

PREDICTORS OF DIFFERENT TYPES OF RECREATIONAL GAMBLING AMONG
COLLEGE STUDENTS

by

LISA A. HOUSE

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ABSTRACT OF THE DISSERTATION

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The current study examined the prevalence, frequency, and predictors of gambling among young adult college students. Nine hundred and fourteen undergraduates from a Mid-Atlantic public university completed a survey to assess gambling behaviors and problems, along with various psychosocial factors that may account for gambling behaviors. Among the entire sample, 53% (n= 461) reported participating in some form of gambling activity during the past year. The most frequently endorsed gambling activity was playing board or card games for money, followed by playing the lottery, and betting on games of personal skill. In contrast to expectations, online gambling was not prevalent. Most student gamblers in this sample gambled for recreational reasons; only 2.5% and 1.5% fell in the problem or pathological range, respectively. Hierarchical regression analyses found different predictors for the two types of gambling, gaming activities and sports betting. Being male and high on novelty/excitement seeking were significantly related to the number of gaming activities participated in during the past year by college students. Binge drinking showed a strong trend as a predictor. For sports betting, being male accounted for the greatest amount of

variance and binge drinking in the past year emerged as the only other significant predictor. Being Caucasian, however, showed a strong explanatory trend. Together, these findings provide valuable information about the predictors of college students' recreational gambling, which was found to represent the vast majority of all gambling behaviors among this sample of college students.

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Table of Contents

Title page.....	i
Abstract.....	ii-iii
Table of contents.....	iv-v
List of tables.....	vi
CHAPTER 1: Introduction.....	1
1.1 Statement of the Problem.....	1
1.2 Prevalence of College Student Gambling Behaviors.....	2
1.3 Demographic Variables and College Student Gambling.....	7
1.4 Social/Personal Predictors of College Student Gambling.....	10
1.5 Theoretical Underpinnings: Sensation Seeking and Recreational Gambling	17
1.6 The Current Study.....	19
CHAPTER 2: Method.....	22
2.1 Participants.....	22
2.2 Procedure.....	22
2.3 Measures.....	24
2.4 Data Analytic Procedure.....	30
CHAPTER 3: Results.....	33
3.1 Descriptive Statistics.....	33
3.2 Differences Between Gamblers and Non-Gamblers.....	34
3.3 Correlational Analyses for Gaming and Sports Betting.....	36
3.4 Regression Analyses for Gaming and Sports Betting.....	37
CHAPTER 4: Discussion.....	39

4.1 Limitations.....	45
4.2 Conclusions and Future Directions.....	46
References.....	50
Tables.....	54
Curriculum Vita.....	68

List of tables

Table 1 • <i>Descriptive Statistics for Participant Variables</i>	54
Table 2 • <i>Descriptive Statistics for Gambling Frequency in the Last Year, by Gambling Activity</i>	55
Table 3 • <i>Descriptive Statistics for Type of Sports Bet During the Past 12 Months</i>	57
Table 4 • <i>Descriptive Statistics for Possible Sources for Gambling Money During the Past 12 Months</i>	58
Table 5 • <i>Principal Component Analyses of the Gambling Frequency Items: Scale Items and Factor Loadings</i>	59
Table 6 • <i>Principal Component Analyses of the Sensation Seeking Items: Scale Items and Factor Loadings</i>	60
Table 7 • <i>Differences Between Gamblers and Non-gamblers on Correlates of Gambling</i>	61
Table 8 • <i>Correlations Among Study Variables</i>	63
Table 9 • <i>Hierarchical Logistic Regression for Gamblers versus Non-gamblers</i>	65
Table 10 • <i>Hierarchical Regressions: Gaming</i>	66
Table 11 • <i>Hierarchical Regressions: Sports betting</i>	67

CHAPTER 1

Introduction

Statement of the Problem

Gambling has increasingly gained social acceptance and grown in prevalence over the past decade. In 2004, the gross gambling revenue in the United States was reported to be close to 79 billion dollars, surpassing the total revenues combined from music and movie sales, sporting events, and other live entertainment (American Gaming Association (AGA), 2005). Compared to 1994 when only 30 Internet gambling sites existed, in 2005 there were more than 2,000 sites. It was estimated that 1.6 million U.S. college students gambled online in 2005, mostly on poker (AGA, 2005). Research has found that young adults, in particular, report extremely high rates of gambling, which may be attributed to numerous and inexpensive gambling venues available. These include cards and dice, lotteries, sports betting, casinos, and Internet games. While many individuals are able to control their gambling behaviors, others may develop gambling problems and experience subsequent adverse professional, financial, and social consequences. Understanding gambling behaviors of young adults is particularly important because most adult problem and pathological gamblers report the onset of their problems during adolescence or early adulthood (Lynch, Maciejewski, & Potenza, 2004; Winters, Stinchfield, Botzet, & Anderson, 2002). As a result, interest in the impact of gambling on young adults has become a public health concern.

Studies assessing lifetime gambling prevalence rates for college students have found rates ranging from 67% to 91%, with males reporting significantly higher rates than females (Engwall, Hunter, & Steinberg, 2004; Lesieur, Frank, Welch, White,

Rubenstein, & Moseley, 1991; Winters, Bengston, Dorr, & Stinchfield, 1998).

Additionally, some studies have found high prevalence rates of problem gambling among the college student population (e.g., Shaffer & Hall, 2001). With the increase in gambling venues, social acceptance of gambling, and access to widespread and inexpensive means of gambling, it is not surprising that studies have found high rates of gambling and associated adverse problems among college students. Although prevalence studies suggest high rates of gambling among college students, few studies have examined the specific nature of gambling among college students and various psychosocial factors that may impact gambling behaviors. Below, I review past research studies that have examined prevalence of college student gambling, demographic variables related to gambling, and social/personal predictors of gambling.

Prevalence of College Student Gambling Behaviors

In an early study, Lesieur et al. (1991) examined gambling behaviors among 1,771 college students from six colleges in five different states (New York, New Jersey, Oklahoma, Texas, and Nevada). Results indicated that 90% of males and 82% of females gambled in their lifetime and 23% of students reported gambling once a week or more often. Geographic differences were also found whereby students from Nevada, New Jersey, and New York gambled significantly more often than students from Oklahoma and Texas. For the entire sample, slot/poker machines (54%), playing cards for money (51%), casino games (49%), and lotteries (46%) were the most popular games.

Furthermore, this study measured problem and pathological gambling behaviors, finding that 15% and 6% of students met the criteria for these categories, respectively. Similar findings were observed by Winters et al. (1998) who conducted a survey with 1,361

students from two colleges in Minnesota and found that 91% of men and 84% of women gambled at least once in the past year. In addition, 12% reported gambling weekly or more often with slot/poker machines (67%) and lotteries (63%) the most preferred games. Of the entire sample, 4% of students scored in the problem gambling range and 3% were classified as pathological gamblers.

In a study using a sample of University of Nevada Las Vegas college students, Knapp, Rasmussen, and Niaghi (2003) examined casino gambling and sports betting among 359 undergraduates (36% male, 64% female) of whom 25% were under 21 years of age. Overall, 43% of the participants “never” gambled in a casino and 54% never participated in sports betting. On the other hand, 6% of students indicated gambling “once or several times a week”. In addition, 46% stated that they bet on sports “once in a while or more frequently”. Additionally, Knapp et al. assessed underage gambling and found 16% of underage students had gambled in a casino and 15% reported sports betting on one of their own college’s sports team. In another study with college students, Neighbors et al. (2002) assessed gambling behaviors among 184 college students (68% male, mean age 19.4) at a Northwestern undergraduate university in the United States. Participants were categorized based on their gambling problems using the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987). The SOGS is a valid and reliable instrument used to screen problem and probable pathological gambling behaviors. Findings showed that 45% of participants were non-problem gamblers (SOGS score of 0), 42% had a minimal tendency toward gambling problems (SOGS score of 1 or 2), 9% were subclinical gamblers (SOGS score of 3 or 4), and 4% were probable problem or pathological gamblers (SOGS score of ≥ 5). Similarly, Wulfert, Roland, Hartley, Wang,

and Franco (2005) found, in a sample of 80 male college students (77% Caucasian; mean age of 18.7), that 78% were social gamblers, 11% met criteria for problem gambling, and 11% fell in the probable pathological gambling range.

To examine gambling prevalence and problems among college students, Engwell et al. (2004) surveyed 1,348 undergraduates (64% females, 36% males) at the four campuses of Connecticut State University. Overall, 67% of the sample gambled in their lifetime, with males (76%) being more likely than females (62%) to report past gambling. The SOGS was used to measure gambling behaviors. It ranges from 0-12 and diagnoses *lifetime problem gamblers* (score of 3 or 4 points on lifetime items), *lifetime probable pathological gamblers* (5 or more on lifetime items), *current problem gamblers* (score 3 or 4 on current items) and *current probable pathological gamblers* (score 5 or more on current items). Engwell et al. modified the classification to include non-gamblers (never gambled), social gamblers (SOGS score of 0, 1, or 2), problem gambler (3 or 4 on SOGS), and probable pathological gambler (5 or more gambling problems on SOGS). Separate analyses were conducted by sex finding significantly more females (37%) than males (24%) were non-gamblers and similar rates of social gamblers were found among males (58%) and females (59%). Among the entire sample, significantly more males than females were classified as either problem (10% compared to 3%, respectively) or probable pathological (9% and 2%, respectively) gamblers

In another study, Nower, Derevensky, and Gupta (2004) created a 9-item instrument based on the DSM-IV criteria for pathological gambling. The DSM-IV classifies degree of disordered gambling based on the number of the following criteria that are exhibited: preoccupation with gambling behavior; a need to increase the amount

of the bet; repeated unsuccessful efforts to control, cut back, or stop gambling; restlessness or irritability associated with attempts to reduce gambling; using gambling as an escape mechanism; chasing (attempting to win back losses with more gambling); lying to family or friends to conceal behavior; committing illegal acts to cover losses; jeopardizing significant relationships; and having to rely on others for financial assistance as a result of gambling. Nower et al.'s measure classified college student participants as: (a) non-gamblers (no past-year gambling), (b) social gamblers (0 to 2 endorsed items), (c) problem gamblers (3 items), and (d) probable pathological gamblers (4 or more items).

Recruitment for Nower et al.'s study consisted of asking professors at five junior colleges in Montreal, Canada to distribute flyers to students in their classes. The final sample consisted of 1,339 students who ranged in age from 17-21. Of the entire sample, 81% reported past year gambling, 18% reported weekly gambling, 4% met criteria for problem gambling, and 4% met criteria for probable pathological gambling. In addition, rates of pathological gambling differed significantly by sex: 6.8% of males and 1.7% of females were classified as pathological gamblers.

