# Gambling among Minnesota American Indian Public School Students from 1992 to 2010

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Abstract

The specific aims of this study are threefold. First, measure 2010 rates of gambling and underage gambling among American Indian public school students. Second, compare rates of gambling, frequent gambling, and underage gambling from 1992 to 2010. Third, compare American Indian to non-American Indian students on frequent gambling in 2010. The 2010 sample includes 1,545 male and 1,723 female Minnesota American Indian public school students enrolled in the 9th and 12th grades and similar sample sizes from 1992, 1995, 1998, 2001, 2004, and 2007. Students were administered the Minnesota Student Survey, a 126-item, anonymous, self-administered, paper-and-pencil questionnaire that inquires about multiple health-related content domains, including gambling behavior. In 2010, one-half of the American Indian student population gambled at least once during the past year and a little over one in ten (13%) gambled frequently (weekly or more often). More boys gamble than girls and boys gamble more frequently than girls. More older students gamble than younger students and older students gamble more frequently than younger students. Gambling participation has shown a gradual and consistent decline from 1992 to 2010 for both boys and girls. Rates of frequent gambling have been relatively stable with recent declines from 2004 to 2010. Underage lottery, casino, and online gambling have shown significant declines from 1992 to 2010. American Indian students had higher rates of frequent gambling than their non-American Indian peers, particularly for girls who exhibited 2-4 times the rate of their non-AI peers.

Keywords: American Indian youth gambling; American Indian adolescent gambling; American Indian teenage gambling

Gambling among Minnesota American Indian Public School Students from 1992 to 2010

The expansion of commercial gambling in North America over the past three decades has resulted in widespread exposure of youth to gambling and its promotion. Gambling has moved out of Las Vegas and Atlantic City, to the convenience store, the internet, and onto the reservations of many American Indian (AI) communities. In Minnesota, commercial gambling opportunities are widespread including more than 3,000 state lottery outlets, over 3,000 charitable gambling sites, 18 tribal casinos, and two racetracks with card rooms. This is a significant shift in society where gambling was once viewed as a vice and is now viewed as a harmless pastime. This shift in societal attitudes undoubtedly has an effect upon youth given that this is the first generation of youth to grow up with commercial gambling and its promotion (Stinchfield & Winters, 1998). For example, some youth in Minnesota now celebrate their 18th birthday by gambling at a tribal casino. The legal age for gambling in Minnesota is 18 years of age. In Minnesota, the graduating high school class of 2010 was born a couple years after the introduction of the state lottery and tribal casinos (1990).

In the 2000 US Census data, 81,074 Minnesotans identified themselves as American Indian alone or in combination with one or more other races (www.demography.state.mn.us). American Indians represent about 1.5% of the Minnesota population of nearly 5 million. Of these, 18,397 lived on an AI reservation. The AI population of Minnesota is made up primarily of seven Anishinaabe (also known as Ojibwe or Chippewa) communities located in the northern half of Minnesota and four Dakota (also known by the French name of Sioux) communities in the southern half of Minnesota. There are two issues that make the study of gambling among AI youth of particular interest. First, gambling can become an addiction and American Indians have higher rates of addiction than the general population, particularly alcohol and other drug abuse

and dependence (Peacock, Day, & Peacock, 1999). This finding has made the prevention and treatment of addiction on AI reservations a public health priority for tribal, county, state, and federal public health agencies. Second, tribal gambling has brought economic development to some reservations, even being referred to as the "New Buffalo" for some AI communities (Wardman, el-Guebaly, & Hodgins, 2001). Tribal gambling has improved the lives of many tribal members and communities and has also brought access to Las Vegas-style casino gambling to tribal members. A concern of tribal elders is the amount of time and money spent by tribal members in tribal casinos. It should also be noted that tribal gambling has brought economic development to some AI communities but not all. Those AI communities near large metropolitan areas have benefitted more from tribal gambling than those AI communities located far away from metropolitan areas. Gambling on reservations may be viewed as a two-edged sword. On the one hand, gambling has provided much needed economic development for some tribal communities and improved the lives of tribal members. On the other hand, some tribal members gamble in tribal casinos and risk becoming addicted to casino games. And what about gambling among AI youth?

There have been four studies on gambling among North American Indian youth (Wardman, el-Guebaly, & Hodgins, 2001). One study was conducted in Alberta, Canada and the other three were conducted in Minnesota. In the earliest study, Hewitt and Auger (1995) administered the SOGS-RA to 1,000 aboriginal students in grades 5-12 (average age of 14 years) in 28 schools located throughout Alberta, Canada. They reported that 89% gambled for money in the past year. Bingo was the most prevalent game played (57%), followed by cards (49%), scratch tabs (48%), sports betting (42%), and games of personal skill (35%). Games played frequently, that is, weekly or more often, include sports betting (13%), bingo (12%), cards

(10%), video games for money (10%). Using the liberal scoring algorithm for the SOGS-RA (Winters, Stinchfield & Fulkerson, 1993), 28% were found to be problem gamblers and 21% were "at risk" gamblers. Problem gamblers were more likely to be boys (65%) than girls (35%). This rate of problem gambling was more than three times higher than the rate reported in the general youth population in Alberta (Wynne, Smith, & Jacobs, 1996) where the SOGS was used. At least part of this difference in prevalence rates between the two studies is due to the use of different instruments.

In the second study, Zitzow (1996) compared gambling behaviors of AI students (n=115) to non-AI students (n=161) who were in grades 9-12 (age range 14-19) and resided within or near this particular Minnesota Indian reservation. Zitzow compared those students who claimed any degree of AI heritage to those students who did not claim any AI heritage. He administered an adolescent gambling survey in class that included gambling frequency, SOGS, DSM-III-R symptoms of pathological gambling, and GA-20. He found that AI students had begun to gamble earlier, gambled more frequently, and had higher scores on the SOGS than their non-AI peers. The AI students had a significantly higher rate of problem gambling (9.6%) than the non-AI students (5.6%), based on the SOGS. Zitzow concluded that AI youth may be at greater risk of developing gambling problems due to a number of factors including their higher level of exposure to gambling, lower SES, cultural acceptance of beliefs about luck and fate, minority status and a resulting perceived lack of control over personal destiny. Gambling among AI tribes has a long history and a significant role in tribal life and therefore AI youth have greater exposure to gambling than non-AI youth. The author recommends that further research needs to examine other variables and behaviors associated with AI youth gambling.

In the third study, using the 1992 and 1995 Minnesota Student Survey (MSS),

Stinchfield, Cassuto, Winters and Latimer (1997) reported that AI youth (n = 1,584 in 1992; n = 1,832 in 1995) had rates of frequent gambling similar to African American and Mexican American youth, but higher than White and Asian American youth. The focus of this study was on Minnesota public school students, so the reporting of AI youth gambling was not a focus of the study, but nevertheless, it did show that AI youth were more involved in gambling than most of their non-AI peers.

In the fourth study, Peacock, Day and Peacock (1999) conducted a replication of the Zitzow (1996) study using the same instrument, hypothesis, and methodology on the same reservation. The hypothesis was as follows: "When depression, poverty, unemployment, the high rate of school drop outs, increasing drug use, the high suicide rate, and the myriad other problems that plague isolated Indian reservations are added to the equation, one would expect to find a higher rate of problem and pathological gambling behaviors among the adolescent Indian population than among non-Indian adolescents" (pp. 8-9). They administered Zitzow's adolescent gambling survey in one tribal secondary school (n=89) and one public secondary school (n=96) near the reservation. From this sample of 185 students, 130 were self-identified as AI and 54 as non-AI. The AI students had higher rates of problem gambling (10.1%) than non-AI students (2.2%), using the SOGS. Comparisons between AI and non-AI led the authors to conclude, "American Indian youth are at greater risk for developing gambling behaviors and problematic gambling than their non-Indian peers." (p. 12).

These four studies show early efforts to look at gambling among North American Indian youth and suggest that AI youth exhibit higher rates of problem gambling than their non-AI peers and therefore further research is warranted. Three of these studies had relatively small sample sizes and none looked at gambling trends over time. The literature on AI youth gambling

is limited, and further studies are needed to increase our understanding of gambling among AI youth so methods can be formulated to prevent the development of problem gambling and thus improve the health of AI youth.

Thc current study is modeled after a study conducted by Stinchfield (2011) that measured gambling trends among Minnesota public school students from 1992 to 2010. Stinchfield found that in 2010, less than half (45%) of the student population gambled at least once during the past year and less than one in ten gambled frequently. Gambling participation has shown a gradual and consistent decline from 1992 to 2010 for both boys and girls. Underage gambling has also shown declines over time. Rates of frequent gambling (weekly or more often) have also shown recent declines in 2007 and 2010 following over a decade of stable rates. Two significant fluctuations were a peak in frequent lottery play in 1998 among 12$^{th}$ graders and a peak in frequent card playing in 2004 for all students with subsequent declines in both. This current study follows the same methodology as Stinchfield (2011) for AI students.

