Gambling and Video Game Playing Among Youth

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Abstract

Gambling and video game playing represent two leisure activities in which adolescents and young adults participate. There are psychological and behavioural parallels between slot machine gambling and video arcade game playing. Because both activities have similar negative effects associated with excessive play (e.g., poor academic performance, moodiness, loss of interest in activities previously enjoyed, interpersonal conflict) there is concern that children and adolescents who are attracted to video games, for both psychological rewards and the challenge, may be at greater risk to gamble. The current research examined the gambling (land-based, online for money, and free online gambling games), video game, and Massively Multiplayer Online Role-Playing Games (MMORPG) playing behaviour in adolescents and young adults to determine shared risk factors and negative consequences for excessive play. These factors include depression, personality characteristics (i.e., impulsivity and extraversion), and outcome expectancies.

Results indicate that gamblers, relative to non-gamblers, were more likely to play video games. Video game players were more likely than non-players to gamble offline and report playing free online gambling games. Problem gamblers had higher rates of video game playing than non-gamblers and addicted gamers had higher rates of land-based gambling than non-gamers. In addition, MMORPG players, relative to non-players, were more likely to have participated in online gambling activities, gambled offline, and played free online gambling games. There were no significant differences among the three gambling groups for depression, however addicted gamers had significantly higher depression scores than both social and non-gamers, who did not differ from each other. Results also suggest there are no differences between gamblers and video game players for Impulsiveness and Extraversion, however

gamblers have significantly higher Venturesomeness scores than video game players. Problem gamblers and addicted video game players did not differ on measures of Impulsiveness, Venturesomeness, and Extraversion.

On each of three positive expectancy scales, problem gamblers endorsed items on the positive scales more highly than social and non-gamblers. Non-gamblers endorsed the negative expectancies scales more highly than social gamblers.

Results from the current study imply similarities in the personalities of gamblers and video game players, with significant overlap in participation in the two activities. These results have implications for the treatment of problem gambling and video game playing.

Résumé

Les jeux d'argent et les jeux vidéo sont deux loisirs auxquels s'adonnent certains adolescents et jeunes adultes. Il existe des parallèles psychologiques et comportementaux entre l'usage de machines à sous et de jeux vidéo en salle. Une participation excessive à ces deux activités présentant des effets négatifs similaires (par ex., piètres résultats scolaires, humeur maussade, perte d'intérêt pour des activités auparavant appréciées, conflits interpersonnels), il est craint que les enfants et adolescents attirés par les jeux vidéo (à la fois pour la satisfaction psychologique qu'ils procurent et le défi qu'ils représentent) soient plus enclins à s'adonner à des jeux d'argent. La présente recherche a étudié les comportements de jeu en ce qui concerne les jeux d'argent (en salle, payants en ligne et gratuits en ligne), les jeux vidéo et les jeux de rôle en ligne massivement multijoueur (soit MMORPG en anglais) chez les adolescents et les jeunes adultes, afin de déterminer les facteurs de risques communs et les conséquences négatives d'un usage excessif. Ces facteurs comprennent la dépression, certains traits de personnalité (c'est-à-dire, l'impulsivité et l'extraversion) et l'accomplissement des attentes.

Les résultats de cette recherche ont indiqué que les joueurs de jeux d'argent étaient plus enclins à jouer à des jeux vidéo que les non-joueurs. Les joueurs de jeux vidéo étaient plus enclins à jouer à des jeux d'argent hors ligne que les non-joueurs et indiquaient jouer à des jeux d'argent en ligne gratuits. Les joueurs à problèmes jouaient davantage à des jeux vidéo que les non-joueurs et les joueurs dépendants jouaient davantage à des jeux d'argent en salle que les non-joueurs. De plus, les joueurs de MMORPG étaient plus enclins que les non-joueurs à participer à des jeux d'argent en ligne, à des jeux d'argent hors ligne et à des jeux d'argent en ligne gratuits. Aucune différence importante n'a été relevée entre les trois groupes de joueurs en matière de dépression; cependant, les joueurs dépendants ont présenté un taux de dépression

considérablement plus élevé que les joueurs sociaux et les non-joueurs, pour lesquels les résultats étaient similaires. Les résultats n'ont également suggéré aucune différence entre les joueurs de jeux d'argent et les joueurs de jeux vidéo en matière d'impulsivité et d'extraversion; cependant, les joueurs de jeux d'argent se sont avérés considérablement plus audacieux que les joueurs de jeux vidéo. Les joueurs à problèmes et les joueurs de jeux vidéo dépendants n'ont pas présenté de différence en matière d'impulsivité, d'audace et d'extraversion.

Sur chacune des trois échelles d'attentes positives, les joueurs de jeux d'argent à problèmes ont davantage choisi les éléments des échelles positives que les joueurs sociaux et les non-joueurs. Les non-joueurs ont davantage choisi les éléments des échelles d'attentes négatives que les joueurs sociaux.

Les résultats de la présente étude indiquent des similarités dans les personnalités des joueurs de jeux d'argent et de jeux vidéo ainsi qu'un chevauchement important de participation aux deux activités. Ces résultats ont des conséquences quant au traitement des problèmes liés aux jeux d'argent et aux jeux vidéo.

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Introduction

Young people are currently living in a digital age and their recreational activities increasingly consist of activities that interact with technology. For example, video game playing and, to a lesser extent, gambling represent two activities in which adolescents and young adults routinely participate. The two activities have been suggested to share similar features. Specifically, it has been proposed that there are psychological and behavioural parallels between slot machine gambling and video arcade game playing (Fisher & Griffiths, 1995; Griffiths, 1991, 2005b; Griffiths & Wood, 2000, 2004; Gupta & Derevensky, 1996; Ladouceur & Dubé, 1995; Wood, Gupta, Derevensky, & Griffiths, 2004). Both activities operate on behavioural principles of variable reinforcement schedules in order to reward and prolong play, use exciting and stimulating sound and light effects with game play to promote physiological arousal, require a response to predictable stimuli, involve eye-hand coordination, and necessitate varying degrees of concentration and focus. Taken to excess, both activities can be considered behavioral addictions (Griffiths, 1991). Additionally, both activities have similar negative effects associated with excessive play (e.g., poor academic performance, moodiness, loss of interest in activities previously enjoyed, interpersonal conflict) (Griffiths & Wood, 2004). The key differences between the two activities are that video games are played for points which are obtained by skill while slot machines (indeed, all forms of electronic gambling machines) are played for money and the outcome is random (Griffiths, 2005b). However, it has been argued that the playing philosophy for both is similar; for some slot machine players the potential for winning money is less important than staying on the machine as long as possible, a similar goal of video game players (Griffiths & Wood, 2004). Specific to these two activities is young people's reliance on technology for entertainment. It has been proposed that children and adolescents who are

attracted to video games, for both the psychological rewards and the challenge, may be at greater risk to gamble (Brown, 1989). The theory is that playing video games provides experience with a type of entertainment (i.e., graphics, using controls/buttons) that could be transferred to gambling machines (Delfabbro, King, Lambos, & Puglies, 2009).

Preliminary research among video game-playing adolescents indicates higher levels of both gambling and problem gambling in this group (Gupta & Derevensky, 1996; Ladouceur & Dubé, 1995). Beyond these early studies, more recent research provides evidence for regular video game playing among gamblers, heavier involvement in video game play for adolescents at risk for gambling-related problems, correlations between problem video game playing and gambling, and positive correlations between self-ratings of excellence for playing video games and gambling (i.e., individuals who perceived themselves as skilled at one also perceived themselves as skilled at the other) (Delfabbro et al., 2009; Walther, Morgenstern, & Hanewinkel, 2012; Wood, Gupta, et al., 2004).

Video game technology has not only become incredibly sophisticated, it has become an important part of the delivery of gambling activities as well. Portable game consoles have clear, cinematic-like graphics and enable playing anywhere and at any time. The Internet, in particular, has been revolutionary in changing the way people gamble and play video games. Mobile devices can connect to the Internet from anywhere, bringing online gambling and gaming software to individuals wherever they may be. Massively Multiplayer Online Role-Playing Games (MMORPGs) are a fast-growing genre of video games played with others on the Internet. MMORPGs are highly social, are played in real time, and have sophisticated interactive graphics. While playing for money once clearly differentiated slot-machine gambling and video arcade games, this differentiation is disappearing as gambling and gaming move online. In what

is referred to as media "convergence", overlaps between gambling and gaming practices and technologies are increasing (de Freitas & Griffiths, 2008; Griffiths, 2008a, 2008b; King, Delfabbro, & Griffiths, 2010a; King, Delfabbro, Kaptsis, & Zwaans, 2014). Many online video games incorporate gambling situations and games of chance within the game itself (e.g., *Grand Theft Auto, Red Dead Redemption, Pokemon, Runescape, Fallout: New Vegas)* (King et al., 2014; King, Ejova, & Delfabbro, 2012; Walther et al., 2012). Some online video games (e.g., first-person shooter games) pay players for every kill they make, creating a potential to make money (Harper, 2007). Online gambling companies offer free gambling games and 'demo' features of traditional money games - often played for virtual ("free") currency - bringing them into the realm of video games. The popularity of technology in young people's leisure and entertainment pursuits and the blurring of previously-distinct lines between some types of gambling and video games may lead some individuals to develop an interest in gambling at a young age. Of concern is that the entertaining aspects of gambling are highlighted while the potentially risky aspects are ignored. Still further, when games of chance are incorporated into games of skill, the potential for misunderstanding the role of skill in the outcome exists, leading to excessive play and potentially negative consequences.

Activities that have the capacity to be either arousing and/or relaxing, and allow individuals to be distracted from normal lives, are highly desirable and have the potential to be participated in excessively by some individuals (Griffiths & Wood, 2004). Both gambling activities and video games fall into this category. In particular, structural characteristics of certain types of gambling activities (e.g., event frequency, the "near miss", and stimulating light and sound effects) have been highlighted as particularly salient (Griffiths & Wood, 2000). Structural characteristics have also been theorized to influence excessive video game behaviour

(King, Delfabbro, & Griffiths, 2010b). In addition to structural characteristics, situational characteristics, social factors, and psychological factors play a contributing role in excessive gambling (Griffiths & Wood, 2004). These factors may play a similar role in excessive video game playing. The pace at which technology has facilitated the convergence of online gambling and gaming has been much more rapid than the research examining this phenomenon. The current research examined the gambling and video game playing behaviour in adolescents and young adults to determine shared risk factors and negative consequences for excessive play. These factors include gender, personality characteristics, such as impulsivity and extraversion, outcome expectancies, and depression.

Review of Literature

Youth Gambling

Most young people today have lived their entire lives within the context of legalised gambling and the resulting increased gambling opportunities and social acceptance of gambling (Blinn-Pike, Worthy, & Jonkman, 2010; Shaffer, 2003; Shaffer, Hall, Vander Bilt, & Vagge, 2003). There is a growing body of evidence from Europe (Kristiansen & Jensen, 2011; Luder, Berchtold, Akré, Michaud, & Surís, 2010; Olason, Skarphedinsson, Jonsdottir, Mikaelsson, & Gretarsson, 2006; Raisamo, Halme, Murto, & Lintonen, 2013), Canada and the United States (Derevensky, 2008; Derevensky & Gupta, 2006; Derevensky, Shek, & Merrick, 2010; Huang & Boyer, 2007; Welte, Barnes, Tidwell, & Hoffman, 2009), the United Kingdom (Wardle, Moody, Spence, et al., 2011), Australia (Delfabbro, King, & Griffiths, 2014; Jackson, Dowling, Thomas, Bond, & Patton, 2008), and Asia (Liu, Luo, & Hao, 2013; Lostutter, Larimer, Neighbors, & Kaljee, 2013) indicating that young people worldwide do indeed participate in both regulated and unregulated forms of gambling, including lottery purchases (especially scratch tickets),

electronic gambling machines, bingo, dice and board games, wagering on games of skill with friends, sports betting with friends, and card playing (Brezing, Derevensky, & Potenza, 2010; Derevensky, 2012). Determinants of youth gambling include gender, age, cultural and ethnic background, familial practices and attitudes, as well as availability and accessibility of gambling (Brezing et al., 2010; Derevensky, 2012). Past-year gambling prevalence rates vary from 32% to 93%, with median ranges of 66% to 72%, depending on the population studied and methodology used (see Volberg, Gupta, Griffiths, Olason, and Delfabbro (2010) for a review). Gambling among young people is highly variable. In a longitudinal study following a group of 16- to 19- year olds for four years, Delfabbro et al. (2014), found that fewer than 5% of the respondents had gambled consistently on the same activity at all four time points. Given that some individuals begin gambling as early as nine years of age, by the time young people reach university they may have been gambling for nearly a decade (Blinn-Pike et al., 2010; Gupta & Derevensky, 1996; Wood, Gupta, et al., 2004). Gambling prevalence in university students has been shown to range from 41% to 80% (Barnes, Welte, Hoffman, & Tidwell, 2010; Bhullar, Simons, & Joshi, 2012; Burger, Dahlgren, & MacDonald, 2006; Engwall, Hunter, & Steinberg, 2004; Stuhldreher, Stuhldreher, & Forrest, 2007).

Problem Gambling and Youth

Although problem gambling is most often thought of as an adult concern, research into youth gambling in the past three decades has established a higher presence of this phenomenon among adolescents and young adults than older adults (Delfabbro et al., 2014; Derevensky & Gupta, 2004; Derevensky et al., 2010; Gupta & Derevensky, 1998a; Jacobs, 2000, 2004; Ladouceur, 1996; Lesieur & Klein, 1987; Nowak & Aloe, 2013; Shaffer & Hall, 2001; Shaffer, Hall, & Vander Bilt, 1999; Wardle et al., 2007). The evidence points to a heightened

vulnerability to problem gambling during adolescence and young adulthood (Chambers & Potenza, 2003; Derevensky & Gupta, 2004; Huang & Boyer, 2007; Jacobs, 2004; Kristiansen & Jensen, 2011).

Among adolescents and young adults, an inability to stop gambling can cause personal, social, familial, and financial difficulties (Blaszczynski & Nower, 2002; Derevensky & Gupta, 2004; Dickson, Derevensky, & Gupta, 2008; Shaffer, 2003; Shaffer et al., 2003). Research has repeatedly shown youth with gambling problems, relative to non-problem-gambling peers, are significantly more likely to have problematic relationships with friends and family, lie about their gambling, have lost or jeopardised a significant relationship, job, or educational or career opportunity because of gambling, miss class or lose time at work to gamble, experience academic failure, truancy, or early school withdrawal, have financial difficulties (e.g., borrowing from friends and family and being unable to repay them, selling personal items), smoke cigarettes, abuse alcohol and drugs, be more involved in delinquency and criminal activities, and have multiple mental health problems, higher rates of suicide ideation, and suicide attempts (Blinn-Pike et al., 2010; Brezing et al., 2010; Derevensky & Gupta, 2004, 2006; Dickson et al., 2008; Engwall et al., 2004; Gupta & Derevensky, 2000, 2004; Hardoon & Derevensky, 2002; Nower, Gupta, Blaszczynski, & Derevensky, 2004; Olason et al., 2006; Ste-Marie, Gupta, & Derevensky, 2006; Stinchfield, 2004; Ipsos MORI Social Research Unit, 2009; Weinstock, Whelan, Meyers, & Watson, 2007). Problem gambling in the above research is typically categorised using screening tools (DSM- or SOGS-derived) given as school-based surveys or surveys completed in community settings.

Online Gambling

The Internet is playing a crucial role in changing the way young people gamble. While regulated in most jurisdictions, online gambling is largely unsupervised and it is possible to gamble on many sites with little or no age verification (Smeaton & Griffiths, 2004). Numerous studies conducted in varying countries have obtained rates of online gambling participation among adolescents varying from 2% to 12%, with some reports up to as high as 24% (Brunelle et al., 2012; Delfabbro, Lahn, & Grabosky, 2005; Griffiths & Wood, 2007; Jackson et al., 2008; Moodie & Finnigan, 2006b; MORI Social Research Unit, 2006; Olason et al., 2011; Olason et al., 2006; Potenza et al., 2011; Tsitsika, Critselis, Janikian, Kormas, & Kafetzis, 2011; Welte et al., 2009). Males are significantly more likely than females to have gambled online and rates of problem gambling (defined using DSM-IV or SOGS as a screen) are higher among those who have gambled online versus those who have not (Griffiths & Parke, 2010). However, it is important to note that some studies have shown that very few online gamblers gamble exclusively online (Gainsbury et al., 2013; McBride & Derevensky, 2012; Wardle, Moody, Griffiths, Orford, & Volberg, 2011; Wood & Williams, 2011). For example, an Icelandic study of young people reported that nearly all of those who reported gambling online had also gambled offline, whereas less than half of offline gamblers had also gambled online, suggesting the Internet represents just one additional medium and venue for gambling for many adolescent gamblers (Olason et al., 2011).

Online gambling prevalence studies among college-age youth suggest 3% to 22% have gambled online, with greater numbers of male (versus female) and younger (versus older) individuals participating (Griffiths & Barnes, 2008; LaBrie, Shaffer, LaPlante, & Wechsler, 2003; Ladd & Petry, 2002; Petry & Weinstock, 2007; Romer, 2010; Svensson & Romild, 2011).

One study found that 8% of university students reported at least one lifetime instance of gambling online for money; and of those, 73% reported past-year and 48% reported at least weekly online gambling (Shead, Derevensky, Fong, & Gupta, 2012). The popularity of online gambling activities mirrors that of offline gambling and includes online lotteries (43%), horse races (36%), sports betting (68%), slot/electronic gambling machines (14%), blackjack, and poker (48%) (Griffiths & Barnes, 2008; Griffiths & Parke, 2010; Olason et al., 2011; Shead et al., 2012).

Problem Gambling and the Internet

Prevalence rates for pathological gambling among adolescent and young adult online gamblers are five to seven times higher than among offline gamblers (Brunelle et al., 2012; Byrne, 2004; Griffiths & Wood, 2007; Griffiths, Parke, Wood, & Rigbye, 2010; Matthews, Farnsworth, & Griffiths, 2009; McBride & Derevensky, 2012; Olason et al., 2011; Petry & Weinstock, 2007; Potenza et al., 2011; Shead et al., 2012). While it is tempting to conclude the Internet may enable problematic gambling behaviour, it is more likely that problem gamblers are more frequent gamblers in general and gamble on a wider range of activities, including activities via the Internet. The reasons individuals offer for gambling online tend also to be factors that have the potential to lead to sustained and problematic gambling (i.e., ease of access, flexibility of use, 24-hour availability, large gambling choice, and anonymity) (Cotte & Latour, 2009; Griffiths & Barnes, 2008). Because there are relatively few barriers to access, the Internet may well be providing a facilitating factor in the excessive gambling of vulnerable individuals, in particular young people and problem gamblers (Griffiths & Barnes, 2008).

Video Game Playing

Video games have become a routine part of childhood and adolescence and play a large role in the entertainment and leisure activities of young people and adults alike (Entertainment Software Association, 2013; Granic, Lobel, & Engels, 2014). According to industry statistics, 51% of U.S. households have a dedicated game console, and the video game industry sold 188 million units in 2012, leading to $14.8 billion in sales (Entertainment Software Association, 2013). Young people play video games for fun, competition, relaxation, to cope with emotional difficulties, for the challenge, and out of boredom (Granic et al., 2014; Olson, 2010). Playing video games is an increasingly common way to socialise and spend time with friends. As graphics have become more sophisticated and the games more complex, evidence is mounting that many young people continue to play well into adulthood (Anand, 2007; Entertainment Software Rating Board, 2013; Jones, 2003). It is important to note that the genre of gaming, much like gambling, encompasses a wide variety of heterogeneous situations and experiences, including role-playing games, action adventure games, first-person shooter games, sports games, music/dance games, driving games, and puzzle/board/card games.

One example of the sophistication and complexity of video games is Massively Multiplayer Online Role-Playing Games (MMORPGs). Among gamers, 36% play video games on their phone and 25% on other wireless devices, with 14% of those choosing MMORPGs (Entertainment Software Association, 2013). It was estimated in 2009 that online gaming revenue had reached $11 billion as part of a $44 billion worldwide video game market (Gamasutra, 2009). MMORPGs are played in real time and take place in fantasy-based settings where thousands of players interact with each other. The graphics are sophisticated and lifelike, and players can devise their own avatars based on their own characteristics combined with

personality characteristics to which they identify or aspire (Barnett & Coulson, 2010; Bessière, Seay, & Kiesler, 2007). It must be noted that for some areas of research, virtuality is not opposed to reality, but rather considered as part of it. Aspects of MMORPGs are used to teach skills (e.g., leadership) that may be transferred to real-world scenarios and many players derive meaningful emotional experiences from playing (Barnett & Coulson, 2010; Yee, 2006a, 2006b).

Behavioural Addiction

Several authors have argued for a broader conceptualisation of addiction other than one that speculates the properties of the drugs or objects themselves are the cause of the addiction (e.g., see Shaffer et al., 2004). It may be that alcoholism or problem gambling are not distinct disorders, but that each disorder is a unique expression of an addiction syndrome, a syndrome being a cluster of traits or symptoms related to an abnormal underlying condition (Shaffer et al., 2004). There is increasing evidence of commonalities across different expressions of addiction and it is possible these commonalities reflect a common aetiology. Antecedents of an addiction syndrome include individual neurobiological elements and psychological and social risk factors which sometimes, though not always, combine to contribute to an underlying vulnerability (they may also contribute to protective factors). Shaffer and his colleagues (2004) outline a number of features, consistent with an addiction syndrome, in various addictions; these are shared neurobiological antecedents (e.g., dopamine reward system), shared psychosocial antecedents (e.g., depression, anxiety, impulsivity), and shared experiences. Dopamine plays a primary role in the development and maintenance of both drug and behavioural addictions (Shaffer, 2004). In the brain, dopamine functions as a neurotransmitter and can be thought of as a "feel-good" chemical. Alcohol and drugs increase the amount of dopamine available to cells in important brain centers (Maté, 2008). While dopamine has been typically implicated in substance

addictions (Maté, 2008), there is increasing evidence it also plays a role in non-substance addictions as well (Blum, Febo, McLaughlin, Cronjé, Han, & Gold, 2014).

In addition to shared antecedents, very different expressions of addiction have similar biopsychosocial outcomes. For example, compulsive gamblers, shoppers, and those who abuse substances have recognisable sequelae in common, including deceit, shame, guilt, and dysthymia (Shaffer et al., 2004). Chemical and behavioural expressions of addiction also have similar neurological sequelae, such as tolerance and withdrawal, and parallel natural histories. Noting that alcohol, heroin, and tobacco have similar relapse patterns, Shaffer and his colleagues (2004) argue that because the same natural history can be observed with drugs with different biochemical effects, the object of addiction may be less relevant than has been previously emphasised to the course of addiction. Finally, varying therapies (e.g., cognitive-behavioural, psychodynamic) are used interchangeably to treat different expressions of addiction.

Jacobs (1989) defined addiction as "a dependent state acquired over time by a predisposed person in an attempt to relieve a chronic stress condition" (p. 35). The predisposition included an abnormal physiological resting state (either over- or under-excited) and an abnormal psychological state (i.e., low self-esteem, feelings of inferiority or rejection, inadequacy). According to Jacobs, a conducive environment must also contribute to an addictive pattern of behaviour, meaning predisposed individuals would first have to come across an activity (e.g., gambling, food, drugs) that both regulated their abnormal resting state and relieved their personal distress. Subsequently, those individuals would be motivated to pursue the activity in order to obtain further relief, creating a pattern of addiction.

Proponents in favour of behaviours as potentially addictive envision addiction as a distinct phenomenon (i.e., something beyond problematic behaviour) and attempt to identify the

principal features of the phenomenon. One of the ways to determine whether or not behavioural addictions should be included in the conceptualisation of addiction is to compare them against clinical criteria for other established addictions (Griffiths, 1995b, 2005a). Citing Brown (1993), Griffiths (2005a) posits behavioural addictions consist of a number of common components; salience, conflict (inter- and intrapersonal), mood modification, tolerance, withdrawal, and relapse. Griffiths (2005a) argues for a 'biopsychosocial' framework of conceptualising addiction; addiction comes from the interplay of many features, including an individual's psychological makeup (e.g., personality, expectations, and beliefs), biological and/or genetic predispositions (e.g., dopamine deficiency), the social environment, and the nature of the activity. This is echoed in the work of Suissa (2014), who proposes a psychosocial perspective for addiction. Namely, conceptions of addiction must take into account not only the individual but the social determinants as well (e.g., weak social ties, social exclusion, poverty, unemployment, etc.).

It may be useful for clinical purposes to use behavioural addiction as a conceptual foundation when describing excessive gambling and video game playing. As with gambling, video game playing behaviour exists on a continuum ranging from no play to recreational involvement to excessive involvement (Kuss & Griffiths, 2012). Some researchers use Brown's (1993) six components of behavioural addiction to place gambling and video game playing under the rubric of behavioural addictions (e.g., Griffiths, 1996, 2005a; Hussain & Griffiths, 2009a). Most researchers agree that the potential for pathological play exists in some gamers, but how to identify and classify such "addicted" behaviour is not unanimous (Ferguson, Coulson, & Barnett, 2011). While Jacobs' *General Theory of Addictions* has been applied to youth gambling (Gupta & Derevensky, 1998b), whether video games fit the model is unclear. According to Wood (2008), unless it can be shown that the inherent structural characteristics of video games can, in

themselves, *cause* problems for a large group of people, then there is no basis to say video games have "addictive" properties. The opposing view puts forth that the player, rather than structural characteristics, is the primary agent in behavioural addictions. The necessary ingredient is an individual's recurrent difficulty in managing his or her behaviour despite a genuine motivation to stop or cut-back (Blaszczynski, 2008).

Many studies on video game addiction use criteria modified from the DSM-IV or ICD-10 criteria for pathological gambling to define a video game addiction (Charlton, 2002; Charlton & Danforth, 2007; Gentile, 2009; Griffiths, 1997, 2005a; Grüsser, Thalemann, & Griffiths, 2007; Hussain & Griffiths, 2009a; Johansson & Götestam, 2004; Salguero & Morán, 2002; Walther et al., 2012). Problem gambling was defined in DSM-IV as an "Impulse-Control Disorder Not Elsewhere Classified" (American Psychiatric Association, 2000); but by DSM-5 it had been revised to "Substance-Related and Addictive Disorders" (American Psychiatric Association, 2013) to reflect research findings that suggested problem gambling was similar to substance-related disorders in its clinical expression, brain origin, comorbidity, physiology, and treatment (Potenza, 2006). There is no clear consensus on whether or not video games can be considered addictive. However, "Internet Gaming Disorder" is mentioned in DSM-5 in Section III as a condition warranting further clinical research.

Certainly, not everyone who plays video games or gambles becomes addicted; nevertheless there are a number of similarities between gambling and video game playing that warrant at least possibly considering excessive video game playing as a behavioural addiction. Video games contain certain structural characteristics that facilitate excessive play. For example, Wood, Griffiths, Chappell, and Davies (2004), comparing arcade games and electronic gaming machines (EGMs), hypothesized that video games contained many of the same properties and

structural characteristics thought to be found in gambling activities, including the use of variable reinforcement schedules, predictable stimuli governed by a software loop, the necessity of focused concentration, a rapid span of play that can be sometimes determined by skill of player (more so in video games than gambling games), the potential for "near miss" opportunities, structural characteristics involving light and sound, digitally displayed scores of "correct behaviour" (points or cash), and the opportunity for peer group attention and approval through competition. The social aspect of MMORPGs requires a level of commitment from players that may lead to intensive play, resulting in neglecting to preserve or nurture real-life relationships at the expense of virtual ones (Block, 2007; Haagsma, Pieterse, Peters, & King, 2013; Hussain & Griffiths, 2009b; Yee, 2006b). Also, goals and rewards in MMORPGs use a random-ratio reinforcement schedule based on operant conditioning, where early achievements are quick and gradually take more and more time and effort until progression in the game requires large time commitments (Yee, 2001, 2006b). In a qualitative study based on chat forums about the MMORPG *EverQuest*, Chappell and his colleagues (2006) presented self-reports by players and former players that suggest that they were addicted to this game very much in the same way that others become addicted to gambling and/or alcohol. These individuals displayed or alluded to Brown's core components.

