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The Prevalence of Pathological Gambling Among College Students: A Meta-analytic Synthesis, 2005–2013

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Abstract The problem of gambling addiction can be especially noteworthy among college and university students, many of whom have the resources, proximity, free time, and desire to become involved in the myriad options of gambling now available. Although limited attention has been paid specifically to college student gambling in the body of literature, there have been two published meta-analyses estimating the prevalence of probable pathological gambling among college students. This present study aims to be the third, presenting an up-to-date proportion of those students exhibiting gambling pathology, and is the first to include international studies from outside the United States and Canada. The purpose of this study was to use the most up-to-date meta-analytical procedures to synthesize the rates of probable pathological gambling for college and university students worldwide. A thorough literature review and coding procedure resulted in 19 independent data estimates retrieved from 18 studies conducted between 2005 and 2013. To synthesize the studies, a random effects model for meta-analysis was applied. The estimated proportion of probable pathological gamblers among the over 13,000 college students surveyed was computed at 10.23 %, considerably higher than either of the two previously published meta-analyses, and more than double the rate reported in the first meta-analysis of this type published in 1999. Implications and recommendations for future practice in dealing with college students and gambling addiction are outlined and described for both administrators and mental health professionals.

Keywords Pathological gambling · College students · Prevalence · Meta-analysis

Introduction

The economic downturn and volatility of the past decade have seen an unprecedented number of cash-strapped state and national governments turn to and rely more heavily

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upon gambling revenue, expanding lotteries, approving more and more casinos, and establishing slot machines at existing racetracks (Stuart 2011). Even countries that do not officially permit gambling for its citizens because of cultural or religious reasons often sanction gambling venues for foreign visitors (e.g., Malaysia and South Korea) (Hodgins et al. 2011). This rapid growth is not only driving up profits, it is also resulting in a dramatic increase in gambling addiction. The concomitant cost to society is staggering, as a Baylor University researcher estimated that addicted gamblers cost the United States alone between $32.4 billion and $53.8 billion a year (Stuart 2011).

Theories of Gambling Addiction

The concept of gambling as an addiction not unlike drug and alcohol addiction, has been hotly debated over the past 30 years since the topic started receiving serious research and academic attention. Researchers in the 1980s had been mainly concerned with determining general population prevalence estimates and were not necessarily focused on an emergent theory of pathological gambling as they attempted to ascertain the extent of the addiction (Ladouceur 2004). Many writing on the subject had indicated that because of the fact that nothing specific was ingested, such as a drug or an alcoholic drink (i.e., a "psychoactive agent"), gambling could not be considered in the same vein as those addictions. The various neurochemical explanations attributed to the action of drugs was not satisfactorily generalized to the milieu of pathological gambling (Walker 1989). Some researchers, however, despite the absence of a psychoactive agent, argued that continued gambling research could support an entirely psychological account of addiction in general (Dickerson 2003).

Numerous articles have attempted to integrate Jacobs' (1986) General Theory of Addictions with regard to "excessive" gambling, and to ascertain if it is indeed applicable. Jacobs (1989) defines an addiction as "a dependent state acquired over time by a predisposed person in an attempt to relieve a chronic condition" (p. 35). Additionally, he postulates that a "conducive" environment accompany the predisposing factors in order for an addictive behavioral pattern to emerge. Thus, it is likely that by chance, the predisposed person may happen upon a novel experience (in this case, gambling), and this "chance triggering event" could motivate the person to actively seek out this activity in the future (Gupta and Derevensky 1998). These predisposing factors include abnormal physiological resting states, evidence of emotional distress, greater levels of dissociation, and comorbidity with other addictive behaviors.

In fact, Gupta and Derevensky (1998) provided good empirical evidence of Jacobs' General Theory of Addiction as applied to gambling in their path analysis of gambling among adolescents. The model tested by the two researchers showed a strong path from the physical and emotional predispositions, to a desired need for escapism, to the severity of gambling behavior. They concluded that "gambling severity was empirically found to be caused by the need to escape, or dissociate, which is fueled by aversive physiological and emotional states" (p. 41), giving strong support for gambling's applicability to Jacob's General Theory of Addictions as a coping response, albeit a negative one, to aversive life situations.

Blaszczynski and Nower (2002) proposed and outlined a detailed pathways model of problem and pathological gambling which is defined by three distinct subgroups of gamblers: those who are behaviorally conditioned, those who are emotionally vulnerable, and those who are antisocial and impulsivist gamblers. Their model attempts to "integrate

biological, personality, developmental, cognitive, learning theory, and environmental factors … into a theoretical framework" (p. 491). Incorporating much of Jacobs' General Theory of Addiction, Blaszczynski and Nower's model has some shared aspects common to the three subgroup pathways described: availability and access to gambling, classical and operant conditioning leading to the development of a habitual pattern of gambling, and the appearance of strong biased and distorted cognitive schemas. These schemas involve faulty beliefs about personal skill and control over outcome, attribution, superstitious thinking, and probability theory, among others.

More recently, medical research has shed light on an illness theory for gambling addiction, and has found that the most afflicted have the kinds of brain disorders found among drug and alcohol abusers. Using functional magnetic resonance imaging (fMRI), the brains of addicted gamblers have been scanned while viewing gambling-related images or gambling with real money. The results have shown that dopamine, a chemical that regulates human behavior, including weighing relative rewards and anticipation of those rewards, floods the nucleus accumbens (midbrain) of these gamblers. This rush of dopamine created something not found in non-addicts, namely, intense feelings of excitement and interest in the gambling addicts (Benston 2009).

What is still not known is exactly why gambling behavior stimulates dopamine production in some people. In order to get the dopamine rush, the gambling addict seeks out opportunities to gamble not for pleasure, but for the chemical rewards. This causes a vicious circle in which the person focuses on gambling at the expense of everything else, a hallmark of gambling addiction. Supporting this illness theory is the discovery and use of naltrexone, a drug used to treat drug addicts and alcoholics, in the treatment of pathological gamblers. This drug, which blocks dopamine release and reduces the addict's cravings, has been used in combination with counseling therapy to successfully treat gambling addicts (Grant et al. 2008).

Pathological Gambling

Gambling addiction as a psychiatric diagnosis is medically defined as *pathological gambling* in both the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision (DSM-IV-TR) (APA 2000) and the International Classification of Diseases, 10th revision (ICD-10) (WHO 1992). Both classification systems describe objective and behavioral diagnostic criteria, and classify pathological gambling as an impulse control disorder. Currently, the American Psychiatric Association is in the process of determining exactly how pathological gambling might be classified in the upcoming fifth edition of the DSM (Petry 2010), scheduled to be released in May 2013 (www.dsm5.org). Both the DSM-IV-TR and ICD-10 criteria are included here as Appendix 1.

