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Correlates of at-risk/problem internet gambling in adolescents

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Abstract

Objective—The internet represents a new and widely available forum for gambling. However, relatively few studies have examined internet gambling in adolescents. This study sought to investigate the correlates of at-risk or problem gambling amongst adolescents acknowledging or denying gambling on the internet.

Method—Survey data from 2,006 Connecticut high-school-student gamblers were analyzed using chi-square and logistic regression analyses.

Results—At-risk/problem gambling was found more frequently in adolescent internet gamblers than in non-internet gamblers. As compared to at-risk/problem gambling in the non-internet gambling group, at-risk/problem gambling in the internet gambling group was more strongly associated with poor academic performance and substance use (particularly current heavy alcohol use; odds ratio=2.99; p=0.03) and less strongly associated with gambling with friends (odds ratio=0.32; p=0.0003). At-risk/problem gambling in both the internet and non-internet gambling groups, respectively, was associated at $p<0.05$ each with multiple adverse measures including dysphoria/depression (odds ratios=1.76, 1.96), getting into serious fights (odds ratios=2.50, 1.93), carrying weapons (odds ratios=2.11, 1.90), and use of tobacco (odds ratios=2.05, 1.88 for regular use), marijuana (odds ratios=2.02, 1.39) and other drugs (odds ratios=3.24, 1.67).

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Conclusions—Clinically, it is important to assess for teenagers' involvement in internet gambling, particularly as adolescent at-risk/problem internet gambling appears specifically associated with non-peer involvement, heavy alcohol use and poor academic functioning.

Keywords

gambling; adolescence; internet; risk behaviors; substance use

Introduction

Youth gambling, particularly at-risk and problem gambling (ARPG), has been linked to poor social functioning and psychiatric concerns during adolescence and later in life.[1–4] Gambling and substance use behaviors co-occur in adolescents,[2, 5, 6] particularly in adolescent problem gamblers.[7, 8] Internalizing pathology (e.g., depression) has also been associated with gambling and gambling problems in youth.[3, 9] As specific forms of gambling may impact development differently, it is important to examine the relationships in adolescents between specific levels and forms of gambling and measures of health and functioning.

Internet gambling represents a relatively new and growing phenomenon, with online gambling sites increasing from 160 in 1999 to over 1800 in 2002.[10–12] The widespread availability of internet gambling sites presents youth with multiple opportunities to gamble online. Given these circumstances, surprising little is known regarding the correlates of internet gambling in adolescents. Given the characteristics of the internet (that it can be accessed in isolation), internet gambling may show some unique features with respect to other forms of adolescent risk-taking that often show strong peer influences. The isolative characteristics of the internet have been hypothesized to contribute to the link between problematic internet use and depression, including amongst adolescents.[3, 13]

In adults, frequency of online gambling has been associated with gambling problems,[14–16] with pathological gambling seen in association with infrequent or weekly internet gambling.[17] Internet gambling has also been associated with heavy alcohol consumption in adults.[16] Together, data suggest that, compared to other forms of gambling, internet gambling may be particularly strongly associated with problem/pathological gambling and other adverse measures in adults.

In this study, we sought to fill an existing knowledge gap by examining the correlates of internet ARPG in high-school adolescents. Given findings summarized above, we hypothesized that: (1) adolescent internet gamblers would be more likely to exhibit ARPG than would adolescent non-internet gamblers; (2) ARPG would be more strongly associated with substance use (e.g., heavy alcohol use) in internet gamblers than in non-internet gamblers; (3) ARPG would be more strongly associated with dysphoria/depression in internet gamblers than in non-internet gamblers; (4) ARPG would be less strongly associated with gambling with friends in internet gamblers as compared to non-internet gamblers.

