

Gambling among Minnesota Youth Out of the Mainstream:

Alternative Schools and Juvenile Corrections

Randy Stinchfield, Ph.D.

Department of Psychiatry

University of Minnesota Medical School

Running head: GAMBLING AMONG YOUTH OUT OF THE MAINSTREAM

## Abstract

The specific aims of this study were fourfold. First, compare the three groups, alternative schools, juvenile corrections, and public schools on 2010 rates of gambling frequency on six different forms of gambling as well as any gambling, frequent gambling, and underage gambling on legalized forms of gambling. Second, compare the three groups on rates of any gambling, frequent gambling, and underage gambling from 1992 to 2010. Third, compare the three groups on endorsement of two problem gambling items from 1992 to 2004. Fourth, identify the correlates of gambling among youth in alternative schools and juvenile corrections. The data was drawn from the Minnesota Student Survey (MSS) and the 2010 MSS alternative school sample includes 2,213 male and 1,892 female students; juvenile corrections sample includes 429 male and 94 female youth; and public school sample includes 38,777 male and 40,593 female students. Six additional administrations of the MSS to alternative schools, juvenile corrections and public school samples were analyzed to examine gambling trends over time including 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. More youth out of the mainstream gamble and experience gambling problems than their mainstream peers and if they were included in youth gambling surveys, the prevalence rates for gambling and gambling problems would be higher. All three groups showed significant declines in gambling participation from 1992 to 2010, however, frequent gambling showed only modest declines over this time period. A number of correlates combined to explain the variance in gambling for both the alternative school students and juvenile corrections youth gambling and these correlates included other risky behaviors such as tobacco use, alcohol use, drug use, running away from

home, antisocial behaviors, and sexual behavior. There is a segment of youth out of the mainstream that gambles frequently and reports gambling problems and these youth may need prevention and intervention services.

Keywords: Youth gambling; Adolescent gambling; Teenage gambling; alternative schools; juvenile corrections; youth out of the mainstream.

## Gambling among Minnesota Youth Out of the Mainstream:

## Alternative Schools and Juvenile Corrections

Gambling among youth has been well documented around the world (Volberg, et al, 2011) and in Minnesota (Stinchfield, 2011). Most of these youth gambling studies have administered surveys in schools or via the telephone. All of these studies could be described as measuring gambling among mainstream youth, that is, youth attending school and living with their parents. These studies do not include youth “out of the mainstream”, that is, youth who have been expelled from mainstream public schools and are in alternative schools; or youth who are not living with their parents, such as youth in juvenile corrections. Because these youth are not included in most youth surveys, it is unknown what effect their absence has on reports of prevalence rates of youth gambling and problem gambling. The question arises, if these out of the mainstream youth were included in surveys would rates of gambling participation and gambling problems be higher, lower, or unchanged?

Youth out of the mainstream are likely to have academic, psychological, emotional, social, and behavioral problems that caused their expulsion from public school or incarceration in juvenile corrections. Studies on mainstream youth have reported that the presence of behavioral problems are associated with greater involvement in gambling and problem gambling (Gupta & Derevensky, 1998; Slavin et al, 2013; Stinchfield et al. 1997; Stinchfield, 2000; Winters, Stinchfield, & Kim, 1995; Vitaro et al. 2001; Welte et al. 2009). So it follows, that if youth out of the mainstream have more behavioral problems than mainstream youth that their rates of gambling participation and gambling problems are likely higher and if they were included in youth gambling surveys that the prevalence of both gambling and problem gambling would be higher. However, this has not been empirically demonstrated and therefore the aim of

this study is to measure gambling among a large sample of youth out of the mainstream and determine rates of gambling participation, frequent gambling, underage gambling, and problem gambling compared to mainstream youth.

Gambling among mainstream Minnesota youth has received a good deal of research attention. Beginning in 1990, at the onset of the Minnesota State Lottery and development of tribal casinos, Winters, Stinchfield and Fulkerson (1993), conducted a telephone survey of 702 Minnesota youth and found that 82% had participated in at least one form of gambling in the past year and that the most common forms of gambling were card games, betting on games of personal skill (such as golf or bowling), and betting on sports. In terms of problem gambling, 3% endorsed four or more symptoms of problem gambling on the SOGS-RA which is the threshold for problem gambling (Winters, Stinchfield, & Kim, 1995). This sample was contacted one and a half years later to test for changes in gambling behavior, following the start of the State Lottery and tribal casinos, and it was found that both gambling participation (82% in 1990 and 80% in 1992) and prevalence of problem gambling (3.5% in 1990 and 2.9% in 1992) were stable.

In 1992, gambling questions were added to the Minnesota Student Survey (MSS). The first published research that reported on these data in 1997 found that gambling rates of 9<sup>th</sup> and 12<sup>th</sup> grade public school students between 1992 and 1995 showed decreases in gambling participation (73% in 1992 and 66% in 1995); stable rates of frequent gambling participation (14% in 1992 and 13% in 1995); decreases in underage lottery play from 1992 to 1995; and slight declines in gambling problems (Stinchfield, et al. 1997). Next, Stinchfield (2000) examined 1998 MSS gambling rates and correlates of gambling and found that variables associated with gambling included antisocial behavior, gender (being male), alcohol and tobacco

use, age, feeling bad about the amount of money they bet, a desire to stop gambling, and sexual activity. It was concluded that gambling appeared to be related to other risky behaviors, and gambling was thought to be part of adolescent experimentation with a number of adult behaviors. Next, trends in gambling from 1992 to 1998 were examined and this study showed two opposite trends: (a) on the one hand, fewer students were gambling in 1998 compared to 1992 and 1995; and (b) on the other hand, there was an increase in the rate of 12<sup>th</sup> grade students gambling frequently (Stinchfield, 2001). The latest published MSS gambling research examined gambling trends for the period from 1992 to 2007 and this study found that gambling participation has shown a gradual decline from 1992 to 2007, including underage gambling (Stinchfield, 2011). Rates of frequent gambling (weekly/daily) have remained relatively stable from 1992 to 2007. There were two notable fluctuations, a peak in lottery play in 1998 and a peak in card playing in 2004 with subsequent declines in both. All of these published studies of youth gambling from the MSS were based on public school students, or what may be considered mainstream youth, that is, they are in mainstream public school and most live with their parents.

There is no published research on gambling among youth in alternative schools or juvenile corrections. A number of studies have found that youth gambling is related to juvenile delinquent behaviors, antisocial behaviors, and conduct disorders (Gupta & Derevensky, 1998; Slavin et al, 2013; Stinchfield, 2011; Vitaro et al. 2001; Welte et al. 2009), but these studies were conducted in schools or the general population and not on gambling among youth in juvenile corrections facilities. Given that most estimates of youth gambling are obtained from mainstream youth either from school-based surveys or telephone surveys, it is likely that these prevalence rates would be different if youth out the mainstream were included. The questions arise: What is the extent of gambling among youth out of the mainstream, that is, youth who

have been expelled from school and who are attending alternative schools or are in juvenile correctional facilities? Are these youth gambling more or less than mainstream youth?

This study has four specific aims. First, compare the three groups, youth in alternative schools, juvenile corrections, and public schools on 2010 rates of gambling frequency on six different forms of gambling as well as any gambling, frequent gambling, and underage gambling on legalized forms of gambling. Second, compare the three groups, on gambling trends from 1992 to 2010, specifically comparing rates of any gambling, frequent gambling, and underage gambling. Third, compare the three groups on two problem gambling items, last administered in 2004, and from 1992 to 2004. Fourth, identify the correlates of gambling among youth in alternative schools and juvenile corrections.

### Method

Participants. This study used data from the Minnesota Student Survey (MSS) which is administered to students in public schools (including charter schools and tribal schools); students in alternative schools; and youth in juvenile correctional facilities. This study compared three groups: (a) alternative schools (AS); (b) juvenile corrections (JC); and (c) public schools (PS). Youth in Alternative School and Juvenile Corrections facilities are considered out of the mainstream while the Public School students are considered mainstream youth for this study. The Public School group was included as a comparison group representing the majority or mainstream of Minnesota public school students. In 2010, the MSS was administered to 4,105 students at 103 Alternative School sites and to 522 youth at 22 Juvenile Corrections facilities. Demographics of the three groups are presented in Table 1. The MSS was administered to 9<sup>th</sup> and 12<sup>th</sup> grade students in public schools. There were significant differences in demographics between the three groups. The Juvenile Corrections group had a much higher proportion of boys

(82%) than either the Alternative School (53.9%) or Public School (48.9%) groups. Due to the methodology of administering the MSS to only 9<sup>th</sup> and 12<sup>th</sup> grade students in the Public School group, there is a greater proportion of 9<sup>th</sup> graders in the Public School (56.3%) group than either the Alternative School (8.6%) and Juvenile Corrections (19.5%) groups and this is also seen in the age variable. In terms of race, the Alternative School and Juvenile Corrections groups have higher proportions of minority race students than the Public School group. The Alternative School and Juvenile Corrections groups have higher rates of students with Individualized Education Programs (IEP) as well as those who receive free/reduced price lunch. There is a lower proportion of students living with both biological parents in the Alternative School (25.6%) and Juvenile Corrections (11.3%) groups than the Public School (62.1%) group. Besides the 2010 data, six additional Alternative School student samples were analyzed to examine changes over time, including 1991/1992 (n = 2,344), 1995/1996 (n = 3,573), 1998 (n = 3,616), 2001 (n = 3,152), 2004 (n = 3,083), and 2007 (n = 2,607). Six additional Juvenile Corrections samples were analyzed to examine changes over time, including 1991/1992 (n = 447), 1995 (n = 852), 1998 (n = 994), 2001 (n = 718), 2004 (n = 727), and 2007 (n = 554). Six additional Public School samples were analyzed to examine changes over time, including 1992 (n = 75,859), 1995 (n = 73,939), 1998 (n = 78,582), 2001 (n = 80,912), 2004 (n = 83,774), and 2007 (n = 83,318).



Table 1

*Demographic Characteristics of 2010 Alternative Schools (AS), Juvenile Corrections (JC), and Public School (PS) Groups*

	AS N = 4,105 N (%)	JC N = 522 N (%)	PS N = 79,370 N (%)	AS vs. JC $X^2$ (p)	AS vs. PS $X^2$ (p)	JC vs. PS $X^2$ (p)
<b>Gender</b>						
Boys	2, 213 (53.9)	428 (82.0)	38,777 (48.9)	<b>149</b>	<b>40</b>	<b>228</b>
Girls	1,892 (46.1)	94 (18.0)	40,593 (51.1)	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )
<b>Grade</b>						
7 <sup>th</sup> Grade	55 (1.3)	13 (2.5)	0	<b>154</b>	<b>39,883</b>	<b>47,042</b>
8 <sup>th</sup> Grade	118 (2.9)	36 (6.9)	0	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )
9 <sup>th</sup> Grade	354 (8.6)	102 (19.5)	44,707 (56.3)			
10 <sup>th</sup> Grade	603 (14.7)	110 (21.1)	0			
11 <sup>th</sup> Grade	1,123 (27.4)	133 (25.5)	0			
12 <sup>th</sup> Grade	1,751 (42.7)	111 (21.3)	34,663 (43.7)			
Missing/NA	101 (2.4)	17 (3.3)	0			
<b>Age</b>						
13	79 (1.9)	17 (3.3)	47 (0.1)	<b>133</b>	<b>9,544</b>	<b>2,424</b>
14	177 (4.3)	59 (11.3)	15,047 (19.0)	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )
15	381 (9.3)	82 (15.7)	28,426 (35.8)			
16	812 (19.8)	126 (24.1)	1,217 (1.5)			
17	1,191 (29.0)	158 (30.3)	12,353 (15.6)			
18	1,104 (26.9)	70 (13.4)	21,431 (27.0)			
19-20	361 (8.8)	10 (1.9)	849 (1.1)			
<b>Race</b>						
American Indian	152 (3.7)	67 (12.8)	874 (1.1)	<b>135</b>	<b>1,898</b>	<b>1,027</b>
African American	600 (14.6)	92 (17.6)	3,688 (4.6)	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )
Hispanic/ Latin American	435 (10.6)	32 (6.1)	2,998 (3.8)			
Asian American	170 (4.1)	14 (2.7)	4,204 (5.3)			
White	2,140 (52.1)	207 (39.7)	60,693 (76.5)			
Mixed Race	467 (11.4)	99 (19.0)	5,009 (6.3)			
Unknown/Missing	141 (3.4)	11 (2.1)	1,904 (2.4)			
Individualized Education Program (IEP)	963 (23.5)	320 (61.3)	12,076 (15.2)	<b>320</b>	<b>194</b>	<b>806</b>
				( <b>&lt;.001</b> )	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )
Free/Reduced price lunch at school	2,153 (52.4)	362 (69.3)	19,305 (24.3)	<b>54</b>	<b>1,639</b>	<b>572</b>
				( <b>&lt;.001</b> )	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )
Live with both biological parents	1,052 (25.6)	59 (11.3)	49,302 (62.1)	<b>52</b>	<b>2,171</b>	<b>567</b>
				( <b>&lt;.001</b> )	( <b>&lt;.001</b> )	( <b>&lt;.001</b> )

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. There were two gambling problem items administered in 2004, 2001, 1998, 1995 and 1992: (a) "During the last 12 months, have you ever felt bad about the amount you bet, or about what happens when you bet money?"; and (b) "During the last 12 months, have you ever felt that you would like to stop betting money but didn't think you could?". Response options are: a) Yes; b) No; and c) I don't bet for money.