The aforementioned empirical studies of college students can be compared with studies of youth in the general population. In a comprehensive longitudinal study, Winters et al. (2002) examined the natural course of gambling behaviors and problems from adolescence into young adulthood. Participants consisted of 205 youth from Minnesota who received assessments at three time intervals (ages 16, 18, and 24) over an 8-year period. The sample was evenly distributed by sex (51% males; 49% females) and primarily White (96%) with 95% having at least a high school degree at Time 3. All participants completed telephone interviews and were asked questions about their

gambling behaviors; the SOGS was used to measure gambling-related problems. Across all time points, rates of past year gambling were high and ranged from 80% to 88%. Rates for regular gambling (weekly or daily frequency for at least one game) were moderate ranging from 13% to 18%. Unlike previous research, this study categorized social gamblers as scoring a 0 or 1, *at-risk* gamblers with a 2 or 3 on the SOGS, and those scoring a 4 or higher as problem gamblers. According to Winters et al., those labeled at-risk represented an intermediate problem severity group and were at an increased risk for serious gambling problems, relative to those who scored a 0 or 1. Analyses showed that at-risk gambling rates decreased from Time 1 (15%) to Time 2 (12%) but there was a significant increase at Time 3 with a 21% prevalence rate. In contrast, the rate of problem gambling remained stable over time ranging from 2% to 4%.

In addition, the 2005 National Annenberg Risk Survey of Youth (NARSY) assessed 900 participants between the ages of 14 and 22 across the United States about risky behaviors, including monthly and weekly gambling activities. Compared to the findings from the 2004 NARSY survey, there was a significant increase in total *monthly* gambling (includes card playing, Internet gambling, lottery, slot machines, and sports betting) among young men from 48% in 2004 to 57% in 2005. A major contributor to this increase was attributed to card playing, which accounted for 70% of the monthly gambling activities.

It is important to note that the prevalence studies mentioned above found a range of gambling prevalence rates and this variation can be attributed to different study procedures (e.g., in-person survey compared to a phone interview), different samples in different geographical locations, varying measures of gambling pathology (e.g., SOGS

and DSM-IV), and different cut-off criteria for classification of gambling problem categories. Despite these methodological differences, studies have consistently found high rates of gambling and relatively lower, but concerning, rates of gambling problems among young adults.

Demographic Variables and College Student Gambling

Significant sex differences in gambling behaviors have been reliably found; male college students report higher rates of gambling and problem gambling than female college students. The NARSY (2005) survey found monthly card gambling for males increased from 35% in 2004 to 42% in 2005, which represented a significant increase. The rate of weekly card gambling among males also appeared to increase (10% to 13%), but this change was not statistically significant. Additionally, rates of monthly card gambling were higher among male college students (51%) compared to male high school students (37%). No significant change was found over time for females, who engaged in considerably lower rates of total gambling and card playing with 18% reporting monthly card playing (18% in 2004) and 3% reporting weekly card playing (2% in 2004).

The NARSY (2005) survey also found that individuals who play cards were more likely than other gamblers to report Internet gambling. For male card players, 20% reported at least monthly Internet gambling and 2% engaged in weekly Internet gambling. For females, 9% of the card players reported Internet gambling at least once a month and less than 1% reported weekly use. For both males and females, Internet gambling was significantly higher among college students compared to high school students.

In Knapp et al.'s study (2003), sex differences were also apparent with significantly more males (10%) than females (3%) reporting gambling "once or several times a week". In addition, there was also a significant difference between males (62%) compared to females (50%) in terms of betting on sports "once in a while or more frequently." Similarly, in a national study examining gambling behaviors among college students, LaBrie, Shaffer, LaPlante, and Wechsler (2003) found significantly more males (52%) than females (33%) reported gambling in the past year. Among the demographic variables, being male was the strongest predictor of being a gambler, followed by being older than 20 years of age, and not having a parent with a college degree. Lynch, Maciejewski, and Potenza (2004) also found significantly more male gamblers than female gamblers among 235 adolescents (16-17 years-old) and 355 young adults (18-29 years-old).

Significant sex differences were also found by Nower et al. (2004). Males, compared to females, reported more past year gambling (84% vs. 79%) and regular weekly gambling (26% vs. 11%). Overall, 4% of participants met the DSM-IV-J criteria for pathological gambling (e.g., endorsement of 4+ items). Sex differences were present with significantly more males (7%) than females (2%) classified as pathological gamblers.

Unlike previous studies, Engwall et al. (2004) examined differences by sex in preferences for gambling games. The top five games played by women were the lottery, casinos, slot/poker machines, bingo, and cards; while men preferred the lottery, playing cards, betting on sports, skill games, and casinos. In another study, Winters et al. (2002) examined gambling behaviors as a function of gender among 305 young adults in the

general population. This study is important in order to put college student gambling into context. Findings showed that males, compared to females, reported significantly more involvement in the gambling games and had higher rates of at-risk and problem gambling behaviors than females across time. The finding that being male was associated with elevated likelihood of membership in the at-risk and problem-gambling groups is consistent with research on college student specific populations.

Age has also been related to gambling behavior. A recent empirical investigation examined casino gambling frequency and gambling problems among college students with a specific focus on comparing underage students (under age 21) with those at legal age for casino gambling in the United States (Platz, Knapp, & Crossman, 2005).

Participants were students from the University of Nevada Las Vegas (n=995; 54% females and 46% males). In terms of age, 67% of the sample were under the legal age of 21. Platz et al. (2005) found that 93% of students over the age of 21 reported gambling at least once in a casino, compared to 60% of the 18-year-olds, 73% of the 19-year-olds, and 86% of the 20-year-olds. No significant difference between those over and under the age of 21 was found for casino game preferences, with both groups ranking video poker/slot machine play first, followed by live tables games, and sports betting. Lastly, gambling problems were assessed using the SOGS. The researchers found that 11% of the gamblers were classified as probable pathological gamblers (score of 5 or higher). Separate analyses were conducted by age with significantly more students over the age of 21 categorized as probable pathological gamblers than those under age (15% vs. 9%). A significant sex difference was also present with 13% of males and 7% of females falling into this category.

Social/Personal Predictors of College Student Gambling

LaBrie et al. (2003) examined gambling behaviors among college students, using the 2001 Harvard School of Public Health College Alcohol Study (CAS) survey, which included 10,765 students (56% females; 44% males) from 119 colleges throughout the United States. LaBrie et al. found that college students who reported past binge drinking, who considered parties to be very important, who were members of fraternities and sororities, who had unprotected sex, and who were less academically successful were more likely to gamble. Male gamblers were more likely than male non-gamblers to consider athletics as very important, be members of intercollegiate sports teams, and consider academics as less than very important. Further, of all the substance use categories, alcohol-related behaviors (past year use, past 30 day use, and binge drinking) were the most significant and strongest predictors of gambling behaviors. Cigarette use in the past year and 30 days and marijuana use in the past year also predicted gambling.

In an effort to expand on LaBrie et al.'s (2003) finding that college students who are members of fraternities or sororities had higher rates of gambling, Rockey, Beason, Howington, Rockey, and Gilbert (2005) surveyed 954 undergraduates (94% White) from nine universities in the southeastern United States and used bivariate analyses. Within the sample, 257 participants were members of Greek life (81 males, 176 females) and 665 were not members of fraternities or sororities (242 males, 423 females). No significant difference was found for lifetime prevalence of gambling in terms of Greek status. Findings showed that 82% of Greek-affiliated students and 80.5% of non-Greek-affiliated students reporting gambling behavior in the past. However, there were differences in the effects of Greek member on males and females. Males in fraternities had higher rates of

both probable problem gambling (14.8% compared to 5.4%) and pathological gambling (12.3% compared to 5.8%) than males not in fraternities. In contrast, no significant difference was found between female sorority members and non-members. Both groups reported similar rates of probable problem gambling (1.1% sorority members, 1.7% non-members) and pathological gambling (1.1% sorority members, 1.2% non-members). Furthermore, the average amount spent during one gambling episode was fairly low with the majority of both Greek-affiliated and non-affiliated students spending between \$10 and \$100 dollars.

When participants were asked if they knew anyone who had a gambling problem, the group they perceived most as having a problem was "friends or someone else important in their life" (Rockey et al., 2005). In addition, "friends or someone else important in their life" was the most common response given by both Greek and non-Greek-affiliated. No statistically significant association was found with Greek affiliation, reports of friends with a perceived gambling problem, and reports of problem and pathological gambling. It was concluded that gambling behaviors are influenced by social norms theory (peer pressure and permissive environment).

In regards to risk taking behaviors correlated with gambling, Engwall et al. (2004) found problem and probable pathological college student gamblers to have significantly higher scores for alcohol problems than social and non-gamblers. In addition, problem and probable pathological gamblers were more likely than other students to engage in binge eating and use of weight-control methods (laxatives, vomiting, and diuretics). Engwall et al. also found athletic participation to be significantly correlated with problem

and probable pathological gambling. Both male and female college student athletes were more likely to engage in disordered gambling than other students.

In a study examining the relationship of alcohol use and gambling among college students, Giacomassi, Stitt, and Vandiver (1998) measured reasons for gambling and found that, among the young adults, early-onset gamblers were more likely than adult-onset gamblers to gamble for excitement. Early-onset young adult gamblers were also more likely than any other group to gamble weekly or daily and more likely than adult-onset gamblers to report gambling with someone and the largest wins. In terms of mental health measures, gamblers were more likely than non-gamblers to report past-year alcohol use, drug use, and alcohol abuse/dependence. Two screening questions from the Diagnostic Interview Schedule measured depression, assessing a lifetime history of 2 weeks when the respondent either felt sad, empty, and depressed all the time or lost interest in most things previously found enjoyable. Among young adults, 32% of early-onset gamblers, 30% of adult-onset gamblers, and 27% of non-gamblers reported lifetime depression.

In addition to the predictors discussed above, other researchers who have studied college student gambling have suggested that individual personality factors may play a role in the development of gambling pathology. Empirical studies have found that the inability to control gambling urges and not being able to delay gratification were prominent among pathological gamblers (Nower et al., 2004). Furthermore, some studies have found high levels of sensation seeking (seeking out thrill and excitement, taking risks, being uninhibited, and having problems dealing with boredom) to be positively

correlated with gambling problems (Cunningham-Williams, Grucza, Cottler et al., 2005; Nower et al., 2004).

