding possible effects of heavy MMORPG use on players’ social support, health, and well-being, particularly for vulnerable individuals such as those suffering from social anxiety. This study uses path modeling to examine relationships between the development of Problematic Internet Use (PIU), and several key factors related to social functioning in a large sample (N = 883) of MMORPG participants, including their levels of social anxiety and perceived real world and virtual world social support. Findings indicated that social anxiety increases risk for PIU, and that this risk is partially mediated by levels of real world, but not virtual world social support. Implications for future research on psychological and psychosocial well-being, perceptions of social support, and therapeutic implementation of MMORPGs are discussed.

Keywords: Social Anxiety; Real World Social Support; Virtual World Social Support; Problematic Internet Use; Internet-based Survey; Web-based Survey; MMO; MMORPG; Gaming
Introduction

Researchers have sought to understand motivations for playing massively multiplayer online role-playing games (MMORPGs) and consequences of these for social relationships and health since their introduction in the late 90s (e.g., Caplan, 2002; Caplan 2005a; Caplan 2005b; Caplan, 2007; Caplan et al., 2009; Caplan, 2010; Ceyhan & Ceyhan, 2008; Seay, 2006; Yee, 2006a; Yee, 2006b). MMORPGs have been defined as online games that are open-ended and ongoing and involve many online players (Caplan, 2009; Yee, 2006a). Often, players play collaboratively using alternate identities or “avatars”, through which they often develop relationships that are highly valued and provide many of the same benefits as relationships in the real world (Capalan, 2009; Seay, 2006; Yee, 2006a). According to Seay (2006), when MMORPG use and virtual networks are integrated with real world networks, real world relationships are reinforced and MMORPG use can be beneficial (Seay, 2006). However, in other cases, virtual world relationships may supplant players’ real world community and/or support system or be used to compensate for a lack of social support in the real world, and in these instances, may be harmful to players’ health and wellbeing (Caplan, 2009; Lee & Stapinski, 2012; Seay 2006). Consistent with this concern, recent studies have suggested that players reporting negative outcomes related to Internet use appear to be drawn to the Internet’s interpersonal functions (i.e. social networking and social gaming such as MMORG play; Caplan, 2002, 2003). Such outcomes of use of MMPORGs and other internet-based activities with interpersonal benefits appear especially likely among players with high levels of social anxiety, who appear to prefer virtual to offline social activities (Caplan, 2007; Lee & Stapinski, 2012). In the extreme, reliance on the internet for social activities in response to anxiety may contribute to development of problematic internet use (PIU), a constellation of adverse outcomes resulting
from excessive play including symptoms similar to those of behavioral addictions (Caplan, 2007; Caplan, 2009; Selfhout et al., 2009)). However, to date, possible contributions of social anxiety and its influence on perceived benefits of online relative to real world social relationships to the development of PIU have not been directly studied.

The aim of the present study is to contribute to research on the development of PIU by examining relationships among levels or social anxiety, perceived “real world” and “virtual world” social support, and symptoms of PIU in a sample of MMORPG players. It is expected that social anxiety will predict PIU, and that this relationship will be partly or fully explained by relationships between social anxiety and perceived real and virtual world support; specifically, decreased real world, and increased virtual world support.

_Possibly:_

*Massively Multiplayer Online Role-Playing Games (MMORPGs)*

Massively Multiplayer Online Role Playing Games (MMORPGs) are some of the most popular online games on the market, with notable titles including “Lord of the Rings: Online,” “Warhammer: Online,” “Star Wars: The Old Republic,” “Second Life,” “World of Warcraft” (Bruce & Van Geel, 2012; Hill, 2010). The majority of MMORPGs are themed in imaginary, fantasy-based worlds (i.e. consisting of motifs of science fiction, magic, and supernatural elements as primary components of various aspects of the game) and consist of non-player characters, characters embedded in the game, not associated with players) and characters controlled by the players (avatars). MMORPGs give players the option to either play on their own against non-player characters or form groups in order to play with other players (“guilds”). MMORPGs are highly social in nature, allowing ongoing communication via text or voice chat, and thus, are likely to have perceived social benefits; when these are sought in place of, rather than as a complement to benefits of real world, engagement in MMPORG or other social online
activities may increase risk of PIU (Caplan, 2003; Caplan et al., 2009; Rotsztein, 2003). Thus, MMORPG players provide a suitable population in which to study such processes.

**Problematic Internet Use (PIU)**

PIU is not recognized as a psychiatric disorder in the current, fourth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 2000). However, in many respects, PIU resembles behavioral addictions (e.g., pathological gambling; Caplan, 2009; LaRose et al., 2009; Seay, 2006. The most commonly accepted model of PIU is Davis’ cognitive-behavioral model (Davis, 2001). Davis’ model attributes PIU several factors, including use of the Internet to regulate unpleasant moods, attachment to social benefits provided by the Internet, and perceptions of greater interpersonal control online than offline. In turn, these processes lead to a constellation of problems, including the development of compulsions to play, withdrawal-like symptoms, and negative consequences for the user socially, psychologically, and/or occupationally in the real world. In the same fashion other researchers have provided similar definitions of PIU (e.g., Block, 2008; Caplan 2002, 2003, 2005a; Seay, 2006). The strong motivations to continue to use despite adverse consequences among PIU are said to resemble those found among sufferers of various other types of dependency, particularly behavioral varieties such as pathological gambling or sexual addictions (Caplan, 2009; Staehlin, 2003; Thalemann, Wölfin, and Grüsser, 2007; Weinstein, 2010). Similarly, phenomena resembling withdrawal have also been reported (Yee, 2002).

