

# The Prevalence of Problem Gambling Among U.S. Adolescents and Young Adults: Results from a National Survey

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**Abstract** A random telephone survey was conducted with a representative sample of 2,274 U.S. residents aged 14–21. The prevalence of problem gambling, as measured by the SOGS-RA, was 2.1%. Sixty-eight percent (68%) of the respondents had gambled in the past year, and 11% had gambled more often than twice per week. Males had much higher gambling involvement than females, and gambling involvement increased among older respondents. Blacks were less likely than average to have gambled in the past year, but if they gambled, they were more likely to do so frequently. Low SES respondents were less likely to have gambled in the past year, but if they gambled, they were more likely to be problem gamblers. Life transitions that are associated with assuming adult roles (employment, living independently of parents, non-student status) are also associated with greater gambling involvement. The rates of problem and pathological gambling were lower than those in an adult survey conducted earlier, when measured with the same questionnaire.

**Keywords** Youth gambling · National survey · Youth problem gamblers

## Introduction

Youth gambling has been the subject of increasing concern. Because of the expansion of legalized gambling in the U.S. in recent decades, young Americans have grown up in a society in which gambling is both common and highly visible. The popular press has frequently reported alarming incidents involving young gamblers. Numerous surveys of U.S. states have indicated high rates of youth problem gambling (e.g., Shaffer et al. 1997; Westphal et al. 2000). Research has shown that adolescent onset of gambling is associated with greater gambling involvement in adulthood (Burge et al. 2004). A key step in addressing the prevalence of problem gambling among youth is to conduct a national U.S. survey of youth gambling. We have conducted such a survey, and in the following article

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we will pursue these objectives: (1) to describe our findings on the prevalence of youth gambling and problem gambling, and compare these findings to other studies, (2) to describe how gambling involvement is distributed across demographic subgroups of the youth population, and to test the statistical significance of these distributions, controlling simultaneously for all demographic variables, (3) to describe how gambling involvement is distributed among jointly defined age and gender groups, and test the statistical significance of these joint distributions, and (4) to compare the rates of problem and pathological gambling in the current national U.S. youth survey to the rates in a national U.S. adult survey that used the same measure of gambling problems.

Surveys of the prevalence of problem gambling among youth in the U.S. have produced varied results, depending on the screening questionnaire and definition of problem gambling employed, as well as the geographic area involved. Shaffer et al. (1997) conducted a meta-analysis of 22 methodologically sound surveys of adolescent gambling in various parts of the U.S. They determined that the average rate for past-year level 3 gambling (their term for serious problem or pathological gambling) for adolescents was 5.77%, although they point out that there is great variance among the surveys, partly due to methodological differences. Jacobs (2004) also summarized the results from U.S. youth gambling surveys, including some more recent than those studied by Shaffer and colleagues. In nine selected surveys from 1989 to 2002, Jacobs found an average rate of problem/pathological gambling of 3.7%. (Note—this figure was calculated from data in Table 5 of Jacobs 2004). Many of the surveys reviewed by Shaffer et al. and by Jacobs used the South Oaks Gambling Screen, a 20-item screen originally developed for adults by Lesieur and Blume (1987). In Table 1, we have reviewed several youth gambling surveys which used the SOGS-RA (Winters et al. 1993), a version of the SOGS adapted for adolescents. This is the same instrument that we have used for the current study (see Methods). These surveys used representative samples of adolescents from five U.S. states and two foreign countries. Each used a standard of four or more items endorsed to define problem gambling. In the U.S. states of Louisiana, Oregon, Alabama, Mississippi and Minnesota, the rate of problem gambling as measured by the SOGS-RA ranged from 2.8% to 5.8%, with an average of 4.4%. The Canadian studies ranged from 2.2% to 5.8%, with an average of 3.7%. The Iceland study found a 2.7% rate of problem gambling among adolescents (Table 1).

The rates of youth problem/pathological gambling reflected in the figures cited above are higher than the rates generally found for adults. For example, although the meta-analysis by Shaffer and colleagues found a rate of 5.77% for adolescents, their meta-analysis of adult surveys found a rate of 1.14%. There has been a controversy in the literature about whether

**Table 1** Adolescent gambling surveys using SOGS-RA past year problem gambling

Reference	Location	Date	Cutpoint	Pct (%)
Winters et al. (1995)	Minnesota	1990	4	2.8
Westphal et al. (2000)	Louisiana	1997	4	5.8
Carlson and Moore (1998)	Oregon	1998	4	4.1
Langhinrichsen-Rohling et al. (2004)	Alabama, Mississippi, and Oregon	2002	4	4.8
Poulin (2002)	Canadian Atlantic Provinces	1998	4	2.2
Wiebe et al. (2000)	Manitoba	1998	4	3.2
Adlaf and Lalomiteanu (2000)	Ontario	1999	4	5.8
Olason et al. (2006)	Iceland	2004	4	2.7