Procedure. The MSS is administered 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 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 after the 1992 administration. 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 highly inconsistent or improbable responses (3%) which suggest invalid responding. To be included in this study, students had to answer gender, grade, and age; and one or more of the six gambling items. A comprehensive description of the survey methodology is provided elsewhere (Minnesota Student Survey Interagency Team, 2010c).

The MSS was administered in classroom settings in the presence of school personnel. 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. Analyses and comparisons will be conducted separately for boys and girls for two reasons: (a) boys and girls gamble at different rates; and (b) the Juvenile Corrections sample is predominantly boys (82%) and therefore comparisons of Juvenile Corrections to Alternative School and Public School would be skewed by the larger proportion of boys in the Juvenile Corrections sample. Frequencies including count and percentages were computed for

each analysis and chi-squares between pairs were computed for comparisons of the three groups. For the examination of gambling trends over time, 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 seven assessments was computed for the entire sample and broken down by gender and grade groups. 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. To identify correlates of gambling, a single gambling variable was computed by summing the six gambling frequency items. The large pool of MSS variables were correlated with this gambling variable and any bivariate correlation of  $r = .25$  or greater was included in a stepwise multiple regression. Because gender has a large effect on gambling frequency, separate multiple regressions were computed for males and females.

## Results

The results section is divided into the four specific aims. First, compare the three groups, alternative schools, juvenile corrections and public schools on 2010 rates of gambling frequency on six different forms of gambling as well as any gambling, frequent gambling, and underage gambling on legalized forms of gambling. Second, compare the three groups on gambling trends from 1992 to 2010, specifically comparing rates of any gambling, frequent gambling, and

underage gambling. Third, compare the three groups on the two problem gambling items, last administered in 2004, and from 1992 to 2004. Fourth, identify the correlates of gambling among alternative school students and juvenile corrections youth.

*Comparison of three groups on 2010 rates of gambling*

Rates of gambling frequency by boys and girls in Alternative Schools, Juvenile Corrections, and Public Schools for each game are shown in Tables 2 and 3. In general, Alternative School and Juvenile Corrections boys and girls gambled more frequently than Public School boys and girls, however, there were a few exceptions, namely more Public School boys played the lottery and gambled in a casino than Juvenile Corrections youth. Alternative School and Juvenile Corrections boys and girls had fairly similar rates of gambling and frequent gambling, with a few exceptions, namely more Alternative School boys played cards, bought lottery tickets and gambled in a casino than Juvenile Corrections boys. In terms of games, the most common games played by boys in all three groups in order were cards for money, betting money on games of personal skill, sports betting, lottery, gambling in a casino, and online. For girls, the order was cards, lottery, games of personal skill, casino, sports betting, and online.

A comparison of all three groups on any gambling for each game broken down by gender is shown in Table 4. Each pair of groups was compared with a chi-square statistic. The two groups that were consistently different were the Alternative School versus Public School comparisons for both boys and girls. More Alternative School students gambled than Public School students on every comparison and most were statistically significant differences. For most comparisons between Alternative School students and Juvenile Corrections youth, more Alternative School boys gambled than Juvenile Corrections boys and most comparisons were statistically significant. None of the comparisons between Alternative School and Juvenile Corrections

girls were statistically significant. The comparisons between Juvenile Corrections and Public School students showed a mix of differences except that all comparisons for girls showed that more Juvenile Corrections girls gambled than Public School girls. In summary, the only clear pattern was that more Alternative School students gambled than Public School students. The other two comparisons, Alternative School vs. Juvenile Corrections and Juvenile Corrections vs. Public School had a mix of differences in either direction and therefore no clear pattern of one group consistently being more involved in gambling over another.

A comparison of all three groups on frequent gambling for each game broken down by gender is shown in Table 5. The two groups that were consistently different were the Alternative School versus Public School comparisons for both boys and girls. More Alternative School students gambled frequently than Public School students and every comparison was statistically significant. There were no differences in frequent gambling between Alternative School and Juvenile Corrections youth. More Juvenile Corrections youth gambled frequently than Public School students and most comparison was statistically significant. In summary, more Alternative School students and Juvenile Corrections youth gambled frequently than Public School students. Alternative School students and Juvenile Corrections youth had similar rates of frequent gambling.

Table 2

*Comparison of Boys in Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) on Gambling Frequency for each Game in 2010*

Gambling Frequency	Groups		
	AS %	JC %	PS %
Played Cards for Money			
Not at all	54.0	61.9	60.2
Less than Monthly	21.0	13.6	22.1
Monthly	12.5	12.4	10.3
Weekly	7.6	8.4	4.6
Daily	4.3	3.5	2.6
Bet money on games of personal skill like pool, golf or bowling			
Not at all	55.6	58.2	63.5
Less than Monthly	18.8	17.5	19.2
Monthly	12.4	12.1	9.6
Weekly	7.1	5.8	4.7
Daily	5.0	5.8	2.5
Bet money on sports teams			
Not at all	67.5	66.8	69.8
Less than Monthly	13.5	11.9	16.5
Monthly	8.9	9.3	7.4
Weekly	5.1	6.5	3.4
Daily	3.5	4.4	2.1

Bought lottery tickets or scratch offs			
Not at all	66.3	80.8	75.9
Less than Monthly	12.7	7.0	11.4
Monthly	8.6	3.3	5.9
Weekly	6.3	4.7	3.7
Daily	4.0	2.6	2.0
Gambled in a casino			
Not at all	75.8	86.7	82.1
Less than Monthly	9.9	4.2	7.9
Monthly	6.1	2.1	5.0
Weekly	3.6	4.4	2.2
Daily	3.1	1.6	1.8
Gambled for money online			
Not at all	88.3	90.0	92.8
Less than Monthly	3.1	3.7	2.1
Monthly	2.3	1.6	1.3
Weekly	1.7	2.1	1.0
Daily	3.2	1.6	1.8
Highest level of gambling across all games			
Not at all	34.5	45.6	41.2
Less than Monthly	23.3	17.5	28.2
Monthly	18.4	13.8	16.0
Weekly	14.1	12.1	9.6
Daily	9.7	11.0	5.0

Note. Highest level of gambling is the highest frequency of play, across all six games, for each student. Column percentages may not total 100% due to missing data and rounding to the tenth decimal place.



Table 3

*Comparison of Girls in Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) on Gambling Frequency for each Game in 2010*

Gambling Frequency	Groups		
	AS %	JC %	PS %
Played Cards for Money			
Not at all	79.5	75.5	87.1
Less than Monthly	11.8	11.7	9.4
Monthly	3.8	5.3	2.2
Weekly	3.1	4.3	0.7
Daily	1.5	2.1	0.4
Bet money on games of personal skill like pool, golf or bowling			
Not at all	84.3	77.7	90.0
Less than Monthly	8.4	8.5	7.0
Monthly	3.6	11.7	1.8
Weekly	1.9	2.1	0.6
Daily	1.2	0	0.3
Bet money on sports teams			
Not at all	88.6	86.2	91.0
Less than Monthly	5.6	4.3	6.3
Monthly	2.4	5.3	1.4
Weekly	1.3	3.2	0.5
Daily	1.2	0	0.3

Bought lottery tickets or scratch offs			
Not at all	76.1	79.8	84.8
Less than Monthly	10.3	7.4	10.0
Monthly	5.7	2.1	2.9
Weekly	4.9	5.3	1.3
Daily	1.8	2.1	0.4
Gambled in a casino			
Not at all	82.6	84.0	90.0
Less than Monthly	9.5	5.3	6.8
Monthly	3.7	3.2	1.8
Weekly	1.8	4.3	0.6
Daily	1.2	0	0.3
Gambled for money online			
Not at all	95.5	94.7	98.5
Less than Monthly	1.6	0	0.4
Monthly	0.4	2.1	0.2
Weekly	0.5	1.1	0.2
Daily	0.8	0	0.3
Highest level of gambling across all games			
Not at all	58.1	63.8	68.6
Less than Monthly	21.1	13.8	22.0
Monthly	9.4	9.6	6.0
Weekly	7.8	8.5	2.5
Daily	3.5	4.3	0.9

Note. Highest level of gambling is the highest frequency of play, across all six games, for each student. Column percentages may not total 100% due to missing data and rounding to the tenth decimal place.

Table 4

*Comparison of Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) on Any Gambling for each Game and by Gender in 2010*

Game	AS %	JC %	PS %	AS vs JC $X^2$ (p)	AS vs. PS $X^2$ (p)	JC vs. PS $X^2$ (p)
Boys any game	65.5	54.4	58.8	<b>19 (&lt; .001)</b>	<b>38 (&lt; .001)</b>	3 (.07)
Girls any game	41.9	36.2	31.4	1 (.28)	<b>91 (&lt; .001)</b>	1 (.32)
9 <sup>th</sup> Grade Boys any game	55.0	53.2	50.8	0 (.79)	1 (.25)	0 (.67)
12 <sup>th</sup> Grade Boys any game	71.6	51.6	69.1	<b>16 (&lt; .001)</b>	3 (.11)	<b>13 (&lt; .001)</b>
9 <sup>th</sup> Grade Girls any game	30.3	36.0	23.0	0 (.57)	5 (.03)	2 (.12)
12 <sup>th</sup> Grade Girls any game	51.9	38.9	42.2	1 (.28)	<b>29 (&lt; .001)</b>	0 (.77)
<b>Boys</b>						
Played cards for money	45.7	37.9	39.6	<b>9 (.003)</b>	<b>32 (&lt;.001)</b>	1 (.47)
Bet money on games of personal skill like pool, golf or bowling	43.8	41.5	36.2	1 (.38)	<b>52 (&lt;.001)</b>	5 (.02)
Bet money on sports teams	31.5	32.5	29.6	0 (.69)	4 (.06)	2 (.19)
Bought lottery tickets or scratch offs	32.3	17.8	23.2	<b>35 (&lt;.001)</b>	<b>94 (&lt;.001)</b>	<b>7 (.009)</b>
Gambled in a casino	23.1	12.5	17.1	<b>24 (&lt;.001)</b>	<b>52 (&lt;.001)</b>	6 (.01)
Gambled for money online	10.4	9.2	6.3	1 (.47)	<b>56 (&lt;.001)</b>	6 (.01)

Youth Gambling 20

Girls						
Played cards for money	20.2	23.7	12.8	1 (.42)	<b>87 (&lt;.001)</b>	<b>10 (.002)</b>
Bet money on games of personal skill like pool, golf or bowling	15.2	22.3	9.8	3 (.06)	<b>59 (&lt;.001)</b>	<b>17 (.001)</b>
Bet money on sports teams	10.6	12.9	8.6	1 (.48)	<b>9 (.003)</b>	2 (.14)
Bought lottery tickets or scratch offs	22.9	17.6	14.7	1 (.24)	<b>95 (&lt;.001)</b>	1 (.43)
Gambled in a casino	16.4	13.2	9.6	1 (.42)	<b>94 (&lt;.001)</b>	1 (.24)
Gambled for money online	3.4	3.3	1.1	0 (.93)	<b>85 (&lt;.001)</b>	4 (.04)

Note. "Any Gambling" is any gambling across all six games. Bold indicates statistical significance of alpha < .01.

Table 5

*Comparison of Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) on Weekly/Daily Gambling Frequency for each Game and by Gender in 2010*

Game	AS %	JC %	PS %	AS vs. JC $X^2$ (p)	AS vs. PS $X^2$ (p)	JC vs. PS $X^2$ (p)
Boys any game	23.8	23.1	14.6	0 (.76)	<b>137 (&lt;.001)</b>	<b>24 (&lt;.001)</b>
Girls any game	11.3	12.8	3.4	0 (.66)	<b>311 (&lt;.001)</b>	<b>25 (&lt;.001)</b>
9 <sup>th</sup> Grade Boys any game	19.6	18.2	11.7	0 (.79)	<b>11 (.001)</b>	3 (.08)
12 <sup>th</sup> Grade Boys any game	26.5	25.8	18.4	0 (.88)	<b>39 (&lt;.001)</b>	3 (.07)
9 <sup>th</sup> Grade Girls any game	9.1	8.0	2.6	0 (.86)	<b>26 (&lt;.001)</b>	3 (.09)
12 <sup>th</sup> Grade Girls any game	14.1	16.7	4.4	0 (.76)	<b>155 (&lt;.001)</b>	6 (.01)
<b>Boys</b>						
Played cards for money	12.0	11.9	7.2	0 (.95)	<b>70 (&lt;.001)</b>	<b>14 (&lt;.001)</b>
Games of personal skill	12.3	11.7	7.2	0 (.76)	<b>77 (&lt;.001)</b>	<b>13 (&lt;.001)</b>
Bet money on sports teams	8.8	11.1	5.6	2 (.13)	<b>39 (&lt;.001)</b>	<b>24 (&lt;.001)</b>
Bought lottery tickets	10.5	7.4	5.7	4 (.05)	<b>84 (&lt;.001)</b>	2 (.15)
Gambled in a casino	6.7	6.1	4.0	0 (.64)	<b>38 (&lt;.001)</b>	5 (.03)
Gambled online	5.0	3.8	2.8	1 (.29)	<b>32 (&lt;.001)</b>	1 (.25)

Youth Gambling 22

Girls						
Played cards for money	4.6	6.5	1.1	1 (.40)	<b>169 (&lt;.001)</b>	<b>24 (&lt;.001)</b>
Games of personal skill	3.1	2.1	1.0	0 (.58)	<b>81 (&lt;.001)</b>	1 (.25)
Bet money on sports teams	2.5	3.2	0.8	0 (.67)	<b>59 (&lt;.001)</b>	<b>7 (.009)</b>
Bought lottery tickets	6.8	7.7	1.7	0 (.74)	<b>249 (&lt;.001)</b>	<b>20 (&lt;.001)</b>
Gambled in a casino	3.0	4.4	0.9	1 (.47)	<b>81 (&lt;.001)</b>	<b>12 (.001)</b>
Gambled online	1.4	1.1	0.5	0 (.81)	<b>27 (&lt;.001)</b>	1 (.41)

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. Bold indicates statistical significance of alpha < .01.

