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Gambling behaviors and attitudes in adolescent high-school students: Relationships with problem-gambling severity and smoking status

Andrea H. Weinberger, PhD^{a,b,c}, Christine A. Franco, PhD^a, Rani A. Hoff, PhD, MPH^{a,d,e}, Corey E. Pilver, PhD^f, Marvin A. Steinberg, PhD^g, Loreen Rugle, PhD^h, Jeremy Wampler, LCSW^h, Dana A. Cavallo, PhD^a, Suchitra Krishnan-Sarin, PhD^a, and Marc N. Potenza, MD, PhD^{a,i,j}

Andrea H. Weinberger: andrea.weinberger@einstein.yu.edu; Christine A. Franco: caf419@hotmail.com; Rani A. Hoff: Rani.Hoff@va.gov; Corey E. Pilver: corey.pilver@yale.edu; Marvin A. Steinberg: ctcl@comcast.net; Loreen Rugle: Lrugle@psych.umaryland.edu; Jeremy Wampler: Jeremy.Wampler@ct.gov; Dana A. Cavallo: dana.cavallo@yale.edu; Suchitra Krishnan-Sarin: suchitra.krishnan-sarin@yale.edu; Marc N. Potenza: marc.potenza@yale.edu

^aDepartment of Psychiatry, Yale University School of Medicine, New Haven, CT 06519 USA

^bCancer Prevention and Control Research Program, Yale Cancer Center, New Haven, CT 06520 USA

^cFerkauf Graduate School of Psychology, Yeshiva University, Bronx, NY 10461 USA

^dDepartment of Public Health, Yale University School of Medicine, New Haven, CT 06520 USA

^eNational Center for PTSD, Evaluation Division; VA CT Healthcare Center, West Haven, CT 06516 USA

^fDepartment of Biostatistics, Yale University School of Public Health, New Haven, CT 06520 USA

^gConnecticut Council on Problem Gambling, Clinton, CT 06413 USA

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Corresponding Author: Marc N. Potenza, MD, Ph.D., Address: CMHC, SAC, Room S-104, 34 Park Street, New Haven, CT 06519 USA, marc.potenza@yale.edu; Tel: 1-203-974-7356; Fax: 1-203-974-7366.

Authors' Contributions

Drs. Potenza, Franco, and Weinberger conceived the study. Dr. Weinberger wrote the first draft of the manuscript. Dr. Pilver conducted the statistical analysis. Drs. Weinberger, Franco, Desai, Pilver, Steinberg, Rugle, Wampler, Cavallo, Krishnan-Sarin, and Potenza contributed to the writing of the paper and approved the final manuscript.

Conflicts of Interest

The authors report no conflicts of interest with respect to the content of this manuscript. Dr. Potenza has served as a consultant or advisor to Boehringer Ingelheim, Somaxon, Lundbeck, Ironwood, Shire, various law offices, and the federal defender's office in issues related to impulse control disorders. He has received research support from the National Institutes of Health, Veteran's Administration, Mohegan Sun Casino, the National Center for Responsible Gaming, Psyadon, Forest Laboratories, Ortho-McNeil, Pfizer, Oy-Control/Biotie, and GlaxoSmithKline. He has participated in surveys, mailings, or telephone consultations related to drug addiction, impulse control disorders, or other topics. He has provided clinical care in the Connecticut Department of Mental Health and Addiction Services Problem Gambling Services Program. He has performed grant reviews for the National Institutes of Health and other agencies. He has guest-edited journal sections, has given academic lectures in grand rounds, continuing medical education events, and other clinical and scientific venues, and has generated book or book chapters for publishers of mental health texts. Drs. Weinberger, Franco, Pilver, Desai, Steinberg, Rugle, Wampler, Cavallo, and Krishnan-Sarin report no potential conflicts of interest.

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^hConnecticut Department of Mental Health and Addiction Services Problem Gambling Services, Middletown, CT 06457 USA

ⁱChild Study Center, Yale University School of Medicine, New Haven, CT 06519 USA

^jDepartment of Neurobiology, Yale University School of Medicine, New Haven, CT 06519 USA

Abstract

Background and Aims—Smoking is associated with more severe/extensive gambling in adults. The purpose of this study was to examine relationships between smoking and gambling in adolescents.

Methods—Analyses utilized survey data from 1,591 Connecticut high-school students. Adolescents were classified by gambling (Low-Risk Gambling [LRG], At Risk/Problem Gambling [ARPG]) and smoking (current smoker, non-smoker). The main effects of smoking and the smoking-by-gambling interactions were examined for gambling behaviors (e.g., type, location), and gambling attitudes. Data were analyzed using chi-square and logistic regression; the latter controlled for gender, race/ethnicity, grade, and family structure.

