Running Head: PROBLEM VIDEO GAME PLAYING, SELF ESTEEM AND SOCIAL SKILL

Problem Video Game Playing, Self Esteem and Social Skills: An Online Study

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Abstract

This study investigated relationships between problem video game playing, self-esteem and social skills in an adult sample. Via the internet, 621 (560 male) primarily Australian participants completed three scales: the Rosenberg Self-Esteem Scale, the multidimensional Social Skills Inventory and Problem Video Game Playing Scale. Hypotheses were: that problem video game playing would be related to social skills and self esteem; that time spent playing online games would be related to social skills; and that social skills and self esteem would predict problematic play. Online game time commitment was not significantly related to social skills or self esteem, suggesting online environments are not distinctly socially enriching or erosive. Resonating with past studies that found links between gaming, introversion, and social anxiety, a pattern of significant ($p < .001$) correlations emerged between 3 social skills subscales, together representing social hesitancy, and problem video game playing; however the magnitude of relationships was minute. To explore whether problematic play is impelled by social difficulties, a multiple regression analysis was used to predict problematic playing scores with scores on the social skills and self esteem scales. A significant model was found: $F(9, 611) = 15.051$, $p < .001$, accounting for 16.9% of variance. Time commitment ($\beta = .314$, $p < .001$), one social skill subscale ($\beta = .184$, $p < .001$) and self esteem ($\beta = -.103$, $p = .03$) emerged as significant predictors. Results suggest a very small proportion of problematic play is related to social skills and self esteem, but considering the magnitude of relationships, other factors may better explain problematic play. More broadly, this study aligns with others that found little negative consequences of problematic or dependant electronic game play. Further analyses included a comparison of game genre choice on important variables, finding players who preferred Massively

Multiplayer Online Role Playing Games had significantly higher problematic play scores, time commitment and age than other genres. Contrary to past studies, males did not show significantly higher time commitment, although the gender discrepancy in participants suggests electronic gaming is still a male-dominated arena.

DECLARATION

I, Daniel Loton, declare that this report does not incorporate any materials previously written by another person except where due reference is made in the text.

I further declare that this study has adhered to the ethical principles as established by the Psychology Ethical Committee of Victoria University.

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Daniel Loton

March, 2007.

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Last but not least a note to future students: I have tried to be aware, as much as one can be, of the competitive advantages I've had during my studies from the support of my family, not least of which being economic and consequently temporal. Any young students studying full time while supporting themselves, subsisting on low-paid casual employment and inadequate government support, while trying hard to achieve high enough grades to progress – you have my respect, admiration and best wishes.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1.0 Introduction and Literature Review

Electronic games are the medium of the 21st century. They constitute a growing industry, which had a peak in the 1980's, temporarily slumped, and is now larger than ever (Provenzo, 1991). Contemporary analyses place the global industry size at US$ 28.5 billion in 2005, which is expected to overtake the global music industry by 2010 (Berger, 2002; BusinessWire, 2005; Provenzo, 1991). Constantly advancing in technology and capability, the latest transmutation takes the form of online role playing games, involving the maintenance of persistent worlds populated by millions of players. Some of these games have spawned virtual economies, where game items and real estate can be traded for 'real' money, with sales out grossing the economy of some small nations (Dibbel, 2003). One can even build a virtual life in some online games, where the goal is to obtain the staples of a modern lifestyle in a first world country, including gaining employment, obtaining a partner and even raising pets ("The Sims 2: Pets", 2006). The advent of electronic games has had significant cultural repercussions, capacitating new art forms like Machinima ("Machinima", 2006), influencing film, literature and pop culture ("Penny Arcade", 2006), and leading to a push to introduce network gaming competition, already extensively sponsored and international, as an Olympic sport (Morris, 2006, May 31).

Yet relative to both the current popularity of electronic games and the media attention devoted to their potential negative effects, academic research on the topic is miniscule; and rather than accelerating with game technology is chronologically and topically disparate (Gibb, Bailey, Lambirth, & Wilson, 1983; Griffiths, Davies, & Chappell, 2003; McClure & Mears, 1984). Paralleling

media attention, research thus far is disproportionately negative and has investigated deleterious relationships between electronic games and aggression (Anderson, 2004; Anderson, Funk, & Griffiths, 2004; Chambers & Ascione, 1987), dependence and excessive playing behaviour (Fisher, 1994; Griffiths & Hunt, 1998), and social withdrawal (Colwell, Grady, & Rhaiti, 1995; Colwell & Payne, 2000; Selnow, 1984).

Of the few studies conducted, different game systems that represent qualitatively different gaming experiences (e.g., home video games compared to arcade parlour games) have been ramped together posing threats to generalisability and theory development (Colwell & Payne, 2000; Douse & McManus, 1993; Fisher, 1994; Griffiths, Davies, & Chappell, 2004). Additionally the majority of studies are survey based, investigating a plethora of 'negativities' that correlate with game play (Barnett, Vitaglione, Harper, Quackenbush, Steadman & Valdez, 1997; Colwell & Payne, 2000). Although partially necessitated by the exploratory approach of early research, this methodology poses the limitations of determining causality and directionality of observed relationships, and the elucidation of etiology.

Deviating from most studies, a growing body of research has turned focus to potential positive effects of electronic games. Recent research evidence suggests video games are an effective pedagogical tool. Video game players receive cognitive benefits in the areas of divided attention tasks, memory, hand-eye co-ordination, visual acuity, spatial skills and even intelligence (Gibb, Bailey, Lambirth, & Wilson, 1983; Green & Bavelier, 2003; Reisenhuber, 2004; Satyen, 2005). In fact, game system manufacturer Nintendo have recently started selling hand-held games aimed at 'exercising the mind', claiming to delay

cognitive decline by providing benefits including memory enhancement, however this is yet to be clinically validated (Mehta, 2006). Games have also been used as a clinical tool to successfully aid therapy (Griffiths, 1997).

1.1 Are Electronic Games Bad For You?

Although electronic game studies are etiologically and topically diverse[1], one broad overarching theory has emerged from research in the field. Research indicates that the resulting effects of play, along with effects of engagement with other communication modalities and modern technologies, do not seem to be universal to all users, and instead are the result of a negotiation of internal and external factors (Colwell, Grady, & Rhaiti, 1995; Fisher, 1994; Griffiths & Hunt, 1998; Yee, 2002). These internal factors, or factors that are within the user, can comprise such variables as demographics, reasons and gratifications of use and pre-existing pathology. External factors can take forms of the characteristics of the modality, such as operant conditioning random reward paradigms, collapse of physical space, lack of facial cues, and even overarching geopolitical or economic variables like affordability or availability of the technology.

The above theory is validated by the absence of strong and universal relationships between video game play and deleterious variables, instead highlighting the importance of factors aside from one-way effects exerted by the medium onto the user, such as diverse motivations for play (Colwell, Grady, & Rhaiti, 1995; Durkin & Barber, 2002; Lo, Wang, & Fang, 2005; Yee, 2006c).

[1] For the purposes of this study, when terms such as ‘games’, ‘gamers’, and ‘game play’ are used without a specification, they denote the generic category of electronic games, which include computer, arcade, video and hand-held games, and all forms they may take, including internet gaming and local area networks (or LANs).

Reiteration of the heterogeneous effects of electronic game use is necessitated by media demonisation of new technologies, as well as anecdotal accusations from Surgeon-Generals and policy makers that video games cause aggression and social withdrawal, which has led to a push to find universal effects (*Appendix 4-b. violence in the media and its effect on youth violence.*, 2001; Miller, 1993) Assessing the "effects of electronic games" is complex, they do not influence everyone in the same way, and it is the task of research to investigate determinant variables and interrelationships that mediate potential outcomes.

1.2 Demographics

It is logical to start an inquiry into electronic gaming by first determining who plays them. Judging by reported experience of play in many adolescent school based samples, it seems that almost everyone has experienced electronic games, although males play more. Rates of experience playing electronic games centre around 90%, with many reporting 100% of participants having experienced play (Barnett et al., 1997; Chambers & Ascione, 1987; Colwell, Grady, & Rhaiti, 1995; Colwell & Payne, 2000; Salguero & Moran, 2002; Wood, Gupta, Derevensky, & Griffiths, 2004). It is safe to conclude that electronic gaming is a normalised and common activity among adolescents, with very high proportions of the population having experienced play.

However, the demographics of differing game modalities have recently been re-explored through online self-selected studies, and at least for the game genre of massively multiplayer online role playing games (or MMORPGs, also called persistent state world games), the mean age of gamers is in the mid

twenties, with Griffiths, Davies & Chappell (2004) finding $M = 27.9$ with $N = 540$, and Yee (2006) finding $M = 26.57$ with $N = 4705$. Of these, approximately 50% worked full time, with the remaining studying full or part time (Yee, 2006). Prominent market research companies, through point-of-sale data, locate the mean age of American gamers at 33 ("Top ten industry facts", 2006). However, for action or first-person shooter PC games, some preliminary evidence suggests the mean age of players is around 21 (Griffiths, Davies, & Chappell, 2004).

Due to fears of negative developmental and psychosocial effects, the vast majority of game studies have focused on adolescents (Colwell, Grady, & Rhaiti, 1995; Barnett et al., 1997), although this recent data suggests that children and teenagers may not be the key gamer demographic, at least for some game types.

1.3 A boys club?

Demographic explorations into electronic game engagement have revealed a consistent and significant gender difference in the amount of play, with males playing more often and for longer periods of time across a range of ages and nationalities (Barnett et al., 1997; Chiu, Lee, & Huang, 2004; Colwell, Grady, & Rhaiti, 1995; Colwell & Payne, 2000; Durkin & Barber, 2002; Fisher, 1994; Griffiths & Hunt, 1998; McClure & Mears, 1984; Salguero & Moran, 2002; Wood, Gupta, Derevensky, & Griffiths, 2004).

It is theorized that this gender discrepancy is the result of the game market not catering to the interests of females, shown to be different both qualitatively (Kafai, 1996), with girls not incorporating violent functions or fantasy themes in self designed games while boys did; and quantitatively

(Barnett et al., 1997), with females selecting the game categories intellectual/creative and action/fantasy as their preferred more than males (χ^2 (3, N = 206) = 73.48, p <. 001), who selected sports and violence most often. Additionally, resonating with the findings of Kafai (1996), females also rated the game characteristics for artistic/self expression as appealing and easy, compared to males who preferred difficult, fast-moving, and violent variety and network games that can be played by friends (Barnett et al, 1997).

Through an exploration of needs fulfilled while playing MMORPG games, it was found males scored significantly higher on all achievement factors than females, pertaining to advancing the game character, mastering game mechanics and competing with others (*t's* (3035) > 9.5, p < .001, two tailed); while females scored higher on relationship components (t (3035) = -14.31, p < .001, two tailed), pertaining to communicating and collaborating with other players, particularly in the sub-component of increasing self-disclosure and forming supportive relationships (Yee, in press).

This research suggests that males and females often have distinct tastes and motivations for play, which underpins the discrepancy in engagement, and that these differences are likely to manifest in any effects associated with play. Indeed, research into the social implications of games has reproduced these gender differences.

1.4 Social Aspects

In response to popular anecdotal accounts of electronic games having negative social implications, including play substituting personal relationships

and social withdrawal, there has been some academic research into the topic, leading to mixed results. The following section will outline the psychological literature salient to the social aspects of electronic gaming.

1.5 'Electronic friend theory'.

Electronic gaming and social withdrawal was first explored in the 1980's, when (Dominick, 1984) found a small inverse relationship between arcade game playing, but not home video game playing, and Rosenberg's Four Item Self Esteem Scale (r = -.14, N = 250, p < .05). Dominick interpreted this as evidence for arcade games substituting social interaction. Selnow (1984) further explored this idea, coining the term 'electronic friendship'. Selnow proposed the possibility of electronic games, through active-participation and immersion, replacing friends and leading to social deprivation of heavy players, a concept echoed anecdotally by many (Brightman, 2006). Using a modified gratification of needs scale for television viewing, Selnow (1984) factor-analysed responses about needs fulfilled while playing arcade games and found five factors. The amount of play (represented by a formula of frequency of visits multiplied by duration of visits multiplied by money spent) was then correlated with these factors in a sample of 244 adolescents. The factors were asserted to represent playing preferred to socialising with friends (r = .219, N = 244, p < .001), games allowing the player to learn about people (r = .148, N = 244, p < .019), providing companionship (r = .267, N = 244, p < .001), action (r = .215, N = 244, p < .001) and solitude/escape (r = .267, N = 244, p < .001). For a breakdown of the constituent items please see Selnow (1984). The sample were arcade parlour

gamers, 74% of which played alone, which is unusual in light of the social nature of arcade parlours in the United States and Britain (Provenzo, 1991).

These results suggest that arcade gamers who commit more time are likely to perceive play to provide gratifications akin to companionship and friendship, and it was concluded that games may be impacting on the socialisation of heavier players. The study has been criticised on the basis of arcade parlours being social spaces, thus providing obvious extraneous variables that could have influenced the relationships found between gaming and social gratifications (Provenzo, 1991).

1.6 Social implications for female players.

These factors were revisited more recently by Colwell, Grady and Rhaiti (1995) in a sample of 120 adolescents, and home video games were included in the analysis. Levels of game play (frequency multiplied by duration) did correlate with the factors of friendship ($r = .36$, $N = 120$, $p < .001$), learning about others ($r = .22$, $N = 120$, $p < .05$), and companionship ($r = .22$, $N = 120$, $p < .05$) in both genders. Additionally, these needs factors correlated significantly and negatively with scores on Battle's Culture Free Self Esteem Inventory in girls, to the degree of friendship ($r = -.43$, $n = 52$, $p < .01$), learning ($r = -.33$, $n = 52$, $p < .01$), companionship ($r = -.41$, $n = 52$, $p < .01$) and escape ($r = -.44$, $n = 52$, $p < .01$), but not in boys. It was suggested this could be the result of the incongruence of gender roles and video game playing for girls, so that increasingly avid players are situated outside the norms of their peer groups, leading to lower self-esteem. This result may also provide some support for

electronic game play substituting friendships, although the directionality is indeterminable.

Interestingly, for boys it was found that playing correlated positively with friends seen outside of school ($r = .20$, $n = 68$, $p < .05$), diametrically refuting electronic friend theory. In light of the absence of a relationship between self-esteem and needs factors in boys, it was proposed that some girls with comparatively lower self-esteem may have turned to games as a replacement to, and escape from, their social situation.

1.7 Social implications for male players.

Even more recently Selnow's (1984) gratification of needs items were tested with home video games. Using the original items, Colwell and Pain (2000) found two factors instead of five that both relate to friendship. These factors correlated with frequency and duration of video game play, but no relationship between these factors and self-reported number of friends was found, again providing little support for electronic friend theory. However, amount of play correlated negatively with self-reported number of good friends in boys ($r = -.22$, $n = 91$, $p < .05$), but not girls. Additionally, scores on the Rosenberg Self Esteem Scale were negatively correlated with frequency of play in boys only ($r = -.21$, $n = 91$, $p < .05$). The authors concluded that game play may be related to friendship, socialising and self-esteem in boys, and that conflicting evidence may be due to differences in measuring play (frequency or duration), and social aspects. The authors argued for a 'total dose' approach when investigating

variables related to exposure to electronic game play, rather than measuring frequency or duration of play independently.

