

Gambling and Problem Gambling among Minnesota Public School Students in 2019

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Abstract

This study has three specific aims. First, examine gambling participation and problem gambling rates for 2019. Second, compare 2019 rates of gambling participation and problem gambling to 2016 to determine if rates increased, decreased or stayed the same. Third, examine what demographic, psychosocial and behavioral variables are associated with adolescent problem gambling. The 2019 sample includes 55,552 male and 58,155 female Minnesota public school students enrolled in the 8th, 9th, and 11th grades and the 2016 sample includes 58,232 male and 59,294 female students from 8th, 9th, and 11th grades. Students were administered the Minnesota Student Survey (MSS), a 126-item, anonymous, self-administered, online survey that includes questions about multiple health-related content domains, including gambling behavior. Problem gambling was measured by the Brief Adolescent Gambling Screen (BAGS).

For 2019, the gambling participation rate was 29.6%, the frequent gambling rate was 6.5%. The problem gambling rate was 0.5% with an additional 2.3% that had problems associated with their gambling but it did not reach the threshold of problem gambling. While one half of one percent may not seem significant, one half of one percent of Minnesota secondary school students is over 2,000 students. More boys gambled than girls (38.5% versus 21.1%); more boys gambled frequently than girls (9.7% versus 3.4%); and more boys were positive for problem gambling than girls (0.9% versus 0.2%). There were fewer students gambling in 2019 (29.6%) than in 2016 (32.1%). There were fewer students gambling frequently in 2019 (6.5%) than in 2016 (7.5%). There was no change in the problem gambling rate (0.5%) between 2016 and 2019. Tobacco use and antisocial behaviors were related to problem gambling but only accounted for 16% of the variance in problem gambling. For the majority of students, gambling participation has turned around since gambling items were

included in the MSS in 1992, when gambling participation rates were 70% and now in 2019 that is the figure for not gambling. The goal of reducing the number of adolescents involved in gambling in the early 1990s has been met. However, there is a small segment of the adolescent population that gambles excessively and experiences problems associated with their gambling and these youth may benefit from prevention and intervention services.

Gambling among Minnesota Public School Students in 2019

Gambling opportunities are widespread across Minnesota including more than 3,000 state lottery retail outlets, over 3,000 charitable gambling sites, 18 tribal casinos, and two racetracks with card rooms, not to mention all of the informal sports betting and card games going on in private residences. Youth are exposed to both informal and commercial gambling and the accompanying advertising such as billboards, lottery sales displays at convenience stores, pictures of lottery and casino winners in the newspaper and across all forms of social media. This is a significant change from pre-1990s and is likely to influence the behavior of youth. For example, some youth in Minnesota now celebrate their 18th birthday by gambling at a tribal casino. The legal age for gambling in Minnesota is 18 years of age. In Minnesota, the graduating high school class of 2019 had been born around 2001, a decade after the introduction of the state lottery and tribal casinos (1990). Gambling is a potentially addictive behavior and therefore early exposure to gambling is a concern. Volberg (1993) has conducted a large number of gambling surveys and she has concluded that early involvement in gambling is predictive of later gambling problems.

There is a growing body of literature on youth gambling that indicates that gambling is a common activity among youth (Shaffer & Hall, 1996; Stinchfield & Winters, 2004) and some consider teen gambling to be an epidemic (Derevensky, 2012). Most studies to date have found that about half of youth have gambled in the past year, boys gamble more than girls, older youth gamble more than younger youth, a minority of youth are frequent gamblers (about 10%), and an even smaller percentage (about 1-3%) test positive for problem gambling (Gupta & Derevensky, 1998; Jacobs, 1989, 2000; Ladouceur, Dube, & Bujold, 1994; National Opinion Research Center, 1999; Shaffer, LaBrie, Scanlan, & Cummings, 1994; Stinchfield, 2000, 2001, 2004, 2011; Welte,

Barnes, Tidwell & Hoffman, 2008). Adolescent problem gambling has been defined as “persistent gambling behavior that creates negative consequences for the gambler, others in his or her social network, or for the community.”(Wiebe, Wynne, Stinchfield & Tremblay, 2005).

While a number of surveys have measured youth gambling, very few have looked at trends over time in either a longitudinal or panel design. Stinchfield (2001) reported on the results of the Minnesota Student Survey (MSS) that was administered in 1992, 1995 and 1998 to most 9th and 12th grade public school students in Minnesota. This study found two opposite trends. On the one hand, fewer students were gambling in 1998 than were gambling in 1995. On the other hand, the percentage of frequent gamblers (weekly or more often) had increased from 1995 to 1998. Stinchfield (2011) published a follow-up study that included three more assessments in 2001, 2004, and 2007. In that analysis it was found that gambling participation had shown a gradual and consistent decline from 1992 to 2007 for both boys and girls. Underage gambling also showed declines. In spite of gradual declines, there were also fluctuations noted, including a peak in lottery play in 1998 and a peak in card playing in 2004 with subsequent declines in both games.

Monitoring youth gambling trends over time provides critical information about changes in rates of gambling participation and games played that is useful to researchers, public health officials, school personnel, parents, and policy makers. This type of monitoring trends over time has proven useful in the youth substance use field as seen in the Monitoring the Future study (Johnston, O’Malley, Bachman, & Schulenberg, 2009). The youth gambling field would benefit from a similar type of national monitoring system to stay up-to-date on trends in youth gambling. It is critical to have current and accurate information in order to respond appropriately with public policy, public awareness, and prevention efforts. Another implication of this research is

that it can indicate whether prevention efforts are having an impact.

One of the most important questions that needs to be addressed is whether youth gambling is increasing, both in terms of whether youth are gambling more frequently and whether more youth are gambling. There have been a small number of reviews that examined gambling trends over time which have yielded mixed conclusions. Jacobs (2004) review of youth gambling studies from 1984-2002 concluded that there was an increase in youth gambling as well as increases in youth problem gambling during this period and he predicted “it is more than a safe bet that juvenile gambling will continue to increase over the next five years”. The theory is that with the growth of the gambling industry and greater accessibility to gambling opportunities more youth will gamble and youth will gamble more frequently. In contrast, Stinchfield and Winters (2004) review indicated that youth gambling has for the most part remained fairly stable over the past decade. In a more recent review of studies around the world by Volberg, Gupta, Griffiths, Olason, and Delfabbro (2010), it was reported that the evidence for changes over time is mixed and varies by location and methodology. The only way to address this question is to monitor youth gambling over time in longitudinal and panel studies.

This study has three specific aims. First, examine student gambling participation and problem gambling rates in 2019. Second, compare 2019 rates of gambling participation and problem gambling to 2016 to determine if rates increased, decreased or stayed the same. Third, examine what demographic, psychosocial, and behavioral variables are associated with problem gambling.

Method

Participants. The 2019 MSS sample includes 113,707 8th, 9th and 11th grade Minnesota public school, charter school, and tribal school students. Inclusion criteria were providing answers to questions of gender, age and grade as well as answer at least one of the gambling participation items. The 2016 MSS dataset is compared to the 2019 MSS and the 2016 MSS dataset includes 117,526 8th, 9th and 12th grade students. Demographics of the 2019 sample are presented in Table 1 and the demographics of the 2016 sample are presented in Supplemental Table 1 in the Appendix. Most demographic characteristics were relatively stable across the two survey administrations. Table 1 also shows that all of the 8th and 9th graders are underage and 99.6% of the 11th graders are underage for legal gambling, that is 18 years of age in Minnesota. The sample is evenly split between urban/suburban metropolitan and out-state rural area. Free or reduced price is a proxy for low income and about one in five students may be considered low income.