Results—For ARPG adolescents, smoking was associated with greater online, school, and casino gambling; gambling due to anxiety and pressure; greater time spent gambling; early gambling onset; perceived parental approval of gambling; and decreased importance of measures to prevent teen gambling. For LRG adolescents, smoking was associated with non-strategic gambling (e.g., lottery gambling); school gambling; gambling in response to anxiety; gambling for financial reasons; greater time spent gambling; and decreased importance of measures to prevent teen gambling. Stronger relationships were found between smoking and casino gambling, gambling due to pressure, earlier onset of gambling, and parental perceptions of gambling for ARPG versus LRG adolescents.

Discussion—Smoking is associated with more extensive gambling for both low- and high-risk adolescent gamblers.

Conclusion—Smoking may be a marker of more severe gambling behaviors in adolescents and important to consider in gambling prevention and intervention efforts with youth.

Keywords

gambling; smoking; adolescents; attitudes; substance use

INTRODUCTION

Adolescent gambling is a common and serious public health concern. Some data suggest that gambling among adolescents has increased over time (Jacobs, 2000) to the point where the majority of adolescents (up to 86%) report some form of gambling and a significant minority of adolescents (4–8%) report a serious gambling problem (Jacobs, 2000; Kristiansen and Jensen, 2014; Splevins et al., 2010). Gambling in adolescents is associated with a range of psychiatric symptoms (e.g., anxiety, depression, low self-esteem), delinquent behavior, and use of alcohol and other drugs (Blinn-Pike et al., 2010; Jackson et al., 2008; Jacobs, 2000; Langhinrichsen-Rohling et al., 2004; Ólason et al., 2006; Petry and Tawfik,

2001; Splevins et al., 2010; Yip et al., 2011). Beyond difficulties that adolescents experience concurrent with their gambling behavior, gambling during adolescence is associated with the development of medical and psychiatric problems in adulthood (Burge et al., 2004; Burge et al., 2006; Lynch et al., 2004). There is a need to better understand adolescent gambling in order to reduce concurrent problems and later negative consequences related to problematic gambling behavior.

A second serious public health concern for adolescents is smoking. The harmful health correlates of smoking; which has a negative impact on nearly every body system and is associated with more than 480,000 annual deaths in the United States alone; are well-known (USDHHS, 2014). More than half of high-school students in the United States report that they have tried smoking, with nearly 1 in 6 adolescents reporting current use of cigarettes (CDC, 2012). Most adults who are current smokers started to smoke when they were adolescents (Lantz, 2003; Schoenborn et al., 2013; USDHHS, 2014). Similar to gambling, adolescent smoking is associated with negative health measures in adulthood including increased risk for continued and heavy smoking (Chassin et al., 1996; Colder et al., 2001; Ellickson et al., 2008; Patton et al., 2006; Stanton et al., 2004; Van De Ven et al., 2010) as well as substance use and delinquent behavior (Audrain-McGovern et al., 2004; Ellickson et al., 1997; Orlando et al., 2004; Stanton et al., 2004).

A positive association between gambling and smoking has been established in adults over the age of 18 (Black et al., 2013; Hayatbakhsh et al., 2012; Lorains et al., 2011; McGrath and Barrett, 2009; Morasco et al., 2006). While fewer studies have explored the relationship between adolescent gambling and smoking, published reports find a pattern similar to adults such that adolescents who gamble report rates of smoking that can be as high as double those of adolescents who do not gamble (Jackson et al., 2008; Jacobs, 2000; Kong et al., 2013; Splevins et al., 2010; Yip et al., 2011). Together, the data show that gambling in both adults and adolescents is associated with higher rates of smoking.

Adults who both smoke and gamble demonstrate a different, and more severe, pattern of gambling than adults who do not also smoke. Specifically, smoking in adults who gamble has been associated with an earlier age of gambling onset, greater number of gambling days per week, more money spent on gambling, greater financial trouble related to gambling losses, greater urges to gamble, lower reported control over gambling, a greater number of criteria met for pathological gambling, and a greater number of gambling treatment experiences (Grant and Potenza, 2005; Grant et al., 2008; McGrath et al., 2012; Odlaug et al., 2013; Petry and Oncken, 2002). Further, a study of 1,619 adult gamblers in Canada (McGrath et al., 2012) found differences in types of gambling and reasons for gambling by smoking status. Adult gamblers who smoked were less likely to report buying raffle tickets and more likely to report using video lottery terminals, using alcohol or other drugs while gambling, and gambling for both positive reinforcement (e.g., socializing) and negative reinforcement (e.g., relieving boredom) reasons. A study of 465 U.S. adults with pathological gambling (Grant et al., 2008) reported that gamblers who smoked were more likely to engage in gambling involving games of chance (i.e., non-strategic gambling) including slot machines and bingo. While more severe gambling behavior is seen in adults

who both gamble and smoke, little is known about the associations between smoking and the severity of gambling in adolescents.

