



# Iowa Youth Survey 2014: Problem Gambling Report

***THE IOWA CONSORTIUM FOR SUBSTANCE ABUSE RESEARCH AND EVALUATION***

## **Problem Gambling Report May 2015**

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Iowa Department of Public Health,  
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Prevention



**Iowa Youth Survey 2014  
Problem Gambling Report  
Special Report**

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## EXECUTIVE SUMMARY

The following report addresses four questions on youth gambling behaviors using 2014 Iowa Youth Survey (IYS) data:

- Who gambles among 6th, 8th, and 11th graders in Iowa?
- What are the significant types of gambling among youth; do they differ between boys and girls and do they change across grades?
- Where in the state are the highest rates of gambling among youth?
- Is youth gambling related to other factors?

The analysis focuses on IYS questions that asked if the respondent ever gambled (lifetime gambling), ever won or lost over \$25 in a day, gambling frequency for a number of activities, and whether or not they had arguments with family or friends about gambling. The IYS included responses from over 76,000 6<sup>th</sup>, 8<sup>th</sup>, and 11<sup>th</sup> graders.

Recommendations:

- Prevention efforts should target young males, before the 8<sup>th</sup> grade.
- Consider using gambling behaviors as an indicator/risk factor for substance use and mental health problems.
- Ensure that adolescents in gambling treatment programs receive substance use and mental health screening.
- Gambling interventions should incorporate multicultural considerations for race, ethnicity, and social class.
- Further development of the Iowa Gambling Exposure Scale (IGES).



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## 2014 IOWA YOUTH SURVEY

The 2014 Iowa Youth Survey (IYS) is the 15th in a series of surveys completed every two or three years since 1975. The survey is conducted with students in grades 6, 8, and 11 attending Iowa public and private schools. In this administration, 77,139 validated records were received from September 29, 2014 through November 7, 2014. The IYS includes questions about students' behaviors, attitudes, and beliefs, as well as their perceptions of peer, family, school, neighborhood, and community environments.

Records came from 287 of Iowa's 338 public school districts (85%), and from 22 of the 190 non-public schools (12%) for students enrolled in grades 6, 8, or 11. These records may represent additional districts (e.g., when districts whole grade share, when multiple districts reported the same district number, when districts shared their unique SurveyMonkey URLs, etc.). The 77,139 validated records received from students completing the IYS represented all 99 counties in Iowa. All Iowa counties were represented by a minimum of 55 IYS records.

The Gambling Section of the IYS includes one skip question (i.e., "Have you ever bet or gambled for money or possessions?"). If a student answers "no" to the skip question, the nine subsequent questions related to gambling are passed over and the survey advances past the gambling questions. Overall, 19,776 (26.0%) of the 75,975 students who responded to this question said that they had ever gambled.

Roughly, equal numbers of 6<sup>th</sup>, 8<sup>th</sup>, and 11<sup>th</sup> graders were included as were roughly equal numbers of male and female students. These counts are shown in Table 1.

**Table 1: Number of Validated 2014 Iowa Youth Survey Records**

Grade	Male	Female	Total <sup>1</sup>
6th	13,182	12,766	26,117
8th	13,295	13,003	26,443
11th	12,321	12,009	24,464
Total <sup>1</sup>	38,815	37,803	77,139

<sup>1</sup>Note: Row/column totals do not add up since they include those with missing grade or sex responses.



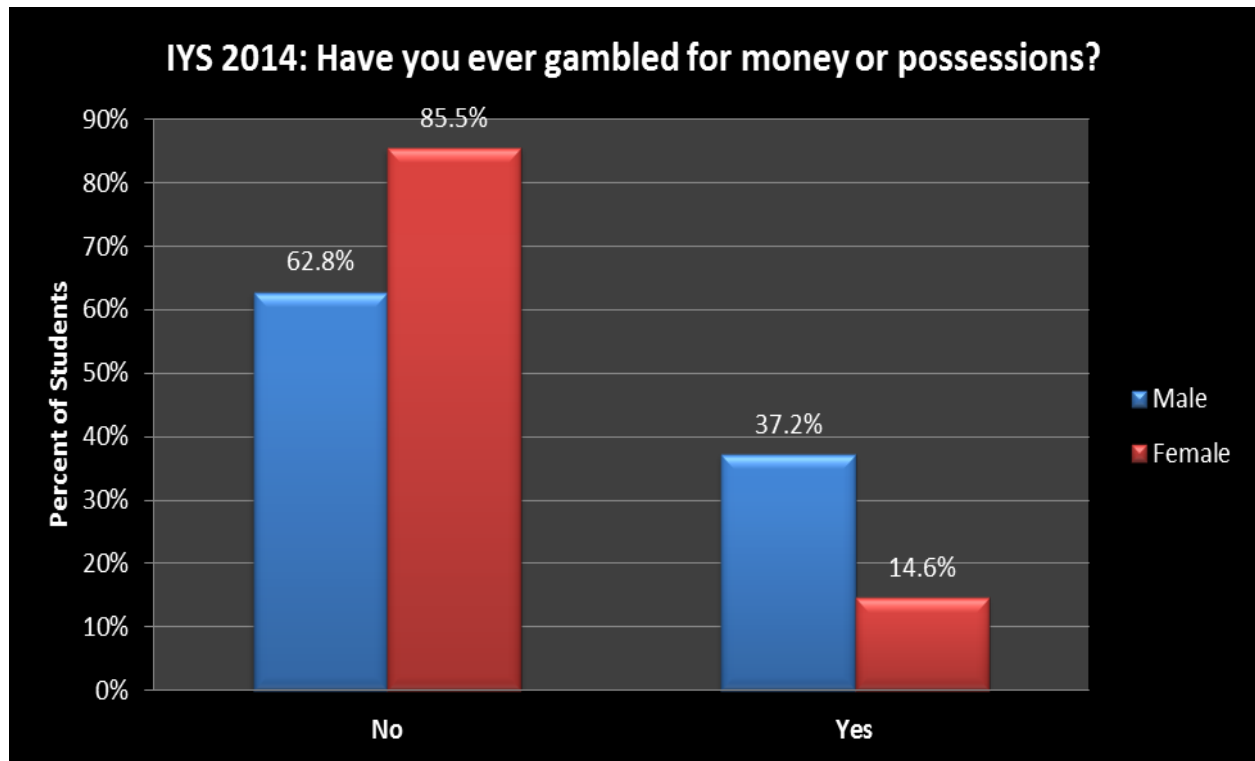
## WHO GAMBLES AMONG 6<sup>TH</sup>, 8<sup>TH</sup>, AND 11<sup>TH</sup> GRADERS IN IOWA?

There is some research literature on the epidemiology of gambling and gambling problems among youth and adolescents. To our knowledge, there has not been peer-reviewed research on the demographic risk factors for Iowa students. The IYS provides a unique source for such evaluations.

### Grade and Sex of Students

For all students, males are more than two times more likely to demonstrate lifetime gambling than females (37.2% vs. 14.6%).<sup>1</sup> Figure 1 shows this difference in the percent of males and females who have ever gambled in their lifetime. From all students who took the 2014 IYS, 25.0% (19,776 students) reported to gambling at least once.

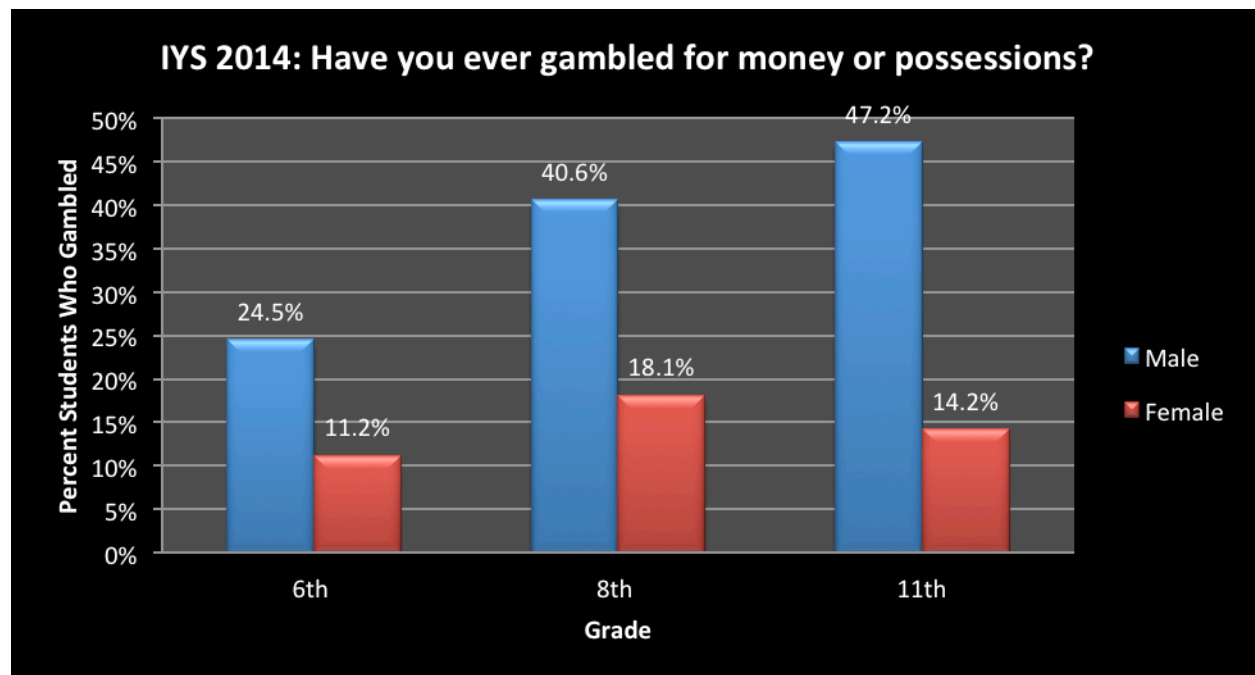
**Figure 1: Percent of Students Who Have Gambled or Not Gambled by Sex**



<sup>1</sup> Logistic regression: Wald  $\chi^2 = 5193.33$ ,  $df = 1$ ,  $p < 0.0001$

There are differences between students who reported they gambled when viewed by grade level. When viewed by grade, 18% of 6<sup>th</sup> graders, 29.5% of 8<sup>th</sup> graders, and 30.9% of 11<sup>th</sup> graders reported ever gambling. These percentages demonstrate a marked increase in gambling between the 6<sup>th</sup> and 8<sup>th</sup> grade, which is maintained through the 11<sup>th</sup> grade. The trends differed for males and females with males largely driving the overall increases.<sup>2</sup> Figure 2 demonstrates the effect of sex and grade for those who have gambled.

**Figure 2: Percent of Students Who Have Gambled by Sex and Grade**

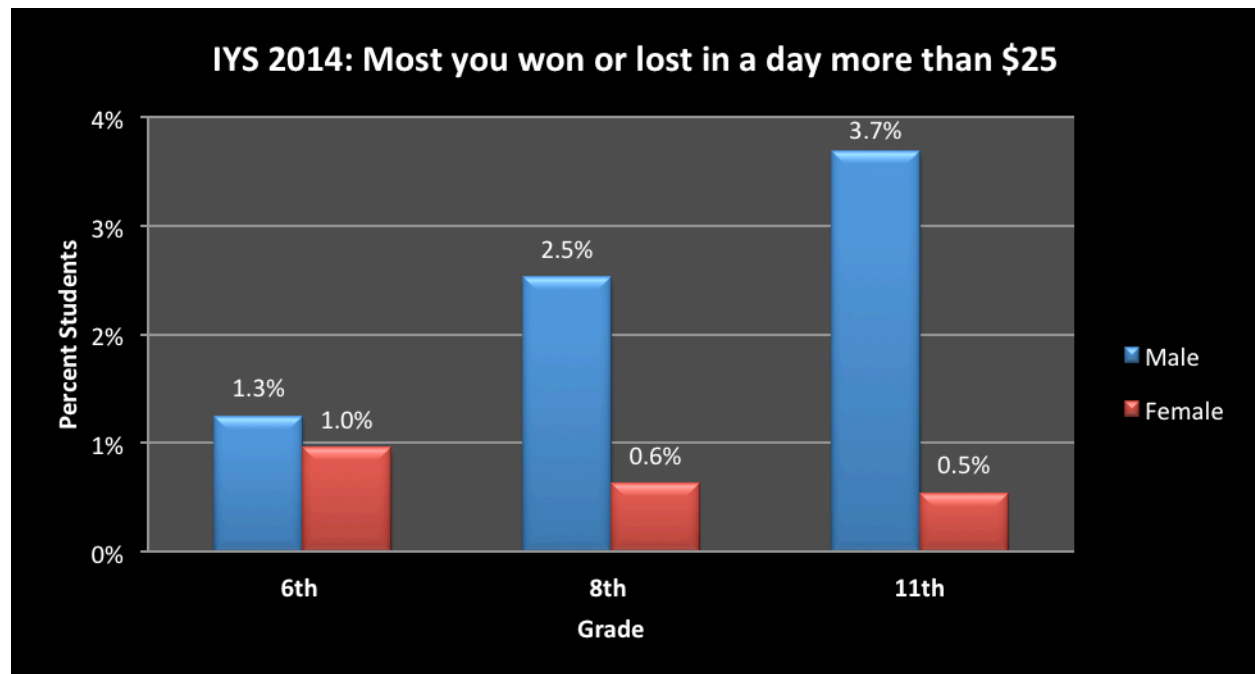


<sup>2</sup> Logistic regression: Interaction Wald  $\chi^2 = 277.58$ ,  $df = 2$ ,  $p < 0.0001$



The amount of money lost by students who gamble is an outcome variable that may indicate potentially problematic gambling behavior. Figure 3 demonstrates the effect of sex and grade of those losing a significant amount of money in one day. Depending on gender, winning or losing more than \$25 in one day while gambling shows a differential change in percentage across grade.<sup>3</sup> While females are not increasing their likelihood of losing more than \$25 in a day over grades, males show a larger increase from grade 6<sup>th</sup> to 8<sup>th</sup> grade (OR = 2.05 95% CI =1.86, 2.27), and the increasing trend continues through from 8<sup>th</sup> to 11<sup>th</sup> grade (OR = 0.66 95% CI = 0.62, 0.72).

