

Comparison of Gambling among Metro and Outstate Minnesota Public School Students

Randy Stinchfield, Ph.D.

Department of Psychiatry

University of Minnesota School of Medicine

Running head: GAMBLING AMONG URBAN AND RURAL YOUTH

Abstract

The specific aims of this study were fourfold. First, compare metro versus outstate youth 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 metro versus outstate youth rates of any gambling, frequent gambling, and underage gambling from 1998 to 2010. Third, compare metro versus outstate youth on endorsement of two problem gambling items from 1998 to 2004. Fourth, identify the correlates of gambling among metro versus outstate youth. The data was drawn from the Minnesota Student Survey (MSS) and the 2010 MSS public school sample includes 20,671 male and 22,119 female metro students; and the outstate sample includes 18,082 male and 18,451 female youth. Four additional administrations of the MSS to public school samples were analyzed to examine gambling trends over time including 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. This study tested the hypothesis that outstate youth are more involved in gambling than metro youth. There were more similarities than differences between the two groups in terms of rates of participation in gambling. The only consistent difference was that more Outstate youth bought lottery tickets than Metro youth. Both groups showed significant declines in gambling participation from 1998 to 2010, however, frequent gambling showed only modest declines over this time period. Both Metro and Outstate youth had similar correlates to explain the variance in gambling and these correlates included antisocial behavior, sexual activity, tobacco use, and alcohol use.

Keywords: Youth gambling; Adolescent gambling; Teenage gambling; urban youth; rural youth.

Comparison of Gambling among Metro and Outstate Minnesota Public School Students

Gambling among youth has been studied in North America and other countries around the globe (Volberg, et al, 2010). Some of the earliest studies of youth gambling were conducted in Minnesota, starting shortly after the onset of the Minnesota State Lottery in 1990 and the final negotiation of compacts between tribal governments and the State of Minnesota which resulted in the development of casino gambling (Winters, Stinchfield & Fulkerson, 1993; Stinchfield, 2011). Youth are thought to be at greater risk of getting involved in gambling, excessive gambling and the development of gambling problems than adults (Derevensky & Gupta, 2004). Most of these youth gambling studies have administered surveys in schools or via the telephone. All of these early studies could be described as simply reporting on gambling among youth. The next phase of youth gambling research is to look beyond the simple reporting of gambling participation rates and determine what are the antecedents, causes? And what maintains youth gambling in the face of negative consequences? These studies look at the relationship between gambling and youth characteristics, such as gender, age, grade in school, tobacco and alcohol use, to name a few. These studies are attempting to explain which youth are involved in gambling while others are not. One such variable that has not been examined is where youth live, specifically, the comparison of urban versus rural youth. The question arises, do rural youth gamble more or less than urban youth? Is the rural setting more likely to facilitate gambling than an urban or metropolitan setting?

This study has four specific aims. First, compare metro versus outstate youth 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 metro versus outstate youth rates of any gambling, frequent gambling, and underage gambling from

1998 to 2010. Third, compare metro versus outstate youth on endorsement of two problem gambling items from 1998 to 2004. Fourth, identify the correlates of gambling among metro versus outstate youth.

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). This study compared two groups: (a) students from the seven county Twin Cities Metropolitan Area; and (b) greater Minnesota. The MSS was administered to 9th and 12th grade students in public schools. Demographics of both groups are presented in Table 1. There were some differences between the two groups on the distribution of race, with the Metro group having more racial minorities than the Outstate group and thus the Outstate group had a larger proportion of White students. Specifically, the Outstate group had a greater proportion of White students (84.4%) than Metro group (69%); and the Outstate group had a greater proportion of American Indian youth (1.6%) than Metro group (0.7%). The Metro group had a larger proportion of African American students (7.2%) than the Outstate group (1.5%); and the Metro group had a greater proportion of Asian American students (8.3%) than the Outstate group (1.8%). Besides the 2010 data, four additional MSS student samples were analyzed to examine changes over time, including 1998, 2001, 2004, and 2007.

Table 1

Demographic Characteristics of 2010 Metro and Outstate Students

	Metro N = 42,790 N (%)	Outstate N = 36,533 N (%)
Gender		
Boys	20,671 (48.3)	18,082 (49.5)
Girls	22,119 (51.7)	18,451 (50.5)
Grade		
9 th Grade	24,320 (56.8)	20,340 (55.7)
12 th Grade	18,470 (43.2)	16,193 (44.3)
Age		
14	8,692 (20.3)	6,355 (17.4)
15	15,105 (35.3)	13,321 (36.5)
16	539 (1.3)	678 (1.9)
17	7,001 (16.4)	5,352 (14.6)
18	11,058 (25.8)	10,373 (28.4)
19-20	395 (0.9)	454 (1.2)
Race		
American Indian	280 (0.7)	584 (1.6)
African American	3,102 (7.2)	566 (1.5)
Mexican American	1,378 (3.2)	857 (2.3)
Latin American	474 (1.1)	208 (0.6)
Asian American	3,544 (8.3)	640 (1.8)
White	29,528 (69.0)	30,826 (84.4)
Mixed Race	3,432 (8.0)	2001 (5.5)
Unknown/Missing	1,052 (2.5)	851 (2.3)
Individualized Education Program (IEP)	6,361 (15.4)	5,707 (16.2)
Free/Reduced price lunch at school	10,008 (23.7)	9,283 (25.8)
Live with both biological parents	26,918 (62.9)	22,357 (61.2)

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, and 1998: (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. Frequencies including count and percentages were computed for each analysis and chi-squares were computed for comparisons of the two groups. The proportions of the sample for each form of gambling at each assessment was computed for each group and broken down by gender. 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 comparison of the two most recent surveys (2007 and 2010) in the series indicates current changes in gambling rates. 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 1998 to 2010. This comparison addresses the question: Are youth gambling more, less, or about the same as the last survey? 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 two groups, metro versus outstate students, 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 two groups on gambling trends from 1998 to 2010, specifically comparing rates of any gambling, frequent gambling, and underage gambling. Third, compare the two groups on the two problem gambling items, last administered in 2004, and from 1998 to 2004. Fourth, identify the correlates of gambling among metro and outstate students.

Comparison of Metro vs. Outstate Students on 2010 rates of gambling, frequent gambling, and

underage gambling

Rates of gambling frequency by boys and girls in Metro and Outstate schools for each game are shown in Tables 2 and 3, respectively. Table 2 shows that Metro boys gamble at very similar rates as Outstate boys and the comparison of highest level of gambling are nearly identical. Table 3 shows that Metro girls gamble at very similar rates to Outstate girls. Outstate girls had a slight edge on more gambling than Metro girls.

A comparison of Metro versus Outstate students any gambling for each game broken down by gender is shown in Table 4. Each comparison was tested with a chi-square statistic. There were four statistically significant comparisons: (a) slightly more outstate girls gambled than metro girls; (b) slightly more Metro 9th grade boys gambled than Outstate; (c) slightly more Outstate 12th grade boys gambled than Metro; and (d) more Outstate 12th grade girls gambled than Metro girls. In terms of games, boys showed statistically significant differences for five out of the six games and the sixth game was nearly statistically significant, but the differences were not all consistent for one group. Metro boys had greater involvement in playing cards, betting on games of personal skill, sports betting, and online gambling. Outstate boys had greater involvement in lottery. For girls, there were two statistically significant differences: (a) more Metro girls bet on sports; and (b) more Outstate girls bought lottery tickets. In summary, the two consistent differences were that Outstate boys and girls bought more lottery tickets than Metro boys and girls; and more Metro boys and girls bet on sports than Outstate boys and girls.