The current study has three specific aims. First, measure 2010 rates of gambling and underage gambling among American Indian public school students. Second, compare rates of any gambling, frequent gambling, and underage gambling from 1992 to 2010. Third, compare AI youth to their non-AI peers on frequent gambling in 2010. This study measures AI youth gambling during the period of commercial gambling expansion in Minnesota starting in 1990.

## Method

Participants. The 2010 MSS sample includes 3,268 ninth and twelfth grade American Indian Minnesota public school students. The race question allows students to endorse one or more races from a list. This sample includes participants who selected American Indian as their only race (n = 864) and those who selected American Indian and one or more other race (n = 2,404)

for a total of 3,268. This study included students who selected AI and one or more other racial/ethnic identities upon consultation with Dr. Thomas Peacock, member of the Fond du Lac Band of Chippewa, and Associate Dean, College of Education and Human Service Professions University of MN, Duluth), and based on previous studies, such as Zitzow (1996). Six additional MSS datasets include 1992 (N=725), 1995 (N=2,178), 1998 (N=2,160), 2001 (N=2,447), 2004 (N=2,743), and 2007 (N=3,496) that allow for looking at changes over time. Demographics of all seven samples are presented in Table 1. In 1992, respondents could select only one race and this is the reason for the smaller sample.

The MSS is conducted under the auspices of the Minnesota Student Survey Interagency Team (2010a), a collaboration of the following four Minnesota State departments: Education; Health; Human Services; and Public Safety. The Minnesota Department of Education has administered the MSS, an alcohol and drug use risk survey, to Minnesota 6th, 9th, and 12th grade public school students every three years starting in 1989. Gambling items were introduced in the 1992 survey. The gambling items were deleted from the 6th grade survey starting in 1995.

Survey participation by school districts is voluntary, however, most districts participate and the rate of participation by Minnesota public school districts was 295 out of 335 (88%) in the 2010 survey (Minnesota Student Survey Interagency Team, 2010b). The data set was cleaned of students with highly inconsistent or improbable responses (3%) which suggest invalid responding. To be included in the sample for this study, students had to answer gender, grade, and age; and one or more of the gambling items. A comprehensive description of the survey methodology is provided elsewhere (Minnesota Student Survey Interagency Team, 2010c).

Table 1

*Demographic Characteristics of Each Sample*

| | 1992 N=725 N (%) | 1995 N=2,178 N (%) | 1998 N=2,160 N (%) | 2001 N=2,447 N (%) | 2004 N=2,743 N (%) | 2007 N=3,496 N (%) | 2010 N=3,268 N (%) |
|---|---|---|---|---|---|---|---|
| Race | | | | | | | |
| American Indian only | 725 (100) | 600 (27.5) | 605 (28.0) | 664 (27.1) | 798 (29.1) | 893 (25.5) | 864 (26.4) |
| American Indian and one or more other race | NA | 1,578 (72.5) | 1,555 (72.0) | 1,783 (72.9) | 1,945 (70.9) | 2,603 (74.5) | 2,404 (73.6) |
| Grade by Gender | | | | | | | |
| 9th Grade Boys | 252 (34.8) | 741 (34.0) | 755 (35.0) | 799 (32.7) | 894 (32.6) | 1,152 (33.0) | 1,021 (31.2) |
| 9th Grade Girls | 248 (34.2) | 896 (41.1) | 879 (40.7) | 1,000 (40.9) | 1,167 (42.5) | 1,338 (38.3) | 1,172 (35.9) |
| 12th Grade Boys | 115 (15.9) | 283 (13.0) | 264 (12.2) | 333 (13.6) | 328 (12.0) | 498 (14.2) | 524 (16.0) |
| 12th Grade Girls | 110 (15.2) | 258 (11.8) | 262 (12.1) | 315 (12.9) | 354 (12.9) | 508 (14.5) | 551 (16.9) |
| Age | | | | | | | |
| 9th Grade | | | | | | | |
| 14 | 159 (21.9) | 465 (21.3) | 439 (20.3) | 503 (20.6) | 633 (23.2) | 725 (29.4) | 715 (32.6) |
| 15 | 282 (38.9) | 1,035 (47.5) | 1,049 (48.6) | 1,159 (47.4) | 1,322 (48.2) | 1,590 (64.4) | 1,354 (61.7) |
| 16 | 55 (7.6) | 130 (6.0) | 143 (6.6) | 127 (5.2) | 97 (3.5) | 149 (6.0) | 119 (5.4) |
| 17 | 4 (0.5) | 7 (0.3) | 3 (0.1) | 10 (0.4) | 9 (0.3) | 5 (0.2) | 5 (0.2) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12th Grade | | | | | | | |
| 16 | 0 (0) | 0 (0) | 0 (0) | 1 (0) | 0 (0) | 1 (0) | 3 (0.1) |
| 17 | 95 (13.1) | 193 (8.9) | 172 (8.0) | 191 (7.8) | 246 (9.0) | 375 (37.5) | 360 (33.5) |
| 18 | 118 (16.3) | 305 (14.0) | 321 (14.9) | 421 (17.2) | 413 (15.1) | 587 (58.8) | 664 (61.8) |
| 19-20 | 12 (1.7) | 43 (2.0) | 33 (1.5) | 35 (1.4) | 23 (0.8) | 36 (3.6) | 48 (4.5) |
| Residence | | | | | | | |
| Minneapolis/ Saint Paul Metropolitan Area | NA | NA | 1,034 (47.9) | 1,136 (46.4) | 1,310 (47.8) | 1,606 (45.9) | 1,593 (48.7) |
| Greater Minnesota | NA | NA | 1,126 (52.1) | 1,311 (53.6) | 1,433 (52.2) | 1,890 (54.1) | 1,675 (51.3) |
| School District | | | | | | | |
| Participation Rate (%) | 99 | 92 | 92 | 91 | 88 | 91 | 88 |
| Live with both biological parents | 249 (34.3) | 933 (42.8) | 886 (41.0) | 933 (38.1) | 1,045 (38.1) | 1,330 (38.0) | 1,167 (35.7) |

Note. NA means Not Available.

Instrument. The 2010 Minnesota Student Survey (MSS) is a 126-item, anonymous, self-administered, paper-and-pencil questionnaire developed by the Minnesota Student Survey Interagency Team (2010a). Content domains include demographics, school problems, school violence/safety, activities, health, mental health, nutrition, family relationships, emotional distress, suicidal behavior, antisocial behaviors, family alcohol/drug problems, physical/sexual abuse, gambling behavior, communication with parents, alcohol/drug and tobacco use behaviors, sources of alcohol/drugs/tobacco, substance use diagnostic criteria, sexual behavior, dating violence, and pregnancy.

The 2010 MSS included six gambling activity frequency items. The preface for all six items is: "During the last 12 months, how often have you done these activities?". The six items

included: (a) Played cards for money; (b) Bet money on games of personal skill like pool, golf or bowling; (c) Bet money on sports teams or horse racing; (d) Bought lottery tickets or scratch offs; (e) Gambled in a casino; and (f) Gambled for money online. Each gambling frequency item has the following five response options: (a) Not at all; (b) Less than once a month; (c) About once a month; (d) About once a week; and (e) Daily.

Procedure. The MSS was administered to 9th and 12th grade students in classroom settings in the presence of school personnel in public schools, charter schools, and tribal schools. The data were collected by the Minnesota Department of Education. A passive consent procedure was used by sending a letter home with students to parents (or guardians) that described the questionnaire and directed parents that unless they contacted the school to exclude their child from the survey, the student would be asked to complete the survey. At the time of administration, students were instructed that their participation was voluntary, they did not have to complete the survey, they could quit at any time and they could skip items if they chose to. Most students completed the survey and it is unknown how many students refused to participate. The students were assured of the anonymity and confidentiality of the MSS.

Statistical Analysis. The reporting method used by the Monitoring the Future reports (Johnston, O'Malley, Bachman, & Schulenberg, 2009) of showing rates of substance use for all years of the surveys and computing a test of the difference between proportions for the last two surveys, was used in this report. The proportions of the sample for each form of gambling at each of the six assessments was computed for the entire sample and broken down by gender and grade. The comparison of the two most recent surveys (2007 and 2010) in the series indicates current changes in gambling rates. This comparison addresses the question, Are youth gambling more, less, or about the same as the last survey? To test for statistically significant differences, the z-

ratio for the significance of the difference between two independent proportions was computed. Gambling rates were also plotted on line charts to give a visual representation of the direction of changes in gambling rates from 1992 to 2010.

## Results

The results section is divided into the three specific aims of the study: (1) measure 2010 rates of gambling and underage gambling among American Indian public school students; (2) compare rates of any gambling, frequent gambling, and underage gambling from 1992 to 2010; and (3) compare AI youth to their non-AI peers on frequent gambling in 2010.