1.8 Introversion, escape and conscientiousness.

A similar focus on gratifications was taken towards studying electronic games by Barnett et al. (1997), who investigated the relationship between play behaviour (including compulsiveness), to attitudes, gender and personality. In a sample of 229 late adolescents, no differences were found between frequent (one or more hours of play per week) and infrequent players on allocation of time to leisure activities, including socialising; and measures of self-esteem, empathy, conscientiousness and introversion, providing little support for social withdrawal theories.

However, when relationships were examined instead of differences between the conservatively defined "frequent" and infrequent players, a pattern of correlations emerged. Introversion was positively associated with a preference for videogames over friends ($r = .22$, $N = 229$, $p < .001$), as well as a desire to play video games to fantasise ($r = .24$, $N = 229$, $p < .001$), and to 'escape' from daily concerns ($r = .31$, $N = 229$, $p < .001$). Furthermore, self esteem was negatively correlated with tendency to perceive video games as companions ($r = -.26$, $N = 229$, $p < .001$), and conscientiousness was negatively related to the importance/compulsiveness of play ($r = -.24$, $N = 229$, $p < .001$).

When considering this constellation of relationships the authors questioned whether some relatively introverted, low self esteem and less conscientious individuals, who would likely have difficulty establishing

meaningful relationships, may turn to game worlds to escape their difficulties, or even complement anxieties or shortcomings through fantasy play. The authors acknowledged that their discriminant function analysis between frequent and infrequent players was too insensitive to detect a sub-group of excessive players, and they recommended that purposive sampling may help to investigate a potential minority of excessive players.

1.9 Arousal.

In a related area of investigation, Wood, Gupta, Derevensky and Griffiths (2004), investigated the relationship between electronic game playing and gambling, including in their analysis motivations for play, dissociative states and risk taking behaviour. In a sample of 996 (549 females and 441 males) 10-17 year olds in Montreal, high frequency players (at least five days of play per week) reported more : trance like states while playing ($\chi^2(2, N = 441) = 67.54, p < .001$), losing track of time ($\chi^2(2, N = 441) = 95.37, p < .001$), experiencing blackouts while playing ($\chi^2(2, N = 441) = 7.75, p < .001$), feeling "outside of yourself" while playing ($\chi^2(2, N = 441) = 40.37, p < .001$), and feeling like a different person while playing ($\chi^2(2, N = 441) = 57.93, p < .001$) than low frequency players (two days of play or less per week).

It was also found that high frequency players reported excitement, relaxation, escape and loneliness as reasons for play significantly more than low frequency players. Further, a moderate positive relationship was found between scores on the Risk Taking Questionnaire (or RTQ) and play, with high frequency players showing significantly higher RTQ scores ($M = 53.32$) than low frequency

players ($M = 49.59$): $t(378) = -3.792$, $p = .001$ (two tailed). However, no differences were found in reported reasons for play of making new friends or to alleviate depression between the high and low frequency player groups, and no relationship was found between play and increased substance abuse, as distinct from the consistent relationship found between gambling and substance abuse (Pallanti, Rosi, & Hollander, 2006).

Notably, video game playing was linked to gambling in many ways, illuminating the possible risk of adolescents familiar with video games having a salience with gambling machines, and attempting to transfer video game playing skills to purely chance based machines. Langer (1975) speculates that misapplication of skill orientation (video game playing) to chance situations (gambling) results in augmented levels of illusion of control beliefs. According to her theoretical framework, skilled and experienced video game players may be particularly vulnerable for developing problem gambling especially if they misinterpret poker machines as games of skill.

Considering the relationships found between electronic game playing and increased dissociative states, reported play motivations of relaxation, excitement and escape, and risk taking behaviour; this study clearly points to the importance of arousal in increased play. However, loneliness was also reported as a reason for play significantly more by high frequency players, which suggests play as an escape from a negative situation, and harkens to the psychosocial correlates found in abovementioned studies.

1.10 Conflicting evidence.

Although a cluster of weak correlations has emerged between electronic game play and psychosocial and personality variables, many studies have found no relationship between a plethora of variables and game play, and some have found positive relationships. Gibb, Bailey, Lambirth and Wilson (1983) found no association between amount of arcade game play and the self esteem subscale of the Bipolar Psychological Inventory in 208 primarily adolescent participants. McClure and Mears (1986) investigated whether there is a link between video game playing and psychopathology in a sample of 290 adolescents. They found no significant relationships between playing and a host of items, including the MMPI dimension of psychopathic deviance and neuroticism, drug taking, smoking, alcohol use, speeding tickets, school expulsions, cutting classes, home life happiness, single parenthood, escaping bad family situations, and running away from home. Contrary to other studies it was found that higher players were more extraverted than low players ($F(4,281) = 2.6$, $p = .03$), and low players were more achievement oriented ($F(2,281) = 3.12$, $p = .01$).

Through content analysis, some scholars have recently asserted that MMORPG environments can provide spaces of informal sociability, and help to diversify world views, possibly increasing sociability (Steinkuehler & Williams, 2006). This resonates with studies finding higher scores on measures of psychosocial health in game playing groups compared to non-playing groups. In one of the only longitudinal studies on electronic game playing, 1304 high school students completed questionnaires from 1983 to 1988 that included measures of psychosocial health and computer game play behaviour (Durkin & Barber,

2002). Archived academic school records were also incorporated in the analysis. Players were divided into no play, low play and high play groups to facilitate comparisons. It was found self concepts of intelligence, mechanical skills and computer skills, self esteem, family closeness, attachment to school, academic friendship group size, grade point average and club membership were all significantly higher in playing groups than non players, some of which being significantly highest in the high playing group, such as family closeness. Additionally, non players had significantly higher scores on measures of disobedience, substance abuse and risky friendship network size than the playing groups. However, high players had significantly higher depressed mood scores ($M = 4.18$, $SD = 1.21$) than low players ($M = 3.95$, $SD = 1.17$), $F(2, 1014) = 4.19$, $p < .05$, which came close to the non-playing group mean ($M = 4.16$, $SD = 1.30$). High players also had the highest aggression score, however computer game play was just slight of reaching significance as a predictor of aggression scores in a MANOVA analysis.

These results suggest electronic game play may be a staple of a healthy, normal adolescence. However, play levels in this sample were low compared to modern samples, with 50.6% of girls and 29.4% of boys in the sample never playing; perhaps because of lower proliferation of electronic games at the time or lower accessibility of the technology to the sample. It is possible that lower indications of psychosocial health for the non-playing group may be an expression of lower socio-economic status, a possible confounding variable associated with this group's lower access to the technology. The scales used to assess the psychosocial variables were composed of four questions or less, and although they showed acceptable alpha scores, reliability and validity for the

scales were not reported. Additionally, the maximum category of computer game use was ‘daily’, which, as the authors also acknowledged, would not have been sensitive enough to detect an excessive subgroup of players.

These results depart from the usual pathological focus on electronic gaming and show promise for future exploration into the role electronic games occupy in many gamers lives. However, electronic games have advanced in complexity and popularity exponentially since the eighties, which may exert changes on these results were the study to be re-run today.

1.11 Overview

In summary, studies into electronic games causing social withdrawal have yielded little support, indicating play does not cause hermitry nor withdrawal from society. However, the pattern of relationships emerging from research into the social implications of games has raised concerns of a possible subgroup of excessive players who have social difficulties. The consistent and moderate inverse relationships found between game play and self-esteem in both genders, as well as the relationships between playing motivation and self-esteem, introversion, conscientiousness, loneliness and a desire to escape, may represent characteristics of this minority (Barnett et al., 1997; Colwell & Payne, 2000; McClure & Mears, 1984). It is also worth noting that relationships between play and self esteem seem to be increasing in magnitude chronologically.

Alternatively, some studies have found no relationship between electronic game play and self esteem, and some have found positive indicators of psychosocial health for playing groups compared to non playing groups

(Chambers & Ascione, 1987; Durkin & Barber, 2002; McClure & Mears, 1986). These mixed results are currently inexplicable, although using a 'total dose', or hours per week approach to measure play may increase research consistency. To further explore this possible minority of excessive players, researchers have used a behavioural addiction framework, leading to the concept some call video game addiction.

1.12 Problem Video Game Play/Video Game Addiction

Dubbed 'kiddie cocaine' by comedian Robin Williams, the notion of video games being addictive has a plethora of anecdotal support, including qualitative reports, expressions of concern from surgeon-generals and governmental imposed video game curfews (Allison, Von Wahlde, Shockley, & Gabbard, 2006; Egli & Meyers, 1984; Soper & Miller, 1983). In response researchers have explored whether game playing can represent video game addiction, likening it to gambling addiction and categorising it within the contemporary subset of technological disorders, their defining feature being human-machine interaction (Griffiths & Hunt, 1998; Soper & Miller, 1983; Young, 2004).

Video game addiction is yet to be established as a discrete disorder from other behavioural addictions and generic impulse control disorders, and little is known of co-morbidities and negative consequences of the construct, thus it is not yet recognized in the Diagnostic and Statistical Manual (*Diagnostic and statistical manual of mental disorder (4th ed.)*, 2000; Shaffer, Hall, & Vander Bilt, 2000). As the construct is not well validated, non-clinical terms have been

used to denote it, such as problematic, intemperate and dependence forming play (Salguero & Moran, 2002; Shaffer, Hall & Vander Bilt, 2000). A detailed exploration of the discriminant validity for this potential disorder is beyond this paper. Notwithstanding, studies using a behavioural addiction framework have shown that a small minority of players gaming mimics the criterion of behavioural addiction and can cause significant disturbances with social, family and work life (Fisher, 1994; Griffiths & Hunt, 1998; Salguero & Moran, 2002; Yee, 2006c). Additionally, some gamers play to such excess that concerns have been raised over potential developmental and psychosocial impacts (Griffiths, 2000).

Little is known of the co-morbidities accompanying dependence like play, but explorations into problematic usage have suggested potential mediating variables may be game characteristics, excitement and relaxation, risk taking behaviour, dissociative states, flow experience, self-esteem, locus of control, depression and escaping negative feelings and thoughts (Griffiths & Dancaster, 1995; Griffiths & Hunt, 1998; Wan & Chiou, 2006; Wood, Gupta, Derevensky, & Griffiths, 2004; Yee, 2006c). However many of these relationships await empirical vindication, and some await even initial investigation.

Research on the topic is still too limited to have produced a comprehensive theoretical process underpinning problematic usage. Preliminary etiologies have broadly aligned with either arousal modification (i.e. excitement and relaxation), (Griffiths & Dancaster, 1995; Griffiths & Hunt, 1998; Wood, Gupta, Derevensky, & Griffiths, 2004), or relief and escape from dissatisfaction, including a negative self-image, low self-esteem and social anxiety, resonating with studies of excessive internet usage (Wan & Chiou, 2006; Yee, 2006c). It

should also be noted that these explanations fit comfortably within the etiology of behavioural addiction. Jacob's General Theory of Addiction (Jacobs, 1986) emphasises arousal modification, particularly through excitement, relaxation and dissociative states; which are inclusive of an empowerment against a negative reality, often characterised by depression and low self esteem. Concerns over dependant play share clear similarities to the abovementioned investigations into the social implications of electronic games; it can even be argued that the notion of dependant play, and particularly associated co-mordibities, is an alternative manifestation of the notion that electronic games may cause social withdrawal.

1.13 Arcade game addiction.

First explored by Egli and Meyers (1984) and Soper and Miller (1983), qualitative accounts of compulsive arcade game playing revealed a small proportion of arcade gamers who described addiction-like qualities to their play, including the interruption of relationships, school work and significant financial sacrifice. Ten years passed until Fisher (1994) first explored excessive playing using the criterion for pathological gambling from the DSM-IV modified to suit arcade gaming. Fisher's questionnaire included criterion mirroring salience (preoccupation and progression of play), tolerance (increasing expenditure to reach same levels of excitement), withdrawal and loss of control (irritability or restlessness with abstinence), escape (playing to escape problems or feelings), chasing (returning to beat high score), deception (lying or concealment of extent of play from friends or family), illegal acts (theft, misuse or borrowing of money

to finance play), conflict (relationship or school problems due to play), and financial bail out which was found to be inapplicable.

A factor analysis on the items revealed two factors, the first explaining 30.4% of the variance, and encompassing escape, salience, chasing and stealing to play. The author concluded this could represent a "subjectively experienced overwhelming and ever-present need to play" (Fisher, 1994, p. 549). The second factor accounted for 11.4% of variance and included items on withdrawal, lying and conflict. The author suggested this factor may represent the negative consequences of excessive play. However, withdrawal resonates more with the description of factor one than two, and stealing to play with factor two than one, rather than vice versa, resulting in questionable face validity for this factor explanation.

Six percent, or 28 of 467 children aged between 11 and 16 answered yes to four or more criteria, and were regarded as "pathological". Non-parametric comparisons between the pathological group and social players (scores between zero and three) revealed some significant differences and potential construct validity. Compared to the social group, pathological players played arcades more frequently (Yates' corrected $\chi^2(4, N = 467) = 41.65$, $df = 4$, $p < .0001$) and for longer periods of time, they spent more money on arcade games each week (Yates' corrected $\chi^2(4, N = 467) = 28.15$, $df = 4$, $p < .0001$), they borrowed more money (Yates' corrected $\chi^2 = (4, N = 467)\ 43.04$, $df = 2$, $p < .0001$), sold more possessions in order to play (Yates' corrected $\chi^2 = 19.65$, $df = 2$, $p < .0001$), and perceived themselves as playing to excess more (Yates' corrected $\chi^2 = 19.4$, $df = 1$, $p < .0001$).

Interestingly, despite males playing casually much more than females, there were no significant gender differences in the pathological group. Alarmingly the author reported that 50% of pathological players stole from the family home to fund playing. However, items on the scale required dichotomous answers, and the item concerning illegal acts did not specify which act of three actually occurred (i.e. – misuse of school dinner/fare money, or theft from home or elsewhere), ergo this reported prevalence is dubious and displays a weakness of dichotomous scales in exploring the dimensions and severity of unexplored technological disorders.

1.14 Video game addiction.

Griffiths and Hunt (1998) later explored whether home game playing was dependence forming using modified diagnostic criterion for pathological gambling. Three hundred and eighty seven children aged between 12 and 16 years completed an eight-item questionnaire concerning video game playing behaviour, which included the components: Salience ("Do you frequently play most days?"), tolerance ("Do you frequently play for longer periods of time?"), euphoria ("Do you play for excitement or a 'buzz'?"), chasing ("Do you play to beat your personal high score?"), relapse ("Do you make repeated efforts to stop or decrease playing?"), withdrawal ("Do you become restless if you cannot play?") and conflict ("Do you play instead of attending to school related activities?" and "Do you sacrifice social activities to play?") (p. 476-477).

