ADOLESCENT PROBLEM GAMBLING: RELATIONSHIP WITH AFFECT REGULATION, INTERNET ADDICTION, AND PROBLEMATIC VIDEO GAME PLAYING

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Abstract

Adolescent Problem Gambling: Relationship with Affect regulation, Internet Addiction, and Problematic Video Game Playing

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The purpose of the present study was to examine the links among addiction-related behaviours (specifically problem gambling, internet misuse, and problematic video/computer game addiction) as well as to examine the relationship between these addiction-related behaviours and affect regulation abilities in samples of both community (N = 605) and clinical (N = 201) adolescents. Emotional intelligence was measured using the youth version of the *Emotional Quotient Inventory* (*EQ-i:YV*; Bar-On & Parker, 2000), alexithymia was measured using the *20 item Toronto Alexithymia Scale* (*TAS-20*; Bagby et al., 1994), and the addiction-related behaviors were assessed using the *Internet Addiction Questionnaire* (*IADQ*; Young, 1998), the *Problem Video Game Playing Scale* (*PVGS*; Salguero & Moran, 2002), and the *South Oaks Gambling Screen-Revised for Adolescents* (*SOGS-RA*; Winters, Stinchfield, & Fulkerson, 1993). The present study provided preliminary evidence suggesting that addiction-related behaviours including problematic video game playing, internet addiction, and problem gambling can be accounted for by an underlying dysfunctional preoccupation variable, and that affect regulation is a significant predictor of dysfunctional preoccupation.

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Table of Contents

List of Tables

List of Figures

List of Appendices

Research has consistently shown that individuals with low affect regulation abilities are at risk for a number of negative outcomes, including problematic gambling behaviour among adults (Coman, Burrows & Evans, 1997; Lumley & Roby, 1995; Parker, Wood, Bond, and Shaughnessy, 2005; Taylor, Bagby, & Parker, 1997). There is also evidence that adolescent problem gambling may be part of a constellation of addiction-related behaviours that include internet misuse and problematic video/computer game playing, and that, collectively, these behaviours are a growing problem. Despite evidence that gambling among adolescents has increased over the past two decades (Langhinrichsen-Rohling, Rhode, Seeley, & Rohling, 2004; Messerlian, Derevensky, & Gupta, 2005), the relationship between social and emotional competency and addiction-related behaviours has not been investigated among adolescents. The adolescent problem gambling literature is further limited by its focus on community-based samples, rather than clinical groups. Studies with adults have found individuals with mental health problems may be at increased risk of developing gambling-related problems. The goal of present thesis is to address some of the limitations in the current literature by examining the link among addiction-related behaviours (specifically problem gambling, internet misuse, and problematic video/computer game addiction) as well as to examine the relationship between these addiction-related behaviours and affect regulation abilities in samples of both community and clinical adolescents.

Adolescent Gambling

The DSM-IV-TR (American Psychiatric Association, 2000) classifies pathological gambling as an Impulse Control Disorder, a diagnostic category that also

includes intermittent explosive disorder, kleptomania, pyromania, and trichotillamania. Impulse control disorders share the common characteristic of impulse dysregulation, which is an inability to resist an impulse that is usually considered to be irrational or harmful. The DSM-IV-TR defines pathological gambling as maladaptive gambling behaviour characterized by a preoccupation with gambling, a desire to gamble with increasingly large sums of money, unsuccessful attempts to gain control of gambling behaviour, negative symptoms when attempting to stop gambling, and attempts to conceal gambling involvement and consequences from others. Pathological gambling precludes gambling as a result of mania.

Although gambling is commonly viewed as a relatively innocuous form of entertainment for adults (Messerlian, Derevensky, & Gupta, 2005), there is widespread consensus amongst researchers that adolescent gambling has become a growing social problem (Derevensky, Gupta, & Winters, 2003). There is growing evidence that adolescent involvement in gambling activities has increased substantially during the past two decades. After reviewing 20 independent studies, Jacobs (2000) concluded that between 1984 and 1999 there was a strong increase in the proportion of adolescents in North America who reported gambling in the past year: 45% of adolescents in 1984 reported participating in gambling activities in the previous 12 months; by 1999 this percentage has risen to 66%. The increase in adolescent gambling participation coincides with increased reports of adolescents experiencing negative outcomes as a result of gambling (Hardoon & Derevensky, 2002; Jacobs, 2000).

Research in Canada and the United States has suggested that approximately 60-80% of adolescents have participated in some form of gambling in their lifetime (Felsher,

Derevensky, & Gupta, 2004; Huang & Boyer, 2007; Messerlian et al., 2005). Gupta and Derevensky (1998), for example asked 817 Canadian adolescents (417 Males and 400 Females), 12 to 17 years of age from English speaking schools in the Montreal area to complete measures. They found that 80.2% of the total adolescent sample reported that they had gambled in the past year; 31.5% reported participating in gambling activities at least once per week. Of particular concern to the researchers was the finding that, among both male and female participants, rates of regular gambling participation (at least once per week) surpassed those for regular alcohol use, regular use of illegal drugs, and regular cigarette smoking. These results suggest that gambling is not only a common activity among adolescents, but that it may be the most frequent addiction-related behaviour in which adolescents participate. This result is not particularly surprising, since gambling is one of the few addiction-related behaviours adolescents are regularly exposed to that is not accompanied by negative parental and social attitudes, as well as widespread efforts to increase awareness and prevention of abuse (Gupta & Derevensky, 1998).

Wiebe (2003) examined the gambling perceptions of 1,403 (50% female) children and adolescents between the ages of 9 and 16 years. Alarmingly, almost 25% of the sample reported that they believed betting was "cool". Approximately 30% of the sample reported that gambling was fun, 78% reported receiving messages from the media promoting gambling, while only 12% reported receiving messages of responsible gambling from the media.

There is considerable evidence that adolescents participate in both legal and non-legal forms of gambling (Griffiths & Wood, 2001; Jacobs, 2000). While the majority of gambling activities are legally limited to individuals over the age of 18 years (although

the legal age depends on location), adolescents frequently report gaining access to these venues, such as participating in online forms of gambling (e.g. online casinos and poker tournaments). Lotteries have also become increasingly socially acceptable and accessible. Adolescents frequently report that adults, including parents and other adult relatives, purchase lottery tickets for them (Griffiths & Wood, 2000). Adolescents also participate in gambling activities that do not violate any specific laws by organizing card games, sports pools, and betting on games of skill (Gupta, Derevensky, & Ellenbogen, 2006). In general, the specific choice of gambling activity is primarily based on availability and accessibility (Griffiths & Wood, 2000; Ladouceur, Dube, & Bujold, 1994).

In a review of existing research, Jacobs (2000) reported that the most common forms of gambling reported by adolescents are: 1. bets placed on cards, dice, and board games with family and friends; 2. bets placed on games of personal skill with peers: 3. sports betting with peers; and 4. bingo. More recently, Felsher et al. (2004) surveyed 1,072 adolescents (521 Males and 551 Females), 10 to 18 years of age from various schools in Ontario. Of those who reported gambling for money, 44% reported placing bets on card games, 40% reported playing scratch or lottery draw tickets, 31% reported playing bingo, and 13% reported playing sport lottery tickets. The majority of the adolescents (65%) reported that despite legal restriction on lottery ticket purchases they found it relatively easy to acquire tickets from local stores.

Research has also demonstrated significant gender differences in choice of gambling activity among adolescents. Gupta and Derevensky (1998), for example, observed that for females the most popular activities included lottery, cards, and bingo; for males, on the other hand, the most popular activities included cards, sports lottery

tickets, sports pools and the lottery. Overall cards, lottery, bingo, sports pools, electronic gambling devices, sports lottery tickets, and games of skill were the most popular activities that participants reported engaging in over the past 12 months. In general, females have been found to prefer games of chance, while males prefer games requiring skill or knowledge (Jacobs, 2000).

Adolescent Problem/Pathological Gambling

Gambling involvement can be conceptualized as a continuum that ranges from little or no involvement in gambling activities to excessive and problem gambling. Although the majority of adolescents who gamble appear to act responsibly (Gupta, Derevensky, & Marget, 2004), some adolescents (as with adults) develop serious gambling problems. Adolescent problem/pathological gambling has been found to be associated with negative economic, academic, and social outcomes (Stitt, Giacopassi, & Vandiver, 2000; Griffiths & Wood, 2000; Messerlian, Derevensky, & Gupta, 2005). Many of these negative consequences are similar to those experienced by adults. Like adult problem gamblers, as adolescents become preoccupied with gambling, invest increasingly large amounts of money, and accumulate debt and related financial problems (Gupta et al., 2004). As a result, many adolescents borrow money from family and peers, spend lunch money, and resort to criminal behaviour to finance gambling activities (Ellenbogen, Gupta, & Derevensky, 2007; Griffiths & Wood, 2000; Gupta & Derevensky, 1998; Jacobs, 2000). Unlike adults, however, the majority of adolescents are not financially independent, and therefore have access to limited financial resources. This reality may actually protect the adolescent from accumulating the type of serious debt

that can face adult gamblers; it suggests that a central problem associated with adolescent gambling may be the excessive amount of time spent on gambling activities. For example, if a group of adolescents play poker for nickels, or bet lunch money on video games, they face quite limited financial repercussions. The escalation of time devoted to gambling activities, however, may negatively impact social and familial relationships, as well as produce unfavorable educational outcomes (Ladouceur et al., 1994; Messerlian et al., 2005). For instance, adolescent problem gambling has been found to be associated with poor academic performance, truancy, and dropping out of school (Ladouceur et al, 1994). These academic consequences can have far reaching implications for future educational and employment opportunities.

Prevalence of Adolescent Problem Gambling

Some researchers have suggested that the prevalence of problem/pathological gambling among adolescents may exceed those found with adults. Studies have suggested that problem gambling rates in adolescents may be up to double the levels reported in adults (Dickson, Derevensky, & Gupta, 2004; Griffiths & Wood, 2000; Hardoon & Derevensky, 2002; Stitt, Giacopassi, & Vandiver, 2000). For example, estimates of adult pathological gambling prevalence range from 1 to 3% of the general population (Coman, Burrows, & Evans, 1997), while as many as 4 to 9% of the adolescent population is considered to be pathological gamblers (Dickson et al., 2004; Hardoon & Derevensky, 2002; Ladouceur, Ferland, Poulin, Vitaro, & Wiebe, 2005). Furthermore, it has been estimated that another 10 to 15% of adolescents gamble excessively, leaving them vulnerable to the development of gambling problems (Dickson et al., 2004; Hardoon & Derevensky, 2002).

Not only has research suggested that there are alarmingly higher rates of problem gambling among adolescent samples, it has been reported that adults are more likely to seek treatment for problem gambling compared to adolescents (Derevensky et al., 2003). In addition, teachers and parents tend to not see gambling as a serious problem in adolescents; not surprisingly, few adolescents seek treatment specifically for gambling problems (Ladouceur et al., 2005).

It is important to note that some researchers have questioned the validity of the high reported prevalence rates for problem gambling in adolescents (Derevensky et al., 2003). Derevensky et al. (2003), for example, postulate that problems surrounding measurement may be responsible for the inflated rates of pathological gambling in adolescents. Researchers have utilized a wide variety of measures (including adult measures modified for use with adolescent samples) and cut-off scores to measure adolescent gambling problems. Instruments like the SOGS-RA (Ladouceur et al., 2000) have been shown to have a high rate of false positives. It has also been suggested that adolescents may fail to understand questionnaire items or may have a bias for preset responses (Derevensky et al., 2003). This issue is exacerbated by the varied use of terminology to describe adolescent gambling problems. For example although the DSM-IV-TR (American Psychiatric Association, 2004) uses the term "pathological gambling", the available literature includes terms such as excessive gambling, compulsive gambling, problem gambling, gambling addiction, at-risk gambling, and disordered gambling (Blaszczynki & Nower, 2002; Derevensky et al., 2003). Despite the debate surrounding prevalence rates it is widely agreed that adolescent gambling is a serious problem and that adolescents may be the segment of the population at the highest risk of developing a

gambling problem (Cunnigham-Williams & Cottler, 2001; Derevensky et al., 2003; Gupta & Derevensky, 2000; Shaffer & Hall, 2001).

In an attempt to overcome some of these limitations of prior research, Shaffer and Hall (2001) conducted on a metaanalysis to integrate prevalence rates reported in North American gambling studies over the past 25 years. The results supported those of the prior research, but led to some confusion regarding the difference between lifetime and past-year prevalence of disordered gambling. Reports of lifetime prevalence of subclinical or problem gambling and pathological gambling among adolescents were 8.4% and 3.4% respectively. Consistent with prior research, these numbers are approximately double those reported by adults (4.2% and 1.9% respectively). The past year prevalence estimates were considerably higher than the lifetime prevalence estimate: 14.6% for subclinical or problem gambling and 4.8% for pathological gambling. Once again, these numbers were more than double those reported by adult samples (2.5% and 1.5% respectively

More recently, Huang and Boyer (2007) used data from the *Canadian Community Health Survey: Mental Health and Well Being* to examine the impact of gender and geographical region on the prevalence of problem gambling among youth between the ages of 15 and 24 years of age. The 5,666 respondents completed the Canadian Problem Gambling Index (CPGI), a nine item measure that assessed problem gambling and its negative consequences over the past 12 months. This study found that 61.45% of Canadian youth reported gambling in the past 12 months. Consistent with prior reports that adolescents represent the highest risk group for gambling problems, there was a significantly higher proportion of non-gamblers (38.7% vs. 21.4%) combined with a

significantly lower proportion of non-problem gamblers (55.6% vs. 74.1%) among adolescents than adults. Furthermore, youth were found to have higher prevalence of low-risk gambling (3.6%, compared to 2.7%) and moderate-risk/problem gambling (2.2% compared to 1.9%) than adults, although this difference was not statistically significant. This pattern of results held across the five geographical regions in Canada (British Columbia, Prairies, Ontario, Quebec, and Atlantic provinces). Overall, 35% of the Canadian youth were classified as non-gamblers, 53% were classified as non-problem gamblers, 5% were classified as low-risk gambler, and 3% were classified as moderate risk or problem gamblers. The prevalence of moderate risk or problem gambling was lowest in British Columbia (1.37%) and highest in Ontario (2.75%). This result indicates that gambling prevalence differs by geographic location and may, in part, account for the varied prevalence estimates of adolescent problem gambling. Overall, males were found to gamble significantly more than females. In addition males were found to have considerably higher (two to three times that of females) prevalence of low risk and moderate risk to problem gambling in the past year. These prevalence rates of problem gambling among adolescents are much lower than those reported in some of the previous research, including that of Shaffer and Hall (2001). Unfortunately, because the CPGI was the sole measure of gambling behaviours employed in this study, it is difficult to accurately compare these results with those of prior research. In addition, the authors caution that although the CPGI has good psychometric properties in adult samples it was not developed for use with adolescent samples.

Gender differences in adolescent gambling participation are a well documented finding (Shaffer et al., 2004). Adolescent gambling is often considered to be a primarily

male problem (Griffiths & Wood, 2000). For example, in a sample of 1,072 Canadian adolescents between 10 and 18 years of age, Felshner et al. (2004) found that significantly more males (31%) reported gambling once a week or more than females (12%). Research with adolescents and adults has consistently shown that males begin gambling at an earlier age, invest more time and money in gambling activities, and experience more problems as a result of their gambling behaviours (Jacobs, 2000; Langhinrichson-Rohling, Rhode, Seeley, & Rohling, 2004). This pattern of behaviour may be particularly true in adolescent samples, as research suggests that females start to gamble at a later age (mid 20-30s), and may be more likely to use gambling as a way to regulate anxiety, stress, loneliness and boredom (Coman et al., 1997).

Comorbidity Issues Among Adolescent Problem Gamblers

Although pathological gambling is considered to be a distinct psychological disorder, it frequently co-occurs with other mental health problems (Barnes, Welte, Hoffman, & Dintcheff, 2005). Given the nature of problem gambling, it is not surprising that individuals identified as pathological gamblers frequently report other impulse control related problems, including compulsive buying and sexual addiction (Black & Moyer, 1998; Burton, Netemeyer, & Andrews, 2000), as well as the abuse of substances such as alcohol, nicotine, and marijuana (Baines, Welte, Hoffman, & Dintcheff, 2005; Black & Moyer, 1998; Burton, Netemeyer, & Andrews, 2000; Cunningham-Williams et al., 2005; Jacobs, 2000; Shaffer et al., 2004).

Among adults seeking treatment for a gambling problem, up to 75% have also been found to meet the diagnostic criteria for mood and eating disorders (Comanet al., 1997; Chambers & Potenza, 2003; Black & Moyer, 1998). Adolescent problem gambling

is frequently associated with both depression and suicide (Griffiths & Wood, 2000; Messerlian et al., 2005). Ladouceur, Dube, and Bujold (1994) examined the relationship between pathological gambling and suicide attempts among 1,471 students (56% female) 16 to 23 years of age in Quebec. The participants were classified as pathological gamblers, potential pathological gamblers, and those with no gambling problems using the SOGS (Winters et al., 1993). Problem gambling behaviour was found to have a significant positive correlation with excessive eating, bulimic tendencies, and anorexia among both men and women. The results also showed that 7.2% of the no gambling problem group and 8.2% of the potential pathological gambling group had attempted suicide. Of particular concern was the finding that 28.8% of the pathological gambling group reported that they had attempted suicide. Pathological gambling has also been shown to have high rates of co-morbidity with anxiety disorders including phobias and panic disorder (Cunningham-Williams et al., 2005; Black & Moyer & 1998), and schizophrenia (Cunningham-Williams et al., 2005; Chambers & Potenza, 2003).

Attention-deficit hyperactivity disorder has also been linked to problem gambling among university students. Wood, Taylor, and Parker (2006), for example examined the link between current ADHD symptomatology and gambling behaviours. The SOGS and the Conners Adult ADHD Rating Scale (Conners et al., 1999) were completed by 1,189 (247 Men, 939 Women, and 3 unreported gender) students from a small Ontario university. The participants were classified as non-problem gamblers, problem gamblers, or pathological gamblers based on their SOGS scores. Pathological gamblers were found to score significantly higher than the other two groups on all ADHD scales (inattention, hyperactivity/impulsivity, and total).

Adolescent Gambling and Dysfunctional Preoccupation

Our understanding of adolescent gambling behaviour may be obscured by its relationship with other activities, including video/computer game and internet use. Over the past 20 years many recreational activities have undergone a drastic transformation. The visual and aural capabilities of computers and video games have become increasingly sophisticated, and the accessibility of the internet has created a new forum for both gambling and gaming. As a result, individuals under the age of 18 years are now able to gain access to gambling activities with relative ease. The popularity of multi-player interactive games (on the internet and on home consoles) also provides adolescents with opportunities to gamble. For example, if a group of adolescents spend a day playing an online interactive computer game with the "loser" buying the rest of the group pizza, should this be considered gambling, gaming, or internet behaviour? There is empirical evidence indicating a relationship between addiction-related recreational behaviours including problem gambling, internet abuse, and video/computer game abuse, and that these behaviours are an increasing problem among adolescents (Griffiths & Wood, 2000; Parker, Taylor, Eastabrook, Schell, & Wood, 2008; Praterelli & Brown, 1999). For example, in a study conducted by Mitchell, Becker-Blease, and Finkelhor (2005) 15% of individuals classified as having an internet addiction were involved with online gambling and game playing. The observed relationships between gambling, video games playing, and internet use suggests that they may be part of a general "dysfunctional preoccupation" dimension. This hypothesis has been supported by recent research conducted by Parker, Taylor, Eastaborrke, Schell, and Wood (2008), which provided empirical evidence that several potentially addictive variables, including gambling,

gaming, and internet use, can be accounted for by a single latent variable. A sample of 667 Ontario adolescents (249 males and 418 females), 13 to 18 years of age, completed the Internet Addiction Questionnaire (IADQ; Young, 1998), the Problem Video Game Playing Scale (PVGS; Salguero & Moran, 2002), and the South Oaks Gambling Screen Revised for use with adolescents (SOGS-RA; Winter, Stinchfield, & Fulkerson, 1993). The sample was divided into two age-groups; 13 to 15 year olds and 16 to 18 year olds. The younger group included 209 participants (80 boys and 129 girls) with a mean age of 14.47 years (SD = 0.92). The older group included 458 participants (169 boys, 289 girls) with a mean age of 16.98 years (SD = 0.83). Consistent with the research outlined above, the correlations between the various addiction-related behaviours were all significant and of moderate magnitude. The use of principal components analysis enabled the researchers to show that the dysfunctional preoccupation variable explained 53% of the variance in the addiction related behaviours for the younger adolescents, and 59% of the variance in older adolescents.

In adolescent populations the financial implications of these behavioural addictions may be less important than in adult populations. With more limited financial resources and gambling opportunities, the central problem for adolescents may relate to the large amounts of time being devoted to gambling-related behaviours. The escalation in the time commitment involved with dysfunctional preoccupations may have a considerable negative impact on factors as diverse as the quality of social relationships and academic performance. In addition, because excessive gambling, gaming and internet use are typically treated as separate mental health issues, with unique etiologies, the

existence of a general dysfunctional preoccupation dimension has important implications for the prevention and treatment of these problematic behaviours.