Method

Study Design

As in prior publications,[18–21] the current investigation analyzes data from a state-wide investigation into gambling and other risk-taking behaviors in Connecticut high-school students. The survey questionnaire employed included 154 items querying demographic, academic, gambling, substance use, aggression, and other domains. While multiple items

were selected from structured instruments (e.g., the Massachusetts Gambling Screen (MAGS)[22]) or national surveys (the Youth Child Risk Behavior Survey[23] and Gambling Impact and Behavior Study[11]), many have not been fully evaluated for their psychometric properties. The selection reflects a combination of minimizing respondent burden while obtaining clinically relevant information that could be placed within the context of existing data.

Recruitment and sample characteristics

All public high schools in Connecticut were invited to participate in the survey through the mailing of 122 letters and follow-up calls to school principals. For participation, schools were offered follow-up reports regarding risk behaviors within their student body. A majority of schools (78) did not respond to inquiries. Among the remaining 44 schools, 13 declined, with approximately 50% demonstrating some level of interest (some follow-up phone calls or e-mails) but ultimately not participating. Additional targeted recruitment was conducted to ensure adequate representation of under-represented regions within the sample and engage the ten schools participating in the survey. Permission was obtained through participating schools' administrations or boards of education, typically after consulting with the principal. Schools agreeing to participate included those with an interest in receiving survey data for their schools and ones with which we had ongoing or previous relationships. Passive consent procedures were used to obtain parental permission for children to participate in the survey. This procedure was approved by the Yale School of Medicine IRB.

The survey was administered at each school on a single day. A member of the research team described the survey, answered students' questions, and oversaw the administration. Students were reminded that participation was voluntary and answers were confidential and anonymous. A pen was offered to each student for participation. The refusal rate for participation was less than 1%.

Schools from all regions of Connecticut and from each of three tiers of district reference groups participated to help ensure adequate geographic and socioeconomic representation. While not a random sample, the survey sample displayed demographics consistent with census data on Connecticut residents ages 14–18.[18]

Demographic and health/functioning variables

Socio-demographic variables included gender, age, race/ethnicity, grade level, and family structure. High school grade averages and engagement in extracurricular activities (e.g., participation in team sports, school clubs, church activities or part-time employment) were assessed. Lifetime cigarette smoking was coded into one of three categories: never ('Never'), occasionally ('Once or twice', 'Occasionally but not regularly'), regularly ('Regularly in the past', 'Regularly now'). Lifetime marijuana, alcohol and other drug use were all coded dichotomously yes/no, with a 'no' response defined as a 'never' response. Current alcohol use was coded into one of four categories, as previously reported: never regular (1–5 days), light (6–9 days), moderate (10–19 days), and heavy (20–30 days). Caffeine use was classified into one of three categories: none, one to two drinks per day, and three or more drinks per day.

Past-year dysphoria/depression was defined as endorsement of having felt 'so sad or hopeless almost every day for two weeks or more in a row that stopped you from doing some usual activities'. Survey items measuring aggressive behaviors assessed carrying a weapon, within the past 30 days, and getting into physical fights in the past year, with responses coded dichotomously as "yes/no."

Gambling variables

Questions assessing gambling behaviors and characteristics were adapted from those used in prior gambling surveys.[11] These gambling measures query gambling types and locations, motivations to gamble, and gambling frequency. Types of gambling (e.g., lottery/scratch card; dice/craps; machine gambling; placing bets with a bookie) were assessed to qualify engagement in different forms of gambling. Internet gambling was assessed and defined as having placed bets on the Internet. Machine gambling was inclusive of gambling on a slot machine or poker machine and placing bets on a videogame or arcade game, but did not include internet gambling. Questions probed locations where participants had gambled (e.g., internet; casino; on school grounds). Gambling motivations were assessed with responses grouped into four categories: Gambling for Excitement/Fun ('Fun and entertainment', 'Excitement', 'It's a challenge', 'It's a hobby'); Gambling for Financial Reasons ('To win money', 'To support good causes'); Gambling for Escape/to Relieve Dysphoria ('To calm down', 'To feel good about myself (e.g., feel like a winner)', 'As a distraction from my problems', 'Boredom'); and Gambling for Social Reasons ('To socialize with friends', 'Peer pressure (e.g., to fit in)'). Items queried whether respondents had experienced pressure ('Do you ever feel pressure to gamble when you do not gamble') or anxiety ('In the past year have you ever experienced a growing tension or anxiety that can only be relieved by gambling') related to their gambling. Types of gambling partners were assessed, with endorsement of either of the response items 'Parents' and 'Other adults' were coded as a 'yes' response to the category 'Adults'. Endorsement of either of the response items 'Parents,' 'With family' and 'Brothers and sisters' were coded as a 'yes' response to the category 'Family'. Response categories 'Alone', 'Friends' and 'Strangers' were each defined by single response items. Average time spent gambling per week and age of first gamble were also assessed.