Table 1

Demographic Characteristics of 2019 Sample

Demographic Characteristic	Grade 8 N=41,944 N (%)	Grade 9 N=40,219 N (%)	Grade 11 N=31,544 N (%)	Total N=113,707 N (%)
Gender				
Girls	21,433 (51.1)	20,712 (51.5)	16,010 (50.8)	58,155 (51.1)
Boys	20,511 (48.9)	19,507 (48.5)	15,534 (49.2)	55,552 (48.9)
Age				
12	69 (0.2)	0	0	69 (0.1)
13	17,158 (40.9)	71 (0.2)	0	17,229 (15.2)
14	24,209 (57.7)	16,153 (40.2)	0	40,382 (35.5)
15	493 (1.2)	23,446 (58.3)	51 (0.2)	23,990 (21.1)
16	15 (0.0)	511 (1.3)	12,880 (40.8)	13,406 (11.8)
17	0	38 (0.1)	18,111 (57.4)	18,149 (16.0)
18	0	0	460 (1.5)	460 (0.4)
19-20	0	0	42 (0.1)	42 (0.0)
Race				
White	28,690 (68.4)	28,390 (70.6)	23,174 (73.5)	80,254 (70.6)
Multiple Races	3,886 (9.3)	3,445 (8.6)	2,408 (7.6)	9,739 (8.6)
Black/African/African American	3,071 (7.3)	2,616 (6.5)	1,761 (5.6)	7,448 (6.6)
Asian	2,880 (6.9)	2,538 (6.3)	1,961 (6.2)	7,379 (6.5)

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Hispanic/Latina/o	2,449 (5.8)	2,399 (6.0)	1,740 (5.5)	6,588 (5.8)
American Indian/Alaska Native	518 (1.2)	539 (1.3)	308 (1.0)	1,365 (1.2)
No answer/unknown	346 (0.8)	222 (0.6)	141 (0.4)	709 (0.6)
Native Hawaiian or Other Pacific Islander	104 (0.2)	70 (0.2)	51 (0.2)	225 (0.2)
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Residence				
Minneapolis/Saint Paul Metropolitan Area	22,149 (52.8)	21,043 (52.3)	15,996 (50.7)	59,118 (52.1)
Greater Minnesota	19,795 (47.2)	19,176 (47.7)	15,548 (49.3)	54,519 (47.9)
<hr/>				
Free or reduced price lunch (proxy for household income)	9,240 (22.4)	8,997 (22.7)	6,816 (22.0)	25,053 (22.4)

Note. Inclusion criteria: must answer gender and at least one gambling frequency item.

The MSS is a statewide school-based census-like survey administered every three years starting in 1989. All public school districts in Minnesota are invited to participate and participation is voluntary and most districts participate. The rate of participation by Minnesota public school districts in 2019 was 81%. The student participation rate in 2019 was 68% of 8th graders, 66% of 9th graders and 54% of 11th grade students (Minnesota Student Survey Interagency Team, 2019). The total 8th, 9th and 11th grade public school population was not surveyed because some school districts did not participate, some of the larger school districts in Minneapolis and Saint Paul randomly sampled from these grades, and some students were not in school or in class at the time of the survey administration. The data set was cleaned of students with highly inconsistent or improbable responses (3%) which suggest invalid responding. A comprehensive description of the survey methodology is provided elsewhere (Minnesota Student Survey Interagency Team, 2010c; 2016, 2019).

The MSS is conducted under the auspices of the Minnesota Student Survey Interagency Team (2010a; 2016, 2019), a collaboration of the following four Minnesota State departments: Education; Health; Human Services; and Public Safety. Gambling items were introduced in the 1992 survey and were administered to the 6th, 9th, and 12th grades. The gambling items were deleted from the 6th grade survey starting in 1995. The gambling items were deleted from the 2013 MSS and the grades assessed were changed to 5th, 8th, 9th, and 11th grades. The gambling items were reintroduced in 2016 along with a brief screen for problem gambling.

Instrument. The 2019 Minnesota Student Survey (MSS) is a 126-item, anonymous, self-administered, online or by paper-and-pencil questionnaire developed by the Minnesota Student Survey Interagency Team (2010a; 2010b; 2016, 2019). 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 2019 MSS gambling item section includes a definition of gambling: "By gambling we mean when you bet money or something else of value so that you can win or gain money or something else." The 2019 MSS includes four gambling participation items. The preface for all four items is: "During the last 12 months, how often have you done the following gambling/betting activities?" The four items include: (a) Played cards, bet on sports teams or games of personal skill like video gaming, pool, golf or bowling; (b) Bought lottery tickets or scratch offs; (c) Gambled in a casino; and (d) Gambled for money online. Each gambling frequency item has the following six response options: (a) Not at all; (b) Less than once a month; (c) About once a month; (d) About once a week; (e) Two to six times a week; and (f) Daily.

Adolescent problem gambling was measured by a three-item brief screen that was new to the MSS in 2016. The preface for all three items is: "During the last 12 months, how often have you . . .": (a) Hidden your gambling/betting from your parents, other family members or teachers? (b) Felt that you might have a problem with gambling/betting? and (c) Skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet? Each problem gambling item has the following four response options: (a) Never; (b) Sometimes; (c) Many times; and (d) All of the time. These three items are from the Brief Adolescent Gambling Screen (BAGS) (Stinchfield, Wynne, Wiebe & Tremblay, 2017). Internal consistency of the BAGS as measured by Cronbach's (1951) coefficient alpha was .72. Convergent validity

coefficients for BAGS and SOGS-RA was $r = .67$. The BAGS estimates of classification accuracy include hit rate = .95, sensitivity = .88, specificity = .98, false positive rate = .02, and false negative rate = .12. classification accuracy (Stinchfield, Wynne, Wiebe & Tremblay, 2017).

The BAGS score ranges from 0 to 9. The BAGS cut score of 4 or more indicates problem gambling. Students who did not participate in any gambling in the past year were instructed to skip the three problem gambling items.

Procedure. The 2019 MSS was administered by the Minnesota Department of Education to 8th, 9th and 11th grade students in classroom settings via computer online administered survey in the presence of school personnel in public schools between January and June 2019. The MSS was also administered to 5th grade students but they are not included in this report because they were not administered gambling items. 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. Students were assured of the anonymity and confidentiality of their responses on the MSS.

Statistical Analysis. The reporting method used by the Monitoring the Future reports (Johnston, O'Malley, Bachman, & Schulenberg, 2009) of showing rates of substance use 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 was computed for the entire sample and broken down by gender and grade. The comparison of the 2016 and 2019 surveys indicates current changes in gambling rates. This comparison addresses the question: Are more, less, or

about the same proportion of adolescent gambling in 2019 as compared to 2016? The difference between two independent proportions was computed. The percent change is also computed to give the reader a sense of whether the amount of change is significant from a practical sense or meaningful perspective. In order to examine variables that are associated with adolescent problem gambling, bivariate correlations were computed between the BAGS total score and demographic, psychosocial and behavioral variables from the survey and those correlations that were greater than $r = .20$ were included in a stepwise multiple regression to see which, if any, variables could account for the variance in the dependent variable, BAGS score.

Results

This section is divided into three specific aims. First, examine student gambling participation and problem gambling rates in 2019. Second, compare 2019 rates of gambling participation and problem gambling to 2016 to determine if rates increased, decreased or stayed the same. Third, examine what demographic, psychosocial, and behavioral variables are associated with problem gambling.

2019 rates of student gambling participation and problem gambling

Gambling participation data for each item for boys and girls across all three grades is shown in Supplemental Tables 2 and 3 in the Appendix. Gambling participation was examined both in terms of “any gambling” and “frequent gambling”. Any gambling refers to playing any of the four games/venues more than “Not at all” in the past year. Frequent gambling refers to playing any of the four games/venues “About once a week” or more often which may be considered frequent and higher risk gambling given that this frequency of gambling discriminates between people who are in treatment for problem gambling from the general public (Stinchfield & Winters, 2001). Frequent gambling gives a proportion of adolescents who are participating at a

level associated with risk for gambling problems.

Rates of any gambling on four games/venues for all students, boys and girls, and broken down into gender by grade groups are shown in Table 2 under the column labelled “2019”. The rate of gambling participation is 30% among 8th, 9th and 11th grade public school students for informal and legal forms of gambling. This means that 70% of students have not gambled in the past year. More students played informal games of cards, betting on sports or betting on games of personal skill (25%) than who played legal forms of gambling such as the lottery, casinos or online gambling. Among legal games, more adolescents bought lottery products (7%) than have gambled at a casino (2%) or online (2.4%). When the sample is divided by gender, nearly twice as many boys than girls have participated in these forms of gambling in the past year (38.5% versus 21.1%). About two out of five boys have gambled in the past year whereas only one out of five girls has gambled. Few students report gambling on the three legal form of gambling and there are differences by gender for casino and online, but not for the lottery where there are nearly as many girls (6.6%) buying lottery products as boys (8.4%). There are three times as many boys reporting casino gambling (3%) as girls (1%) and five times as many boys reporting online gambling (4.2%) than girls (0.8%). When the sample is further broken down into gender by grade, there are about the same proportion of boys gambling for each grade, whereas fewer older girls are gambling than younger girls.