As stated, with the venues for legalized gambling ever increasing, the need to identify, diagnose, and treat gambling addiction issues also grows exponentially. Conservative estimates of the number of individuals who gamble socially who may qualify for diagnosis as a pathological gambler vary from 2 to 5 %, thereby affecting millions of people in the United States alone (Lesieur and Blume 1987). Because of this, the ability to accurately screen for and treat these large numbers of people is of paramount importance. For the purposes of this paper, pathological gambling (also referred to in the literature and elsewhere as *disordered gambling* or *compulsive gambling*) can be very briefly defined as a condition in which the gambling behavior cannot be controlled, is compulsive as well as

destructive, with substantially negative consequences personally, socially, financially, psychologically, somatically, and vocationally.

Pathological gamblers have little to no control over their behavior and are often preoccupied with thoughts about gambling. Withdrawal symptoms, similar to those commonly experienced by those addicted to drugs or alcohol, may manifest themselves when the individual attempts to curtail or stop his or her gambling behavior. It is worth noting the discrepancies in the body of literature which often confuse the term *problem gambling*, a precursor to pathological gambling along the diagnostic continuum of gambling behavior, with pathological gambling as described above and diagnostically outlined by the DSM-IV-TR and ICD-10. They are most decidedly not interchangeable terms, even though some researchers (including a few cited in this paper and whose work is analyzed in this meta-analysis), tend to do so erroneously.

Prevalence and Risk Factors

Researchers estimate that approximately 75 % of college students have gambled legally or illegally during the past year (Barnes et al. 2010), and in addition, college students also appear to have the highest prevalence estimates of pathological gambling (Blinn-Pike et al. 2007). The addiction prevalence has often been surmised to be higher in this particular group than in the general population as referenced above, specifically, greater than the 5 % figure considered to be the upper limit overall, with various estimates computed between 6 and 8 % (Lesieur et al. 1991; Stuart 2011). Regardless of the various estimates of pathological gambling in the college student population, society is still ultimately faced with an affected number of young people which amounts to hundreds of thousands, and perhaps millions worldwide. As seen above, the societal cost is considerable, and in a global context, may be inestimable.

College students are particularly susceptible to falling into gambling addiction because of the confluence of several different factors, creating a so-called "perfect storm" in what we term as "The Five A's": *age*, with the college years being associated with a wide range of risky behaviors (LaBrie et al. 2003); *availability* of wide-scale legal (and illegal) gambling, including online gambling; *acceptability* of gambling operated by various government entities and integrated into mainstream culture; *advertising* and media which promote, glorify, and glamorize gambling as a sport; and *access* to monetary funds, especially from student loans and through numerous credit card solicitations. The result is a population group specifically targeted by the media, a vast number of whom have the resources, proximity, and free time to become involved in the myriad options of gambling available, such as casinos, Internet gambling, poker games on- and off-campus, state lotteries and numbers games, instant scratch-off tickets, and sports gambling (Blinn-Pike et al. 2007). This does not begin to include the vast number of illegal and informal modes of gambling (often involving a bookmaker) that may expose a student to personal safety issues, as well as the obvious and inevitable monetary losses.

Although most of the research in the field focuses on risk factors for college students, LaBrie et al. (2003) cited two specific protective factors: one's belief that religion and the arts are personally important, and having a parent who has obtained a college degree. Clearly, much more research is needed in this important area of identifying protective factors that may help buffer college students from the numerous negative consequences of problem gambling (Stinchfield et al. 2006).

Student-Athletes

The aforementioned personal safety issues with regard to gambling addiction (among a litany of other activities) is no more apparent than with a certain subgroup of the college student population, specifically student-athletes, who may find themselves as easy prey for bookmakers and other undesirable figures, which may put them at risk for physical harm. This is evidenced by the 2003 murder of a college student at the University of Wisconsin-Madison, and the 2007 murder of a varsity athlete at the University of Memphis. Both of these students' untimely deaths were ultimately linked back to gambling (McComb and Hanson 2009).

The area of pathological gambling in college students and student-athletes was generally ignored in favor of an initial focus on treatment of pathological gambling in adults and on addiction and prevention in adolescents. Gambling scandals in the late 1990s at Arizona State University, Boston College, and Northwestern University caught the attention of the National Collegiate Athletic Association (NCAA), its member institutions, the press, and fans of intercollegiate athletics. Other researchers began to believe that college students might represent the segment of our population with the highest rate of pathological gambling (Weiss and Loubier 2008); thus, interest in gambling behavior of student-athletes began to get some attention in the body of gambling addiction literature (Ellenbogen et al. 2008).

College student-athletes seem to be particularly at risk for developing serious gambling problems, perhaps in part due to their inherent competitive nature and willingness to engage in risky behaviors, as well as the culture of athletics in general (Weiss and Loubier 2008). In light of this, and because of the growing number of gambling-related scandals among student-athletes at member institutions, the NCAA has identified gambling by athletes as a major threat to the integrity of intercollegiate athletics and responded with the development of a comprehensive education program for student-athletes at NCAA member schools, and through the website www.dontbetonit.org (NCAA 2003).

One study that looked at gambling and other high risk behaviors in college students (Stuhldreher et al. 2007) surveyed over 1,000 Pennsylvanian college students, with part of their research devoted to noting patterns of gambling among student-athletes as compared to non-athletes. The researchers found that significantly more athletes (17 %) than non-athletes (9 %) reported frequent gambling ($p < .01$) and also had more gambling debt (5 %) than did non-athletes (1 %; $p < .001$). However, a significantly higher percentage of athletes actually sought help for gambling problems compared with non-athletes (7 vs. 4 %; $p < .05$). They also found that these significant differences were gender-specific to the men in the sample only.

Ellenbogen et al. (2008) used the 2003 NCAA survey data of over 20,000 student-athletes to determine whether certain student-athletes were more prone to frequent or problem gambling behavior. Looking at gender, race, type of sport played, and gambling mode, among many correlates, Ellenbogen and colleagues reported several interesting results. First, they found that Hispanic males reported the highest problem and pathological rates and that the percentage of gamblers was highest among Division III student-athletes, followed by Divisions II and I. In addition, the only significant difference between student-athletes in team and individual sports was that members of team sports were more likely to gamble. Student-athletes in high profile sports (i.e., football and basketball) were more likely that other student-athletes to gamble, gamble weekly, be at-risk gamblers, be pathological gamblers, and place more money on sports wagers.

Symptomology

Some of the symptomology of pathological gambling specific to college students often include substantially decreased academic performance, as well as physically and socially isolating behavior (McClellan et al. 2002; Petry and Weinstock 2007). This is in addition to considerable debt, missed classes, interpersonal relationship difficulties, and suicide (Stinchfield et al. 2006). College students who exhibit pathological gambling have also displayed traits of other high risk factors such as promiscuous and unsafe sexual behavior, alcohol abuse, and increased use of both tobacco and marijuana (LaBrie et al. 2003). Since limited attention has been paid specifically to college student gambling (Takushi et al. 2004) for various reasons, not the least of which is college students' perceived status as an intermediary group inconveniently sandwiched between adolescents and adults, there is a gap in the literature that has resulted in two limited published meta-analyses estimating the prevalence of pathological gambling among college students.