Gambling groups

Of the 4,523 adolescents taking the survey, the 2,006 students reporting past-year gambling and completing all questions targeting DSM-IV criteria for pathological gambling were included in analyses. Respondents were instructed to consider gambling "to be any game you bet on for money OR anything else of value." Problem gambling severity groups were determined based on DSM-IV criteria,[24] as assessed using items from the MAGS.[22] The MAGS contain 12 items (questions 16–27) that target the 10 DSM-IV inclusionary criteria for pathological gambling.[22] When more than a single MAGS item corresponded to the same criterion (e.g., tolerance), a single point was awarded for endorsing either item as done previously.[25] Participants who reported past-year gambling but did not acknowledge any DSM-IV criteria were classified as low-risk gamblers (LRGers). Participants endorsing one or more DSM-IV criteria were classified as at-risk/problem gamblers (ARPGers), as in studies of adults.[26, 27]

Data Analysis

Data were double-entered from the paper surveys into an electronic database. Random spot-checks of completed surveys and data cleaning procedures were performed to ensure that data were accurate and within range. All statistical analyses were conducted using the SAS system (Cary, NC). Differences between the two gambling groups (i.e., internet and non-internet) were examined using Pearson chi-square. All comparisons were two-tailed. Models examined associations between the two gambling groups and health/functioning and gambling measures adjusting for age, race, gender and household structure. Logistic regression models were used to examine variables with two levels, and multinomial logistic regression models were used for those with more than two levels. These models were

adjusted for socio-demographic differences in gender, race/ethnicity, grade level, and familial structure.

Results

Demographic characteristics

Of the 2,006 adolescent gamblers, 412 (20.5%) reported internet gambling (Table 1). Among internet gamblers, 57.5% were classified as ARPGers and 42.5% as LRGers, and among non-internet gamblers, 27.7% were classified as ARPGers and 72.3% as LRGers, generating a significant between-group difference (χ^2 = 129.799, p <.0001). Socio-demographic characteristics of internet gamblers and non-internet gamblers stratified by problem gambling severity are tabulated (Table 1).

Health/functioning measures

Chi-square (Table S1) and logistic regression analyses (Table 2) examining the relationships between gambling groups (internet ARPGers and LRGers and non-internet ARPGers and LRGers) and health/functioning characteristics are presented. Significant findings were identified for academic, substance use, depression and aggression measures.

Among internet gamblers (but not among non-internet gamblers), ARPGers were more likely than LRGers to report receiving D's or lower (OR = 3.88, p = .0002). The interaction odds ratio for this variable between internet and non-internet gambling groups was significant (OR = 2.93, p = .0067), demonstrating a stronger association between low grades and ARPG in the internet gambling group.

Among internet gamblers, ARPGers were more likely than low-risk ones to report regular tobacco use (OR = 2.05, p = .0135), marijuana use (OR = 2.02, p = .0032), both moderate and heavy alcohol use (OR = 2.25, p = .0486; OR = 4.14, p = .0023), and use of other drugs (OR = 3.24, p = .0002). Among non-internet gamblers, ARPGers in comparison to LRGers were more likely to report both occasional and regular tobacco use (OR = 1.73, p = .0001; OR = 1.88, p = .0005), marijuana use (OR = 1.39, p = .0120), and use of other drugs (OR = 1.67, p = .0181). The interaction odds ratios between internet and non-internet gamblers was significant for heavy alcohol use (OR = 2.99, p = .0304), indicating a stronger association with ARPG amongst internet gamblers.