Aims of the current study

Adolescents experience multiple adverse outcomes related to both gambling and tobacco use. Adolescents and adults who gamble are more likely to smoke and adult gamblers who smoke demonstrate more extensive and severe gambling. The purpose of the current investigation was to examine whether adolescent gamblers who smoke also demonstrate more extensive and severe gambling. We hypothesized that adolescents who both gamble and smoke would report more extensive and severe gambling than adolescents who gamble and do not smoke in similar ways seen in research on adults who both gamble and smoke (cited above). Specifically, we expected that adolescents who both gambled and smoked would be more likely to report non-strategic (i.e., “games of chance” like lotteries) gambling, gambling due to pressure and anxiety, gambling for reasons related to both positive (e.g., excitement, to be social) and negative (e.g., escape) reinforcement, and greater time spent gambling. We also expected smoking versus non-smoking adolescents would report an earlier age at onset of gambling, greater use of instant (scratch) lottery tickets, greater parental approval of gambling, less parental concern about gambling, and decreased endorsement of actions to prevent gambling problems in teenagers. Further, we hypothesized that these relationships would be stronger in adolescents with at-risk/problem gambling (ARPG) compared to adolescents with low-risk gambling (LRG).

METHODS

Participants

Participants were public high-school students in the state of Connecticut. Slightly less than half of the total number of adolescents who took the survey (n=4,523) reported past-year gambling and completed all questions targeting DSM-IV criteria for pathological gambling (n=2,030). Of those adolescents, 1,591 students reported that they were current or non-smokers (defined below) and were included in the analyses. Demographics of the participant sample were consistent with those reported in the 2000 Census of Connecticut residents ages 14 to 18 years. Previous publications have detailed this study’s recruitment procedures (Cavallo et al., 2010; Potenza et al., 2011; Schepis et al., 2008; Schepis et al., 2011; Yip et al., 2011).

Measures

Demographics—Assessed demographics included age, gender, race/ethnicity, level in school, family structure. A detailed description of each demographic variables, the coding of responses, and the classification of these responses into groupings/categories has been presented previously (Potenza et al., 2011; Yip et al., 2011).

Gambling measures—Each participant was classified into one of two problem-gambling severity categories: LRG or ARPG. Similar to previous studies (Potenza et al., 2011), problem-gambling severity was assessed using items from the Massachusetts Gambling Screen (MAGS; Shaffer and Hall, 1996) which is a validated measure of DSM-IV criteria

for pathological gambling. Participants who reported gambling in the past year and endorsed one or more DSM-IV criteria were classified as ARPG while participants who reported gambling in the past year but who did not meet any DSM-IV criteria were classified as LRG. As described previously (Kundu et al., 2013; Rahman et al., 2012; Slavin et al., 2013), additional gambling measures included type, location, triggers, reasons, and partners for gambling; time spent gambling; age of gambling onset; scratch and lottery ticket use; attitudes regarding actions that might prevent gambling problems in teens; and concern about family member gambling (see Tables 1, 2, and 3). Consistent with prior research on adults (Potenza et al., 2001) and adolescents (Yip et al., 2011), specific gambling behaviors were classified as “strategic” (i.e., “games of skill” such as gambling on cards, placing a bet with a bookie, betting on video or arcade games), “non-strategic” (i.e., “games of chance” such as playing bingo), or “machine” (e.g., gambling on slot or poker machines).

Smoking measures—Each participant was classified into one of two smoking status categories based on their current cigarette-smoking status: current smoker and non-smoker. Participants who reported that they “never” or “once or twice” smoked a cigarette in their life were classified as “non-smokers” (1,375). Participants who reported that they smoked cigarettes “regularly now” (n=239) were classified as smokers. Participants who had missing data (n=92) or who reported that they smoked “regularly in the past” (n=107) or “occasionally but not regularly” (n=217) were excluded from the analyses. Adolescents who reported that they smoked “occasionally but not regularly” were excluded due to a lack of additional information that would be needed to characterize the smoking behavior of this group to be able to include them as a group in the analyses (e.g., the percentage of participants who were current versus former occasional smokers).

Procedure

Previous publications have detailed this study’s recruitment procedures, sampling characteristics, and consent procedures (Cavallo et al., 2010; Potenza et al., 2011; Schepis et al., 2008; Schepis et al., 2011; Yip et al., 2011). All public high schools in the state of Connecticut were invited to participate in the survey with targeted efforts to recruit schools that would ensure geographic and socioeconomic representation within the sample. Letters were sent to the parents from each participating school outlining passive consent procedures (i.e., parents could call their school to refuse participation by their child/children). The 154-item surveys were administered to eligible students from a school on a single day. Students were told that they could refuse or discontinue participation at any time, and surveys were completed anonymously. All study and consent procedures were approved by the participating schools as well as by the Institutional Review Board (IRB) of the Yale University School of Medicine. This study was carried out in accordance with the Declaration of Helsinki.

