The Changing Landscape of Gambling Among College Student-Athletes: Current Knowledge and Future Directions

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Abstract

Given the rise in the availability, accessibility, and appeal of gambling activities, gambling as a high-risk behaviour has become a major concern among college students. Student-athletes, in particular, represent a vulnerable subgroup of the college student population with regards to engagement in gambling activities, as prevalence studies have consistently indicated that student-athletes who participate in club or intercollegiate sports are significantly more likely to experience gambling-related problems than their non-athletic counterparts. This thesis is comprised of two manuscripts that aimed to extend current research regarding gambling behaviours and attitudes among National Collegiate Athletic Association (NCAA) student-athletes by conducting a cross comparison of survey data collected from three large samples of NCAA student-athletes in 2004, 2008, and 2012 regarding gambling behaviours and attitudes in order to gain insight into how the landscape of gambling and attitudes among college student-athletes has changed within the last eight-years in relation to the ongoing expansion of gambling opportunities. The first manuscript paid particular attention to gender and sport affiliation differences; while the second manuscript focused on divisional differences. It was expected that student-athletes would progressively show more pro-gambling attitudes towards over the eight-year span, which would result in an increase in gambling participation rates between 2004 and 2012. Results indicated that gambling, as a recreational activity, was perceived as being more acceptable in 2012 than in previous years. However, despite this surge in pro-gambling attitudes, gambling participation rates were generally lowest for all gambling activities in 2012. Therefore, the results suggest that in spite of the growth of the gambling industry, gambling activity among student-athletes is on a downward trend. Outcomes of the current research not only inform

NCAA policies surrounding gambling, but also aid in the development of educational, prevention, and intervention initiatives at the college level.

Resume

A cause de augmentation de la disponibilité, l'accessibilité, et l'appel des jeux d'argent, le jeux d'argent a devenu une haute risque parmi les adolescents. Particulièrement, les jeunes athlètes représentent une des groupes plus vulnérables parmi la population des étudiants au collège en ce qui concerne les jeux d'argent. Les études prévalence indique que les jeunes athlètes qui participent dans une club de sport sont plus vulnérable de problèmes qui concerne les jeux d'argents plus que leurs amis qui non pas athlétiques. Pour améliorer la recherche, cette études a fait une comparaison de données des enquête recueillies obtenue de trois grands échantillon de L'Association de Collège Athlétique National (NCAA) pendant 2004, 2008, et 2012 en ce qui concerne les comportement et attitudes des jeux d'argents pour obtenir des détails et information sur comment les attitudes des athlètes, qui sont aussi des étudiants, ont changé depuis huit années à cause des opportunités qui existent en jeux d'argent. Les attentions particulière ont données a genre et aussi les différences divisionnaire, parce-que c'était recognisees que les jeunes athlètes ne représente pas une groupe homogène. Ce n'est pas une surprise que les jeunes étudiants vont montrer plus des attitudes bizarre des jeux-d'argent progressivement vers les huit années et cela peut améliorer le participation compris entre 2004-2012 que les 4 années avant ça. Les résultats indique que les jeux-d'argent comme une activité loisirs, a aperçu plus acceptable en 2012. Donc, les résultats suggère que à cause de la croissance dans l'industrie de jeux-d'argent, les activités parmi les jeunes athlètes est une descente. Les résultats obtenus donnent le politique qui concerne NCAA et leurs policy, mais aussi, il aide le développement des études, préventions, et intervention au niveau de collège.

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Contribution of Authors

Rayna M. Sansanwal was primarily responsible for analyzing the data collected from the three National Collegiate Athletic Association (NCAA) survey studies. She was also responsible for the writing of the manuscripts.

Dr. Jeffrey L. Derevensky was responsible for designing the NCAA studies, as well as data collection. Dr. Derevensky, along with Dr. Durand Jacobs, was also responsible for the design of the 2004 NCAA survey. As the supervisor of Rayna Sansanwal, Dr. Derevensky contributed by revising the manuscripts and providing feedback.

Dr. Thomas S. Paskus was responsible for designing the NCAA studies, as well as data collection. Dr. Paskus was also responsible for data cleaning once the data had been collected and for ensuring integrity of the 2008 and 2012 data collection.

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Introduction

Problem gambling is a growing public health concern. The liberalisation of gambling activities, technological advancements and changing cultural norms have led to greater acceptance, accessibility, and availability of multiple gambling opportunities. As a result, gambling has become commonplace and in many places has become viewed as a socially acceptable form of entertainment. There is increasing evidence that gambling, in general, is a widespread activity, particularly among young adults. Research indicates that over 80% of college and university students have engaged in some form of gambling (Lostutter, Lewis, Cronce, Neighbors, & Larimer, 2012). (Since universities are by definition comprised of colleges, all institutions of higher learning henceforth will be referred to as "colleges"). In a meta-analytical study that compared the prevalence rates of disordered gambling among various age groups, it was found that college students experience the highest incidence of problem gambling (7.89%), followed by adolescents (4.25%) and adults (1.71%) (Blinn-Pike, Worthy & Jonkman, 2007). More recent research conducted by the National Center for Responsible Gaming (2014) estimates that 6% of college students in the United States gamble at the problematic and pathological level. Similarly, a prevalence study conducted by the Responsible Gambling Council (2014) reported that 6.9% of young adults in Ontario, aged 18-24, have a moderate to severe gambling problem. As such, for a proportion of young adults, gambling progresses from a fun, social pastime to an activity that becomes excessive and uncontrollable (Derevensky, 2012; Gupta, Derevensky, & Margret, 2004). The resulting impact of problem gambling on college students remains substantial, as there are a multitude of associated personal, social-emotional, familial, mental health, financial and legal repercussions (see Derevensky, 2012).

Gambling Among College Students

Young adulthood marks a profound stage of psychological development in relation to high-risk behaviours, interpersonal relationships, educational attainments, and employment. This transitional phase of development, particularly for college students, is often characterized by heightened risk-taking, identity development, and self-exploration, without the parental and social controls (e.g., age of legal status) previously imposed during adolescence (Arnett, 2004). During this developmental phase, young adults essentially need to learn how to "become autonomous and responsible individuals capable of functioning within a defined set of community standards and expectations" (Ladouceur, 2004, p.8). As such, young adulthood is often marked by a period of experimentation and exploration. Consequently, gambling, along with other potentially risky behaviours, is frequently engaged in. Given the potential for escalation from social/recreational gambling to disordered gambling, it remains important to examine the frequency, severity, and impact of problem gambling among college students.

Gambling Motivation Among College Students

Jacob's *General Theory of Addictions* (1986) suggests that "problem gambling arises from the combination of chronic hypotensive arousal, experienced as boredom and emptiness, and a negative self-concept and chronic low self-esteem" (p. 362). Similarly, McCormick (1987) differentiated two sub-types of problem gamblers; the chronically under-stimulated problem gambler and the recurrently depressed problem gambler. As evident, gambling can be motivated by various desires, such as to increase levels of arousal, escape boredom, a strategy to cope with depression or improve a negative self-concept. Neighbors, Lostutter, Cronce, and Larimer (2002) conducted a mixed methods study across Northwestern universities in the United States to examine gambling motives among college students in order to understand why problem

gambling is so predominant among this population. In terms of the frequency of motives endorsed by college student gamblers, the results revealed that winning money (42.7%), enjoyment/fun (23.0%), and social reasons (e.g., meeting new people, spending time with friends, and not being left out) (11.2%) were among the top three reasons endorsed for participation in gambling activities. This suggests that gambling may, for some individuals, be a part of the socialization process of the college experience. Further, these results also lend support for the 'bio-psycho-social' approach to college-student gambling, which posits that college students are motivated to engage in gambling behaviours as a means to satisfy biological and arousal related desires (e.g., excitement, enjoyment, fun); cognitive desires (e.g., win money); and social desires (e.g., socialization and conformity) (Griffiths & Delfabbro, 2001).

Gender Differences in Gambling Among College Students

Research suggests that male college students, like their adult counterpart, are more likely than females to experience gambling-related problems. In a study conducted across four universities in Ontario, Canada, it was found that 9% of males experienced moderate to severe gambling problems, in comparison to 2.05% of females (Adams, Sullivan, Horton, Menna, & Guilmette, 2007). This gender difference among college students has remained consistent across the literature (Derevensky, 2012; Lightsey & Hulsey, 2002; Williams, Connolly, Wood, & Nowatzki, 2006; Winters, Bengston, Door, & Stinchfield, 1998). The most common types of gambling activities engaged in by college students, overall, are lottery and instant win tickets (44%), electronic gambling machines (video lottery terminals) (29%), and casino table games (26%) (Williams et al., 2006). However, the types of gambling activities in which college students engage also appear to differ according to availability, as well as gender. Male college students have been found to engage more in lottery tickets, Pro-Line (e.g., sports wagering),

casino table games, casino blackjack, card games, dice games and sport pools. Female college students have been similarly reported to purchase lottery game tickets, but also tend to engage in bingo, casino slots and raffles more often than males (Adams et al., 2007).

Gambling Among College Student-Athletes

Student athletes represent a unique subgroup among the college-student population. There is a general consensus among the literature that student-athletes have a greater tendency to engage in more high-risk behaviours than their non-athletic peers, including alcohol use, substance use, and sexual promiscuity (O'Brien, McCoy, Rhodes, Wagoner, & Wolfson, 2008). Student athletes have also been identified as a high-risk group among the college-student population in regards to gambling, as several studies have reported the extent to which problem gambling is evident among college student-athletes. Using the South Oaks Gambling Screen (SOGS), Bourne (1998) reported that the rate of pathological gambling among student athletes was significantly higher among athletes than their non-athletic peers (7.8% versus 4.9%). Similarly, Sullivan (2005) found that 15% of student athletes reported a SOGS score greater than or equal to three, indicating problem or pathological gambling.

There have been many reasons put forth to explain why there appears to be a higher prevalence rate of gambling behaviour among college student-athletes than their non-athletic peers (Engwall, Hunter, & Steinberg, 2004). Considerable research has demonstrated that college student-athletes are more likely to report involvement in other risky behaviours, including tobacco use, physical aggression, unsafe motor vehicle operation, and risky sexual activities (LaBrie, Shaffer, LaPlante, & Wechsler, 2003; Nelson & Wechsler, 2001). In particular, among U.S. college student-athletes, Huang, Jacobs, and Derevensky (2011) reported a clear relationship between elevated gambling behaviours and increased prevalence of weekly alcohol

use. As such, gambling appears to be a potential correlate of other high-risk activities. College student-athletes have also been reported to have more permissive attitudes towards thrill-seeking activities that entail high-risk behaviours (Cross, Basten, Hendrick, Kristofic, & Schaffer, 1998). In particular, male athletes who participated in football and basketball reported more permissive attitudes towards risk-taking behaviours in general. Given that many highly visible gambling activities revolve around sports (e.g., sports betting on the Super Bowl, March Madness, World Series, NBA Finals, College Bowl games, and Fantasy Leagues) and considering that many media messages promoting gambling in general appear on sports networks and broadcasts, college student-athletes may be more susceptible to partaking or engaging in gambling-related behaviours (Nelson & Weschler, 2003; Patel & Luckstead, 2000). Additionally, gambling among college student-athletes may be viewed as a team bonding experience and athletic team participation may be perceived as a way to foster social ties, increase team comradery and even induce competition with sports teams from rival institutions (Berkman & Glass, 2000). Apart from the aforementioned risks associated with gambling (e.g., academic, psychosocial, financial, and legal), gambling among student athletes poses additional risks, including devaluing the integrity of intercollegiate sports by influencing game scores (e.g., point shaving, etc.), affecting athletic performance, and impacting team dynamics, which contributes to the importance of examining gambling-related behaviour among this population of students.

Gambling Trends Among College Student-Athletes

The psychological literature has consistently suggested that college students who participate in sports programs are significantly more likely to engage in gambling behaviours and experience associated gambling problems (Cullen & Latessa, 1996; Engwall et al., 2004; LaBrie et al., 2003). Research has also generally supported the conclusion that gambling behaviour

among college student-athletes is steadily increasing and this student population is at a particular risk for gambling and gambling-related problems in spite of potential eligibility consequences. However, there is considerable debate about how to measure gambling behaviours (Derevensky & Gupta, 2006); therefore, given that research studies tend to vary in the measures used to gather information pertaining to problem gambling and the definition of a 'student-athlete', it can be unreliable to examine trends in gambling behaviour among college student-athletes across studies.

To account for discrepancies and concerns related to the well-bring of college student-athletes, as well as the integrity of the game, the National Collegiate Athletic Association (NCAA) conducted a comprehensive research program assessing various aspects of student life and performance, one of which relates to their concerns related to gambling behaviours across all three NCAA divisions in the years 2004, 2008, and 2012. This allowed the NCAA to gain insight into student-athletes' engagement in gambling activities and analyze trends across the eight-year span. Shead, Derevenky, and Paskus (2014) conducted a cross-comparison study of the 2004 (N = 18,916) and 2008 (N = 17,675) NCAA survey data to examine gambling trends among college student-athletes across the four-year span. The results suggested that yearly participation in gambling behaviours in general decreased between 2004 and 2008 (62.8% versus 54.8%, respectively), with the exception of Internet gambling and sports wagering. Gender comparisons revealed that males engaged in gambling behaviours significantly more than females in both 2004 and 2008. Additionally, the proportion of student-athletes categorized as at-risk/probable pathological gamblers (PPGs) was consistent in 2004 (2.6%) and 2008 (2.5%). Overall, the results suggest that between 2004 and 2008 gambling behaviour among NCAA college student-athletes appeared to be on a downward trend, which contradicts previous literature suggesting a

rise in gambling behaviour. A comparison of the 2004, 2008, and 2012 data can shed light on current trends.

Contributing Factors to Changing Trends in Gambling

Despite previous trends, there are reasons to suggest that gambling trends among college student-athletes have changed throughout the years, particularly in relation to the continuing expansion of the gambling industry into the global market, which has led to greater availability, accessibility and acceptability of gambling. As proposed by Bronfenbrenner (1979), a social-ecological model posits that there is an interplay between individuals and their social and physical environment, which further influences behaviour. In the context of gambling, physical and environmental features, such as the number of gambling-related activities and/or outlets in a specified area, the location of these gambling venues, societal changes toward gambling, and the frequency of gambling-related advertisements, influence the availability and in turn, accessibility of gambling opportunities (St-Pierre, Walker, Derevensky, & Gupta, 2014). Additionally, changes among institutional factors, such as policies, diagnostic criteria, and cultural norms, can also alter the acceptability of gambling.

Changes in Classification of Gambling

The terms and classification used to define problem gambling have been divergent and have clinical and research implications. In the former *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), *Pathological Gambling* was categorized under *Impulse Control Disorders Not Elsewhere Specified* (American Psychiatric Association, 2000). This distinguished feature of impulsivity was suggestive of neurological or neuro-chemical dysfunction. Thus, research surrounding problem gambling typically focused on genetic predispositions, including childhood impulsivity and hyperactivity (Goldstein, Manowitz, Nora, Swartzburg, & Carlton,

1985). However, in the DSM-5, *Gambling Disorder* is now classified under *Substance-Related and Addictive Disorders,* which is still characterized by persistent and recurrent maladaptive gambling behaviour (American Psychiatric Association, 2013), but is currently regarded as the only behavioural addiction (American Psychiatric Association, 2013). With the reclassification of problem gambling as a behavioural addiction, it is imperative to take the environmental context into greater account when assessing changes in the gambling industry and in turn, prevalence of gambling-related behaviour among the student-athlete population.

Availability & Accessibility of Gambling Venues & Opportunities

Research has often suggested that increasing prevalence of disordered gambling among college students can be linked to the increased availability of gambling opportunities. Abbott and Volberg (2000) have suggested that the presence of casinos provides additional opportunities for gambling, which can increase the prevalence of gambling-related problems for individuals who live in close proximity to a casino, in comparison to those who live a considerable distance, for whom casinos are less accessible. Therefore, ecological and geographic factors are contributory to gambling behaviour among college students, especially considering that gambling opportunities have proliferated with the expansion of lotteries, casinos and online gambling, both on campus and in the surrounding community.

Adams, Sullivan, Horton, Menna, and Guilmette (2007) investigated whether a relationship exists between college proximity to a casino and problem gambling behaviour among college students across four colleges in Ontario, Canada. Their results suggest that 80% of students categorized as pathological gamblers were enrolled at colleges in close proximity to a major casino. Additionally, students who attended a college located close to a casino were significantly more likely than students who attended a college far away from a casino venue to

engage in casino-related gambling activities, including slot machines (55.3% versus 29.1%) and table games (14.2% versus 7.2%). The availability of gambling venues appears to influence students' decision to engage in gambling activities; at least casino gambling. However, college proximity to a casino did not influence students' engagement in non-casino related gambling behaviours, including card games; dice games; sports pools; online gambling activities; and the purchase of lottery tickets. As such, geographical and structural factors can enhance access to gambling venues (e.g., casinos) and increase gambling behaviour related to such activities (Adams et al., 2007; Griffiths, 2003). This can potentially be explained by the 'Exposure Theory', which stipulates that increases in exposure to gambling venues can desensitize students to the negative effects associated with gambling and in turn, lead to an increase in the rates of problem gambling (Shaffer, LaBrie &, LaPlante, 2004). While further research has not explored this link in relation to college students in particular, additional international research supports the positive trend between casino proximity and gambling participation of young adults (Abbott & Volberg, 2000; Room, Turner, & Ialomiteanu, 1999; Sévigny, Ladouceur, Jacques, & Cantinotti, 2008). As such, although college proximity to a casino in itself does not completely explain the rate of problem gambling among college students, it does appear to contribute to higher levels of engagement in certain forms of gambling and may contribute a partial role to why problem gambling is largely apparent among college students, including college student-athletes. Of additional importance is that many college students, particularly those in their first and second year, are still under the legal gambling age. In the U.S. for example, the legal age for entering most casinos and partaking in gambling activities is 21 years (the lottery being the exception); therefore, casino proximity to colleges may be attracting underage students, which poses additional concerns.

The American Gaming Association (AGA) conducts yearly detailed analyses of the national and state-by-state economic impact of the commercial casino industry. According to the AGA Survey of Casino Entertainment (2009), there were 445 land-based and riverboat casinos operating in 12 U.S. states, 423 Native American tribal casinos operating among 29 U.S. states, and 44 racetrack casinos operating in 12 U.S. states in 2008. As of the end of 2012, the availability of casinos in the U.S. substantially increased; there were 464 land-based and riverboat casinos operating in 17 states, 466 Native American tribal casinos operating in 28 states, and 49 racetrack casinos operating in 14 states (AGA, 2013). As evident, the gambling industry continues to thrive in most jurisdictions. There has been an expansion of commercial gaming into new states, as many states have approved commercial casinos in attempt to generate tax revenues, create stable employment opportunities and stimulate economic growth (Calcagno, Walker, & Jackson, 2010). The increase in the availability of gambling-based venues, such as casinos, allows for greater opportunities for gambling, specifically among college students (see St. Pierre et al., 2014, for a comprehensive review).

The AGA reported that commercial casinos earned US$32.54 billion in gross gaming revenue in 2008 and this increased to US$37.34 billion in 2012. Similarly, consumer spending on commercial casino gaming increased from US$35.62 billion to US$37.34 billion between 2008 and 2012. The increasing growth rates for gross gambling revenue and consumer spending suggests that the commercial casino industry is continually expanding and gambling behaviour appears to have increased among the general population. This could potentially result in an increase in gambling-related behaviour among the college student population, including college student-athletes.

Proximity of college students to their parents may also contribute to changing trends in gambling among college students. In recent years, more young adults have chosen to attend a college institution outside of their home town or state (Holdsworth, 2009). This may be particularly true for student athletes where the decision of which college to attend is frequently dependent on where they are offered an athletic scholarship. As such, during the college years, parental oversight of children are most often reduced, as these young adults are separated from the influence of their parents (Wintre & Yaffe, 2000). The increased proximity and experience of living away from home, which is the case for the majority of American college students, is commonly associated with greater independence, autonomy and freedom than experienced during adolescence (Wilcox, Winn, & Fyvie-Gauld, 2005). This gives parents limited opportunity to observe the various activities that their child may be engaging in on a daily basis; therefore, engagement in gambling-related activities may go unnoticed.

College students have also obtained greater financial freedom and could also contribute to changes in gambling trends among the young adult population, particularly college student-athletes. A number of college students work part-time while enrolled in full-time education of programs (Howieson, McKechnie, Hobbs, & Semple, 2012). Additionally, many more college students are obtaining student loans or receiving academic/athletic scholarships in order to finance their education; however, these students often borrow or receive in excess to what is needed to fund the cost of their education, which allows for the prospect of allocating extra money in other ways (Avery & Turner, 2012). Therefore, greater financial freedom could equate to student-athletes having more money to engage in gambling-related activities.

Emergence of "Non-Traditional" Forms of Gambling

The expansion of commercial casinos across the U.S. is not the only initiative that has contributed to the expansion of the gambling industry between 2008 and 2012. Non-traditional forms of gambling have also recently emerged, thereby, creating greater opportunities to engage in gambling behaviour. There are a wide range of government-sponsored and government-regulated forms of gambling that are readily available and easily accessible to the public, including lottery tickets (e.g., Lotto 6/49, Lotto Max, Powerball, etc.), instant scratch cards (e.g., Monopoly, Bingo, Crossword, etc.), sports betting (e.g., Superbowl, Fantasy Leagues), and electronic gambling machines (EGMs) (e.g., slot machines, video lottery terminals [VLTs], etc.). In Canada, alone, there are currently 30,090 lottery ticket outlets and 96,000 EGMs, while there are more than 12,000 EGMs in the U.S. available to the public (AGA, 2013; Smith, 2013).

The proliferation of the Internet and recent technological advancements, such as personal, portable devices (e.g., tablets and smartphones) have also led to online and mobile/smart phone gambling being an easily accessible form of gambling. Davis (2001) suggests that individuals who engage in gambling, either recreationally or excessively, are likely to effectively realize that gambling is available online, which has the potential to lead to problematic behaviours. Despite legislative prohibitions preventing online gambling in certain jurisdictions, reports suggest that global revenue for online gambling approached US$30 billion in 2010 (Stewart & Gray, 2011) and that total wagers from mobile gaming exceeded US$19.5 billion worldwide in 2011 (Holden, 2012). There are currently over 3,500 free and pay-to-play gambling applications available for smartphones and a number of social media websites, such as Facebook, offer a variety of simulated casino games (e.g., *Zynga Poker*, *Double Down Casino*, *Vegas Slots,* and *Texas HoldEm*) (Derevensky, Gainsbury, Gupta, & Ellery, 2013). The advent of online and mobile

gambling not only normalizes wagering as a form of entertainment, but it presents many of the same risks and consequences associated with traditional forms of gambling-related problems, such as (a) perseverance – an inability to quit if winning or losing, (b) intolerance – an inability to accept failure and an urgency to resume gambling in order to regain lost money immediately, and (c) preoccupation of thoughts surrounding gambling activities (Kaltiala-Heino, Lintonen, & Rimpelä, 2004; Vitaro, Arseneault, & Tremblay, 1999). In fact, Woods and Williams (2007) found that among an international sample of Internet (N = 1,954) and land-based (N = 5,967) gamblers, the prevalence of problem gambling was three to four times higher among the sample of online gamblers. Additionally, Internet gamblers are significantly more likely than solely land-based gamblers to engage in a greater number of gambling activities. As Torres and Goggin (2014) suggest, "mobile gambling on smartphones and tablets extend earlier cultural practices associated with gambling activities much deeper into the realm of the everyday" (p. 94). The availability and accessibility of gambling products via the mobile gaming market presents increased opportunities for vulnerable populations, such as college student-athletes, to engage in gambling behaviours, particularly due to the convenience, lack of supervision, perceived knowledge, and anonymity associated with online gambling.