Today's college students are exposed not only to alcohol and drug use but also to gambling, both on campus and in the surrounding community. As mentioned, gambling disorders are associated with numerous negative consequences and are often highly correlated with other high-risk behaviors in the college student population (Engwall et al. 2004). To compound this, the proximity of a college or university to a casino appears to have a direct influence on an increased rate of gambling addiction in the college student population (Bailey et al. 1997; Adams et al. 2007), as is similarly reflected in the adult population whose rate doubles with a relatively "close" proximity to gambling venues (Sumitra and Miller 2005). Despite the prevalence of on-campus gambling, and while almost all schools have alcohol and drug policies, only 22 % of U.S. colleges and universities have formal policies on gambling (LaBrie et al. 2003) and only 7 % of administrators reported receiving in-service education about gambling-related issues for faculty and staff (McComb and Hanson 2009).

Comorbidity

Gambling disorders are highly comorbid with other psychiatric disorders, particularly those related to substance use (Petry 2005). In 2005, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), the largest study of its kind to date, found that pathological gamblers had a six times greater risk of having a diagnosis of alcohol abuse and a increased risk of 4.4 times for a substance use disorder, compared with non-gamblers. Additionally, rates of major depression and dysthymia were each about three times higher in pathological gamblers than in non-gamblers. Other comorbid disorders more common in pathological gamblers included generalized anxiety disorder, panic disorder, manic episodes, and specific phobias, including social phobia. In the NESARC sample, pathological gamblers also had an increased risk of having a personality disorder by a factor of eight (Hodgins et al. 2011).

With regard to substance use disorders, it appears that pathological gambling more often was a predictor of the subsequent onset of substance use disorders than vice versa (Kessler et al. 2008), bringing the idea of a bidirectional nature of the association between pathological gambling and psychiatric disorders into question, and introducing an avenue for further research. Clearly, college students, who are already at various risks for mental health issues due to the increased stressors of college life and academic challenges, as well as social adjustments, need to be paid special attention when it comes to ascertaining their mental health status, especially when presenting at counseling centers for gambling issues.

Motivations

All of this information begs the question "Why do college students gamble?" The reasons and motivations for student gambling are varied, and not just as simplistic as wanting to win some "easy" money. The limited research in this particular area has concluded that college students engage in gambling activity for a myriad of reasons, including for fun and excitement, competition, and to experience the thrill of winning (Neighbors et al. 2007), as well as to escape relationship problems, boredom, and perceived life stressors (Lesieur et al. 1991). Additionally, students gamble to take risks, experience uncertainty, and test their perceived skill, as well as to conform because of peer pressure and "because everyone else is doing it" (Burger et al. 2006, p. 710).

It is important to note the most recent trends in college student gambling behavior, namely, the poker craze on college campuses and the tremendous increase of Internet gambling among college students (McComb and Hanson 2009). Internet gambling is, by its very nature, particularly prevalent on college campuses, especially for technologically-savvy students who can easily engage in increasingly attractive online gaming environments in the privacy of their own dorm rooms and residence halls. As indicated above, though, this can result in a substantial increase in both social and physical isolation (Petry and Weinstock 2007). Additionally, the current poker craze, as evidenced by television shows on various networks, including the *World Series of Poker*'s Main Event on ESPN, as well as university-sponsored "poker nights" for undergraduates, establishes this form of gambling as a notable (and implicitly acceptable) presence on college campuses (McComb and Hanson 2009). To compound this, it is relevant to note that university students are a specific population that is currently and actively being singled out and targeted by poker marketing campaigns (Hardy 2006). In certain college residence halls, the poker boom is visible virtually everywhere, and its presence is practically ubiquitous, as can be noted from several students' perspectives on the issue (Caswell 2006): one student, working as a residence assistant, was quoted as saying, "It [poker playing] is everywhere, all the time" (p. 29).

Previous Meta-Analyses

The first published synthesis of the research material by Shaffer, Hall, and Vander Bilt in the *American Journal of Public Health* in 1999 examined prevalence rates of disordered gambling among adults, adolescents, and college students in the United States and Canada. The authors employed 119 prevalence studies overall, but were only able to locate 14 studies representing 8,918 students between 1987 and 1997 specifically related to identifying the percentage of college students with a pathological gambling addiction. They computed an overall estimated rate of 5.05 % [3.55 %, 6.56 %], as determined by the South Oaks Gambling Screen (SOGS), the most commonly used assessment. Different instruments were also used in the synthesis to ascertain the prevalence in the college population studied, but the authors only reported the estimate obtained from the SOGS specifically. Compounding this problem, the authors utilized the Kruskal–Wallis test for their synthesis, which implicitly assumes a fixed effects model (Blinn-Pike et al. 2007), and is arguably inappropriate for this type of single-group meta-analytical synthesis. Finally, and curiously enough, this meta-analysis did not include a list of any of the articles synthesized in its references section or elsewhere, thus making it virtually impossible to

verify *any* of the published results, including the prevalences estimated for college students.

The other meta-analysis published in this milieu was authored by Blinn-Pike, Worthy, and Jonkman in 2007 in the *Journal of Gambling Studies*, and identified 15 studies between 1999 and 2005 examining college student gambling rates among the 9,848 students represented. This particular meta-analysis had a much more stringent set of inclusion rules than the Shaffer meta-analysis. Most of the Blinn-Pike inclusion rules were also mirrored in this present synthesis, including the use of the SOGS (and in one case the SOGS-CT, a modified version) as the primary assessment instrument. The authors, using a random effects model for synthesizing the prevalence estimates, calculated an estimated proportion of disordered gambling among college students to be 7.89 % [5.37 %, 10.41 %], citing, in part, "the meteoric rise in gambling in the last two decades" (p. 175). Blinn-Pike, Worthy, and Jonkman also indirectly set the stage for this author's current research by stating that "college students are on a trajectory to report increased rates of disordered gambling" as gambling opportunities are predicted to increase (p. 181). Unlike the previous meta-analysis, the authors did manage to list the articles synthesized in the references section, but did not explicitly make it clear in the section (by asterisk, or otherwise) which studies were used, among the many articles cited as references.

The most recent prevalence meta-analyses in the last several years have appeared in the journal *International Gambling Studies* and were mostly concerned with general population estimates in Australia and New Zealand in respect to another assessment interest, the Problem Gambling Severity Index (PGSI) and also proximity to gambling venues.

The South Oaks Gambling Screen

Both aforementioned syntheses used the South Oaks Gambling Screen (SOGS), the *de facto* preferred instrument of choice in the literature. Developed in 1987 by Henry Lesieur and Sheila Blume, the SOGS is about as close to a proxy gold standard as is available in the literature (Toneatto 2008). The SOGS test items were selected based on a modification of the DSM-III diagnostic criteria for pathological gambling, and after several years of statistical research, were narrowed down to 20 items (Lesieur and Blume 1987; Shaffer and Hall 2001).

The SOGS was originally intended to screen for pathological gambling in clinical settings, but over the past 30 years, has since expanded to other purposes, populations, and settings, including prevalence estimate studies of pathological gambling in the general population (Stinchfield 2002). The past-year self-report version has indicated good overall classification accuracy (0.96), with better sensitivity (0.99) than specificity (0.75), indicating that the SOGS tends to more often identify false positives (Stinchfield 2002). The SOGS has demonstrated good validity and reliability among university students (Beaudoin and Cox 1999; Lesieur et al. 1991).