this is a valid relationship, or an artifact of methods. As Shaffer et al. (1997) point out, somewhat different methods have been used to measure pathological gambling for adolescents and adults. Although the conceptual criteria are the same, some criteria must be operationalized differently for adolescents. A question containing wording such as “borrowed money from your spouse or partner” or “borrowed money from in-laws” would not be appropriate for adolescents. Therefore, measures of adolescent pathological gambling use wording appropriate for adolescents. In addition, some adolescent studies have used a smaller number of endorsed items than adult studies to qualify for problem or pathological gambling. There are additional reasons why youth problem gambling rates might be inflated. Jacques and Ladouceur (2003) have pointed out that scoring errors have been made by some researchers using common screening instruments, and Ladouceur et al. (2000) have demonstrated the possibility that young respondents may misinterpret some questions in a way that inflates problem gambling scores. These arguments are summarized in an article by Derevensky et al. (2003) which is aptly titled “Prevalence Rates of Youth Gambling Problems: Are the Current Rates Inflated?”.

The uncertainty about the extent of teenage gambling pathology was underscored by the results obtained by the national U.S. telephone survey of 534,16 and 17-year-old respondents conducted for the National Gambling Impact Study Commission (NORC 1999). The investigators who conducted this study along with the larger adult study, devised their own measure of pathological gambling—the NORC DSM Screen for Gambling (NODS). They administered the NODS with the same wording in both the adolescent and adult studies, and they found a lifetime rate of pathological or problem gambling of 1.5% for adolescents, and a higher lifetime rate of 2.1% for adults. Past-year rates were not reported for adolescents because of the small *N*. In the current study, in addition to the SOGS-RA, we also administered the DIS for pathological gambling (see Methods), the same instrument that we used in a national U.S. survey of adult gambling. We administered the DIS in the current study so that we would have a measure of problem gambling that allowed a direct comparison between the current youth survey and the earlier adult survey. In the current article, we will compare youth and adult rates using the same screening instrument.

Surveys of youth gambling behavior show some consistent—and some inconsistent—findings with regard to demographic patterns. In a Louisiana survey of students in grades 6 through 12, Westphal et al. (2000) found that problem gambling was more prevalent among males than females, more prevalent among minority group members than whites. In a high school survey conducted in Alabama, Mississippi and Oregon, Langhinrichsen et al. (2004) had those same findings. In a telephone survey of New York State adolescents, Volberg (1998) found that frequent gambling was significantly more common among males, older adolescents, whites, and adolescents who were employed 10 more hours per week. A survey of Connecticut high school students sponsored by the Connecticut Council on Problem Gambling (1998) found that males and females had the same rates of ever having gambled (84%), but males were three times as likely to be problem gamblers. This study also found that minorities had higher rates of problem gambling than whites. Stinchfield et al. (1997) analyzed two large surveys, conducted in 1992 and 1995, of Minnesota 6th, 9th and 12th grade students. They found that boys gambled more often than girls, and that 9th and 12th graders gambled more frequently than 6th graders. White and Asian students gambled less frequently than Black, Hispanic and American Indian students. A survey of Texas adolescents (Wallisch 1993) found that males, older adolescents, Hispanics, and adolescents with disposable income of \$50/week or more were more likely to be weekly gamblers. Blacks had lower rates of frequent gambling than whites or

Hispanics. In a survey of Washington adolescents, Volberg (1993) found that males and adolescents with incomes of \$50/week or more were more likely to be problem gamblers. Race was not significantly related to problem gambling.

Surveys of youth gambling have of course been conducted outside of the U.S. Fisher (1999) analyzed a large sample of 12–15 year olds from schools in Britain and found that problem gambling was associated with being male, having a higher disposable income, and living in a single-parent family. In a Scottish survey, Moodie and Finnigan (2006) found males to have higher rates of problem gambling than females and, not surprisingly, 13–16 year olds to have higher rates than 11–12 year olds.

These are mixed results. The one consistent finding in the literature is that males gamble more, and have more problems, than females. Generally, young people who have more access to money have more gambling involvement. Some studies have found that youths who are members of minority groups are more likely to be problem gamblers, but this is not a universal finding. While one might expect gambling involvement to increase with age among teens and young adults, that is also not a universal finding. Results related to socioeconomic status and religion are sparse in the literature, because most researchers did not measure those factors, even though some results attributed to race might be confounded with socioeconomic status or religion. In the current large representative U.S. study, we will examine the relationship between youth gambling involvement and demographic variables including SES and religion, as well as life transition variables such as employment and living independently of parents.

## Methods

We conducted a national random-digit-dial telephone survey with a representative sample of 2,274 U.S. residents aged 14–21. 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. The sample was stratified by county and by telephone block within county. This resulted in a sample that was spread across the U.S. according to population, and not clustered by geographic area. The interviews were conducted by trained interviewers at the Research Institute on Addictions in Buffalo, NY. Each telephone number was called at least seven 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. The respondents were recruited by selecting randomly from the persons aged 14–21 years in each household by identifying the one with the next birthday. The 2,274 telephone 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. Results were statistically weighted to compensate for the number of potential respondents in the household. Weighting adjustments were also used to align the sample with gender, age and race distributions shown in the U.S. census estimates.