Problematic Video Game Playing

Although the majority of the research on video/computer games has focused on the older (1980s) style games, which have been shown to be associated with a relatively small risk for addiction (Phillips, Rolls, Rouse, & Griffiths, 1995), there is evidence that the newer style (post-1980s) video/computer games carry a greater potential for addiction (Griffiths & Wood, 2000). Since the 1990s video game graphics and sound effects have become increasingly realistic and stimulating, and the games themselves require more skill (Phillips et al., 1995). As such, it is not surprising that research has shown that since the 1980s there has been an increase in the frequency and duration of adolescent video/computer game playing (Salguero & Moran, 2002).

The DSM-IV-TR (2004) does not provide a diagnostic category for problematic video game playing, and no validated diagnostic criteria are available. However, research conducted with adolescent samples suggests that some cases of problematic video game playing resemble dependence (Salguero & Moran, 2002). It is also important to note that the prevalence of problematic video game playing is in dispute. While some researchers assert that video game playing represents a problem in only a small number of players, other researchers have suggested that 10 to 15% of players display signs of addiction (Salguero & Moran, 2002)

Phillips et al. (1995) attempted to identify normal and abnormal video game playing behaviour among a sample of 868 (429 Male and 387 Female) 11 to 16 year olds. Of the total sample, 77.2% reported playing video games. Overall, males were more

likely to play video games, and spent more time playing than females. It was found that 7.5% of the sample provided responses indicative of behavioural addiction. These participants reported playing video games six or more days each week, for one hour or more at a time, for longer than they had intended, and reported neglecting school work to play. Of the total sample, 34% reported playing to "pass the time", 12.1% to "avoid doing other things", and 12.2% to "cheer oneself up". Individuals identified as displaying symptoms of behavioural addiction were significantly more likely than other participants to report "feeling better after playing". Males were significantly more likely to display symptoms of video game addiction than females.

Excessive adolescent video/computer game playing has been linked to a number of negative outcomes that mirror those associated with adolescent problem gambling, including antisocial behaviour (Griffiths & Wood, 2000), poor academic achievement, and the deterioration of social relationships (Phillips et al., 1995). Some researchers consider video-game playing to be a non-financial form of gambling, in which the goal is to continue the game as long as possible in order to maximize the accumulation of points. This is not surprising based on the similarities between video/computer games and many forms of electronic gambling (i.e. online poker and slot machines). Both involve "responses that are predictable and governed by software, provide rapid aural and visual rewards for desired responses, display scores for desired responses, and employ similar reinforcement schedules" (Griffiths & Wood, 2000, p. 210).

Research has shown that adolescents who engage in gambling activities are more likely to play video games. Wood, Gupta, Derevensky, and Griffiths (2004) studied the relationship between video games and gambling among 995 (441 Male, 549 Female, and

6 Unreported Gender) students in grades 7 to 11 at several English speaking schools in Quebec. These students completed measures of video game and gambling activities and the results indicated that video game playing was more common than gambling among the adolescents. The majority of adolescents (80.9%) reported playing video games at least once per week, and 90.3% owned their own console. In contrast, 58.8% of adolescents reported gambling once per week. Of the total sample 6.6% (49 Male and 15 Female) were identified as probable pathological gamblers. This number is consistent with the prevalence rates reported in other studies. Regular gamblers (those who gambled once per week or more) were significantly more likely to report regular video game playing than non-regular gamblers. A moderate positive correlation was also found between the number of hours spent each week playing video games and the severity of gambling problems, suggesting that spending more time playing video games is associated with the severity of gambling problems.

Problematic Internet Use

Since the explosion of the internet in the 1990s there has been an exponential increase in the number of both applications and users. Computers and the internet have now become a powerful influence in the daily lives of many adolescents; recent Canadian research has shown that over 90% of adolescents use the internet regularly (Willoughby, 2008). The widespread availability and use of the internet provides many benefits; the internet also has a downside and some researchers have examined the potential impact on mental health (Iften & Roberts, 2004; Ko, Chen, Chen, & Yen, 2005; Morahan-Martin & Schumacher, 2000; Yang, 2001). Although the majority of users suffer no negative consequences, research suggests that there is an identifiable group for which the internet

represents a significant problem. Like problematic video game playing, internet addiction is not a formally recognized disorder in the DSM-IV-TR (American Psychiatric Association, 2000). Consequently, there are no standardized diagnostic criteria or accepted terms for problematic internet use. It is generally agreed that excessive use alone is not indicative of a problem (Caplan, 2005, Johansson & Gotestam, 2004). Only when excessive use is associated with loss of control and negative outcomes does internet use become a problem (Morahan-Martin & Schumacher, 2000).

Attempts to define and measure problematic internet use have primarily relied on the DSM-IV (American Psychiatric Association, 2000) criteria for substance abuse and pathological gambling (Johansson & Gotestam, 2004; Kaltiala-Heino, Lintonen, & Rimpela, 2004; Yang, 2001). Because the suitability of the substance abuse/addiction paradigm for behavioural addictions is controversial (Johansson & Gotestam, 2004; Ko et al., 2005), and internet abuse is generally considered to be related to poor impulse control (Mitchell, Becker-Blease, & Finkelhor, 2005), problematic internet use may be better conceptualized as an impulse control disorder (Morahan-Martin, 2005). Alternatively, some researchers have suggested that problematic internet use does not represent a distinct diagnostic category and that it may simply be a symptom of other disorders (Morahan-Martin, 2005). From this perspective problematic use of the internet is viewed as a new manifestation of an old behaviour. The individual is not considered to be "addicted" to the internet per se; the problem is the specific applications, or set of applications, that are accessed using the internet. Possible problem categories of problematic internet use include excessive use of pornography, infidelity, online interactions and chatting, gambling, gaming, and role playing. The internet can also be

used to engage in criminal behaviours, including sexual exploitation and abuse, harassment, fraud, and stealing (Mitchell, Becker-Blease, & Finkelhor, 2005). Adolescents who report problematic internet use have been found to spend more time using the internet for chat rooms, multi-user domains, and multiplayer online games compared to individuals who do not report problems associated with internet use (Caplan, 2005; Griffiths & Wood, 2000; Morahan-Martin, 2005).

Problematic use of the internet has been found to be associated with a number of psychological disorders, including sexual dysfunction, compulsive shopping, attention-deficit hyperactivity disorder (Morahan-Martin, 2005) depression, (Caplan, 2005; Kim, et al, 2006; Morahan-Martin & Schumacher, 2005; Yang, 2001), bipolar disorder (Morahan-Martin & Schumacher, 2005), and anxiety disorders (Yang, 2001). It is important to note that the causal relationship between problematic internet use and other psychological disorders is not well understood. Morahan-Martin (2005) suggests that this relationship is likely bidirectional. In addition, problematic use of the internet has also been shown to lead to negative outcomes similar to those associated with problem gambling and problematic video game playing, including the deterioration of social relationships (e.g. family and peer conflict), a decline in physical health (Young, 1998), and poor academic performance (Caplan, 2005; Johansson & Gotestam, 2004; Yang, 2001).

Empirical evidence for gender differences in computer and internet use has been inconsistent. Studies conducted with British (Madell & Muncer, 2004) and Israeli (Nachamias, Mioduser, & Shelma, 2000) children and adolescents, and Romanian (Durndell & Haag, 2002) and American (Schumacher & Morahan-Martin, 2001) post-

seconadary students have indicated that males use the internet more frequently than females. In contrast, studies conducted by Odell, Kogen, Schumacher, and Delucchi (2000), Kim et al., (2006) and Jackson, Ervin, Gardner, and Schmitt (2001) have found no gender differences.

To date few studies have been conducted to determine the prevalence of problematic internet use among adolescents, and the research that is available was not conducted with North American samples. In Asia, where internet addiction is considered to be a serious health concern, research (conducted in South Korea and China) has indicated prevalence rates ranging from 2.1% to 13.7% (Block, 2008). Johansson and Gotestam (2004) used Young's Diagnostic Questionnaire (Young, 1998) to asses the pattern of internet use among 3,237 12 to 18 year olds in Norway. On average, these adolescents reported spending an average of 4.3 hours each week on the internet. Overall, 2% of the adolescents were found to display internet addiction, and 8.7% were considered to be at risk of developing internet addiction. If these categories are combined, 10.7% of adolescents in the sample displayed problematic use of the internet. Boys were found to have more internet related problems than girls.

Using data from a Finnish study of adolescent health and health behaviours, Kaltiala-Heino et al. (2004) also examined the prevalence of problematic internet use among 12 to 18 year olds, but examined these rates among daily or occasional internet users separately. Overall, 85% of the sample used the internet; 26% of the sample used the internet daily. Among the occasional users 0.5% of the girls and 0.3% of the boys reported symptoms indicative of internet addiction. Among the daily users the prevalence

of internet addiction was much higher: 4.7% of the girls and 4.6% of the boys reported symptoms indicative of internet addictions.

Morahan-Martin and Schmacher (2000) examined problematic internet use among 277 (150 Male and 127 Female) American undergraduate students. Their results indicated that 8.1% of the participants reported four or more negative symptoms associated with internet use, indicating problematic internet use. In this sample males were found to suffer more negative consequences as a result of their internet use, and females were more likely to report no negative symptoms. It is important to note that the participants in this study were university students. As such, it is likely this prevalence rate exceeds levels that would be found in adolescents, since university students are more likely to have access to the internet, be required to use it to complete academic work, and have more free time and less supervision, they may be a greater risk of internet related problems than adolescents. However, of particular relevance to the present study was the finding that individuals who reported problematic internet use were more likely to use the internet for social support, relaxation, playing games, and gambling than individuals who did not report internet related problems.

Internet gambling is now widely accessible with more than 2,500 gambling websites available online (Stewart, 2006). As previously mentioned, the internet has created new ways for adolescents to gain access to gambling activities. Although gambling remains illegal to adolescents under the age of 18 years, many of the gambling sites that adolescents access are operated from outside Canada where authorities have little control. Wiebe (2003) demonstrated that of 1403 Canadian adolescents, between 11 and 16 years of age, 10% reported having placed bets online. Unfortunately very few

studies have been conducted that specifically look at the prevalence and impacts of internet gambling in adolescent samples.

Although video and computer game use is not a new activity for adolescents, the internet has taken gaming to a new level of sophistication. The internet now enables gamers to interact with other players from all over the world in real time. Studies have shown that problematic use of the internet is associated with playing online games. For example, Ko et al. (2005) employed a 26 item scale based on DSM-IV criteria for impulse control and substance abuse disorders to measure internet addiction among a sample of 12 to 19 year olds. The results indicated that internet abusers were significantly more likely to play online games, and that online games were one the most popular online activities among adolescents. In general, boys are more likely than girls to participate in online gaming (Willoughby, 2008; Yang, 2001).

Etiology of Adolescent Problem Gambling

The research literature has identified many risk factors believed to play a role in the etiology of gambling problems (Burton et al., 2000). Messerlain, Derevensky, and Gupta (2005) argue that adolescent problem gambling is best understood using an ecological approach that views problem gambling a product of relationships among societal/governmental, community, institutional, interpersonal, and intrapersonal factors. At the societal/governmental level, adolescent gambling behaviours are impacted by both federal and provincial policies and laws, as well as the enforcement of these policies. These laws and policies impact the community in many ways, including the relationships, social networks, and standards that exist between the individual and the larger

community. The community in turn largely shapes social norms, the media, available communication resources, and ultimately the availability and accessibility of gambling opportunities. At the institutional level, social institutions and their regulations determine school policies and programs, as well as the policies of industry. At the interpersonal level gambling involvement is impacted by social networks and support systems, as well as family and peer history. Intrapersonal factors are the individual characteristics that either protect the individual or place them at risk of developing a gambling problem.

Much of the research on adolescent gambling etiology has focused on the interpersonal and intrapersonal determinants of the problem. Most of these models implicate some combination of factors in the development and maintenance of gambling problems. For example, Blaszczynski and Nower (2002) have developed a conceptual model that integrates biological, personality, developmental, cognitive, learning, and environmental factors. The model includes several distinct pathways that lead to overlapping subtypes of problem gamblers. One benefit to this approach is that it acknowledges that one model cannot be applied to understand the etiology of problematic gambling among all gamblers, and that the pathways that lead to problematic gambling are not mutually exclusive. This is important as problematic gamblers often display characteristics of multiple pathways. Unfortunately little research has been conducted to empirically test this model (Turner, Zangeneh, Littman-Sharpe, 2006). Common to all of the pathways proposed by Blaszczynski and Nower (2002) are ecological factors such as the availability and accessibility of gambling opportunities, the influences of learning (i.e. observation learning, classical conditioning, and operant conditioning) and cognition, and

a pattern of increased gambling participation that leads to the development of a problematic gambling behaviour.

Social learning is a common explanation for problem gambling that involves interpersonal and intrapersonal factors. Observational learning and modeling explanations are, in part, based on research that shows that adolescent problem gamblers often report that their first gambling experiences were at home with family (Hardoon & Derevensky, 2002). Adolescent problem gamblers also frequently report that their parents gamble excessively and are aware of their gambling activities (Jacobs, 2000; Stitt et al., 2000). This suggests that some adolescents gamble as a result of social learning experiences with their parents. Alternatively, these results may reflect a genetic predisposition to gambling problems, or the adolescent's bias with regard to their parent's knowledge and behaviour. It may be that adolescents with gambling problems overestimate their parents' involvement with gambling, as well as their knowledge of their offspring's gambling involvement.

There is also considerable empirical evidence that cognitive factors play an important role in the development of problem gambling. Adolescents frequently report chasing losses and display irrational beliefs about control when gambling (Coman et al., 1997). Research has provided evidence connecting problem gambling to cognitive misconceptions about gambling (Hardoon, Baboushkin, Derevensky, & Gupta, 2001). Problem gamblers often hold false beliefs about gambling (Coman et al., 1997) and these cognitive errors help to explain why some individuals continue to gamble despite repeated failures. For example, many adolescents have reported chasing losses (Hardoon & Derevensky, 2002). Some of the false beliefs held by problem gamblers include

illusion of control and a lack of understanding about the independence of events (Hardoon & Derevensky, 2002). Moore and Ohtsuka (1999) conducted a study to evaluate the contribution of illusion of control to problem gambling behaviour. Their sample included 1,017 (435 Males and 577 Females) individuals from grades 10 to 12, as well as first year undergraduates from four campuses in Australia. Each participant completed a measure of gambling frequency, problem gambling (measured by the SOGS), and a questionnaire assessing beliefs about control. The results showed that irrational beliefs about gambling had a positive correlation with problem gambling. Young problem gamblers were more likely to believe that gambling would provide the money they need and that they could manipulate chance and beat the system. Overall, illusion of control was a strong predictor of gambling frequency and problem gambling.

Another causal pathway proposed by Blaszczynski and Nower (2002) includes an emotional and/or biological vulnerability, and is conceptually similar to the General Theory of Addictions proposed by Jacobs (1986, 1989). From this perspective, problematic gambling is seen as the result of interactions between two predisposing factors. The first is a biological vulnerability. Jacobs (1986) suggested that this biological vulnerability is a "unipolar resting state" in which the individual is chronically hypo or hyper aroused. Consistent with this perspective, heightened arousal while gambling has consistently been identified as a risk factor for pathological gambling (Hardoon & Derevensky, 2002). The second predisposing factor in this pathway is an emotional vulnerability. Jacobs (1986) believed that as a result of negative social and developmental experiences during childhood and early adolescence the individual comes to have a negative view of themselves. Blaszczynski and Nower (2002) take a broader perspective

and view this emotional vulnerability as resulting from personality (e.g. risk taking, boredom proneness), mood disturbance (e.g. depression, anxiety), and poor coping or problem solving skills (e.g. life stresses). They believe that cumulative effects of these biological and emotional vulnerabilities is the motivation of the individual to gamble in an attempt to regulate affective states and meet physiological needs.

Consistent with Jacobs' (1989) perspective, beliefs about self do appear to play a role in adolescent problem gambling. Youth with gambling problems have been found to have a lower self-image than non-problem gamblers (Dickson, Derevensky, & Gupta, 2004). This may indicate that individuals with lower self image are more likely to become problem gamblers, perhaps in an attempt to distract themselves from their negative feelings about themselves. Alternatively, this tendency to report lower self-image may be an outcome of adolescent gambling problems. The combination of negative outcomes associated with adolescent problem gambling may lead to deterioration in self image among adolescents.

There is also considerable evidence for qualitative differences in personality and behaviour between adolescents with and without gambling problems (Gupta, Derevensky, & Ellenbogen, 2006; Hardoon & Derevensky, 2002). Gupta et al., (2006) conducted a study to identify the personality characteristics associated with problem gambling with sample of 817 (Males = 417, Females = 400) adolescents from the Quebec area. Participants completed the DSM-IV-J (Fisher, 1992), in order to screen for gambling pathology, as well as the High School Personality Questionnaire (HSPQ; Cattell, Cattell, & Johns, 1984). A discriminant analysis identified lower levels of conformity and self-discipline as predictors of adolescent problem gambling. The same

study found that higher levels of disinhibition and boredom susceptibility (two variables frequently associated with sensation seeking) were found to predict adolescent problem gambling. This result is consistent with other research that has identified sensation seeking as a risk factor for problem gambling (Hardoon & Derevensky, 2002).

Several studies also provide evidence linking maladaptive stress-coping styles and adolescent problem gambling (Bergevin, Gupta, Derevensky, & Kauffman, 2006; Gupta, Derevensky, & Marget, 2004). Most researchers distinguish between task-oriented coping strategies that act on the stressor, and emotion-focused or avoidance coping strategies that are used to regulate the emotional states that emerge as a result of facing the stressor (Gupta et al., 2004). Research has shown that task-oriented coping strategies are usually associated with positive outcomes, while less solution-focused strategies (emotion-focused and avoidance coping strategies) are associated with negative outcomes, including depression, conduct problems, substance abuse problems, and problem gambling among adolescents (Bergevin et al., 2006). Gupta et al. (2004) conducted a study with 587 (220 Males and 367 Females) adolescents between 12 and 17 years of age from secondary schools in Quebec and found that problem and pathological gamblers scored higher on emotion and avoidance-oriented coping than non-gamblers and social gamblers. Bergevin et al. (2006) found similar results in a study that included 2,156 (1093 Males and 1063 Females) grade 7 to 12 students from various rural and urban high schools in Ontario. Using structural equation modeling, they found that emotion-oriented coping styles mediated the relationship between negative life experiences and severity of gambling problems, indicating that individuals who focus on their emotions rather than strategies to deal with the stressor may be at greater risk for developing gambling

problems. The apparent link between how an individual copes with stress and gambling severity strongly suggests gambling may be used as a way to modify negative feelings and regulate emotions in some adolescents.

Gupta and Derevensky (1998) specifically tested whether the General Addictions Theory of Addictions (Jacobs, 1986, 1989) applied to adolescent problem gamblers. In order to measure problematic gambling behaviors, participants completed the DSM-IV-J (Fisher, 1992), as well as measures of gambling activities, excitability, apprehension, sensation seeking (often theorized to be an attempt to correct cortical arousal), self perception, and depression. The results were consistent with both Jacobs (1986) and Blaszczynski and Nower (2002)'s theories. Adolescents identified as problem gamblers exhibited higher levels of excitability and disinhibition, providing indirect evidence of abnormal physiological arousal levels in this group. Problem gamblers also reported higher levels of depression and apprehension, indicating greater emotional distress. Finally, problem gamblers were more likely to report gambling for social involvement, to escape problems, to relieve depression, to escape loneliness, and dissociation while gambling. The authors note that this result is interesting since it indicates that the adolescent problem gamblers may be aware of why they gamble. Overall, these results provide strong support for the General Theory of Addictions, and suggest that for some individuals problem gambling is a maladaptive coping response used to deal with unpleasant physiological and emotional states.

The final pathway proposed by Blaszczynski and Nower (2002) includes "substantional psychosocial interference", in addition to the emotional and physiological vulnerabilities seen in the second pathway. This pathway is distinguished by impulsivity,

antisocial features, and symptoms of neurological or neurochemical dysfunction. This theory is consistent with the finding that impulsivity is another personality variable commonly implicated in the etiology of gambling problems (Hardoon & Derevensky, 2002; Langewisch & Frisch, 1998; Steel & Blaszczynski, 1996) and deviant behaviours in general (Barnes, Welte, Hoffman, & Dintcheff, 2005). Blaszczynski and Nower (2002) cite several studies indicating that these individuals have the most severe gambling pathology, and are highly resistant to treatment.

Adolescent Gambling and Affect regulations Abilities

Although few studies have been conducted to specifically look at the relationship between affect regulation and adolescent problem gambling, studies have identified affect regulation abilities as an important risk factor for the development of problem gambling and other addiction-related problems among adults (Coman, Burrows, & Evans, 1997; Lumley & Roby, 1995; Taylor, Bagby, & Parker, 1997). Lumley and Roby (1995) suggested that individuals with poor affect regulation abilities may struggle with regulating distressing emotions due to difficulty identifying subjective emotional states, and a limited ability to communicate these feelings to others. In addition, the limited imaginal processes associated with poor affect regulation abilities may prevent the individual from using fantasy or other mental activities to modify their own distressing emotional states. Lumley and Roby (1995) hypothesized that these individuals use compulsive behaviours to regulate their emotions.