Statistical Analysis

To ensure accuracy of the data, all data were double-entered into an electronic database with random spot-checks to check for errors. Pearson chi-square tests were used to examine differences in demographics by gambling (LRG versus ARPG). All comparison tests were two-tailed. Models examined main effects of smoking (current smoking versus non-

smoking) within the two gambling groups and the interactive associations of smoking and gambling on gambling behaviors and attitudes. 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. Grade, race/ethnicity, gender and household structure were included as covariates. Age was not included as a covariate due to multicollinearity with grade. All statistical analyses were conducted using the SAS system (Cary, NC).

RESULTS

Sample Characteristics

Out of the sample of 1,591 adolescents included in the analyses, 1,053 participants were classified as LRG and 538 were classified as ARPG. More ARPG adolescents reported current smoking (20.1%) than LRG adolescents (12.1%; $\chi^2=18.43$, $p<0.001$). Nearly two-thirds of the sample was male (61.8%) and 72.5% of adolescents identified as Caucasian/white. Two-thirds (69.7%) of participants reported living with two parents (one parent, 23.4%; other family structure, 6.9%). Participants from 9th through 12th grade were represented in the sample (9th grade 32.7%, 10th grade, 25.9%; 11th grade, 24.7%; 12th grade, 16.7%). Compared to LRG adolescents, a greater percentage of ARPG adolescents were male (78.2% versus 53.4%, $\chi^2=93.36$, $p<0.001$), African-American (16.5% versus 9.5%, $\chi^2=16.41$, $p<0.001$), Hispanic (20.0% versus 16.0%, $\chi^2=3.95$, $p<0.05$), and living in a family situation that was “other” than living with 1 or 2 parents (10.1% versus 5.3%, $\chi^2=13.96$ $p<0.001$).

Gambling Measures (Tables 1 and 2, Supplementary Table 1)

Gambling Types and Locations—ARPG adolescents who smoked were less likely to report engaging in strategic forms of gambling, while LRG adolescents who smoked were more likely to report engaging in non-strategic gambling. The interaction for strategic gambling was significant, with the strength of the negative association between smoking and strategic gambling stronger in the ARPG group than in the LRG group. ARPG adolescents who smoked, compared to ARPG adolescents who did not smoke, were more likely to report gambling online, at school, and in casinos, while LRG adolescents who smoked were only more likely to report gambling at school compared to LRG adolescents who did not smoke. The interaction analyses suggested a significantly stronger association between smoking and greater problem-gambling severity for casino gambling.

To understand better the types of gambling promoting the observed interaction, post-hoc analyses examined in LRG and ARPG adolescents the relationships between smoking and participation in specific forms of gambling (Table 2). LRG smokers were more likely than LRG non-smokers to report placing a bet with a bookie, betting with a friend for money, betting on video or arcade games, betting on dice games like craps (outside of a casino), betting on pool or other games of skill, and doing other types of gambling. ARPG smokers were more likely than ARPG non-smokers to report machine gambling (e.g., slot or poker machines), placing a bet with a bookie, betting on dice games like craps (outside of a casino).

Gambling Triggers—Two triggers for gambling were assessed: feeling pressure to gamble and gambling to relieve anxiety. ARPG adolescents who smoked were more likely to report gambling in response to both triggers while LRG adolescents who smoked were more likely to report gambling because of anxiety. The interaction for pressure was significant indicating a stronger relationship between smoking and gambling due to the trigger of pressure for ARPG adolescents than LRG adolescents.

Reasons for Gambling—Four reasons for gambling were assessed: excitement, financial reasons, escape, and social reasons. LRG adolescents who smoked were more likely to report gambling for financial reasons than LRG adolescents who did not smoke. No other main effect was significant and no gambling-by-smoking interactions were significant.

Gambling Partners—ARPG adolescents who smoked were more likely to report gambling with strangers and gambling alone. LRG adolescents who smoked were significantly more likely to report gambling with friends and gambling alone. Interaction analyses found a stronger relationship between smoking and gambling with friends for LRG adolescents compared to ARPG adolescents.

Time Spent Gambling—More ARPG adolescents who smoked and LRG adolescents who smoked reported gambling at least 2 hours per week relative to non-smoking adolescents in each gambling group. The interaction between gambling and smoking for time spent gambling was not significant.