Most research on PIU has focused on use of social networks such as Facebook, instant messaging clients, daily checking media sources, etc. and studies of PIU among MMORPG players have are still relatively few. Most existing research on PIU among MMORPG players has focused on the prevalence of specific symptoms. In a large survey study of MMORPG
players, roughly 9% of MMORPG players report logging 40+ hours of game play in a week; 60% of those players stated that they played 10+ hours in a single day, and 40% identified themselves as being addicted to the game (Smahel, Blink, and Ledabyl, 2008, Yee, 2002). Yee (2002) also discovered that 30% of females and 19% of boys aged twelve-to-seventeen self-reported as being unsuccessful in their attempts to quit playing their preferred MMORPG. Likewise, 4.8% of females and 6.4% of males aged thirty-five or older also reported being unsuccessful in their attempts to quit their MMORPG of choice.

Social Anxiety Disorder

Several prior studies have shown relationships between social anxiety and PIU and social anxiety is considered to be one of the most important PIU risk factors (e.g. Campbell et al., 2006; Caplan, 2007; Erwin et al. 2004; Lee & Stapinski, 2012). Social anxiety involves inflated threat expectancies and resultant avoidance of social situations (Lee & Stapinski, 2012; Rapee & Heimberg, 1997). Social anxiety has been viewed as debilitating to individuals that suffer from the disorder because it interferes with establishing and maintaining social relationships and limits access to social support (Gross et al. 2002). Social anxiety has been linked to PIU and is considered by some to be one of the most important risk factors in PIU.

Studies have shown that individuals with high levels of social anxiety prefer online social interaction to face-to-face interaction (Caplan; 2005; Caplan 2007; Caplan 2009). Reported reasons include feeling more at ease when interacting in virtual versus real world contexts (Erwin et al., 2004) and conversely, feeling more threatened in real-world social situations due to fears of negative social-evaluation (Gross et al., 2002; Mckenna & Bargh, 2000). The greater ease in virtual world and greater sense of threat in real world contexts reported by individuals with social anxiety may arise from perceptions that virtual world interactions are better
controlled (Lee & Stapinski, 2012). Further, individuals with social anxiety indicate that they seek out relationships and attachments in the virtual world as a means for compensating for their lacking relationships in the real world (Campbell et al., 2006; Selfhout et al., 2009). As indicated previously, this compensatory use of virtual world interactions increases risk for PIU. Social anxiety could also be linked to PIU in other ways. Davis’ model of PIU (Davis, 2001) suggests that, in addition to the inclination to seek interpersonal benefits through online rather than real world social interactions, PIU may be driven by general difficulties in regulating mood and anxiety. To the extent that social anxiety reflects more general mood and/or anxiety regulatory difficulties, then, it might be expected to have effects on PIU apart from mechanisms involved in preferences for online rather than real world social interaction.

Perceived Social Support

Social support is a broad term encompassing a variety of specific constructs, including the characteristics of social networks through which support is obtained (e.g., number of individuals in a social network), receipt of supportive behaviors from networks (“received support”) and perceptions that one is adequately supported by one’s network to meet life’s challenges (“perceived support”) (Haber, Cohen, Lucas, & Bates, 2007). Perceived support is the most frequently studied specific dimension of social support and shows the strongest relationships with health outcomes (Lakey & Cohen, 2000). Social support acts a “buffer” when coping with various life stressors and results in a better state of overall psychological wellbeing in individuals (Cohen & Willis, 1985). Those with stronger social networks are better equipped to handle life stressors, particularly insofar as support from these networks is perceived to available if needed (Cohen & Hoberman, 1983; Lakey & Cohen, 2000).

Based on these links between perceived social support and mental health more generally,
those with healthy social networks and ample perceived social support, at least in the real world, might be expected to be less likely to develop PIU and exhibit maladaptive use. Accordingly, research with similar constructs to perceived social support has suggested the possibility of such a relationship. PIU has been linked to real world social isolation (Caplan, 2009; Erwin et al., 2004; Lee & Stapinski, 2012; Longman, Sci, O’Conner, & Obst, 2009; Seay, 2006).

Although in principle, compensatory use of virtual sources of social support to meet social needs could be effective (as suggested by reports of some non-problematic players; Yee, 2006a), as discussed earlier, preferences for online to real world social support, and attempts to pursue interpersonal benefits through online relationships increase risk for PIU. Caplan (2009) found that another construct resembling perceived social support involving perceptions of being in a supportive community, or “sense of community” (McMillan & Chavis, 1986) related to PIU, and further, that the direction of this relationship depended on whether the community concerned was in the real world or online. Specifically, deriving sense of community from real world interactions acted as a negative predictor of PIU, but the virtual world sense of community positively predicted PIU. Furthermore, real and virtual world sense of community were shown to be linked to levels of social anxiety, such that those with higher social anxiety were more likely to have lower real world and higher virtual world sense of community (Caplan et al., 2009). Although sense of community is not equivalent to social support as it involves relationships to a collective group rather than specific individuals, one might well expect based on this research individuals with relatively high levels of virtual world social support and low levels of real world social support would be more vulnerable to PIU. Observing such patterns between perceived social support would enhance the capacity to further develop literature on social relationships, health, and PIU, by directing tying research and theory on social relationships and PIU.
development to the very large, rich literature on perceived social support and health.