Rates of frequent gambling for 2019 are shown in Table 3 under the category labelled “2019”. Frequent gambling was reported by 6.5% of this sample in the past year. More students bet frequently on informal games (5.2%) than legal forms including buying lottery products (1.1%), gambling in a casino (0.9%) and online (0.8%). When the sample is divided by gender, nearly three times more boys (9.7%) gambled frequently than girls (3.4%) (See Figure 1). When

the sample is further broken down into gender by grade, there are about the same proportion of boys gambling frequently for each grade, whereas fewer older girls are gambling frequently than younger girls. Specifically, 4.4% of 8th grade girls, 3.3% of 9th grade girls, and 2.2% of 11th grade girls gambled frequently in 2019.

Problem gambling for 2019 is shown in Table 4 under the column labelled “2019”. As noted above, the sample is divided into four categories: a) No gambling; b) No problem gambling, that includes those students who have gambled in the past year and who score 0 on the problem gambling screen; c) Subclinical gambling problems, that includes those students who have gambled in the past year and score 1, 2, or 3 on the problem gambling screen; and d) Problem gambling, that includes those students who have gambled in the past year and who score 4 or more on the problem gambling screen. The proportion of the sample of students with problem gambling is 0.5%, that is, one half of one percent. While one half of one percent may not seem very significant, it represents over 2,000 students in Minnesota secondary public schools (403,331). Another 2.3% were categorized as subclinical gambling problems, and 26% had no problems associated with their gambling. When the sample is divided by gender, four times more boys are shown to be classified as problem gambling (0.9%) than girls (0.2%). When the sample is broken into gender by grade groups, there is very little difference between grades for both boys and girls.

Comparison of 2019 to 2016 rates of gambling participation and problem gambling

The second specific aim is to compare 2019 results to 2016 to see if rates of gambling participation and problem gambling have increased, decreased or stayed relatively constant over this three-year time period. Table 2 shows the comparisons between 2019 and 2016 for “any gambling”. There was a slight decline in gambling participation from 2016 (32.1%) to 2019

(29.6%) and three of the four forms of gambling showed slight declines except lottery which showed no change. When the sample is divided by gender, boys showed more declines than girls. When the sample is divided into gender by grade groups, the older grades showed more and larger declines from 2016 to 2019 than the younger students. The 11th grade students showed declines across all four game/venues. The lottery showed the most consistent declines across all gender and grade groups. Table 3 shows the comparisons between 2019 and 2016 for “Frequent gambling”. There was a slight decline from 2016 (7.5%) to 2019 (6.5%), but not all games/venues showed declines, with casino showing an increase from 2016 (0.6%) to 2019 (0.9%). When the sample is divided by gender, boys showed an overall decline and girls were unchanged. Boys and girls showed increases in frequent casino gambling from 2016 to 2019. When the sample was further divided into gender by grade groups, both boys and girls showed larger declines in frequent gambling for the older grade.

Comparisons of any gambling and frequent gambling for 9th grade students from 1992 to 2019 are shown in Tables 5 and 6. Ninth grade is the only grade that has been surveyed at each MSS administration every three years from 1992 to 2019, with the exception of 2013 which did not include gambling items. Figure 4 shows rates of any gambling and frequent gambling for 9th grade boys and 9th grade girls from 1992 to 2019. Figure 4 shows large and consistent declines for both 9th grade boys’ and girls’ rates of any gambling from 1992 to 2019. Frequent (weekly or more often) gambling exhibited small and inconsistent declines from 1992 to 2019, and there are fewer frequent gamblers in 2019 than there were in 1992. Frequent gambling rates have shown much smaller declines than any gambling from 1992 to 2019 and could be interpreted as more stable over time than rates of any gambling.

The comparison of problem gambling from 2016 to 2019 is shown in Table 6. The

problem gambling rate was unchanged from 2016 to 2019 and that was true for both boys and girls. When the sample was broken into gender by grade groups, the rate of problem gambling was relatively unchanged for all three grades from 2016 to 2019.

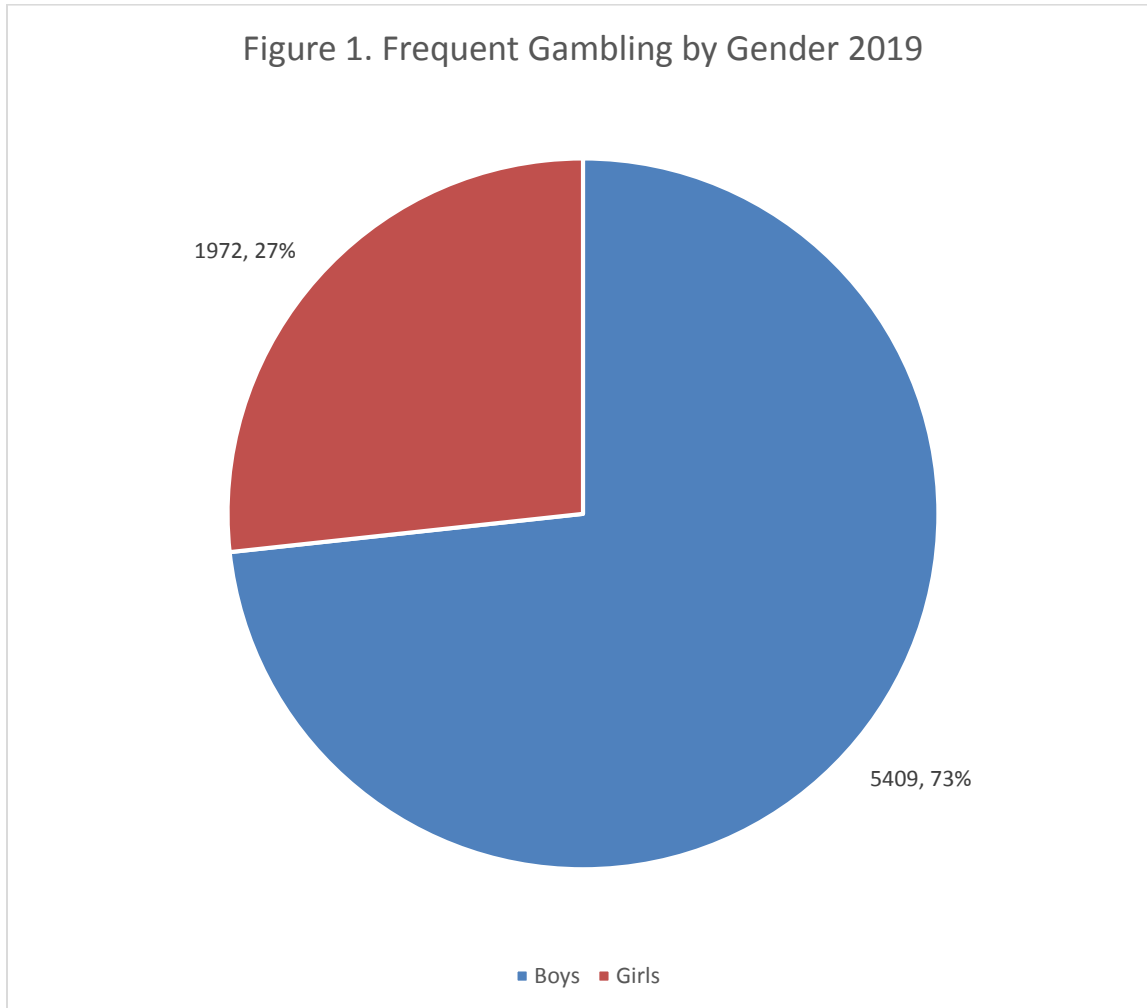


Table 2

Any gambling on each game/venue in last 12 months by 8th, 9th and 12th Grade Boys and Girls from 2016 to 2019