Acceptability of Gambling

Gambling, as a recreational activity, has proceeded through cycles of being regarded with pervasive acceptance and widespread prohibition (Derevensky, Gupta, Messerlian, & Gillespie, 2004). Currently, only a limited number of countries and U.S. states legally prohibit gambling activities; rather, in most jurisdictions, gambling is viewed as a socially acceptable form of entertainment. Changing cultural norms has also led to greater accessibility and availability of multiple gambling opportunities.

Social Learning Theory emphasizes the importance of observing and modeling the behaviors, attitudes, and emotional reactions of others (Bandura, 1977). Therefore, pro-gambling attitudes among society has the potential to influence the attitudes and behaviour of the public, including college student-athletes. In a study examining parental attitudes and involvement in adolescent gambling across Canada, only 39% of parents reported perceiving youth gambling as being a serious issue and amongst 13 potentially risky adolescent behaviors (e.g., alcohol use, drug use, violence/bullying, unsafe sexual activities, etc.) gambling was perceived by parents to be the least problematic (Campbell, Derevensky, Meerkamper, & Cutajar, 2011). Additionally, 59% of parents reportedly complied with their underage child's request to purchase them a lottery ticket (Ladouceur, Vitaro, & Cote, 2001). Similarly, in a study examining the awareness, concerns, and attitudes of Canadian teachers (Derevensky, St-Pierre, Temcheff & Gupta, 2013) and mental health professionals (Temcheff, Derevensky, St-Pierre, Gupta, & Martin, 2014) regarding adolescent problem gambling and other high risk behaviours, only 20% and 18%, respectively, viewed gambling as being a serious issue concerning youth. This appears to be the consensus among young adults, as well. Calado, Alexandre, and Griffiths (2014) interviewed 17 full-time university students, aged 19-26, about their perceptions of gambling. Their results indicated that these young adults perceived gambling as being an amusing activity and a tool for increasing personal and social skills (e.g., "*critical thinking in games of strategy*" or "*good communication*"). As such, young adults, themselves, appear to perceive gambling as an opportunity for social interaction and self-improvement. Evidently, the overall acceptability of gambling among the general public remains high, which encourages participation in gambling-related activities.

Gambling is a legalized and socially acceptable form of entertainment across a multitude of countries. Moreover, gambling behaviours are widely promoted and highly visible, largely, in part, due to mass media. In recent years, a variety of gambling-related shows such as World Series of Poker (ESPN) and Las Vegas (NBC), as well as movies (e.g., *Runner Runner* and *Casino Royale*), have appeared across various cable and network genres, including entertainment, sports and travel (Benston, 2004). Additionally, participation in gambling activities are commonly endorsed by celebrities; gambling establishments have been sponsored by sports teams; and a range of advertisements promoting casinos and gambling sites have appeared on the television, Internet, radio and billboards (Monaghan, Derevensky, & Sklar, 2008). These cultural values and beliefs endorsed by the media are apt to depict gambling in a positive light (Derevensky, Sklar, Gupta, & Messerlian, 2010; Monaghan et al., 2008). Young adults, therefore, are frequently exposed to messages from a broad range of media that glamorize gambling and transmit the belief that gambling is a pleasurable, exciting and harmless activity to engage in. In turn, this has the potential to influence young adults' attitudes and behaviours regarding gambling. Lee, Lemanski, and Jun (2008) found among students enrolled in U.S. Southeastern universities, a positive relationship between media exposure and attitudes to gambling exists, wherein, the more students are exposed to gambling media (i.e., television shows and advertisements), the more positive their attitudes towards gambling behaviours. Additionally, favourable attitudes towards gambling media led to positive gambling intentions (Lee et al., 2008). Therefore, as evident, the media can serve as an impetus for the developmental progression of initial participation in gambling activities to impaired control and persistence characterized by problem gambling among college and university students, including student-athletes (Grant & Kim, 2001).

Summary

Given the continual changing landscape of the gambling industry in these various facets, it is imperative to look at the way in which gambling-related behaviour and attitudes has evolved over time. Similar to the way that "college athletics is shaped by social, moral, and economic aspects of modern culture", gambling within college athletics is impacted by these same factors (Hill, Burch-Ragan, & Yates, 2001, p.65). The pro-gambling stance that has emerged throughout the years has raised significant concerns among college institutions and the world of professional athletics (Shead et al., 2014), particularly in regards to the integrity of intercollegiate sports and the well-being of college student-athletes. Such an examination of the changing trends of gambling among college student-athletes will allow researchers to become aware of the various trends surrounding gambling among student athletes, particularly in relation to prevalence and attitudes; become knowledgeable about techniques that have been effective thus far in reducing gambling behaviour among student athletes; and where greater efforts to reduce gambling behaviour among student athletes needs to be allocated.

Manuscript I

Trends in Gambling Behaviour among NCAA College Student-Athletes: A Comparison of 2004, 2008 and 2012 NCAA Survey Data

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Abstract

Student-athletes represent a vulnerable subgroup of the college student population with regards to engagement in high-risk behaviours, including gambling. Three large samples of National Collegiate Athletic Association (NCAA) student-athletes in 2004 (N=20,587), 2008 (19,942), and 2012 (N=22,935) were surveyed about their gambling behaviour and attitudes. A cross-sectional study was conducted in order to gain insight into how the landscape of gambling and attitudes among college student-athletes has changed within the last eight-years in relation to the ongoing expansion of gambling opportunities. Findings revealed gender differences in participation rates of gambling with males consistently engaging in all gambling activities at higher rates than females (57% of males versus 39% females in 2012). Despite gender differences, the results suggested that participation rates for all gambling activities has decreased over the eight-year span (57% of student-athletes in 2012 compared to 70.7% of student-athletes in 2004), except for past year purchasing of lottery tickets, which increased in 2012 among males. Across sports, gambling participation was notably highest among golfers of both genders. The proportion of student-athletes at-risk or meeting criteria for a gambling problem between 2004 and 2012 has also decreased among males (4% in 2004 versus 1.9% in 2012) while remaining relatively consistent among females (<1% across all years). Taken together, the results suggest that gambling behaviour among NCAA student-athletes is on a downward trend in spite of the increase in available gambling opportunities.

Introduction

Research has indicated that college students who participate in either club or intercollegiate sports programs are significantly more likely to experience gambling-related problems than their non-athletic peers (Engwall, Hunter, & Steinberg, 2004). As such, gambling among college student athletes, has garnered increased public attention among researchers, policy makers, college administrators, and the National Collegiate Athletic Association (NCAA) in the United States. In attempt to preserve the integrity of intercollegiate athletics and the welfare of collegiate athletes, the NCAA membership adopted bylaw 10.3 that prohibits both athletics department staff and student athletes from engaging in gambling activities that relate to intercollegiate or professional sporting events (NCAA, 2004). Despite this bylaw, gambling among college student-athletes remains a multifaceted problem.

Gambling Among National Collegiate Athletic Association College Student-Athletes

The NCAA is responsible for the regulation of student-athletes across member colleges in the U.S., while also governing and enforcing rules that are designed to protect the well-being of student-athletes and maintain integrity and fair play among sports and member institutions (NCAA, 2015). The NCAA has a longstanding history of opposing all forms of legal and illegal gambling on NCAA sports and prohibits student-athletes from engaging in gambling behaviours, specifically in relation to sports wagering, sports pools, and fantasy leagues (money) (NCAA, 2015). In the interests of protecting the integrity of intercollegiate sports and the well-being of student-athletes, the NCAA has conducted multiple comprehensive research programs on many aspects of student life and performance, one of which relates to their concerns related to gambling behaviours across all three NCAA divisions in the years 2004, 2008 and 2012, with another data collection scheduled for 2016. This has allowed the NCAA to gain insight into

student-athletes' engagement in gambling activities and in turn, "develop legislation, educational policies and best practices that enhance student-athletes' experiences in college" (NCAA, 2015). Regardless of the rules and regulations surrounding gambling, the NCAA studies on college student-athlete gambling has also allowed researchers to examine trends in gambling behaviour among student-athletes (albeit not longitudinally), including changing gambling preferences, problem disordered gambling, and other gambling-related insights, in relation to the ongoing opportunities to gamble in light of the expansion and changing environment of the gambling industry.

Shead, Derevenky, and Paskus (2014) reported on a cross-comparison study of the 2004 (N = 18,916) and 2008 (N = 17,675) NCAA survey data to examine gambling trends among college student-athletes across the four-year span. Their results suggested that yearly participation in gambling behaviours, including lottery tickets, slot machines, horse/dog race wagering, playing the stock market, bingo, and card games (e.g., poker), decreased from 2004 to 2008 with 62.8% of student-athletes reporting engagement in 2004 compared to 54.8% in 2008. Similarly, 21.9% of student-athletes reported weekly participation in gambling in 2004, whereas 12.6% reported gambling on a weekly basis in 2008. Across all sports (played by the athletes), gambling participation was also lower in 2008 compared to 2004 with the exception of student-athlete golfers. However, yearly participation in Internet gambling (6.8% in 2004 compared to 12.1% in 2008) and sports wagering (23.5% in 2004 to 29.3% in 2008) increased across the four-year span, suggesting that more student-athletes are trying out these forms of gambling. There were also some consistencies in the data. Gender comparisons revealed that males engaged in gambling behaviours significantly more than females in both 2004 and 2008. Additionally, the proportion of student-athletes categorized as at-risk/probable pathological gamblers (PPGs) was

consistent from 2004 (2.6%) to 2008 (2.5%). Overall, the results suggest that between 2004 and 2008 gambling behaviour among NCAA student-athletes was on a downward trend. This may have been a result in renewed efforts to enforce existing regulations and educational and prevention initiatives.

Contributing Factors to Changing Trends in Gambling

Despite previous trends, there are reasons to suggest that gambling trends among college student-athletes may have changed since 2008. Social-ecological factors, such as the proliferation of the number of gambling-related activities and/or outlets in a specified area, the location of these gambling venues, and the frequency of gambling-related advertisements, influence the availability and in turn, accessibility of gambling opportunities (St-Pierre, Walker, Derevensky, & Gupta, 2014). Additionally, cultural shifts (e.g., more permissive gambling attitudes) can impact how widely accepted gambling is, as a recreational activity. Finally, the expansion of online legal daily and weekly Fantasy sports wagering increased. Changes in these areas may have contributed to changes in gambling trends among NCAA college student-athletes between 2008 and 2012, which has yet to be examined.

Availability and Accessibility

Geographical, situational and structural factors can enhance access to gambling venues, such as casinos, and increase gambling behaviour related to such activities (Adams, Sullivan, Horton, Menna, & Guilmette, 2007; Griffiths, 2003). The American Gaming Association (AGA) conducts yearly detailed analyses of the national and state-by-state economic impact of the commercial casino industry. According to the AGA Survey of Casino Entertainment (2009), there were 445 land-based and riverboat casinos operating in 12 U.S. states, 423 Native American tribal casinos operating among 29 U.S. states, and 44 racetrack casinos operating in 12

U.S. states in 2008. As of the end of 2012, the availability of casinos in the U.S. substantially increased; there were 464 land-based and riverboat casinos operating in 17 states, 466 Native American tribal casinos operating in 28 states, and 49 racetrack casinos operating in 14 states (AGA, 2013). As evident, the gambling industry continued to thrive. There has been an expansion of commercial gaming into new states, as many states have approved commercial casinos in attempt to generate tax revenues, create stable employment opportunities and stimulate economic growth (Calcagno, Walker, & Jackson, 2010). The increase in the availability of gambling-based venues, such as casinos, allows for greater opportunities for gambling-related behaviour, specifically among college student-athletes (see St. Pierre et al., 2014, for a comprehensive review).

Additionally, the AGA reported that commercial casinos earned US$32.54 billion in gross gaming revenue in 2008 and this increased to US$37.34 billion in 2012. Similarly, consumer spending on commercial casino gaming increased from US$35.62 billion to US$37.34 billion between 2008 and 2012. The increasing growth rates for gross gambling revenue and consumer spending suggests that the commercial casino industry during this period was continually expanding and general gambling behaviour appears to have increased among the general population. This could potentially include an increase in gambling-related behaviour among the college student population, including college student-athletes.

Emergence of Non-Traditional Forms of Gambling

The expansion of commercial casinos across the U.S. is not the only factor that has contributed to the expansion of the gambling industry between 2008 and 2012. Non-traditional forms of gambling also emerged, thereby, creating greater opportunities to engage in gambling behaviour. There are a wide range of government-sponsored and government-regulated forms of

gambling that are readily available and easily accessible to the public, including lottery tickets (e.g., Lotto 6/49, Lotto Max, etc.), instant scratch cards (e.g., Monopoly, Bingo, Crossword, etc.), sports betting in certain jurisdictions (e.g., Superbowl, Fantasy Leagues), and electronic gambling machines (EGMs) (e.g., slot machines, video lottery terminals [VLTs], etc.). In Canada, alone, there are currently 30,090 lottery ticket outlets and 96,000 EGMs, while there are more than 12,000 EGMs in the U.S. available to the public (AGA, 2013; Smith, 2013).

The proliferation of the Internet and recent technological advancements, such as personal, portable devices (e.g., tablets) have also led to online and mobile/smart phone gambling being an easily accessible form of gambling. The availability and accessibility of gambling products via the mobile gaming market presents increased opportunities for vulnerable populations, such as college student-athletes, to engage in gambling behaviours, particularly due to the convenience, lack of supervision, and anonymity associated with online gambling.

Acceptability

Gambling, as a recreational activity, has proceeded through cycles of being regarded with pervasive acceptance and widespread prohibition (Derevensky, Gupta, Messerlian, & Gillespie, 2004). Currently, only a limited number of countries and U.S. states legally prohibit gambling activities; rather, in most jurisdictions, certain forms of gambling are viewed as a socially acceptable form of entertainment. Changing cultural norms has also led to greater accessibility and availability of multiple gambling opportunities.

In several studies examining attitudes towards adolescent gambling, parents (Campbell, Derevensky, Meerkamper, & Cutajar, 2011), teachers (Derevensky, St-Pierre, Temcheff, & Gupta, 2013), and mental health professionals (Temcheff, Derevensky, St-Pierre, Gupta, &

Martin, 2014) alike perceived gambling to be the least serious issue concerning youth amongst 13 potentially risky adolescent behaviours (e.g., alcohol use, drug use, violence/bullying, unsafe sexual activities, etc.). Likewise, many young adults appear to perceive gambling as a recreational activity that allows for social interaction and self-improvement (e.g., development of critical thinking and communication skills) (Calado, 2014). Evidently, the overall acceptability of gambling among the general public remains high, which encourages participation in gambling-related activities.

The changing attitudes of school institutions may also contribute to changes in gambling behaviour among student-athletes between the years of 2008 and 2012. The approach school institutions adopt, in relation to risky behaviours, has been shown to significantly influence and impact the attitudes and behaviours of students in terms of their engagement in multiple risky behaviours. For instance, Salmivalli (2001) reported that schools who choose to adopt bullying prevention/intervention campaigns are more likely to foster students who promote anti-bullying attitudes and behaviours. As such, given the significant amount of time adolescents and young adults spend at school on a daily basis, these institutions can be considered front line in terms of being equipped to influence student's attitudes and in turn, engagement, in multiple high-risk behaviours. Shaffer, Donato, LaBrie, Kidman, and LaPlante (2005) analyzed policy information related to gambling and alcohol use in handbooks, Websites, and supplemental material from 119 selected colleges in the U.S. Their results indicated that while all schools had a policy pertaining to alcohol use, only 26 schools (22%) had some form of a gambling-related policy. Unlike education about substance use, there is currently still no federal mandate requiring schools to educate students about the risks associated with excessive gambling, including academic difficulties, psychosocial problems, financial repercussions, legal issues, and the

potential for involvement in other high-risk behaviours (Shaffer et al., 2005). The absence of such a federal mandate outside of the NCAA bylaws combined with limited comprehensive school policies and materials addressing gambling as a high-risk behaviour "leaves an open-door for student-related gambling disorders to emerge unchecked" and can contribute to a general lack of awareness surrounding the dangers associated with gambling among college student-athletes (Shaffer et al., 2005, p. 4).

The mass media also plays a fundamental role in promoting pro-gambling attitudes on both a national and international level. In recent years, there has been a rise in the number of gambling-related shows (e.g., *World Series Poker* and *Las Vegas*) and movies (e.g., *Runner Runner* and *Casino Royale*) that have appeared across various cable and network genres, including entertainment, sports, and travel (Benston, 2004). Additionally, participation in gambling activities are commonly endorsed by celebrities; gambling establishments have been sponsored by sports teams; and a range of advertisements promoting casinos and gambling sites have appeared on the television, Internet, radio, and billboards (Monaghan, Derevensky, & Sklar, 2008). These cultural values and beliefs, endorsed by the media, are apt to depict gambling in a positive light (Derevensky, Sklar, Gupta, & Messerlian, 2010; Monaghan et al., 2008). Young adults, therefore, are frequently exposed to messages from a broad range of media that glamorize gambling and transmit the belief that gambling is a pleasurable, exciting, and harmless activity to engage in.

Given the changing landscape of gambling since the NCAA's 2008 study, a follow-up study was conducted in 2012 to examine changes in the patterns and prevalence of gambling behaviours among college student-athletes. The purpose of the current study is to compare results of the 2004, 2008, and 2012 NCAA national surveys. While this represents a cross-

sectional study, a comparison of the findings can provide insight into how the landscape of gambling and attitudes among college student-athletes has changed within the last eight-years. Particular attention was paid towards changes in overall gambling participation (monthly and yearly), sports wagering, problem gambling rates, and attitudes towards gambling-related behaviours. In addition, due to the ongoing expansion of the online/mobile gambling industry between 2008 and 2012, changes in Internet gambling activities were closely examined.

Method

Participants

Data was drawn from self-report surveys administered by the NCAA to U.S. college student-athletes in 2004, 2008, and 2012. The NCAA consists of 1281 colleges and universities in the U.S. Ethics approval was obtained from ethics review committees of respective institutions where the surveys were administered.

A total of 20,587 surveys were administered in 2004; 19,942 were administered in 2008; and 22,935 were administered in 2012. The socio-demographic characteristics of the sample from each year are presented in Table 1.

Table 1. Socio-demographic characteristics of the participants

Variable	2004 (%)	2008 (%)	2012 (%)
Gender			
Male	62	62	57
Female	38	38	43
Race/Ethnicity			
White	75	72	77
Black	15	17	15
Other	10	11	8

Academic Year			
Freshman	33	35	32
Sophomore	26	27	27
Junior	23	23	25
Senior	19	15	16

Survey Administration

A multi-stage cluster sampling design was incorporated in all three studies (2004, 2008, and 2012). Faculty Athletics Representatives (FARs) of all NCAA member colleges were approached to participate. Each school was informed that all members of between one and three teams would be surveyed. Teams were selected based on a stratified random sampling procedure to ensure that all sports in each of the three NCAA divisions would be represented in the total sample. All students and FARs were assured that participation would remain anonymous at the student and institution level. Student-athletes from each team were surveyed at the same time without coaches or other team personnel present. Completed surveys were not handled by FARs. Rather, one student-athlete assumed responsibility for collecting the completed surveys, placing them into a sealed package, and mailing the package to an independent third-party vendor that compiled and entered the data.

As survey responses were submitted anonymously, institutional response rate could not be calculated absolutely. The response rate was estimated to be greater than 60% based upon previous surveys conducted in this manner and the total number of completed surveys received.

Survey content

The 2004, 2008, and 2012 surveys differed somewhat in content. The 2004 survey collected information on multiple health-risk behaviors (e.g., substance use, sexual activity, and criminal activity) in addition to gambling behavior and demographic information. The 2008 and

2012 survey was significantly modified and streamlined with most items related to health-risk behaviors removed and with a greater focus on gambling behaviors. In all three surveys, student-athletes provided demographic information, details about the college sport they played, and experiences with gambling including extensive questions related to sports wagering and gambling-related problems. All gambling questions referred to participants' behavior during the previous 12 months. Participants were initially categorized as non-gamblers or gamblers based on their responses to the Gambling Activities Questionnaire (GAQ; Gupta & Derevensky, 1996) portion of the survey which queries frequency of participation for 14 gambling activities over the past 12 months ("daily", "at least once a week", "at least once a month", "less than once a month", and "not at all"). All individuals who reported not gambling in any form in the past year were categorized as non-gamblers. Those who reported having gambling at least once on any of the activities in the previous year (i.e., gamblers) were further divided into three categories based upon their responses to a questionnaire format of the DSM-IV-TR (American Psychiatric Association, 2000) criteria for pathological gambling. This instrument contains 10 items that query the presence of various symptoms and diagnostic criteria associated with pathological gambling including preoccupation with gambling, need to increase better to achieve the same level of excitement (tolerance), loss of control, withdrawal symptoms, escape, chasing of losses, lying to family, illegal activities to pay for gambling, disruptions to family or job, and borrowing money to pay for gambling debts. Standard cut-off scores for problem gambling categorization were used to form three DSM categories of problem gambling. Participants who reported 0-2 symptoms were categorized as Social Gamblers, those who endorsed 3-4 symptoms were categorized as At-risk Gamblers, and those who endorsed 5 or more symptoms were categorized as Probable Pathological Gamblers (PPGs). A similar system of categorization has been used in

other studies (e.g., Gupta, Derevensky, Shead, & Nower, 2009; Shead et al., 2012; Temcheff, Derevensky, & Paskus, 2011). This questionnaire format has been shown to have strong internal consistency (.92) and a good agreement rate (87%) with another measure of problem gambling severity (Stinchfield, Govoni, & Frisch, 2005).

Data Preparation

Rigorous data cleaning procedures were implemented to eliminate, as much as possible, invalid data resulting from dubious responses to the surveys. Included in these cleaning procedures were a series of validity checks and Item Response Theory techniques to identify questionable patterns of responding. Cases revealing strong evidence of insincere responses (e.g., statistically unlikely combination of responses, inconsistent responding, responses in some portions of the survey that contradict responses elsewhere) were excluded from analyses. These cleaning procedures were applied to the 2004, 2008, and 2012 survey data to enhance comparability. Because these cleaning procedures were applied retroactively to the 2004 survey data, the results reported in this paper are not identical to those previously reported for the same 2004 data (e.g., Ellenbogen, Jacobs, Derevensky, Gupta, & Paskus, 2008).