*The Current Investigation*

PIU research is still a relatively new topic, even more so when looking exclusively at the MMORPG user population. The present study is intended to simultaneously examine relationships anticipated from the literature between social anxiety, real and virtual world social support, and PIU in one model describing means through which interpersonal relationships in the real and virtual worlds may impact PIU development. Based on available literature examining these or similar constructs, the following relationships were hypothesized: Hypothesis #1 (H1) social anxiety is positively associated with PIU; Hypothesis #2 (H2) lower levels of perceived real world social support are positively associated with PIU; Hypothesis #3 (H3) higher levels of perceived virtual world social support are positively associated with PIU; Hypothesis #4 (H4), the relationship between social anxiety and PIU will be mediated through its relationships with decreased real world perceived support and increased virtual world perceived support. See ‘Figure 1’.

*Method*

*MMORPG Selection*

The approximate number of subscriptions and active subscribers to current MMORPGs are collected and made publically available (Bruce & Van Geel, 2012). MMORPG players were targeted based on which MMORPGs comprised the bulk of the subscriptions and active user user-base. For the purposes of this study, data from the year 2010-2012 was used. The following MMORPGs were found to comprise the majority of subscriptions and active accounts (over 1 million): *Runescape, Star Wars: The Old Republic, World of Warcraft, etc.* (Bruce & Van Geel, 2012) Players, forums, and environments fixated around these popular MMORPGs titles were
the main target for this study. Other players, forums, and environments that were related to popular MMORPGs found to comprise a moderate amount of subscriptions and active accounts (150k-to-1 million) were also targeted for this study, including: Lord of the Rings: Online, Second Life, Warhammer: Online, etc. (Bruce & Van Geel, 2012).

**Procedures**

Participants were recruited online through multiple means using an IRB approved recruitment text. Participants were recruited through two methods. First, participants were recruited through the University of North Carolina at Charlotte online “SONA” system. Individuals in their 20s comprise a vast majority of MMORPG players (Yee, 2006a), which made a college-age student population valuable to this research. Additional recruitment occurred through popular forum based websites that attract MMORPG players (e.g., ‘IGN Vault Networks’, ‘Lore’, ‘Reddit’, ‘Stratics’) and MMORPG gaming forums related to high subscriptions and active accounts (e.g., those for World of Warcraft found on ‘Blizzard Entertainment’s’ website). It was estimated that approximately 100 participants would be needed for adequate power to test planned models.

The primary inclusion criterion for the study was prior MMORPG use. For the study, MMORPGs were defined as ‘online games involving role-playing in virtual environments, many players interacting at once, and ongoing, continuously evolving play.’ Participants were provided with this definition, asked if they play MMORPGs, and were asked to list one-to-three MMORPGs that they have played in order to define them as gamers familiar with the specific type of games being included in this study. Games that fit the study criteria include: ‘World of Warcraft’, ‘Lord of the Rings Online, ‘Star Wars: The Old Republic’, and ‘Final Fantasy XI’ amongst others. Participants consented to participate in the study by checking a box and
providing a viable e-mail address on the online survey form after reviewing a brief description of
the study entailing intentions and scope of the project and issues related to their participation.
After providing informed consent participants answered surveys consisting of mostly multiple-
choice questions in a Likert-style or Likert-continuum format, other continuous variables such as
age, hours played, and MMORPGs played were recorded via text-fields.

After providing consent, players completed an online web-based survey that required
approximately 20 minutes to complete in its entirety. Student research volunteers pooled from
the University of North Carolina at Charlotte ‘SONA’ system were provided with participation
incentives based on time needed for their participation. Respondents recruited through other
means were not paid or compensated for their participation in the study. Because participants
were briefed with study goals, no experimental manipulations, and no cover story, there was no
need to debrief participants at the end of the study.

Measures

Demographic Information. Respondents were asked their; gender, age, ethnicity, work
status, whom they played with (family, significant others, real world friends, virtual world
friends, guilds, etc.), and whether or not they were full, part-time, or non-students. See ‘Appendix
A’

MMORPG Play. The amount of time participants spent playing MMORPGs was also
assessed using a brief, 3-item free-response questionnaire. Questions include “How many hours
do you spend playing MMORPGs a day,” “How many hours do you spend playing MMORPGs a
week,” and “How many hours do you spend playing MMORPGs a month”. , Players were also
asked about games that they use, amount of time spent on MMORPG gaming, and they have
been playing MMORPGs. Participants were also asked whether they consistently played with the
same group of friends (online or offline friends), whether they played with a significant other or family, whether the belonged to a guild or not, and whether or not they used forms of voice technologies to communicate. See ‘Appendix A’

*Voice Technologies Measure.* Participants’ utilization of in-game voice technologies was assessed using a single-item question. Question included “How often do you use a voice system (e.g. Teamspeak, Ventrillo) to talk to other players?” The question was based on a 5-point Likert scale ranging from (1=Never, 5=Always) (Caplan et al., 2009). See ‘Appendix A’

*Liebowitz Social Anxiety Scale (Self-Report Version (LSAS-SR)).* The LSAS-SR consists of a 24–item questionnaire assessing social anxiety in the past week across two domains: ‘Fear/Anxiety’ and ‘Avoidance’. Each item on the LSAS-SR is based on a 4-point Likert scale, on which higher scores indicate a higher level of fear/anxiety (None=0, Severe=3) or avoidance (Never Avoided This Activity=0, Usually Avoid This Activity=3) in various social situations. Sample items (situations) include; “Talking to people in authority,” “Working while being observed,” and “Expressing disagreement or disapproval to people you don’t know very well. Scores range from 0-144 and outcomes range from social anxiety: unlikely, probable, very probable, and extremely probable (Fresco, Coles, Heimberg, Liebowitz, Hami, Steing, et al., 2001). See ‘Appendix B’