The SOGS is a self-report questionnaire with many of the items centered on financial issues, as well as the amount and type of gambling involved in by the individual. Response format is primarily dichotomous (yes/no) with some Likert-scale items and should take no more than 10 min to complete and score (Lesieur & Blume 1987). Questions such as "Did you ever gamble more than you intended to?" and "Have you ever felt like you would like to stop betting money on gambling, but didn't think you could?" are typical of the SOGS questionnaire. A score sheet is provided with easy instructions, with 0 indicating "no problem with gambling," 1–4 indicating "some problems with gambling," and 5 or more indicating a "probable pathological gambler." As the SOGS has been employed in the vast

majority of previous student gambling studies (Shaffer et al. 1999) as well as most current research, the use of the SOGS as the principal measurement instrument is a primary inclusion criterion for this research paper.

Purpose

This current review aims to analyze and synthesize the recent literature in this important area of addiction studies and contribute to the overall knowledge base of college students and the prevalence of probable pathological gambling, as well as fill the existing gap in the body of literature. By examining the research done between 2005 and the present, this writer is interested to discover if the overall rate reported by Blinn-Pike, Worthy, and Jonkman has changed measurably in the past 8 years, as these same researchers predicted in their 2007 meta-analysis. Because of the intense, systematic, and exponential proliferation of gambling venues and outlets, as well as the concomitant amount of advertising in various media, not only in the United States and Canada, but worldwide, it is not unreasonable to suspect that the previously reported rates may have increased appreciably since the publication of the Blinn-Pike, Worthy, and Jonkman meta-analysis. Also of note for this review is the influence of gender, specifically the male student percentage influence, on the reported rates, and whether the rates in public or private academic institutions differ significantly. Additionally, the influence of the age of the students surveyed on the reported rates is of interest, as well as whether the rates have increased in any noticeable fashion on a yearly basis from the period 2005–2013.

Hypotheses

The first hypothesis of this research synthesis is that the overall prevalence estimate of probable pathological gambling in college students will show an increase from the Blinn-Pike meta-analysis estimate of 7.89 %, based on the rationales explained above and outlined in the literature review. In the same vein, the second hypothesis is that this rate will show an increase on a biennial basis from 2005 to 2013. The third hypothesized result is that the prevalence rate will be directly related in a positive way to the percentage of male students in each sample. A fourth hypothesis is that the prevalence rates in public academic institutions, where students may come from less affluent families, and have more predilection towards gambling for monetary gain, will be higher in those student populations than in private institutions. Finally, it is hypothesized that the age of the student will have a substantial impact of the rate of probable pathological gambling, namely, that as the student ages and matures, the prevalence rates will decrease.

Data Collection

The process involved in obtaining information about probable pathological gambling and its prevalence among college and university students was thorough and exhaustive. In order to identify all possible studies between the years 2005–2013 inclusively, and using the search terms "gambling" and "college students" as the primary search terms, as well as using other synonyms such as "gaming" for "gambling," "disordered" for "pathological," and "university students" for "college students," PsycINFO returned 340 articles, PsycARTICLES resulted in 36 articles, ERIC identified 50 articles of interest, and

MEDLINE contributed 18 additional papers. *Dissertation Abstracts International* was also examined and contributed two completed dissertations which were ultimately used in this meta-analysis. Bibliographies of the past two published syntheses outlined above were not examined for possible contributions since this meta-analysis is concerned with articles that were published after the respective publication of each meta-analysis, however, they were consulted in terms of a initial review on the body of literature presented above.

In addition to this, this author used these aforementioned terms in search functions for the online library of the Responsible Gambling Council (www.responsiblegambling.org), as well as the online gambling library of the International Gambling Research Institute (www.gamblib.org). Both are comprehensive resources of scholarly articles in the gambling research field, which is still growing and relatively nascent in terms of generating academic work. Additionally, www.springerlink.com, the online resource for the company that publishes the seminal journal in the field, the *Journal of Gambling Studies*, among many other academic titles, was invaluable during the research process. Similarly, www.sciencedirect.com was helpful in obtaining additional information from other journals not covered by the Springer website.

In order to be included in this present analysis, the identified studies had to: (a) have been published in or after 2005 (and not have been included in the Blinn-Pike meta-analysis), (b) use the South Oaks Gambling Screen (SOGS) as the main gambling pathology assessment instrument, (c) use a score of five or greater on the SOGS as the marker for probable pathological gambling, (d) have the surveyed sample be comprised of a general group of college/university students exclusively, (e) have taken place in a non-clinical setting, and (f) report the percentage of the sample in the disordered gambling range with specified criteria for how the sample was categorized.

Applying these inclusion criteria to the numerous journal articles, papers, presentations, conference proceedings, reports, and dissertations identified resulted in 23 applicable studies. Of these, one study had to be omitted because the sole author of the article did not respond to three separate emails sent by this writer requesting additional information that was not fully discernible from the available online abstract. The final tally for this synthesis consisted of 22 discrete studies. The effect size of interest, namely, the percentage of students scoring 5 or more on the SOGS, where it was not given directly, was computed by dividing the amount scoring 5 or higher by the total amount of students surveyed. The variances for the effect sizes of interest were computed using the formula $\frac{p(1-p)}{n}$ (Borenstein et al. 2009), where p is the proportion of students scoring 5 or higher on the SOGS, and n is the total number of student surveyed.

Data Evaluation and Coding Procedures

As this synthesis is a single-group summary attempting to ascertain a certain prevalence rate, the study outcome was the percentage of those college students who scored a composite tally of 5 or greater on the SOGS, thus indicating a probable pathological gambler. Coding was done by the primary author and a fellow university researcher over the course of several weeks. The main items being examined for coding were the percentage of students scoring a 5 or greater on the SOGS, the percentage of male students, sample size, age characteristics of the student sample, research funding details, the country in which the study took place, and whether the students surveyed were enrolled in a public or private university, or both. Interrater reliability for these coded items were as follows: percentage

of students scoring a 5 or greater on the SOGS, 82 %; percentage of male students, 91 %; sample size, 82 %; funding details, 100 %; country in which the study took place, 100 %; whether the students were from a public or private university, 55 %. Discrepancies were resolved by a scheduled meeting between the two coders in which both went over the rationales for their respective decisions, and carefully re-read the texts, until both coders agreed upon the proper way to code any disputed or unclear item. There were no items upon which the two coders could not eventually come to an agreement.

Omitted Studies

Note that the interrater agreement listed in the previous paragraph reflects agreement on independent proportions that were gleaned from the thorough examination of the previously identified 22 studies. One study from an Australian journal (Blaszczynski eta l. 2008) had to be excluded because the same authors (in a different order of authorship) produced an article in an American journal with the exact same information, i.e., sample size, characteristics, prevalence rates, etc., and would thus be redundant data. In addition to this, another study had to be eliminated after consultation with the second coder, and after determining that the sample of students was of individuals who had already admitted to gambling "at least once a week," thus contaminating and vastly inflating the overall results.