After data cleaning procedures were applied to exclude insincere respondents, a series of steps were applied to account for differences in sampling strategies and survey content between the 2004 and 2008 surveys. These procedures were aimed at making more accurate comparisons across samples. To account for differences in sampling strategies, a filter was applied to both samples such that respondents participating in one of 22 sports (11 men's sports; 11 women's sports) were adequately sampled in each of the three NCAA divisions in 2004, 2008, and 2012. Furthermore, these data were weighted to the NCAA's estimate of 2008 participation rates

within the 22 sports to account for differences in sampling proportions within each cohort and scale for the results from both years in relation to current national participation figures.

To account for differences in survey content, an additional set of filters was applied to all samples. Given the present study's main goal of examining changes in problem gambling behaviours and gambling severity rates over the eight-year span, the basis for filtering was implemented to ensure that problem gambling severity rates were comparable. Participants in all samples were categorized as either non-gamblers, social gamblers, at-risk gamblers, or probable pathological gamblers based on responses to the GAQ and DSM-IV-TR questionnaire. However, differences in formatting of the surveys necessitated survey-specific methods of filtering out certain participants with missing data. In the 2004 survey, the GAQ immediately preceded the DSM-IV-TR gambling questions. The DSM-IV-TR questions contain the instruction, "If you have not gambled, bet or wagered in any way during the past 12 months, please skip [this section]." Despite this instruction, some participants who reported gambling on the GAQ skipped the DSM-IV-TR ostensibly because they did not believe themselves to have "gambling problems" suggesting they should be categorized as "social gamblers." Accordingly, the following four guidelines were employed to filter out and categorize respondents: (1) those who missed the GAQ and DSM-IV-TR were categorized as "missing" and excluded from further analyses (1.5%); (2) those who indicated "no gambling" in the past year on the GAQ were categorized as "non-gamblers" whether or not they completed or skipped the DSM-IV-TR; (3) those who indicated any gambling participation on the GAQ in the past year but skipped the DSM-IV-TR were categorized as "social gamblers,"; and (4) all others who indicated gambling participation on the GAQ and who completed the DSM-IV-TR were categorized according to their scores on the DSM-IV-TR.

Whereas the 2004 survey placed the DSM-IV-TR gambling questions immediately following the GAQ, the 2008 and 2012 survey placed the questions several sections after the GAQ. This gap between the GAQ and DSM-IV-TR in the 2008 survey raises the possibility that some participants might be incorrectly categorized if the 2004 guidelines were applied. For example, a participant might have endorsed gambling in the past year on the GAQ but then stopped completing the survey before reaching the gambling questions. In such a case, the participant would be categorized as a "social gambler" according to 2004 survey guidelines; however, they would be more appropriately filtered out given the possibility that they are actually an at-risk or pathological gambler. Alternatively, a participant might have endorsed gambling on the GAQ but validly skipped the DSM-IV-TR questions, believing that problem gambling questions do not apply to them. Therefore, the section preceding the DSM-IV-TR was examined to determine if individuals who missed the DSM-IV-TR had done so purposely or had terminated the survey by that point. The following guidelines were employed to filter out and categorize participants in the 2008 sample: (1) those who missed the GAQ and DSM-IV-TR were categorized as "missing" and excluded from further analyses (0.4%); (2) those who missed the section preceding the DSM-IV-TR and did not complete the DSM-IV-TR were categorized as "missing" and excluded from further analysis (8.0%); (3) those identified as non-gamblers on the GAQ, did not skip the section preceding the DSM-IV-TR, but skipped the DSM-IV-TR were categorized as "non-gamblers,"; (4) those who indicated any gambling participation on the GAQ in the past year but skipped the DSM-IV-TR, were categorized as "social gamblers,"; and (5) all others who indicated any gambling participation on the GAQ and who completed the DSM-IV-TR gambling questions were categorized according to their scores on the DSM-IV-TR.

As a result of differences in survey sampling strategies, comparisons are not available across all surveys for each item. While there are 23 official NCAA sports, comparisons are limited to 22 sports (11 men's sports and 11 women's sports) that were adequately sampled in each NCAA division across all three administrations. After applying all data cleaning and filtering procedures, comparative data were available for 19,354 student-athletes from 2004, 19,371 student-athletes from 2008, and 22,935 student-athletes from 2012.

Results

Gambling Activities Among Student-Athletes

Male Student-Athletes

Overall, gambling behaviour among NCAA male student-athletes have decreased over the eight-year span. In 2012, 57% of the males reported engaging in some form of gambling for money within the past year, compared to 65.6% of males in 2008 and 70.7% of males in 2004. This generally lower participation rate among NCAA male student-athletes was observed across the majority of gambling activities. Differences between the 2004, 2008, and 2012 samples in terms of past year and monthly participation rates with respect to different types of gambling among males are presented in Table 2. The activity that showed the largest decrease in monthly participation among male student-athletes was playing cards for money (6.1% in 2012, 14.3% in 2008, and 20.6% in 2004). Past year participation rates of playing cards for money were also lowest in 2012. Despite the increase in Internet gambling opportunities over the years, the results showed an increase in yearly participation of casino gaming on the Internet for money among NCAA male student-athletes from 2004 (6.8%) to 2008 (12.1%), but a decrease in 2012 (7.5%). Monthly participation in Internet casino gaming for money was also lowest in 2012 (1.9%), compared to 2008 (4.7%) and 2004 (2.8%). Additionally, despite the NCAA adopting bylaws

that prohibit engagement in gambling activities that relate to intercollegiate or professional sporting events, 25.7% of male student-athletes reported betting on sports for money in the past year and 8.3% reported wagering on sports for money at least once a month. For male student-athletes who reported sports wagering, the NFL was the most common pro-sport wagering target (60.1%) and basketball tournaments was the most common college sport wagering target (53.1%). Yearly participation in sports wagering among male student-athletes has slightly increased from 2004 (23.5%), but has decreased since 2008 (29.5%). Monthly participation in sports wagering among male student-athletes, however, have remained relatively consistent across the twelve-year span (9.6% in 2004 and 2008, and 8.3% in 2012).

Table 2. Differences in Male Participation in Different Gambling Activities between 2004 and 2012

Gambling activity	**Past year gambling (%)**			**Weekly gambling (%)**		
	2004	2008	2012	2004	2008	2012
Lottery tickets	36.2	31.4	35.2	11.1	9.1	11.1
Card games	46.8	45.9	27.4	20.6	14.3	6.1
Bet on games of personal skill	39.7	33.1	25.4	16.3	13.0	9.9
Horse/dog races	9.8	8.5	6.5	2.0	1.4	1.5
Played the stock market	10.2	9.2	7.4	4.7	4.5	3.6
Bingo	6.5	6.9	5.3	0.9	1.1	1.2
Internet gambling	6.8	12.3	7.5	2.8	4.7	1.9
Shot dice	13.4	11.7	7.8	4.3	3.9	2.5
Slot machines	19.8	15.1	11.9	3.6	2.0	1.8
Sports wagering	23.5	29.5	25.7	9.6	9.6	8.3

In terms of male student-athletes and sports wagering, monthly sports wagering rates were generally lower in 2012 compared to 2008 and 2004 across all sports, with the exception of golfers (see Figure 1). In 2012, 20.2% of male golfers reported wagering on sports at least once a month, which increased from 19.6% in 2008 and 14.2% on 2004. Male swimmers and track/cross country runners have steadily shown the lowest sports wagering participation rates over the eight-year span, with 3.5% of male swimmers and 4.4% of male track/cross country runners in the 2012 survey reporting monthly engagement in sports wagering. Of importance is that male golfers have not only consistently reported the highest rates of sports wagering (20.2% versus 7.8% all other student-athletes reported monthly wagering in 2012), but male golfers are more likely to engage in virtually all types of gambling activities in comparison to other male student-athletes. For example, among male golfers, betting on games involving personal skill, which include on-course bets, was the most frequent wagering activity with 56% reporting participation in the past year in 2012, compared to 24% of all other male student-athletes. Likewise, almost double the amount of male golfers reported playing cards for money in the past year in comparison to other student-athletes (43% versus 26.7%, respectively), and 35.4% of male golfers reported gambling in a casino in the past year, compared to 17.9% of all other male student-athletes. Thus, gambling and sports wagering among student-athlete golfers remains a concern, as it appears to be moving in the opposite direction of all other athletes.

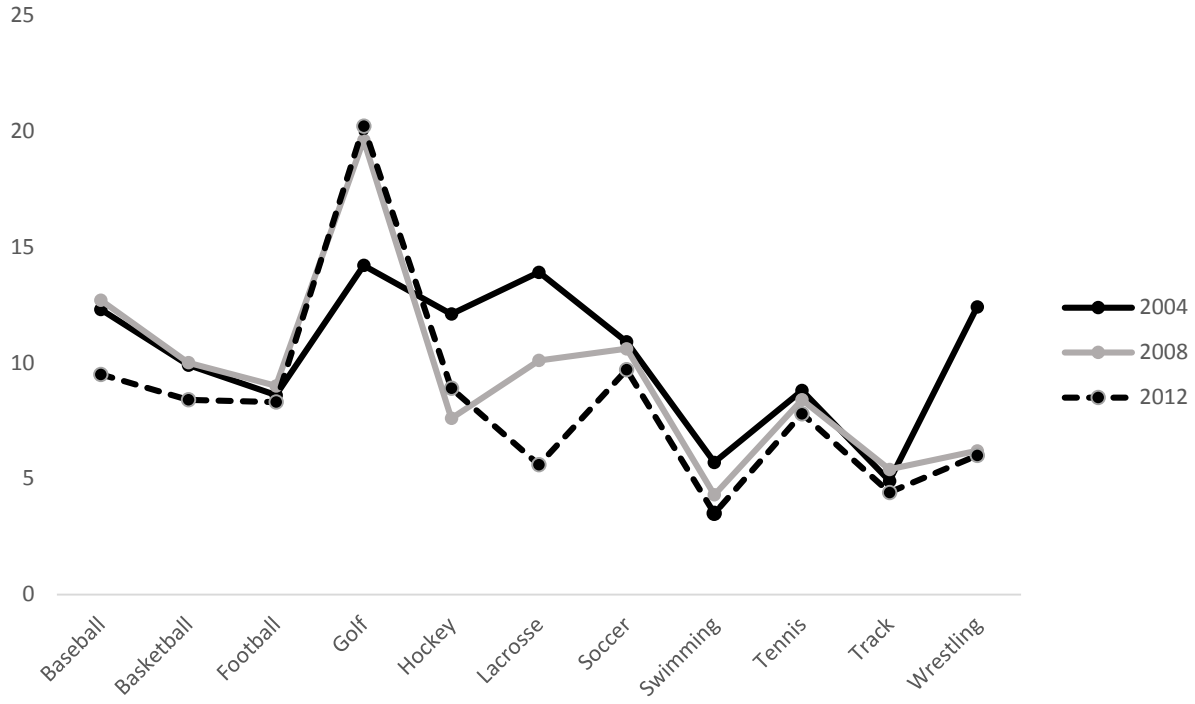

Figure 1. Monthly sports wagering rates among male student-athletes across different sports

Female Student-Athletes

Female student-athletes report engaging in gambling activities at much lower rates than male student-athletes. While overall gambling behaviour among NCAA female student-athletes appear to have decreased from 2004 to 2008, participation rates have remained stagnant from 2008 to 2012; 39% of females in both the 2012 and 2008 survey reported gambling for money within the past year, compared to 48.9% of females in 2004. Among female student-athletes, participation rates across all gambling activities was more consistent. Differences between the 2004, 2008, and 2012 samples of past year and monthly participation rates with respect to different types of gambling among females are presented in Table 3. Past year and monthly participation rates were highest in 2004 for the majority of activities. Playing cards for money and betting on games involving personal skill showed the largest decline in past year and

monthly participation among female student-athletes. There were no differences observed in terms of commercial bingo and casino gambling for money on the Internet among female student-athletes over the twelve-year span. The proportion of female student-athletes who have reported betting on sports for money in the past year and month has also remained consistent, with 5.2% of female student-athletes reporting wagering on sports in the past year in 2012; 6.6% in 2008; and 6.7% in 2004. Similar to males, the NFL (57.7%) and college basketball tournaments (37.5%) are the most common sports wagering targets for female student-athletes in the 2012 survey. The one activity that showed an increase in past year participation across the eight-year span were the purchasing of lottery tickets, which increased from 24% in 2008 to 30% in 2012. Apart from the purchasing of lottery tickets, the prevalence of weekly participation in all gambling activities was significantly low for female student-athletes (0.8% or less).

Table 3. Differences in Female Participation in Different Gambling Activities between 2004 and 2012

Gambling activity	Past year gambling (%)			Weekly gambling (%)		
	2004	2008	2012	2004	2008	2012
Lottery tickets	29.7	24.0	30.5	5.4	3.5	5.1
Card games	19.0	10.7	5.3	4.4	1.3	0.6
Bet on games of personal skill	14.1	7.2	4.0	3.2	1.2	0.7
Horse/dog races	4.8	3.2	2.8	0.4	0.1	0.2
Played the stock market	3.5	2.1	1.1	1.3	0.6	0.4
Bingo	7.3	6.8	6.2	0.8	0.8	0.8
Internet gambling	2.1	1.9	1.8	0.8	0.2	0.3
Shot dice	3.5	2.2	2.0	0.7	0.3	0.3
Slot machines	14.3	9.9	8.4	1.3	0.5	0.6
Sports wagering	6.7	6.6	5.2	1.5	0.8	0.6

Similar to male student-athletes, female golfers in 2012 reported the highest rates of past year and monthly gambling (see Figure 2). In 2012, sports wagering participation rates continued to be highest among Division I female golfers (2.1%), which increased since 2008 (1.7%) and 2004 (0.7%). The lowest past year and monthly gambling rates continue to be reported by Division I female gymnasts.

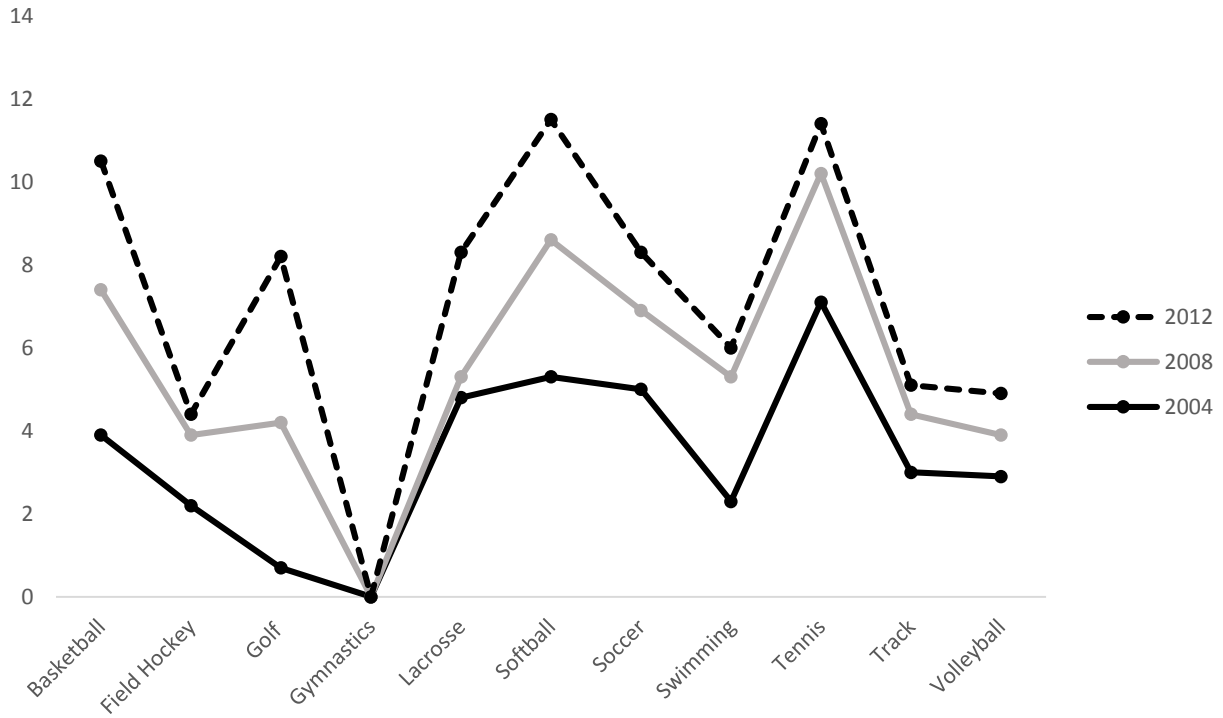

Figure 2. Monthly sports wagering rates of female student-athletes across different sports

Internet Gambling & Social Media

Technological advancements have changed the way student-athletes can engage in gambling. Among the 2012 cohort, 28.1% of male student-athletes engaged in some form of simulated gambling activity in the past year, including via videogame consoles (18.2%), smartphones (14.5%), social media websites (12%), and Internet gambling websites (10.3%). In comparison to male student-athletes, 10.2% of female student-athletes in the 2012 survey reported engaging in some form of simulated gambling activity in the past year. Participation rates among female student-athletes were considerably lower with 4.5% reporting gambling via videogame consoles, 5.4% via smartphones, 4.2% via social media websites, and 2.4% via Internet gambling websites. In the 2012 survey, 33.7% of male student-athletes, who reported engaging in sports wagering, reported that they place their bets via the Internet or mobile device (e.g., through phone/text messaging). This has increased from 26.3% of male student-athletes in

the 2008 survey. All other methods used for placing sports betting have remained fairly consistent between 2008 and 2012 among male student-athletes, including betting with friends (92.7% versus 91.5%), betting with an off-campus bookie (7.5% versus 8.6%), and betting at casinos/sport books (18.5% versus 20.9%). Data from the 2004 survey regarding placing of bets for sports wagering is unavailable, as this was question was not asked.

Fantasy sports also incorporates the proliferation of the Internet into gambling opportunities. In 2012 and 2008, approximately 50% of male-student athletes reported that they participated in a free fantasy league, which increased from 37.6% in 2004. In terms of participation in fantasy leagues involving entry fees and prize money, 18.7% of male student-athletes in the 2012 survey reported engagement, an increase from 17% in 2008 and 15.5% in 2004. Female student-athletes participate in fantasy sports to a lesser extent than male student-athletes. In 2012 and 2008, 8.4% of female student-athletes reported participation in a free fantasy league, which increased from 5.5% in 2004. Among the 2012 cohort, 1.8% of female student-athletes reportedly participated in fantasy leagues that entailed entry fees and prize money, which slightly decreased from 2.4% in 2008 and 2.7% in 2004.

Social media outlets have also been utilized to increase gambling opportunities. Over the eight-year span, there has been a significant increase in the number of student-athletes reporting being contacted by outside sources to share insider information. For example, in the 2004 study, 1.6% of Division I basketball male student-athletes reported having been contacted by outside gamblers, which increased to 3.5% in 2008, and again to 4.6% in 2012. However, the percentage of student-athletes who have provided insider information has remained unchanged over the eight-year span. Interestingly, in the 2012 survey, more female than male student-athletes across all divisions reported sharing information on social media websites regarding teammates,

training, and preparation for games. For example, 15.4% of Division I female student-athletes in the 2012 survey reported sharing this type of information on social media sites, such as Facebook and Twitter, in comparison to 8% of male student-athletes.

Problem-Gambling Behaviour

Overall, the percentage of student-athletes that meet the standard diagnostic criteria for problem gambling has decreased over the twelve-year span (see Table 4). Overall, 42.3% of male student-athletes were categorized as non-gamblers in 2012, whereas 33.7% in 2008 and 29.3% in 2004 were categorized as non-gamblers. In the 2012 survey, 55.8% of male student-athletes were categorized as social gamblers, compared to 62.5% in 2008 and 66.7% in 2004, which also suggests that less male student-athletes have been recreationally engaging in gambling activities over the eight-year span. Overall, 1.2% of male student-athletes were categorized as at-risk gamblers in 2012 versus 1.8% in 2008 and 2.9% in 2004. Likewise, 0.7% of male student-athletes were categorized as probable pathological gamblers (PPGs) in 2012 versus 2% in 2008 and 1.1% in 2004.

With regards to female student-athletes, the proportion of respondents categorized as non-gamblers has increased since 2004 (51.4%), but has remained consistent between 2008 (61.4%) to 2012 (61.3%). A similar trend was found with respect to the proportion of female student-athletes categorized as social gamblers; 38.6% were categorized as social gamblers in 2012, 38.3% in 2008, and 48.6% in 2004. Less than 0.1% of female student-athletes were identified as at-risk gamblers in 2012 versus 0.2% in 2008 and 0.3% in 2004. Likewise, less than 0.1% of female student-athletes were probable pathological gamblers (PPGs) in 2012 versus 0.2% in 2008 and <0.1% in 2004. Female student-athletes engage in gambling activities at lower

rates than males and problem gambling rates among female student-athletes have remained much steadier over the eight-year span in comparison to male student-athletes.

Table 4. Proportion of at-risk gamblers and probable pathological gamblers (PPGS) among male and female student-athletes.

DSM Classification	**Males (%)**			**Females (%)**		
	2004	2008	2012	2004	2008	2012
Non-gambler	29.3	33.7	42.3	51.1	61.4	61.3
Social gambler	66.7	62.5	55.8	48.6	38.2	38.6
At-risk gambler	2.9	1.8	1.2	0.3	0.2	<0.1
Probable pathological gambler	1.1	2.0	0.7	<0.1	0.2	<0.1

Origin of Gambling Behaviours

Male and female student-athletes who reported engaging in gambling behaviours were asked about their age of onset for gambling. In the 2012 survey, the majority of male (59.1%) and female (57.3%) student-athletes reported initially gambling for money during high-school. However, a sizable proportion of students begin even before high-school; 32.9% of male student-athletes and 17.8% of female student-athletes in the 2012 survey reported engaging in gambling behaviours for the first time before high-school. This has increased from 25.5% of male and 13.5% of female student-athletes in the 2008 survey, suggesting that student-athletes are now beginning to gamble at an earlier age than previously reported. Additionally, 8.0% of males and 24.8% of female student-athletes in the 2012 survey reported that the first time they gambled for money was while in college, a finding consistent with 2008 survey data, further suggesting that male student-athletes start gambling earlier than their female counterparts. For the 2012 cohort, playing cards for money (47.8%), sports wagering (19.6%), and betting on games of personal

skill (12.3%) were reported as being the most typical entry point for male student-athletes initial gambling experience. Female student-athletes showed a somewhat different specific entry point than their male counterparts. Lottery/scratch tickets (25.7%), playing cards for money (23.5%), slots (15.3%), and sports wagering (13%) were the most common activities female student-athletes engaged in as their first gambling experience.

Male and female student-athletes in the 2012 survey reported different companions when engaging in gambling activities. For male student-athletes, they were more likely to gamble with teammates and other student-athletes (33.8%), as well as other friends or co-workers (33.6%). Female student-athletes, on the other hand, were more likely to gamble with a significant other or family member (60.6%) rather than with a teammates (9%).

