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## The Association of Form of Gambling with Problem Gambling Among American Youth

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### Abstract

A random telephone survey was conducted with 2274 U.S. residents aged 14-21. Analyses were performed to assess the relationship between the specific gambling games played and the extent of problem gambling symptoms. The forms of gambling that were most associated with gambling problems were card games, casino gambling, “other” gambling on routine activities, and betting on games of skill such as basketball, pool, or golf. The form of gambling which made the largest contribution to gambling problems per 14 days of play was casino gambling. The hypothesis that rapid forms of gambling, such as slot machines, would be the most problematic forms of gambling was not upheld.

### Introduction

Risk for problem gambling can involve individual factors such as impulsivity (Blaszczynski et al., 1997), a family history of problem gambling (Slutske et al., 2000), or alcohol and drug abuse (Welte et al., 2001). Physical and social availability of gambling opportunities, and exposure to gambling images, can also be related to problem gambling. For example, U.S. adults who live within 10 miles of a casino have been shown to have twice the prevalence of problem gambling as those who do not (Welte et al., 2004a). The role of specific forms of gambling has been neglected by researchers, but it is possible that some gambling games are more associated with negative consequences than others. Mark Griffiths (1999, 2002) and others have speculated that games with high rates of opportunities to gamble (high event frequency), such as gambling machines and scratch cards, are particularly associated with problem gambling, although this notion does not have strong empirical support. The current article addresses the relationship between the form of gambling played and problem gambling among young people.

Adolescents engage in a different mix of gambling games from adults, so it is important to examine the relatively few studies of adolescents or young adults which link specific gambling games with problem gambling. Griffiths (1995, p. 72) reviewed a group of British studies of adolescent use of gambling machines. Although these studies lacked any standardized assessment of problem gambling and contained no comparison of machine

gambling with other forms of gambling, they did document high percentages of adolescent “fruit machine” players who engaged in problematic behaviors such as using lunch money to gamble and stealing to get money to gamble. Wood and Griffiths (1998) studied a sample of British instant scratchcard players aged 11-15, and found that a surprising 6% fulfilled the DSM-IV criteria for pathological gambling. In a study of New Zealand students, Clarke and Rossen (2000) found that the forms of gambling most associated with problem gambling were gambling machines, scratch tickets, and bingo. In a Minnesota study of adolescents, Winters et al. (1993a) found that the forms of gambling most commonly played by problem gamblers were cards, betting on games of skill, and betting on sports. Engwall et al. (2004) conducted a survey of Connecticut college students, and, similarly to Winters et al., found that the most frequently played games by pathological gamblers were cards, betting on sports, and betting on games of skill. In an analysis of data from a U.S. national survey of adults, our own research group found that for respondents aged 18-29, casino gambling and cards were the forms of gambling most associated with problem gambling; for respondents 30 and older it was casinos, lottery and gambling machines other than in a casino (Welte et al., 2007). These youth studies produced different results in different countries. The U.S. studies found card games to be the most associated with problem gambling, followed by betting on sports and games of skill. The British and New Zealand studies tended to emphasize gambling machines and scratch cards, with gambling machines being quite common in those countries. The American results are not consistent with the high event frequency hypothesis, because cards, sports and games of skill are not the most rapid gambling activities. In fact, the argument that gambling machines are likely to produce problem gambling, which Mark Griffiths has pursued in many articles, might be influenced by the prominence of machine gambling in Britain.

Because there is a relatively small literature linking specific forms of youth gambling to gambling problems, and more sophisticated analyses have been performed in the adult literature, it is worthwhile to consider that literature. In interpreting this literature, we need to keep in mind that some forms of gambling that are legal and socially accepted for adults may not be so for younger persons. The most sophisticated studies attempted to determine which forms of gambling distinguished problem from non-problem gamblers. The National Research Council (1999, p. 79) summarized the results from several studies which compared the percentage of recreational gamblers who participated in specific forms of gambling with the percentage of problem gamblers who participated in those same forms of gambling. Problem gamblers were more likely than recreational gamblers to play all forms of gambling, but the National Research Council reasoned that to the extent that the percentage of problem gamblers who played a particular gambling game exceeded the percentage of recreational gamblers who played that game, the more implicated in problem gambling that game would be. They found that problem gambling was most strongly associated with bingo, the lottery, racetrack and sports betting. In a general population survey of Manitoba adults, Cox et al. (2000) found that frequenting casinos and using electronic gambling machines distinguished problem gamblers from recreational gamblers, whereas lottery play did not distinguish these groups. Our own research group (Welte et al., 2004b) used data from a U.S. national survey of adults to predict the number of problem gambling symptoms as a function of the volume of play for 15 forms of gambling. We found that problem

gambling symptoms were most strongly associated with casino gambling, bingo, lottery, and card games. Most of these more sophisticated adult studies, which took into account typical gambling patterns in identifying problematic forms of gambling, implicated less rapid forms of gambling, such as sports betting and racetrack betting.