Youth identified as pathological gamers receive poor grades and experience conflict at school or work, are truant, steal money to buy new games, show aggressive behaviours, have comorbid attention problems, show tolerance and withdrawal, have anxiety, deception about use, and enter dissociative states while playing (Gentile, 2009; Griffiths & Hunt, 1995; Griffiths & Wood, 2004; Keepers, 1990; King, Delfabbro, Zwaans, & Kaptsis, 2013; Yee, 2001). One study with university students suggested significant negative correlations with excessive video game

play and total SAT, Math SAT, and GPA scores, although personality and other social or comorbid factors were not controlled for (Anand, 2007). A more recent study found correlations with video game addiction and college engagement, with higher video game addiction scores indicating lower expectations for college engagement and negatively predicting GPA (Schmitt & Livingston, 2015).

While gambling is now considered an addictive disorder (American Psychiatric Association, 2013; Holden, 2010), similar research on video games and addiction is in early stages. If the similarities between video game playing and gambling, including structural characteristics, personality correlates, and shared pathology of play are strong enough, then video game playing may be able to be considered a behavioural addiction. Behavioural addiction, then, becomes a useful theory with which to conceptualise both gambling and video game playing.

Convergence Between Gambling and Video Game Playing

Overlaps between gambling and gaming practices and technologies are increasing (de Freitas & Griffiths, 2008; Griffiths, 2008a, 2008b; King et al., 2010a; King et al., 2014). Adolescents' involvement in gambling may stem from the similarity between gambling (in particular, slot machine gambling) and other technology-based games with which they are familiar (Delfabbro et al., 2009). Griffiths (1991) proposed a developmental trajectory for problem gambling, whereby an individual passes from an initial stage of passive interaction with technology (e.g., television addict) to a final stage of active pathological, gambling participation via an intermediary stage of arcade video-game playing. Video game players shift from the purely psychological rewards of video game playing to the financial rewards that come from

playing electronic gambling machines (Griffiths, 1991). These assumptions are purely

theoretical, but provide a jumping-off point for research.

Early research on video-game playing and gambling alluded to a link between slot

machines and arcade-type video games in adolescence (Griffiths, 1991; Wood, Gupta, et al.,

2004). Regular adolescent gamblers were more likely to report regular video-game playing

(Wood, Gupta, et al., 2004). Adolescents who described themselves as good video-game players

also described themselves as good gamblers; moreover, adolescents experiencing significant

gambling-related problems were also more likely to perceive themselves as skilled video-game

players (Wood, Gupta, et al., 2004). Ladouceur and Dubé (1995) reported that higher South Oaks

Gambling Screen (SOGS) scores were positively correlated with frequency of arcade visits in a

group of video arcade game players, and problem gamblers were more likely to visit arcades

once a week.

Experimental studies have demonstrated that frequent video game players, in addition to

reporting weekly gambling, wagered significantly greater amounts of money on an experimental

blackjack task compared to those who did not play regularly (Gupta & Derevensky, 1996). Other

studies have reported recurring video game playing among habitual gamblers (compared to non-

gamblers), positive correlations between high self-ratings for playing video games and gambling

(i.e., individuals who perceived themselves as skilled at one also perceived themselves as skilled

at the other), and correlations between problem video game playing and gambling (Walther et

al., 2012; Wood, Gupta, et al., 2004). Wood et al. (2004) also found that adolescents who were

experiencing significant gambling-related problems were more likely to rate themselves as

excellent video game players. These results suggest a possible interactive effect between

gambling and gaming. The authors interpreted these results as indicating that these problem

gamblers may try to apply the skills they learned as video game players to gambling situations; they may perceive that gambling skills can be learned and mastered in much the same way as the skills needed to win at video games (Wood, Gupta, et al., 2004).

The link seems to be much clearer with respect to electronic gambling machines and arcade-type video games - where structural characteristics are similar in both genres. Recently, Delfabbro et al. (2009) investigated the association between video game playing behaviour and adolescent gambling in Australia and found that adolescents who were at risk for gambling-related problems were more likely to have heavier involvement in video game play, particularly hand-held and arcade games; nevertheless, this association was small and became negligible when controlling for gender. However, the gamblers in this study predominantly gambled on card games, sports gambling, and instant scratch tickets, whose structural characteristics are vastly different from arcade video games. Similarly, more recent research has failed to find a relationship between frequent video game playing and gambling, either for money or credits/points online (Forrest, King, & Delfabbro, 2015). Nevertheless, small but significant relationships did emerge when controlling for video gaming frequency between problem video gaming scores (as assessed by the Game Addiction Scale (Lemmens, Valkenburg, & Peter, 2009)) and frequency of gambling for money (Forest et al., 2015).

Some researchers have likened MMORPGs to nonfinancial forms of gambling (Barnett & Coulson, 2010; King et al., 2012). While the overall goals for playing may be different, free online poker and MMORPGs share many similar structural characteristics. For example, both run continuously and endlessly in real time, involve quests of a sort, use avatars, are fast, continuous, and widely available, offer possibilities of advancement, involve social interaction (simultaneous chat and communication opportunities), and allow the players to be anonymous

(Ng & Wiemer-Hastings, 2005). To a certain extent, both games involve skill, although there is more skill involved in MMORPGs, as poker contains an element of chance (i.e., what cards one is dealt). Two common phenomena known from gambling, *entrapment* and the *near miss* have been shown to be psycho-structural phenomena also present in MMORPGs (Karlsen, 2011). As well, goals and rewards in MMORPGs incorporate a random-ratio reinforcement schedule based on operant conditioning; early achievements come quickly but gradually take more and more time and effort until a player's progression becomes slow and difficult to notice, or requires increasing cooperation and dependence on others (Yee, 2001, 2006b). Of particular concern, many MMORPGs incorporate gambling situations and games of chance into the playing experience (e.g., the action role-playing game *Fable II* has gambling activities modeled on blackjack, roulette, and slot machines; in *Grand Theft Auto: San Andreas* players can win 'in-game' money in a casino) (King et al., 2010a). Gambling is portrayed within these contexts as fun and exciting, with few or no negative consequences, and players can earn rewards to hasten their progress in the game or 'in-game' money to further gamble in a virtual casino (King et al., 2010a). More importantly, games of chance are presented in the context of a game of skill, which may misrepresent the degree of skill needed in real-world gambling activities.

The concern is that children and adolescents who frequently play video games may begin to believe gambling activities operate under the principle that specific skills are responsible for success and that their acquired skills can influence the outcome of a game of chance (Wood, Gupta, et al., 2004). Youth may become convinced they can eventually master skills that will make them successful gamblers, the way they master skills to become successful video-game players. In a study designed to understand how video game playing influenced gambling thoughts and behaviour, both regular gamblers and regular video game players were given a

computer gambling task that provided an illusion of control, however the outcome was randomly determined. A post-game survey that assessed how participants accounted for their wins (chance or control) indicated that, among regular gamblers who also played video games, video game playing was significantly related to statements that reflected control over the experimental gambling task (e.g., "I got better with practice", "I developed a logical strategy to win the game", and "My experience at playing video games helped me win"), as well as their overall rating of direct control over outcomes of the gambling task (King et al., 2012). However, these same results were not found for regular video game players. The video game players reported higher agreement with an item that stated "It was all chance" (referring to the experimental gambling task), were less likely to attribute wins to direct control over the outcome, and reported low overall enjoyment of the game compared to a non-gaming sample. The authors concluded that, while video game playing may not be directly related to gambling behaviour or problem gambling, it may influence some gambling cognitions among gamblers who also play video games, including illusion of control over the outcome of the game, superstitious thoughts about gambling, overestimating the amount of skill involved in a gambling task, and belief that video game playing experience helps to produce gambling wins (King et al., 2012). Forrest et al. (2015) also concluded that gambling may not necessarily be an appealing activity to regular video game players, who might value specific types of experiences that are not provided by chance-based gambling (e.g., high skill level, need for strategy/planning, reward progression cycles). However, many gamblers see some games, for example poker, as fulfilling those needs, so the relationship warrants further examination.

Free Online "Gambling" Games

Nowhere is the convergence between video game playing and gambling more apparent than with the free online casino-type gambling games. Many online gambling companies offer free/play-for-fun sites where no actual money is required, with many of these sites allowing individuals to play for virtual currency. Incentives, such as free chips, prizes, and bonuses for sign-up, lure players to engage in card playing and casino-type games. These sites are promoted relentlessly on television and online advertising messages and there is little or no gatekeeping to prevent access by minors. As with gambling activities offered within some MMORPGs (see above), free gambling games blur the distinction between gambling and playing video games and may serve as fertile training ground for a new breed of gamblers (Griffiths & Parke, 2010; Messerlian, Byrne, & Derevensky, 2004). Within these games, adolescents experience the excitement of gambling, without experiencing the consequences of losing money. Furthermore, non-monetary forms of gambling promote positive attitudes toward gambling, glamorise and misrepresent gambling, and are freely available and playable by adolescents and children (King et al., 2010a). Gambling is promoted as fun and exciting, with the potential to "win big", and games are accompanied by sounds and music to increase player arousal.

Free online gambling sites are commonly advertised on poker programs that air on television (Kim, Lee, & Jung, 2013). The ads emphasize excitement, confidence, and collegiality - often using a celebrity poker player - with reference to the educational purpose of their websites. In fact, 90% of ads promoting websites ending in ".net" depict themselves as learning websites (Kim et al., 2013). The concern is that these ".net" sites are often sister-sites to ".com" sites where individuals gamble for actual money. These online ".com" sites may be easily accessible from the free sites; many have direct links and accept points won on the free sites.

Although under-researched, there is emerging evidence of a notable amount of free online gambling activity in young people. Not only are young people using these sites, they may be more popular than the paid online gambling sites (Griffiths & Wood, 2007; Ipsos MORI Social Research Unit, 2009; Olason et al., 2006; Shead et al., 2012; Volberg, Hedberg, & Moore, 2008). For young people, the decision to begin playing on free gambling sites may not be seen as risky, as no money is actually wagered. However, many free online gambling sites post messages to the players, inciting them to play for money and focusing on their wins during the practice sessions. These messages attempt to give an illusion of control (e.g., "Practice makes perfect.") or contribute to erroneous beliefs (e.g., "Based on your playing skills…") (Sévigny, Cloutier, Pelletier, & Ladouceur, 2005). In addition, many slot machine sites have inflated pay-out rates (i.e., exceeding 100%) in the practice trials compared to the pay-out rates using actual money (Sévigny et al., 2005). In an experiment examining the effect of inflated payout rates and pop-up messages in free sites on subsequent risky gambling behaviour on paid sites, Frahn, Delfabbro, and King (2014) found that players exposed both to sites with profitable pay-out rates (i.e., overall win) and sites with profitable rates plus encouraging pop-up messages subsequently placed higher bets than controls and those exposed to standard rates (i.e., overall loss) on gambling sites for money. However, there was no difference in subsequent bet sizes between those who had been exposed to the pop-ups as well as inflated pay-out rates and those exposed to inflated pay-out rates only, indicating the influencing factor in risky betting on monetary sites is whether or not the free sites have been profitable. This suggests that positive expectancies about gambling outcome can be produced quickly, even without winning actual money (Frahn et al., 2014). Often, players win points or credits that can then be used on the for-money gambling sites, encouraging migration from free to paying gambling games.

The risk factors for problem gambling in conjunction with the growth of free gambling opportunities online may be a worrisome combination. Potential gambling problems are fostered by beginning gambling at a young age, experiencing early big wins, and repeated circumstances of gambling (Griffiths, 1995a; Gupta & Derevensky, 2000; Jacobs, 2000). Free online gambling sites provide opportunities for each of the above. Playing on free online gambling sites has been shown to have a positive association with both gambling participation and problem gambling (King et al., 2014; Ipsos MORI Social Research Unit, 2009). Further empirical studies on youth and free online gambling games are warranted to determine prevalence rates, their relationship to online gambling for actual money, and the relationship between playing on free sites, gambling, and problem gambling. The vulnerability of youth to the development of gambling problems, along with the amount of time they spend online, and the promotion and accessibility of online free gambling is a hypothetically disturbing combination.

Factors That Affect Problem Gambling and Gaming

A number of studies have attempted to identify risk factors for pathological gambling and video game playing, respectively. The convergence between the two raises the question whether individuals who gamble and play video games excessively share similar risk factors. These include gender, personality traits (e.g., impulsivity and extraversion), comorbid mental health problems (e.g., depression), and motivations for engaging in these activities (Kuss & Griffiths, 2012).

Gender. Research has consistently shown that males are more likely than females to gamble (both offline and online) and have higher scores on problem gambling screens (Bakken, Gotestam, Grawe, Wenzel, & Oren, 2009; Barnes et al., 2010; Bhullar et al., 2012; Derevensky & Gupta, 2000a; Jackson et al., 2008; McCormack, Shorter, & Griffiths, 2014; Olason et al.,

2011). Males and females also differ in their choices of gambling activities, with males

preferring casino games, cards, horse/dog racing, sports betting and women preferring lotteries,

slot machines, and bingo (Hing & Breen, 2001; LaPlante, Nelson, LaBrie, & Shaffer, 2006;

Potenza et al., 2001; Wenzel & Dahl, 2009). Speculation for this difference includes a proclivity

on the part of males for risk behaviour (Bradley & Wildman, 2002), adherence to social norms

(Hing & Breen, 2001), escape vs. competition motivations (Wenzel & Dahl, 2009).

     Males are also more likely than females to play video games and score more highly on

addicted gaming screens (Dauriat et al., 2011; Griffiths, Davies, & Chappell, 2004a, 2004b;

Lemmens, Valkenburg, & Peter, 2011; Mentzoni et al., 2011; Padilla-Walker, Nelson, Carroll, &

Jensen, 2010). Males and females differ in regard to what game characteristics they state as

important; males are more likely to nominate full motion video, having a realistic setting, being

based on factual events, being of long duration, the option to customise a game, multi-player

features (e.g., multi-player communication, building alliances, beating other players),

sophisticated interactions, and surviving against all odds, whereas females are more likely to

nominate cartoon-style graphics, use of humour, choice of control method (e.g., joystick,

keyboard), solving puzzles, avoiding dangerous places or spells, finding/collecting things, and

finding bonuses (Wood, Griffiths, et al., 2004). With respect to MMORPGs, females are more

likely than males to have discussed sensitive issues with their online friends they would not

discuss with real-life ones, to have met up with online friends in real life, more likely to be

attracted to another player, and more likely to date other players (Cole & Griffiths, 2007).

     Personality. Specific personality traits may be factors in predisposing individuals to

gamble and play video games to excess and experience significant negative consequences.

Personality correlates of problem gamblers include traits reflecting risk-taking, impulsivity,

distractibility, over-activity, high levels of disinhibition and boredom susceptibility, negative

emotionality, difficulty conforming to group norms/rebelliousness, low self-discipline/constraint,

and excitability (Gupta, Derevensky, & Ellenbogen, 2006; Slutske, Caspi, Moffitt, & Poulton,

2005). Impulsivity, in particular, is highly correlated with and predictive of problem gambling

behaviour in youth (Nower, Derevensky, & Gupta, 2004; Pagani, Derevensky, & Japel, 2010;

Shead, Derevensky, & Gupta, 2010; Vitaro, Arseneault, & Tremblay, 1997, 1999), adults

(Shenassa, Paradis, Dolan, Wilhelm, & Buka, 2012; Walther et al., 2012), university students

(Clarke, 2006; Lightsey & Hulsey, 2002), and treatment-seeking gamblers (Maccallum,

Blaszczynski, Ladouceur, & Nower, 2007; Steel & Blaszczynski, 1998; Tang & Wu, 2012).

Problem gamblers are impulsive in specific ways. They discount future, large rewards in favour

of immediate, smaller ones. They act on the spur of moment, have difficulty planning and

thinking carefully, and have greater difficulty than non-problem gamblers maintaining attention

(Ledgerwood, Alessi, Phoenix, & Petry, 2009).

Few studies have examined personality factors with respect to video game playing, and

those studies that have have tended to examine the effects of personality on arousal (Griffiths &

Dancaster, 1995) or aggression (Chumbley & Griffiths, 2006). However, two studies examining

the relationship between gaming and impulsiveness reported that youth who are impulsive, have

attention problems, low social competence and empathy, and poor emotional regulation skills are

more likely to become pathological gamers (based on questions adapted from DSM-IV criteria

for gambling) (Gentile et al., 2011; Littel et al., 2012). With respect to MMORPGs and

personality, players have been shown to have higher scores on openness, conscientiousness, and

extraversion compared to non-players (Teng, 2008). A review of the literature concerning

excessive online video game playing has identified introversion, neuroticism, and impulsivity as

key personality characteristics significantly related to online gaming addiction (Kuss & Griffiths, 2012). More research in this area is needed to clarify video game and MMORPG playing, addicted gaming, and personality correlates.

There is little direct research examining personality correlates among gamblers and video game players. One study, examining the co-occurrence of substance use, problem gambling, and problematic video game playing and their association with personality characteristics in adolescents and young adults found high impulsivity was a common factor in both gambling and video game playing (Walther et al., 2012). Identifying common personality characteristics may provide insight into similarities and differences between gambling and video game playing as forms of behavioural addictions, which may in turn inform treatment and prevention initiatives.

Depression. In addition to examining common risk factors for problematic gambling and gaming, it is of interest to examine the comorbidity between gambling- and gaming-related behaviours and mental health disorders, such as depression. There is ample research indicating significant correlations between gambling, problem gambling, and depression (Bonnaire, Bungener, & Varescon, 2009; Gupta & Derevensky, 1998a; Kim, Grant, Eckert, Faris, & Hartman, 2006; Martin, Usdan, Cremeens, & Vail-Smith, 2014; McCormick, Russo, Ramirez, & Taber, 1984; Potenza et al., 2001). Adolescents with gambling problems report higher rates of depression, alcohol abuse, anxiety, and are at heightened risk for both reported suicide ideation and attempts (Desai, Maciejewski, Pantalon, & Potenza, 2005; Kaminer, Burleson, & Jadamec, 2002; Molde, Pallesen, Bartone, Hystad, & Johnsen, 2009; Moodie & Finnigan, 2006a; Nower, Gupta, et al., 2004) While in its infancy, the research on gaming and depression supports a positive relationship between problematic gaming (as measured by time spent playing or the Game Addiction Scale (Lemmens et al., 2011)), and depression (Desai, Krishnan-Sarin, Cavallo,

& Potenza, 2010; Lemmens et al., 2011; Mentzoni et al., 2011; Messias, Castro, Saini, Usman, & Peeples, 2011). Problem video game players have been found to have higher levels of anxiety and depression and lower life satisfaction compared with both non-gamers and non-problem gamers and are more likely to report suicidal ideation and suicidal plans than those who do not play video games (Desai et al., 2010; Mentzoni et al., 2011; Messias et al., 2011). Problematic MMORPG playing has been associated with poor psychosocial well-being, including loneliness, introversion, and depression, escapism, and time spent continuously in-game (Allison, von Wahlde, Shockley, & Gabbard, 2006; Caplan, Williams, & Yee, 2009; Stetina, Kothgassner, Lehenbauer, & Kryspin-Exner, 2011). The one study examining the co-occurrence of depression, gambling, and video game playing reported no commonalities with respect to depression among problematic gamblers and gamers (Walther et al., 2012). However, given that this association has been found in both the gambling and video game literature, the relationship warrants further analysis in order to tease apart whether depression is a common factor for both behaviours or an explanation for their co-occurrence.

Discovering patterns of meaningful relationships between depression and problematic gambling and gaming is helpful for the potential to influence prevention and treatment initiatives. If individuals use excessive gambling and video game playing as an attempt to cope with negative mood states, then therapies that deal with teaching adaptive coping strategies could be applied to both groups simultaneously.

Motivations for gambling and video game playing. With respect to risky behaviour, social cognitive models place importance on the role of cognitions related to behaviour choice. Whether or not an individual chooses to engage in a behaviour depends on perceived positive or negative outcomes of that behaviour. Gillespie and her colleagues (2007a) developed a gambling

expectancy questionnaire, based upon the alcohol literature, to explore youth gambling outcome expectancies. The Gambling Expectancy Questionnaire (GEQ) consisted of three positive expectancy scales (Enjoyment/Arousal, Self-Enhancement, and Money) and two negative expectancy scales (Over-involvement and Emotional Impact). Results from the GEQ suggest that gambling outcomes are perceived differently by problem, social, and non-gamblers (2007b). With respect to positive expectancy scales, problem gamblers endorsed items on the enjoyment/arousal, self-enhancement, and money scales more highly than social gamblers and non-gamblers. For the negative expectancy scales, problem gamblers rated the over-involvement scale more highly than social gamblers. Overall, despite experiencing negative consequences as a result of gambling, problem gamblers still anticipated positive outcomes from gambling. Given that some youth gamblers report regular video-game playing and those who see themselves as good video-game players also see themselves as good gamblers (Wood, Gupta, et al., 2004), examining gambling outcome expectancies for video game players may provide additional insight into the shared common features of these two activities. The present study proposes to further examine the GEQ among gamblers and video game players and how their outcome expectancies relate to gambling behaviour and problem gambling in both groups.

Present Study

Aims

The main goal of the current study is to examine commonalities between gambling and video game playing, playing MMORPGs and online gambling, and problem gambling and addicted gaming. One aim is to ascertain if individuals share personality traits as risk factors for excessive play; another is to discover if they share similar pathologies as a result of excessive play. Knowledge of common personality traits as risk factors is important to inform prevention

initiatives, and knowledge of shared pathologies is helpful in order to design treatment programs. If both can be considered behavioural addictions, with common personality traits as risk factors, and common negative outcomes, then a general intervention can be designed.

Hypotheses

The following hypotheses/research questions are proposed:

1. Gamblers, relative to non-gamblers, will be more likely to play video games, and video game players will be more likely to gamble than non-players.

2. MMORPG players, relative to non-players, will be more likely to participate in online gambling activities and online gamblers will be more likely to play MMORPGs than non-online gamblers.

3. Playing on free/play-for-fun online gambling games sites will be positively associated with both online and problem gambling.

4. More males than females will endorse gambling online, MMORPG playing, problem gambling, and excessive video game playing.

5. Problem gamblers will have higher rates of video game playing than non-gamblers and problem gamers will have higher rates of gambling than non-gamers.

6. Gamblers and video game players will have similar personality traits, in particular high impulsiveness. Online gamblers (in particular, online poker players) and MMORPG players will have similar personality traits, in particular low extraversion. Problem gamblers and problem video game players will share personality traits of high impulsivity.

7. Problem gamblers and problem gamers will report higher rates of depression relative to social gamblers and gamers.

8. With respect to outcome expectancies, problem gamblers will endorse items on the positive expectancy scales more highly than non-gamblers. Non-gamblers will endorse the negative expectancy items more highly than problem gamblers (Gillespie et al., 2007b). Video game players will endorse positive expectancy items on the GEQ more highly than non-players, and non-players will endorse the negative expectancy items more highly than players.

Method

Participants

In total, 1,276 CEGEP[1] students completed the questionnaire packages. Fourteen questionnaires were excluded due to inconsistent responding or missing information, one did not indicate gender, and a further 32 questionnaires were excluded because the respondents were older than 24. The final sample included 1,229 individuals (534 males, 695 females), aged 16 - 24 years ($M = 18.69$, $SD = 1.41$) (Table 1). Participants represented a convenience sample and were recruited from four local CÉGEPs and one university in Montreal, Canada (see Table 2 for the cultural/ethnic background).

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[1] CEGEPs (Collège d'enseignement général et professionnel) are public, post-secondary education collegiate institutions exclusive to the education system in the province of Quebec. Most, but not all CEGEPs offer two types of programs: pre-university (two-year) and technical (three-year).

Table 1
Sample Distribution by Gender and Age

	Sample distribution	
	N	Percentage
Gender		
Male	534	43.4
Female	695	56.6
Age Group		
Under 18	150	12.2
18-20	944	76.8
21-24	131	10.7
Age unspecified	4	0.3
Total	1229	100

Table 2
Sample Distribution by Cultural/Ethnic Background

	Sample distribution	
	N	Percentage
English-Canadian	192	21.9
French-Canadian	109	12.4
Italian	88	10.0
Hindi	68	7.8
Chinese	40	4.6
Arabic	28	3.2
Spanish	27	3.1
German	26	3.0
Eastern European	25	2.9
Greek	25	2.9
Filipino	20	2.3
Haitian	17	1.9
Polish	13	1.5
Armenian	13	1.5
Persian	12	1.4
Hebrew	12	1.4
Vietnamese	10	1.1
Jamaican	10	1.1
Ukrainian	9	1.0
First Nations	6	0.7
Russian	6	.07
Portuguese	5	0.6
Dutch	3	0.3
Korean	2	0.2
Other	110	12.6
Missing	353	
Total	1229	100.0

Instruments

Demographic questionnaire. Several items were included to assess participants' gender, age, cultural/ethnic background, and marital status (see Appendix A).

Gambling Activities Questionnaire (GAQ) (Byrne, 2004; McBride & Derevensky, 2009, 2012). A series of 12 items was developed from a previous study of adolescent online gambling to assess gambling behaviour (i.e., poker, lotteries (draw and scratch), sports betting, electronic gaming machines, betting on games of skill, casino gambling, dice, bingo, stock market, horse/dog racing, keno, and "other") (Byrne, 2004) (see Appendix A). Respondents were asked to indicate if they had ever gambled for money and, if so, the frequency with which they engaged in the gambling activities during the previous 12 months on a 5-point Likert scale (e.g., *never*, *less than once a month*, *1-3 times a month*, *once a week or more,* or *daily)*. All questions were asked directly and no constructs were assessed, assuring face validity (Ellenbogen, Gupta, & Derevensky, 2007).

Internet Gambling Questionnaire (IGQ) (Byrne, 2004; McBride & Derevensky, 2009, 2012). To assess online gambling, both with and without money, respondents were first required to indicate if they had ever played any free gambling games online for fun (without money) and, if so, the frequency with which they engaged in various online gambling games without money (virtual currency) in the previous year (i.e., roulette, blackjack, baccarat, dice/craps, keno, bingo, free sports "betting", slot machines, horse/dog racing, poker, and electronic gaming machines). Frequency was assessed by using a 5-point Likert scale (e.g., *never*, *less than once a month*, *1-3 times a month*, *once a week or more,* or *daily)*. Respondents indicated the age of onset, how long they typically played per session (a session was defined as each time they logged onto the

Internet), the number of sessions typically played per week, and with whom they usually played (e.g., alone, friends, strangers, etc.).

Respondents were then asked a similar set of questions addressing gambling online for real money (i.e., roulette, blackjack, lottery, baccarat, dice/craps, keno, bingo, electronic gaming machines, slot machines, poker, and sports betting); frequency, age of onset, time typically spent gambling online per session, with whom they usually gambled, the average amount of money spent gambling per session, the most money wagered in one session, and the most money won or lost gambling online, method(s) of payment typically used (e.g., personal credit card, debit card, bank transfer, etc.), how often they returned the next day to win money back, and whether or not they had consumed alcohol, smoked tobacco, marijuana or other illicit drugs while gambling online (if applicable) (see Appendix A).