Underage gambling is defined as playing a legal or commercial form of gambling and being under the age of 18. The legal forms of gambling in the MSS are buying lottery tickets, gambling in a casino and gambling online. Rates of underage gambling frequency by boys and girls in Alternative Schools, Juvenile Corrections, and Public Schools for legal form of gambling are shown in Table 6. More Alternative School and Juvenile Corrections youth were involved in underage gambling than Public School students. This was true for both boys and girls. Lottery was played more often than casino gambling followed by online gambling.

A comparison of all three groups on underage gambling for each game broken down by gender is shown in Table 7. More Alternative School students were underage gamblers than Public School students and all of these comparisons were statistically significant for both boys and girls. There were no statistically significant differences in underage gambling between Alternative School and Juvenile Corrections youth. More Juvenile Corrections youth gambled underage than Public School students and half of these comparisons were statistically significant. In summary, more Alternative School students and Juvenile Corrections youth gambled underage than Public School students. Alternative School students and Juvenile Corrections youth had similar rates of underage gambling.

Table 6

*Comparison of Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) on Underage Gambling Frequency on Legalized Games by Gender in 2010*

Gambling Frequency	Groups		
	AS %	JC %	PS %
Underage Boys Bought Lottery Tickets			
Not at all	76.3	82.3	86.4
Less than Monthly	9.1	6.5	6.2
Monthly	5.7	3.9	3.0
Weekly	3.6	3.7	1.9
Daily	3.5	2.0	1.6
Underage Boys Gambled in a Casino			
Not at all	87.5	88.7	93.7
Less than Monthly	4.0	3.4	1.9
Monthly	3.0	2.0	1.2
Weekly	1.7	4.2	0.7
Daily	2.5	0.8	1.5
Underage Boys Gambled Online			
Not at all	88.8	90.1	93.4
Less than Monthly	2.5	3.4	1.8
Monthly	2.3	1.7	1.1
Weekly	1.6	2.5	0.9
Daily	3.1	1.1	1.8



Underage Girls Bought Lottery Tickets			
Not at all	83.6	79.3	92.4
Less than Monthly	7.4	8.0	4.7
Monthly	2.9	2.3	1.4
Weekly	3.7	4.6	0.7
Daily	1.7	2.3	0.3
Underage Girls Gambled in a casino			
Not at all	92.8	85.1	98.0
Less than Monthly	3.2	4.6	0.8
Monthly	1.1	3.4	0.3
Weekly	0.6	3.4	0.1
Daily	1.2	0	0.3
Underage Girls Gambled for money online			
Not at all	95.2	94.3	98.5
Less than Monthly	1.8	0	0.4
Monthly	0.6	2.3	0.2
Weekly	0.3	1.1	0.1
Daily	1.0	0	0.3

Note. Underage is defined as 17 years of age or less.

Table 7

*Comparison of Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) on any Underage Gambling for each Legal Game by Gender in 2010*

Game	AS %	JC %	PS %	AS vs. JC $X^2$ (p)	AS vs. PS $X^2$ (p)	JC vs. PS $X^2$ (p)
<b>Underage Boys</b>						
Bought lottery tickets	22.3	16.3	12.7	6 (.01)	<b>105 (&lt;.001)</b>	4 (.04)
Gambled in a casino	11.3	10.5	5.3	0 (.67)	<b>88 (&lt;.001)</b>	<b>18 (&lt;.001)</b>
Gambled online	9.9	8.8	5.7	0 (.61)	<b>39 (&lt;.001)</b>	6 (.01)
Any of the above three games	26.2	19.8	15.2	6 (.01)	<b>120 (&lt;.001)</b>	6 (.02)
<b>Underage Girls</b>						
Bought lottery tickets	15.8	17.9	7.1	0 (.61)	<b>129 (&lt;.001)</b>	<b>14 (.001)</b>
Gambled in a casino	6.1	11.9	1.5	4 (.04)	<b>146 (&lt;.001)</b>	<b>58 (&lt;.001)</b>
Gambled online	3.7	3.5	1.0	0 (.94)	<b>83 (&lt;.001)</b>	6 (.02)
Any of the above three games	18.6	20.0	7.9	0 (.75)	<b>179 (&lt;.001)</b>	<b>17 (&lt;.001)</b>

Note. Underage is defined as 17 years of age or less. Bold indicates statistical significance of alpha < .01.

*Comparison of Alternative School, Juvenile Corrections and Public School Students on Gambling Trends from 1992 to 2010*

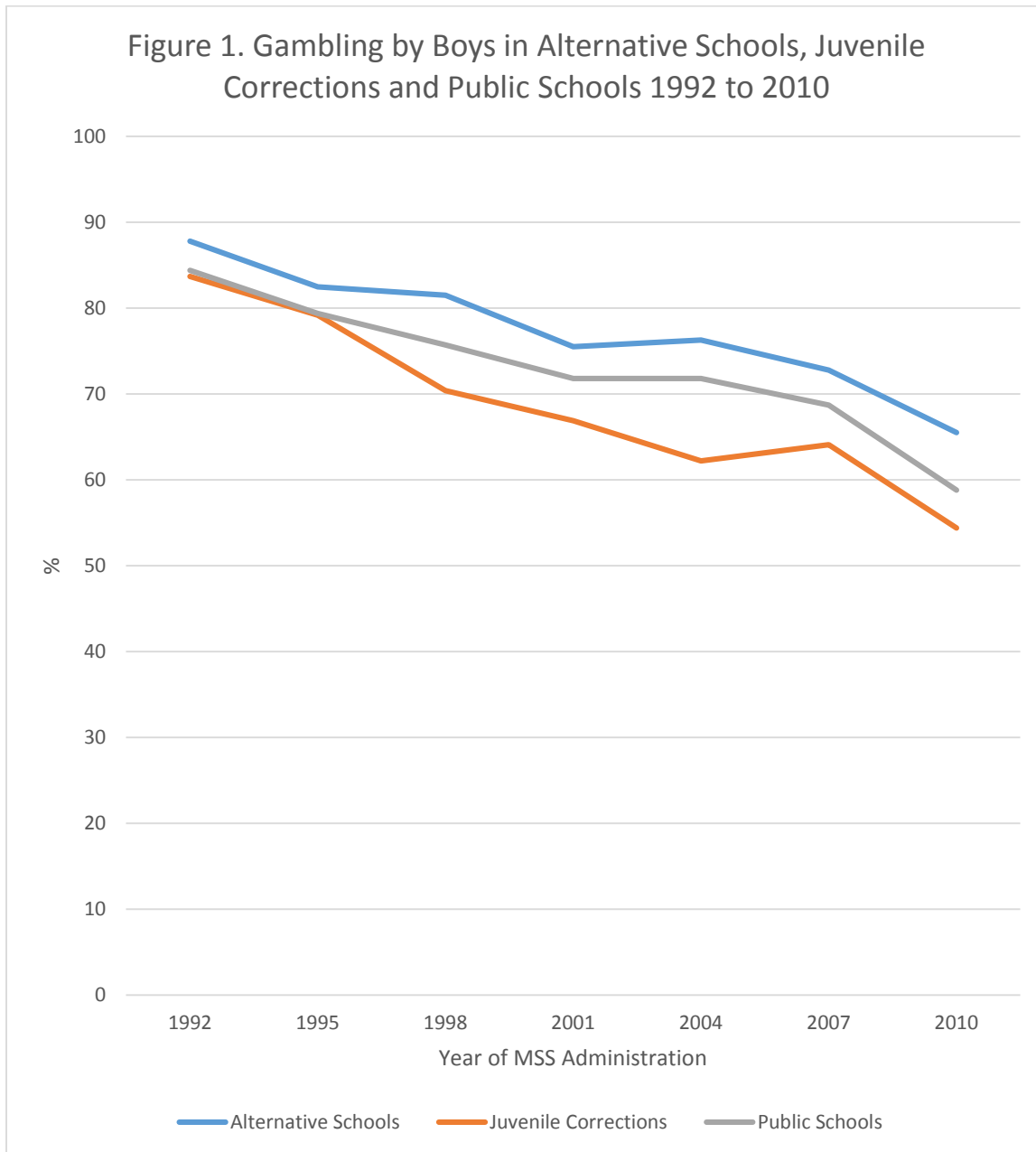
A comparison of gambling from 1992 to 2010 for all three groups and broken down by gender is shown in Table 8. Gambling trends broken down by game for Alternative school students are shown in Appendix A. All three groups and both genders within each group showed statistically significant declines from 2007 to 2010. Gambling from 1992 to 2010 showed consistent and large declines for all three groups and both genders within each group. Figures 1 and 2 illustrate that all three groups have nearly identical slightly downward trajectories of gambling from 1992 to 2010.

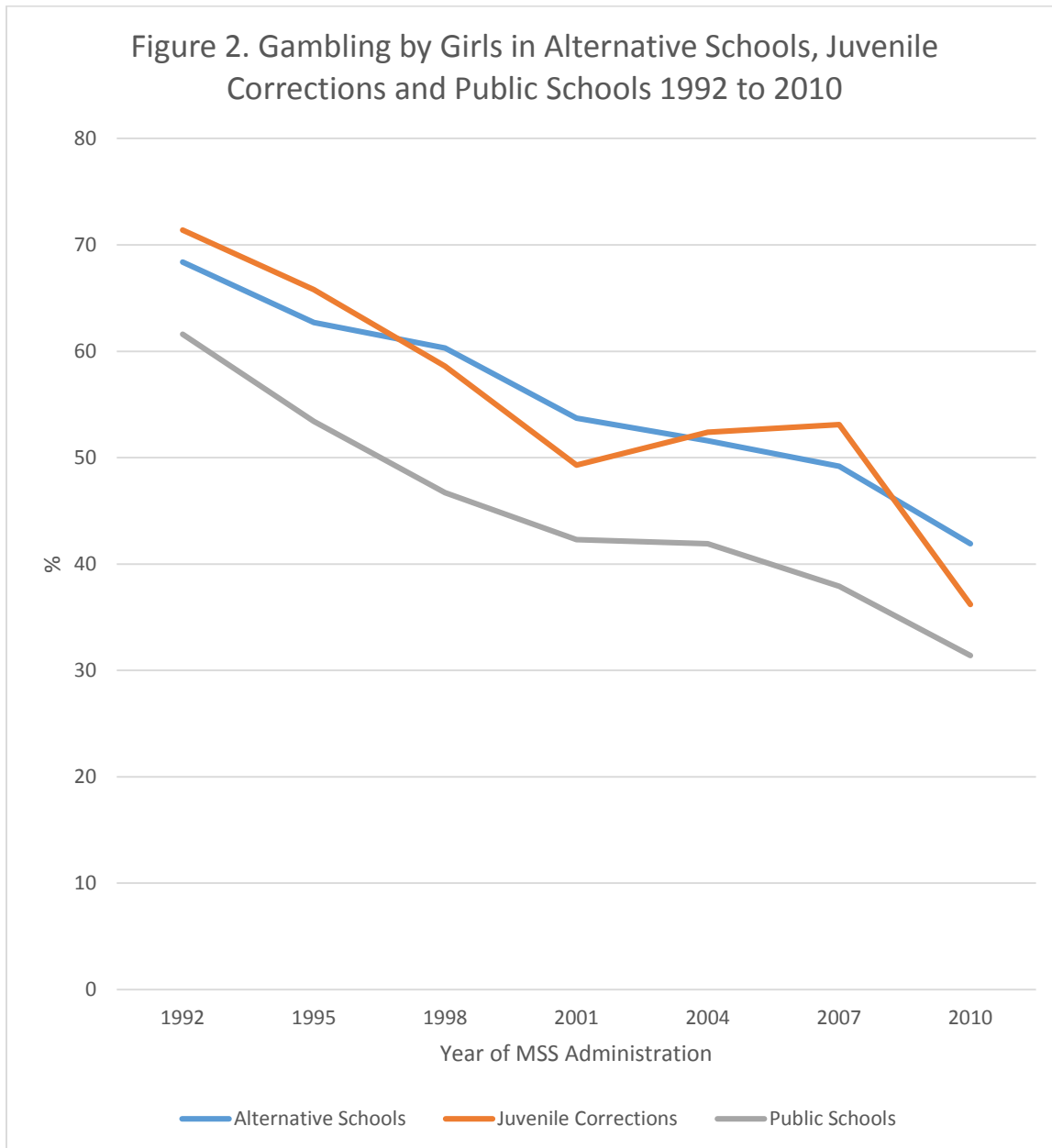
Table 8

Any Gambling in past year by Alternative School (AS), Juvenile Correction (JC), and Public School (PS) Students broken down by Gender from 1992 to 2010

Group	1992 %	1995 %	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
Boys									
AS	87.8	82.5	81.5	75.5	76.3	72.8	65.5	<b>-7.3**</b>	-10
JC	83.7	79.2	70.4	66.9	62.2	64.1	54.4	<b>-9.7**</b>	-15
PS	84.4	79.4	75.7	71.8	71.8	68.7	58.8	<b>-9.9**</b>	-14
Girls									
AS	68.4	62.7	60.3	53.7	51.6	49.2	41.9	<b>-7.3**</b>	-15
JC	71.4	65.8	58.6	49.3	52.4	53.1	36.2	<b>-17.0*</b>	-32
PS	61.6	53.4	46.7	42.3	41.9	37.9	31.4	<b>-6.5**</b>	-17

Note. NA indicates Not Available. Bold and asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): \*p < .05, \*\*p < .01.