ARPGers were more likely than LRGers to report dysphoria/depression amongst non-internet gamblers (OR = 1.96, p < .0001) and internet gamblers (OR = 1.76, p = .0519). Among internet gamblers, ARPGers were more likely than LRGers to report engagement in serious fights (OR = 2.50, p = .0033) and carrying a weapon (OR = 2.11, p = .0014). Similarly, among non-internet gamblers, ARPGers were more likely than LRGers to report participation in serious fights (OR = 1.93, p = .0002) and carrying a weapon (OR = 1.90, p < .0001).

Gambling motivations and behaviors

Chi-square (Table S2) and logistic regression analyses (Table 3) examining the relationships between gambling groups and gambling motivations and behaviors are presented.

Among internet gamblers, ARPGers were more likely than LRGers to report machine gambling (OR = 3.34, p < .0001). Among non-internet gamblers, ARPGers were more likely than LRGers to report engagement in strategic gambling (OR = 3.01, p = .0039), non-strategic (OR = 1.45, p = .0068), and machine gambling (OR = 1.61, p = .0002). The

interaction odds ratio indicates a stronger relationship between machine gambling and ARPG in internet gamblers (OR = 1.96, p = .0324).

Among internet gamblers, ARPGers were more likely than LRGers to report financial (OR = 3.15, p < .0001) and escape (OR = 2.50, p < .0001) motivations for gambling. Among non-internet gamblers, ARPGers were more likely than LRGers to report gambling for excitement (OR = 2.93, p < .0001), financial reasons (OR = 3.12, p < .0001), escape (OR = 2.42, p < .0001), and social reasons (OR = 1.96, p < .0001).

Among internet gamblers, ARPGers were more likely than LRGers to report feelings of pressure to gamble (OR = 3.28, p = .0005) and anxiety prior to gambling that was subsequently relieved by gambling (OR = 15.48, p < .0001). There was a similar result for non-internet gamblers, as ARPGers were more likely than LRGers to report experiencing pressure (OR = 3.81, p < .0001) and anxiety (OR = 10.65, p < .0001).

Among internet gamblers, ARPGers were more likely than LRGers to report gambling alone (OR = 2.68, p = .0007) or with adults (OR = 2.03, p = .0015) or strangers (OR = 3.78, p < .0001). Among non-internet gamblers, ARPGers were more likely than LRGers to report gambling alone (OR = 2.45, p < .0001) or with adults (OR = 1.99, p < .0001), family (OR = 1.43, p = .0037), friends (OR = 2.04, p < .0001), or strangers (OR = 3.40, p < .0001). The association between ARPG and gambling with friends was weaker amongst internet gamblers than amongst non-internet gamblers (interaction OR = 0.32, p = .0003).

Among both internet and non-internet gamblers, ARPGers were more likely than low-risk ones to report gambling more than one hour per week (internet gamblers: OR = 4.12, p < .0001; non-internet gamblers: OR = 4.23, p < .0001). Amongst internet gamblers, ARPGers compared to LRGers were less likely to report onset of gambling at an older age (12–14 years) (OR = 0.41, p = .0158).

Discussion

To our knowledge, this is the first study in the United States to examine in a large sample of adolescent internet and non-internet gamblers the relationships between problem gambling severity and a wide range of health/functioning characteristics, risk behaviors, and gambling motivations and behaviors. Consistent with our first hypothesis, adolescents who reported gambling on the internet were more frequently classified as ARPGers compared to adolescents who did not report gambling on the internet. Our second hypothesis was largely supported by our findings, as among adolescent internet gamblers compared to non-internet gamblers, ARPG was more strongly associated with current heavy alcohol use. However, the associations between ARPG and other substance use measures were largely similar among internet and non-internet gamblers. Our third hypothesis that classification as an ARPGer would be more strongly associated with the report of past-year dysphoria/depression among internet gamblers than among non-internet gamblers was not supported. Specifically, among both internet and non-internet gamblers, ARPGers were more likely than LRGers to report past-year dysphoria/depression. Our finding that for non-internet gamblers, ARPG was more closely associated with gambling with friends as compared to internet gamblers did provide support for our fourth hypothesis. These differences found between internet gamblers and non-internet gamblers highlight the importance of considering specific forms of gambling when investigating the health implications related to problem gambling severity amongst adolescents. The identified differences between adolescent internet and non-internet gamblers will be discussed with respect to their clinical relevance.