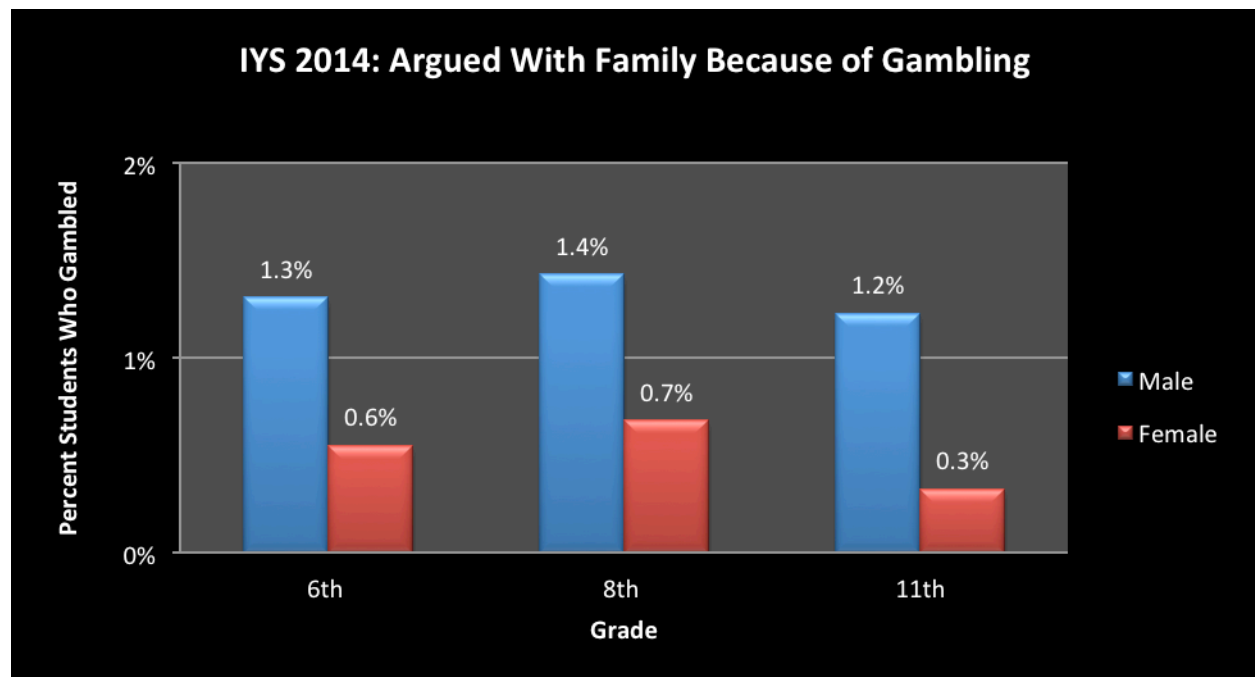
**Figure 3: Percent of Students Who Have Lost More than \$25 in One Day by Sex and Grade**



<sup>3</sup> Logistic regression: Interaction Wald  $\chi^2 = 39.44$ ,  $df = 2$ ,  $p < 0.0001$

An argument with friends or family is another important outcome variable that may indicate potentially problematic gambling behavior. Figure 4 demonstrates the association sex and grade have with arguing as a result of gambling. While significant, differences in students, by sex, having arguments due to their gambling appear not to be as dramatic across grade levels.<sup>4</sup> Arguments with family and friends do differ between males and females with males being more than twice as likely to have an argument (4.0% vs. 1.6%).<sup>5</sup>

**Figure 4: Percent of Students Who Argued with Family Because of Gambling by Sex and Grade**



<sup>4</sup>  $\chi^2 = 20.20, df = 2, p < 0.0001$

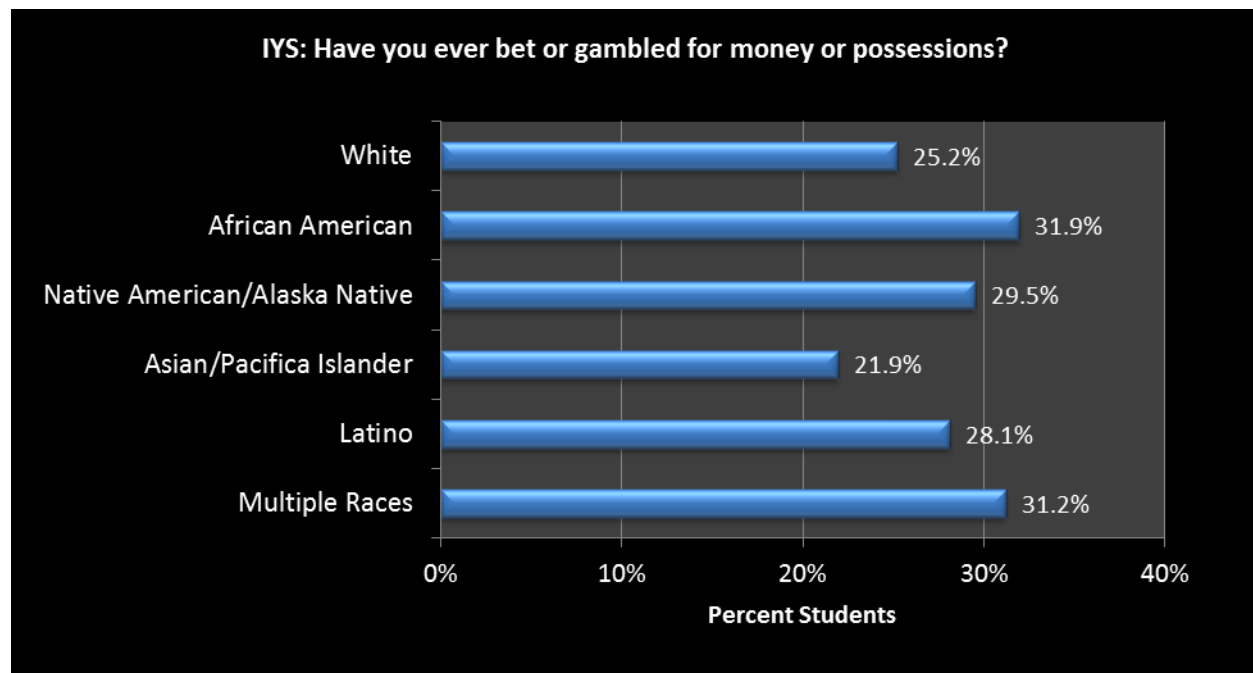
<sup>5</sup> Logistic regression: Wald  $\chi^2 = 377.96, df = 1, p < 0.0001$

## Student Race, Ethnicity, and Living Arrangements

### Race/Ethnicity

There were significant differences among students' racial/ethnic groups who reported lifetime gambling.<sup>6</sup> After controlling for the effects of grade and sex, the effect of race on lifetime gambling increased slightly.<sup>7</sup> Figure 5 shows the different percentages for each of the racial/ethnic groups. White (25.2%) and Asian (21.9%) students had the least lifetime exposure. Latino students had a somewhat higher percentage (28.1%). African American (31.9%), multi-racial students (31.2%), and American Indian students (29.5%) had the highest percentages.

**Figure 5: Percent of Students Who Have Ever Gambled by Race/Ethnicity**



Of those who reported gambling, students having lost more than \$25 in a single day were somewhat similar across races. White (3.9%) and Asian (4.5%) students were only slightly lower than the other groups who ranged between 5.8% and 8.8%. Arguing with family was least likely to occur in White students (2.3%) and most likely to occur in African American students (7.1%). Other groups ranged from 3.2 to 4.1%.

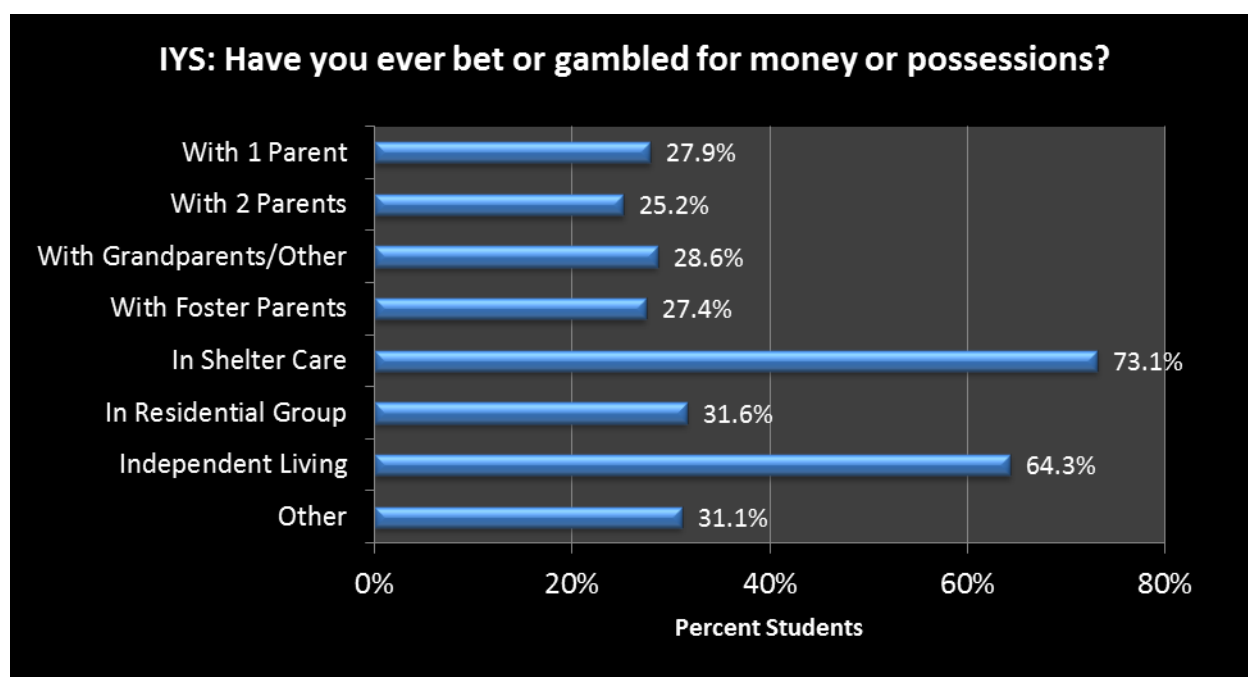
<sup>6</sup> Logistic regression:  $Wald \chi^2 = 186.94, df = 6, p < 0.0001$

<sup>7</sup> Logistic regression:  $Wald \chi^2 = 214.88, df = 6, p < 0.0001$

## Living Arrangements

Students' living arrangement also had a statistically significant relationship with the likelihood of lifetime gambling.<sup>8</sup> After controlling for grade and sex, the effect of living situation on lifetime gambling increased, but only slightly.<sup>9</sup> Living arrangement percentages are shown in Figure 6. The two groups with the greatest percentage of gamblers are those living in shelter care (73.1%) and in independent living (64.3%). These were significantly different from all other groups. Those living with two parents had the lowest percentage of students who have gambled at nearly 25.2%, though this did not significantly differ from other low percentage groups of one parent (27.9%), with grandparents/other relatives (28.6%), foster parents (27.4%), students living in a residential group (31.6%), or other (31.1%).

**Figure 6: Percent of Students Who Have Ever Gambled by Living Situation**



Of those who reported gambling, students having lost more than \$25 in a single day demonstrated a similar pattern to lifetime gambling, but with more dramatic differences. Shelter care (47.9%) and independent living (42.6%) were the most likely to lose more than \$25, surpassing all other groups, with the next highest being in a residential group (14.3%). Arguing with family, again demonstrated a similar pattern.

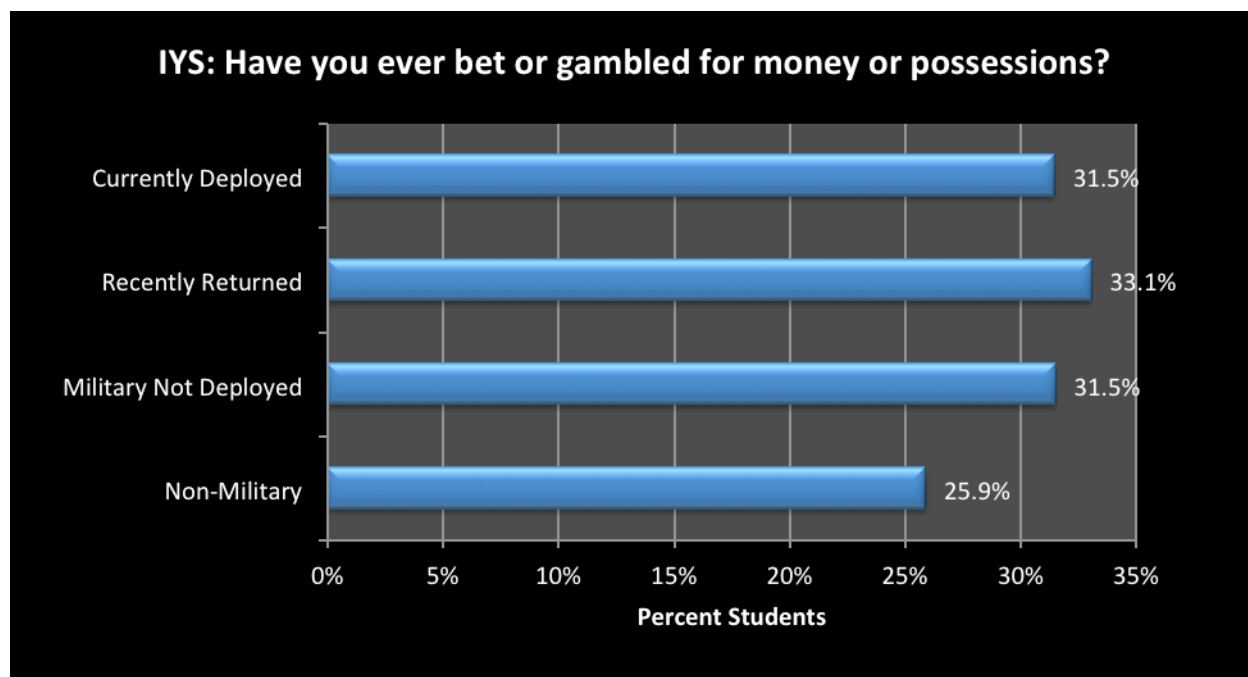
<sup>8</sup> Logistic regression: Wald  $\chi^2 = 214.58$ ,  $df = 7$ ,  $p < 0.0001$

<sup>9</sup> Logistic regression: Wald  $\chi^2 = 231.06$ ,  $df = 7$ ,  $p < 0.0001$

## Students in Military Families

Students in military families demonstrated a relatively small but significant difference in lifetime gambling.<sup>10</sup> After controlling for grade and sex, the effect of living in a military family did not change substantially.<sup>11</sup> This suggests that grade and sex do not affect the likelihood of lifetime gambling when comparing military families. Figure 7 shows the association living in a military family has on gambling. Students from non-military families demonstrated the lowest percentage of lifetime gambling (25.9%). Students with at least one parent in the military were separated into three subgroups demonstrating varying levels of lifetime gambling. Students in military families with at least one parent currently deployed for more than two weeks, and students with at least one parent who had not deployed for more than two weeks in the last year demonstrated a similar percentage of lifetime gambling (31.5%). Students in military families with at least one parent deployed in the past year for more than two weeks demonstrated the greatest percentage of lifetime gambling (33.1%).

**Figure 7: Percent of Students Who Have Ever Gambled by Military Family**



Of those who reported gambling, students having lost more than \$25 in a single day demonstrated a slightly more striking pattern. While percentages are lower, students with currently deployed parents were more at risk with 13.9% reporting losing more than \$25 in a single day. Those with parents who had recently returned were next highest (8.8%), followed by military but not deployed (6.3%) and non-military (4.4%). Students who reported having an argument due to their gambling revealed a similar pattern. Students with currently deployed parents were more at risk with 9.5% reporting having an argument. Those with parents who recently returned were next highest (7.5%), followed by military but not deployed (3.3%) and non-military (2.6%).