Respondent's age was assessed by asking for their date of birth, and then following up with a verification of their age. Respondents who did not want to give their date of birth were simply asked their age. Respondent's race/ethnicity was assessed by asking two questions. First, respondents were asked if they considered themselves to be Spanish,

Hispanic, Latino or Chicano. Second, they were asked for their race, and given the choices: White or White Hispanic, Black or Black Hispanic, Asian, and American Indian or Alaskan Native. We derived the mutually exclusive race/ethnicity variable by putting everyone who said that they were Hispanic in the “Hispanic” category. Religion was assessed by simply asking: “What is your religion?”. Marital status was assessed by asking: “What is your marital status?”, and giving the choices: never married, married, divorced/annulled/separated, and widowed. In a second question, respondents were asked if they were living with someone as if married. Employment status and educational status were assessed by asking: “Are you currently employed?”, and “Are you currently enrolled in school?”. Living independently was assessed by asking: “Are you currently living on your own or in the home of your parent or guardian?”. 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.

Our primary measure of problem gambling was the SOGS-RA. The best known adult assessment of problem gambling, the South Oaks Gambling Screen (SOGS) (Lesieur and Blume 1987) was modified for use with adolescents by Winters, Stinchfield and Fulkerson (1993). Their instrument, 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. Since its original development, the SOGS-RA has been used successfully in numerous studies. The early studies using the SOGS-RA were reviewed by Shaffer et al. (1997), and some of the more recent studies were cited in our introduction. 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, the SOGS-RA items had a Cronbach’s Alpha of 0.74, demonstrating good internal consistency reliability. Following the common practice in the literature, we refer to endorsement of two or three items as “at risk” gambling, and we refer to endorsement of four or more items as “problem gambling”. The SOGS-RA was administered to every respondent who reported any gambling during his or her life.

For comparing problem/pathological gambling rates among youth with problem/pathological gambling rates from our national survey of adults, we used the Diagnostic Interview Schedule (DIS) for pathological gambling (Robins et al. 1996). The DIS for pathological gambling contains 13 items that map into the 10 DSM-IV criteria for pathological gambling, such as preoccupation with gambling and needing to gamble with increasing amounts of money to get the same excitement. In the current study, the DIS pathological gambling items had a Cronbach’s Alpha of 0.79, demonstrating good internal consistency reliability. Endorsement of five or more criteria is considered pathological gambling, and for our purposes we considered endorsement of three or more criteria to be problem gambling. Respondents who endorsed the requisite number of criteria for the past

year are considered to be current pathological or problem gamblers. Before adopting this measure for the current study, we examined the items for applicability to adolescents and young adults. Based on face validity, 12 of the 13 items could be used unaltered, and we did so. For the 13th item, which asks about trouble with “spouse or partner”, we changed the wording to “parent, other family member or close friend.” We added a 14th item, which asks about missing a day or more of school because of gambling. This item was added to parallel an item about job trouble. These 14 questions are mapped into 10 DSM criteria. We will compare results from these questions to those obtained by almost identical questions in our adult national survey. In both the current youth survey and the earlier adult survey, we administered the DIS for pathological gambling to every respondent who reported any gambling during his or her life. In the current study, the DIS was administered after the SOGS-RA; in the previous adult survey the DIS was administered after the original adult version of the SOGS. Although having been administered after another screen for problem gambling could have influenced the DIS problem and pathological gambling rates in both surveys, comparability was maintained because the order effects were roughly the same for both surveys.

We based our examination of youth gambling on four dependent variables, each defined in terms of the 12 months before the interview: any gambling, frequent gambling (twice a week or more on average), at risk or problem gambling (2+ endorsements on the SOGS-RA) and problem gambling (4+ endorsements). Each of these is broken down by nine demographic and life transition variables, as shown in Table 3. In Table 4, these breakdowns are repeated among past-year gamblers only. For example, 18% of males were frequent gamblers, and 23% of males who gambled in the past year were frequent gamblers. We repeated the breakdowns with past-year gamblers only so that the decision to gamble and serious gambling involvement can be considered as separate steps. For an illustrative example, Table 3 shows that respondents in the lowest SES category are significantly less likely than middling SES respondents to have gambled in the past year. However, Table 4 shows that if they gambled, lower SES respondents are significantly more likely than others to be problem gamblers. The fact that low SES is oppositely related to gambling at these different steps suggests that the model which predicts who will gamble is different from the model which predicts those gamblers who will gamble frequently or with problems. Thus, separate examinations of all respondents and gamblers only are justified.