	2016 %	2019 %	Difference 2016 to 2019	% Change 2016 to 2019
All Students				
Cards, sports, games	27.5	25.4	-2.1	-8
Lottery	9.9	7.4	-2.5	-25
Casino	2.0	2.0	0	0
Online	3.0	2.4	-0.6	-20
Any Gambling	32.1	29.6	-2.5	-8
Boys				
Cards, sports, games	38.5	34.7	-3.8	-10
Lottery	11.4	8.4	-3.0	-26
Casino	3.0	3.0	0	0
Online	5.3	4.2	-1.1	-21
Any Gambling	42.7	38.5	-4.2	-10
Girls				
Cards, sports, games	16.8	17.1	0.3	2
Lottery	8.4	6.6	-1.8	-21
Casino	1.0	1.0	0	0
Online	0.8	0.8	0	0
Any Gambling	21.7	21.1	-0.6	-3
8th Grade Boys				
Cards, sports, games	37.4	34.8	-2.6	-7
Lottery	11.1	9.1	-2.0	-18
Casino	2.5	2.6	0.1	4
Online	4.8	3.6	-1.2	-25
Any Gambling	41.9	38.6	-3.3	-8
8 th Grade Girls				
Cards, sports, games	18.6	20.5	1.9	10
Lottery	9.5	8.1	-1.4	-15

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Casino	0.9	1.1	0.2	22
Online	0.9	0.9	0	0
Any Gambling	24.0	25.1	1.1	5
9 th Grade Boys				
Cards, sports, games	38.5	34.2	-4.3	-11
Lottery	10.8	7.7	-3.1	-29
Casino	2.4	2.8	0.4	17
Online	5.2	4.1	-1.1	-21
Any Gambling	42.4	37.7	-4.7	-11
9 th Grade Girls				
Cards, sports, games	16.8	16.7	-0.1	-1
Lottery	8.2	6.1	-2.1	-26
Casino	0.8	1.0	0.2	25
Online	0.7	0.9	0.2	29
Any Gambling	21.5	20.4	-1.1	-5
11 th Grade Boys				
Cards, sports, games	39.9	35.3	-4.6	-12
Lottery	12.4	8.2	-4.2	-34
Casino	4.2	3.7	-0.5	-12
Online	6.0	4.9	-1.1	-18
Any Gambling	44.0	39.2	-4.8	-11
11 th Grade Girls				
Cards, sports, games	14.5	13.0	-1.5	-10
Lottery	7.3	5.3	-2.0	-27
Casino	1.2	1.0	-0.2	-17
Online	0.7	0.6	-0.1	-14
Any Gambling	19.1	16.5	-2.6	-14

Note. Any gambling refers to gambling reported across all four gambling items.

Table 3

Weekly/Daily gambling on each game/venue in last 12 months by 8th, 9th and 12th Grade Boys and Girls from 2016 to 2019

	2016 %	2019 %	Difference 2016 to 2019	% Change 2016 to 2019
All Students				
Cards, sports, games	6.6	5.2	-1.4	-21
Lottery	1.3	1.1	-0.2	-15
Casino	0.6	0.9	0.3	50
Online	1.1	0.8	-0.3	-27
Any Weekly/Daily Gambling	7.5	6.5	-1.0	-13
Boys				
Cards, sports, games	10.4	8.0	-2.4	-23
Lottery	1.8	1.5	-0.3	-17
Casino	0.9	1.4	0.5	56
Online	2.0	1.3	-0.7	-35
Any Weekly/Daily Gambling	11.7	9.7	-2.0	-17
Girls				
Cards, sports, games	2.8	2.7	-0.1	-4
Lottery	0.8	0.7	-0.1	-12
Casino	0.2	0.4	0.2	100
Online	0.3	0.3	0	0
Any Weekly/Daily Gambling	3.3	3.4	0.1	3
8th Grade Boys				
Cards, sports, games	9.9	8.7	-1.2	-12
Lottery	1.7	1.5	-0.2	-12
Casino	0.9	1.2	0.3	33
Online	1.8	1.2	-0.6	-33
Any Weekly/Daily Gambling	11.2	10.2	-1.0	-9
8th Grade Girls				
Cards, sports, games	3.2	3.6	0.4	12
Lottery	0.9	0.7	-0.2	-22

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Casino	0.3	0.4	0.1	33
Online	0.3	0.3	0	0
Any Weekly/Daily Gambling	3.8	4.4	0.6	16
9 th Grade Boys				
Cards, sports, games	10.7	7.7	-3.0	-28
Lottery	1.7	1.5	-0.2	-12
Casino	0.8	1.6	0.8	100
Online	1.9	1.2	-0.7	-60
Any Weekly/Daily Gambling	11.8	9.5	-2.3	-19
9 th Grade Girls				
Cards, sports, games	2.9	2.5	-0.4	-14
Lottery	0.7	0.7	0	0
Casino	0.2	0.5	0.3	150
Online	0.2	0.3	0.1	50
Any Weekly/Daily Gambling	3.4	3.3	-0.1	-3
11 th Grade Boys				
Cards, sports, games	10.8	7.6	-3.2	-30
Lottery	2.2	1.5	-0.7	-32
Casino	1.2	1.5	0.3	25
Online	2.4	1.6	-0.8	-33
Any Weekly/Daily Gambling	12.3	9.3	-3.0	-24
11 th Grade Girls				
Cards, sports, games	2.1	1.6	-0.5	-24
Lottery	0.7	0.5	-0.2	-29
Casino	0.2	0.4	0.2	100
Online	0.2	0.2	0	0
Any Weekly/Daily Gambling	2.6	2.2	-0.4	-15

Note. Any Weekly/Daily Gambling refers to gambling weekly or more often reported across all four gambling items.

Table 4

Any gambling on each game/venue in last 12 months by 9th Grade Boys and Girls from 1992 to 2019

	1992	1995	1998	2001	2004	2007	2010	2013	2016	2019
	%	%	%	%	%	%	%	%	%	%
9th Grade Boys										
Cards, sports, games	64.1	63.1	55.2	50.6	52.7	49.0	33.9	NA	38.5	34.2
Lottery	42.1	36.2	20.9	15.8	13.5	13.5	11.5	NA	10.8	7.7
Casino	NA	NA	6.8	5.7	5.2	4.6	4.3	NA	2.4	2.8
Online	NA	NA	NA	NA	NA	6.5	5.4	NA	5.2	4.1
Any Game	83.2	77.3	70.6	65.7	66.5	63.1	50.8	NA	42.5	37.7
9th Grade Girls										
Cards, sports, games	30.6	31.3	24.3	20.5	22.7	18.2	10.9	NA	16.8	16.7
Lottery	38.0	30.0	12.3	8.6	8.0	8.2	6.7	NA	8.2	6.1
Casino	NA	NA	1.8	1.4	1.4	1.2	1.1	NA	0.8	1.0
Online	NA	NA	NA	NA	NA	1.2	1.0	NA	0.7	0.9
Any Game	60.5	49.8	37.9	33.8	33.8	30.3	23.0	NA	21.5	20.4

Note. NA denotes Not Available. Any game refers to gambling reported across all gambling items.

Table 5

Weekly/Daily gambling on each game/venue in last 12 months by 9th Grade Boys and Girls from 1992 to 2019

	1992	1995	1998	2001	2004	2007	2010	2013	2016	2019
	%	%	%	%	%	%	%	%	%	%
9th Grade Boys										
Cards, sports, games	10.9	12.5	14.2	13.0	18.0	9.6	6.8	NA	10.7	7.7
Lottery	7.1	6.8	6.0	4.5	4.0	3.6	3.1	NA	1.7	1.5
Casino	NA	NA	2.9	2.7	2.5	2.0	2.0	NA	0.8	1.6
Online	NA	NA	NA	NA	NA	2.9	2.6	NA	1.9	1.2
Any Game	21.8	20.4	23.2	20.7	24.9	16.1	11.7	NA	11.8	9.5
9th Grade Girls										
Cards, sports, games	1.6	2.0	2.3	2.0	3.0	1.6	1.1	NA	2.9	2.5
Lottery	3.4	2.5	1.7	1.1	1.3	1.2	1.0	NA	0.7	0.7
Casino	NA	NA	0.4	0.4	0.5	0.3	0.4	NA	0.2	0.5
Online	NA	NA	NA	NA	NA	0.4	0.5	NA	0.2	0.3
Any Game	6.0	4.5	4.6	4.1	5.1	3.3	2.6	NA	3.4	3.3

Note. NA denotes Not Available. Any game refers to highest rate of gambling across all gambling items.