Our findings indicate that ARPG is more frequent among adolescent internet gamblers compared to non-internet gamblers. These data are consistent with studies of adults in which internet gambling has been associated with higher rates of problem gambling[14, 28] and other studies of adolescents in which the overall frequency of gambling (i.e., number of days spent gambling) and gambling "versatility" (i.e., number of gambling types performed) were higher for individuals gambling on the internet when compared to other forms of gambling.[29]

The finding of an association between ARPG and grade averages of D's or lower amongst internet gamblers is consistent with previous research linking poorer academic performance with problem/pathological gambling in adolescents[30] and with internet gambling in college students.[17] Therefore, the association between poor academic performance and internet gambling, particular at a risky or problematic level, may exist across age groups and educational settings.

For adolescent internet gamblers, ARPG status was more strongly associated with current heavy alcohol use when compared to non-internet gamblers, consistent with data linking internet gambling and heavy drinking in adults.[16] However, the associations between ARPG and other substance use measures, although significant, were largely similar among internet gamblers and non-internet gamblers. These findings extend previous research associating heavier or problematic gambling and substance use during adolescence.[2, 6, 31, 32] Adolescents who gamble on the internet may thus be at greater risk for developing both gambling and substance-related problems, particularly as early onset of heavy alcohol consumption has been linked to alcoholism later in life. Consistently, individuals initiating gambling during pre-adolescence and early adolescence were more likely than adult-onset gamblers to report receiving treatment for alcohol use disorders and more likely to report the use of other drugs.[33] Potential factors underlying the relationship between internet ARPG and heavy alcohol consumption (e.g., genetic factors linking alcoholism and pathological gambling, early life stressors, impulsivity, or others) warrant additional investigation, particularly within a developmental framework.

ARPG was associated with depressive symptoms among both internet and non-internet gamblers, consistent with prior studies linking adolescent gambling and depressive features.[4, 6, 34] In young adult online gamblers, negative mood states, including after gambling, predict problem/pathological gambling,[35] and over 10% of pathological gamblers committing suicide had co-occurring mood disorders.[36] As genetic factors contribute substantially to the co-occurrence between pathological gambling and major depression,[37] identification of specific genetic risk alleles might aid in prevention efforts. Additionally, screening for gambling problems, depression and their co-occurrence amongst adolescents may lead to early identification and intervention.

As with depression measures, ARPG was similarly associated with aggressive behaviors (participation in serious fights within the past-year and carrying a weapon with the last month) in internet and non-internet gamblers. This finding is consistent with other results associating problem/pathological gambling with conduct problems and other risky and violent behaviors.[7, 34, 38] Assessing for gambling problems amongst potentially violent youth (e.g., those in school receiving detention for aggressive behaviors) may assist in prevention and treatment of youth gambling problems.

Differences in gambling behaviors and motivations were observed in association with ARPG across adolescent internet and non-internet gamblers. First, as compared to ARPG among non-internet gamblers, ARPG in internet gamblers was less strongly associated with gambling with friends, consistent with the notion that online gambling is typically solitary in

nature and that individuals who gamble excessively on the internet do so alone. Second, among non-internet gamblers, ARPG was associated with gambling for social reasons, suggestive of a more substantial peer influence for non-internet forms of risky or problematic gambling behaviors amongst adolescents.[28] The socially isolative aspects of internet gambling, and computer use in general, may promote social withdrawal from peers, which together with heavy alcohol use and poor academic performance, may impact negatively on adolescent social functioning and development. The nature of the relationships between these variables (academic performance, alcohol consumption, social involvement, and internet gambling) warrants additional study, particularly in longitudinal studies of youth, so as to better inform prevention and treatment efforts.

