School Factors Associated with Past-Month Gambling Among A Large Sample of Adolescents

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Abstract: The present study sought to identify school factors associated with recent gambling (gambling within the past 30 days). We used pooled data from the 2016, 2018, and 2020 PRIDE data set among 108,690 adolescents among 13 local public schools. A sizeable percentage (13.1%) of adolescents reported gambling in the past 30 days. Results from multiple logistic regression analyses found differences based on demographic factors, previous substance use, and school factors. Adolescents at highest risk were those who were male, non-white, in high school, sold drugs, used their technological devices other than for school purposes, and participated in violent activities in the past 30 days. Worrying rates of substance use were also found. Findings from the present study can inform harm reduction efforts, prevention messaging, and clinical interventions related to adolescent gambling.

Keywords: Adolescent, School Factor, PRIDE, Gambling.

Introduction

Compulsive gambling is defined as an "uncontrollable urge to keep gambling despite the toll it takes on one's life" (Mayo Clinic, 2016). The National Council on Problem Gambling (2015) estimated that 5 million Americans met the criteria for compulsive gambling in 2015, yet only 8% of them sought treatment or other behavioural health services to address it. Even more concerning are the elevated rates of gambling among adolescents, compared to adults. While the prevalence of compulsive gambling among the general population globally is between 0.4% and1% (American Psychiatric Association, 2013), among adolescents in the United States it is estimated to be as high as 12.3% (Calado et al., 2016), and may be even higher in Europe (Canale et al., 2016). Such elevated rates of compulsive gambling are concerning because regular gambling is associated with increased risk of poor mental health and substance abuse (Cook et al., 2015).

Several psychological, psychosocial, and school-related factors are associated with problem gambling among adolescents. School factors include peer pressure, poor academic performance, and overall school climate (Langhinrichsen-Rohling et al., 2004). One study of youth in Connecticut found that having a low-grade average was a significant risk factor for gambling among students (Yip et al., 2011). Other risk factors for adolescent gambling include peer antisocial behaviours and substance use (Dowling et al., 2017). Adolescents who have peers that engage in antisocial behaviours such as theft, violence, and substance abuse are also more likely to gamble.

The school environment and the social contexts involved is a crucial influence on adolescent development and behaviour (Eccles & Roeser, 2012). School is also a place of social learning, where peers have strong influences on one's behaviour, in addition to academic learning and intellectual development. Unfortunately, exposure to negative influences at school can result in adolescents engaging in risky behaviours. According to social disorganization theory, a disorganized school is one that includes several negative influences, such as high rates of suspension, discipline problems, and low attendance (Gottfredson, 1987), that promote unhealthy behaviours (Lindstrom-Johnson et al., 2017). One study of adolescents found that disorder in the school and bullying was associated with higher levels of gambling among male students (Grande-Gosende et al., 2020).

While previous studies have examined the association between school context and adolescent risky behaviours like substance use and violence (Harris et al., 2002), its association with adolescent gambling has been largely ignored (Lee et al., 2014). This is of concern because gambling early in adolescence predisposes one to become dependent on gambling in adulthood. For example, one study that followed young adults ages 17 or older for over ten years found that those who initiated gambling at earlier

ages were more likely to be compulsive gamblers and tended to have poorer mental health (Parhami et al., 2014). Further research is needed to inform potential school-based interventions to stop the development of problematic gambling in adolescents.

The Present Study

Despite the available evidence suggesting that an adolescent's school environment can place them at an increased risk of problem gambling, there are currently limited school-based prevention programs for treating and identifying warning signs of adolescent gambling (Keen et al., 2017; St-Pierre & Derevensky, 2016). This is a troubling deficiency, given a recent study which found that between 10% and 20% of Connecticut youth gambled at pathological levels (Farhat et al., 2021). Thus, the present study sought to identify school factors that are associated with gambling in the past month among a large sample of adolescents. The specific research questions were as follows:
(1) What percentage of adolescents (age 13-18) report gambling in the past month?
(2) What demographic factors, if any, are associated with adolescent gambling in the past month?
(3) What school factors, if any, are associated with adolescent gambling in the past month?