Table 6

Problem Gambling in last 12 months by 8th, 9th and 12th Grade Boys and Girls from 2016 to 2019

	2016 %	2019 %	Difference 2016 to 2019	% Change 2016 to 2019
All Students				
No Gambling	68.9	71.2	2.3	3
No Problem Gambling	28.1	26.0	-2.1	-7
Subclinical Problem Gambling	2.5	2.3	-0.2	-8
Problem Gambling	0.5	0.5	0	0
Boys				
No Gambling	58.4	62.6	4.2	7
No Problem Gambling	36.7	32.9	-3.8	-10
Subclinical Problems	4.0	3.6	-0.4	-10
Problem Gambling	0.9	0.9	0	0
Girls				
No Gambling	79.2	79.4	0.2	0
No Problem Gambling	19.6	19.4	-0.2	-1
Subclinical Problems	1.0	1.0	0	0
Problem Gambling	0.2	0.2	0	0
8th Grade Boys				
No Gambling	58.3	62.3	4.0	7
No Problem Gambling	37.0	33.1	-3.9	-10
Subclinical Problems	3.9	3.7	-0.2	-5
Problem Gambling	0.7	0.8	0.1	14
8th Grade Girls				
No Gambling	76.1	75.3	-0.8	-1
No Problem Gambling	22.5	23.3	0.8	4
Subclinical Problems	1.2	1.1	-0.1	8
Problem Gambling	0.2	0.2	0	0
9th Grade Boys				
No Gambling	59.3	63.5	4.2	7

Youth Gambling 25

No Problem Gambling	36.3	32.2	-4.1	-11
Subclinical Problems	3.6	3.4	-0.2	-6
Problem Gambling	0.8	0.9	0.1	12
9 th Grade Girls				
No Gambling	79.9	80.1	0.2	0
No Problem Gambling	19.0	18.6	-0.4	-2
Subclinical Problems	0.9	1.0	0.1	11
Problem Gambling	0.2	0.3	0.1	50
11 th Grade Boys				
No Gambling	57.4	61.8	4.4	8
No Problem Gambling	36.9	33.4	-3.5	-9
Subclinical Problems	4.6	3.9	-0.7	-15
Problem Gambling	1.1	1.0	-0.1	-9
11 th Grade Girls				
No Gambling	82.2	83.8	1.6	2
No Problem Gambling	16.9	15.3	-1.6	9
Subclinical Problems	0.7	0.7	0	0
Problem Gambling	0.2	0.1	-0.1	-50

Note. Subclinical Problems is defined as a score below the clinical threshold for Problem Gambling and a score above 0, so scores of 1, 2, and 3 on the Brief Adolescent Gambling Screen (BAGS).

Figure 2. Problem Gambling; all students 2019

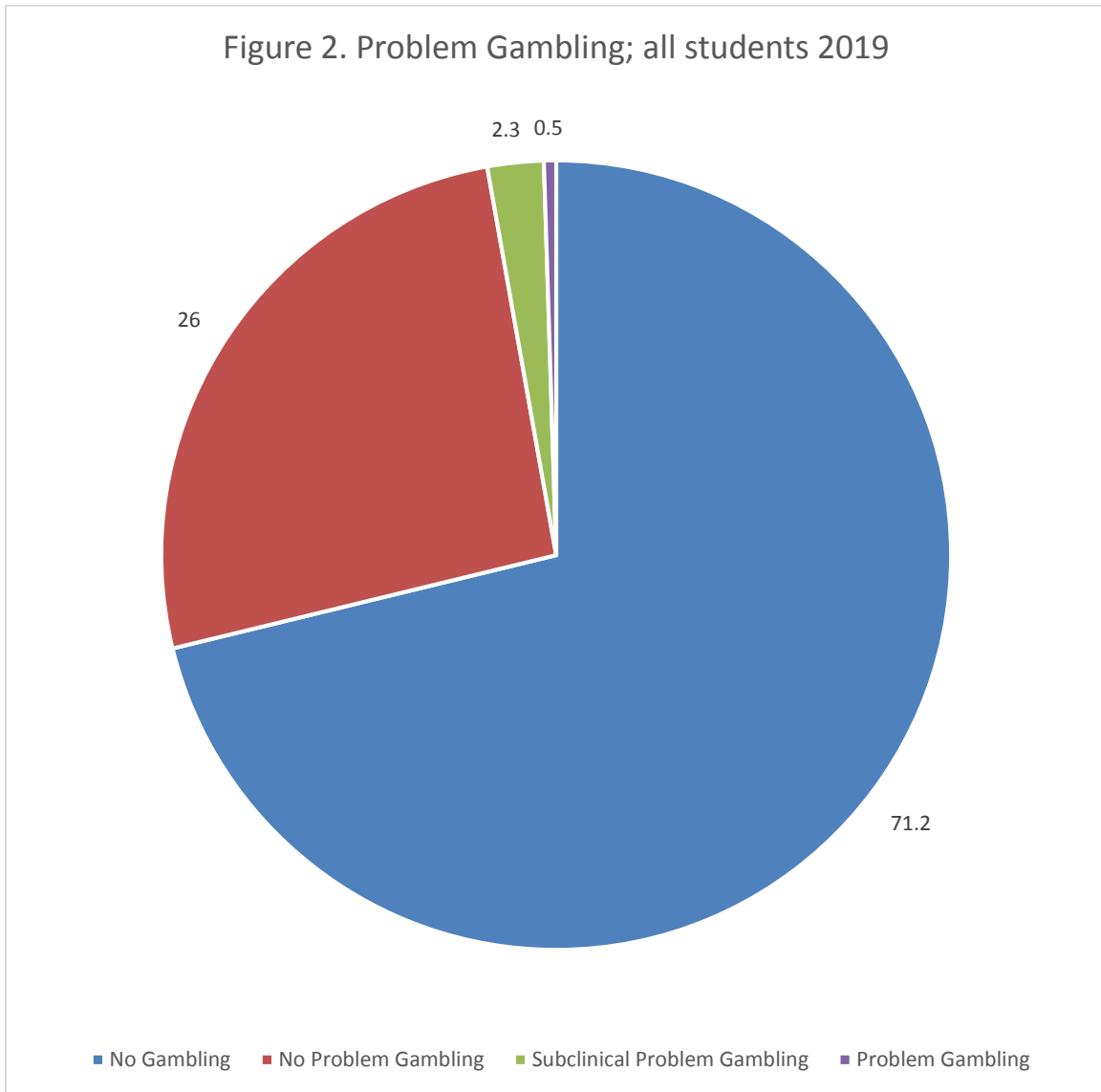
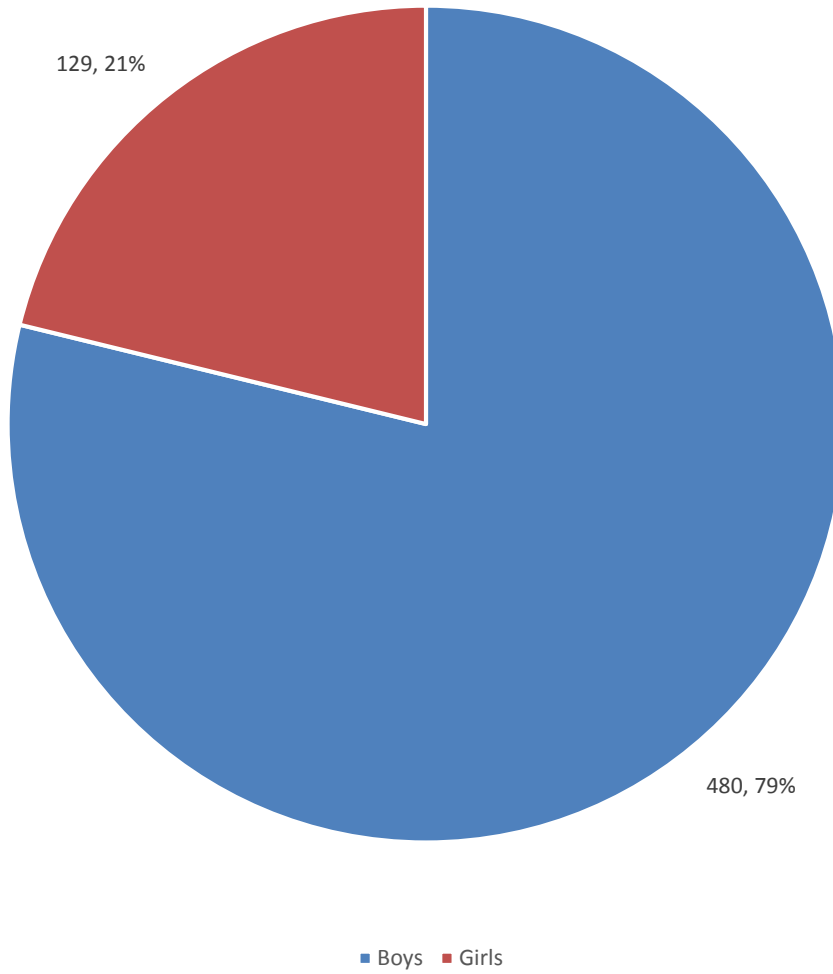
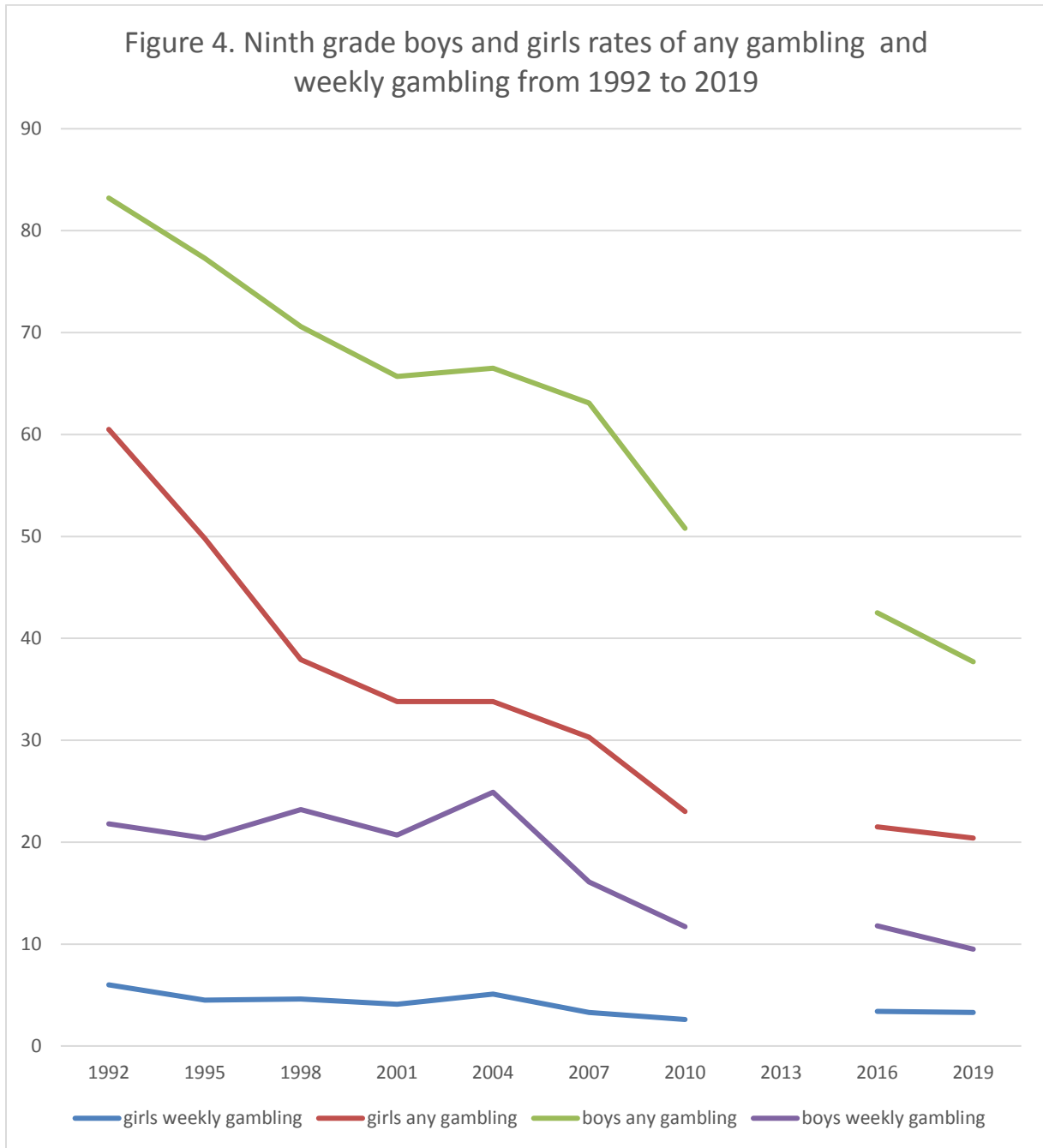