Other researchers used the simpler approach of merely reporting the problem gambling rates of those who engaged in particular forms of gambling, or reporting the gambling preferences of problem gamblers. Morgan et al. (1996) examined a group of South Dakotans in treatment for problem gambling. They had more problem gambling symptoms associated with video lottery terminals than with other forms of gambling. Morgan and colleagues attributed this result to the addictive characteristics of gambling machines, such as immediate payout, frequent near misses, numerous small wins, and the illusion of skill. Studying a group of problem gamblers in treatment, Breen and Zimmerman (2002) found that the use of gambling machines was associated with the rapid onset of problem gambling. They replicated their study (Breen, 2004) and found the same results. Cox et al. (2005) examined data from a large general population sample of Canadian adults. They found the highest rates of problem gambling to be in regions that had both casinos and concentrations of gambling machines in the community in addition to those in casinos. They associated these gambling modalities with an especially high risk of problem gambling. An Australian group (Productivity Commission, 1999) found that 6.1% of those who played casino table games had significant gambling problems, and that notable problem gambling rates were also associated with gambling machines (4.7%) and betting on the races (4.5%). Wood and Williams (2007) conducted a web-based survey of internet gamblers, and found that a remarkable 42.7% could be classified as problem gamblers. Volberg and Steadman (1992) examined the gambling preferences of problem gamblers selected from adult general population surveys in six U.S. states. They found that lottery was the most popular form of gambling with problem gamblers (89% had played the lottery), followed by card games (87%), casino gambling (76%) and gaming machines (75%). The more sophisticated adult studies, which took into account typical gambling patterns in identifying problematic forms of gambling, found a variety of games associated with problem gambling. However, in the second group of adult studies, which used less sophisticated analyses, machine gambling emerged as the most commonly designated problematic form of gambling. A possible reason for these inconsistent findings is that the second group of studies did not take into account the effect of the respondent's complete gambling behavior. Those who participate in a particular form of gambling may also participate in many others, and their rate of problem gambling reflects their total gambling. It is also worthy of note that the less sophisticated studies included studies of treatment populations [Morgan et al. (1996), Breen and Zimmerman (2002), and Breen (2004)]. Because of biases of selection into treatment, results from these studies might not generalize to the entire population.

In the current study, we will examine the results from a U.S. national survey of adolescents and young adults. We will analyze the relationship between the respondent's extent of participation in specific forms of gambling and his or her risk of problem gambling, while taking into account all of the forms of gambling in which the respondent participates, and also the number of days on which he or she participates. We will also investigate the

possible roles of gender, age and socioeconomic status in moderating the relationship between gambling behavior and problem gambling.

## Methods

The data for the current article are from the National Survey of Youth and Gambling, a random-digit-dial telephone survey of U.S. residents aged 14-21. Interviews were conducted with 2274 respondents. If a household contained more than one resident aged 14-21, the one with the next birthday was selected. The interviews were conducted from August 2005 through January 2007. This relatively lengthy period of data collection allowed the use of a smaller but highly trained and carefully supervised crew of interviewers, and captured possible seasonal variations in gambling. Interviews were conducted in all 50 states plus the District of Columbia. Sample weights were computed in three stages. First, they were set to be proportional to the number of eligible respondents (age 14-21) in the household. This is necessary to provide unbiased estimates of the general population, because respondents who live with other eligible persons would otherwise be underrepresented. Secondly, the weights were adjusted to align the sample with the gender, age and race distributions in the U.S. census. No adjustment for gender was necessary, but (for example) older respondents were underrepresented in the unweighted sample, and therefore had their weights increased. Finally, the weights were scaled so that the weighted N equaled the true N of 2274.