<sup>10</sup> Logistic regression:  $Wald \chi^2 = 49.38$ ,  $df = 7$ ,  $p < 0.0001$

<sup>11</sup> Logistic regression:  $Wald \chi^2 = 49.30$ ,  $df = 7$ ,  $p < 0.0001$

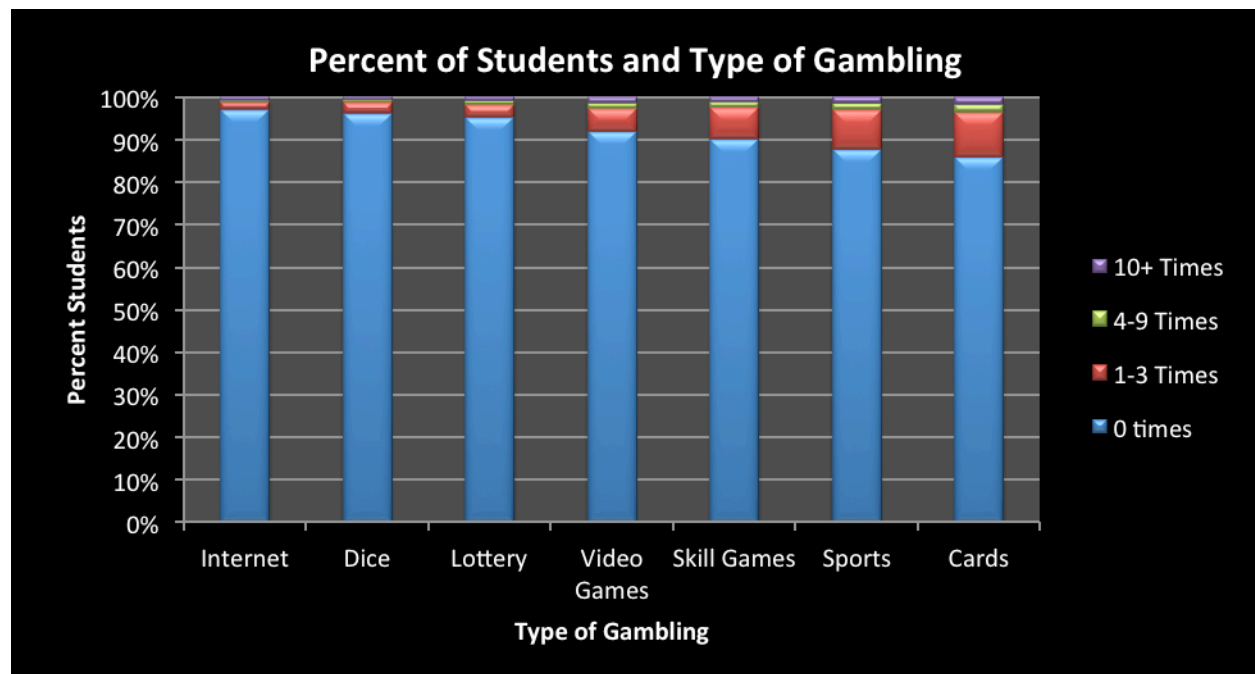
## TYPE OF GAMBLING PATTERNS

The IYS asks students about the type and frequency of gambling they have engaged in during the last 12 months. The question asks: "During the past 12 months how many times have you bet or gambled for money or possessions in any of the following ways:"

- Sports?
- Card games with friends or family?
- Internet?
- Personal skill games such as pool, bowling, or dominoes?
- Video or arcade games?
- Dice games?
- Lottery scratch off tickets or numbers?

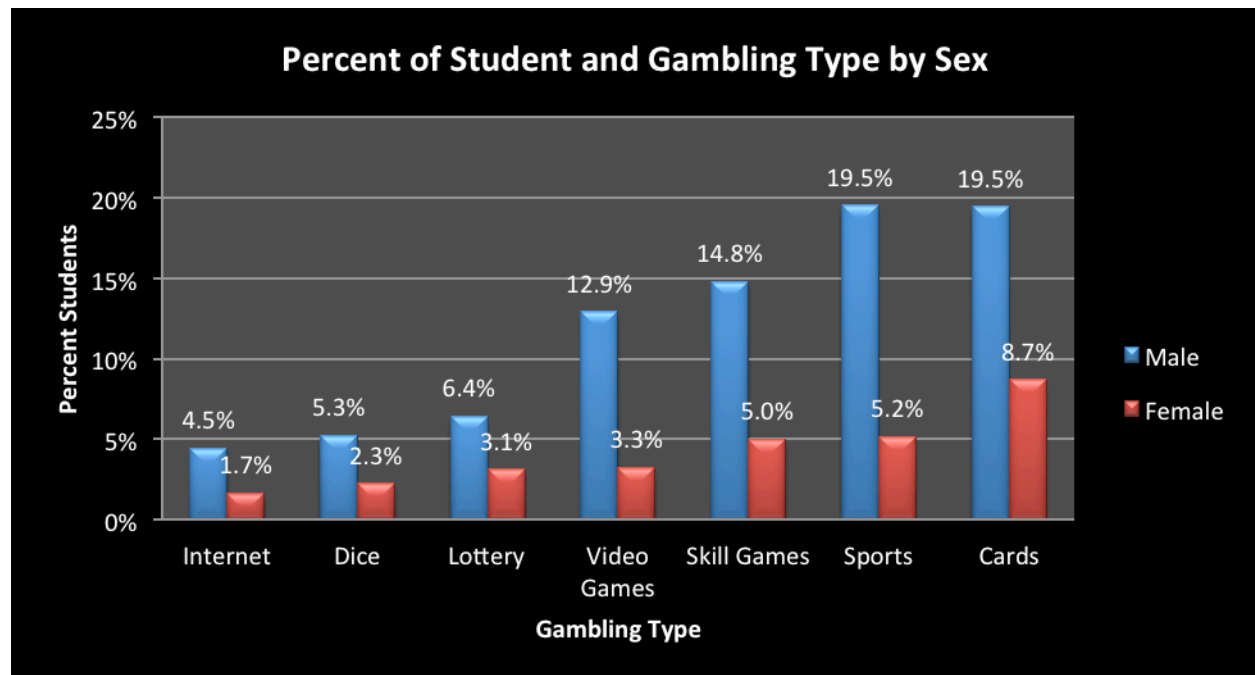
Figure 8 shows the types of gambling ordered from least often mentioned to most often mentioned. The most common gambling activity involves cards with friends or family, with 14.1% students gambling at least once in the last year in this activity. This is followed by sports (12.4%), skill games (10%), and video games (8.1%). Types of gambling that tended to have a lower percentage of student involvement are lottery (4.8%), dice (3.8%), and internet (3.1%).

**Figure 8: Percent of Students Who Gambled Within the Last Year at Various Games**



Males and females differed on whether or not they gambled at least once during the past 12 months on all types of activities.<sup>12</sup> The largest differences between males and females were apparent with the more common activities, e.g., sports, cards, skill games as shown in Figure 9. Video/Arcade games also showed a large difference.

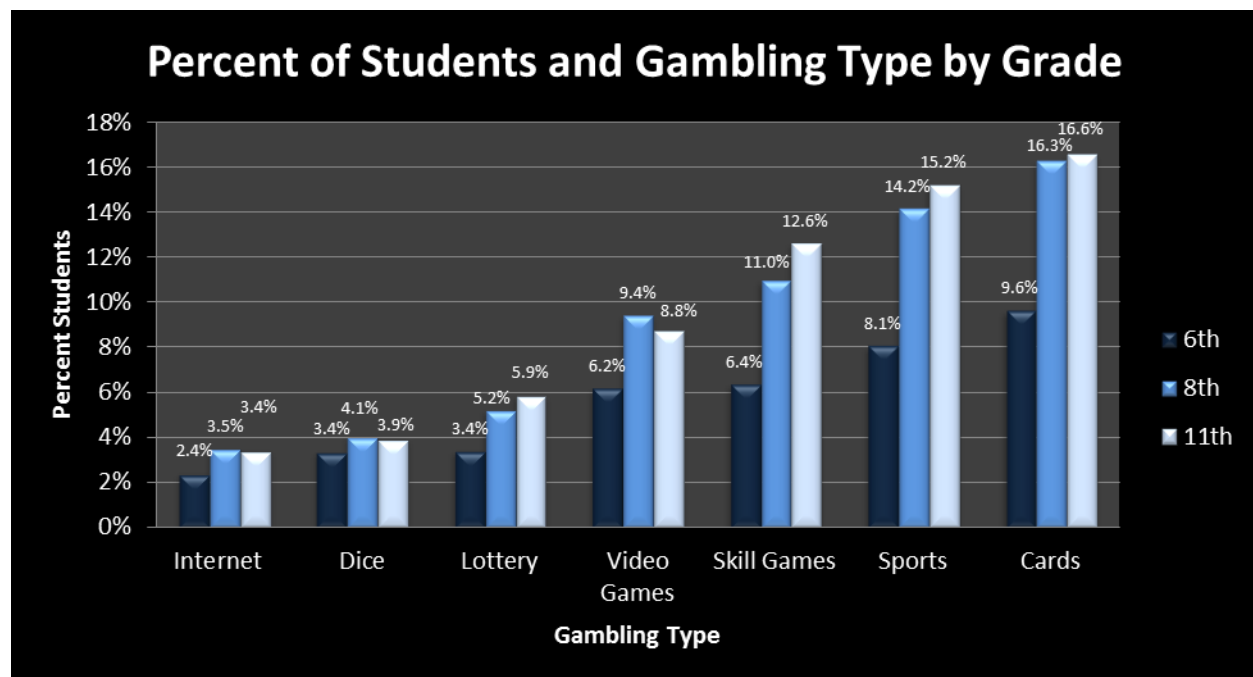
**Figure 9: Percentages of Students Who Gambled at Least Once Within the Last Year in Various Activities**



<sup>12</sup>  $\chi^2 = 4319.27$ ,  $df = 1$ ,  $p < 0.0001$

There were interesting patterns of differences across grade levels as seen in Figure 10.<sup>13</sup> The 8<sup>th</sup> and 11<sup>th</sup> grade percentages are consistently similar across all of the gambling activities. Based on these data, it again appears that the largest increase in gambling behaviors occurs between the 6<sup>th</sup> and 8<sup>th</sup> grade. The effect is most noticeable with the more frequent activities. Thus, students appear to be introduced to gambling behaviors during this time period (between 6<sup>th</sup> and 8<sup>th</sup> grade).

**Figure 10: Percentages of Students at Each Grade Level Who Gambled at Least Once Within the Last Year in Various Activities**

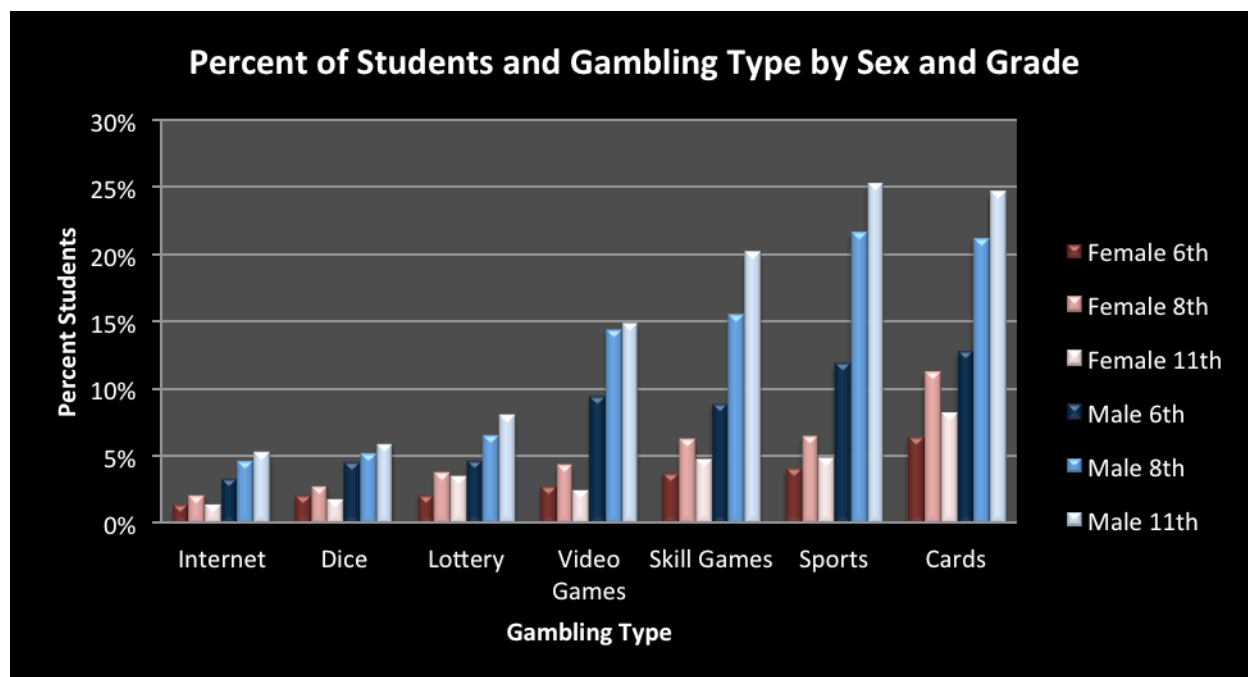


<sup>13</sup>  $\chi^2 = 1145.57, df = 2, p < 0.0001$



Figure 11 displays how the type of gambling differs between sex and grade of students. Females show a relatively stable set of percentages for all activities. Males demonstrate a consistently higher percentage of gambling across grades and a clear preference for video games, skill games, sports, and card games. An interesting pattern that emerged is the peak in gambling that occurs for females in 8<sup>th</sup> grade, then a decline in percent in 11<sup>th</sup> grade. This pattern in females suggests that they are introduced to gambling at the same time as males. However, something happens for females that does not promote a continued increase in gambling participation at the same rate as does for males.

**Figure 11: Percentage of Students Who Gambled at Least Once Broken Down by Activity Sex and Grade**



### *Frequent Gambling Patterns*

Frequent gambling, defined as 10 or more times in a year for an activity, is relatively uncommon for all groups. Frequent gambling is more often seen in the more popular activities. For example, the most likely activity of gambling while playing cards with friends or family members also has the highest percentage of students who play frequently, 1.7%. This is closely followed by gambling on sports (1.6%) and video games (1.4%). Frequent internet, dice and lottery gambling is relatively rare, all with less than 1%.