Figure 3. Problem Gambling by Gender 2019





Correlates of Problem Gambling

The third specific aim is to examine what demographic, psychosocial, and behavioral variables are associated with problem gambling. Variables that met the criteria of A correlation of $r = .20$ or greater included four items on use of various tobacco products and four items inquiring about various antisocial behaviors. Table 5 shows the results when these eight items were entered into a stepwise multiple regression with BAGS score as the dependent variable. Six correlates were identified that accounted for 16% of the variance in BAGS score, and these include, in order of magnitude, smoking tobacco from a hookah or water pipe; running away from home; using chewing tobacco; vandalism; smoke cigars; and hitting or beating up another person. Problem gambling is associated with tobacco use and antisocial behaviors. Both vaping (or use of e-cigarettes) and smoking cigarettes were correlated with problem gambling but they did not add to the strength of the regression beyond what was already accounted for by the other three tobacco products. The antisocial behaviors associated with problem gambling were running away from home, vandalism and hitting or beating up other people. Adolescents who have high scores on a measure of problem gambling also tend to use tobacco products and engage in antisocial behaviors.

Table 5

Multiple Stepwise Regression Between Problem Gambling and Related Variables for All Students in 2019

Regression Step	MSS Correlate	<i>Beta</i>	<i>r</i>	<i>r</i> ²
1	During the last 30 days, on how many days did you use a hookah or a waterpipe to smoke tobacco?	.23	.27	.08
2	During the last 12 months, how often have you run away from home?	.20	.34	.12
3	During the last 30 days, on how many days did you use chewing tobacco, snuff or dip?	.17	.37	.14
4	During the last 12 months, how often have you damaged or destroyed property?	.09	.39	.15
5	During the last 30 days, on how many days did you smoke cigars, cigarillos or little cigars?	.13	.39	.16
6	During the last 12 months, how often have you hit or beat up another person?	.06	.40	.16

Discussion

This study had three specific aims and each specific aim will be revisited. The first and second aims, examine student gambling participation and problem gambling rates in 2019; and compare 2019 rates of gambling participation and problem gambling to 2016 in order to determine if rates increased, decreased, or remained stable, will be discussed together. The rate of gambling participation is 30% among 8th, 9th and 11th grade students for these forms of informal and legal gambling. This is a much lower rate than has been reported for Minnesota in the past and for other surveys of adolescent gambling (Stinchfield, 2001). However, it is in line with the demonstrated decline in gambling participation that has occurred in Minnesota over the past three decades of Minnesota Student Surveys (Stinchfield, 2001; 2011). The finding of a decline in gambling participation in 2019 continues what has previously been reported. Stinchfield (2001) reported declines from 1992 to 1998 and Stinchfield (2011) reported continued declines from 2001 to 2007, and the decline has continued from 2016 to 2019. These 2019 rates of gambling participation represent nearly a complete turnaround from the early 1990s. For example, in 1992, 83% of 9th grade boys and 60% of 9th grade girls had gambled in the past year (Stinchfield, 2001) compared to 38% of boys and 20% of girls in 2019. These rates of gambling participation are similar to what was reported in the neighboring state of Iowa in 2016 survey of 6th, 8th and 11th grade students, where 36% of boys and 14% of girls had gambled (Jones & Arndt, 2017). In the 1990s, public health officials had goals of preventing youth from becoming over-involved in gambling and reducing youth gambling, particularly underage gambling. It appears that the goal of reducing youth gambling has been met. This finding is also similar to the conclusion of a review of international youth gambling studies by Volberg, et al (2010) that gambling participation has either remained stable or has decreased.