Gambling Attitudes and Behaviors (Table 3, Supplementary Table 2)

Age of Gambling Onset—ARPG adolescents who smoked were more likely to report younger ages of onset of gambling behavior. There was a significant interaction indicating a stronger relationship between smoking and younger age of gambling onset for ARPG adolescents than LRG adolescents.

Scratch or Lottery Tickets—More ARPG and LRG adolescents who smoked reported buying scratch and other lottery tickets than adolescents who did not smoke. More ARPG adolescents who smoked reported receiving lottery tickets other than scratch tickets as gifts than ARPG adolescents who did not smoke. There were no significant smoking-by-gambling interactions for scratch or other lottery tickets.

Perceived Parental Perceptions of Gambling—There were significant main effects of smoking status on perceived parental perception of gambling for both ARPG and LRG adolescents. Relative to neutral perceived parental attitudes about gambling, ARPG adolescents who smoked versus those who did not were more likely to report parental approval of gambling. In LRG adolescents, those who smoked versus those who did not were less likely to report parental disapproval of gambling. There were significant smoking-by-gambling interactions for both relationships.

Family Concern about Gambling—ARPG adolescents who smoked were more likely to report parental concern about gambling than ARPG adolescents who did not smoke.

There was no main effect of smoking for LRG adolescents or interaction effects of gambling and smoking with regard to concerns about family member gambling.

Prevention of Gambling Problems—ARPG adolescents who smoked were less likely to state that all 15 actions queried were important for preventing gambling problems in teenagers, as compared to ARPG adolescents who did not smoke. Similarly, LRG adolescents who smoked were less likely to state that 11 out of the 15 actions were important for preventing gambling problems in teenagers, as compared to ARPG adolescents who did not smoke. There were significant interactions of smoking and gambling for three of the 15 actions, indicating that smoking status was differentially associated across gambling groups, with greater likelihoods in ARPG versus LRG groups of smoking being associated with not endorsing as important the checking of identification for purchasing lottery tickets, fearing losing valuable possessions, close friends, and relatives to gambling, and hearing warnings from peers for preventing gambling problems in teens.

DISCUSSION

The current study was the first to examine gambling behaviors and attitudes in adolescents by smoking status and severity of problem gambling. To summarize, smoking was associated with more severe gambling behaviors compared with non-smoking, consistent with research with adults (e.g., Grant and Potenza, 2005; McGrath et al., 2012; Odlaug et al., 2013), and these relationships differed in ARPG and LRG youth. For ARPG adolescents, smoking was associated with greater online, school, and casino gambling; gambling due to anxiety and pressure; gambling with strangers and alone; greater time spent gambling; early gambling onset; buying scratch and other lottery tickets; parental approval of gambling; and decreased endorsement of the importance of all queried measures to prevent teen gambling. For LRG adolescents, smoking was associated with non-strategic gambling (i.e., “games of chance”), school gambling; gambling in response to anxiety; gambling for financial reasons; gambling with friends and alone; greater time spent gambling; buying scratch tickets; and decreased endorsement of the importance of most measures to prevent teen gambling. smoking was more strongly associated with multiple gambling behaviors for higher-risk rather than lower-risk gamblers (e.g., earlier gambling onset, greater perceived parental approval of gambling, pressure as a trigger to gamble).

Smoking versus non-smoking status in ARPG adolescents was associated with engagement in arguably riskier types of gambling (i.e., slot-machine gambling; Dowling et al., 2005), while this relationship was not seen in LRG adolescents. Conversely, smoking versus non-smoking status in LRG adolescents was associated with engagement in a wider range of forms of gambling, including more easily accessible forms (e.g., betting with a friend, betting on video or arcade games). Intervention efforts may benefit from targeting slot-machine gambling with adolescents who report ARPG and smoking to reduce potential financial and legal consequences. Interventions may also be targeted towards lottery points of purchase. Given that adolescents who smoke (versus those who do not) are more likely to buy instant lottery tickets across ARPG and LRG groups and that this finding extend to other forms of lottery tickets for ARPG adolescents, youth may be purchasing lottery tickets and tobacco products concurrently. Thus, interventions aimed at curbing underage

purchasing may target both tobacco and gambling products, and this possibility warrants additional investigation.

Prior analyses have shown main effects of gambling behaviors and smoking. For example, Leeman et al (2014) found that greater perceived permissiveness toward gambling was associated with smoking across the sample. The current analyses found that parental approval of gambling was highest for the subsample of adolescents who reported ARPG and smoking. As such, educational efforts that communicate the potential harms of adolescent gambling might be particularly helpful for parents/guardians of adolescent smokers. As a second example, Yip et al. (2011) reported that youth with higher versus lower problem-gambling severity were more likely to report gambling due to pressure or anxiety. Our findings extended this research to demonstrate that gambling due to anxiety was associated with smoking in both high and low problem-gambling-severity adolescents, with a stronger relationship between smoking and this trigger for gambling for ARPG adolescents. Gambling due to pressure was associated with smoking only in ARPG adolescents. Given that these internal states might drive gambling behaviors, it would be important to examine the extent to which similar states drive smoking behaviors or the extent to which youth might engage in smoking to mitigate these states.