It was found that 19.9% (or 62) participants answered yes to four or more items and were classified as dependant. Although the psychometrics of the scale

were not investigated, the scale overall score correlated with play frequency (r = .53, N = 387, p < .001), mean play time per session (r = .42, N = 387, p < .001), the longest single playing time (r = .43, N = 387, p < .001), sex, with boys playing more often (r = -.21, N = 387, p < .001), and starting age (r = -.42, N = 387, p < .001). Affective states were also significantly related, with dependent players reporting to be in a bad mood and excited before, during and after play, and also more likely to be in a good mood before and during play, hinting at the importance of arousal. Dependent players also reported significantly more often not wanting to stop playing, and wishing they were still playing when they stopped. Dependent players were also significantly more likely to report aggressive feelings as a direct result of play.

However, dependent players were unexpectedly not more likely to report truancy or having bad schoolwork marks due to play, or stealing to buy new games. This lack of negative consequences of excessive play raises the question of whether the scale measures a distinct addiction or merely preoccupation. However, the variance not accounted for in the correlations between the scale and measures of game play suggest that time spent playing games does not wholly explain positive responses to scale items, suggesting that time commitment does tend to increase affirmation of diagnostic criterion, but some players may feel more dependant on play while spending less time playing than others. More research is required to determine the negative consequences of excessive play, and additional dimensions not detected by the scale.

1.15 Massively multiplayer online role playing games addiction.

The most recent investigations of problematic video game play have focused on MMORPGs. Through online surveys, large sample sizes have been obtained; and using purposive sampling some alarming results have emerged from Asia. In the most detailed and extensive base of studies on electronic games, Nicholas Yee (Yee, 2006b) has investigated problematic MMORPG playing through a behavioural addiction framework both quantitatively and qualitatively (Yee, 2002, October).

Through numerous online surveys, many utilising five-point Likert-type scales as opposed to dichotomous, 3,989 MMORPG players completed questions on problematic play (Yee, 2002, October, , 2006a, in press). It was found that 15% of respondents agreed or strongly agreed that they became angry and irritable if unable to play; 30% that they continue to participate in the environment even when they are frustrated with it or not enjoying the experience; and 18% that their usage patterns had caused them academic, health, financial or relationship problems. Agreement with these statements was positively and significantly correlated with average weekly use of MMORPGs. Strikingly, 50% of respondents (n = 3,166) considered themselves addicted to an MMORPG in a dichotomous question.

Further, through cross-tabulation, relationships emerged between levels of agreement to a question about being addicted to game play and questions measuring self esteem (i.e. - I feel I am a failure), feelings of control over one's life, and daily stress. Agreement with addiction was inversely related to self

esteem and feelings of control, and positively related to daily stress (Yee, 2002, October).

Further, Yee investigated relationships between problematic play and gender, age and play motivations (Yee, in press). Using scores on a modified version of Kimberley Young's Internet Addiction questionnaire to suit MMORPG playing (Young, 2004), a prediction was attempted with a scale that maps motivations of play. The internet addiction questionnaire included seven items equating to dependence, withdrawal and the negative impact on real life obligations and relationships.

A significant model with three predictors emerged. The motivational subcomponent escapism, described as "using the online environment to avoid thinking about real life problems" (Yee, in press, p. 4), showed the highest standardised correlation coefficient at $b = .31$, $p < .001$, followed by hours of play per week ($b = .30$, $p < .001$), and finally the advancement component, pertaining to rapidly advancing the game character and acquiring in-game wealth, power and status ($b = .17$, $p = .01$). The model explained 34% of variance in problematic scores. These results suggest that problematic players spend more time playing than less problematic gamers, and that escape from a negative reality is seminal to problematic play. Further, the advancement component, akin to building status and power through character advancement, suggests that the feelings of agency provided by the MMORPG environment are also predictive of problematic play.

Qualitative studies have provided further convergent evidence that an escape from a negative reality is compositional of problematic play. Accounts from self-defined "addicts" have described qualities of severe depression and

social withdrawal arising from excessive involvement in an MMORPG (Yee, 2002, October). This resonates with case studies from clinicians who have treated adolescents and adults who play excessively, and have highlighted co-morbidities of depression, low self esteem, social difficulties and feelings of inadequacy (Allison, Von Wahlde, Shockley, & Gabbard, 2006).

1.16 Two-factor theory of problematic play.

In light of these relationships between problematic play, self esteem, locus of control, stress and escapism; and drawing on theories of behavioural addiction, Yee conceptualised problematic play as two-factor, composed of both motivating factors and attraction factors (Yee, 2002, October). Motivating factors, synonymous with risk factors or co-morbidities in studies of other addictions (Jacobs, 1986), are those that exist within the player that may compel them to intemperate and damaging play, including low self-esteem, poor self-image, difficulty in making and sustaining relationships and stress. Attraction factors are those that exist within the medium, in this case MMORPG's, which draw people into play, including operant conditioning random reward paradigms and the potential for communication, entertainment and immersion.

MMORPG play can fulfil many of these factors through simplifying and hyper-personalising communication, fostering feelings of agency in appearance, competence and locus of control, as well as providing distraction to players from real life problems (Yee, 2002, October). This two-part view of behavioural addiction is validated by the fact that not all players develop problematic play, suggesting that qualities of the medium cannot be wholly responsible as they

should exert effects universally. Convergent studies by Yee suggest that MMORPG environments are also deeply salient and important to players, harkening to what may be a crucial element in problematic play: hyper-personal computer mediated communication.

1.17 Computer mediated communication.

Research on computer mediated communication through interactive internet functions and Multi User Dungeons (or MUDS, online textual environments in which users communicate and role-play), suggest an important attraction is their ability to make communication hyper-personal, and that may apply to online games (Bartle, 1996; Parks & Roberts, 1998; Turkle, 1994). The qualities of communication via the internet differ from face to face communication in important ways (McKenna & Bargh, 2000). Internet communication is mostly anonymous, and studies have highlighted that anonymity increases the degree of self-disclosure in comparison to face-to-face, therefore those communicating online are more likely to self-disclose. Nonverbal communication is almost completely nullified via the internet, and it has been theorised that this allows for a reallocation of cognitive resources to focus on the message, increasing the salience of the words. Additionally, internet communication allows people more control over the pace of interaction. This increased control coupled with decreased nonverbal communication removes most cues for social-anxiety, measures of which have predicted both internet chat use and excessive online game play (Armstrong, Phillips, & Saling, 2000; Lo, Wang, & Fang, 2005; Wan & Chiou, 2006). These findings corroborate variables

shown to be quantitatively and qualitatively related to problematic game play, further highlighting social difficulties as a potential predictor of uptake and maintenance of this behaviour, and suggesting games that capacitate online communication may encourage more problematic play than games that do not.

1.18 Cross-cultural studies on problematic online gaming.

Recently the Chinese government, in conjunction with service providers, have initiated a fatigue system designed to reduce the duration of game playing by capping the advancement online players can achieve in one sitting (Dickie, 2005, August 23). Recent studies conducted in China and Taiwan have provided some justification for these concerns, tying problematic online video game play to escape from dissatisfaction, negative life events, social anxiety and the deterioration in quality of gamers' interpersonal relationships (Lo, Wang, & Fang, 2005; Wan & Chiou, 2006; Yang, 2005).

Wan and Chiou (2006) investigated relationships between "online game addiction", flow time and humanistic needs theory. The online game addiction scale used was a modified internet addiction scale for adolescents. The scale showed some positive psychometric validity and included categories of compulsive use, withdrawal, tolerance, and related social, work and financial problems. It was found that flow time was slightly negatively correlated with online game addiction scores, suggesting it plays little role in problematic play, contradicting arousal-based explanations (Wood, Gupta, Derevensky, & Griffiths, 2004).

However, when two-factor humanistic needs were applied to game playing, they were able to discriminate addicts from non addicts. This theory distinguishes between dissatisfaction needs, concerned with reducing dissatisfaction, and satisfaction needs, pertaining to increasing satisfaction. It was found addicts had significantly higher dissatisfaction scores (M = 154.48, SD = 96.76) than satisfaction scores (M = 130.04, SD = 107.58) : $F(1, 83) = 5.72$, $p < .001$); and non addicts had significantly higher satisfaction scores (M = 162.46, SD = 91.87) than dissatisfaction scores (M = 112.97, SD = 83.86) : $F(1, 97) = 33.04$, $p < .001$), suggesting problematic play is driven by reducing dissatisfaction rather than increasing satisfaction.

If problematic play is conceptualised as a behavioural addiction, this finding resonates with the components of tolerance and withdrawal by suggesting an avoidance of negative feelings that surface with abstinence of game play. More broadly, it provides further evidence of problematic play including an escape from a negative reality. However, like other preliminary studies, the online game addiction scale used is yet to be thoroughly validated. There may be components of compulsive play not measured by the scale, and it is possible high scores may be expressing an underlying disorder.

Another study conducted in Taiwan emphasised the social aspects behind amount of online game usage, as distinct from online game addiction (Lo, Wang & Fang, 2005). Participants consisted of 174 (89 female) students of a college in Northern Taiwan, with mean age M = 19 and SD = 1.25. After discriminating participants into high, low and non-users, a Scheffé test indicated that high users had significantly lower quality of interpersonal relationship scores than other groups ($p < .001$), and significantly higher social anxiety scores ($p = .001$). The

authors concluded that excessive time spent playing games can lead to less satisfying social relationships, and higher social anxiety. However, direction of causality is not beyond question, and it may be that those with social difficulties are drawn to play excessively, as theorised by others, and this excessive play may then exacerbate social difficulties present (Barnett et al., 1997; Yee, 2002, 2006c).

1.19 Problematic Play Review

The epidemiology of studies on problematic play suggests pathological players make up a small proportion of all gamers. In each study, affirmations to questions mirroring behavioural addiction diagnostic criteria were significantly related to increased play and concerns over playing. As far as self-reported diagnostic criteria indicate, this subgroup experience life interruptions as well as work and social problems resulting from excessive play. Although there are consistent dovetails between theories of behavioural addiction and research on problematic game play, video game addiction is yet to be distinguished as a subclass of behavioural addictions, as little is known of its exact dimensions and negative consequences. For instance, qualitative accounts of compulsive game play have indicated that when a new game comes out, commitment to play is high, impacting other life activities, but when the novelty wears off play decreases, which contradicts notions of tolerance and withdrawal (Salguero & Moran, 2002).

Some studies have converged to suggest excessive gamers are escaping from a negative reality, and although some deleterious social aspects have been

suggested, including low self esteem and social anxiety, what exactly is being escaped from is yet to be determined (Lo, Wang & Fang, 2005; Wan & Chiou, 2006; Yee, in press). Further scale development is required as current research has been restricted by using modified diagnostic criterion which is usually dichotomous, and epidemiological research is needed to determine the prevalence, negative consequences, longitudinal fluctuations and behavioural pathways underpinning problematic play.

There is a discrepancy between the concerns over electronic game play and research on the topic. Topically and geographically diverse studies have indicated electronic game play may sometimes be excessive and problematic. The available psychological literature has indicated problematic play can take the form of a behavioural addiction or impulse control disorder. Through self-reported symptomatology, components of this behaviour may be life interruption, arousal modification and dissociative states, leading to feelings of escapism and coping with a negative reality and associated real life problems (Griffiths & Hunt, 1998; Soper & Miller, 1983; Wood, Gupta, Derevensky, & Griffiths, 2004; Yee, in press).

Furthermore, studies of electronic game playing have revealed relationships with some personality characteristics suggestive of difficulty in establishing relationships (i.e. - introversion, conscientiousness, social-anxiety), as well as with low self-esteem, leading to the notion that a subgroup of problematic players may be attracted to game playing as a means of alleviating social difficulties (Barnett et al., 1997; Colwell, Grady, & Rhaiti, 1995; Colwell & Payne, 2000). Moreover, the majority of studies involving electronic games

have focused on adolescents, yet for some game genres often associated with problematic play, adults are the most prominent demographic (Griffiths, Davies, & Chappell, 2003).

Alternatively, some longitudinal studies have found moderate and high game playing groups to be rated more positively on psychosocial health measures than non-gamers, indicating less risky behaviour and higher self esteem (Durkin & Barber, 2002). Other studies have failed to produce a strong and consistent link between deleterious variables and gaming (Chambers & Ascione, 1987; McClure & Mears, 1986; Steinkuehler & Williams, 2006). Some preliminary studies have even postulated that playing online games may increase sociability and social skills (Steinkuehler & Williams, 2006).

Possible interpretations of these conflicting findings are compounded by a scarcity of research with adults, and particularly within Australia. In order to increase the present understanding of the social aspects behind engagement with an extremely popular form of entertainment, further study is warranted into the possible predictors and associated variables of problematic electronic game play in adults.

1.20 Social skills.

Previous studies have established a very strong and consistent link between self esteem, introversion, social anxiety and social skills (Riggio, Throckmorton, & DePaola, 1990; Riggio, Watring, & Throckmorton, 1993). A construct evolved from social intelligence, social skills refer to a cluster of skills used in decoding, sending and regulating non-verbal and verbal information in

order to facilitate positive and adaptive social interactions (Riggio, 1986). In past studies social skills have extensively predicted important markers of psychosocial health, such as the size of interpersonal and social support networks, self esteem, personal adjustment and psychopathology (Riggio, Watring, & Throckmorton, 1993).

1.21 Research Rationale

If indeed there is a subgroup of electronic gamers who have difficulty with self-esteem and establishing meaningful relationships, and who develop problematic play to cope with or escape from these difficulties, then it is possible that a lack of social skills may underpin this relationship. Accordingly, a measure of social skills and self-esteem may effectively predict game playing problems. Moreover, by investigating the relationship between a range of social skills and problematic game play, insight may be gained as to the social characteristics of devoted gamers.

In addition, as theories surrounding technological disorders emphasise the distinctive communication capacitated by the modality, an investigation into relationships between time spent playing online games and a range of social skills may shed light on whether and how contemporary online socialising bolsters or detracts from traditional social skills. Considering the social nature of online gaming and the unique nature of online communication (McKenna & Bargh, 2000; Steinkuehler & Williams, 2006), it is reasonable to theorise that time spent playing online games may even enrich some, or all, social skills.

The primary aim of this study is to identify and explore potential relationships between problematic electronic game play and a range of social skills and self esteem in an adult sample. An extension of this aim is to attempt a prediction of the magnitude of problematic play with the aforementioned variables. Hence the first hypothesis of this research is that significant relationships will be present between social skills, self esteem and problematic play; and the second is that social skills and self esteem will predict problematic play.

In light of the paucity of research on the topic, the secondary aim is to contribute knowledge to this under-researched field. As it is possible that time spent communicating online may bolster social skills, the third hypothesis is that significant relationships will be present between time spent playing online games and social skills and self esteem. Further exploration will include the analysis of differences between game genres on all variables measured, as well as relationships between problematic play, age and gender. The only specific hypotheses for this aim arise from theories that games capacitating socialisation with others may be more attractive, as well as the contemporary research focus on MMORPGs. Thus, more problematic play and time commitment is expected by those who play online compared to offline games, and MMORPGs compared to other genres.

2.0 Method

2.0 Participants

A total of 621 participants fully completed the study. Participants were recruited via the internet, responding to advertisements for the study placed on multi-system, multi-genre video game forums. The sample consisted of 560 males (90.2%) and 61 females (9.8%). Their ages ranged from 18 to 60, with a mean of 23.84 (*SD* = 6.70), and a mode of 18 (21.9% of the sample). Notably, 70.9% of the sample were between 18 and 25, and 50.6% between 18 and 21.