Method

Pooled data from the 2016-2020 Parents' Institute for Drug Education (PRIDE) survey was analyzed. The PRIDE survey is a national survey of adolescents in grades 7 through 12 in the United States that assesses risky behaviours and substance use and anonymously answered by students. For the present study, we utilized data from 133 public and private schools in the greater Cincinnati area because it was the only data available at the time. A University of Cincinnati Institutional Review Board approved this study and deemed it "non-human subjects," because the data did not include any potentially identifying or personal information about the study participants.

The PRIDE survey has found to be valid (Metze, 2000; Reliand Consultants, 2018), reliable with stability reliability coefficients between .814 and .851 (Metze, 2000), and to have high agreement (80%) between survey responders (Craig & Emshoff, 1987). Adams (1994) also compared PRIDE survey estimates to the Monitoring the Future survey and found similar estimates between the surveys. The response rate for the survey was 74.9%.

Measures
Dependent Variable
Gambling, as defined by the PRIDE Survey, is "betting anything of value (money, watch, soda, etc.) on a game or event." To assess gambling in the past month, the survey asks "In the past month, have you participated in any of the following gambling behaviours?" and lists eleven different gambling activities: (1) "Played 'scratch offs,'" (2) "Played lottery tickets (Powerball or Megabucks)," (3) "Played pull tabs or 'paper' games other than lotteries," (4) "Played dice or coin flips," (5) "Played cards (poker, etc.)," (6) "Bet on a sport," (7) "Bet on a horse/dog race," (8) "Bet on games of personal skill (bowling, video games, dares, etc.)," (9) "Played bingo for money," (10) "Bet money over the internet," and (11) "Bet money in other ways." For the purposes of this study, a binary response variable was created where 1 = "Participated in any form of gambling in the past month" (i.e., answered "yes" to one or more of the gambling types), and 0 = "Did not participate in any form of gambling in the past month" (i.e., answered "no" on all of them).

School Factors
Five questions were used to assess school factors and were on a binary scale: (1) "Do you make good grades?," (2) "Do you get in trouble at school?," (3) "Do you take part in school clubs/activities?," (4) "Bought or sold drugs at school?," and (5) "On an average school day, how often do you play video or computer games or use a device for something that is not school work?" (1 = "Yes", 0 = "No").

Covariates
The covariates of grade level, sex, age, and race were used for the analysis.

Data Analysis
Less than 3% of responses had missing data, and these were excluded from all analyses. Little's MCAR test revealed the data were missing completely at random, $p = .35$. We used Rao-Scott tests to assess bivariable relationships, due to the complex sampling design. To ensure that results were not biased across schools and counties, we created sampling weights using a post-stratification raking procedure to adjust for these issues (Battaglia et al., 2009; Deville et al., 1993). The rakes were based on age (three categories), race (four categories), and grade level (three categories). Demographic data from the 2016-2020 U.S. Census was used for the raking procedure to create the sampling weights.
Controlling for covariates, we built logistic regression models to determine conditional associations between substance use/psychosocial factors and gambling. We also conducted interaction tests between variables. Taylor linearization series were used to provide accurate standard

errors. Variance inflation factors (VIF) were all below 2.5, indicating that multicollinearity was not an issue (Kutner et al., 2004).

All analyses were conducted in Stata v. 15.1 (StataCorp, 2019) with the appropriate survey commands (Heeringa et al., 2010). The alpha level was set at $p < .05$. We did not control for multiple comparisons, as recommended by previous research (Rothman, 1990).

Results

The sample consisted of near equal percentages of males (51.7%) and females (48.7%). One in seven (13.1%) participated in some form of gambling in the past month. From 2016 to 2020, this rate of gambling did not significantly change (12.3% (2016-2017), 12.9% (2018-2019), 13.1% (2020) respectively) (see Tables 1 & 2).

Table 1

Recent Gambling Behaviours Among Adolescents

Gambling Format	Proportion (*n*)	95% CI
Scratch offs	12.2% (13,252)	[12.0, 12.4]
Lottery	5.53% (6,019)	[5.40, 5.68]
Pull tabs	3.84% (4,178)	[3.73, 3.96]
Dice games	11.5% (12,532)	[11.3, 11.7]
Card games	14.1% (15,305)	[13.9, 14.3]
Sport	10.1% (11,001)	[9.94, 10.3]
Horse/dog race	2.91% (3,162)	[2.81, 3.01]
Personal skill (e.g., video games, dares, etc.)	15.3% (16,650)	[15.1, 15.5]
Bingo	3.27% (3,552)	[3.16, 3.37]
Internet	2.42% (2,636)	[2.33, 2.52]
Others	6.90% (7,503)	[6.75, 7.06]