Still another study was omitted because the group of students surveyed contained a smaller unreported number of participants who were university staff and faculty. Interestingly, a study of student gambling and casino proximity (Adams et al. 2007) was not included because the probable pathological gambling rate reported (0.9 %) was so unusually small that the authors themselves were nonplussed by it, and among the many limitations listed, specifically warned that "the data are not useful to estimate prevalence rates" (p. 13). Finally, one study (Goodie 2005) was determined to contain two different prevalence rates, with two different groups of students, thus resulting in a sole study containing two independent proportions for the purposes of this review. This ultimately resulted in 19 data points from 18 qualifying studies for this synthesis, more than either of the two previous published meta-analyses. See Table 1 for a complete alphabetical listing of the articles reviewed and utilized in this meta-analysis.

Data Analysis

The analyses were based on current meta-analytical techniques. The original methods were proposed by Hedges and Olkin (1985) and also described in Cooper et al. (2009). In our various analyses, we adopted either random-effects or mixed models. Random-effects weights were computed as $w_i^* = 1/(v_i + S^2)$, where the between-sample uncertainty (S^2) for k effects was estimated using restricted maximum likelihood estimator. When adopting mixed-effects models, both predictor variables and additional between-studies uncertainty in the effect variances are incorporated. All computations were conducted in R (R Core Team 2012), using the metafor package (Viechtbauer 2010). Categorical and regression analyses were conducted to examine differences due to gender, age, status as a public or private school, and year of each study's publication. For both continuous and categorical analyses, the results reported were based on mixed-effects models estimating a common between-study variance for each moderator. Weighted mean effects, standard errors, and Q statistics are presented within each analysis.

Table 1 Included primary studies

Study (years)	Publication type	College setting type	Country of origin	Number of students	Percentage scoring as PG
Arthur et al. (2008)	Journal	Public	Singapore	148	8.7
Burger et al. (2006)	Dissertation	Public	USA	264	3.0
Butler (2011)	Dissertation	Private	USA	270	3.1
Fortune and Goodie (2010)	Journal	Public	USA	72	32.4
Goodie 1 (2005)	Journal	Public	USA	200	16.0
Goodie 2 (2005)	Journal	Public	USA	384	23.0
Kido and Shimazaki (2007)	Journal	Public	Japan	96	4.2
Kuentzel et al. (2008)	Journal	Public	USA	191	6.8
Locke et al. (2013)	Journal	Public	USA	1,979	7.3
Moodie (2008)	Journal	Both	Scotland	1,483	3.9
Oyebisi et al. (2012)	Journal	Both	Nigeria	2,400	14.2
Parker et al. (2005)	Journal	Private	Canada	562	8.7
Petry and Weinstock (2007)	Journal	Both	USA	1,356	11.8
Platz et al. (2005)	Journal	Public	USA	995	11.05
Tang and Wu (2009)	Journal	Both	China	979	6.4
Weinstock et al. 1 (2007)	Journal	Private	USA	159	25.0
Weinstock et al. 2 (2007)	Journal	Public	USA	1,007	8.9
Wickwire et al. 1 (2007)	Journal	Private	USA	302	6.0
Wickwire et al. 2 (2008)	Journal	Public	USA	233	6.6

Both both public and private colleges, *PG* pathological gambler

Dependence

In meta-analysis, independence of the effects is an essential assumption of most standard analyses (see Becker 2000). In our meta-analysis, one study (Goodie 2005) contributed two data points. However, given that these two data points are from independent samples (i.e., the research reported two separate results with different sets of participants), the assumption of independence was not violated.

Publication Bias

Publication bias occurs because statistically significant results are more likely to be published than non-significant results. Thus, publication bias should be examined in every meta-analysis. When publication bias (Rothstein et al. 2005) exists, meta-analysis results may not fully represent the population of interest. Thus, both published and unpublished studies were included in this review. Publication bias was assessed via a commonly used graphical representation (i.e., funnel plot) and Egger's regression test. As can be seen in Fig. 3, there is a substantial degree of asymmetry in the funnel plot, and only six data

points actually fit inside the so-called "funnel." In addition, the results of the Egger's regression test indicated that there is statistically significant asymmetry ($z = 4.15$, $p < .05$). These two assessments of publication bias indicate that the results of this meta-analysis should be interpreted with some caution. However, there are two good reasons to suspect that perhaps publication bias is not a major issue or concern for this particular meta-analysis. First, after performing the "trim and fill" procedure (Duval and Tweedie 2000), several data points appear below 0.00 on the "observed outcome" (i.e., percentage) scale, which, in a prevalence study incorporating percentages/proportions, is obviously not possible (see Fig. 4). Second, studies such as the ones analyzed in this report, which are simply percentages of college students scoring a particular number on a given assessment instrument, seemingly do not have any vested interest in whether these proportions are comparatively "low" or "high," and are merely reporting the overall results, thus making any claims of publication bias in this present study tenuous, at best. None of the articles utilized were evaluating a treatment effect or protocol, so it would seem none would have any vested interest in inflating (or deflating) the proportions.

Results

A forest plot of the studies included in the synthesis as well as a frequency histogram of the 19 effect sizes are presented in Figs. 1 and 2 above. The estimated percentages of probable pathological gamblers among college students ranged from 3.00 to 32.00 % with a median of 8.70 %, and the distribution was slightly positively skewed. The overall weighted-average estimated percentage of probable pathological gamblers among college students under the random-effects model was 10.23 % ($SE = 1.56$, $p < .05$), with a 95 % *CI* from 7.17 to 13.29 %. The homogeneity test ($Q_T(18) = 330.30$, $p < .05$, $I^2 = 97.54$ %) indicated that the effects did not all arise from the same population. This very substantial heterogeneity is consistent with syntheses of single-group summaries (Borenstein et al. 2009). Next, moderator analyses to examine potential sources of variability were conducted. For categorical analyses, the weighted mean effects, standard errors, and Q statistics are presented in Table 2 for the three data sets.

Moderators

While the primary purpose of this research paper was to conduct a meta-analysis of the studies reporting the prevalence proportions of probable pathological gambling among college and university students, several moderators of interest were examined to determine their possible impact on these rates, and any implications that may arise (Fig. 3).