A comparison of Metro to Outstate youth on frequent gambling for each game broken down by gender is shown in Table 5. Metro boys and girls had frequent gambling rates similar to Outstate boys and girls. When grade was included, more Metro 9th grade boys were frequent gamblers than Outstate 9th grade boys. More Outstate 12th grade boys and girls were frequent

gamblers than Metro 12th grade boys and girls. When comparing Metro to Outstate boys on frequent gambling all comparisons were statistically significant, and again, more Metro boys played cards, bet on games of personal skill, bet on sports, gambled in a casino, and gambled online. The only game where more Outstate boys played than Metro boys was the lottery. For girls, there were more similarities than differences. There was only one statistically significant difference: more outstate girls bought lottery tickets than Metro girls. In summary, the consistent difference was that more Outstate boys and girls bought lottery tickets frequently than Metro boys and girls. More Metro boys played all other games frequently than Outstate boys, and girls showed more similarities on frequent gambling than boys.

Table 2

Comparison of Metro versus Outstate Boys on Gambling Frequency for each Game in 2010

Gambling Frequency	Groups	
	Metro %	Outstate %
Played Cards for Money		
Not at all	59.4	61.2
Less than Monthly	22.3	21.8
Monthly	10.3	10.3
Weekly	4.8	4.5
Daily	2.9	2.1
Bet money on games of personal skill like pool, golf or bowling		
Not at all	62.0	65.2
Less than Monthly	19.5	19.0
Monthly	10.1	9.0
Weekly	5.0	4.4
Daily	2.8	2.0
Bet money on sports teams		
Not at all	67.1	72.9
Less than Monthly	17.6	15.2
Monthly	8.1	6.7
Weekly	3.9	2.8
Daily	2.5	1.7

Bought lottery tickets or scratch offs		
Not at all	79.2	72.2
Less than Monthly	10.4	12.6
Monthly	4.6	7.3
Weekly	2.6	4.9
Daily	2.1	1.9
Gambled in a casino		
Not at all	82.4	81.9
Less than Monthly	7.2	8.7
Monthly	4.9	5.1
Weekly	2.3	2.2
Daily	2.0	1.4
Gambled for money online		
Not at all	92.0	93.7
Less than Monthly	2.2	2.0
Monthly	1.5	1.2
Weekly	1.2	0.8
Daily	2.1	1.5
Highest level of gambling across all games		
Not at all	40.9	41.5
Less than Monthly	28.7	27.6
Monthly	15.8	16.2
Weekly	9.1	10.2
Daily	5.5	4.5

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 Metro versus Outstate Girls on Gambling Frequency for each Game in 2010

Gambling Frequency	Groups	
	Metro %	Outstate %
Played Cards for Money		
Not at all	87.1	87.2
Less than Monthly	9.4	9.4
Monthly	2.2	2.3
Weekly	0.8	0.7
Daily	0.4	0.3
Bet money on games of personal skill like pool, golf or bowling		
Not at all	89.9	90.1
Less than Monthly	7.0	7.0
Monthly	1.8	1.7
Weekly	0.6	0.6
Daily	0.4	0.3
Bet money on sports teams		
Not at all	90.3	91.9
Less than Monthly	6.8	5.8
Monthly	1.5	1.2
Weekly	0.5	0.4
Daily	0.4	0.3

Bought lottery tickets or scratch offs		
Not at all	86.9	82.4
Less than Monthly	9.0	11.3
Monthly	2.3	3.6
Weekly	0.9	1.7
Daily	0.4	0.5
Gambled in a casino		
Not at all	90.2	89.7
Less than Monthly	6.5	7.2
Monthly	1.8	1.8
Weekly	0.6	0.6
Daily	0.4	0.3
Gambled for money online		
Not at all	98.4	98.6
Less than Monthly	0.4	0.4
Monthly	0.2	0.1
Weekly	0.2	0.1
Daily	0.3	0.3
Highest level of gambling across all games		
Not at all	69.7	67.2
Less than Monthly	21.5	22.5
Monthly	5.5	6.6
Weekly	2.3	2.8
Daily	0.9	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 Metro to Outstate youth on Any Gambling for each Game and by Gender in 2010

Game	Metro %	Outstate %	X^2 (p)
Boys any game	59.1	58.5	1.5 (.23)
Girls any game	30.3	32.8	30.8 (<.001)
9 th Grade Boys any game	52.7	48.5	38.0 (<.001)
12 th Grade Boys any game	67.6	70.8	19.7 (<.001)
9 th Grade Girls any game	23.6	22.4	4.7 (.03)
12 th Grade Girls any game	38.9	46.2	95.2 (<.001)
Boys			
Played cards for money	40.4	38.7	11.8 (.001)
Bet money on games of personal skill like pool, golf or bowling	37.6	34.6	39.8 (<.001)
Bet money on sports teams	32.4	26.5	157 (<.001)
Bought lottery tickets or scratch offs	19.9	27.0	275 (<.001)
Gambled in a casino	16.7	17.5	4.6 (.03)
Gambled for money online	7.0	5.6	30.4 (<.001)
Girls			
Played cards for money	12.9	12.7	0.2 (.68)
Bet money on games of personal skill like pool, golf or bowling	9.9	9.6	0.6 (.45)
Bet money on sports teams	9.3	7.7	32.5 (<.001)
Bought lottery tickets or scratch offs	12.6	17.1	164.8 (<.001)
Gambled in a casino	9.3	9.9	4.3 (.04)
Gambled for money online	1.1	1.0	2.9 (.09)

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

Table 5

Comparison of Metro to Outstate youth on Weekly/Daily Gambling Frequency for each Game and by Gender in 2010

Game	Metro %	Outstate %	X^2 (p)
Boys any game	14.6	14.7	0.1 (.80)
Girls any game	3.2	3.7	6.4 (.01)
9 th Grade Boys any game	12.7	10.4	28.5 (<.001)
12 th Grade Boys any game	17.0	19.9	23.5 (<.001)
9 th Grade Girls any game	2.8	2.5	2.2 (.14)
12 th Grade Girls any game	3.8	5.2	21.5 (<.001)
Boys			
Played cards for money	7.7	6.6	17.6 (<.001)
Bet money on games of personal skill like pool, golf or bowling	7.8	6.5	27.7 (<.001)
Bet money on sports teams	6.5	4.5	69.4 (<.001)
Bought lottery tickets or scratch offs	4.7	6.9	87.7 (<.001)
Gambled in a casino	4.4	3.7	12.7 (<.001)
Gambled for money online	3.2	2.4	26.8 (<.001)
Girls			
Played cards for money	1.2	1.0	3.4 (.07)
Bet money on games of personal skill like pool, golf or bowling	1.0	0.9	0.6 (.45)
Bet money on sports teams	0.9	0.7	5.1 (.02)
Bought lottery tickets or scratch offs	1.3	2.1	40.2 (<.001)
Gambled in a casino	0.9	0.9	0.3 (.57)
Gambled for money online	0.5	0.5	0.8 (.39)

Note. 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. The comparison of Metro to Outstate students on underage gambling on legal forms of gambling in 2010 for boys and girls is shown in Tables 6 and 7. Rates of underage gambling frequency by boys and girls are relatively similar between Metro and Outstate boys and girls as shown in Table 6. Table 7 includes the statistical comparison and it reveals two statistically significant differences for boys: (a) more Outstate underage boys played the lottery than Metro underage boys; and (b) more Metro underage boys gambled online than Outstate underage boys. Underage girls did not show any statistically significant differences.