Video game activities questionnaire. This scale was developed based on the IGQ. Respondents indicated if they had ever played video games (excluding games played online) and, if so, the frequency with which they played a variety of games during the previous 12 months (i.e., *Grand Theft Auto, Call of Duty, Halo, Mario & Luigi, NHL/NBA/FIFA, Left 4 Dead, Star Wars, Wii Fit/Wii Sports, Batman: Arkham Asylum, BioShock, The Sims, Army of Two, Final Fantasy, Lord of the Rings, Rock Band/Guitar Hero/Dance Dance Revolution, Dragon Age: Origins,* and *Prince of Persia*) (see Appendix A). The list was developed based on the most popular games rated by gaming websites as well as list of the top sellers. Frequency of play was on a 5-point Likert scale (e.g., *never*, *less than once a month*, *1-3 times a month*, *once a week or more*, or *daily)*. Respondents indicated age of onset, typical length of play per session, number of sessions typically played weekly, type of console typically used (e.g., home computer,

PlayStation, PSP, etc.), and with whom they usually played (e.g., alone, friends, strangers, etc.).

Participants also rated their self-perceived skill level.

Respondents were then asked a similar set of questions addressing past-year MMORPG

playing (i.e., *World of Warcraft, Everquest, Final Fantasy, Star Trek Online, Asheron's Call,*

Star Wars, Lord of the Rings Online, Ultima Online, Halo Online, EVE Online, and *Runescape*);

frequency, age of onset, the duration typically played per session, the number of sessions

typically played per week, and with whom they usually played (e.g., alone, friends, strangers,

etc.). Respondents indicated if they belonged to a guild (a group of players who come together

online for friendship and quests), their self-perceived skill level, and the number of offline and

online friends they had.

Problem gambling. Respondents over 18 years of age completed the DSM-IV

standardised checklist designed to measure problem gambling. It includes gambling behaviours

such as a preoccupation with gambling, tolerance, an inability to stop gambling,

restlessness/irritability when not able to gamble, chasing losses, the presence of social conflict,

lying about gambling, and stealing to finance gambling. The items are scored using a 'yes/no'

format with a total score of four of more indicative of problem gambling (Delfabbro et al., 2014)

(see Appendix A). The use of the DSM-IV as an index for problem gambling has been well

established in research (Derevensky, 2012; Derevensky & Gupta, 2000b; Petry, 2005).

DSM-IV-MR-J (Fisher, 2000). Participants under the age of 18 completed the DSM-IV-

MR-J. This 12-item, 9-category instrument is a screen for severity of gambling problems during

adolescence, was modelled after the DSM-IV (American Psychiatric Association, 2000), and

revised from the DSM-IV-J (Fisher, 1992) (see Appendix A). It assesses a number of variables

related to problem gambling, including progression, preoccupation, tolerance, withdrawal, loss

of control, escape, chasing losses, lying, illegal activity, and interference with family and school. It has been widely used to assess problem and pathological gambling in youth (Derevensky, 2012; Gillespie et al., 2007b; Nower, Gupta, et al., 2004).

Game Addiction Scale (GAS) (Lemmens, Valkenburg, & Peter, 2009). This 21-item scale was modelled upon on the DSM-IV criteria for pathological gambling and taps into criteria proposed by Griffiths (2005a); the components of which are salience, tolerance, mood modification, withdrawal, relapse, conflict, and related problems. The scale, based on research with two adolescent samples, had a Cronbach's alpha of .92 and .94 in both studies. It has been shown to have strong convergent and criterion validity (King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013). For the purposes of data analysis, gaming addiction was measured by the seven-item short version of this scale.

Eysenck Personality Questionnaire – Revised (Short-form) (EPQ-R Short; Eysenck, Eysenck, & Barrett, 1985). This 48-item personality questionnaire is a short version of the revised EPQ and examines personality traits on three dimensions: Psychoticism (12 items; α = .62 for males, α = .61 for females); Neuroticism (12 items; α = .84 for males, α = .80 for females); and Extraversion (12 items; α = .88 for males, $\alpha.$ = .84 for females). As well, a validity scale is included (12 items; α = .77 for males, α = .73 for females).

I$_7$ Impulsiveness Questionnaire (Eysenck, Pearson, Easting, & Allsopp, 1985). The 54-item I$_7$ Impulsiveness Questionnaire measures two components of Impulsivity: Impulsiveness (19 items,; α = .84 for males, α = .83 for females) and Venturesomeness (16 items; α = .85 for males, α = .84 for females), as well as Empathy (19 items; α = .69 for males, α = .69 for females). The I$_7$ has been shown to be a reliable measure of the distinct components of impulsivity (Corulla, 1987).

Reynolds Adolescent Depression Scale - 2nd Edition (RADS-2). The RADS-2 is a 30-item measure assessing depressive symptoms in adolescents aged 11–19 years (Reynolds, 1987, 2002). The RADS-2 includes subscales that measure adolescents' depressive symptoms along four basic dimensions; dysphoric mood, anhedonia/negative affect, negative self-evaluation, and somatic complaints.

Gambling Expectancy Questionnaire (GEQ) (Gillespie et al., 2007a, 2007b). This 23-item scale is comprised of five discrete scales representing three positive outcome expectancies - enjoyment/arousal ($\alpha = .86$), self-enhancement ($\alpha = .81$), and (make) money ($\alpha = .78$) - and two negative outcome expectancies - overinvolvement ($\alpha = .91$), and emotional impact ($\alpha = .85$). Questions deal with expectancies with respect to gambling. Participants who had not gambled during the previous year were instructed to answer how they imagined they would feel if they did gamble.

Procedure

Ethical approval for the study was obtained by McGill University's Research Ethics Review Committee. After approval, participants were recruited through each participating CEGEP. Personnel were first contacted by letter to introduce the current research project, followed by a phone call to obtain permission to conduct research. Ethical approval was obtained from each respective college's REB and individual professors were contacted for permission to administer questionnaires in the classrooms. For students under 18, permission was given by their parents.

Data collection was administered face-to-face in individual classrooms by the researcher, doctoral students, and/or a research coordinator from McGill University's International Centre for Youth Gambling and High-Risk Behaviors. Students completed questionnaires

independently, however any questions that arose were answered by the researcher or research assistants. Data were collected over a seven-month period beginning in November 2010 and ending in May 2011.

All participants completed a consent form, were informed their participation was voluntary, and were free to withdraw from the study at any point without penalty. If they wished, participants were entered into a draw for one of 20 movie tickets. Participants were assured anonymity and confidentiality. Written informed consent was obtained from the students themselves.

Gambling was defined as betting/wagering money on one or more activities (e.g., lottery, cards, sports events, bingo, casino-type games, etc.) with an unpredictable outcome determined by chance (Bolen & Boyd, 1968). This study addressed three different forms of gambling: land-based gambling games played for money (referred to as offline gambling); simulated gambling-type activities online without money (sometimes played for virtual currency; referred to as free online gambling games); and gambling online for money (referred to as online gambling). A distinction was made between online gambling *with* money and *without* actual money (virtual currency, points, chips, etc.). Participating in simulated gambling games online for fun (*without* money) was defined as using free online gambling games, free games, free trials, etc.

The total time to complete the survey varied from 30 – 60 minutes, with most students finishing within 45 minutes.

Data coding and entry. Questionnaires were given an identification number and were scanned using a Fujitsu scanner (Scan Partner 620C) and Optical Mark Recognition software (Remark Office OMR 5.5). Questionnaire data were then converted to SPSS 19.0 for analysis

using descriptive statistics, including frequency counts, cross-tabulations, *t*-tests, one-way ANOVA, regression analyses, and chi-square tests of significance.

Data analyses. The EPQ-R, I_7, and RADS-2 were each scored according to their appropriate standardization manuals.

Frequency data for gambling and video game playing were examined to determine proportion rates for each activity in the sample. Non-parametric tests (e.g., Chi-square, cross-tabulations) were used to examine the association between prevalence rates, categorization on these factors, and demographic variables (e.g., gender, age) as well as problem gambling and problem gaming classification. For non-parametric analyses, the age variable was recoded into three categories: adolescents (under 18, $n = 51$), younger adults (aged 18-20, $n = 504$), and adults (aged 21-24, $n = 85$). The rates of gambling have been shown to be higher among adolescents and younger adults than older adults (Derevensky & Gupta, 2004; Stuhldreher et al., 2007). Although Chi-square tests have been shown to be accurate even for small expected cell frequencies (Camilli & Hopkins, 1978, 1979), significance levels of Fisher's exact test are reported in those instances where the cell count is less than five (Field, 2013). Differences between groups on personality measures and depression were tested using *t*-tests (independent samples). Effect sizes (*d*) were calculated between each group using the procedures outlined by Cohen (1988) for a two-sample *t*-test: $d = M_1 - M_2 / \sigma_{pooled}$ where $\sigma_{pooled} = \sqrt{[(\sigma_1^2 + \sigma_2^2) / 2]}$.

Binary logistic regression was used to evaluate the relative contributions of predictor variables to the likelihood of membership in past-year gambling, online gambling, free-to-play gambling, video gaming, MMORPG playing, and problem gambling and addicted gaming categories. For gambling, demographic information (i.e., gender and age), past-year video and MMORPG playing (yes/no), personality variables (Impulsiveness, Venturesomeness, and

Extraversion), and total depression scores were entered as covariates. For gaming, demographic information (i.e., gender and age), past-year gambling (offline and online) and free online games (yes/no), personality variables (Impulsiveness, Venturesomeness, and Extraversion), and total depression scores were entered as covariates. For problem gambling, online gambling, playing free gambling games, video gaming, and MMORPG playing, in addition to demographic, personality, and depression variables, were covariates. For gaming addiction, video gaming, MMORPG playing, gambling (offline and online), and free gambling games playing, in addition to demographic, personality, and depression variables, were covariates. The outcome variable was coded as 0 = not engaged in the behaviour and 1 = engaged in the behaviour. A backward stepwise method (likelihood ratio) was chosen, with only the final model reported (Field, 2000).

To assess group differences on the five scales of the Gambling Expectancies Questionnaire, a 2 (gender) X 3 (DSM groups) X 3 (age) factorial analysis of variance was performed, with post-hoc tests where appropriate (Gillespie et al., 2007b).

Due to the numerous unplanned comparisons made, the probability level was set at $p \leq$ .001, however all p values are reported.

Missing data. A number of measures (i.e., personality and depression) were missing for some participants, due to non-responses. In all cases the proportion of missing data was small (<5%), so listwise deletion (complete case analysis) was employed (Raykov & Marcoulides, 2008).

Results

Gambling Participation

A total of 52.2% of students reported some form of offline gambling during the past 12 months, 41.2% reported playing free online gambling games, and 4.9% reported gambling online

(see Table 3). Only two respondents reported exclusively gambling online. Significantly more males than females reported gambling, online gambling, and playing free online gambling games. There was a significant difference among age groups for offline gambling, but not for playing free online gambling games or online gambling. Significantly more 18-24 year-olds than those under 18 reported gambling, and significantly more 21-24 year-olds than 18-20 year-olds report having gambled during the past year.

Table 3
Gambling Participation During the Past 12 Months by Gender and Age

| | | Gambling participation | | |
	N	Offline gambling	Free online gambling games	Online gambling
Gender				
Male	534	364 (68.2%)	326 (61.0%)	54 (10.1%)
Female	695	278 (40.0%)	180 (25.9%)	6 (.9%)
Age Group				
Under 18	150	51 (34.0%)	61 (40.7%)	5 (3.3%)
18-20	944	504 (53.4%)	387 (41.0%)	44 (4.7%)
21-24	131	85 (64.9%)	58 (44.3%)	11 (8.4%)
(age excluded)	4	-	-	-
Total	1229	642 (52.2%)	506 (41.2%)	60 (4.9%)

Chi-square	
Offline gambling (gender)	$\chi^2 (1, N = 1229) = 96.01, p < .001$
Free online gambling games (gender)	$\chi^2 (1, N = 1229) = 154.04, p < .001$
Online gambling (gender)	$\chi^2(1, N = 1229) = 55.63, p < .001$
Offline gambling (age group)	$\chi^2(2, N = 1225) = 28.90, p < .001$
Free online gambling games (age group)	NS
Online gambling (age group)	NS
Under 18 vs. 18-20	$\chi^2(1, N = 1094) = 19.47, p < .001$
Under 18 vs. 21-24	$\chi^2(1, N = 281) = 26.71, p < .001$
18-20 vs. 21-24	$\chi^2(1, N = 1075) = 6.14, p = .013$

The most commonly reported offline gambling activities were poker, lottery scratch cards and lottery draws, slot machines, and casino table games (i.e., roulette and blackjack) (Table 4). Online, both free and with real money, the most frequently-endorsed games were poker, sports betting, and blackjack. The mean age of onset for gambling was 15.89 years (*SD* = 2.56), with

the youngest reported being 4 ($n = 1$) and the oldest being 21 ($n = 2$). Males started gambling

significantly earlier than females but there were no differences based on gambling severity

(Table 5).

Table 4
Gambling Participation among Participants Reporting Gambling During the Past 12 Months by Gambling Activity

	Past year gambling participation		
	Offline gambling ($n = 642$)	Free online gambling games ($n = 506$)	Online gambling ($n = 60$)
Gambling activity			
Lottery scratch cards	315 (49.1%)		
Lottery draws	311 (48.4%)		5 (8.3%)
Sports betting	197 (30.7%)	138 (27.3%)	24 (40.0%)
Games of skill	213 (33.2%)		
Roulette		64 (12.6%)	9 (15.0%)
Blackjack		292 (57.7%)	13 (21.7%)
Baccarat		7 (1.4%)	2 (3.3%)
Electronic gaming machines	252 (39.3%)	137 (27.1%)	7 (11.7%)
Casino	294 (45.8%)		
Slot machines		106 (20.9%)	4 (6.7%)
Dice	113 (17.6%)	67 (13.2%)	2 (3.3%)
Bingo	162 (25.2%)	104 (20.6%)	2 (3.3%)
Poker	315 (49.1%)	371 (73.3%)	42 (70.0%)
Horses/dogs/animals	18 (2.8%)	16 (3.2 %)	
Keno	28 (4.4%)	8 (1.6%)	1 (1.7%)
Stock market	47 (7.3%)		

Table 5
Age of Onset for Offline Gambling by Gender and Gambling Severity

	N	Mean	SD	*t*-test
Gender				
Male	361	15.52	2.48	
Female	271	16.39	2.59	t(630) = 4.25***
Gambling Severity				
Social gambler[a]	597	15.92	2.57	
Problem gambler[b]	35	15.46	2.41	NS
Total	632	15.89	2.56	

***$p < .001$

Past year gambling participation was examined by gender for each activity. A

distribution, for those who reported offline gambling is presented in Table 6. Significantly more

males than females reported gambling on poker, sports betting, betting on games of skill, dice,

the stock market, and racing while females reported lottery draws, scratch card playing, and

bingo playing. No significant gender differences for gambling on EGMs, gambling at casinos, or

playing keno were found (Table 6).

Table 6
Participation in Offline Gambling Activity by Gender

Gambling activity ($n = 642$)	Male ($n = 364$)	Female ($n = 278$)	$\chi^2(1, N = 642)$
Lottery scratch cards	134 (36.8%)	181 (65.1%)	50.49, $p < .001$
Lottery draws	157 (43.1%)	154 (55.4%)	9.49, $p = .002$
Sports betting	160 (44.0%)	37 (13.3%)	69.60, $p < .001$
Games of skill	161 (44.2%)	52 (18.7%)	46.32, $p < .001$
Electronic gaming machines	137 (37.6%)	115 (41.4%)	NS
Casino	172 (47.3%)	122 (43.9%)	NS
Dice	75 (20.6%)	38 (13.7%)	5.23, $p = .022$
Bingo	68 (18.7%)	94 (33.8%)	19.13, $p < .001$
Poker	246 (67.6%)	69 (24.8%)	115.33, $p < .001$
Horses/dogs/animals	15 (4.1%)	3 (1.1%)	5.35, $p = .028$[a]
Keno	18 (4.9%)	10 (3.6%)	NS
Stock market	37 (10.2%)	10 (3.6%)	10.02, $p = .002$

[a]Fisher's exact test.

Offline gambling participation by age group revealed significant differences for poker,

lottery draws, lottery scratch cards, casino gambling, and electronic gaming machines (Table 7).

Further analyses suggest no significant age differences for lottery draws, scratch cards, poker

playing, or EGMSs between 18-20 and 21-24 year-olds, but there was a trend for older youth to

gamble in casinos (Table 7). There were also greater numbers of participants ages 18 and under,

relative to those over 18, who played poker, while those over 18 were more likely to participate

in lottery draws, scratch cards, casino gambling, and EGMs.

Table 7
Participation in Offline Gambling Activity by Age Group

Gambling activity (n = 640)	Under 18 (n = 51)	18 - 20 (n = 504)	21 - 24 (n = 85)
Poker	36 (70.6%)	237 (47.0%)	42 (49.4%)
Lottery draws	8 (15.7%)	253 (50.2%)	50 (58.8%)
Lottery scratch cards	10 (19.6%)	259 (51.4%)	45 (52.9%)
Sports betting	20 (39.2%)	155 (30.8%)	22 (25.9%)
Games of skill	24 (47.1%)	162 (32.1%)	27 (31.8%)
Casino	4 (7.8%)	240 (47.6%)	50 (58.8%)
Dice	11 (21.6%)	89 (17.7%)	13 (15.3%)
Bingo	17 (33.3%)	125 (24.8%)	20 (23.5%)
Electronic gaming machines	5 (9.8%)	207 (41.1%)	40 (47.1%)
Stock market	5 (9.8%)	39 (7.7%)	3 (3.5%)
Horses/dogs/animals	1 (2.0%)	16 (3.2%)	1 (1.2%)
Keno	1 (2.0%)	21 (4.2%)	6 (7.1%)

Chi-square

Poker	$\chi^2(2, N = 640) = 10.29, p = .006$
Under 18 vs. 18-20	$\chi^2(1, N = 555) = 10.29, p = .001$
Under 18 vs. 21-24	$\chi^2(1, N = 136) = 5.84, p = .016$
18-20 vs. 21-24	NS
Lottery draws	$\chi^2(2, N = 640) = 26.19, p < .001$
Under 18 vs. 18-20	$\chi^2(1, N = 555) = 22.14, p < .001$
Under 18 vs. 21-24	$\chi^2(1, N = 136) = 24.25, p < .001$
18-20 vs. 21-24	NS
Lottery scratch cards	$\chi^2(2, N = 640) = 19.31, p < .001$
Under 18 vs. 18-20	$\chi^2(1, N = 555) = 18.73, p < .001$
Under 18 vs. 21-24	$\chi^2(1, N = 136) = 14.70, p < .001$
18-20 vs. 21-24	NS
Casino gambling	$\chi^2(2, N = 640) = 36.06, p < .001$
Under 18 vs. 18-20	$\chi^2(1, N = 555) = 29.74, p < .001$[a]
Under 18 vs. 21-24	$\chi^2(1, N = 136) = 34.60, p < .001$[a]
18-20 vs. 21-24	$\chi^2(1, N = 589) = 3.65, p = .056$
Electronic gaming machines	$\chi^2(2, N = 640) = 21.39, p < .001$
Under 18 vs. 18-20	$\chi^2(1, N = 555) = 19.18, p < .001$
Under 18 vs. 21-24	$\chi^2(1, N = 136) = 19.98, p < .001$[a]
18-20 vs. 21-24	NS

[a]Fisher's exact test.

Problem Gambling

One aim of the study was to explore aspects of problem gambling, based on endorsement of DSM-IV criteria. Respondents were identified as social gamblers if they had gambled in the past year and endorsed 0 - 2 items on the DSM-IV, as at-risk for developing a gambling problem if they endorsed 3 or 4 items, and as probable pathological gamblers if they endorsed 5 or more items (American Psychiatric Association, 2000). Based on gambling participation and both the DSM-IV-MR-J and DSM-IV criteria, 47.6% of the sample were identified as non-gamblers, 49.6% social gamblers, 2.4% at-risk gamblers, and 0.5% probable pathological gamblers (PPGs). Due to the small number of PPGs in the present sample, and in order to reflect those individuals who may be transitioning in or out of pathological gambling, participants who reported gambling in the past year and who endorsed three or more items on the DSM-IV or DSM-IV-MR-J were categorised as problem gamblers, and those who endorsed 0-2 items, and who had gambled in the past year, were categorised as social gamblers (Table 8). Past research has suggested that individuals with a minimum of three gambling-related problems on these scales share similar characteristics to those meeting criteria for probable pathological gambling (Gupta & Derevensky, 1998b).

A greater proportion of male than female social and problem gamblers was found, with more female than male non-gamblers (Table 8). There were no significant age differences among non-gamblers and problem gamblers, or among social and problem gamblers. However, comparing non-gamblers and social gamblers showed significantly more non-gamblers were under 18, whereas significantly more social gamblers were aged 21-24 (Table 8).

Table 8
Gambling Severity by Gender and Age

| | | Gambling severity | | |
	N	Non-gambler[a]	Social gambler[b]	Problem gambler[c]
Gender				
Male	534	168 (31.5%)	336 (62.9%)	30 (5.6%)
Female	695	417 (60.0%)	273 (39.3%)	5 (0.7%)
Total	1229	585 (47.6%)	609 (49.6%)	35 (2.8%)
Age Group				
Under 18	150	99 (66.0%)	49 (32.7%)	2 (1.3%)
18-20	944	438 (46.4%)	476 (50.4%)	30 (3.2%)
21-24	131	46 (35.1%)	82 (62.6%)	3 (2.3%)
Total	1225	583 (47.6%)	607 (49.6%)	35 (2.9%)

	Chi-square
Gender	$\chi^2(2, N = 1229) = 111.18, p < .001$
Non-gamblers vs. social gamblers	$\chi^2(1, N = 85.60) = 111.18, p < .001$
Non-gamblers vs. problem gamblers	$\chi^2(1, N = 620) = 49.36, p < .001$
Social gamblers vs. problem gamblers	$\chi^2(1, N = 644) = 12.59, p < .001$
Age	$\chi^2(4, N = 1229) = 30.23, p < .001$
Non-gamblers vs. problem gamblers	NS
Non-gamblers vs. social gamblers Under 18 vs. 18-20	$\chi^2(1, N = 1062) = 18.34, p < .001$
Non-gamblers vs. social gamblers Under 18 vs. 21-24	$\chi^2(1, N = 276) = 26.38, p < .001$
Non-gamblers vs. social gamblers 18-20 vs. 21-24	$\chi^2(1, N = 1042) = 6.48, p = .011$
Social gamblers vs. problem gamblers	NS

[a]DSM-IV score = 0, no gambling activity (offline or online) during the past 12 months.
[b]DSM-IV score (0-2).
[c]DSM-IV score ($\geq$ 3).

There were significant differences for online vs. offline gambling based on gambling severity. There was a significantly greater proportion of problem gamblers (three times as many) among online compared to offline gamblers, whereas there were more social gamblers among offline gamblers than online gamblers (Table 9). This discrepancy between problem gambling rates among online and offline gamblers is striking.

Table 9
Gambling Participation During the Past Year by Gambling Severity

		Gambling severity[1]	
	N	Social gambler[a]	Problem gambler[b]
Gambling participation			
Offline gambling	642	607 (94.5%)	35 (5.5%)
Online gambling	60	51 (85.0%)	9 (15.0%)
Chi-square		$\chi 2(1, N = 702] = 8.52, p = .004$	

[1]Non-gamblers are excluded.
[a]DSM-IV score (0-2).
[b]DSM-IV score ($\geq$ 3).

Participation in Online Gambling

Given the growing concern around online gambling, the present study sought to identify rates of past year online gambling participation. The results indicated that 60 students (4.9%) in the entire sample (9.3% of gamblers) had gambled online (Table 10). Two students reported exclusively gambling online; both were male and were considered social gamblers. There were significant differences for online gambling based on gender and gambling severity, but not age group. The mean age for first gambling online was 17.43 years (SD = 1.88), with the youngest age reported being 12 (*n* = 1) and the oldest being 23 (*n* = 1). There were no significant differences based on gender or gambling severity for age of onset (Table 11).

Table 10

Online Gambling During the Past 12 Months by Gender, Age, and Gambling Severity

	N	Participation in past 12 months
Gender		
Male	534	54 (10.1)
Female	695	6 (0.9)
Age group		
Under 18	150	5 (3.3%)
18-20	944	44 (4.7%)
21-24	131	11 (8.4%)
Total	1225	60 (4.9%)
Gambling severity		
Non-gambler[a]	585	-
Social gambler[b]	609	51 (8.4%)
Problem gambler[c]	35	9 (25.7%)
Total	1229	60 (4.9%)

	Chi-square
Gender[1]	$\chi^2(1, N = 1229) = 55.63, p < .001$
Gambling severity[1]	$\chi^2(1, N = 1229) = 11.78, p = .003$
Age group	NS

[1]Fisher's Exact Test.
[a] No gambling activity (offline or online) during the past 12 months.
[b]DSM-IV score (0-2).
[c]DSM-IV score (≥ 3).

Table 11

Age of Onset for Online Gambling by Gender and Gambling Severity

	N	Mean	SD	t-test
Gender				
Male	54	17.31	1.77	
Female	6	18.50	2.67	NS
Gambling severity				
Social gambler[a]	51	17.49	1.99	
Problem gambler[b]	9	17.11	1.05	NS
Total	60	17.43	1.88	

[a]DSM-IV score (0-2).
[b]DSM-IV score (≥ 3).

Game Preferences

Students were provided with an 11-item list of online gambling activities and indicated the frequency played for each game (i.e., *never, less than once a month, 1-3 times a month, once a week or more,* and *daily*). The most commonly reported forms of online gambling were poker, sports betting, blackjack, roulette, and electronic gaming machines (Table 12). Males were significantly more likely to wager on sports online (Table 12). Due to the small number of online gamblers, hence small cell sizes, gender and gambling severity were not analysed statistically. However, the results provide information on the popular activity for each group. Females reported predominantly two online forms of gambling activities - poker and blackjack - while males reported those two activities, plus sports betting and roulette. A similar pattern is seen for gambling severity; problem gamblers predominantly report gambling on poker and blackjack online, while social gamblers choose those two activities plus blackjack, roulette, and EGMs (Table 13).

Table 12
Participation in Online Gambling During the Past 12 Months by Gender

	Male (*n* = 54)	Female (*n* = 6)	Total (*n* = 60)
Online gambling activity			
Poker	37 (68.5%)	5 (83.3%)	42 (70.0%)
Sports betting	24 (44.4%)	-	24 (40.0%)
Blackjack	10 (18.5%)	3 (50.0%)	13 (21.7%)
Roulette	8 (14.8%)	1 (16.7%)	9 (15.0%)
Electronic gambling machines	5 (9.3%)	2 (33.3%)	7 (11.7%)
Online lottery	3 (5.6%)	2 (33.3%)	5 (8.3%)
Slot machines	3 (5.6%)	1 (16.7%)	4 (6.7%)
Baccarat	1 (1.9%)	1 (16.7%)	2 (3.3%)
Dice/craps	2 (3.7%)	-	2 (3.3%)
Bingo	2 (3.7%)	-	2 (3.3%)
Keno	1 (1.9%)	-	1 (1.7%)
Other	3 (5.6%)	-	3 (5.0%)

Note. Cells containing '-' indicate no activity.

Table 13
Participation in Online Gambling During the Past 12 Months by Gambling Severity

	Social gambler[a] (n = 51)	Problem gambler[b] (n = 9)	Total (n = 60)
Online gambling activity			
Poker	35 (68.6%)	7 (77.8%)	42 (70.0%)
Sports betting	20 (39.2%)	4 (44.4%)	24 (40.0%)
Blackjack	11 (21.6%)	2 (22.2%)	13 (21.7%)
Roulette	6 (11.8%)	3 (33.3%)	9 (15.0%)
Electronic gaming machines	6 (11.8%)	1 (11.1%)	7 (11.7%)
Online lottery	4 (7.8%)	1 (11.1%)	5 (8.3%)
Slot machines	4 (7.8%)	-	4 (6.7%)
Baccarat	2 (3.9%)	-	2 (3.3%)
Dice/craps	2 (3.9%)	-	2 (3.3%)
Bingo	2 (3.9%)	-	2 (3.3%)
Keno	1 (2.0%)	-	1 (1.7%)
Other	2 (3.9%)	1 (11.1%)	3 (5.0%)

Note. Cells containing '-' indicate no activity.
[a]DSM-IV score (0-2).
[b]DSM-IV score ($\geq$ 3).