*Cohen’s The Interpersonal Support Evaluation List (ISEL).* The ISEL consists of a 40-items and includes four subscales (Appraisal, Belonging, Tangible, and Self-esteem support). For this study, only the following scales were used: Appraisal (e.g., “There are several people that I trust to help solve my problems”): Belonging (e.g., “If I decide one afternoon that I would like to go to a movie that evening, I could easily find someone to go with me.”). Items are rated on a 4-point scale with anchors ranging from “definitely true” to “definitely false.” For the purposes of
this study the items were qualified with the following language “Please answer the following while taking primarily offline friends, family, and significant others into consideration” (Cohen, et al., 1985). See ‘Appendix C’

Cohen’s The Interpersonal Support Evaluation List (ISEL) ~ Longman et al. MMORPG adapted scales. The Longman et al. MMORPG adapted ISEL scales consists of a 19-item questionnaire based on adaptations of the original ISEL Appraisal and Belonging scales. A focus group of World of Warcraft players (N=4) assisted in the adaptation of the Appraisal and Belonging subscales of the ISEL to the World of Warcraft context. The Appraisal item “There is no one that I feel comfortable to talk to about intimate personal problems” was reworded to “There is no one I know through World of Warcraft that I feel comfortable to talk with about intimate personal problems.” For the purposes of this study the items were qualified with the following language “Please answer the following questions taking primarily online friends into consideration.” Furthermore the adapted language “World of Warcraft” was changed to “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” in order to better generalize the statements to MMORPG players as a whole and not just those that play “World of Warcraft” exclusively. See ‘Appendix D’

Generalized Problematic Internet Use Scale 2 (GPIUS2). The GPIUS2 consists of a 15-item questionnaire assessing PIU that contains five subscales, including: “preference for online social interaction (α=.82),” “mood regulation (α=.86),” “cognitive preoccupation (α=.86),” “compulsive internet use (α=.87),” and “negative outcomes (α=.83).” Item on the GPIUS2 use a 7-point Likert scale, on which higher scores indicate a higher level of agreement with each statement (Strongly Disagree=1, Strongly Agree=7). Sample items include “I prefer online social interaction over face-to-face communication,” “I have used the Internet to talk with others
when I was feeling isolated,” “When I haven’t been online for sometime, I become preoccupied with the thought of going online,” “I have difficulty controlling the amount for time I spend online,” and “My internet has made it difficult for me to manage my life” (Caplan, 2005b). See ‘Appendix E’

*Yee’s Motivations for MMORPG Game Play Scale (2006)*. The Motivations for MMORPG Game Play assesses participants’ motives for play concerning: *escapism* (“when players use the game as a means to escape real-world situations. More specifically, escapist behavior is related to players using the virtual world in order to forget about, escape, and avoid real-world problems” via a 4-item sub-scale (α=.62) (Stetina 2011; Yee, 2006a). See ‘Appendix F’

*Yee’s Motivations for MMORPG Game Play Scale (2012-items)*. The Motivations for MMORPG Game Play assesses participants’ motives for play concerning: *achievement* (“the desire to enhance oneself in the context of the virtual world through the completion of goals” (Yee, 2006)) via a 4-item sub-scale, *immersion* (“developing character stories, customizing one’s avatar, learning about the game itself (i.e. aspects of play such as knowledge of weapons and statistics, often knowledge the majority of players do not posses”), learning about the history and lore crafted for the game (Yee, 2006a, 2006b)) via a 4-item sub-scale, and *social* (“playing to have social interaction with other players, forming friendships that in some cases might be more intimate than those experienced in the real world” (Yee, 2006a)) via 4-item sub-scale. Each item is answered on a 5-point Likert scale. Participants are presented the following root and asked “*How important are these gameplay elements when you are playing online games?*” Higher scores indicate higher agreement with the statement (*Not Important At All=1, Extremely Important=5*) (Yee, Ducheneaut, & Nelson, 2012). See ‘Appendix F’
Analysis

Following calculation of correlations to assess all direct associations, path modeling was used (Muthén & Muthén, 2012) to simultaneously assess relationships between the hypothesized predictor (social anxiety), mediators (real and virtual world social support), and outcome variable (PIU). Correlations concerning the primary study variables and motivations for play were examined. Missing data was estimated using the Full Information Maximum Likelihood (FIML) approach (Muthén & Muthén, 2012). Hypothesized paths were tested using the standard maximum likelihood algorithm of M plus (Muthén & Muthén, 2012). Fit was assessed using chi square goodness of fit, the root mean squared error of approximation (RMSEA), and relative fit indices (CFI and TLI) (Raykov & Marcoulides, 2000). In order to assist in interpretation of results, fit indices for two models involving hypothesized relationships was compared and the significance of difference in fit assessed for: 1) a model in which all possible unidirectional relationships between the predictor, mediators, and outcome was tested, including a direct path between social anxiety and PIU; 2) a “nested” model excluding the direct social anxiety-PIU relationship. A lack of significant difference between these two models indicates that indirect effects of social anxiety on PIU through real and virtual world social support fully account for the social anxiety-PIU relationship.

Results

Participants

The original sample procured from approximately a month and a half of data collection resulted in an initial $N = 1,548$. Many of these responses were incomplete or questionable for a variety of reasons (e.g., underage participants, non-MMORPG players, and lewd or vulgar text within survey responses). After eliminating these responses, the final sample consisted of 883
participants, mostly Caucasian (83%) and male (80%). Participants ranged in age from 18-to-67
\((M = 24.95, SD = 6.781)\). World of Warcraft was the most common game played, while other
games frequently played included: *Lord of the Rings Online, Star Wars: The Old Republic,
Runescape, Guild Wars 2*, and *Final Fantasy XI*. All of the aforementioned games fit study
criteria for MMORPGs. For descriptives see ‘Table 1’.