Gambling Knowledge, Education & Attitudes

Student-athletes were asked about their awareness of NCAA rules and regulations pertaining to gambling and sports wagering. Across the eight-year span, while relatively high, fewer student-athletes in 2012 reported having received information on the NCAA rules concerning gambling. More specifically, 71.5% of Division I male student-athletes and 75.9% of Division I female student-athletes reported receiving information on NCAA sports wagering rules in 2012 compared to 76.9% of male and 83.4% of female student-athletes in 2008. Similar trends were also found among Division II and III student-athletes in 2012 and 2008. Of interest is that while fewer student-athletes in 2012 reported having received information on the NCAA rules concerning gambling, a larger proportion of student-athletes in the 2012 cohort compared to the 2008 cohort believe that penalties designed by the NCAA act as an effective deterrent with regards to gambling. In 2012, 74.7% of student-athletes ‘agreed’ or ‘strongly agreed’ that the

threat of NCAA penalties discourages student-athletes generally from wagering on sports. This is an increase from 63.9% of student-athletes in the 2008 survey.

In the 2012 survey, a considerable proportion of male and female student-athletes held pro-gambling attitudes. More specifically, among the 2012 cohort, 57% of male student-athletes and 41% of female student-athletes believed sports wagering is acceptable so long as the individual is wagering on a sport other than the one in which they participate. This is an increase from 28.5% of male student-athletes and 9.8% of female student-athletes in the 2008 cohort who 'agreed' or 'strongly agreed' that wagering on sports other than the one the individual participates in is acceptable. Similarly, 68% of male and 58% of female student-athletes in 2012 perceive sports wagering as a harmless pastime, which largely increased from 53.3% of male student-athletes and 32.5% of female-student-athletes in 2008. Additionally, 59% of male and 49% of female student-athletes in 2012 believe gambling can be a means of making a lot of money, which also increased from 51.3% of male and 35.9% of female student-athletes in 2008.

Discussion

Despite the changing landscape of gambling and greater availability and easier accessibility of gambling opportunities over the eight-year span, overall past year and monthly gambling participation rates were lowest in 2012 compared to 2008 and 2004 for college student-athletes, particularly among males. When looking at the changes in gambling severity categorization across the eight-year span, the results indicate an increase in the proportion of student-athletes identified as non-gamblers and a decrease in the proportion of student-athletes categorized as social gamblers. Additionally, when at-risk gamblers and probable pathological gamblers were collapsed into a single group and compared to non-gamblers and social gamblers, there was a significant difference between the 2008 and 2012 cohort with regards to the

proportion of student-athletes having a gambling problem or meeting criteria for gambling problems. More specifically, significantly fewer student-athletes in 2012 were experiencing gambling-related problems than student-athletes in 2008. These results present a promising trend in gambling activity among college student-athletes, as participation appears to have decreased over the eight-year span in spite of more enticing forms of gambling and greater availability.

When participation rates in various gambling activities were compared between 2004, 2008, and 2012, the 2004 sample reported higher rates of past year and monthly gambling participation in almost all activities. Between 2004 and 2008, the only two activities that student-athletes reported higher past year participation rates were Internet gambling and sports wagering. Between 2008 and 2012, yearly and monthly sports wagering participation rates among student-athletes has remained relatively consistent. Given the rapid expansion and increasing popularity of Internet-based gambling since 2008, it was expected that there would be higher rates of Internet gambling reported among student-athletes in 2012. Despite the notion that Internet gambling is a growing concern and poses a significant risk to the student-athlete population given the associated appeal and anonymity, the results indicate that past year and monthly Internet gambling rates among student-athletes had decreased from 2008 to 2012. There are multiple reasons to account for this decrease. Heller, Bloom, Neil, and Salmela (2003) interviewed NCAA Division I women ice hockey players about their sources of stress and found that performance expectations, training demands, and academic stressors (e.g., time concerns related to studies), were amongst the primary sources of stress for these student-athletes. Although this study was conducted on NCAA Division I women's hockey players, it is not unreasonable to assume that the majority of NCAA student-athletes, regardless of gender, division or sport, experience similar stressors. As such, given the increasing demands and

intensity of intercollegiate sports and academic curriculums over the years, student-athletes may have less time to become or stay involved in Internet gambling or gambling-related activities, in general, without jeopardizing their performance in their sport or academic program. At the same time, career pursuits in sports may also prevent student-athletes from engaging in gambling behaviours (fear of suspension or loss of eligibility), including Internet gambling. Student-athletes are more likely to be under scrutiny from teammates, coaches, scouts/recruiters, etc. As such, detrimental behaviour, like gambling, could hinder the chance for student-athletes to move to the professional level for some. Student-athletes may, therefore, avoid engaging in gambling-related activities, as it has the potential to hamper their professional career. This is interesting to note, as gambling-related behaviour has often been associated with the 'Stress Relief Theory', which suggests that "gambling is a behavioural stress reaction" (Blaszczynski & McConaghy, 1989), as gamblers engage in gambling behaviour as a way to avoid anxiety or dysphoric mood by seeking sensation through gambling activities.

Additionally, the NCAA has implemented multiple awareness programs, enforcement groups, and a website (www.dontbetonit.org) designed to provide student-athletes, coaches, and administrators with educational information pertaining to gambling and sports wagering in attempt to decrease the proportion of student-athletes participating in gambling-related activities. These initiatives provide information about NCAA rules and regulations on sports wagering, data on the prevalence of sports wagering among college student-athletes, risks associated with student-athletes engaging in gambling, and resources for student-athletes who may have a gambling-related problem. In 2008, 21.5% of student-athletes reported receiving information on NCAA gambling rules and consequences from educational materials, including 'Don't Bet On It' websites, booklets, and posters, which is consistent with 24.2% of student-athletes in 2012.

Additionally, in 2012, 47.6% of student-athletes 'agreed' or 'strongly agreed' that NCAA material, including websites, booklets, and posters, is an effective deterrent of gambling and sports wagering, which increased from approximately 36% of student-athletes in the 2008 survey. As such, these educational and awareness initiatives implemented by the NCAA may play an important role in discouraging student-athletes from engaging in gambling-related behaviours, including Internet gambling.

Of interest is that while yearly and monthly participation in gambling-related activities, in general, has decreased from 2008 to 2012, pro-gambling attitudes have increased over the eight-year span. As such, the decrease in Internet gambling seen in the 2012 survey may be the result of the types of gambling activities student-athlete participants regard as 'Internet gambling'. While overall participation in Internet gambling decreased from 2008 to 2012, sports wagering via the Internet or mobile phone rose from 26.3% in 2008 to 33.7% in 2012. Of interest is that more than half of student-athletes (57%) in the 2012 perceived sports wagering outside of ones' own sport to be acceptable and not necessarily a form of prohibited gambling. Thus, student-athletes may be selective in what they perceive as being 'Internet gambling' and may not have necessarily reported participating in Internet gambling if they did not believe the activity they were engaging in was a viable form of gambling. For example, student-athletes may have only considered traditional gambling from a computer to constitute Internet online gambling and not necessarily mobile gambling via a smart phone or online Fantasy leagues as being Internet gambling. This was supported by less than one-quarter of male (19.9%) and female (17.7%) student-athletes in the 2012 survey who considered participation in a Fantasy league with an entry fee and prize money to be a form of gambling.

This increase in pro-gambling attitudes may be the result of the lack of information that is directly presented to student-athletes. As previously noted, more than half of the student-athletes in the 2012 survey (68% of males and 58% of females) perceived such sports wagering as a harmless pastime, which increased incrementally from the proportion of student-athletes in the 2008 survey who held this belief (53.3% of males and 32.5% of females). As such, a large proportion of student-athletes still appear to be uninformed about the potential risks and consequences associated with certain gambling activities. While the NCAA has increased awareness and educational initiatives aimed at discouraging student-athletes from engaging in gambling activities and sports wagering over the years, the results suggest that less student-athletes are currently being presented with this educational material. Among Division I student-athletes in 2012, 71.5% of males and 75.9% of females reported that they received information discussing gambling and sports wagering; a decline from 76.9% of male and 83.4% of female student-athletes four years earlier. As such, information regarding the risks and consequences of gambling is readily available for student-athletes, but is apparently not being directly provided to them. Therefore, in order to counter pro-gambling attitudes, the NCAA needs to find ways to effectively, efficiently, and directly disseminate this information to student-athletes, rather than student-athletes seeking this information on their own.

One such way that information can be disseminated to student-athletes is through coaches. Protective factors are associated with a reduction in problematic behaviours. In relation to gambling, models for conventional behaviour (e.g., coaches) and involvement in school/clubs (e.g., intercollegiate sports) have been identified as protective factors (Dickson, Derevensky, & Gupta, 2008). While a considerable proportion of student-athletes in both the 2008 and 2012 cohorts reported that NCAA educational material acts as an effective deterrent, the majority of

student-athletes (75.8% in both 2008 and 2012) reported that coaches are the most effective in influencing student-athletes not to engage in gambling-related activities, including sports wagering. In addition, 65.3% of student-athletes in 2012 believed that their coach could be trusted. While this is the case, only 39.8% of student-athletes in 2008 and 43.8% of student-athletes in 2012 reported that coaches would generally be aware of whether teammates are gambling. Given the respected role of coaches and the apparent high standards that student-athletes hold their coaches to, greater efforts can be allocated to training and equipping coaches with the knowledge and resources needed to deter student-athletes from engaging in gambling behaviours, which can play a role in the continual decrease of gambling participation rates among student-athletes. Male student-athletes in particular reported primarily engaging in gambling-related behaviours with teammates. As such, coaches have the potential to be effective and address multiple athletes at the same time at team meetings. Provided that the majority of student-athletes reported beginning their gambling activities in high-school, this may even need to extend to include high-school teachers and staff. However, this continues to present as a challenge given the majority of teachers do not perceive gambling to be a serious issue concerning youth in comparison to high-risk behaviours that adolescents experience (Derevensky et al., 2013).

While the number of student-athletes between 2004 and 2012 who have reported wagering on sports has either decreased or remained relatively consistent depending upon the sport played, male golfers remain a concern. In all three divisions, male golfers have the highest prevalence of sports wagering. This is particularly apparent for Division I male golfers, who report wagering on sports nearly twice as much as any of the other Division I men's sports surveyed. In sports, self-efficacy – the judgement of one's ability to use their skills to achieve a

desirable outcome – has been identified as having a positive relationship with sport performance (Moritz, Feltz, Fahrback, & Mack, 2000). Given the individual nature of golf and reliance on one's own skills, golfer's self-efficacy may account for why sports wagering is highest among golfers and particularly gambling activities involving personal skill (Ariyabuddhiphongs & Sakolnakorn, 2014). Due to golfer's self-reliance on their own skills, sports wagering (e.g., on-course bets), may also be seen by golfers as a form of competition and as being part of the sport's culture of golf. Thus, golfers may not perceive sports wagering as constituting "gambling" per se and being an activity prohibited by the NCAA. Golfer's participation in sports wagering stemming from this self-reliance on their own skills may also have led to participation in other forms of gambling, which may account for why gambling is high across all activities for golfers, not only sports wagering. This is of interest, as student-athletes commonly view gambling as being a team bonding experience, whereas, golfing is typically identified as being more of an individual sport.

Conclusion & Limitations

A limitation of the current study is the use of self-report measures where acknowledgement of gambling contravenes NCAA rules and policies. In the 2004, 2008, and 2012 surveys, student-athletes were assured anonymity and that all responses would be kept confidential. However, given that responses to select survey items could be considered a violation of NCAA rules and regulations (e.g., engagement in sports wagering), student-athletes may have been hesitant to reliably report their gambling activities due to fear of loss of eligibility, which may have resulted in student-athletes underreporting their level of engagement in gambling activities. Given the changes in the format and content of the survey over the eight-year span, comparability of responses across the samples is not 100% perfectly comparable.

Additionally, given that this is not a longitudinal study, it is difficult to account for cohort and environmental changes over the eight-year span (e.g., greater educational efforts by the NCAA), which may have influenced the results. Despite the limitations of the current study, the results of this study, the largest study ever reported concerning college student-athletes, suggest an overall decline in gambling rates among student-athletes across the eight-year span, in spite of the rapid expansion of the gambling industry, easier accessibility, and greater societal acceptance of gambling behaviours.

References

Adams, G. R., Sullivan, A. M., Horton, K. D., Menna, R., & Guilmette, A. M. (2007). A study of differences in Canadian university students' gambling and proximity to a casino. *Journal of Gambling Issues*, *19(1)*, 9-17.

American Gaming Association. (2009). *State of States: The AGA Survey of Casino Entertainment*. Retrieved January 10, 2015 from http://casat.unr.edu/docs/State.of.states.2009.aga_sos2009web_FINAL.pdf.

American Gaming Association. (2013). *State of States: The AGA Survey of Casino Entertainment*. Retrieved January 10, 2015 from http://www.americangaming.org/sites/default/files/uploads/docs/aga_sos2013_fnl.pdf.

Ariyabuddhiphongs, V., & Sakolnakorn, C. P. N. (2014). Peer pressure and Thai amateur golfers' gambling on their games: The mediating effect of golf self-efficacy. *Journal of Gambling Studies*, *30*(3), 685-696.

Benston, L. (2004). Gambling TV backfires hopeful. *Las Vegas Sun*. Retrieved May 7, 2015 from http://www.lasvegassun.com/sunbin/stories/text/2004/nov/08/517790964.html.

Blaszczynski, A., & McConaghy, N. (1989). Anxiety and/or depression in the pathogenesis of addictive gambling. *Substance Use & Misuse*, *24*(4), 337-350.

Calado, F., Alexandre, J., & Griffiths, M. D. (2014). Mom, dad it's only a game! Perceived gambling and gaming behaviors among adolescents and young adults: An exploratory study. *International Journal of Mental Health and Addiction*, *12*(6), 772-794.

Calcagno, P. T., Walker, D. M., & Jackson, J. D. (2010). Determinants of the probability and timing of commercial casino legalization in the United States. *Public Choice, 142*(1-2), 69-90.

Campbell, C., Derevensky, J., Meerkamper, E., & Cutajar, J. (2011). Parents' perceptions of adolescent gambling: A Canadian national study. *Journal of Gambling Issues, 25(1),* 36-53.

Derevensky, J., Gupta, R., Messerlian, C., & Gillespie, M. (2004). Youth gambling problems: A need for responsible social policy. *Gambling problems in youth: Theoretical and applied perspectives*, 231-252. New York: Kluwer Academic/Plenum Publishers.

Derevensky, J., Sklar, A., Gupta, R., & Messerlian, C. (2010). An empirical study examining the impact of gambling advertisements on adolescent gambling attitudes and behaviors. *International Journal of Mental Health and Addiction*, *8*(1), 21-34.

Derevensky, J. L., St-Pierre, R. A., Temcheff, C. E., & Gupta, R. (2014). Teacher awareness and attitudes regarding adolescent risky behaviours: Is adolescent gambling perceived to be a problem? *Journal of Gambling Studies*, *30*(2), 435-451.

Dickson, L., Derevensky, J. L., & Gupta, R. (2008). Youth gambling problems: Examining risk and protective factors. *International Gambling Studies*, *8*(1), 25-47.

Ellenbogen, S., Jacobs, D., Derevensky, J., Gupta, R., & Paskus, T. (2008). Gambling behaviour among college student-athletes. *Journal of Applied Sports Psychology, 20(3),* 349-362.

Engwall, D., Hunter, R., & Steinberg, M. (2004). Gambling and other risk behaviors on university campuses. *Journal of American College Health*, *52*(6), 245-256.

Griffiths, M. (2003). Adolescent gambling: Risk factors and implications for prevention, intervention, and treatment. In D. Romer (Ed.), *Reducing adolescent risk: Toward an integrated approach* (pp. 223-238). Thousand Oaks, CA: Sage.

Gupta, R., Derevensky, J., Shead, N.W., & Nower, L. (2009). *Bingeing behaviour in young gamblers: An exploratory study of gambling patterns* (Research Report No. 2340). Ontario Problem Gambling Research Centre. Retrieved from http://old.opgrc.org/content/research.php?appid=2340.

Heller, T. L., Bloom, G. A., Neil, G. I., & Salmela, J. H. (2003). *Sources of stress in NCAA Division 1 women ice hockey players* (Unpublished Doctoral Dissertation). Montreal, QC: McGill University.

Monaghan, S., Derevensky, J., & Sklar, A. (2008). Impact of gambling advertisements and marketing on children and adolescents: Policy recommendations to minimise harm. *Journal of Gambling Issues*, *22*, 252-274.

Moritz, S. E., Feltz, D. L., Fahrbach, K. R., & Mack, D. E. (2000). The relation of self-efficacy measures to sport performance: A meta-analytic review. *Research Quarterly for Exercise and Sport*, *71*(3), 280-294.

National Collegiate Athletic Association. (2004). Sports wagering: The threat to collegiate athletics. Retrieved January 8, 2015, from http://www.ncaa.org/gambling.

National Collegiate Athletic Association. (2015). *Gambling on college sports*. Retrieved January 10, 2015 from http://www.ncaa.org/about/resources/media-center/gambling-college-sports.

Salmivalli, C. (2001). Peer-led intervention campaign against school bullying: who considered it useful, who benefited? *Educational Research*, *43*(3), 263-278.

Shaffer, H. J., Donato, A. N., LaBrie, R. A., Kidman, R. C., & LaPlante, D. A. (2005). The epidemiology of college alcohol and gambling policies. *Harm Reduction Journal*, *2*(1), 1-20.

Shead, N. W., Derevensky, J. L., & Paskus, T. S. (2014). Trends in gambling behavior among college student-athletes: A comparison of 2004 and 2008 NCAA survey data. *Journal of Gambling Issues*, *29*, 1-21.

Smith, G. (2014). The nature and scope of gambling in Canada. *Addiction*, *109*(5), 706-710.

Stinchfield, R., Govoni, R., & Frisch, G.R. (2005). DSM-IV diagnostic criteria for pathological gambling: Reliability, validity and classification accuracy. *The American Journal on Addictions*, *14*, 73-82.

St-Pierre, R. A., Walker, D. M., Derevensky, J., & Gupta, R. (2014). How availability and accessibility of gambling venues influence problem gambling: A review of the literature. *Gaming Law Review and Economics*, *18*(2), 150-172.

Temcheff, C. E., Derevensky, J. L., St-Pierre, R. A., Gupta, R., & Martin, I. (2014). Beliefs and attitudes of mental health professionals with respect to gambling and other high risk

behaviors in schools. *International Journal of Mental Health and Addiction*, *12*(6), 716-729.

Bridging Manuscripts

Gambling among student-athletes remains a multifaceted problem. When broadly examining trends in gambling behaviour among NCAA student-athletes, the results suggest that engagement in gambling-related activities have decreased from 2004 to 2012. However, these trends differ when looking at select subgroups of student-athletes. More specifically, when analyzing gambling behaviour in relation to gender, the results suggest that male student-athletes were more likely than female student-athletes (57% versus 39%, respectively) to engage in gambling-related behaviour. Further, gambling-related activities that student-athletes most frequently engage in also differ according to gender. This is particularly true for sports wagering, wherein, 25.7% of male versus 5.2% of female student-athletes reported engaging in this type of gambling. Additionally, the results suggest that trends in gambling among student-athletes differ according to which sport student-athletes participate in, as golfers showed the highest participation rates in all types of gambling.

The data suggests college student-athletes do not represent a homogenous group. Rather, the results suggest that differences in gambling behaviour noticeably differ according to gender and type of sport played. Within the NCAA, there are three distinct levels of competition (Division I, Division II, Division III) and student-athletes' level of competition could potentially be an additional contributing factor to differences in gambling behaviour and trends among college student-athletes, similar to gender and type of sport. Although the NCAA opposes and prohibits student-athletes from all three levels of competition from engaging in gambling behaviours, there are differential risks in terms of the impact on the integrity of intercollegiate sports, student eligibility, and the well-being of student athletes depending level of competition.

Thus, it is important to examine gambling trends among student-athletes in relation to their level of competition.

Manuscript II

NCAA Division & Gambling Behaviour: An Examination of Differences among College Student-Athletes

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Abstract

Student-athletes governed by the National Collegiate Athletic Association (NCAA) compete in one of three divisions; Division I, Division II, and Division III. Three large samples of National Collegiate Athletic Association (NCAA) student-athletes in 2004 (N=20,587), 2008 (19,942), and 2012 (N=22,935) from all three divisions were surveyed about their gambling behaviour and attitudes. The aim of the current study was two-fold. The first objective was to examine the 2012 NCAA survey data to determine if differences in gambling behaviour and attitudes among student-athletes exist based on level of competition. The second objective was to compare the 2004, 2008, and 2012 NCAA survey data to see the trends in gambling behaviour and attitudes over the eight-year span across all three NCAA divisions. Findings revealed that past year gambling and monthly participation rates were highest among Division III student-athletes and lowest among Division I student-athletes across all three NCAA studies (50% of Division I versus 65% of Division III student-athletes in 2012). Across sports, gambling participation was notably highest among golfers within all three divisions. Additionally, when looking at gambling severity, the results indicate that Division I student-athlete were most frequently identified as non-gamblers, whereas, Division III student-athletes were most frequently identified as social gamblers. However, there were no significant differences across divisions with regards to the proportion of student-athletes having a gambling problem or meeting criteria for a gambling problem across all three studies (2% of males and <1% of females in 2012). Collectively, the results indicate that a relationship between level of competition and gambling behaviour exists. Further, the results suggest that engagement in high profile sports may act as a protective factor in deterring student-athletes from engaging in gambling-related activities.

Introduction

Multiple high-risk behaviours on college campuses remain a significant public health concern. Excessive alcohol use, drug use, unsafe sexual behaviour, self-mutilation, and physical altercations have all been reported as being highly prevalent among the college student population (Knight et al., 2002; Nattiv, Puffer, & Green, 1997; Paul, McManus, & Hayes, 2000). More recently, given the rise in the availability, accessibility, and appeal of gambling activities, gambling as a high-risk behaviour has also become a major concern among college students (Neighbors, Lostutter, Cronce, & Larimer, 2002). Gambling behaviour appears to be most prevalent among this subset of the population, with over 80% of college students across campuses in the United States (U.S.) having reported engagement in some form of gambling during their childhood, adolescence, and young adulthood (Lostutter, Lewis, Cronce, Neighbors, Larimer, 2014). In addition, according to an early meta-analytic study conducted by Shaffer and Hall (2001), the lifetime prevalence estimate of level 2 (subclinical/problem) and level 3 (pathological) gambling among college students is 10.9% and 5.6%, respectively; which is considerably higher than estimates reported for adolescents (8.4% and 3.4%, respectively) and adults (4.2% and 1.9%, respectively). This is of concern, as gambling among college students has been associated with a wide range of physiological and psychosocial consequences, including poor mental health, a decline in academic performance, strained social relationships, and poor financial situations (LaBrie, LaPlante, Nelson, Schumann, & Shaffer, 2007).