In order to study impulsivity as a possible mediator between depression and problem gambling, Clarke (2006) studied 159 New Zealand university students (127 females; 32 males) who reported past incidents of gambling for money. Problem gambling was defined by a score of 3 or greater on the SOGS. Of the entire sample, 16% met criteria for problem gambling; similar rates of males and females were included in this category. Findings showed that depression, impulsivity and problem gambling were significantly correlated, after controlling for sex and age. Regression analyses that included the entire sample indicated that impulsivity fully mediated the relationship between depression and problem gambling. Clarke suggested that for college students, impulsivity may be the mechanism that links their depression to increased gambling.

In the Canadian study described above, Nower et al. (2004) examined impulsivity, sensation seeking, coping, and substance use and their relationships to gambling. Results showed that, for both males and females impulsivity and one subscale of sensation seeking (intensity seeking) predicted problem and pathological gambling behaviors. No significant relationship was found between the novelty seeking subscale of the sensation seeking scale and problem or pathological gambling. In regards to stress coping styles, both male and female non-gamblers were more likely to engage in active and planning-oriented coping styles than social, problem, and pathological gamblers. In a comparison of coping styles between disordered gamblers (problem and pathological gamblers) and non-disordered gamblers (social gamblers and non-gamblers), Nower et al. found significant within group differences for male college students. Among males, problem

and pathological gamblers were significantly more likely than social and non-gamblers to use avoidant coping styles such as engaging in distracting activities, denial, and substance use. No difference in coping styles was found between disordered gamblers (problem and pathological gamblers) and non-disordered (social and non-gamblers) female college students. Only high levels of impulsivity and intensity seeking were predictive of female college student gambling problems.

In a sample of 248 college males, Breen and Zuckerman (1994) reported that impulsive-sensation seeking predicted gamblers who “chased” their losses (continued to gamble even after a sequence of losing bets with the intent to win back losses). Zuckerman (1994) developed the Impulsive-Sensation Seeking scale as a measure of a general need for excitement and impulsivity in seeking out activities. Results also indicated that participants who were highest in impulsive-sensation seeking also reported significantly greater interest in gambling than moderate or low impulsive-sensation seekers. It was concluded that gambling interest and participation may be motivated by the combined influence of impulsivity and sensation seeking.

In another study, Langewisch and Frisch (1998) compared non-pathological college student gamblers (scores of < 5 on the SOGS) with pathological college student gamblers (scores of 5 or higher) on measures of impulsivity, sensation seeking, and risk taking behaviors. The sample consisted of 144 male college students in Canada. Findings indicated that impulsivity, risky behavior, and sensation seeking were positively correlated with level of gambling involvement for male non-pathological gambling students. Contrary to their hypotheses, this relationship was not significant for male

pathological gamblers, suggesting that another mechanism may be functioning in gambling activity at the pathological level.

One area of continuing interest is the role of excitement and thrill (physiological arousal) as a major source of reinforcement for gambling behaviors (Wulfert et al., 2005). In a study assessing contributing factors to excitement of gambling, 80 male college students were recruited from introductory psychology classes. The mean age was 18.7 years and the majority of participants were Caucasian (77%). All participants had their heart rate monitored as they watched a video of an exciting horse race with a close finish. The experimental design consisted of randomly assigning students to one of four conditions: picking a horse without wagering, with predictions being either correct (Condition 1) or wrong (Condition 2), or wagering \$1 on a horse that would either win and pay a \$7 prize (Condition 3) or lose and pay nothing (Condition 4). In this study, winning and losing were experimentally manipulated. Before participants watched the horse race, a measure of their baseline heart rate was taken and participants gave a subjective rating of excitement on a 1–10 scale. During the race, three additional subjective ratings of excitement were completed: (1) when the horses reached the second turn; (2) when they were in the final stretch; and (3) when the race was over.

Findings indicated that students who had placed wagers showed significantly greater arousal and reported more excitement during the race than those who had predicted the winning horse without money (Wulfert et al., 2005). At the end of the race, subjective excitement levels were no longer significantly different, but significantly greater arousal between those who wagered money and those who did not was still

present. This study suggests that the possibility of winning money and high arousal may be powerful reinforcements for gambling behaviors.

In sum, empirical studies have consistently found male college students, compared to females, to report higher prevalence rates of lifetime gambling as well as problem and pathological gambling (Knapp et al., 2003; LaBrie et al., 2003; Lesieur et al., 1991; Platz et al., 2005; Rockey et al. 2005). Although sex differences are consistently found, the reasons for these findings are unclear. Possible explanations may be gambling motivations (Neighbors et al., 2002; Wulfert et al., 2005), varying personality variables such as impulsivity and sensation seeking (Nower et al., 2004), or some other difference between males and females. In regards to age, the above studies indicate that gambling is done by young people regardless if they are of the legal gambling age. A few studies, however, have found increased gambling frequency and problems experienced by individuals over the age of 20 compared to those under the age of 20 (LaBrie et al., 2003; Platz et al., 2005). Unfortunately, the aforementioned studies did not examine or report whether ethnic differences in gambling behaviors among college students are prevalent. However, studies of adults tend to suggest that minorities have more gambling problems than Caucasians (Stinchfield, 2000; Volberg, 2002).

Studies have also identified behavioral variables that have been linked to college student gambling include alcohol and drug use, academic disinterest, Greek life affiliation, athlete status, impulsivity, sensation seeking, and depression (Engwall et al., 2004; Lynch et al., 2004; Nower et al., 2004; Platz et al., 2005; Rockey et al., 2005). While research (e.g., Clarke, 2006; Lynch et al., 2004) has more consistently linked depression to gambling, the nature of the link between the two remains unclear, with conflicting views

on whether depression is primary or secondary to gambling. Similarly, the link between alcohol use and gambling is also open to interpretation, in that alcohol use may increase gambling behaviors or gambling may increase alcohol use. There clearly is a need to examine which of the above variables, in the context of all the other variables, help to explain the extent to which college students, in general, engage in gambling.

Theoretical Underpinnings: Sensation Seeking and Recreational Gambling

A theory that is consistent with the above empirical findings is that gamblers are motivated by the thrill, excitement, and emotional arousal that gambling provides (Zuckerman, 2007). Zuckerman (1994, 2007) called this motivation “sensation seeking” and considered it to be a personality trait that varies across individuals. He defined sensation seeking as “seeking out varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience.” In addition, Zuckerman (1994) suggested that an individual’s level of sensation seeking is a result of both biological and behavioral foundations.

According to Zuckerman (1994), sensation seeking is a normally distributed personality characteristic. Sensation seeking usually peaks in late-adolescence and then declines with age, and men typically demonstrate a higher overall sensation seeking tendency than women (Zuckerman, 2007). In addition, sensation seeking is conceptualized as being a multidimensional personality construct comprised of four components: thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility. Thrill and adventure seeking refers to an attraction to activities that involve risk and adventure such as water-skiing or street car racing. Experience seeking is defined as the pursuit of new sensations and experiences through activities such as music, art,

travel, drugs, or unconventionality in dress or behavior. Disinhibitors have the tendency to lose their self control and may engage in heavy drinking and sexual activities with strangers. Finally, the last component of sensation seeking is the tendency to get bored by repetitious and predictable experiences and having a lack of interest in situations with less than the optimal level of stimulation. Taken together, these personality characteristics make up the sensation seeking trait.

Since Zuckerman's (1994) theory of sensation seeking states that individuals elevated on sensation seeking have a strong need for varied and intense stimulation, gambling is thought to serve as a means to increase that positive arousal. Therefore, high sensation seekers are presumed to engage in more gambling behaviors than low sensation seekers because they are seeking, through gambling, an optimal level of arousal. In addition to intensity and variety, gambling also provides uncertainty and the risk of losing money, which also provides a higher level of arousal for individuals with high levels of sensation seeking. Thus, it is hypothesized that high sensation seekers continue to gamble, despite the negative consequence of losing money, for the purpose of maintaining a high level of arousal.

As mentioned above, Zuckerman (1994, 2007) assumed that individual differences in sensation seeking are potentially biologically based. He reported that sensation seeking has been linked to individual differences in monoamine oxidase (MAO) type B. High sensation seekers have lower levels of MAO type B, an enzyme involved in the regulation of neurotransmitters, particularly dopamine. It is suggested that low levels of MAO type B reduce the effects of dopamine so sensation seekers require extremely arousing activities to get the same pleasure a normal person would get from

everyday activities. Since dopamine helps generate a sense of satisfaction, high sensation seekers may tend to pursue activities, such as gambling, that stimulate dopamine production in order to get that sense of satisfaction. Zuckerman also reported that an association has been found between the Type 4 dopamine receptor gene polymorphism and novelty seeking, which supports the notion that sensation seeking may have a genetic basis.

In addition to biological influences, high sensation seekers differ from low sensation seekers in their preferences, emotional tendencies, and cognitive styles. For instance, high sensation seekers are more likely than low sensation seekers to be involved in risky activities such as extreme sports, dangerous professions, criminal activity, substance use, and reckless driving (Zuckerman, 1994; 2007). High sensation seekers are extroverted, nonconformists, and risk takers who have an intense need for autonomy. In addition, high sensation seekers tend to have better selective attention but worse sustained attention than low sensation seekers. They tend to perform well under stress and in the face of distractions, which may in turn, serve as another source of sensations.

If indeed, excitement seeking motivates gambling in some college students, individual differences in the degrees to which they vary in different types of sensation seeking may help explain individual differences in gambling among those students. In addition, it is important to consider the type of gambling activity and various gambling environments because it is possible that individuals high on sensation seeking may only engage in specific types of gambling that best provide them with the optimal arousal and excitement that they are seeking.

The Current Study

Few studies have examined the specific nature of gambling among college students and the various combinations of psychosocial factors that may impact on different types of gambling. The small number of extant studies that have assessed individual differences in gambling involvement offer conflicting explanations, with numerous psychosocial variables cited as possible predictors of college student gambling and problem gambling. The goal of the present study is to broaden the understanding of why young adults choose to gamble and examine the role of combinations of demographic characteristics and psychosocial variables in relation to gambling behaviors. More specifically, the present study aims to 1) examine current prevalence and frequency of gambling and game preferences, as well as gambling problems, in a cross-section of public university students; 2) test the relative extent to which variables suggested in past research explain individual differences when the predictors are tested together in separate regression analyses for different indices of gambling, with the goal of identifying their relative contributions for explaining variations in gambling in the context of each other; 3) test which predictors are associated with gambling and different types of gambling; and 4) examine whether sex moderates the relationships between combinations of predictors and gambling.