In addition to socially isolative aspects of internet use, other factors may influence the development of gambling problems. The accessibility of online casinos, including 24-hour-per-day availability, may influence the development of problematic gambling behaviors. Additional efforts to limit access by adolescents (e.g., through the creation of additional barriers with respect to online identification and/or credit verification) warrant consideration. The stronger association between machine gambling and ARPG in internet gamblers suggests that excessive engagement with mechanized forms of gambling might be particularly relevant to this group. However, the link between problem/pathological gambling and internet gambling may also reflect internet gamblers' wide-ranging participation in multiple forms of gambling.[29] Investigating specific factors (e.g., impulsivity[39]) that may promote participation in multiple forms of gambling or risk-taking behaviors could aid in school-based or clinical interventions.

In general, public health policies are important in preventing and limiting underage gambling.[40] The Youth Gambling Risk Prevention Model[41] provides a framework for addressing gambling problems in adolescents that exhibit differing levels of gambling involvement and risk for developing gambling-related problems. This model describes the use of primary prevention to limit the onset of at-risk gambling behaviors, secondary prevention to prevent gambling from reaching the problem/pathological levels, and tertiary prevention strategies to increase the availability of gambling-related treatment and other clinical resources to individuals who have developed severe gambling problems. Increasing awareness of the negative health outcomes and risk associated with problem gambling, especially among adolescents who gamble on the internet, appears important to these efforts.[42] Specific interventions (e.g., monitoring school computers and limiting access to gambling-related internet sites) warrant consideration.

The current investigation has limitations. First, the sample was not nationally representative so generalizability may be limited. Second, the cross-sectional design of the survey limits the ability to examine the nature of observed associations. For example, it cannot be discerned whether poor grades lead to ARPG, ARPG leads to poor grades, or additional factors (e.g., genetic predispositions, stress exposure) might link the two. Third, our study did not assess for specific type of online gambling activities. Distinct types of internet gambling, such as online poker, blackjack, or sports betting, may differ with respect to their associations with measures of health/functioning and gambling behaviors and motivations. Fourth, several of the measures (e.g., those assessing depressive and aggressive characteristics) used non-diagnostic and dichotomous measures. Future studies using more precise measures would be valuable in further investigating these domains in relation to internet gambling.

In a large survey of high-school students, significant differences were identified in the correlates of ARPG in internet and non-internet gamblers, particularly with respect to academic functioning, heavy alcohol use, and peer involvement. Given these findings and

the growth and availability of the internet to individuals of all ages, more studies are needed to assess the long-term effects of internet gambling throughout the lifespan. Future studies may benefit from including additional measures of online gambling, internet use and other factors (e.g., illegal use of credit cards to gamble online) to better elucidate the relationships between types and frequencies of online gambling and clinically relevant measures.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Table 1