Geographically, the sample was located in English-speaking developed countries, with the majority of participants residing in Australia (64.7%). A further 22.5% resided in the USA, 4% in Canada, 3.5% in the UK and 1.6% in New Zealand. These five countries represent 96.3% of the sample, the remaining countries are listed in Appendix A.

In response to employment status, 41.1% worked full time, 21.7% studied full time, 9.2% studied full time and worked part time, and 7.7% did not work or study. The remaining choices to describe employment status, including combinations of the above, are listed in Appendix A.

Questions were included to identify the characteristics of game playing behaviour of participants. It was found the primary game medium was home video or computer games, making up 90.3% of the sample, with 8.4% playing at LANs and only 0.2% playing arcade parlour games. In an open ended question, participants were asked to name their primary game system used. Importantly,

82.8% played computer games, possibly attributable due to the study being advertised on the internet. The remaining proportion is presented in Appendix A.

Participants were also asked which genre of game they primarily played, from a choice of action, strategy, simulation, adventure, mmorpg and not applicable. Despite recommendations to use complex genre systems in previous studies (Griffiths & Hunt, 1998), the hybridity of extensive genre systems inhibited a clear delineation between genres, and the resultant ability to analyse differences between gamers who played them. Hence, a simple approach was taken and the category "not applicable" included for those who believed the games they played didn't fit any available selection. The genre system used allowed for the assimilation of other popular genres such as first person shooters equating to action, resource management games equating to strategy, sports and racing games equating to simulation and persistent state world games referring to MMORPGs. The top genres played by the sample are as follows: 47.5% played action games, 29.1% played MMORPGs, 10% played strategy, 6.6% simulation, 5.3% adventure, 1.3% selected Not Applicable and 1 participant did not select a genre.

The mean age at which participants first reported playing video games was 8.69 with $SD = 4.95$. In line with previous studies, a 'total dose' approach to time commitment was taken, and participants were asked to report the average hours of play per day, and per week. The mean daily hours of play reported was 3.42, with $SD = 2.48$, and mean weekly hours of play 23.78 with $SD = 16.88$. Additionally, participants were asked to rate how many hours of weekly play is in the physical presence of friends, and with friends online. A percentage of weekly hours of play were calculated to represent these two social variables. The

mean percentage of time spent playing games in the physical presence of friends was 16.06%, with *SD* = 25.04, and with friends online 51.85%, with *SD* = 39.72. In relation to online gaming, 68.8% played games primarily online, leaving 31.2% who played primarily offline.

2.1 Materials

2.1 Problem Video Game Playing

Problematic and dependence forming electronic game play was assessed with the Problem Video Game Playing Scale, or PVP. Developed in Spain with adolescents, and based on diagnostic criterion for substance dependence and pathological gambling from the DSM IV, this dichotomous scale consists of nine questions relating to problematic video game play (Salguero & Moran, 2002). The scores range from zero to nine, and mirror the criterion of preoccupation, tolerance, loss of control, withdrawal, escape, lies and deception, disregard for the physical or psychological consequences, and family, school and work disruption.

Displaying factorial validity, Salguero and Moran (2002) found the scale was psychometrically univariate and internally consistent ($\alpha = 0.69$), with all 9 items contributing to the alpha score. Construct validity was drawn from correlations with PVP total scores and playing frequency ($r = .64$, $N = 223$, $p < .001$), duration ($r = .52$, $N = 223$, $p < .001$), and longest play time per session ($r = .56$, $N = 223$, $p < .001$). Additionally, the scale distinguished between participants who self-reported concerns about their video game playing and those

who did not. T-tests revealed significantly higher PVP scores for those who answered affirmatively to the questions 'I think I play videogames too much' ($t(220) = -4.59$, $p < .001$, two tailed), and 'I think I have some type of problem with my video game playing' ($t(221) = -3.43$, $p < .001$, two tailed), than those who answered negatively.

The nine PVP items can be summed to provide an indication of problems associated with video game play. Some very slight grammatical modifications were made to the items to increase clarity, as the authors translation into English from Spanish resulted in some minor grammatical errors (Salguero & Moran, 2002). A full list of the original items, and alterations made, is in Appendix B. Although the scale is not available for purchase, permission for use was still was sought from the authors of the scale, but was not obtained as they were unreachable through various means.

2.2 Social Skills

To measure social skills, a multidimensional self-report scale was chosen in order to facilitate an exploration of what particular social skills may be associated with problematic play and time spent playing online games. The Social Skills Inventory (or SSI), by Ronald Riggio was employed, which conceptualizes social competence as composed of a variety of social and communicative skills, and incorporates diverse branches of communication research (Riggio, 1986; Riggio & Carney, 2003). The scale is comprised of 90 questions and contains six distinct sub-scales, concerning expressiveness (sending skills), sensitivity (receiving or decoding skills) and control (or

appropriateness), and spanning both social (verbal) and emotional (non-verbal) communication domains.

All sub-scales have a large base of discriminant and convergent validity with numerous communication skills scales and personality scales, allowing for the identification of similar constructs to any sub-scales that emerge as important in the present study. SSI scores have predicted laboratory tests of emotional recognition, measures of psychopathology, and interrater scores of role playing and social skills (Riggio, Throckmorton, & DePaola, 1990; Riggio, Watring, & Throckmorton, 1993). The SSI sub scales have shown acceptable test-retest reliability, with scores ranging from .81 to point .96, and Cronbach's alpha coefficients ranging from .65 to .88 (Riggio & Carney, 2003).

To help overcome validity threats inherent to a self-report measure of social skills, including the possible response bias of social desirability, some questions are asked from both a self-perspective (i.e. – 'I am…' or 'I've been…') and a social feedback perspective (i.e. 'I've been told that…'), and many items are reverse scored. It also has a large amount of convergent and discriminant validity, showing predictable relationships to numerous skill based emotional and personality measures. The SSI is published by Mindgarden and available for purchase, therefore permission to use the SSI was obtained via email from one of the authors, Ronald Riggio.

Questions are responded to using a Likert-type scale ranging from 1-5, or 'Not at all like me', 'A little like me', 'Like me', 'Very much like me', and 'Exactly like me' respectively. Scores on each subscale range from 15-75. The full scale is attached in Appendix B, and the six subscales in the SSI, with brief

descriptions and example questions paraphrased from Riggio (1986, p. 651) are as follows :

Emotional Expressivity (or EE) : Emotional expressivity refers to general skill in nonverbal sending…this dimension reflects individuals' ability to express, spontaneously and accurately, felt emotional states as well as the ability to nonverbally express attitudes and cues of interpersonal orientation.

Example Items – "I often laugh out loud", and "My facial expression is generally neutral" (reverse scored).

Emotional Sensitivity (or ES) : Emotional sensitivity refers to general skill in receiving and decoding the nonverbal communication of others. As such, it is closely related to nonverbal sensitivity as defined by Rosenthal (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979)…Individuals high in ES are concerned with and vigilant in observing the nonverbal emotional cues of others.

Example Items – "I am easily able to give a comforting hug or touch someone who is distressed", and "I am often told that I am a sensitive, understanding person"

Emotional Control (or EC) : The general ability to control and regulate emotional and nonverbal displays is referred to as EC. The individual high in EC is likely to be a good emotional actor, able to pose emotions on cue, and able to

use conflicting emotional cues to mask felt emotional states (i.e. laughing appropriately at a joke; putting on a cheerful face to cover sadness).

Example Items – "I am very good at maintaining a calm exterior even if I am upset", and "I usually adapt my ideas and behaviour to the group I happen to be with at the time".

Social Expressivity (or SE) : Social expressivity refers to a general verbal speaking skill and an ability to engage others in social interaction. Persons high in SE appear outgoing and gregarious because of their ability to initiate conversations with others.

Example Items – "I love to socialize" and "I always mingle at parties"

Social Sensitivity (or SS) : The ability to decode and understand verbal communication and general knowledge of the norms governing appropriate social behaviour is termed SS. Socially sensitive individuals are attentive to others (i.e., good watchers and listeners). Because of their knowledge of social norms and rules, persons high in SS may become over concerned with the appropriateness of their own behaviour and the behaviour of others.

Example Items – "I'm generally concerned about the impression I'm making on others", and "Sometimes I think that I take things other people say to me too personally"

Social Control (or SC) : Social control refers to a general skill in social self-presentation. Individuals high in SC are tactful, socially adept, and self-confident. Persons high in SC are skilled at acting…Consequently they are able to adjust personal behaviour to fit with what they consider to be appropriate to any given social situation.

Example Items – "I can be comfortable with all types of people - young and old, rich and poor", and "When I'm with a group of friends, I am often the spokesperson for the group"

2.3 Self Esteem

Global self esteem refers to one's attitude towards oneself, and particularly how favourable or unfavourable this attitude is (Rosenberg, 1967). Measures of global self esteem have been related to many psychological constructs, including psychosocial health, mood disorders and quality of life, across time and a range of cultures (Choi, Meininger & Robers, 2006). To measure global self esteem the Rosenberg 13 Item Self Esteem Scale (or RSES) was employed (Rosenberg, 1967). The RSES was developed in America in the 1960's, is widely used in research and has well established validity and reliability. Questions are answered on a Likert-type scale, ranging from 'strongly agree' to 'strongly disagree'. The scale is unidimensional, alternates between positive and negative direction to reduce response sets, shows strong face validity, and displays convergent validity by predicting various measures of psychosocial health. The full scale is attached in Appendix B.

2.4 Procedure and Implementation

Human Research Ethics approval was acquired from the Victoria University Board of Ethics (HRETH 028/04) prior to commencement, and all guidelines stipulated within were adhered to. The internet was the chosen medium of the study, as it allows many participants to be reached conveniently and quickly, in comfortable and private settings, helping to reduce social-desirability, and is salient with video gamers as they are shown to be adept internet users (Wood, Griffiths, & Eatough, 2004).

A website was created introducing and explaining the study, adhering to ethical guidelines as well as guidelines for online research with gamers (Wood, Griffiths, & Eatough, 2004). These guidelines included the listing of contact details for the researcher, a photo of the researcher, a debriefing page with helpful links, increasing legitimacy through acknowledging the institution overseeing the research, and notification that the results of the research will be made public on the website upon completion. The website is copied in full in Appendix C. After participants verified their age (18 or over), and agreed to a voluntary consent form, they were taken to the full online survey, which was created using the online survey creation tool, Survey Monkey ("Surveymonkey"). To reduce attrition participants were provided with their progress (i.e. how many questions remained) throughout the survey.

To increase the honesty of responses and reduce the response bias of social desirability, participants remained completely anonymous and confidential, with no identifying data collected including email address.

Participants were informed of this anonymity on the website and in the voluntary consent form. However, IP addresses were collected to reduce duplicate and false responses. At all possible times, social skills were referred to as 'communication styles', to further reduce socially desirable response bias (Riggio & Carney, 2003). The inclusion of a social desirability scale was considered, but as past research has indicated many of the SSI subscales are unaffected by social desirability (Riggio, 1986), as well the anonymous and private nature of internet participation further reducing social desirability, it was deemed unnecessary.

Forums catering to the fullest gamut of video game systems and genres were utilised in order to target the widest range of gamers possible. In the great majority of forums, invitations to participate were posted in the 'general' or 'chat' section, which were always the most populated, and allowed for a range of gamers to be exposed to the invitation without having to duplicate posts in each different forum sub-section (i.e. Playstation, X-Box, PC, etc.). All forums utilized are listed in Appendix C. Any questions posted on forums or emailed to the researchers were answered as fully as possible, in order to maintain a rapport with the community involved in the research.

The data collection system was tested with a pilot study of 30 participants, which confirmed that data collection was successful, and also led to the addition of the verification question 'work status'. The dataset was then formatted from Microsoft Excel into the Statistical Package for the Social Sciences (SPSS) and then analysed. On top of the 621 fully completed participants, a further 250 began the survey but did not complete all questions, and were excluded from the data. Invalid age selections (including blank responses and ages under 18) were also excluded ($n = 5$), as well as invalid work

status selections, including responses of "do not work or study" with another response such as "work full time" (n = 7).

Participants with large unexplained discrepancies between their average daily hours of play, and average weekly hours of play were removed from the data (n = 3). Some participants put in a range of hours in these sections, for example, 15-20 hours of play per week. For these responses a median between the two figures was used. For participants who did not complete the hours of play per week section, but did complete the hours of play per day (with some noting to multiply the previous question by seven), the daily hours of play was multiplied to obtain the weekly figure.

IP addresses were scanned for duplicates to ensure that many surveys did not come from the same IP address in a close proximity of time. Twenty-seven duplicates emerged, the largest of which was five records from one IP address. These duplicates had dispersed start dates and times, they all indicated the same country of residence, many showed different ages and genders, suggesting that the same computer was used by different people legitimately. No duplicates appeared identical in survey responses, therefore no records were removed based on duplicate IP addresses.

In preparation for analysis, reverse-scored items were transformed into new variables using SPSS, and totals calculated for the SSI subscales and other dimensions of the SSI, as well as the RSES and PVP overall scores.

3.0 Results

3.0 Statistical Methods Used in Analysis of Data

All assumptions of the statistical methods used were checked and met, with normality checks and Cronbach's Alpha calculated where applicable. These are reported in Appendix D, along with relevant SPSS output. Statistical tests used were Pearson Product-Moment correlations, Multiple Regression, ANOVAs and *t*-tests.

3.1 PVP means and relationships with gender and age.

The mean score of the PVP was 4.17, with $SD = 2.19$. Although the discrepancy in sample size across gender is inhibitive of detailed comparisons such as running two separate multiple regressions, it was found that the PVP total score and hours of play per week were not significantly different across genders according to independent groups *t*-tests. Age was not related to PVP scores.

3.2 PVP item endorsement.

The percentage of the endorsement for the PVP Items, in order of endorsement, is presented in Table 1 below. Although all items are summed to acquire the total score used in analyses, thereby giving each item an equal weight, the individual item endorsement indicates which video game playing problems are most common. The item pertaining to withdrawal was the least

endorsed, although 45.7% of the sample played games more when they felt bad or had problems. The item with many different forms of loss of control showed the highest endorsement, but the question is unable to distinguish which exact problem (from six) was endorsed.

Table 1

Item Endorsement of the PVP in Order of Endorsement

Item #	Item text	% Yes
Item 9	Due to video game playing, I have reduced homework or work, or I have skipped meals, or I have gone to bed later than I wished, or I have spent less time with friends and family than I intended to	78.7
Item 3	I have tried to control, cut back or stop playing; OR I usually play video games over a longer period than I intended	59.7
Item 1	When I am not playing video games I keep thinking about them, i.e. remembering games, planning the next game, etc.	56.5
Item 6	When I lose in a game or I have not obtained the desired results, I need to play again to achieve my target	54.9
Item 5	When I feel bad, e.g. nervous, sad or angry; or when I have problems, I play video games more often	45.7
Item 7	Sometimes I conceal my video game playing, or the extent of my video game playing to others, such as parents, friends, colleagues or partners	35.4
Item 2	I spend an increasing amount of time playing video games	33.8
Item 8	In order to play video games, I have skipped classes or work, or lied, or stolen, or had an argument or a fight with someone	30
Item 4	When I can't play video games I get restless or irritable	22.5

3.3 PVP validity.

Similar to the normative data the PVP is based on, a significant positive correlation was found between PVP total score and average hours of game play per week ($r = .317$, $N = 621$, $p < .001$), and with average hours of game play per

day (r = .298, N = 621, p < .001). However, the magnitude of these relationships are smaller than those reported by the authors (Salguero & Moran, 2002), between the PVP total score and play frequency (r = .64, N = 223, p < .001), duration (r = .52, N = 223, p < .001) and longest play time per session (r = .56, N = 223, p < .001). The internal consistency was also found to be lower than previous studies (α = .661).