The random-digit-dial sample was purchased from Survey Sampling International of Fairfield, Connecticut. The telephone sample was selected randomly from a sampling frame of all working telephone blocks in the U.S., and was stratified by county and by telephone block within county. This resulted in a sample that was spread across the U.S. with the same density as the population, not clustered in any geographic area. Because this was a sample of household telephone numbers, cell phone numbers were not intentionally included. Nonetheless, some cell phone numbers became a part of the sample because phone numbers from land-line exchanges may be ported to cell phones; and some telephone exchanges (often in less populated areas) contain both land-line and cell numbers. Estimates from the CDC's National Health Interview Survey for 2005 - 2006 show that approximately 8% of U.S. households with children had only wireless telephone service or no telephone service. The proportion of cell-phone-only users is higher among young adults living independently from their parents (Blumberg, & Luke, 2007). Weighting to assure correct representation of each age category, which was done in the present study, reduces potential bias. The interviews were conducted by trained interviewers at the Research Institute on Addiction in Buffalo, NY. Each telephone number was called at least 7 times to determine if that number was assigned to a household containing an eligible respondent. Once a household was designated as eligible, the number was called until an interview was obtained or refusal conversion had failed. Parental permission was obtained to interview respondents under the age of 18. Respondents were paid \$25 for participating. A professionally translated Spanish questionnaire was available, and 31 interviews were conducted in Spanish with respondents who were more comfortable with that language. The response rate for this survey was 2274/4467, or 50.9%. Our interviewers contacted 4467 households which contained an eligible respondent. Among those households, 2274 provided usable interviews, 935 potential respondents refused to be interviewed, 923 were never contacted despite repeated

attempts, 329 were physically or mentally unable to provide an interview, and 6 interviews were dropped from analyses because they were incomplete or judged to be deceptive by the interviewers.

Recent gambling behavior was assessed by asking on how many days in the past 12 months the respondent engaged in 15 different gambling activities: 1) office pools, raffles and charitable small stakes gambling, 2) lottery, including big jackpot tickets such as Powerball, daily lottery, and scratch-off tickets, 3) pulltabs, 4) internet gambling, 5) casino gambling, 6) betting on horses, dogs or other animals, 7) gambling machines, not in a casino or on the internet, 8) card games, not in a casino or on the internet, 9) betting on a game of skill, such as pool, golf or backgammon, 10) lottery video-keno games, such as Quick-Draw, 11) bingo, not in a casino or on the internet, 12) dice games, not in a casino or on the internet, 13) sports betting, not in a casino or on the internet, 14) buying trading cards in the hope of reselling the insert cards, and 15) other gambling. These questions were elaborated with clarifying material. The lottery question is an example: "In the past 12 months, have you played the lottery, including big jackpot tickets such as Powerball or Mega Millions, daily lottery tickets such as Lotto or Pick-4, or scratch-off tickets". These questions were developed by us for our national gambling surveys, but the list of 15 gambling activities and the question wording was influenced by other gambling surveys, particularly the NORC (1999) national gambling survey. We also examined current gambling practices to keep our questions up-to-date.

Our measure of problem gambling was the South Oaks Gambling Screen Revised for Adolescents (SOGS-RA, Winters, Stinchfield and Fulkerson, 1993b). The SOGS-RA was first developed for a telephone survey. It demonstrated internal consistency reliability, and also demonstrated its validity by having a high correlation with frequent gambling. In the current study, the SOGS-RA items have a Cronbach's Alpha of .74, demonstrating good internal consistency reliability. Since its original development, the SOGS-RA has been used successfully in numerous studies (for example, see Shaffer et al., 1997). The SOGS-RA consists of 12 items which are related to the DSM-III-R criteria for pathological gambling. An example is the "chasing" item: "In the past 12 months, how often have you gone back another day to try to win back the money that you lost?" Another example deals with loss of control: "In the past 12 months, have you ever gambled more than you planned to?" In the current study, we used the past-year symptom count from the SOGS-RA for some of our analyses. Among the 1535 respondents who gambled in the year before the interview, 81.0% had zero SOGS-RA symptoms, 9.3% had 1 symptom, 5.0% had two symptoms, with percentages trailing off to the two respondents who had nine symptoms.