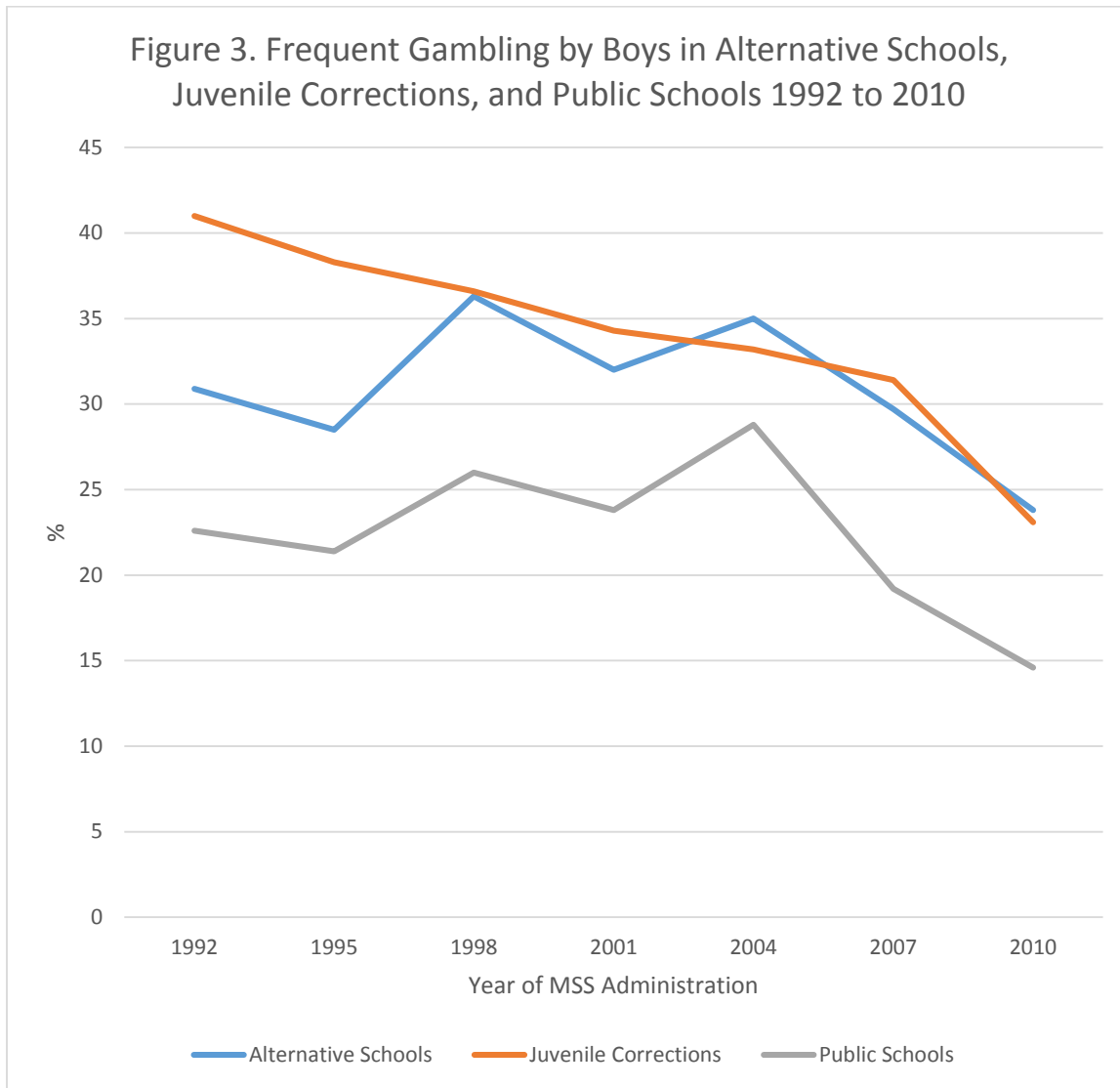
A comparison of frequent gambling from 1992 to 2010 for all three groups and broken down by gender is shown in Table 9. All three groups and boys within each group and girls in Public School showed statistically significant declines from 2007 to 2010. Girls in Alternative School and Juvenile Corrections did not show statistically significant declines. Frequent gambling from 1992 to 2010 showed consistent and large declines for all three groups and both genders within each group. Figures 3 and 4 illustrates comparisons of the rates of frequent gambling for boys and girls. Each group’s trajectory showed fluctuations in rates of frequent gambling, however, all three groups showed a decrease from 1992 to 2010.

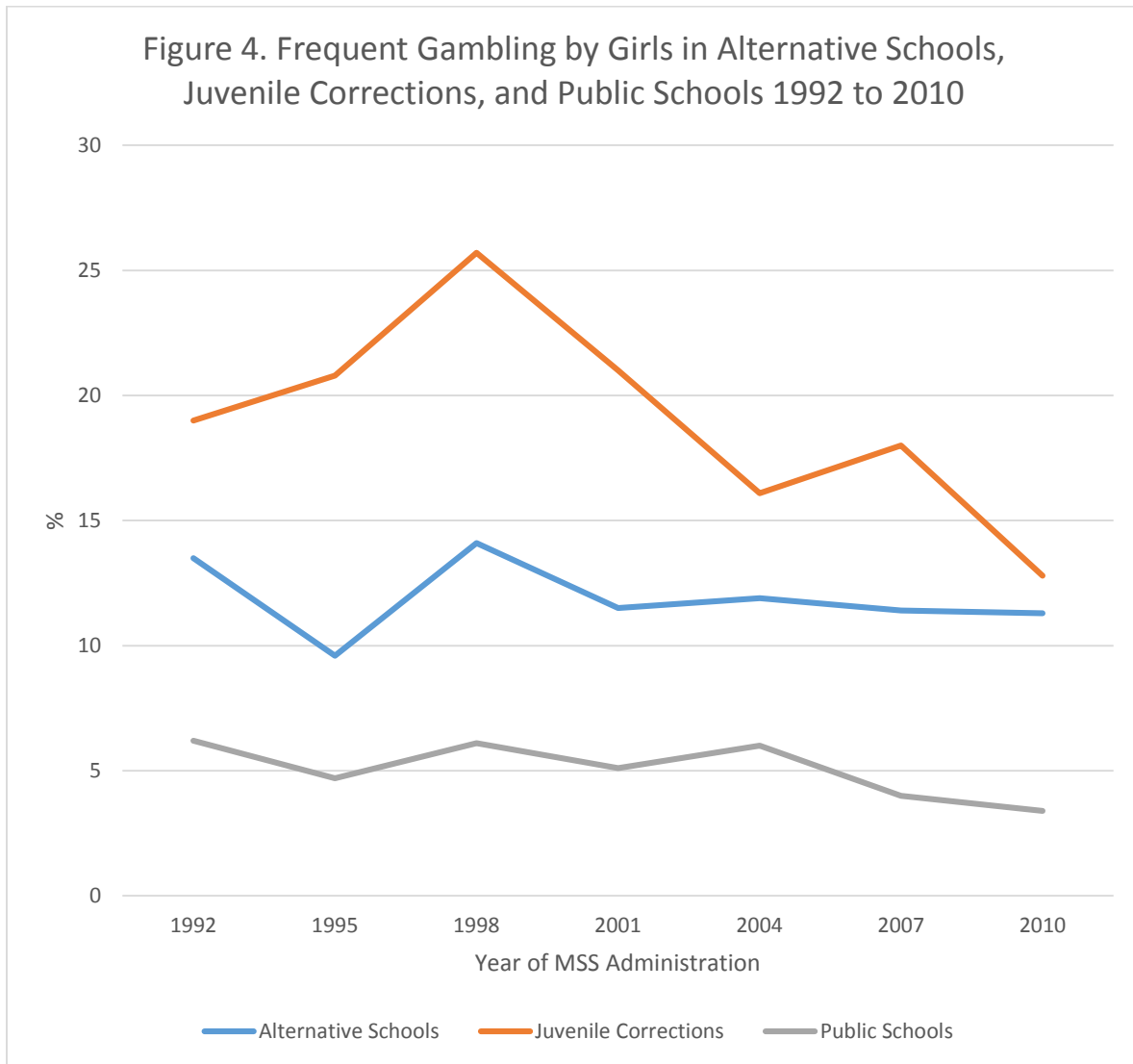
Table 9

Weekly/Daily Gambling by Alternative School (AS), Juvenile Corrections (JC), and Public School (PS) students broken down by Gender from 1992 to 2010

Group	1992 %	1995 %	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
Boys									
AS	30.9	28.5	36.3	32.0	35.0	29.7	23.8	<b>-5.9**</b>	-20
JC	41.0	38.3	36.6	34.3	33.2	31.4	23.1	<b>-8.2**</b>	-26
PS	22.6	21.4	26.0	23.8	28.8	19.2	14.6	<b>-4.6**</b>	-24
Girls									
AS	13.5	9.6	14.1	11.5	11.9	11.4	11.3	-0.1	-1
JC	19.0	20.8	25.7	21.0	16.1	18.0	12.8	-5.2	-29
PS	6.2	4.7	6.1	5.1	6.0	4.0	3.4	<b>-0.6**</b>	-15

Note. NA indicates Not Available. Bold and asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): \*p < .05, \*\*p < .01.







Underage lottery, casino, and online gambling rates from 1992 to 2010 for boys and girls in Alternative Schools, Juvenile Corrections and Public Schools are shown in Tables 10 and 11 and Figures 5 and 6. Alternative School boys had higher rates of underage lottery play than Juvenile Corrections boys who had higher rates than Public School boys. All three groups showed consistent and significant declines in underage lottery play from 1992 to 2010. All three groups showed statistically significant declines in underage lottery play from 2007 to 2010. Alternative School and Juvenile Corrections boys had nearly identical rates of underage casino gambling that was higher than Public School boys. All three groups showed modest declines in underage casino gambling from 1998 to 2010. Public School boys showed a statistically significant decline in underage casino gambling from 2007 to 2010. Online gambling was assessed in 2007 and 2010. Alternative School boys had higher rates of underage online gambling than Juvenile Corrections boys who had higher rates than Public School boys. Alternative School and Public School boys showed declines in underage online play and the decline was statistically significant for Public School boys. Juvenile Corrections boys showed a modest increase in underage online gambling from 2007 to 2010.

Alternative School and Juvenile Corrections girls had nearly identical rates of underage lottery play that was higher than Public School girls. All three groups showed consistent and significant declines in underage lottery play from 1992 to 2010. Alternative School and Public School girls showed statistically significant declines in underage lottery play from 2007 to 2010. Juvenile Corrections girls had higher rates of underage casino gambling than Alternative School girls who had higher rates than Public School girls. All three groups showed relatively stable rates of underage casino gambling from 1998 to 2010. Online gambling was assessed in 2007 and 2010. Alternative School girls had a statistically significant increase in underage online

gambling from 2007 to 2010. Juvenile Corrections girls showed a decrease in underage online gambling and Public School girls' rates of underage online gambling were stable from 2007 to 2010.

Table 10

Underage Gambling by Boys in Alternative School, Juvenile Corrections, and Public School from 1992 to 2010

Game	1992 %	1995 %	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
Alternative Schools									
Lottery	55.8	44.2	36.3	30.8	26.2	26.7	22.0	<b>-4.7*</b>	-18
Casino	NA	NA	13.4	11.4	11.6	13.3	11.2	-2.1	-16
Online	NA	NA	NA	NA	NA	10.3	9.6	-0.7	-7
Juvenile Corrections									
Lottery	51.6	39.4	27.6	28.3	22.1	22.3	16.1	<b>-6.2*</b>	-28
Casino	NA	NA	12.7	13.3	11.9	11.3	10.4	-0.9	-8
Online	NA	NA	NA	NA	NA	7.1	8.7	1.6	23
Public Schools									
Lottery	42.7	36.3	22.5	17.3	14.7	15.1	12.6	<b>-2.5**</b>	-17
Casino	NA	NA	7.9	6.5	6.0	5.7	5.3	<b>-0.4*</b>	-7
Online	NA	NA	NA	NA	NA	6.8	5.6	<b>-1.2**</b>	-18

Note. Underage is defined as less than 18 years of age. NA denotes Not Available. Bold and asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): \*p < .05, \*\*p < .01.