### *2010 rates of gambling and underage gambling*

Rates of gambling frequency in 2010 for all students, by gender, by grade, and for each game by gender and grade are shown in Table 2. Half of all students gambled in the past year. A comparison of highest level of gambling between gender and grade groups was computed and more boys (64%) gamble frequently than girls (38%) ($X^2 = 282, df= 4, p < .001$) and more 12th grade students (63%) gamble frequently than 9th grade students (44%) ($X^2 = 99, df = 4, p < .001$). More 12th grade boys (75%) gambled than 9th grade boys (59%). More 12th grade girls (51%) gambled than 9th grade girls (32%). In terms of frequent gambling, a small, but significant number of boys (18% of 9th graders and 23% of 12th graders) reported gambling weekly or daily, and a smaller number of girls (6% of 9th graders and 9% of 12th graders) reported gambling weekly or daily. More boys are engaged in gambling and more boys gamble frequently than girls.

The games played frequently (weekly or daily) by 9th grade boys were betting on games of personal skill (11%), cards (10%), and sports teams/horseracing (10%). A small percentage of 9th grade boys played the lottery (5%), gambled in a casino (4%) or gambled online (4%)

frequently. For 12th grade boys, the games played frequently were games of personal skill (11%), lottery (11%), cards (10%), and casino (10%). A smaller percentage of 12th grade boys bet on sports teams/horseracing (8%) or gambled online (5%) frequently. Very few 9th grade girls played any game frequently. Less than 3% played any game on a weekly or daily frequency. Very few 12th grade girls played any game frequently. The lottery was the game played most frequently by 12th grade girls (6%) and all the other games were played frequently by about 3% or less. Very few 12th grade girls gambled in a casino (3%) or gambled online (2%) frequently.

Table 2

*2010 Gambling Frequency for all Students, by Gender, by Grade, and for each Game by Grade and Gender*

| | Gambling Frequency | | | | |
|---|---|---|---|---|---|
| | Not at all % | < Monthly % | Monthly % | Weekly % | Daily % |
| All Students (n=3,268) | 49.7 | 23.5 | 13.6 | 8.0 | 5.2 |
| Boys (n=1,545) | 35.9 | 24.9 | 19.1 | 12.0 | 8.1 |
| Girls (n= 1,723) | 62.0 | 22.2 | 8.8 | 4.5 | 2.6 |
| 9th Graders (n= 2,193) | 55.7 | 20.5 | 11.9 | 7.4 | 4.6 |
| 12th Graders (n= 1,075) | 37.3 | 29.6 | 17.3 | 9.3 | 6.5 |
| 9th Grade Boys (n=1,021) | | | | | |
| Played cards for money | 58.0 | 19.3 | 12.3 | 6.6 | 3.8 |
| Games of personal skill | 58.0 | 18.8 | 11.7 | 6.8 | 4.3 |
| Bet money on sports teams or horse racing | 65.0 | 14.8 | 8.8 | 6.5 | 3.8 |
| Bought lottery tickets | 81.7 | 8.2 | 3.6 | 2.0 | 3.0 |
| Gambled in a casino | 89.8 | 3.2 | 1.4 | 2.0 | 2.3 |

| | | | | | |
|---|---|---|---|---|---|
| Gambled online | 89.7 | 3.0 | 1.8 | 1.3 | 2.9 |
| Highest level of gambling | 41.3 | 22.4 | 17.6 | 11.5 | 7.1 |
| 12th Grade Boys (n=524) | | | | | |
| Played cards for money | 47.5 | 27.1 | 14.7 | 5.3 | 4.8 |
| Games of personal skill | 55.2 | 21.4 | 11.6 | 5.7 | 5.5 |
| Bet money on sports teams or horse racing | 65.6 | 15.6 | 9.0 | 4.8 | 3.4 |
| Bought lottery tickets | 55.3 | 19.8 | 12.4 | 6.3 | 4.6 |
| Gambled in a casino | 57.3 | 15.5 | 15.6 | 4.8 | 5.3 |
| Gambled online | 89.3 | 2.9 | 1.7 | 1.1 | 3.8 |
| Highest level of gambling | 25.4 | 29.8 | 21.9 | 13.0 | 9.9 |
| 9th Grade Girls (n = 1,172) | | | | | |
| Played cards for money | 83.3 | 11.2 | 2.8 | 1.5 | 1.1 |
| Games of personal skill | 83.4 | 10.1 | 3.4 | 1.9 | 0.7 |
| Bet money on sports teams or horse racing | 86.5 | 7.3 | 3.2 | 1.0 | 1.2 |
| Bought lottery tickets | 88.6 | 5.2 | 2.7 | 1.1 | 0.9 |
| Gambled in a casino | 96.6 | 1.1 | 0.3 | 0.3 | 0.5 |
| Gambled online | 97.2 | 0.5 | 0.3 | 0.2 | 0.8 |
| Highest level of gambling | 68.3 | 18.8 | 6.8 | 3.8 | 2.3 |
| 12th Grade Girls (n =551) | | | | | |
| Played cards for money | 80.0 | 13.4 | 3.3 | 1.8 | 1.5 |
| Games of personal skill | 85.8 | 8.5 | 3.1 | 1.1 | 1.5 |
| Bet money on sports teams or horse racing | 87.8 | 6.2 | 3.4 | 1.1 | 1.3 |
| Bought lottery tickets | 69.0 | 17.8 | 6.5 | 4.4 | 1.8 |
| Gambled in a casino | 72.8 | 17.8 | 5.8 | 2.2 | 1.3 |
| Gambled online | 96.7 | 0.7 | 0.5 | 0.5 | 1.3 |
| Highest level of gambling | 48.6 | 29.4 | 12.9 | 5.8 | 3.3 |

*Note. Highest level of gambling is the highest frequency of play, across all six games, for each*

*student. Row percentages may not total 100% due to missing data.*

Underage gambling is defined as playing a legalized or commercial form of gambling (lottery, casinos, and online gambling) by youth under the legal age, which in Minnesota is 18 years of age for the state lottery and most tribal casinos. Online gambling legal age may vary by web site, but is assumed to be 18 for this comparison. Rates of underage gambling in 2010 are shown by gender and game in Table 3. Most underage students did not play legalized games, but there was a small percentage that did play. More boys engaged in underage gambling than girls. In terms of lottery play, 18% of underage boys report that they bought a lottery ticket in the past year versus 11% of girls ($X^2 = 26, df = 1, p < .001$). And, 10% of underage boys report that they gambled in a casino versus 3% of underage girls ($X^2 = 52, df = 1, p < .001$). For underage online gambling, 9% of boys reported doing so versus only 2% of girls ($X^2 = 56, df = 1, p < .001$).

Table 3

*Underage Gambling Frequency on Legalized Games by Gender and Game in 2010*

| Game | Gambling Frequency | | | | |
|---|---|---|---|---|---|
| | Not at all % | < Monthly % | Monthly % | Weekly % | Daily % |
| Underage Boys (n = 1,078) | | | | | |
| Bought lottery tickets | 81.0 | 8.4 | 4.1 | 2.2 | 3.1 |
| Gambled in a casino | 88.5 | 3.9 | 2.0 | 1.9 | 2.4 |
| Gambled online | 90.1 | 2.8 | 1.7 | 1.3 | 3.0 |
| Underage Girls (n = 1,378) | | | | | |
| Bought lottery tickets | 88.0 | 5.2 | 3.0 | 1.5 | 1.1 |
| Gambled in a casino | 95.9 | 1.5 | 0.4 | 0.5 | 0.8 |
| Gambled online | 97.0 | 0.7 | 0.3 | 0.2 | 1.0 |

*Note. Underage is defined as 17 years of age or less. Row percentages may not total 100% due to missing data.*

*Gambling Trends from 1992 to 2010*

Rates of gambling among all students, boys and girls, and broken down by grade and gender by game from 1992 to 2010 are shown in Table 4. The phrase "any game" refers to highest rate of gambling across all six gambling items. These results show fairly consistent and significant declines in gambling rates from 1992 to 2010. A statistical comparison of the difference between 2007 and 2010 gambling rates show statistically significant declines for all students, boys, girls, and for many games broken down by grade and gender. Figure 1 shows a gradual decline in gambling participation rates from 1992 to 2010 for boys and girls. There were fewer students gambling in 2010 than were gambling in 1992. Figure 1 also shows that rates of frequent gambling by boys and girls have remained relatively stable from 1992 to 2004 with subsequent declines 2007 and 2010.