Our measure of socioeconomic status was based on the mean of four equally weighted factors: father's years of education, mother's years of education, father's occupational prestige and mother's occupational prestige. Occupational prestige was coded from census occupation categories using the method described by Hauser and Warren (1997). Knowing that a few respondents would be unable to supply information on their parent's education and occupation, we asked a series of questions (home ownership, number of musical instruments and books in home, receipt of food stamps, etc.) gleaned from other studies that attempted to measure the SES of teens and young adults. We used these as independent

variables to impute parental education or occupational prestige when these variables were missing. Imputation was performed by the SPSS Missing Value program.

## Results

Table 1 shows a descriptive picture of the sample of 2274 young adults interviewed for the Youth and Gambling Survey. All of the analyses for the current study are weighted analyses, and reflect the weighted correction for the age and racial/ethnic composition of U.S. Table 1 shows a gender, age and racial distribution virtually identical to census figures for the U.S. at the time of the survey. The distribution of educational status is what might be expected for a sample aged 14-21. A few respondents are still in grade school or have advanced to graduate school; most are in high school, college, or not in school. The parents' education reflects diversity by socioeconomic status. Fewer than half of the respondents are employed, and the great majority still live with their parents. Table 1 also shows a descriptive picture of the 1535 respondents who gambled in the past year. This subset of the sample is used for the analyses shown in Tables 4 and 5. It is similar to the entire sample, other than containing a higher proportion of males.

The left section of Table 2 shows the percentage of all respondents who engaged in various forms of gambling in the 12 months before the interview. The most prevalent forms of betting among all respondents were card games (33%), lottery (29%), and office pools and charitable gambling (30%). The least popular were internet gambling (2%), video keno (3%), sports cards (4%), betting on horses and dogs (5%), gambling machines (6%), and pulltabs (5%). The most prevalent form of gambling among females was the lottery (29%), whereas the most prevalent form of gambling among males was card games (45%). Males were more likely than females to have played every form of gambling except bingo. Almost as high a percentage of females (29%) played the lottery as males (30%). On the other hand, males were much more likely than females to bet on sports (35% vs. 11%), games of skill (33% vs. 8%) or card games (45% vs. 21%). The right section of Table 2 shows the average number of days in the past 12 months on which each form of gambling was played by those respondents who engaged in that form at least once in the past 12 months. This provides additional important information in assessing involvement in different forms of gambling. For example, only 2% of respondents (mostly males) engaged in internet gambling, but they did so an average of 48 days per year, the highest average of any form of gambling. Similarly, only 7% of males used gambling machines, but they used them on an average of 42 days per year.

Table 3 provides information about respondents who have engaged in different forms of gambling, broken down by gender. The column headed "Percent with Any Gambling Symptoms" contains the percentage of respondents who had scores of one or more on the SOGS-RA among those who engaged in each form of gambling in the past 12 months. For example, 10.6% of the females who played the lottery had scores of one or more on the SOGS-RA. The column headed "Mean Number of Gambling Symptoms" contains the average number of SOGS-RA symptoms among those who engaged in each gambling activity. For example, females who played the lottery had an average of .23 symptoms. The column headed "Gambling Versatility" contains the total number of the 15 forms of

gambling in which the respondent has engaged in the past 12 months. For example, females who played the lottery participated in an average of 2.8 forms of gambling in the past 12 months. The last three columns of Table 3 contain the total number of days in the past 12 months on which all 15 forms of gambling were played. For example, females who played the lottery gambled on an average of 34 days in the past 12 months, counting all 15 gambling activities.

Certain forms of gambling were associated with prevalent gambling problems. An impressive 64.8% of respondents who gambled on the internet had at least one SOGS-RA symptom, as well as 55.9% of those who bet on “other” forms of gambling. These groups also had mean gambling symptoms of 2.02 and 1.58 respectively, the highest figures in the column. (“Other gambling” was a highly varied mix of gambling in everyday life. Examples included betting on who would shoot the biggest deer, betting on elections, betting on fights at school, and betting on stopping smoking.) On the low end, 25.0% of those who played the lottery, 25.1% of those who played bingo, and 28.1% of those who engaged in office pools and charitable gambling had at least one SOGS-RA symptom. These groups also had the lowest mean gambling symptoms. The extensive problem gambling symptoms among internet gamblers might make us believe that internet gambling has great power to produce negative consequences. However, an examination of the right section of Table 3 shows that internet gamblers had an average gambling versatility (number of forms of gambling) of 6.9, and an average total number of gambling days of 387; both of these figures are far higher than for any other form of gambling. For those respondents who played the lottery, the average versatility and total days were the lowest figures in the column, 3.7 and 94 respectively. In light of this observation, it seems likely that internet gamblers have high problem gambling symptoms because they gamble a great deal at many forms of gambling. In upcoming analyses which jointly control for all 15 gambling activities, we will further examine this proposition.