Participation in Free Online Gambling Games

A primary aim of the present study was to examine the link between gambling and video game playing. Free online gambling games are a key element in that link. A total of 41.2% of participants (*n* = 506) reported having played free online gambling games during the past 12 months (Table 14). There were significant differences for gender and gambling severity but not age group. Of note is that while greater numbers of social and problem gamblers report playing free online gambling games, nevertheless 25% of respondents who did not gamble at all reported playing these games (Table 14). The mean age of onset for first playing free online gambling games was 14.93 years (*SD* = 2.31), with the youngest age reported being 7 (*n* = 2) and the oldest being 23 (*n* = 1). No significant differences based on gender or gambling severity for age of onset were found (Table 14).

Table 14

Participation in Free Online Gambling Games by Gender, Age, and Gambling Severity

	N	Participation in past 12 months	Mean age of onset[a]	*SD*
Gender				
Male	534	326 (61.0%)	14.93	2.19
Female	695	180 (25.9%)	14.90	2.51
Total	1229	506 (41.2%)	14.92	2.31
Age				
Under 18	150	61 (40.7%)		
18-20	944	387 (41.0%)		
21-24	131	58 (44.3%)		
Total	1225	506 (41.3%)		
Gambling severity				
Non-gamblers[b]	585	148 (25.3%)	14.99	2.00
Social gamblers[c]	609	329 (54.0%)	14.96	2.37
Problem gambler[d]	35	29 (82.9%)	14.14	2.94
Total	1229	506 (41.2%)	14.93	2.31

Chi-square	
Gender	$\chi^2(1, N = 1229) = 154.04, p < .001$
Age group	NS
Gambling severity	$\chi^2(1, N = 1229) = 127.49, p < .001$
Non-gambler vs. social gambler	$\chi^2(1, N = 1194) = 102.62, p < .001$
Non-gambler vs. problem gambler	$\chi^2(1, N = 620) = 53.64, p = .001$
Social vs. problem gambler	$\chi^2(1, N = 644) = 11.15, p = .001$

[a]Mean age of onset was not significant for gender, age, or gambling severity.
[b]No gambling activity (offline or online) during the past 12 months.
[c]DSM-IV score (0-2).
[d]DSM-IV score (≥ 3).

Due to the small number of online gamblers, hence small cell sizes, gender and gambling severity were not analysed statistically. However, the results provide information on the popular activity for each group. Males tended to report past-year free poker and sports betting, whereas among females free bingo and slot machine playing were popular (Table 15).

Table 15
Participation in Free Online Gambling Games by Gender

Free online activity (n = 506)	Male (n = 326)	Female (n = 180)
Roulette	48 (14.7%)	16 (8.9%)
Blackjack	196 (60.1%)	96 (53.3%)
Baccarat	5 (1.5%)	2 (1.1%)
Dice	39 (12.0%)	28 (15.6%)
Keno	5 (1.5%)	3 (1.7%)
Bingo	41 (12.6%)	63 (35.0%)
Sports betting	113 (34.7%)	25 (13.9%)
Electronic gaming machines	85 (26.1%)	52 (28.9%)
Slot machines	58 (17.8%)	48 (26.7%)
Horses/dogs/animals	7 (2.1%)	9 (5.0%)
Poker	265 (81.3%)	106 (58.9%)

Table 16 shows participation in free online gambling games based on severity. Small cell

sized to not allow statistical differences.

Table 16
Participation in Free Online Gambling Games by Gambling Severity

Free online activity (n = 506)	Non-gamblers[a] (n = 148)	Social gamblers[b] (n = 329)	Problem gamblers[c] (n = 29)
Roulette	13 (20.3%)	40 (62.5%)	18 (4.1%)
Blackjack	84 (28.8%)	188 (64.4%)	20 (6.8%)
Baccarat	3 (42.9%)	1 (14.3%)	3 (42.9%)
Dice	21 (31.3%)	36 (53.7%)	10 (14.9%)
Keno	2 (25.0%)	5 (62.5%)	1 (12.5%)
Bingo	42 (40.4%)	58 (55.8%)	4 (3.8%)
Sports betting	29 (21.0%)	93 (67.4%)	16 (11.6%)
Electronic gaming machines	33 (24.1%)	95 (69.3%)	9 (6.6%
Slot machines	38 (35.8%)	60 (56.6%)	8 (7.5%)
Horses/dogs/animals	7 (43.8%)	8 (50.0%)	1 (6.3%)
Poker	98 (26.4%)	250 (67.4%)	23 (6.2%)

[a]DSM-IV score = 0, no gambling activity (offline or online) during the past 12 months.
[b]DSM-IV score (0-2).
[c]DSM-IV score (≥ 3).

Online Gambling With and Without Money: A Comparison

It has been speculated that playing free gambling games may be a gateway to gambling

online with money. Results of the present study suggest that of those who reported playing free

online gambling games (*n* = 506), 10.3% also reported online gambling (Table 17). Among

them, males were significantly more likely than females and problem gamblers were

significantly more likely than social gamblers to have gambled online.

Table 17
Online Gambling Among Participants Reporting Playing Free Online Gambling Games During the Past 12 Months by Gender and Gambling Severity

		Online gambling participation
	N	
Gender		
Male	326	48 (14.7%)
Female	180	4 (2.2%)
Gambling severity		
Non-gamblers[a]	148	
Social gamblers[b]	329	43 (13.1%)
Problem gamblers[c]	29	9 (31.0%)
Total	506	52 (10.3%)

Chi-square	
Gender[1]	χ^2(1, *N* = 506) = 19.66 *p* < .001
Gambling severity[1]	χ^2(1, *N* = 358) = 6.30, *p* = .023

[1]Fisher's exact test.
[a] No gambling activity (on or off the online) during the past 12 months.
[b]DSM-IV score (0-2).
[c]DSM-IV score ($\geq$ 3).

Among participants who reported online gambling (*n* = 60), 86.7% had also played free

online gambling games (Table 18). No statistically significant differences for male and female

gamblers or for gambling severity were found, although it is of interest to note *all* online

gamblers who were also identified as problem gamblers had played free online gambling games.

Table 18

Playing Free Online Gambling Games among Participants Reporting Online Gambling During the Past 12 Months by Gender and Gambling Severity

		Free online gambling participation[1]
	N	Yes
Gender		
Male	54	48 (88.9%)
Female	6	4 (66.7%)
Gambling severity		
Social gamblers[a]	51	8 (84.3%)
Problem gamblers[b]	9	9 (100.0%)
Total	60	52 (86.7%)

[1]Percentage (number of participants in parentheses).
[a]DSM-IV score (0-2).
[b]DSM-IV score ($\geq$ 3).

Video Game Playing

This study addressed two different forms of gaming: personal video games not played online and Massively Multiplayer Online Role-Playing Games (MMORPGs) played with others. Participation was determined by asking respondents to indicate how often (e.g., *never, less than once a month, 1-3 times a month, once a week or more,* and *daily)* they had played a specific video game (e.g., *Grand Theft Auto, Call of Duty, Halo*) or MMORPG (e.g., *World of Warcraft, Everquest*) during the previous 12 months.

A total of 90.1% of students reported playing video games and 29.0% reported playing MMORPGs (Table 19). Males were more likely than females to play video games and MMORPGs, but no differences were found based on age group (Table 19). There were five respondents who reported playing MMORPGs exclusively.

Table 19
Gaming Participation During the Past 12 Months by Gender and Age

| | *N* | Gaming participation | |
		Video games	MMORPGs
Gender			
Male	534	524 (98.1%)	266 (49.8%)
Female	695	583 (83.9%)	91 (13.1%)
Total	1229	1107 (90.1%)	357 (29.0%)
Age Group			
Under 18	150	132 (88.0%)	39 (26.0%)
18-20	944	853 (90.4%)	273 (28.9%)
21-24	131	119 (90.8%)	45 (34.4%)
Total	1225	1104 (90.1%)	357 (29.0%)

Chi-square [$\chi^2(1, N = 1229)$]	
Video games (gender)	68.51 $p < .001$
Video games (age group)	NS
MMORPGs (gender)	197.55 $p < .001$
MMORPGs (age group)	NS

Gaming Addiction

As per Lemmens et al. (2009), seven items on the GAS were used to identify a gaming addiction. As the cut-off on the GAS for video game addiction can be set in a number of different ways, the current study employed a procedure whereby each item was considered met when a person answered 4 - "*often*" or 5 -"*very often*" out of 7 possible choices (Lemmens et al., 2009). This is a conservative estimate of problematic gaming, as some studies include "*sometimes*" in their criteria (Collins & Freeman, 2013). A polythetic format was adopted and a person was considered an 'addicted gamer' when endorsing four or more items on the 7-item scale. Based on gaming performance and the established criteria, 9.5% of the sample was identified as non-gamers, 87.6% as social gamers, and 2.8% as addicted gamers (Table 20). There were significant differences in GAS identification of gaming addiction among males and females, with males (5.4%) more likely to be addicted than females (0.9%) (Table 20). Gaming addiction by age group was not analysed due to small cell sizes (Table 20). Social and addicted

gamers did not differ from non-gaming counterparts in their likelihood of playing video games, however significantly more addicted gamers reported playing MMORPGs than not, and more social gamers reported not playing MMORPGs than playing (Table 20). When comparing gaming addiction by activity, there was a significantly larger proportion of addicted gamers among MMORPG players than video game players, and a significantly larger proportion of social gamers among video game players compared to MMORPG players (Table 20).

Table 20
Gaming Addiction by Gender, Age, and Gaming Participation

	N	Non-gamer[a]	Social gamer[b]	Addicted gamer[c]
		Gaming addiction		
Gender				
Male	534	9 (1.7%)	496 (92.9%)	29 (5.4%)
Female	695	108 (15.5%)	581 (83.6%)	6 (0.9%)
Total	1229	117 (9.5%)	1077 (87.6%)	35 (2.8%)
Age Group				
Under 18	150	17 (11.3%)	130 (86.7%)	3 (2.0%)
18-20	944	87 (9.2%)	828 (87.7%)	29 (3.1%)
21-24	131	12 (9.2%)	116 (88.5%)	3 (2.3%)
Total	1225	116 (9.5%)	1074 (87.7%)	35 (2.9%)
Gaming activity				
Video games	1107	-	1072 (96.8%)	35 (3.2%)
MMORPGs	357	-	326 (91.3%)	31 (8.7%)
Total	1229	117 (9.5%)	1077 (87.6%)	35 (2.8%)
		Chi-square		
Gender		$\chi^2(2, N = 1229) = 85.98, p < .001$		
Social vs. addicted gamer		$\chi^2(1, N = 1112) = 18.42, p < .001$		
Non-gamer vs. addicted gamer		$\chi^2(1, N = 152) = 81.18, p < .001$		
Non-gamer vs. social gamer		$\chi^2(1, N = 1194) = 63.63, p < .001$		
Video games		NS		
MMORPGs		$\chi^2(1, N = 1112) = 52.86, p < .001$		
Video games vs. MMORPGs		$\chi^2(1, N = 1464) = 19.12, p < .001$		

[a]GAS score = 0, no gaming activity (including MMORPGs) during the past 12 months.
[b]GAS score (0-3).
[c]GAS score ($\geq$ 4).

Video Game Playing

For each type of video game (MMORPGs are reported separately, see below), participants were provided with a list of possible activities and asked to indicate the frequency with which they had engaged in a particular activity during the past 12 months. Participation in various video games among those who reported playing in the previous year ($N = 1107$) is presented in Table 21. Overall, the most commonly reported video games were *Mario & Luigi, Rock Band/Guitar Hero/Dance Dance Revolution (DDR), Grand Theft Auto,* and *Wii Fit/Wii Sports*. The mean age of onset for video games was 9.3 years (SD = 2.87), with the youngest age reported being 2 ($n = 3$) and the oldest being 20 ($n = 2$). Males started playing earlier than females and addicted gamers started playing earlier than social gamers (Table 22).

Table 21
Gaming Participation Among Participants Reporting Gaming During the Past 12 Months by Gaming Activity

	Gaming Participation ($n = 1107$)
Gaming Activity	
Mario & Luigi	796 (71.9%)
Rock Band/Guitar Hero/DDR	705 (63.7%)
Grand Theft Auto	704 (63.6%)
Call of Duty	639 (57.7%)
Wii Fit/Wii Sports	638 (57.6%)
NHL/NBA/FIFA	535 (48.3%)
The Sims	443 (40.0%)
Halo (NOT online)	414 (37.4%)
Left 4 Dead	215 (19.4%)
Prince of Persia	201 (18.2%)
Star Wars	194 (17.5%)
Final Fantasy	162 (14.6%)
BioShock	141 (12.7%)
Lord of the Rings	126 (11.4%)
Batman: Arkham Asylum	113 (10.2%)
Army of Two	103 (9.3%)
Dragon Age: Origins	85 (7.7%)
Other	306 (27.6%)

Table 22

Age of Onset for Video Games by Gender and Gaming Addiction

	N	Mean	SD	t-test
Gender				
Male	518	8.58	2.73	
Female	574	9.94	2.84	$t(1090) = 8.01, p < .001$
Gaming addiction				
Social gamer[a]	1057	9.34	2.85	
Addicted gamer[b]	35	7.91	3.16	$t(1090) = 2.91, p = .004$
Total	1092	9.30	2.87	

[a]GAS score (0-3).
[b]GAS score (≥ 4).

A distribution, by gender, of the types of gaming activities in which respondents engaged is presented in Table 23. Because of small cell sizes, data were not analysed using chi-square. The most popular games among males were *Grand Theft Auto*, *Call of Duty*, *Halo*, *NHL/NBA/FIFA, Left 4 Dead*, *Star Wars*, *Batman: Arkham Asylum*, *BioShock*, *Army of Two*, *Final Fantasy*, *Lord of the Rings*, *Dragon Age: Origins*, and *Prince of Persia*. The most popular games among females were *Mario & Luigi*, *Wii Fit/Wii Sports*, *The Sims,* and *Rockband/Guitar Hero/DDR*.

Table 23

Participation in Video Games Activity by Gender

Gaming Activity (n = 1107)	Male (n = 524)	Female (n = 583)
Mario & Luigi	320 (61.1%)	476 (81.6%)
Rock Band/Guitar Hero/DDR	299 (57.1%)	406 (69.6%)
Grand Theft Auto	431 (82.3%)	273 (46.8%)
Call of Duty	419 (80.0%)	220 (37.7%)
Wii Fit/Wii Sports	222 (42.4%)	416 (71.4%)
NHL/NBA/FIFA	337 (64.3%)	198 (34.0%)
The Sims	135 (25.8%)	308 (52.8%)
Halo (NOT online)	291 (55.5%)	123 (21.1%)
Left 4 Dead	176 (33.6%)	39 (6.7%)
Prince of Persia	154 (29.4%)	47 (8.1%)
Star Wars	147 (28.1%)	47 (8.1%)
Final Fantasy	118 (22.5%)	44 (7.5%)
BioShock	119 (22.7%)	22 (3.8%)
Lord of the Rings	92 (17.6%)	34 (5.8%)
Batman: Arkham Asylum	96 (18.3%)	17 (2.9%)
Army of Two	94 (17.9%)	9 (1.5%)
Dragon Age: Origins	74 (14.1%)	11 (1.9%)

Again, due to small cell sizes, video game activity was described with respect to gaming addiction (Table 24). Addicted gamers tended to prefer *Grand Theft Auto*, *Call of Duty*, *Halo*, *Left 4 Dead*, *Star Wars*, *Batman: Arkham Asylum*, *BioShock*, A*rmy of Two*, *Final Fantasy*, *Lord of the Rings*, and *Dragon Age: Origins,* while social gamers preferred *Wii Fit/Wii Sports.*

Table 24
Participation in Video Games Activity by Gaming Addiction

Gaming Activity (n = 1107)	Social gamer[a] (n = 1072)	Addicted gamer[b] (n = 35)
Mario & Luigi	773 (72.1%)	23 (65.7%)
Rock Band/Guitar Hero/DDR	687 (64.1%)	18 (51.4%)
Grand Theft Auto	676 (63.1%)	28 (80.0%)
Call of Duty	609 (56.8%)	30 (85.7%)
Wii Fit/Wii Sports	626 (58.4%)	12 (34.3%)
NHL/NBA/FIFA	516 (48.1%)	19 (54.3%)
The Sims	432 (40.3%)	11 (31.4%)
Halo (NOT online)	393 (36.7%)	21 (60.0%)
Left 4 Dead	199 (18.6%)	16 (45.7%)
Prince of Persia	191 (17.8%)	10 (28.6%)
Star Wars	177 (16.5%)	17 (48.6%)
Final Fantasy	152 (14.2%)	10 (28.6%)
BioShock	130 (12.1%)	11 (31.4%)
Lord of the Rings	116 (10.8%)	10 (28.6%)
Batman: Arkham Asylum	104 (9.7%)	9 (25.7%)
Army of Two	95 (8.9%)	8 (22.9%)
Dragon Age: Origins	78 (7.3%)	7 (20.0%)

[a] GAS score (0-3).
[b] GAS score (≥4).

Participants indicated their self-perceived skill level at playing video games based on a 5-point Likert-type scale (e.g., *1 = Not at all skilled* and *5 = Extremely* skilled). Among individuals who reported playing video games (*n* = 1101), 13.5% stated they were "*not at all skilled*", 21.2% were "*a little bit skilled*", 18.0% "*neither skilled no unskilled*", 36.1% "*fairly skilled*", and 11.3% indicated being "*extremely skilled*". Due to small cell sizes, participants were divided into three: groups "very skilled" (endorsing "*extremely skilled*" or "*fairly skilled*"), "skilled" (endorsing "*neither skilled no unskilled*" or "*a little bit skilled*"), and "unskilled" (endorsing "*not at all skilled*"). There was a statistically significant difference in self-rate of skill level between males and females and based on gaming addiction (Table 25). In addition, those individuals who rated themselves as "Very skilled" were almost twice as likely to be identified as addicted gamers. However, given that gaming addiction is often associated with greater

gaming frequency and time spent on gaming, the apparent association between addiction and

skill level likely reflects that those individuals who are addicted to gaming are likely to be more

skilful and to (correctly) perceive themselves as such.

Table 25
Self-Perceived Skill Level at Playing Video Games by Gender and Gaming Addiction

		Self-perceived skill rating		
	N	Not skilled	Skilled	Very skilled
Gender				
Male	521	10 (1.9%)	130 (25.0%)	381 (73.1%)
Female	580	139 (24.0%)	301 (51.9%)	140 (24.1%)
Total	1101	149 (13.5%)	431 (39.1%)	521 (47.3%)
Gaming addiction				
Social gamer[a]	1066	149 (14.0%)	425 (39.9%)	492 (46.2%)
Addicted gamer[b]	35	-	6 (17.1%)	29 (82.9%)
Total	1101	149 (13.5%)	431 (39.1%)	521 (47.3%)

	Chi-square
Gender	$\chi^2(2, N = 1101) = 288.68, p < .001$
Not skilled vs. Skilled	$\chi^2(1, N = 580) = 33.25, p < .001$
Skilled vs. Very skilled	$\chi^2(1, N = 952) = 175.12, p < .001$
Very skilled vs. Not skilled	$\chi^2(1, N = 670) = 210.32, p < .001$
Gaming addiction	$\chi^2(2, N = 1101) = 19.01, p < .001$
Not skilled vs. Skilled[1]	NS
Skilled vs. Very skilled	$\chi^2(1, N = 952) = 11.61, p = .001$
Very skilled vs. Not skilled[1]	$\chi^2(1, N = 670) = 8.67, p = .001$

[1]Fisher's Exact Test.
[a] GAS score (0-3).
[b] GAS score (≥ 4).

Massively Multiplayer Role-Playing Games (MMORPGs)

Although MMORPGs are a type of video game, they were analysed as a separate genre

from video games not played online. A key difference between the two is the multi-player

aspect; MMORPGs are highly social within the game itself. Participation in various MMORPGs

among those who reported playing ($n = 357$) is presented in Table 26. Overall, the most

commonly reported MMORPGs played were *World of Warcraft, Runescape*, and *Halo Online*.

Approximately one-third of all participants chose games other than those which were presented.

This suggests that while considered one genre, there is much diversity within MMORPGs. For the purposes of this study, MMORPG players were considered as a whole, but these results imply they may not be a homogeneous group and players may be more correctly defined by the games they choose to play.

The mean age of onset for playing MMORPGs was 13.4 years (SD = 2.71), with the youngest age reported as 4 ($n = 1$) and the oldest as 22 ($n = 1$). Males began playing MMORPGs at an earlier age than females, but social and addicted gamers did not differ with respect to age of onset (Table 27).

Table 26
MMORPG Participation Among Participants Reporting Playing During the Past 12 Months by Activity

Activity	Participation ($n = 357$)
World of Warcraft	146 (40.9%)
Runescape	101 (28.3%)
Halo Online	100 (28.0%)
Final Fantasy XI	28 (7.8%)
Lord of the Rings Online	24 (6.7%)
MapleStory	21 (5.9%)
Star Wars Online	20 (5.6%)
Diablo	19 (5.3%)
Everquest	14 (3.9%)
EVE Online	14 (3.9%)
Call of Duty	12 (3.4%)
Ragnarok	9 (2.5%)
StarCraft	7 (2.0%)
League of Legends	7 (2.0%)
Ultima Online	6 (1.7%)
Star Trek Online	4 (1.1%)
Asheron's Call	3 (0.8%)
Other	115 (32.2%)

Table 27
Age of Onset for MMORPGs by Gender and Gaming Addiction

	N	Mean	*SD*	*t*-test
Gender				
Male	266	13.06	2.50	
Female	90	14.30	3.09	$t(354) = 3.84, p < .001$
Gaming addiction				
Social gamer[a]	325	13.44	2.67	
Addicted gamer[b]	31	12.68	3.05	NS
Total	356	13.37	2.71	

[a]GAS score (0-3).
[b]GAS score ($\geq$ 4).

A distribution, by gender, of the types of MMORPGs in which respondents engaged is

presented in Table 28. Due to small cell sizes, chi-square analyses were not performed.

Table 28
Participation in MMORPG Activity by Gender

Activity (*n* = 357 participants)	Male (*n* = 266)	Female (*n* = 91)
World of Warcraft	116 (43.6%)	30 (33.0%)
Halo Online	84 (31.6%)	16 (17.6%)
Runescape	80 (30.1%)	21 (23.1%)
Final Fantasy XI	22 (8.3%)	6 (6.6%)
Lord of the Rings Online	21 (7.9%)	3 (3.3%)
MapleStory	15 (5.6%)	6 (6.6%)
Star Wars Online	14 (5.3%)	6 (6.6%)
Diablo	19 (7.1%)	-
Everquest	10 (3.8%)	4 (4.4%)
EVE Online	13 (4.9%)	1 (1.1%)
Call of Duty	11 (4.1%)	1 (1.1%)
Ragnarok	6 (2.3%)	3 (3.3%)
StarCraft	7 (2.6%)	-
League of Legends	6 (2.3%)	1 (1.1%)
Ultima Online	6 (2.3%)	-
Star Trek Online	3 (1.1%)	1 (1.1%)
Asheron's Call	3 (1.1%)	-
Other	77 (28.9%)	38 (41.8%)

Note. Cells containing '-' indicate no activity.

A distribution, by gaming addiction, of the types of MMORPGs in which respondents

engaged is presented in Table 29. Statistical analyses were not performed due to small cell sizes.

Table 29

Participation in MMORPG Activity by Gaming Addiction

Activity (n = 357 participants)	Social gamer[a] (n = 326)	Addicted gamer[b] (n = 31)
World of Warcraft	129 (39.6%)	17 (54.8%)
Halo Online	92 (28.2%)	8 (25.8%)
Runescape	92 (28.2%)	9 (29.0%)
Final Fantasy XI	25 (7.7%)	3 (9.7%)
Lord of the Rings Online	18 (5.5%)	6 (19.4%)
MapleStory	18 (5.5%)	3 (9.7%)
Star Wars Online	13 (4.0%)	7 (22.6%)
Diablo	18 (5.5%)	1 (3.2%)
Everquest	14 (4.3%)	-
EVE Online	11 (3.4%)	3 (9.7%)
Call of Duty	12 (3.7%)	-
Ragnarok	9 (2.8%)	-
StarCraft	5 (1.5%)	2 (6.5%)
League of Legends	6 (1.8%)	1 (3.2%)
Ultima Online	3 (0.9%)	3 (9.7%)
Star Trek Online	4 (1.2%)	-
Asheron's Call	3 (0.9%)	-
Other	107 (32.8%)	8 (25.8%)

Note. Cells containing '-' indicate no activity.
[a]GAS score (0-3).
[b]GAS score ($\geq$ 4).

Playing MMORPGs with Others

Nearly half of MMORPG players (46.2%) reported playing with friends, 10.8% with siblings/relatives, 3.2% with boyfriends/girlfriends/spouses, 38.2% with strangers (e.g., people with whom they did not interact outside of the game), and 0.6% reported usually playing with others (e.g., "guildies") (Table 30). Choice of MMORPG partner between males and females appeared to differ, but not based on gaming addiction. However, these results were not analysed, due to the size of some of the cells.

Table 30
Usual Partners for Playing MMORPGs by Gender and Gaming Addiction

			Usual partners			
	N	Friends	Siblings/ relatives	Boyfriend/ girlfriend	Strangers	Other
Gender						
Male	111	58 (52.3%)	5 (4.5%)	1 (0.9%)	46 (41.4%)	1 (0.9%)
Female	47	15 (31.9%)	12 (25.5%)	4 (8.5%)	16 (34.0%)	-
Gaming addiction		70 (47.9%)				
Social gamer[a]	146		17 (11.6%)	5 (3.4%)	53 (36.3%)	1 (0.7%)
Addicted gamer[b]	12	3 (25.0%)	-	-	9 (75.0%)	-
Total	158	73 (46.2%)	17 (10.8%)	5 (3.2%)	62 (39.2%)	1 (0.6%)

Note. Cells containing '-' indicate no activity.
[a] GAS score (0-3).
[b] GAS score ($\geq$4).

In order to determine degree of involvement in MMORPGs, participants indicated if they belonged to a guild (a guild is an organised group of players that regularly play together). Approximately one third of MMORPG players (33.5%; *n* = 119) reported belonging to a guild, with significantly more males (37.0%, *n* = 98) than females (23.3%, *n* = 21) belonging to guilds [$\chi^2(1, N = 355) = 5.62, p = .018$], but with no relation to gaming addiction (though the trend was for proportionally more addicted gamers (48.4%, *n* = 15) than social gamers (32.1%, *n* = 104) to report belonging to guilds [$\chi^2(1, N = 355) = 3.37, p = .066$]).

One-tenth of MMORPG players (10.4%) stated they were "*not at all skilled*", 12.7% "*a little bit skilled*", 22.8% "*neither skilled nor unskilled*", 36.9% "*fairly skilled*," and 17.2% endorsed "*extremely skilled*". Due to small cell sizes, participants were divided into three: groups "very skilled" (endorsing "*extremely skilled*" or "*fairly skilled*"), "skilled" (endorsing "*neither skilled no unskilled*" or "*a little bit skilled*"), and "unskilled" (endorsing "*not at all skilled*"). There was a statistically significant difference for self-rated skill level between males and females (Table 31). Due to small cell sizes, statistical analyses were not conducted for gaming addiction, however, it anecdotally more addicted than social gamers rated themselves as

"very skilled". Given that gaming addiction is often associated with greater frequency and time

spent on gaming, the apparent association between addiction and skill level likely reflects that

those who are addicted to gaming are likely to be more skilful and to (correctly) perceive

themselves as such.