Significance tests were generated by logistic regressions, one for each column in Tables 3 and 4. In the first step, demographic variables (gender, age, race, SES and religion) were entered. The significance tests for each of these variables were done with the other four controlled. Life transitions (marital, employment, student status, living arrangement) were entered at the second step, so these significance tests are with all five demographics plus the other three life transition variables controlled. In the third step, interactions between gender and the other predictors were entered, and were tested with all main effects and other interactions controlled. The results of this third and last step appear in Table 5. The terms “ref” and “trend” in the first columns of Tables 3 and 4 show how the contrasts were arranged in the logistic regressions, with reference categories labeled “ref”. For example, the reference category for race is “White”, so the \*\*\* by “Asian” in the “any gambling” column means that Asian youth are significantly less likely than Whites to have gambled in the past year. The contrast category for SES is the three middle fifths, so that the highest and lowest fifths were compared with it. Age was a continuous independent variable, and therefore was tested as a trend.

**Results**

Table 2 shows the prevalence of SOGS-RA scores at each level up to five or more endorsements. The table shows that 87.3% of our respondents failed to endorse a single item. The most commonly published cutpoints on the SOGS-RA have been 4+ (problem gambling) and 2+ (at-risk or problem gambling), for which we found 2.1% and 6.5%, respectively. We have included this table so that our results can be compared with any study that used the SOGS-RA, regardless of the cutpoint that was used in the published results.

Table 3 shows the prevalence of various gambling measures. Sixty-eight percent of our respondents gambled in the past year, 11% gambled twice per week or more, 6.5% were

**Table 2** U.S. youth and gambling survey past year problem gambling scores SOGS-RA

Number of items	%	Cumulative %
5+	1.3	1.3
4	0.8	2.1
3	1.0	3.1
2	3.4	6.5
1	6.2	12.7
0	87.3	100.0

**Table 3** U.S. youth and gambling survey past-year gambling percentages respondents aged 14–21

	<i>N</i>	Any gambling (%)	Frequent gambling (%)	At-risk or problem gambling (%)	Problem gambling (%)
Overall	2,274	68	11	6.5	2.1
Male	1,148	77***	18***	10.6***	3.3***
Female (ref)	1,126	58	4	2.4	0.9
14–15 (trend)	588	60***	9**	5.0	1.7*
16–17	583	64	10	6.2	0.9
18–19	564	74	11	8.5	2.6
20–21	538	72	13	6.6	3.3
White (ref)	1,408	70	9	6.2	1.6
Black	334	60*	18***	8.1	3.4
Hispanic	373	71	14	6.5	2.8
Asian	83	48***	5	6.7	1.0
American Indian	27	83	28**	8.7	3.0
Mixed/unknown	50	45***	9	4.4	2.4
SES lowest 1/5	455	60***	16*	8.3	3.5
SES second 1/5 (ref)	454	67	12	5.0	1.0



**Table 3** continued

	<i>N</i>	Any gambling (%)	Frequent gambling (%)	At-risk or problem gambling (%)	Problem gambling (%)
SES third 1/5 (ref)	456	75	11	8.0	3.5
SES fourth 1/5 (ref)	456	66	9	7.3	1.3
SES highest 1/5	454	70	6*	4.1*	1.1
Baptist	334	59***	13	8.0	2.0
Other protestant (ref)	858	71	10	6.4	2.4
Catholic	606	75	13	5.9	1.7
Mormon	65	37***	1	0.0	0.0
Jewish	36	58**	2	5.8	0.0
Other	77	42***	12	6.4	3.2
None	298	66*	10	8.1	2.5
Never married (ref)	2,143	67	11	6.4	1.9
Married	41	62	13	7.9	5.2
Living together	82	73	14	8.8	3.8
Employed full time	311	81**	16	7.7	5.5
Employed part time	578	70	9	6.0	0.6
Not employed (ref)	1,385	64	10	6.5	1.9
Not student (ref)	412	71	18	9.2	4.9
Student	1,862	67	9**	6.0	1.5
Lives with parents (ref)	2,011	66	11	6.4	1.7
Lives independently	263	76*	12	7.9	4.8*

\* Significant at 0.05 level

\*\* Significant at 0.01 level

\*\*\* Significant at 0.001 level

Note: “ref” indicates reference group; statistical significance from logistic regression

at-risk or problem gamblers, and 2.1% were problem gamblers. Males were very significantly higher than females on every measure of gambling involvement. Any gambling, frequent gambling, and problem gambling increased with age from 14 to 21. Blacks, Asians and “Mixed/Unknown” were less likely to have gambled than Whites. Blacks and American Indians were more likely to be frequent gamblers than Whites. Eighteen percent (18%) of Blacks and 28% of American Indians gambled twice per week or more, as compared to 9% of Whites. There were no detectable differences by race in at-risk/problem or problem gambling. The lowest SES respondents were least likely to gamble. However, frequent gambling was most common among low SES respondents, and least common among high SES respondents. Likewise, at-risk/problem gambling was least common at the high end of SES. Religion was related to “any gambling”, with every religious group except Catholics less likely than “other (than Baptist) Protestants” to have gambled. Marital status showed no consistent relationship to gambling involvement.