Table 2

Demographic Factors Associated with Adolescent Gambling in the Past Month

	Univariable		Bivariable Comparisons			
	Full Sample (*n* = 108,690)		Gambled in Past Month?		Multivariable Model	
			No (*n* = 94,436)	Yes (*n* = 14,254)		
	%	95% CI	% 95% CI	% 95% CI	aOR	95% CI
Sex						
Female	48.7	[48.4, 49.1]	89.2 [88.9, 89.5]	10.8 [10.5, 11.1]***	1.00	
Male	51.2	[50.9, 51.6]	81.8 [81.4, 82.2]	18.2 [17.9, 18.6]	1.45***	[1.23, 1.78]
Age						
12–13	31.1	[30.8, 31.4]	85.6 [85.2, 86.0]	14.4 [14.0, 14.8]***	1.00	
14–15	35.5	[35.2, 35.8]	84.3 [83.9, 84.7]	15.7 [15.3, 16.1]	1.23***	[1.11, 1.34]
16–17	33.4	[33.1, 33.7]	86.9 [86.5, 87.3]	13.1 [12.7, 13.4]	1.11	[0.98, 1.24]
Race						
Non-Hispanic White	82.7	[82.4, 82.9]	85.3 [85.2, 85.7]	14.6 [13.1, 14.8]***	1.00	
African American	10.2	[10.0, 10.4]	86.2 [85.5, 86.9]	13.8 [13.1, 14.5]	1.04***	[1.01, 1.95]
Hispanic	5.70	[5.55, 5.85]	82.5 [81.5, 83.6]	17.4 [16.4, 18.5]	2.34***	[1.67, 2.56]
Other/Mixed Race	1.40	[1.01, 1.45]	92.3 [90.2, 95.4]	7.7 [6.9, 8.1]	0.85	[0.67, 1.07]
Grade Level						
7th –8th grade	22.5	[22.3, 22.8]	89.0 [88.2, 89.2]	11.0 [10.7, 11.3]***	1.00	
9th –10th grade	44.9	[44.6, 45.2]	85.7 [85.4, 86.1]	14.3 [13.9, 15.1]	1.92***	[1.80, 2.13]
11th –12th grade	31.1	[30.8, 31.4]	88.3 [88.1, 89.4]	11.7 [10.5, 12.3]	1.55***	[1.24, 1.93]

Notes. Past-Month Gambling is the outcome variable (13.1%). CI = confidence interval, aOR = adjusted odds ratio (controlling for all covariates presented in table). ***$p < .001$, **$p < .01$, *$p < .05$.

Boys were more likely to gamble in the past month than girls, with an adjusted odds ratio (aOR) of 1.45, and a 95% CI of 1.23–1.78. Adolescents age 14-15 were the most at risk for gambling in the past month, aOR = 1.23, 95% CI [1.11, 1.34], compared to 12-13-year-olds. Compared to non-Hispanic White adolescents, two ethnic demographics were more likely to have gambled in the past month: African Americans, aOR = 1.04, 95% CI [1.01, 1.95], and Hispanics, aOR = 2.34, 95% CI [1.67, 2.56]. Adolescents in 9th or 10th grade were more likely to gamble than 7th or 8th graders, aOR = 1.92, 95% CI [1.80, 2.13], as were those in the 11th or 12th grade, aOR = 1.55, 95% CI [1.24, 1.93].

Several school factors significantly predicted past-month gambling (see Table 3). Adolescents who never/seldom/sometimes received good grades were more likely to have gambled in the past month, aOR = 1.26, 95% CI [1.16, 1.38]. Getting in trouble in school often/a lot also increased the risk of participating in gambling activities in the past month, aOR = 1.97, 95% CI [1.82, 2.13], as did not participating in school clubs/activities, aOR = 1.87, 95% CI [1.84, 1.91], and using their technological devices for non-school purposes (e.g. games), aOR = 1.41, 95% CI [1.36, 1.46]. Finally, adolescents who sold drugs were more than twice as likely to have gambled in the past month, aOR = 2.43, 95% CI [2.23, 2.64].