3.4 RSES and SSI subscale validity.

Chronbach's Alpha scores were also calculated for the RSES (α = .90), as well as all six SSI subscales; including EE (α = .71), ES (α = .8), EC (α = .74), SE (α = .9), SS (α = .84) and SC (α = .86).

3.5 Relationships Between Problem Video Game Play, Social Skills and Self Esteem

To investigate potential relationship between problem video game play, social skills and self esteem, Pearsons Product-Moment correlations were generated between the PVP total score (all nine items summed), and SSI subscales and the RSES total score. No relationships were found between the PVP and non-verbal subscales EE (r = -.044, N = 621, p = .27), ES (r = -.045, N = 621, p = .26) and EC (r = -.057, N = 621, p = .15). However small significant relationships were found between the social subscales SE (r = -.134, N = 621, p = .001), SS (r = .224, N = 621, p < .001) and SC (r = -.217, N = 621, p < .001). It is noteworthy that significant relationships were only present in the verbal

subscales but not the nonverbal. It is apparent that as video game playing problems increase so does SS, whereas SC and SE decrease. Duplicating past studies, the strongest relationship that emerged was between the PVP and RSES (r = -.234, N = 621, p < .001).

3.6 Relationships Between Problem Video Game Play and Dimensions of Social Skills

Certain SSI subscales can also be summed to provide indications of important constructs within the SSI, including Total Social (SE + SS + SC) and Total Emotional (EE + ES + EC); as well as Total Expressivity (SE + EE), Total Sensitivity (SS + ES) and Total Control (EC + SC). The subscales can be summed to provide an overall SSI score, however caution must be taken when interpreting these figures as a balance of the subscales is emphasised in interpreting the SSI summed scores. A higher overall score, without an interpretation of balance between the subscales, does not necessarily indicate a socially skilled person. The SSI provides a formula to measure this balance (Riggio & Carney, 2003). As contemporary studies have related this balance score to severity of pathological symptoms (Perez, Riggio, & Kopelowicz, 2007), this will also be included in analysis.

Pearsons correlations were run between the PVP and the aforementioned variables. A very small inverse relationship was present between the overall score and the PVP (r = -.084, N = 621, p = .037), as well as a small positive relationship between Total Sensitivity (r = .130, N = 621, p < .001), and small inverse relationships between Total Expressivity (r = -.108, N = 621, p = .007)

and Total Control (r = -.187, N = 621, p < .001). Relationships between the PVP and Total Social (r = -.077, N = 621, p = .056) and Total Emotional (r = -.075, N = 621, p = .06) approached significance. The balance score was not significantly related to PVP, hours of play per week or self esteem. Due to the emphasis on balance when scoring the SSI, and these relationships being smaller in magnitude than those between the PVP total score and the individual subscales (as well as being partial products of them), an interpretation of the individual subscales is a more useful indicator of the relationships between the PVP and the SSI.

3.7 Predicting Problem Video Game Play with Social Skills and Self Esteem

Multiple regression was employed to determine if a measure of social skills and self esteem could predict the magnitude of reported problematic play. Using the enter method, prediction of the PVP total score was attempted using the predictor variables of the six SSI Subscales, the RSES, sex and the average hours of play per week. Because sex is a dichotomous variable, it was entered into the model as a 'dummy' variable, with females coded as zero and males as one (Brace, Kemp, & Snelgar, 2006). Using the enter method, a significant model emerged: F (9, 611) = 15.051, p < .001. However, the model explains a negligible 16.9% of the variance in the PVP total score (adjusted R^2 = .169), with the predictor variable of average hours of play per week accounting for the highest prediction (β = .314, p < .001). The two other significant predictor variables were the SSI subscale SS (β = .184, p < .001) and the RSES total score (β = -.103, p = .03). Interestingly, SE and SC showed correlations with PVP scores, but neither emerged as significant predictors in a regression model. Sex

approached significance (p = .056). The results of this multiple regression were confirmed using the stepwise method (Appendix D). Table 2 below shows a breakdown of the predictor variables using the enter method.

Table 2

Summary of Enter Multiple Regression Analysis Predicting PVP Total Score

Variable	*B*	*SE B*	β
Emotional Expressivity (EE)	.017	.014	.064
Emotional Sensitivity (ES)	-.004	.011	.016
Emotional Control (EC)	.004	.011	.016
Social Expressivity (SE)	-.011	.011	-.058
Social Sensitivity (SS)	.039	.010	.184**
Social Control (SC)	-.010	.014	- .050
Rosenberg Self Esteem Scale (RSES)	-.023	.011	- .103*
Average hours of play per week	.041	.005	.314**
Sex	.545	.285	.074

*p<.05. **p<.000

3.8 Relationships Between Time Spent Playing Online Games and Self Esteem and Social Skills

To investigate the relationship between time spent playing online games and social skills and self esteem, an additional Pearsons correlation matrix was produced. Participants that reported they play primarily offline games were

excluded from the analysis (n = 194), and correlations were run between average hours of game play per week and the SSI subscales and the RSES. Interestingly, no significant relationships emerged, suggesting a more prominent relationship between problems associated with game play and social skills and self esteem, *not* amount of online game play alone. A multiple regression was run, with average hours of play per day as the criterion variable, and all six SSI subscales and the RSES total score as predictor variables. Using the enter method, an insignificant model was found: $F(7, 419) = 1.62$, $N = 427$, $p < .12$, confirming the absence of significant relationships between time spent playing online games and self esteem and social skills.

3.9 Genre Comparison

To determine if differences were present between the 5 game genres on PVP total scores, average hours of play per week, all SSI subscales, RSES total score and age, one way between-subjects ANOVAs were conducted. Those that selected "not applicable" for genre were excluded from analysis (n = 8). No significant differences were found between genres on all measures except for PVP total scores ($F(4, 607) = 4.054$, $p = .003$, partial $\eta^2 = .02$), hours of game play per week ($F(4, 607) = 32.843$, $p < .001$, partial $\eta^2 = .17$), and age ($F(4, 611) = 6.394$, $p < .001$, partial $\eta^2 = .04$). However, for hours of play per week, Levene's test for Homogeneity of Variance was significant, indicating a violation of the assumptions of normality for this ANOVA, and post-hoc comparisons of group means must be interpreted with caution.

3.10 Post-hoc hours of play per week analysis.

MMORPG players showed the highest mean average hours of play per week ($M = 34.16$, $SD = 19.32$), which was significantly higher than the next highest mean of action players ($M = 21.32$, $SD = 14.26$), according to a Bonferonni post-hoc test ($p < .001$). As homogeneity was not met for this ANOVA, an independent groups t-test was conducted comparing MMORPG to action players to confirm the result. As Levene's test for equality of variance was significant, the result for equal variances not assumed was used. A significant difference was found ($t = -7.725$, $df = 301.542$, $p < .001$).

3.11 Post-hoc PVP mean scores analysis.

Similarly, MMORPG players showed the highest mean PVP total score ($M = 4.69$, $SD = 2.29$), however, using Bonferonni post-hoc tests, it was not significantly different from the next highest mean of strategy ($M = 4.19$, $SD = 2.07$), but was significantly different from action ($p < .02$), the next highest mean score ($M = 4.06$, $SD = 2.13$).

3.12 Post-hoc age analysis.

MMORPG players had the highest mean age ($M = 25.76$, $SD = 7.31$), which was significantly higher than action players ($M = 22.72$, $SD = 6.10$), according to Bonferonni post-hoc ($p < .001$).

3.13 Age, and Age First Played Electronic Games

Using Pearson correlations, age was not related to PVP or hours of play per week, but it was minimally related to subscales EC (r = -.110, N = 621, p = .006), SS (r = -.094, N = 621, p < .02) and SC (r = .119, N = 621, p = .003). Confirming past studies, a small positive correlation between age and RSES total scores was found (r = .173, N = 621, p < .001).

Age at which first play electronic games was not related to any SSI subscales or measures of play time, but was minimally related to RSES scores (r = .082, N = 621, p < .04).

4.0 Discussion

4.0 Hypothesis 1 : Relationships Between Problem Video Game Playing, Social Skills and Self Esteem

Overall, there were not large and pronounced relationships found between a multidimensional measure of social skills, self esteem and problems associated with electronic game play. This suggests that social difficulties, specifically caused by a lack of social skills, do not underpin problematic play. Considering the strong relationships established between social difficulties, network size, competence and SSI scores, this finding casts doubt on the theory that avid (or perhaps dependant) video game players turn to games to compensate or cope with social difficulties. This finding gains credence from the sample's high playing time per week and PVP total scores, indicating that they were avid gamers. An unlikely but possible alternative explanation is that the PVP is not measuring problems associated with video game play, or is not appropriately weighting the most deleterious problems, and thus only minute relationships were found between the two scales. If this is the case, further research into the construct of problem video game playing, including the enhancement of scales that weight intensity of associated problems, may confirm whether social skills, self esteem and video game playing problems are more strongly related.

4.1 Emergent Relationships

Nonetheless, some statistically significant relationships did emerge between the social, but not emotional, subscales of the SSI and the PVP total score. The correlation matrix indicates that those who experience more problematic play communicate no differently on non-verbal dimensions than their less problematic counterparts. However, higher problematic play was related to mild decreases in SE (r = -.134, N = 621, p = .001) and SC (r = -.217, N = 621, p < .001), and an increase in SS (r = .224, N = 621, p < .001). As expected, there was an inverse relationship between problematic play and the Rosenberg Self Esteem Scale (r = -.234, N = 621, p < .001). The degree of this relationship is similar to relationships found between self esteem and playing time in previous studies. However, the relationship found in this study between hours of play per week and the self esteem score is smaller than those found previously (r = -.091, N = 621, p < .01), suggesting problems associated with play are more strongly related to self esteem than playing time alone.

4.2 Interpretation Using Subscale Descriptions

According to the subscale definitions, the relationship with SE suggests that those who had higher problematic play scores are less socially and verbally engaging than those with lower PVP scores. The relationship found with SC suggests those with higher PVP scores are less adaptable to varying social situations, and less able to act in differing social roles. SS showed the strongest relationship with PVP of all subscales, and unlike others the direction was

positive ($r = .224$, $N = 621$, $p < .001$). This indicates that as PVP scores increase, so does the participants' skill in listening to others and awareness of social norms and rules. However, the correlation coefficients indicate that these relationships only explain a minimal 1.7, 4.7 and 5 percent, respectively, of the variance between the two measures. The correlation coefficient of the relationship between self esteem and PVP scores indicated that 5.4% of variance was shared.

Nonetheless, this pattern is particularly interesting, as to quote the definition of SS from the scale manual (Riggio & Carney, 2003):

> Extremely high scores on this scale, in conjunction with moderate to low scores on Social Expressivity and Social Control, may indicate self-consciousness that may inhibit participation in social interaction (p. 4).

If taken together these relationships suggest those with higher problematic scores have mildly lower self-esteem, are less verbally expressive, less comfortable in varying social situations, better listeners and more sensitive to social norms; although all relationships are minute in magnitude. Causal directionality can only be hypothesized, it may be that increased time commitment associated with problematic play reduces avenues for face-to-face socialisation, or these characteristics represent risk factors preceding problematic play. To further explore relationships between these variables, a multiple regression was conducted.

4.3 Hypothesis 2: Predicting Problem Play with Self Esteem and Social Skills

Previous studies have questioned whether some gamers who have social difficulties may turn to game worlds to escape from their situation, or even complement socialisation. To explore this hypothesis, a prediction of problematic video game play was attempted using a measure of diverse social skills, as well as other variables of interest, including play time, sex and self esteem. Employing multiple regression (enter method), a significant model emerged: $F(9, 611) = 15.051$, $p < .001$, accounting for 16.9% of the variance in PVP total scores (adjusted $R^2 = .169$). The predictor accounting for the most variance in PVP scores was hours of play per week ($\beta = .314$, $p < .001$). Only one SSI subscale significantly predicted PVP scores - Social Sensitivity (SS), although the percentage of variance it accounted for was small ($\beta = .184$, $p < .001$). The RSES score also emerged as a significant predictor, but a smaller one ($\beta = -.103$, $p < .03$). These two predictors accounted for a small but significant prediction of problematic play scores, and may be tested further in models that already predict problematic play (Yee, in Press). Considering SS was the only SSI subscale to significantly predict PVP scores, this component of social skills comprises a small but important element of problematic play and warrants further analysis.

4.4 Understanding Social Sensitivity: Convergent Constructs and Previous Findings

By reviewing constructs related to SS, it is possible to speculate as to what other social or personality characteristics may be related to problematic

video game play. In studies building validity for the SSI, relationships between SS, psychosocial health and personality were examined.

4.5 The inverse relationship between SS and psychosocial health variables.

Previous studies have indicated that the relationship between SS and psychosocial health deviates from the positive relationships found with the other five SSI subscales. SS was found to be inversely related to self esteem and well-being, and positively related to social anxiety (Riggio, Throckmorton, & DePaola, 1990). Specifically, SS was positively correlated with the subscales interaction anxiety ($r = .25$, $N = 121$, $p < .01$) and audience anxiety ($r = .31$, $N = 121$, $p < .01$) of the Leary Social Anxiety Inventory; it was also negatively correlated with the Rand Well-Being Scale ($r = -.25$, $N = 121$, $p < .05$) and the Coopersmith Self Esteem inventory ($r = -.34$, $N = 121$, $p < .05$). This finding was confirmed in the present study, as the RSES total score was negatively correlated with SS ($r = -.39$, $N = 621$, $p < .001$), but positively correlated with every other subscale. To quote the original definition of the subscale, Riggio (1986) states:

> In extremes, high socially sensitive persons' concern over appropriate social behaviour may lead to self-consciousness and social anxiety, which may inhibit the persons' participation in social interaction (p. 651).

This explanation is further validated by relationships found between SS and the Fenigstein, Scheier and Buss measures of Public Self-Consciousness ($r = .58$, $N = 149$, $p<.001$) and Social Anxiety ($r = .37$, $N = 149$, $p<.001$). The

relationship between Public Self-Consciousness and SS was the strongest in magnitude of all other psychosocial health variables tested (Riggio & Carney, 2003).