This study will add to the existing literature by using current 2005-2006 survey data from a large, diverse university sample; examining a range of gambling (including Internet gambling) and not just disordered gambling, examining the contribution of numerous predictors simultaneously; and examining whether the relationships between the combinations of predictors and gambling differ for young men and women. The potential predictors that will be examined in this study include: age, sex, ethnicity, athlete

status, GPA, Greek life affiliation, alcohol, marijuana, and cigarette use, sensation seeking, and depression. Based on previous findings (e.g., Engwall et al., 2004; Lynch et al., 2004; Nowers et al. 2004; Zuckerman, 2007), it is predicted that males will gamble more than females and that when all of the predictors are considered together, some type of sensation seeking will be the strongest predictor of gambling. Given that Greek affiliation (Rockey et al., 2005), athlete status (LaBrie et al., 2003) and alcohol use (Giacopassi et al., 1998) have been found to be more predictive for gambling behaviors among males, compared to females, sex also will be examined as a potential moderator.

CHAPTER 2

Method

Participants

This study collected data on 914 students; 480 students were sampled in Spring of 2005; 159 in the Fall of 2006; and 275 in the Spring of 2006. For the current study data from 896 students (47% male; 53% female), ages 18-26, from a large public Mid-Atlantic university are included. Participants over the age of 26 were not used in the analyses. Among the sample, 89% of participants were aged 18-21 years and 69% were Caucasian. In addition, 44% of the sample was comprised of student athletes and 8% reported being members of fraternities or sororities. See Table 1 for complete demographic statistics.

Procedure

Participants were recruited for a different study using three different methods: from the online psychology website pool, from undergraduate communication classes, and from sports teams (Yusko, Buchman, White, & Pandina, in press). Data collection took place at three different time points. In the Spring of 2005, a total of 171 participants were recruited from an undergraduate communication class, 70 participants were recruited from an online psychology website pool, and 239 participants were recruited from sports teams. In the Fall of 2006, 159 participants were surveyed from an undergraduate communication class. Lastly in the Spring of 2006, 122 participants were recruited from an undergraduate communication class and 153 participants were recruited from additional sports teams not surveyed the previous Spring.

Participants recruited through the online psychology website pool (n=70) were obtained from introductory psychology courses. As part of their course requirement,

these students had to obtain five “research participation units” (RPUs). For every half hour of participation in research, students obtained one RPU. Participants signed up for this study through a participant pool website that contained information about this approved psychology research study. All students recruited from the psychology website pool took the survey in small classrooms on campus. For the student sample ($n=452$) recruited from undergraduate communication courses, permission was obtained from University professors to recruit participants at the end of a lecture. These survey administrations took place in large classrooms. For participants recruited from sports teams ($n=392$), surveys were given to all members of a team before they participated in a mandatory, university required, alcohol education seminar, although participation in the study was voluntary. Large rooms provided by the athletic department were used to administer the survey to groups of student-athletes. Permission was obtained from the University’s athletic director to recruit and administer the questionnaire packet.

During all survey collections, a trained research assistant read a script that emphasized that the study was voluntary, participants could stop their participation in the study at any time, not answer questions they were uncomfortable answering, and responses would be anonymous. They were also informed that their data were protected by a Federal Certificate of Confidentiality. To make sure anonymity was maintained; participants’ gave verbal assent to the procedures (e.g., they consented to the study by choosing to fill out the survey). For the sports team data collections, no individuals chose not to participate. Individuals who declined participation in the undergraduate classrooms were excused before the survey was distributed. Because it was possible that athletes could be recruited through the undergraduate courses, the first page of questionnaire

asked whether or not an individual was a current university varsity athlete. If this item was checked, the student was excused from continued participation in order to avoid surveying a student twice.

The questionnaire took approximately 30 minutes to finish, and completed materials were placed by participants in a box at the front of the room. RPU credit was assigned for participants recruited through the psychology subject pool. In addition, participants were offered the opportunity to participate in a lottery to win one of two possible prizes (two \$50 American Express gift cards). Participants from the communication classes, none of whom were required to participate in research, were given an opportunity to enter a lottery with a chance to win two \$50 American Express gift cards or an MP3 player. For the athlete data collections, participants could enter a lottery to win one of three possible prizes: two MP3 players and an Xbox. If participants chose to participate in the lottery, they were given a contact sheet that asked for their name and preferred means of contact should they win a prize. The contact sheet was completed and returned to a separate box in another location within the room to assure anonymity of the survey. Lastly, participants were given the contact information for the principal investigator and for the Sponsored Programs Administrator with the Office of Research and Sponsored Programs. All procedures were approved by the university Institutional Review Board for the Protection of Human Subjects in Research.

Measures

A comprehensive survey instrument was administered to measure prevalence of health risk behaviors and attitudes among college students. For the variables of interest in this study, all participants received the same questions except that an additional question

assessing the frequency of playing Texas Hold'em (poker card game) was included in the student survey in the Spring of 2006 (n=122). Only the variables relevant to this study and used in this investigation will be discussed. These variables include sex, age, ethnic background, Greek status, athlete status, academic achievement, gambling prevalence and preferences, gambling problems, money sources for gambling, patterns of alcohol, marijuana, and cigarette use, depression, and sensation seeking.

Demographic characteristics. These questions obtained information on sex, age, and ethnic background. For analyses, sex was coded as 0 for females and 1 for males. Age was used as continuous variables. Ethnicity was coded as 1 (Caucasian) and 0 (all other minorities).

Gambling frequency and game preferences. Questions were adapted from the 2003 National Study on Collegiate Sports Wagering and Associated Health Risks (NCAA, 2003), a survey of 21,000 male and female student-athletes across all three NCAA divisions. All participants were presented with a list of 14 different gambling activities: cards, table games at a casino, bet on games of personal skill (e.g., pool, golf, bowling), stock market, bingo, dice or craps, wagered on the Internet, bet on sports cards or pools, bet on horse or dog races, wagered on intercollegiate games with a campus bookie, wagered on intercollegiate games with an off-campus bookie, bought lottery tickets, and played slot or electronic poker machines. For those surveyed in the spring of 2006, played Texas Hold 'em with friends or others was added to the list. Participants were asked to indicate the frequency with which they engaged in each of these gambling activities during the past 12 months. Using a 5-point Likert-type scale, participants endorsed answers ranging from "not at all", "less than once a month," "at least once a

month,” “at least once a week,” and “daily. Students who engaged in any one of these activities in the past year were coded as gamblers. The rest were coded as non-gamblers.

In order to reduce the number of gambling variables, principal component analysis (PCA) with varimax rotation was first performed for 14 items that measured the frequency of gambling. Texas Hold Em was excluded from the analysis because only a small number ($N = 122$) of students reported on this item. Based on the eigenvalues and scree plot, two main components were extracted. The two components explained 45% of the variance (35% and 10%, respectively). Table 5 presents detailed information on the component analysis.

Component 1 (items 1-7; 12-14) was called *gaming* because it represented betting money on games of chance (e.g., card playing, casino games, Internet games, lottery, bingo, etc.) that are typically structured or semi-structured activities and in some cases involve degrees of skill. The ten items that represented the gaming component were recoded to 0 (no participation) and 1 (any endorsement) and summed to provide a variable that represented the number of gaming activities that were endorsed but not frequency or intensity. Scores for the ten items could range from 0 to 10 (actual range 0-10).

The second component extracted from the PCA was comprised of items 8, 9, 10, and 11 and was termed *sports betting* because the four items represented wagering in some manner on some type of sport. Due to high kurtosis when the responses on the sports betting component item responses were summed, all items were recoded to 0 (no participation) and 1 (any endorsement), and two items (wagered on intercollegiate games with a campus bookie; wagered on intercollegiate games with an off-campus bookie)

were combined due to the low frequency of endorsement of both these items. Therefore, if participants reported “yes” to either one of the two items, they received a 1. As a result, there were a total of three items and scores could range from 0 to 3 (actual range 0-3) and provided a value that measured the number of sports betting activities endorsed but did not measure the frequency or intensity of each activity.

All participants were also presented with a list of 10 sports and reported whether or not they had ever bet on each of these sports. These items provided descriptive information on sports betting.

Gambling problems. Problem gambling was assessed with 11 items from the National Study on Collegiate Sports Wagering and Associated Health Risks survey (NCAA, 2003), for which participants were asked to indicate whether or not (yes/no), in the past 12 months, they experienced negative consequences associated with gambling including preoccupation, tolerance, loss of control, withdrawal symptoms and antisocial behaviors typically linked with problem gambling (e.g., lying and stealing). Sample items include: “Have there been periods in the past year where you spent a lot of time thinking about past gambling experiences, thinking about future gambling experiences, or thinking about ways of getting money to gamble?”; “Have you tried to cut down or stop your gambling several times in the past year and been unsuccessful?”; “Did you feel quite restless or irritable after your tried to cut down or stop gambling?”; “Have you committed any illegal acts (such as theft, forgery, embezzlement, or fraud) to enhance your gambling?” All items endorsed were summed to obtain to a total score that categorizes individuals as one of the following: non-gambler, social gambler (0-2 symptoms), problem gambler (3 or 4 symptoms), and pathological gambler (5 or more symptoms).

Money sources for gambling. All participants were given a list of ways in which individuals typically obtain money to gamble or to pay gambling debts. They were asked to check “yes” or “no” for whether they had used any of the possible sources for gambling money during the past 12 months. These money sources included: “personal savings, sale of personal property, family or friends, cash withdrawals from credit or bank cards, and loan sharks.” These items provide descriptive information in regards to the means in which college students obtain money for gambling.

Greek status, athlete status, and academic achievement variables. For Greek status, answers were coded as 1 for members and 0 for non-members. Similarly, athlete status was coded 1 for athletes and 0 for non-athletes. Academic achievement was measured by grade point average (GPA). Grade point average was a continuous variable (ranging from 1.09 to 4.00) with a higher score indicating higher academic success.

Alcohol, marijuana, and cigarette use variables. Alcohol consumption was assessed by items adapted from the Rutgers Health and Human Development Project (Pandina, Labouvie, & White, 1984) and the Harvard School of Public Health College Alcohol Study (Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002). Specifically, past year frequency of alcohol use and binge drinking were assessed. For alcohol frequency in the past year, there were eight possible responses: “I did not drink in the last year”; “Less than once a month”; “About once a month”; “Two or three times a month”; “Once or twice a week”; “Three or four times a week”; “Five or six times a week”; and “Once a day or more.” For binge drinking, participants were asked to provide their number of binge drinking occasions (defined as 5 or more drinks in a row for males and 4 or more for females on one drinking occasion) in the past year. For marijuana use, frequency of

use during the past year was assessed. Participants were asked, “How often have you used marijuana or hashish in the last year?” The seven possible responses were: “No use in the last year”; “Less than once a month”; “About once a month”; “Two or three times a month”; “One or two times a week”; “Three or four times a week”; and “Once a day or more.” To measure cigarette use frequency, non-athlete participants were asked, “On average, how many cigarettes do you smoke a day during the current semester?” Student athletes were asked, “On average, how many cigarettes do you usually smoke a day during your current or last off-season?” Participants provided a two digit number response.