Frequent gambling is strongly related to potential gambling problems. Students who frequently gamble on one or more activity are:

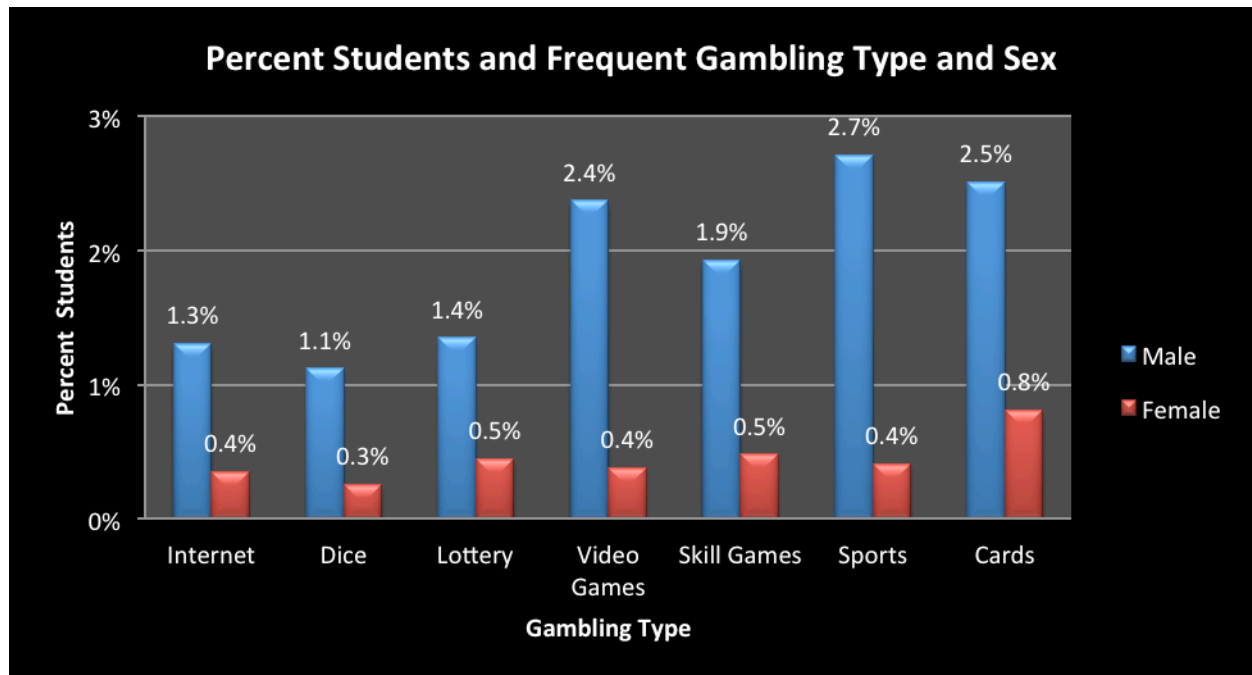
- More than 17 times more likely to argue with family or friends about their gambling.<sup>14</sup>
- More than 27 times more likely to have won or lost over \$25 in one day.<sup>15</sup>

<sup>14</sup> Odds ratio = 17.204, Wald  $\chi^2 = 3144.74$ ,  $df = 1$ ,  $p < 0.0001$

<sup>15</sup> Odds ratio = 27.096, Wald  $\chi^2 = 6377.90$ ,  $df = 1$ ,  $p < 0.0001$

Percent of frequent gambling activities, separated for males and females, appear in Figure 12. Males are much more likely to demonstrate a high frequency of gambling. Female frequent gambling is well below 1% in every gambling type and only nears 1% in card games (0.8%). Males gamble more than twice as much<sup>16</sup> as females on video games (2.4% vs. 0.4%), skill games (1.9% vs. 0.5%), sports (2.7% vs. 0.4%), and cards (2.5% vs. 0.8%).

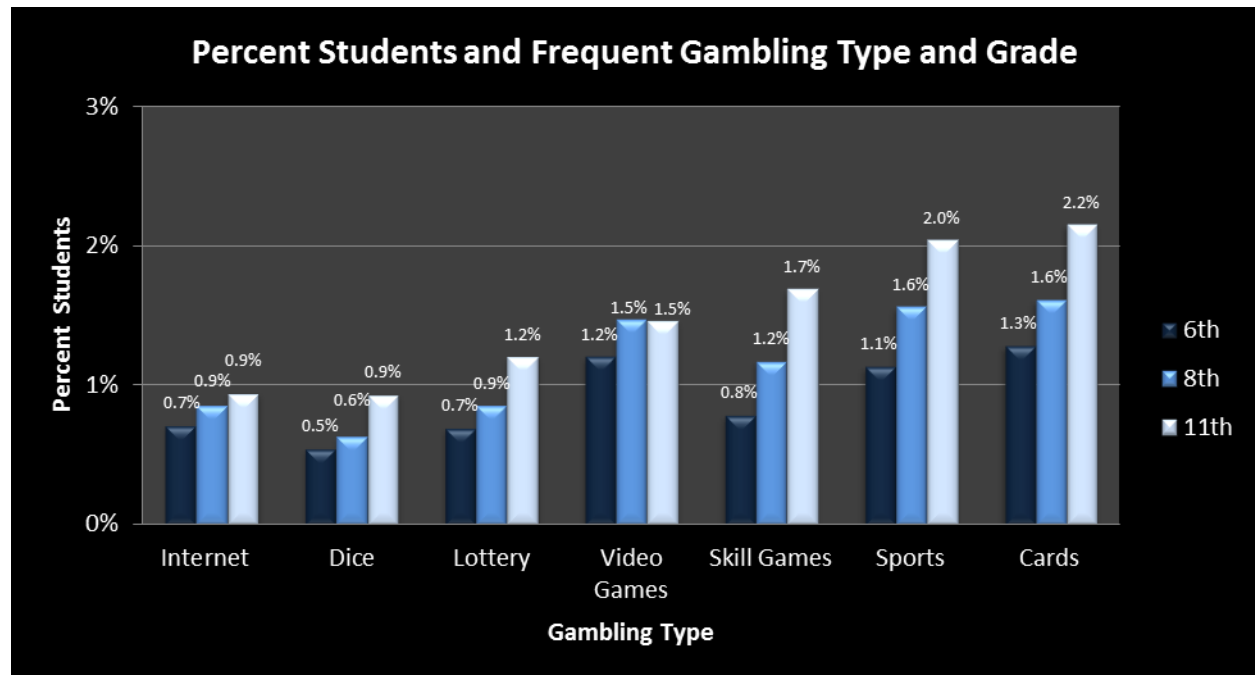
**Figure 12: Percentage of Students Who Frequently Gambled Broken Down by Activity and Sex**



<sup>16</sup> When interpreting “twice as much,” it is important to note these are very low percentages.

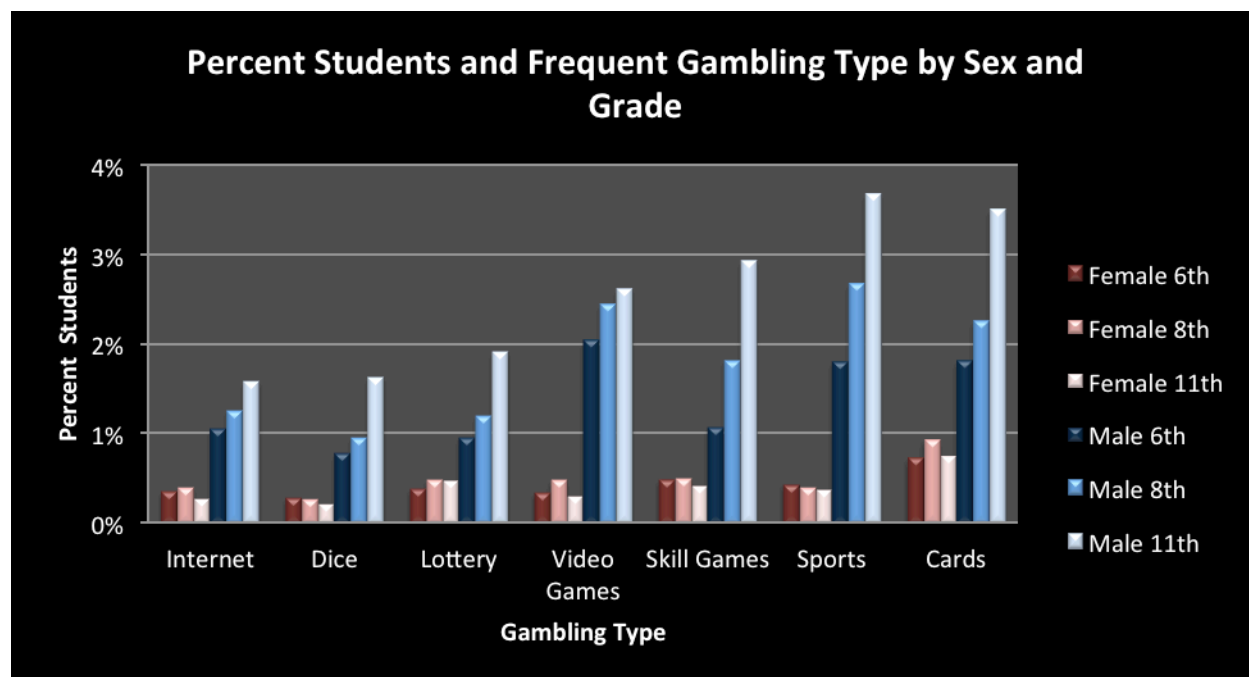
For most activities, frequent gambling increases with advancing grades as shown in Figure 13. The exceptions were frequent internet and video/arcade games. Internet gambling was infrequent for all grades.

**Figure 13: Percentage of Students Who Frequently Gambled Broken Down by Activity and Grade**



The increasing percentages across grades are most noticeable among male students as displayed in Figure 14. Female students rarely gamble frequently, and they tend to maintain that status across all grades, with slightly more females gambling on card games.

**Figure 14: Percentage of Students Who Frequently Gambled Broken Down by Activity, Sex and Grade**



## Summary

Cards, sports, skill games, and video/arcade games were the most popular activities for gambling. This popularity was mainly attributed to male students. Female students tended to gamble infrequently. For male students, the frequency of past year gambling increases from 6<sup>th</sup> to 8<sup>th</sup> grades. Frequent gambling also increases with each surveyed grade, but mostly for males. Internet gambling was infrequent for males and females showing little increase with older students. Popular gambling types tend to show a dramatic percent increase between 6<sup>th</sup> and 8<sup>th</sup> grade for males. This percent increase continues between 8<sup>th</sup> and 11<sup>th</sup> grades for males. However, this is not true for females. Rather, females show a slight decrease in gambling between 8<sup>th</sup> and 11<sup>th</sup> grades.

## COUNTY GAMBLING RATES, RANKABILITY, AND G.I.S. MAPPING

This section includes color-coded county maps showing the percentages of students who reported:

- Lifetime gambling/bet,
- Won or lost over \$25 in a day, and
- Argued with family or friends because of gambling.

Because there are varying numbers of students within each county who took the IYS, the reliability of each county's percentage also varies.

### ***County Rankability***

Differences among counties are affected by chance variation to some extent. Analyses were conducted to estimate the reliability of the county estimates, i.e., how much of the differences in the county maps might be due to chance.<sup>17</sup> Based on our rankability analysis, the differences among counties were significantly and moderately based on real differences among counties. This means that county gambling differences are rankable. For the "ever gambled" question, approximately 70.8% of the variability between counties represents "actual" differences. The reliabilities of county differences for the other questions were slightly less than that. This also suggests that much of the county differences present random error, which would be expected to vary from time to time by chance. This also suggests that a substantial amount of the observed differences among the counties represents random unexplained variation. Of the three maps, the first regarding students' lifetime gambling is the most reliable. Each map breaks the counties into roughly five equal groups of counties, with dark pink marking the top highest percentages. Casino locations are also indicated on the maps.

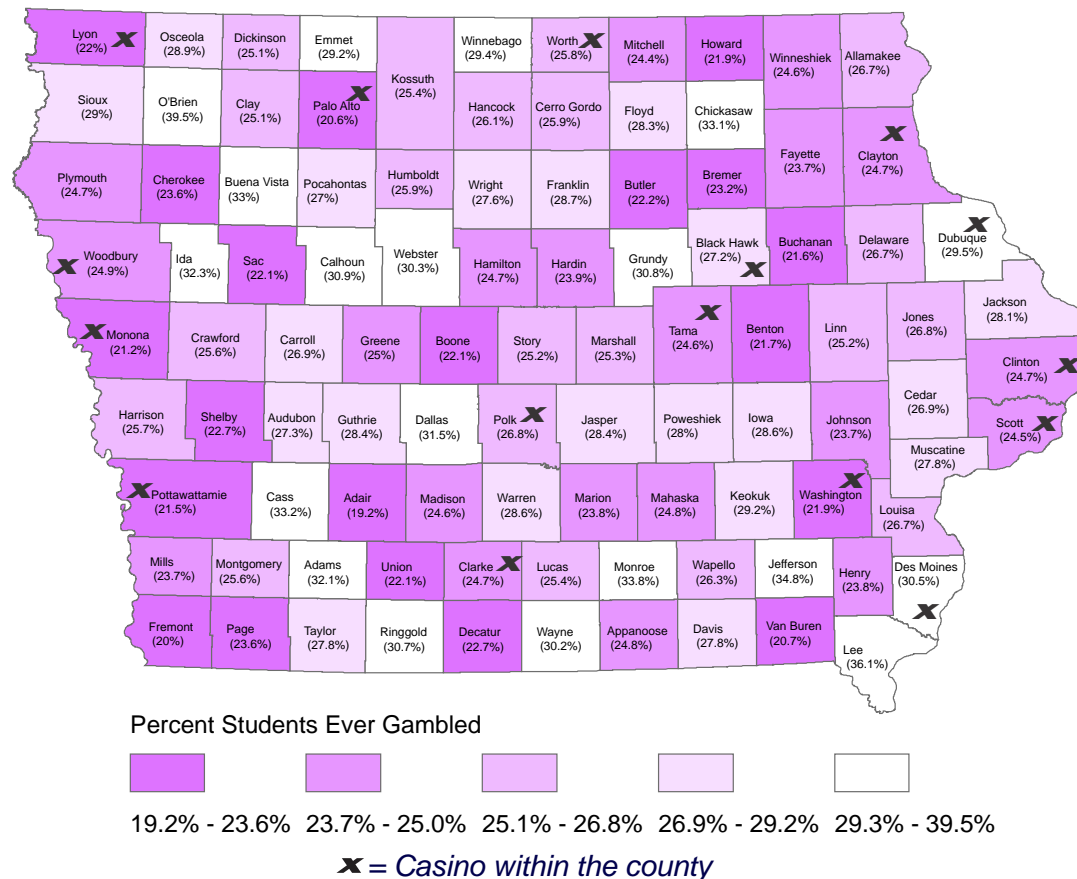
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<sup>17</sup> Arndt, S., Acion, L., Caspers, K. & Diallo, O. Assessing community variation and randomness in public health indicators. *Population Health Metrics*. 9, 3 (2011).

## County Maps

The county map reflecting responses for IYS question B52, "Have you ever bet or gambled for money or possessions?" appears as Figure 15.