4.6 Personality variables and SS.

Research on how the SSI subscales relate to the 16PF and the Eysenck Personality Inventory yielded personality traits associated with each subscale (Riggio, 1986; Riggio & Carney, 2003). Those higher in SS are more affected by feelings (r = -.41, N = 149, p < .05), shy (r = -.26, N = 149, p < .05), astute (r = .40, N = 149, p < .05), apprehensive (r = .60, N = 149, p < .05), conservative (r = -.27, N = 149, p < .05) and tense (r = .54, N = 149, p < .05), which corroborate the definition of SS. Oddly, there is a mild inverse relationship between SS and the 16PF domain careless of social rules (r = -.23, N = 149, p < .05). This may indicate those with high SS scores are highly aware of social rules in the self and others, but do not necessarily conform to them.

4.7 Applied to problem game playing.

These relationships may give an indication of social and personality aspects predictive of a small amount of problematic play. In order of the magnitude of correlations with SS, those with high PVP scores may be more: apprehensive, publicly self-conscious, tense, affected by feelings, astute, socially anxious, conservative and shy; and have lower self esteem and less well-being. Ergo, as highlighted by the definition of the subscale, those higher in SS can become

over-concerned with social norms and rules, as well as their public appearance, and thus exhibit elements of social anxiety or even possible social hesitance (Riggio, 1986; Riggio & Carney, 2003; Riggio, Throckmorton, & DePaola, 1990). The prediction of PVP scores by SS may indicate that a very small component of problematic play hinges on these personality characteristics. Although no correlations emerged between time commitment and SSI subscale scores while PVP scores did, in the multiple regression analysis time commitment accounted for more variance in the model than PVP scores, suggesting that when all variables are held constant, time commitment is more important. This may indicate that causal directionality is more related to a lack of face-to-face socialization due to playing time commitment, but this conclusion is only speculative.

It must be noted that dependable inferences of what social and personality characteristics perpetuate problematic play cannot be gained by investigating was has correlated with SS in past studies. It must again be stressed that the amount of variance in PVP scores explained by SS was very small. Future investigations are required to determine if any of these social and personality traits are directly important to problematic play.

4.8 Overview of Social Skills, Self Esteem and Problem Electronic Game Play

On face value, a pattern of relationships emerged between PVP scores and social characteristics that suggest a social impairment, resonating with the notion of games compensating or providing escape from social difficulties. However, the magnitude of these relationships was *very* small. In light of the

lack of larger relationships between the SSI subscales and PVP scores, as well as the relatively small proportion of variance explained by SS in the multiple regression analysis, it must be stressed that problem gamers do not seem to have severe social difficulties. However, as SS was the only subscale to emerge as a significant positive predictor from six diverse subscales, and as it is related to increases in public self-consciousness, apprehensiveness and social anxiety, and decreases in well-being and self esteem, then this single predictive subscale does corroborate previous studies that found relationships between problem game play, a desire to escape, introversion and social anxiety (Barnett et al., 1997; Lo, Wang, & Fang, 2005; Wan & Chiou, 2006; Wood, Gupta, Derevensky, & Griffiths, 2004; Yee, in Press). It is possible that a very small amount of problematic play is encouraged or maintained by traits representing a social hesitancy. This dovetails with explanations of social electronic games reducing anxiety cues and making communication less confronting and more personal (McKenna & Bargh, 2000; Young, 2004). However, the proportion explained by these social traits is minimal, and future research is required to elaborate variables related to problematic play.

4.9 Hypothesis 3: Social Skills and Time Spent Playing

Surprisingly, correlational analyses revealed no indication that time spent playing online games is related to social skills. This lack of significant relationships between time spent playing may be an indication that a measure of traditional social skills is unable to detect skills learnt through online socialisation, or that online environments are not as socially enriching as

suggested by some (Steinkuehler & Williams, 2006). Further research on the role of virtual communications on psychological development is recommended to explore the relationship between time spent playing and social skills.

4.10 Further Explorations: Gender, Age, Age at First Played Electronic Games and Genre

To elaborate on this contemporary area of study, comparisons of genre on all variables of interest were performed. They indicate that MMORPG players had the highest time commitment, PVP scores and age, significantly higher than other genres. This suggests MMORPGs are popular among an older audience compared to other games, confirming recent demographic studies (Griffiths, Davies, & Chappell, 2003).

The finding that MMORPGs had significantly higher PVP scores and time commitment indicates that there is something particularly compelling or problem-inducing about MMORPGs compared to other genres, corroborating evidence that interactive internet functions are more 'addictive', and validating the current research focus on MMORPGs (Armstrong, Phillips, & Saling, 2000; McKenna & Bargh, 2000). However, this finding may also simply represent the most popular genre of game at the present time, or within this sample. It is logical that the highest indications of problematic play and time commitment will be present in the most popular genre of the time, as that genre is likely to attract the most avid gamers. Interestingly, despite the gender discrepancy in the sample, males did not show significantly higher time commitment compared to females according to *t*-tests. This may be an indication of the further proliferation of electronic games.

5.0 Limitations and Future Suggestions

5.0 Sample Bias

Although forums catering for a range of gaming systems were utilized, the sample obtained does not represent as broad a cross section of gamers as sought. Even though many systems are identified as secondary and tertiary systems played, the PC makes up the great majority of the primary systems identified (82.8%). This is likely because the medium of the study was a computer. The average hours spent playing per day ($M = 3.42$, $SD = 2.48$) and per week ($M = 23.78$, $SD = 16.88$) were generally higher than previous studies. Similarly, the mean PVP score is higher than would have been expected judging by prevalence of problematic play in past studies ($M = 4.17$, $SD = 2.19$).

This could be the result of the study invitations being posted on forums devoted to gaming, hence targeting gamers who spend time in meta-game environments that allow for further exploration of game content, and who are therefore likely to be more committed gamers. According to the endorsement of individual PVP items, 56.5% of the sample spent time outside of play persistently thinking and planning their game playing, suggesting play was a salient and meaningful activity to much of the sample. Those that play console games may be less likely to populate meta-game environments, as they would require a shift of medium to a computer to access them, although this may change with the advent of internet browsing capability in home game consoles. These sample characteristics suggest that the results are more applicable to

highly involved PC gamers rather than less avid or console players, and generalisations to all gamers must be made cautiously.

5.1 Problem Video Game Playing Scale

The problem video game playing scale (or PVP) is dichotomous and unable to measure intensity of problems affirmed. Also, without extensive validation, it cannot be verified that the scale is measuring all elements of the construct, including negative effects. More investigations into the construct of problematic play are required to determine its epidemiology, longitudinal fluctuations, negative consequences and mediating variables. Qualitative research tapping problematic players' perspectives may help to identify risk factors, including what real life problems are commonly being escaped from; symptomatology, including what negative consequences of problematic play are most intrusive; as well as potential co-morbidities and maintenance factors which may then help to inform scale development. Scale development efforts could draw from qualitative studies, use a response method that is sensitive to degrees such as Likert-type scales, and perform factor analyses on the pooled items of all previous "video game addiction" scales with self-reported addicts to further pinpoint what composes problematic play.

5.2 Research Collaboration

Considering the lack of research and consequent research tools concerning electronic game play, collaboration is required among those

pioneering investigations in this field. Currently the largest base of psychologically research on electronic games is based online, and not peer reviewed! (Collaboration may help to focus future research direction by prioritizing issues concerning electronic game play, including scale development, providing a base from which future researchers can build from, and more broadly to stimulate investigations into the roles that electronic games have in the lives of those that use them.

6.0 Conclusion

This study aimed to investigate the relationship between problematic electronic game play, social skills and self esteem in an adult sample. Confirming past studies, an inverse relationship (and prediction) was present between problematic play and self esteem, but the magnitude was small (Barnett et al., 1997; Colwell, Grady & Rhaiti, 1995; Colwell & Pain, 2000). Also resonating with past studies, a pattern of relationships emerged between the social skills subscales and problematic play indicating a social hesitancy (Barnett et al., 1997; Lo, Wang & Fang, 2005). Further, the subscale SS (which is related to public self-consciousness and social anxiety) accounted for a small prediction of problem video game playing scores. Taken together, these results may indicate a deleterious consequence, or possible risk factor associated with problematic play, although considering the high PVP scores and time commitment within the sample, stronger relationships would have been expected to justify the hypothesis that problematic play is impelled by social difficulties. Ultimately the magnitude of the relationships and predictions found was minimal; suggesting that other

factors aside from social skills and self esteem will better predict problematic play.

The findings of this study cast doubt on the notion that gamers with social difficulties turn to game worlds to cope with or escape from these problems. This resonates with past studies that found little negative consequences to the construct of problematic or dependant play (Fisher, 1994; Griffiths, 2000; Griffiths & Hunt, 1998). Despite anecdotal accounts and clinical examples (Allison, Von Wahlde, Shockley, & Gabbard, 2006; Griffiths, 2000), this consistent lack of severe negative consequences suggests that research has either overlooked important areas of this construct, or taken an unnecessarily pathological approach.

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Appendix A

Extended Demographics

Work and Study Life Status

Work/Study life

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	work full time	255	41.1	41.1	41.1
	work part time	46	7.4	7.4	48.5
	study full time	135	21.7	21.7	70.2
	study part time	22	3.5	3.5	73.8
	do not work or study	48	7.7	7.7	81.5
	work full time and study full time	4	.6	.6	82.1
	work full time and study part time	23	3.7	3.7	85.8
	work part time and study full time	57	9.2	9.2	95.0
	work part time and study part time	31	5.0	5.0	100.0
	Total	621	100.0	100.0	

Country of Residence

Country of residence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Australia	402	64.7	64.7	64.7
	USA	140	22.5	22.5	87.3
	Canada	25	4.0	4.0	91.3
	UK	22	3.5	3.5	94.8
	Spain	1	.2	.2	95.0
	Germany	1	.2	.2	95.2
	New Zealand	10	1.6	1.6	96.8
	Brazil	2	.3	.3	97.1
	Finland	2	.3	.3	97.4
	Malaysia	2	.3	.3	97.7
	Holland	1	.2	.2	97.9
	Denmark	1	.2	.2	98.1
	United Arab Emirates	1	.2	.2	98.2
	Sweden	2	.3	.3	98.6
	Norway	1	.2	.2	98.7
	Portugal	1	.2	.2	98.9
	South Africa	1	.2	.2	99.0
	Serbia	1	.2	.2	99.2
	Poland	1	.2	.2	99.4
	Cyprus	1	.2	.2	99.5

	Netherlands	1	.2	.2	99.7
	Austria	1	.2	.2	99.8
	Slovenia	1	.2	.2	100.0
	Total	621	100.0	100.0	

Primary Game Medium

Primary game medium

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Home video or computer games	561	90.3	90.5	90.5
	Arcade, coin operated and parlour games	1	.2	.2	90.6
	LAN games	52	8.4	8.4	99.0
	Hand held games	4	.6	.6	99.7
	None	2	.3	.3	100.0
	Total	620	99.8	100.0	
Missing	System	1	.2		
Total		621	100.0		

Game System Played the Most

Number 1 system played

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	blank	15	2.4	2.4	2.4
	pc	514	82.8	82.8	85.2
	playstation 2	42	6.8	6.8	91.9
	playstation	6	1.0	1.0	92.9
	x-box 360	21	3.4	3.4	96.3
	psp	1	.2	.2	96.5
	x-box	12	1.9	1.9	98.4
	Nintendo DS	4	.6	.6	99.0
	Gamecube	3	.5	.5	99.5
	Nintendo 64	1	.2	.2	99.7
	Dreamcast	1	.2	.2	99.8
	Saturn	1	.2	.2	100.0
	Total	621	100.0	100.0	

Genre of Games Played Most

Number 1 genre of game played

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	1.3	1.3	1.3
	action	295	47.5	47.6	48.9
	adventure	33	5.3	5.3	54.2

	strategy	62	10.0	10.0	64.2
	simulation	41	6.6	6.6	70.8
	mmorpg	181	29.1	29.2	100.0
	Total	620	99.8	100.0	
Missing	System	1	.2		
Total		621	100.0		

Appendix B

Scales

PVP Original and Modified Items

Item	DSM-IV Criterion	Original	Modified
1	Preoccupation	When I am not playing with the video games, I keep thinking about them, i.e. remembering games, planning the next game, etc.	When I am not playing video games I keep thinking about them, i.e. remembering games, planning the next game, etc.
2	Tolerance	I spend an increasing amount of time playing video games	Retained original item
3	Loss of control	I have tried to control, cut back or stop playing, or I usually play with the video games over a longer period than I intended	I have tried to control, cut back or stop playing; OR I usually play video games over a longer period than I intended
4	Withdrawal	When I can't use the video games I get restless or irritable	When I can't play video games I get restless or irritable
5	Escape	When I feel bad, e.g. nervous, sad or angry, or when I have problems, I use the video games more often	When I feel bad, e.g. nervous, sad or angry; or when I have problems, I play video games more often
6	Loss of control	When I lose in a game or I have not obtained the desired results, I need to play again to achieve my target	Retained original item
7	Lies and deception	Sometimes I conceal my video game playing to the others, this is, my parents, friends, teachers…)	Sometimes I conceal my video game playing, or the extent of my video game playing to others, such as parents, friends, colleagues or partners.
8	Disregard for the physical or psychological consequences	In order to play video games, I have skipped classes or work, or lied, or stolen, or had an argument or a fight with someone	Retained original item

9	Family/Schooling disruption	Because of the video game playing I have reduced my homework or schoolwork, or I have not eaten, or I have gone to bed late, or I spent less time with my friends and family	Due to video game playing, I have reduced homework or work, or I have skipped meals, or I have gone to bed later than I wished, or I have spent less time with friends and family than I intended to

Social Skills Inventory

In this section all six subscales of the Social Skills Inventory (or SSI) are defined in full with items attached. Numbers next to the item indicate where that item is listed within the 90 questions comprising the full scale - individual subscales are not delineated to the participant, all 90 questions are continuous and in the order listed below. The letter 'R' next to an item denotes that this item is reverse scored. The following descriptions are direct quotes from the original article building validity for the SSI (Riggio, 1986, p. 651). Extended validity and reliability, as well as normative data are available from the SSI manual (Riggio & Carney, 2003).

Emotional Expressivity (EE)

Description – Emotional expressivity refers to general skill in nonverbal sending. Some previous attempts at measuring individual differences in emotional sending ability have focused on posed emotional sending (e.g. Zuckerman, Lipets, Koivumaki & Rosenthal, 1975). However, this dimension reflects individuals' ability to express, spontaneously and accurately, felt emotional states as well as the ability to nonverbally express attitudes and cues of interpersonal orientation. This definition of EE is more in line with that of Friedman et al. (1980). Persons skilled in EE are animated and energetic and may be characterized as emotionally charged. Individuals who are high in EE may be able to emotionally arouse or inspire others because of their ability to transmit their felt emotional states (cf Friedman & Riggio, 1981). Individuals high in emotional expressivity may tend to lack emotional control, owing to their emotional spontaneity.

Items -

1. It is difficult for others to know when I am sad or depressed R
7. I talk faster than most people
13. When depressed, I tend to make those around me depressed also
19. I have been told that I have expressive eyes
25. I usually feel uncomfortable touching other people R

31. I often laugh out loud
37. Sometimes I have trouble making my friends and family realize just how angry or upset I am with them R

43. My facial expression is generally neutral R
49. I rarely show my anger R
55. I often touch my friends when talking to them.