Table 6

Comparison of Metro to Outstate Students on Underage Gambling Frequency on Legalized Games by Gender in 2010

Gambling Frequency	Groups	
	Metro %	Outstate %
Underage Boys Bought Lottery Tickets		
Not at all	87.9	86.5
Less than Monthly	6.1	6.4
Monthly	2.5	3.6
Weekly	1.7	2.1
Daily	1.8	1.3
Underage Boys Gambled in a Casino		
Not at all	94.5	95.0
Less than Monthly	1.8	2.0
Monthly	1.2	1.2
Weekly	0.7	0.7
Daily	1.8	1.2
Underage Boys Gambled Online		
Not at all	93.9	94.8
Less than Monthly	1.8	1.9
Monthly	1.2	1.0
Weekly	1.1	0.8
Daily	2.0	1.5

Underage Girls Bought Lottery Tickets		
Not at all	93.1	92.5
Less than Monthly	4.6	4.8
Monthly	1.2	1.6
Weekly	0.7	0.8
Daily	0.3	0.3
Underage Girls Gambled in a casino		
Not at all	98.4	98.6
Less than Monthly	0.8	0.8
Monthly	0.3	0.3
Weekly	0.2	0.1
Daily	0.3	0.3
Underage Girls Gambled for money online		
Not at all	99.0	99.1
Less than Monthly	0.4	0.4
Monthly	0.2	0.1
Weekly	0.2	0.1
Daily	0.3	0.3

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

Table 7

Comparison of Metro to Outstate Students on any Underage Gambling for each Legal Game by Gender in 2010

Game	Metro %	Outstate %	X^2 (p)
Underage Boys			
Bought lottery tickets or scratch offs	12.1	13.5	12.2 (<.001)
Gambled in a casino	5.5	5.0	3.2 (.07)
Gambled for money online	6.1	5.2	9.8 (.002)
Underage Girls			
Bought lottery tickets or scratch offs	6.9	7.5	4.0 (.04)
Gambled in a casino	1.6	1.4	2.0 (.16)
Gambled for money online	1.0	0.9	2.2 (.14)

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

Comparison of Metro and Outstate Students on Gambling Trends from 1998 to 2010

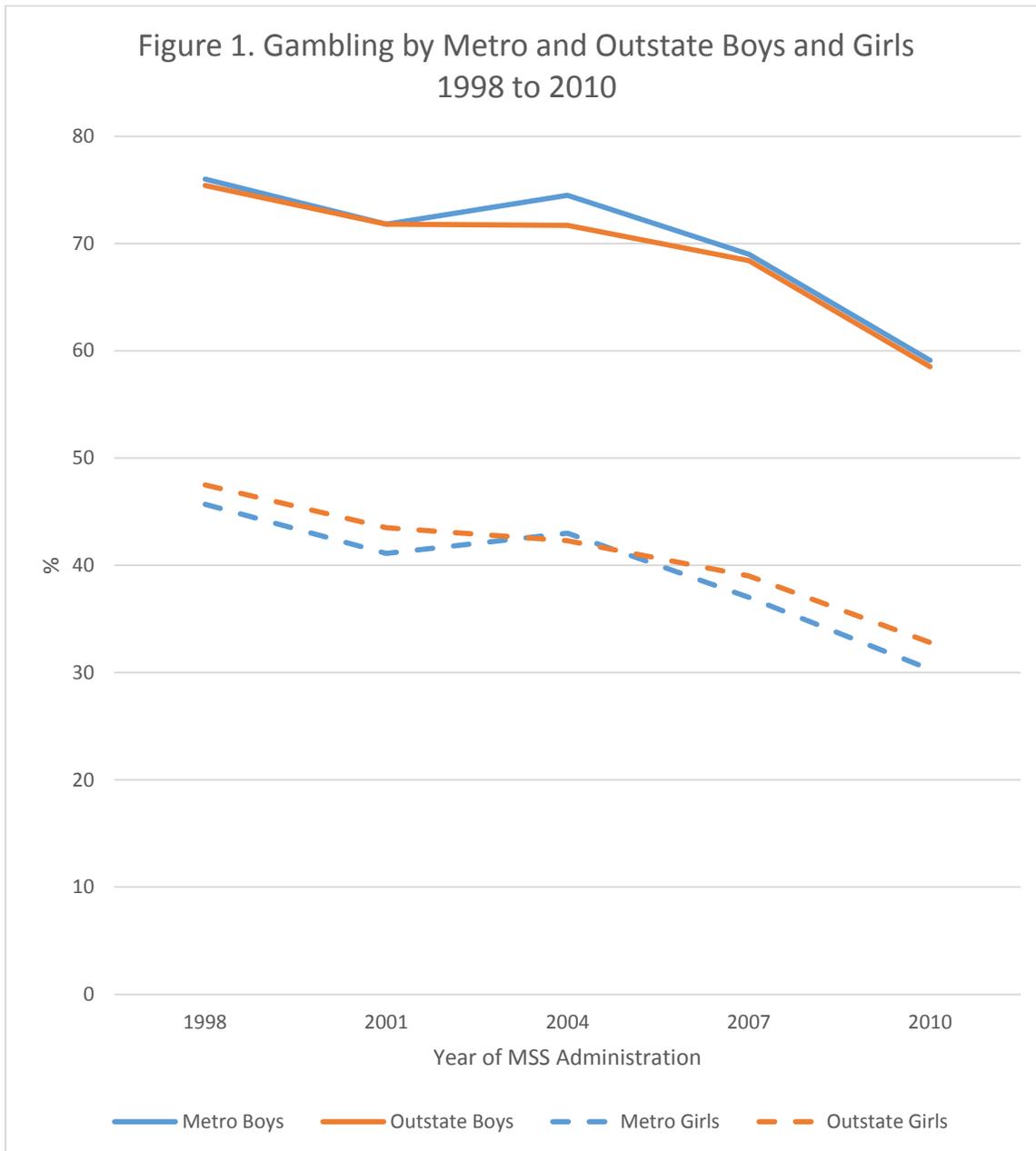
A comparison of gambling from 1998 to 2010 for both groups and broken down by gender is shown in Table 8. Both groups and both genders within each group showed statistically significant declines from 2007 to 2010. Gambling from 1998 to 2010 showed relatively consistent declines for both groups and both genders within each group. Figure 1 illustrates that both groups had nearly identical rates and nearly identical trajectories of declining gambling from 1998 to 2010.