Table 4

*Any gambling in last 12 months for all Students, by Gender, and each Game by Grade and Gender for each Year*

| | 1992 % | 1995 % | 1998 % | 2001 % | 2004 % | 2007 % | 2010 % | Difference 2007 to 2010 | % Change 2007 to 2010 |
|---|---|---|---|---|---|---|---|---|---|
| All Students | 75.4 | 70.4 | 62.4 | 59.7 | 57.4 | 54.6 | 50.3 | -4.3** | -8 |
| Boys | 86.8 | 81.3 | 75.9 | 75.1 | 73.9 | 69.2 | 64.1 | -5.1** | -7 |
| Girls | 64.2 | 60.7 | 50.3 | 46.5 | 44.2 | 41.6 | 38.0 | -3.6* | -9 |
| 9th Grade Boys | | | | | | | | | |
| Cards | 62.3 | 66.5 | 60.1 | 54.3 | 56.6 | 49.9 | 42.0 | -7.9** | -16 |
| Skill games | 55.2 | 53.2 | 55.1 | 56.3 | 52.0 | 49.1 | 41.5 | -7.6** | -15 |
| Sports teams | 62.7 | 54.5 | 51.5 | 47.7 | 41.5 | 37.3 | 33.8 | -3.5* | -9 |
| Lottery | 43.3 | 40.8 | 25.2 | 22.8 | 17.4 | 16.8 | 16.8 | 0 | 0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Casino | NA | NA | 13.0 | 12.8 | 8.7 | 8.3 | 8.8 | 0.5 | 6 |
| Online | NA | NA | NA | NA | NA | 8.9 | 9.0 | 0.1 | 1 |
| Any Game | 84.5 | 79.9 | 72.8 | 71.1 | 71.6 | 65.6 | 58.7 | -6.9** | -11 |
| 12th Grade Boys | | | | | | | | | |
| Cards | 63.5 | 65.7 | 65.2 | 57.4 | 59.1 | 59.8 | 51.9 | -7.9** | -13 |
| Skill games | 60.0 | 58.3 | 53.4 | 54.4 | 52.7 | 54.6 | 44.3 | -10.3** | -19 |
| Sports teams | 53.9 | 48.4 | 46.2 | 43.2 | 40.9 | 40.3 | 32.8 | -7.5* | -19 |
| Lottery | 60.9 | 58.7 | 57.6 | 52.3 | 45.4 | 45.2 | 43.1 | -2.1 | -5 |
| Casino | NA | NA | 54.2 | 44.4 | 41.8 | 38.0 | 41.2 | 3.2 | 8 |
| Online | NA | NA | NA | NA | NA | 13.0 | 9.5 | -3.5 | -27 |
| Any Game | 90.4 | 85.2 | 84.5 | 84.7 | 80.2 | 77.5 | 74.6 | -2.9 | -4 |
| 9th Grade Girls | | | | | | | | | |
| Cards | 43.5 | 39.8 | 34.8 | 28.0 | 29.0 | 23.7 | 16.6 | -7.1** | -30 |
| Skill games | 31.5 | 20.5 | 20.9 | 23.9 | 22.0 | 19.6 | 16.0 | -3.5* | -18 |
| Sports teams | 30.2 | 20.6 | 19.9 | 16.6 | 18.5 | 14.0 | 12.6 | -1.4 | -10 |
| Lottery | 37.1 | 34.5 | 16.6 | 12.2 | 12.1 | 12.3 | 9.9 | -2.4 | -20 |
| Casino | NA | NA | 3.5 | 2.6 | 3.0 | 2.7 | 2.3 | -0.4 | -15 |
| Online | NA | NA | NA | NA | NA | 2.8 | 1.8 | -1.0 | -36 |
| Any Game | 64.9 | 59.6 | 47.0 | 42.4 | 41.0 | 37.6 | 31.7 | -5.9** | -16 |
| 12th Grade Girls | | | | | | | | | |
| Cards | 35.5 | 32.9 | 28.2 | 31.4 | 26.3 | 25.4 | 20.0 | -5.4* | -21 |
| Skill games | 12.7 | 17.1 | 14.5 | 18.1 | 13.3 | 18.7 | 14.2 | -4.5* | -24 |
| Sports teams | 20.9 | 17.4 | 12.2 | 10.5 | 10.5 | 12.8 | 12.0 | -0.8 | -6 |
| Lottery | 49.1 | 46.9 | 44.3 | 40.3 | 31.4 | 31.7 | 30.5 | -1.2 | -4 |
| Casino | NA | NA | 29.8 | 30.8 | 30.5 | 23.4 | 27.0 | 3.6 | 15 |
| Online | NA | NA | NA | NA | NA | 2.4 | 3.1 | 0.7 | 29 |
| Any Game | 62.7 | 64.7 | 61.5 | 59.7 | 54.5 | 52.0 | 51.4 | -0.6 | -1 |

*Note*. NA denotes Not Available. Any game refers to highest rate of gambling across all five gambling items. Asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): $^{*}p < .05$, $^{**}p < .01$.

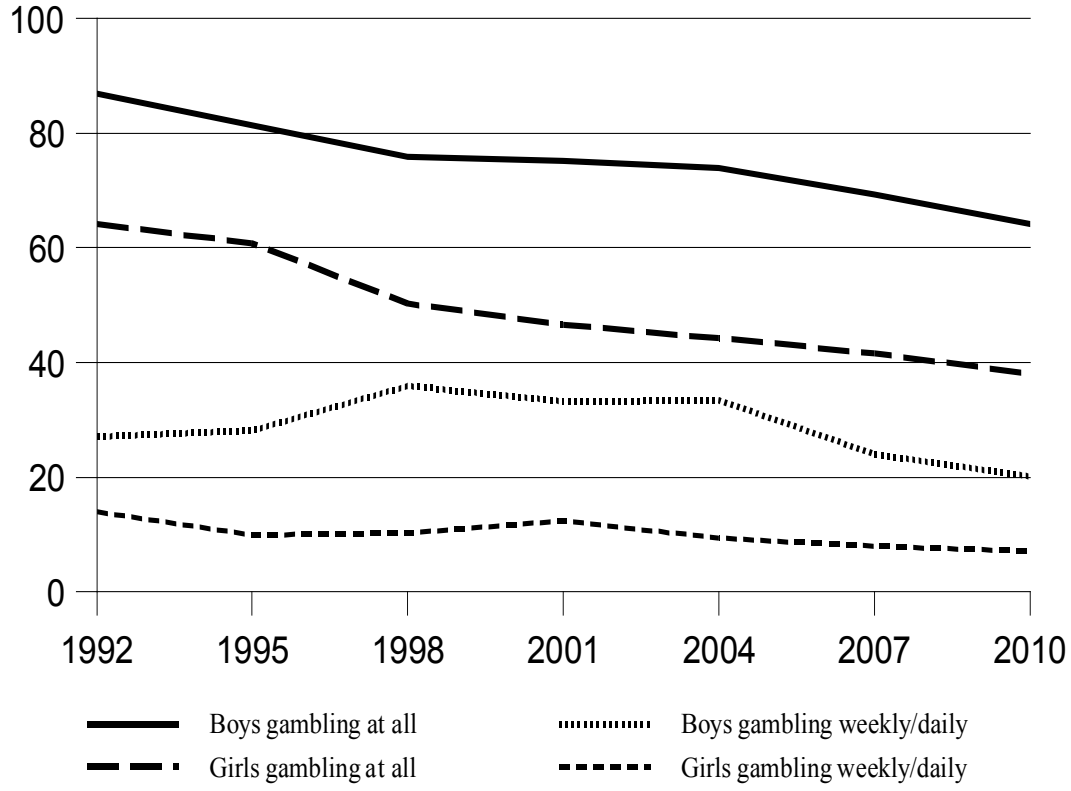


Figure 1. Any gambling and frequent gambling (weekly/daily) for boys and girls.

Rates of frequent gambling (weekly or daily) for all students, boys, girls, and each game broken down by gender, grade and year from 1992 to 2010 are presented in Table 5. There are three important findings here. First, the 2010 survey shows statistically significant declines in frequent gambling by boys, and specific games showed declines including cards, skill games and sports betting. Second, girls also showed declines from 2007 to 2010 but they did not reach statistical significance. Third, there are significantly fewer youth gambling frequently in 2010 than in 1992. For example, there are half as many girls gambling frequently in 2010 (7%) as compared to 1992 (14%). Figure 2 shows rates of frequent gambling by 9th grade boys for each game from 1992 to 2010. This figure shows an increase in most games from 1992 to 1998 with subsequent declines from 1998 to 2010 in most games except for casino and online gambling which has been stable from 2004 to 2010 at about 4%. Figure 3 shows rates of frequent gambling by 12th grade boys for each game from 1992 to 2010. There was a peak in lottery play in 1998, peaks in card playing and skill games in 2004, and all games show significant declines from 2004 to 2010, except for online gambling, which was stable at 5%. Figure 4 shows rates of frequent gambling by 9th grade girls for all games from 1992 to 2010. While rates of frequent gambling for girls were relatively low (one to six percent), there has been a decline in frequent play of the lottery from a high of 5% in 1992 to 2% in 2010. Ninth grade girls also showed a peak in card playing from 1998 to 2004, while casino and online gambling have been fairly stable at 1%. All games showed modest declines from 2007 to 2010, except for casino gambling which was stable around 1%. Figure 5 shows rates of frequent gambling by 12th grade girls for all games from 1992 to 2010. Most games showed fairly stable rates except for lottery play which showed a peak in 2001. There were no significant changes from 2007 to 2010.