Alexithymia is a multidimensional personality construct (Taylor, Bagby, & Parker, 1997) that involves cognitive and affective deficits in the processing and regulation of affective states. The alexithymia construct contains three salient features,

including difficulty identifying feelings, difficulty describing feelings to other people, and limited imaginal abilities or a concrete externally oriented thinking style. Although the ability to understand and identify with the feelings of others is not part of the definition of alexithymia, alexithymic individuals have been found to experience difficulty in this area. For example, previous research has shown that individuals high in alexithymia have difficulty identifying facial expressions in others (Parker, Taylor, & Bagby, 2001). Alexithymics have also been found to have a limited ability to empathize with the affective states of others (Parker et al., 2001; Taylor et al., 1997). Previous research has found alexithymia to be associated with negative outcomes including delinquent behaviours in adolescent males (Zimmerman, 2006), as well as addictive and compulsive behaviours (Lumley & Roby, 1995; Taylor et al., 1997). The limited ability to identify emotions and distinguish them from bodily sensations may limit the ability of alexithymic individuals to think about their feelings, as well as to use these internal experiences to cope with stress (Parker et al., 2001). In addition, because these individuals have difficulty describing their feeling to others they may be unable to seek social support when faced with unpleasant emotions. Finally, the externally oriented thinking style limits the imaginal abilities of these individuals and prevents them from using fantasy, dreams, and play to deal with unpleasant emotional states (Taylor et al., 1997). It has been hypothesized that the limited ability to deal effectively with affective states may lead these individuals to engage in impulsive acts or compulsive behaviours in order to "discharge tension" (Taylor et al., 1997).

In order to test the hypothesis that alexithymic individuals use compulsive behaviours like gambling to regulate their emotions, Lumley and Roby (1995) looked at

the association between cognitive and affective aspects of alexithymia and pathological gambling in 1,147 (456 men and 691 women) university students. They found that the prevalence of alexithymia was significantly higher in pathological gamblers than in controls. These results were replicated by Parker et al. (2005), in which first year university students who had been identified as alexithymic had higher scores on a measure of problem gambling than non-alexithymic participants.

In the past, researchers have suggested that individuals with alexithymia use compulsive behaviours to regulate their emotions (Taylor, Bagby, & Parker, 1991), a hypothesis supported by studies linking alexithymia to other addiction related problems, including drug and alcohol abuse (Ladouceur, Dube, & Bujold, 1994; Pinard, Negrete, Annabele & Audet, 1996; Uzan, 2003). Unfortunately, the relationship between alexithymia and adolescent problem gambling is unknown, as it is unclear whether alexithymia can be reliably measured across different adolescent groups (Eastabrook, 2008; Rieffe, Oosterveld, & Wogan, 1998; Sakkinnen, Kaltiala-Heino, Ranta, Haatja, & Joukamaa, 2007).

Emotional intelligence is another affect regulation construct that conceptually overlaps with alexithymia (Parker et al., 2001). Although a number of conceptual models of emotional intelligence have been proposed (Matthews, Zeidner, & Roberts, 2007), most models include abilities such as accurate emotional appraisal in oneself and in others, emotional expression, emotional regulation, and adaptive use of emotions to guide behaviours. High levels of emotional intelligence are believed to allow individuals to cope effectively with environmental demands (Bar-On & Parker, 2000). Despite the large number of emotional intelligence models that have been developed, the majority of

measures used to assess this construct fall into one of two broad categories (Petrides & Furnham, 2000). Ability measures, such as the *Mayer-Salovey-Caruso Emotional Intelligence Test* (*MSCEIT*; Mayer, Salovey, & Caruso, 2002), assess emotional intelligence abilities using a performance based methodology. In contrast, trait emotional intelligence measures, such as the *EQ-I* (Bar-On, 1997), assess emotional intelligence using a self-report format. The Bar-On (1997) model of emotional intelligence is made up of four dimensions (including intrapersonal abilities, interpersonal abilities, adaptability, and stress management) that represent an individual's potential social and emotional competency.

Emotional intelligence has been found to predict many 'real life outcomes" (Ciarrochi, Chan, & Bajgar, 2001). For example, it has been found that emotional intelligence is negatively associated with deviant behaviours (Parker, Creque, Bainhart et al., 2004), tobacco and alcohol use (Trinidad & Johnson, 2002), unauthorized absences from school, expulsion from school (Petrides, Fredrickson, & Furnham, 2004) and academic achievement in adolescents (Parker et al., 2004). However, the relationship between emotional intelligence and gambling behaviours has, thus far, not been explored in adult or adolescent samples.

The Present Research

In an attempt to overcome some of the limitations of previous research, the present study examined the relationship between affect regulation (assessed using measures of alexithymia and emotional intelligence) and various addiction related

behaviours (problem gambling, internet misuse, and gaming abuse) in a large community-based sample of adolescents. In addition, based on evidence that adolescent with some specific mental health problems may be especially vulnerable to the development of problem gambling, the present study also included an adolescent clinical sample. Furthermore, based on empirical evidence linking problem gambling in adolescents to a constellation of addiction-related problem behaviours, including video/computer game and internet misuse, the present study sought to establish preliminary evidence of a dysfunctional preoccupation dimension in community and clinically based samples of adolescents.

Method

Participants

The participants included a community sample of 605 adolescents (boys = 219, girls = 386) and a clinical sample of 201 adolescents (boys = 135, girls = 66). The community sample were recruited from a number of ongoing research projects and resided in several communities in Central and Eastern Ontario. They ranged in age from 15 to 18 years. The mean age of the community sample was 16.51 years (SD = 1.13); 16.45 years (SD = 1.08) for boys and 16.54 years (SD = 1.16) for girls. Of the participants, 89.59% identified themselves as "White", 0.50% as "Black", 5.79% as "Asian", 2.31% as "Native American", 2.49% as "other", and 5.12% did not indicate their ethnicity.

The clinical sample included 201 adolescents (boys = 135, girls = 66) adolescents between 15 and 18 years of age, recruited from an outpatient clinic for children and adolescents located in central Ontario. The mean age of the clinical sample was 16.38

years (*SD* = 1.19); 16.38 years (*SD* = 1.19) for boys and 16.38 years (*SD* = 1.19) for girls. Of the participants 87.06% identified themselves as "White", 1.99 % as "Black", 1.99% as "Asian", 2.49% as "other", and 4.98% did not indicate their ethnicity.

Measures

Each participant completed a questionnaire package that included the *Problem Video Game Playing Scale* (PVGS; Salguero & Moran, 2002), the *Internet Addiction Questionnaire* (IADQ; Young, 1998), the *South Oaks Gambling Screen-Revised for Adolescents* (SOGS-RA; Winters, Stinchfield, & Fulkerson, 1993), the youth version of the *Emotional Quotient Inventory* (EQ-i:YV; Bar-On & Parker, 2000), and the 20-Item *Toronto Alexithymia Scale* (*TAS-20*; Bagby, Parker, & Taylor, 1994).

The *PVGS* (Salguero & Moran, 2002) includes 9 dichotomous (yes/no) items, developed using the DSM-IV (APA, 1994) definitions of pathological gambling and substance abuse, to measure addictive use of video games and video game systems in adolescents. A high score reflects a higher level of problem video gaming playing behaviour, including preoccupation and excessive use, during the previous 12 months. Studies have shown that the PVGS measures a single addictive video game use construct and has acceptable psychometric properties (Salguero & Moran, 2002). The alpha coefficient for the present study was 0.80 for the community sample and 0.78 for the clinical sample. See Appendix A for a copy of the *PVGS*.

The *IADQ* (Young, 1998) is a 20-item self-report measure of internet abuse, developed for use with adults. Respondents are asked to choose the answer that best corresponds to their use of the internet, for non-academic (or job related) purposes, on a 5-point Likert scale ranging from "1" ("rarely") to "5" ("always"). Recent research by

Yang (2001) found the IADQ to have acceptable internal reliability (alpha = 0.92) and test retest reliability (0.85) when measured at 2 weeks. In the current study, the alpha coefficient was 0.94 for the community sample and 0.93 for the clinical sample. See Appendix B for a copy of the *IADQ*.

The *SOGS-RA* (Winters et al., 1993) is the most commonly used measure of adolescent gambling behaviour (Langhinrichson-Rohling et al., 2004). A copy of the *SOGS-RA* can be found in Appendix C, which includes 12 self-report items, adapted from the *South Oaks Gambling Screen* (*SOGS*) (Wiebe, Cox, & Mehmel, 2000). Responses are made on a 4-point Likert scale ranging from "0" ("not at all, never") to "3" ("very much, very frequently"). Scores on each item are summed to create a total *SOGS-RA* score. The *SOGS* has been shown to have adequate internal consistency reliability (Poulin, 2002; Winters et al., 1993) and to accurately discriminate between regular and non-regular gamblers (Ladouceur et al., 2005; Winters et al., 1993). For the present study the alpha coefficient was 0.92 for the community sample and 0.91 for the clinical sample.

The *EQ-i:YV* (Bar-On & Parker, 2000) is based on the Bar-On model of emotional intelligence (Bar-On, 1997, 2000) and is a 60 item self report measure of emotional and social competency designed for use with children and adolescents between the ages of 7 and 18 years. A copy of the *EQ-i:YV* is presented in appendix D. The *EQ-i:YV* provides scores for each of the four dimensions that make up the emotional intelligence construct according to the theory used to develop the instrument (Bar-On, 1997, 2000). Six items measure intrapersonal abilities (consisting of related abilities like recognizing and labelling one's own emotions), 12 items measure interpersonal abilities (consisting of related abilities like identifying emotions in others and empathy), 10 items

measure adaptability (consisting of abilities like being able to adjust one's emotions and behaviours to changing situations or conditions), and 12 items measure stress management abilities (consisting of abilities such as delaying or resisting an impulse). Participants are instructed to choose the answer that best reflects their feelings, abilities, and behaviours on a 4-point Likert scale ranging from "1" ("very seldom true") to "4" ("very often true"). The sum of the scores on the four subscales provides a total emotional intelligence score. A high score reflects high emotional intelligence. The *EQ-i:YV* has been found to have a replicable factor structure, and to have high correlation with comparable scores of the adult version (the *EQ-i*; Bar-On, 1997). Studies have shown the *EQ-i:YV* scales to have adequate internal reliabilies (Bar-On & Parker, 2000). Alpha coefficients were computed for each of the *EQ-i:YV* subscales for the present study. For the community sample intrapersonal = 0.85, interpersonal = 0.82, adaptability = 0.85, and stress management = 0.88. For the clinical sample intrapersonal = 0.82, inferpersonal = 0.83, adaptability = 0.84, and stress management = 0.89.

The *TAS-20* (Bagby et al., 1994) is a 20-item measure designed to measure alexithymia in adult samples. A copy of the *TAS-20* can be found in Appendix E. The *TAS-20* provides scores for three core dimensions of the alexithymia construct: 7 items assess symptoms associated with difficulty identifying feelings, 5 items assess symptoms associated with difficulty describing feelings, and 8 items assess symptoms associated with externally oriented thinking. The sum of these three subscales provides a total alexithymia score. Participants are asked to rate their agreement with each item on a 5-point Likert scale ranging from "1" ("strongly disagree") to "5" ("strongly agree"). Higher scores on the *TAS-20* indicate higher levels of alexithymia. Research has shown

that the *TAS-20* is a reliable and valid measure of alexithymia in samples of community and clinical adults (Bagby et al., 1994; Parker et al., 2003; Taylor et al., 2003). More recently, research has supported the use of the three factor structure of the TAS-20 to measure alexithymia in adolescent samples (Eastabrook, 2008; Rieffe, Oosterveld, & Wogan, 1998; Sakkinnen, Kaltiala-Heino, Ranta, Haatja, & Joukamaa, 2007). The difficulty identifying feelings and the difficulty describing feelings dimensions of the English and Dutch versions of the *TAS-20* have both demonstrated reasonable psychometric properties in large samples of adolescents (Eastabrook, 2008; Rieffe et al., 1998). The externally oriented thinking style dimension, has however, consistently been shown to have low reliability and validity in some adolescent samples (Eastabrook, 2008; Rieffe et al., 1998; Sakkinnen et al., 2007). The alpha coefficients were computed separately for both the community (difficulty identifying feelings = 0.71, difficulty describing feelings = 0.79, externally oriented thinking = 0.63) and clinical samples (difficulty identifying feelings = 0.72, difficulty describing feelings = 0.65, externally oriented thinking = 0.59).

Procedure

Participants in the community sample were recruited to participate in a study on "emotions, personality, and behaviour" from several different public secondary schools in a number of communities in South-Central Ontario via advertisements and presentations to teachers and the parents of students. All of the participants signed a consent form that provided a description of the study. Questionnaire packages were then given to the

participants who completed the measures under the supervision of their teacher or a member of the research team.

The clinical sample was recruited from a clinic for children and adolescents located in South-Central Ontario. The participants completed a questionnaire package as part of their introductory assessment, under the supervision of a research assistant. The nature of the study was explained to the participants and their parents.

Statistical Procedure

Group Differences and Correlations. A series of group (community versus clinical) by gender factorial ANOVAs were conducted with each of the *EQ-i:YV*, *TAS-20* and addiction related scales as dependent variables. Correlations between the same scales were computed separately for the boys and girls in the community and clinical samples.

Structural Equation Modelling. Structural Equation Modelling (SEM) is a collection of multivariate statistical methods that simultaneously examines the relationships among multiple latent or manifest variables. SEM also allows researchers to investigate complex relationships, as well as test the overall fit of specific models (Tabachnick & Fidell, 2006).

Confirmatory factor analysis (CFA) and latent variable path analysis are both special types of SEM. CFA can be used to evaluate a measurement model using a variety of statistical tests and indices in order to validate models that include one or more latent variables (Bentler, 1990; Breckler, 1990; Tabachnick & Fiddel, 2007). CFA is a theory driven technique which places constraints on the data to assess the hypothesized factor structure within a particular sample, enabling the researcher to test the overall adequacy of a specific model. In contrast, exploratory factor analysis is a data driven technique in

which the solution is determined by arbitrary statistical constraints (Aluja & Blanch, 2002).

CFA was used to examine several measurement models: the latent structure of affect regulation, as well as the structure of addiction-related behaviours. Latent variable path analysis was then used to examine the relationship between latent variables. For all SEM analyses the estimation method used was the default in Statistica version 6, Maximum Likelihood-Generalized Least Squares. Cole (1987) has recommended the use of multiple goodness of fit criteria, as each fit indicator has its own strengths and weaknesses. The goodness of fit indices that were used to assess fit include the comparative fit index (CFI; Bentler, 1990), root mean-square residual (RMSR; Bentler, 1990), goodness-of-fit index (GFI; Joreskog & Sorbom, 1986), and the adjusted goodness-of-fit index (AGFI; Joreskog & Sorbom, 1986). Based on the recommendations of previous researchers (Anderson & Gerbing, 1984; Bentler, 1990; Cole, 1987; Marsh, Balla, & McDonald, 1988), the criteria used to evaluate goodness of fit are $CFI > .90$, $RMSR < .10$, $GFI > .85$, and $AGFI > .80$

Results

Gender and group differences

Means and standard deviations for the *EQ-i:YV* scales for the combined, community, and clinical samples (by gender) are presented in Table 1. Means and standard deviations for the *TAS-20* scales for the combined (community and clinical), community, and clinical samples (by gender) are presented in Table 2. A series of gender by group (community vs. clinical sample) factorial ANOVAS were conducted with the

various affect regulation measures and addiction related behaviours as dependent variables. Girls scored higher than boys on the intrapersonal ($F_{(1, 802)} = 4.51, p < .05$) and interpersonal ($F_{(1,802)} = 45.84, p < .01$) scales of the *EQ-i:YV*. Boys scored higher than girls on the externally oriented thinking scale of the *TAS-20* ($F_{(1, 802)} = 19.08, p < .01$).

Insert Tables 1 and 2 here

The community sample was found to score higher on the intrapersonal ($F_{(1, 802)} = 4.66, p < .05$), interpersonal ($F_{(1, 802)} = 8.63, p < .01$), adaptability ($F_{(1, 802)} = 25.02, p < .01$), stress management ($F_{(1, 802)} = 14.54, p < .01$), and total ($F_{(1, 801)} = 24.34, p < .01$) scales of the *EQ-i:YV*. The clinical sample was found to score higher than the community sample on the externally oriented thinking ($F_{(1, 802)} = 15.29, p < .01$) and total scales of the *TAS-20* ($F_{(1, 802)} = 10.75, p < .01$).

Means and standard deviations for the addiction-related behaviour scales (*PVGS, IADQ, SOGS-RA*) for the combined, community, and clinical samples by gender are presented in Table 3. Boys scored significantly higher than girls on the measure of problematic video game playing [$F_{(1, 802)} = 109.65, p < .001$] and gambling [$F_{(1, 802)} = 11.19, p < .01$). A significant group by gender interaction was also found for internet abuse [$F_{(1, 802)} = 5.13, p < .05$]. Girls from the clinical sample were found to score higher than clinical boys. No other main effects or interactions were significant.

Insert Table 3 here

Relationships between affect regulation and addiction-related behaviours

Correlations between the affect regulation scales (*EQ-i:YV* and *TAS-20*) were computed for the community and clinical samples (separately by gender). Table 4 presents the correlations between the various affect regulation scales for the community and clinical samples. For the community sample the correlations between the *EQ-i:YV* scales were all significant, and ranged from ranged from 0.24 to 0.72. The correlations between the scores for the *TAS-20* were also all significant, and ranged from 0.16 to 0.80. Finally, the correlations between the various *EQ-i:YV* and *TAS-20* scales were all significant and ranged from -0.19 to -0.77. For the clinical sample correlations between the various *EQ-i:YV* scales were all significant, ranging from 0.15 to 0.68. The correlations between the *TAS-20* scales were also significant, and ranged from 0.20 to 0.77. The majority of the correlations between the *EQ-i:YV* scales and the *TAS-20* scales were significant, ranging from -0.17 to -0.58. However, the correlations between the difficulty identifying feelings scale of the *TAS-20* and the *EQ-i:YV* interpersonal scale (r = -0.11), the difficulty describing feelings scale of the *TAS-20* and the adaptability scale of the *EQ-i:YV* (r = -0.10), and the difficulty describing feelings scale of the *TAS-20* and the stress management scale of the *EQ-i:YV* (r = -0.12) were all non-significant.

Insert Table 4 here

Table 5 presents the correlations between the affect regulation scales for the girls and boys in the community sample. For the boys in the community sample the correlations between the *EQ-i:YV* scales were all significant, and ranged from 0.27 to

0.72. The correlations between the scores for the *TAS-20* were also all significant (ranging from 0.21 to 0.76), with the exception of the relationship between difficulty identifying feelings and externally oriented thinking ($r = 0.09$). Finally, the correlations between the various *EQ-i:YV* and *TAS-20* scales were all significant and ranged from -0.23 to -0.70. For the girls from the community sample correlations between the various *EQ-i:YV* scales were all significant, ranging from 0.24 to 0.72. The correlations between the *TAS-20* scales were also significant, and ranged from 0.21 to 0.83. The correlations between the various *EQ-i:YV* and *TAS-20* scales were all significant and ranged from -0.27 to -0.72.

Insert Table 5 here

Table 6 presents the correlations between the affect regulation scales for the girls and boys of the clinical sample. For the boys of the clinical sample correlations between the *EQ-i:YV* scales were significant (ranging from 0.19 to 0.69), with the exception of the correlations between adaptability and stress management ($r = 0.16$). The correlation between the difficulty identifying feelings and externally oriented thinking scales of the *TAS-20* was also found to be non-significant ($r = 0.17$). The correlations between all of the other *TAS-20* scales were found to be significant and ranged from 0.21 to 0.77. The difficulty describing feelings of the *TAS-20* was not found to have a significant correlation with the interpersonal ($r = -0.11$), adaptability ($r = -0.05$), or stress management ($r = -0.07$) scales of the *EQ-i:YV*. The difficulty identifying feelings scale of the *TAS-20* was also not significantly correlated with the interpersonal ($r = -0.11$) or

adaptability (r = -0.08) scales. For the girls in the clinical sample significant correlations, ranging from 0.26 to 0.66, were found between most of the *EQ-i:YV* scales. The intrapersonal scores on the *EQ-i:YV* for girls of the clinical sample were not found to be significantly correlated with adaptability (r = 0.15) or stress management scales (r = 0.07). The correlations between the *TAS-20* scales were all significant, ranging from 0.38 to 0.82. The majority of the correlations between the *EQ-i:YV* scales and the *TAS-20* scales were significant, ranging from -0.25 to -0.62. However, the correlations between the difficulty identifying feelings scale of the *TAS-20* and the intrapersonal scale (r = -0.11), the difficulty describing feelings scale of the *TAS-20* and the adaptability scale (r = -0.10), and the difficulty describing feelings scale of the *TAS-20* and the stress management scale (r = -0.12) were all non-significant.