**Table 4** U.S. youth and gambling survey past-year gambling percentages respondents aged 14–21 past-year gamblers only

	<i>N</i>	Frequent gambling (%)	At-risk or problem gambler (%)	Problem gambler (%)
Overall	1,535	16	9.7	3.1
Male	878	23***	13.9***	4.3***
Female (ref)	657	7	4.1	1.5
14–15 (trend)	356	15*	8.2	2.7*
16–17	376	16	9.6	1.5
18–19	418	15	11.4	3.5
20–21	387	19	9.2	4.5
White (ref)	986	12	8.8	2.3
Black	201	30***	13.5	5.6
Hispanic	264	19	9.2	3.9
Asian	39	10	14.1	2.2
American Indian	22	34*	10.5	3.7
Mixed/unknown	22	20	9.7	5.3
SES lowest 1/5	275	26**	13.7	5.8*
SES second 1/5 (ref)	303	19	7.5	1.5
SES third 1/5 (ref)	341	15	10.7	4.7
SES fourth 1/5 (ref)	301	14	11.1	2.0
SES highest 1/5	316	8**	5.8*	1.6
Baptist	196	22*	13.6	3.5
Other protestant (ref)	611	14	9.0	3.4
Catholic	456	17	7.8	2.2
Mormon	24	2	0.0	0.0
Jewish	21	3	10.0	0.0
Other	33	29*	15.0	7.5
None	196	15	12.3	3.8
Never married (ref)	1,444	16	9.5	2.8
Married	26	20	12.8	8.5
Living together	60	19	12.1	5.2
Employed full time	251	20	9.6	6.8
Employed part time	402	13	8.6	0.9
Not employed (ref)	882	16	10.2	3.0
Not student (ref)	294	26	12.6	6.8
Student	1,241	14***	8.9	2.2
Lives with parents (ref)	1,335	16	9.6	2.6
Lives independently	200	16	10.4	6.3

\* Significant at 0.05 level

\*\* Significant at 0.01 level

\*\*\* Significant at 0.001 level

Note: “ref” indicates reference group; statistical significance from logistic regression

**Table 5** U.S. youth and gambling survey past-year gambling percentages by gender and age

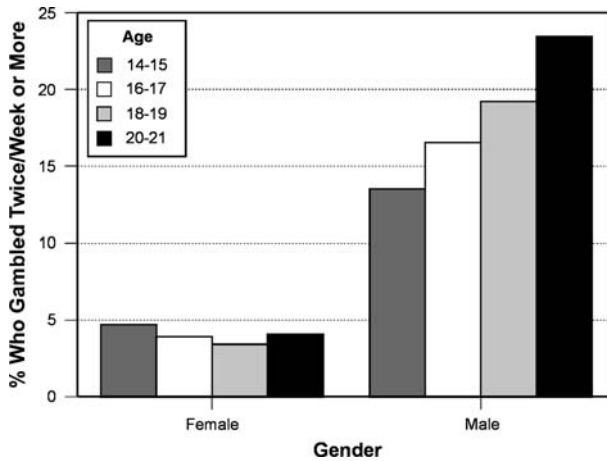
Age	N		Any gambling		Frequent gambling		At risk or problem gambling		Problem gambling	
	M	F	M (%)	F (%)	M (%)	F (%)	M (%)	F (%)	M (%)	F (%)
14–15	282	306	68	53	<i>13</i>	<i>5</i>	7.3	2.4	2.6	0.6
16–17	282	301	76	52	<i>16</i>	<i>4</i>	10.9	1.1	1.9	0.0
18–19	289	276	83	65	<i>19</i>	<i>3</i>	14.3	2.9	4.3	0.9
20–21	274	265	80	64	<i>23</i>	<i>4</i>	10.2	3.1	4.6	1.9

Note: Italics indicates gender by age interaction significant at 0.05 level

Note that the statistical tests pertaining to employment, student status and living arrangement are all reported with every other predictor, including age, held constant. Those who were employed full time were significantly more likely to have gambled in the past year than those not employed. Non-students were significantly more likely to have gambled frequently than were students. Respondents who lived independently were significantly more likely to have gambled in the past year and to have been problem gamblers than those who lived with their parents. Although only these four contrasts on the life transition variables reached statistical significance, it may be worth noting that those who were employed full time, were not students and lived independently of their parents were higher than their counterparts on all measures of gambling involvement.