In particular, student-athletes represent a vulnerable subgroup of the college student population with regards to engagement in high-risk behaviours, including gambling. A number of prevalence studies conducted among college students have consistently indicated that student-athletes who participate in club or intercollegiate sports are significantly more likely to

experience gambling-related problems than their non-athletic counterparts (Engwall, Hunter, & Steinberg, 2004). College student-athletes, however, are not a homogenous group. Differences in engagement in high-risk behaviours, including gambling, have been shown to exist among college student-athletes according gender, race, and type of sport played (e.g., individual or team sport) (Brenner & Swanik, 2007; Huang, Jacobs, Derevensky, Gupta, & Paskus, 2007; Miller, 2008; Shead, Derevensky, & Paskus, 2014). Among these factors contributing to differences in level of engagement in high-risk activity, including gambling behaviour, is also level of competition. The National Collegiate Athletic Association (NCAA) in the U.S. is integral in setting guidelines for the health and well-being of student-athletes across colleges and universities in the U.S., as well as overseeing intercollegiate athletic competition (NCAA, 2015). Student-athletes governed by the NCAA compete in one of three divisions; Division I, Division II, and Division III. Division I represents the highest level of competition and comprise a large number of student-athletes with ambitions to pursue professional athletics. Division I student-athletes are typically competitively recruited and can be offered large college scholarships and the opportunity to play their sport at a particular school. Division II student-athletes are typically less competitive than Division I student-athletes. While considerable emphasis is still placed on athletic skill and student-athletes are occasionally offered partial scholarships, more focus is placed on balancing athleticism and a traditional collegiate experience. Division III student-athletes tend to be the least competitive of the three divisions that fall under the NCAA. With shorter practice and playing seasons, the primary focus for Division III student-athletes is primarily academics and not competitive athleticism (NCAA, 2015).

Regardless of their level of competition (Division I, Division II, Division III), the NCAA opposes all forms of regulated and unregulated gambling on sports and prohibits student-athletes

from engaging in gambling behaviours. Such behaviour may be perceived to negatively impact the integrity of intercollegiate athletics and ultimately, the welfare of individual athletes. As such, the NCAA membership bylaw 10.3 prohibits both athletics department staff and student-athletes from engaging in gambling activities that relate to intercollegiate or professional sporting events (NCAA, 2004). Although the NCAA has undertaken such measures, gambling among college student-athletes remains relatively widespread. While several studies have looked at gambling among college student-athletes, these studies have typically employed small sample sizes with a focus on Division I high-profile sports (Cross & Vollano, 1999; Cullen & Latessa, 1996).

NCAA Divisions & High-Risk Behaviours

Limited studies have looked at divisional differences among college student-athletes' engagement in various other high-risk behaviours. Initially, in the early 1990's, eating disorders, as a high-risk behaviour, was a leading concern among NCAA student-athletes (Brownell, Steen, & Wilmore, 1987; Powers & Johnson, 1996; Thompson & Sherman, 1993), as a number of elite athletes, particularly females, were reportedly experiencing serious illnesses, or in dire circumstances, several died, resulting from eating disorders (Ryan, 1995). Picard (1999) examined the relationship between student-athletes' level of competition (Division I, II, III) and their eating attitudes and behaviours in order to gain insight into the role that level of competition plays in the development of disordered eating. Female student-athletes from NCAA Divisions I, III, and non-athletes completed the Eating Attitudes Test (EAT-26) and the Eating Disorder Inventory-2 (EDI-2) in order to examine differences in eating attitudes and behaviours among the three NCAA divisions. Female student-athletes from Division I had significantly higher EAT-26 and EDI-2 scores than those from Division III, suggesting a higher prevalence of

disordered eating attitudes and patterns. The results suggested that student-athletes at higher levels of competition showed increased signs of pathological eating disorders and/or were at an increased risk for the development of an eating disorder. Picard (1999), as well as Johnson, Powers, and Dick (1999) suggested that these differences are likely attributable to differences in pressures associated within each division. Given the increased media attention paid to student-athletes and the potential for athletic career advancements, and scholarship renewals, Picard (1999) concluded that there is generally greater pressure placed on Division I student-athletes, particularly female student-athletes in sports where there is an emphasis placed on appearance/aesthetics (e.g., gymnastics and figure skating) (Ryan, 1995). Moreover, aligned with what Johnson et al. (1999) refer to as 'performance thinness', many Division I student-athletes believe that achieving a lower weight and lower percentage body fat will enhance their appearance and athletic performance, which ultimately leads them to be more likely engage in disordered eating more frequently than Division II or III student-athletes.

Additional studies have looked at the relationship between NCAA student-athletes' level of competition and substance use. Of interest is that these studies contradict the previous mentioned research regarding student-athletes' level of competition and engagement in disordered eating, as a high-risk behaviour. Green, Uryasz, Petr, and Bray (2001) used self-report measures to look at substance-use patterns of NCAA student-athletes competing at 991 NCAA Division I, II, and III institutions. The results indicated that the likelihood of substance abuse, including alcohol, amphetamines, marijuana, and psychedelic use, was highest among Division III student-athletes and lowest among Division I student-athletes. In a more recent study, Barry, Howell, Riplinger, and Piazza-Gardner (2015) used information collected from the American College Health Association's National College Health Assessment (ACHA-NCHA) to look at

differences in alcohol-related behaviour among students participating in various sporting groups, including varsity student-athletes (NCAA Division I student-athletes), club sport student-athletes, and intramural student-athletes. The results indicated a negative correlation between intensity of sports involvement and alcohol consumption, whereby, as involvement in organized sports increases (e.g., intercollegiate athletics), alcohol consumption decreases. Intramural student-athletes exhibited the highest rates of drinking behaviour per week and engaged in binge drinking significantly more than intercollegiate varsity student-athletes. These results mirror those found by Green et al. (2001). Brenner and Swanik (2007) found results that differed from the aforementioned studies. Using a multi-institutional survey design, Brenner and Swanik (2007) surveyed 720 NCAA college student-athletes in the U.S. in attempt to look at differences in alcohol consumption among college student-athletes according to their level of competition (Division I, II or III). The findings indicated a significant relationship between level of competition and reported alcohol use, wherein, Divisions I (78%) and II (76%) had the greatest percentage of high-risk drinking athletes, in comparison to Division III (67.5%). Division I athletes also reported being more likely to binge drink (e.g., consuming five or more drinks per occasion) than Division II or III athletes. However, it is important to note that this study was conducted during the off-season; thus, the results may be an inaccurate reflection of Division I student-athletes in general, as previous research has found that Division I college student-athletes tend to consume more alcohol during their off-season rather than during their regular competitive season, in comparison to Division II and III student-athletes whose alcohol consumption tends to be more stable and consistent throughout the year (Bower & Martin, 1999; Martin, 1998; Selby, Weinstein, & Bird, 1990).

NCAA Division I Student-Athletes & High-Risk Behaviours

There are a multitude of factors that may contribute to Division I student-athletes reporting the lowest rates of substance misuse among all three NCAA divisions. Division I student-athletes may be less likely to use substances because of the effects it may have on their athletic performance. While numerous drugs, such as Anabolic-Androgenic Steroids (AASs), claim performance enhancing qualities, other recreational drugs (e.g., cannabis) have been medically shown to slow down athletic performance (Campos, Yonamine, & de Moraes, 2003; Congeni & Miller 2002). Given that Division I student-athletes readily participate in high-profile sports and major college sporting events, such as March Madness, which receive much media coverage (Watt & Moore, 2001), Division I student-athletes may be more likely to refrain from substance abuse in order to avoid negatively impacting their athletic performance, as well as avoiding public scrutiny, which readily accompanies media publicity.

In addition, Division I student-athletes are more frequently subject to drug testing than Division II or Division III student-athletes. According to the 2014 NCAA Survey on Institutional Drug Testing, 90% of Division I institutions reportedly conducted random drug testing throughout the playing season compared to 65% of Division II and 21% of Division III institutions (NCAA, 2015). Given that the majority of performance enhancing and recreational drugs are banned by major sports governing bodies, such as the NCAA, Division I student-athletes may not want to risk their athletic eligibility by misusing substances, which could also impact any scholarships they may hold.

Dickson, Derevensky, and Gupta (2008) examined several risk and protective factors of risky gambling behaviour among youth. Involvement in conventional activities, group cohesion, mentorship, school connectedness, and achievement motivation were all identified as significant

environmental protective factors mediating youth engagement in high-risk behaviours. In comparison to Division II and III student-athletes, Division I student-athletes have been shown to have highly structured playing seasons (e.g., involvement in conventional activities) (Green et al., 2001); spend extensive time bonding with their teammates and coaches due to their long playing season (e.g., group cohesion and mentorship) (Trattner, Thompson, Dehass, & Wilfert, 2005); foster school spirit through playing high-profile sports and engaging in worldwide sporting events (e.g., school connectedness) (Palanjian, Cooper, Weight, & Mihalik, 2014); and have strong aspirations to pursue a professional athletic career (e.g., achievement motivation) (Mazerolle, Eason, Ferraro, & Goodman, 2014; Tyrance, Harris, & Post, 2013). Evidently, while student-athletes share many qualities in terms of their athletic participation, Division I student-athletes appear to have greater protective factors than Division II and III student-athletes, which may be preventing these student-athletes from engaging in certain high-risk behaviours, such as alcohol and drug use.

Lastly, the discrepancy in substance use educational programs among each division may also account for less substance abuse. Division I institutions tend to allocate a larger budget than Division II or III institutions to educational programs; therefore, Division I institutions are able to allocate more funds to preventative initiatives and educational programs regarding drug and alcohol use. According to the 2013 NCAA Survey on Drug Education, 89% of Division I institutions provided a drug/alcohol education program to their student-athletes, compared to 48% of Division II and 40% of Division III institutions.

NCAA Division I Student-Athletes & Gambling

It appears that the relationship between level of competition and engagement in high-risk behaviours likely depends on the type of high-risk behaviour and student-athletes' perceived

consequences associated with this particular behaviour. The NCAA has conducted multiple large scales studies on student-athlete gambling behaviour and attitudes (e.g., 2004, 2008, and 2012). This has allowed the NCAA to gain insight into student-athletes' engagement in gambling activities and in turn, design and implement legislative changes, educational policies, and best practices that will ensure the protection of the integrity of intercollegiate sports and the health of student-athletes (NCAA, 2015). Huang et al. (2007) examined the prevalence of gambling problems and health risk behaviours from the 2004 NCAA survey data (N = 20,739) and found that 62.4% of male student-athletes and 42.8% of female student-athletes reported engaging in some type of gambling during the past year. The results also indicated a trend, whereby, as student-athletes' level of gambling problems increased, the prevalence of their engagement in other high-risk behaviours (e.g., substance use and unprotected sex) also increased. Shead, Derevensky, and Paskus (2014) conducted a cross-comparison study of the 2004 (N = 18,916) and 2008 (N = 17,675) NCAA survey data to examine gambling trends among college student-athletes across the four-year span. The results suggested a downward trend with 62.8% of student-athletes reporting engagement in 2004 compared to 54.8% in 2008. While these studies provide an overview of the trends in gambling behaviour and attitudes among NCAA college student-athletes, they did not explicitly look at divisional differences. As such, studies assessing whether differences in gambling behaviour and attitudes exist among NCAA student-athletes according to level of competition (Division I, II, III) is currently missing from the literature.

Given the co-occurrence between gambling behaviour and substance use (e.g., Division III student-athletes reporting the greatest use of substances), the lower proportion of Division I student-athletes engaging in substance misuse, and considering that "a gambling problem parallels other addictive behaviours (e.g., alcohol, drug abuse, tobacco consumption)"

(Derevensky & Paskus, 2014, p. 46), it is not unreasonable to think that Division I student-athletes also have lower rates of participation in gambling activities when compared to Division II and III student-athletes. The aim of the current study is two-fold. The first objective is to examine the 2012 NCAA survey data to determine if differences in gambling behaviour and attitudes among student-athletes exist based on level of competition. The second objective is to compare the 2004, 2008, and 2012 NCAA survey data to see the trends in gambling behaviour and attitudes over the eight-year span across all three NCAA divisions.

Method

Participants

Data was drawn from self-report surveys administered by the NCAA to U.S. college student-athletes in 2004, 2008, and 2012. The NCAA consists of 1281 colleges and universities in the U.S. Ethics approval was obtained from ethics review committees of respective institutions where the surveys were administered.

A total of 20,587 surveys were administered in 2004, 19,942 were administered in 2008, and 22,935 were administered in 2012. The socio-demographic characteristics of the sample from each year are presented in Table 1.

Table 1. Socio-demographic characteristics of the participants

Variable	2004 (%)	2008 (%)	2012 (%)
Gender			
Male	62	62	57
Female	38	38	43
Race/Ethnicity			
White	75	72	77

Black	15	17	15
Other	10	11	8
Academic Year			
Freshman	33	35	32
Sophomore	26	27	27
Junior	23	23	25
Senior	19	15	16
Division			
I	36.7	36.9	34.9
II	23.1	22.9	27.8
III	40.2	40.2	37.7

Survey Administration

A multi-stage cluster sampling design was incorporated in all three studies (2004, 2008, and 2012). Faculty Athletics Representatives (FARs) of all NCAA member colleges were approached to participate. Each school was informed that all members of between one and three teams would be surveyed. Teams were selected based on a stratified random sampling procedure to ensure that all sports in each of the three NCAA divisions would be represented in the total sample. All students and FARs were assured that participation would remain anonymous at the student and institution level. Student-athletes from each team were surveyed at the same time without coaches or other team personnel present. Completed surveys were not collected by FARs. Rather, one student-athlete assumed responsibility for collecting the completed surveys, placing them into a sealed package, and mailing the package to an independent third-party vendor that compiled and entered the data.

As survey responses were submitted anonymously, institutional response rate could not be calculated absolutely. The response rate was estimated to be greater than 60% based upon previous surveys conducted in this manner and the total number of completed surveys received.

Survey content

The 2004, 2008, and 2012 surveys differed somewhat in content. The 2004 survey collected information on multiple health-risk behaviors (e.g., substance use, sexual activity, and criminal activity) in addition to gambling behavior and demographic information. The 2008 and 2012 survey was significantly modified and streamlined with most items related to health-risk behaviors removed and with a greater focus on gambling behaviors. In all three surveys, student-athletes provided demographic information, details about the college sport they played, their Division, and experiences with gambling including extensive questions related to sports wagering and gambling-related problems. All gambling questions referred to participants' behavior during the previous 12 months. Participants were initially categorized as non-gamblers or gamblers based on their responses to the Gambling Activities Questionnaire (GAQ; Gupta & Derevensky, 1996) portion of the survey which queries frequency of participation for 14 gambling activities over the past 12 months ("daily", "at least once a week", "at least once a month", "less than once a month", and "not at all"). All individuals who reported not gambling in any form in the past year were categorized as non-gamblers. Those who reported having gambling at least once on any of the activities in the previous year (i.e., gamblers) were further divided into three categories based upon their responses to a questionnaire format of the DSM-IV-TR (American Psychiatric Association, 2000) criteria for pathological gambling. This instrument contains 10 items that query the presence of various symptoms and diagnostic criteria associated with pathological gambling including preoccupation with gambling, need to increase

better to achieve the same level of excitement (tolerance), loss of control, withdrawal symptoms, escape, chasing of losses, lying to family, illegal activities to pay for gambling, disruptions to family or job, and borrowing money to pay for gambling debts. Standard cut-off scores for problem gambling categorization were used to form three DSM categories of problem gambling. Participants who reported 0-2 symptoms were categorized as Social Gamblers, those who endorsed 3-4 symptoms were categorized as At-Risk Gamblers, and those who endorsed 5 or more symptoms were categorized as Probable Pathological Gamblers (PPGs). A similar system of categorization has been used in other studies (e.g., Shead et al., 2012; Temcheff, Derevensky, & Paskus, 2011; Gupta, Derevensky, Shead, & Nower, 2009). This questionnaire format has been shown to have strong internal consistency (.92) and a good agreement rate (87%) with another measure of problem gambling severity (Stinchfield, Govoni, & Frisch, 2005).

Data Preparation

Rigorous data cleaning procedures were implemented to eliminate invalid data resulting from dubious responses to the surveys. Included in these cleaning procedures were a series of validity checks and Item Response Theory techniques to identify questionable patterns of responding. Cases revealing strong evidence of insincere responses (e.g., statistically unlikely combination of responses, inconsistent responding, responses in some portions of the survey that contradict responses elsewhere) were excluded from analyses. These cleaning procedures were applied to the 2004, 2008, and 2012 survey data to enhance comparability. Because these cleaning procedures were applied retroactively to the 2004 survey data, the results reported in this paper are not identical to those previously reported for the same 2004 data previously reported elsewhere (e.g., Ellenbogen, Jacobs, Derevensky, Gupta, & Paskus, 2008).

After data cleaning procedures were applied to exclude insincere respondents, a series of steps were applied to account for differences in sampling strategies and survey content between the 2004 and 2008 surveys. These procedures were aimed at making more accurate comparisons across samples. To account for differences in sampling strategies, a filter was applied to both samples such that respondents participating in one of 22 sports (11 men's sports; 11 women's sports) were adequately sampled in each of the three NCAA divisions in 2004, 2008, and 2012. Furthermore, these data were weighted to the NCAA's estimate of 2008 participation rates within the 22 sports to account for differences in sampling proportions within each cohort and scale for the results from both years in relation to current national participation figures.

To account for differences in survey content, an additional set of filters was applied to all samples. Given the present study's main goal of examining changes in problem gambling severity rates over the eight-year span, the basis for filtering was implemented to ensure that problem gambling severity rates were comparable. Participants in all samples were categorized as either non-gamblers, social gamblers, at-risk gamblers, or probable pathological gamblers based on responses to the GAQ and DSM-IV-TR gambling questionnaire. However, differences in formatting of the surveys necessitated survey-specific methods of filtering out certain participants with missing data. In the 2004 survey, the GAQ immediately preceded the DSM-IV-TR gambling questions. The DSM-IV-TR questions contain the instruction, "If you have not gambled, bet or wagered in any way during the past 12 months, please skip [this section]." Despite this instruction, some participants who reported gambling on the GAQ skipped the DSM-IV-TR ostensibly because they did not believe themselves to have "gambling problems" suggesting they should be categorized as "social gamblers." Accordingly, the following four guidelines were employed to filter out and categorize respondents: (1) those who missed the

GAQ and DSM-IV-TR were categorized as "missing" and excluded from further analyses (1.5%); (2) those who indicated "no gambling" in the past year on the GAQ were categorized as "non-gamblers" whether or not they completed or skipped the DSM-IV-TR; (3) those who indicated any gambling participation on the GAQ in the past year but skipped the DSM-IV-TR were categorized as "social gamblers,"; and (4) all others who indicated gambling participation on the GAQ and who completed the DSM-IV-TR were categorized according to their scores on the DSM-IV-TR.

Whereas the 2004 survey placed the DSM-IV-TR gambling questions immediately following the GAQ, the 2008 and 2012 survey placed the questions several sections after the GAQ. This gap between the GAQ and DSM-IV-TR in the 2008 survey raises the possibility that some participants might be incorrectly categorized if the 2004 guidelines were applied. For example, a participant might have endorsed gambling in the past year on the GAQ but then stopped completing the survey before reaching the DSM-IV-TR. In such a case, the participant would be categorized as a "social gambler" according to 2004 survey guidelines; however, they would be more appropriately filtered out given the possibility that they are actually an at-risk or pathological gambler. Alternatively, a participant might have endorsed gambling on the GAQ but validly skipped the DSM-IV-TR questions, believing that problem gambling questions do not apply to them. Therefore, the section preceding the DSM-IV-TR was examined to determine if individuals who missed the DSM-IV-TR had done so purposely or had terminated the survey by that point. The following guidelines were employed to filter out and categorize participants in the 2008 sample: (1) those who missed the GAQ and DSM-IV-TR were categorized as "missing" and excluded from further analyses (0.4%); (2) those who missed the section preceding the DSM-IV-TR and did not complete the DSM-IV-TR were categorized as "missing" and excluded

from further analysis (8.0%); (3) those identified as non-gamblers on the GAQ, did not skip the section preceding the DSM-IV-TR, but skipped the DSM-IV-TR were categorized as "non-gamblers,"; (4) those who indicated any gambling participation on the GAQ in the past year but skipped the DSM-IV-TR, were categorized as "social gamblers,"; and (5) all others who indicated any gambling participation on the GAQ and who completed the DSM-IV-TR gambling questions were categorized according to their scores on the DSM-IV-TR.

As a result of differences in survey sampling strategies, comparisons are not available across all surveys for each item. While there are 23 official NCAA sports, comparisons are limited to 22 sports (11 men's sports and 11 women's sports) that were adequately sampled in each NCAA division across all three administrations. After applying all data cleaning and filtering procedures, comparative data were available for 19,354 student-athletes from 2004, 19,371 student-athletes from 2008, and 22,935 student-athletes from 2012.

Data Analysis

The large sample sizes and number of statistical analyses employed greatly increased the possibility of spurious findings. Accordingly, the threshold probability for reporting statistical significance was set at <.001 rather than the conventional .05. Pearson chi-square analysis was used to determine whether level of competition/sport division could differentiate gambling patterns among collegiate student-athletes. This was conducted using SPSS software. Given the large differences between male and female student-athletes, gambling activities among student-athletes are separated by gender.

Results

Gambling Among Student-Athletes According to Division

Male Student-Athletes

Overall, male student-athletes from Division I reported the lowest rates of past year gambling behaviour and Division III male student-athletes reported the highest rates of past year gambling behaviour in both the 2008 and 2012 survey data. In addition, gambling behaviour among male student-athletes decreased across all divisions between 2008 and 2012. In 2012, 50% of Division I male student-athletes reported engaging in some form of gambling for money within the past year, compared to 56% of Division II and 65% of Division III male student-athletes. In 2012, there was a significant relationship between which NCAA Division a student-athlete competed in and their engagement in gambling behaviours, $\chi^2 (2, 12170) = 171.28$, $p < .001$. In 2008, 58% of Division I male student-athletes had reported engaging in some form of gambling for money within the past year, in comparison to 67% of Division II and 73% of Division III male student-athletes.

In terms of *monthly* participation rates in gambling activities, Division I student-athletes reported the lowest rates of monthly participation across all activities (see Figure 1). The activity that Division I male student-athletes reported the highest participation in (e.g., at least once a month) was the purchasing of lottery/scratch cards (6.5%), followed by playing games involving personal skill (5.4%), sports betting (4.0%), playing cards for money (3.3%), casino gambling (2.5%), Internet-based casino gambling (1.2%), betting on stocks (1.7%), horse/dog race wagering (.7%), and bingo (.6%). Of all gambling activities, Division II male student-athletes also reported purchasing lottery/scratch tickets the most frequently (8.7%), followed by betting on games of skill (6.6%), sports wagering (5.4%), card playing (5.1%), horse/dog race wagering

(4.4%), casino gambling (3.3%), playing casino games on the Internet (1.7%), betting on stocks (1.6%), and bingo (.7%). Division III male student-athletes were similar to Division I and II student-athletes, wherein, of all gambling activities, they reported purchasing lottery/scratch tickets the most (10.2%), followed by sports wagering (7.2%), betting on games involving personal skill (6.9%), casino gambling (2.5%), betting on stocks (2.2%), Internet-based casino gambling (1.4%), horse/dog race wagering (1.3%), and bingo (.2%) (see Figure 1).