Socio-demographic characteristics of the sample, by gambling type and severity

	Gambling Type											
	Internet Gambling (*n*=412)						Non-Internet Gambling (*n*=1594)					
	Problem Gambling Severity						Problem Gambling Severity					
	Low-Risk Gamblers (*n*=175)		At-Risk & Problem/ Pathological Gamblers (*n*=237)				Low-Risk Gamblers (*n*=1152)		At-Risk & Problem/ Pathological Gamblers (*n*=442)			
Variables	Total	%	Total	%	χ^2	P-value	Total	%	Total	%	χ^2	P-value
Gender												
Boys	125	72.67	188	81.39	4.3130	0.0378	559	49.12	330	75.51	89.4697	<.0001
Girls	47	27.33	43	18.61			579	50.88	107	24.49		
Race/Ethnicity												
African American												
Yes	15	8.57	33	13.92	2.8020	0.0941	106	9.20	77	17.42	21.2358	<.0001
No	160	91.43	204	86.08			1046	90.80	365	82.58		
Caucasian												
Yes	130	74.29	163	68.78	1.4875	0.2260	855	74.22	295	66.74	8.5800	0.0029
No	45	25.71	74	31.22			297	25.78	147	33.26		
Asian												
Yes	9	5.14	19	8.02	1.3127	0.2519	45	3.91	16	3.62	0.0712	0.7897
No	166	94.86	218	91.98			1107	96.09	426	96.38		
Other												
Yes	30	17.14	39	16.46	0.0341	0.8535	186	16.15	77	17.42	0.3769	0.5393
No	145	82.86	198	83.54			966	83.85	365	82.58		
Hispanic												
Yes	32	19.39	54	24.00	1.1749	0.2784	155	14.04	73	17.46	2.7914	0.0948
No	133	80.61	171	76.00			949	85.96	345	82.54		
Grade												
9th	56	32.18	71	30.21	1.1577	0.7632	323	28.14	150	34.01	5.9064	0.1163
10th	49	28.16	60	25.53			306	26.66	112	25.40		

	Gambling Type											
	Internet Gambling (*n*=412)						Non-Internet Gambling (*n*=1594)					
	Problem Gambling Severity						Problem Gambling Severity					
	Low-Risk Gamblers (*n*=175)		At-Risk & Problem/ Pathological Gamblers (*n*=237)				Low-Risk Gamblers (*n*=1152)		At-Risk & Problem/ Pathological Gamblers (*n*=442)			
Variables	Total	%	Total	%	χ^2	P-value	Total	%	Total	%	χ^2	P-value
11th	36	20.69	50	21.28			317	27.61	104	23.58		
12th	33	18.97	54	22.98			202	17.60	75	17.01		
Age												
<14 years	27	19.71	31	16.49	0.6377	0.7270	140	15.95	50	14.62	1.1744	0.5559
15–17 years	85	62.04	119	63.30			619	70.50	238	69.59		
>17 years	25	18.25	38	20.21			119	13.55	54	15.79		
Family Structure												
One parent	45	26.01	51	22.08	4.2247	0.1210	284	25.04	95	22.04	6.9709	0.0306
Two Parent	112	64.74	143	61.90			799	70.46	303	70.30		
Other	16	9.25	37	16.02			51	4.50	33	7.66		

Table 2

Adjusted odds ratios for health and well-being measures

Variables		Gambling Type: Internet Gambling — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: Adjusted odds ratios	Gambling Type: Internet Gambling — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: P-Value	Gambling Type: Non-Internet Gambling — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: Adjusted odds ratios	Gambling Type: Non-Internet Gambling — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: P-Value	Interaction Odds Ratio — Internet Gambling vs. Non-Internet Gambling: Adjusted odds ratios	Interaction Odds Ratio — Internet Gambling vs. Non-Internet Gambling: P-Value
Academic and Extracurricular							
Grade Average (reference: Mostly A's and B's)							
Mostly C's		0.90	0.6692	1.27	0.0900	0.71	0.2130
D's or lower		3.88	0.0002	1.20	0.3156	2.93	0.0067
Any Extra-Curricular	**Yes**	0.79	0.3826	1.29	0.0941	0.73	0.2793
Substance Use							
Smoking Lifetime (reference: Never)							
Occasionally		0.98	0.9227	1.73	0.0001	0.60	0.0782
Regularly		2.05	0.0135	1.88	0.0005	1.22	0.5596
Marijuana Ever	**Yes**	2.02	0.0032	1.39	0.0120	1.49	0.1372
Alcohol Ever Sip	**Yes**	1.74	0.1899	0.96	0.8548	1.50	0.3613
Current Alcohol Frequency (reference: Never Regular)							
Light		1.50	0.3505	1.30	0.1835	1.30	0.5597
Moderate		2.25	0.0486	1.29	0.2104	2.05	0.0933
Heavy		4.14	0.0023	1.45	0.1568	2.99	0.0304
Other Drug Use Ever	**Yes**	3.24	0.0002	1.67	0.0181	1.92	0.0756
Caffeine Use (reference: None)							
1–2 Per Day		0.43	0.0108	0.91	0.5589	0.49	0.0453
3+ Per Day		1.10	0.7847	1.11	0.5725	0.92	0.8252
Mood							
Dysphoria/depression	**Yes**	1.76	0.0519	1.96	<.0001	0.83	0.5464
Aggression							
Serious Fights	**Yes**	2.50	0.0033	1.93	0.0023	1.09	0.8151