61. I am able to liven up a dull party
67. I dislike being the center of attention R
73. I rarely show my feelings or emotions R
79. Friends have sometimes told me that I talk too much
85. I never shout or scream when angry R

Emotional Sensitivity (ES)

Description – Emotional sensitivity refers to general skill in receiving and decoding the nonverbal communication of others. As such, it is closely related to nonverbal sensitivity as defined by Rosenthal et al (1979). Individuals high in ES are concerned with and vigilant in observing the nonverbal emotional cues of others. Because persons high in ES are able to decode emotional communication rapidly and efficiently, they may be more susceptible to becoming emotionally aroused by others-sympathetically experiencing the emotional states of others (see Friedman & Riggio, 1981).

Items –

2. When people are speaking, I spend as much time watching their movements as I do listening to them
8. Few people are as sensitive and understanding as I am
14. At parties, I can immediately tell when someone is interested in me
20. I am interested in knowing what makes people tick
26. I can easily tell what a person's character is by watching his or her interactions with others.

32. I always seem to know what peoples' true feelings are no matter how hard they try to conceal them
38. I can accurately tell what a persons's character is upon first meeting him or her
44. One of me greatest pleasures in life is being with other people.
50. I can instantly spot a "phony" the minute I meet him or her.
56. I dislike it when other people tell me their problems. R

62. I sometimes cry at sad movies.
68. I am easily able to give a comforting hug or touch someone who is distressed
74. I can spend hours just watching other people
80. I am often told that I am a sensitive, understanding person
86. When my friends are angry or upset, they seek me out to help calm them down.

Emotional Control (EC)

Description – The general ability to control and regulate emotional and nonverbal displays is referred to as EC. The individual high in EC is likely to be

a good emotional actor, able to pose emotions on cue, and able to use conflicting emotional cues to mask felt emotional states (i.e. laughing appropriately at a joke; putting on a cheerful face to cover sadness). Emotional control may be one of the critical skills that, combined with other skills, is what Snyder (1974) referred to as self-monitoring (see Riggio & Friedman, 1982). The high emotionally controlled person may tend to moderate the display of strong, felt emotions, thus controlling against the display of spontaneous and extreme emotional states.

Items -

3. People can always tell when I dislike them, no matter how hard I try to hide my feelings R
9. It is often hard for me to keep a "straight face" when telling a joke or humorous story R
15. People can always tell when I am embarrassed by the expression on my face. R
21. I am not very skilled in controlling my emotions R
27. I am able to conceal my true feelings from just about anyone
33. I can keep a straight face even when friends try to make me laugh or smile
39. It is very hard for me to control my emotions R
45. I am very good at maintaining a calm exterior even if I am upset
51. I usually adapt my ideas and behaviour to the group I happen to be with at the time
57. While I may be nervous on the inside, I can disguise it very well from others

63. I can make myself look as if I'm having a good time at a social function even if I'm not really enjoying myself at all
69. I am rarely able to hide a strong emotion. R
75. I can easily pretend to be mad even when I am really feeling happy
81. People can always "read" my feelings even when I am trying to hide them. R
87. I am easily able to make myself look happy one minute and sad the next.

Social Expressivity

Descriptions – Social expressivity refers to a general verbal speaking skill and an ability to engage others in social interaction. Persons high in SE appear outgoing and gregarious because of their ability to initiate conversations with others. Socially expressive individuals are usually able to speak spontaneously, sometimes without apparent control or mentoring of content.

Items –

4. I enjoy giving parties
10. It takes people quite a while to get to know me well R
16. I love to socialize
22. I prefer jobs that require working with a large number of people
28. I always mingle at parties

34. I usually take the initiative to introduce myself to strangers

40. I am usually the one to initiate conversations
46. When telling a story, I usually use a lot of gestures to help get the point across.
52. When in discussions, I find myself doing a large share of the talking.
58. At parties I enjoy talking to a lot of different people.

64. I consider myself a loner. R
70. I enjoy going to large parties and meeting new people.
76. I am unlikely to speak to strangers until speak to me. R
82. I tend to be the "life of the party"
88. I could talk for hours on just about any subject.

Social Sensitivity

Description – The ability to decode and understand verbal communication and general knowledge of the norms governing appropriate social behaviour is termed SS. Socially sensitive individuals are attentive to others (i.e., good watchers and listeners). Because of their knowledge of social norms and rules, persons high in SS may become overconcerned with the appropriateness of their own behaviour and the behaviour of others. In extremes, high socially sensitive persons' concern over appropriate social behaviour may lead to self-consciousness and social anxiety, which may inhibit the persons' participation in social interaction.

Items -

5. Criticism of scolding rarely makes me feel uncomfortable. R
11. My greatest source of pleasure and pain is other people
17. I would much rather take part in a political discussion than to observe and analyse what the participants are saying R
23. I am greatly influenced by the moods of those around me.
29. There are certain situations in which I find myself worrying about whether I am doing or saying the right things

35. Sometimes I think that I take things other people say to me too personally
41. What others think about my actions is of little or no consequence to me. R
47. I often worry that people will misinterpret something I have said to them
53. While growing up, my parents were always stressing the importance of good manners.
59. I can be strongly affected by someone smiling or frowning at me.

65. I am very sensitive of criticism.
71. It is very important that other people like me
77. I get nervous if I think someone is watching me.
83. I'm generally concerned about the impression I'm making on others
89. I am often concerned with what others are thinking of me

Social Control

Description – Social control refers to a general skill in social self-presentation. Individuals high in SC are tactful, socially adept, and self-confident. Persons high in SC are skilled at acting-able to play various social roles and can easily take a particular stance or orientation in a discussion. Individuals high in SC are socially sophisticated and wise. Consequently they are able to adjust personal behaviour to fit with what they consider to be appropriate to any given social situation.

Items -

6. I can be comfortable with all types if people—young and old, rich and poor.
12. When I'm with a group of friends, I am often the spokesperson for the group.
18. Sometimes I find it difficult to look at others when I am talking about something personal. R
24.I am not good at making prepared speeches. R
30. I find it very difficult to speak in front of a large group of people R

36. When in a group of people, I have trouble thinking of the right things to talk about. R
42. I am usually very good at leading group discussions
48. I am often uncomfortable around people whose social class is different from mine R
54. I am not very good at mixing at parties. R
60. I would feel out of place at a party attended by a lot of very important people. R
66. Occasionally I've noticed that people from different backgrounds seem to feel uncomfortable around me. R
72. I sometimes say the wrong thing when starting a conversation with a stranger. R
78. I am often chosen to be the leader of a group
84.I often find myself in awkward social situations. R
90. I can easily adjust to being in just about any social situation.

Rosenberg 13 Item Self Esteem Scale

The 13 items of the Rosenberg self esteem scale are listed below, with the letter 'R' denoting which are reverse scored.

1. I feel that I am a good person – at least as good as others
2. I feel I have a number of good qualities
3. Overall, I feel that I'm not very good at most things R
4. I am able to do things as well as most people
5. I feel I do not have much to be proud of R
6. I take a positive attitude towards myself
7. On the whole, I am satisfied with myself
8. I wish I could have more respect for myself R
9. I certainly feel useless at times R
10. At times I think I am no good at all R
11. I feel pretty confident that I am able to do things if I try
12. I feel there are lots of things I can do really well
13. At times, I feel that I am not as good as other people R

Appendix C

Internet as Laboratory – Advertising the Study and Gathering Data

URL

The URL for the Website throughout the study was –
www.computergameresearch.com

Standardised Invitation to Participate

The standardised invitation that was posted on various gaming forums is as follows –

Hi All,

My name is Daniel Loton, and I'm currently completing an honours thesis as part of a Psychology degree at Victoria University in Melbourne, Australia. For my thesis, I've decided to conduct an online, international study of adult gamers, looking at whether there is a relationship between gaming and communication styles, self esteem and video game addiction (or problem video game playing, as it is yet clinically unproven that video game 'addiction' exists).

Gaming is hugely popular now, and particular kinds of games have become a new avenue for communication. I've chosen to look at whether elements of video gaming can predict a measure of communication styles (including verbal and non-verbal expressivity and sensitivity), self esteem and signs of problem video game playing. The study will hopefully identify what (if any) elements of communication are related to video gaming, and explore the existence or prevalence of problem video game playing.

If you have 15-20 minutes to participate in the survey, or are interested in the topic, please visit
http://www.computergameresearch.com
The survey is COMPLETELY anonymous, and the information you could provide can contribute to a still infantile branch of research, particularly in relation to the popularity of the actual topic (gaming). Note you do not have to be a gamer to participate, as this allows even more interesting comparisons!

Thanks very much, and if you have questions please don't hesitate to reply, pm me or email me.

Regards, Daniel Loton.

Forums Used to Advertise Invitation –

Although the study was advertised on these forums by me, the internet is an open medium and the study was advertised elsewhere by others interested in the topic.

www.gtplanet.net – in pc gaming, and general gaming sections
www.cybershack.com.au
http://serendip.brynmawr.edu/forum/viewforum.php?forum_id=402&palette=lightyellow
http://www.gamerevolution.com/
http://forum.gamehead.com.au/
http://www.atomicmpc.com.au/
http://forums.gamespace.net.au/
http://forums.overclockers.com.au/
http://www.mmorpg.com/
http://reg.gamespot.com/
http://boardsus.playstation.com/
http://forum.teamxbox.com/
http://games.iinet.net.au/
http://forums.filefront.com/
http://www.theoldergamers.com/
www.womengamers.com
www.grrlgamers.com
www.gamearena.com.au

Copy of Operational Website –

VICTORIA UNIVERSITY | A NEW SCHOOL OF THOUGHT

Video game addiction, self esteem & social skills

(a psychology honours thesis by Daniel Loton, supervised by Dr Keis Ohtsuka)

Dear Fellow Gamer,

My name is Daniel Loton, and I am currently undertaking a post-graduate honours year in Psychology at Victoria University in Melbourne, Australia. As part of this year I have to complete a thesis which attempts to conduct research on a particular topic. For my topic I have chosen video games. Video games are a hugely popular, and constantly expanding leisure activity worldwide, and although not much research on video games has been conducted in Australia, previous research globally has identified a link between playing video games and self esteem (self respect or confidence), as well as elements of socializing (including a means of developing social relationships, both in person and online). It has also been found that some avid game players enjoy gaming so much that their gaming behaviour resembles a behavioural addiction, similar to gambling, with the gamer unable to stop playing, sacrificing work and socializing for game play, and even suffering symptoms of tolerance, and withdrawal if they stop.

For my thesis I would like to explore the issue of whether video gaming behaviour does represent an addiction, and if so, how prevalent it is, as well as whether playing video games, including the type of video game (i.e. genre and medium of game), has a link with self esteem and the way people socially communicate. To do this, I must administer some questionnaires that collect information on people's game playing habits, self esteem and communication patterns. The questionnaires have all been used in past studies, and they will take about half an hour to complete.

If you would be kind enough to participate then please click on the link below to read the consent form ensuring you understand the nature of the study. Otherwise, thankyou for your time, and if you are further interested in the psychological effects of video games then please explore the links section of this site, or email me with any questions.

Kind Regards,
Daniel Loton.

Please click here to participate in the study

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Information and consent to participate in the study

About the study

Data collected by the questionnaires will remain strictly anonymous and confidential, and there are no right or wrong answers. After the data is gathered, I will statistically analyse the results to discover the prevalence of symptoms of problem video game playing within the respondents, and whether there is a possible link between playing video games and commonly used measures of self esteem and communication patterns. Please be aware that the questionnaires will focus on your opinions of yourself, your communicative style, and video game playing habits. If these areas are of concern to you, please be mindful of this when deciding to participate, and know that links to places to seek counselling and discuss this topic further through internet forums will be provided on the debriefing page when the questionnaires are completed. I will also be including in the questionnaires some topical questions, such as whether games are often played with friends, either physically or online, and whether there is a negative social stigma against computer games as a legitimate hobby. With enough honestly completed

questionnaires, some interesting findings may be discovered concerning a demographic I have been part of for most of my life - video gamers.

Consent

Please read below, ensuring that you understand the study and are voluntarily participating.

I certify that I am at least 18 years of age, and am voluntarily giving my consent to participate in the study entitled : “Video Game Addiction, Self Esteem and Social Skills : An Online Study”, being conducted at Victoria University, by :Daniel Loton and Dr Keis Ohtsuka (Supervisor)

I certify that the objectives of the study, together with any risks and safeguards associated with the procedures listed hereunder to be carried out in the research, have been fully explained to me by Daniel Loton throughout this webpage.

And that I freely consent to participate by completing the following questionnaires, which will take about half an hour.

I have been informed that the information I provide will be kept confidential, and that I will be kept anonymous by not having to complete any identifying data.

Yes, I've read and agree to the above information, I'm at least 18 years of age, please take me to the survey

No, I'm under 18 or don't want to participate

The Operational Survey

Example pages from the operational survey are copied below. For brevity, only two pages are pictured, which still display the format of the questions. Indications of progress were present on each page to inform the participant and decrease attrition.

Video Game Playing and Communication Style Survey Exit this survey >>

1. Demographics

The survey is 125 questions in total, and takes about 30 minutes to complete.

Please answer all questions honestly and keep in the mind the results of the questionnaire are completely anonymous.

*** 1. Age :**

*** 2. Sex :**

- Male
- Female

*** 3. Country of residence :**

12. Please list the top three games you play the most - e.g. everquest, warcraft 3, the sims online, etc. (if you cannot think of three, just complete what you can)

3.
2.
1.
3.
2.
1.

13. Please list the top three game systems you play the most – e.g. PC, playstation, X-Box 360, etc.
(if you cannot think of three, just complete what you can)

1.
2.

3.
1.
2.
3.

*** 14. Of the games you play, are most**

- 1. Online
- 2. Not Online

Next >>

Video Game Playing and Communication Style Survey Exit this survey >>

3. 25% Complete

25% Complete! Please Continue...

*** 34. I have been told that I have expressive eyes**

- 1. = Not at all like me
- 2. = A little like me
- 3. = Like me

- 4. = Very much like me
- 5. = Exactly like me

*** 35. I am interested in knowing what makes people tick**

- 1. = Not at all like me
- 2. = A little like me
- 3. = Like me
- 4. = Very much like me
- 5. = Exactly like me

*** 36. I am not very skilled in controlling my emotions**

- 1. = Not at all like me
- 2. = A little like me
- 3. = Like me
- 4. = Very much like me
- 5. = Exactly like me

*** 37. I prefer jobs that require working with a large number of people**

- 1. = Not at all like me
- 2. = A little like me

- 3. = Like me
- 4. = Very much like me
- 5. = Exactly like me

*** 38. I am greatly influenced by the moods of those around me**

- 1. = Not at all like me
- 2. = A little like me
- 3. = Like me
- 4. = Very much like me
- 5. = Exactly like me

Debriefing Page

VICTORIA UNIVERSITY | A NEW SCHOOL OF THOUGHT

Thankyou sincerely for your time and honesty in completing the questionnaires, this study and other research projects simply could not be completed without those willing to participate. If the subject matter of the questionnaires was concerning, or if you feel you need to speak to someone about video game addiction or any issues to do with self esteem and social skills, please refer to the link below for the computer game addiction clinic based in the USA, or the link to the American Psychological Association (if you are in America) or the Australian Psychological Society (if you are in Australia) to locate a psychologist or counsellor near you. If these links cannot help you, then please contact a relevant mental health professional in your area. Alternately, if you would like to connect with others who feel they have a problem with playing too much video games, please explore the forums in the links section.