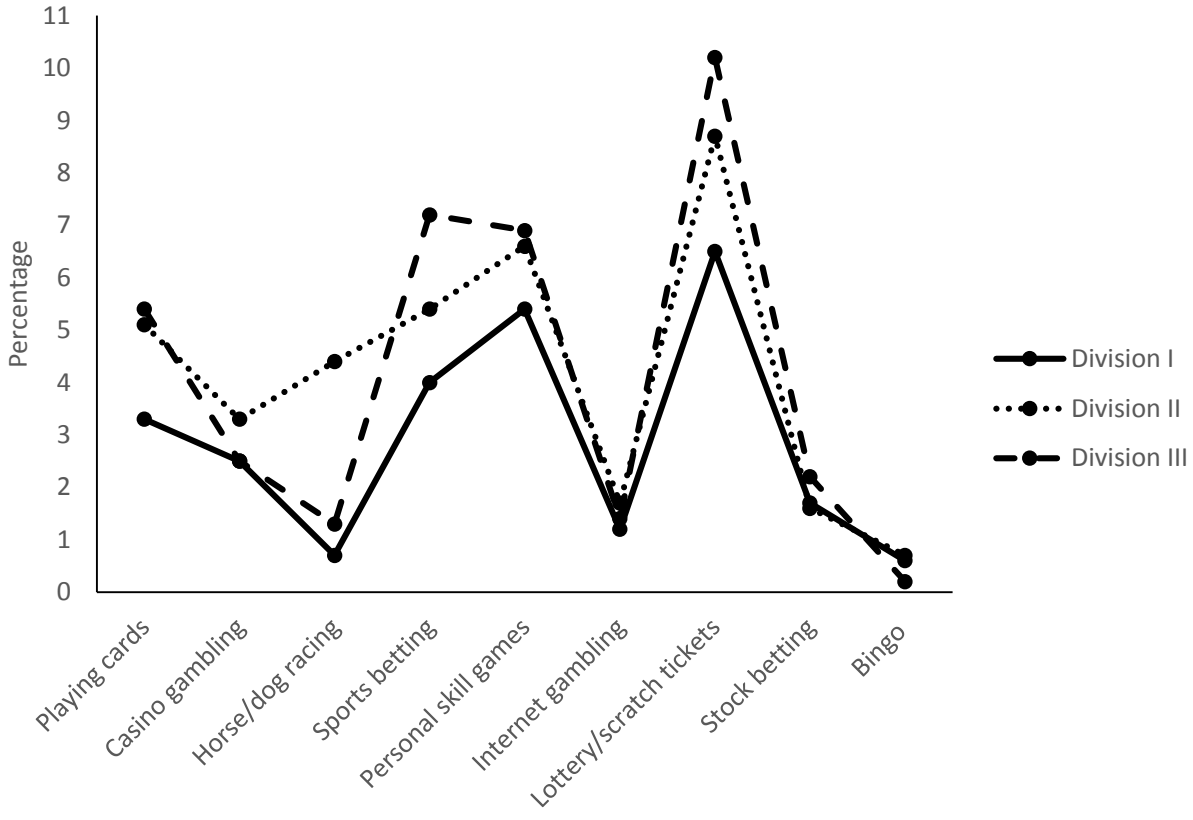

Figure 1. Student-athletes monthly participation in gambling activities.

Despite the NCAA bylaws that prohibit engagement in gambling activities that relate to intercollegiate or professional sporting events, male student-athletes from all divisions reported wagering on sports. Across the 2004, 2008, and 2012 studies, male student-athletes from

Division I consistently reported wagering on sports for money the least, whereas, male student-athletes from Division III consistently reported wagering on sports for money most frequently (see Table 1). Male student-athletes from all divisions were most likely to report socially wagering on sports for money (e.g., at least once in the past year). In 2012, 18.7% of Division I male student-athletes reported socially wagering on sports for money, compared to 25.9% of Division II and 31.9% of Division III male student-athletes. In 2012, there was a significant relationship between which NCAA division in which a student-athlete competed with respect to sports wagering, χ^2 (2, 12169) = 186.80, $p < .001$. Fewer male student-athletes from all divisions reported frequently (e.g., at least one time a month) or heavily (e.g., at least once a week) wagering on sports for money, but a similar trend was found, wherein Division I male student-athletes were least likely to report engaging in this behaviour in comparison to Division III male student-athletes. In 2012, 5.9% of Division I male student-athletes reported frequently wagering on sports, compared to 8.5% of Division II and 10.4% of Division III male student-athletes. In terms of heavily wagering on sports, 2.1% of Division I male student-athletes reported this behaviour, compared to 3.3% of Division II and 3.1% of Division III male student-athletes in the 2012 study.

Table I. Male student-athletes reporting wagering on sports by Division (%)

	2004 Study	2008 Study	2012 Study
Social Wagering			
Division I	17.1%	22.4%	18.7%
Division II	20.6%	27.9%	25.9%
Division III	30.7%	36.9%	31.9%
Frequent Wagering			

Division I	6.6%	6.8%	5.9%
Division II	8.7%	9.4%	8.5%
Division III	12.8%	12.1%	10.4%
Heavy Wagering			
Division I	2.8%	1.9%	2.1%
Division II	4.1%	2.9%	3.3%
Division III	6.7%	3.2%	3.1%

Across all divisions of men's sports, male golfers consistently reported the highest rates of participation in sports wagering for money across all three studies. In the 2012 study, 21.3% of Division I, 19.0% of Division II, and 20.1% of Division III male golfers reported wagering on sports for money. Apart from golf, Division I male student-athletes from all other sports showed lower rates of engagement in sports wagering for money in comparison to Division II and III male student-athletes from all other sports (Figure 2). In 2012, Division I male wrestlers (2.7%), swimmers (3.0%), and track runners (3.1%) reported the lowest rates of participation in sports wagering for money. Among Division II men's sports in 2012, male track runners (2.8%) reported the lowest rates of participation in sports wagering for money and among Division III men's sports, male swimmers (3.2%) reported the lowest rates of participation in sports wagering.

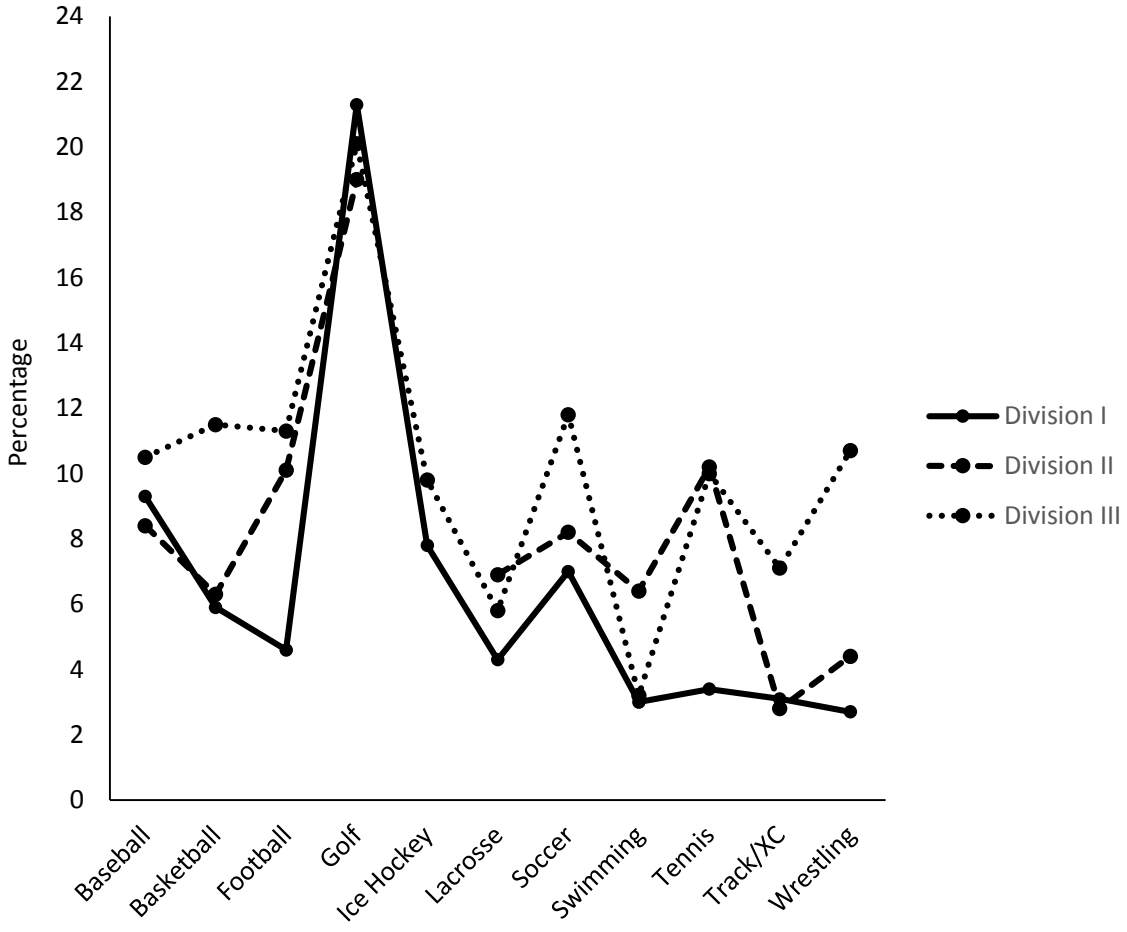

Figure 2. Male student-athletes from each men's sport reporting wagering on sports (%) (2012)

Many of Division I (26.7%), II (28.3%), and III (33.5%) male student-athletes reported that their first sports wagering experience took place in high-school. Additionally, for male student-athletes who reported engaging in sports wagering in the past year, the most common wagering target for Division I (10.7%), II (13.6%), and III (16.0%) male student-athletes was the NFL, followed by college basketball tournaments (8.0% of Division I; 12.1% of Division II; 15.6% of Division III). When asked through which source they place their sports wagering bet (e.g., friends, student bookie, off-campus bookie, via the Internet, by phone/text, casino/sports book) male student-athletes from all divisions most frequently reported friends being the most

common way. Overall, 7.5% of Division I, 9.8% of Division II and 11.1% of Division III male student-athletes reported that they 'often' place their sports wagering bet with friends. This is aligned with the majority of male student-athletes from all divisions reporting being most likely to gamble with teammates/other student-athletes (19.1% from Division I; 20.8% from Division II; 18.9% from Division III) or friends (17.0% from Division I; 18.6% from Division II; 21.6% from Division III).

Among male student-athletes, differences were found in relation to participation in a fantasy league with respect to each division. Division I male student-athletes were found to report lower rates of participation in a free (no entry fee) fantasy league (46.3%), compared to Division II (50%) and III (60.4%) male student-athletes. In terms of participation in fantasy leagues involving entry fees and prize money, similar results were found, whereby, 13.7% of Division I male student-athletes reported involvement, in comparison to 16.3% and 26.6% of Division II and III student-athletes, respectively. Similarly, Division III male student-athletes (33.2%) were more likely to report engagement in simulated forms of gambling (e.g., via videogame consoles, social media websites, Internet gambling websites, and mobile phones) in the past year than were Division I (25.3%) or II (29.9%) male student-athletes.

Female Student-Athletes

Similar to male student-athletes, Division I female student-athletes reported the lowest rates of past year gambling behaviour while Division III female student-athletes reported the highest rates of past year gambling behaviour. However, unlike male student-athletes, past year gambling behaviour among female student-athletes across divisions remained relatively consistent between 2008 and 2012. In 2012, 30% of Division I female student-athletes reported engaging in some form of gambling for money within the past year, compared to 41% of

Division II and 46% of Division III female student-athletes. In 2012, there was a significant relationship between which NCAA division a student-athlete competed in and their engagement in gambling behaviours, χ^2 (2, 9320) = 160.31, $p < .001$. Similar results were found in 2008, with 31% of Division I, 40% of Division II and 45% of Division III female student-athletes reporting engaging in some form of gambling for money in the past year. Apart from the monthly purchasing of lottery/scratch tickets (2.3% of Division I, 5.0% of Division II, and 5.2% of Division III), female student-athletes from all divisions reported significantly low monthly participations across all gambling activities (.7% or less).

Less female than male student-athletes across all divisions also reported engaging in sports wagering. Similar to the results found among male student-athletes, Division I female student-athletes consistently reported wagering on sports for money the least, whereas, female student-athletes from Division III consistently reported wagering on sports for money the most across all three studies. In 2012, 2.7% of Division I female student-athletes reported socially wagering on sports for money, compared to 5.4% of Division II and 7.3% of Division III. In 2012, there was a significant relationship between which NCAA division a student-athlete competed in and their engagement in sports wagering, χ^2 (2, 9320) = 73.33, $p < .001$. With regards to frequently and heavily wagering on sports for money, there was less discrepancy among the three divisions (see Table 2). In 2012, 0.3% of Division I, 0.5% of Division II and 0.8% of Division III female student-athletes reported frequently wagering on sports for money. Likewise, in 2012, 0.1% of Division I and III female student-athletes reported heavily engaging in sports wagering. No student-athletes from Division II reported participating in sports wagering in the 2012 study.

Table 2. Female student-athletes reporting wagering on sports according to division (%)

	2004 Study	2008 Study	2012 Study
Social Wagering			
Division I	4.6%	4.1%	2.7%
Division II	7.9%	6.2%	5.4%
Division III	8.1%	9.1%	7.3%
Frequent Wagering			
Division I	0.9%	0.6%	0.3%
Division II	2.1%	0.7%	0.5%
Division III	1.7%	1.0%	0.8%
Heavy Wagering			
Division I	0.3%	0.1%	0.1%
Division II	1.0%	0.1%	0.0%
Division III	0.7%	0.2%	0.1%

Sports wagering rates across all divisions of women's sports was significantly lower than men's sports. Overall, the prevalence of sports wagering in 2012 was significantly low for female student-athletes (2.1% or less). In the 2012 study, Division I female golfers (2.1%) and Division II lacrosse players (2.1%) reported the highest engagement in sports wagering for money. Across all divisions of women's sports, there was also less variability in terms of participation rates in sports wagering, as the majority of female student-athletes reported a less than 1% engagement rate in sports wagering for money (see Figure 3).

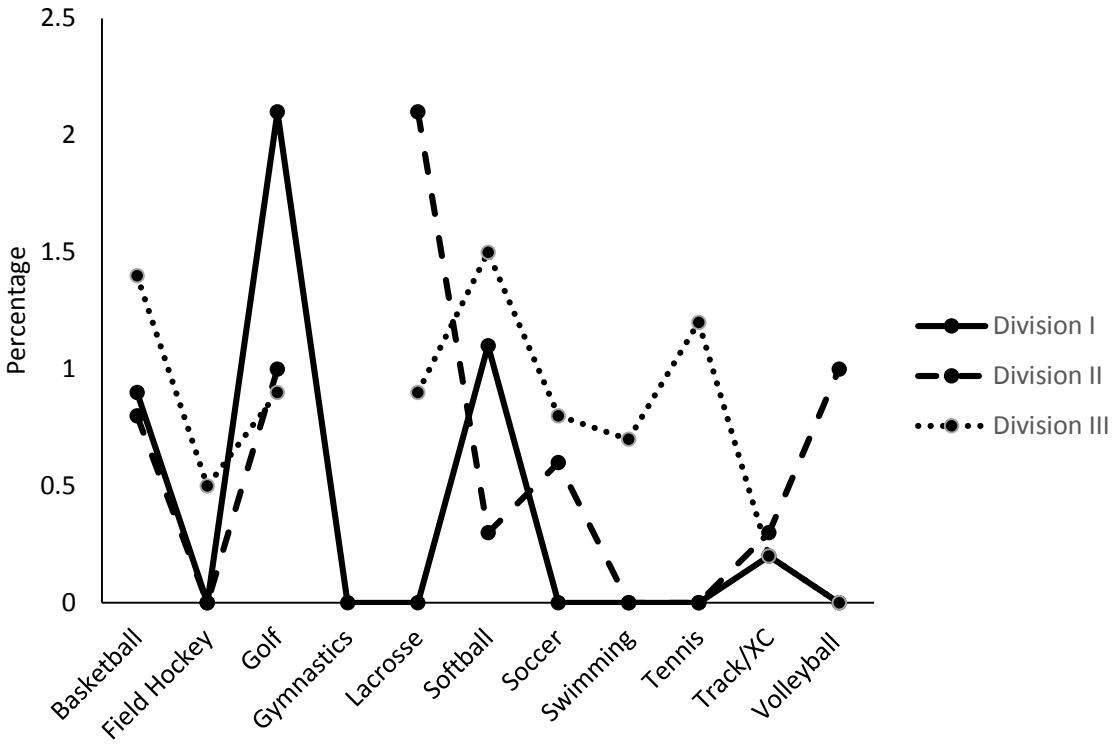

Figure 3. Female student-athletes from each women's sport reporting wagering on sports

Female student-athletes across all divisions also differed from male student-athletes in terms of with whom they are most likely to engage in gambling activities. Female student-athletes from all divisions (14% from Division I, 14.8% from Division II, and 16.8% from Division III) reported being most likely to engage in gambling activities with a significant other, such as a boyfriend, girlfriend or family member, as opposed to by themselves or with teammates.

Female student-athletes across all divisions were also more likely than male student-athletes across all divisions to use social media websites (e.g., Facebook or Twitter) during the playing season as a medium to post information about the status of teammates and preparation for upcoming games. More specifically, Division II female-student athletes reported posting on social media most frequently (17.9%), followed by Division I (15.4%) and Division III (14.1%)

female student-athletes. In relation to males, Division III male student-athletes (11.6%) reported posting information on social media websites most frequently, followed by Division II (9.7%) and Division I (8.0%) male student-athletes. Interestingly, both Division I male (17.4%) and female (23.4%) student-athletes were more likely than Division II (10.4% of males; 18.3% of females) or Division III (12.7% of males; 13.6% of females) student-athletes to report having been told by their coach not to post pertinent information about their team (e.g., information regarding practice or training) on a social media website.

Gambling Severity among Student-Athletes by Division

Male Student-Athletes

In the 2012 study, 47% of Division I male student-athletes were categorized as non-gamblers in comparison to 41.4% of Division II and 33.6% of Division student-athletes. Additionally, 51.5% of Division I male student-athletes were identified as social/occasional gamblers compared to 56.5% of Division II and 64.4% of Division III male student-athletes, suggesting that more Division I male student-athletes are refraining from engaging in gambling behaviours, whereas, Division III male student-athletes appear to be more apt to recreationally engage in gambling activities (see Table 3). Overall, the percentage of male student-athletes that met the standard diagnostic criteria for a gambling problem was relatively consistent across the three divisions. Overall, a small number of male student-athletes from Division I (1.2%), II (1.3%), and III (1.2%) were categorized as at-risk gamblers. Likewise, .7% of Division I and .8% of Division II and III male student-athletes were identified as probable pathological gamblers (PPGs).

Table 3. Gambling severity among male student-athletes across divisions (%)

	Division I (%)	Division II (%)	Division III (%)
Non-gambler	47	41.4	33.6
Social gambler	51.1	56.5	64.6
At-risk gambler	1.2	1.3	1.2
Probable pathological gambler	0.7	0.8	0.8

Female Student-Athletes

Female student-athletes across all divisions were primarily identified as non-gamblers. The majority of female non-gamblers were found among Division I student-athletes (68.7%) compared to Division II (58.4%) and Division III (54%) female student-athletes. Similar to male student-athletes, the majority of social gamblers were found among Division III female student-athletes (45.9%), followed by Division II (41.5%), and Division I (31.2%), suggesting that Division III female student-athletes are recreationally/occassionally engaging in gambling activities most frequently (see Table 4). The proportion of female student-athletes categorized as at-risk gamblers was consistent across all divisions – .1% of Division I, II, and III female student-athletes were identified as at-risk gamblers, while no student-athletes from all divisions were identified as pathological gamblers.

Table 4. Gambling severity among female student-athletes across divisions (%)

	Division I (%)	Division II (%)	Division III (%)
Non-gambler	68.7	58.4	54
Social gambler	31.2	41.5	45.9
At-risk gambler	0.1	0.1	0.1
Probable pathological gambler	0	0	0

Gambling Knowledge & Education

Student-athletes across all divisions were asked about their awareness of NCAA rules and regulations pertaining to gambling and sports wagering. Division I male and female student-athletes were more likely than Division II or III student-athletes to report having received information on the NCAA rules concerning gambling in both the 2008 and 2012 study. Additionally and of interest is that the percentage of student-athletes reporting having received this information decreased from 2008 to 2012 across divisions. For instance, 71.5% of Division I male student-athletes and 75.9% of female student-athletes in the 2012 study reported receiving NCAA information on rules and regulations pertaining to gambling, which is much higher than the percentage of Division II and III student-athletes that reported receiving this same information (Figure 6). The percentage of Division I student-athletes reporting having received this information in 2012 also decreased from the percentage of Division I student-athletes that reported receiving this information in 2008 (76.9% of males and 83.4% of females). A similar trend was found among Division II and III student-athletes, as well, for both males and females.

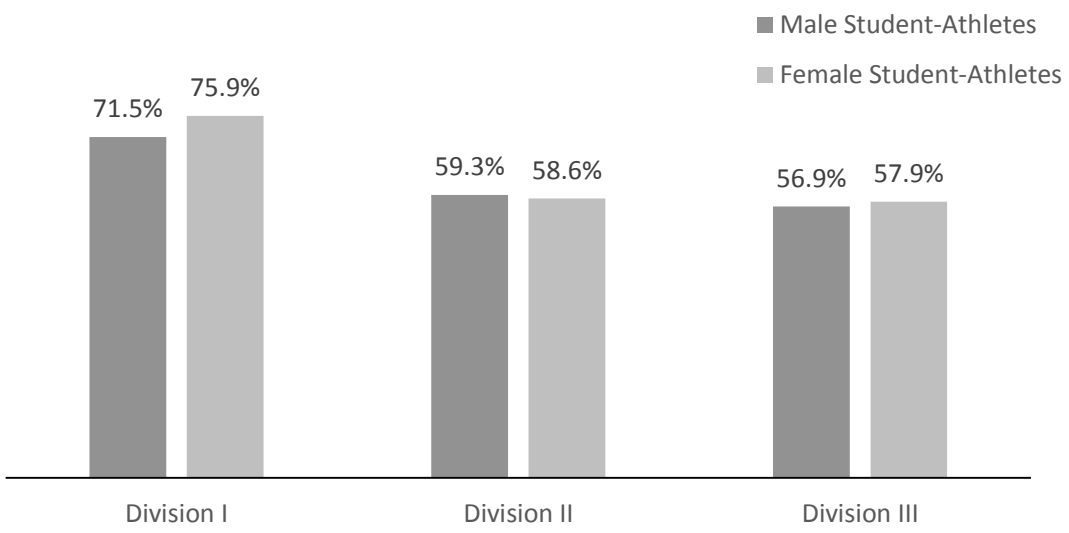

Figure 6. Student-athletes reporting of having received NCAA information concern gambling rules and regulations

In terms of where student-athletes receive information concerning gambling rules and regulations, Division I student-athletes were more likely to report receiving this information from a variety of available sources. More specifically, 61.3% of Division I student-athletes reported receiveing information about gambling from their athletic department compared to 43.7% of Division II and 40.8% of Division III student-athletes. Division I student-athletes were more likely to report receiving this information from all other sources, whereas, Division III student-athletes were least likely to report having received this information from coaches, athletic departments, teammates, NCAA presentations, and law enforcement officials (see Figure 7).