Table 4 reports the prevalence of frequent, at-risk and problem gambling only for those respondents who gambled in the past year. As mentioned earlier, we reported these results separately because the factors which predict whether an individual gambles or not may be different from those factors which predict which gamblers will become heavily involved. Male gender and increased age are associated with an increased probability of gambling in the past year (as Table 3 also shows) and also with increased gambling involvement among those who do gamble. Table 4 shows that male gamblers are higher than females on every measure, and that frequent gambling and problem gambling increase with age among those who gambled in the past year. Blacks are less likely than Whites to have gambled in the past year (Table 3), but if they gambled, Table 4 shows that they are much more likely than Whites (30% vs. 12%) to gamble frequently. Table 3 shows that respondents in the lowest fifth of SES are the least likely to have gambled in the past year. However, Table 4 shows that among those who gambled, the lowest SES is associated with the highest gambling involvement, and the highest SES is associated with the lowest gambling involvement. Among gamblers, the lowest fifth of SES had the highest rates of frequent gambling and problem gambling. The highest fifth of SES had the lowest rates of frequent gambling and at-risk/problem gambling. The results pertaining to religion also show reversals. Other religions (which include Moslem, Hindu, Buddhist, Jehovah's Witnesses and others) had a very low rate of having gambled in the past year (42%), but if they gambled, they had higher rates of frequent gambling than any other religious group. Similarly, Baptists were less likely than other Protestants to have gambled in the past year, but if they gambled, they had higher rates of frequent gambling.

Table 5 and Fig. 1 show the noteworthy result that emerged from our tests of gender interactions. Only one interaction between gender and the other predictors was significant—the interaction between gender and age, with frequent gambling as the dependent variable. Table 5 shows the gambling measures broken down jointly by gender and age. As Fig. 1 shows more dramatically than the table, frequent gambling increased with age among males, but not among females. There is a suggestion of this same pattern with



**Fig. 1** Percentage of frequent gamblers by age and gender

at-risk/problem gambling and problem gambling, but these interactions were not statistically significant.

Table 6 shows a comparison between problem/pathological gambling rates in the current study and our national U.S. adult (18 and older) survey conducted in 2000. The other problem gambling results reported in this article were measured using the SOGS-RA, but these results were measured using the DSM-IV DIS for problem/pathological gambling. This measure was used in both studies, with only minor modifications as described in the methods section. The results for problem gambling (our term for an endorsement of 3+ DSM criteria) show that the rates for males in the two studies are identical (4.2%), but the rate for females in the adult study (2.9%) is much higher than the rate for females in the youth study (0.1%). As measured by DSM-IV criteria, problem gambling is almost non-existent among adolescent and young adult females. The results for pathological gambling (last column of Table 6) show that adult males have a higher rate of pathological gambling than adolescent and young adult males, and that adult females have a much higher rate than adolescent and young adult females. In the youth survey, pathological gambling by DSM-IV criteria did not occur among females. These results do not support the supposition that problem gambling is more common among young people than adults. These results are consistent with the supposition that gambling problems develop later in life for females than for males.

**Table 6** U.S. youth and adult gambling survey rates of problem and pathological gambling measured by DSM-IV criteria

		Problem gambling 3+ DSM-IV criteria (%)	Pathological gambling 5+ DSM-IV criteria (%)
Youth survey <i>N</i> = 2,274	Male	4.2	0.7
	Female	0.1	0.0
	Overall	2.2	0.4
Adult survey <i>N</i> = 2,631	Male	4.2	1.3
	Female	2.9	1.4
	Overall	3.5	1.4

## Discussion

The rates of problem gambling found in the current study are not as high as the rates of problem gambling found in other surveys which used the SOGS-RA and defined problem gambling as 4 or more positive answers. It is possible that differences in study design might account for some of this difference. Among the eight surveys listed in Table 1, five were school surveys. The school surveys produced the three highest rates, but also the two lowest rates. The remaining three studies were telephone surveys. One of these sampled from listed numbers, and another used an “age-targeted”, non-probability sample. Only one study (Carlson and Moore 1998) seems to have been a random-digit-dial survey. Our currently reported survey was sampled with a known probability from a frame that included all phone numbers, and therefore is closest to a representative household sample. Having made this observation, it is not clear why this would make our estimate of the rate of problem gambling lower than the others. For example, school surveys obtain data only from those who are attending school, but one would not think that this constitutes a bias for more problem behaviors. The 95% confidence interval for our 2.1% rate of problem gambling is roughly plus or minus half a percent, making it unlikely that the current study found a lower problem gambling rate than the eight studies in Table 1 by chance. Also, the rates of other problem behaviors (such as conduct disorder and daily marijuana use) in our sample are high relative to the rates found in the literature; and therefore, we did not obtain a sample low in problem behaviors, either by chance or by method bias. Some of the reasons suggested by Jacques and Ladouceur (2003) for overestimation of the rate of youthful problem gambling do not apply to the comparison between our survey and those in Table 1. All of these studies all used the same cutpoint—four or more endorsements. Question misinterpretation does not explain the difference, because the same questions were used. Wrong scoring is not likely with the SOGS-RA, which has a very straightforward scoring procedure. The most likely explanation is that the rate of problem gambling in the U.S. as a whole is lower than in many of the smaller jurisdictions in which surveys have been conducted.