Country

This synthesis included 13 studies done in the United States and Canada, as well as five in other countries (China, Japan, Nigeria, Scotland, and Singapore). To that end, country of origin was analyzed as a moderator and as such we obtained a probable pathological gambling prevalence that could be generalized to the population of North American college and university students. A categorical analysis was conducted to compare the effect values from the studies that reported on students in the United States and Canada (14 effects from the 13 studies) to five effects that did not. An initial fixed-effects test indicates between-groups differences. However, the difference between the two sets of

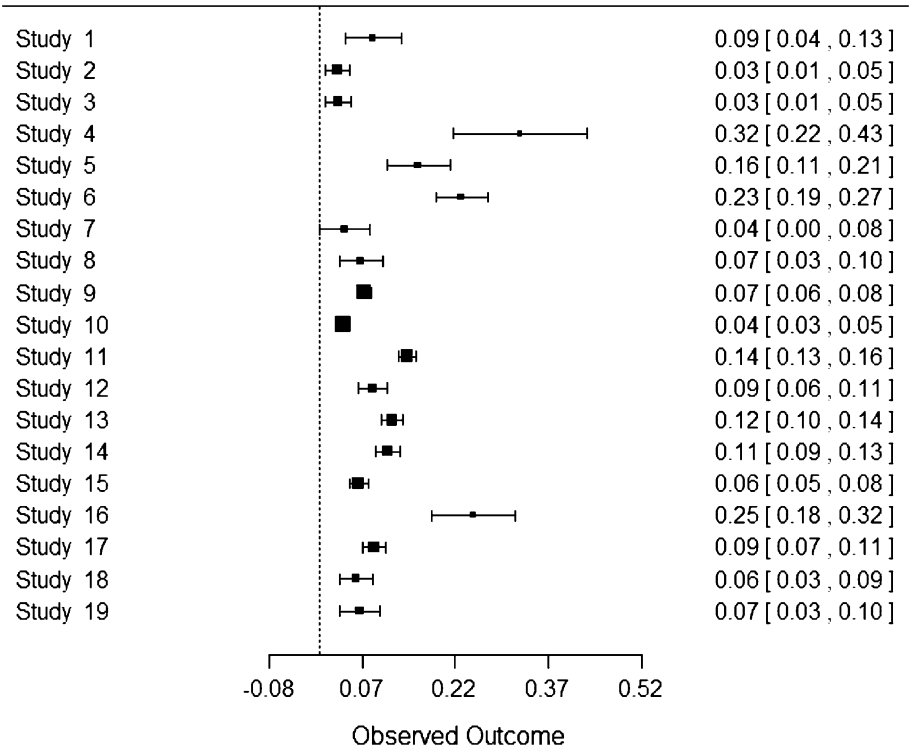

Fig. 1 Forest plot of studies included in the synthesis. *Note.* Study numbers correspond with their alphabetical order as listed in Table 1

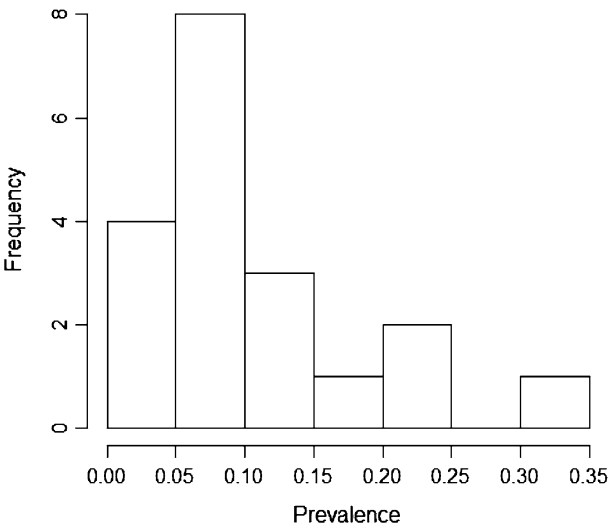

Fig. 2 Distribution of prevalence values

Table 2 Results for moderator analyses

Categories	Prevalence		
	k	Mean and (*SE*)	$Q_{Residual}$
Overall	19	10.23* (1.56)	330.30*
Categorical moderators			
Country (Q_B (1) = 1.12)			
US and Canada	14	11.26* (1.85)	179.97*
Other	5	7.50* (3.03)	143.20*
School type (Q_B (2) = 0.19)			
Public	11	10.87* (2.23)	116.97*
Private	4	10.06* (3.67)	42.96*
Both	4	9.07* (3.56)	165.10*
Continuous moderators			
Gender (Q_B (1) = 0.84)			
Slope	19	−0.01 (0.01)	323.32*
Age (Q_B (1) = 1.71)			
Slope	14	−1.72 (1.31)	203.72*
Year (Q_B (1) = 0.19)			
Slope	19	−0.31 (0.72)	328.96*

The degree of freedom for $Q_{Residual}$ are $k - 1$; k = number of effects

* $p < .05$

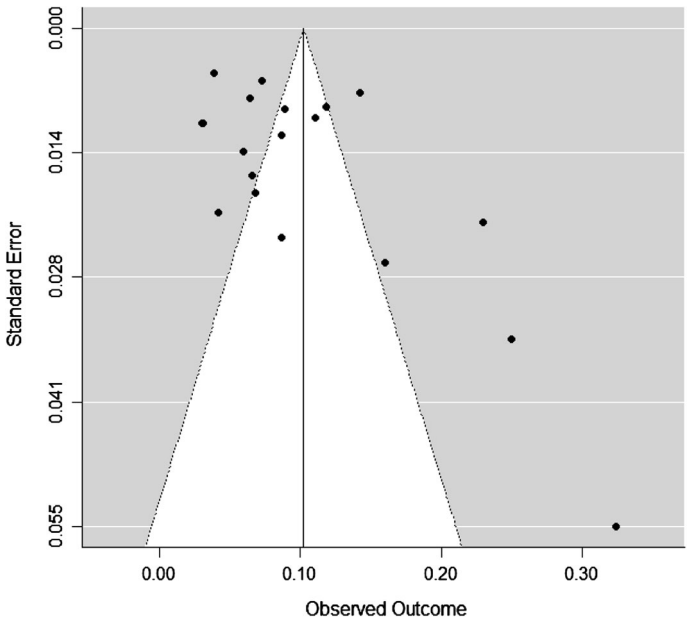

Fig. 3 Funnel plot of studies included in the synthesis. *Note.* Though it may appear that only 18 data points are represented in this plot, the first blot furthest to the *left* is actually two convergent data points, and this can be confirmed by enlarging the figure

effects disappeared when the additional unexplained variation was incorporated into the analysis ($Q_B(1) = 1.12$, $p = .30$). Significant variation was found among both set of effects. Specifically, for studies reporting on students in the United States and Canada ($Q_R(13) = 179.97$, $p < .05$) and for studies reporting on students on other countries ($Q_R(4) = 143.20$, $p < .05$). Nonetheless, under mixed-effect model, the average weighted mean for the United States and Canada was 11.26 % ($SE = 1.85$) and for others was 7.50 % ($SE = 3.03$), both were different from zero. This indicates that on average the percentage of studies reporting on students in the United States and Canada are a point higher overall than the overall percentage calculated and reported above. Incidentally, the five non-North American studies were lower than the overall and U.S./Canadian rates (Fig. 4).

School Type

This study was also designed to examine whether the students' enrollment in either a public or private university had any substantial effect on the prevalence rates reported. The studies were grouped as "public" ($k = 11$), private" ($k = 4$), or "both" ($k = 4$) for the studies had a mix of both public and private students in the sample. The between-groups test was not statistically significant with $Q_B(2) = 0.19$, $p = .91$, indicating that this moderator did not explain any differences among the effects under the mixed-model. The three average weighted effects differed from zero, with mean effect sizes of 10.87 % ($SE = 2.23$), 10.07 % ($SE = 3.67$), and 9.07 ($SE = 3.56$), for public, private, and both types of schools respectively. The three Q_R were significant, indicating that effects within group results varied more than expected by chance.