Depression. The Profile of Mood States (POMS) Short Form (McNair, Lorr, & Droppleman, 1992) was used to measure depressive mood. The POMS features a list of 30 mood adjectives and participants used a 5-point scale ranging from 0 (not at all) to 4 (extremely) to indicate the degree to which each adjective described their mood “right now.” These 30 mood adjectives factor into six subscales: tension/anxiety, depression/dejection, anger/hostility, vigor/activity, fatigue/inertia, and confusion/bewilderment. This study used only the depression/dejection subscale in the analyses. This subscale includes 5 items: sad, unworthy, discouraged, lonely, and gloomy. Good internal consistency has been reported for college students with an alpha level of .86 (McNair et al., 1992). To equate for missing data, a total score was created that consisted of the mean score multiplied by the total number of items. This value was used in statistical analyses. A higher total score on the depression/dejection index represents increased depressive mood. In this study the alpha was .85.

Sensation seeking. Sensation seeking was measured with nine items that were adapted from Schafer, Blanchard, and Fals-Stewart (1994). Participants were asked how often they act or feel what was expressed in the statement and asked to rate this on a 5-point scale ranging from 1 (never) to 5 (always). Sample items include: “How often do you act on the spur of the moment without stopping to think?” “How often do you think that your actions are risky?” “How often do you go for thrills in life when you get a chance?” “How often do you like to experience new and different sensations?” From the 9 items, a mean score can be computed to provide an overall sensation seeking score. Internal consistency was measured by Schafer et al. (1994) who found a Cronbach’s alpha of .87. In this study, the alpha was .88.

A PCA with varimax rotation was used to reduce the sensation seeking items into a smaller number of components. The PCA yielded a solution of two components for these items based on the scree plot and eigenvalues. Please refer to Table 6 for detailed information on the PCA. Component 1 covered the *impulsivity/risk-taking* dimension of sensation seeking. The five items that comprised component 1 assessed the frequency of the following items: “Act on the spur of the moment without stopping to think?” “Get a kick out of doing things that are a little dangerous?” “Act quickly?” “Test yourself every now and then by doing something a little risky?”; “Think that your actions are risky?”. Component 2 represented the *novelty/excitement seeking* items. Four items comprised this component and they assessed the frequency of the following: “Look for a new experience?” “Try new things just for excitement?” “Go for thrills in life when you get a chance?” “Like to experience new and different sensations?”. The two components explained 64% of the variance (34% and 30% respectively). The reliability (Cronbach’s

Alpha) for component 1 was .74 and for component 2 it was .68. Based on these results, these two distinct components of sensation seeking were used in the analysis.

Data Analytic Procedure

Almost all variables had missing data ranging from 3 to 70 cases. However, t-tests and chi-squares indicated no difference between students included in the analyses and those excluded in terms of marijuana use in the past year, binge drinking in the past year, cigarette use, age, GPA, depression, novelty seeking, and impulsivity/risk taking. In addition, chi square analyses indicated that those included and those excluded did not differ significantly on any of the categorical variables, sex, athlete status, Greek life affiliation, and ethnicity.

First, descriptive statistics were computed to measure prevalence rates for various gambling behaviors and gambling problems and to examine proportions of non-gamblers, social gamblers, problem gamblers, and potential pathological gamblers in the sample. Frequency analyses were performed for every variable and each variable was examined for skewed distributions and kurtosis. Skew and kurtosis were acceptable for all variables. Correlations were computed to examine the relations between every study variable and every other and to check for multicollinearity. The next step of the data analyses consisted of t-tests and also chi-square analyses to examine sex differences on all of the study variables.

Next, hierarchical regression analyses were computed to examine the degree to which the study variables, when they are tested together in one model, account for variance in gambling behaviors. Separate hierarchical regression analyses, with the same independent variables in each model, were performed for the two gambling composite

variables. For each regression analysis, Step 1 tested for the main effects of the independent variables and Step 2 examined whether adding interactions between sex and each of the independent variables significantly improved the amount of variance accounted for. Independent variables were centered (e.g., the grand mean was subtracted from each response) before Step 2 was performed. In addition, because of the large N, the significance level was placed at $<.01$ for the study to increase the chances that statistically significant relationships would be meaningful associations and have acceptable effect sizes (Tabachnick & Fidell, 2007).

CHAPTER 3

Results

Descriptive Statistics

Overall, among the entire sample 53% (n= 461) reported participating in some form of gambling activity during the past 12 months. Among males, 65% reported some form of gambling behavior in the past 12 months, 42% of women reported doing so. Chi-square analyses demonstrated a significant difference between male and female college students, with significantly more males reporting that they had gambled ($\chi^2(1, N = 866) = 47.32, p < .001$). The most frequently endorsed gambling activity was playing board or card games for money with 50% of the entire sample engaging in such activities in the past 12 months, followed by playing the lottery, with 42% of participants engaging in this activity in the past 12 months. The next popular gambling activity was betting on games of personal skill (31% in past year). In contrast to expectations, 88% of students reported never gambling online (see Table 2).

For the four sports betting items (bet on sports cards or football pools, bet on horse or dog races, and wagered on intercollegiate games with a campus bookie/with an off-campus bookie), 32% of gamblers reported engaging in one or more of these activities. The most frequently endorsed sports betting item was betting on sports cards or football pools (17%), followed by wagering on horse or dog races (8%) (see Table 2). For the items assessing types of sports wagered on in the past 12 months, 19% of students reported betting on professional football and 11% endorsed wagering on college sports (see Table 3).

Among students who reported gambling in the past 12 months ($n = 463$), the mean number of gambling activities reported was three. In this sample, the most frequently reported means of obtaining money for gambling was using personal savings (25%), while 17% used cash withdrawals from credit or bank cards to obtain money for gambling (see Table 4). In an examination of problem gambling, 47% of participants were categorized as non-gamblers, 49% as social gamblers (0-2 symptoms), 2.5% as problem gamblers (3 or 4 symptoms), and 1.5% (5 or more symptoms) as compulsive/pathological gamblers.

Although this study found very few individuals meeting criteria for problem (2.5%) or pathological (1.5%) gambling, males were more likely than females to fall into one of these categories ($\chi^2(3, N = 866) = 60.77, p < .001$). For problem gambling, 5% of males compared to .05% of females met criteria and, for pathological gambling, 3% of males and .05% of females fell in this range. An ANOVA was performed to examine whether mean age differences across the four categories of gambling were present. No significant difference was found for age and the gambling categories. As a result of the low numbers of problem and compulsive gamblers, predictors of problem gambling could not be examined.

Differences Between Gamblers and Non-Gamblers

T-tests and chi-squares were performed to compare student gamblers versus non-gamblers on all the study variables (See Table 7). Chi-squares were used to assess differences between gamblers and non-gamblers on sex, Greek life affiliation, ethnicity, and athlete status. T-tests were used to examine substance use related variables, depression, impulsivity/risk-taking, novelty/excitement seeking, age, and GPA.

For the chi-square analyses, there was no significant difference between student gamblers and student non-gamblers on athlete status, ethnicity, and Greek life affiliation. Significant differences were found for sex ($\chi^2(3, N = 866) = 47.32, p < .001$) with males reporting higher rates of gambling than females. Findings from the t-tests showed no significant difference between student gamblers and student non-gamblers on impulsivity/risk-taking, age, and cigarette use. Significant differences were found for marijuana use ($t(861) = -3.34, p < .001$) and binge drinking ($t(824) = -5.36, p < .001$); gamblers reported significantly higher rates than non-gamblers. In addition, students who gambled reported significantly higher rates of novelty/excitement seeking than non-gamblers ($t(826) = -2.8209, p = .005$), lower GPAs ($t(813) = 3.02, p = .003$), and lower levels of depression ($t(857) = 2.72, p = .007$).

In order to test for multicollinearity and to examine bivariate associations between gambling scale variables and potential predictors, correlational analyses were performed. Pearson correlations were performed between all continuous study variables. For dichotomous variables (sex, athlete status, ethnicity, and Greek life affiliation), Spearman's correlation coefficients were computed. Table 8 provides a summary of the correlations between the study variables. It is important to note that because a very high correlation between alcohol use frequency in the past year and binge drinking ($r = .58, p < .01$) was found, only binge drinking was used in subsequent analyses. Binge drinking was selected because it was more highly correlated with the gambling variables than past year alcohol frequency. The correlations of gaming and sports betting with the predictors are discussed later.

Next, a hierarchical logistic regression analysis was performed to examine what combination of the predictor variables best accounted for whether or not students gambled. As a set, the predictors reliably distinguished between gamblers and non-gamblers ($\chi^2(12)=70.50, p<.001$) and two of the variables were found to be significant predictors after controlling for all other variables in the model: sex and binge drinking. Males compared to females were more likely to have gambled. The odds ratios suggest that males were more than twice as likely to gamble as women (odds ratio = 2.32). In addition, binge drinking was significantly related to gambling. For every additional occasion of binge drinking, students were 1.01 times more likely to gamble. There was also a strong trend for depression as a predictor. Students who reported depressive symptoms were less likely to have gambled (odds ratio = .94) (See Table 9).

Correlational Analyses for Gaming and Sports Betting

As shown in Table 8, sex was significantly and positively correlated ($r = .36, p < .01$) with *gaming* (number of gambling items endorsed); males were more likely to engage in gaming activities than females. GPA was significantly and negatively correlated ($r = -.13, p < .01$) with it (i.e., the higher the GPA, the less likely the student was to engage in gaming activities). All substance use variables were significantly and positively correlated with gaming: marijuana use ($r = .19, p < .01$), binge drinking ($r = .24, p < .01$), and cigarette use ($r = .11, p < .01$). In addition, novelty/excitement seeking was significantly and positively correlated ($r = .20, p < .01$) with *gaming*.

Two demographic variables were significantly and positively correlated with *sports betting*: sex ($r = .28, p < .01$) and ethnicity ($r = .15, p < .01$). Men were more likely to bet on sports than women and Caucasians were more likely to bet on sports than

minority students. Similar to *gaming*, both marijuana use ($r = .13, p < .01$) and binge drinking ($r = .28, p < .01$) were significantly and positively correlated with *sports betting*. In addition, *sports betting* was significantly and positively correlated with novelty/excitement seeking ($r = .11, p < .01$). Some variables that have been shown to correlate with gambling in other studies were not significantly correlated with either gambling variable in this study. They include: age, athlete status, Greek life affiliation, impulsivity/risk-taking, and depression.