Figure 5. Underage Gambling by Boys in Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) from 1992 to 2010

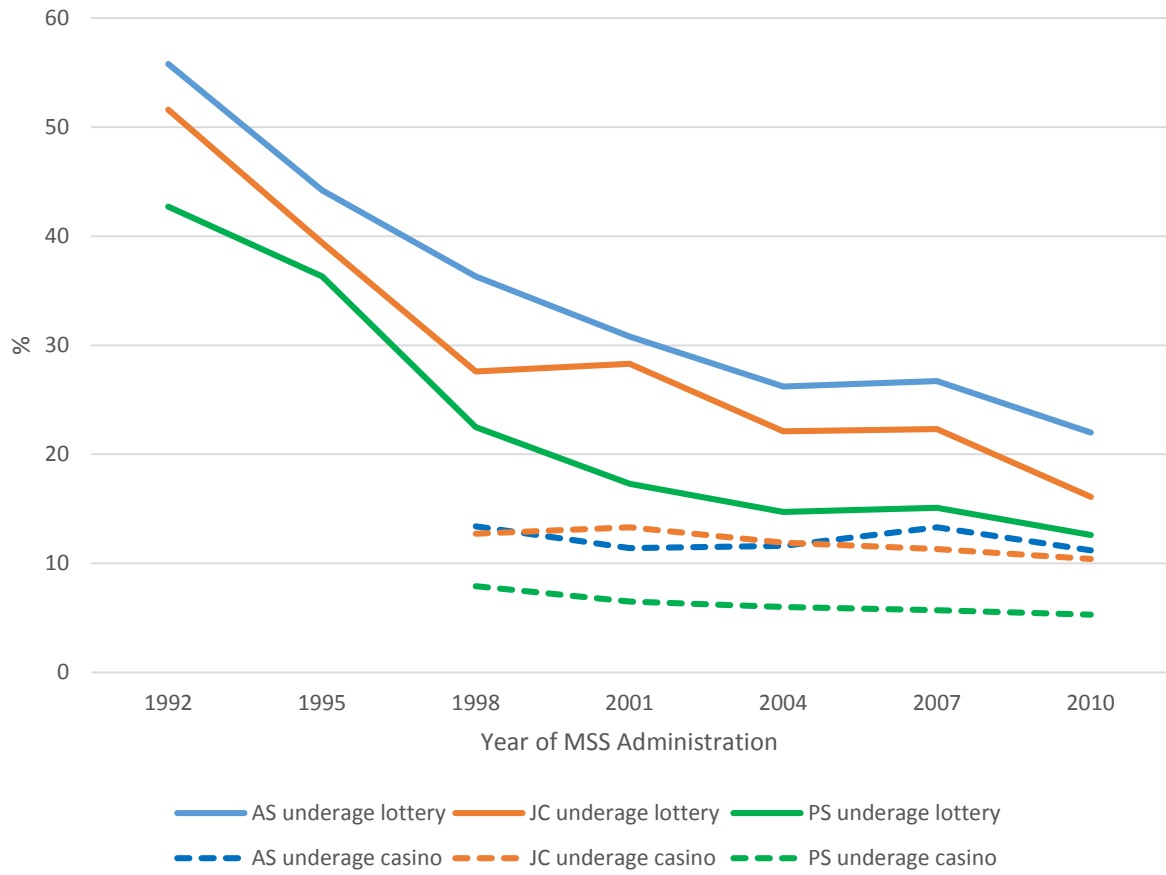


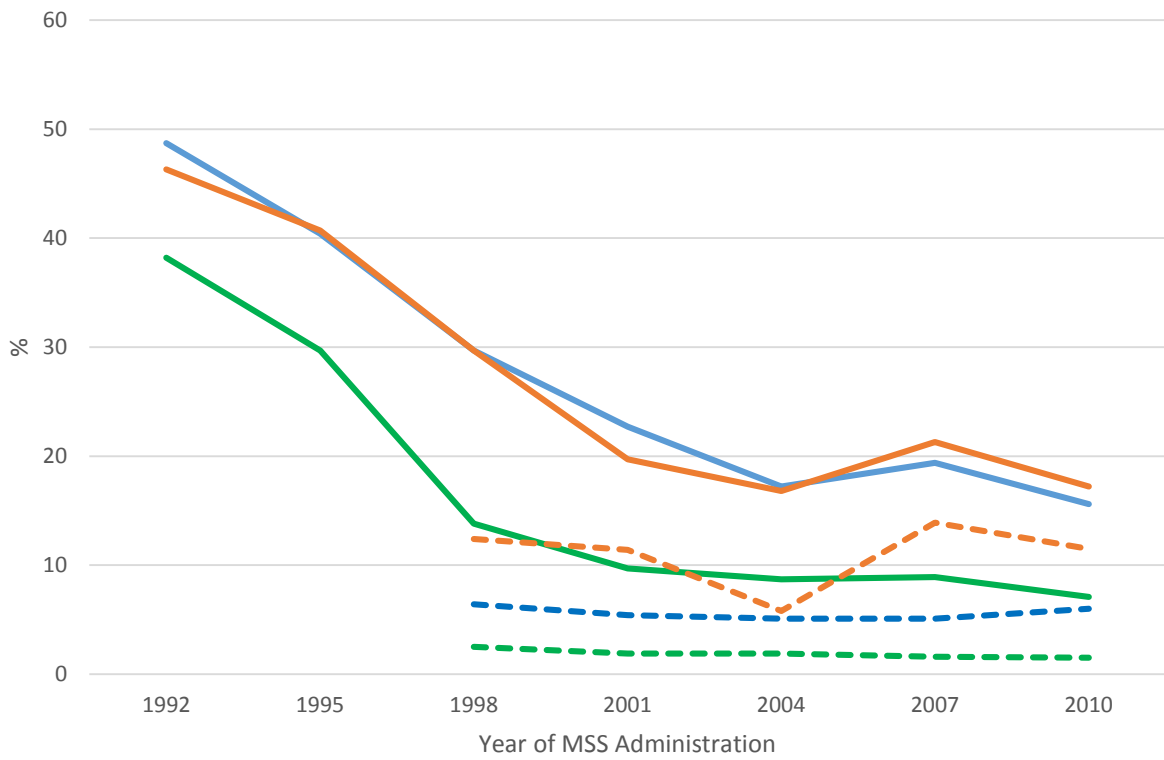
Table 11

Underage Gambling by Girls in Alternative School, Juvenile Corrections, and Public School from 1992 to 2010

Game	1992 %	1995 %	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
Alternative Schools									
Lottery	48.7	40.4	29.7	22.7	17.2	19.4	15.6	<b>-3.8*</b>	-20
Casino	NA	NA	6.4	5.4	5.1	5.1	6.0	0.9	18
Online	NA	NA	NA	NA	NA	2.1	3.7	<b>1.6*</b>	76
Juvenile Corrections									
Lottery	46.3	40.7	29.7	19.7	16.8	21.3	17.2	-4.1	-19
Casino	NA	NA	12.4	11.4	5.8	13.9	11.5	-2.4	-17
Online	NA	NA	NA	NA	NA	4.6	3.4	-1.2	-26
Public Schools									
Lottery	38.2	29.7	13.8	9.7	8.7	8.9	7.1	<b>-1.8**</b>	-20
Casino	NA	NA	2.5	1.9	1.9	1.6	1.5	-0.1	-6
Online	NA	NA	NA	NA	NA	1.1	1.0	<b>-0.1*</b>	-9

Note. Underage is defined as less than 18 years of age. NA denotes Not Available. Bold and asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): \*  $p < .05$ , \*\*  $p < .01$ .

Figure 6. Underage Gambling by Girls in Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) from 1992 to 2010



AS underage lottery JC underage lottery PS underage lottery  
 AS underage casino JC underage casino PS underage casino

*Problem Gambling*

The third specific aim is to compare the three groups on the two problem gambling items, last administered in 2004, and from 1992 to 2004. Two additional variables were computed: (a) endorsing either item; and (b) endorsing both items. A comparison of the three groups on the two problem gambling items and two scored variables by gender is shown in Table 12. Juvenile Corrections youth had higher rates than Alternative School students who had higher rates than Public School students. Juvenile Corrections youth and Alternative School students had significantly higher endorsement rates of problems with gambling than Public School students on most of the comparisons.

Table 13 and Figure 7 show endorsement rates of problem gambling items from 1992 to 2004 for boys in all three groups. Table 13 shows that endorsement rates of problem gambling items by Alternative School boys have shown modest increases from 1992 to 2004 and no statistically significant differences from 2001 to 2004. Juvenile Corrections boys show a mix of increases and decreases from 1992 to 2004 and two statistically significant increases from 2001 to 2004. Public School boys show a mix of increases and decreases from 1992 to 2004 and three statistically significant increases from 2001 to 2004. Table 14 and Figure 8 show that endorsement rates of problem gambling items by Alternative School girls have shown modest decreases from 1992 to 2004 and no statistically significant differences from 2001 to 2004. Juvenile Corrections girls show a mix of increases and decreases from 1992 to 2004 and no statistically significant differences from 2001 to 2004. Public School girls show modest decreases from 1992 to 2004 and one statistically significant increase from 2001 to 2004.

To summarize, Alternative School students and Juvenile Corrections youth had higher rates of problem gambling item endorsement than Public School students. Alternative School boys

showed stable rates of problem gambling item endorsement from 2001 to 2004, whereas, Juvenile Corrections and Public School boys showed increases. Girls in all three groups showed relatively stable rates from 2001 to 2004.

Table 12

Comparison of Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) on Problem Gambling Items by Gender in 2004

Problem Gambling Item	AS %	JC %	PS %	AS vs. JC $X^2$ (p)	AS vs. PS $X^2$ (p)	JC vs. PS $X^2$ (p)
Boys						
Felt bad about amount you bet	13.7	12.7	10.8	0 (.55)	<b>14 (&lt; .001)</b>	2 (.13)
Would like to stop	6.4	11.1	5.1	<b>16 (&lt; .001)</b>	6 (.01)	<b>50 (&lt; .001)</b>
Endorsed either item	16.8	19.9	13.2	3 (.10)	<b>17 (&lt; .001)</b>	<b>22 (&lt; .001)</b>
Endorsed both items	3.3	3.9	2.6	1 (.48)	3 (.08)	4 (.04)
Girls						
Felt bad about amount you bet	6.4	5.6	3.6	0 (.73)	<b>32 (&lt; .001)</b>	2 (.18)
Would like to stop	2.0	7.7	1.2	<b>17 (&lt; .001)</b>	<b>7 (.008)</b>	<b>48 (&lt; .001)</b>
Endorsed either item	7.7	11.2	4.3	2 (.14)	<b>38 (&lt; .001)</b>	<b>16 (&lt; .001)</b>
Endorsed both items	0.7	2.1	0.5	3 (.09)	1 (.23)	<b>7 (.008)</b>

Note. Bold indicates statistical significance of  $\alpha < .01$ .



Table 13

Problem Gambling by Boys in Alternative Schools, Juvenile Corrections, and Public Schools from 1992 to 2004

Problem Gambling Items	1992 %	1995 %	1998 %	2001 %	2004 %	Difference 2001 to 2004	% Change 2001 to 2004
Alternative Schools							
Felt bad about amount you bet	12.9	12.2	14.1	11.7	13.7	1.9	16
Would like to stop	4.1	5.5	6.5	6.5	6.4	-0.1	-2
Either item	15.0	14.9	17.2	14.7	16.8	2.1	14
Both items	2.0	2.8	3.3	3.5	3.3	-0.2	-6
Juvenile Corrections							
Felt bad about amount you bet	13.8	13.1	12.8	11.2	12.7	1.5	13
Would like to stop	7.2	7.8	8.1	5.2	11.1	<b>5.9**</b>	113
Either item	16.5	17.1	16.7	13.6	19.9	<b>6.3**</b>	46
Both items	4.4	3.8	4.2	2.8	3.9	<b>1.1</b>	39
Public Schools							
Felt bad about amount you bet	14.0	12.0	11.5	10.5	10.8	0.3	3
Would like to stop	4.4	4.3	4.5	4.3	5.1	<b>0.8**</b>	19
Either item	16.0	13.8	13.5	12.4	13.2	<b>0.8**</b>	19
Both items	2.4	2.5	2.5	2.4	2.6	<b>0.2*</b>	8

Note. Bold and asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): \*p < .05, \*\*p < .01.