Insert Table 6 here

Correlations between the addiction-related behaviours were computed separately for the boys and girls in the community and clinical samples. Table 7 presents the correlations between the addiction-related behaviour scales (*PVGS, IADQ*, and *SOGS-RA*) for the community and clinical samples by gender. For the total community sample, the correlations were all significant. Moderate positive relationships were found between *PVGS* and *SOGS-RA* scores (r = 0.24), *PVGS* and *IADQ* scores (r = 0.38), and *SOGS-RA* and *IADQ* scores (r = 0.41). The correlations for the total clinical sample were also significant, lower in magnitude. Low to moderate correlations were found between the *PVGS* and *SOGS-RA* scores (r = 0.16), *PVGS* and *IADQ* scores (r = 0.28), and the *IADQ*

and *SOGS-RA* ($r = 0.30$). For the boys in the community sample the correlations between *PVGS* and *IADQ* scores ($r = 0.52$) and *SOGS-RA* and *IADQ* scores ($r = 0.46$) were both significant, and of moderate magnitude. However, the correlation between the *PVGS* and *SOGS-RA* scores ($r = .06$) was not significant. For the girls in the community sample the correlations between *PVGS* and *SOGS-RA* scores ($r = 0.34$), *PVGS* and *IADQ* scores ($r = 0.35$), and *SOGS-RA* and *IADQ* scores ($r = 0.41$) were all significant. The same pattern of correlations was found for the boys in the clinical sample. The correlations between *PVGS* and *IADQ* scores ($r = 0.38$) and *SOGS-RA* and *IADQ* scores ($r = 0.41$) were both significant, and of moderate magnitude. However, the correlation between the *PVGS* and *SOGS-RA* scores ($r = 0.05$) was not significant. For the girls in the clinical sample the relationship between *PVGS* and *IADQ* scores ($r = 0.41$) and *PVGS* and *SOGS-RA* scores ($r = 0.37$) were significant, but the correlation between *SOGS-RA* and *IADQ* scores ($r = 0.22$) was not.

Insert Table 7 here

Correlations between the affect regulation scales (*EQ-i:YV* and *TAS-20* total and subscales) and addiction-related behaviours were computed separately for the boys and girls in the community and clinical samples. Table 8 presents the correlations between the affect regulation scales and addiction related behaviours for the total community sample, as well as separately by gender. Overall, the *PVGS*, *IADQ*, and *SOGS-RA* scores were found to have low to moderate correlations with the affect regulations scales. For the total community sample the correlations between *PVGS* scales and the *EQ-i:YV* scales ranged

from -0.08 to -0.35, and the correlations between *PVGS* scores and the *TAS-20* scales ranged from 0.14 to 0.20. For the boys in the community sample the correlations between *PVGS* scales and the *EQ-i:YV* scales ranged from -0.12 to -0.25, and the correlations between *PVGS* scores and the *TAS-20* scales ranged from 0.14 to 0.20. For the girls in the community sample the correlations between *PVGS* scales and the *EQ-i:YV* scales ranged from -0.17 to -0.34; the correlations between *PVGS* scores and the *TAS-20* scales ranged from 0.13 to 0.20. As predicted, scores on the *PVGS* were negatively correlated with the interpersonal, stress management and total EI scales of the *EQ-i:YV* for both the boys and girls of the community sample. *PVGS* scores were positively correlated with the difficulty identifying feelings, difficulty describing feelings, externally oriented thinking, and total alexithymia scales of the *TAS-20*, for both the males and females in the community sample. However, for the total community sample the correlation between *PVGS* scores and adaptability was not significant; among the boys, correlations between *PVGS* scores and the intrapersonal (r = -0.12) and adaptability (r = -0.13) scales were non-significant.

For the total community sample (and girls) *IADQ* scores were significantly correlated with all of the affect regulation scales. For the total community sample the correlations between *IADQ* scales and the *EQ-i:YV* scales ranged from -0.09 to -0.32, and the correlations between *IADQ* scores and the *TAS-20* scales ranged from 0.13 to 0.28. For the girls in the community sample the correlations between *IADQ* scales and the EQ-*i:YV* scales ranged from -0.12 to -0.36, and the correlations between *IADQ* scores and the *TAS-20* scales ranged from 0.15 to 0.29. For the boys in the community sample the correlations between *IADQ* scales and the *EQ-i:YV* scales ranged from 0.04 to -0.30, and

the correlations between *IADQ* scores and the *TAS*-20 scales ranged from 0.11 to 0.36. All of the correlations were significant with the exception of the correlations between *IADQ* scores and the intrapersonal scale of the *EQ-i:YV* (r = -0.04) and the difficulty describing feelings scale of the *TAS-20* (r = 0.11) for the boys in the community sample.

The correlations between the *SOGS-RA* scores and the interpersonal, adaptability, stress management, and total EI scales of the *EQ-i:YV* were all positive and significant. These correlations ranged from -0.13 to -0.30 in the total community sample, -0.15 to -0.21 in the boys of the community sample, and -0.17 to -0.32 in the girls of the community sample. The correlations between the *SOGS-RA* scores and the intrapersonal scale of the *EQ-i:YV* were not found to be significant in the boys (r = -0.03), girls (r = -0.02) or the total community samples (r = -0.04). For boys (r = 0.19), girls (r = 0.12), and total (r = 0.15) community samples the correlations between the *SOGS-RA* and the difficulty identifying feelings of the *TAS-20* were significant. In addition, the correlations between the *SOGS-RA* scores and the externally oriented thinking and total alexithymia scores were significant in the boys and total community samples. In contrast, *SOGS-RA* scores were not found to have significant correlations with the externally oriented thinking (r = 0.09) or total alexithymia (r = 0.07) scales of the *TAS-20* in girls from the community sample. The correlations between the *SOGS-RA* scores and the difficulty describing feelings scale of the *TAS-20* were not significant in the boys (r = 0.08), girls (r = -0.05) or total community samples (r = 0.01).

Insert Table 8 here

Table 9 presents the correlations between the affect regulation scales and addiction-related behaviours for the total clinical sample, as well as separately by gender. For the total clinical sample the correlations between *PVGS* scales and the *EQ-i:YV* scales ranged from -0.08 to -0.27, and the correlations between PVGS scores and the *TAS-20* scales ranged from 0.08 to 0.15. For the boys in the clinical sample the correlations between *PVGS* scales and the *EQ-i:YV* scales ranged from 0.02 to -0.28, and the correlations between *PVGS* scores and the *TAS-20* scales ranged from 0.20 to 0.25. The relationships between the *PVGS* and the interpersonal (r = -.19), stress management (r = -0.28), and total EI (r = -0.18) scales were significant. *PVGS* scores the in the boys on the clinical sample were also found to significantly correlated with the difficulty identifying feelings (r = 0.25), difficulty describing feelings (r = 0.18) and total alexithymia (r = 0.19) scales. For the girls in the clinical sample no significant correlations were found between *PVGS* scores and the various affect regulation scales.

The correlations between *IADQ* scores and the affect regulation scales were low to moderate in magnitude. The correlations between the *EQ-i:YV* scales and the *IADQ* ranged from -0.05 to -0.20. The correlations between *IADQ* scores and the stress management (r = -0.20) and total EI scales of the *EQ-i:YV* were significant. *IADQ* scores in the clinical sample were also found to be significantly correlated with the difficulty identifying feelings (r = 0.31) and total alexithymia (r = 0.16) scales. For the boys in the clinical sample the correlations between *IADQ* scores and the affect regulation scales ranged from 0.00 to 0.23. The difficulty identifying feelings scale of the *TAS-20* was the only affect regulations scale found to be significantly correlated with *IADQ* scale (r = 0.23). For girls in the clinical sample the correlations between *IADQ* scores ranged from

0.13 to -0.39. Significant correlations were found between *IADQ* scores and the interpersonal (r = -0.26), stress management (r = -0.44) and total EI (r = -0.39) scales. *IADQ* scores in girls from the clinical sample were also found to be significantly correlated with the difficulty identifying feelings (r = 0.38) and total alexithymia (r = 0.30) scales.

Overall, the correlations between the SOGS-RA and affect regulations scales for the clinical sample were very low to moderate. The majority of the affect regulation scales were not significantly correlated with *SOGS-RA* scores. A significant correlation was found between *SOGS-RA* scores and the stress management scale of the *EQ-i:YV* (r = -0.36). For the total sample, the correlation between *SOGS-RA* scores and the interpersonal scale of the *EQ-i:YV* was significant (r = -0.15).

Insert Table 9 Here

Structure of affect regulation and addiction-related behaviours

In order to better understand the relationships between affect-regulation abilities and addiction-related behaviours a series of CFAs were conducted. The first focused on identifying the best affect regulation model. The first model tested was a two-factor model that included two separate affect regulation constructs: emotional intelligence (measured with the intrapersonal, interpersonal, adaptability, and stress management scales from the *EQ-i:YV*) and alexithymia (measured with the difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking subscales from the *TAS-20*). This model was examined separately for the total community and clinical

samples. For the community sample, GFI (0.85) met the goodness-of fit criteria, while and AGFI (0.68), CFI (0.76), RMSR (0.12) did not meet the criteria for goodness of fit. Similarly, for the clinical sample, GFI (0.87) met the goodness-of fit criteria, while and AGFI (0.72), CFI (0.68), RMSR (0.10) did not meet the criteria for goodness of fit. The parameter estimates for the community and clinical samples are presented in Figure 1. The indicator to factor parameter estimates for the community sample were all significant, and ranged from 0.32 to 0.87. The indicator to factor parameter estimates for the clinical sample were also all significant, and ranged from 0.31 to 0.87. Of particular note was the very high parameter estimate between the latent variables of emotional intelligence and alexithymia: -0.97 ($p < .05$) for the community sample and -0.87 ($p < .05$) for the clinical sample.

Insert Figure 1 here

Given the very high association between the emotional intelligence and alexithymia latent variables, as well as the poor goodness of fit results, a 1-factor affect regulation model was also tested. To maximize the stability of the latent variable, the *TAS-20* total scale was used (due to the low internal reliability for the externally oriented thinking style subscale), along with the four *EQ-i:YV* scales (intrapersonal, interpersonal, adaptability, and stress management). For the community sample, GFI (0.94), AGFI (0.82), RMSR (0.08) all met the criteria for goodness of fit, while the CFI (0.89) came very close to meeting the criteria for adequate fit. For the clinical sample GFI (0.98), AGFI (0.94), CFI (0.96), RMSR (0.04) all met the criteria for goodness of fit. The

parameter estimates for the community and clinical samples are presented in Figure 2. The indicator to factor parameter estimates for the community sample were all significant, and ranged from 0.44 to -0.89. The indicator to factor parameter estimates for the clinical sample were also all significant, and ranged from 0.42 to -0.70.

Insert Figure 2 here

To explore the generalizability of the 1-factor affect regulation model by gender, the same analysis was then repeated separately for the boys and girls in the community sample. For the boys, GFI (0.96), AGFI (0.88), CFI (0.94), RMSR (0.05) all met the criteria for good fit. For the girls sample, GFI (0.91) and RMSR (0.10) met the criteria for goodness of fit, however the CFI (0.83) and AGFI (0.71) did not. The parameter estimates for the boys and girls in the community are presented in Figure 3. The indicator to factor parameter estimates for the community sample were all significant, and ranged from 0.55 to -0.85. The indicator to factor parameter estimates for the community sample were also all significant, and ranged from 0.40 to -0.90.

Insert Figure 3 here

A confirmatory factor analysis was also conducted to examine the relationships among the addiction-related behaviours. A three factor model was tested that consisted of separate oblique video game playing, internet use, and gambling factors. Due to the large number of indicators (items) associated with the *PVGS*, *IADQ*, and *SOGS-RA* scales,

each latent variable was measured by three indicators made up of random parcels of scale items. Item parceling is a technique used to reduce the complexity of measurement models in which individual scale items are assigned to a minimum of three parcels per latent variable, thus reducing the number of observed variables included in the model (Ahuja & Wisenbaker, 2006; Cattell & Burdsal, 1975). Parceling has been found to have a number of advantages including: increased internal consistency and reduced error variance (Kishton & Widaman, 1994), the distributions of the parcels are more continuous and normal than those of the individual items (this is especially relevant in the present study as the estimation technique used assumes that the data is normally distributed and continuous; Nasser & Wisenbaker, 2003), the number of parameters that need to be estimated is reduced, without the need to eliminate items that may provide additional information about the latent variable (Nasser & Wisenbaker, 2003), and simulation studies have shown that using parcels rather than individual items results in improved fit between the sample data and the model (Meade & Kroustalis, 2006).

For the community sample, GFI (0.98), AGFI (0.97), CFI (0.99), and RMSR (0.02) all met the criteria for goodness of fit. Similarly, for the clinical sample, GFI (0.96), AGFI (0.92), CFI (0.99), and RMSR (0.03) all met the criteria for goodness of fit. Figure 4 presents the parameter estimates for the community and clinical samples. For both samples the indicator (item parcels) to factor (video game playing, internet use, and gambling) estimates were statistically significant. The between factor parameter estimates for the community sample were 0.45 ($p < .05$) between video game playing and internet use, 0.43 ($p < .05$) between internet use and gambling, and 0.29 ($p < .05$) between video game playing and gambling. The between factor parameter estimates for the clinical

sample were 0.34 ($p < .05$) between video game playing and internet use, 0.30 ($p < .05$) between internet use and gambling, and 0.19 ($p < .05$) between video game playing and gambling.

Insert Figure 4 here

Confirmatory factor analysis of the addiction-related behaviour model was then repeated separately for the boys and girls in the community sample. The model was found to have good fit to the data for both the boys (GFI = 0.96, AGFI = 0.93, CFI = 0.99, and RMSR = 0.04) and girls (GFI = 0.97, AGFI = 0.95, CFI = 0.99, and RMSR = 0.03) in the community sample. Figure 5 displays the parameter estimates for the boys and girls in the community sample. All of the indicator (item parcels) to factor (video game playing, internet use, and gambling) estimates were statistically significant. The between factor parameter estimates for the boys were 0.63 ($p < .05$) between video game playing and internet use, 0.47 ($p < .05$) between internet use and gambling, and 0.11 ($p > .05$) between video game playing and gambling. The between factor parameter estimates for girls were 0.41 ($p < .05$) between video game playing and internet use, 0.43 ($p < .05$) between internet use and gambling, and 0.42 ($p < .05$) between video game playing and gambling.

Insert Figure 5 here

Confirmatory factor analysis was also used to explore the hypothesis that the relationships among the addiction-related behaviours indicated a higher order "dysfunctional preoccupation" latent variable. The dysfunctional preoccupation model is

a one factor model with three indicators: video game playing, internet use, and gambling. Figure 6 presents the parameter estimates for the community and clinical samples. Figure 7 presents the parameter estimates for the boys and girls in the community sample.

Insert Figures 6 and 7 here

Relationship between affect regulation and addiction-related behaviour models

Latent variable path analysis was used to examine the relationship between the latent variable of affect regulation (intrapersonal, interpersonal, adaptability, and stress management subscales of the *EQ-i:YV* and the total *TAS-20* score) and the dysfunctional preoccupation latent variable (video game playing, internet use, and gambling) in the total community and clinical samples. The parameter estimates from the latent variable path analysis examining the relationship between affect regulation and dysfunctional preoccupation are presented in Figure 8 for the community and clinical samples, and Figure 9 for the boys and girls of the community sample. For the community sample GFI (0.91), AGFI (0.84), and RMSR (0.09) met the criteria for adequate fit (although the CFI (0.82) did not). The same pattern was found for the clinical sample (GFI = 0.95, AGFI = 0.91, RMSR = 0.06 and CFI = 0.86). The parameter estimates between the affect regulation and dysfunctional preoccupation latent variables was -0.42 ($p < .05$) for the community sample and -0.39 ($p < .05$) for the clinical sample. For the boys of the community sample the model was found to have good fit to the data (GFI = 0.94, AGFI = 0.88, CFI = 0.90, RMS = 0.07). This was not the case for girls from the community

sample, were the GFI (0.87) did meet the criteria for goodness of fit; AGFI (0.85), CFI (0.78), and RMSR (0.11) failed to meet the criteria for adequacy. The parameter estimate between the affect regulation and dysfunctional preoccupation latent variables was -0.31 ($p < .05$) for the boys in the community sample and -0.43 ($p < .05$) for the girls in the community sample.

Insert Figures 8 and 9 here

Latent variable path analysis was also used to examine the relationship between affect regulation and the various addiction-related behaviours (problematic video game playing, internet abuse, and problem gambling) in the boys and girls of the community sample, as well as the total community and clinical samples. The parameter estimates from the latent variable path analysis examining the relationship between affect regulation and the addiction-related behaviours are presented in Figures 10 and 11 for the community and clinical samples. For the community sample, GFI (0.92), AGFI (0.88), CFI (0.95), and RMSR (0.08) all met the criteria for goodness-of-fit. Similarly, for the clinical sample, GFI (0.92), AGFI (0.88), CFI (0.96), and RMSR (0.06) all met the criteria for goodness-of-fit.

Insert Figures 10 and 11 here

The parameter estimates from the latent variable path analysis examining the relationship between affect regulation and the addiction-related behaviours are presented

in Figures 12 and 13 for the boys and girls of the community sample. For the boys of the community sample, GFI (0.93), AGFI (0.89), CFI (0.98), and RMSR (0.06) all met the criteria for goodness-of-fit. The same results were found for the girls from the community sample: GFI (0.89), AGFI (0.84), CFI (0.94), and RMSR (0.09) all met the criteria for goodness-of-fit.

Insert Figures 12 and 13 here

Discussion

Gender and group differences

Consistent with previous research (Bar-On & Parker, 2000), girls were found to score higher than boys on the intrapersonal and interpersonal scales of the *EQ-i:YV* (Bar-On & Parker, 2000). This indicates that girls in both the community and clinical samples have a greater understanding of their own emotions and are better able to express their feelings and needs (intrapersonal), and are more likely to have satisfying relationships in which they are empathetic and good listeners (interpersonal) than boys. In addition, males were found to score higher than girls on the externally oriented thinking and total scales of the *TAS-20*. This finding is consistent with prior research using an overlapping sample (Eastabrook, 2007). Overall, these gender differences in affect regulation abilities found in the present study are consistent with previous research using (Bar-On & Parker, 2000); the results are also consistent with results from previous research using the adult version of the scale (Bar-On, 1997, 2002). In general, females have been found to score higher on

emotional intelligence (intrapersonal, interpersonal, and total EI scores) than males (Bar-On & Parker, 2000; Harrod & Scheer, 2005), although there is evidence that males in prior research have tended to score higher than females on the adaptively scale. No gender differences have been found for the stress management scales (Bar-On & Parker, 2000). Also consistent with prior research was the finding that the community sample scored higher than the clinical sample on all *EQ-i:YV* scales; the same was true for the finding that the clinical sample scored higher than the community sample on the externally oriented thinking and total scales of the *TAS-20*. These results indicate that overall the community sample demonstrates greater social and emotional competency than the clinical sample.

Boys in both the community and clinical samples were found to score higher than females on the measures of problem video game playing (*PVGS*) and gambling behaviors (*SOGS-RA*). These results are not surprising, since most video games are designed for male users (Yang, 2001). These results are also consistent with those of Phillips et al. (1995), who examined video game playing among adolescents between 11 and 16 years of age. They found that males were more likely to play video games, spend more time playing video games, neglect school work in favor of playing video games, and, of particular relevance to the present study, report "feeling better" after playing video games. Phillips et al. (1995) suggest that boys are more likely to play video games, at least partially due to superior visual spatial skills, socialization factors, and the characteristics of the games themselves. Gender differences among gamblers are also a well documented finding, with males beginning to gamble at an earlier age, gambling

more often, and spending more time and money on gambling than females (Griffiths & Wood, 2000; Hardoon & Derevensky, 2002; Jacobs, 2000).

More surprising in the present study is the lack of a gender difference for internet abuse (*IADQ*) among the participants in the community sample. This finding contradicts prior research that has suggested that boys are more likely to report problematic internet use than girls. For example, Ko, Yen, Chen, Chen, and Yen (2005) found that males use the internet more often, and for longer periods of time than do females. It is possible that because the present study did not distinguish between different internet-mediated activities (e.g., chatting, gaming, shopping, viewing pornography, information seeking, etc.), gender differences in different types of activities cancelled each other out. Yang (2001), for example, reports that adolescent males are more likely to use the internet to play games, while adolescent females are more likely to use the internet to chat with friends. On the other hand, this result is consistent with research that has found no significant gender difference for problematic internet use (Odell et al., 2000; Kim et al., 2006; Jackson et al., 2001).

In the clinical sample used in the present study, girls reported more problematic internet use than boys. This result contradicts studies conducted with British (Madell & Muncer, 2004) and Israeli (Nachamias, Mioduser, & Shelma, 2000) children and adolescents as well as with Romanian (Durndell & Haag, 2002) and American (Schumacher & Morahan-Martin, 2001) University students, where males were reported to use the internet more frequently than females. The finding from the present study also contradicts other research which has found no significant gender differences in problematic internet use (Jackson et al., 2001; Kim et al., 2006; Odell et al., 2000). This

surprising result may be linked to the fact that the gender difference was found in a clinical sample. Most of the prior research that has investigated gender differences in internet misuse has been conducted with community samples of adolescents. Further research is needed to replicate this finding and determine why girls in a clinical sample may be more likely to report problematic use of the internet.

Despite empirical evidence suggesting a differential pattern of behavioral addiction among clinical groups, the clinical sample in the present study did not score higher on any of the addiction-related behaviours scales. This suggests that adolescents identified as having preexisting mental health issues are not at increased risk for developing addiction-related behaviours. Alternatively, this result may reflect a difference in self-insight, evidenced by lower emotional intelligence and higher alexithymia scores among the participants in the clinical sample. It is possible that these individuals are inadvertently underreporting their involvement with addiction-related behaviours. Clearly, further research is needed to test this hypothesis and determine if adolescents identified as having mental health issues are, in fact, at increased risk of developing problems with addiction-related behaviours.