Table 8

Any Gambling in past year by Metro and Outstate Students broken down by Gender from 1998 to 2010

Group	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
Boys							
Metro	76.0	71.8	74.5	69.0	59.1	-9.9**	-14
Outstate	75.4	71.8	71.7	68.4	58.5	-9.9**	-14
Girls							
Metro	45.7	41.1	43.0	37.0	30.3	-6.7**	-18
Outstate	47.5	43.5	42.3	39.0	32.8	-6.2**	-16

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



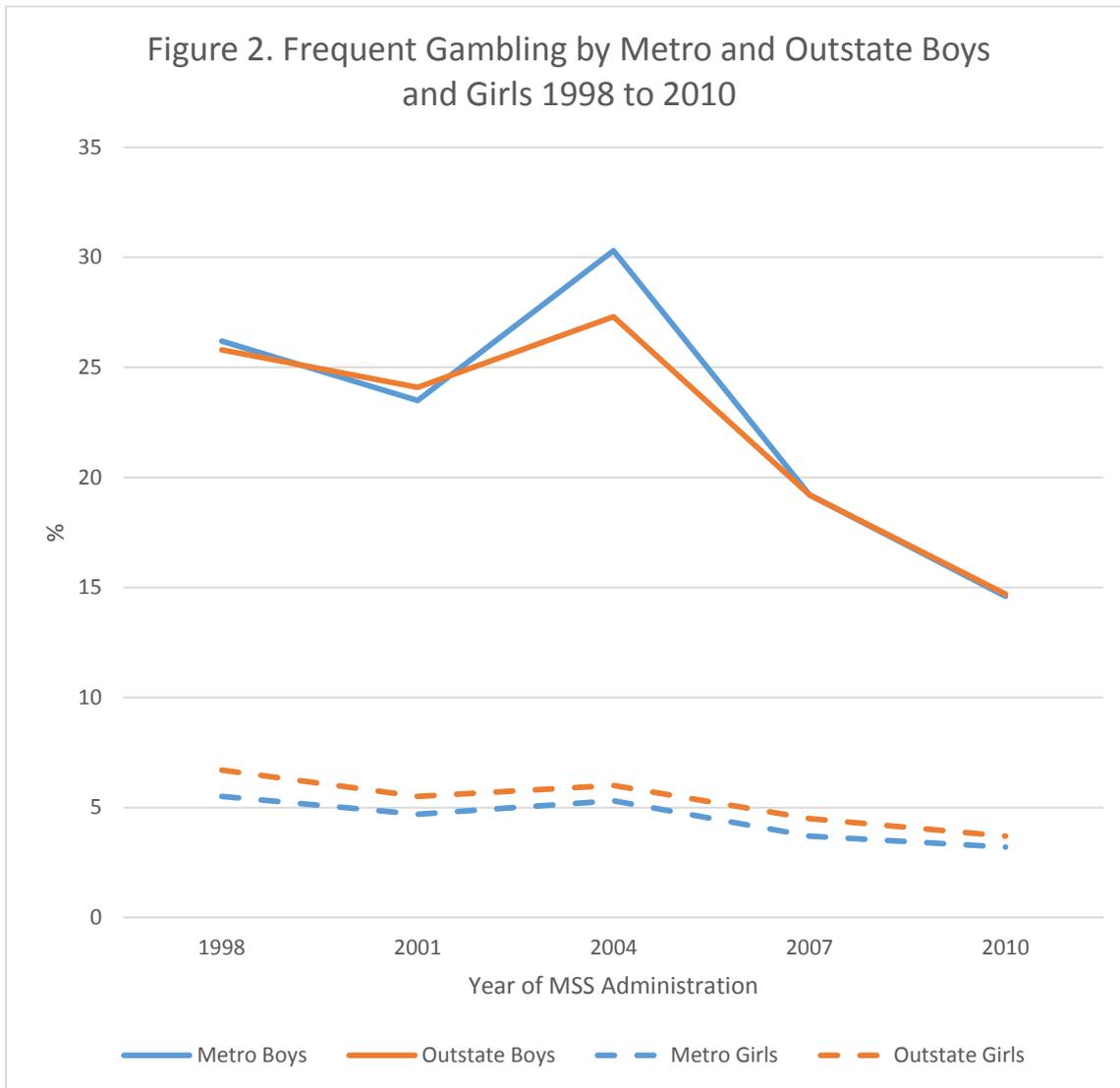
A comparison of frequent gambling from 1998 to 2010 for both groups and broken down by gender is shown in Table 9. Both groups and genders within each group showed statistically significant declines from 2007 to 2010. Frequent gambling from 1998 to 2010 showed declines, with one exception (2004), for both groups and both genders within each group. Figure 2 illustrates comparisons of the rates of frequent gambling for Metro and Outstate boys and girls, respectively. Both group's rates and trajectories are similar and for boys both rates and trajectories are nearly identical between Metro and Outstate. For girls, Outstate has slightly higher rates, but the trajectories are nearly identical and show declines, with one exception (2004), and both groups show decreases from 1998 to 2010.

Table 9

Weekly/Daily Gambling by Metro and Outstate students broken down by Gender from 1998 to 2010

Group	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
Boys							
Metro	26.2	23.5	30.3	19.2	14.6	-4.6**	-24
Outstate	25.8	24.1	27.3	19.2	14.7	-4.5**	-23
Girls							
Metro	5.5	4.7	5.3	3.7	3.2	-0.5**	-14
Outstate	6.7	5.5	6.0	4.5	3.7	-0.8**	-18

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 1998 to 2010 for boys and girls in Metro and Outstate groups are shown in Tables 10 and 11 and Figures 3 and 4. Table 10 and Figure 3 show that both Metro and Outstate boys had similar rates and trajectories for underage lottery and casino gambling. Both Metro and Outstate underage boys showed similar declines from 1998 to 2010 in both lottery and casino gambling. There were statistically significant declines from 2007 to 2010 for underage lottery and online gambling for both Metro and Outstate boys, and Outstate boys also showed a statistically significant decline for casino gambling. Table 11 and Figure 4 show that both Metro and Outstate girls had nearly identical rates and trajectories for underage lottery and casino gambling. Both Metro and Outstate underage girls showed nearly identical declines from 1998 to 2010 in both lottery and casino gambling. There were statistically significant declines from 2007 to 2010 for underage lottery for both Metro and Outstate girls. Online gambling was assessed in 2007 and 2010 and both Metro and Outstate underage boys and girls had low rates of participation and the rates were stable from 2007 to 2010.

Table 10

Underage Gambling by Metro and Outstate Boys from 1998 to 2010

Game	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
Metro							
Lottery	22.7	17.3	13.9	14.4	12.1	-2.3**	-16
Casino	8.8	7.2	5.5	5.7	5.5	-0.2	-4
Online	NA	NA	NA	6.7	6.1	-0.6*	-9
Outstate							
Lottery	23.4	17.7	14.8	15.9	13.5	-2.4**	-15
Casino	7.4	5.8	5.1	5.7	5.0	-0.7*	-12
Online	NA	NA	NA	6.8	5.2	-1.6**	-24

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.