**Path Analysis Results**

Table 2 shows the means, standard deviations, and zero-order correlations for primary
study variables. On average, players reported levels of social anxiety that put them at “social
anxiety probable” levels \((M = 38.39, SD = 26.88)\) “scores in this range are typical of persons
entering treatment for the generalized type of social anxiety disorder” (Fresco, Coles, Heimberg,
Liebowitz, Hami, Steing, et al., 2001). Results of the path analysis are shown in Figure 2. Two of
the direct relationships found were as hypothesized. As hypothesized, results showed that social
anxiety was related to PIU and to lower real world social support, but unexpectedly, was related
to lower, not higher virtual social support. Specifically, the direct relationship between social
anxiety and PIU was positive and significant \((\beta = .33, p < .001)\); and the direct relationship
between real world social support and PIU was negative and significant \((\beta = -.19, p < .001)\); .
However, contrary to expectations, virtual world social support was not positively related to PIU
\((\beta = .05, p > .05)\).

The relationship between social anxiety and PIU was partially mediated by real world
social support \((\beta = .10, p < .001)\); this indirect relationship accounted for approximately 22% of
the variance in PIU. The indirect effect of social anxiety via virtual world social support was
small and non-significant \((\beta = -.01, p > .05)\). Remaining variance was associated with the direct
path between social anxiety and PIU. Given the strength of the direct relationship, it was not
surprising that the full model (i.e., containing the direct path) was a significant improvement over the constrained model (where the direct path was set to 0; Full Model: $\chi^2 = 98.707$, $df = 1$, $p < .001$, RMSEA = .337 [CI = .283, .395], CFI = .831, TLI = -.695; Nested Model: $\chi^2 = 182.223$, $df = 2$, $p < .001$, RMSEA = .324 [CI = .285, .365] CFI = .687, TLI = -.563). However, both models were a poor fit as indicated by the significant chi square difference test ($\chi^2 = 83.516$, $df = 1$, $p < .001$). See ‘Figure 2’.

**Discussion**

The aim of the present study was to contribute to research on the development of PIU by examining relationships among levels or social anxiety, perceived “real world” and “virtual world” social support, and symptoms of PIU in a sample of MMORPG players. It was expected that social anxiety would predict PIU, and that the relationship would be partly or fully explained by relationships between social anxiety and decreased perceived real and increased virtual world support. Results supported the original notion that social anxiety would predict PIU; moreover, the relationship between social anxiety and PIU was explained by decreased levels of perceived real world support. Contrary to expectations, perceived virtual world social support did not act as a predictor or mediator of PIU.

Path model results suggest that when individuals are socially anxious they tend to have lower levels of perceived real and virtual social support and also exhibit higher levels of PIU. Lower levels of real social support among more anxious participants partially explained the social anxiety-PIU relationship, whereas virtual social support did not, suggesting that in this sample, virtual social support had little role in contributing to the risk of PIU from social anxiety. Thus, generally virtual social support did not appear to be detrimental or beneficial to health outcomes. However, it might be possible to enhance potential positive effects of compensatory
MMPORG use among anxious individuals by encouraging them to pursue real world relationships with other virtual world participants, use voice technology, and find other means of distraction and escape than excessive play. See ‘Table 3’.

Implications of Path Analysis

Results were more consistent with the notion that individuals with healthy social networks are less likely to develop problematic usage patterns. Similarly, results appeared to lend support to findings (e.g. Caplan, 2009; Lee & Stapinski, 2012; Longman, Sci, O’Conner, & Obst, 2009; Seay, 2006) that individuals who exhibit PIU (those whom were socially anxious) are more likely to experience social isolation (in this case much less likely to perceive either real or virtual world social support). Perceptions of real world social support did not fully account for the path between social anxiety and PIU, meaning that other mechanisms might need to be examined to account for the social anxiety-PIU relationship (e.g. difficulties in self-regulation; Seay, 2006). In contrast to findings concerning the role of real world social support, findings concerning virtual world social support were not consistent with prior research, calling into question contentions that virtual support has a harmful influence among diverse players such as those in the sample used for the present study (e.g., Caplan, 2009)

The study lost approximately half of the original N (initial N = 1,549 to a working N = 883) as a result of incomplete responses (almost 600), underage participants, non-MMORPG players, and questionable responses. Thus, selection biases may have contributed to the pattern of results observed. The study was cross-sectional, precluding inferences regarding causal relationships. However, the lack of fit to hypothesized model may stem from the heterogeneity of the sample; specifically, although all participants were required to have played MMORPGs, no distinctions were drawn between relatively heavy users and those who used only rarely or
occasionally. Relationships involving online social support and guild involvement might be stronger among heavier users of MMORPGs.

Comparative analysis between player groups, such as those with differing levels of involvement (e.g., differing weekly average hours of use) may aid in better understanding why the tested path models showed poor fit, as path coefficients might differ for low and high involvement groups. For example, it might be expected that players with higher involvement would show stronger relationships involving virtual world support. Similarly, comparing student and non-student groups or groups of differing ages may also yield different relationships than those found in the full sample. Conversely, improvement of model fit once between group differences are examined (i.e., for the separate groups) could help identify ways in which relationships between study variables vary across respective subpopulations. Accompanying differences between groups on variables not considered in the present study might contribute to further explanation of more specific mechanisms involved in relationships between social anxiety, social support, and PIU (e.g., differences between groups in social isolation, types of social relationships, norms for internet use volume).