Table 3 also shows that the males who engage in every form of gambling (except internet gambling, which has a very low weighted N of 4 for females) have much higher rates of any gambling symptoms and higher mean gambling symptoms than females who engage in the same form of gambling. Males also have higher gambling versatility than females (3.3 vs. 2.2), and four times as many total gambling days as females (105 vs. 25).

The analyses in Tables 4 and 5 were performed with the 1535 respondents who gambled in the past year. Because of the large number of statistical tests, only results beyond .01 were considered significant. Table 4 shows the results of negative binomial regressions in which the independent variables represent whether a particular form of gambling was engaged in during the past year. For example, the casino variable is equal to one if a respondent gambled in a casino in the past year, and zero otherwise. The dependent variable for these regressions was the number of past-year SOGS-RA problem gambling symptoms, so that the value of the dependent variable was an integer that ranges from 0 to 9, with a mean of .40 and a variance of 1.15. (Negative binomial regression is recommended for “overdispersed” count variables with variances greater than their means [Long, 1997].) The incidence risk ratios (IRR) result from a negative binomial regression in which all 15 forms of gambling are independent variables. The IRR is the factor by which the dependent variable is

multiplied for each increase of one unit in the independent variable. These IRRs represent the total impact of having engaged in a particular form of gambling without taking into account how many times the respondent participated. Therefore, if a particular form of gambling has a high IRR in Table 4, it may be because that form of gambling is associated with a high number of problems per day of play, or because those who play it do so frequently. Gender, age and socioeconomic status are predictors in addition to the 15 forms of gambling. This is to control for the possibility that these important demographic variables might be common antecedents of engaging in a particular form of gambling and being unusually prone to gambling problems. The incidence risk ratios show that card games are associated with the highest increase in gambling symptoms (IRR = 3.14), when controlling for the 14 additional forms of gambling. Casino gambling is the second highest, with an IRR of 2.52. Casino gambling is followed by “other gambling” (2.22), and games of skill (1.97) as the highest IRRs for problem gambling. Lottery and office pools/charitable gambling are associated with moderate but significant increases in gambling symptoms. Gambling machines (other than in a casino) are not associated with a significant increase in gambling symptoms. Internet gambling, in spite of the very high gambling symptoms associated with it (Table 3), is not significant when other forms of gambling are controlled for.

We also tested interactions between gender, age and socioeconomic status and all 15 forms of gambling, in an attempt to detect different effects of the various forms of gambling for different demographic groups. The last two columns show the only significant interaction. The IRR for card games was much higher for females than for males. Playing cards for money multiplied the female's problem gambling symptoms by 11 times.

Table 5 follows a similar pattern to Table 4. The difference is that the incidence risk ratios are associated with a negative binomial regression in which the independent variables represent the number of days on which a particular form of gambling was played during the past 12 months, as opposed to simply whether or not it was played. We converted number of days to 14 day units, so that a respondent who played the lottery 14 days in the past year would have a value of 1 on the lottery independent variable, and a respondent who played the lottery 21 days would have a value of 1.5. We did this to make the IRRs larger and more understandable. The dependent variable was the number of SOGS-RA symptoms, as it was with Table 4. The IRRs in Table 5 represent the increase in the number of gambling symptoms associated with an additional 14 days on which a particular form of gambling was engaged in. For example, each 14 days of card games was associated with a 6% increased in problem gambling symptoms. Casino gambling had by far the strongest association with gambling symptoms. Each 14 days of casino visits multiplied the gambling symptoms by 1.58, or a 58% increase. The next strongest association is with office pools and charitable gambling (1.12, or a 12% increase for each 14 days of play), followed by other gambling (1.09), card games (1.06) and games of skill (1.04). There are some notable differences between these IRRs and those in Table 4. Lottery, card games and games of skill have low IRRs in Table 5, because numerous instances of play are necessary to generate the significant contribution to problem gambling which is reflected in their high IRRs in Table 4. Casino gambling, however, has a very high IRR in both Table 4 and Table 5. Both the fact of gambling at a casino, and each additional 14 days of play, are associated with a large increase in gambling symptoms.