Table 5

*Weekly/Daily Gambling in last 12 months for All Students, by Gender, and for each Game by Grade and Gender for each Year*

| | 1992 % | 1995 % | 1998 % | 2001 % | 2004 % | 2007 % | 2010 % | Difference 2007 to 2010 | % Change 2007 to 2010 |
|---|---|---|---|---|---|---|---|---|---|
| All Students | 20.6 | 18.5 | 22.4 | 22.0 | 20.2 | 15.6 | 13.2 | -2.4** | -15 |
| Boys | 27.1 | 28.1 | 35.9 | 33.2 | 33.4 | 24.1 | 20.1 | -4.0** | -17 |
| Girls | 14.0 | 9.9 | 10.3 | 12.4 | 9.5 | 8.0 | 7.1 | -0.9 | -11 |
| 9th Grade Boys | | | | | | | | | |
| Cards | 11.5 | 18.9 | 24.8 | 20.0 | 22.4 | 13.9 | 10.4 | -3.5* | -25 |
| Skill games | 11.5 | 14.4 | 22.0 | 20.2 | 18.2 | 14.3 | 11.1 | -3.2* | -22 |
| Sports teams | 14.3 | 13.2 | 20.0 | 16.4 | 14.8 | 10.1 | 10.2 | 0.1 | 1 |
| Lottery | 7.1 | 11.5 | 11.5 | 9.4 | 6.5 | 5.7 | 5.0 | -0.7 | -12 |
| Casino | NA | NA | 5.7 | 6.3 | 4.4 | 4.0 | 4.2 | 0.2 | 5 |
| Online | NA | NA | NA | NA | NA | 3.8 | 4.2 | 0.4 | 11 |
| Any Game | 24.6 | 27.9 | 35.6 | 31.2 | 31.9 | 22.8 | 18.6 | -4.2* | -18 |
| 12th Grade Boys | | | | | | | | | |
| Cards | 20.0 | 19.4 | 16.7 | 22.2 | 23.2 | 15.3 | 10.1 | -5.2* | -34 |
| Skill games | 16.5 | 14.8 | 16.3 | 17.4 | 20.7 | 16.3 | 11.3 | -5.0* | -31 |
| Sports teams | 11.3 | 12.0 | 14.8 | 15.6 | 13.7 | 12.0 | 8.2 | -3.8* | -32 |
| Lottery | 16.5 | 16.6 | 22.3 | 20.7 | 19.2 | 14.1 | 10.9 | -3.2 | -23 |
| Casino | NA | NA | 14.4 | 13.8 | 11.9 | 10.8 | 10.1 | -0.7 | -6 |
| Online | NA | NA | NA | NA | NA | 4.6 | 4.9 | 0.3 | 7 |
| Any Game | 32.2 | 28.6 | 36.7 | 38.1 | 37.5 | 27.1 | 22.9 | -4.2 | -15 |
| 9th Grade Girls | | | | | | | | | |
| Cards | 4.4 | 5.0 | 6.0 | 6.4 | 5.9 | 3.9 | 2.7 | -1.2 | -31 |
| Skill games | 4.4 | 2.3 | 3.8 | 4.8 | 3.4 | 3.4 | 2.6 | -0.8 | -24 |
| Sports teams | 4.4 | 2.0 | 3.2 | 3.0 | 3.2 | 2.6 | 2.2 | -0.4 | -15 |
| Lottery | 5.2 | 4.8 | 4.0 | 3.3 | 2.5 | 2.6 | 2.0 | -0.6 | -23 |
| Casino | NA | NA | 1.1 | 1.3 | 1.2 | 0.7 | 0.9 | 0.2 | 29 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Online | NA | NA | NA | NA | NA | 1.2 | 0.9 | -0.3 | 25 |
| Any Game | 14.5 | 9.9 | 10.2 | 11.0 | 9.3 | 7.6 | 6.1 | -1.5 | -20 |
| 12th Grade Girls | | | | | | | | | |
| Cards | 5.5 | 3.1 | 4.6 | 5.7 | 2.8 | 3.0 | 3.3 | 0.3 | 10 |
| Skill games | 3.6 | 1.9 | 2.7 | 3.5 | 2.0 | 2.4 | 2.5 | 0.2 | 8 |
| Sports teams | 2.7 | 1.9 | 1.9 | 1.6 | 2.0 | 2.4 | 2.4 | 0 | 0 |
| Lottery | 6.4 | 7.0 | 7.6 | 12.1 | 4.8 | 6.3 | 6.2 | -0.1 | -2 |
| Casino | NA | NA | 1.5 | 3.8 | 5.1 | 4.3 | 3.4 | -0.9 | -21 |
| Online | NA | NA | NA | NA | NA | 2.0 | 1.8 | -0.2 | -10 |
| Any Game | 12.7 | 9.7 | 10.7 | 16.8 | 10.5 | 9.1 | 9.1 | 0.0 | 0 |

*Note*. NA denotes Not Available. Any game refers to highest rate of gambling across all five gambling items. Asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): $^{*}p < .05$, $^{**}p < .01$.

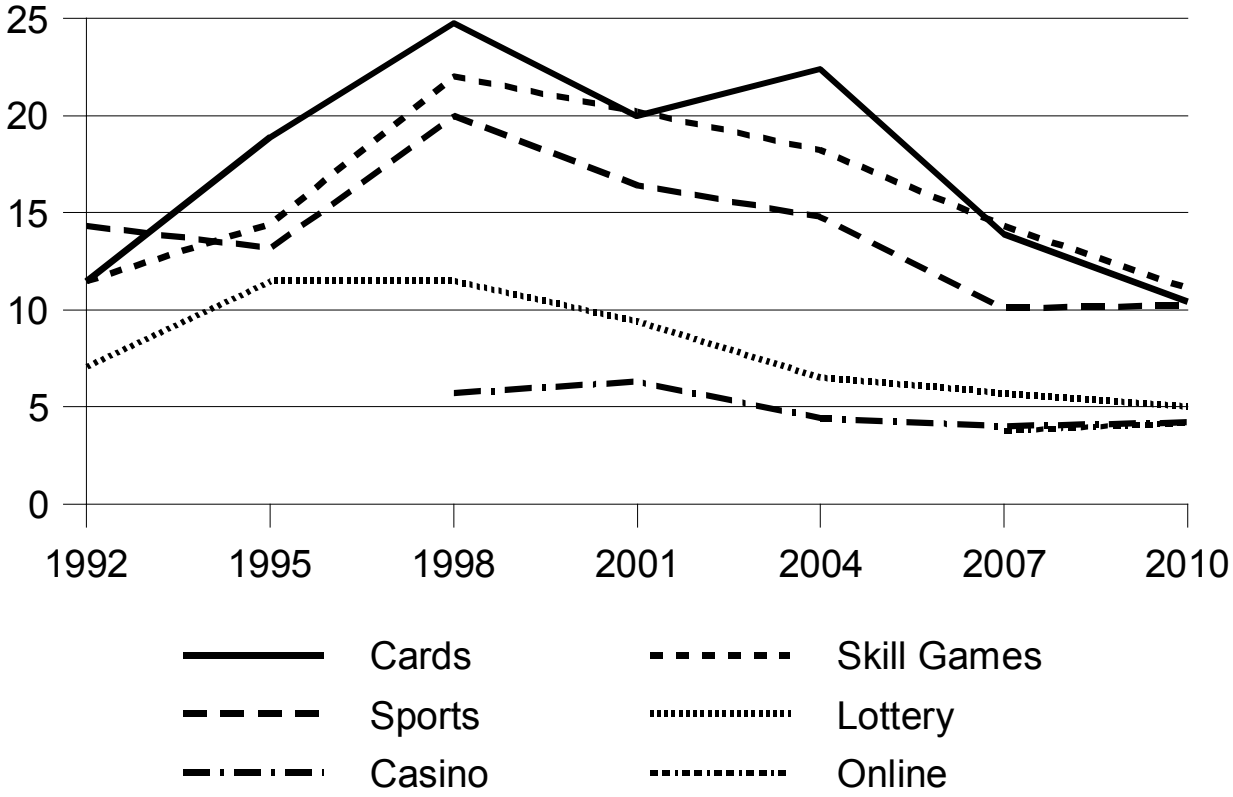


Figure 2. Percent of 9th Grade Boys Gambling Weekly or Daily on each Game.