Figure 7. Problem Gambling by Boys in Alternative Schools (AS), Juvenile Corrections (JC), and Public Schools (PS) from 1992 to 2010

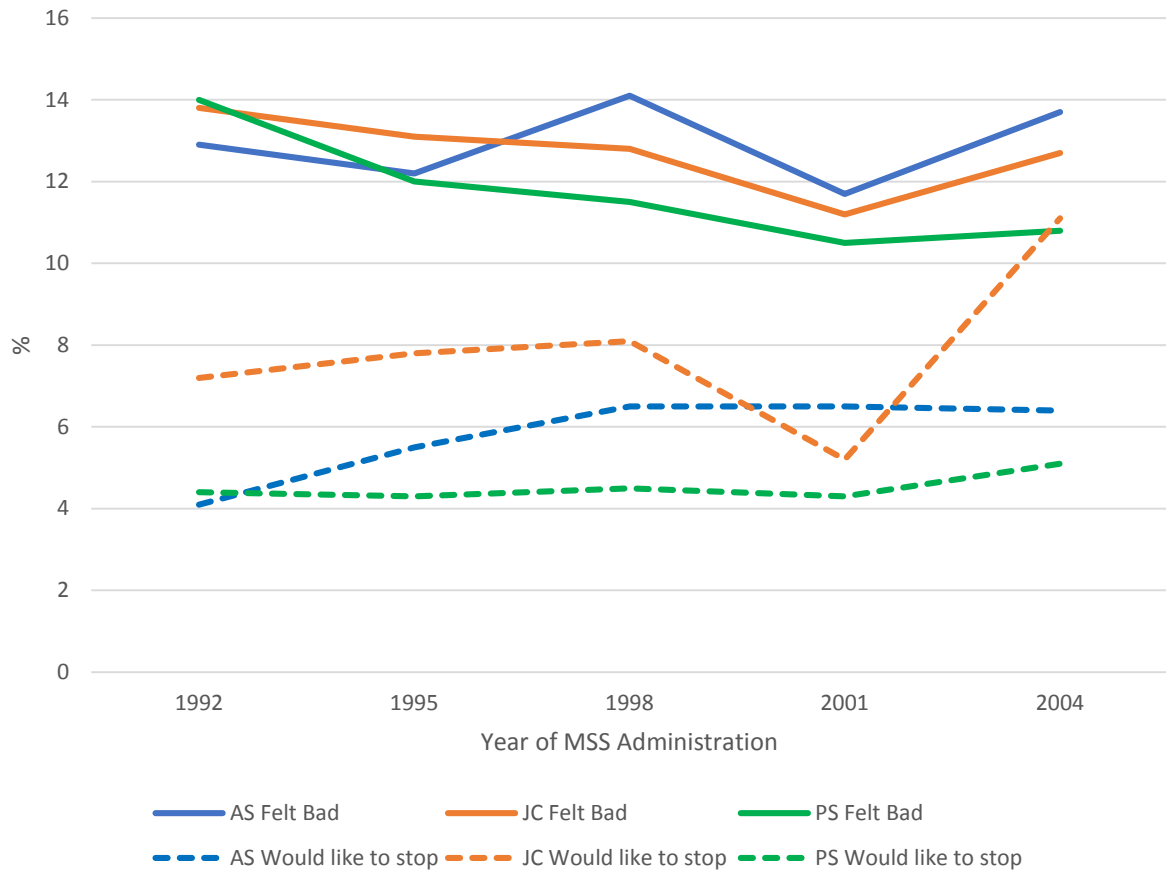


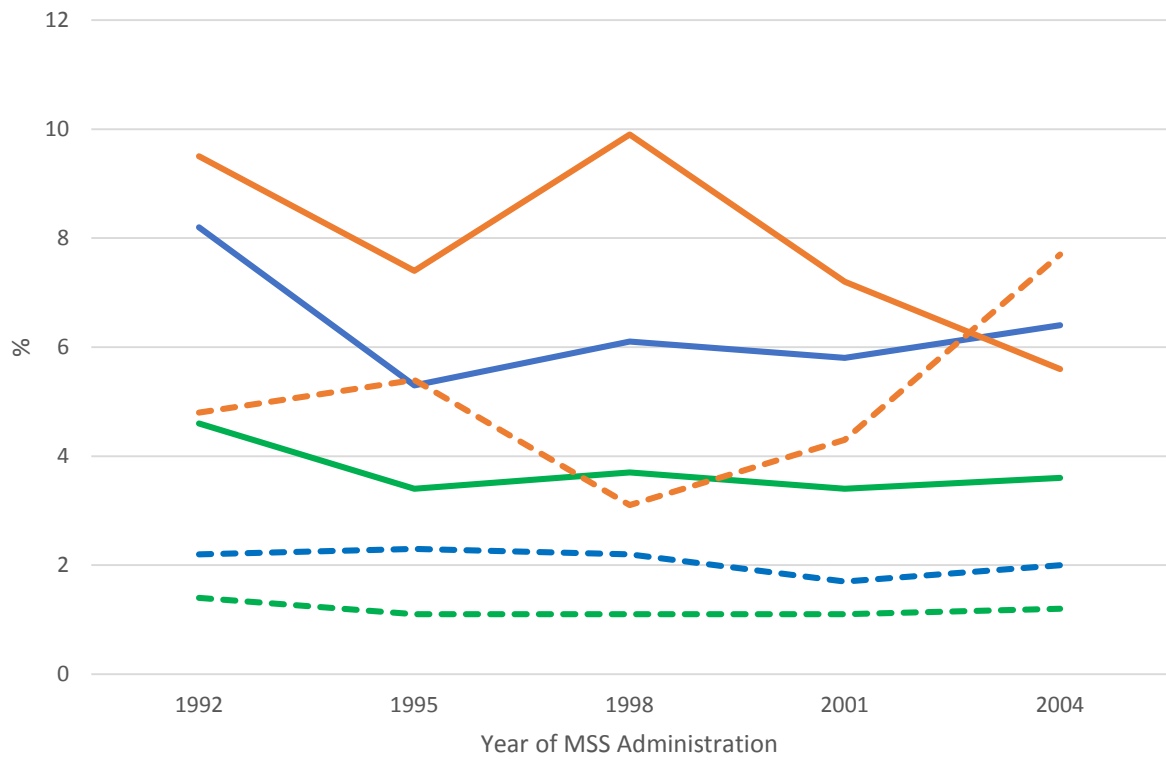
Table 14

Problem Gambling by Girls in Alternative Schools, Juvenile Corrections, and Public Schools from 1992 to 2004

Problem Gambling Items	1992 %	1995 %	1998 %	2001 %	2004 %	Difference 2001 to 2004	% Change 2001 to 2004
Alternative Schools							
Felt bad about amount you bet	8.2	5.3	6.1	5.8	6.4	0.6	10
Would like to stop	2.2	2.2	2.3	1.7	2.0	0.3	18
Either item	8.9	6.7	7.1	6.6	7.7	1.1	17
Both items	1.5	0.8	1.3	0.9	0.7	-0.2	-22
Juvenile Corrections							
Felt bad about amount you bet	9.5	7.4	9.9	7.2	5.6	-1.6	-22
Would like to stop	4.8	5.4	3.1	4.3	7.7	3.4	79
Either item	9.5	11.4	11.0	9.4	11.2	1.8	19
Both items	4.8	1.3	2.1	2.2	2.1	-0.1	-5
Public Schools							
Felt bad about amount you bet	4.6	3.4	3.7	3.4	3.6	0.2	6
Would like to stop	1.4	1.1	1.1	1.1	1.2	0.1	9
Either item	5.3	4.0	4.2	4.0	4.3	<b>0.3*</b>	8
Both items	0.6	0.5	0.5	0.6	0.5	-0.1	-17

Note. Bold and asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): \*p < .05, \*\*p < .01.

Figure 8. Problem Gambling by Girls in Alternative Schools, Juvenile Corrections, and Public Schools from 1992 to 2010



AS Felt Bad      JC Felt Bad      PS Felt Bad  
 AS Would like to stop      JC Would like to stop      PS Would like to stop

*Correlates of Gambling*

The fourth specific aim is to identify correlates of gambling. Table 15 shows multiple regressions for Alternative Schools including separate multiple regressions for boys and girls. Five correlates were identified that accounted for 20% of the variance in gambling frequency, and these include, in order of magnitude, hitting or beating up another person, smoking cigars, being a male, drinking alcoholic beverages, and vandalism. For boys, the multiple regression yielded six correlates that accounted for 22% of the variance in gambling frequency including hitting or beating up another person, smoking cigars, running away from home, victim of family sexual activity, drinking alcoholic beverage, and dating forced or unwanted sexual activity. For girls, the multiple regression yielded four correlates that accounted for 8% of the variance in their gambling frequency and they included hitting or beating up another person, vandalism, smoking cigars, and binge drinking.

Table 16 shows multiple regressions for Juvenile Corrections including separate multiple regressions for boys and girls. Five correlates were identified that accounted for 28% of the variance in gambling frequency, and these include, in order of magnitude, driving a motor vehicle after using alcohol or other drugs, drinking alcoholic beverages, hitting or beating up another person, carry a weapon (other than a gun) on school property, and the number of different female partners with whom you had sexual intercourse. For boys, the multiple regression yielded four correlates that accounted for 31% of the variance in gambling frequency including driving a motor vehicle after using alcohol or other drugs, carry a gun on school property, hitting or beating up another person, drinking alcoholic beverage, and used crack (cocaine in chunk or rock form) or cocaine in any other form. For girls, the multiple regression yielded two correlates that accounted for 29% of the variance in their gambling frequency and

they included hitting someone or becoming violent while using alcohol or drugs, and smoking cigarettes.

Table 15

Stepwise Multiple Regression Between Gambling and Related Variables for Alternative Schools and by Gender in 2010

Regression Step	MSS correlate	Beta	r	r <sup>2</sup>
Alternative Schools (n = 3,601)				
1	During the last 12 months, how often have you hit or beat up another person?	.16	.30	.09
2	During the last 30 days, on how many days did you smoke cigars, cigarillos or little cigars?	.16	.38	.14
3	Being Male	.13	.41	.17
4	During the last 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?	.11	.43	.19
5	During the last 12 months, how often have you damaged or destroyed property at school or somewhere else?	.11	.44	.20
Alternative School Boys (n = 1,996)				
1	During the last 12 months, how often have you hit or beat up another person?	.17	.31	.10
2	During the last 30 days, on how many days did you smoke cigars, cigarillos or little cigars?	.14	.38	.14
3	During the last 12 months, how often have you run away from home?	.14	.42	.18
4	Has any older or stronger member of your family ever touched you sexually or had you touch them sexually?	-.12	.44	.19
5	During the last 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?	.13	.46	.21
6	Has someone you were going out with ever forced you to have sex or do something sexual that you did not want to?	-.09	.47	.22
Alternative School Girls (n = 1,527)				
1	During the last 12 months, how often how many times have you hit someone or become violent while using alcohol or drugs?	.12	.20	.04
2	During the last 12 months, how often have you damaged or destroyed property at school or somewhere else?	.12	.24	.06
3	During the last 30 days, on how many days did you smoke cigars, cigarillos or little cigars?	.10	.27	.07
4	In the last two weeks, how many times (if any) have you had five or more drinks in a row?	.10	.28	.08

Table 16

Multiple Regression Between Gambling and Related Variables for Juvenile Corrections in 2010

Regression Step	MSS correlate	<i>beta</i>	<i>r</i>	<i>r</i> <sup>2</sup>
Juvenile Corrections (n = 403)				
1	During the last 12 months, how many times have you driven a motor vehicle after using alcohol or other drugs?	.18	.37	.14
2	During the last 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?	.18	.47	.22
3	During the last 12 months, how often have you hit or beat up another person?	.16	.50	.25
4	During the last 30 days, on how many days did you carry a weapon (other than a gun) on school property?	.16	.52	.27
5	During the last 12 months, with how many different female partners have you had sexual intercourse?	.11	.53	.28
Juvenile Corrections Boys (n = 316)				
1	During the last 12 months, how many times have you driven a motor vehicle after using alcohol or other drugs?	.24	.41	.17
2	During the last 30 days, on how many days did you carry a gun on school property?	.24	.49	.24
3	During the last 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?	.18	.54	.29
4	During the last 12 months, on how many occasions (if any) have you used crack (cocaine in chunk or rock form), or cocaine in any other form?	.18	.56	.31
Juvenile Corrections Girls (n = 74)				
1	During the last 12 months, how often how many times have you hit someone or become violent while using alcohol or drugs?	.41	.42	.18
2	During the last 30 days, how frequently have you smoked cigarettes?	.33	.54	.29



## Discussion

This study had four specific aims. First, compare the three groups, alternative schools, juvenile corrections, and public schools on 2010 rates of gambling frequency on six different forms of gambling as well as any gambling, frequent gambling, and underage gambling on legalized forms of gambling. Second, compare the three groups on gambling trends over time, from 1992 to 2010, specifically comparing rates of any gambling, frequent gambling, and underage gambling. Third, compare the three groups on endorsement of two problem gambling items, last administered in 2004, and compare rates of endorsement of these two items from 1992 to 2004. Fourth, identify the correlates of gambling among alternative school students and juvenile corrections youth. The graduating high school class of 2010 was among the first generations of youth to grow up with commercial gambling and its promotion in Minnesota (Stinchfield & Winters, 1998).

### *Comparison of Alternative School, Juvenile Corrections and Public School Students on 2010 Rates of Gambling*

Youth out of the mainstream were more involved in gambling than mainstream youth. Youth who have been expelled from school and youth who have been arrested and placed in juvenile correction facilities were more involved in gambling than youth who remained in school. More than half of youth out of the mainstream gambled in the past year (54.6% of Alternative School students and 51.1% of Juvenile Corrections youth) as compared to less than half of mainstream youth (44.8% of Public School students). More than twice as many youth out of the mainstream gambled frequently in the past year (18.1% of Alternative School students and 21.3% Juvenile Corrections youth) as compared to mainstream youth (8.9% of Public School students). About twice as many youth out of the mainstream gambled underage in the past year

(22.6% of Alternative School students and 19.9% Juvenile Corrections youth) as compared to mainstream youth (11.4% of Public School students). The fact that lottery, casino, and online gambling is illegal for underage youth was less of a deterrent for Alternative School and Juvenile Corrections youth than Public School youth. Playing legalized games while underage is higher risk behavior than playing informal games because it is illegal and has adverse legal consequences if the youth is caught. Furthermore, these rates are much higher than those reported elsewhere, such as 1% of Ontario youth gambling underage in a casino (Adlaf, Paglia-Boak, & Ialomiteanu, 2006).