Our results provide an opportunity to examine the influence of demographics and life transitions on gambling. Males were much higher than females on every measure of gambling. This was not the case in our 2000 adult survey, in which the “gender gap” in gambling involvement was much narrower (Welte et al. 2001). It seems likely that females’ gambling involvement tends to emerge in adulthood, while male involvement can be high in adolescence. This point is underscored by Fig. 1, which shows graphically how male frequent gambling is increasing at an early age, whereas female frequent gambling is stable. While three of our four measures of gambling involvement increased significantly with age in the 14–21 range, that increase comes primarily from males.

Asians were the racial group that showed the lowest gambling involvement. This is an interesting result in view of the commonly accepted notion (e.g., Liu 2006) that Asians are heavy gamblers. While it is possible that Asian gambling involvement develops later in life, it is also possible that examination of a representative sample simply fails to uphold a stereotype. Blacks are the least likely to have gambled, but Black gamblers are among the highest in gambling involvement. This replicates the finding in our national adult survey (Welte et al. 2001), and also is similar to the findings in general population surveys with respect to alcohol, which invariably find Blacks with a high percentage of abstainers, but may also find relatively high rates of alcohol abuse among Blacks who are drinkers (Welte et al. 2001). We have a small sample of American Indians, so it is difficult to obtain a statistically significant contrast. However, their rate of frequent gambling is so much higher than the reference group (28% for American Indians as opposed to 9% for Whites)

that it is statistically significant. They are also relatively high on measures of problem gambling. We might speculate that there is a connection between this result and the rapid spread of legal gambling in Indian communities.

Low SES respondents are most likely to have abstained from gambling, just as many studies have shown them to be the most likely to have abstained from alcohol (Welte et al. 2001). However, among gamblers, our results show a clear tendency for gambling involvement and negative consequences to increase as SES declines. We have elsewhere hypothesized that lower SES persons are more prone to gamble excessively because they see gambling as a reasonable method to improve their financial status (Welte et al. 2004). Religion clearly influences the decision to gamble, with Mormons, Jews and Baptists less likely to have gambled than the reference group (“Other Protestants”). Catholics were the most likely to gamble, not surprising as they are practitioners of a religion that is generally tolerant of gambling. For the other gambling involvement variables, we see little in the way of significant religious differences, but here again we have a small group problem. Nevertheless, it may not be a coincidence that Mormons reported 1% frequent gamblers (average for the entire sample was 11%) and also reported 0% problem or at-risk gamblers, as they are practitioners of a religion that discourages gambling.

We also examined the relationship between four life transitions (marriage, employment, living independently and student status) and gambling involvement. Those who work full time are more likely to gamble, those who are not students are more likely to gamble frequently, and those who live independently are more likely to gamble and to be problem gamblers. All statistically significant results show that greater gambling involvement is associated with an adult status. In fact, those who work full time, are not students and live independently are higher than their counterparts on all four measure of gambling involvement. These results suggest that, in the minds of some, gambling may be associated with the transition to adulthood.

We compared the pathological and problem gambling rates in our adult and youth studies, using the same measure, the DIS for pathological gambling. This comparison showed lower rates of problem and pathological gambling among adolescents/young adults than among all adults. When also considering the relatively low rate of problem gambling that we found using the SOGS-RA, our results are not consistent with the common notion that problem gambling is more prevalent among adolescents than among adults. Our results do support those researchers, some of whom we cited earlier, who have questioned that notion.

While there have been numerous surveys of adolescent gambling conducted in U.S. states, there has been a lack of studies of this topic in the nation as a whole. In this article, we have presented results from the first national U.S. survey of gambling among adolescents and young adults. We have found that gambling is widespread among U.S. youths. We also found a problem gambling rate which projects to approximately three quarters of a million problem gamblers among U.S. residents aged 14–21. In a society where young people are increasingly exposed to gambling influences, this is a cause for concern.

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## References

- Adlaf, E. M., & Ialomiteanu, A. (2000). Prevalence of problem gambling in adolescents: Findings from the 1999 Ontario student drug use survey. *Canadian Journal of Psychiatry*, 45(8), 752–755.