**Figure 15: Percent of Students Who Ever Gambled by Iowa County**



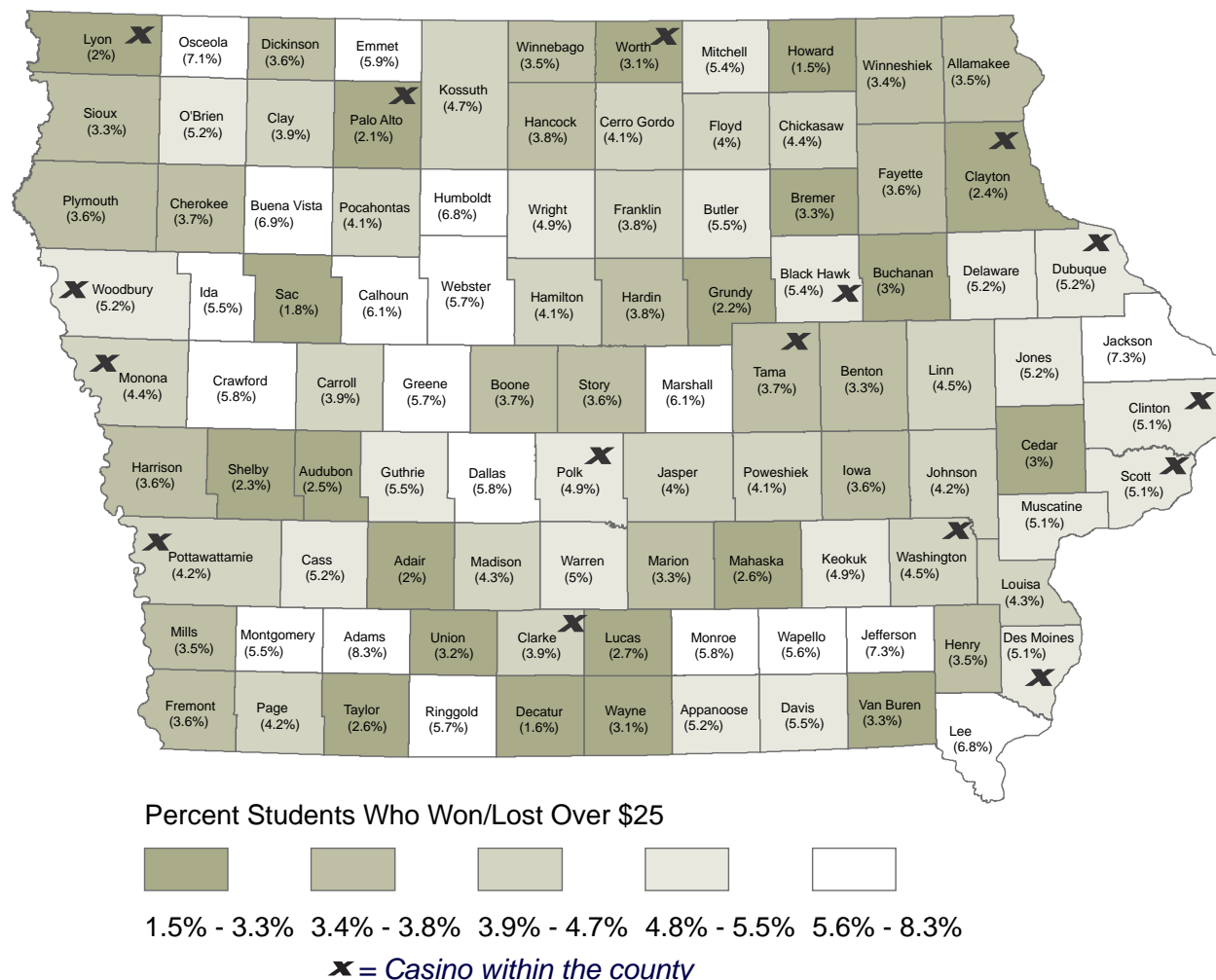
There was a marginal statistical association between a county having a casino or not on their lifetime prevalence of student gambling.<sup>18</sup> Counties with casinos had a lower rate of lifetime gambling, 25.6%, compared to counties without a casino, 26.3%. Using a more sophisticated analysis and controlling for student grade in school, this effect became non-significant.<sup>19</sup>

<sup>18</sup>  $\chi^2 = 4.4, p > 0.045$

<sup>19</sup> Logistic regression, Wald  $\chi^2 = 1.12, p > 0.277$

County's rankings for percent of students who won or lost over \$25 in a day appear in Figure 16. There was a statistical association between having a casino and the percentage of students who won or lost over \$25.<sup>20</sup>

**Figure 16: Percent of Students Won/Lost Over \$25 Gambling in a Day by Iowa County**



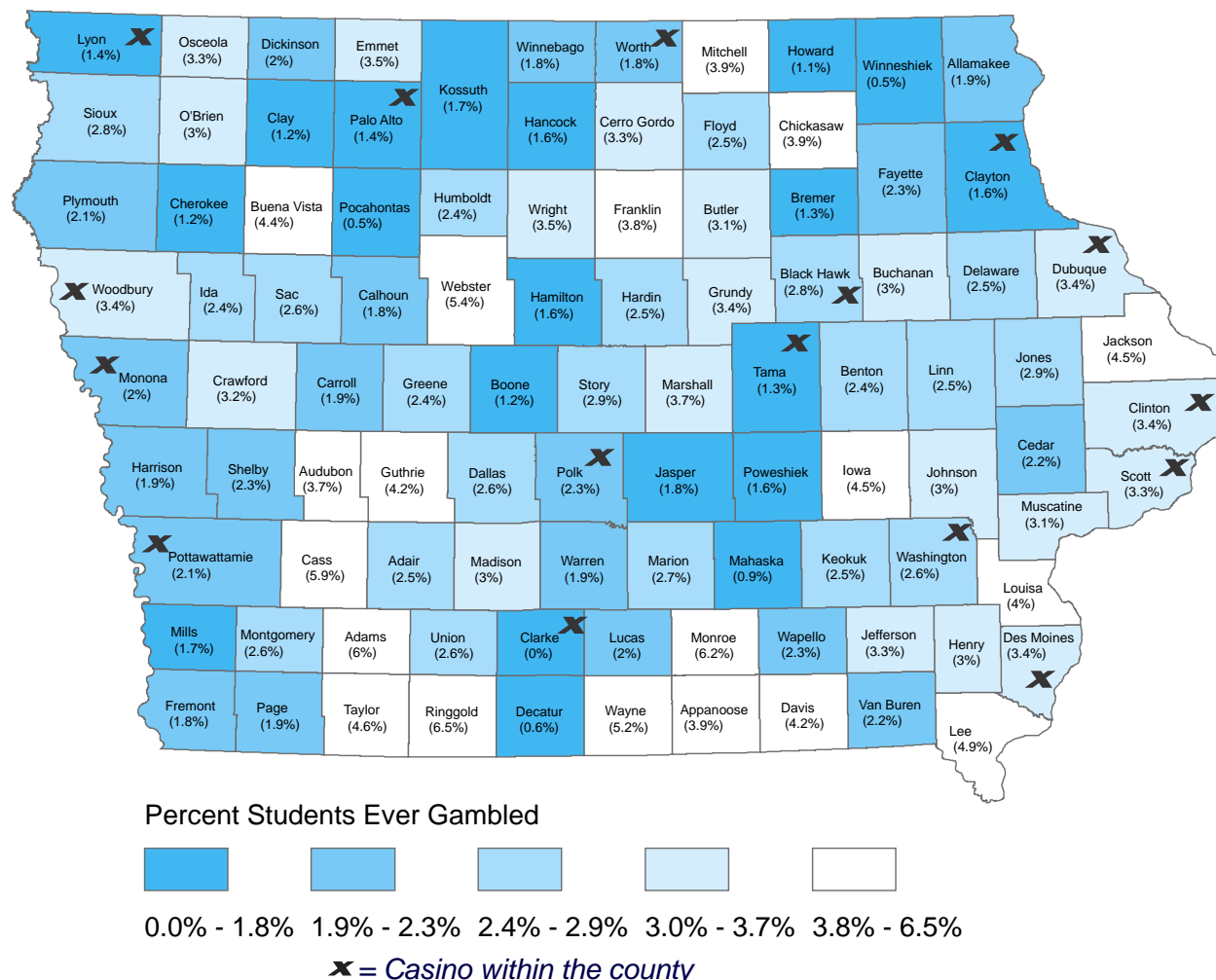
Counties with a casino had a slightly higher percentage of students who won or lost over \$25 in a day (4.8%) than counties without a casino (4.4%). However, none of the counties with the highest percentage of students winning or losing \$25 had a casino.<sup>21</sup> Four of the counties with the lowest percentage of students winning or losing \$25 had casinos. When the counties were ranked from the lowest to highest percentage of children with high wins/loses, there was no significant difference between counties with or without a casino.

<sup>20</sup>  $\chi^2 = 6.9, p > 0.01$

<sup>21</sup> Mann-Whitney  $z = 0.35, p > 0.70$

Percentages of students who argued with family or friends are shown in Figure 17. There was no evidence of a statistical association between having a casino and the county's percent of students who had gambling related arguments.<sup>22</sup>

**Figure 17: Percent of Students Argues Over Gambling by Iowa County**



## Summary

While we did not perform more sophisticated GIS or spatial statistical analyses, simple analyses did not support the notion that casino location increased student gambling activities. That said there were real differences with some counties having higher or lower levels of student gambling. There were also moderate correlations among the gambling measures considered on the county-level. Thus, some counties tended to have consistently higher or lower youth gambling issues. For example, Adams County (without a casino) consistently has among the highest levels of gambling, highest students who lost or won over \$25, but had the lowest

<sup>22</sup>  $\chi^2 = 0.04, p > 0.83$



percentage of arguments as a result of gambling. Lee and Monroe Counties were also among the counties with the highest percentages. Neither of these counties contains a casino. Howard, Palo Alto (has a casino), and Decatur counties had consistently low student gambling.

## OTHER FACTORS ASSOCIATED WITH GAMBLING

In addressing the question, "Is youth gambling related to other factors?" another set of analyses were conducted. Aside from the demographic associations discussed earlier, we investigated the degree to which exposure to gambling (ever gambled) related to other student behaviors. This was not an exhaustive search for correlates. Only a select few types of behavior were reviewed: substance use, depression, suicidal thoughts, and other risky behaviors.

### *Substance Use (Lifetime)*

Lifetime gambling was a risk factor for lifetime use of any alcohol or drugs. Table 2 shows alcohol behaviors, have you ever had alcohol, have you ever had five or more drinks of alcohol within a couple of hours (Binge). Ever using tobacco is also shown, as are any drug use, any marijuana use.

**Table 2: Lifetime Substance Use**

Lifetime Use of:	Ever Gambled?		Risk Difference
	No	Yes	
<b>Alcohol</b>	23.9%	47.0%	23.1%
<b>Binge Drinking</b>	4.0%	11.0%	7.0%
<b>Marijuana</b>	7.0%	15.5%	8.5%
<b>Drugs</b>	14.9%	29.1%	14.3%
<b>Tobacco</b>	8.0%	19.4%	11.4%

In all instances, lifetime gambling was strongly associated with increased lifetime substance use. The student's age and sex might have caused these increases. For example, older male students, who are more likely to gamble, are also more likely to have ever had a drink of alcohol. Analyses that are more sophisticated were done to control for student grade and sex. In all of the cases, the effects of gambling remained significant and large. Furthermore, analyzing each grade level separately showed the same large increases.

## Depression and Suicidal Thoughts

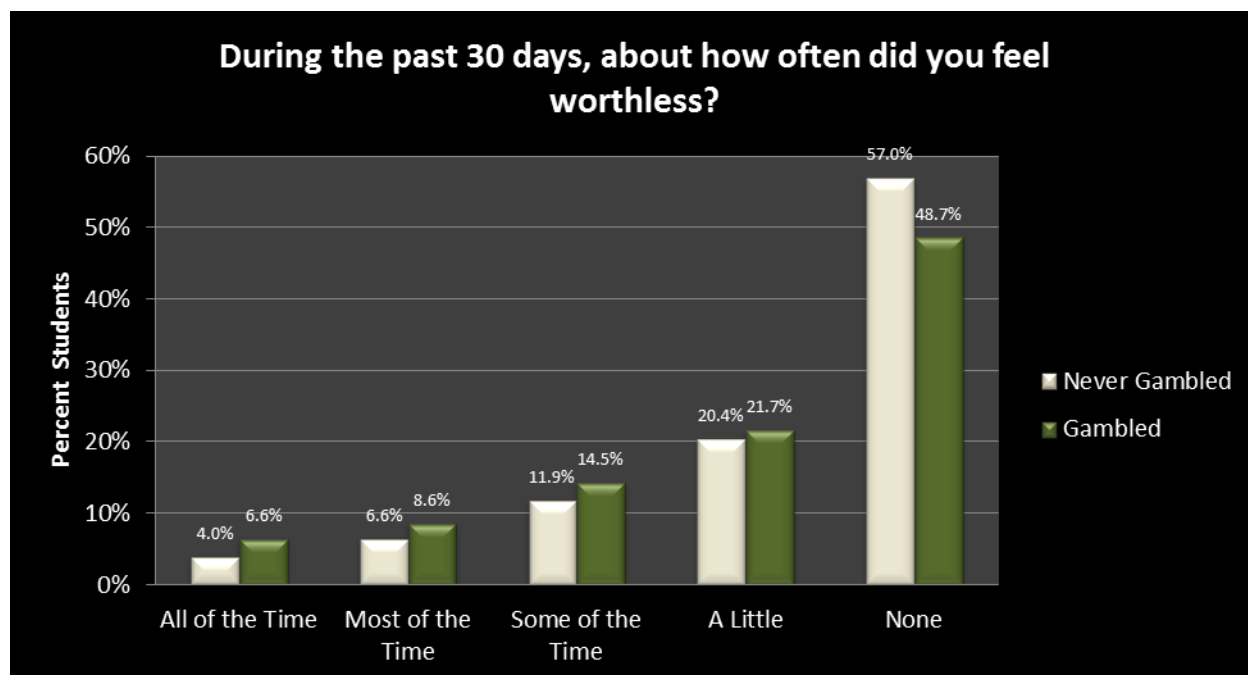
Table 3 shows the risk of lifetime gambling and having thoughts of suicide and depression.

**Table 3: Mental Health Concerns and Lifetime Gambling**

	Ever Gambled?		Risk Difference
	No	Yes	
<b>Depressive Thoughts</b>	43.0%	51.4%	8.4%
<b>Thoughts of Suicide</b>	11.5%	17.6%	6.0%

Figure 18 shows lifetime gambling as it relates to depressive feelings. Students who never gambled reported "None" more often than those who have gambled.<sup>23</sup> Students who have gambled experience slightly more days of feeling worthless than those who have not gambled.

**Figure 18: Lifetime Exposure to Gambling and Amount of Time Students Felt Worthless**



Arguing with friends and family due to gambling is also associated with feelings of worthlessness.<sup>24</sup> Students who reported feeling worthless all of the time during the past 30 days were nearly four times more likely to report arguing about gambling with friends and family (4.5% vs. 16.4%). There was also a significant association between students' lifetime gambling and responding "Yes" to the question "During the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some usual activities?" Of students who never gambled, 16% responded "Yes," while 20.3% students who

<sup>23</sup>  $\chi^2 = 409.91$ ,  $df = 1$ ,  $p < 0.0001$

<sup>24</sup>  $\chi^2 = 791.42$ ,  $df = 5$ ,  $p < 0.0001$

have gambled responded "Yes".<sup>25</sup> Thus, feelings of hopelessness were associated with an increased likelihood for lifetime gambling.<sup>26</sup> When we controlled for the grade and sex of the students, this likelihood increased<sup>27</sup> with students feeling hopeless being 1.71 times more likely to report lifetime gambling.<sup>28</sup>

While the effects on feelings of worthlessness and hopelessness were somewhat subtle, lifetime gambling was fairly strongly associated with suicidal ideation when asked, "During the past 12 months, have you seriously thought about killing yourself?"<sup>29</sup> Viewed by grade, the effect is apparent at each level, but is significantly more pronounced in the younger grades (see Figure 19).<sup>30</sup> In analyses that are more sophisticated the effects continued once the student's sex was statistically controlled.