Table 31
Self-Perceived Skill Level at Playing MMORPGs by Gender and Gaming Addiction

	N	Not skilled	Skilled	Very skilled
			Self-perceived skill rating	
Gender				
Male	268	19 (7.1%)	87 (32.5%)	162 (60.4%)
Female	83	20 (24.1%)	37 (44.6%)	26 (31.3%)
	351	39 (11.1%)	124 (35.3%)	188 (53.6%)
Gaming addiction				
Social gamer[a]	338	46 (13.6%)	125 (37.0%)	167 (49.4%)
Addicted gamer[b]	31	2 (6.5%)	4 (12.9%)	25 (80.6%)
Total	369	48 (13.0%)	129 (35.0%)	192 (52.0%)

	Chi-square
Gender	$\chi^2(2, N = 351) = 29.17, p < .001$
Not skilled vs. Skilled	$\chi^2(1, N = 177) = 11.30, p = .001$
Skilled vs. Very skilled	$\chi^2(1, N = 321) = 14.62, p < .001$
Very skilled vs. Not skilled	$\chi^2(1, N = 240) = 44.54, p < .001$

[a] GAS score (0-3).
[b] GAS score ($\geq$4).

Gambling and Gaming

An important focus of this study was the relationship between gambling and video game

playing. As such, participation in gaming was examined based on gambling severity. Within

Table 32 one can see significant differences based on gambling severity for both video game and

MMORPG playing, with fewer non-gamblers than social gamblers playing video games and

MMORPGs, and greater numbers of problem gamblers playing MMORPGs compared non-

gamblers. A greater proportion of gamblers reported playing video games than not, whereas a

greater proportion did not report playing MMORPGs than did play (Table 32)

Table 32

Relationship Between Gambling Participation and Severity and Gaming Participation

		Gaming participation during the past-year	
	N	Video games	MMORPGs
Past-year offline gambling			
Yes	642	604 (94.1%)	224 (34.9%)
No	587	503 (85.7%)	133 (22.7%)
Past-year online gambling			
Yes	60	55 (91.7%)	28 (46.7%)
No	1169	1052 (90.0%)	329 (28.1%)
Past-year free gambling-type games			
Yes	506	486 (96.0%)	221 (43.7%)
No	723	621 (85.9%)	136 (18.8%)
Gambling severity			
Non-gambler[a]	585	501 (85.6%)	132 (22.6%)
Social gambler[b]	609	574 (94.3%)	209 (34.3%)
Problem gambler[c]	35	32 (91.4%)	16 (45.7%)
Total	1229	1107 (90.1%)	357 (29.0%)

Chi-square	
Offline gambling	
Video games	$\chi^2(1, N = 1229) = 24.15, p < .001$
MMORPGs	$\chi^2(1, N = 1229) = 22.27, p < .001$
Online gambling	
Video games	NS
MMORPGs	$\chi^2(1, N = 1229) = 9.50, p = .002$
Free online gambling-type games	
Video games	$\chi^2(2, N = 1229) = 34.33, p < .001$
MMORPGs	$\chi^2(1, N = 1229) = 89.30, p < .001$
Video games	$\chi^2(2, N = 1229) = 24.82, p < .001$
Non-gamblers vs. social gamblers	$\chi^2(1, N = 1194) = 24.66, p < .001$
Social vs. problem gamblers	NS
Non-gamblers vs. problem gamblers	NS
MMORPGs	$\chi^2(2, N = 1229) = 24.86, p < .001$
Non-gamblers vs. social gamblers	$\chi^2(1, N = 1194) = 20.21, p < .001$
Social vs. problem gamblers	NS
Non-gamblers vs. problem gamblers	$\chi^2(1, N = 620) = 9.74, p = .002$

[a]DSM-IV score = 0, no gambling activity (on or off the online) during the past 12 months.
[b]DSM-IV score (0-2).
[c]DSM-IV score (≥ 3).

Another aim of this study was to determine if video game players were more likely to gamble than non-players. As can be seen in Table 33, significantly more video game players than non-players reported past-year offline gambling, but not online, and playing free online

gambling-type games. Significantly more MMORPG players, compared to non-players, reported offline gambling, online gambling, and playing free online gambling-type games (Table 33). There was a significant difference based on gaming addiction classification for past-year offline gambling and playing free online gambling games, however, due to small numbers no conclusions can be reached for online gambling (Table 33). Social gamers and addicted gamers were more likely than non-gamers to have gambled offline and played free online gambling games. Addicted gamers were also more likely than social gamers to have played free online gambling games, but not to have gambled offline.

Table 33

Relationship Between Gambling, Video Game Playing, MMORPG Playing, and Gaming Addiction

	N	Offline gambling	Free online gambling games	Online gambling
		Past-year gambling participation		
Past-year video game playing				
Yes	1107	604 (54.6%)	486 (43.9%)	55 (5.0%)
No	122	38 (31.1%)	20 (16.4%)	5 (4.1%)
Past-year MMORPG playing				
Yes	357	224 (62.7%)	221 (61.9%)	28 (7.8%)
No	872	418 (47.9%)	285 (32.7%)	32 (3.7%)
Gaming addiction				
Non-gamer[a]	117	36 (30.8%)	19 (16.2%)	5 (4.3%)
Social gamer[b]	1077	584 (54.2%)	463 (43.0%)	52 (4.8%)
Addicted gamer[c]	35	22 (62.9%)	24 (68.6%)	3 (8.6%)
Total	1229	642 (52.2%)	506 (41.2%)	60 (4.9%)

Chi-square	
Video game playing	
Offline gambling	$\chi^2(1,1229) = 24.15, p < .001$
Free online gambling games	$\chi^2(1,1229) = 34.33, p < .001$
Online gambling	NS
MMORPG playing	
Offline gambling	$\chi^2(1,1229) = 22.27, p < .001$
Free online gambling games	$\chi^2(1,1229) = 89.30, p < .001$
Online gambling	$\chi^2(1,1229) = 9.50. p = .002$
Offline gambling	$\chi^2(1,1229) = 24.90, p < .001$
Non-gamer vs. social gamer	$\chi^2(1,1194) = 23.26, p < .001$
Social vs. addicted gamer	NS
Non-gamer vs. addicted gamer	$\chi^2(1,152) = 11.76, p = .001$
Free online gambling games	$\chi^2(1,1229) = 42.35, p < .001$
Non-gamer vs. social gamer	$\chi^2(1,1194) = 31.37, p < .001$
Social vs. addicted gamer	$\chi^2(1,1112) = 9.01, p = .003$
Non-gamer vs. addicted gamer	$\chi^2(1,152) = 36.37, p < .001$

[a]GAS score = 0, no gaming activity (including MMORPGs) during the past 12 months.
[b]GAS score (0-3).
[c]GAS score (≥ 4).

One other aim of the study was to examine how pathological gambling and gaming may intersect and whether the same individuals are experience problems with both activities. Within Table 34, one can see there was a significant difference among addicted gamers for gambling

severity classification. Proportionally, significantly more addicted gamers than social or non-gamers were identified as problem gamblers. However, due to the small numbers of problem gamblers and addicted gamers, in actuality only four addicted gamers were also identified as problem gamblers. Due to these small numbers no conclusions can be reached.

Table 34
Relationship Between Gambling Severity and Gaming Addiction

| | | Gambling severity | | |
| | | Non-gambler[a] | Social gambler[b] | Problem gambler[c] |
	N			
Game addiction scale				
Non-gamer[d]	117	81 (69.2%)	33 (28.2%)	3 (2.6%)
Social gamer[e]	1077	491 (45.6%)	558 (51.8%)	28 (2.6%)
Addicted gamer[f]	35	13 (37.1%)	18 (51.4%)	4 (11.4%)
Total	1229	585 (47.6%)	609 (49.6%)	35 (2.8%)

Chi-square	
Gambling severity	$\chi^2 (4, 1229) = 34.43, p < .001$

[a]DSM-IV score = 0, no gambling activity (on or off the online) during the past 12 months.
[b]DSM-IV score (0-2).
[c]DSM-IV score ($\geq$ 3).
[d]GAS score = 0, no gaming activity (including MMORPGs) during the past 12 months.
[e]GAS score (0-3).
[f]GAS score ($\geq$ 4).

One concern relating to the convergence of gambling and video games is that gamblers who consider themselves skilled video game players may also believe gambling operates under the same principles, leading those individuals to believe they can influence the outcome of gambling. Results suggest that a greater proportion gamblers (relative to non-gamblers), free online gambling-games players (relative to non-players), and online gamblers (relative to non-online gamblers) considered themselves "skilled" video game players (perceived skill). There was also a greater proportion of problem gamblers who rated themselves "skilled" versus "unskilled" players (Table 35).

Table 35

Relationship Between Self-Reported Video Game Skill, Past-Year Gambling, and Gambling Severity

	N	Self-reported skill level	
		Unskilled	*Skilled*
Offline gambling			
Yes	601	271 (45.1%)	330 (54.9%)
No	500	309 (61.8%)	191 (38.2%)
Free online gambling games			
Yes	483	175 (36.2%)	308 (63.8%)
No	618	405 (65.5%)	213 (34.5%)
Online gambling			
Yes	55	11 (20.0%)	44 (80.0%)
No	1046	569 (54.4%)	477 (45.6%)
Gambling severity			
Non-gambler[a]	498	309 (62.0%)	189 (38.0%)
Social gambler[b]	571	262 (45.9%)	309 (54.1%)
Problem gambler[c]	32	9 (28.1%)	23 (71.9%)
Total	1101	580 (52.7%)	521 (47.3%)

Chi-square $[\chi^2(1, N = 1101)]$	
Offline gambling	30.57, $p < .001$
Free online gambling games	93.38, $p < .001$
Online gambling	24.80, $p < .001$
Gambling severity	35.85, $p < .001$

[a]DSM-IV score = 0, no gambling activity (on or off the online) during the past 12 months.
[b]DSM-IV score (0-2).
[c]DSM-IV score (≥ 3).

Depression

Another objective of the study was to examine the relationship between gambling, gambling severity, and depressive symptomatology. The overall mean depression score based on the RADS-2 for the entire sample was 59.75 ($n = 1198$, $SD = 13.18$, range 31 -109), with females, in general, having significantly higher mean scores ($M = 61.50$, SD = 12.50) than males ($M = 57.41$, SD = 13.70), $t(1196) = 5.39$, $p < .001$, $d = .312$.

There was a significant difference among gambling groups based on depression score, however Bonferroni post-hoc tests revealed no significant differences by severity (Table 36). There were significant differences among addicted gaming groups based on depression scores

(Table 36). Post-hoc tests revealed addicted gamers had significantly higher depression scores than both social and non-gamers, who did not differ from each other.

Table 36

Mean Depression Scores Based on Gambling Severity and Gaming Addiction

	Mean RADS-2 scores		
	N	*M*	*SD*
Gambling severity			
Non-gambler[a]	579	60.48	13.06
Social gambler[b]	585	58.86	13.18
Problem gambler[c]	34	62.59	14.26
Gaming addiction			
Non-gamer[d]	113	60.40	12.62
Social gamer[e]	1052	59.45	13.12
Addicted gamer[f]	33	66.94	14.96
Total	1198	59.75	13.18

Univariate ANOVA	
Gambling severity	
Mean depression scores	$F(2, 1198) = 3.03$, $p = .048$, partial $\eta^2 = .005$
Gaming addiction	
Mean depression scores	$F(2, 1198) = 5.36$, $p = .005$, partial $\eta^2 = .009$
Bonferroni post-hoc	Addicted gamer > social gamer, non-gamer

[a]DSM-IV score = 0, no gambling activity (on or off the online) in past 12 months.
[b]DSM-IV score (1-2).
[c]DSM-IV score (≥ 3).
[d]GAS score = 0, no gaming activity (on or off the online) in past 12 months.
[e]GAS score (1-3).
[f]GAS score (≥4).

Personality Measures

One important goal of this research was to begin to identify which personality traits were common to gamblers and video game players. As such, those who had participated in gambling (offline and online), free online gambling games, video games, and MMORPGs were compared with those who had not. In addition, problem gamblers were compared to non-problem gamblers and addicted gamers were compared to non-addicted gamers. The personality variables of interest were Impulsiveness, Venturesomeness, and Extraversion. Venturesomeness is

conceptualised as a distinct component of Impulsiveness, one that correlates largely with

Extraversion (Eysenck et al., 1985). It taps adventurousness, risk-taking, and sensation-seeking.

Extraversion as described by Eysenck et al. (1985) represents gregariousness and friendliness.

Given the social nature of both gambling and video game playing, one objective was to examine

the two groups with respect to this trait.

Impulsiveness

The mean Impulsiveness scores for gamblers and gamers are presented in Table 37.

There were statistically significant differences in overall Impulsiveness score for gamblers

versus non-gamblers, free-gambling site users versus non-users, and for video game players

versus non-players. Moreover, problem gamblers were significantly more impulsive than non-

problem gamblers, as were addicted gamers compared to non-addicted gamers. Gamblers and

gamers did not differ on Impulsiveness scores, nor did MMORPG players and online gamblers.

Effect sizes ranged from small to medium.

Table 37
Mean Impulsiveness Scores Based on Activity

	N	Mean	SD	t-test[1]
Gambler	594	8.50	4.17	
No gambling	554	7.50	3.96	$t(1146) = 4.15, p <.001, d = 0.246$
Free gambling games player	472	8.44	4.09	
No free games	676	7.72	4.09	$t(1146) = 2.92, p = .004, d = .176$
Online gambler	52	8.56	4.50	
No online gambling	1096	7.99	4.08	NS
Video game player	1035	8.11	4.11	
No video game playing	113	7.13	3.89	$t(1146) = 2.42, p = .016, d = 0.245$
MMORPG player	334	8.25	4.39	
No MMORPG playing	814	7.92	3.98	**NS**
Problem gambler	33	10.00	3.82	
Non-problem gambler	418	8.12	4.18	$t(449) = 2.50, p = .013, d = .470$
Addicted gamer	32	9.84	3.96	
Non-addicted gamer	801	7.89	4.07	$t(831) = 2.66, p = .008, d = .486$

[1]In most cases, Levene's test is non-significant and homogeneity of variances is assumed.
Statistics in bold show where assumption has been violated and statistics are reported as equal
variances not assumed.

Venturesomeness

In general, gamblers had significantly higher Venturesomeness scores than video game players (Table 38). Gamblers, free gambling game players, online gamblers, video game players, and MMORPG players all had higher Venturesomeness scores than those respondents who had not participated in those activities, respectively, with small to medium effect sizes. There was no significant difference for Venturesomeness scores between problem and non-problem gamblers or addicted gamers and non-addicted gamers.

Table 38
Mean Venturesomeness Scores Based on Activity

	N	Mean	SD	t-test[1]
Gambler	601	10.13	3.35	
No gambling	560	8.95	3.41	$t(1159) = 5.97, p < .001, d = 0.349$
Free gambling games player	476	10.39	3.28	
No free games	685	8.99	3.42	$t(1159) = 7.01, p < .001, d = 0.418,$
Online gambler	51	11.33	2.66	
No online gambling	1110	9.48	3.44	**$t(1159) = 4.80, p < .001, d = 0.602$**
Video game player	1048	9.69	3.44	
No video game playing	113	8.38	3.11	$t(1159) = 3.88, p < .001, d = 0.399,$
MMORPG player	339	10.28	3.32	
No MMORPG playing	822	9.27	3.44	$t(1159) = 4.62,\ p < .001, d = 0.299$
Problem gambler	32	10.81	2.56	
Non-problem gambler	422	10.03	3.40	NS
Addicted gamer	34	10.09	3.48	
Non-addicted gamer	813	9.62	3.45	NS
Gambler	601	10.13	3.35	
Video game player	1048	9.69	3.44	$t(1648) = 2.60, p = .009, d = 0.132$
Online gambler	51	11.33	2.66	
Video game player	1048	9.69	3.44	**$t(58.52) = 4.26, p < .001, d = 0.533$**

[1]In most cases, Levene's test is non-significant and homogeneity of variances is assumed. Statistics in bold show where assumption has been violated and statistics are reported as *equal variances not assumed*.

Extraversion

Gamblers and video game players were not statistically different on scores measuring

Extraversion; however MMORPG players had lower scores than online gamblers (Table 39).

Gamblers were statistically higher in Extraversion scores than non-gamblers, while MMORPG

players were significantly less extraverted than non-players, however effect sizes are small.

There were no significant differences for Extraversion between problem gamblers and non-

problem gamblers, or between addicted gamers and non-addicted gamers.

Table 39
Mean Extraversion Scores Based on Activity

	N	Mean	SD	t-test[1]
Gambler	612	9.17	3.01	
No gambling	567	8.63	3.11	$t(1177) = 2.99, p = .003, d = 0.176$
Free gambling games player	481	9.06	3.08	
No free games	698	8.80	3.05	NS
Online gambler	52	9.46	3.09	
No online gambling	1127	8.88	3.06	NS
Video game player	1066	8.93	3.08	
No video game playing	113	8.74	2.96	NS
MMORPG player	341	8.49	3.24	**$t(585.14) = 2.92, p = .004,$**
No MMORPG playing	838	9.08	2.98	**$d = 0.19$**
Problem gambler	33	9.30	2.63	
Non-problem gambler	434	9.12	3.03	NS
Addicted gamer	33	8.12	3.63	
Non-addicted gamer	823	9.08	2.97	NS
Online gambler	52	9.46	3.09	
MMORPG player	341	8.49	3.24	$t(391) = 2.03, p = .043, d = 0.306$

[1]In most cases, Levene's test is non-significant and homogeneity of variances is assumed.
Statistics in bold show where assumption has been violated and statistics are reported as *equal variances not assumed*.

Regression Analyses

Binary logistic regression was used to identify which variables best predict category

membership; gambler/non-gambler (offline and online), free gambling games player/non-player,

video game player/non-player, MMORPG player/non player, problem gambler/non-problem

gambler, and addicted gamer/non-addicted gamer. The predictor variables tested included

gender, age, gambling, video game playing, Impulsiveness, Venturesomeness, Extraversion, and depression. The age, personality, and depression scores were continuous variables, and all other variables were dummy coded (the outcome variable was coded as 0 = not engaged in the behaviour and 1 = engaged in the behaviour; gender was coded 0 = female and 1 = male). Not unexpectedly, being male was overwhelmingly the strongest predictor of gambling (both offline and online), playing free gambling games, video gaming, and MMORPG playing. In order to discount this gender effect, males and females were examined separately to minimize confounding; failure to consider the effect of gender may overstate the strength of an observed relationship between video game playing and gambling (Delfabbro et al., 2009).

Offline Gambling

Gender, age, playing video games, Impulsiveness, Extraversion, and Venturesomeness were found to contribute significantly to the prediction of past-year offline gambling. The Hosmer and Lemeshow goodness-of-fit test was non-significant, indicating the chosen model adequately fits the data. Hosmer and Lemeshow's R^2_L is a version of the coefficient of determination for logistic regression (Field, 2013).

The regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for the final model are presented in Table 40. The odds ratio of past-year gambling were approximately 2.5 times as likely for males as for females and almost twice as likely for video game players compared to non-players. One year increase in age increased the odds of having gambled by 28%, and for each unit increase in Impulsiveness, Extraversion, and Venturesomeness, the odds of past-year gambling increased by 3%, 5%, and 7%, respectively.

For males, only Extraversion predicted past-year gambling, with Venturesomeness approaching significance. Every unit of increase on the Extraversion scale increased the odds of

past-year gambling by 14%. For females, age, past-year video game playing, and

Venturesomeness positively predicted having gambled. Playing video games made it almost

twice as likely females had gambled, for each one year increase in age the odds of having

gambled increased by 33%, and each unit increase in Venturesomeness increased the odds of

past-year gambling by 8%.

Table 40
Binary Logistic Regression Predicting Offline Gambling - Final Model

	β	Wald	Exp(β)	95% C.I.	*p*
Gender[a]					
Male	.914	44.62	2.49	1.91-3.26	< .001
Age	.231	23.00	1.28	1.15-1.38	< .001
Video game playing[b]					
Player	.548	5.22	1.73	1.08-2.77	.022
Impulsiveness	.033	4.12	1.03	1.00-1.07	.042
Extraversion	.046	4.24	1.05	1.00-1.09	.040
Venturesomeness	.065	10.05	1.07	1.03-1.11	.002
Males only					
Extraversion	.127	15.31	1.14	1.07-1.21	<.001
Venturesomeness	.061	3.61	1.06	.998-1.13	.057
Females only					
Age	.285	21.32	1.33	1.18-1.50	<.001
Video game playing[b]					
Player	.624	6.09	1.87	1.14-3.07	.014
Venturesomeness	.079	9.75	1.08	1.03-1.14	.002

[a]Female is the reference for gender.
[b]Non-player is the reference for video game playing.

Online Gambling

Gender and playing free online gambling games significantly predicted past-year online

gambling and were included in the final model. The Hosmer and Lemeshow test was non-

significant indicating an adequate model fit. The regression coefficients, Wald statistics, odds

ratios, and 95% confidence intervals for the final model are presented in Table 41. Gender was

the strongest predictor, with males being nearly seven times as likely as females to have gambled

online and playing free online gambling games increased the odds of online gambling by nearly

five. For males, playing free online gambling games increased the odds of online gambling by approximately five.

There were only six female online gamblers, none of whom reported MMORPG playing. The presence of a cell with a frequency of zero entails performing an operation for which there is no definable outcome, making it impossible to estimate the coefficients and standard errors. As there is no point in estimating the odds ratio for a variable with a frequency equal to zero, statistical programs fail; neither convergence nor correct results are obtained (de Irala, Navajas, & del Castillo, 1997). As a result, MMORPG playing was dropped and the analysis was re-run. Fore females, age, Extraversion (negative), and Venturesomeness were the significant predictors for online gambling; each one year increase in age increased the likelihood of online gambling among females by 119% and each unit increase in Venturesomeness by 99%. As Extraversion increased by one unit, the likelihood of gambling online decreased by 27%.

Table 41
Binary Logistic Regression Predicting Online Gambling - Final Model

	β	Wald	Exp(β)	95% C.I.	p
Gender[a]					
Male	1.91	14.90	6.73	2.56-17.72	< .001
Free online gambling games[b]					
Player	1.54	12.89	4.67	2.01-10.81	< .001
Males only					
Free online gambling games[b]					
Player	1.63	11.28	5.13	1.98-13.31	.001
Females only					
Age	.785	8.81	2.19	1.31-3.68	.003
Extraversion	-.319	4.21	.727	.536-.986	.040
Venturesomeness	.686	6.44	1.99	1.17-3.37	.011

[a]Female is the reference for gender.
[b]Non-player is the reference for free online gambling games playing.

Free Online Gambling Games

Gender, video game playing, MMORPG playing, and Venturesomeness were found to contribute significantly to the prediction of free online gambling games and were included in the

final regression model. The Hosmer and Lemeshow test was non-significant, indicating an adequate model fit. The regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for the final model are shown in Table 42. The odds of playing free online gambling games during the previous year were approximately three times as high for males as for females, and slightly over twice as high for video game and MMORPG players. For each unit increase in Venturesomeness the odds of past-year free gambling games use increased by 8%.

For males, MMORPG playing more than doubled the odds of free online gambling, and one unit increase in Venturesomeness increased the likelihood of using free gambling games by 10%. For females, both video game and MMORPG playing increased the odds of free online gambling, by two-and-a-half and approximately two, respectively.

Table 42
Binary Logistic Regression Predicting Free Online Gambling Games - Final Model

	β	Wald	Exp(β)	95% C.I.	*p*
Gender[a]					
Male	1.12	58.95	3.05	2.29-4.05	< .001
Video game playing					
Player[b]	.869	8.01	2.39	1.31-4.36	.005
MMORPG playing	.731	22.35	2.08	1.53-2.81	<.001
Player[c]					
Venturesomeness	.076	13.67	1.08	1.04-1.12	< .001
Males only					
MMORPG playing					
Player[c]	.818	17.02	2.27	1.54-3.34	<.001
Venturesomeness	.095	9.65	1.10	1.04-1.17	.002
Females only					
Video game playing					
Player[b]	.953	7.92	2.59	1.34-5.04	.005
MMORPG playing					
Player[c]	.601	5.72	1.82	1.12-2.98	.017

[a]Female is the reference for gender.
[b]Non-player is the reference for video game playing.
[c]Non-player is the reference for MMORPG playing.

Problem Gambling

Gender, playing free online gambling games, gambling online, and depression significantly predicted problem gambling and were included in the final model (Table 43). The Hosmer and Lemeshow test was non-significant, indicating an adequate model fit. Males were approximately eight times more likely than females to be identified as problem gamblers. Players of free online gambling games and online gamblers were over six and four times (respectively) more likely than non-users to be identified. Each unit increase in the RADS-2 increased the likelihood of problem gambling by 4%. As there were only three female problem gamblers, these analyses were not divided by sex.

Table 43
Binary Logistic Regression Predicting Gambling Severity - Final Model

	β	Wald	Exp(β)	95% C.I.	*p*
Gender[a]					
Male	2.09	8.93	8.05	2.05-31.61	.003
Free online gambling games					
Player[b]	1.91	8.47	6.72	1.86-24.26	.004
Online gambling					
Gambler[c]	1.55	10.95	4.72	1.88-11.84	.001
Depression	.034	5.59	1.04	1.01-1.07	.018

[a]Female is the reference for gender.
[b]Non-player is the reference for free online gambling games playing.
[c]Non-gambler is the reference for online gambling.

Video Game Playing

Gender, gambling, and gambling significantly predicted past-year video game playing, with Impulsiveness approaching significance (Table 44). The Hosmer and Lemeshow test was non-significant, indicating an adequate model fit. Gender was the strongest predictor, with males being more than nine times as likely to have played video games, followed by free online gambling games (slightly over twice as likely) and gambling (almost twice as likely). When males were examined separately, none of the variables reached significance, indicating the

greatest predictor of past-year video game playing is male gender. With respect to females, gambling, playing free online gambling games, and Impulsiveness all significantly increased the likelihood of playing video games.

Table 44
Binary Logistic Regression Predicting Video Game Playing - Final Model

	β	Wald	Exp(β)	95% C.I.	*p*
Gender[a]					
Male	2.21	25.98	9.15	3.97-21.44	<.001
Gambling[b]					
Gambler	.485	4.15	1.62	1.02-2.59	.042
Free online gambling games[c]					
Player	.885	8.23	2.42	1.32-4.44	.004
Impulsiveness	.054	3.69	1.06	.999-1.11	.055
Females only					
Gambling[b]					
Gambler	.546	4.75	1.73	1.06-2.82	.029
Free online gambling games[c]					
Player	.960	8.02	2.61	1.34-5.08	.005
Impulsiveness	.058	3.90	1.06	1.00-1.12	.048

[a]Female is the reference for gender.
[b]Non-gambler is the reference for gambling.
[c]Non-player is the reference for free online gambling games playing.

MMORPG Playing

Gender, playing free online gambling games, and Venturesomeness significantly positively predicted and Extraversion negatively predicted past-year MMORPG playing (Table 45). The Hosmer and Lemeshow test was non-significant, indicating an adequate model fit. Gender was the strongest predictor, with males being over five times as likely than females to have played MMORPGs. Respondents who played free online gambling games were just over twice as likely to have played MMORPGs as non-players. Each unit increase in Venturesomeness increased the odds of MMORPG playing by 5%. Of interest, the proportion increase (or decrease) in the odds caused by Extraversion is -.068 (.932 - 1); in percent terms, the odds of MMORPG playing decreased 6.8% for each unit increase on the Extraversion scale,

indicating more extraverted respondents did not play MMORPGs. For males, playing free online

gambling games raised the odds of MMORPG playing for males over two-fold, and for each unit

increase in Extraversion the odds of playing MMORPGs decreased by 7.1%.