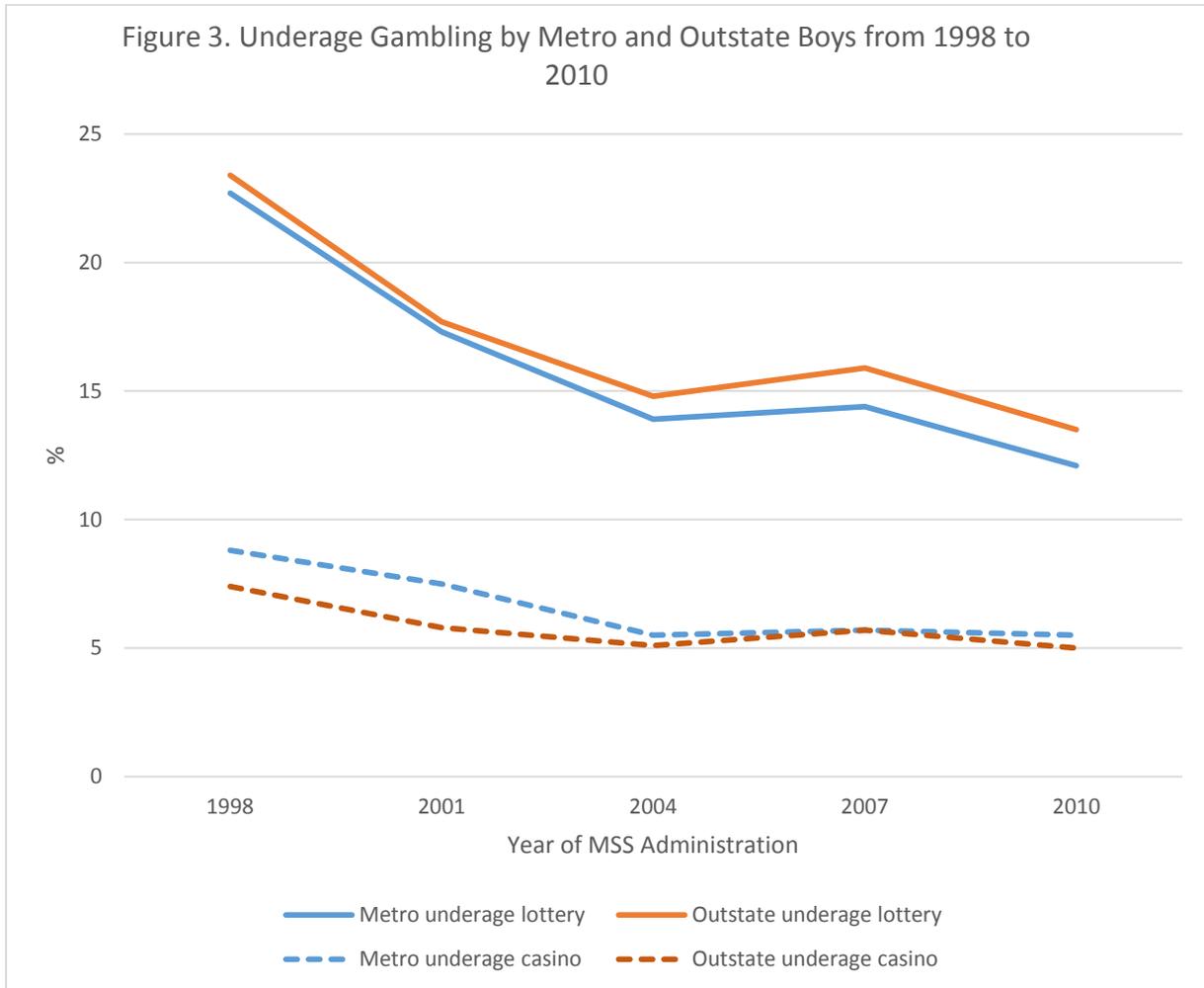


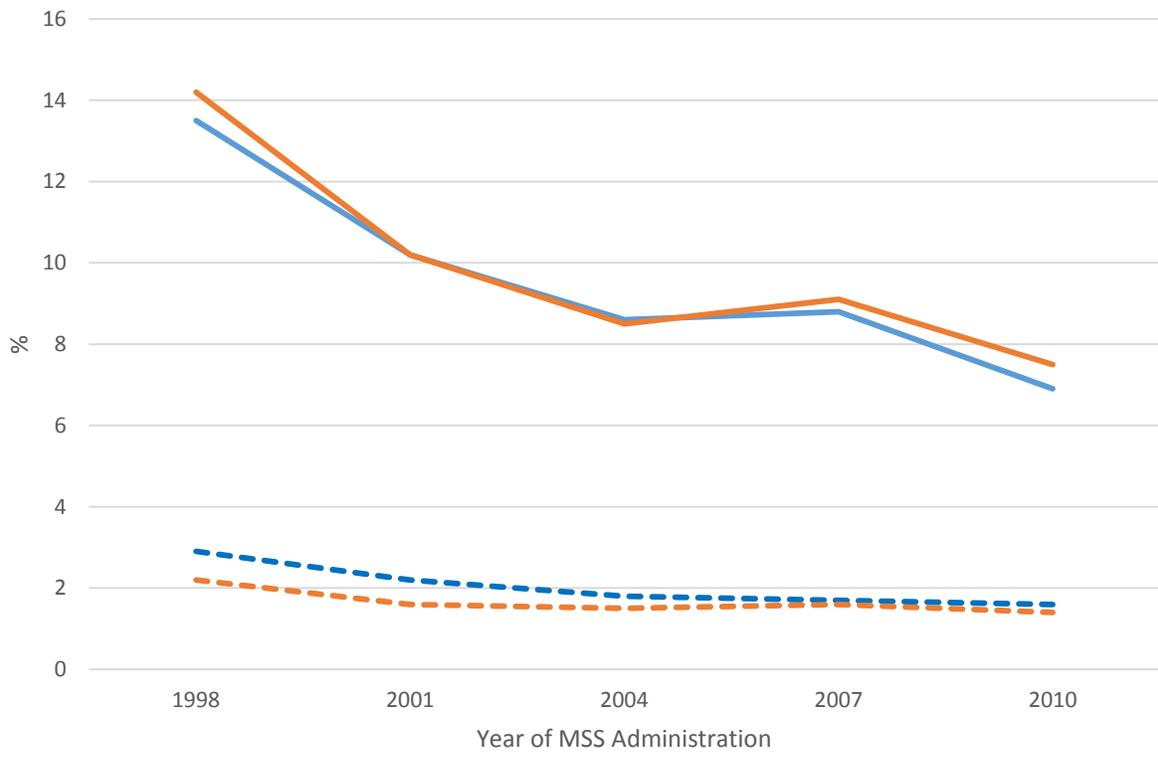
Table 11

Underage Gambling by Metro and Outstate Girls from 1998 to 2010

Game	1998 %	2001 %	2004 %	2007 %	2010 %	Difference 2007 to 2010	% Change 2007 to 2010
Metro							
Lottery	13.5	10.2	8.6	8.8	6.9	-1.9**	-22
Casino	2.9	2.2	1.8	1.7	1.6	-0.1	-6
Online	NA	NA	NA	1.2	1.0	-0.2	-17
Outstate							
Lottery	14.2	10.2	8.5	9.1	7.5	-1.6**	-18
Casino	2.2	1.6	1.5	1.6	1.4	-0.2	-12
Online	NA	NA	NA	1.1	0.9	-0.2	-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 4. Underage Gambling by Metro and Outstate Girls from 1998 to 2010



— Metro underage lottery — Outstate underage lottery
- - - Metro underage casino - - - Outstate underage casino

Problem Gambling

The third specific aim is to compare the two groups on the two problem gambling items, last administered in 2004, and from 1998 to 2004. Two additional variables were computed: (a) endorsing either item; and (b) endorsing both items. A comparison of the two groups on the two problem gambling items and two scored variables by gender is shown in Table 12. The only differences between the two groups on problem gambling items were that Metro boys had higher rates than Outstate youth on having felt bad about the amount bet and endorsing either of the two problem gambling items. There were no differences between Metro and Outstate girls.