Table 3

School Factors Associated with Adolescent Gambling in the Past Month

	Univariable		Bivariable Comparisons				Multivariable Model	
	Full Sample (n = 108,690)		Gambled in Past Month?					
			No (n = 94,436)		Yes (n = 14,254)			
	%	95% CI	%	95% CI	%	95% CI	aOR	95% CI
Do You Make Good Grades?								
Never/Seldom/Sometimes	4.53	[4.41, 4.66]	87.8	[86.9, 88.7]	12.2	[11.3, 13.1]*	1.26***	[1.16, 1.38]
Do You Get in Trouble at School?								
Often/A lot	3.51	[3.40, 3.62]	75.7	[74.4, 77.1]	24.2	[22.9, 25.6]***	1.97***	[1.82, 2.13]
Do You Take Part in School Clubs/Activities?								
Never/Seldom/Sometimes	65.3	[65.0, 65.6]	86.3	[86.1, 86.6]	13.6	[13.4, 13.9]***	1.87***	[1.84, 1.91]
Bought or Sold Drugs at School?								
Yes	2.68	[2.59, 2.78]	71.7	[70.0, 73.3]	28.3	[26.7, 29.9]***	2.43***	[2.23, 2.64]
On an average school day, how often do you play video or computer games or use a device for something that is not schoolwork?								
Often/A Lot	52.9	[52.6, 53.2]	85.0	[84.7, 85.3]	15.0	[14.7, 15.3]***	1.41***	[1.36, 1.46]

Notes. Past-Month Gambling is the outcome variable (13.1%). CI = confidence interval, aOR = adjusted odds ratio (controlling for all covariates presented in table). ***p < .001, **p < .01, *p < .05.

Discussion

　　　The present study sought to identify potential associations between recent gambling behaviour and school-related factors among a large sample of adolescents. Adolescent males were more likely than females to have engaged in gambling in the past month, corroborating other studies (Cook et al., 2015; Dowling et al., 2017). This is consistent with the fact that males are also more likely to engage in other risky behaviours (Martins et al., 2004). Since gambling is widely perceived to be a risky behaviour, males may be more inclined to participate in it for similar reasons they might be attracted to other risky behaviours such as substance use and violence.

　　　Regarding race, we found that Hispanic and African American adolescents were more likely than White adolescents to have engaged in recent gambling. Similarly, Welte and colleagues (2008) found that African American adolescents were less likely than non-Hispanic White adolescents to gamble, and that Hispanic adolescents reported higher gambling rates than other ethnicities. Another study of ethnic minority adolescents in Europe found that gambling was common in their culture, which may apply in the United States as well to help explain the present finding (Zangeneh et al., 2010). Our findings are consistent with previous research on ethnic

differences in gambling behaviours among the US general population (Evans et al., 2001). Certain cultural factors may explain why Hispanic adolescents are more likely to gamble—Cuadrado (1999) posited that *machismo,* the cultural belief of "manliness" may explain it because gambling is seen as a rite of passage to becoming "a man."

Our findings also corroborate other studies that link a higher propensity for gambling behaviours among African Americans (Gerstein et al., 1999; Gerstein, 2006). Although less likely to gamble, when initiated into gambling, African Americans tend to gamble more heavily and exhibit more addictive problems (Welte et al., 2002). A survey of African American gamblers found that thrill seeking and urge reduction were some of the most endorsed reasons for gambling (Vander Linden et al., n.d.). These findings indicate a need for more cultural research on gambling in order to attenuate the risk of stereotyping and enhance treatment efficacy (Canales, 2000). Several suggestions for ameliorating gambling problems among African Americans were made by Van Linden et al. (n.d.), including enhancing community outreach efforts and expanding access to mental health services.

Adolescents who were 14 or 15 years old were more likely than those 12 or 13 years old to have engaged in recent gambling. Arcuri et al. (1985) also found that high school students were more likely than younger students to gamble. However, it is noted that the present study did not show a significant difference between those age 16 to 18 and those 12 to 13. It seems logical that gambling rates would increase with age, since gambling opportunities would also increase with age. Further research is warranted to understand this difference more fully.