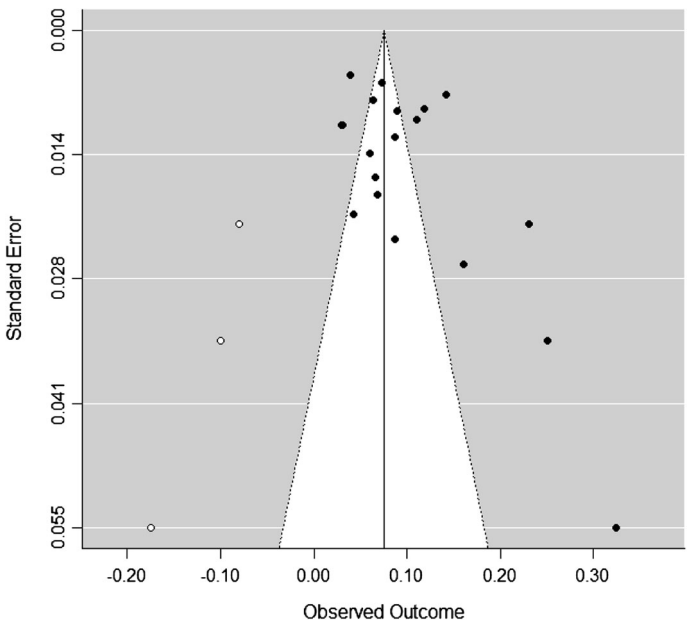

Fig. 4 Funnel plot of studies using the "trim and fill" procedure

Gender

The influence of gender on the results cannot be underestimated, given that males have a higher prevalence of gambling in general (Oster and Knapp 1998) and of pathological gambling (Lesieur et al. 1991). To that end, the studies were examined to see how the percentage of male students in the samples influenced the prevalence rates. Those effects ($k = 5$) that did not report a gender breakdown were not included. Quite coincidentally, these five omitted studies were the international studies, and thus the following statistics also represent the U.S./Canadian studies only. However, using "percentage of male students" as a moderator variable in a weighted regression model, the initial variability that this model explained disappeared when the additional unexplained variation was incorporated into the mixed-model analysis ($Q_M(1) = 0.84$, $p = .36$). Thus, percentage of male students did not relate significantly to the size of the effects under the mixed-effects model ($b = -0.0001$, $SE = 0.0001$).

Age

Average age of student sample was used as a moderator variable in a regression model for those effects ($k = 13$) which provided such information. The initial explanatory power of the model under fixed-effect tests disappeared when the additional unexplained variation was incorporated into the mixed-model analysis ($Q_M(1) = 1.72$, $p = .19$). This result suggests that the student's age does not impact the prevalence in a statistically significant fashion. More specifically, as the age increases by 1 year, the rate of probable pathological gambling goes down by 1.72 % ($SE = 1.31$, $z = -1.31$, $p = .19$). Thus, it appears then that the age of the student does not have any influence one way or another in terms of the prevalence of probable pathological gambling.

Year of Publication

The final predictor that we examined was the year of publication of the study. The initial variability that this model explained disappeared when the additional unexplained variation was incorporated into the mixed-model analysis ($Q_M(1) = 0.19$, $p = .67$). Thus, year of publication did not relate significantly to the size of the effects under the mixed-effects model ($b = -0.31$, $SE = 0.72$).

Discussion

This is the third reported attempt to utilize a meta-analytical approach to synthesize the prevalence rates of pathological gambling among college and university students, and the first to include international studies from outside the United States and Canada. The procedure allowed for the synthesis of findings across multiple sources of estimates. The first meta-analysis was reported by Shaffer et al. (1999) using 14 studies with college students, and the second synthesis was reported by Blinn-Pike and colleagues in 2007, and utilized 15 studies. This present study exceeds both, synthesizing 19 independent estimates from 18 studies, and encompassing over 13,000 college students.

Methodology

The prevalence estimate for college students reported here (10.23 %) was higher than that reported by Blinn-Pike and colleagues (7.89 %) in 2007 and more than double the rate reported by Shaffer et al. in 1999 (5.05 %). In fact, the percentage of college students with probable pathological gambling reported here is indeed higher as hypothesized at the onset of this synthesis, but considerably larger than we had anticipated. The 10.23 % estimated in this paper is very close to the 95 % confidence interval's upper bound of the Blinn-Pike estimate. Even after controlling for the influence of international reports, the prevalence rate actually went up more than one percent (11.26 %) when attempting to generalize to the population of North American college and university students.

Second, the methodologies differed in the present study from the first two published meta-analyses in several significant and important ways. The more recent meta-analysis (Blinn-Pike et al. 2007), which was more similar in methodologies to this present study, did not include dissertations, unpublished reports, or international studies among its studies analyzed. However, unlike the first meta-analysis published in this milieu (Shaffer et al. 1999), this present study and the Blinn-Pike study used a random effects model to calculate the overall prevalence rate. Shaffer and colleagues utilized the Kruskal–Wallis test, which implicitly assumes a fixed effects model (Blinn-Pike et al. 2007), and is arguably inappropriate for this type of single-group meta-analytical synthesis.

While meta-analysis is the correct statistical tool for synthesizing these estimates in the state of the research regarding college student gambling, it is necessarily limited by the amount and content of the literature involved. The large degree of heterogeneity reported here resulted in a relatively wide confidence interval for the prevalence of pathological gambling in college students [7.17 %, 13.29 %], but it is interesting to note that the prevalence estimate reported by Blinn-Pike et al. (2007) is close to the lower bound of this present study's confidence interval. Additionally, this research's estimated lower bound, in turn, is well above the synthesized estimate reported by Shaffer and colleagues in the first meta-analysis conducted in this milieu in 1999.

Finally, in terms of the hypotheses presented earlier in this paper, it appears that, out of the five hypotheses stated, only one was actually shown to be accepted, namely, that the rate of probable pathological gambling in college students has increased appreciably since 2005. The research presented herein does not support the influence of age of the undergraduate student, nor the type of institution (public or private) which the student attends, and not the year in which the study was published on those proportions.

Limitations

Although this meta-analysis contains more studies encompassing a larger number of students surveyed than either of the two previous meta-analyses, it is, however, not without its limitations. As indicated earlier in this paper, while the SOGS has demonstrated good validity and reliability among university students (Beaudoin and Cox 1999; Lesieur et al. 1991), it does tend to more often identify false positives (Stinchfield 2002). However, the SOGS' versatility and use in the vast majority of research articles makes this instrument hard to dismiss. While there are other relevant and psychometrically acceptable instruments available to assess probable pathological gambling (e.g., the Inventory of Gambling Motives, Attitudes, and Behaviors), none are used as commonly as the SOGS is in its various forms in the United States and abroad, both clinically and in research. The five

identified international studies did report evidence of sufficient validity and reliability estimates for the cases in which translated versions of the SOGS were implemented, however, future meta-analyses may want to include other instruments for assessing gambling pathology in the college student population.