Given no female MMORPG players reported online gambling, this variable was excluded

from the analysis. Playing free gambling games and depression both predicted MMORPG

playing. The odds doubled for females who played free gambling games, and for each unit

increase on the RADS-2, the likelihood of playing MMORPGs increased by 2%.

Table 45
Binary Logistic Regression Predicting MMORPG Playing - Final Model

	β	Wald	Exp(β)	95% C.I.	p
Gender[a]					
Male	1. 64	99.99	5.15	3.73-7.09	<.001
Free online gambling games[b]					
Player	.776	24.80	2.17	1.60-2.95	<.001
Extraversion	-.070	7.51	.932	.886-.980	.006
Venturesomeness	.053	4.89	1.06	1.01-1.11	.027
Depression	.011	3.39	1.01	.999-1.02	.066
Males only					
Free online gambling games[b]					
Player	.832	17.33	2.30	1.55-3.40	<.001
Extraversion	-.073	5.33	.929	.874-.989	.021
Females only					
Free online gambling games[b]					
Player	.700	7.93	2.01	1.24-3.28	.005
Depression	.024	6.50	1.02	1.01-1.04	.011

[a]Female is the reference for gender.
[b]Non-player is the reference for free online gambling games playing.

Gaming Addiction

MMORPG playing, Impulsiveness, and depression significantly predicted gaming

addiction with MMORPG players being nearly 12 times as likely to be identified as addicted

gamers. For every unit increase on the RADS-2, the likelihood of gaming addiction increased by

4% and for every unit increase in Impulsiveness the likelihood increased by 11% (Table 46). The

Hosmer and Lemeshow test was non-significant, indicating an adequate model fit. As gender

was non-significant, males and females were not analysed separately.

Table 46
Binary Logistic Regression Predicting Gaming Addiction - Final Model

	β	Wald	Exp(β)	95% C.I.	*p*
MMORPG playing[a]					
Player	2.45	18.19	11.53	3.75-35.49	<.001
Impulsiveness	.104	5.01	1.11	1.01-1.22	.025
Depression	.042	7.35	1.04	1.01-1.08	.007

[a]Non-player is the reference for MMORPG playing.

Expectancies

Gambling Severity

The predictive utility of expectancy models, based on alcohol and drug use research, has

previously been established for problem gambling (Gillespie et al., 2007b). The current study

sought to replicate findings relating outcome expectancies to gambling severity, and to examine

the relationship of outcome expectancies with respect to gambling and video game playing.

A significant main effect of gambling severity was found on all scales of the GEQ;

enjoyment/arousal; self-enhancement; money; overinvolvement; and, emotional impact (Table

48). On each of the three positive expectancy scales, problem gamblers endorsed items on the

enjoyment/arousal, self-enhancement, and money scales more highly than social and non-

gamblers. Similarly, social gamblers endorsed the enjoyment/arousal and money scales more

positively than non-gamblers. In terms of negative expectancies, non-gamblers endorsed the

overinvolvement and emotional impact scales more highly than social gamblers. Problem

gamblers differed significantly from social gamblers in their endorsement of the

overinvolvement and emotional impact scales, but only differed from non-gamblers on the

overinvolvement scale. Mean scores of the Dunnett's C post-hoc results are summarised in Table

47.

Table 47
Differences on the Five Scales of the GEQ Based on Gambling Severity

	Non-gamblers[a] (*n* = 583)		Social gamblers[b] (*n* = 607)		Problem gamblers[c] (*n* = 35)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Enjoyment/arousal	3.58	1.44	4.31	1.19	4.81	0.97
Self-enhancement	2.46	1.30	2.55	1.22	3.60	1.32
Money	2.89	1.38	3.37	1.22	4.09	1.29
Overinvolvement	2.14	1.40	1.75	.978	3.05	1.28
Emotional impact	3.23	1.70	2.57	1.34	3.29	1.23

	Univariate ANOVA	Post-hoc
Enjoyment/arousal	$F(2,1188) = 51.96, p < .001$, partial $\eta^2 = .081$	c > b > a
Self-enhancement	$F(2,1210) = 13.42, p < .001$, partial $\eta^2 = .022$	c > b, a
Money	$F(2,1213) = 28.91, p < .001$, partial $\eta^2 = .046$	c > b > a
Overinvolvement	$F(2,1209) = 29.30, p <.001$, partial $\eta^2 = .046$	c > a > b
Emotional impact	$F(2,1212) = 29.27, p < .001$, partial $\eta^2 = .046$	c, a > b

[a] No gambling activity (on or off the online) during the past 12 months.
[b] DSM-IV score (0-2).
[c] DSM-IV score ≥ 3.
Range of scores: 1-7

Gender

A significant main effect of gender was found for the negative expectancy scale of emotional impact (Table 48). Females reported higher scores than males, indicating they are more likely to anticipate negative emotional consequences to gambling.

Table 48
Differences on the Five Scales of the GEQ Based on Gender

	Male (*n* = 534) *M (SD)*	Female (*n* = 695) *M (SD)*	
Enjoyment/ arousal	4.26 (1.27)	3.75 (1.40)	NS
Self-enhancement	2.71 (1.30)	2.40 (1.24)	NS
Money	3.38 (1.39)	3.00 (1.26)	NS
Overinvolvement	1.92 (1.17)	2.00 (1.28)	NS
Emotional impact	2.61 (1.38)	3.13 (1.64)	$F(1,1208) = 4.34, p = .038$, partial $\eta^2 = .004$

Range of scores: 1-7

Age

Developmentally, no statistically significant differences were found among participants

as observed in Table 49.

Table 49
Differences on the Five Scales of the GEQ Based on Age

	Under 18[1] (*n* = 150)		18 - 20[2] (*n* = 944)		21 - 24[3] (*n* = 131)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Enjoyment/ arousal	4.08	1.36	3.97	1.26	3.92	1.47
Self-enhancement	2.57	1.25	2.52	1.27	2.58	1.37
Money	3.19	1.32	3.16	1.32	3.14	1.43
Overinvolvement	2.11	1.34	1.94	1.21	1.95	1.29
Emotional impact	3.05	1.68	2.92	1.55	2.65	1.43

Univariate ANOVA	
Enjoyment/arousal	NS
Self-enhancement	NS
Money	NS
Overinvolvement	NS
Emotional impact	NS

Range of scores: 1-7

Video Game Playing

A significant main effect of video game playing was found on all scales of the GEQ

(Table 50). Video game players had significantly higher scores than non-players for the

enjoyment/arousal, self-enhancement, and money items, but not the overinvolvement or

emotional impact items, indicating they are more likely to anticipate positive, but not negative

emotional consequences to gambling.

Table 50
Differences on the Five Scales of the GEQ Based on Past-Year Video Game Playing

	Non-Players		Players	
	M	*SD*	*M*	*SD*
Enjoyment/ arousal	2.97	1.54	4.09	1.30
Self-enhancement	2.15	1.28	2.58	1.26
Money	2.68	1.40	3.22	1.31
Overinvolvement	2.04	1.44	1.96	1.21
Emotional impact	3.06	1.87	2.89	1.52

Univariate ANOVA statistics	
Enjoyment/arousal	$F(1,1187) = 73.33, p < .001$, partial $\eta^2 = .058$
Self-enhancement	$F(1,1209) = 12.68, p < .001$, partial $\eta^2 = .010$
Money	$F(1,1212) = 17.92, p < .001$, partial $\eta^2 = .015$
Overinvolvement	NS
Emotional impact	NS

Interactions

No significant interactions were found, although there was a trend toward a significant interaction between gender and age for enjoyment/arousal, $F(1,1184) = 2.80, p = .061$, partial $\eta^2 = .005$ and self-enhancement, $F(1,1206) = 2.72, p = .067$, partial $\eta^2 = .005$.

Discussion

The present study examined the gambling and gaming behaviour, including online gambling and online role-playing games, of adolescents and young adults. Overall, 52% of students reported offline/land-based gambling during the previous 12 months, 5% reported online gambling for money, and 41% reported playing free online gambling games. A total of 48% of the sample was identified as non-gamblers, 50% as social gamblers, and 3% as problem gamblers. Males, relative to females, were more likely to have gambled offline and online, played free online gambling games, and be identified as problem gamblers. Playing free online gambling games was positively correlated with both online and problem gambling; free online

gambling games, online gambling, and problem gambling were found to be co-occurring behaviours. Online gambling was a strong predictor of problem gambling.

Overall, 90% of students reported playing video games and 29% reported playing MMORPGs. Based on the GAS and gaming participation, 10% of participants were identified as non-gamers, 88% social gamers, and 3% addicted gamers. MMORPG playing was a predictor for addicted gaming. Males, relative to females, were more likely to have played both traditional video games and MMORPGs.

This study found that gamblers and problem gamblers were more likely to play video games than non-gamblers and non-problem gamblers. Video game players were more likely than non-players to gamble offline and report playing free online gambling games. MMORPG players, relative to non-players, were more likely to have participated in online gambling activities, gambled in general, and played free online casino-type gambling games. Addicted gamers had higher rates of offline gambling than non-gamers. It is conceivable there is a small percentage of people who both gamble and play games, and engage in those activities both online and offline.

No significant differences among the three gambling groups were found for depression, however addicted gamers had significantly higher depression scores than both social and non-gamers (who did not differ from each other). Findings also suggest there are no differences between gamblers and video game players on the measures of Impulsiveness or Extraversion, however gamblers have significantly higher Venturesomeness scores than video game players. Moreover, problem gamblers and addicted video game players did not differ significantly on measures of Impulsiveness, Venturesomeness, or Extraversion.

On each of the three positive expectancy scales, problem gamblers endorsed items on the enjoyment/arousal, self-enhancement, and money (financial gain) scales more highly than social and non-gamblers. Similarly, social gamblers endorsed the enjoyment/arousal and money scales more positively than non-gamblers. In terms of negative expectancies, non-gamblers endorsed the overinvolvement and emotional impact scales more highly than social gamblers. Problem gamblers differed significantly from social gamblers in their endorsement of the overinvolvement and emotional impact scales, but only differed from non-gamblers on the overinvolvement scale. Problem gamblers anticipate positive outcomes from gambling, but, as with non-gamblers, they are also aware of the negative aspects.

The results contribute to the scant research on gambling and video game playing among college-age students, which may be helpful in informing clinical practice for the treatment of excessive gambling and gaming.

Gambling

The prevalence rates from the current study are somewhat lower than previously found among other college populations (Engwall et al., 2004; Williams, Connolly, Wood, & Nowatzki, 2006; Winters, Bengston, Door, & Stinchfield, 1998), but similar to studies of young adults (Bakken et al., 2009; Burger et al., 2006; Huang & Boyer, 2007; LaBrie et al., 2003; Stuhldreher et al., 2007). Differences in findings are often related to sampling procedures employed, types of instruments used, number and type of easily available gambling opportunities, demographics of the gambling population, length of time during which gambling occurred, the respective cultural and ethnic composition of groups being surveyed, and nature of the local gambling legislation (Derevensky & Gupta, 2000b; Volberg et al., 2010; Williams et al., 2006). To address the last

point, there have been prevention campaigns aimed at Quebec youth and it may be speculated these campaigns have had an effect on youth gambling participation.

Results indicate differential participation rates based upon age, with 34% of those under 18, 53% of those 18-20, and 65% of those ages 21 - 24 having gambled during the past year. The increase in gambling behaviour with age has been reported elsewhere (Turner, Macdonald, Bartoshuk, & Zangeneh, 2008; Williams et al., 2006), but is at odds with other studies where the legal gambling age is under 18 (Delfabbro & Thrupp, 2003). This is not surprising and may be a result of ease of accessibility, for in Quebec opportunities to gamble increase after individuals turn 18; they can legally gamble in casinos, purchase lottery tickets, and enter bars where electronic gaming machines are abundant.

Poker was the most popular form of gambling, followed by the lottery (scratch cards and draws), gambling at a casino, electronic gaming machines, games of skill, and sports betting. Young people under 18 reported playing poker in greater numbers than those 18 - 24 years, and more 18 - 24 year-olds than those under 18 reported gambling on the lottery (draws and scratch cards), gambling at a casino, and electronic gaming machines. Again, this is most likely a reflection of the legal gambling age of 18 and ease of accessibility. Among college students in the U.S., Goudriaan, Slutske, Krull, and Sher (2009) found that gambling activities tended to cluster around formal (e.g., casino/slot machines) and informal gambling (e.g., sports betting, games of skill, cards) activities, although gambling changed over the four years for some types of gamblers. Those who tended to gamble on more informal activities, such as cards and skill betting, transitioned to more formal casino and slot gambling as they aged. While the data in this study are cross-sectional and do not imply that students begin gambling on legal activities after they turn 18, it is of interest to note that, relative to those over 18, significantly more participants

under 18 reported unregulated (i.e., non-state run) forms of gambling, whereas significantly more participants over 18 years of age reported gambling on regulated activities.

Online Gambling

Self-reported online gambling rates in the present study were found at 5%. Online participation rates are varied in the literature, ranging from 1% to 8% (Halme, 2011; Jones, 2003; LaBrie et al., 2003; Ladd & Petry, 2002; McBride & Derevensky, 2012; Petry & Weinstock, 2007; Shead et al., 2012), with rates as high 22% among college gamblers (Griffiths & Barnes, 2008) and 16% among similarly-aged youth not in college (Romer, 2010). In this study, only two individuals reported solely gambling online. This is not unusual; researchers have found an overwhelming majority of gamblers also gamble on land-based venues and few gamble exclusively online (Kairouz, Paradis, & Nadeau, 2012; McCormack, Shorter, & Griffiths, 2013; Wood & Williams, 2011). It appears that online gambling, as opposed to being a phenomenon in its own right, is rather one more venue in which to gamble. It is possible existing gamblers opt to gamble online when other activities are not readily available. Griffiths (2003) has speculated on a number of factors that might influence an individual's decision to gamble online, including accessibility and convenience (see also Derevensky (2012)). The concern is that, unlike traditional brick-and-mortar gambling venues, online gambling opportunities are always readily available, negating the need to travel to gambling venues, which could contribute to increased instances of gambling.

Problem Gambling

The results of this study suggest that approximately 3% of the participants are self-reporting a gambling problem. There were significantly more non-gamblers than social gamblers under 18 years old and significantly more social gamblers than non-gamblers over 18.

Prevalence rates for disordered gambling in college students have ranged from 5% - 15% (Burger et al., 2006; Engwall et al., 2004; Lesieur et al., 1991; Martin, Usdan, & Turner, 2012; Volberg et al., 2010; Williams et al., 2006; Winters et al., 1998). A recent meta-analysis estimated overall weighted-average percentage of probable pathological gamblers among college students in North America and abroad at 10% (Nowak & Aloe, 2013).

The rates in the current study are lower than those cited above, but are not inconsistent with several other studies (Ellenbogen, Jacobs, Derevensky, Gupta, & Paskus, 2008). It has been noted that the gambling behaviour of college-age students experiencing gambling problems fluctuates, and some previously-identified gamblers experiencing problems were no longer experiencing any problems at a later date (Martin et al., 2012). Problem gambling may not necessarily be a progressive disorder as has been previously assumed, with individuals moving in and out of gambling problems during their lifetimes (LaPlante, Nelson, LaBrie, & Shaffer, 2008; Slutske, 2006). It is also possible that problem gamblers were not found in this population due to the demands of school; those currently experiencing problems may already have dropped out of school, missed class, or have not attended CÉGEP in the first place (CÉGEP is not mandatory; it is attended following a high school diploma, and comprises two streams - vocational programs and pre-university programs). The students who participated in the current study attended non-vocational programs; perhaps the rigour of the academics engulfed the students' leisure time. There is some indication gambling is higher among young people not attending college compared to those enrolled in college (Barnes et al., 2010). Research with individuals in this age group, often difficult to get in large numbers, who are not in school would provide valuable insight to the gambling behaviour of young adults in general.

Depression scores were found to be a significant predictor for problem gambling, corroborating previous research (e.g., Moodie & Finnigan, 2006a; Stuhldreher et al., 2007). Gambling may be used to provide relief and distraction from depression (or may result in depression). However, if individuals are disordered gamblers this will only temporarily alleviate their negative affective state, and when gambling episodes are over the depression remains, and may be exacerbated by the consequences of gambling. An important aspect of treating problem gamblers would be to address any underlying depression.

Problem Gambling and the Internet

In the present study, while problem and social gamblers were equally likely to report land-based gambling, problem gamblers were three times as likely as social gamblers to have gambled online. Past-year online gambling was also a significant predictor for problem gambling. While it is not possible, from these data, to identify whether or not gambling online causes problem gambling, there is something inherent in the medium that makes it particularly attractive to individuals with gambling problems. The extent to which technology facilitates excessive gambling has been explored at length (Derevensky & Gupta, 2007; Griffiths, 1999, 2003; Griffiths, Parke, Wood, & Parke, 2006). Griffiths (2011) has speculated that the structural characteristics of online gambling games (e.g., event frequency of an activity, payout interval, and light, colour, and sound effects, etc.) promote interactivity and may be addictive. The use of electronic cash may promote a suspension of financial judgement leading to further gambling (Griffiths, 2011). The Internet also provides convenience, and the promise of gambling games at the touch of a button may be difficult for problem gamblers to resist. Online gamblers, compared to traditional, land-based gamblers, gamble more frequently, have higher gambling frequency on multiple gambling activities, spend a greater proportion of money gambling, gamble for longer

per session, and have more severe gambling problems (Griffiths & Barnes, 2008; Kairouz et al., 2012; Ladd & Petry, 2002; McBride & Derevensky, 2012; Petry & Weinstock, 2007; Shead et al., 2012; Svensson & Romild, 2011; Wood, Griffiths, & Parke, 2007). In fact, there are multiple empirical investigations suggesting problem gamblers are over-represented among online gamblers (see Griffiths, 2011 for a review). This proved to be the case in the current study.

Problem gambling notwithstanding, gambling online is also attractive to non-problem gamblers. For example, regular online poker players have been found to be significantly more likely to choose to gamble online because of the availability, ease of accessibility, comfort, high speed of play, ability to bet at their own pace, greater variety of games, flexibility in stake size, multi-gambling opportunities, free practice games, and the fact that land-based venues may require significant travel (McCormack et al., 2013). In a similar vein, regular online sports bettors report preferring to gamble online due to its convenience, availability, accessibility, and ability to bet in-play (McCormack et al., 2013). The present study found no significant differences in online activity between social and problem gamblers. The features of online gambling mentioned above are equally alluring for social and problem gamblers, and may entice individuals to gamble when they otherwise would not, ultimately leading to excessive gambling and the development of gambling problems for some individuals.

Gender Differences

Consistent with the majority of gambling research, being male increased the odds of past-year gambling two-fold (Bakken et al., 2009; Barnes et al., 2010; Bhullar et al., 2012; Derevensky & Gupta, 2000b; Engwall et al., 2004; LaBrie et al., 2003; Stuhldreher et al., 2007). Males were also significantly more likely than females to gamble online, which is consistent with other studies of online gambling (Ariyabuddhiphongs, 2013; Brosowski, Meyer, & Hayer,

2012; Griffiths & Barnes, 2008; Petry & Weinstock, 2007; Romer, 2010; Shead et al., 2012; Svensson & Romild, 2011). In this study, female gambling was predicted by age; as females got older the likelihood of gambling increased. This is consistent with what has been found in previous research. Women tend to begin gambling, and to develop gambling problems, later in life than men (Wenzel & Dahl, 2009). It has been speculated that males are drawn to gambling for the excitement, challenge, and social aspect, and begin gambling at an earlier age, whereas females often begin gambling later in life and choose to gamble to escape negative emotions, dissociate, or to relieve boredom, loneliness, and social isolation (Bhullar et al., 2012; Boughton & Falenchuk, 2007; Corney & Davis, 2010; Potenza et al., 2001).

However, this gender divide may change as a number of factors make online gambling inherently attractive to younger women. Researchers exploring gender differences in online gambling found that compared to males, females were significantly more likely to first gamble online before they were 24 years old (McCormack et al., 2014). Online gambling may be less intimidating, women can play anonymously, and practice using free sites to improve their skills. McCormack et al. (2014) reported that females were more likely to play free online gambling games than males, and were more likely than males to endorse being attracted to online gambling because of the ability to spend less money. Women also report finding online gambling safer and less intimidating than some offline venues (Griffiths, 2001). In a qualitative study of female online gamblers, Corney and Davis (2010) reported that in addition to privacy, anonymity, ease of accessibility, safety, and gender-neutrality, many women selected to gamble online as a way to socialise while remaining at home. In particular, females may prefer to play poker online, where they are anonymous and do not risk embarrassment for playing poorly, can hide their gender, practice for free, or visit female-only sites (Corney & Davis, 2010). The gambling

industry realises the potential of this market and researchers would do well to monitor the relationship between gender and online gambling.

Males and females had different predictors for gambling. For males, gambling was predicted by Extraversion scores; for females gambling was predicted by age, past-year video game playing, and Venturesomeness. Gambling may be more normalised for males than for females, especially during childhood and adolescence, whereas it may be seen less as a way to socialise and more as a risky activity by young females.

In the current study, significantly more males than females were identified as problem gamblers. Males consistently are reported to have higher rates of problem gambling than females (Bakken et al., 2009; Barnes et al., 2010; Blinn-Pike, Worthy, & Jonkman, 2007; Burger et al., 2006; Engwall et al., 2004; Goudriaan et al., 2009; LaBrie et al., 2003; Platz, Knapp, & Crossman, 2005; Stinchfield, Hanson, & Olson, 2006). Although females are not exempt from developing gambling problems, women tend to develop problems later in life, as previously mentioned, and this was reflected in the current sample. Nevertheless, prevention programs should include gender-specific strategies and messages, including public service announcements from prominent female gamblers on the potential dangers of excessive gambling, especially for those females gambling online.

Video Game and MMORPG Playing

The results indicate the pervasiveness of video game playing among youth; nearly everyone reported playing some form of video game during the past year. The mean age of onset for video game playing was nine years of age, however video game playing was equally endorsed by all age groups denoting that while children begin playing video games early on in life, they do not stop playing when they reach early adulthood. Approximately 29% of all

participants reported playing MMORPGs, with a mean age of onset slightly older than for video games (13 years of age). Among those who had played MMORPGs, five reported exclusively playing MMORPGs and no other forms of video games. Nearly half of all MMORPG players reported usually playing with friends, and just under half usually played with strangers (i.e., those they only knew online). MMORPG playing was negatively predicted by Extraversion, implying that less extraverted individuals played these types of games. Interestingly, recent research has shown MMORPGs to be highly socially interactive, with players having higher extraversion scores than non-players (Teng, 2008). Some MMORPG players would rather spend time in "the game" than with real-life friends, claim to have more fun with in-game friends than people they know, find socialising online more pleasant than socialising offline, and feel online gaming better satisfies their social needs (Hussain & Griffiths, 2009a; Ng & Wiemer-Hastings, 2005). Cole and Griffiths (2007) reported that an overwhelming majority of MMORPG players indicated that they had made "good friends" within the game and thought that MMORPGs had a positive impact on their relationships with those with whom they played. Many reported personally meeting their online friends. The players, particularly female players, stated they discussed sensitive issues they would not discuss with their real-life friends, including family problems, loss of loved ones, sexuality issues, discrimination, and work-related problems. However, a significant negative correlation between the effects playing the game had on relationships with those outside the game and the number of hours played per week was found, possibly because more time playing resulted in less face-to-face interactions with friends and family.

The relationship between online games and extraversion is complicated; while the games are highly social in nature individuals nevertheless typically play in a room alone. However, it

may be easier for some people to socialise with others while in character, where one's skills are highlighted and flaws are downplayed. While in-game socialisation may feel as meaningful as real-life interaction, it may interfere with face-to-face interaction, further reinforcing introverted tendencies. For example, Lo, Wang, and Fang (2005) found heavy players of online games had higher levels of social anxiety and lower quality of interpersonal relationships than less frequent players.

Gaming Addiction

Based on the GAS, 3% of participants were identified as addicted gamers. Although there is no single 'gold-standard' measure in identifying pathological video game playing, the current results are consistent with other research (Johansson & Götestam, 2004). Males were significantly more likely than females to be identified as addicted gamers. There were no differences in gaming addiction based on age. Social and addicted gamers did not differ from their non-gaming counterparts in the likelihood of playing video games, however significantly more addicted gamers reported playing MMORPGs. When comparing gaming addiction by activity, there was a significantly larger proportion of addicted gamers among MMORPG players than video game players.

Addicted gamers typically began playing video games a year-and-a-half earlier than social gamers. This mirrors findings in gambling research where it has been noted that individuals with gambling problems begin gambling earlier on than those without problems (Derevensky & Gupta, 2004; Gupta & Derevensky, 1998a). This correlation may prove potentially dangerous in an era where 63% of children aged eight and under have used a mobile device to play games (e.g., smartphone, iPod Touch, or tablet device) and 50% have used a mobile device for games (e.g., *Angry Birds, Candy Crush, Tic Tac Toe, Jewel Mania)* (Rideout,

2013). On the other hand, it may breed a familiarity with games that transcends addiction. Age of onset and its relationship to video game addiction is an important future area of research.

MMORPG playing, Impulsiveness, and depression significantly predicted gaming addiction, with MMORPG players being nearly 12 times as likely to be identified as addicted gamers than non-players. This is an interesting finding, as anecdotally MMORPGs are thought to be "addictive". Early thinking was that the accessibility and immersive qualities of MMORPGs would cause gamers to play to excess; paired with the stereotype of the MMORPG player as a socially inept loner who preferred fantasy worlds to real life, conventional wisdom labelled these games as addictive. Some of this thinking is borne out in research. Qualitative studies with online gamers soliciting their opinions and feelings toward MMORPGs indicate they are aware of the potential for addiction, but for the most part gamers organise and manage their time well, and can balance gaming with work, school, and family/relationships (often by playing with children and/or partners) (Hussain & Griffiths, 2009b). Those that play extensively are well aware of the excessiveness of their online gaming, and admit the social aspects of belonging to an online community facilitated excessive play (e.g., belonging to certain types of guilds), as did setting goals of completing specific quests. Nevertheless, a vast majority of gamers highlight the positive effects of online gaming (i.e., meeting new people, learning about new cultures, teamwork/cooperation, building friendships, improves computer skills, closeness with partner/spouse) as well as successfully using MMORPGs to relieve stress, loneliness, anger, and frustration (Hussain & Griffiths, 2009b). The alternative argument is the negative aspects associated with excessive play are often severe; losing friends in real life, insufficient time to socialise, and neglecting hygiene, sleep, diet, and work/school responsibilities. As with gambling, when online gaming is casual, or regular but balanced with other responsibilities, it

can be a positive leisure activity for individuals; however, for some excessive play has serious negative consequences with implications for their mental health and well-being. The relationship between gaming addiction and depression found in this study bears this out. As with gambling, using gaming to alleviate negative emotions is a short-term strategy with long-term potentially harmful consequences. Similar treatment strategies, targeting effective coping mechanisms, could be used with both problem gamblers and gamers.

Individuals who have experienced problems with online gaming describe two processes that seem to contribute to an excessive gaming pattern: playing longer each session and playing more and more frequently (Haagsma et al., 2013). When gamers describe why they play to excess, the main themes that emerge include reward and completion (i.e., not quitting because one is close to one's goal, level, or reward; completing a story line so not to lose achieved results), mood regulation (relief from boredom, escape from reality), and the social aspects of online gaming, where cooperation with others is necessary to progress in the game (Haagsma et al., 2013). In many ways, online relationships maintain excessive playing patterns as cooperation is often necessary in order to progress in the game and players attempt to keep appointments made with others to avoid abandoning the team. Qualitative reports indicate the feeling of belonging to a team enhances gamers' immersion in the game and the present study found a trend that proportionally more addicted gamers (48.4%) than social gamers (32.1%) reported belonging to guilds.