Regression Analyses for Gaming and Sports Betting

Hierarchical regression analyses were used to examine which study variables were predictive of the two dependent variables: gaming (number of gaming activities involved in) and sports betting (number of sports betting activities involved in) among this sample of college students in the context of the other variables. In Step 1 of the two separate hierarchical regression analyses, gaming and sports betting, respectively, were regressed onto age, sex, athlete status, grade point average (GPA), Greek life affiliation, binge drinking, frequency of marijuana use, cigarette use, novelty/excitement seeking, impulsivity/risk-taking, and depression. The second steps of the analyses tested for the presence of sex by other predictor two-way interactions. Sex interactions were tested simultaneously with all predictors in both regression models. Continuous predictors were centered at their overall mean to eliminate nonessential multicollinearity. Tolerance analyses revealed no problem with multicollinearity. In addition, Cook's distances were examined and revealed no influential outliers.

Gaming. In the first step, the model as a whole accounted for 15% of the variance ($R^2 = .15, F(12, 705) = 10.62, p < .001$) with sex contributing 6% of the unique variance

($\beta = .26, t = 7.11, p < .001$) and novelty seeking contributing 2% of the unique variance ($\beta = .15, t = 3.95, p < .001$). There was also a strong trend toward binge drinking being a predictor ($\beta = .10, t = 2.54, p < .011$). In Step 2 the interactions between sex and each of the predictors were entered into the analyses. The ΔR^2 for Step 2 was not significant indicating that none of the interactions was significant. Therefore, only the results of Step 1 are reported in Table 10.

Sports betting. In the first step, the model as a whole accounted for 14% of the variance ($R^2 = .14, F(12, 705) = 9.27, p < .001$) with sex contributing 4% of the unique variance ($\beta = .22, t = 5.83, p < .001$) and binge drinking contributing 3% of the unique variance ($\beta = .19, t = 4.78, p < .001$). There was also a trend toward ethnicity being a significant predictor ($\beta = .09, t = 2.35, p < .02$). In Step 2, the interactions between sex and each of the predictors were added to the model. The ΔR^2 for Step 2 was not significant; thus, none of the interactions was significant. Therefore, only the results of Step 1 are reported in Table 11.

CHAPTER 4

Discussion

The current study represented an effort to add to the literature on gambling activities among college students and to assess which predictors significantly accounted for individual differences in recreational gambling when considered simultaneously with other potential predictors. In addition, prevalence of Internet gambling was examined. While many previous empirical studies on college student gambling have focused on pathological or problem gambling, this study examined the whole spectrum of gambling behaviors among a large diverse Mid-Atlantic sample of college students.

Whereas 53% of the students in this sample reported gambling in the past year, only 2.5% reported a level that met criteria for problem gambling, and only 1.5% reported gambling behaviors in the pathological gambling range. The most frequently endorsed gambling activity in the past year was playing board or card games for money (50%), followed by the lottery (42%), and betting on games of personal skill (31%). Although only a small portion of the sample ($n=117$) was asked about their involvement with Texas Hold'em, it is interesting to point out that 37% of those students reported engaging in this activity in the past year.

The rate for past year gambling (53%) in this study was lower than previous studies (e.g., Lesieur et al. 1991; Neighbors et al., 2002; Nower et al., 2004; Shaffer & Hall, 2001; Winters et al. 1998, 2002), which reported rates of 80% or higher. Problem gambling prevalence (2.5%) and pathological gambling (1.5%) were also low in this sample. These rates are also lower than the prevalence figures and the meta-analytic prevalence estimates reported by Shaffer and Hall (2001), who reported that 11% of

college students across studies were categorized as problem gamblers and 5.6% as pathological gamblers. The low gambling prevalence rates found in this study, which was comprised of a sample of Mid-Atlantic college students, brings into question the extent to which student characteristics and environment-specific factors (e.g., commuters, SES, immigrant status, amount of free time) are linked to gambling frequency and problems. Future research is needed to examine the relationships between gambling, life experiences, peer influences, and environmental factors, including proximity to casinos and gambling specific campus programming, within diverse college populations to gain a better understanding of prevalence rates among college students.

Another possible explanation for the lower prevalence rates in this study is that the participants did not have the financial means for engaging in large amounts of gambling. It is, therefore, important to examine the social contexts in which college students engage in gambling behaviors. In addition, the very low prevalence of Internet gambling (12%) was not expected. The online world is widespread across college campuses and among college students who have grown up in the age of online technology. In fact, national statistics show that 84% of college students report regular and frequent use of the Internet (Rainie & Horrigan, 2005). In addition, online gambling is convenient with a variety of game options (e.g., casinos, poker, sports betting) and unlimited access from anywhere with numerous payment options. Thus, it is noteworthy that such a small percentage of the sample reported Internet gambling.

A factor analysis suggested that sports related gambling was a different type of gambling from other gaming activities, perhaps engaged in for slightly different reasons by slightly different students. The predictors differed somewhat for gaming activities

compared to sports gambling. For gaming activities, when all predictors of gambling found in previous research were considered together, only sex and novelty/excitement seeking significantly helped explain individual differences in the number of gaming activities participated in during the past year by college students. Being male and having higher novelty/excitement seeking predicted more gaming activities. Binge drinking showed a strong trend as a predictor. For sports betting, sex also accounted for the greatest amount of variance and binge drinking in the past year arose as the only other significant predictor. Ethnicity, however, showed a strong explanatory trend. Caucasians had a tendency to engage in more types of sports betting than members of other ethnic/racial groups.

In the regression analyses, sex arose as the most significant predictor of gambling, as well as for the number of gaming activities and sports betting. The sex difference found in this study is consistent with prior research (Knapp et al., 2003; LaBrie et al., 2003; NARSY, 2005; Winters et al. 2002), in that the male college students reported significantly higher rates of gambling than the female college students. This suggests that sex differences are present for recreational gambling behaviors and should be viewed as an important factor when examining college student gambling. It is important for future research to report gambling prevalence figures separately by sex for more accurate cross-study comparisons.

One explanation for the consistent sex difference may be that males and females gamble in different social contexts. In addition, since males typically have a higher tendency for increased levels of sensation seeking, compared to females (Zuckerman, 2007), differences in gambling may be accounted for by variances in sensation seeking.

Nevertheless, although there were sex differences in prevalence, as well as gaming and sports betting, there was no significant sex by risk factor interaction. This finding suggests that the predictors of gambling may be similar for men and women. More research is needed on gambling norms and differences in expectations between males and females and other sex differences in terms of individual and college environment effects. The consistent sex difference found in this study illustrates that sex considerations are important to understanding college student gambling.

Another possible explanation for the sex differences in prevalence of gambling, as well as gaming and sports betting, may be that males compared to females may be more exposed, from a very young age, to video games. Many video games include an element of competition, luck, thrill, and high levels of stimulation, and this fascination with video games often continues into college. According to the Pew Internet and American Life Project Survey (2003), 70% of college students reported playing video, computer, or online games at least once in a while and 65% were occasional or regular players. Among college males, 53% reported playing video games, compared to only 17% of college females. Thus, exposure to video gaming at an early age and continual play may contribute to males being more likely to engage in other similar activities such as playing online computer games, betting on sports, and playing card or board games for money.

The hypothesis regarding the relationship between gambling and sensation seeking was partially supported. Novelty/excitement seeking (e.g., a tendency toward looking for new experiences) was a significant predictor of the number of gaming activities, but not sports betting. For college students, novelty/excitement seeking is not an atypical behavior (Zuckerman, 1994, 2007). It is common for young adults to seek out

new experiences. On the other hand, these results point out the importance of further investigating novelty/excitement seeking because college students who are high novelty/excitement seekers may be more prone to engage in gambling activities. For instance, high levels of novelty/excitement seeking may be linked to gambling because gambling predictably involves arousal, excitement, and new experiences (Wulfert et al., 2005; Zuckerman, 2007). In addition, since high sensation seekers typically get bored by routine and often seek out novel experiences, they may have been more likely to score higher on gaming activities in this study because the gaming factor was a measure of the number of different gaming activities.

Previous research has found that gamblers who are high in excitement seeking gamble for longer periods of times, engage in a variety of gambling activities, and place higher bets which result in more significant winnings or losses, compared to non-excitement seeking gamblers (McDaniel & Zuckerman, 2003; Wulfert et al., 2005; Zuckerman, 2007). These findings, along with this study's findings, are consistent with Zuckerman's theory that individuals vary in sensation seeking and that this variation helps explain individual differences in life choices. It very well could be that a major reason why novelty/excitement seeking predicts more gaming activities is that gaming activities bring arousal up to levels that feel normal and right for individuals who are high novelty/excitement seekers. Other students may not seek novelty and excitement because their levels of arousal already feel normal, without the addition of gaming activities.

Novelty/excitement seeking arose as a significant predictor of the number of gaming activities participated in, but no significant relationship was found for the impulsivity/risk-taking component of sensation seeking. This finding is in contrast to

previous studies (Clark, 2006; Nower et al. 2004) that have found impulsivity to predict gambling among young adults. The measures of sensation seeking and gambling differed between this study and those others, which could have accounted for differences in findings. In the Clark (2006) and Nower et al.'s (2004) studies, impulsivity was related to problem and pathological gambling, subgroups that were not prevalent in this sample. Thus, impulse control problems may be predictive of problem gambling behaviors but not of social or recreational involvement.

For sports betting, binge drinking was a significant predictor and for gaming activities, it almost reached significance. Thus, binge drinking added to prediction beyond that accounted for by novelty/excitement seeking and sex. In previous studies, alcohol use has also been linked to gambling for longer periods of time and to difficulty resisting the urge to gamble (Kynge & Dickerson, 1999). It is possible that binge drinking increases an individual's susceptibility to engage in gambling, regardless of their sensation seeking status, by decreasing inhibition and increasing risk taking behaviors. It is also possible, as was found in an experiment conducted by Stewart, McWilliams, Blackburn, and Klein (2002), that gaming promotes alcohol consumption. The cross-sectional nature of this study prevents determining the directionality of the relationships.

The strength of the association between drinking and sports betting can also be explained by the fact that, in our society, alcohol use and sporting events often go together. Similarly, for college students, watching, betting, and going to sports events is often associated with drinking alcohol with friends. All home games at colleges have tailgating parties that foster alcohol consumption throughout the day and bonding among fans. In addition, alcohol advertising is common during sporting events, both in person

and watching an event on television. For instance, Nelson and Wechsler (2003) have found that sports fans watch more television than their peers, most likely more sports-related events and programs, in which advertisements for alcohol are frequent

There was a trend found for ethnicity to predict sports betting; Caucasian college students were more likely than ethnic minority college students to engage in sports betting. Since there is no literature supporting this finding, it is difficult to draw conclusions. This finding highlights the need for further research on racial/ethnic differences in different types of gambling.