Table 13 and Figure 5 show trends in endorsement rates of problem gambling items from 1998 to 2004 for Metro and Outstate boys. Table 13 shows that endorsement rates of endorsing problem gambling items have been relatively stable from 1998 to 2004, however there was statistically significant increases from 2001 to 2004 for Metro boys having felt bad about amount they bet and endorsing either item. Table 14 and Figure 6 show trends in endorsement rates of problem gambling items from 1998 to 2004 for Metro and Outstate girls. Table 13 shows that endorsement rates of endorsing problem gambling items have been relatively stable from 1998 to 2004, however there was statistically significant decreases from 2001 to 2004 for Metro girls having wanted to stop gambling and endorsing both problem gambling items. To summarize, Metro and Outstate youth had similar rates and trajectories of problem gambling item endorsement over time.

Table 12

Comparison of Metro to Outstate Students on Problem Gambling Items by Gender in 2004

Problem Gambling Item	Metro %	Outstate %	X^2 (p)
Boys			
Felt bad about amount you bet	11.8	10.0	27.5 (<.001)
Would like to stop	4.6	4.7	0.3 (.57)
Endorsed either item	13.7	12.3	15.5 (<.001)
Endorsed both items	2.5	2.3	1.4 (.24)
Girls			
Felt bad about amount you bet	3.5	3.3	1.2 (.27)
Would like to stop	0.9	1.1	6.2 (.01)
Endorsed either item	4.0	4.0	0.1 (.76)
Endorsed both items	0.3	0.5	2.8 (.09)

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

Table 13

Problem Gambling by Metro Boys from 1998 to 2004

Problem Gambling Items	1998 %	2001 %	2004 %	Difference 2001 to 2004	% Change 2001 to 2004
Metro					
Felt bad about amount you bet	12.6	10.8	11.8	1.0**	9
Would like to stop	4.9	4.4	4.6	0.2	4
Either item	14.6	12.7	13.7	1.0**	8
Both items	2.8	2.3	2.5	0.2	9
Outstate					
Felt bad about amount you bet	10.8	10.4	10.0	-0.4	-4
Would like to stop	4.2	4.3	4.7	0.4	9
Either item	12.6	12.2	12.3	0.1	1
Both items	2.3	2.4	2.3	-0.1	-4

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

Figure 5. Problem Gambling by Metro and Outstate Boys from 1998 to 2004

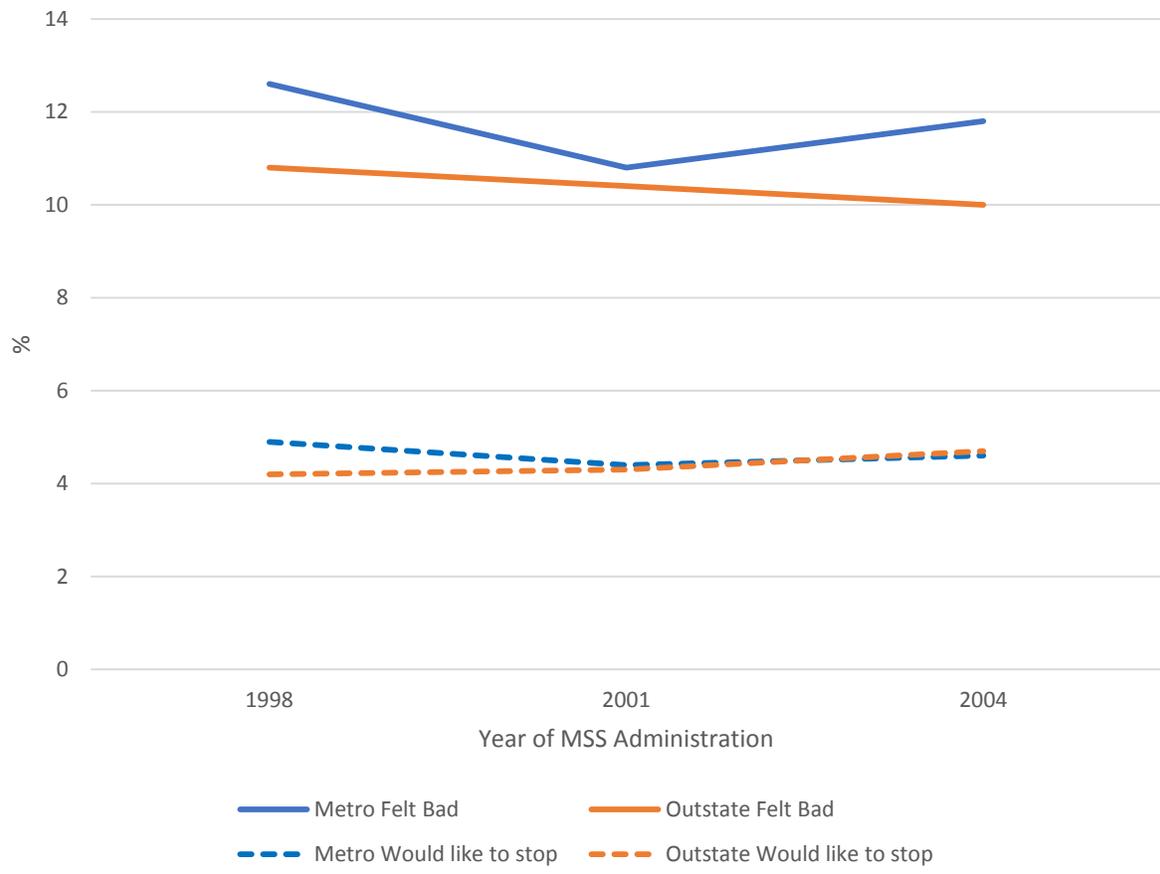
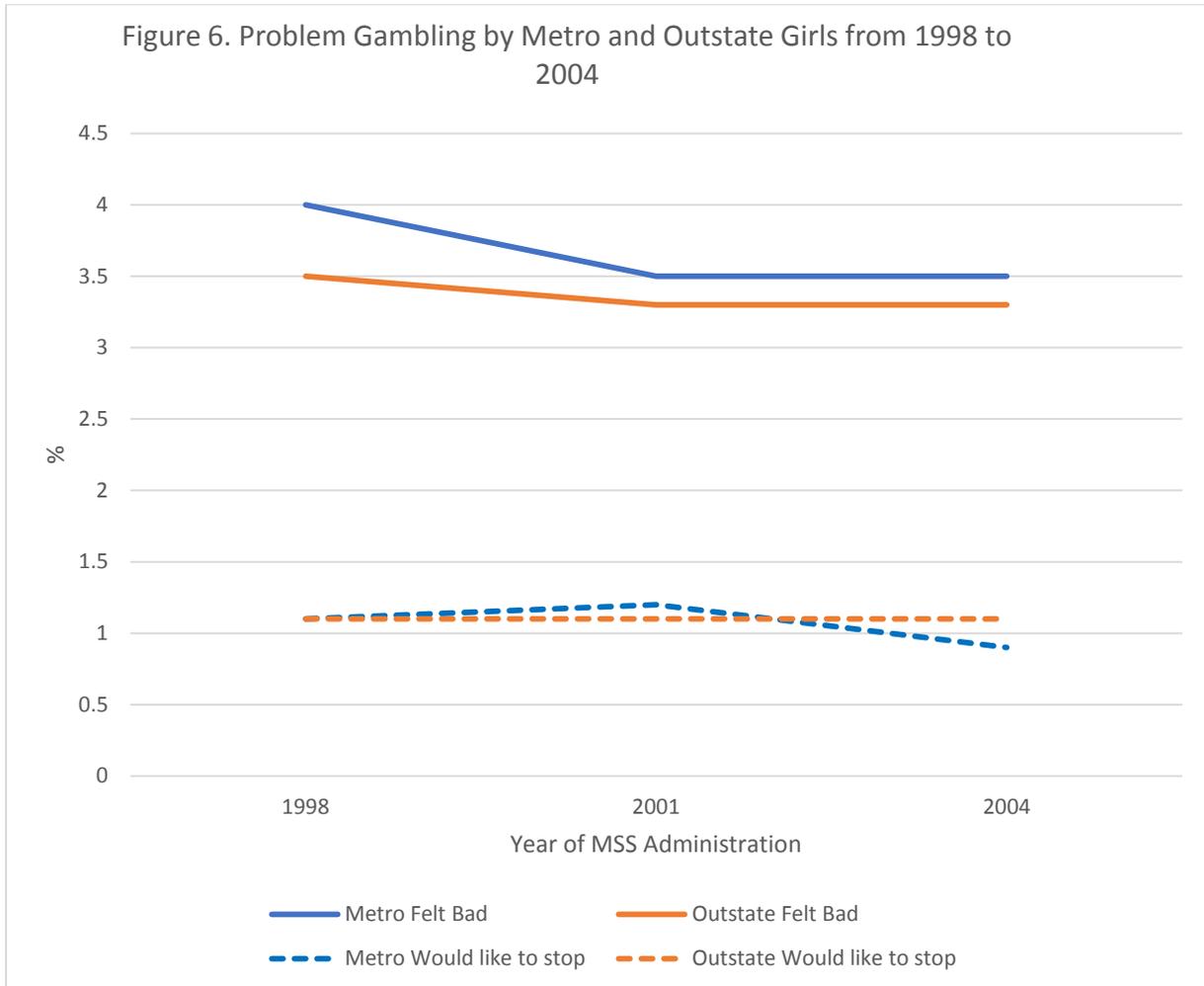