Post-hoc findings suggest some specific mechanisms that might be examined through group comparisons or inclusion of additional variables in models of anxiety, support, and PIU relationships. These may include escapist or social motivations for play, utilization of communication technologies, extent of play with specific groups (e.g., real world friends, guilds). Other variables examined in the literature on MMOs and PIU but not included in the present study would also be of interest, such as self-regulation, activity level, reward related learning, and specific types of psychological problems found to covary with PIU (e.g. depression, loneliness, anger, etc.; Caplan, 2009).
Ultimately, the goal of MMORPG player research is not to “blame” the technology for PIU or other poor outcomes, but rather, to understand how technology interacts with individuals’ vulnerabilities (e.g., social anxiety) or resources (e.g., real and virtual world support) in determining outcomes, including positive outcomes. Certain players will appear more likely to develop PIU and/or behavioral dependencies on online gaming, but given their extent of use and documented benefits of these games, this will not be the case for all. With further development of the evidence-base, research on MMORPGs could inform efforts by preventionists or mental health practitioners to identify those individuals most likely to experience problems, and intervene to ameliorate processes that link their vulnerabilities to PIU. As the literature develops, hopefully, protective or health promotive mechanisms associated with PIU such as those identified in correlational analyses (e.g., negative associations between guild participation and PIU) can also be more thoroughly investigated.
References


Kang, J, Ko, I., & Yunjung, K. (2009). The impact of social support of guild members

Kim, J., LaRose, R., Peng, W. 2009. Loneliness as the cause and the effect of problematic Internet use: the relationship between Internet use and psychological well-being.

*CyberPsychology & Behavior*. 12, 451-455. Doi:10.1089


the Internet for personality and social psychology. *Personality and Social Psychology Review, 4*, 57-75.


Rotsztein, B. (2003). Problem Internet use and locus of control among college students unpublished manuscript.


Sharer, N. (2012). Examining social anxiety and depression among excessive online


Social Anxiety, Support and Problematic Use of MMORPGs


Figure 1. Proposed model of relationships between social anxiety, perceived real and virtual world social support, and Problematic Internet Use.
Figure 2: Path model results (Standardized).
Table 1
Descriptives for primary study variables.

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std.Deviation</th>
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<tr>
<td>Female</td>
<td>868</td>
<td>0</td>
<td>1</td>
<td>.20</td>
<td>.399</td>
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<tr>
<td>Nwhite</td>
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<td>0</td>
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<td>Age</td>
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<td>133.00</td>
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<td>.54056</td>
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<tr>
<td>Perceived Virtual World Social Support</td>
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<td>6.00</td>
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<td>Mood Regulation (PIU)</td>
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<tr>
<td>Negative Outcomes</td>
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<td>.00</td>
<td>6.00</td>
<td>1.7971</td>
<td>1.49492</td>
</tr>
</tbody>
</table>

a: Female/Male; b: Non-White/White; c: Age; d: Social Anxiety; e: Perceived Real World Social Support; f: Perceived Virtual World Social Support; g: Problematic Internet Use; h: Mood Regulation (PIU); i: Preference for Online Social Interactions (PIU); j: Cognitive Preoccupancy (PIU); k: Compulsive Use (PIU); l: Negative Outcomes
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<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>M (SD)</th>
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<td>1. Social Anxiety</td>
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<td>-</td>
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<tr>
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<tr>
<td>4. Problematic Internet Use</td>
<td>0.421***</td>
<td>-0.349***</td>
<td>-0.084</td>
<td>2.81 (1.08)</td>
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Note: *** p < .001, ** p < .01, * p < .05. N = 883.
Table 3
Means, standard deviations, and zero-order correlations for primary study variables and variables of interest

<table>
<thead>
<tr>
<th></th>
<th>Social Anxiety</th>
<th>Perceived Real World Support</th>
<th>Perceived Virtual World Support</th>
<th>Problematic Internet Use</th>
<th>Achievement Motivations</th>
<th>Social Motivations</th>
<th>Escapist Motivations</th>
<th>Plays With Guild</th>
<th>Plays With Virtual World Friends</th>
<th>Plays With Real World Friends</th>
<th>Plays With Voice Technology Use In Game</th>
<th>Talk To Players Out of Game</th>
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<tr>
<td>RW^b</td>
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<td>.373***</td>
<td>-.349***</td>
<td>.078*</td>
<td>.224**</td>
<td>-.121***</td>
<td>.072*</td>
<td>.252***</td>
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<td>.134***</td>
<td>.102**</td>
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<td>-.084*</td>
<td>.139***</td>
<td>.568***</td>
<td>.059†</td>
<td>.401***</td>
<td>.289***</td>
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<td>PIU^d</td>
<td>.421***</td>
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<tr>
<td>Mot. Ach.^e</td>
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<td>.212†</td>
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<td>.305†</td>
<td>.381***</td>
<td></td>
</tr>
</tbody>
</table>

Note. ***p < .001; **p < .01; *p < .05; †p < .10
^a Social Anxiety; ^b Perceived Real World Support; ^c Perceived Virtual World Social Support; ^d Problematic Internet Use
^e Achievement Motivations; ^f Social Motivations; ^g Escapist Motivations
^h Plays With a Guild; ^i Plays With Virtual World Friends; ^j Plays With Virtual World Friends
^k Utilizes Voice Technologies In Game; ^l Talks To Other Players Outside of Game
Appendix A. Demographics

0) Do you play Massively Multiplayer Online Role-playing Games (e.g. World of Warcraft, Second Life, Guild Wars 2, Star Wars: The Old Republic, etc.)?
   a. Yes
   b. No

1) Please list MMORPGs (up to three) that you have played in the past year:
   1. __________
   2. __________
   3. __________

2) Gender:
   a. Male
   b. Female

3) Your Race (Check all that apply):
   a. American Indian/Alaska Native
   b. Asian
   c. Black or African American
   d. Caucasian/White
   e. Native Hawaiian or other Pacific Islander
   f. Other
      i. Please specify: ______

4) Age: _____

5) Standing:
   a. I am a high school student.
   b. I am a part-time student in a college or university.
   c. I am a full-time student in a college or university.
   d. I am not a student.