We tested gender, age and SES interactions to determine whether the associations of days of gambling participation with gambling problems shown in Table 5 were different for different demographic groups. This produced the one interaction shown in the two final columns of Table 5. Each 14 days of gambling on games of skill is associated with a much greater increase in problem gambling symptoms in females than in males. Table 5 shows that each 14 days of play is associated with a 48% increase in problem gambling symptoms for females, and with only a 3% increase in problem gambling symptoms for males.

## Discussion

In the current article we have examined the extent to which particular forms of gambling are associated with symptoms of problem gambling among U.S. residents 14-21 years of age. We have focused on the extent to which various forms of gambling are associated with gambling problems, while controlling for all other gambling in which the respondent engaged. First we examined the association between gambling problems and playing or not playing particular forms of gambling, regardless of how often. The form of gambling associated with the biggest increase in problem gambling symptoms is gambling on cards, which the U.S. youth studies reviewed earlier also found to be the most likely form of gambling to be associated with a young person's problem gambling. Gambling on cards is clearly a key element in youth problem gambling in the U.S. The second strongest association is with casino gambling. The vast majority of our respondents cannot gamble legally in a casino, but investigation of this issue has invariably shown that young gamblers can get around the prohibitions. A young gambler who does go to a casino is demonstrating his or her keen interest in gambling, while casino gambling is less exceptional for an adult. The third strongest association is with "other gambling", an eclectic mix that includes betting on who would shoot the biggest deer, betting on elections, betting on fights at school, and betting on whether or not one can stop smoking. A small percentage of respondents engaged in these unusual forms of gambling, but those who did tended to gamble frequently, both on "other" gambling and on more conventional gambling activities. The conclusion to be drawn is not that betting on deer hunting is an unusually problematic form of gambling, but rather that betting on routine daily events may be a sign of a problem gambler. The finding that cards and games of skill have a close association with gambling problems is consistent with the U.S. youth literature reviewed earlier (e.g., Winters et al., 1993a; Engwall et al., 2004), although we did not replicate the finding that sports betting is significant. These findings are not consistent with the notion that the most rapid forms of gambling, such as gambling machines, are most likely to be associated with problem gambling.

In the next stage of our examination of the connection between various forms of gambling and problem gambling symptoms, we examined the change in gambling symptoms associated with each additional 14 days of play of any particular form of gambling, holding constant all the others. This differs from the previous analysis in that it does not gauge the overall association of specific forms of gambling with problem gambling symptoms, but it examines the marginal result per 14 days of play. By far the highest risk ratio is for casino gambling. Machine gambling is not associated with significant marginal risk. These findings are also not consistent with the notion that the most rapid forms of gambling, such as

gambling machines, are most likely to be associated with problem gambling, although this conclusion is subject to the caveat that casino gamblers may have been gambling on machines in the casino.

In the overall analysis (Table 4), we found that card games were more strongly associated with gambling symptoms for females than for males. In the analysis of marginal association with each 14 days of play (Table 5), we found that each additional 14 days of gambling on games of skill was associated with greater increases in symptoms for females than for males. Both card games and games of skill are traditionally male forms of gambling. It may be that female participation in a traditionally male form of gambling tends to indicate a deep gambling involvement, resulting in problems. Our analyses did not uphold the notion that machine gambling is particularly problematic for females. Age and socioeconomic status were not found to moderate the relationship between form of gambling and symptoms of problem gambling.

One principle demonstrated by the current analyses is that one must be cautious when interpreting data which show that persons who engage in a particular form of gambling have a high rate of problem gambling. The assessment of rates of problem gambling among those who have engaged in various forms of gambling has been a common practice in the literature reviewed above. However, some forms of gambling are clearly “advanced”, such that devotees of those forms of gambling tend to gamble frequently and to engage in several other forms of gambling. For example, our results show that internet gamblers had the surprisingly high rate of 64.8% with at least one problem gambling symptom, and also had a very high average of 2.02 problem gambling symptoms. This is consistent with the result of Wood and Williams (2007) cited earlier, who found that 42.7% of internet gamblers qualified as problem gamblers. But we also found that internet gamblers' overall frequency of gambling and their gambling versatility were far higher than those who engaged in any other form of gambling. High gambling frequency and gambling versatility are themselves associated with elevated problem gambling. That is the case in the current study and also in our adult national survey (Welte et al., 2004b). When the association of internet gambling with problem gambling symptoms is adjusted for all other gambling activity, it ceases to be significant. When the marginal contribution of additional days of internet gambling is adjusted for all other gambling, it also ceases to be significant.