Relationships between affect-regulation and addiction-related behaviours

The present study found negative relationships, of moderate to high magnitude, between the *EQ-i:YV* and *TAS-20* scales. This result is consistent with prior research conducted with adults. Parker et al., (2001), for example, conducted a study to examine the relationship between alexithymia and emotional intelligence in a sample of 734 (329 men, 405 women) adults. They found a moderate to high negative relationship between alexithymia and emotional intelligence. Alexithymia was found to be a narrower

construct, since emotional intelligence was found to be related to a broader range of personality variables, including assertiveness, self-regard, self-actualization, independence, relationship skills, and social responsibility. Overall, these constructs were conceptually independent, with a strong, inverse relationship (Parker, Taylor, & Bagby, 2001; Taylor, Bagby, & Parker, 1997).

The results of the present study also revealed positive relationships, of low to moderate magnitude, among the various addiction-related behaviours. Prior research (Wood et al., 2004) has shown that adolescents who regularly participate in gambling activities are more likely to report regular video game playing. Consistent with previous research, there was a moderate positive relationship between video games and gambling for girls in the community and clinical samples. In contrast, no significant relationship between video games and gambling was found among boys in the community or clinical samples. The reason for this gender difference is unclear. It is possible that adolescent boys in the two samples participate in gambling or video games, but not both. If this is the case, future research is needed to determine what differentiates individuals who gamble and those who play video games. This result may also reflect a more complicated relationship between gambling and video game playing among adolescent boys, in which video games are a precursor to later gambling activities. Alternatively, if most or all of the boys in the sample participate in gambling and video game playing, the non-significant result may reflect a restricted range of behaviour in the data.

A moderate positive relationship was found between internet abuse and problematic gambling behaviours among boys and girls in the community sample, as well as the boys in the clinical sample. For these adolescents increased participation in internet

activities was associated with increased problematic gambling behaviour. Whether this result indicates that these individuals are participating in online gambling activities remains unclear. However, it is likely that adolescents who gamble participate in both online and non-online forms of gambling. In contrast, no significant relationship was found between internet abuse and problematic gambling behaviours among the girls in the clinical sample. This may suggest that although girls in the clinical sample score higher on a measure of internet abuse, they are not gambling online. A moderate positive relationship was also found between problematic video game playing and internet abuse among all samples, suggesting that these problematic behaviours frequently co-occur.

One of the primary purposes of this study was to examine the relationship between affect regulation abilities (emotional intelligence and alexithymia) and the addiction-related behaviours (video games, internet, and gambling) among the community and clinical samples of adolescents. Significant correlations were found between problematic video game playing and the affect regulation scales for both samples. These relationships indicate that as affect regulation abilities increase there is a decrease in problematic video game playing. Among the girls in the community sample, all affect regulation scales were significantly correlated with problematic video game playing. Among the community sample boys, however, video game playing was not significantly associated with intrapersonal or adaptability scales of the *EQ-i:YV*. It is important to note that among participants in the total clinical sample only, the interpersonal, stress management, and total scales of the *EQ-i:YV*, as well as the difficulty identifying feelings and total alexithymia scales of the *TAS-20*, were associated with problematic video game playing. This pattern of associations may reflect gender

differences in the clinical sample. Among the boys in the clinical sample, all of the affect regulation scales were moderately correlated with problematic video game playing. For the girls in the clinical sample, however, problematic video game playing was not associated with any of the affect regulation scales.

For the total community sample problematic use of the internet was significantly correlated with all affect regulation scales, indicating that as affect regulation abilities increase problematic use of the internet decreased. This same pattern was found among the girls in the community sample. Among the boys in the community sample, however, intrapersonal abilities and difficulty describing feelings were not significantly associated with problematic internet use. For the clinical sample, problematic use of the internet was found to be associated with stress management and total *EQ-i:YV* scores, as well as the difficulty identifying feelings and total alexithymia scales of the *TAS-20.* Among girls in the clinical sample, problematic use of the internet was associated with the interpersonal, stress management, and total emotional intelligence scales of the *EQ-i:YV* and the difficulty identifying feelings and total alexithymia scales of the *TAS-20.* For the boys in the clinical sample, only the difficulty identifying feelings scale of the *TAS-20* was significantly associated with problematic video game playing. Gender differences may once again reflect different online activities linked to boys and girls. It is likely that some internet activities are more likely to be used for affect regulation purposes than others (e.g. pornography, chat rooms, online interactive games vs. email, online research, music downloading).

For the community sample there was a low to moderate association between the affect regulation scales and problem gambling. For girls problematic gambling was

associated with low interpersonal, adaptability, stress management, and difficulty identifying feelings; for boys problem gambling was associated with all affect regulation scales, with the exception of the intrapersonal and difficulty describing feelings scales. For the clinical sample there was only a minimal association between problem gambling and affect regulation abilities. Among girls problematic gambling was found to have a moderate correlation with stress management; among the problem gambling was associated with difficulty identifying feelings, although this correlation was of fairly low magnitude.

The correlations between the affect regulation and addiction-related behaviour scales for the community sample provide some support for the hypothesis that poor affect regulation is associated with addiction-related behaviours among adolescents, and are consistent with the findings of Coman et al. (1997), Lumley and Roby (1995), and Taylor et al. (1997). Overall, these correlations were of low to moderate magnitude and suggest that poor social and emotional competency is associated with participation in addiction-related behaviours. This was especially true for girls in the community sample. For boys in the community sample, however, the ability to understand and effectively communicate one's feelings, and adapt those emotions to changing situations, appear to be less important with regard to addiction-related behaviours. This suggests that for males the participation in addiction-related behaviours is less associated with an understanding of emotion than how the emotions are actually dealt with by the individual.

In contrast, the results for the clinical sample were less straight forward. The clinical sample displayed a similar pattern to the community sample, in which the ability to understand and effectively communicate one's own feelings, as well as to adapt those

emotions to changing situations, do not appear to be linked to increased problems with addiction-related behaviours. However, the overall pattern of results suggests that affect regulation abilities may be less important to the development of addiction-related behaviours in clinical samples of adolescents. Among these individuals, specific characteristics of their pre-existing mental health problems may account for participation in addiction-related behaviors. This possible explanation is consistent with the pathways model proposed by Blasczcynski and Nower (2002), who describe three non-mutually exclusive pathways that lead to pathological gambling (or other addiction-related behaviours): learning, emotional vulnerability, or psychosocial disturbance. It may be that for the community sample emotional vulnerability, in the form of poor affect regulation abilities, accounts for participation in addiction-related behaviours. In contrast, among the clinical sample, participation in addiction-related behaviours may be accounted for partially by emotional vulnerability, but primarily by psychosocial disturbance.

Structure of affect regulation and addiction-related behaviours

The results of the first confirmatory factor analysis supported the use of the one-factor model of affect regulation (the four *EQ-i:YV* scales and the *TAS-20* total score as one latent variable) over the two-factor model of affect regulation (separate latent variables for emotional intelligence and alexithymia). The extremely high parameter estimates between the emotional intelligence and alexithymia latent variables obviously contributed to the poor fit of the two-factor affect regulation model. The one-factor model was found to have good fit to the data. The total *TAS-20* scale was used instead of the individual subscales because of measurement issues associated with the assessment of

alexithymia in adolescents, and the externally oriented thinking style scale in particular (Eastabrook, 2008; Rieffe et al., 1998; Sakkinnen et al., 2007). The difficulty identifying feelings and the difficulty describing feelings dimensions of the English and Dutch versions of the *TAS-20* have both demonstrated good psychometric properties in large samples of adolescents (Eastabrook, 2008; Rieffe et al., 1998). However, the externally oriented thinking style dimension has consistently been shown to have low reliability and validity in adolescent samples (Eastabrook, 2008; Rieffe et al., 1998; Sakkinnen et al., 2007).

The three-factor addiction-related behaviours model was also found to fit the data well. For both the community and clinical samples the parameter estimates indicated positive relationships (of moderate magnitude) among all of the addiction-related behaviours. For both the clinical and community samples the relationships between problematic video game playing and internet abuse, and internet abuse and problem gambling were stronger than the relationship between problematic video game playing and problem gambling. This same pattern of relationships was observed among boys and girls in the community sample. For boys, the strongest relationship among the addiction-related behaviours was between internet abuse and problem gambling, whereas for females the strongest relationship was between problematic video game playing and internet abuse. Consistent with the correlation analyses, the relationship between problematic video game playing and gambling was non-significant among boys in the community sample. This result contradicts the finding of Wood et al. (2004), who found that individuals who reported regular participation in gambling activities were more likely to play video games regularly. This discrepancy in findings may be gender

specific. The Wood et al. (2004) study did not differentiate between boys and girls, and their sample included more girls (n = 549) than boys (n = 441).

The present study found empirical evidence that addiction-related behaviours (problematic video game playing, internet abuse, and problem gambling) can be accounted for by a single latent variable labeled "dysfunctional preoccupation". This latent variable emerged in both the community and clinical adolescent samples, accounting for the greatest amount of variability in addiction-related behaviors in the community sample. Similar results were found among boys and girls in the community sample. These results provide further support for the results of Parker et al. (2008). Although a portion of the sample in the current study was used in the Parker et al. (2008) study, the present study extends the dysfunctional preoccupation variable to a clinical sample of adolescents.

The results of the current research indicate that problematic video game playing, internet abuse, and problem gambling are related behaviours. Individuals high on this dimension appear to share a maladaptive preoccupation with a set of recreational activities that have the potential to lead to a loss of control or behavioral addiction. This result is consistent with prior research indicating a relationship between addiction-related behaviours (Griffiths & Wood, 2000; Mitchell, Becker-Blease, & Finkelhor, 2005; Parker, Taylor, Eastabrook, Schell, & Wood, 2008; Praterelli & Brown, 1999). However, the specific nature of this predisposition remains unclear. Morahan-Martin and Schumacher (2000) and Chiu, Lee, and Huang (2004), for example, have suggested that the internet serves as a displacement activity that allows the individual to engage in an activity that is more pleasurable than "the task at hand". This theory is supported by

research conducted by Chaney and Blalock (2006), who looked at the relationship between online sexual addiction and boredom susceptibility among 517 men between the ages of 18 and 76 years of age. It was found that individuals with online sexual addiction, as well as those with those classified as at risk for online sexual addiction, reported significantly higher levels of boredom than individuals judged not to have an online sexual addiction. Of particular relevance to the current study was the additional finding that those identified as internet sexual addicts were also more likely to report lower levels of social connectedness. This may indicate that these individuals are engaging in online sexual activities in an attempt to escape or regulate their negative emotional states.

There is a convincing body of evidence to suggest that difficulty regulating one's emotions may create a predisposition for participation in these types of behaviours. Participation in addiction-related behaviours has been linked with boredom susceptibility (Gupta et al., 2006; Hardoon & Derevensky, 2002) and emotion-focused and avoidance coping strategies (Bergevin et al., 2006; Gupta et al., 2004). Future research is needed to examine how dysfunctional preoccupation relates to other variables including, environmental predictors, personality, and temperament.

Although the present study only included three types of behavioral addiction, it is likely that other types of behavioural addiction are linked with dysfunctional preoccupation. The current study included only electronic recreational activities, however many other non-electronic activities carry a potential for behavioural addiction. For example, the DSM-IV (APA, 1994) reports that when individuals with pathological gambling are not gambling they may be more likely to spend excessive amounts of time and energy on work, suggesting that pathological gamblers are also more likely to be

"workaholics". In addition, Morahan-Martin (2005) reported that internet addiction was significantly associated with sexual dysfunction and compulsive shopping. A review of the current research literature, however, suggests that the relationships among other addiction-related behaviours are not well known. The role of dysfunctional preoccupation in other addiction-related behaviours, such as excessive working, compulsive buying, sexual addiction, and some forms of eating disorders, needs to be examined. It is particularly important that future research examine dysfunctional preoccupation in relation to both electronic and non-electronic addiction-related behaviours.

The results of the present study also have implications for the diagnosis of addiction-related behaviours, as the existence of the dysfunctional preoccupation variable may indicate that the current structure of the DSM-IV "impulse control" category may be inaccurate. The DSM-IV (APA, 1994) included a "not otherwise specified category" in the impulse control disorder category for addiction-related disorders that do not meet the diagnostic criteria for any other disorders. This is the diagnostic category that would best fit problematic video game playing and internet abuse, but this diagnostic category was not included in the DSM-IV-TR (2000). The results of the current research suggests that since pathological gambling, problematic video game playing, and internet use may share a common etiology, these disorders might be better contained within a single category within future revision of the DSM.

The present study also has implications for our conceptualization of behavioral addictions. The term "addiction" is controversial (Charlton & Danforth, 2007), and the question of how to conceptualize various types of addiction-related behaviours has generated a long-standing debate. This term has been used almost exclusively for

substance-use disorders; however, there has been a recent shift toward including non-substance-related or behavioural addictions (Potenza, 2006). The dysfunctional preoccupation dimension may provide a better way to conceptualize behavioural addiction by providing an alternative to the use of the term "addictions".

Finally, the presence of a "dysfunctional preoccupation" dimension has important implications for intervention and prevention strategies directed at youth. Gambling problems, excessive internet use, and gaming addiction are typically treated as separate mental health issues, with unique etiologies. Intervention and prevention strategies for youth might be more effective if they simultaneously targeted a broad range of addiction-related behaviors. By employing a more general approach to the treatment of addiction-related behaviours clinicians will be better able to target a wide range of addiction-related behaviours that appear to share a common underlying etiology. As such, this may prevent the patient from "moving on" to another addiction-related behaviour. Further research is needed to further explore the underlying cause of dysfunctional preoccupation so that clinicians are better prepared to treat the problem and prevent future issues with addiction-related behaviours.

Relationship between affect regulation and addiction-related behaviour models

One of the central goals of the present study was to examine the relationship between affect regulating abilities and a constellation of addiction-related behaviors (gambling, gaming, and internet use) in an adolescent community sample. The path analysis revealed that affect regulation is a moderate predictor of dysfunctional preoccupation. Affect regulation was found to account for 18% and 15% of the variance in dysfunction preoccupation for the community and clinical samples, respectively. When

this model was examined separately for boys and girls in the community sample, the model was found to fit the data well for the boys; for the girls three of the four goodness-of-fit indices indicated inadequate fit. For boys and girls in the community sample affect regulation was found to account for 10 % and 18% of the variance in dysfunctional preoccupation, respectively. This pattern of results suggests that affect regulation may be a better predictor of dysfunctional preoccupation among the girls in the community sample.

In order to examine the contribution of affect regulation abilities for each of the addiction-related behaviours (problematic video game playing, internet abuse, and problem gambling) latent variable path analysis was used. For both the community and clinical samples the model was found to fit the data. For the community sample affect regulation accounted for 11% of the variance in problematic video game playing and 4% of the variance in internet abuse. The relationship between affect regulation and problem gambling, however, was found to be non-significant. The relationships between all of the addiction-related behaviours were significant; the relationships between internet abuse and problematic video game playing and internet abuse and problem gambling were of moderate magnitude, while the relationship among problematic video game playing and problem gambling was considerably lower. For the clinical sample, affect regulation accounted for 8% of the variance in problematic video game playing, but was not a significant predictor of internet abuse or problem gambling. The relationships between the addiction-related behaviours were all positive, and of moderate magnitude.

When this model was examined separately for boys and girls in the community sample the model continued to fit the data well. For boys in the community sample affect

regulation accounted for 14% of the variance in problematic video game playing and 3% of the variance in problem gambling; however, affect regulation was not found to be a significant predictor of internet abuse. Among boys in the community sample the relationships between the addiction-related behaviours were all significant. The relationships between problematic video game playing and internet abuse and internet abuse and problem gambling were positive and of high magnitude. The relationship between problematic video game playing and problem gambling was significant, but it was a negative relationship. This pattern of results indicates that boys in the community sample who participated in gambling activities were less likely to participate in gambling activities, and vice versa. For girls in the community sample, affect regulation accounted for 12% of the variance in problematic video game playing and 5% of the variance in internet abuse. Affect regulation was not found to be a significant predictor of problem gambling among the girls in the community sample. The relationships between the addiction-related behaviours were all significant, positive, and of moderate magnitude. The relationship between problem gambling and problematic video game playing was positive among the girls in the community sample, but negative among the boys in the community sample. This accounts for the non-significant relationship between problematic video game playing and problem gambling when the total community sample is examined as a whole.

Viewed as a whole, the results of the present study indicate that problematic video game playing was the only addiction-related variable that can reliably be predicted by affect regulation abilities. At first glance, this finding appears to contradict the results of studies that poor affect regulation abilities are a risk factor for problematic gambling

behaviors (Coman et al., 1997; Lumley & Roby, 1995; Taylor et al., 1997). However, this result may actually be an artifact of how the addiction-related behaviours were measured in the present study. Specifically, problematic internet use and gambling were treated as homogenous variables, without differentiation between specific internet-mediated activities or types of gambling activities. In contrast, problematic video game playing is a relatively homogenous variable that includes electronic game playing on home consoles, computers, or in arcades. It is possible that only some types of internet and gambling activities are used to regulate affect, but the treatment of these variables as homogenous categories has concealed the relationship between some variants of these behaviours and affect regulation abilities.

In addition, due to its legally restricted nature, gambling among adolescents is likely quite different than gambling among adults. Among adults, casino-type electronic gambling is one of the most popular forms for which individuals seek treatment (Griffiths & Wood, 2000). In North America these forms of gambling are illegal for individuals under the age of 18 years, and therefore less accessible to adolescents. For example, in Jacobs' (2000) review of the gambling literature it was reported that the most common forms of gambling reported by adolescents included bets placed on games played with family and friends, bets placed on games of skill, bets placed on sporting events, and bingo. In contrast, video games are highly accessible and include many of the structural characteristics that are present in the more popular forms of gambling among adults (Griffiths & Wood, 2000). Since the financial incentives and repercussions of gambling may be less important to adolescent gamblers, the structural characteristics of video games may provide the stimulus desired by adolescents with poor affect regulation

abilities. If this is the case, the results of the present study actually provide indirect support of prior research (including Coman et al., 1997; Lumley & Roby, 1995; Taylor et al., 1997). The present study indicates that individuals with affect regulation difficulties are more likely to participate in specific forms of addiction-related behaviours in an attempt to regulate their emotions.

Limitations and Future Directions

One limitation of the present study is that it did not distinguish between gambling types or internet activities. As mentioned earlier, the lack of distinction between internet and activities may have allowed specific differences to cancel each other out. As suggested by Morahan-Martin (2005), a focus on internet activities may be misleading, since the problem is often not the internet so much as the activities pursued while on the internet. The same is true for gambling. Many forms of gambling exist, from bets made among friends, to lottery tickets, to the more formal types of games found in casinos. It may be that different results would be found if gambling was not treated as a homogenous variable. Future research would benefit studying the many forms of gambling (e.g. online poker, betting on sports event among friends, lottery ticket playing) separately. Furthermore, since males were found to score higher on all of the addiction-related behavior scales, distinguishing between different activities may also reveal more information about the behaviors of females, since previous research has found that males and females prefer different types of gambling (Jacobs, 2000) and internet (Yang, 2001) activities.

There are some other noteworthy limitations to mention about the present study. First, the present study used a rather homogeneous sample of adolescents (the majority of adolescents were Caucasian), which therefore limits the generalizability of the study. The findings are also limited by the use of a single measure for each key variable. The study needs to be replicated using other measures for key variables, and using a broader range of assessment strategies (e.g., self-report, performance based, or observer ratings). As Petrides and Furnham (2000) have noted, emotional intelligence measures using either an ability or self-report approach may predict outcome variables quite differently.

Adolescence is an important formative period in which the individual undergoes physical and psychological changes that impact the development of affect regulation abilities. Poor affect regulation abilities have been implicated in a number of undesirable outcomes among adult samples, including problem gambling (Coman et al., 1997; Lumley & Roby, 1995; & Taylor et al., 1997). Furthermore, there is evidence that problem gambling is part of a collective of addiction-related behaviours that also includes internet abuse and problematic video game playing. The purpose of the present study was to examine the link among addiction–related behaviours (specifically problem gambling, internet misuse, and problematic video/computer game use), as well as to examine the relationship between the addiction-related behaviours and affect regulation abilities in both community and clinical samples of adolescents.

The present study provided preliminary evidence suggesting that addiction-related behaviours including problematic video game playing, internet abuse, and problem gambling can be accounted for by an underlying dysfunctional preoccupation dimension. The existence of this variable provides evidence for a common underlying etiology in

addiction-related behaviours. Overall, the finding that affect regulation is a significant predictor of dysfunctional preoccupation is consistent with previous work that has found affect regulation abilities to be important risk factors in the development of problem gambling and other addiction-related problems (Coman et al., 1997; Griffiths & Wood, 2000; Jacobs, 2000; Kim et al., 2006; Lumley & Roby, 1995; Mitchell et al., 2005). Further research is needed to examine whether other addiction-related behaviours (e.g. excessive working, compulsive buying, sexual addiction, and some forms of eating disorders) can be linked with the dysfunctional preoccupation dimension.

In addition to looking more specifically at the various addiction-related behaviours, future research is needed to examine the relationship between the specific affect regulation dimensions (intrapersonal, interpersonal, adaptability, stress management, and alexithymia) and dysfunctional preoccupation, as well as specific addictions-related behaviours. For example, the research conducted by Lumley and Roby (1995) and Parker et al. (2005) has suggested that alexithymia is a risk factor for gambling among adults. Because alexithymia is primarily related to intrapersonal affect regulation abilities it would be expected that intrapersonal abilities would be the best predictor of addiction-related behaviours. In contrast, research has suggested that a deficit in social skills is associated with problematic internet use, suggesting that the interpersonal dimension of emotional intelligence maybe the best predictor of at least some internet related problems. Based on the results of prior research it seems likely that the specific aspects of affect regulation that contribute to the prediction of these behaviours is different for specific behaviours.