This greater involvement in gambling by Alternative School and Juvenile Corrections youth is likely due to a number of factors. First, adolescent experiment with adult behaviors, and some youth experiment earlier than others. Some youth become more involved in these behaviors than other youth for various reasons, not the least of which is that they enjoy the behavior, even though they may not be emotionally mature enough to use responsible guidelines and even though they may experience negative consequences. Second, Alternative School and Juvenile Corrections youth are likely to exhibit behavioral problems that are often associated with using addictive substances and engaging in addictive behaviors and engaging in behaviors while under the influence of substances, all of which can lead to negative consequences, including being expelled from school and incarceration. Third, there are differences between the three groups on a number of demographic characteristics that could partially explain the difference in gambling rates, including that the Juvenile Corrections group had a larger proportion of males and males have higher rates of gambling than females; both Alternative School and Juvenile Corrections groups had higher proportions of racial minorities that have higher rates of gambling than whites (Peacock, Day, & Peacock, 1999; Stinchfield, et al, 1997;

Welte et al, 2008). Both Alternative School and Juvenile Corrections groups had higher rates of Individualized Education Programs, lower SES, and not living with both biological parents than Public School students, all of which could contribute to greater involvement in risky behaviors such as gambling. Fourth, Alternative School and Juvenile Corrections youth may also experience greater exposure to gambling and modeling of gambling behavior by peers and family.

*Comparison of Alternative School, Juvenile Corrections and Public School Students on Gambling Trends from 1992 to 2010*

Trends in gambling among Alternative School students showed fairly consistent and significant declines from 1992 to 2010 across nearly all games. There were three important trends in frequent gambling. First, Alternative School student rates of frequent gambling showed some fluctuations, but were relatively stable when comparing 1992 to 2010, and this is in stark contrast to the significant decline in proportion of Alternative School students who participated in any gambling. While the popularity of gambling appears to be waning among most Alternative School students, about 20% are frequent gamblers and that has remained stable from 1992 to 2010. This finding is consistent with that reported by Stinchfield (2011) for public school student rates of frequent gambling trends. Second, the 2010 results show a mix of declines and increases for various games from 2007, and there was a gender effect, where boys showed declines and girls exhibited increases. Third, there were a few games that increased from 2007 to 2010, however, only casino gambling showed a statistically significant increase from 2007 to 2010 (moving from 3.9% to 5.0%).

The comparison of the three groups showed similar rates and trajectories of declining participation in gambling from 1992 to 2010. In contrast, frequent gambling showed different

rates and trajectories for the three groups from 1992 to 2010. More Juvenile Corrections youth were frequent gamblers and their trajectory showed a consistent decline from a peak of 39% in 1992 to 21% in 2010. In contrast, both Alternative School and Public School students showed fluctuations over time but were relatively stable from 1992 to 2010. In terms of frequent gambling on specific games, there was a peak for most games in 1998 for boys with subsequent declines, while girls showed varying peaks for different games, with increases from 2007 to 2010.

Trends in underage gambling on legalized forms of gambling showed different trends for each legalized form. There has been a consistent decline in underage lottery play from 1992 to 2010. Conversely, underage casino gambling has been fairly stable between 1998 (11.6%) and 2010 (11.1%). Online gambling has only been assessed in the 2007 and 2010 and there was a slight increase from 2007 (8.1%) to 2010 (9.2%) but only two assessments does not give a reliable picture of a trend and boys showed a slight increase and girls showed a slight decrease. The decrease in lottery play is good news for those concerned about underage lottery play. This study does not determine why there is a decrease in underage lottery play, however this decline was also observed in the larger underage Public School student population (Stinchfield, 2011). It has been speculated that one possible reason for the decline is that the novelty of lottery play has gradually worn off after its introduction in 1990 in Minnesota (Stinchfield, 2011) and this may also be true for the Alternative School and Juvenile Corrections youth population. Another factor in the decline in youth gambling may be the fact that there is greater competition for the attention of youth since 1992 in the form of new technologies (e.g., internet, cell phones, smart phones) to access new social media (Facebook, Pandora, etc.) and youth have less interest and time for other social/recreational activities such as gambling.

### *Comparison of Alternative School, Juvenile Corrections and Public School Students on Problem Gambling*

Because the assessment of problem gambling was limited to two items, it is not possible to obtain a valid prevalence rate of problem gambling, however, these two items do afford a comparison between the three groups and comparison of item endorsement rates over time. In general, Juvenile Corrections and Alternative School youth showed higher rates of gambling problems than Public School students. Juvenile Corrections youth had the highest rates followed by Alternative School students followed by Public School students. This pattern was similar for both boys and girls; and boys had higher endorsement of problem gambling items than girls. Alternative School boys showed stable rates of problem gambling item endorsement from 2001 to 2004, whereas, Juvenile Corrections and Public School boys showed increases. Girls in all three groups showed relatively stable rates from 2001 to 2004.

In comparing gambling participation to gambling problems, this study shows that while gambling participation rates may ebb and flow with gambling fads, gambling problem rates stay relatively stable. This pattern fits the larger population where problem gambling rates stay relatively stable regardless of changes in gambling participation rates.

### *Correlates of Gambling*

The third specific aim is to identify correlates of gambling. The purpose of this analysis is to identify possible causes and mediators of gambling behavior among youth out of the mainstream, which may serve as risk factors for the development of problem gambling and may play a role in the onset, duration and severity of excessive gambling (Stinchfield, 2004). The analysis for Alternative School students found five correlates that accounted for 20% of the variance in gambling, including in order of magnitude, hitting or beating up another person, smoking cigars,

being a male, drinking alcoholic beverages, and vandalism. For Alternative School boys, some of the same correlates were observed as well as two new correlates of running away from home and sexual activity. Alternative School girls showed similar correlates of violence, vandalism, and tobacco and alcohol use. For Juvenile Corrections youth, similar correlates were found and some showed greater antisocial involvement, including driving a motor vehicle after alcohol or other drug use, carrying a gun or weapon on school property, and cocaine use. These correlates could be described as a mix of antisocial and risky behaviors. The greater involvement in gambling was associated with greater involvement in these antisocial and/or risky behaviors, particularly other addictive behaviors such as tobacco, alcohol and drug use. These correlates have similarities with those reported in other studies, including tobacco use, alcohol use, drug use, and antisocial behaviors (Gupta & Derevensky, 1998, Stinchfield, 2000; Vitaro, et al, 2001; Wynne, Smith & Jacobs, 1996) (See Stinchfield, 2004 for a review of correlates of youth gambling).

One of the values of this study is the large sample of youth out of the mainstream that has not been included in other studies. The sample sizes of Alternative School and Juvenile Corrections youth in this study are larger than any other studies reported thus far and therefore serve as one of the foremost sources of gambling information about youth out of the mainstream. The value of having such a large sample is that it allows for an accurate measurement of gambling for the population. Another value is the recurring assessments on a three year interval that allows for monitoring gambling trends over time. This study shows a picture of gambling trends among youth out of the mainstream 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 and it includes only six gambling frequency items. Adolescents may play other games that were not included in this survey (e.g., dice games). 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 youth who were attending Alternative School school or were in Juvenile Corrections facilities. Some out-of-the-mainstream are not included in this study, such as youth who have been expelled from Alternative School schools, students who were absent from school on the day of the survey administration, runaways, homeless youth, hospitalized youth (particularly psychiatric hospitals), and youth who have entered the workforce after dropping out of school. A third limitation is that this study relies on self-report data and this raises the question of response bias. There is no objective, independent corroboration of a student's responses, however, methods were utilized that enhance the validity of self-report data. These methods include providing and assuring the student of anonymity and confidentiality, 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; 2010a).

There are some findings in this study that raise concerns. First, youth out of the mainstream have greater gambling participation than mainstream youth. Second, a greater proportion of youth out of the mainstream are frequent gamblers (18.1% of Alternative School and 21.3% of Juvenile Corrections) than mainstream youth and this rate is over twice the rate of Public School students (8.9%). Third, a greater proportion of youth out of the mainstream are underage gamblers than their mainstream peers, specifically, Alternative School and Juvenile Corrections youth rates of underage lottery play (19.2% and 16.6%, respectively) are nearly

twice the rate of their Public School peers (9.8%). Fourth, a greater proportion of youth out of the mainstream reported gambling problems than mainstream youth. Fifth, there is a small but substantial segment of youth out of the mainstream that are frequent gamblers and this proportion has remained stable from 1992 to 2010. Sixth, gambling among youth out of the mainstream appears to be related to other risky and antisocial behaviors, such as hitting or beating up another person and tobacco and alcohol use.

One of the significant concerns raised by this study is about underage youth playing legal forms of gambling and youth out of the mainstream have higher rates of underage play than mainstream youth. Those who provide legal forms of gambling, such as operators of the State lottery and tribal casinos, do not want underage youth playing. So, how do underage youth access legal forms of gambling and how can this be prevented? Underage youth can obtain lottery products by using a fake identification or by having people of legal age buy lottery tickets 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 tickets and online gambling, it seems less likely that they could access casino gambling because they must physically 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. 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, or 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, particularly the corroboration of this self-reported underage gambling.

*Questions Answered by this Study*

- 1) Do more Alternative School and Juvenile Corrections youth gamble than Public School Students? Yes, but with one exception. In 2010, the order of gambling participation for boys was Alternative School (65.5%), Public School (58.8%) and Juvenile Corrections (54.4%). The order of gambling participation for girls was Alternative School (41.9%), Juvenile Corrections (36.2%), and Public School (31.4%).
- 2) Do more Alternative School and Juvenile Corrections youth gamble frequently than their Public School peers? Yes, in 2010, the order of frequent gambling for boys was Alternative School (23.8%), Juvenile Corrections (23.1%), and Public School (14.6%). The order of frequent gambling for girls was Juvenile Corrections (12.8%), Alternative School (11.3%), and Public School (3.4%).
- 3) Do more underage Alternative School and Juvenile Corrections youth gamble on legalized games than their Public School peers? Yes, in 2010, the order of underage gambling for boys was Alternative School (26.2%), Juvenile Corrections (19.8%), and Public School (15.2%). The order of underage gambling for girls was Juvenile Corrections (20%), Alternative School (18.6%), and Public School (7.9%).

- 4) Are more Alternative School and Juvenile Corrections youth gambling now than in the past? No, gambling participation among Alternative School and Juvenile Corrections youth has shown a gradual and consistent decline from 1992 to 2010. For Alternative School boys, gambling declined from 87.8% in 1992 to 65.5% in 2010. For Alternative School girls, gambling declined from 68.4% in 1992 to 41.9% in 2010. For Juvenile Corrections boys, gambling declined from 83.7% in 1992 to 54.4% in 2010. For Juvenile Corrections girls, gambling declined from 71.4% in 1992 to 36.2% in 2010.
- 5) Are more Alternative School and Juvenile Corrections youth gambling frequently now than in the past? No, rates of frequent gambling were relatively stable with recent declines from 2004 to 2010. For Alternative School boys, frequent gambling declined from 30.9% in 1992 to 23.8% in 2010. For Alternative School girls, frequent gambling declined from 13.5% in 1992 to 11.3% in 2010. For Juvenile Corrections boys, frequent gambling declined from 41.0% in 1992 to 23.1% in 2010. For Juvenile Corrections girls, frequent gambling declined from 19.0% in 1992 to 12.8% in 2010.
- 6) Do more underage Alternative School and Juvenile Corrections youth gamble now, than in the past? No, underage lottery play has shown significant declines from 1992 to 2010, while casino and online gambling have remained relatively stable. For Alternative School boys, underage lottery declined from 55.8% in 1992 to 22% in 2010. For Alternative School girls, underage lottery declined from 48.7% in 1992 to 15.6% in 2010. For Juvenile Corrections boys, underage lottery declined from 51.6% in 1992 to 16.1% in 2010. For Juvenile Corrections girls, underage lottery declined

from 46.3% in 1992 to 17.2% in 2010.

- 7) Do more Alternative School and Juvenile Corrections youth have gambling problems than their Public School peers? Yes, Juvenile Corrections youth and Alternative School students had significantly higher endorsement rates of the two gambling problem items than Public School students.
- 8) What behaviors are correlated with gambling among Alternative School and Juvenile Corrections youth? Tobacco use, alcohol use, drug use, running away from home, antisocial behaviors, and sexual behavior.

In conclusion, on the one hand, there are more youth out of the mainstream gambling and experiencing gambling problems than their mainstream peers and if they were included in youth gambling surveys, the prevalence rates for gambling and gambling problems would be higher. On the other hand, there were fewer youth out of the mainstream gambling in 2010 than were gambling in 1992 and this has been a gradual and consistent decline. There were also fewer underage youth out of the mainstream playing the lottery in 2010 than in 1992. Future research should explore why fewer youth out of the mainstream are gambling which could identify causal and protective factors that could be enhanced to achieve even lower rates. There is a small but significant proportion of youth out of the mainstream that gamble frequently and this proportion has remained relatively stable from 1992 to 2010. The proportion of frequent gamblers is higher among youth out of the mainstream than in their mainstream peers. Future research will need to address why there is a greater proportion of frequent gamblers among youth out of the mainstream than among their mainstream peers. There is a segment of youth out of the mainstream 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 these youth so methods to prevent the development of problem gambling can be implemented and thus improve the health and functioning of these youth out of the mainstream.