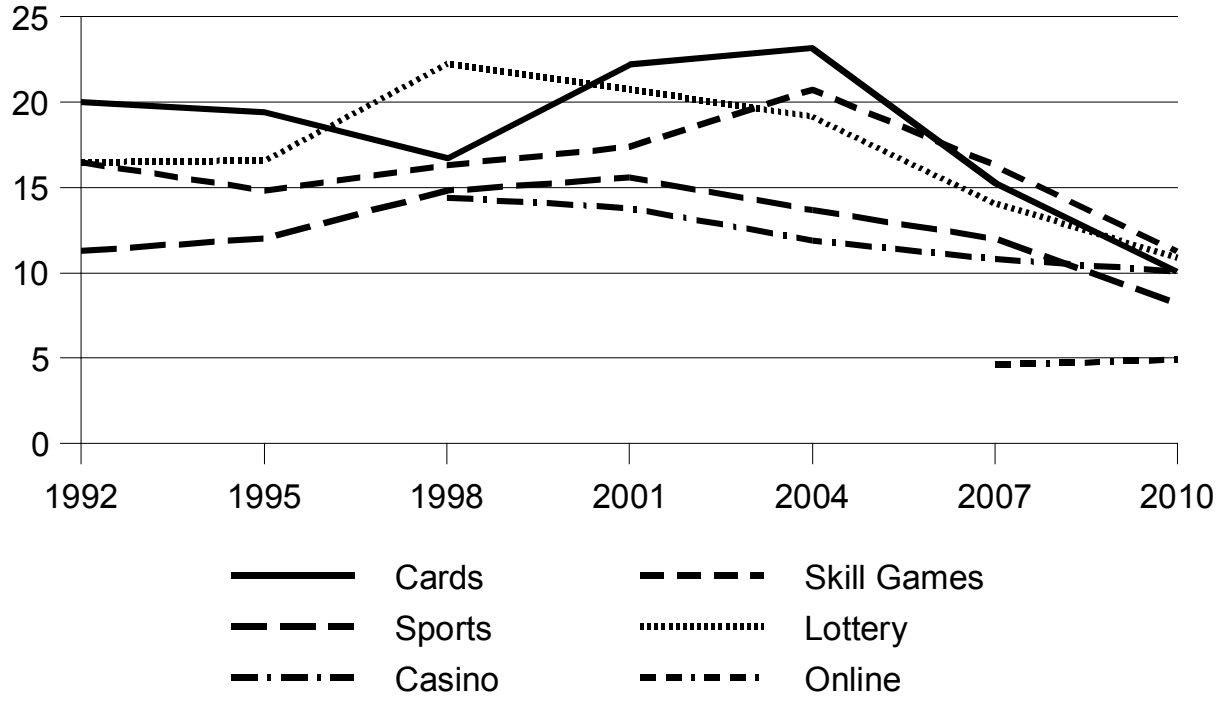


Figure 3. Percent of 12th Grade Boys Gambling Weekly or Daily on each Game.

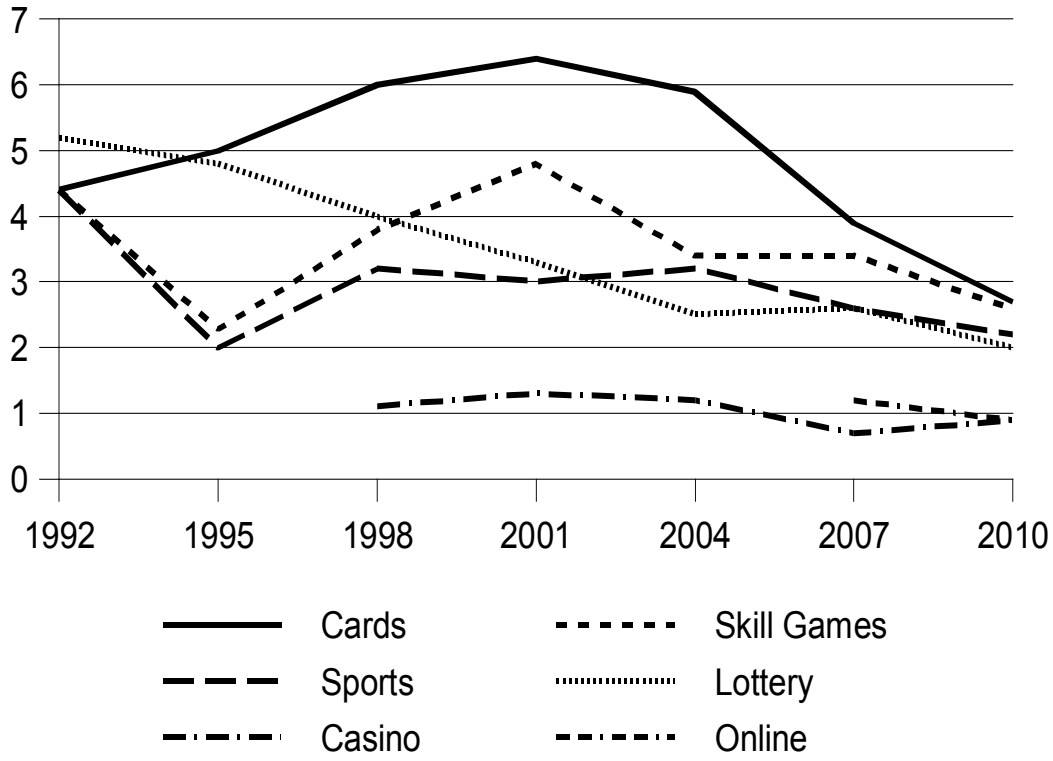


Figure 4. Percent of 9th Grade Girls Gambling Weekly or Daily on each Game.

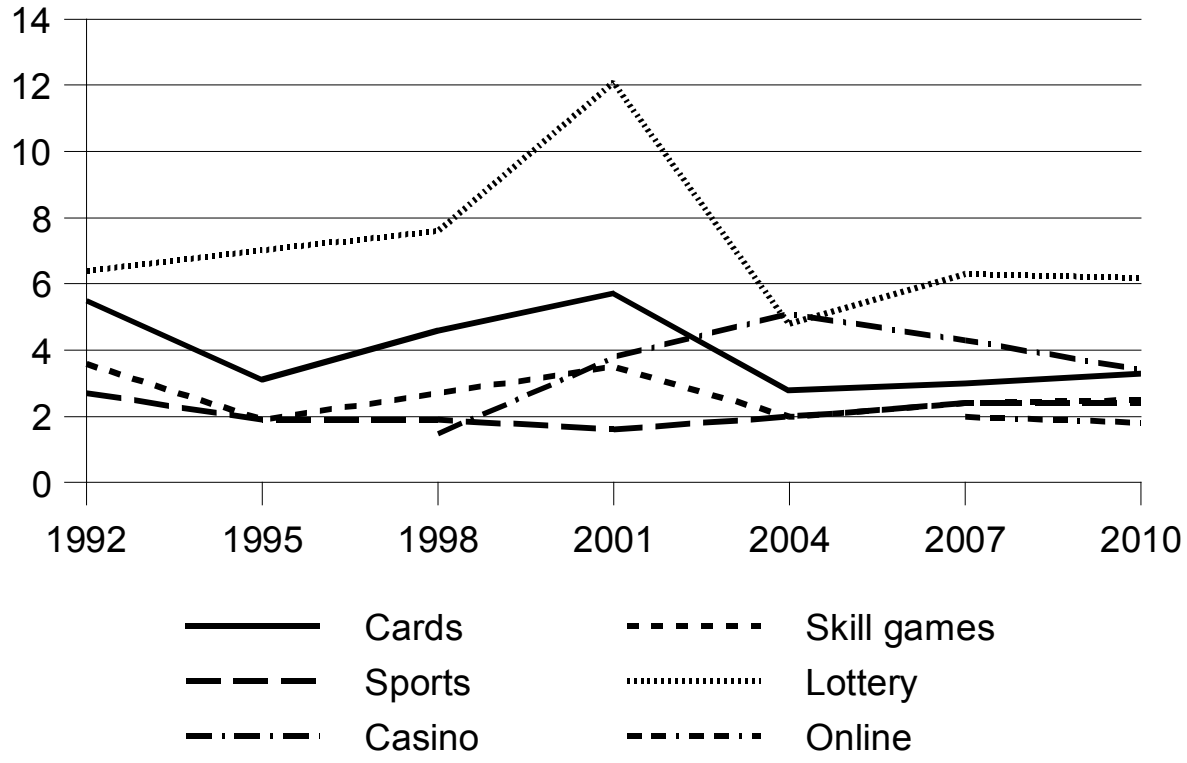


Figure 5. Percent of 12th Grade Girls Gambling Weekly or Daily on each Game.

*Underage gambling trends from 1992 to 2010*

Underage lottery, casino and online gambling rates for boys and girls from 1992 to 2010 are shown in Table 6 and Figure 6. There was a relatively high rate of underage lottery play by boys and girls starting in 1992 around 40%, however, there has been a consistent gradual decline from 1992 to 2010 where the rate is now less than 10%. Underage boys casino gambling showed modest declines from 1998 to 2010, while underage girls casino gambling rates have been fairly stable with a significant decline from 2007 to 2010. Online gambling was measured in 2007 and 2010 and these two assessments showed significant declines for both boys and girls.