Table 14

Problem Gambling by Metro and Outstate Girls from 1998 to 2004

Problem Gambling Items	1998 %	2001 %	2004 %	Difference 2001 to 2004	% Change 2001 to 2004
Metro					
Felt bad about amount you bet	4.0	3.5	3.5	0	0
Would like to stop	1.1	1.2	0.9	-0.3**	-25
Either item	4.5	4.1	4.0	-0.1	-2
Both items	0.5	0.6	0.3	-0.3**	-50
Outstate					
Felt bad about amount you bet	3.5	3.3	3.3	0	0
Would like to stop	1.1	1.1	1.1	0	0
Either item	4.0	3.9	4.0	0.1	3
Both items	0.5	0.5	0.5	0	0

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



Correlates of Gambling

The fourth specific aim is to identify correlates of gambling and compare correlates between Metro and Outstate youth. Table 15 shows stepwise multiple regressions between gambling and related variables for Metro students including separate multiple regressions for boys and girls. Five correlates were identified that accounted for 31% of the variance in gambling frequency, and these include, in order of magnitude, antisocial behavior, being male, number of different female sexual partners, tobacco use, and alcohol use. For Metro boys, the multiple regression yielded five correlates that accounted for 29% of the variance in gambling frequency including antisocial behavior, alcohol use, dating someone who forced sex or unwanted sexual activity, number of different female sexual partners, and tobacco use. For Metro girls, the multiple regression yielded four correlates that accounted for 18% of the variance in their gambling frequency and they included antisocial behavior, chewing tobacco use, alcohol use, and smoking cigars.

Table 16 shows stepwise multiple regressions between gambling and related variables for Outstate students 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, antisocial behavior, number of different female sexual partners, being male, smoking cigars, and alcohol use. For Outstate boys, the multiple regression yielded four correlates that accounted for 24% of the variance in gambling frequency including antisocial behavior, alcohol use, number of different female sexual partners, and smoking cigars. For Outstate girls, the multiple regression yielded three correlates that accounted for 13% of the variance in their gambling frequency and they included antisocial behavior, alcohol use, and smoking cigars.

Antisocial behavior was consistently the strongest correlate of gambling in both Metro and Outstate youth and among both boys and girls. Antisocial behavior is the name of a scale made up of eight items in the MSS: (1) skipping school (truancy); (2) carry a gun on school property; (3) carry a weapon (other than a gun) on school property; (4) bullying behavior; (5) run away from home; (6) vandalism; (7) hit or beat up another person; and (8) shoplifting.

Table 15

Stepwise Multiple Regression Between Gambling and Related Variables for Metro Students and by Gender in 2010

Regression Step	MSS correlate	Beta	r	r ²
Metro Students (n = 37,792)				
1	Antisocial behavior including skipping school, carry gun or weapon on school property, bullied another student, runaway, vandalism, hit or beat up another person, and shoplifting	.28	.46	.21
2	Being Male	.19	.51	.26
3	During the last 12 months, with how many different female partners have you had sexual intercourse?	.15	.54	.29
4	Tobacco use, including cigarettes, cigars, chew use	.10	.55	.30
5	During the last 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?	.09	.55	.31
Metro Boys (n = 17,784)				
1	Antisocial behavior including skipping school, carry gun or weapon on school property, bullied another student, runaway, vandalism, hit or beat up another person, and shoplifting	.21	.47	.22
2	Alcohol use	.14	.50	.25
3	Has someone you were going out with ever forced you to have sex or do something sexual that you did not want to?	.12	.52	.27
4	During the last 12 months, with how many different female partners have you had sexual intercourse?	.11	.53	.28
5	Tobacco use, including cigarettes, cigars, chew use	.08	.54	.29
Metro Girls (n = 20,818)				
1	Antisocial behavior including skipping school, carry gun or weapon on school property, bullied another student, runaway, vandalism, hit or beat up another person, and shoplifting	.23	.35	.12
2	During the last 30 days, on how many days did you use chewing tobacco?	.16	.40	.16
3	During the last 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?	.11	.42	.17
4	During the last 30 days, on how many days did you smoke cigars, cigarillos or little cigars?	.10	.43	.18

Table 16

Stepwise Multiple Regression Between Gambling and Related Variables for Outstate Students and by Gender in 2010