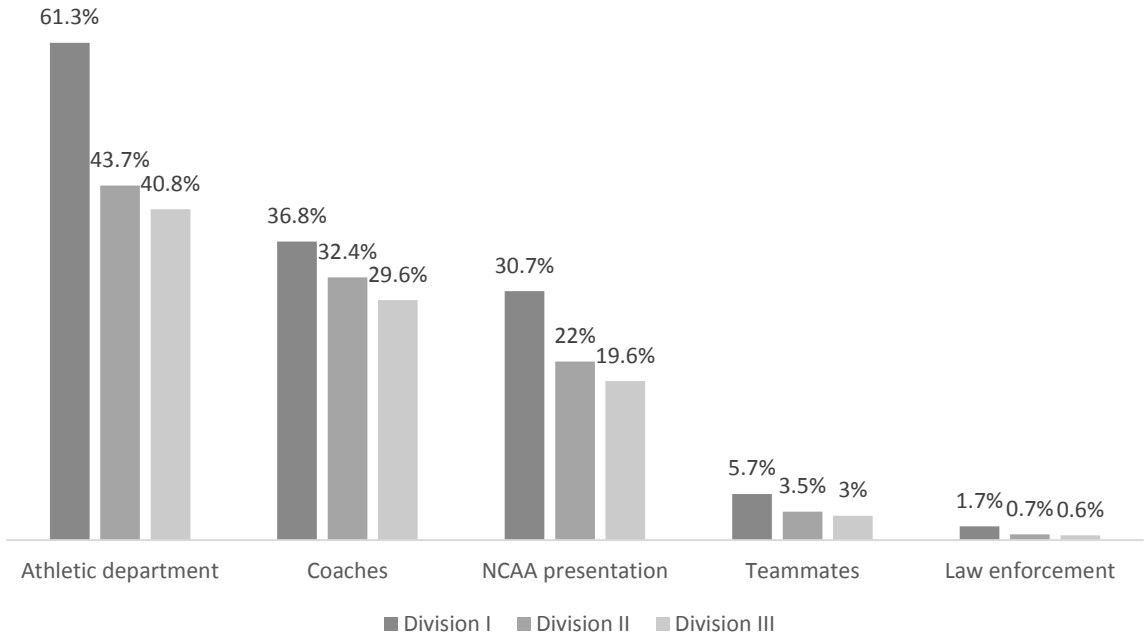

Figure 7. Student-athletes reporting of where they receive information concerning gambling rules

Student-Athletes Attitudes Towards Gambling

Male Student-Athletes

While Division III male student-athletes reported the highest rates of past year gambling behaviour, the same results were not found in terms of pro-gambling attitudes. Rather, Division III male student-athletes reported the lowest pro-gambling attitudes with 42% reporting that they 'somewhat agreed', 'agreed', or 'strongly agreed' that sports wagering is acceptable as long as you wager on a sport other than the one in which you participate compared to 57% of Division I and 56% of Division II male student-athletes that endorsed the same belief. Male student-athletes from all divisions, while only a small percentage, reported being more likely to bet on sports that do not involve their school than on games involving their own team (1.6% of Division I, 2.8% of

Division II, and 1.9% of Division III male student-athletes wagering on a sports game involving their own game). Additionally, 70% of Division I male student-athletes held the belief that sports wagering is a harmless pastime in comparison to 66% of Division II and 67% of Division III student-athletes. Lastly, a relatively similar proportion of male student-athletes across all divisions believed that people can consistently make a lot of money gambling; 59% of Division I, 60% of Division II, and 58% of Division III male student-athletes reported that they held this belief regarding gambling.

Female Student-Athletes

Similar to male student-athletes, Division III female student-athletes reported more permissive attitudes towards gambling, whereas, Division I female student-athletes reported the highest pro-gambling attitudes. Overall, 44% of Division I female student-athletes believed that sports wagering is acceptable as long as you wager on a sport other than the one in which you participate in comparison to 36% of Division II and 23% of Division III female student-athletes. Likewise, 69% of Division I female student-athletes held the belief that sports wagering is a harmless pastime, whereas, 57% of Division II and 54% of Division III female student-athletes endorsed this same belief. In terms of consequences associated with gambling, 52% of Division I, 57% of Division II and 54% of Division III female student-athletes reported the belief that people can consistently make a lot of money gambling.

Discussion

Overall, past year gambling participation rates were highest among Division III student-athletes and lowest among Division I student-athletes for both males and females. Additionally, when looking at gambling severity, the results indicate that Division I student-athlete were most frequently identified as non-gamblers, whereas, Division III student-athletes were most

frequently identified as social gamblers. However, there were no significant differences across divisions with regards to the proportion of student-athletes having a gambling problem or meeting criteria for a gambling problem and the proportion of student-athletes meeting this criteria was considerably low overall (<1% across divisions). According to the Pathways Model of problem and pathological gambling (Blaszczynski & Nower, 2001), emotionally vulnerable gamblers constitute individuals who engage in gambling-related behaviour as a means to cope with current life stressors and high levels of anxiety. Lai and Wiggins (2003) looked at levels of psychological stress and burnout among Division I soccer players over the course of a season and found that fear of failure, frustration, high expectations, anxiety, and pressure to perform were identified as the leading stressors impacting student-athletes. Given the greater intensity, pressures, and time commitment required by Division I athletes, it is not unreasonable to assume that Division I student-athletes experience these identified stressors to a greater degree than Division II or III student-athletes. For these reasons and given the Pathways Model of problem gambling (Blaszczynski & Nower, 2001), it can be argued that Division I student-athletes may be more likely to engage in gambling-related behaviours more frequently than Division II or III student-athletes. However, according to all three NCAA studies, this does not appear to be the case. In the 2012 study, 43.6% of student-athletes (50% of males; 30% of females) reported engaging in some of gambling for money within the past year, compared to 51.6% of Division II (56% of males; 41% of females) and 57.3% of Division III (65% of males; 46% of females) student-athletes. Therefore, despite higher levels of perceived stress, Division I student-athletes are not engaging in gambling-related behaviours as readily as other divisions.

Forrest and Simmons (2003) adapted the general economic theory of criminal behaviour proposed by Ehrlich (1996) to assess the risks and gains associated with gambling and possibly

explain why Division I student-athletes are less likely to engage in gambling activities prohibited by the NCAA, in comparison to Division III student-athletes. According to Forrest and Simmons (2003), athletes are more likely to engage in gambling activities "(a) the lower the chance of detection, (b) the lower the player wage level and, (c) the less the loss of sporting glory when they deliberately underperform" (p. 44). Firstly, sports governing bodies, such as the NCAA, will invest in screening to an extent commensurate with how financially important the result of the sporting game/event is: sporting games/events where the marginal gain from winning is high are likely to be screened more rigorously, so chances of detection will be higher in high-profile sports, such as those played by Division I student-athletes. Many Division I sporting events are revenue-generating and tend to attract high television ratings. The 2006 NCAA Division I men's basketball tournament, for example, had a $6 billion television contract, attracted 670-254 on-site customers, and had higher levels of advertising spending than the Super Bowl or The World Series (Southhall, Nagel, Amis, & Southhall, 2008). Due to the commercial popularity of Division I sporting games/events and the associated public scrutiny, Division I student-athletes may be more likely to refrain from gambling activities (e.g., sports wagering) or influencing the outcome of games (e.g., point shaving) in order to avoid undergoing possible investigations if suspicions of engagement in gambling behaviour are suspected, which is more likely to be detected among Division I than Division III student-athletes. Secondly, Division I student-athletes are generally more financially stable, as they typically receive payments in the form of extensive scholarships, food vouchers, etc. As such, the penalty for engaging in illegal gambling activities (e.g., sports wagering) for Division I student-athletes could be the loss of scholarships, loss of eligibility or temporary suspension. Division III student-athletes, on the other hand, are not typically provided any compensation for playing their sport; therefore, they may perceive

engaging in gambling activities as a potentially viable form of financial gain, as opposed to a risk. This may increase their likelihood of participating in gambling opportunities. Lastly, Division I student-athletes are likely to rely more on achieving and winning a set number of games in order to advance their professional sports career. As such, Division I student-athletes may be less likely to underperform, purposely influence the outcome of games or engage in excessive gambling that may impact their athletic performance.

The advent of the Internet has allowed for greater and more private/secluded gambling opportunities. This is particularly true in relation to sports wagering. First and foremost, the Internet increases access to sports wagering sites. Given the highly structured playing season and limited free time for many student-athletes, particularly those in Division I, the Internet makes gambling more readily available, as student-athletes are able to place sports wagering bets from nearly any location via one's laptop, mobile phone, personal tablet, etc. Gambling via the Internet is also a solitary activity, wherein, it allows student-athletes to anonymously engage in gambling-related activities (LaBrie et al., 2007). The anonymity associated with Internet gambling essentially reduces many of the barriers that Division I student-athletes encounter if they were to publicly engage in gambling-related behaviour, including public scrutiny or being below the legal gambling age (e.g., the legal gambling age in the U.S. is 21-years; however, many student-athletes are still below this age). Given these factors that contribute to the appeal of Internet gambling, including accessibility, convenience, and anonymity, it is interesting to note that Division I student-athletes (18.7%) were still less likely than Division II (25.9%) and Division III (31.9%) student-athletes to report sports wagering via the Internet.

Gupta, Derevensky, and Ellenbogen (2006) found that individuals with certain personality types, such as sensation seekers, are more likely to develop a gambling-related

problem. Additionally, Cross and Vollano (1998) reported that student-athletes who engage in gambling behaviour, such as sports wagering, are more likely to be risk-takers. As such, certain sports may appeal to and attract certain personality types, which may result in higher rates of gambling-related behaviour. Ellenbogen et al. (2008) examined whether certain student-athletes are more prone to having a gambling-related problem. Their results indicated that male student-athletes who participate in high-profile sports that are regularly televised (e.g., football, basketball, and baseball) were more prone to report experiencing a gambling-related problem compared to their other athletic counterparts (e.g., volleyball, track and field). Additionally, members of team sports (e.g., those involving a pass to another player) were more likely to gamble than those playing an individual sport. In the current study, male golfers across all divisions, particularly Division I golfers, reported the highest engagement in sports wagering. This is consistent with findings from Ellenbogen et al. (2008), as golf may be considered a high-profile sport. However, this high prevalence of gambling found among golfers was not found among other high-profile sports (e.g., football and basketball), which raises the question of why this variation in gambling participation among sports exists. It may be that gambling is unique to the culture of sport of golf. While golf is characterized as an individual sport, sports wagering is embedded into the culture of the game – wagering during golf games on performance is a common occurrence among friends, with golfers placing multiple bets throughout one game (e.g., lowest score, closest to the hole, longest drive, etc.) (Ellenbogen et al., 2008). Evidently, participation in certain sports may be a risk factor in relation to gambling.

Division I student-athletes' lower participation rates in gambling across all activities may likely be directly attributable to the higher quantity of educational material, lectures, and discussions they receive pertaining to NCAA gambling rules and regulations in comparison to

Division II and III student-athletes. Division I student-athletes reported more readily receiving information regarding gambling from all sources, including athletic departments, coaches, NCAA presentations, teammates, and law enforcement officials. Yet, it is interesting to note that despite Division I student-athletes having the lowest yearly gambling participation rates, both male and female Division I student-athletes held more pro-gambling attitudes and beliefs than Division II and III student-athletes. Therefore, Division I student-athletes may be informed about the rules, regulations, and penalties surrounding gambling (e.g., gambling-related behaviour is in violation of NCAA rules), which may prevent them from engaging in gambling-related behaviours due to fear of losing their eligibility; however, not necessarily because they are aware of the additional risks and consequences associated with gambling, such as mental health issues, involvement in delinquent and criminal behaviour, a decline in academic or athletic performance, strained interpersonal relationships, and financial hardships (Derevensky, 2012; LaBrie et al., 2007; Volberg, Griffiths, Olason, & Delfabbro, 2010). As such, level of competition may be acting as a protective factor for Division I student-athletes; however, given their attitudes towards gambling as acceptable and a harmless pastime, the question arises as to whether these student-athletes would be more apt to engage in gambling-related behaviours if it were not for their athletic position. Consequently, more efforts on behalf of the NCAA may need to be allocated towards educating Division I student-athletes about psychosocial and mental health risks associated with excessive gambling, apart from only providing information about the risks associated with their status as a student-athlete. This can include incorporating such educational material into pre-existing resources and initiatives, such as NCAA presentations or ‘Don’t Bet On It’ websites, booklets, and posters produced by the NCAA. Such efforts can assist with ensuring that student-athletes are making more informed decisions related to gambling that will

translate to when they possibly may no longer be involved in collegiate athletics. Provided that a substantial number of student-athletes from all divisions, particularly males (50% or more), reported agreement with the belief that sports wagering is acceptable so long as you wager on a sport other than the one in which you participate and that sports wagering is a harmless pastime, it may be beneficial to provide this educational training to student-athletes within all divisions of the NCAA.

Conclusion & Limitations

A limitation of the current study is the use of self-report measures. In the 2004, 2008, and 2012 surveys, student-athletes were assured anonymity and that all responses would be kept confidential. However, given that responses to select survey items could be considered a violation of NCAA rules and regulations (e.g., engagement in sports wagering), student-athletes may have been hesitant to report their actual gambling activities due to fear (e.g., loss of eligibility), which may have resulted in student-athletes underreporting their level of engagement in gambling activities. Given the changes in the format and content of the survey over the eight-year span, comparability of responses across the samples is uncertain. Additionally, given that this is not a longitudinal study, it is difficult to account for cohort and environmental changes over the eight-year span (e.g., greater educational efforts by the NCAA), which may have influenced the results. Despite the limitations of the current study, the results suggest a decline in gambling rates among student-athletes across the eight-year span, in spite of the rapid expansion of the gambling industry and greater societal access and acceptance of gambling behaviours.

References

Barry, A. E., Howell, S. M., Riplinger, A., & Piazza-Gardner, A. K. (2015). Alcohol use among college athletes: Do intercollegiate, club, or intramural student athletes drink differently? *Substance Use & Misuse*, *50*(3), 302-307.

Blaszczynski, A., & Nower, L. (2002). A pathways model of problem and pathological gambling. *Addiction, 97*(5), 487-499.

Bower, B. L., & Martin, M. (1999). African American female basketball players: An examination of alcohol and drug behaviors. *Journal of American College Health*, *48*(3), 129-133.

Brenner, J., & Swanik, K. (2007). High-risk drinking characteristics in collegiate athletes. *Journal of American College Health*, *56*(3), 267-272.

Brownell, K. D., Steen, S. N., & Wilmore, J. H. (1987). Weight regulation practices in athletes: Analysis of metabolic and health effects. *Medicine and Science in Sports and Exercise*, *19*(6), 546-556.

Campos, D. R., Yonamine, M., & de Moraes Moreau, R. L. (2003). Marijuana as doping in sports. *Sports Medicine, 33*(6), 395-399.

Congeni, J., & Miller, S. (2002). Supplements and drugs used to enhance athletic performance. *Pediatric Clinics of North America*, *49*(2), 435-461.

Cross, M. E., & Vollano, A. G. (1999). *The extent and nature of gambling among college student athletes*. Ann Arbor, MI: University of Michigan Department of Athletics.

Cullen, F. T., & Latessa, E. J. (1996). *The extent and sources of NCAA rule infractions: A national self-report study of student-athletes*. Kansas City, MO*:* National Collegiate Athletic Association.

Derevensky, J. (2012). *Teen gambling: Understanding a growing epidemic*. New York, NT: Rowman & Littlefriield Publishing.

Derevensky, J.L., & Paskus, T. (2014). *Gambling among student-athletes: Cause for concern*. In G.T. Brown (Ed.), Mind, body, and sport. Understanding and supporting student-athlete mental wellness (pp. 46-50). Indianapolis, IN: National Collegiate Athletic Association.

Dickson, L., Derevensky, J. L., & Gupta, R. (2008). Youth gambling problems: Examining risk and protective factors. *International Gambling Studies, 8*(1), 25-47.

Ehrlich, I. (1996). Crime, punishment, and the market for offenses. *Journal of Economic Perspectives, 10*(1), 43-67.

Ellenbogen, S., Jacobs, D., Derevensky, J., Gupta, R., & Paskus, T. (2008). Gambling behavior among college student-athletes. *Journal of Applied Sport Psychology, 20*(3), 349-362.

Engwall, D., Hunter, R., & Steinberg, M. (2004). Gambling and other risk behaviors on university campuses. *Journal of American College Health, 52*(6), 245-256.

Forrest, D. & R. Simmons. (2003). Sport and gambling. *Oxford Review of Economic Policy, 19*(4), 598-611.

Green, G. A., Uryasz, F. D., Petr, T. A., & Bray, C. D. (2001). NCAA study of substance use and abuse habits of college student-athletes. *Clinical Journal of Sport Medicine, 11*(1), 51-56.

Gupta, R., Derevensky, J., Shead, N.W., & Nower, L. (2009). *Bingeing behaviour in young gamblers: An exploratory study of gambling patterns* (Research Report No. 2340). Ontario Problem Gambling Research Centre. Retrieved from http://old.opgrc.org/content/research.php?appid=2340.

Huang, J. H., Jacobs, D. F., Derevensky, J. L., Gupta, R., & Paskus, T. S. (2007). Gambling and health risk behaviors among US college student-athletes: Findings from a national study. *Journal of Adolescent Health, 40*(5), 390-397.

Johnson, C., Powers, P. S., & Dick, R. (1999). Athletes and eating disorders: the National Collegiate Athletic Association study. *International Journal of Eating Disorders*, *26*(2), 179-188.

Knight, J. R., Wechsler, H., Kuo, M., Seibring, M., Weitzman, E. R., & Schuckit, M. A. (2002). Alcohol abuse and dependence among US college students. *Journal of Studies on Alcohol and Drugs*, *63*(3), 263.

LaBrie, R. A., LaPlante, D. A., Nelson, S. E., Schumann, A., & Shaffer, H. J. (2007). Assessing the playing field: A prospective longitudinal study of internet sports gambling behavior. *Journal of Gambling Studies*, *23*(3), 347-362.

Lai, C., & Wiggins, M. S. (2003). Burnout perceptions over time in NCAA division I soccer players. *International Sports Journal*, *7*(2), 120.

Lostutter, T. W., Lewis, M. A., Cronce, J. M., Neighbors, C., & Larimer, M. E. (2014). The use of protective behaviors in relation to gambling among college students. *Journal of Gambling Studies*, *30*(1), 27-46.

Martin, M. (1998). The use of alcohol among NCAA Division I female college basketball, softball, and volleyball athletes. *Journal of Athletic Training, 33*(2), 163.

Mazerolle, S. M., Eason, C. M., Ferraro, E. M., & Goodman, A. (2014). Career and family aspirations of female athletic trainers employed in the National Collegiate Athletic Association Division I setting. *Journal of Athletic Training, 50*(2), 170-177.

Miller, K. E. (2008). Energy drinks, race, and problem behaviors among college students. *Journal of Adolescent Health, 43*(5), 490-497.

National Collegiate Athletic Association. (2013). *NCAA Drug-Education and Drug-Testing Survey*. Indianapolis, IN: National Collegiate Athletic Association.

National Collegiate Athletic Association. (2015). *Understanding the NCAA's drug testing policy*. Retrieved 13 May 2015 from http://www.ncaa.org/health-and-safety/policy/drug-testing.

Nattiv, A., Puffer, J. C., & Green, G. A. (1997). Lifestyles and health risks of collegiate athletes: A multi-center study. *Clinical Journal of Sport Medicine, 7*(4), 262-272.

Neighbors, C., Lostutter, T. W., Cronce, J. M., & Larimer, M. E. (2002). Exploring college student gambling motivation. *Journal of Gambling Studies, 18*(4), 361-370.

Palanjian, S., Cooper, C. G., Weight, E. A., & Mihalik, J. (2014). Factors influencing student and employee attendance at NCAA Division I FBS college football games. *Journal of Contemporary Athletics, 8*(4), 249.

Picard, C. L. (1999). The level of competition as a factor for the development of eating disorders in female collegiate athletes. *Journal of Youth and Adolescence, 28*(5), 583-594.

Paul, E. L., McManus, B., & Hayes, A. (2000). "Hookups": Characteristics and correlates of college students' spontaneous and anonymous sexual experiences. *Journal of Sex Research*, *37*(1), 76-88.

Powers, P. S., & Johnson, C. (1996). Small victories: Prevention of eating disorders among athletes. *Eating Disorders*, *4*(4), 364-377.

Ryan, J. (1995). *Pretty girls in little boxes: The making and breaking of elite gymnasts and figure skaters*. New York, NY: Doubleday.

Selby, R., Weinstein, H. M., & Bird, T. S. (1990). The health of university athletes: Attitudes, behaviors, and stressors. *Journal of American College Health*, *39*(1), 11-18.

Southall, R. M., Nagel, M. S., Amis, J. M., & Southall, C. (2008). A method to March madness? Institutional logics and the 2006 National Collegiate Athletic Association Division I men's basketball tournament. *Journal of Sport Management*, *22*(6), 677-700.

Tyrance, S. C., Harris, H. L., & Post, P. (2013). Predicting positive career planning attitudes among NCAA division I college student-athletes. *Journal of Clinical Sport Psychology*, *7*(1), 22-40.

Trattner Sherman, R., Thompson, R. A., Dehass, D., & Wilfert, M. (2005). NCAA coaches survey: The role of the coach in identifying and managing athletes with disordered eating. *Eating disorders*, *13*(5), 447-466.

Thompson, R. A., & Sherman, R. T. (1993). *Helping athletes with eating disorders*. Champaign, IL: Human Kinetics Publishers.

Volberg, R., Gupta, R., Griffiths, M. D., Olason, D., & Delfabbro, P. (2010). An international perspective on youth gambling prevalence studies. *International Journal of Adolescent Medicine and Health, 22,* 3-38.

Watt, S. K., & Moore, J. L. (2001). Who are student athletes? *New Directions for Student Services, 2001*(93), 7-18.