Links to information and support for video game and internet addiction:

Video Game Addiction: Do we need a Video Gamers Anonymous?

Computer and Video Game Addiction

When games stop being fun

Video games: Cause for concern?

Video Game Addiction: One Family's Story

The Salvation Army

American Psychological Association

A clinic for computer addiction

http://www.egameaddiction.com/forums

A forum comparing drug addiction to game addiction

Links to forums and discussions about online role playing games

A discussion of video game addiction

A medical perspective on video game addiction

A Civilization addict's personal experience

Australian Psychological Society - psychologist referral service

Appendix D

SPSS Output

Prioritization

Presentation of raw SPSS data has been prioritized to the most important findings; those being the Correlation Matrix between the scales, the Multiple Regression Analysis predicting PVP total scores, and the ANOVAs by genre. Additional SPSS data can be supplied electronically upon request.

Multiple Regression Predicting PVP Total Scores

Regression

```
[DataSet1] E:\data
exporting\FullDATAillegitimateworkstatusremoved.sav
```

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Sex, SSI Subscale Social Expressivity, Average hours of play per week, SSI Subscale Social Sensitivity, SSI Subscale Emotional Control, SEStotalscore, SSI Subscale Emotional Sensitivity, SSI Subscale Emotional Expressivity, SSI Subscale Social Control[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Problem Video Game Playing total score

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.426[a]	.181	.169	2.001

a. Predictors: (Constant), Sex, SSI Subscale Social Expressivity, Average hours of play per week, SSI Subscale Social Sensitivity, SSI Subscale Emotional Control, SEStotalscore, SSI Subscale Emotional Sensitivity, SSI Subscale Emotional Expressivity, SSI Subscale Social Control

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	542.461	9	60.273	15.051	.000[a]
	Residual	2446.756	611	4.005		
	Total	2989.217	620			

a. Predictors: (Constant), Sex, SSI Subscale Social Expressivity, Average hours of play per week, SSI Subscale Social Sensitivity, SSI Subscale Emotional Control, SEStotalscore, SSI Subscale Emotional Sensitivity, SSI Subscale Emotional Expressivity, SSI Subscale Social Control

b. Dependent Variable: Problem Video Game Playing total score

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.905	1.060		1.797	.073
	SEStotalscore	-.023	.011	-.103	-2.178	.030
	SSI Subscale Emotional Expressivity	.017	.014	.064	1.248	.213
	SSI Subscale Emotional Sensitivity	.004	.011	.016	.360	.719
	SSI Subscale Emotional Control	.004	.011	.016	.382	.703
	SSI Subscale Social Expressivity	-.011	.011	-.058	-.945	.345
	SSI Subscale Social Sensitivity	.039	.010	.184	4.037	.000
	SSI Subscale Social Control	-.010	.014	-.050	-.745	.456
	Average hours of play per week	.041	.005	.314	8.419	.000
	Sex	.545	.285	.074	1.915	.056

a. Dependent Variable: Problem Video Game Playing total score

Stepwise Multiple Regression for Confirmation

Regression

```
[DataSet1] E:\data
exporting\FullDATAillegitimateworkstatusremoved.sav
```

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Average hours of play per week	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	SSI Subscale Social Sensitivity	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	SEStotalscore	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Problem Video Game Playing total score

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.317[a]	.101	.099	2.084
2	.399[b]	.159	.157	2.017
3	.416[c]	.173	.169	2.001

a. Predictors: (Constant), Average hours of play per week

b. Predictors: (Constant), Average hours of play per week, SSI Subscale Social Sensitivity

c. Predictors: (Constant), Average hours of play per week, SSI Subscale Social Sensitivity, SEStotalscore

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	300.735	1	300.735	69.242	.000[a]
	Residual	2688.482	619	4.343		
	Total	2989.217	620			
2	Regression	476.069	2	238.035	58.534	.000[b]
	Residual	2513.148	618	4.067		
	Total	2989.217	620			
3	Regression	518.281	3	172.760	43.139	.000[c]
	Residual	2470.936	617	4.005		
	Total	2989.217	620			

a. Predictors: (Constant), Average hours of play per week

b. Predictors: (Constant), Average hours of play per week, SSI Subscale Social Sensitivity

c. Predictors: (Constant), Average hours of play per week, SSI Subscale Social Sensitivity, SEStotalscore

d. Dependent Variable: Problem Video Game Playing total score

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.193	.145		22.089	.000
	Average hours of play per week	.041	.005	.317	8.321	.000
2	(Constant)	.883	.379		2.333	.020
	Average hours of play per week	.043	.005	.331	8.957	.000
	SSI Subscale Social Sensitivity	.051	.008	.243	6.566	.000
3	(Constant)	2.810	.702		4.000	.000
	Average hours of play per week	.041	.005	.316	8.559	.000
	SSI Subscale Social Sensitivity	.040	.008	.191	4.771	.000
	SEStotalscore	-.029	.009	-.130	-3.247	.001

a. Dependent Variable: Problem Video Game Playing total score

Excluded Variables[d]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	SEStotalscore	-.206[a]	-5.522	.000	-.217	.992
	SSI Subscale Emotional Expressivity	-.041[a]	-1.063	.288	-.043	1.000
	SSI Subscale Emotional Sensitivity	-.025[a]	-.662	.508	-.027	.996
	SSI Subscale Emotional Control	-.061[a]	-1.613	.107	-.065	1.000
	SSI Subscale Social Expressivity	-.104[a]	-2.738	.006	-.109	.991
	SSI Subscale Social Sensitivity	.243[a]	6.566	.000	.255	.997
	SSI Subscale Social Control	-.192[a]	-5.109	.000	-.201	.993
	Sex	.050[a]	1.304	.193	.052	.997
2	SEStotalscore	-.130[b]	-3.247	.001	-.130	.834
	SSI Subscale Emotional Expressivity	-.034[b]	-.912	.362	-.037	.999
	SSI Subscale Emotional Sensitivity	-.051[b]	-1.383	.167	-.056	.985
	SSI Subscale Emotional Control	-.012[b]	-.319	.750	-.013	.957
	SSI Subscale Social Expressivity	-.079[b]	-2.125	.034	-.085	.979
	SSI Subscale Social Control	-.107[b]	-2.639	.009	-.106	.812
	Sex	.073[b]	1.964	.050	.079	.989
3	SSI Subscale Emotional Expressivity	.003[c]	.074	.941	.003	.906
	SSI Subscale Emotional Sensitivity	-.020[c]	-.529	.597	-.021	.912
	SSI Subscale Emotional Control	.006[c]	.159	.873	.006	.936
	SSI Subscale Social Expressivity	-.038[c]	-.954	.340	-.038	.833
	SSI Subscale Social Control	-.052[c]	-1.093	.275	-.044	.584
	Sex	.066[c]	1.779	.076	.072	.985

a. Predictors in the Model: (Constant), Average hours of play per week

b. Predictors in the Model: (Constant), Average hours of play per week, SSI Subscale Social Sensitivity

c. Predictors in the Model: (Constant), Average hours of play per week, SSI Subscale Social Sensitivity, SEStotalscore

d. Dependent Variable: Problem Video Game Playing total score

One-Way Between Subject ANOVAs

One-Way Between Subjects ANOVAs by Genre on PVP Total Score, Hours of Play Per Week, Age, All SSI Subscales and RSES Total Score

```
UNIANOVA
  PVPTotalScore  BY Numberonegenreminuszero
  /METHOD = SSTYPE(3)
  /INTERCEPT = INCLUDE
  /POSTHOC = Numberonegenreminuszero ( BONFERRONI )
  /PRINT = DESCRIPTIVE ETASQ
  /CRITERIA = ALPHA(.05)
  /DESIGN = Numberonegenreminuszero .
```

Univariate Analysis of Variance

```
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exporting\FullDATAillegitimateworkstatusremoved.sav
```

Between-Subjects Factors

		Value Label	N
Numberonege nreminuszeri	1.00	action	295
	2.00	adventure	33
	3.00	strategy	62
	4.00	simulation	41
	5.00	mmorpg	181

Descriptive Statistics

Dependent Variable: Problem Video Game Playing total score

Numberonege	Mean	Std. Deviation	N
action	4.06	2.137	295
adventure	3.79	1.691	33
strategy	4.19	2.071	62
simulation	3.49	2.215	41
mmorpg	4.69	2.298	181
Total	4.21	2.185	612

Tests of Between-Subjects Effects

Dependent Variable: Problem Video Game Playing total score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	75.928[a]	4	18.982	4.054	.003	.026
Intercept	5126.177	1	5126.177	1094.809	.000	.643
Numberonegenr eminuszero	75.928	4	18.982	4.054	.003	.026
Error	2842.131	607	4.682			
Total	13744.000	612				
Corrected Total	2918.059	611				

a. R Squared = .026 (Adjusted R Squared = .020)

Post Hoc Tests

Numberonegenreminuszeri

Multiple Comparisons

Dependent Variable: Problem Video Game Playing total score

Bonferroni

(I) Numberonegenreminuszeri	(J) Numberonegenreminuszeri	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
action	adventure	.27	.397	1.000	-.85	1.39
	strategy	-.14	.302	1.000	-.99	.72
	simulation	.57	.361	1.000	-.45	1.59
	mmorpg	-.63*	.204	.020	-1.21	-.06
adventure	action	-.27	.397	1.000	-1.39	.85
	strategy	-.41	.466	1.000	-1.72	.91
	simulation	.30	.506	1.000	-1.13	1.73
	mmorpg	-.90	.410	.279	-2.06	.25
strategy	action	.14	.302	1.000	-.72	.99
	adventure	.41	.466	1.000	-.91	1.72
	simulation	.71	.436	1.000	-.52	1.93
	mmorpg	-.50	.318	1.000	-1.39	.40
simulation	action	-.57	.361	1.000	-1.59	.45
	adventure	-.30	.506	1.000	-1.73	1.13
	strategy	-.71	.436	1.000	-1.93	.52
	mmorpg	-1.20*	.374	.014	-2.26	-.15
mmorpg	action	.63*	.204	.020	.06	1.21
	adventure	.90	.410	.279	-.25	2.06
	strategy	.50	.318	1.000	-.40	1.39
	simulation	1.20*	.374	.014	.15	2.26

Based on observed means.

*. The mean difference is significant at the .05 level.

```
UNIANOVA
  Averageweeklyhoursofplay  BY Numberonegenreminuszero
  /METHOD = SSTYPE(3)
  /INTERCEPT = INCLUDE
  /POSTHOC = Numberonegenreminuszero ( BONFERRONI )
  /PRINT = DESCRIPTIVE ETASQ
  /CRITERIA = ALPHA(.05)
  /DESIGN = Numberonegenreminuszero .
```

Univariate Analysis of Variance

```
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exporting\FullDATAillegitimateworkstatusremoved.sav
```

Between-Subjects Factors

		Value Label	N
Numberonegenreminuszeri	1.00	action	295
	2.00	adventure	33
	3.00	strategy	62
	4.00	simulation	41
	5.00	mmorpg	181

Descriptive Statistics

Dependent Variable: Average hours of play per week

Numberonege	Mean	Std. Deviation	N
action	21.324	14.3676	295
adventure	14.030	9.1292	33
strategy	19.169	12.3404	62
simulation	12.476	9.0705	41
mmorpg	34.166	19.3266	181
Total	23.917	16.8830	612

Tests of Between-Subjects Effects

Dependent Variable: Average hours of play per week

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	30985.804[a]	4	7746.451	32.843	.000	.178
Intercept	128350.769	1	128350.769	544.170	.000	.473
Numberonegenreminuszero	30985.804	4	7746.451	32.843	.000	.178
Error	143170.279	607	235.865			
Total	524248.250	612				
Corrected Total	174156.083	611				

a. R Squared = .178 (Adjusted R Squared = .173)

Post Hoc Tests

Numberonegenreminuszeri

Multiple Comparisons

Dependent Variable: Average hours of play per week

Bonferroni

(I) Numberonegenreminuszeri	(J) Numberonegenreminuszeri	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
action	adventure	7.293	2.8190	.099	-.649	15.236
	strategy	2.154	2.1457	1.000	-3.891	8.199
	simulation	8.848*	2.5598	.006	1.636	16.060
	mmorpg	-12.842*	1.4501	.000	-16.927	-8.757
adventure	action	-7.293	2.8190	.099	-15.236	.649
	strategy	-5.139	3.3093	1.000	-14.463	4.184
	simulation	1.555	3.5917	1.000	-8.564	11.674
	mmorpg	-20.135*	2.9070	.000	-28.325	-11.945
strategy	action	-2.154	2.1457	1.000	-8.199	3.891
	adventure	5.139	3.3093	1.000	-4.184	14.463
	simulation	6.694	3.0915	.308	-2.016	15.403
	mmorpg	-14.996*	2.2600	.000	-21.363	-8.629
simulation	action	-8.848*	2.5598	.006	-16.060	-1.636
	adventure	-1.555	3.5917	1.000	-11.674	8.564
	strategy	-6.694	3.0915	.308	-15.403	2.016
	mmorpg	-21.690*	2.6563	.000	-29.174	-14.206
mmorpg	action	12.842*	1.4501	.000	8.757	16.927
	adventure	20.135*	2.9070	.000	11.945	28.325
	strategy	14.996*	2.2600	.000	8.629	21.363
	simulation	21.690*	2.6563	.000	14.206	29.174

Based on observed means.

*. The mean difference is significant at the .05 level.

```
UNIANOVA
  Age  BY Numberonegenreminuszero
  /METHOD = SSTYPE(3)
  /INTERCEPT = INCLUDE
  /POSTHOC = Numberonegenreminuszero ( BONFERRONI )
  /PRINT = DESCRIPTIVE ETASQ
  /CRITERIA = ALPHA(.05)
  /DESIGN = Numberonegenreminuszero .
```

Univariate Analysis of Variance

```
[DataSet1] E:\data
exporting\FullDATAillegitimateworkstatusremoved.sav
```

Between-Subjects Factors

		Value Label	N
Numberonegenreminuszeri	1.00	action	295
	2.00	adventure	33
	3.00	strategy	62
	4.00	simulation	41
	5.00	mmorpg	181

Descriptive Statistics

Dependent Variable: Age

Numberonege	Mean	Std. Deviation	N
action	22.72	6.107	295
adventure	22.82	6.272	33
strategy	23.32	6.662	62
simulation	24.63	6.895	41
mmorpg	25.76	7.311	181
Total	23.81	6.717	612

Tests of Between-Subjects Effects

Dependent Variable: Age

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1114.658[a]	4	278.665	6.394	.000	.040
Intercept	178334.571	1	178334.571	4091.765	.000	.871
Numberonegenreminuszero	1114.658	4	278.665	6.394	.000	.040
Error	26455.355	607	43.584			
Total	374536.000	612				
Corrected Total	27570.013	611				

a. R Squared = .040 (Adjusted R Squared = .034)

Correlation Matrix

Correlation Matrix is attached on the following A3 page.