## References

- Adlaf, E., Paglia-Boak, A., & Ialomiteanu, A. (2006). Underage gambling in Ontario casinos. *Journal of Gambling Issues, 16*, 1-4.
- Gupta, R., & Derevensky, J. (1998). An empirical investigation of Jacobs' General Theory of Addictions: Do adolescent gamblers fit the theory? *Journal of Gambling Studies, 14*, 17-49.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2009). *Monitoring the Future national survey results on drug use, 1975-2008. Volume 1: Secondary school students* (NIH Publication No. 09-7402). Bethesda, MD: National Institute on Drug Abuse, 721 pp.
- Minnesota Student Survey Interagency Team. (2007). *2007 Minnesota Student Survey statewide tables*. Minnesota Departments of Education, Health, Human Services, and Public Safety: Saint Paul, MN.
- Minnesota Student Survey Interagency Team. (2010a). *Minnesota Student Survey*. Minnesota Departments of Education, Health, Human Services, and Public Safety: Saint Paul, MN.
- Minnesota Student Survey Interagency Team. (2010b). *2010 Minnesota Student Survey Statewide Tables, Fall 2010*. Minnesota Departments of Education, Health, Human Services, and Public Safety: Saint Paul, MN.
- Minnesota Student Survey Interagency Team. (2010c). *Minnesota Student Survey 1992-2010 Trends*. Minnesota Departments of Education, Health, Human Services, and Public Safety: Saint Paul, MN.
- Peacock, R. B., Day, P. A., & Peacock, T. D. (1999). Adolescent gambling on a great lakes Indian reservation. *Journal of Human Behavior in the Social Environment, 2* (1/2), 5-17.

- Slavin, M., Pilver, C. E., Hoff, R. A., Krishnan-Sarin, S., Steinberg, M. A., Rugle, L., & Potenza, M. N. (2013). Serious physical fighting and gambling-related attitudes and behaviors in adolescents. *Journal of Behavioral Addictions, 2*(3), 167-178. doi: 10.1556/JBA.2.2013.009
- Stinchfield, R. (2000). Gambling and correlates of gambling among Minnesota public school students. *Journal of Gambling Studies, 16*, 153-173.
- Stinchfield, R. (2001). A Comparison of Gambling among Minnesota Public School Students in 1992, 1995 and 1998. *Journal of Gambling Studies, 17*, 273-296.
- Stinchfield, R. (2004). Demographic, Psychosocial, and Behavioral Factors Associated with Youth Gambling and Problem Gambling. In Derevensky, J., & Gupta, R. (Eds.), *Gambling problems in youth: Theoretical and applied perspectives* (pp. 27-39). New York: Kluwer Academic/Plenum Publishers.
- Stinchfield, R. (2011). Gambling among Minnesota Public School Students from 1992 to 2010: Declines in Youth Gambling. *Psychology of Addictive Behaviors, 25*(1), 108-117.
- Stinchfield, R., Cassuto, N., Winters, K., & Latimer, W. (1997). Prevalence of Gambling among Minnesota Public School Students in 1992 and 1995. *Journal of Gambling Studies, 13*, 25-48.
- Stinchfield, R. & Winters, K. C. (1998). Gambling and problem gambling among youth. *Annals of the American Academy of Political and Social Science, 556*, 172-185.
- Vitaro, F., Brendgen, M., Ladouceur, R., & Tremblay, R. E. (2001). Gambling, delinquency, and drug use during adolescence: Mutual influences and common risk factors. *Journal of Gambling Studies, 17*, 171-190.
- Welte, J. W., Barnes, G. M., Tidwell, M. O., Hoffman, J. H. (2008). The prevalence of problem gambling among U.S. adolescents and young adults: Results from a national survey. *Journal of Gambling Studies, 24*, 119-133.

- Welte, J. W., Barnes, G. M., Tidwell, M. O., Hoffman, J. H. (2009). Association between problem gambling and conduct disorder in a national survey of adolescents and young adults in the United States. *Journal of Adolescent Health, 45*, 396-401.
- Winters, K. C., Stinchfield, R., & Fulkerson, J. (1993). Toward the development of an adolescent gambling problem severity scale. *Journal of Gambling Studies, 9(1)*, 63-84.
- Winters, K. C., Stinchfield, R., & Kim, L. G. (1995). Monitoring adolescent gambling in Minnesota. *Journal of Gambling Studies, 11(2)*, 165-183.
- Wynne, H., Smith, G., & Jacobs, D. (1996). Adolescent gambling and problem gambling in Alberta. Edmonton, Alberta: Alberta Alcohol and Drug Abuse Commission.

Author Notes

This study was conducted with funds from the State of Minnesota to the Northstar Problem Gambling Alliance, Roseville, Minnesota. The Minnesota Student Survey data was provided by public school students, alternative school students and youth in juvenile corrections in Minnesota and managed by the Minnesota Student Survey Interagency Team (1992, 1995, 1998, 2001, 2004, 2007, and 2010). I would also like to thank Cathie Perrault, executive director, and the board of directors of the Northstar Problem Gambling Alliance for their helpful reviews of the manuscript.



## Appendix A

*Gambling Trends from 1992 to 2010 for Alternative School Students*

Rates of any gambling among Alternative School students broken down by gender and by game from 1992 to 2010 are shown in Table A. The phrase “any game” refers to any gambling on any of the six forms of gambling. The main trend is one of fairly consistent and significant declines in gambling rates from 1992 to 2010 across nearly all games and many of the declines from 2007 to 2010 were statistically significant. There were fewer Alternative School students gambling in 2010 (54.6%) than were gambling in 1992 (77.8%). A comparison of the difference between 2007 and 2010 gambling rates show statistically significant declines for all Alternative School students for betting on cards, skill games, lottery and any game. For Alternative School boys, statistically significant declines were found for betting on cards, skill games, sports, lottery and any game. For Alternative School girls, statistically significant declines were found for betting on cards, skill games, lottery and any game. There are a few exceptions to the general trend of decline and those are slight increases in online gambling by all Alternative School students and by Alternative School girls, however, these increases did not reach statistical significance. Figure A shows a gradual decline in gambling participation rates from 1992 to 2010 for Alternative School boys and girls.

Rates of frequent gambling (weekly or daily) for all Alternative School students, boys, girls, and broken down by game from 1992 to 2010 are presented in Table B. There are three important findings in Table B. First, rates of frequent gambling, although showing some fluctuations up and down over time, were relatively stable when comparing 1992 to 2010. There was about the same proportion of Alternative School students gambling frequently in 2010 (18.1%) as there was in 1992 (21.9%). Second, the 2010 survey showed declines from 2007 for

some games and some declines were statistically significant, including frequent gambling on cards, skill games, and any game for all students. Alternative School Boys showed statistically significant declines in card playing, betting on games of personal skill, and any game.

Alternative School Girls did not show any statistically significant changes from 2007 to 2010.

Third, there were some instances of increases from 2007 to 2010 and the increase in casino gambling was statistically significant, moving from 3.9% to 5.0%. Alternative School Girls showed more increases than decreases from 2007 to 2010 but none reached statistical significance. Figure A shows that rates of frequent gambling by Alternative School boys and girls, while showing some fluctuations, have remained relatively stable from 1992 to 2010, and boys showed a significant decline in frequent gambling from 2007 (29.7%) to 2010 (23.8%).

Figure B shows rates of gambling by Alternative School boys for each game from 1992 to 2010. This figure shows a decline for all games from 1992 to 2010 and a decline for casino play from 1998 to 2010, while online gambling was stable from 2007 to 2010. Figure C shows rates of frequent gambling by Alternative School boys for each game from 1992 to 2010. There was a peak for most games in 1998 with subsequent declines to 1992 levels by 2010. Online gambling was stable at 5% at both 2007 and 2010. Figure D shows rates of gambling by Alternative School girls for all games from 1992 to 2010. Figure D shows significant declines in lottery and card play from 1992 to 2010, and more modest declines for betting on skill games, sports betting and casino gambling. Online gambling bucked the trend showing a slight increase from 2007 (2.2%) to 2010 (3.4%). Figure E shows rates of frequent gambling by Alternative School girls for all games from 1992 to 2010. There is a mix of trends. Frequent lottery play declined from 1992 to 2010, while cards was stable and all other games have shown slight increases. There were no significant changes from 2007 to 2010 in frequent play on any game

for Alternative School girls.

Table A

*Any gambling in last 12 months for Alternative School Students by Gender and each Game from 1992 to 2010*

Game	1992 %	1995 %	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
<b>All Alternative School Students</b>									
Cards	51.2	51.6	46.4	41.8	42.0	41.5	33.8	<b>-7.7**</b>	-19
Skill games	37.5	33.3	35.4	36.5	35.9	35.1	30.4	<b>-4.7**</b>	-13
Sports teams	32.2	30.3	26.7	25.5	24.7	23.4	21.6	-1.8	-8
Lottery	58.3	48.7	43.1	36.9	33.6	33.9	27.5	<b>-6.4**</b>	-19
Casino	NA	NA	23.9	20.6	24.7	21.0	19.7	-1.3	-7
Online	NA	NA	NA	NA	NA	6.5	7.0	0.5	6
Any game	77.8	72.3	70.5	64.6	64.4	61.6	54.6	<b>-7.0**</b>	-11
<b>Alternative School Boys</b>									
Cards	65.9	66.0	61.3	55.1	57.0	54.9	45.5	<b>-9.4**</b>	-17
Skill games	56.5	51.5	55.4	52.9	53.3	50.6	43.4	<b>-7.2**</b>	-14
Sports teams	49.4	45.0	42.1	40.1	37.7	34.3	31.1	<b>-3.2*</b>	-9
Lottery	63.4	51.3	47.5	41.4	39.2	37.4	31.6	<b>-5.8**</b>	-16
Casino	NA	NA	28.6	24.0	29.4	24.4	22.7	-1.7	-7
Online	NA	NA	NA	NA	NA	10.4	10.2	-0.2	-2
Any Game	87.8	82.5	81.5	75.5	76.3	72.8	65.5	<b>-7.3**</b>	-10
<b>Alternative School Girls</b>									
Cards	37.5	38.0	32.7	28.6	25.7	26.6	20.1	<b>-6.5**</b>	-24
Skill games	19.8	16.2	16.9	20.0	17.0	17.8	15.1	<b>-2.7*</b>	-15
Sports teams	16.0	16.6	12.4	11.0	10.8	11.3	10.5	-0.8	-7
Lottery	53.4	46.3	39.0	32.5	27.6	29.9	22.6	<b>-7.3**</b>	-24
Casino	NA	NA	19.5	17.1	19.8	17.3	16.2	-1.1	-6
Online	NA	NA	NA	NA	NA	2.2	3.4	1.2	57
Any Game	68.4	62.7	60.3	53.7	51.6	49.2	41.9	<b>-7.3**</b>	-15

*Note.* NA denotes Not Available. Any game refers to highest rate of gambling across all six games. Bold and asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): \* p < .05, \*\* p < .01.

Table B

*Weekly/Daily Gambling in last 12 months for AS Students by Gender and each Game from 1992-2010*

Game	1992 %	1995 %	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
<b>All Alternative School Students</b>									
Cards	8.8	10.0	12.2	10.5	10.3	11.0	8.6	<b>-2.4**</b>	-22
Skill games	7.2	7.7	10.2	10.5	10.4	10.3	8.0	<b>-2.3**</b>	-22
Sports teams	4.7	5.7	6.7	7.2	7.0	5.8	5.8	0.0	0
Lottery	12.6	9.4	13.1	10.9	10.7	8.9	8.6	-0.3	-3
Casino	NA	NA	4.5	4.0	3.7	3.9	5.0	<b>1.1*</b>	28
Online	NA	NA	NA	NA	NA	3.0	3.3	0.3	10
Any Game	21.9	18.8	24.8	22.0	21.8	21.1	18.1	<b>-3.0**</b>	-14
<b>Alternative School Boys</b>									
Cards	13.0	16.8	19.2	16.9	16.6	16.3	12.0	<b>-4.3**</b>	-26
Skill games	12.7	13.8	18.3	17.9	17.8	17.2	12.2	<b>-5.0**</b>	-29
Sports teams	8.2	10.4	11.8	12.6	12.4	9.5	8.6	-0.9	-9
Lottery	15.5	13.0	17.9	14.3	14.1	11.7	10.3	-1.4	-12
Casino	NA	NA	6.9	6.1	5.6	5.7	6.6	0.9	16
Online	NA	NA	NA	NA	NA	5.0	4.9	-0.1	-2
Any Game	30.9	28.5	36.3	32.2	32.0	29.7	23.8	<b>-5.9**</b>	-20
<b>Alternative School Girls</b>									
Cards	4.9	3.7	5.7	4.1	4.1	5.0	4.5	-0.5	-10
Skill games	2.1	2.0	2.7	3.0	2.9	2.5	3.1	0.6	24
Sports teams	1.4	1.3	2.0	1.7	1.6	1.6	2.5	0.9	56
Lottery	9.9	6.0	8.7	7.5	7.3	5.8	6.7	0.9	16
Casino	NA	NA	2.4	2.0	1.8	1.9	3.0	1.1	58
Online	NA	NA	NA	NA	NA	0.7	1.4	0.7	100
Any Game	13.5	9.6	14.1	11.8	11.5	11.4	11.3	-0.1	-1

*Note.* NA = Not Available. Any game refers to highest gambling across all six games. Bold and asterisks denote statistical significance of the difference between two independent proportions (z-ratio, two-tailed): \*p < .05, \*\*p < .01.