It is not completely clear what factors have caused this gradual reduction in gambling participation and there is no empirical evidence to explain this reduction. There are some plausible explanations, but these remain speculation. Commercial gambling was introduced to Minnesota in 1990 and it was thought that adolescents would initially be interested in this new adult behavior but that over time the novelty would wear off. This is likely true for many adolescents. Youth continue to be interested in experimenting with adult behaviors and we continue to see youth celebrating milestones such as going to a casino to celebrate their 18th birthday. The other way to look at this reduction is to ask the question: How do adolescents spend their spare time and how has this changed over the past three decades? With the advent of smart phones and social media and constant access to the internet, adolescents have embraced this new technology more so than their parents and grandparents. Adolescents are obsessed with their smartphones and with social media. Gambling is also available online, so there is a concern about this online access to gambling, however, online gambling has not appeared to become a popular form of gambling for youth based on this survey.

More adolescents play informal games of cards, betting on sports or betting on games of personal skill than who play legal forms of gambling such as the lottery, casinos or online gambling. Few students report gambling on the three legal form of gambling and this has always been the case. Legal forms of gambling have obstacles to underage access and these appear to have discouraged most youth gamblers. Among legal games, more adolescents have bought lottery products (7%) than have gambled at a casino (2%) or online (2.4%). Although underage youth would find it difficult to buy lottery products, they can access them by having legal aged buyers purchase products for them, including parents and older siblings.

There continues to differences between boys and girls on their interest in gambling.

Nearly twice as many boys than girls have participated in these forms of gambling in the past year (38.5% versus 21.1%). About two out of five boys have gambled whereas only one out of five girls have gambled in the past year. Boys have historically been more interested in gambling than girls and this appears to be just as true in 2019 as it was in the 1990s.

In contrast to the decline of student rates of gambling participation, when we look at frequent gambling, that is, weekly or more often, rates have remained relatively stable over time for Minnesota students. In terms of the games played by frequent gamblers, more students bet frequently on informal games than legal forms including buying lottery products, gambling in a casino and online. Nearly three times more boys gambled frequently than girls and fewer older girls are gambling frequently than younger girls. There appears to be a small subset of the youth population who are frequent gamblers and they are predominantly boys and they play cards and bet on sports and games of personal skill. It would appear that adolescent frequent gambling is relatively unresponsive to prevention and reduction efforts. Whereas, most of their peers have lost interest in gambling, this small group of mostly boys continues to bet on card games, sports, games of personal skill on regular basis. While gambling once a week or more often is not necessarily pathological, some adolescents may already be experiencing problems associated with their frequent gambling while others are at risk of developing problems associated with their gambling. These frequent gamblers are more likely to go into debt, become preoccupied with gambling and obtaining money to gamble, become alienated from their parents and family, be distracted from productive activities that will move them into adult maturity, to name a few risks. Prevention efforts would do well to focus on this small subsample of the larger school population because frequent gamblers are most at risk of developing gambling problems.

Adolescent problem gambling was screened with the Brief Adolescent Gambling Screen.

The sample was divided into four categories: a) No gambling; b) No problem gambling; c) Subclinical problems, and d) Problem gambling. The proportion with problem gambling is one half of one percent and this is the same rate reported in 2016. Another 2.3% were categorized as subclinical problems which means they are reporting some problems associated with their gambling but they did not reach the threshold of severity of those with problem gambling. Again, this rate was similar to that reported in 2016 of 2.5%. Rates of problem gambling are relatively stable over time. Four times more boys are shown to be positive for problem gambling (0.9%) than girls (0.2%) and there was very little difference between grades. Four times more boys are experiencing problem gambling than girls. This is a common finding across studies and suggests that there is something unique about boys that makes gambling much more interesting and attractive to them than it is to girls. While we should not ignore female gamblers, frequent and problem gamblers are primarily made up of male gamblers, and therefore problem gambling prevention efforts should include content and messages that get the attention of male gamblers, particularly the issues that draw them into excessive gambling.

The third aim to examine what demographic, psychosocial, and behavioral variables are associated with problem gambling found that tobacco use and antisocial behaviors were associated with problem gambling. Specifically, six items measuring each of these two domains accounted for 16% of the variance in problem gambling scores. This could be interpreted the higher the problem gambling score, the more likely the person it to use tobacco and engage in antisocial behaviors. This nature and direction of the cause-effect relationship is not clear from this cross-sectional data. That is, it is not clear if tobacco use and antisocial behaviors lead to problematic gambling or whether problematic gambling leads to tobacco use and antisocial behaviors.

One of the values of this study is the recurring assessments on a three-year interval that allows for monitoring student gambling trends over time. Another value is the large sample size over 100,000 adolescent participants—this is the largest youth gambling dataset in the world. This sample is nearly the entire population of 8th, 9th, and 11th grade public school students in Minnesota. The value of having such a large sample is that it allows for an accurate measurement of gambling for the population and does not require inferring a small sample estimate onto a larger population.

This study has at least six limitations. First, this survey was not intended to be a comprehensive measure of gambling behavior or problem gambling—there are a small number of items focused on gambling. Adolescents may play other games that were not included in this survey (e.g., dice). Gambling on these other games could affect the overall rate of gambling. Related, the measure of gambling frequency response options is a gross level of measurement and does not take into account other measures of participations such as time and money. Problem gambling is assessed with a brief screen and brief screens are not as reliable or accurate as full scale measures. A second limitation is a possible sample bias, in that surveys were administered to adolescents who are attending school. Those students who have dropped out of school, been suspended or expelled, or who are absent did not participate and they may be more likely to gamble than students in school (see Stinchfield, 2015 for results from students out of the mainstream). This potential sample bias increases with each advancing grade, so that the 11th grade estimates are most affected by this potential sample bias. A third limitation is that this study does not include students from all grades that are commonly included in youth gambling surveys. Therefore, it does not include a complete assessment of age/grade effect. A fourth limitation is that this study relies on self-report data and this raises the question of response bias.

There is no objective independent corroboration of a student's responses, however, methods were utilized that enhance the validity of self-report data. These methods include providing anonymity and confidentiality and assuring the respondent of these two safeguards, administering the survey in a controlled environment, and then finally, checking students' responses for inconsistencies and improbable answers which suggest invalid responding and eliminating those cases from the database whose responses suggest that they were not giving valid information (Minnesota Student Survey Interagency Team, 2007; 2016; 2019). A fifth limitation is that the set of gambling questions have been revised over time and in the 2016 and 2019 MSS, different types of gambling that were previously separate questions were combined into one question, that is, "played cards, bet on sports teams or games of personal skill like video gaming, pool, golf or bowling". By combining these different forms of gambling into one question, we can no longer monitor the extent of play of any one of these different forms of gambling. Related, a sixth limitation is that these traditional forms of gambling measured by the MSS may not capture new forms of gambling and new trends of "pay to play" activities such as fantasy sports, betting on e-sports and video gaming and other new forms of sports betting.

There are some findings in this study that raise concerns. First, there continue to be underage adolescents who report gambling on legalized games including the lottery, casino, and online gambling. Underage adolescents can access the lottery by obtaining lottery products from people of legal age. Underage adolescents can access online gambling sites by lying about their age. While it seems relatively easy for underage adolescents to access lottery products and online gambling, it seems less likely that they could access casino gambling because they must walk through the front door of the casino and pass a security guard or casino staff and may be asked to present identification to verify that they are of legal age. So, if underage adolescents 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. There have been reports in the media of underage patrons gambling in casinos, so there are other sources reporting the same activity. Underage gambling is illegal and should be a concern for lottery retailers and casino operators and additional efforts should be put in place to prevent underage gambling. On the other hand, it could be that underage adolescents are reporting casino gambling, when in fact they are not gambling in casinos. This is a possibility and future research should examine the validity of self-reports of casino gambling by underage adolescents.