The current study is subject to limitations. Some U.S. residents in the 14-21 year age range could not fall in our sample, because they reside where there is no telephone, or only a cell phone. Potential respondents who agreed to be interviewed may not be a perfectly representative sample of all potential respondents. All of our results are based on self-report, and are subject to practical limitations on their accuracy. For example, subjects may not remember exactly how many times they played a specific form of gambling in the past year. Because of time limitations, our gambling questions mixed gambling settings (casino gambling, charitable gambling, and internet gambling) with specific forms of gambling (e.g., gambling machines, not in a casino or on the internet). Therefore, our results concerning, for example, gambling machines, are subject to the limitation that they do not include gambling machines in casinos.

It is worthwhile to point out another limitation of our chosen approach, and to extend a bit beyond it. We have attempted to determine the likely extent of gambling problems for an individual who participates in a specific form of gambling. This is not equivalent to determining the overall societal problems associated with a particular form of gambling for the 14-21 age group. For that determination, one has to take into account the percent of the population that participates in a particular form of gambling. For example, while “other” gambling has a strong association with gambling symptoms, it does not play an important role in the overall youth gambling problem, because it is engaged in by only 2% of the youth population. If we judge overall societal gambling problems by both the increase in symptoms associated with a particular form of gambling and the percentage of the youth population that engages in that form of gambling, card games are the form of gambling associated with the largest total problems, followed by lottery, office pools/charitable gambling, and betting on games of skill.

One broad conclusion is that the most rapid forms of gambling, with the highest event frequencies, may not be the most problematic among young people. Informal gambling, such as card games, betting on games of skill, and betting on everyday events can be a cause for concern. Adolescents and young adults have problems with gambling, even though they cannot or do not patronize a casino or a state lottery.

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**Table 1**  
**Demographic Profile of Respondents, U.S. Youth and Gambling Survey All Respondents**  
**(N = 2274), Past Year Gamblers (PYG) (Weighted N = 1535)**

		All	PYG
Gender	Male	50%	57%
	Female	50%	43%
Age	14-15	26%	23%
	16-17	25%	25%
	18-19	25%	27%
	20-21	24%	25%
Race	White	62%	64%
	Black	15%	13%
	Hispanic	16%	17%
	Asian	4%	3%
	American Indian	1%	1%
	Mixed, Unknown	2%	2%
Parent's Highest Education	Less than HS grad	9%	8%
	HS grad	27%	27%
	Beyond HS, no bachelor's	21%	21%
	Bachelor's degree	25%	26%
	Beyond bachelor's	18%	18%
Current Education Status	Grade school	5%	4%
	High school	48%	46%
	Post-HS vocational	1%	1%
	2-year college	9%	10%
	4-year college	17%	18%
	Grad school, other	2%	2%
Employment Status	Not in school	18%	19%
	Full time	14%	16%
	Part time	25%	26%
	Not employed	61%	58%
	Live with parents	88%	87%
	Live independently	12%	13%

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**Table 2**  
**Participation in all Forms of Gambling by Gender, U.S. Youth and Gambling Survey, (N = 2274)**

Form of gambling	Percent played last year			Mean # days for those who played		
	Female	Male	Overall	Female	Male	Overall
Office pools, charity	24	37	30	7	22	16
Lottery	29	30	29	12	28	21
Pull tabs	3	6	5	11	21	18
Internet gambling	0	3	2	9	52	48
Casino gambling	5	10	7	7	9	8
Bet on horse, dog	2	7	5	9	16	14
Gambling machines	5	7	6	13	42	31
Card games	21	45	33	14	35	28
Games of skill	8	33	21	11	42	36
Video keno	3	4	3	11	35	26
Bingo	13	11	12	7	8	8
Dice games	4	14	9	12	41	35
Sports betting	11	35	23	12	37	31
Sports cards	1	7	4	9	34	31
Other	1	4	2	66	83	79
All gambling	58	77	68	25	105	71