**Figure 19: Lifetime Exposure to Gambling and Suicidal Ideation**



<sup>25</sup>  $\chi^2 = 190.57$ ,  $df = 1$ ,  $p < 0.0001$

<sup>26</sup> Logistic regression: Wald  $\chi^2 = 191.08$ ,  $df = 1$ ,  $p < 0.0001$

<sup>27</sup> Logistic regression: Wald  $\chi^2 = 540.90$ ,  $df = 7$ ,  $p < 0.0001$

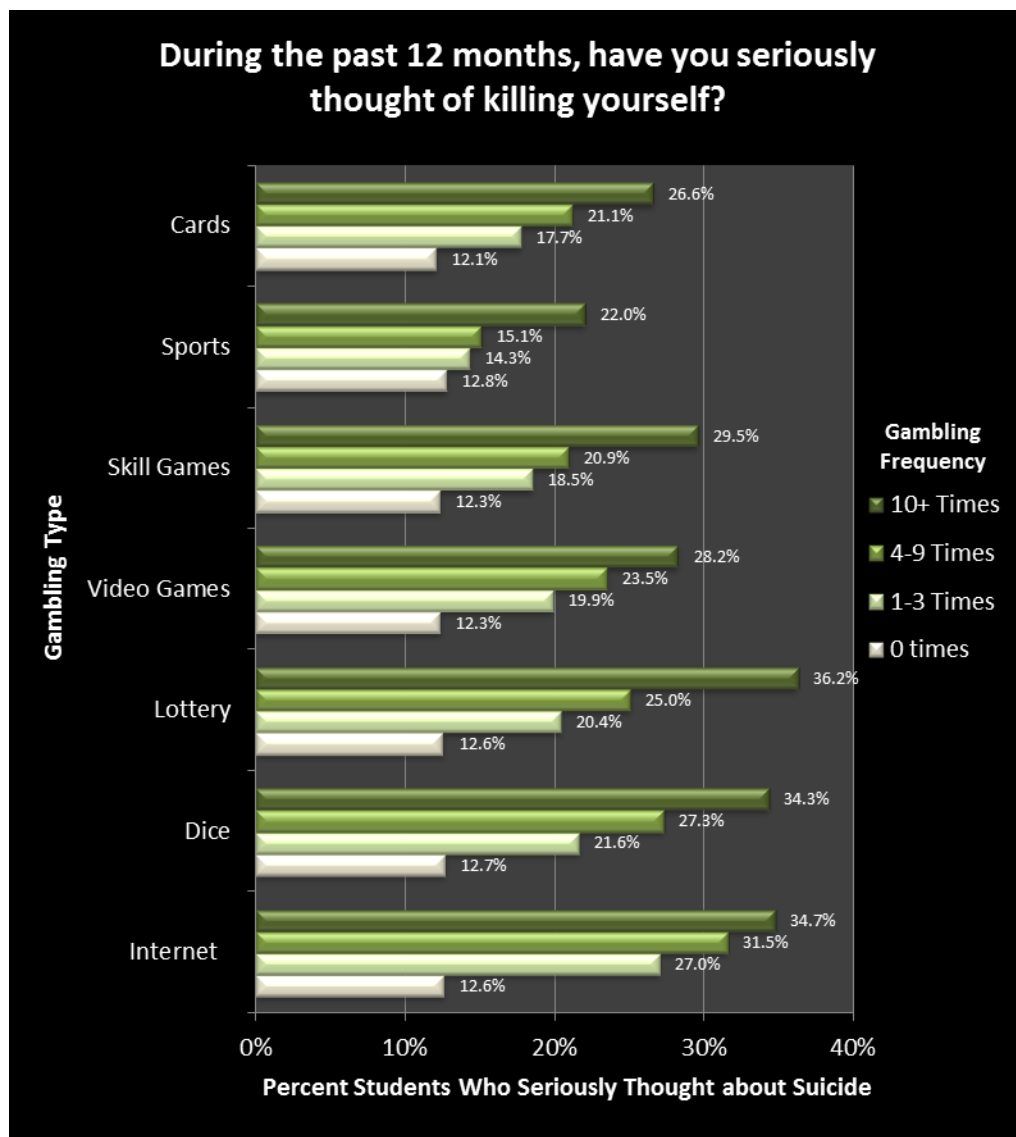
<sup>28</sup> Odds Ratio = 0.586, 95% Confidence Interval = 0.560, 0.613

<sup>29</sup> Logistic regression, Wald  $\chi^2 = 455.67$ ,  $df = 1$ ,  $p < 0.0001$

<sup>30</sup> Logistic regression, interaction Wald  $\chi^2 = 64.32$ ,  $df = 1$ ,  $p < 0.0001$

The frequency of gambling over the past 12 months was strongly related to the percentage of students who admitted seriously thinking of killing themselves. While this risk factor relationship was evident over all levels of gambling frequency (0 times to 9 times in the past year), the largest increase in suicidal ideation is obvious in the frequent gamblers (10 or more times in the past year; Figure 20).

**Figure 20: Suicidal Ideation and Gambling Frequency of Different Activities**



Great care should be exercised in assuming any kind of causal connection between gambling behaviors and suicidal ideation. Many factors might affect the probability of both in the adolescent. For example, students with excessive impulsivity may tend to gamble and gamble more often, as well as seriously consider killing themselves. Students with depression may demonstrate similar responses. Cognitive factors such as effective decision-making abilities and executive functions developing in adolescents, may increase how attractive these behaviors and thoughts appear to students.

## Other Risky Behaviors

Gambling may be related to risky behavior or impulse control in general. Odds ratios were used to measure the likelihood other risky behaviors would be associated with problem gambling outcomes of lifetime gambling, won/lost more than \$25 in one day, and argument with friends or family over gambling. The following questions from the 2014 IYS were used:

- A. In the past 12 months, how often have you:
  - 1. Carried a gun, knife, club, or other weapon to school or school event
  - 2. Used a weapon, force, or threats to get money or things from someone
  - 3. Used alcohol or other illegal drugs on school property or school event
  - 4. Been disciplined for fighting, theft, or damaging property at school or school event
  - 5. Damaged property just for fun
  - 6. Beaten up on or fought someone because they made you angry
  - 7. Verbally threatened to physically harm someone
  - 8. Stolen something
- B. In the past 30 days, how many times have you bullied someone else at school?
- C. How much do you agree or disagree that each of the following statements is true:
  - 1. It is against my values to have sex as a teenager
  - 2. Even if it is dangerous, I like to do exciting things

Of the other risky behaviors analyzed, many demonstrated small relationships with outcome measures of lifetime gambling, won/lost more than \$25 in one day, argument with friends or family over gambling. Correlations are shown in Table 4.

**Table 4: Odds Ratios for Gambling Outcome Measures and Other Risky Behaviors**

Other Risky Behavior	Odds Ratios of Other Risky Behaviors Predicting the likelihood of Outcome Behaviors		
	Lifetime gambling	Argued	Won/Lost >\$25
Carried a weapon at school	2.86	1.56	2.67
Used weapon at school	1.03	1.82	1.14
Used AOD at school	1.22	1.32	1.79
Disciplined	1.27	1.58	1.38
Damaged Property	1.42	1.34	1.30
Beat up Someone	1.54	1.80	1.84
Threatened someone	2.18	1.17	1.63
Stole	1.65	1.95	1.50
Bullied someone	1.64	2.18	1.55

Figure 21 shows the percent of students who have gambled compared to those who have never gambled and their level of agreement with the statement, “It is against my values to have sex as a teenager.” The extent of agreement is negatively associated with the percent of students who have gambled.

**Figure 21: Percent of Students Who Have Gambled and Belief about Sex as a Teenager**

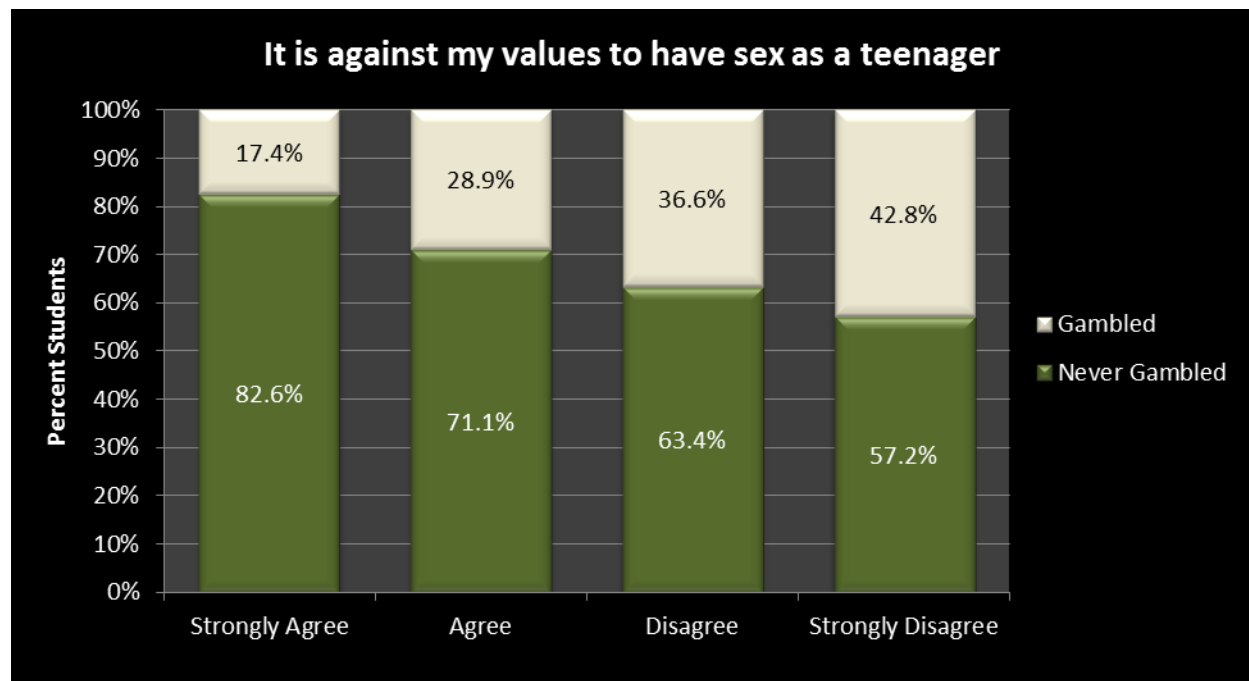
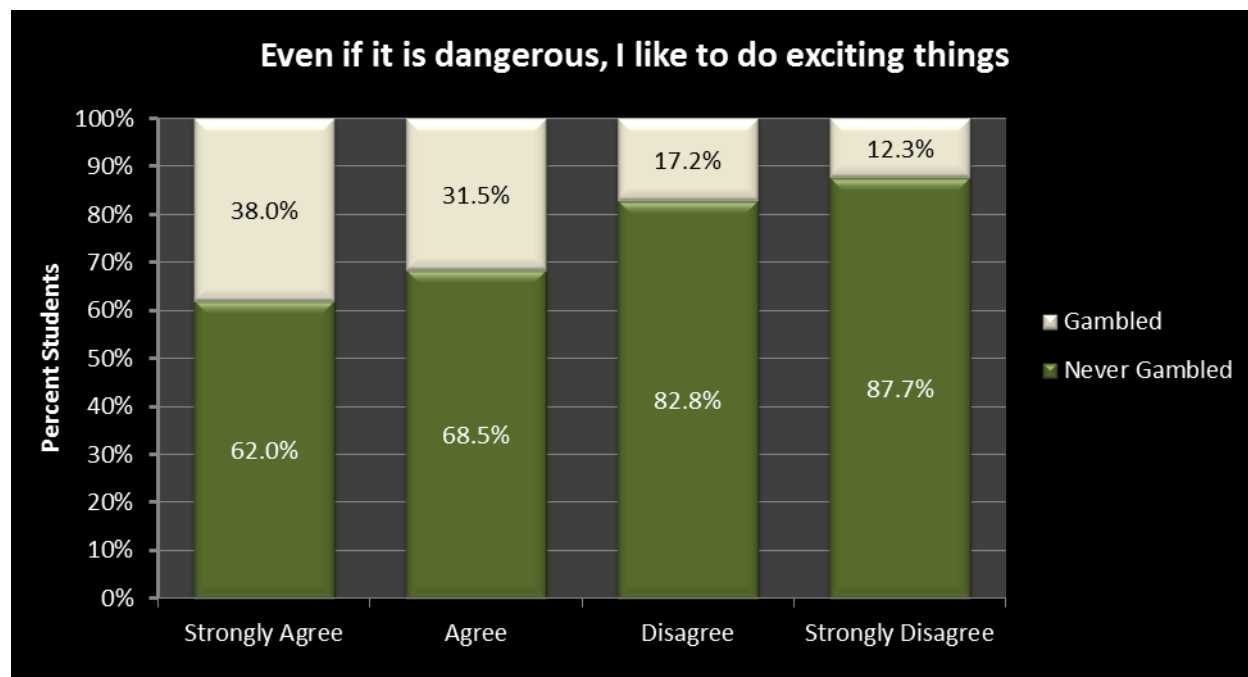


Figure 22 shows the percent of students who have gambled compared to those who have never gambled and their level of agreement with the statement, “Even if it is dangerous, I like to do exciting things.” The extent of agreement is negatively associated with the percent of students who have gambled.

**Figure 22: Percent of Students Who Have Gambled and Belief about Exciting Things**



### Summary

Lifetime substance use had a very strong association with lifetime gambling and was most highly associated with alcohol use. Those reporting depressive thoughts and thoughts of worthlessness were also more likely to gamble. Thoughts of suicide were strongly related to gambling behaviors. Moreover, the largest effects between suicidal ideation and gambling behavior were most clearly seen in 6<sup>th</sup> and 8<sup>th</sup> graders. As students get older, the likelihood that students having suicidal thoughts will also having gambled becomes less obvious. In addition, other risky behaviors were associated with gambling behavior. The risky behaviors analyzed may be related to impulse control and other conduct related issues.

## IYS 2012 AND 2014 YEAR COMPARISON

The comparison between the 2012 and 2014 IYS gambling data was approached in a three-stage analysis. First, each variable and its subcategories were tested for statistically significant differences over time ( $p < .001$ ). Second, a risk difference (RD) was calculated. An RD is a measure of effect size, and RDs greater than five represent more clinically meaningful differences. Finally, if variables were significant and had meaningful RDs (greater than five percentage points), they were broken down by grade and sex to better illustrate where the differences are occurring. Below, tables are provided with all comparison data accompanied by figures for meaningful differences between years. Some variables may be statistically significant, yet, they do not demonstrate clinically meaningful differences. This differentiation is due to the large sample size increasing the power of analyses detecting very small percentage differences as "statistically significant". Clinically meaningful differences are represented by red RDs and are a more meaningful portrayal of effect. Thus, both "statistically significant" results are presented as well as the larger more meaningful differences.

Table 5 shows gambling outcomes comparisons. The only meaningful difference in subcategories can be seen among those winning or losing \$25 or more in a single day within the past 12 months. There was a meaningful increase in those who have not gambled in the past 12 months in 2014 (RD = 5.41).

**Table 5: Outcomes 2012 and 2014 Year Comparison**

Year Comparison			
Outcomes	2012 (%)	2014 (%)	Risk Difference
<b>Ever Gambled</b>			No
No	73.33	73.97	0.64
Yes	26.67	26.03	0.64
<b>Money won or lost<sup>31</sup></b>			Yes
Did not gamble	73.66	79.07	<b>5.41</b>
< \$10	16.14	12.15	3.99
\$11-\$25	4.77	4.19	0.58
\$26-\$50	2.38	1.98	0.40
\$51-\$100	1.15	1.05	0.10
> \$100	1.90	1.56	0.34
<b>Argued</b>			No
No	97.13	97.22	0.09
Yes	2.87	2.78	0.09

<sup>31</sup>  $\chi^2 = 632.40$ ,  $df = 5$ ,  $p < 0.0001$



Figure 23 illustrates the roles sex and grade played in the increase of students who reported that they did not gamble in the past 12 months and of those who reported winning or losing \$25 or more in a single day. Among all students, there was a 5.4% increase from 2012 to 2014 in those who reported not gambling in the past 12 months. The largest change is among male students. Among males, 6<sup>th</sup> grade students increased the most between 2012 and 2014 (72.6% vs. 81.4%). This was followed by 8<sup>th</sup> grade males (58.8% vs. 66.2%), and 11<sup>th</sup> grade males (53.6% vs. 59.6%). Female students did not demonstrate a meaningful difference.