In contrast to findings by LaBrie et al. (2003) and Rockey et al. (2005), being a member of a fraternity or sorority was not associated with gambling behaviors in the current study. It is important to note, however, that the current sample consisted of 92% of college students who were *not* members of Greek life. In addition, there was no difference in gambling behaviors between athletes and non-athletes in this study, although, other researchers have found such differences (Rockey et al., 2005). Discrepancies in results may be due to the current study being conducted at a Division I college and that at least one major sports team was not surveyed. Finally, the fact that GPA, marijuana use, and cigarette use did not uniquely predict any measure of gambling is probably due to their correlations with variables that were significant predictors. After those stronger predictors accounted for some of the gambling variance, there was probably minimal unique variance left to be explained. Lastly, the marginal finding that those with fewer, compared to more, depressive symptoms were more likely to have gambled disagrees with Lynch et al.'s (2004) study. This difference in findings could be related to the differences in the measures of depression. The POMS was used in this

study and assessed only current mood. In addition, perhaps, for recreational gambling, those less depressed have the energy and ambition to make the effort to gamble; whereas those who are more depressed do not. The relationship between depression and gambling behaviors may be stronger for problem gamblers.

Limitations

One potential limitation of this study is that results were based on self-report measures. Although it is possible that gambling behaviors were underreported, self-report questionnaires were the most feasible method for assessing this particular risky behavior. Anonymity was emphasized to increase honesty on reporting of risky behaviors. Another limitation of this study was the generalizability of the sample. The participants of this study consisted of 69% who were Caucasian students from a large, semi-urban, public Mid-Atlantic university. Additionally, 44% of the sample consisted of student athletes, which is more than would be found in a typical college sample. Results, therefore, may not be applicable to a larger spectrum of college students. In addition, reasons for gambling were not included in this study. It would be interesting to examine if there are sex differences, drinking pattern differences, and novelty/excitement seeking differences in reasons for gambling (e.g., for the thrill or excitement; as a way of escaping problems; social event) among college students. Lastly, there were very low rates of problem (2.5%) or pathological (1.5%) gambling in this current study, which limited the ability to examine a wide range of gambling. It is possible that predictors for gambling are different based on whether individuals are social gamblers or fall in the problematic or pathological range.

Conclusions and Future Directions

The exact picture of what gambling among young adults looks like and its predictors have been inconclusive. This study suggests that, at least for the present sample, the majority of college student gambling is recreational and is conducted in a controlled, non-problematic manner. Although previous research suggests elevated levels of problem gambling among college students, this study shows the importance of viewing gambling on a continuum, ranging from non-gamblers, to social gamblers, to problem/excessive gamblers. This study found specific characteristics that were linked to increased gambling behaviors among college students: being male, novelty/excitement seeking, and binge drinking.

Based on the findings, the current study enhances our understanding of college student gambling in at least two important ways. First, this study found different predictors of gambling behaviors based on the type of gambling, with novelty/excitement seeking significantly predicting gaming activities and not significantly predicting sports betting activities. Given the observed relationship between novelty/excitement seeking and gaming behaviors, more research examining temperament and character traits among gamblers is warranted to further explore this relationship. Future studies should focus on sensation seeking and recreational gambling behaviors among college students and examine their relationship in the context of individual differences in different types of gambling. Sensation seeking is thought to be a normally distributed personality characteristic that is influenced by both biological and environmental factors. Empirical examinations of these factors may better help to explain the relationship between sensation seeking and recreational gambling behaviors among college students.

In addition, the study findings suggest that it is possible for the majority of college student gambling to be a recreational behavior at a low risk level. Future studies are needed to expand the literature on recreational gambling and continuum of risk that is associated with non-problematic gambling. Empirical guidelines are also warranted to inform individuals of what is considered “responsible gambling.” For example, we need to determine what the limitations on the frequency of gambling and amount of money and time spent on gambling are to be categorized as social gambling. This information may even be helpful for harm reduction approaches to gambling in which individuals with problems want to reduce their levels of gambling but not completely abstain. In addition, more information on health predictors of recreational gambling and associations with motivations and reasons for gambling may facilitate the development of better guidelines and screening measures for the college student population. Finally, since some research has found that being an ethnic minority is a risk factor for developing gambling problems among adults (e.g. Stinchfield, 2000; Volberg, 2002), exploring gambling behaviors among ethnic minority college students is important.

Gambling might be viewed as a normative activity among college students. The most popular gambling activities in this study were playing board or card games, the lottery, and betting on games of skill. It is possible that recreational gambling can be explained by Neighbors et al.’s (2002) study, which found that the most common reasons for gambling reported by college students were to win money, for fun, for social reasons, for excitement, or just to have something to do. In addition, there is strong empirical evidence suggesting a link between excitement seeking, increased arousal, and gambling behaviors (McDaniel & Zuckerman, 2003; Zuckerman, 2007). Given the factors that may

be related to college student gambling, understanding the impact of beliefs and perceptions on individuals' gambling behaviors is essential.

Longitudinal research is needed to examine gambling across a larger age range and progression over time. Research on adolescent and young adult populations is important since past research has found that the likelihood for problem gambling as an adult is higher for individuals who begin gambling at an early age (Gupta & Derevensky, 1998; Winters et al., 2002). Given that there are now several studies on college student gambling, the field may be ready for a meta-analysis where college student characteristics, proximity to gambling venues, and amount of gambling-specific programming on college campuses are coded and taken into consideration. Future studies should also assess other possible environmental variables such as parent and peer gambling behaviors and attitudes. Particularly in college settings, peers can be a strong influence and examining the role of peer relationships, attitudes, and social norms in relation to gambling behavior is important. Lastly, access to online betting and gambling games continues to increase and additional research is needed on the prevalence and impact of Internet gambling among college students.

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Table 1

Descriptive Statistics for Participant Variables (Total N= 896)

Variable	Percent	<i>N</i>	<i>M</i>	<i>SD</i>
Age (18-26)		893	19.97	1.38
Sex		893		
% Male	47%	418		
% Female	53%	475		
Year in school		893		
% Freshmen	17%	156		
% Sophomores	56%	498		
% Juniors	23%	204		
% Seniors	3%	27		
% Fifth year or above	1%	8		
GPA		839	2.96	.52
Member of Greek life		885		
% in Fraternity/Sorority	8%	72		
% Not in Fraternity/Sorority	92%	813		
Ethnicity		879		
%Asian/Pacific Islander	11%	100		
%Black	8%	71		
%Hispanic/Latino	5%	40		
% Native American	.1%	1		
%White/Caucasian	68.5%	602		
%Other/Multi-Ethnic	7.4%	65		
Athlete status		896		
% student athletes	44%	392		
% student non-athletes	56%	504		
Types of Gamblers		869		
% non-gamblers	47%	408		
% social gamblers	49%	425		
% problem gamblers	2.5%	22		
% compulsive gamblers	1.5%	14		

Table 2

Descriptive Statistics for Gambling Frequency in the Last Year, by Gambling Activity

Type of Gambling	Not at All	Less than Once a Month	At Least Once A Month	At Least Once A Week	Daily
Cards or Board Games for Money (N= 878)	50%	30%	14%	5%	1%
Table Games at Casinos (N= 877)	79%	15.5%	4%	1%	.5%
Bet on Personal Skill Games (N= 871)	69%	21%	7%	2.5%	.5%
Played the stock Market (N= 871)	92%	4%	2%	1%	1%
Played Commercial Bingo (N= 875)	94%	5%	1%	0%	0%
Dice or Craps (N= 874)	89%	8%	3%	0%	0%
Internet gambling (N= 876)	88%	7%	3%	1%	1%
Bet on Sport Cards, Pools, or Parlays (N= 871)	83%	11%	4%	1.5%	.5%
Bet on Horse or Dog Races (N= 872)	92%	5.5%	2%	.5%	0%
Bet on College Games with Campus Bookie (N= 875)	97%	1.5%	1%	.5%	0%

Bet on College Games with Off-Campus Bookie (N= 873)	96%	2%	1%	.5%	.5%
Played lottery (N= 872)	58.5%	30.5%	8%	2.5%	.5%
Slot or Poker Machines (N= 877)	81%	16%	2%	.5%	.5%
Other Form of Gambling (N= 875)	80%	11%	6%	2%	1%
*Texas Hold'em (N= 117)	63%	28%	6%	3%	0%

* Only asked of the last survey group of students N= 117.

Table 3

Descriptive Statistics for Type of Sports Bet During the Past 12 Months

Sports	Percent Yes	Percent No
Professional Football	19%	81%
Professional Basketball	7%	93%
Professional Hockey	2%	98%
Professional Baseball	6%	94%
Professional Boxing	3%	97%
Auto Racing	1%	99%
Professional Soccer	1%	99%
College Sports (e.g. football, basketball, etc)	11%	89%
Other (e.g. horse racing)	6%	94%
None of the above	20%	80%

* Total sample N= 914. The numbers represented in the table are the total sample after excluding cases with missing data.

Table 4

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Descriptive Statistics for Possible Sources for Gambling Money During the Past 12 Months

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Money Sources	Percent Yes	Percent No
Personal Savings	25%	75%
Sale of personal property	2%	98%
Family or friends	8.5%	91.5%
Cash withdrawals from credit or bank cards	17%	83%
Loan sharks	1%	99%

* Total sample N= 914. The numbers represented in the table are the total sample after excluding cases with missing data.