Table 6

*Underage Gambling by Gender and Game*

| | 1992 % | 1995 % | 1998 % | 2001 % | 2004 % | 2007 % | 2010 % | Difference 2007 to 2010 | % Change 2007 to 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Boys | | | | | | | | | |
| Lottery | 43.9 | 40.1 | 25.5 | 23.5 | 18.3 | 17.6 | 9.3 | -8.3** | -47 |
| Casino | NA | NA | 13.8 | 13.0 | 10.2 | 9.0 | 6.3 | -2.7** | -30 |
| Online | NA | NA | NA | NA | NA | 8.9 | 5.9 | -2.9** | -33 |
| Girls | | | | | | | | | |
| Lottery | 37.8 | 34.1 | 17.8 | 12.8 | 12.3 | 12.9 | 5.6 | -7.3** | -57 |
| Casino | NA | NA | 3.8 | 1.9 | 3.1 | 3.6 | 1.7 | -1.9** | -53 |
| Online | NA | NA | NA | NA | NA | 2.6 | 1.5 | -1.1* | -42 |

*Note*. Underage is defined as 17 years of age or less. NA denotes Not Available. Asterisks denote statistical of the difference between two independent proportions (z-ratio, two-tailed): $^{*}p < .05$, $^{**}p < .01$.

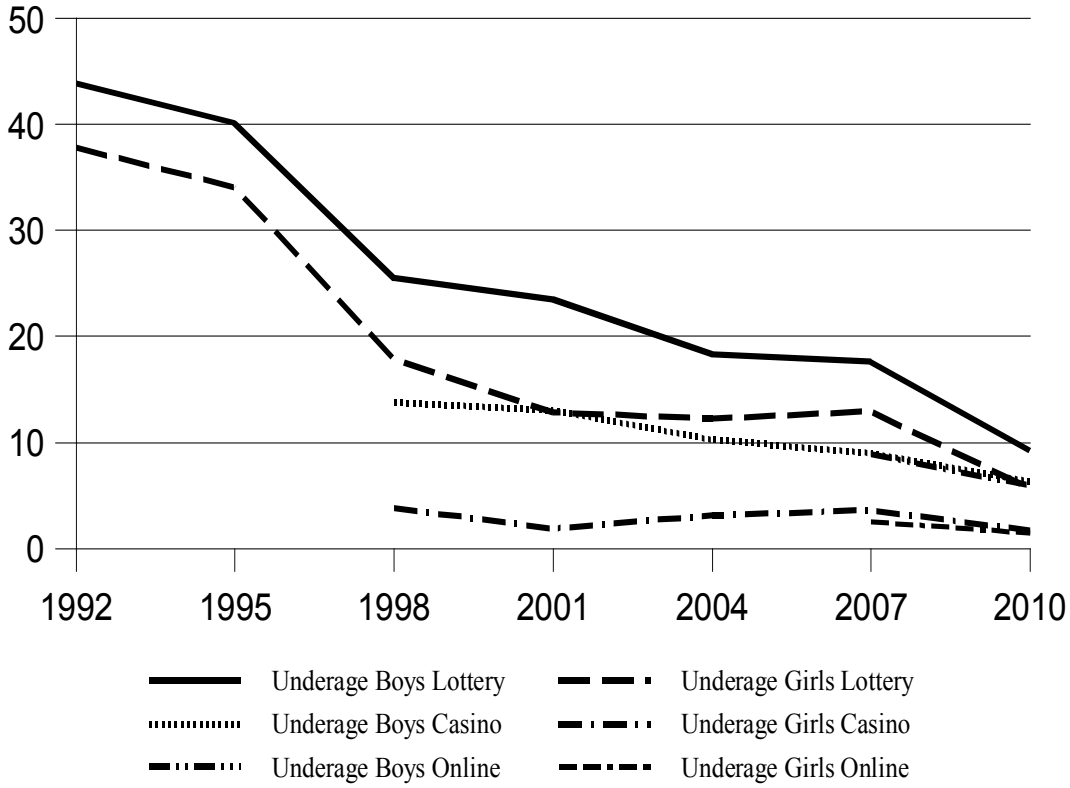


Figure 6. Percent of Underage Boys and Girls Lottery and Casino Gambling.

*Comparison of AI youth to their non-AI peers*

The third specific aim is a comparison of AI youth to their non-AI peers on frequent gambling in 2010 and the results are shown in Table 7. AI youth had higher rates of frequent gambling than their non-AI peers as a group, by gender, and by grade and the most striking contrast was for AI girls who had twice the rate as their non-AI peers. Table 7 also shows the comparison for gender by grade groups and AI youth had higher rates for every form of gambling and again girls showed the greatest difference, ranging from two to four times the rate of their non-AI peers.

Table 7

*Comparison of American Indian Students to non-American Indian Students in 2010 on Weekly/Daily Gambling Frequency for each Game by Grade and Gender*

| Game | Weekly/Daily Gambling Frequency | | | |
|---|---|---|---|---|
| | American Indian % | Non-American Indian % | Difference | Ratio of AI to non-AI |
| All Students | 13.2 | 8.7 | 4.5** | 1.5 |
| Boys | 20.1 | 14.4 | 5.7** | 1.4 |
| Girls | 7.1 | 3.3 | 3.8** | 2.2 |
| 9th Graders | 11.9 | 6.8 | 5.1** | 1.8 |
| 12th Graders | 15.8 | 11.1 | 4.7** | 1.4 |
| 9th Grade Boys | | | | |
| Played cards for money | 10.4 | 5.6 | 4.8** | 1.9 |
| Games of personal skill | 11.1 | 6.6 | 4.6** | 1.7 |
| Bet money on sports teams or horse racing | 10.3 | 5.4 | 4.9** | 1.9 |
| Bought lottery tickets | 5.1 | 3.0 | 2.1** | 1.7 |
| Gambled in a casino | 4.3 | 1.9 | 2.4** | 2.3 |
| Gambled online | 4.3 | 2.6 | 1.7** | 1.3 |

| | | | | |
|---|---|---|---|---|
| Highest level of gambling | 18.6 | 11.3 | 7.3** | 1.6 |
| 12th Grade Boys | | | | |
| Played cards for money | 10.2 | 8.9 | 1.3 | 1.1 |
| Games of personal skill | 11.3 | 7.6 | 3.7** | 1.5 |
| Bet money on sports teams or horse racing | 8.3 | 5.4 | 2.9** | 1.5 |
| Bought lottery tickets | 11.1 | 9.1 | 2.0 | 1.2 |
| Gambled in a casino | 10.3 | 6.6 | 3.7** | 1.6 |
| Gambled online | 5.0 | 3.0 | 2.0* | 1.7 |
| Highest level of gambling | 22.9 | 18.3 | 4.6** | 1.3 |
| 9th Grade Girls | | | | |
| Played cards for money | 2.6 | 1.0 | 1.6** | 2.6 |
| Games of personal skill | 2.6 | 1.1 | 1.5** | 2.4 |
| Bet money on sports teams or horse racing | 2.2 | 0.8 | 1.4** | 2.8 |
| Bought lottery tickets | 2.0 | 0.9 | 1.1** | 2.2 |
| Gambled in a casino | 0.9 | 0.4 | 0.5** | 2.3 |
| Gambled online | 0.9 | 0.4 | 0.5** | 2.3 |
| Highest level of gambling | 6.1 | 2.4 | 3.7** | 2.5 |
| 12th Grade Girls | | | | |
| Played cards for money | 3.3 | 1.1 | 2.2** | 3.0 |
| Games of personal skill | 2.5 | 0.7 | 1.8** | 3.6 |
| Bet money on sports teams or horse racing | 2.4 | 0.6 | 1.7** | 4.0 |
| Bought lottery tickets | 6.2 | 2.5 | 3.7** | 2.5 |
| Gambled in a casino | 3.5 | 1.5 | 2.0** | 2.3 |
| Gambled online | 1.8 | 0.5 | 1.3** | 3.6 |
| Highest level of gambling | 9.1 | 4.3 | 4.8** | 2.1 |

Note. Highest level of gambling is the highest frequency of play, across all six games, for each student. That is, what percent were playing on a weekly or daily basis for any one of the six games. Asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): $^{*}p < .05$, $^{**}p < .01$. The ratio of AI to non-AI is the percent of AI divided by the percent of non-AI.

## Discussion

This study had three specific aims. First, measure 2010 rates of gambling and underage gambling among American Indian public school students. Second, compare rates of gambling, frequent gambling, and underage gambling from 1992 to 2010. Third, compare American Indian to non-American Indian students on frequent gambling in 2010. In terms of the first aim, half of all American Indian students gambled in the past year, more boys gambled than girls and more 12th grade students gambled than 9th grade students. More boys (20%) were frequent gamblers (weekly or daily) than girls (7%). The games played frequently by 9th grade boys were informal games of games of personal skill, cards, and sports betting and few played the lottery, gambled in a casino or gambled online frequently. For 12th grade boys, the games played most often were games of personal skill, lottery, cards, and casino. For 9th grade girls, cards, games of skill, sports betting and the lottery were the games played most frequently. For 12th grade girls, the games played most frequently were the lottery, cards, and casino gambling. There appears to be a shift from informal games to legalized gambling as youth get older.