Regression Step	MSS correlate	<i>beta</i>	<i>r</i>	<i>r</i> ²
Outstate Students (n = 33,400)				
1	Antisocial behavior including skipping school, carry gun or weapon on school property, bullied another student, runaway, vandalism, hit or beat up another person, and shoplifting	.22	.41	.16
2	During the last 12 months, with how many different female partners have you had sexual intercourse?	.15	.47	.22
3	Being Male	.18	.50	.25
4	During the last 30 days, on how many days did you smoke cigars, cigarillos or little cigars?	.12	.52	.27
5	Alcohol use	.13	.53	.28
Outstate Boys (n = 16,271)				
1	Antisocial behavior including skipping school, carry gun or weapon on school property, bullied another student, runaway, vandalism, hit or beat up another person, and shoplifting	.24	.41	.17
2	Alcohol Use	.15	.46	.21
3	During the last 12 months, with how many different female partners have you had sexual intercourse?	.13	.48	.23
4	During the last 30 days, on how many days did you smoke cigars, cigarillos or little cigars?	.12	.49	.24
Outstate Girls (n =17,703)				
1	Antisocial behavior including skipping school, carry gun or weapon on school property, bullied another student, runaway, vandalism, hit or beat up another person, and shoplifting	.20	.29	.09
2	During the last 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?	.15	.34	.11
3	During the last 30 days, on how many days did you smoke cigars, cigarillos or little cigars?	.14	.36	.13

Discussion

This study had four specific aims. First, compare metro versus outstate youth 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 metro versus outstate youth rates of any gambling, frequent gambling, and underage gambling from 1998 to 2010. Third, compare metro versus outstate youth on endorsement of two problem gambling items from 1998 to 2004. Fourth, identify the correlates of gambling among metro versus outstate youth. The graduating high school class of 2010 was among the first high school graduates to grow up with commercial gambling and its promotion in Minnesota.

Comparison of Metro to Outstate Students on 2010 Rates of Gambling

Metro and Outstate youth had more similarities than differences in their gambling participation rates and for some comparisons the two groups are identical. There were a few exceptions: (a) more Outstate youth, both boys and girls, bought lottery tickets than Metro youth; (b) more Outstate youth, both boys and girls, bought lottery tickets frequently than Metro youth; and (c) more underage Outstate boys bought lottery tickets than underage Metro boys. Why do Outstate youth have higher rates of lottery play than Metro youth? This study does not answer that question, but it could be a matter of accessibility. Outstate youth may have greater access to lottery games than other forms of gambling such as casinos.

Comparison of Metro to Outstate Students on Gambling Trends from 1998 to 2010

Again, there are more similarities than differences between Metro and Outstate youth on gambling trends from 1998 to 2010 and in most analyses the trends are parallel and in some analyses the trends are identical. Trends in gambling among Metro and Outstate students showed fairly consistent and significant declines from 1998 to 2010. There were three important

trends in frequent gambling. First, the popularity of gambling appears to be waning among most youth and declines from 1998 to 2010 were statistically significant. This finding is consistent with that reported by Stinchfield (2011) for public school student rates of frequent gambling trends. Second, both Metro and Outstate youth showed declines in underage gambling on lottery, casino and online. The most dramatic decline was seen in underage lottery play and the rate was cut in half from 1998 to 2010. Conversely, underage casino gambling has been fairly stable between 1998 and 2010, with modest declines from 2007 to 2010.

The decline in underage lottery play is good news for those concerned about underage age youth playing the lottery. This study does not determine why there is a decrease in underage lottery play. 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). Another factor in the decline in youth gambling may be the fact that there is greater competition for the attention of youth 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 Metro and Outstate 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 two groups and comparison of item endorsement rates over time. Again, there were more similarities than differences between Metro and Outstate youth on endorsement of these two problem gambling items. There were no differences between Metro and Outstate girls, and there were only two differences between Metro and Outstate boys, Metro boys had slightly higher rates of “feeling bad about the amount you bet” and endorsing either of

the two items. Both Metro and Outstate youth had similar trends over time both in terms of rates and trajectories.

Correlates of Gambling

The fourth specific aim is to identify correlates of gambling among metro and outstate youth. The purpose of this analysis is to identify possible causes and mediators of gambling behavior among youth, 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). Again, there were more similarities than differences in gambling correlates identified in this study. The most consistent find was that antisocial behavior was the strongest correlate of gambling for both groups and for both genders. The other correlates that were consistent between groups was sexual activity, tobacco use and alcohol use. These correlates could be described as a mix of antisocial and risky behaviors. These behaviors seem to form a constellation of high risk behaviors among some youth, such that those youth who are most involved in gambling are also engaging in antisocial behaviors, sexual activity, and using tobacco and alcohol. These correlates have similarities with those reported in other studies, including tobacco use, alcohol 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 Metro and Outstate youth in this study are large and therefore serve as one of the foremost sources of gambling information about youth. 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 has at least three 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 school. Some youth are not included in this study, such as youth who have been expelled from or dropped out of school, students who were absent from school on the day of the survey administration, 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).

One of the concerns raised by this study is about underage youth playing legal forms of gambling. 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 Outstate youth gamble than Metro youth? No, but with one exception.
More Outstate youth play the lottery than Metro youth.
- 2) Do more Outstate youth gamble frequently than their Metro peers? No, but with one exception. More Outstate youth play the lottery frequently than Metro youth.
- 3) Do more underage Outstate youth gamble on legalized games than their Metro peers?

- No, for most comparisons there were no differences. The only comparisons that reached statistical significance were more Underage Outstate boys played the lottery and more underage Metro boys gambled online.
- 4) Are more Outstate and Metro youth gambling now than in the past? No, gambling participation among Outstate and Metro youth has shown a decline from 1998 to 2010. For Metro boys, gambling declined from 76% in 1998 to 59% in 2010. For Outstate boys, gambling declined from 75% in 1998 to 58% in 2010. For Metro girls, gambling declined from 46% in 1998 to 30% in 2010. For Outstate girls, gambling declined from 47% in 1998 to 33% in 2010.
 - 5) Are more Outstate and Metro youth gambling frequently now than in the past? No, rates of frequent gambling showed modest declines from 1998 to 2010. For Metro boys, frequent gambling declined from 26% in 1998 to 15% in 2010. For Outstate boys, frequent gambling declined from 26% in 1998 to 15% in 2010. For Metro girls, frequent gambling declined from 5% in 1998 to 3% in 2010. For Outstate girls, frequent gambling declined from 7% in 1998 to 4% in 2010.
 - 6) Do more underage Metro and Outstate youth gamble now, than in the past? No, underage lottery, casino and online play has shown declines from 1998 to 2010. For Metro boys, underage lottery declined from 23% in 1998 to 12% in 2010. For Outstate boys, underage lottery declined from 23% in 1998 to 13% in 2010. For Metro girls, underage lottery declined from 13% in 1998 to 7% in 2010. For Outstate girls, underage lottery declined from 14% in 1992 to 7% in 2010.
 - 7) Do more Outstate youth have gambling problems than their Metro peers? No, they have relatively similar rates.

In conclusion, Outstate and Metro youth have fairly similar gambling experiences. The only consistent exception is the finding that Outstate youth are more involved in lottery play than Metro youth. Future research should explore why more Outstate youth are involved in lottery play than metro youth. There is a small but significant proportion of Outstate and Metro youth that gamble frequently and some of this may be excessive and problematic gambling 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.

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Author Notes

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