A second concern is that the rates of frequent gambling and problem gambling remain relatively stable over time and appear to be unaffected by prevention efforts. Parents, teachers, public health officials are most concerned about those adolescents who are over-involved in gambling and have problems associated with their gambling and those are the very adolescents who appear to be impervious to prevention efforts so far. The message of “Do not give lottery products to underage youth” appears to have gotten through to the general public because the majority of students show declines in lottery participation, but in addition to this message, we need to provide additional messages and resources to those students who are over-involved in gambling and experiencing negative consequences from their gambling.

These results do not support the assertion that youth gambling is an epidemic (Derevensky, 2012). Fewer Minnesota adolescents are gambling in 2019 than were gambling at the onset of the expansion of commercial gambling in Minnesota in 1992. While there have been fluctuations in frequent gambling rates for different games, these fluctuations are limited to small segments of the youth population, such as poker players. From a public policy perspective,

this information is helpful in that there does not appear to be a causal link between commercial gambling and youth gambling. Prior to 1990 Minnesota commercial gambling was limited to charitable gambling in bars and a few tribal Bingo halls. Since 1990 Minnesota gambling expanded to include over 3,000 state lottery retail outlets, over 3,000 charitable gambling outlets, 18 Las Vegas-style tribal casinos, and two racetracks with card rooms.

On the one hand, gambling participation continues to decline for most students and gambling for most youth is an infrequent and inconsequential past time. On the other hand, there is a small segment of the adolescent population that appears to gamble frequently and experience problems associated with their gambling and these youth may need prevention and intervention services. Our goal is to gain a better understanding of gambling among youth so methods to prevent the development of problem gambling can be formulated and thus improve the health of youth.

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Appendix

Supplemental Table 1

Demographic Characteristics of 2016 Sample

Demographic Characteristic	Grade 8 N=42,021 N (%)	Grade 9 N=41,731 N (%)	Grade 11 N=33,774 N (%)	Total N=117,526 N (%)
Gender				
Girls	21,153 (50.3)	21,071 (50.5)	17,070 (50.5)	59,294 (50.5)
Boys	20,868 (49.7)	20,660 (49.5)	16,704 (49.5)	58,232 (49.5)
Age				
12	72 (0.2)	0	0	72 (0.1)
13	17,421 (41.5)	47 (0.1)	0	17,468 (14.9)
14	23,888 (56.8)	16,686 (40.0)	0	40,574 (34.5)
15	627 (1.5)	24,355 (58.4)	42 (0.1)	23,024 (21.3)
16	13 (0.0)	616 (1.5)	13,740 (40.7)	14,369 (12.2)
17	0	27 (0.1)	19,425 (57.5)	19,452 (16.6)
18	0	0	516 (1.5)	516 (0.4)
19-20	0	0	51 (0.2)	51 (0.0)
Race				
White	28,313 (67.4)	29,503 (70.7)	24,998 (74.0)	82,814 (70.5)
Multiple Races	3,460 (8.2)	3,118 (7.5)	2,009 (5.9)	8,587 (7.3)
Black/African/African American	2,559 (6.1)	2,169 (5.2)	1,577 (4.7)	6,305 (5.4)

Asian	2,371 (5.6)	2,432 (5.8)	1,984 (5.9)	6,787 (5.8)
Hispanic/Latina/o	4,382 (10.4)	3,718 (8.9)	2,651 (7.8)	10,751 (9.1)
American Indian/Alaska Native	602 (1.4)	483 (1.2)	301 (0.9)	1,386 (1.2)
No answer/unknown	269 (0.6)	258 (0.6)	196 (0.6)	723 (0.6)
Native Hawaiian or Other Pacific Islander	65 (0.2)	50 (0.1)	58 (0.2)	173 (0.1)
<hr/>				
Residence	<hr/>			
Minneapolis/Saint Paul Metropolitan Area	22,295 (53.1)	21,958 (52.6)	17,664 (52.3)	61,917 (52.7)
Greater Minnesota	19,726 (46.9)	19,773 (47.4)	16,110 (47.7)	55,609 (47.3)

Note. Inclusion criteria: must answer gender and at least one gambling frequency item.

Supplemental Table 2

Comparison of 8, 9 and 11th Grade Boys on Gambling Frequency for each Game and Problem Gambling Questions in 2019

Gambling Question response options	8th %	9th %	11th %
Played cards, bet on sports teams or games of personal skill like video gaming, pool, golf or bowling			
Not at all	65.2	65.8	64.7
Less than once a month	18.6	18.9	19.1
About once a month	7.5	7.6	8.7
About once a week	3.6	3.5	3.8
2 to 6 times a week	2.2	1.7	1.8
Daily	2.9	2.4	2.0
Bought lottery tickets or scratch offs			
Not at all	90.9	92.3	91.8
Less than once a month	5.7	4.8	5.1
About once a month	1.9	1.5	1.6
About once a week	0.6	0.6	0.5
2 to 6 times a week	0.3	0.2	0.2
Daily	0.7	0.7	0.8
Gambled in a casino			
Not at all	97.4	97.2	96.3
Less than once a month	0.9	0.7	1.6
About once a month	0.5	0.5	0.6
About once a week	0.2	0.3	0.4
2 to 6 times a week	0.2	0.2	0.1
Daily	0.8	1.1	1.0

Gambled for money online			
Not at all	96.4	95.9	95.1
Less than once a month	1.7	2.0	2.3
About once a month	0.8	0.9	1.0
About once a week	0.5	0.5	0.6
2 to 6 times a week	0.2	0.2	0.3
Daily	0.5	0.5	0.7
Hidden your gambling/betting from your parents, other family members or teachers?			
Never	91.3	91.5	90.6
Sometimes	5.2	4.8	5.0
Many times	1.2	1.5	1.6
All of the time	2.3	2.2	2.8
Felt that you might have a problem with gambling/betting?			
Never	94.6	94.3	93.7
Sometimes	3.3	3.5	3.8
Many times	1.2	1.6	1.3
All of the time	0.9	0.7	1.2
Skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet?			
Never	96.1	96.0	95.9
Sometimes	2.3	2.2	2.4
Many times	0.9	1.2	1.0
All of the time	0.8	0.6	0.8

Note. Column percentages may not total 100% due to rounding to the tenth decimal place.

Supplemental Table 3

Comparison of 8, 9 and 11th Grade Girls on Gambling Frequency for each Game and Problem Gambling Questions in 2019

Gambling Question response options	8th %	9th %	11th %
Played cards, bet on sports teams or games of personal skill like video gaming, pool, golf or bowling			
Not at all	79.5	83.3	87.0
Less than once a month	13.0	11.0	8.9
About once a month	3.9	3.2	2.4
About once a week	1.8	1.3	0.9
2 to 6 times a week	1.0	0.7	0.4
Daily	0.9	0.6	0.2
Bought lottery tickets or scratch offs			
Not at all	91.9	93.9	94.7
Less than once a month	6.1	4.5	3.9
About once a month	1.4	1.0	0.9
About once a week	0.4	0.3	0.3
2 to 6 times a week	0.1	0.1	0.1
Daily	0.2	0.3	0.2
Gambled in a casino			
Not at all	98.9	99.0	99.0
Less than once a month	0.6	0.3	0.5
About once a month	0.2	0.2	0.1
About once a week	0.1	0.1	0.1
2 to 6 times a week	0	0.1	0.1

Daily	0.2	0.3	0.2
Gambled for money online			
Not at all	99.1	99.1	99.4
Less than once a month	0.4	0.4	0.3
About once a month	0.1	0.2	0.2
About once a week	0.1	0.1	0.1
2 to 6 times a week	0.1	0.1	0
Daily	0.1	0.1	0.1
Hidden your gambling/betting from your parents, other family members or teachers?			
Never	96.3	95.5	96.9
Sometimes	2.3	2.7	2.1
Many times	0.7	0.7	0.6
All of the time	0.6	1.1	0.5
Felt that you might have a problem with gambling/betting?			
Never	97.6	96.9	96.9
Sometimes	1.6	2.0	2.1
Many times	0.4	0.7	0.8
All of the time	0.3	0.4	0.2
Skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet?			
Never	97.7	97.2	97.9
Sometimes	1.5	1.4	1.3
Many times	0.5	0.7	0.7
All of the time	0.3	0.7	0.1

Note. Column percentages may not total 100% due to rounding to the tenth decimal place.