Regarding school factors, adolescents who reported they never/seldom made good grades were more likely to report recent gambling. This aligns with research showing that involvement in gambling was associated with poor grades, and vice-versa (Potenza et al., 2011). Excellent/good academic performance has been shown to promote positive values, higher self-esteem, and act as a protective factor against initiating risky behaviours (Regier, 2011). Struggling young students may be tempted to engage in risky behaviours like gambling to cope with their academic difficulties. Ensuring adequate academic success for students therefore remains a priority for educational faculty. Creating groups to assist students and enhance communication may be an option to help prevent academic failure for at-risk youth (Regier, 2011).

Adolescents who sold drugs at school or got in trouble at school were much more likely to report recent gambling. One in four (28.3%) adolescents who reported selling drugs at school also reported gambling in the past month. Jessor's (1987) Problem Behavior Theory (PBT) may provide an explanation for this relationship. This social-psychosocial framework encompasses four domains that may influence an individual to engage in risky behaviours: (1) the social environment, (2) the perceived environment, (3) personality, and (4) other behaviour. Certain risk behaviours (e.g., gambling) that may be acceptable or condoned in the

social environment may encourage an individual to engage in other, even more risky behaviours. Strategies that schools may use to prevent this include interventions to promote school connectedness, resilience, and opportunities for adolescents to build emotional competence (Terzian et al., 2011).

Adolescents who seldom/never participated in school activities were nearly twice as likely to participate in recent gambling (aOR = 1.87). This aligns with a study of Washington adolescents that found a strong correlation between delinquency and lack of involvement in school activities (Fleming et al., 2008). Participation in school sports or activities may improve an adolescent's sense of self-worth, responsibility, and self-esteem (Grabe, 1981). Adolescents who avoid after school activities may turn to other enticing activities such as gambling. Thus, promoting school activities that bolster social communication and connectedness may help to prevent the initiation of gambling among students.

Adolescents who used their digital devices for non-school purposes (e.g., games) were more likely to report recent gambling. Seeing positive social ads and information about gambling may also increase likelihood to participate in gambling. Cultivation theory hypothesizes that individuals who view certain forms of media (e.g., ads, videos) adopt hegemonic views of the world and the external environment (McQuail & Windahl, 1993). Consistent exposure to pro-gambling messages and media may cultivate a predisposition to gambling. Indeed, one study of adolescents from the European School Survey Project on Alcohol and Other Drugs (ESSPAOD) estimated that adolescents who reported online gambling were nearly five times more likely to report problem gambling, compared to gamblers who did not use online platforms (Canale et al., 2016).

Considering that adolescents are vulnerable to gambling advertisements (Gupta & Derevensky, 2008), several strategies could curb the initiation of gambling among adolescents, including creating other ads with information about the harms of gambling, restricting ads on gambling apps, regulation of these media platforms by parents and school professionals, and prohibiting media from containing images or sounds that are associated with winning money (e.g., coins falling out of slot machines with blinking lights and "jackpot" music), which can entice people to gamble by creating a false sense of their odds of winning (Monaghan et al., 2008). Harm reduction efforts that have been suggested to curb technological approaches to gambling include implementing push notifications with tips to limit gambling and excessive losses, high praise pop-up messages, (Broda et al., 2008; Tanner et al., 2017).

Limitations

Because the surveys responses were self-reported, under/over-reporting of answers may be present. Participants were limited to the Cincinnati area, so location bias may also be present—, so future studies should assess gambling behaviours among broader samples (e.g., national).

Characteristics associated with adolescence, which could be a fundamental explanatory element of the data, should be highlighted as a limitation.

Conclusions

This study identified several school factors significantly associated with recent gambling. Adolescents who were male, older, sold drugs at school, did not participate in sports/school activities, and used technology for purposes other than school were more likely to have gambled in the past month. Further research is warranted to identify causality in these relationships to better inform treatment and prevention programs. We believe our findings can bolster harm reduction efforts and clinical interventions.

Funding
None.

Declaration of conflict of interest
The authors declare no conflict of interest or competing interests.

Availability of data and material
Data source: https://www.prevention-first.org/home/

Author's contributions
Robert Andrew Yockey: Initial draft, analyses, and interpretation of results. Keith King: Initial draft and interpretation of results. Rebecca Vidourek: Initial draft and interpretation of results. Ashley Merianos: Initial draft and interpretation of results.

Ethics and informed consent
University of Cincinnati Institutional Review Board approved this study and deemed it "non-human subjects.

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