6) Occupational status:
   a. I am working part-time.
   b. I am working full-time.
   c. I am a stay-at-home-mom/dad.
   d. I am unemployed.
   e. I am retired.

7) Relationship/Marital status:
   a. Single/unmarried
   b. In a relationship (e.g. boyfriend/girlfriend, boyfriend/boyfriend, girlfriend/girlfriend)
   c. Engaged
   d. In a domestic partnership (Not married)
   e. Married
Appendix A. Demographics: Continued

8) Do you have children?
   a. Yes
   b. No

9) Did someone introduce you to the game?
   a. No, I read an ad or found out on my own.
   b. My romantic partner (boyfriend/girlfriend, fiancé/fiancée, husband/wife) introduced me to the game.
   c. A friend introduced me to the game.
   d. A family member (excluding spouse) introduced me to the game.

10) MMORPG Time Investment Measure.
    1. How many hours do you spend playing MMORPGs a day? _____
    2. How many hours do you spend playing MMORPGs a week? _____
    3. How many hours do you spend playing MMORPGs a month? _____

11) I have played the game for 10 hours continuously or more:
    a. Yes
    b. No

12) Do you belong to a guild?
    a. Yes
    b. No

13) Do you regularly play with your guild?
    a. No, I do not play the game with my guild.
    b. Yes, but we’re seldom grouped.
    c. Yes, and we’re sometimes grouped.
    d. Yes, and we’re almost always grouped.
    e. N/A – I do not belong to a guild.

14) Do you regularly play with friends?
    a. No, I do not play the game with friends.
    b. Yes, but we’re seldom grouped.
    c. Yes, and we’re sometimes grouped.
    d. Yes, and we’re almost always grouped.

15) Do you play with friends you have offline exclusively?
    a. No, I do not play the game with any of my offline friends.
    b. Yes, but we’re seldom grouped.
    c. Yes, and we’re sometimes grouped.
    d. Yes, and we’re almost always grouped.
Appendix A. Demographics: Continued

16) Do you play with friends you know in-game exclusively?
   a. No, I do not play the game with any of my in-game friends.
   b. Yes, but we’re seldom grouped.
   c. Yes, and we’re sometimes grouped.
   d. Yes, and we’re almost always grouped.

17) Do you play the game with a real life significant other/romantic partner
   (boyfriend/girlfriend, fiancé/fiancée, husband/wife)?
   a. No, I do not play the game with a significant other/romantic partner.
   b. Yes, but we’re seldom grouped.
   c. Yes, and we’re sometimes grouped.
   d. Yes, and we’re almost always grouped.

18) Do you play the game with a family member?
   a. No, I do not play the game with a family member.
   b. Yes, but we’re seldom grouped.
   c. Yes, and we’re sometimes grouped.
   d. Yes, and we’re almost always grouped.

19) Voice Technologies Measure
   1. How often do you use a voice system (e.g. Teamspeak, Ventrillo, etc.) to talk to
      other players?
      a. Never
      b. Rarely
      c. Sometimes
      d. Very Often
      e. Always

20) Do you communicate with other players outside of the game (i.e via Skype, in person,
    phone calls, or text messaging)?
    a. Yes.
    b. No.
Appendix B. Liebowitz Social Anxiety Scale

1. Telephoning in public. (P)
2. Participating in small groups. (P)
3. Eating in public places. (P)
4. Drinking with others in public places. (P)
5. Talking to people in authority. (S)
6. Acting, performing or giving a talk in front of an audience. (P)
7. Going to a party. (S)
8. Working while being observed. (P)
9. Writing while being observed. (P)
10. Calling someone you don’t know very well. (S)
11. Talking with people you don’t know very well. (S)
12. Meeting strangers. (S)
13. Urinating in a public bathroom. (P)
14. Entering a room when others are already seated. (P)
15. Being the center of attention. (S)
16. Speaking up at a meeting. (P)
17. Taking a test. (P)
18. Expressing disagreement or disapproval to people you don’t know very well. (S)
19. Looking at people you don’t know very well in the eyes. (S)
20. Giving a report to a group. (P)
21. Trying to pick up someone. (P)
22. Returning goods to a store. (S)
23. Giving a party. (S)
24. Resisting a high-pressure salesperson. (S)

Response Scale

Fear or Anxiety:
0 = None
1 = Mild
2 = Moderate
3 = Severe

Response Scale

Avoidance:
0 = Never (0%)
1 = Occasionally (1-33%)
2 = Often (33-67%)
3 = Usually (67-100%)
Appendix C. Interpersonal Support Evaluation List (ISEL)
“Please answer the following while taking primarily offline friends into consideration.”

Appraisal Subscale
1. There are several people that I trust to help solve my problems.
6. There is no one that I feel comfortable to talking about intimate personal problems.[R]
11. There really is no one who can give me an objective view of how I’m handling my problems.[R]
17. I feel that there is no one I can share my most private worries and fears with.[R]
19. There is someone I can turn to for advice about handling problems with my family.
22. When I need suggestions on how to deal with a personal problem, I know someone I can turn to.
26. There is someone I could turn to for advice about making career plans or changing my job.
30. There really is no one I can trust to give me good financial advice.[R]
36. If a family crisis arose, it would be difficult to find someone who could give me good advice about how to handle it.[R]
38. There is at least one person I know whose advice I really trust.