Overarching Discussion

Student-Athletes versus General College Student Population

From expanding lotteries to the development of new casinos and placement of slot machines in non-casino venues, it is largely apparent that there has been rapid growth in the gambling industry. This expansion of gambling opportunities has commonly been associated with an increase in gambling behaviours, particularly among the college-student athlete population. Largely a result of the inherent competitive nature and culture of athletics, Weiss and Loubier (2008) stated that "college student-athletes represent the segment of the population with the highest rate of pathological gambling" (p. 53). While the literature suggests that significantly more athletes than non-athletes report engaging in gambling-related behaviours (Stuhldreher, Stuhldreher, & Forrest, 2007), the results from this study indicate that participation in gambling activities among college student-athletes in on a downward trend. Moreover, the proportion of student-athletes at-risk or meeting DSM-IV criteria for a gambling problem across the eight-year span has decreased among males (4% of male student-athletes in 2004 compared to 1.9% of male student-athletes in 2012), while remaining relatively low and consistent across females (<1% across all three studies). The cross-comparison results of this study contradicts the existing literature, which has consistently indicated that gambling behaviour among college students, in general, has continually increased. Nowak and Aloe (2014) conducted a meta-analytic study of the rates of probable pathological gambling among college students and found that the rates in 2013 (10.23%) were considerably higher than in 2007 (7.89%) and 1999 (5.05%) (Blinn-Pike et al., 2007; Shaffer, Hall, & Vander Bilt, 1999). This suggests that gambling behaviour among the general college student population may be increasing, as opposed to strictly among student-athletes.

This decline in gambling-related behaviours among student-athletes, in comparison to the general college student population, may be the result of NCAA policies that prohibit student-athlete engagement in gambling-related activities, as well as the availability of comprehensive educational programs for student-athletes designed by the NCAA (www.dontbetonit.org). Efforts taken on behalf of the NCAA to reduce gambling behaviour among their student-athletes could potentially help to inform college institution administrators with implementing gambling education and harm reduction initiatives that would target the entire college student population. As it currently stands, college administrators do not address gambling to the same degree as they do other high-risk behaviours that college students are susceptible to engaging in, including unsafe sex, drug use, and alcohol use. 'Frosh Week', as a prime example, is celebrated by large numbers of college students across Canada and the United States at the beginning of every academic year. This week of events hosted by respective colleges are designed to orient and welcome freshman students; however, these events are typically characterized by an increase in high-risk behaviours, particularly heavy alcohol use, wherein many colleges have implemented policies surrounding the use of alcohol during these events (Riordan, Scarf, & Conner, 2015). The same is typically not done to address gambling, which is of concern as the legal gambling age in some countries (e.g., Canada) varies from 18 to 19, the same age as most freshmen students entering college. This is in contrast to NCAA member institutions, where every year student-athletes are required to attend an orientation session where they are provided a summary of NCAA regulations, including bylaws that prohibit gambling behaviour, as well as available resources that address risks associated with gambling (NCAA, 2011). Similar efforts could be undertaken by college administrators by incorporating gambling education into these new student orientation programs where students tend to receive other educational material pertaining

to the risks associated with unsafe sex, drug misuse, alcohol abuse, violence, etc. Additionally, mental health centers on campus could begin to distribute educational brochures and materials regarding the risks associated with gambling.

Discrepancy Between Gambling Behaviour and Gambling Attitudes

While gambling among college student-athletes appears to be on a downtrend trend, the results of the current study indicate that a considerable proportion of student-athletes continue to hold pro-gambling attitudes. Among the 2012 cohort, 57% of male student-athletes believed sports wagering was acceptable so long as the individual is wagering on a sport other than the one in which they participate. This is an increase from 28.5% of male student-athletes in the 2008 cohort. Similarly, 68% of male student-athletes in 2012 perceived sports wagering as a harmless pastime, which largely increased from 53.3% of male student-athletes in 2008. These findings query the true effectiveness of NCAA gambling education initiatives and poses the question of whether student-athletes are opting to not participate in gambling activities because they are aware of the potential risks and consequences or because of the threat of NCAA penalties that discourage student-athletes from participating in gambling-related activities. As such, a potential follow-up question for student-athletes would be whether gambling educational/prevention efforts or strict bylaws/policies surrounding gambling are more effective in preventing them from engaging in gambling-related behaviours. The rise in pro-gambling attitudes, but decrease in gambling participation rates among student-athletes over the eight-year span essentially suggests that student-athletes perceive gambling to be an acceptable recreational activity, but are choosing not to engage in gambling behaviours. The findings of the current study that gambling participation rates were considerably lowest among Division I student-athletes and highest among Division III student-athletes in the 2012 study also lends support to

this question, as both gambling policies and educational initiatives are most strongly enforced and endorsed by Division I athletics. The stakes of violating NCAA gambling bylaws are also highest for Division I student-athletes. Therefore, the question remains as to whether gambling behaviour among student-athletes has decreased largely in part due to NCAA gambling education/prevention efforts or more so the result of student-athletes fearing the loss of their athletic eligibility. If the latter holds true, it can then be implied that commitment to athletics can act as a potential protective factor in terms of gambling prevention among student-athletes. An awareness of this potential protective factor can be helpful in terms of finding ways to foster similar ties for the general college student population, where gambling rates are reported to be increasing. Additionally, future research could also look at what other subgroups within the college student population show low gambling participation rates and how these subgroups resemble the student-athlete subgroup.

Gambling and Social Media

Social networking sites, such as Facebook, have consistently been recognized as a platform for college students to manage social relationships, connect with others within their social and geographic proximity, and share personal information and testimonials in various forms (Kim, Sohn, & Choi, 2011). In the U.S, 65% of young adults, including college-aged students, have reported using social networking sites (Ellison & Boyd, 2013). Underlying this ever-increasing popularity of social networking sites is the fact that it provides for further gambling opportunities. Over the eight-year span, there has been a significant increase in the number of student-athletes reporting being contacted by outside sources to share insider information. For example, in the 2004 study, 1.6% of Division I basketball male student-athletes reported having been contacted by outside gamblers, which increased to 3.5% in 2008, and again

to 4.6% in 2012. Of interest is that while female student-athletes have consistently showed lower gambling participation rates than their male counterparts, more female than male student-athletes reported sharing information on social media websites regarding teammates, training, and preparation for games, which has the potential to inform gambling-related decisions (e.g., sports wagering). For example, 15.4% of Division I female student-athletes in the 2012 survey reported sharing this type of information on social media sites, such as Facebook and Twitter, in comparison to 8% of male student-athletes. Given that the literature suggests that females are more likely to engage in high-risk behaviours through social media and social networking sites, such as online bullying (Horner, Asher, & Fireman, 2015), online sexual promiscuity (Bryant, Heath, & Carter, 2014), and online pro-eating disorder forums (Custers, 2015), it is not unreasonable to assume that as new forms of gambling via social networking sites begin to emerge, female student-athletes may be more susceptible and may show higher rates of engagement than male student-athletes. There is also a potential that female student-athletes may currently be engaging in gambling-related activities in a more passive manner than male student-athletes, which may not be recognized or considered gambling (e.g., sharing insider information regarding the status of team members). Therefore, with the ongoing expansion of the gambling industry, it remains imperative that future research continues to expand the definition of 'gambling' in order to incorporate emerging forms and how females may differ in their participation in relation to this.

Conclusion & Limitations

A limitation of the current study is the use of self-report measures. In the 2004, 2008, and 2012 surveys, student-athletes were assured anonymity and that all responses would be kept confidential. However, given that responses to select survey items could be considered a

violation of NCAA rules and regulations (e.g., engagement in sports wagering), student-athletes may have been hesitant to reliably report their gambling activities due to fear of loss of eligibility, which may have resulted in student-athletes underreporting their level of engagement in gambling activities. Given the changes in the format and content of the survey over the eight-year span, comparability of responses across the samples is not perfectly comparable. Additionally, given that this is not a longitudinal study, it is difficult to account for cohort and environmental changes over the eight-year span (e.g., greater educational efforts by the NCAA), which may have influenced the results. Despite the limitations of the current study, the results of this study, the largest study ever reported concerning college student-athletes, suggest a decline in gambling rates among student-athletes across the eight-year span, in spite of the rapid expansion of the gambling industry and greater societal acceptance of gambling behaviours. Additionally, the results suggest that college student-athletes do not represent a homogenous group. Rather, student-athletes exhibit different gambling behaviours and attitudes in relation to their gender, sport, and level of competition.

References

Abbott, M.W., & Volberg, R.A. (2000). *Taking the pulse on gambling and problem-gambling in New Zealand. A report on Phase One of the 1999 National Prevalence Survey*. Wellington, New Zealand: Department of Internal Affairs.

Adams, G. R., Sullivan, A. M., Horton, K. D., Menna, R., & Guilmette, A. M. (2007). A study of differences in Canadian university students' gambling and proximity to a casino. *Journal of Gambling Issues*, *19*, 9-17.

American Gaming Association. (2013). *State of States: The AGA Survey of Casino Entertainment*. Retrieved January 10, 2015 from http://www.americangaming.org/sites/default/files/uploads/docs/aga_sos2013_fnl.pdf.

American Psychiatric Association. (2000*). Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, DC: American Psychiatric Association.

American Gaming Association. (2009). *State of States: The AGA Survey of Casino Entertainment*. Retrieved January 10, 2015 from http://casat.unr.edu/docs/State.of.states.2009.aga_sos2009web_FINAL.pdf.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*. Washington, DC: American Psychiatric Association.

Arnett, J. (2004). *Emerging adulthood*. New York, NY: Oxford University Press.

Avery, C., & Turner, S. (2012). Student loans: Do college students borrow too much or not enough? *The Journal of Economic Perspectives, 26*(1), 165-192.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Benston, L. (2004). Gambling TV backfires hopeful. *Las Vegas Sun*. Retrieved May 7, 2015 from http://www.lasvegassun.com/sunbin/stories/text/2004/nov/08/517790964.html.

Berkman, L. F., & Glass, T. (2000). Social integration, social networks, social support, and health. *Social Epidemiology*, *1*, 137-173.

Blinn-Pike. L., Worthy, S.L., & Jonkman, J.N. (2007). Disordered gambling among college students: A meta-analytic study. *Journal of Gambling Studies, 23*, 175-183.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design.* Cambridge, MA: Harvard University Press.

Bryant, C. M., Heath, J. C., & Carter, V. L. (2014). Assessing the impact of social media on the risky sexual behaviors of college students. *Proceedings of the National Conference on Undergrad Research, 2014,* 1232-1239.

Calado, F., Alexandre, J., & Griffiths, M. D. (2014). Mom, dad it's only a game! Perceived gambling and gaming behaviors among adolescents and young adults: An exploratory study. *International Journal of Mental Health and Addiction*, *12*(6), 772-794.

Calcagno, P. T., Walker, D. M., & Jackson, J. D. (2010). Determinants of the probability and timing of commercial casino legalization in the United States. *Public Choice*, *142*(1-2), 69-90.

Campbell, C., Derevensky, J., Meerkamper, E., & Cutajar, J. (2011). Parents' perceptions of adolescent gambling: A Canadian national study. *Journal of Gambling Issues, 25*, 36-53.

Cross, M. E., Basten, J., Hendrick, E. M., Kristofic, B., & Schaffer, E. J. (1998). Student-athletes and gambling: An analysis of attitudes towards risk-taking. *Journal of Gambling Studies, 14*(4), 431-439.

Cullen, F.T., & Latessa, E.J. (1996). The extent and sources of NCAA rule infractions: A national self-report study of student-athletes. *A report to the National Collegiate Athletic Association.*

Custers, K. (2015). The urgent matter of online pro-eating disorder content and children: Clinical practice. *European Journal of Pediatrics, 174*(4), 429-433.

Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior, 17*(2), 187-195.

Derevensky, J. (2012). *Teen gambling: Understanding a growing epidemic.* New York, NY: Rowman & Littlefield Publishing.

Derevensky, J. L., Gainsbury, S. M., Gupta, R., & Ellery, M. (2013). *Play-for-fun/social-casino gambling: An examination of our current knowledge*. Final Report to the Manitoba Gambling Research Program, 31pp.

Derevensky, J., Sklar, A., Gupta, R., & Messerlian, C. (2010). An empirical study examining the impact of gambling advertisements on adolescent gambling attitudes and behaviors. *International Journal of Mental Health and Addiction, 8*(1), 21-34.

Derevensky, J. L., St-Pierre, R. A., Temcheff, C. E., & Gupta, R. (2014). Teacher awareness and attitudes regarding adolescent risky behaviours: Is adolescent gambling perceived to be a problem? *Journal of Gambling Studies, 30*(2), 435-451.

Ellenbogen, S., Jacobs, D., Derevensky, J., Gupta, R., & Paskus, T. (2008). Gambling behaviour among college student-athletes. *Journal of Applied Sports Psychology, 20,* 349-362.

Ellison, N. B., & Boyd, D. (2013). *Sociality through social network sites* (pp. 151-172). Oxford, UK: Oxford University Press.

Engwall, D., Hunter, R., & Steinberg, M. (2004). Gambling and other risk behaviors on university campuses. *Journal of American College Health, 52*(6), 245-256.

Goldstein, L, Manowitz, P., Nora, R., Swartzburg, M., & Carlton P.L. Differential EEG activation and pathological gambling. *Biological Psychiatry, 20*(11), 1232–1234.

Grant, J.E., & Kim, S.W. (2001). Demographic and clinical features of 131 adult pathological gamblers. *Journal of Clinical Psychiatry, 62*, 957-962.

Griffiths, M. (2003). Adolescent gambling: Risk factors and implications for prevention, intervention, and treatment. In D. Romer (Ed.), *Reducing adolescent risk: Toward an integrated approach* (pp. 223-238). Thousand Oaks, CA: Sage Publishing Inc.

Griffiths, M., & Delfabbro, P. (2001). The biopsychosocial approach to gambling: Contextual factors in research and clinical interventions. *eGambling: The Electronic Journal of Gambling Issues, 5*. Retrieved May 7, 2015 from http://www.camh.net/egambling/issue5.

Gupta, R., Derevensky, J. L., & Ellenbogen, S. (2006). Personality characteristics and risk-taking tendencies among adolescent gamblers. *Canadian Journal of Behavioural Science, 38*(3), 201-213.

Gupta, R., Derevensky, J.L, & Marget, N. (2004). Coping strategies employed by adolescents with gambling problems. *Child and Adolescent Mental Health, 9*(3), 115-120.

Hill, K., Burch-Ragan, K. M., & Yates, D. Y. (2001). Current and future issues and trends facing student athletes and athletic programs. *New Directions for Student Services*, 93, 65-80.

Holden, W. (2012). *Mobile gambling: Casinos, lotteries, and betting 2012-2017*. Retrieved May 8, 2015 from http://www.juniperresearch.com/mobile-online-gambling/casinos-lotteries-betting.

Holdsworth, C. (2009). Between two worlds: local students in higher education and 'scouse'/student identities. *Population, Space and Place*, *15*(3), 225-237.

Horner, S., Asher, Y., & Fireman, G. D. (2015). The impact and response to electronic bullying and traditional bullying among adolescents. *Computers in Human Behavior*, *49*, 288-295.

Howieson, C., McKechnie, J., Hobbs, S., & Semple, S. (2012). New perspectives on school students' part-time work. *Sociology, 46*(2), 322-338.

Huang, J. H., Jacobs, D. F., & Derevensky, J. L. (2011). DSM-based problem gambling: Increasing the odds of heavy drinking in a national sample of US college athletes? *Journal of Psychiatric Research*, *45*(3), 302-308.

Jacobs, D.F. (1986). A general theory of addictions: A new theoretical model. *Journal of Gambling Behaviour*, *2*, 15-31.

Kaltiala-Heino, R., Lintonen, T., & Rimpelä, A. (2004). Internet addiction? Potentially problematic use of the Internet in a population of 12-18 year-old adolescents. *Addiction Research & Theory, 12*(1), 89-96.

Kim, Y., Sohn, D., & Choi, S. M. (2011). Cultural difference in motivations for using social network sites: A comparative study of American and Korean college students. *Computers in Human Behavior, 27*(1), 365-372.

LaBrie, R. A., Shaffer, H. J., LaPlante, D. A., & Wechsler, H. (2003). Correlates of college student gambling in the United States. *Journal of American College Health, 52*(2), 53-62.

Ladouceur, R. (2004). Perceptions among pathological and nonpathological gamblers. *Addictive Behaviors, 29*(3), 555-565.

Ladouceur, R., Vitaro, F., & Côté, M. A. (2001). Parents' attitudes, knowledge, and behavior toward youth gambling: A five-year follow-up. *Journal of Gambling Studies, 17*(2), 101-116.

Lee, H. S., Lemanski, J. L., & Jun, J. W. (2008). Role of gambling media exposure in influencing trajectories among college students. *Journal of Gambling Studies, 24*(1), 25-37.

Lightsey Jr, O. R., & Hulsey, C. D. (2002). Impulsivity, coping, stress, and problem gambling among university students. *Journal of Counseling Psychology, 49*(2), 202.

Lostutter, T. W., Lewis, M. A., Cronce, J. M., Neighbors, C., & Larimer, M. E. (2014). The use of protective behaviors in relation to gambling among college students. *Journal of Gambling Studies, 30*(1), 27-46.

McCormick, R.A. (1987). Pathological gambling: A parsimonious need state model. *Journal of Gambling Behaviour*, *3*(4), 257-263.

Monaghan, S., Derevensky, J., & Sklar, A. (2008). Impact of gambling advertisements and marketing on children and adolescents: Policy recommendations to minimise harm. *Journal of Gambling Issues*, *22*, 252-274.

National Center for Responsible Gambling. (2014*). Fact sheet: Gambling disorders among college students*. Retrieved May 7, 2015 from http:// http://www.collegegambling.org/just-facts/gambling-disorders-among-college-students.

National Collegiate Athletic Association. (2011). *NCAA rules orientation*. Retrieved October 9, 2015 from http://grfx.cstv.com/photos/schools/tcu/genrel/auto_pdf/2011-12/misc_non_event/2011BOYOrientation.pdf.

Neighbors, C., Lostutter, T.W., Cronce, J.M., & Larimer, M.E. (2002). Exploring college student gambling motivation. *Journal of Gambling Studies*, *18*(4), 361-370.

Nelson, T. F., & Wechsler, H. (2001). Alcohol and college athletes. *Medicine & Science in Sports & Exercise*, 33, 43-47.

Nelson, T. F., & Wechsler, H. (2003). School spirits: Alcohol and collegiate sports fans. *Addictive Behaviors*, *28*(1), 1-11.

Nowak, D.E., & Aloe, A.M. (2014). The prevalence of pathological gambling among college students: A meta-analytic synthesis, 2005-2013. *Journal of Gambling Studies, 30*(8), 819-843.

O'Brien, M. C., McCoy, T. P., Rhodes, S. D., Wagoner, A., & Wolfson, M. (2008). Caffeinated cocktails: energy drink consumption, high-risk drinking, and alcohol-related consequences among college students. *Academic Emergency Medicine*, *15*(5), 453-460.

Patel, D. R., & Luckstead, E. F. (2000). Sport participation, risk taking, and health risk behaviors. *Adolescent Medicine*, *11*(1), 141-155.

Shead, N. W., Derevensky, J. L., & Paskus, T. S. (2014). Trends in gambling behavior among college student-athletes: A comparison of 2004 and 2008 NCAA survey data. *Journal of Gambling Issues*, *29*, 1-21.

Responsible Gambling Council. (2014). *Annual report*. Retrieved May 8, 2015 from http://www.responsiblegambling.org/docs/default-source/rgc-research/2014-2015-annual-report.pdf?sfvrsn=6.

Riordan, B. C., Scarf, D., & Conner, T. S. (2015). Is orientation week a gateway to persistent alcohol use in university students? A preliminary investigation. *Journal of Studies on Alcohol and Drugs*, *76*(2), 204-211.

Room, R., Turner, N. E., & Ialomiteanu, A. (1999). Community effects of the opening of the Niagara casino. *Addiction*, *94*(10), 1449-1466.

Sevigny, S., Ladouceur, R., Jacques, C., & Cantinotti, M. (2008). Links between casino proximity and gambling participation, expenditure, and pathology. *Psychology of Addictive Behaviors*, *22*(2), 295.

Shaffer, H.J., Hall, M.N., & Vander Bilt, J. (1999). Estimating the prevalence of disordered gambling behaviour in the United States and Canada: A research synthesis. *American Journal of Public Health, 89*, 1369-1376.

Shaffer, H. J., LaBrie, R. A., & LaPlante, D. (2004). Laying the foundation for quantifying regional exposure to social phenomena: considering the case of legalized gambling as a public health toxin. *Psychology of Addictive Behaviors*, *18*(1), 40-48.

Stewart, D. O., & Gray, L. L. P. (2011*). Online gambling five years after UIGEA*. Washington, DC: American Gaming Association.

Stinchfield, R., Govoni, R., & Frisch, G.R. (2005). DSM-IV diagnostic criteria for pathological gambling: Reliability, validity and classification accuracy. *The American Journal on Addictions, 14*(1), 73-82.

St-Pierre, R. A., Walker, D. M., Derevensky, J., & Gupta, R. (2014). How availability and accessibility of gambling venues influence problem gambling: A review of the literature. *Gaming Law Review and Economics*, *18*(2), 150-172.

Stuhldreher, W.L., Stuhldreher, T.J., & Forrest, K.Z. (2007). Gambling as an emerging health problem on campus. *Journal of American College Health, 56*(1), 75-83.

Temcheff, C. E., Derevensky, J. L., St-Pierre, R. A., Gupta, R., & Martin, I. (2014). Beliefs and attitudes of mental health professionals with respect to gambling and other high risk behaviors in schools. *International Journal of Mental Health and Addiction*, *12*(6), 716-729.

Torres, C. A., & Goggin, G. (2014). Mobile social gambling: Poker's next frontier. *Mobile Media & Communication*, *2*(1), 94-109.

Vitaro, F., Arseneault, L., & Tremblay, R. E. (1999). Impulsivity predicts problem gambling in low SES adolescent males. *Addiction*, *94*(4), 565-575.

Weiss, S.M., & Loubier, S.L. (2008). Gambling behaviours of former athletes: The delayed competitive effect. *UNLV Gaming Research and Review Journal*, *12*(1-2), 53-60.

Wilcox, P., Winn, S., & Fyvie-Gauld, M. (2005). 'It was nothing to do with the university, it was just the people': the role of social support in the first-year experience of higher education. *Studies in Higher Education*, *30*(6), 707-722.

Williams, R. J., Connolly, D., Wood, R. T., & Nowatzki, N. (2006). Gambling and problem gambling in a sample of university students. *Journal of Gambling Issues*, *16,* 1-14.

Winters, K.C., Bengston, P., Dorr, D., & Stinchfield, R. (1998). Prevalence and risk factors of problem gambling among college students. *Psychology of Addictive Behaviours, 12*, 127-135.

Wintre, M. G., & Yaffe, M. (2000). First-year students' adjustment to university life as a function of relationships with parents. *Journal of Adolescent Research, 15*(1), 9-37.

Wood, R. T., & Williams, R. J. (2007). Problem gambling on the Internet: Implications for Internet gambling policy in North America. *New Media & Society*, *9*(3), 520-542.