The findings of statistically significant interactions between gambling and smoking groups for gambling variables is noteworthy. While some of these findings may relate directly to problem-gambling severity with respect to engagement in a broader range of risk behaviors (e.g., the stronger relationship between smoking and earlier age at gambling onset in the ARPG versus LRG groups), other findings may intimate possible transitions in severities. For example, the stronger relationship between smoking and gambling with friends in LRG adolescents suggests that peer involvement may be particularly relevant to the co-occurrence between smoking and gambling in LRG, whereas the stronger relationship between smoking and pressure-related triggers to gamble in the ARPG suggests that internal factors like perceived pressure may be particularly relevant to the co-occurrence between smoking and gambling in ARPG. Longitudinal studies are needed to examine if such transitions occur, and if so, how and when peer involvement may become less relevant to the relationship between smoking and gambling and pressure to gamble becomes more relevant.

Multiple behaviors demonstrated associations with smoking across problem-gambling severity levels (e.g., greater time spent gambling, anxiety as a trigger for gambling). These findings suggest that smoking status may be able to be used as a “clinical indicator” of more severe and problematic gambling in adolescents similar to the suggestion that smoking status be used as a marker of problematic alcohol use in adults (McKee et al., 2007). Our data also suggest the potential importance of integrating information about smoking (e.g., smoking cessation) into prevention and intervention efforts with all adolescent gamblers. For example, gambling intervention programs could include efforts to increase the motivation of adolescents to quit smoking (e.g., motivational enhancement therapy, Miller and Rollnick, 2002) and support for smoking cessation. Integrating smoking cessation into gambling interventions may yield better gambling outcomes in addition to reducing negative health-related smoking consequences (USDHHS, 2014). Research is needed to empirically

determine the impact of addressing smoking on short- and long-term gambling behaviors and consequences among adolescents.

Multiple limitations of the current study exist. First, the participants in the study completed a survey allowing for inherent limitations in this methodology including possible response biases. Second, due to the illegal and/or sensitive nature of some of the assessed behaviors (e.g., gambling, smoking), participants may have under-reported (for shame) or over-reported (for bravado) engagement in some of these activities. Third, while the sample adequately represented adolescents aged 14–18 years who lived in the state of Connecticut, the results may not be generalizable to adolescents living in other geographic areas. Fourth, as described earlier, we were not able to examine the association of smoking and gambling for adolescents who were current occasional smokers. More adolescents who report smoking in the past month report nondaily, rather than daily, smoking (USDHHS, 2014). Adolescents with nondaily smoking, compared to those with daily smoking, report less dependence on cigarettes but report equal attempts to quit smoking (Rubinstein et al., 2014). While there has not yet been research on gambling and intermittent smoking in adolescents, gambling problems differ for light versus heavy adult smokers (Weatherly & Bogenreif, 2013). Future studies are needed that are able to examine the differences in problem-gambling severity for adolescents who engage in occasional smoking compared to daily smoking and non-smoking. Fifth, while outside the scope of the current study, it will be important for future studies to examine potential mediators and moderators of the relationship between problem-gambling severity and smoking in adolescents including demographics (e.g., gender, race), personality-related variables (e.g., impulsivity), and environmental variables (e.g., parental approval of gambling). Identifying and learning more about mediating and moderating factors involved in the association of gambling and smoking in adolescents can help to develop and target gambling- and smoking-related intervention efforts. Finally, this study utilized a cross-sectional design. Because gambling and smoking behavior was not followed over time, there are limits to the ability to make inferences about causality. Some research indicates that the onset of gambling in adolescence precedes the onset of other risk behaviors, including cigarette smoking (Gupta and Derevensky, 1998; Jacobs, 2004). Longitudinal research will be important to examine temporal and dynamic relationships among smoking and gambling behavior.

CONCLUSIONS

In the current study of adolescent gamblers, smoking was associated with more extensive gambling for both ARPG and LRG adolescents. Smoking may be a marker of more severe and extensive gambling in adolescents, and considering relationships between adolescent smoking and gambling may be helpful in optimizing prevention and intervention efforts with adolescent gamblers.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- We examined adolescent gambling behaviors and attitudes by smoking status.
- Smoking was associated with more extensive gambling for adolescent gamblers.
- Considering smoking may be helpful in intervention efforts with adolescent gamblers.