- Burge, A. N., Pietrzak, R. H., Molina, C. A., & Petry, N. M. (2004). Age of gambling initiation and severity of gambling and health problems among older adult problem gamblers. *Psychiatric Services*, *55*, 1437–1439.
- Carlson, M. J., & Moore, T. L. (1998). *Adolescent gambling in Oregon: A report to the Oregon gambling addiction treatment foundation*. Salem, Oregon: Funded by the Oregon Gambling Addiction Treatment Foundation.
- Connecticut Council on Problem Gambling. (1998). *Gambling and problem gambling among Connecticut high school students*. Guilford, CT: Author.
- Derevensky, J. L., Gupta, R., & Winters, K. (2003). Prevalence rates of youth gambling problems: Are the current rates inflated? *Journal of Gambling Studies*, *19*(4), 405–425.
- Fisher, S. (1999). A prevalence study of gambling and problem gambling in British adolescents. *Addiction Research*, *7*(6), 509–538.
- Hauser, R. M., & Warren, J. R. (1997). Socioeconomic indexes for occupations: A review, update, and critique. *Sociological Methodology*, *27*, 177–298.
- Jacobs, D. F. (2004). Youth gambling in North America: Long-term trends, future prospects. In J. L. Deverensky & R. Gupta (Eds.), *Gambling problems in youth. Theoretical and applied perspectives* (pp. 1–24). New York: Kluwer Academic/Plenum Publishers.
- Jacques, C., & Ladouceur, R. (2003). DSM-IV-J criteria: A scoring error that may be modifying the estimates of pathological gambling among youths. *Journal of Gambling Studies*, *19*(4), 427–431.
- Ladouceur, R., Bouchard, C., Rheaume, N., Jacques, C., Ferland, F., Leblond, J., & Walker, M. (2000). Is the SOGS an accurate measure of pathological gambling among children, adolescents and adults? *Journal of Gambling Studies*, *16*, 1–24.
- Langhinrichsen-Rohling, J., Rohling, M. L., Rohde, P., & Seeley, J. R. (2004). The SOGS-RA vs. the MAGS-7: Prevalence estimates and classification congruence. *Journal of Gambling Studies*, *20*(3), 259–281.
- Lesieur, H. R., & Blume, S. B. (1987). The South Oaks gambling screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry*, *144*(9), 1184–1187.
- Liu, L. (2006). *Casinos winning big by betting on Asians*. Washington Post: The Associated Press.
- Moodie, C., & Finnigan, F. (2006). Prevalence and correlates of youth gambling in Scotland. *Addiction Research and Theory*, *14*(4), 365–385.
- National Opinion Research Center. (1999). *Gambling impact and behavior study*. Chicago: Author.
- Olason, D. T., Sigurdardottir, K. J., & Smari, J. (2006). Prevalence estimates of gambling participation and problem gambling among 16–18-year-old students in Iceland: A comparison of the SOGS-RA and DSM-IV-MR-J. *Journal of Gambling Studies*, *22*(1), 23–39.
- Poulin, C. (2002). An assessment of the validity and reliability of the SOGS-RA. *Journal of Gambling Studies*, *18*(1), 67–93.
- Robins, L., Marcus, L., Reich, W., Cunningham, R., & Gallagher, T. (1996). *NIMH Diagnostic Interview Schedule—Version IV (DIS-IV)*. St. Louis: Department of Psychiatry, Washington University School of Medicine.
- Shaffer, H. J., Hall, M. N., & Bilt, J. V. (1997). *Estimating the prevalence of disordered gambling behavior in the United States and Canada: A meta-analysis*. Boston, MA: Harvard Medical School.
- Stinchfield, R., Cassuto, N., Winters, K., & Latimer, W. (1997). Prevalence of gambling among Minnesota public school students in 1992 and 1995. *Journal of Gambling Studies*, *13*(1), 25–48.
- Volberg, R. A. (1993). Gambling and problem gambling among adolescents in Washington state. Report to the Washington State Lottery.
- Volberg, R. A. (1998). *Gambling and problem gambling among adolescents in New York*. Albany, NY: NY Council on Problem Gambling.
- Wallisch, L. S. (1993). *1992 Texas survey of adolescent gambling behavior*. Texas: Texas Commission on Alcohol and Drug Abuse.
- Welte, J. W., Barnes, G. M., Wieczorek, W. F., Tidwell, M., & Parker, J. (2001). Alcohol and gambling pathology among U.S. adults: Prevalence, demographic patterns and co-morbidity. *Journal of Studies on Alcohol*, *62*(5), 706–712.
- Welte, J. W., Wieczorek, W. F., Barnes, G. M., Tidwell, M., & Hoffman, J. H. (2004). The relationship of ecological and geographic factors to gambling behavior and pathology. *Journal of Gambling Studies*, *20*(4), 405–423.
- Westphal, J. R., Rush, J. A., Stevens, L., & Johnson, L. J. (2000). Gambling behavior of Louisiana students in grade 6 through 12. *Psychiatric Services*, *51*(1), 96–99.
- Wiebe, J. M. D., Cox, B. J., & Mehmel, B. G. (2000). The South Oaks gambling screen revised for adolescents (SOGS-RA): Further psychometric findings from a community sample. *Journal of Gambling Studies*, *16*(2/3), 275–288.

- Winters, K. C., Stinchfield, R. D., & Fulkerson, J. (1993). Toward the development of an adolescent gambling problem severity scale. *Journal of Gambling Studies*, 9(1), 63–84.
- Winters, K. C., Stinchfield, R. D., & Kim, L. G. (1995). Monitoring adolescent gambling in Minnesota. *Journal of Gambling Studies*, 11(2), 165–183.