Variables		Gambling Type: Internet Gambling — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: Adjusted odds ratios	Gambling Type: Internet Gambling — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: P-Value	Gambling Type: Non-Internet Gambling — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: Adjusted odds ratios	Gambling Type: Non-Internet Gambling — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: P-Value	Interaction Odds Ratio — Internet Gambling vs. Non-Internet Gambling: Adjusted odds ratios	Interaction Odds Ratio — Internet Gambling vs. Non-Internet Gambling: P-Value
Carry a Weapon	**Yes**	2.11	0.0014	1.90	<.0001	1.04	0.8737

Table 3

Adjusted odds ratios for gambling characteristics across gambling groups

Variables		Gambling Type: Internet Gamblers — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: Adjusted odds ratios	Internet Gamblers: P-Value	Non-Internet Gamblers — At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers: Adjusted odds ratios	Non-Internet Gamblers: P-Value	Interaction Odds Ratio — Internet Gambling vs. Non-Internet Gambling: Adjusted odds ratios	Interaction Odds Ratio: P-Value
Gambling Types							
Strategic	**Yes**	4.69	0.2007	3.09	0.0039	1.39	0.7884
Nonstrategic	**Yes**	1.72	0.0861	1.45	0.0068	1.35	0.3708
Machine	**Yes**	3.34	<0.0001	1.61	0.0002	1.96	0.0324
Gambling Motivations							
Gamble for Excitement	**Yes**	1.63	0.1155	2.93	<0.0001	0.53	0.0540
Gamble for Financial	**Yes**	3.15	<0.0001	3.12	<0.0001	0.91	0.7330
Gamble for Escape	**Yes**	2.50	<0.0001	2.42	<0.0001	0.99	0.9791
Gamble for Social	**Yes**	1.31	0.2092	1.96	<0.0001	0.66	0.0992
Gambling Urges							
Pressure	**Yes**	3.28	0.0005	3.81	<0.0001	0.84	0.6722
Anxiety	**Yes**	15.48	<0.0001	10.65	<0.0001	1.06	0.9323
Gambling Partners							
Gamble with Adults	**Yes**	2.03	0.0015	1.99	<0.0001	1.02	0.9321
Gamble with Family	**Yes**	1.27	0.2748	1.43	0.0037	0.84	0.4641
Gamble with Friends	**Yes**	0.73	0.2960	2.04	<0.0001	0.32	0.0003
Gamble with Strangers	**Yes**	3.78	<0.0001	3.40	<0.0001	1.09	0.8316
Gamble Alone	**Yes**	2.68	0.0007	2.45	0.0005	1.16	0.7007
Gambling Onset and Duration							
Time Spent Gambling (reference: ≤ 1 hour)							
> 1 hour		4.12	<0.0001	4.23	<0.0001	0.88	0.6976
Age of Onset (reference: > 15 years)							
≤ 8 years		0.68	0.2924	1.08	0.7452	0.62	0.2585
9–11 years		0.58	0.1034	0.86	0.4735	0.72	0.3789

Variables	Gambling Type				Interaction Odds Ratio	
	Internet Gamblers		Non-Internet Gamblers			
	At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers		At-Risk & Problem/Pathological Gamblers vs. Low-Risk Gamblers		Internet Gambling vs. Non-Internet Gambling	
	Adjusted odds ratios	P-Value	Adjusted odds ratios	P-Value	Adjusted odds ratios	P-Value
12–14 years	0.41	0.0158	0.69	0.0986	0.64	0.2662