Gender and Gaming

Significantly more males than females reported playing video games and MMORPGs, although a substantial number of females reported video game playing. Significantly more males than females were identified as addicted gamers and social gamers, and significantly more

females than males were identified as non-gamers. The gender divide in video game players is similar to that of gamblers, with more males than females being involved in both MMORPGs and video games, particularly among adolescents compared to adults, and more males than females with a video game addiction (Desai et al., 2010; Gentile et al., 2011; Griffiths et al., 2004b; Lemmens et al., 2009, 2011; Mentzoni et al., 2011; Padilla-Walker et al., 2010; Wood, Griffiths, et al., 2004).

Descriptively, there were gender differences in preferred games for both video games and MMORPGs. Overall, males endorsed first-person shooter games, sports games, and fantasy games, whereas females endorsed active games (*Wii Fit, Dance Dance Revolution/ Rockband*), *The Sims,* and *Mario & Luigi*. While these results could not be confirmed with statistical analysis, other studies have reported similar trends, with women highly represented among puzzle, sports/workout games, and board/card games and men disproportionately represented among simulated team sports, role-playing games (RPGs), shooter, and real-time strategy genres (Elliott, Golub, Ream, & Dunlap, 2012).

Convergence Between Gambling and Video Game Playing

As hypothesised, results of the present study suggest that significantly more video game players than non-players were gamblers, and more gamblers than non-gamblers played video games. Significantly more MMORPG players than non-players reported gambling, gambling for money online, and playing free online gambling games. Video game playing was a significant predictor of past-year offline gambling and both gambling and free online gambling games predicted video game playing. MMORPG playing was a significant predictor for online gambling, while free online gambling games predicted MMORPG playing. Video game and

MMORPG playing were predictors of free online gambling games. These results provide evidence for the convergence of gambling with video gaming.

One aspect of the present study was to explore the possibility that video game playing may influence some individuals' irrational beliefs about gambling and therefore have an effect on their gambling behaviour. The concern was that young people who play video games may be convinced they can eventually master skills that will make them successful gamblers, the way they mastered the skills to become successful video-game players. In the current study, those who considered themselves "skilled" video game players, compared to those gamers who considered themselves "unskilled", were significantly more likely to report gambling (both offline and online) and playing free online gambling games. Furthermore, significantly more problem gamblers rated themselves as "skilled" at playing video games versus "unskilled". While the limited data do not necessarily prove that playing video games leads players to believe they can control the outcome of gambling games, the greater numbers of self-perceived "skilled" video game players among all gambling activities is striking. Experience with video games may be contributing to young people's perception of gambling as something at which they can be skilled.

Results from this study indicate that problem gamblers were more likely than non-gamblers to report playing video games and MMORPGs and addicted gamers were more likely than non-gamers to report past-year land-based gambling and playing free online gambling games (but not online gambling). Playing video games and MMORPGs may provide an escape or distraction from the negative consequences and emotions associated with problem gambling and vice versa. These results provide support for the co-occurrence of addictive behaviours, and expand upon previous findings that correlated problematic video game playing with gambling

(Walther et al., 2012), but contradict others (Forrest et al., 2015; King et al., 2012). The relationship between gambling and video game playing is not linear, and it could be video game playing is more popular among gamblers than gambling is among video game players, and the effects of video game playing may be stronger for gamblers than the effects of gambling for video game players (King et al., 2012). Future research is needed to determine what makes these two groups similar, or different, and how the two activities do or do not influence the thoughts and behaviours of players.

As gambling enters the digital age and converges with other digital media, including video games, clear-cut distinctions between the two begin to disappear. One of the biggest changes in the division between gambling and video game playing is the existence of social media games, that is, games played via social networking sites like *Facebook* (Derevensky & Gainsbury, 2014). These games incorporate elements of free gambling, as well as offering the potential to purchase "virtual" credits for money. Purchasing virtual credits to extend play was the single largest predictor in the migration from social casino gaming to online gambling, as it potentially brings the activity closer to gambling than a video game (Kim, Wohl, Salmon, Gupta, & Derevensky, in press). Among adolescents, one quarter have engaged in simulated gambling in a video game (either as bonus feature or as virtual gambling experience) (King et al., 2014). Exposure to past involvement with simulated gambling is a significant predictor of problem gambling in young people (King et al., 2014).

There is a growing body of research examining gambling via social networking sites, such as *Facebook,* and how this normalisation of gambling may contribute to addictive behaviour in young people (Derevensky & Gainsbury, 2014; Griffiths, 2013, 2014). Gambling early on has been linked to problem gambling later in life, and young people are being socially

conditioned to view gambling as a legitimate social activity freely available to them (King et al., 2010a). In an interesting study of video game genre and its relationship to problematic video game play, Elliott et al. (2012) recruited adults who played one or more hours of video games a week and discovered one of the 15 genres of games respondents played was gambling (defined as simulations of poker, blackjack, and slot machine gambling) and that gambling was one of the video game genres most strongly associated with problematic video game play; odds were generally twice that associated with other genres.

The possibilities offered by rapid technological development are expanding exponentially. This is an area full of possibility for future research, as children begin interacting with technology earlier and earlier and the lines between gambling and gaming become increasingly blurred.

Free Online Gambling Games

Results of the current study found that significantly more video game players than non-players had played free online gambling games. Furthermore, one-quarter of non-gamblers had played free online gambling games, signifying the popularity of these games for leisure even among those who do not gamble for money.

As with simulated gambling found within video and social media games, one concern regarding free online gambling games is that they promote positive attitudes toward gambling, ignore the potential negative consequences, and glamourize and misrepresent gambling; moreover, they are freely available and playable by adolescents and children (King et al., 2010a). Gambling is presented as fun and exciting, with the potential to "win big", and games are accompanied by sensory sounds and music to increase player arousal. Adolescents experience the excitement of gambling, without experiencing the consequences of losing actual money.

Free "gambling" blurs the distinction between gambling and playing video games and may serve as fertile training ground for a new breed of gamblers (Griffiths & Parke, 2010; Messerlian et al., 2004). The message is that gambling is akin to a video game and the risks, including financial risks, get disregarded. By the time adolescents reach legal age to gamble for money, many of them already have been spending a significant amount of time playing gambling games. In the current study, 42% of participants reported playing free online gambling games, compared to 5% reporting online gambling. In fact, 25% who had neither gambled offline nor online for money during the previous year nevertheless reported free gambling site activity.

Young people might see the free gambling sites as a way to prepare for betting with real money online. In many cases, online free poker sites are advertised as poker schools (Kim et al., 2013). In a study of advertisements promoting free gambling sites on poker programming, Kim and his colleagues (2013) suggested the advertisements highlighted the educational purpose of their websites. Often, these sites are affiliated with and/or run by real money gambling sites. In what is referred to as a "Trojan horse strategy", many of the money sites are accessible from the free sites (Kim et al., 2013). Preliminary longitudinal research examining the migration from free sites to money sites suggests that individuals tend to migrate to online gambling from free sites (Kim et al., in press).

Many young people already believe gambling involves skill with possibilities to improve (Hume & Mort, 2011) and free online gambling may cement this belief, given the disproportionately high payout rates. Many free poker sites stress the educational value of their games, but the warnings related to gambling as a risky, potentially harmful activity are not provided. The result is increasing numbers of young people playing gambling-related games for "free", with no understanding of the implications or potential negative consequences of such

play. Online gamblers themselves state the ability to master skills for free attracted them to online gambling, although they also note that the odds of winning were more favourable when playing for points or virtual credits, rather than money (Corney & Davis, 2010). Players then come to false conclusions about the possibilities of winning and may lose more money than they can afford, causing them to return to gambling to try and win it back, entering into the vicious cycle of chasing losses. The accessibility of online gambling makes returning to try to recoup losses much easier than at offline venues. A study of online gambling in university students found that 30% reported chasing losses most or all of the time.

Researchers should investigate the role of practice sites in the development and maintenance of problem gambling in young people over and above their interest in online gambling with money. There is an indication that for young people money is not the primary reason to gamble, but rather the means to be able to keep gambling (Derevensky & Gupta, 2000b). People gamble for excitement and enjoyment, however those with gambling problems experience dissociation and the feeling that all their problems disappear while gambling. In light of this, the existence of practice sites is particularly problematic. If money is no longer the limiting factor to gambling, then the repercussions of unlimited access have the potential to be dire. To what extent the availability of free gambling games online is contributing to problem gambling is not clear. Clearly, this phenomenon necessitates further inquiry. Future research should include longitudinal studies to examine practice sites, and the role they play, if any, in the transitioning to gambling online with real money.

Factors That Affect Problem Gambling and Gaming

Personality. Gamblers and video game players did not differ in either Impulsiveness or Extraversion scores. Problem gamblers and addicted gamers also did not differ in Impulsiveness

or Extraversion scores, alluding to individuals with similar personality types attracted to and experiencing difficulties with both activities. Situating these activities in a framework of overall risky behaviour, gamblers scored higher on a Venturesomeness scale than video game players, implying that gambling draws more risk-takers than video game playing. One interpretation is that as normalised as gambling has become, it is still seen as more risky than video games.

Impulsiveness. As hypothesised, there were no statistically significant differences between gamblers and video gamer players for measures of Impulsiveness. However, those who participated in gambling and video game playing, respectively, were more impulsive than those who did not. Gambling and video game playing, and pathological gambling and gaming, have been linked previously with impulsivity (e.g., Gentile et al., 2011; Gentile, Swing, Lim, & Khoo, 2012; Littel et al., 2012; Walther et al., 2012; Zuckerman, 2007). Problem gamblers tend to act on the spur of the moment; they show difficulty with planning and thinking carefully, and often discount future, large rewards in favour of immediate, smaller ones (Ledgerwood et al., 2009). Experimentally, excessive video game players have decreased sensitivity to error trials and increased response bias to correct trials than controls - a pattern that has been found in problem gamblers and substance abusers (Littel et al., 2012). However, research with MMORPG players has found that problematic players have lower impulsivity than non-problematic players, indicating not all video game players share the same personality traits (Collins, Freeman, & Chamarro-Premuzic, 2012). In fact, impulsiveness may be problematic amongst MMORPG players, where players rely on each other and acting too hastily may hinder the group (Collins et al., 2012). In keeping with this theory, there were no differences in Impulsiveness scores for MMORPG players and non-players in the present study.

Venturesomeness. Video game players had lower Venturesomeness scores than gamblers, but higher scores than non-players, as did gamblers compared to non-gamblers. Problem gamblers and addicted gamers did not differ on this measure. Venturesomeness is conceptualised as a distinct component of Impulsiveness, one that correlates largely with Extraversion (Eysenck et al., 1985). It taps adventurousness, risk-taking, and sensation-seeking. Correlations between risk-taking and gambling (Engwall et al., 2004; Goudriaan et al., 2009; LaBrie et al., 2003; Pedrelli et al., 2011), online gambling (McBride & Derevensky, 2012), and problem gambling (Huang, Jacobs, & Derevensky, 2010; Huang, Jacobs, Derevensky, Gupta, & Paskus, 2007; Stuhldreher et al., 2007), as well as between sensation-seeking and gambling (Gupta et al., 2006) and problem gambling (Slutske et al., 2005; Worthy, Jonkman, & Blinn-Pike, 2010) have been established. Sensation seeking scores in children are positively related to playing video games and MMORPGs and RPGs (Jensen, Weaver, Ivic, & Imboden, 2011) and online gaming addiction and sensation-seeking have been found to be significantly related (Mehroof & Griffiths, 2009; see Kuss and Griffiths (2012) for a review).

Overall, the results suggest that while video games may attract risk- or sensation-seeking individuals (compared to those who do not play video games), gambling does so to a greater degree. Nonetheless, the gamblers and video game players can be considered more alike in this regard than video game players and non-players. Sensation seeking may be a coping mechanism to relieve boredom, and both gambling and video games may provide the requisite psychological and physiological stimulation.

Extraversion. Extraversion as described by Eysenck et al. (1985) represents gregariousness and friendliness. Given the social nature of both online poker and MMORPGs, it was hypothesised both groups would also have similar results with respect to Extraversion.

Unfortunately, due to the small number of online poker players it was not possible to conduct statistical analyses on these two groups. However, MMORPG players did have lower Extraversion scores than non-MMORPG players. Although this contradicts some research that found that online game players have higher scores on extraversion than non-players (Teng, 2008; Yee, 2001), other studies have found online gaming addiction is significantly related to introversion (Kuss & Griffiths, 2012) or no association between extraversion and video game or MMORPG playing, or problematic video game playing (Collins & Freeman, 2013; Collins et al., 2012). Individuals low in Extraversion may be attracted to online role-playing games precisely because they are not gregarious individuals and might find it difficult to meet new people face-to-face. Low social competence does predict pathological video game playing (Gentile et al., 2011). Charlton and Danforth (2010) surveyed 388 *Asheron's Call* players and found that gaming addiction scores increased with decreasing extraversion. There may also be a reciprocal relationship at play; individuals low in Extraversion are drawn to online role-playing games because it is easier to socialise that way than face-to-face, but the more they play the less they engage in face-to-face socialisation, reinforcing the difficulty of real-life engagement with others.

One way to look at socialising is the concept of social capital (i.e., the benefits of social interactions and behaviours) (Portes, 1998). As technology become more central to people's lives, the notion of social capital must change to not only incorporate online forms of sociability, but to differentiate between 'bonding' capital, indicative of strong emotional ties (e.g., family and close friends) and high levels of emotional support and 'bridging' capital, indicative of weaker ties with groups which may not necessarily provide emotional support, but nonetheless are beneficial by providing different perspectives and creating opportunities of new experiences

(Collins & Freeman, 2013; Williams, 2006). Collins and Freeman (2013) found that problem video game players scored more highly on measures of online social capital and lower in offline social capital than non-problem video game players and non-video game players. MMORPG players had significantly higher online social capital and its subscale online bridging capital, suggestive of a reliance on online social networks and, in the case of problem video game players, an absence of face-to-face equivalents. However, high online social capital is still indicative of an emotionally supportive community and those experiencing such a community would most likely vouch for its authenticity. Further research into online versus offline socialisation and psychological health is warranted.

Depression. It was hypothesised that problem gamblers, in relation to those gamblers with no problems, and addicted gamers, in relation to those gamers with no addiction, would both have higher mean scores on the RADS-2. This proved to be the case for gaming, but not gambling. The relationship between gambling and depression is fairly well-established in research, but not always clear-cut. Many researchers have found, in adolescent gamblers in particular, that problem gamblers have higher rates of depression (e.g., see Derevensky & Gupta, 2000b; Desai et al., 2005; Gupta & Derevensky, 1998b; Lynch, Maciejewski, & Potenza, 2004; Nower, Gupta, et al., 2004) and gamble to alleviate depression (Gupta & Derevensky, 1998a). Conversely, among university students some studies have found no relation between depression and gambling (Pascual-Leone, Gomes, Orr, Kaploun, & Abeare, 2011), whereas others have reported significant positive correlations between problematic gambling and depression (Moodie & Finnigan, 2006a; Stuhldreher et al., 2007) as well as psychological distress (Weinstock, Whelan, & Meyers, 2008). Shenassa and his colleagues (2012) found no relationship between depressed behaviour, as assessed at age seven, and lifetime problem gambling behaviour thirty

years later. The relationship between gambling, problem gambling, and depression is complex and further research in this area is warranted.

Addicted gamers had significantly higher depression scores than both social and non-gamers, who did not differ from each other, and depression was a significant predictor for classification as an addicted gamer. Interestingly, depression predicted MMORPG playing in females. Escaping into a fantasy world where one can be any fanciful character one wishes may be a powerful lure to young girls with depression. As this research is correlational, there is no way to state that addicted gaming behaviour leads to depression, nor that those with depression will play pathologically. It could be these youths suffer from depression and therefore play pathologically to escape negative emotions, or it could be pathological play has led to depression. Other research has found that young people who report excessive video game play (five hours or more per day) are more likely to report pervasive feelings of sadness or hopelessness, stopping participating in usual activities, and suicidal ideation and suicidal plans (Messias et al., 2011). Correlations have been found for video game addiction and depression, poor academic achievement, heavy drinking, and conduct problems (Brunborg, Mentzoni, & Frøyland, 2014). This study only looked at depression as one possible negative outcome (or antecedent). Future research, especially longitudinal, examining drug or alcohol use, anxiety (in particular social anxiety), self-esteem, academic success or failure, and conduct problems with respect to video game playing is warranted.

Young people may use video games as a way to escape depressed feelings, but the danger is excessive video game involvement may lead to reduced pleasure in other, non-video game-related activities, as "real" life may not be seen as exciting or as rewarding as virtual life. If young people then become proficient at a particular game they may even use video games to

boost their self-esteem. In the current study those individuals who rated themselves as skilled video game and MMORPG players were more likely to be identified as addicted gamers than those who rated themselves as not skilled. Video games may well be a way to avoid negative feelings about oneself, and may even be a way to boost self-esteem, but care must be taken to ensure that any ensuing improvements in self-esteem are generalised to non-technological areas and that other, more adaptive coping mechanisms are also provided.

Expectancies

Positive Expectancies. One purpose of the current study was to replicate findings relating outcome expectancies to gambling severity, and to examine the relationship of outcome expectancies with respect to gambling and video game playing. As found by Gillespie and her colleagues (2007b), problem gamblers endorsed items on the enjoyment/arousal, self-enhancement, and money scales more highly than social and non-gamblers; social gamblers endorsed items on enjoyment/arousal and money scales more positively than non-gamblers. Clearly, both social and problem gamblers anticipate positive outcomes from gambling. This is of concern, as perceiving benefits from gambling has a significant positive relationship with problem gambling among college students (Wickwire et al., 2007). Research examining college students' motivation for gambling has found that money, enjoyment, social contact, and excitement were the top reasons for gambling (Neighbors, Lostutter, Cronce, & Larimer, 2002).

Negative Expectancies. Problem gamblers endorsed items on the over-involvement scale more highly than social and non-gamblers, and both problem and non-gamblers endorsed items on the emotional impact scale equally, but more strongly than social gamblers. Some of these results are inconsistent with earlier research. Gillespie and her colleagues (2007b) found that PPGs endorsed the overinvolvement scale more positively than at-risk gamblers and non-

gamblers, though not differently from non-gamblers; while non-gamblers endorsed the overinvolvement scale more highly than social gamblers. The overinvolvement scale reflects loss of control over gambling and encompasses themes of preoccupation and relational disruptions. While non-gamblers are keenly aware of the risks of gambling, so are problem gamblers - more so than casual gamblers and non-gamblers. Gillespie and her colleagues (2007b) expected that non-gamblers saw the loss of control as a deterrent to gambling, whereas problem gamblers' evaluation stemmed from experience. This explanation fits these data as well.

In the current study, non-gamblers and problem gamblers did not differ from social gamblers on the emotional impact scale, however both groups endorsed items on this scale more highly than social gamblers. Gillespie and her colleagues (2007b) reported that non-gamblers endorsed emotional impact scale more highly than social gamblers, at-risk gamblers, and PPGs. As with the overinvolvement measure, non-gamblers are aware of the potential toll gambling can take on emotional well-being, sense of self, and mental health and this may serve as an incentive to not gamble. On the other hand, those who gamble and experience problems are also more aware of the potential toll, but this awareness stems from past involvement.

Video Game Playing. This is the first study that has examined gambling expectancies from the point of view of video game players. Results indicate that video game players had significantly higher scores than non-players for all positive expectancy scales but did not differ for the negative expectancy scales, suggesting gamers anticipate positive outcomes to gambling with none of the risks. Gamers see gambling as a socially acceptable form of entertainment, an activity that has the potential to be exciting and stress-relieving, and to provide an opportunity to feel good about themselves as well as to win money. Video game playing may have influenced their beliefs and attitudes toward gambling, and this may influence their gambling behaviour.

Again, as a key question this study sought to address was how video game playing might cross over into gambling, these results are striking. A key prevention/education component, then, is to ensure video game players understand the risks that accompany gambling.

Limitations

There are several limitations that need to be acknowledged. The first limitation concerns the cross-sectional study design which does not allow conclusions about causality to be drawn. In order to determine if online gambling leads to problem gambling, or MMORPG playing to gaming addiction, longitudinal studies need to be carried out. Longitudinal studies would also be helpful in examining the relationship between free online gambling games, online gambling with money, and problem gambling.

A second limitation reflects the self-selection bias for sampling. It is possible individuals who have a particular interest in gambling and/or gaming would preferentially elect to participate and complete the survey. The data were obtained by self-report which in and of itself has implications for reliability, as it is possible individuals would want to portray themselves in more positive ways. However, the anonymity of the questionnaires should be sufficient to counter this.

The study used a convenience sample of CÉGEP students, a system unique to the province of Quebec, Canada. This age group elsewhere would either be in the last year of secondary school or first-year college/university and therefore results may not be representative of a larger sample of youth. In addition, problem gamblers and problem gamers may not have been included due to school absence from excessive playing, may not have elected to continue their education due to gambling and gaming problems, or may have been less likely to participate. Caution should be used in generalising the results until replication studies have been completed. As with all convenience samples, a large number of individuals must be surveyed in

order to ensure sufficient numbers of participants for statistical power. Future research would do well to focus on non-random convenience samples (i.e., gamblers (both offline and online) or video game players).

Although over one thousand students were surveyed, in the end there were relatively few pathological gamblers and gamers. While this has positive mental health implications for young people, for research purposes it makes statistical analyses difficult and caution should be taken in generalising results to a larger population.

Implications

Results indicate problem gamblers and gamers share specific personality traits, including impulsiveness, sensation-seeking (Venturesomeness), and extraversion, and therefore would benefit from similar prevention and intervention strategies. This is important, as it may save time and money with respect to treatment and education. Prevention programs that emphasise positive risk-taking, mindfulness training to combat impulsivity, and social skills training would benefit individuals at risk for problem gambling, video game addiction, or both. Treatment programs dealing with information about chance vs. skill in gambling activities and video games as well as erroneous beliefs in these areas would also benefit both gamblers and gamers.

An important aspect of education must concern the risk factors inherent in gambling and gaming. While the leisure and positive aspects are highlighted, marketed, and understood, the downside must also be emphasised, especially regarding free online gambling games. Sites promoting free online gambling games should not advertise themselves as "training grounds" for gambling, need to have similar payout rates, and should post the same responsible gambling messages as are being promoted on the sites with money. These may include deposit limits, self-exclusion options, age verification checks, references to controlled gambling, links to helplines

and social responsibility partners, and built-in pauses or instant exits (Broda et al., 2008; Griffiths, Wood, & Parke, 2009; Smeaton & Griffiths, 2004). It may prove difficult to regulate MMORPGs. Because the games are played by many people, in real time, built-in pauses or saving the games once a level or quest has been achieved is practically impossible. Nonetheless, self-exclusion strategies may serve to help those who play compulsively; an individual could pre-select an amount of time to play, and when that time has expired be unable to log back in for a certain period (i.e., 24 hours). Greater information with respect to what is required from guild members should be made available before players select guilds.

Treating depression with adaptive coping skills may reduce using gaming as a coping tool. Blinka and Smahel (2011) provide good advice for therapists treating MMORPG addiction, including working with the player's relationship with the avatar and the context of social links in the game. They suggest it is crucial to understand the function of a player's social network in order to provide alternatives in the real world. This would be particularly true for young girls, for whom depression was predictive of MMORPG playing and who may be reluctant to give up in-game relationships.

Colleges and universities need to develop and implement strategic secondary prevention efforts, awareness, information, and education about gambling and the link with video game playing, as they often do with sex, drug, and alcohol education. This should include the signs and symptoms of problematic gambling and gaming. Particular emphasis should be placed on video game playing, as this leisure activity is much more pervasive than gambling. Also, a fundamental element to the prevention of problem gambling is to not promote this behaviour in young people. As such, high schools and colleges where many students are not of age to gamble should not offer "casino nights" or poker tournaments as fundraisers. At the university level, counselling

services should be able to screen for problem gambling and gaming issues, along with other high-risk behaviours (with the understanding that risky behaviours are often linked and reinforce each other), when students present for mental health issues. At best, there should be someone who is available for treatment and brief intervention strategies. If there is no-one available to treat problem gambling and gaming, counselling centres should have lists of available community resources for their students in order to plan for, and provide, appropriate referral and treatment services.

Social gaming operators must be more socially responsible in how they market their games and how they encourage in-game purchasing (Griffiths, 2014). Stricter age verification measures should be in place for social games, especially where such games allow young people to play games with gambling-related content, even if real money is not used. Video games that have alcohol and cigarette use, graphic violence, sexual references, and coarse language are more restricted, whereas video game versions of simulated gambling activities are rated for "everyone" or "teen" audiences by the Entertainment Software Rating Board (ESRB) (King et al., 2010a).

Parents also need to take responsibility when allowing their children to play social games or download gaming apps. Griffiths (2014) has a number of suggestion for parents to work with their children to prevent buying in-game items for real money, including overseeing all apps they download, not giving them online store passwords and deleting stored credit/debit card information from online accounts, and discussing buying in-game extras with their children. Carefully monitoring the behaviour of youth is highly recommended.

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Appendix A

Questionnaire Package

The following questionnaire refers to your gambling and gaming preferences and behaviour. For each statement, please indicate your response by filling in the circle next to the statement you agree with. All information is confidential and anonymous. We do not require any identifying information and only our research team at McGill University will have access to this information. The entire questionnaire should take approximately 30-45 minutes to complete.

For each question, please fill in marks like this: ●   <u>**NOT**</u> **like this:** ⊗ ↻ ⊘

1   Gender: ○ Male   ○ Female

2   Age:

○ 13	○ 16	○ 19
○ 14	○ 17	○ Other
○ 15	○ 18	please specify: _____

3   Cultural/ethnic background:

○ French	○ Italian	○ Hindi	○ Korean	○ First Nations
○ English	○ Hebrew	○ Chinese	○ Polish	○ Other
○ Spanish	○ Greek	○ Japanese	○ Dutch	please specify:
○ Portuguese	○ Arabic	○ Vietnamese	○ Russian	_____

4   In the past 12 months, how much time have you spent on the Internet <u>per day</u>?

○ Less than 30 minutes	○ 2.1 to 4 hours
○ 30 to 59 minutes	○ Over 4 hours
○ 1 to 2 hours	

NOTE: **Gambling** refers to betting <u>money</u> on activities (e.g., lottery, cards, sports wagers, bingo, slot machines, casino-type games, sporting events, games of skill, etc.) with a chance of <u>winning money</u>. This can include gambling on the Internet.

The following questions refer to gambling NOT on the Internet.

5   Have you ever gambled for money?
    ○ Yes
    ○ No

6   How old were you the first time you gambled <u>for money</u>? (NOT including games you play on the Internet.)

○ 10	○ 13	○ 16	○ 19
○ 11	○ 14	○ 17	○ Other
○ 12	○ 15	○ 18	please specify:
			_____

The next few questions ask about gambling habits. Certain questions may not apply to you, but all participants must answer the same questions. The following is a list of gambling activities on which you may have spent money.

7 Listed below are several types of gambling, wagering, or betting activities. How often have you done each of the listed activities <u>during the past 12 months for _money_?</u> Enter one response for _each_ type of activity.

THIS DOES NOT INCLUDE GAMES YOU PLAY ON THE INTERNET.

	Never	Less than once a month	1-3 times a month	Once a week or more	Daily
Played poker for money (e.g., Texas Hold'Em)	O	O	O	O	O
Bought lottery draw tickets (e.g. Lotto 6/49)	O	O	O	O	O
Bought lottery scratch cards/pull tabs	O	O	O	O	O
Bet on sports for money (e.g., sports cards, football pools, fantasy leagues, etc.)	O	O	O	O	O
Bet on games of personal skill (e.g., pool, golf, bowling, video games)	O	O	O	O	O
Gambled in a casino	O	O	O	O	O
Played dice games or craps	O	O	O	O	O
Played bingo	O	O	O	O	O
Played electronic gaming machines, slot machines, or other gambling machines (e.g. VLT, video poker)	O	O	O	O	O
Played the stock or commodities market	O	O	O	O	O
Bet on horses, dogs, or other animals	O	O	O	O	O
Played keno	O	O	O	O	O
Other	O	O	O	O	O

please specify: _____

The following questions deal with Internet gambling without money. Certain questions may not apply to you, but all participants must be asked the same questions.