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**Table 3**  
**Prevalence of Any Gambling Symptoms, Mean Gambling Symptoms, Gambling Versatility, and Days Gambled on all Forms of Gambling for Gamblers Who Played Each Form of Gambling, U.S. Youth and Gambling Survey**

Forms of Gambling	N(Weighted)			Percent With Any Gambling Symptoms			Mean Number of Gambling Symptoms			Mean Number of Types of Gambling (Gambling Versatility)			Mean Total Days Gambled		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
Office Pools, charity	266	420	687	12.1	38.3	28.1	.23	.81	.59	2.9	4.4	3.8	29	145	100
Lottery	323	342	664	10.6	38.7	25.0	.24	.83	.54	2.8	4.5	3.7	34	150	94
Pull tabs	38	72	110	26.9	40.0	35.4	.29	.87	.67	3.8	6.2	5.3	42	261	185
Internet gambling	4	36	40	56.8	65.7	64.8	2.27	1.99	2.02	5.6	7.1	6.9	112	416	387
Casino gambling	52	112	164	37.7	49.1	45.5	.85	1.34	1.18	4.2	5.6	5.2	71	185	149
Bet on horse, dog	27	81	108	20.2	56.0	47.0	.26	1.43	1.13	3.6	6.2	5.5	94	223	190
Gambling machines	51	79	130	21.9	51.6	40.0	.45	1.29	.96	4.4	6.1	5.2	72	299	210
Card games	235	515	749	20.0	36.1	31.0	.41	.82	.69	5.3	4.2	3.9	45	143	112
Games of skill	88	381	469	22.5	41.9	38.2	.51	.92	.85	4.2	4.6	4.4	66	181	160
Video keno	28	46	74	25.9	58.0	45.8	.39	1.30	.96	4.6	6.8	5.7	92	349	251
Bingo	150	120	270	12.4	41.1	25.1	.27	1.01	.60	5.4	5.6	4.4	44	202	114
Dice games	41	165	206	21.2	50.3	44.5	.45	1.34	1.16		5.7	5.3	86	273	236
Sports betting	129	401	530	14.0	39.3	33.2	.30	.89	.75	2.8	4.5	4.2	53	167	140
Sports cards	12	81	93	8.7	39.4	35.4	.09	.79	.70	2.9	4.9	4.6	30	178	159
Other	14	40	54	38.2	61.9	55.9	.98	1.78	1.58	3.9	5.9	5.4	181	326	290
All gambling	657	877	1534	8.7	26.7	19.0	.16	.58	.40	2.2	3.3	2.8	25	105	71

**Table 4**  
**Incidence Risk Ratios for Each Form of Gambling, Negative Binomial Regression of SOGS-RA Symptom Count with Past-Year Gamblers (Weighted N =1535)**

Independent Variable <sup>1</sup>	IRR	Female		Male	
		IRR	IRR	IRR	IRR
Office pools, charity	1.56*				
Lottery	1.64*				
Pull tabs	.77				
Internet gambling	1.73				
Casino gambling	2.52***				
Bet on horse, dog	1.21				
Gambling machines	1.50				
Card games	3.14***	11.04***		2.17***	
Games of skill	1.97***				
Video keno	1.06				
Bingo	1.11				
Dice games	1.41				
Sports betting	1.43				
Sports cards	.77				
Other	2.22**				
Gender	1.94***				
Age	.93				
Socioeconomic Status	.89**				

\*\* Significant at .01 level

\*\*\* Significant at .001 level

<sup>1</sup> 0 = Not played in past year  
 1 = Played in past year

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**Table 5**  
**Incidence Risk Ratios Associated with 14 Days of Each Form of Gambling, Negative Binomial Regression of SOGS-RA Symptom Count with Past-Year Gamblers (Weighted N =1535)**

Independent Variable	IRR	Female	Male
		IRR	IRR
Office pools, charity	1.12**		
Lottery	1.07**		
Pull tabs	.98		
Internet gambling	1.09		
Casino gambling	1.58**		
Bet on horse, dog	1.03		
Gambling machines	1.03		
Card games	1.06**		
Games of skill	1.04**	1.48**	1.03
Video keno	.96		
Bingo	1.05		
Dice games	1.02		
Sports betting	1.02		
Sports cards	.97		
Other	1.09**		
Gender	2.38***		
Age	1.00		
Socioeconomic Status	.97		

\*\* Significant at .01 level

\*\*\* Significant at .001 level

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