Also, the amount of studies utilized for this synthesis was necessarily limited by the somewhat narrow range of years (2005–2013), but this was a function of the proposed study itself, and its stated purpose to provide a contrast and comparison to the other previous two meta-analyses in a chronological context. The amount of international studies was relatively small ($n = 5$) as well because of this, and also because of the specific usage of the SOGS as the assessment instrument of choice, as outlined above. In addition to this, the studies that were identified as candidates for this present synthesis were not consistently reliable in terms of reporting certain demographic information of interest which made coding for such items as the male/female SOGS score breakdown impossible (in fact, none of the studies reported this).

Implications and Recommendations

If, as it appears, the rate of pathological (e.g., disordered) gambling among college students is dramatically on the rise, then certain issues need necessarily be addressed in the near future. The vast proliferation and glamorization of gambling in terms of increased gaming venues, media attention, Internet gambling sites, and states' continued emphases on lotteries and scratch-off cards as a major stream of revenue, etc., all seemingly contribute in part to this startling prevalence rate increase. In addition, if these trends continue upward as is projected, it is only logical to assume that this increased rate in college students would result in a concomitantly increased rate in the adult population as these college students age. This, in fact, has already been evaluated and reported (Shaffer et al. 1999). Thus, the implications of this rate increase in a societal context cannot be underestimated. As seen at the start of this report, the monetary costs alone are staggering.

To that end, those in most direct contact with these college students, namely, colleges and universities, need to immediately take it upon themselves to develop and implement strategic gambling education and harm reduction with their students. This could easily be incorporated into the programs that students regularly receive with similar educational programs involving sex, drug, and alcohol education, as well as violence prevention. Even something as seemingly simple as educational brochures and materials distributed at new student orientation, as well as mental health and medical centers on campus would be a good place to start. This would be especially noteworthy and beneficial at university campuses which may be in close proximity to large, Las Vegas-style casinos, as well as other gambling outlets (the so-called "racinos"—racetracks where slot machines and video lottery terminals have been added) where the minimum age to gamble is often only 18, the same age as most incoming freshmen college students. Also, universities should seriously consider not sanctioning on-campus gambling activities including poker tournaments and casino nights.

Additionally, college counseling centers, if they are not already, should also include screening (with such instruments as the SOGS) for probable pathological gambling with those students coming in or referred for services, along with the other litany of disorders and problems generally screened for. Lesieur et al. (1991) suggested that all students coming into a counseling center for mental health issues be screened for problem gambling. Counseling personnel should at least be able to refer students to community resources to help those individuals identified as probable pathological gamblers such as Gambler Anonymous, gambling help-lines, and professional counseling services.

Appendix 2 contains a useful list of online college gambling resources. While not a focus of this particular prevalence study, certain sub-groups of students, it has been seen in the literature, such as student-athletes (as expounded upon in this study's introduction), students of color, those in fraternities and sororities, as well as gay/lesbian/bisexual/transgender students are at an increased risk for gambling problems above and beyond those prevalence estimates reported here, and this obviously needs to be researched further, and also be taken into account when counseling centers come into contact with such students (NCAA 2003; Rockey Jr. et al. 2005; Stinchfield et al. 2006; McComb and Hanson 2009).

Finally, it is sincerely hoped that this meta-analysis and the notable increase in prevalence estimates synthesized within the past 9 years will serve as a "wake-up" call to both researchers and university administration alike. The results presented should encourage not only more needed research in terms of the college and university student body as a distinct population unto itself, but also prompt colleges to develop and implement programs to address, educate, prevent, identify, and treat those students who are most at risk for pathological gambling problems. When one stops to consider that essentially one in 10 college students has a severe gambling problem, it is a surprising and sobering thought indeed. As has been demonstrated, in less than a decade, the prevalence of this serious psychological and social problem have gone up dramatically, with no apparent signs of slowing down in the foreseeable future.

Appendix 1

DSM-IV-TR Diagnostic Criteria for Pathological Gambling (312.31)

Diagnostic Criteria:

Persistent and recurrent maladaptive gambling behavior as indicated by at least five of the following:

1. is preoccupied with gambling (e.g., preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)
2. needs to gamble with increasing amounts of money in order to achieve the desired excitement
3. has repeated unsuccessful efforts to control, cut back, or stop gambling
4. is restless or irritable when attempting to cut down or stop gambling
5. gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)
6. after losing money gambling, often returns another day in order to get even ("chasing" one's losses)
7. lies to family members, therapist, or others to conceal the extent of involvement with gambling
8. has committed illegal acts, such as forgery, fraud theft, or embezzlement, in order to finance gambling
9. has jeopardized or lost a significant relationship, job, or educational career opportunity because of gambling
10. relies on others to provide money to relieve a desperate financial situation caused by gambling

Differential diagnosis
Distinct from

- Social and professional gambling
- Gambling in the context of a manic episode
- Problems with gambling in antisocial personality disorder

ICD-10 Diagnostic Criteria for Pathological Gambling (F63.0)

The disorder consists of frequent, repeated episodes of gambling that dominate the patient's life to the detriment of social, occupational, material, and family values and commitments.

Diagnostic Criteria:

a. Repeated (two or more) episodes of gambling over a period of at least 1 year.
b. These episodes do not have a profitable outcome for the person, but are continued despite personal distress and interference with personal functioning in daily living.
c. The person describes an intense urge to gamble which is difficult to control, and reports that he or she is unable to stop gambling by an effort of will.
d. The person is preoccupied with thoughts or mental images of the act of gambling or the circumstances surrounding the act.

Exclusions:

- Excessive gambling by manic patients (F30)
- Gambling and betting not otherwise specified (Z72.6)
- Gambling in dissocial personality disorder (F60.2)

Appendix 2

College Gambling Resources

1. BetCheck: www.responsiblegambling.org/betcheck/
   (a) Online tool that allows gamblers to assess their risk by answering their questions

2. Self Help Handbook for Problem Gambling: www.problemgamblingvictoria.ca/handbook/handbook_toc.shtm
   (a) This book is for adult gamblers who would like to address their problem gambling individually.

3. Gambling Decisions: www.gamingresearch.blogspot.com/2006/12/gambling-decisions program-news.html
   (a) Six-week program to help individuals abstain or control gambling

4. YMCA Youth Gambling Project: www.peterboroughymca.org/programs/ygp.htm
   (a) Gambling program for youth 8–24
5. Association of Problem Gambling Services Administrators: www.camh.net/egambling/pdf/jgi_15_christensen.pdf
   (a) A group that initiates collaboration among states for problem gambling services
6. National Council on Problem Gambling: www.ncpgambling.org
   (a) National organization that provides information on problem and pathological gambling including clinician gambling certification
7. Responsible Gaming Council: www.responsiblegambling.org/en/index.cfm
   (a) Website of a non-profit organization that address problem gambling preventions
8. Gambler's Anonymous: www.gamblersanonymous.org
   (a) Organizational website that provides lists of meetings and resources for those seeking assistance for pathological gambling.
9. Don't Bet on It: www.dontbetonit.org
   (a) Interactive resource for college athletes, developed by NCAA
10. Campus Blues: www.campusblues.com/gambling.asp
    (a) This site provides information on gambling on American campuses

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