Some people play gambling games on the Internet for fun (WITHOUT money) using practice sites, free games, free trials, etc. (e, Partypoker.net). Other people gamble on the Internet WITH actual money.

8 **Have you ever played gambling games on the Internet for fun WITHOUT money?**
○ Yes
○ No

9 **How old were you the first time you played gambling games on the Internet for fun (WITHOUT money)?**

○ 10	○ 13	○ 16	○ 19
○ 11	○ 14	○ 17	○ Other
○ 12	○ 15	○ 18	please specify:

_____

10 Listed below are several types of gambling-type games offered on the Internet for free or for practice (WITHOUT money). How often have you done each of the listed activities <u>during the past 12 months</u> *on the Internet for fun (WITHOUT money*? Enter one response for *each* type of activity.

	Never	Less than once a month	1-3 times a month	Once a week or more	Daily
Roulette	○	○	○	○	○
Blackjack	○	○	○	○	○
Baccarat	○	○	○	○	○
Dice/craps	○	○	○	○	○
Keno	○	○	○	○	○
Bingo	○	○	○	○	○
Placed "bets" on sports for free (including fantasy leagues)	○	○	○	○	○
Played electronic gaming machines (e.g. VLT, video poker)	○	○	○	○	○
Played slot machines	○	○	○	○	○
Bet on horses, dogs, or other animals	○	○	○	○	○
Played poker (including Texas Hold'Em)	○	○	○	○	○
Other	○	○	○	○	○

please specify: _____

11   **In the past 12 months, on average, approximately how much time have you spent playing gambling games for fun (WITHOUT money)
per session?   NOTE: A session is defined as anytime you log onto the Internet.**

    ○ Less than 30 minutes

    ○ 30 to 59 minutes
    ○ 1 to 2 hours
    ○ 2.1 to 4 hours
    ○ Over 4 hours

12   **In the past 12 months, how many free gambling sessions do you typically play in one week?**

    ○ 1

    ○ 2

    ○ 3
    ○ 4   ○ 7 or more
    ○ 5
    ○ 6

13   **When you play gambling games on the Internet for fun (WITHOUT money), who do you usually gamble with?   (You may choose more than one answer)**

    ○ Alone

    ○ Friends

    ○ Parents

    ○ Siblings/relatives

    ○ Boyfriend/girlfriend/spouse

    ○ Strangers (people I don't interact with outside of gambling)

    ○ Co-workers

    ○ Other
       please specify: _____

> The following questions deal with Internet gambling with money. Certain questions may not apply to you, but all participants must be asked the same questions.

14 **Have you ever gambled for money on the Internet?**
   ○ Yes
   ○ No

15 **Listed below are several types of gambling activities offered on the Internet for money. How often have you done each of the listed activities <u>during the past 12 months <i>on the Internet for money</i></u>? Enter one response for <u><i>each</i></u> activity.**

	Never	Less than once a month	1-3 times a month	Once a week or more	Daily
Roulette	○	○	○	○	○
Blackjack	○	○	○	○	○
Lottery	○	○	○	○	○
Baccarat	○	○	○	○	○
Dice/craps	○	○	○	○	○
Keno	○	○	○	○	○
Placed "bets" on sports for free (including fantasy leagues)	○	○	○	○	○
Bingo	○	○	○	○	○
Played electronic gaming machines (e.g. VLT, video poker)	○	○	○	○	○
Played slot machines	○	○	○	○	○
Bingo	○	○	○	○	○
Poker	○	○	○	○	○
Other	○	○	○	○	○

please specify: _____

16 **How old were you the first time you played gambling games on the Internet WITH money?**

○ 10	○ 13	○ 16	○ 19
○ 11	○ 14	○ 17	○ Other
○ 12	○ 15	○ 18	please specify:

_____

17 **<u>In the past 12 months</u>, how much time have you spent gambling WITH MONEY <u>per session</u>? NOTE: A session is defined as each time you log onto the Internet.**

○ less than 30 minutes	○ 1-2 hours	○ Over 4.1 hours
○ 30-59 minutes	○ 2.1-4 hours	

18 **When you gamble on the Internet WITH MONEY, who do you usually gamble with?**
(You may choose more than one answer.)

- ○ Alone
- ○ Friends
- ○ Parents
- ○ Siblings/relatives
- ○ Co-workers

- ○ Strangers (people I don't interact with outside of gambling)
- ○ Boyfriend/girlfriend/spouse
- ○ Other (please specify):

_____

19 In the past 12 months, what is the average amount of money you have spent gambling on the Internet **per session**? NOTE: A session is defined as each time you log onto the Internet.

_____

20 **In the past 12 months, what is the <u>most</u> money you have wagered in <u>one</u> Internet session?**

- ○ $1 – $5
- ○ $6 – $10
- ○ $11 – $25

- ○ $26 – $50
- ○ $51 – $100
- ○ $101 – $500

- ○ $501 – $1000
- ○ Over $1000

21 **In the past 12 months, what is the <u>most</u> money you have WON in <u>one</u> Internet session?**

- ○ None
- ○ $1 – $5
- ○ $6 – $10

- ○ $11 – $25
- ○ $26 – $50
- ○ $51 – $100

- ○ $101 – $500
- ○ $501 – $1000
- ○ Over $1000

22 **In the past 12 months, what is the <u>most</u> money you have LOST in <u>one</u> Internet session?**

- ○ None
- ○ $1 – $5
- ○ $6 – $10
- ○ $11 – $25
- ○ $26 – 50

- ○ $51 – $100
- ○ $101 – $500
- ○ $501 – $1000
- ○ Over $1000

23 **When you have gambled for money on the Internet, what method(s) of payment do you use ?**
(You may choose more than one answer.)

- ○ Personal credit card
- ○ Credit card belonging to family member (with permission)
- ○ Credit card belonging to family member (without permission)
- ○ Debit card
- ○ Wire (e.g., Western Union)

- ○ PayPal
- ○ EWallet
- ○ Electronic funds transfer (EFT) to third party companies such as NETELLER or FirePay
- ○ Other (please specify):

_____

24   When gambling on the Internet, how often do you return to win back money you lost?

       O Never   O Most of the time (more than half the time I lose money)

       O Some of the time (less than half the time I lose money)

                                     O All the time

25   In the past 12 months, _while gambling on the Internet_, how often have you:

	Never	Less than half the time I play	More than half the time I play	Every session
Consumed alcohol	O	O	O	O
Smoked tobacco (cigarettes, cigars)	O	O	O	O
Used marijuana or hashish	O	O	O	O
Used other illicit drugs (e.g. cocaine, speed, GHB, ecstasy)	O	O	O	O

26   Answer these questions ONLY if you are <u>UNDER</u> 18 YEARS OF AGE.
If you are 18 years of age or over, skip ahead to question 27.

1. **In the past year, how often have you found yourself thinking about gambling or planning to gamble?**

    ○ Never   ○ Sometimes
    ○ Once or Twice   ○ Often

2. **During the course of the past year, have you needed to gamble with more and more money to get the amount of excitement you want?**

    ○ Yes   ○ No

3. **In the past year, have you ever spent <u>much</u> more than you planned to on gambling?**

    ○ Never   ○ Sometimes
    ○ Once or Twice   ○ Often

4. **In the past year, have you felt bad or fed up when trying to cut down or stop gambling?**

    ○ Never   ○ Often
    ○ Once or Twice   ○ Never tried to cut down
    ○ Sometimes

5. **In the past year, how often have you gambled to help you escape from problems or when you are feeling bad?**

    ○ Never   ○ Sometimes
    ○ Once or Twice   ○ Often

6. **In the past year, after losing money gambling, have you returned another day to try and win back money you lost?**

    ○ Never   ○ More than half the time
    ○ Less than half the   ○ Every time
    time

7. **In the past year, has your gambling ever led to:**

a) Lies to your family?	○ Never	○ Once or Twice	○ Sometimes	○ Often
b) Arguments with family/friends or others?	○ Never	○ Once or Twice	○ Sometimes	○ Often
c) Missing school?	○ Never	○ Once or Twice	○ Sometimes	○ Often

8. **In the past year, have you ever taken money from the following <u>without permission</u> to spend on gambling:**

a) School dinner money or fare money?	○ Never	○ Once or Twice	○ Sometimes	○ Often
b) Money from your family?	○ Never	○ Once or Twice	○ Sometimes	○ Often
c) Money from outside the family?	○ Never	○ Once or Twice	○ Sometimes	○ Often

27 Answer these questions ONLY if you are 18 years of age or over.

NOTE: **gambling** refers to betting <u>money</u> on activities (e.g., lottery, cards, sports wagers, bingo, slot machines, casino-type games, sporting events, games of skill, etc.) with a chance of <u>winning money</u>. This can include gambling on the Internet.

During the past year:

		YES	NO
1.	Have you been preoccupied with gambling (e.g. thinking about gambling, planning to gamble, or thinking about ways to get money to gamble with)?	O	O
2.	Have you needed to gamble with more and more money in order to get the amount of excitement you want?	O	O
3.	Have you tried repeatedly to control, cut back or stop gambling, without being able to?	O	O
4.	Have you felt restless or irritable when attempting to cut down or stop gambling?	O	O
5.	Have you gambled to escape from problems or when you were feeling bad?	O	O
6.	After losing money gambling, have you often returned another day to get even (try to win back money you lost)?	O	O
7.	Has your gambling let to lies to family members, your therapist, or other people in order to conceal your involvement with gambling?	O	O
8.	Has your gambling led you to commit illegal acts such as forgery, fraud, theft, or embezzlement to finance it?	O	O
9.	Has your gambling ever led you to jeopardize or lose a significant relationship, job, or career or educational opportunity?	O	O
10.	Have you had to rely on others to provide money to relieve a desperate financial situation caused by gambling?	O	O

The following questions deal with your expectancies with respect to gambling. Even if you do not gamble, answer the questions as you would imagine you would feel if you did gamble.

WHEN I GAMBLE,
HOW LIKELY IS IT THAT…

	No chance	Very Unlikely	Unlikely	Neither Likely nor Unlikely	Likely	Very Likely	Certain to Happen
1. I have fun	○	○	○	○	○	○	○
2. I become more relaxed	○	○	○	○	○	○	○
3. I stop being bored..............................	○	○	○	○	○	○	○
4. I only want to spend time with people who gamble..	○	○	○	○	○	○	○
5. I feel excited..	○	○	○	○	○	○	○
6. I spend time with people I like	○	○	○	○	○	○	○
7. I make a profit.....................................	○	○	○	○	○	○	○
8. I feel a rush...	○	○	○	○	○	○	○
9. I feel guilty...	○	○	○	○	○	○	○
10. I feel in over my head…………….	○	○	○	○	○	○	○
11. I feel like gambling all of the time	○	○	○	○	○	○	○
12. I want to gamble more and more.......	○	○	○	○	○	○	○
13. I get hooked......................................	○	○	○	○	○	○	○
14. I feel ashamed of myself	○	○	○	○	○	○	○

WHEN I GAMBLE, HOW LIKELY IS IT THAT…	No chance	Very Unlikely	Unlikely	Neither Likely nor Unlikely	Likely	Very Likely	Certain to Happen
15. I enjoy myself..................................	○	○	○	○	○	○	○
16. I win money	○	○	○	○	○	○	○
17. My friends and classmates think I'm cool...	○	○	○	○	○	○	○
18. I feel powerful..................................	○	○	○	○	○	○	○
19. I feel in control................................	○	○	○	○	○	○	○
20. I get rich	○	○	○	○	○	○	○
21. I'm not able to stop	○	○	○	○	○	○	○
22. I'm more accepted by people	○	○	○	○	○	○	○
23. I have a good time.............................	○	○	○	○	○	○	○

VIDEO GAMES (NOT ONLINE)

The following questions refer to your gaming preferences and behaviours. The first part looks at video games that are not played online, the second part looks at online video games, in particular massively multiplayer role-playing games (MMORPGs).

1 Have you ever played video games (NOT including games played online)?
- ○ Yes
- ○ No

2 Listed below are several popular video games and series. How often have you played each of the listed games? Enter one response for _each_ game.

	Never	Less than once a month	1-3 times a month	Once a week or more	Daily
Grand Theft Auto	○	○	○	○	○
Call of Duty	○	○	○	○	○
Halo (NOT online)	○	○	○	○	○
Mario & Luigi	○	○	○	○	○
NHL/NBA/FIFA	○	○	○	○	○
Left 4 Dead	○	○	○	○	○
Star Wars	○	○	○	○	○
Wii Fit/Wii Sports	○	○	○	○	○
Batman: Arkham Asylum	○	○	○	○	○
BioShock	○	○	○	○	○
The Sims	○	○	○	○	○
Army of Two	○	○	○	○	○
Final Fantasy (NOT FFXI)	○	○	○	○	○
Lord of the Rings (NOT online)	○	○	○	○	○
Rock Band/Guitar Hero/DDR	○	○	○	○	○
Dragon Age: Origins	○	○	○	○	○
Prince of Persia	○	○	○	○	○
Other	○	○	○	○	○

please specify: _____

3   How old were you the first time you played video games?

○ 10	○ 13	○ 16	○ 19
○ 11	○ 14	○ 17	○ Other
○ 12	○ 15	○ 18	please specify:

_____

4 Some people play video games with different types of machines. Listed below are several types of video game players. How often have you played a video game using each machine? Enter one response for <u>each</u> type of machine.

	Never	Less than once a month	1-3 times a month	Once a week or more	Daily
Home computer (PC Games)	○	○	○	○	○
Xbox 360	○	○	○	○	○
Wii	○	○	○	○	○
PlayStation 2	○	○	○	○	○
PlayStation 3	○	○	○	○	○
PSP	○	○	○	○	○
DS	○	○	○	○	○
Cell phone	○	○	○	○	○
Other	○	○	○	○	○

please specify: _____

5 In the past 12 months, on average, how much time have you spent playing video games <u>per session</u> (NOT online)?

- ○ Less than 30 minutes
- ○ 30 to 59 minutes
- ○ 1 to 2 hours
- ○ 2.1 to 4 hours
- ○ Over 4 hours

6 In the past 12 months, how many sessions do you typically play per week?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7 or more

7 When you play video games (NOT online), who do you usually play with? (You may choose more than one answer.)

- ○ Alone
- ○ Friends
- ○ Parents
- ○ Siblings/relatives
- ○ Co-workers
- ○ Classmates
- ○ Other
- ○ Boyfriend/girlfriend/spouse

please specify: _____

8   How skilled do you perceive yourself to be at playing video games (NOT online)?

Not at all skilled	A little bit skilled	Neither skilled nor unskilled	Fairly skilled	Extremely skilled
O	O	O	O	O

MMORPGs (ONLINE ROLE-PLAYING GAMES)
Some people choose to play video games on the Internet. In particular, some people choose to play online role-playing games. The following questions refer to playing massively multiplayer online role-playing games (MMORPGs).

9   Have you ever played MMORPGs (online role-playing games)?
   O Yes
   O No

10 Listed below are several types of MMORPGs (online games). How often have you played each of the listed games? Enter one response for _each_ game.

	Never	Less than once a month	1-3 times a month	Once a week or more	Daily
World of Warcraft	O	O	O	O	O
Star Trek Online	O	O	O	O	O
Everquest	O	O	O	O	O
Final Fantasy XI	O	O	O	O	O
Asheron's Call	O	O	O	O	O
Star Wars	O	O	O	O	O
Lord of the Rings Online	O	O	O	O	O
Ultima Online	O	O	O	O	O
Halo online	O	O	O	O	O
EVE Online	O	O	O	O	O
Runescape	O	O	O	O	O
Other	O	O	O	O	O

please specify: _____

11   How old were you the first time you played online role-playing games?

O 10	O 13	O 16	O 19
O 11	O 14	O 17	O Other
O 12	O 15	O 18	please specify:

_____

12   In the past 12 months, on average how much time have you spent playing MMORPGs <u>per session</u>?   NOTE: A session is defined as anytime you sit down to play.

    ○ Less than 30 minutes

    ○ 30 to 59 minutes
    ○ 1 to 2 hours
    ○ 2.1 to 4 hours
    ○ Over 4 hours

13   In the past 12 months, how many sessions do you typically play per week?

○ 1	○ 3		
○ 2	○ 4	○ 7	○ 10
	○ 5	○ 8	○ 11
	○ 6	○ 9	○ 12 or more

14   When you play MMORPGs, who do you usually play with?   (You may choose more than one answer.)

    ○ Friends
    ○ Parents
    ○ Siblings/relatives
    ○ Co-workers

○ Boyfriend/girlfriend/spouse
○ Classmates
○ Strangers (people I don't interact with outside online gaming)
○ Boyfriend/girlfriend
○ Other (please specify): _____

15   Do you belong to a guild (i.e., a group of players that play online games together)?
    Yes ○
    No   ○

16   How skilled do you perceive yourself to be at playing MMORPGs?

Not at all skilled	A little bit skilled	Neither skilled nor unskilled	Fairly skilled	Extremely skilled
○	○	○	○	○

17   How many friends do you have?

○ 1	○ 3		
○ 2	○ 4	○ 7	○ 10
	○ 5	○ 8	○ 11
	○ 6	○ 9	○ 12 or more

18   How many online friends do you have?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10
- ○ 11
- ○ 12 or more

The following questions refer to your videogame playing, either on or offline.

How often during *the last 6 months…*

1 Did you think about playing a game all day long?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

2 Did you spend much free time on games?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

3 Have you felt addicted to a game?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

4 Did you play longer than intended?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

5 Did you spend increasing amounts of time on games?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

6 Were you unable to stop once you started playing?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

7 Did you play games to forget about real life?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

8 Have you played games to release stress?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

9 Have you played games to feel better?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

10 Were you unable to reduce your game time?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

11 Have others unsuccessfully tried to reduce your game use?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

12 Have you failed when trying to reduce game time?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

13 Have you felt bad when you were unable to play?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

14 Have you become angry when unable to play?
○ Never ○ Rarely ○ Sometimes ○ Often ○ Very Often

15 Have you become stressed when unable to play?
○ Never   ○ Rarely   ○ Sometimes   ○ Often   ○ Very Often

16 Did you have fights with others (e.g., family, friends) over your time spent on games?
○ Never   ○ Rarely   ○ Sometimes   ○ Often   ○ Very Often

17 Have you neglected others (e.g., family, friends) because you were playing games?
○ Never   ○ Rarely   ○ Sometimes   ○ Often   ○ Very Often

18 Have you lied about time spent on games?
○ Never   ○ Rarely   ○ Sometimes   ○ Often   ○ Very Often

19 Has your time on games caused sleep deprivation?
○ Never   ○ Rarely   ○ Sometimes   ○ Often   ○ Very Often

20 Have you neglected other important activities (e.g., school, work, sports) to play games?
○ Never   ○ Rarely   ○ Sometimes   ○ Often   ○ Very Often

21 Did you feel bad after playing for a long time?

○ Never   ○ Rarely   ○ Sometimes   ○ Often   ○ Very Often

PERSONALITY
The following questions refer to aspects of your personality and not specifically to gambling or gaming. Please answer each question by putting a circle around 'YES' or 'NO' following the questions. There are no right or wrong answers.

	YES	NO
1. Does your mood often go up and down?	○	○
2. Do you take much notice of what people think?	○	○
3. Are you a talkative person?	○	○
4. If you say you will do something, do you always keep your promise no matter how inconvenient it might be?	○	○
5. Do you ever feel 'just miserable' for no reason?	○	○
6. Would being in debt worry you?	○	○
7. Are you rather lively?	○	○
8. Were you ever greedy by helping yourself to more than your share of anything?	○	○
9. Are you an irritable person?	○	○
10. Would you take drugs which may have strange or dangerous effects?	○	○
11. Do you enjoy meeting new people?	○	○
12. Have you ever blamed someone for doing something you knew was really your fault?	○	○
13. Are your feelings easily hurt?	○	○
14. Do you prefer to go your own way rather than act by the rules?	○	○
15. Can you usually let yourself go and enjoy yourself at a lively party?	○	○
16. Are *all* your habits good and desirable ones?	○	○
17. Do you often feel 'fed-up'?	○	○
18. Do good manners and cleanliness matter much to you?	○	○
19. Do you usually take the initiative in making new friends?	○	○

	YES	**NO**

20. Have you ever taken anything (even a pin or a button) that belonged to someone else? .... ○ ○

21. Would you call yourself a nervous person? .... ○ ○

22. Do you think marriage is old-fashioned and should be done away with? ○ ○

23. Can you easily get some life into a rather dull party? .... ○ ○

24. Have you ever broken or lost something belonging to someone else? ..... ○ ○

25. Are you a worrier? .... ○ ○

26. Do you enjoy co-operating with others? .... ○ ○

27. Do you tend to keep in the background on social occasions? .... ○ ○

28. Does it worry you if you know there are mistakes in your work? .... ○ ○

29. Have you ever said anything bad or nasty about anyone? .... ○ ○

30. Would you call yourself tense or 'highly-strung'? .... ○ ○

31. Do you think people spend too much time safeguarding their future with savings and insurances? .... ○ ○

32. Do you like mixing with people? .... ○ ○

33. As a child were you ever cheeky to your parents? .... ○ ○

34. Do you worry too long after an embarrassing experience? .... ○ ○

35. Do you try not to be rude to people? .... ○ ○

36. Do you like plenty of bustle and excitement around you? .... ○ ○

37. Have you ever cheated at a game? .... ○ ○

38. Do you suffer from 'nerves'? .... ○ ○

39. Would you like other people to be afraid of you? .... ○ ○

40. Have you ever taken advantage of someone? .... ○ ○

41. Are you mostly quiet when you are with other people? .... ○   ○

42. Do you often feel lonely? ○   ○

43. Is it better to follow society's rules than go your own way? .... ○   ○

44. Do other people think of you as being very lively? .... ○   ○

45. Do you always practice what you preach? .... ○   ○

46. Are you often troubled about feelings of guilt? .... ○   ○

47. Do you sometimes put off until tomorrow what you ought to do today? . ○   ○

48. Can you get a party going? .... ○   ○

The following questions deal with how you feel about risk taking.

Instructions: Please answer each question by selecting 'YES' or 'NO' to the following the questions. There are no right or wrong answers.

	YES	NO
1. Would you enjoy water skiing?	○	○
2. Usually do you prefer to stick to brands you know are reliable, to trying new ones on the chance of finding something better?	○	○
3. Would you feel sorry for a lonely stranger?	○	○
4. Do you quite enjoy taking risks?	○	○
5. Do you often get emotionally involved with your friends' problems?	○	○
6. Would you enjoy parachute jumping?	○	○
7. Do you often buy things on impulse?	○	○
8. Do unhappy people who are sorry for themselves irritate you?	○	○
9. Do you generally do and say things without stopping to think?	○	○
10. Are you inclined to get nervous when others around you seem to be nervous?	○	○
11. Do you often get into a jam because you do things without thinking?	○	○
12. Do you think hitch-hiking is too dangerous a way to travel?	○	○
13. Do you find it silly for people to cry out of happiness?	○	○
14. Do you like diving off the highboard?	○	○
15. Do people you are with have a strong influence on your moods?	○	○
16. Are you an impulsive person?	○	○
17. Do you welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional?	○	○
18. Does it affect you very much when one of your friends seems upset?	○	○
19. Do you usually think carefully before doing anything?	○	○

20. Would you like to learn to fly an aeroplane? ....○　　○

21. Do you ever get deeply involved with the feelings of a character in a film, play or novel? ....○　　○

22. Do you often do things on the spur of the moment? ....○　　○

23. Do you get very upset when you see someone cry? ....○　　○

24. Do you sometimes find someone else's laughter catching? ....○　　○

25. Do you mostly speak without thinking things out? ....○　　○

26. Do you often get involved in things you later wish you could get out of? ....○　　○

27. Do you get so 'carried away' by new and exciting ideas, that you never think of possible snags? ....○　　○

28. Do you find it hard to understand people who risk their necks climbing mountains? ○　　○

29. Can you make decisions without worrying about other peoples' feelings? ....○　　○

30. Do you sometimes like doing things that are a bit frightening? ....○　　○

31. Do you need to use a lot of self-control to keep out of trouble? ....○　　○

32. Do you become more irritated than sympathetic when you see someone cry? ....○　　○

33. Would you agree that almost everything enjoyable is illegal or immoral? ....○　　○

34. Generally do you prefer to enter cold sea water gradually, to diving or jumping straight in? ....○　　○

35. Are you often surprised at people's reactions to what you do or say? ....○　　○

36. Would you enjoy the sensation of skiing very fast down a high mountain slope? ...○　　○

37. Do you like watching people open presents? ....○　　○

38. Do you think an evening out is more successful if it is unplanned or arranged at the last moment? ....○　　○

39. Would you like to go scuba diving? ....○　　○

40. Would you find it very hard to break bad news to someone?....................○   ○

41. Would you enjoy fast driving?...○   ○

42. Do you usually work quickly, without bothering to check? ....○   ○

43. Do you often change your interests?...○   ○

44. Before making up your mind, do you consider all the advantages

and disadvantages?...○   ○

45. Can you get very interested in your friends' problems? ....○   ○

46. Would you like to go pot-holing? ....○   ○

47. Would be put off a job involving quite a bit of danger?............................○   ○

48. Do you prefer to 'sleep on it' before making decisions? ....○   ○

49. When people shout at you, do you shout back?..○   ○

50. Do you feel sorry for very shy people?..○   ○

51. Are you happy when you are with a cheerful group and sad when

others are glum?..○   ○

52. Do you usually make up your mind quickly? ....○   ○

53. Can you imagine what it must be like to be very lonely? ....○   ○

54. Does it worry you when others are worrying and panicky? ....○   ○

FEELINGS

This questionnaire has sentences about how you feel. Decide if you feel this way almost never, hardly ever, sometimes, or most of the time. There are no right or wrong answers. Select the answer that tells how you usually feel.

	Almost never	**Hardly ever**	**Sometimes**	**Most of the time**
1. I feel happy……………………..........	○	○	○	○
2. I worry about school……………….……	○	○	○	○
3. I feel lonely…………………...............	○	○	○	○
4. I feel my parents don't like me…………..	○	○	○	○
5. I feel important…………………………...	○	○	○	○
6. I feel like hiding from people……….........	○	○	○	○
7. I feel sad…………………...................	○	○	○	○
8. I feel like crying…………………...............	○	○	○	○
9. I feel that no one cares about me………….	○	○	○	○
10. I feel like having fun with other students.	○	○	○	○
11. I feel sick…………………................	○	○	○	○
12. I feel loved…………………………..	○	○	○	○
13. I feel like running away………………...	○	○	○	○
14. I feel like hurting myself………..............	○	○	○	○
15. I feel that other students don't like me….	○	○	○	○
16. I feel upset…………………………....	○	○	○	○
17. I feel life is unfair………………………...	○	○	○	○
18. I feel tired……………………………	○	○	○	○
19. I feel I am bad………………….............	○	○	○	○
20. I feel I am no good……….……………..	○	○	○	○
21. I feel sorry for myself ………………….	○	○	○	○
22. I feel mad about things……………………	○	○	○	○
23. I feel like talking to other students……...	○	○	○	○
24. I have trouble sleeping……….……..........	○	○	○	○
25. I feel like having fun……………………....	○	○	○	○
26. I feel worried…………………………....	○	○	○	○
27. I get stomachaches……………………….	○	○	○	○
28. I feel bored…………………………....	○	○	○	○

	Almost never	Hardly ever	Sometimes	Most of the time
29. I like eating meals…………………………				
30. I feel nothing I do helps anymore………	○	○	○	○

Thank you for taking the time to fill this out!

FOR OFFICE USE ONLY:

⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨   ⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨   ⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨   ⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