**Figure 23: Students Who Did Not Gamble in the past year by Grade, Sex and Year**

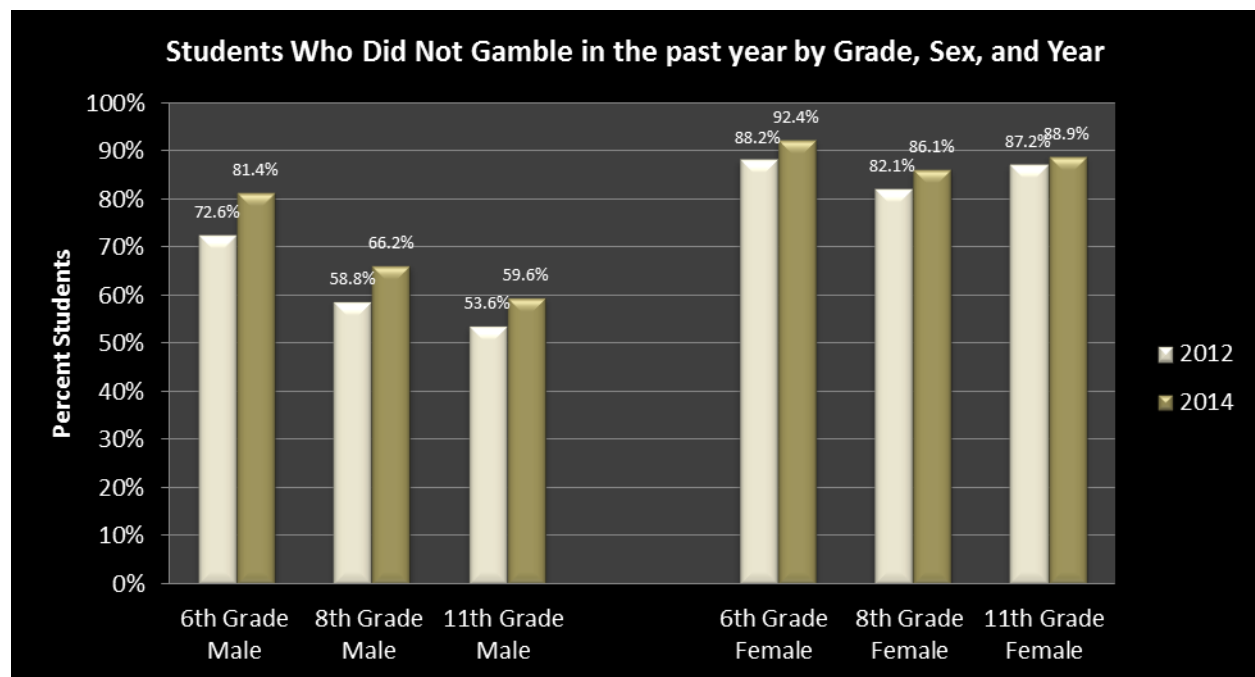


Table 6 represents differences in gambling types. The percentages between 2012 and 2014 in gambling types demonstrated no meaningful differences.

**Table 6: Gambling Type 2012 and 2014 Year Comparison**

Year Comparison				
Gambling Type	2012 (%)	2014 (%)	Significant	Risk Difference
<b>Sports</b>			Yes	
0 Times	86.88	87.57		0.69
1-3 Times	9.91	9.38		0.53
4-9 Times	1.52	1.49		0.03
> 9 Times	1.70	1.57		0.13
<b>Cards</b>			Yes	
0 Times	84.75	85.87		1.12
1-3 Times	11.20	10.53		0.67
4-9 Times	2.15	1.93		0.22
> 9 Times	1.90	1.67		0.23
<b>Internet</b>			No	
0 Times	96.88	96.91		0.03
1-3 Times	1.73	1.79		0.06
4-9 Times	0.42	0.47		0.05
> 9 Times	0.98	0.83		0.15
<b>Skill</b>			Yes	
0 Times	89.13	90.06		0.93
1-3 Times	7.98	7.43		0.55
4-9 Times	1.40	1.31		0.09
> 9 Times	1.49	1.21		0.28
<b>Video Games</b>			Yes	
0 Times	91.10	91.88		0.78
1-3 Times	6.00	5.56		0.44
4-9 Times	1.24	1.17		0.07
> 9 Times	1.66	1.38		0.28
<b>Dice</b>			Yes	
0 Times	95.70	96.22		0.52
1-3 Times	2.83	2.61		0.22
4-9 Times	0.56	0.47		0.09
> 9 Times	0.91	0.70		0.21
<b>Lottery</b>			Yes	
0 Times	94.70	95.20		0.50
1-3 Times	3.33	3.11		0.22
4-9 Times	0.81	0.78		0.03
> 9 Times	1.16	0.91		0.25

Table 7 represents demographic characteristics. Race/Ethnicity was the only variable with a difference. However, this difference is due to a change in data collection. In 2012, neither “Multiple Races” nor “Other Race” categories were collected. Race/Ethnicity” had a change in coding between the two years that makes the comparison invalid.

**Table 7: Demographics 2012 and 2014 Year Comparison**

Year Comparison				
Demographics	2012 (%)	2014 (%)	Significant	Risk Difference
<b>Grade</b>			Yes	
6th	25.81	23.37		2.44
8th	38.96	38.97		0.01
11th	35.24	37.66		2.42
<b>Sex</b>			No	
Male	73.42	72.39		1.03
Female	26.58	27.61		1.03
<b>Race/Ethnicity</b>			Yes	
White	82.03	77.14		--
African American	6.30	5.02		--
American Indian	1.71	1.04		--
Asian/PI	2.34	1.83		--
Latino	7.62	6.88		--
Multiple Races	-- <sup>1</sup>	6.68		--
Other Race	-- <sup>1</sup>	1.41		--
<b>Living Situation</b>			No	
1 Parent	21.22	21.18		0.04
2 Parents	71.78	72.22		0.44
Other Relatives	2.54	2.41		0.13
Foster Parents	0.47	0.36		0.11
Shelter Care	0.26	0.25		0.01
Group Home	0.19	0.12		0.07
Independently	0.40	0.42		0.02
Other	3.14	3.04		0.10
<b>Parent(s) in Military</b>			No	
Currently Deployed	0.78	0.74		0.04
Recently Returned	1.63	1.64		0.01
Military Not Deployed	1.79	1.96		0.17
Non-Military	95.80	95.66		0.14

1. Note: Multiple races and Other Race were not options in 2012.

Table 8 shows substance use comparisons. There was one meaningful difference between 2012 and 2014 among students demonstrating lifetime gambling. Of those who reported lifetime gambling, students were more likely to report lifetime alcohol use in 2014 than in 2012 (RD = 8.06).

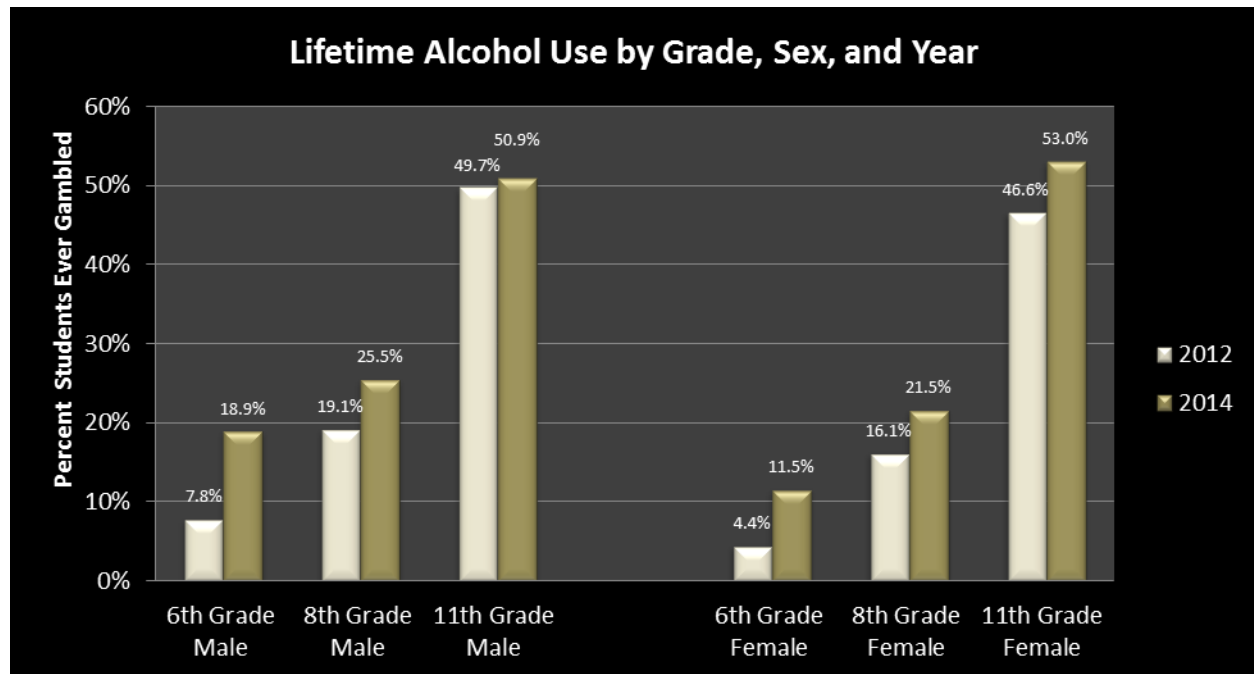
**Table 8: Substance Use 2012 and 2014 Year Comparison**

Gambling Correlates	Year Comparison		
	2012 (%)	2014 (%)	Risk Difference
<b>Alcohol Ever</b> <sup>32</sup>			Yes
No	61.05	52.99	<b>8.06</b>
Yes	38.95	47.01	<b>8.06</b>
<b>Marijuana Ever</b>			No
No	84.19	84.50	0.31
Yes	15.81	15.50	0.31
<b>Drugs Ever</b>			No
No	71.23	70.86	0.37
Yes	28.77	29.14	0.37
<b>Tobacco Ever</b>			Yes
No	78.95	80.64	1.69
Yes	21.05	19.36	1.69
<b>Binge Drinking</b>			Yes
No	85.45	89.00	3.55
Yes	14.55	11.00	3.55
<b>Suicidal Ideation</b>			No
No	82.18	82.42	0.24
Yes	17.82	17.58	0.24
<b>Worthlessness Feelings</b>			Yes
All the Time	5.90	6.55	0.65
Most of the Time	7.15	8.64	1.49
Some of the Time	12.84	14.45	1.61
A Little	21.17	21.70	0.53
None	46.69	41.83	4.86
Don't Know	6.25	6.82	0.57
<b>Hopelessness Feelings</b>			No
No	80.63	79.66	0.97
Yes	19.37	20.34	0.97

<sup>32</sup>  $\chi^2 = 254.21$ , df = 1, p < 0.0001

Figure 24 illustrates the roles sex and grade played in the increase of students who reported lifetime alcohol use. All female students demonstrated meaningful increases, while male student increases were only meaningful in grades 6 and 8. By far, 6<sup>th</sup> grade male students had the greatest increase in lifetime alcohol use from 2012 to 2014 (7.8% vs. 18.9%). This was followed by 6<sup>th</sup> grade female students (4.4% vs. 11.5%). Both 8<sup>th</sup> grade males (19.1% vs. 25.5%) and females (16.1% vs. 21.5%) increased between years. While 11<sup>th</sup> grade males remained relatively unchanged (49.7% vs. 50.9%), 11<sup>th</sup> grade females demonstrated a meaningful increase (46.6% vs. 53.0%).

**Figure 24: Lifetime Alcohol Use by Grade, Sex and Year**



### Summary

For the most part, the attitudes and behaviors related to gambling have not changed meaningfully between 2012 and 2014. There were few variables related to gambling that did demonstrate meaningful differences. From actual gambling behaviors, the only meaningful difference was seen in past-year gambling. There was a large reduction in 2014 in gambling, evidenced by an increase in those reporting they had not gambled in the past year.

## IOWA GAMBLING EXPOSURE SCALE (IGES)

There is a continuum of a youth's past-year gambling exposure. One youth might gamble while playing cards with family once or twice during the past year while another youth often bets online or plays pool, with a variety of other venues. The IYS asks seven questions about how often a youth gambled in different venues over the past year: Sports, Cards, Internet, Personal Skill Games, Video (or Arcade) Games, Dice Games, and Lottery tickets. Each question is scaled into four ordinal categories, 0 times, 1 – 3 times, 4 – 9 times, and 10 or more times.

**Figure 25: Facsimile of Iowa Gambling Venue Questions**

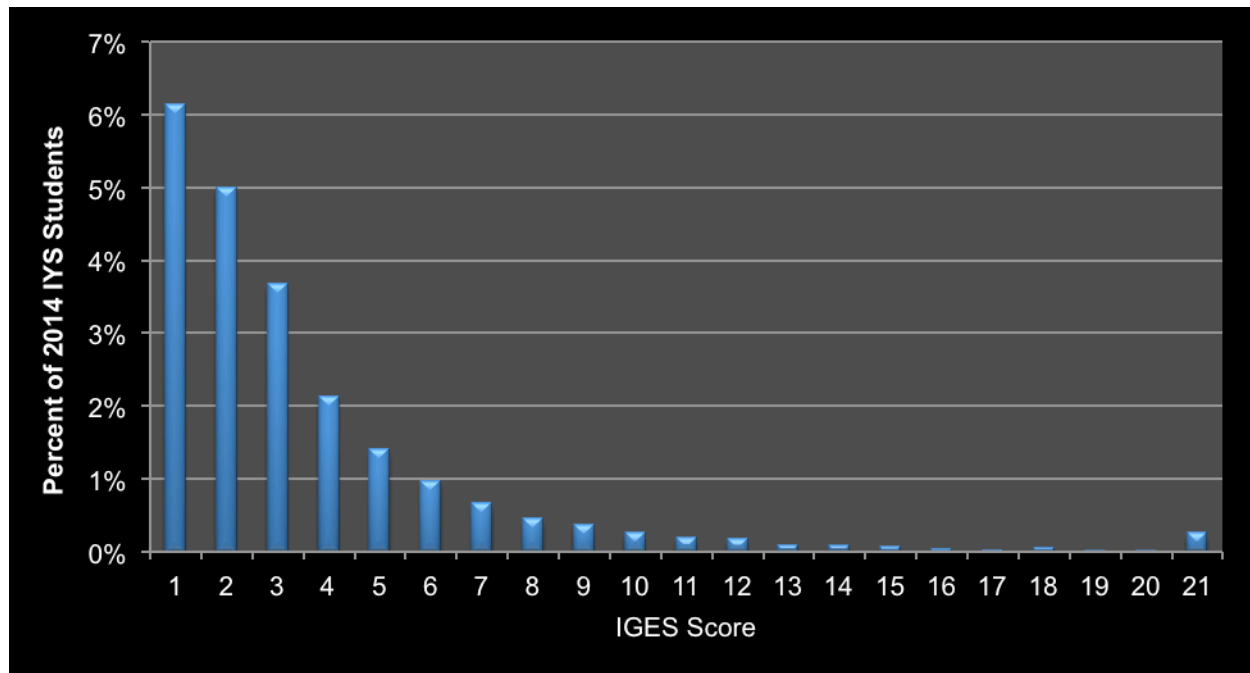
During the past 12 months, how many times have you bet or gambled for money or possessions in any of the following ways:

	0 times	1-3 times	4-9 times	10 or more times
53. Sports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
54. Card games with friends or family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
55. Internet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
56. Personal skill games such as pool, bowling, or dominoes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
57. Video or arcade games?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
58. Dice games?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
59. Lottery scratch off tickets or numbers?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following analyses assess the reliability and various types of validity for a simple measure of gambling exposure. Although analyses assessed several different scoring schemes, a simple sum of the seven items provided the best measure. Of these, the sum of the seven items, IGES, is the only scoring that will be discussed along with an optimal cut-point for predicting problems.