Table 1

Gambling Measures

Variable/Category	At Risk/Problem Gambling (ARPG; N=538)		Low-Risk Gambling (LRG; N=1,053)		Gambling status by smoking status interaction	
	OR	95% CI	Current Smokers versus Non-Smokers	OR	95% CI	ARPG versus LRG
Gambling Type^c						
Strategic ^d	0.02	0.001, 0.25		1.12	0.45, 2.77	0.09
Non-strategic ^e	1.49	0.81, 2.74		2.06	1.24, 3.40	0.75
Machine ^f	1.53	0.91, 2.56		1.51	0.995, 2.29	1.01
Gambling Location^c						
Online	2.20	1.36, 3.56		1.13	0.61, 2.11	2.10
School gambling	2.39	1.37, 4.17		2.81	1.77, 4.46	1.00
Casino	4.34	2.60, 7.26		1.30	0.56, 3.02	3.23
Triggers for gambling^c						
Pressure	2.02	1.15, 3.55		0.21	0.03, 1.59	10.70
Anxiety	4.33	2.32, 8.09		7.35	1.13, 36.97	1.02
Reasons for gambling^c						
Excitement	1.06	0.56, 2.02		1.04	0.69, 1.57	1.00
Financial reasons	1.22	0.71, 2.13		1.87	1.24, 2.81	0.67
Escape	1.26	0.80, 2.00		1.32	0.83, 2.09	0.99
Social reasons	0.96	0.60, 1.54		0.92	0.60, 1.43	0.92
People gamble with^c						
Family	0.69	0.43, 1.11		1.06	0.70, 1.60	0.62
Friends	0.56	0.33, 0.94		1.63	1.04, 2.57	0.33
Other adults	1.21	0.75, 1.94		1.51	0.94, 2.45	0.80
Strangers	2.90	1.70, 4.94		1.74	0.67, 4.52	1.92
Alone	2.44	1.45, 4.09		2.63	1.24, 5.61	1.10
Time spent gambling						
1 hour or less	ref	---		ref	---	---
2+ hours/week	2.09	1.25, 3.50		4.05	2.01, 8.15	0.63
						0.27, 1.44

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OR, Odds Ratio; CI, Confidence Interval

^aModel covariates include: gender, race/ethnicity, grade, family structure

^bInteraction OR reflects ARPG versus LRG

^cAnalyses reflect a “yes” response to each category compared to a “no” response, participants could respond “yes” to more than one category

^d“Games of skill” such as card games

^e“Games of chance” such as bingo

^fGames where gambling occurs using a machine such as slot machines or poker machines

Analysis of Specific Gambling Types by Smoking Status and Problem-Gambling Severity.

Table 2

Type of gambling ^a	At Risk/Problem Gambling (ARPG; N=538)				Low-Risk Gambling (LRG; N=1,053)			
	Current Smokers (n=110)		Non-Smokers (n=437)		Current Smokers (n=129)		Non-Smokers (n=938)	
	%	%	%	χ^2	p-value	%	%	χ^2
Played bingo at a church, synagogue or other public place	43.5	36.0	2.10	0.15	29.1	32.1	0.46	0.50
Played slot machines, poker machines, or other gambling machines	53.7	31.9	17.67	<0.001	20.2	17.7	0.48	0.49
Played cards (not at a casino)	93.6	94.9	0.29	0.59	30.6	92.3	0.42	0.52
Placed a bet with a bookie	53.3	19.5	50.58	<0.001	13.2	4.2	18.22	<0.001
Bet with a friend for money	89.9	87.8	0.37	0.54	82.0	71.2	6.60	<0.05
Bet on video or arcade games	57.9	55.4	0.23	0.63	35.9	26.5	5.08	<0.05
Bet on dice (craps) outside of a casino	63.9	37.0	25.51	<0.001	28.7	13.0	21.86	<0.001
Bet on pool or other games of skill	76.2	67.4	3.10	0.07	51.9	37.9	9.34	<0.01
Done any other kind of gambling	72.7	63.1	3.57	0.06	44.2	33.8	5.41	<0.05

^a Percentages reflect a "yes" response to each category, participants could respond "yes" to more than one category