Belonging Subscale
5. When I feel lonely, there are several people I can talk to.
7. I often meet or talk with family or friends.
10. I feel like I’m not always included by my circle of friends.[R]
12. There are several different people I enjoy spending time with.
15. If I wanted to go on a trip for a day (e.g., to the mountains, beach, or country), I would have a hard time finding someone to go with me.[R]
21. If I decide one afternoon that I would like to go to a movie that evening, I could easily find someone to go with me.
25. Most people I know do not enjoy the same things that I do.[R]
27. I don’t often get invited to do things with others.[R]
31. If I wanted to have lunch with someone, I could easily find someone to join me.
34. No one I know would throw a birthday party for me.[R]

Response Scale
0 = Definitely False
1 = Probably False
2 = Probably True
3 = Definitely True
Appendix D. Interpersonal Support Evaluation List (ISEL) ~ Longman et all.

**MMORPG adapted scales**

"Please answer the following while taking primarily online friends (exclusive to your games of choice) into consideration."

**Appraisal Subscale ~ Adapted Wording**

1. There are several people that I trust to help solve my problems.
2. There is no one I know through “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” that I feel comfortable to talking about intimate personal problems.[R]
3. There really is no one I play with who can give me an objective view of how I’m handling my problems. There is someone I can turn to for advice about handling problems with my family.[R]
4. I feel that there is no one I know through “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” I can share my most private worries and fears with. When I need suggestions on how to deal with a personal problem, I know someone I can turn to.[R]
5. There is someone I play with that I can turn to for advice about handling problems with my family. There really is no one I can trust to give me good financial advice.
6. When I need suggestions on how to deal with a personal problem, I know someone in “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” I can turn to.
7. There is someone I play with I could turn to for advice about making career plans or changing my job.
8. There really is no one in “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” I can trust to give me good financial advice.[R]
9. If a family crisis arose, it would be difficult to find someone I play with who could give me good advice about how to handle it.[R]
10. There is at least one person I know though “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” whose advice I really trust.

**Belonging Subscale ~ Adapted Wording**

1. When I feel lonely, there are several people I know though “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” I can talk to.
2. I often meet or talk with friends in “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)”
3. I feel like I’m not always included by my circle of friends from “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)”[R]
4. There are several different people I enjoy spending time with in “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.).”
5. If I wanted to go on a raid (e.g., insert high level dungeons here for your MMORPG of choice), I would have a hard time finding someone to go with me.[R]
6. If I decide one afternoon that I would like to do an instance (e.g. Insert name of short term instance here for your MMORPG of choice), I could easily find someone to go with me.[R]
7. Most people I know through “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” do not enjoy the same things I do.[R]
Appendix D. Interpersonal Support Evaluation List (ISEL) ~ Longman et all.  
MMORPG adapted scales cont.

8. I don’t often get invited to do things in “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” with others. [R]

9. If I wanted to hang out with someone in “My MMORPG of choice (e.g. World of Warcraft, Second Life, etc.)” I could easily find someone to join me.

Response Scale
0 = Definitely False
1 = Probably False
2 = Probably True
3 = Definitely True
Appendix E. Caplan’s Generalized Problematic Internet Use Scale 2

Preference for Online Social Interaction (POSI) (α = .82)
1. I prefer online social interaction over face-to-face communication.
2. Online social interaction is more comfortable for me than face-to-face interaction.
3. I prefer communicating with people online rather than face-to-face.

Mood Regulation (α = .86)
1. I have used the Internet to talk with others when I was feeling isolated.
2. I have used the Internet to make myself feel better when I was down.
3. I have used the Internet to make myself feel better when I’ve felt upset.

Cognitive Preoccupation (α = .86)
1. When I haven’t been online for some time, I become preoccupied with the thought of going online.
2. I would feel lost if I was unable to go online.
3. I think obsessively about going online when I am offline.

Compulsive Internet Use (α = .87)
1. I have difficulty controlling the amount of time I spend online.
2. I find it difficult to control my Internet use.
3. When offline, I have a hard time trying to resist the urge to go online.

Negative Outcomes (α = .83)
1. My Internet use has made it difficult for me to manage my life.
2. I have missed social engagement or activities because of my Internet use.
3. My Internet use has created problems for me in my life.

Response Scale
1 - Strongly Disagree
2 - Disagree
3 - Slightly Disagree
4 - Neutral
5 - Slightly Agree
6 - Agree
7 - Strongly Agree

Item for each subscale (either sum or average the items listed to obtain a score for the subscale).
Appendix F. Yee’s Motivations for MMORPG Play Scale (2006 & 2012 items)

(2006-items)

**Escapism** \( (\alpha = .86) \)
1. I like the escapism aspect of the game. \( (\alpha = .59) \)
2. Playing the game lets me forget some of the real-life problems I have. \( (\alpha = .65) \)
3. Playing the game lets me vent and relieve stress from the day. \( (\alpha = .52) \)

**Response Scale**
1 - Strongly Disagree
2 - Disagree
3 - Neutral
4 - Agree
5 - Strongly Agree

(2012-items)

“How important are these gameplay elements when you are playing online games?”

**Achievement**
1. Becoming powerful.
2. Acquiring rare items.
3. Optimizing your character as much as possible.
4. Competing with other players.

**Social**
1. Chatting with other players.
2. Being part of a guild.
3. Grouping with other players.
4. Keeping in touch with your friends.

**Immersion**
1. Learning about stories and lore of the world.
2. Feeling immersed in the world.
3. Exploring the world just for the sake of exploring it.
4. Creating a background story and history for your character.

**Response Scale**
1 - Not Important At All
2 - Slightly Important
3 - Somewhat Important
4 - Very Important
5 - Extremely Important