Table 5

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Principal Component Analyses of the Gambling Frequency Items: Scale Items and Factor Loadings

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Scale Item	Gaming	Sports betting
Played cards or board games	.67	.19
Played table games at casino	.70	.22
Bet on games of personal skill	.60	.37
Played the stock market	.40	.09
Played bingo	.43	-.05
Shot dice/craps	.62	.10
Internet gambling on casino or other games	.59	.30
Bought lottery tickets	.48	.10
Played slot machines	.57	.16
Other forms of gambling	.65	.28
Bet on sports cards or football pools	.40	.64
Bet on horse or dog races	.29	.66
Bet on college games with campus bookie	.06	.84
Bet on college games with off-campus bookie	.10	.86

*Total N=828

Table 6

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Principal Component Analyses of the Sensation Seeking Items: Scale Items and Factor Loadings

=====

Scale Items	Impulsivity/Risk-taking	Novelty/Excitement Seeking
Act on the spur of the moment without stopping to think	.74	.13
Get a kick out of doing things that are a little dangerous	.68	.38
Act quickly	.67	.12
Test yourself every now and then by doing something risky	.72	.34
Think that your actions are risky	.73	.26
Look for a new experience	.21	.81
Try new things just for excitement	.29	.84
Go for thrills in life when you get a chance	.24	.81
Like to experience new and different sensations	.21	.80

*Total N=854

Table 7

Differences Between Gamblers and Non-gamblers on Correlates of Gambling

Measure	N's	Mean	t-value or X^2	df	p-value
Athlete	869		.031	1	.457
Gamblers	461				
Non-gamblers	408				
Gender	866		47.32	1	<.001
Gamblers	458				
Non-gamblers	408				
Member of Greek Life	860		1.33	1	.152
Gamblers	456				
Non-gamblers	404				
Ethnicity	853		3.72	1	.032
Gamblers	437				
Non-gamblers	378				
Age	866		-1.29	864	.199
Gamblers	460	20.02			
Non-gamblers	406	19.90			
GPA	826		3.02	813	.003
Gamblers	437	2.91			
Non-gamblers	378	3.02			
Past Year Binge Drinking	826		-5.36	824	.001
Gamblers	440	32.40			
Non-gamblers	386	18.19			
Past Year Marijuana Use	863		-3.34	861	.001

Gamblers	458	1.14			
Non-gamblers	405	.78			
Current Cigarette Use	861		-1.38	859	.169
Gamblers	458	1.15			
Non-gamblers	403	.81			
Depression	859		2.72	857	.007
Gamblers	457	1.85			
Non-gamblers	402	2.47			
Novelty/Excitement Seeking	865		-2.81	826	.005
Gamblers	458	3.30			
Non-gamblers	407	3.22			
Impulsivity/Risk Taking	866		-1.01	826	.311
Gamblers	459	2.79			
Non-gamblers	407	2.66			

Non-gamblers= 0; Gamblers=1

Table 8

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Correlations Among Study Variables

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Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gaming N=879	----														
2. Sports- betting N=879	.55*														
3. Sex ^a N= 893	.33*	.28*													
4. Ethnicity ^a N= 879	.06	.15*	.11*												
5. Athlete ^a N= 896	.01	.08	.23*	.25*											
6. Greek life ^a N= 885	.02	.06	.10*	.01	.18*										
7. Age N=893	.09	.02	.11*	.07	-.03	-.01									
8. GPA N=839	-.13*	-.06	-.14*	.01	-.07	-.03	.07*								
9. Marijuana Use N=889	.19*	.13*	.05	.08	.20*	-.06	-.01	-.16*							
10. Binge Drinking N=850	.24*	.28*	.22*	.31*	.12*	-.10	.09	-.09	.29*						
11. Impulsivity/ Risk-taking N=854	.03	-.02	.01	-.11*	-.16*	-.06	.09*	.01	.19*	.11*					

12. Novelty/
Excitement

Seeking .20* .11* .18* -.07 -.07 -.03 -.05 -.15* .22* .20* .01
N=854

13. Cigarette

Use .12* .02 .04 -.05 .18* -.11* .10* -.06 .22* .15* .07 .08
N=886

14. Mood (Depression)

N=877

15. Alcohol .18* .15* .11* .22* -.01 -.17 .08* -.10* .33* .58* .14* .21* .14* -.02
Frequency
N= 890

Due to the large n, significance was set to $p < .01$.

** $p < .01$ (2-tailed); Males = 1, Females = 0; Whites= 1, Minorities= 0; Athletes=1, non-athletes=0; Greeks=1, non-Greek=0*

^a Spearman's correlations were performed for all dichotomous variables

Table 9

Hierarchical Logistic Regression for Gamblers versus Non-gamblers

Variable	Odds Ratio	Confidence Intervals	Significance (<i>p</i> value)
Age	1.017	.91 - 1.14	<.775
Sex	2.322	1.66 - 3.24	<.001
Athlete	.791	.55 – 1.14	<.203
Ethnicity	1.197	.84 – 1.72	<.327
GPA	.859	.63 – 1.18	<.343
Greek life	1.446	.83 – 2.51	<.191
Binge drinking	1.007	1.00 – 1.01	<.008
Marijuana use	1.049	.94 – 1.17	<.399
Cigarette use	.997	.95 – 1.04	<.897
Novelty/Excitement Seeking	1.165	.98 – 1.38	<.077
Impulsivity/Risk-Taking	1.000	.85 – 1.18	<.996
Depression	.944	.90 - .99	<.017
95% Confidence Interval			

Table 10

Hierarchical Regressions

Variable	B	SE	β	Unique variance	t value	Significance
Dependent Variable= Number of Gaming Activities (Gaming) $R^2 = .15$, F (12, 705) 10.62, $p < .001$						
Step 1:						
Age	.02	.06	.01	.01	.42	.674
Sex	1.17	.17	.26	.06	7.11	<.001
Athlete	-.25	.18	-.04	.01	-1.43	.154
Ethnicity	.20	.18	.04	.01	1.10	.271
GPA	-.22	.15	-.05	.01	-1.43	.152
Greek life	.30	.27	.04	.01	1.10	.271
Binge drinking	.01	.01	.10	.01	2.54	.011
Marijuana Use	.05	.05	.04	.01	1.06	.291
Cigarette Use	.01	.02	.01	.01	.35	.729
Novelty/Excitement Seeking	.33	.08	.15	.02	3.95	<.001
Impulsivity/ Risk-taking	-.06	.08	-.03	.01	-.77	.439
Depression	.01	.02	.01	.01	-.09	.932

Table 11

Hierarchical Regressions

Variable	B	SE	β	Unique variance	t value	Significance
Dependent Variable= Number of Sports Betting Activities (Sports betting) $R^2 = .14$, F (12, 705) 9.27, $p < .001$						
Step 1:						
Age	-.02	.02	-.05	.01	-1.47	.142
Sex	.27	.05	.22	.04	5.83	<.001
Athlete	-.02	.05	-.01	.01	-.301	.763
Ethnicity	.12	.05	.09	.01	2.35	.019
GPA	-.02	.04	-.01	.01	-.42	.678
Greek life	.11	.08	.05	.01	1.44	.152
Binge drinking	.01	.01	.19	.03	4.78	<.001
Marijuana Use	.01	.02	.03	.01	.65	.518
Cigarette Use	-.01	.01	-.04	.01	-1.14	.253
Novelty/Excitement Seeking	.03	.02	.05	.01	1.27	.197
Impulsivity/ Risk-taking	-.03	.02	-.04	.01	-1.12	.206
Depression	.01	.01	.06	.01	1.70	.089

Curriculum Vita

LISA A. HOUSE

EDUCATION

Ph.D., 2008	Rutgers University, Piscataway, NJ Clinical Psychology, Ph.D. Program, GPA: 3.96
M.S., May 2005	Rutgers University, Piscataway, NJ Clinical Psychology, Ph.D. Program
B.A., 2002	Princeton University, Princeton, NJ Cum Laude Major: Psychology, GPA: 3.75

RESEARCH EXPERIENCE

2007-present	<i>Caregiver Perceptions of their Child's Rehabilitation Process Following a Spinal Cord.</i> Principal Investigators: Lisa A. House, Ph.D. and Heather Russell, Ph.D.
2006-2008	<i>Predictors of Different Types of Recreational Gambling Behaviors Among College Students.</i> Principal Investigator: Lisa A. House, M.S.; Dissertation Project.
2004-2005	<i>The Protective Effects of Ethnic Identity for Alcohol and Marijuana Use Among Black Young Adults.</i> Principal Investigator: Lisa A. Pugh; Masters Thesis Project
2003-2007	Developing Brief Interventions for Drug Abuse Prevention for College Students. Principal Investigator: Dr. Helene R.White.
2003-2005	Enhanced Peer Based Interventions During Transition to High School Principal Investigators: Dr. Valerie Johnson and Dr. Brenna Bry
2002-2003	Research Assistant, Princeton University.

RESEARCH GRANT PARTICIPATION

The Rutgers Transdisciplinary Prevention Research Center (RTPRC): Funded by NIDA's National Prevention Research Initiative (NPRI). Two projects:

*“Developing Brief Interventions for Drug Abuse Prevention for College Students”
 “Enhanced Peer Based Interventions During Transition to High School”*

ACADEMIC EXPERIENCE

Instructor for Undergraduate Course: *Alcohol Use Disorders: Prevention, Treatment, & Research Issues* (Fall 2005 & Spring 2006)

Rutgers University, Piscataway, NJ

Mentor and Academic Advisor for Minority Students (2005-2007)

Rutgers University, Piscataway, NJ

CLINICAL EXPERIENCE

July 2007 – June 2008: Clinical Psychology Intern

Temple University (APA Approved), Philadelphia, PA

Pediatric and Child Psychology Rotation:

Supervisors: Brian Daly, Ph.D. and Heather Russell, Ph.D.

Behavioral Medicine Rotation:

Supervisors: Melissa Napolitano, Ph.D., Gary Foster, Ph.D., and Henry Weisman, M.D.

Physical Medicine and Rehabilitation (PM&R):

Supervisors: Robert Ruchinskas, PsyD and Nancy Repetz-Ciccolella, PsyD

June 2005- June 2007: Youth Anxiety and Depression Treatment Team

Rutgers University, Piscataway, NJ

Supervisor: Dr. Brian Chu

March 2003- June 2007: Rutgers Somerset Counseling Practicum

Graduate School of Applied and Professional Psychology

Rutgers University, Piscataway, NJ

Supervisors and Co-Directors: Brenna H. Bry, Ph.D. & Nancy Boyd-Franklin, Ph.D.

Fall 2004-Fall 2005: Rutgers Psychological Clinic

Rutgers University, Piscataway, NJ

Supervisor: Dr. Patricia Brady

Director: Don Morgan

PUBLICATIONS

White, H. R., **Pugh, L.**, Labouvie, E. W., Morgan, T. J. & Celinska, K. (Under Review).
 Potential mechanisms that account for the efficacy of brief substance use
 interventions for mandated college students.

- White, H. R., Mun, E. Y, **Pugh, L. A.**, & Morgan, T. J. (2007). Long-term effects of brief substance use interventions for mandated college students: Sleeper effects of an in-person personal feedback intervention. *Alcoholism: Clinical and Experimental Research*, 31(8), 1380-1391.
- Pugh, L. A.**, & Bry, B. H. (2007). The protective effects of ethnic identity for alcohol and marijuana use among Black young adults. *Cultural Diversity and Ethnic Minority Psychology*, 13 (2), 187-193.
- White, H. R., Morgan, T. J., **Pugh L. A.**, Celinska, K., Labouvie, E. W., & Pandina, R. J. (2006). Evaluating two brief substance use interventions for mandated college students. *Journal for Alcohol Studies*, 67(2), 309-317.
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