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Table 1

Means and standard deviations for the Youth Version of the Emotional Quotient Inventory for the combined, community, and clinical samples by gender.

	Intra	Inter	Adapt	Stress	Total EI
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Community					
Boys (n = 219)	2.38 (0.61)	3.17 (0.41)	2.94 (0.52)	2.89 (0.55)	2.85 (0.37)
Girls (n = 386)	2.50 (0.71)	3.39 (0.39)	2.81 (0.49)	2.80 (0.53)	2.87 (0.37)
Total (N = 605)	2.46 (0.67)	3.31 (0.41)	2.86 (0.51)	2.83 (0.54)	2.87 (0.37)
Clinical					
Boys (n = 135)	2.25 (0.65)	3.05 (0.04)	2.76 (0.55)	2.65 (0.60)	2.68 (0.37)
Girls (n = 66)	2.39 (0.71)	3.31 (0.41)	2.56 (0.50)	2.67 (0.66)	2.73 (0.37)
Total (N = 201)	2.30 (0.67)	3.13 (0.44)	2.69 (0.54)	2.66 (0.62)	2.69 (0.37)
Combined Sample					
Boys (n = 354)	2.34 (0.63)	3.12 (0.42)	2.87 (0.54)	2.80 (0.58)	2.78 (0.38)
Girls (n = 452)	2.48 (0.71)	3.78 (0.40)	2.78 (0.50)	2.78 (0.56)	2.85 (0.37)
Total (N = 806)	2.42 (0.68)	3.27 (0.42)	2.82 (0.52)	2.79 (0.57)	2.82 (0.38)

Note: Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, EI = total emotional intelligence

Table 2

Means and standard deviations for the 20 item Toronto Alexithymia Scale for the combined, community and clinical samples by gender.

	DIF	DDF	EOT	Total Alex
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Community				
Boys (n = 219)	17.10 (4.45)	14.85 (4.01)	22.50 (4.76)	54.44 (9.29)
Girls (n = 386)	17.16 (4.57)	14.35 (4.52)	21.40 (4.24)	52.93 (10.15)
Total (N = 605)	17.19 (4.64)	14.52 (4.34)	21.79 (4.46)	53.48 (9.87)
Clinical				
Boys (n = 66)	16.99 (4.58)	15.23 (3.54)	24.53 (4.10)	56.75 (8.71)
Girls (n = 135)	18.54 (4.83)	15.26 (3.80)	22.32 (0.56)	56.12 (10.47)
Total (N = 201)	17.50 (4.71)	15.23 (3.62)	23.80 (4.37)	56.54 (9.30)
Combined Sample				
Boys (n = 354)	17.06 (4.50)	14.99 (3.84)	23.27 (4.62)	55.32 (9.13)
Girls (n = 452)	17.39 (4.69)	14.98 (4.43)	21.53 (4.29)	53.40 (10.25)
Total (N = 806)	17.24 (4.61)	14.70 (4.18)	22.30 (4.52)	54.24 (9.82)

Note: DIF = difficulty identifying feelings, DDF = difficulty describing feelings, EOT = externally oriented thinking, Total Alex = total alexithymia.

Table 3

Means and standard deviations for the addiction related behaviours for the combined, community and clinical samples by gender.

	PVGS	IADQ	SOGS-RA
	Mean (SD)	Mean (SD)	Mean (SD)
Community			
Boys (n = 219)	2.59 (2.26)	34.95 (14.09)	2.70 (5.63)
Girls (n = 386)	0.83 (1.47)	34.94 (14.42)	0.93 (3.68)
Total (N = 605)	1.47 (1.99)	34.94 (14.29)	1.56 (4.56)
Clinical			
Boys (n = 135)	2.59 (2.21)	32.25 (12.29)	1.78 (3.77)
Girls (n = 66)	0.97 (1.71)	37.79 (16.99)	1.06 (3.85)
Total (N = 201)	2.05 (2.19)	34.07 (14.21)	1.54 (3.80)
Combined Sample			
Boys (n = 354)	2.59 (2.24)	33.92 (13.48)	2.35 (5.02)
Girls (n = 452)	0.86 (1.51)	35.35 (14.84)	0.94 (3.70)
Total (N = 806)	1.62 (2.05)	34.72 (14.27)	1.56 (4.38)

Note: PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents.

Table 4

Correlations between EQ-i:YV and TAS-20 Scales for community (N= 605) and clinical (N = 201) samples.

	1	2	3	4	5	6	7	8	9
1. Intra	-	.31*	.26*	.24*	.72*	-.40*	-.33*	-.77*	-.67*
2. Inter	.32*	-	.35*	.38*	.67*	-.24*	-.40*	-.23*	-.39*
3. Adapt	.18*	.30*	-	.36*	.69*	-.23*	-.38*	-.19*	-.36*
4. Stress	.15*	.28*	.19*	-	.70*	-.33*	-.26*	-.25*	-.38*
5. EI	.68*	.67*	.62*	.64*	-	-.45*	-.48*	-.57*	-.68*
6. DIF	-.20*	-.11	-.17*	-.34*	-.33*	-	.16*	.51*	.76*
7. EOT	-.24*	-.42*	-.34*	-.21*	-.45*	.20*	-	.29*	.65*
8. DDF	-.58*	-.20*	-.10	-.12	-.41*	.45*	.28*	-	.80*
9. Alexi	-.44*	-.33*	-.28*	-.32*	-.53*	.77*	.68*	.75*	-

Note: *p < .05; Community sample above diagonal line, clinical sample below diagonal line; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, EI = total emotional intelligence, DIF = difficulty identifying feelings, EOT = externally oriented thinking, DDF = difficulty describing feelings, Alex = total alexithymia.

Table 5

Correlations between EQ-i:YV and TAS-20 Scales for community sample boys (N = 219) and girls (N = 386).

	1	2	3	4	5	6	7	8	9
1. Intra	-	.35*	.33*	.27*	.72*	-.31*	-.30*	-.67*	-.59*
2. Inter	.27*	-	.32*	.45*	.69*	-.23*	-.43*	-.23*	-.43*
3. Adapt	.25*	.45*	-	.39*	.71*	-.26*	-.47*	-.22*	-.46*
4. Stress	.24*	.39*	.33*	-	.74*	-.32*	-.38*	-.32*	-.49*
5. EI	.72*	.58*	.69*	.69*	-	-.40*	-.54*	-.53*	-.70*
6. DIF	-.44*	-.26*	-.22*	-.34*	-.47*	-	.09	.46*	.72*
7. EOT	-.34*	-.36*	-.36*	-.21*	-.45*	.21*	-	.21*	.64*
8. DDF	-.80*	-.23*	-.19*	-.22*	-.59*	.54*	.33*	-	.76*
9. Alex	-.70*	-.37*	-.33*	-.34*	-.67*	.78*	.66*	.83*	-

Note: *p < .05; Community sample boys above diagonal line, community sample girls below diagonal line; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress =stress management, EI = total emotional intelligence, DIF = difficulty identifying feelings, EOT = externally oriented thinking, DDF =difficulty describing feelings, Alex = total alexithymia.

Table 6

Correlations between EQ-i:YV and TAS-20 Scales for clinical sample boys (N = 135) and girls (N = 66).

	1	2	3	4	5	6	7	8	9
1. Intra	-	.30*	.23*	.19*	.69*	-.21*	-.22*	-.56*	-.44*
2. Inter	.32*	-	.36*	.25*	.67*	-.11	-.33*	-.11	-.26*
3. Adapt	.15	.38*	-	.16	.65*	-.08	-.35*	-.05	-.22
4. Stress	.07	.37*	.25*	-	.63*	-.33*	-.24*	-.07	-.32*
5. EI Total	.64*	.72*	.62*	.66*	-	-.29*	-.42*	-.32*	-.48*
6. DIF	-.23	-.27*	-.29*	-.36*	-.44*	-	.17	.41*	.77*
7. EOT	-.25*	-.48*	-.48*	-.17	-.48*	.38*	-	.21*	.64*
8. DDF	-.62*	-.41*	-.21	-.21	-.57*	.53*	.43*	-	.72*
9. Alex	-.44*	-.48*	-.42*	-.32*	-.62*	.82*	.77*	.79*	-

Note: *p <.05; Clinical sample males above diagonal line, clinical sample girls below diagonal line; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, EI = total emotional intelligence, DIF = difficulty identifying feelings, EOT = externally oriented thinking, DDF = difficulty describing feelings, Alex = total alexithymia.

Table 7

Correlations between the addiction-related behaviours for the combined, community, and clinical samples by gender.

	PVGS	IADQ	SOGS-RA
1. Combined Sample			
PVGS	-	.38*	.24*
IADQ	.28*	-	.41*
SOGS-RA	.16*	.30*	-
2. Community			
Sample			
PVGS	-	.52*	.06
IADQ	.35*	-	.46*
SOGS-RA	.34*	.41*	-
3. Clinical Sample			
PVGS	-	.38*	.05
IADQ	.41*	-	.41*
SOGS-RA	.37*	.22	-

Note: *p < .05; 1. Combined sample- community sample above diagonal line, clinical sample below diagonal line; 2. Community sample- boys above diagonal line, girls below diagonal line; 3. Clinical sample boys above diagonal line, clinical sample girls below diagonal line; PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen-Revised for Adolescents.

Table 8

Correlations between affect regulation scales and addiction-related behaviours for the boys (n = 219), girls (n = 386), and total community sample (N = 605).

	PVGS			IADQ			SOGS		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Intra	-.12	-.23*	-.19*	-.04	-.12*	-.09*	-.03	-.02	-.04
Inter	-.21*	-.34*	-.35*	-.24*	-.31*	-.28*	-.21*	-.32*	-.30*
Adapt	-.13	-.17*	-.08	-.17*	-.31*	-.26*	-.15*	-.17*	-.13*
Stress	-.25*	-.23*	-.17*	-.30*	-.32*	-.32*	-.20*	-.19*	-.17*
EI	-.24*	-.34*	-.27*	-.25*	-.36*	-.32*	-.20*	-.22*	-.21*
DIF	.14*	.16*	.13*	.26*	.29*	.28*	.19*	.12*	.15*
DDF	.14*	.15*	.15*	.11	.15*	.13*	.08	-.05	.01
EOT	.14*	.13*	.17*	.18*	.16*	.16*	.15*	.09	.14*
Alex	.20*	.20*	.20*	.26*	.26*	.26*	.26*	.07	.14*

Note: $p < .05$; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, EI = total emotional intelligence, DIF = difficulty identifying feelings, EOT = externally oriented thinking, DDF = difficulty describing feelings, Alex=total alexithymia, PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents.

Table 9

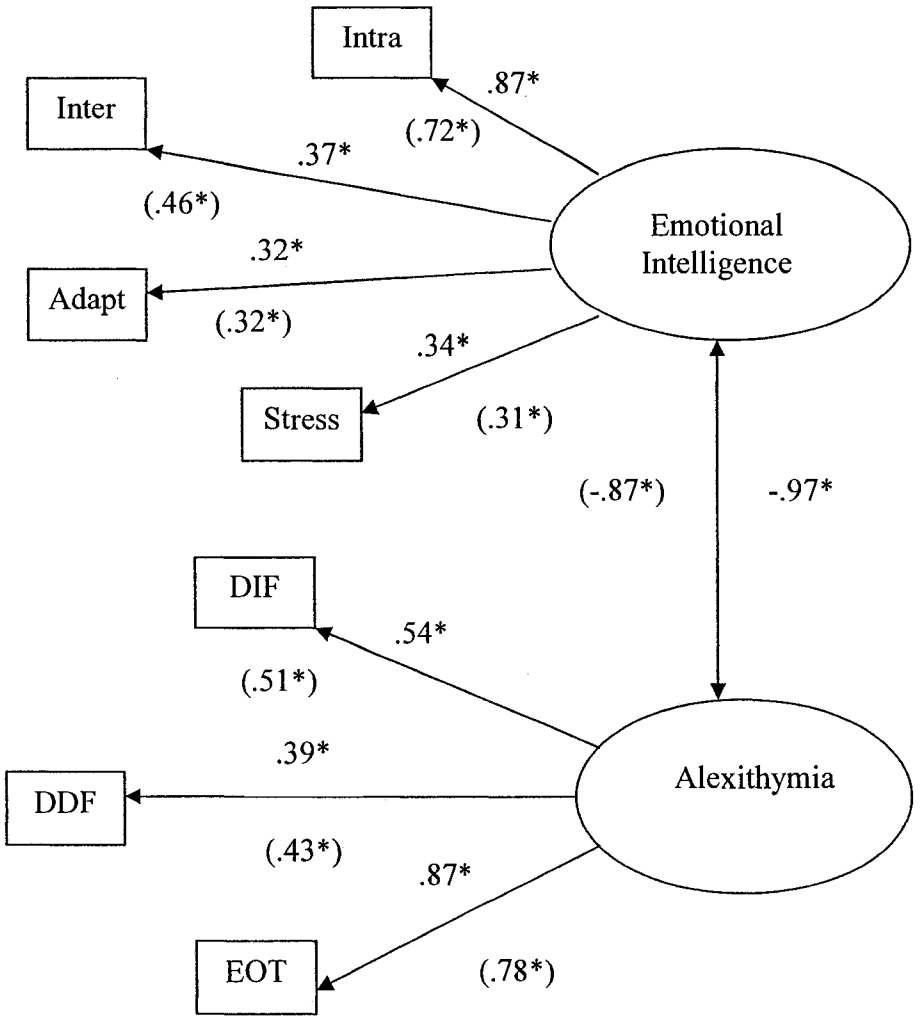
Correlations between affect regulation scales and addiction-related behaviours for the boys (n = 135), girls (n = 66), and total clinical sample (N = 201).

	PVGS			IADQ			SOGS		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Intra	-.05	-.05	-.08	.00	-.17	-.05	.03	.09	.04
Inter	-.19*	-.21	-.27*	-.08	-.26*	-.09	-.14	-.14	-.15*
Adapt	.02	.08	.09	-.06	-.14	-.12	-.14	-.09	-.05
Stress	-.28*	-.20	-.24*	-.04	-.44*	-.20*	-.00	-.36*	-.13
EI	-.18*	-.14	-.18*	-.06	-.39*	-.18*	-.08	-.12	-.10
DIF	.25*	.16	.15*	.23*	.38*	.31*	.16*	.06	.13
DDF	.18*	-.08	.09	.03	.13	.07	.02	-.10	-.10
EOT	-.02	.04	.08	-.16	.19	-.06	.07	.07	.13
Alex	.19*	.06	.15*	.06	.30*	.16*	.06	.09	.07

Note: $p < .05$; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, EI = total emotional intelligence, DIF = difficulty identifying feelings, EOT = externally oriented thinking, DDF = difficulty describing feelings, Alex = total alexithymia, PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents.

Figure 1

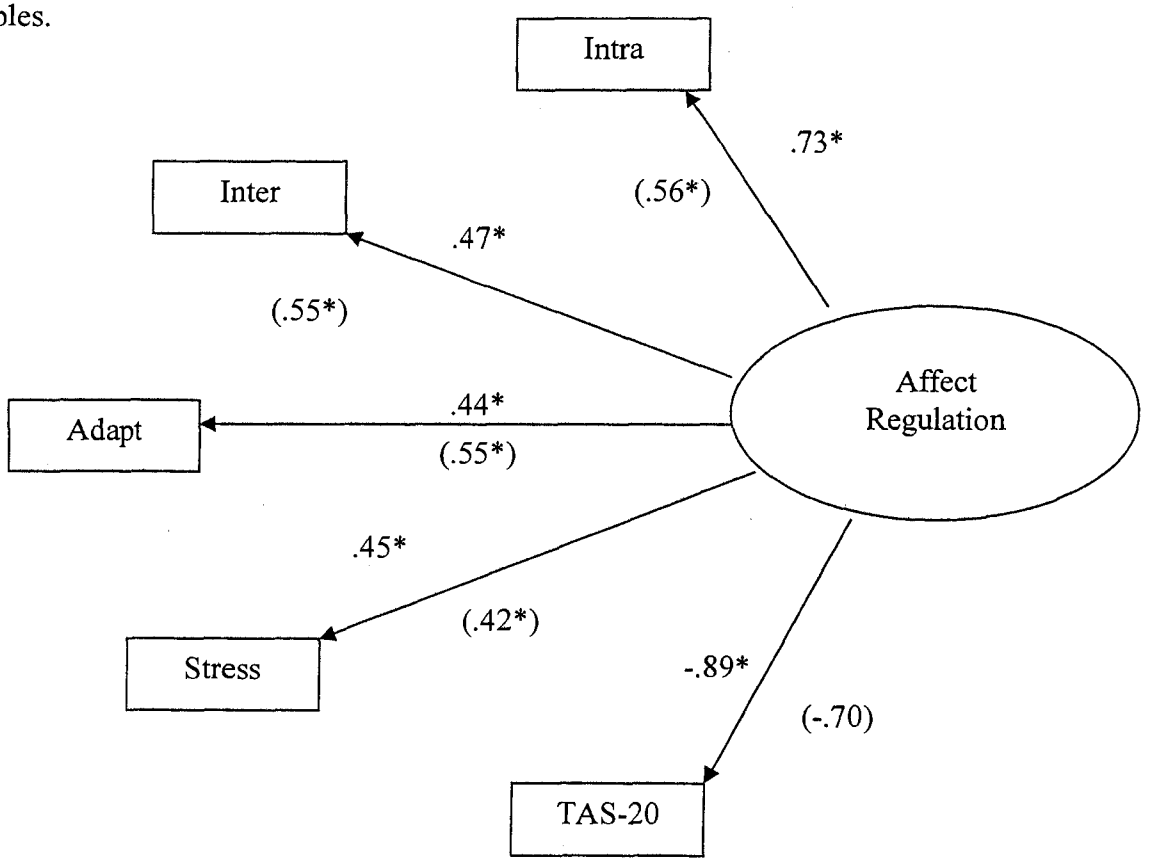
Confirmatory factor analysis of the 2-factor affect regulation model for the community (N = 605) and clinical (N = 201) samples.



Note: *p < .05; Clinical sample in parentheses; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, DIF = Difficulty identifying feelings, DDF = Difficulty describing feelings, EOT = Externally oriented thinking.

Figure 2

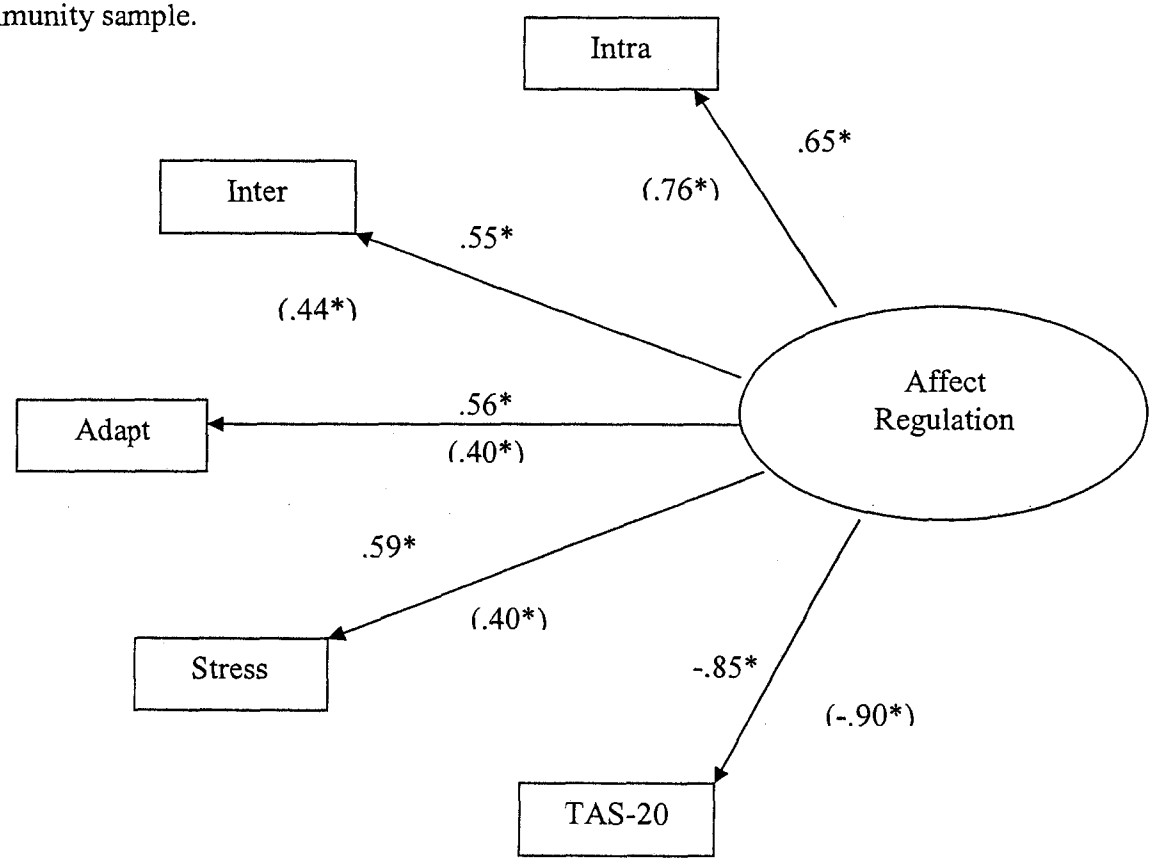
Confirmatory factor analysis for the 1-factor model of affect regulation for the community (N = 605) and clinical (N = 201) samples.