In terms of the second aim, compare rates of any gambling, frequent gambling, and underage gambling from 1992 to 2010, it was found that rates of gambling participation have gradually and consistently declined since it was first measured by the MSS in 1992, two years after the onset of the state lottery and widespread tribal casino gambling across Minnesota. Frequent gambling has been relatively stable but with peaks of some games in 1998, 2001, and 2004 followed by declines in 2007 and 2010. For example, frequent card playing by boys peaked in 2004. Lottery play peaked in 1998 for boys and has declined each assessment since then. For 12th grade girls, frequent lottery peaked in 2001. In terms of underage gambling, there have been large significant declines in lottery play from 1992 to 2010 for both boys and girls.

Casino gambling has declined significantly for boys and less so for girls. Online gambling showed significant declines from 2007 to 2010 for both boys and girls.

The finding of a decline in gambling participation among American Indian students is similar to the previous finding of a decline from 1992 to 1998 by Stinchfield (2001), and the decline has continued from 1998 to 2010 (Stinchfield, 2011) in the larger population of Minnesota students. This finding is similar to the conclusion of a recent review of international youth gambling studies by Volberg, et al (2010) that gambling participation has either remained stable or has decreased. The finding of a decline in gambling participation rates and a peak in card playing in 2004 with subsequent declines in 2007 and 2010 matches unpublished reports from the National Annenberg Survey of Youth. The Annenberg survey is a telephone survey of 835 youth in 2008 and 596 youth in 2010 between the ages of 14 and 22 that has been conducted since 2002 (www.annenbergpublicpolicycenter.org). In the most recent Annenberg report on youth gambling (October 14, 2010) it was found that weekly card playing among 14-17 year old males declined from 4% in 2008 to less than 1% in 2010 and declined modestly in 18-22 males from 4.4% in 2008 to 3.8% in 2010.

The decline in gambling participation from 1992 to 2010 raises the question: Why are fewer AI teenagers gambling? This study does not answer the question of why, but there are a few possible reasons. It could be that the novelty of legalized gambling in the form of the state lottery, Las Vegas style tribal casinos and online gambling has worn off since their onset in 1990 and adolescents are settling into a normative pattern of gambling. Another possible reason is that teenagers' time is being occupied by other interests and activities such as the recent technological developments and widespread access to cell phones, handheld audio and video players such as Apple iPods, surfing the internet, social networking (such as Facebook), and

video game playing, to name a few. The question of why fewer AI youth are gambling needs to be addressed in future research and this research could assist in the development of prevention programs. It would appear that the same phenomenon that has occurred in the larger Minnesota adolescent population of a gradual decline in gambling participation is also reflected in the AI adolescent population.

In terms of the third aim, to compare AI youth to their non-AI peers, it was found that AI youth have higher rates of frequent gambling and this difference is most pronounced among the girls where there were 2-4 times as many AI girls gambling frequently than non-AI girls. The finding that a greater proportion of AI students are frequent gamblers than their non-AI peers is similar to the results reported by other investigators (Hewitt & Auger, 1995; Peacock, Day & Peacock, 1999; Stinchfield, Cassuto, Latimer, & Winters, 1997; Zitzow, 1996 ). This finding that AI youth gamble more than their non-AI peers needs to be addressed in future research. This finding raises the question as to why AI youth have higher rates, and there are a number of possible reasons for this higher rate among AI youth. One possible reason is that gambling has played an important role in the history of American Indian people and it continues to play a role. Another possible reason is that the 18 tribal casinos in Minnesota have come to play a central role in tribal community life and has positive attributions for tribal members who benefit from the economic development afforded their community by the casino. Furthermore, the presence of 18 tribal casinos has made casino gambling more accessible to AI teenagers who live on reservations near casinos, particularly those of legal age, than non-AI youth who may live further away from a tribal casino.

One of the values of this study is the large sample of AI youth. The sample sizes in this study are larger than any other studies reported thus far and therefore serve as one of the

foremost sources of AI youth gambling information. The value of having such a large sample is that it allows for an accurate measurement of gambling for the population and does not require inferring a population estimate from a small and possibly non-representative sample. Another value is the recurring assessments on a three year interval that allows for monitoring gambling trends over time. This study shows both a current snapshot of AI gambling as well as a historical perspective on gambling trends starting in 1992.

This study has at least five limitations, some of which have been identified previously (Stinchfield, 2001; 2011). First, this survey was not intended to be a comprehensive measure of gambling behavior; it included six gambling frequency items. Adolescents may play other games that were not included in this survey (e.g., dice). Gambling on these other games could raise the overall rate of gambling. A second limitation is a possible sample bias, in that surveys were administered to AI youth who were attending school. Those students who have dropped out of school, been suspended or expelled, or who are absent were excluded and they may be more likely to gamble than students in school. This potential sample bias increases with each advancing grade, so that the 12th grade estimate is most affected by this potential sample bias. Some AI youth were not represented in this study. This study does not measure gambling among AI youth out of school, for example, AI youth in alternative learning centers and juvenile corrections settings. Therefore a future research direction should be to measure gambling in AI youth out of the mainstream and compare their rates to mainstream youth. A third limitation is that this study does not include students from all grades that are commonly included in youth gambling surveys. Therefore, it does not include a complete assessment of an age/grade effect. A fourth limitation is that this study relies on self-report data and this raises the question of response bias. There is no objective, independent corroboration for a student's responses,

however, methods were utilized that enhance the validity of self-report data. These methods include providing anonymity and confidentiality and assuring the respondent of these two safeguards, administering the survey in a controlled environment, and then finally, checking students' responses for inconsistencies and improbable answers which suggest invalid responding and eliminating those cases from the database (3%) whose responses suggest that they were not giving valid information (Minnesota Student Survey Interagency Team, 2007). A fifth limitation is that the data does not indicate whether the AI youth lives on or off reservation. There may be differences related to gambling between AI youth on and off reservation but it is not possible to make this comparison.

There are some findings in this study that raise concerns and a call for action. First, there are two trends that appear to be somewhat at odds. On the one hand, fewer AI youth are gambling in 2010 than in 1992. On the other hand, there is a small but substantial segment of the AI youth population that are frequent gamblers. About 7% of girls and 20% of boys maintains a fairly regular and frequent level of gambling, that is, weekly or daily on one or more games. A second concern is the finding that a greater proportion of AI youth are frequent gamblers than their non-AI peers. This was particularly true of AI girls whose rates of frequent gambling were two to four times higher than their non-AI peers. Future research will need to address why there are a greater proportion of frequent gamblers among AI students than among their non-AI peers. A third concern is that there are underage AI youth who report gambling on legalized games including the lottery, casino, and online gambling. Underage youth can obtain lottery products by using a fake identification and having people of legal age buy lottery products for them. Underage youth can also access online gambling sites by lying about their age. While it seems relatively easy for underage youth to access lottery products and online gambling, it seems less

likely that they could access casino gambling because they must walk through the front door and pass a security guard or casino staff and may need to present identification to verify that they are of legal age. They must also gamble at card tables or slot machines in view of casino staff. So, if underage youth are gambling at a casino, they are either passing through the front door by casino staff undetected or they may be presenting a fake identification card, either of which raise a concern about casino security and suggests that casino efforts to prevent underage patrons are not completely effective. Adlaf, Paglia-Boak, and Ialmiteanu (2006) found that about 1% of underage youth in Ontario reported gambling in a casino. Underage gambling is a concern for the lottery and tribal casinos and additional efforts should be put in place to prevent underage gambling. It is also possible that underage youth are reporting underage gambling when in fact they are not buying lottery products, gambling in a casino or online. This is a possibility, however, methods were in place to prevent this type of response distortion in this survey administration, namely the assurance of both confidentiality and anonymity; and students who exhibit signs of exaggeration were removed from the database. Nevertheless, false responses are possible and the question of underage gambling and its relation to invalid responding needs further research attention.

In conclusion, there were fewer AI students gambling in 2010 than were gambling in 1992 and this has been a gradual and consistent decline. There were fewer underage AI youth playing the lottery in 2010 than in 1992 and there were fewer underage boys gambling in casinos in 2010 than in 1998. There is a small but significant proportion of the AI youth population that gamble frequently and this proportion has remained relatively stable from 1992 to 2010. The proportion of frequent gamblers is higher in the AI youth group than in their non-AI peers and this difference is most striking among girls. There is a subgroup of the AI youth population that

gambles frequently and may gamble to excess and these youth may need prevention and intervention services. The goal of this research is to gain a better understanding of gambling among AI youth so methods to prevent the development of problem gambling can be formulated and thus improve the health of AI youth.

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## Author Notes

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