Each question was scored 0 through 3 and summed. The lowest possible score was 0 and the highest score was 21. Using the entire 2014 IYS sample, the mean score was 0.8 and the standard deviation was 2.23. Over three-quarters (77.8%) of the youth received a 0, suggesting no gambling in any form over the past year. For those who gambled at least once, the mean IGES score was 3.6 (median = 2) with a standard deviation of 3.56. Figure 26 shows the percentage of students receiving each IGES score omitting the lowest score.

**Figure 26: Distribution of IGES Score Greater Than Zero**



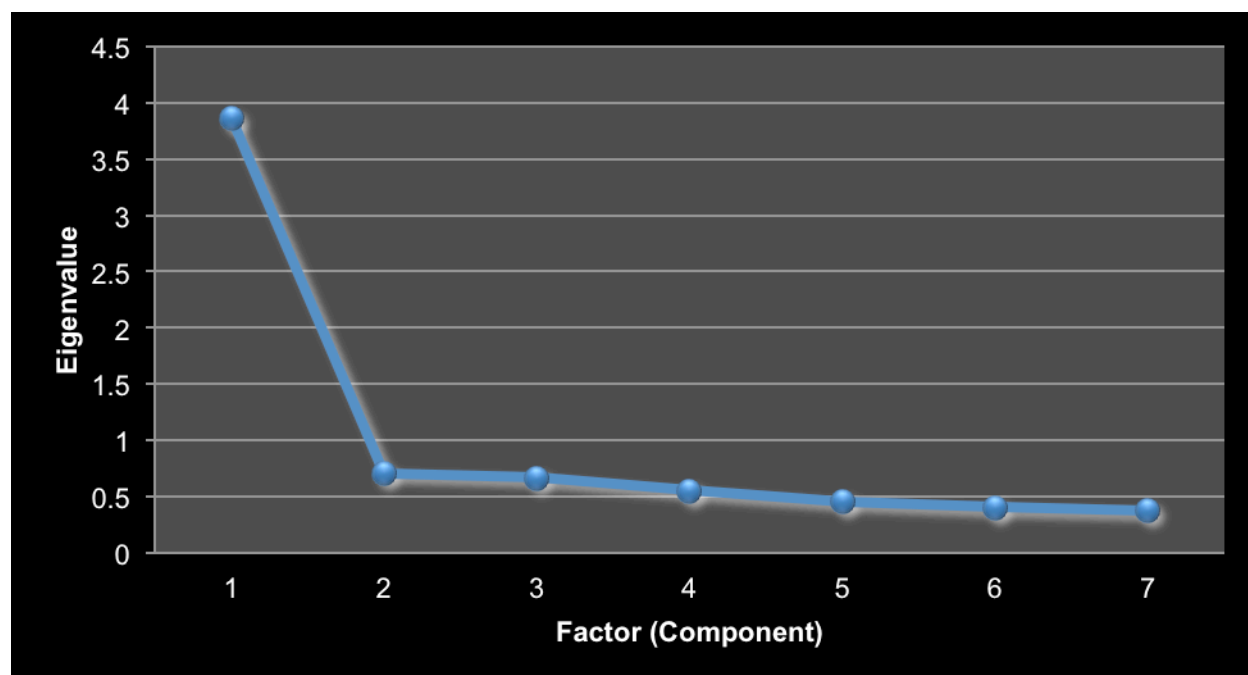
### **Reliability**

Internal consistency reliability using the seven questions for the IGES was very good; Cronbach's alpha was 0.86 for the simple sum. Inspection of the individual questions indicated that all items contributed to the high internal consistency. The alpha always went down when any item was removed from the set. Questions all correlated with the sum and all (corrected) correlations ranged from a low of 0.59 to a high of 0.79. Thus, all of the items appeared to contribute to the IGES, correlate with the sum of the other items, and the internal consistency was well within acceptable values.

## Factor Validity

A principal component (factor) analysis suggested that these seven questions represented a single dimension. The first component (factor) accounted for 55.1% (eigenvalue = 3.15) of the total variance and no other components had an eigenvalue greater than 1.0. The eigenvalue directly relates to the percentage of variance each component summarizes. The second component's eigenvalue was 0.71. Figure 27 shows a "Scree Plot" of the eigenvalues against the sequential components (factors). Components 2 through 7 gradually taper off and appear to represent noise, leaving only the first component.

**Figure 27: Scree Plot Following a Principal Components Analysis Using Seven IYS Questions**



We also used a multiple group factor analysis<sup>33</sup> with a predefined single factor, the sum of the question responses. Using corrected (item-total) correlations or multiple R-squares to estimate communality, the single predefined factor accounted for all of the common variance. This, again, suggests a single factor underlying the seven questions. The factor validity for a simple sum seems strong.

<sup>33</sup> Gorsuch, R. L. (1974). *Factor Analysis*. Philadelphia: W. B. Saunders Company.

Arndt, S. (1983). *Multiple group factor analysis*. *American Statistician*, 37, 326.

Soto, C. M., & Arndt, S. (2013). *Análisis factorial confirmatorio de la Escala de Estilos de Crianza de Steinberg: validez preliminar de constructo*. *Revista de Psicología*, 22(2), 189-214.

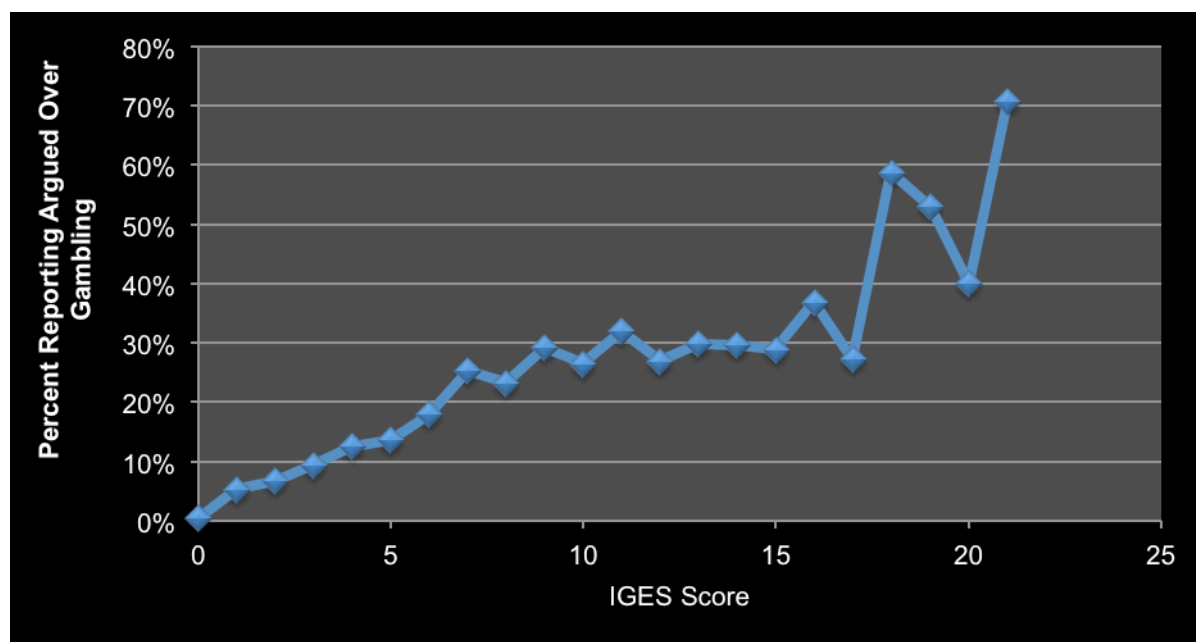


### Criterion Validity and Determining a Cut-Off for Problem Gambling

The 2014 IYS contains a question, "In the past 12 months, have you argued with family, friends, or others because of your gambling (betting)?" In the total sample of IYS responses, 2.78% of students responded "Yes" to this question. This question was taken as a direct indication of potential problems with gambling.

The IGES sum score showed a strong and significant predictive relationship with the argument question (Wald  $\chi^2 = 3616.54$ ,  $df = 1$ ,  $p < 0.0001$ ) using logistic regression. Figure 28 shows the IGES scores and the percentage of students who argued about their gambling.

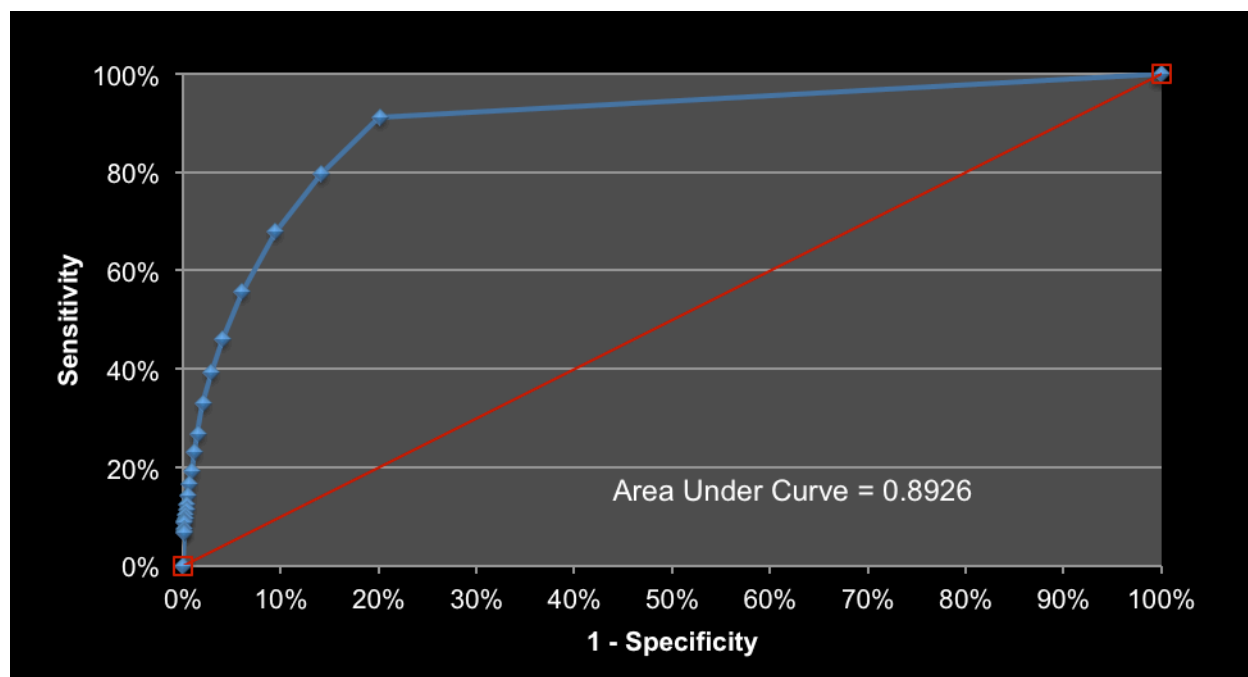
**Figure 28: IGES Scores and the Percentage of Youth Who Argued About Gambling**



Both the IGES sum score and the argument question were related to the students sex (Mann-Whitney  $z = 66.4$ ,  $p < 0.0001$ ) and grade (Kruskal-Wallis  $\chi^2 = 1125.96$ ,  $df = 2$ ,  $p < 0.0001$ ), so the analysis was repeated controlling for sex and grade. The IGES sum score remained highly predictive of reporting arguments (Wald  $\chi^2 = 3280.08$ ,  $df = 1$ ,  $p < 0.0001$ ).

Figure 29 shows the results of a Receiver Operator Characteristics (ROC) analysis using argument as the criterion and IGES scores as the predictor.

**Figure 29: ROC Analysis Predicting Student Arguments from IGES Score**



Using a traditional criterion<sup>34</sup>, the optimal cut-point for the IGES scores is 0.5, i.e., a zero score indicates a negative screen while a 1 or more indicates a positive screen. Using this cut-point for problem gambling the sensitivity is 91.1% and the specificity is 79.9%. Table 9 shows these results.

**Table 9: Results Using IGES => One as an Indicator of Problem Gambling**

Argued About Gambling?	IGES => 1	
	No Number (%)	Yes Number (%)
No	59,039 (79.9%)	14,845 (20.1%)
Yes	187 (8.9%)	1,924 (91.1%)

This cut-off score may be overly stringent for a few reasons. It identifies youth who gambled while playing cards with their families only one time in the past year as potentially having a gambling problem. Furthermore, while 91.1% of students (1,924) who had arguments about gambling are correctly identified, missing only 8.9% (187) appears successful; another 14,845 students are incorrectly identified. Thus, standard methods for determining the cut-off points may need to be revisited.

<sup>34</sup> Youden, W.J. (1950). Index for rating diagnostic tests. *Cancer* 3: 32–35.

### ***Further Analyses of Individual Questions***

Based on the analyses of internal consistency for these questions, all of the items appeared to benefit the IGES scoring. Removing any item resulted in a slightly lower internal consistency. However, all of the items may not equally predict problems with gambling. The following exploratory analysis used students' responses to each question to predict arguments about gambling. A multivariate logistic regression was used to predict arguments controlling for sex and grade. Results are shown in Table 10.

**Table 10: Odds of Argument for IGES Gambling Types**

IYS Question:	Odds Ratio	95% Confidence Interval
53. Sports	1.9	1.8 - 2.0
54. Card games with friends or family	1.6	1.5 - 1.8
55. Internet?	1.2	1.1 - 1.3
56. Personal skill games such as pool, bowling, or dominoes?	1.2	1.1 - 1.3
57. Video or arcade games?	1.4	1.3 - 1.5
58. Dice games?	1.0	0.9 - 1.1
59. Lottery scratch off tickets or numbers?	1.2	1.2 – 1.3

Interestingly, playing (and betting on) cards with family and friends shows the second strongest odds-ratio when predicting arguments. Playing dice games did not significantly contribute to predicting arguments (Wald  $\chi^2 = 0.53$ ,  $df = 1$ ,  $p > 0.46$ ).

Using more criterion markers for gambling problems and their correlates may shed more light on the value of each item and, perhaps, further support choosing an optimal cut-point score. Preliminary analyses suggest that the IGES correlates with:

- Past 30-day alcohol use
- Past 30-day marijuana use
- Ever having driven a car after using alcohol/drugs
- Past-year alcohol or other illegal drugs on school property/event
- Past-year disciplined for fighting, theft, or damaging property at school/event
- Past-year Carried a gun, knife, club, or other weapon to school/event
- Past-year beaten up on or fought someone because they made you angry
- Number of hours outside of school with no adult supervision
- Disagreement with:
  - "It is against my values to have sex as a teenager"
  - "Violence is the worst way to solve problems"

## ***Summary***

The IGES seems to have high internal consistency reliability and shows extremely promising concurrent predictive validity using a variety of criterion questions (e.g., arguments over gambling). Item analyses suggest that all items support the internal consistency. However, all items may not support the predictive validity, at least, with the one criterion investigated (arguments over gambling). Analyses into the optimal cut-off point suggest a value of 1 or greater as an indicator of potential problems, although without further analyses using different criteria this suggestion is likely premature. Further analyses with more criteria will also shed more light on the usefulness of all of the questions.