Note: *p < .05; Clinical sample in parentheses; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, TAS-20 = total alexithymia.

Figure 3

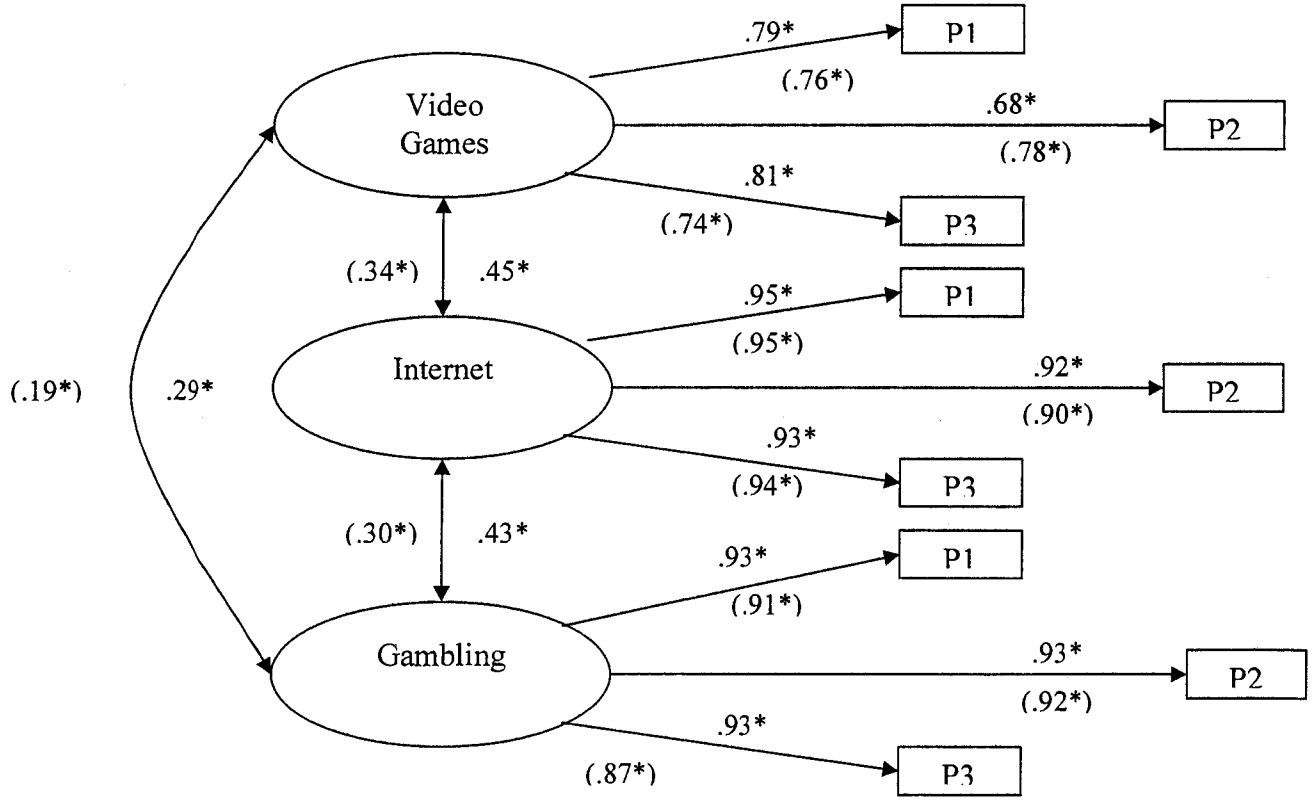
Confirmatory factor analysis for the 1-factor model of affect regulation for the boys (n = 219) and girls (n = 386) in the community sample.



Note: *p < .05; Girls in parentheses; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, TAS-20 = total alexithymia.

Figure 4

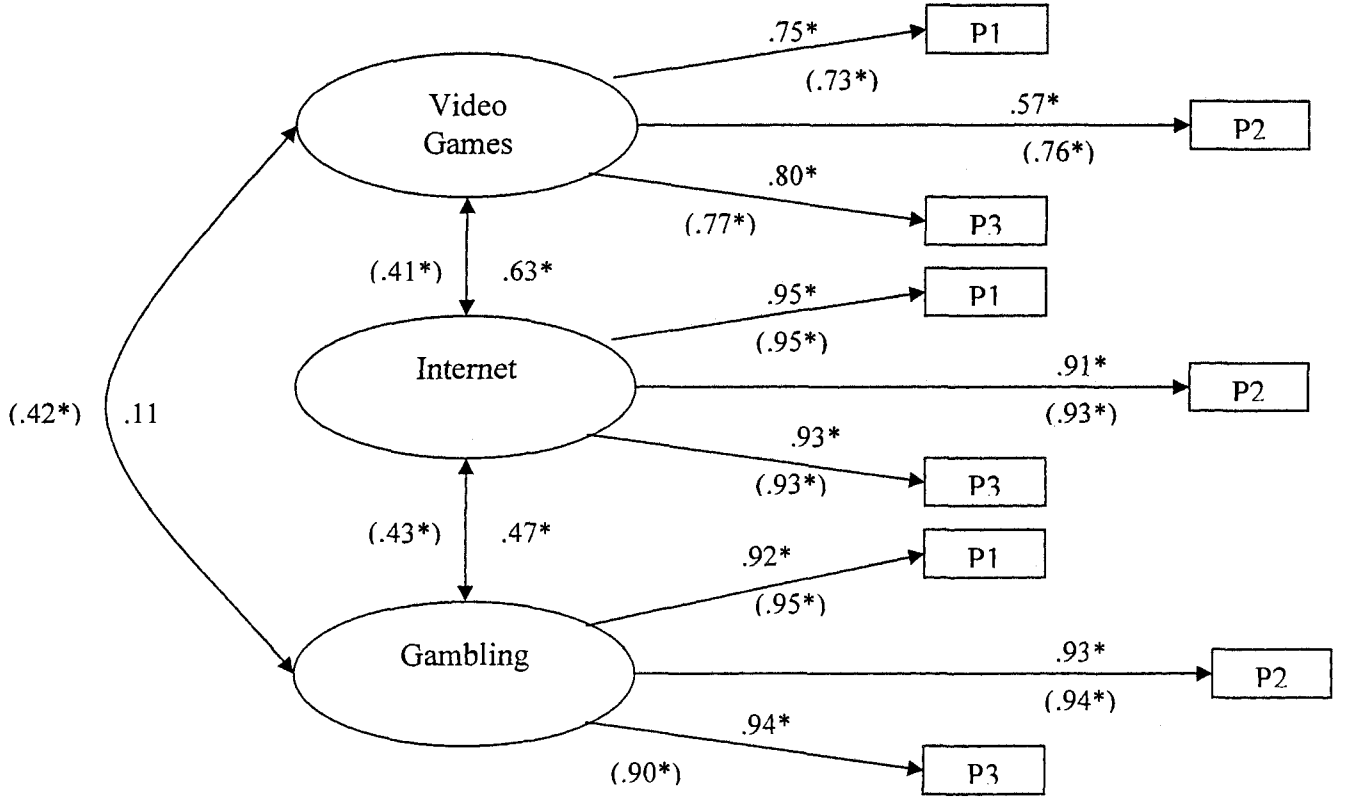
Confirmatory factor analysis for addiction-related behaviours model for community (N = 605) and clinical (N = 201) samples.



Note: *p < .05; Clinical sample in parentheses; PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents, P1 = Parcel 1, P2 = Parcel 2, P3 = Parcel 3.

Figure 5

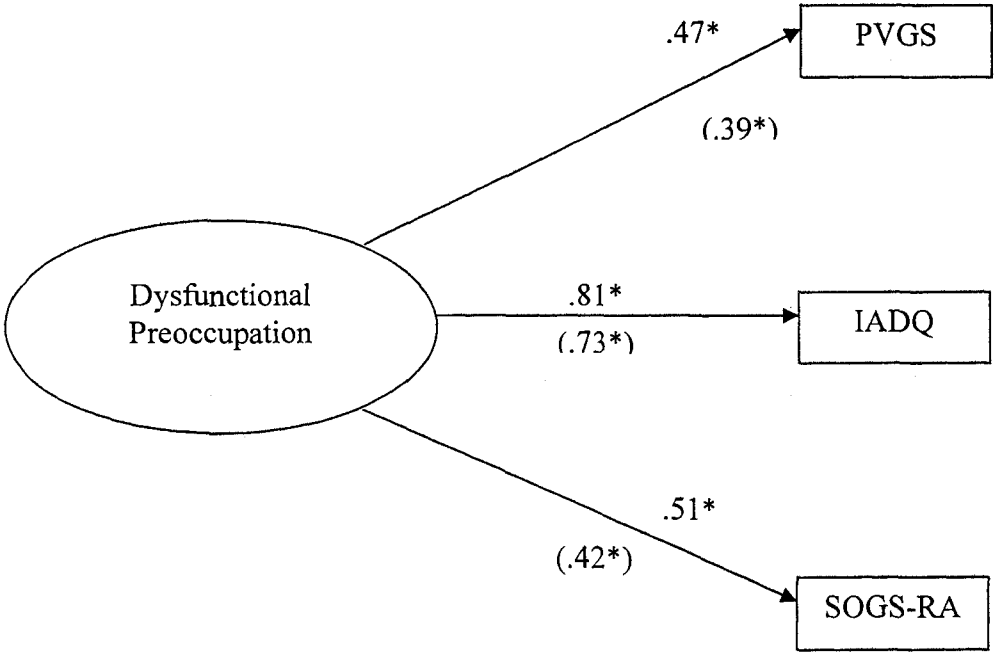
Confirmatory factor analysis for addiction-related behaviours model for boys (N = 219) and girls (N = 386) in the community sample.



Note: *p < .05; Clinical sample in parentheses; PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents, P1 = Parcel 1, P2 = Parcel 2, P3 = Parcel 3.

Figure 6

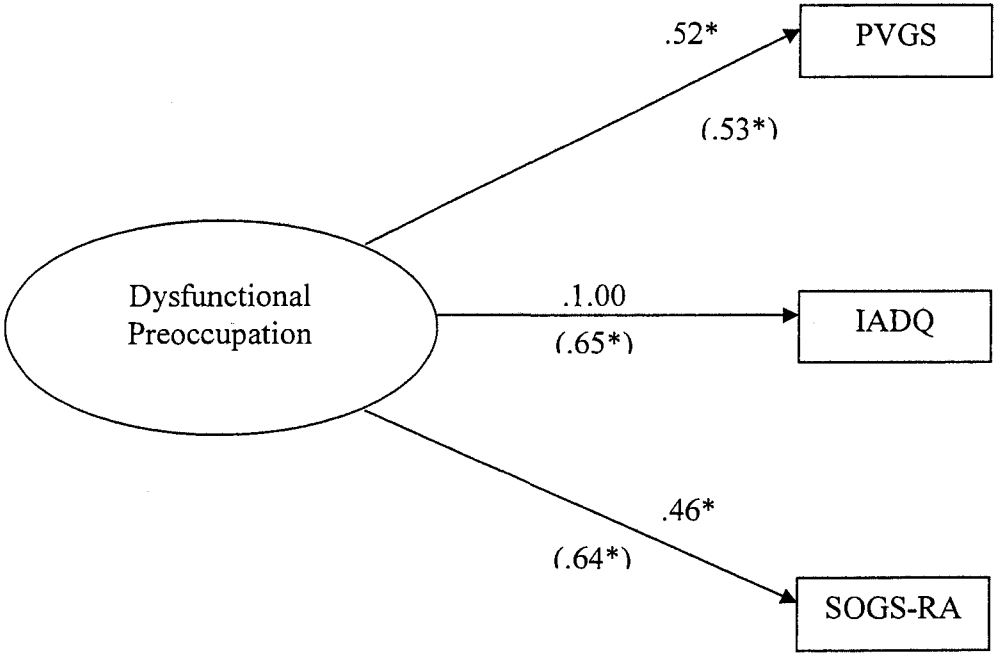
Confirmatory factor analysis for dysfunctional preoccupation model for community (N = 605) and clinical samples (N = 201).



Note: *p < .05; Clinical sample in parentheses; PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents

Figure 7

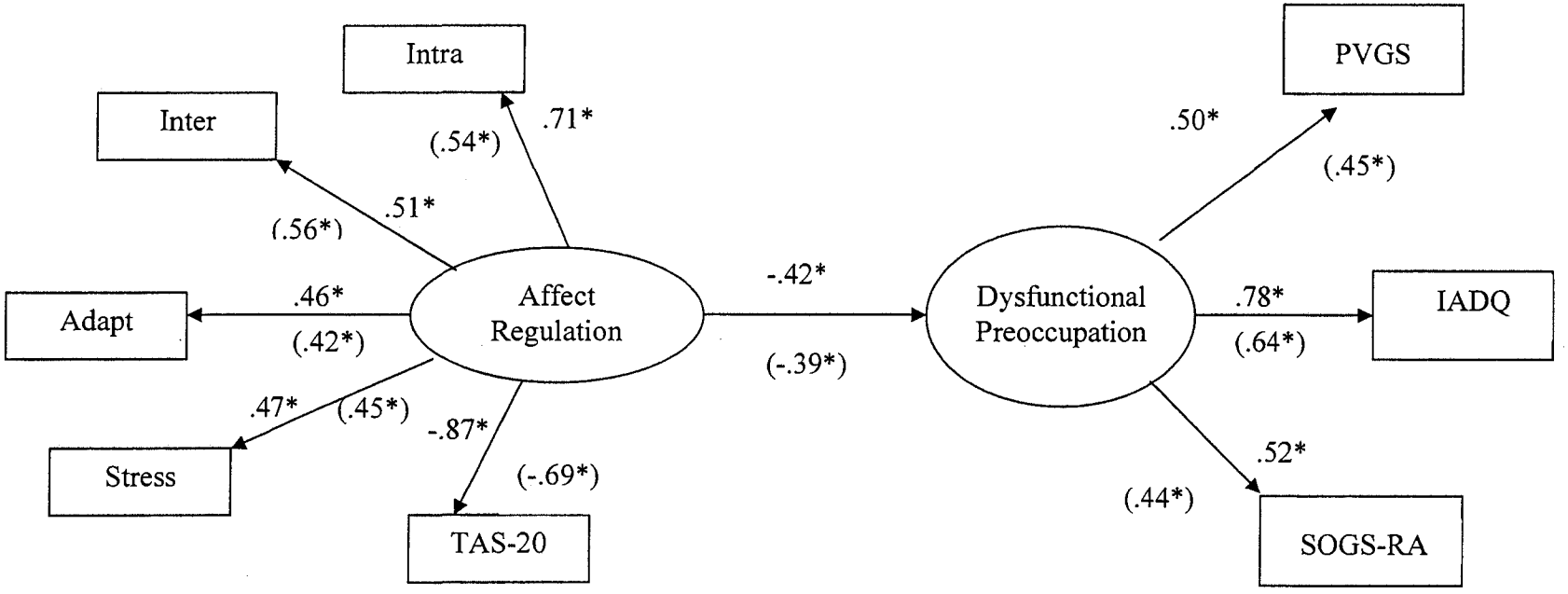
Confirmatory factor analysis for the dysfunctional preoccupation model for the boys (n = 219) and girls (n = 386) in the community sample.



Note: *p < .05; Girls in parentheses; PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents

Figure 8

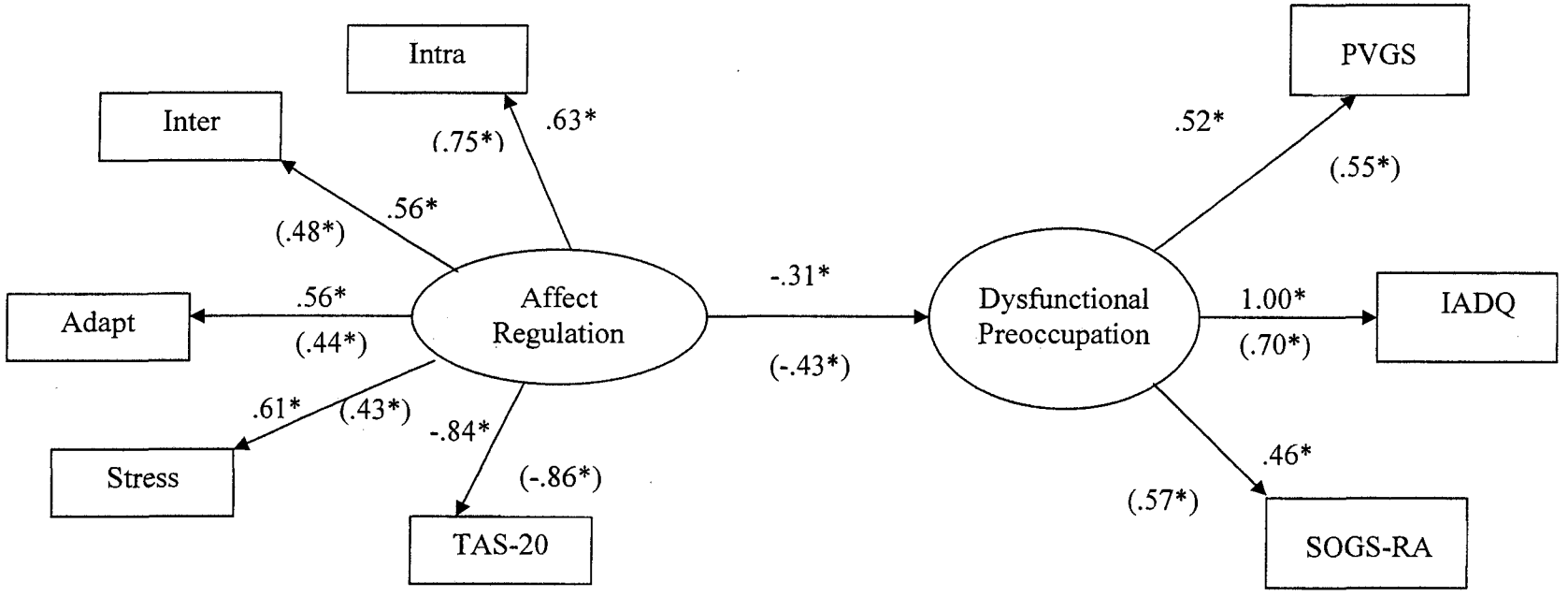
Latent variable path analysis of the relationship between the latent variables affect regulation and dysfunctional preoccupation for community (n = 605) and clinical (N = 201) samples.



Note: *p < .05; Clinical sample in parentheses; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, TAS-20 = total alexithymia, PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents.

Figure 9

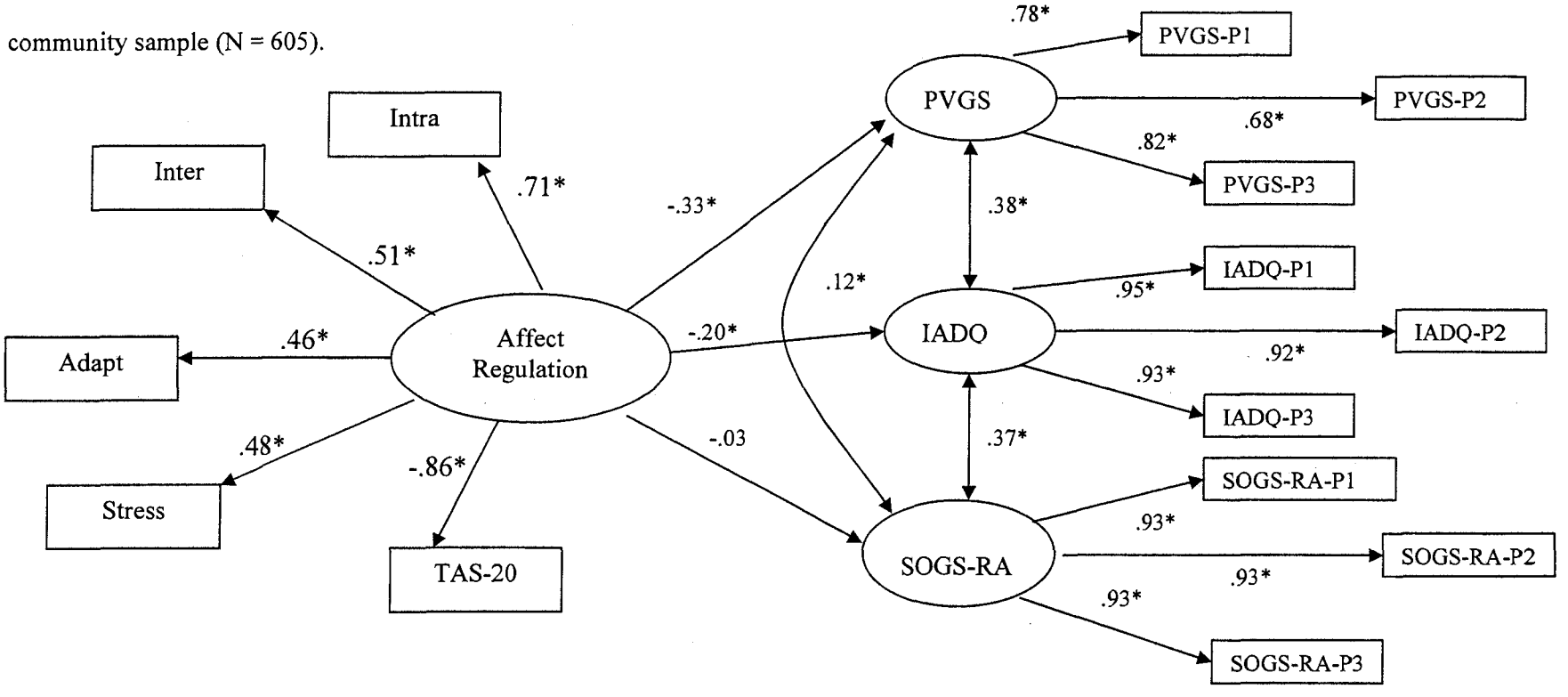
Latent variable path analysis of the relationship between the latent variables affect regulation and dysfunctional preoccupation for boys (n = 219) and girls (n = 386) from the community sample.