Gambling Attitudes and Behaviors

Table 3

Variable/Category	At Risk/Problem Gambling (ARPG; N=538)		Low-Risk Gambling (LRG; N=1,053)		Gambling status by smoking status interaction	
	OR	95% CI	Current Smokers versus Non-Smokers	OR	95% CI	ARPG versus LRG
Age at gambling onset						
Earlier onset (11 years)	3.20	1.97, 5.19	1.08	0.64, 1.82	2.97	1.47, 5.98
Later onset (12 years)	ref	---	ref	---	---	---
Scratch or Lottery tickets						
Bought scratch tickets for self						
Yes	2.94	1.85, 4.68	2.93	1.94, 4.41	1.01	0.55, 1.87
No	ref	---	ref	---	---	---
Bought other type of lottery ticket						
Yes	3.88	2.38, 6.33	1.86	1.02, 3.40	2.01	0.94, 4.33
No	ref	---	ref	---	---	---
Received scratch ticket as gift						
Yes	1.59	0.99, 2.56	1.09	0.73, 1.61	1.40	0.75, 2.62
No	ref	---	ref	---	---	---
Received other type of lottery ticket as gift						
Yes	1.69	1.08, 2.63	1.04	0.66, 1.64	1.57	0.83, 2.96
No	ref	---	ref	---	---	---
Parent perception about gambling						
Disapprove	1.14	0.63, 2.05	0.36	0.22, 0.61	3.00	1.38, 6.54
Neither approve nor disapprove	ref	---	ref	---	---	---
Approve	4.70	2.51, 8.80	0.69	0.33, 1.47	6.23	2.36, 16.45
Concern about Family Member Gambling						
Yes	1.75	1.00, 3.04	1.50	0.83, 2.71	1.19	0.53, 2.65
No	ref	---	ref	---	---	---
Importance for preventing gambling problems in teens						
Checking identification for purchasing lottery tickets						

Variable/Category	At Risk/Problem Gambling (ARPG; N=538)		Low-Risk Gambling (LRG; N=1,053)		Gambling status by smoking status interaction	
	OR	95% CI	OR	95% CI	Interaction OR ^b	95% CI
Important	0.28	0.17, 0.45	0.61	0.37, 1.01	0.43	0.22, 0.86
Not important	ref	---	ref	---	---	---
Hanging out with friends who don't gamble						
Important	0.45	0.28, 0.71	0.47	0.30, 0.72	0.92	0.49, 1.72
Not important	ref	---	ref	---	---	---
Participating in activities that are fun and free of gambling						
Important	0.36	0.22, 0.58	0.49	0.30, 0.81	0.69	0.35, 1.36
Not important	ref	---	ref	---	---	---
Fear of losing valuable possessions, close friends, and relatives						
Important	0.15	0.09, 0.26	0.52	0.28, 0.97	0.28	0.13, 0.62
Not important	ref	---	ref	---	---	---
Advertisements that s how the problems associated with gambling						
Important	0.37	0.23, 0.60	0.66	0.41, 1.04	0.54	0.28, 1.04
Not important	ref	---	ref	---	---	---
Not having access to internet gambling at home						
Important	0.53	0.34, 0.85	0.89	0.58, 1.37	0.58	0.31, 1.09
Not important	ref	---	ref	---	---	---
Parent/guardian strictness about gambling						
Important	0.38	0.23, 0.61	0.43	0.27, 0.69	0.81	0.42, 1.56
Not important	ref	---	ref	---	---	---
Warnings from adults in family						
Important	0.32	0.20, 0.51	0.42	0.27, 0.67	0.73	0.38, 1.40
Not important	ref	---	ref	---	---	---
Warnings from, or listening to, peers						
Important	0.27	0.17, 0.44	0.56	0.34, 0.93	0.48	0.24, 0.94
Not important	ref	---	ref	---	---	---
Having parents who don't gamble						

Variable/Category	At Risk/Problem Gambling (ARPG; N=538)		Low-Risk Gambling (LRG; N=1,053)		Gambling status by smoking status interaction ARPG versus LRG	
	OR	95% CI	OR	95% CI	Interaction OR ^b	95% CI
Important	0.30	0.18, 0.48	0.56	0.35, 0.90	0.52	0.27, 1.01
Not important	ref	---	ref	---	---	---
Learning about the risks of gambling in school						
Important	0.39	0.24, 0.62	0.61	0.39, 0.97	0.60	0.32, 1.16
Not important	ref	---	ref	---	---	---
Learning about the risks of gambling from parents						
Important	0.31	0.19, 0.49	0.46	0.28, 0.74	0.62	0.32, 1.21
Not important	ref	---	ref	---	---	---
Learning about the risks of gambling from peers						
Important	0.39	0.24, 0.63	0.54	0.34, 0.86	0.69	0.36, 1.33
Not important	ref	---	ref	---	---	---
Adults not involving kids in gambling						
Important	0.44	0.27, 0.71	0.59	0.35, 0.98	0.73	0.36, 1.47
Not important	ref	---	ref	---	---	---
Parent/guardian not permitting card games (for money) at home						
Important	0.60	0.38, 0.95	0.67	0.44, 1.02	0.89	0.48, 1.66
Not important	ref	---	ref	---	---	---

OR, Odds Ratio; CI, Confidence Interval

^aModel covariates include: gender, race/ethnicity, grade, family structure^bInteraction OR reflects ARPG versus LRG