Note: *p < .05; Girls in parentheses; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, TAS-20 = total alexithymia, PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen Revised for Adolescents.

Figure 10

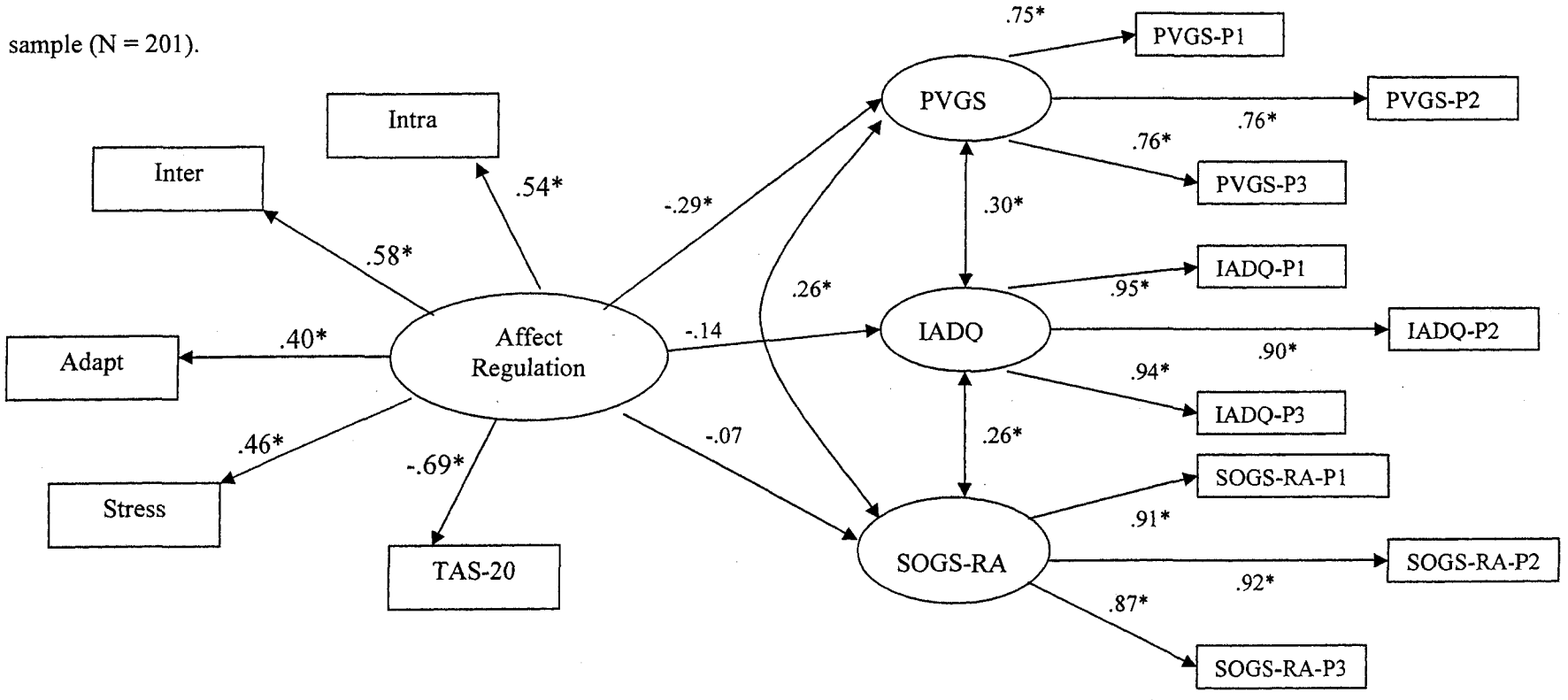
Latent variable path analysis of the relationship between the latent variable affect regulation and the addiction-related behaviours for the community sample (N = 605).



Note: *p < .05; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, TAS-20 = total alexithymia, PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen-Revised for Adolescents, P1 = Parcel 1, P2 = Parcel 2, P3 = Parcel 3.

Figure 11

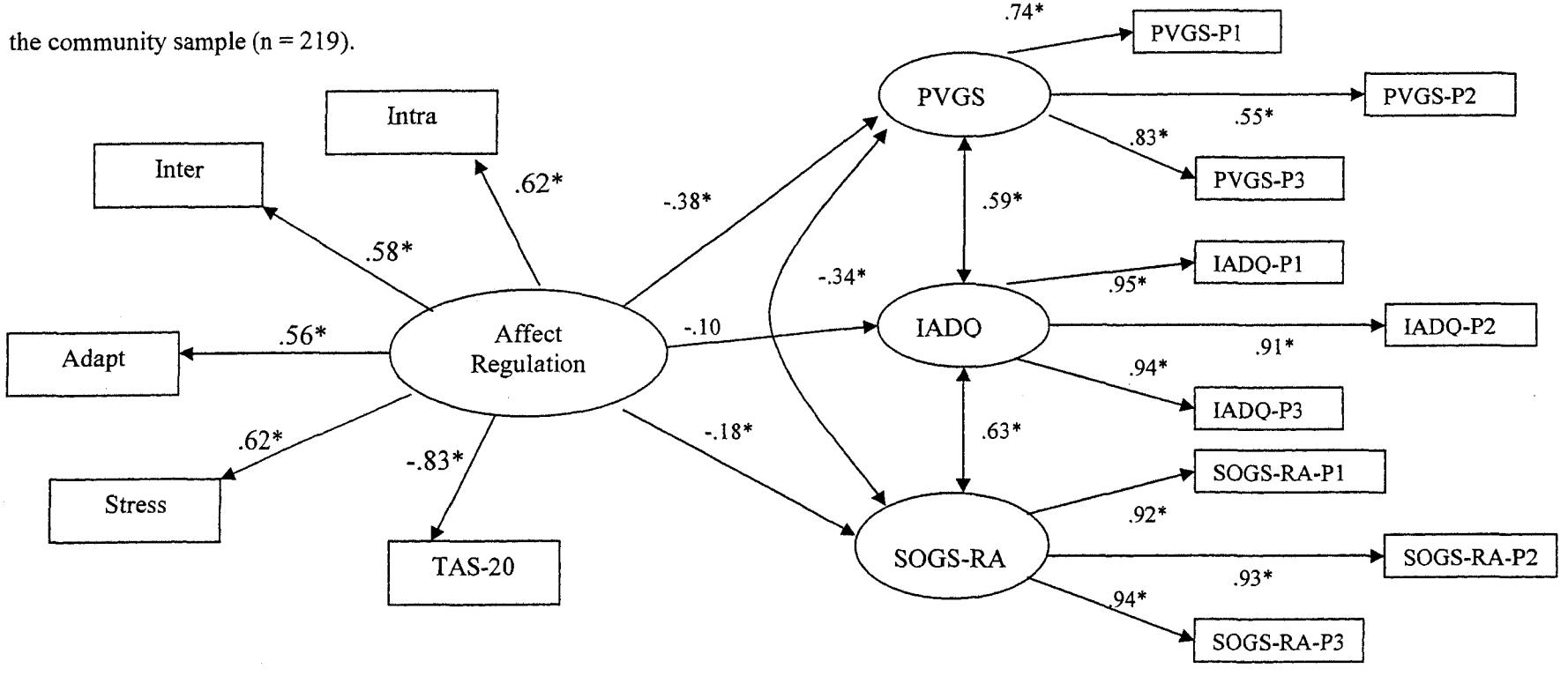
Latent variable path analysis of the relationship between the latent variable affect regulation and the addiction-related behaviours for the clinical sample (N = 201).



Note: *p < .05; Community sample above/left of line, clinical sample below/right of line; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, TAS-20 = total alexithymia, PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen-Revised for Adolescents, P1 = Parcel 1, P2 = Parcel 2, P3 = Parcel 3.

Figure 12

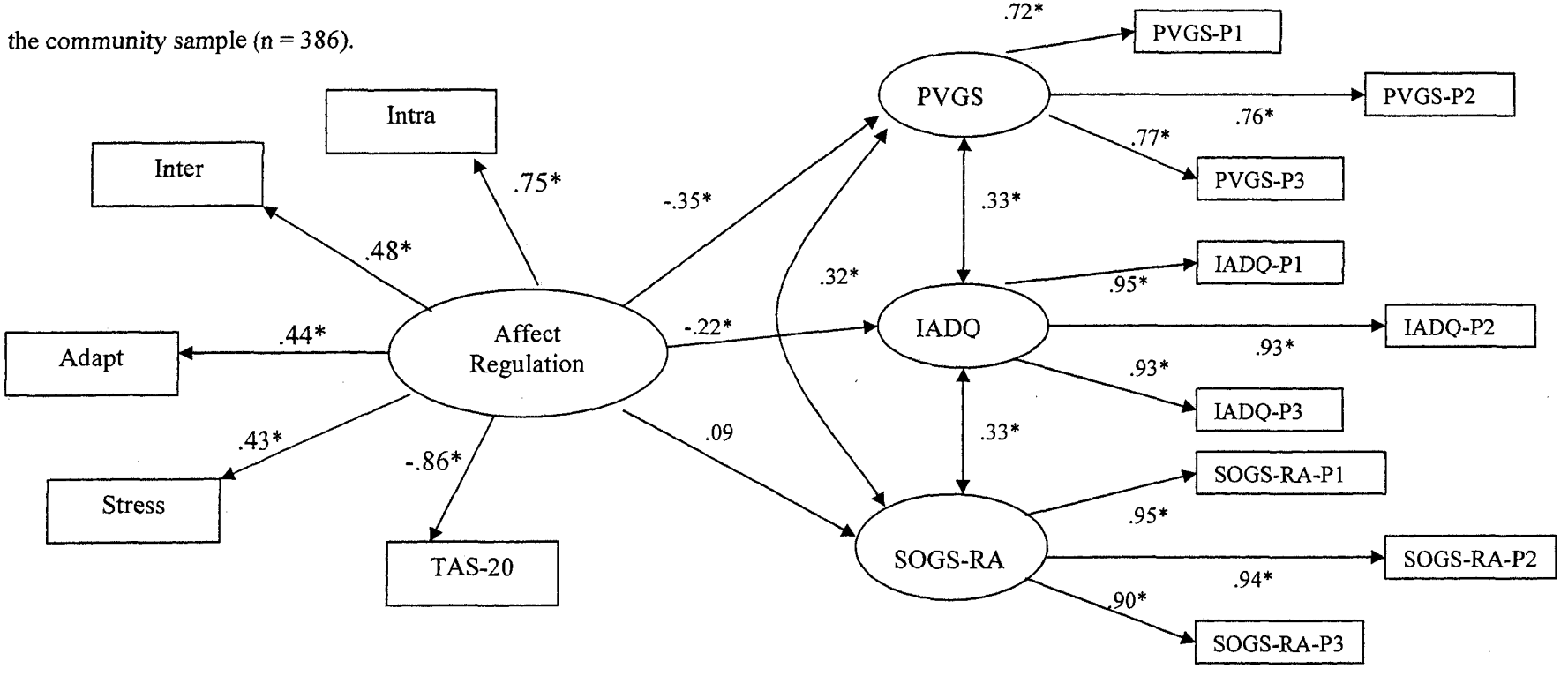
Latent variable path analysis of the relationship between the latent variable affect regulation and the addiction-related behaviours for the boys from the community sample (n = 219).



Note: *p < .05; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, TAS-20 =t otal alexithymia, PVGS = Problem Video Game Playing Scale, IADQ= Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen-Revised for Adolescents, P1 = Parcel 1, P2 = Parcel 2, P3 = Parcel 3.

Figure 13

Latent variable path analysis of the relationship between the latent variable affect regulation and the addiction-related behaviours for the girls from the community sample (n = 386).



Note: *p < .05; Intra = intrapersonal, Inter = interpersonal, Adapt = adaptability, Stress = stress management, TAS-20 = total alexithymia, PVGS = Problem Video Game Playing Scale, IADQ = Internet Addiction Questionnaire, SOGS-RA = South Oaks Gambling Screen-Revised for Adolescents, P1 = Parcel 1, P2 = Parcel 2, P3 = Parcel 3.

Appendix A

Instructions

Please respond, yes or no, to the following 9 questions relating to your video game playing behaviours over the past year. Mark your answer by filling in the circle that matches your answer. This is not a test, and there are no "good" or "bad" answers. Please answer all of the questions.

	Yes	No
1. When I am not playing with video games, I keep thinking about them (i.e., remembering games, planning the next game, etc.).	①	②
2. I spend an increasing amount of time playing video games.	①	②
3. I have tried to control, cut back or stop playing, or I usually play with video games over a longer period than I intended.	①	②
4. When I can't use video games I get restless or irritable.	①	②
5. When I feel bad, e.g., nervous, sad, or angry, or when I have problems, I use video games more often.	①	②
6. When I lose in a game or I have not obtained the desired results, I need to play again to achieve my target.	①	②
7. Sometimes I conceal my video game playing from others, this is, my parents, friends, teachers, etc.	①	②
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.	①	②
9. Because of video game playing I have reduced my homework or schoolwork, or I have not eaten, or I have gone to bed late, or I have spent less time with my friends and family.	①	②

Appendix B

Instructions

Please answer the following 20 questions using the scale provided. Remember when answering, only consider the time spent online for non-academic or non-job related purposes.

	Rarely	Occasionally	Frequently	Often	Always
1. How often do you find that you stay online longer than you intended?	①	②	③	④	⑤
2. How often do you neglect household chores to spend more time online?	①	②	③	④	⑤
3. How often do you prefer the excitement of the internet to intimacy with your partner?	①	②	③	④	⑤
4. How often do you form new relationships with fellow on-line users?	①	②	③	④	⑤
5. How often do others in your life complain to you about the amount of time you spend online?	①	②	③	④	⑤
6. How often do your grades or school work suffer because of the amount of time you spend online?	①	②	③	④	⑤
7. How often do you check your email before	①	②	③	④	⑤

something else that you need to do?					
8. How often does your job performance or productivity suffer because of the internet?	①	②	③	④	⑤
9. How often do you become defensive or secretive when anyone asks you what you do online?	①	②	③	④	⑤
10. How often do you block out disturbing thoughts about your life with soothing thoughts of the internet?	①	②	③	④	⑤
11. How often do you find yourself anticipating when you will go online again?	①	②	③	④	⑤
12. How often do you fear that life without the internet would be boring, empty, and joyless?	①	②	③	④	⑤
13. How often do you snap, yell, or act annoyed if someone bothers you while you are online?	①	②	③	④	⑤
14. How often do you lose sleep due to late-night log-ins?	①	②	③	④	⑤
15. How often do you feel					

preoccupied with the internet when off-line, or fantasize about being online?	①	②	③	④	⑤
16. How often do you find yourself saying "just a few more minutes" when online?	①	②	③	④	⑤
17. How often do you try to cut down the amount of time you spend online and fail?	①	②	③	④	⑤
18. How often do you try to hide how long you've been online?	①	②	③	④	⑤
19. How often do you choose to spend more time online over going out with others?	①	②	③	④	⑤
20. How often do you feel depressed, moody, or nervous when you are offline, which goes away once you are back online?	①	②	③	④	⑤

Appendix C

Instructions

Read each of the following 12 items carefully and decide how much or how frequently each item describes your *gambling behaviours* in the past year. Mark your choice by filling in the circle which corresponds to your answer using the following scale:

0=not at all, never	1=just a little, once in a while	2=pretty much, often	3=very much, very frequently

1. How often have you gone back another day to win back the money lost?	⓪	①	②	③
2. When you were betting, have you told others you were winning money when you really weren't winning?	⓪	①	②	③
3. Has your betting money caused any problems for you such as arguments with family and friends, or problems with school or work?	⓪	①	②	③
4. Have you gambled more than you had planned to?	⓪	①	②	③
5. Has anyone criticized your betting or told you that you had a gambling problem, regardless of whether you thought it was true or not?	⓪	①	②	③
6. Have you felt bad about the amount you bet, or about what happens when you bet money?	⓪	①	②	③
7. Have you felt that you would like to stop betting money but didn't think you could?	⓪	①	②	③
8. Have you hidden from family or friends any betting slips, IOUs, lottery tickets, money that you've won or other signs of gambling?	⓪	①	②	③
9. Have you had money arguments with family or friends that centered on gambling?	⓪	①	②	③
10. Have you borrowed money to bet and not paid	⓪	①	②	③

it back?				
11. Have you skipped or been absent from school or work due to betting activities?	⓪	①	②	③
12. Have you borrowed money or stolen something in order to bet or to cover gambling debts?	⓪	①	②	③

Appendix D

The BarOn Emotional Quotient Inventory: Youth Version (BarOn EQ-i:YV) is copyright protected by Multi-Health Systems (MHS).

Appendix E
Instructions

Please rate how much you agree with the following 46 questions by filling in the circle which corresponds to your answer using the following scale which ranges from strongly disagree to strongly agree.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My dreams are much like events in my everyday life.	①	②	③	④	⑤
2. I usually know when I am being emotional.	①	②	③	④	⑤
3. People tell me to describe my feelings more.	①	②	③	④	⑤
4. It is difficult for me to reveal my innermost feelings, even to close friends.	①	②	③	④	⑤
5. When something important happens to someone close to me, I have no trouble describing what I feel.	①	②	③	④	⑤
6. I find it hard to describe how I feel about people.	①	②	③	④	⑤
7. I have physical sensations that even doctors do not understand.	①	②	③	④	⑤
8. I am usually aware of when my feelings change.	①	②	③	④	⑤
9. I find examination of my feelings useful in solving personal problems.	①	②	③	④	⑤
10. When I am angry at someone I have no trouble describing how I feel.	①	②	③	④	⑤
11. I prefer to analyze problems rather than just describe them.	①	②	③	④	⑤
12. When I am upset, I do not know if I am sad, frightened, or angry.	①	②	③	④	⑤
13. When I meet a stranger I often imagine what the person might be like.	①	②	③	④	⑤
14. I usually know when I am feeling anxious.	①	②	③	④	⑤
15. When something good or bad happens I have					

trouble describing what I feel.	①	②	③	④	⑤
16. Some of my dreams involve unusual or unlikely experiences or events.	①	②	③	④	⑤
17. I often do not know if I am angry.	①	②	③	④	⑤
18. I prefer to just let things happen rather than to understand why they turned out that way.	①	②	③	④	⑤
19. When I read a book or watch a movie I can imagine how I would feel if the events in the story were happening to me.	①	②	③	④	⑤
20. I learn much about myself on the basis of my feelings.	①	②	③	④	⑤
21. It is difficult for me to find the right words for my feelings.	①	②	③	④	⑤
22. Looking for hidden meanings in movies or plays distracts from their enjoyment.	①	②	③	④	⑤
23. Thinking about past experiences helps me understand new problems.	①	②	③	④	⑤
24. I have feelings that I cannot quite identify.	①	②	③	④	⑤
25. I prefer movies or books that depict interesting emotional situations.	①	②	③	④	⑤
26. My emotions are a major source of meaning in my life.	①	②	③	④	⑤
27. I like to imagine situations that involve interesting emotions.	①	②	③	④	⑤
28. I prefer talking to people about their daily activities rather than their feelings.	①	②	③	④	⑤
29. Others believe I am usually in touch with my feelings.	①	②	③	④	⑤
30. When I think about past events I can relive and imagine them in my mind.	①	②	③	④	⑤
31. I do not know what's going on inside me.	①	②	③	④	⑤

32. I prefer to watch "light" entertainment shows rather then psychological dramas.	①	②	③	④	⑤
33. When I have strong emotions I try to understand the reasons for my feelings.	①	②	③	④	⑤
34. I enjoy playing with ideas or situations in my imagination.	①	②	③	④	⑤
35. I usually know when I am feeling unhappy about something.	①	②	③	④	⑤
36. When I look at clouds I sometimes imagine seeing different things.	①	②	③	④	⑤
37. When writing to someone, I find it difficult to express my feelings.	①	②	③	④	⑤
38. I am rarely puzzled by sensations in my body.	①	②	③	④	⑤
39. I rarely pay attention to my dreams.	①	②	③	④	⑤
40. When something stressful happens I usually can describe how I feel.	①	②	③	④	⑤
41. It is rare for me to daydream or fantasize.	①	②	③	④	⑤
42. I am able to describe my feelings easily.	①	②	③	④	⑤
43. Being in touch with emotions is essential.	①	②	③	④	⑤
44. I use my imagination a great deal.	①	②	③	④	⑤
45. I am often confused about what emotion I am feeling.	①	②	③	④	⑤
46. I can feel close to someone, even in moments of silence.	①	②	③	④	⑤