Gambling and Other Risk Behaviors Among 8th- to 12th-Grade Students

Jenny Proimos, MBBS*; Robert H. DuRant, PhD‡; Judith Dwyer Pierce, EdD, CHES§; and Elizabeth Goodman, MD*

ABSTRACT. Objective. To examine the associations between a self-reported history of gambling or problems related to gambling and health risk behaviors in adolescence.

Design. An anonymous risk behavior survey was administered to 21,297 8th- through 12th-grade students in 79 public and private schools in Vermont. Gambling or problems related to gambling were the outcome variables of interest. Demographic variables and 13 target risk behaviors related to substance use, sexual activity, and violence were tested for association with gambling and problems related to gambling.

Results. Of the students, 53% reported gambling in the past 12 months, and 7% reported problems attributable to gambling. Male gender, any use of alcohol, infrequent use of cigarette smoking, any marijuana use, any inhalant use, infrequent steroid use, frequent illegal drug use, seatbelt nonuse, driving after drinking alcohol, being threatened, carrying a weapon, being involved in a fight, and years of sexual activity were all significantly associated with reported gambling in the past 12 months. Among the students who gambled, younger age, male gender, daily marijuana use, frequent use of cocaine, frequent use of inhalants, any steroid use, never wearing seatbelts, carrying a weapon for up to 3 days a month, fighting, and years of sexual activity were all significantly associated with reported problems with family and friends as a consequence of gambling. There was an increase in the absolute number of risk behaviors reported between those who had not gambled, those who had gambled, and those for whom gambling had created problems.

Conclusions. Risk behaviors are associated with gambling in adolescence. The typology of risk behaviors was different for adolescents who reported gambling compared with those for whom gambling had created problems. Both gambling and problems related to gambling were significantly associated with the absolute number of risk behaviors reported by adolescents in a graded manner. Involvement in gambling should be assessed as part of the health encounter. Assessment may provide a nonthreatening entry into the evaluation of other risk behaviors. Furthermore, it may identify youth who are at risk of developing additional risk behaviors or pathological gambling. Interventions then could be targeted toward prevention of these undesirable outcomes.

Gambling is a common pastime in most Western societies today. Many studies have shown that up to 90% of adults have gambled at some point in their life. Pathological gambling is defined by the Diagnostic and Statistical Manual of Mental Disorders, 4th ed (DSM-IV) as persistent or recurrent gambling behavior that disrupts personal, family, or vocational pursuits. The prevalence of pathological gambling among adults is estimated to be between 1% to 3%, and several studies have shown that the majority of pathological gambling begins during adolescence. In one study, 86% of adult pathological gamblers started gambling before 19 years of age.

Current estimates of the lifetime rate of gambling by senior year in high school range between 75% and 91%. Between 9.9% and 14.2% of adolescents are considered at risk of developing or returning to serious gambling problems. In a survey of 892 students from four New Jersey high schools, Lesieur and Klein reported that 91% of students had gambled at least once, and 86% had gambled in the past year. Nearly 6% were classified as pathological gamblers according to DSM-III criteria. In a study of 1612 Quebec high school students, 76% reported they had gambled and 24% had gambled at least weekly in the previous year. Between 1% and 2% were classified as pathological gamblers. Arcuri and colleagues surveyed 1120 high school students in Atlantic City, NJ, and found that 64% of students had gambled in a casino, and 9% gambled at least weekly.

Previous studies have shown that pathological gambling is associated with alcohol and drug use, truancy, low grades, problematic gambling in parents, and illegal activities to finance the gambling. Given that pathological gamblers often begin gambling in adolescence, a better understanding of adolescents who gamble is necessary to develop effective interventions. This study examined the associations between gambling and other risk behaviors among high school students in Vermont. We hypothesized that adolescents who gamble are more likely to be involved in other risk behaviors and that ado-
lescents who report problems attributable to gambling will be involved in more risk behaviors than those who do not report problems. Finally, we hypothesized that the typology of risk behaviors would differ by the level of involvement in gambling.

METHODS

Survey Design

The Centers for Disease Control and Prevention (CDC) developed the Youth Risk Behavior Survey (YRBS) to assess the prevalence of health risk behaviors among youth in the United States. It has been used nationally, in a cluster sample design, every 2 years to measure the progress toward achieving 26 of the 111 Year 2000 National Health Objectives.12 Data for this study were obtained from the 1995 Vermont YRBS, an expanded version of the CDC YRBS. This survey was administered in March 1995 to 21,297 8th- to 12th-grade students in 79 public and private schools in Vermont. This represented 67% of the student population in these grades. Unlike the national YRBS that surveyed randomly selected classes in schools, the Vermont YRBS surveyed all students in 8th through 12th grades who were present at school on the day the survey was administered.

Students were asked to complete a voluntary, anonymous, self-administered questionnaire consisting of 91 multiple choice questions. The questionnaire was available in both English and Spanish.

Variables

Two dependent variables were examined. Gambling in the past 12 months, was measured with the dichotomous question, “During the past 12 months, have you ever gambled (for example, bet money on the lottery, bingo, sporting events, casino games, cards, racing or other games of chance)?” Problems caused by gambling were measured with the question, “During the past 12 months, has your gambling ever created problems between you and any member of your family or friends?” The three answers included “haven’t gambled,” “yes,” or “no.” This variable, which does not satisfy DSM-IV criteria for pathological gambling, will hereafter be referred to as “problem gambling.”

Independent Variables

Demographics

Demographic variables included age, gender, and grade level. The Vermont Agency of Human Services provided information about the percentage of rural areas, the percentage of students living in poverty, and the annual average wage for each school county. Because 97.5% of students in Vermont are Caucasian, information about ethnicity was not included to avoid compromising the confidentiality of minority students.

Drug and Alcohol Use

The frequency of use of alcohol, cigarettes, and marijuana was measured on a 6-point scale ranging from “never” to “about every day.” Lifetime use of cocaine, steroids, inhalants, and other illegal drugs were all measured on a 6-point scale ranging from “0 times” to “40 or more times.” Driving after drinking alcohol was assessed using the question, “How often do you drive a car while drinking alcohol or shortly after drinking alcohol?” This was measured on a 7-point scale ranging from “I don’t drive” and “never” to “about every day.”

Seatbelt Nonuse

Lack of use of seatbelts was assessed using the question, “How often do you wear a seatbelt when riding in a car driven by someone else?” This was measured on a 6-point scale ranging from “never” to “always.”

Violence-related Behaviors

Three questions were used to assess violent risk behaviors. Fighting was assessed with the question, “During the past 12 months, how many times were you in a physical fight?” Responses on a 6-point scale ranged from “0 times” to “12 or more times.” Being threatened with physical violence in the past 12 months was measured on a 5-point scale ranging from “0 times” to “6 or more times.” Carrying a weapon in the past 30 days was measured on a similar 5-point scale.

Sexual Activity

Students were asked if they had ever had sexual intercourse. The years of sexual activity were derived by subtracting the age at first sexual intercourse from the age of each sexually active individual. Students who had been sexually active for <1 year were given a score of 0.5 to differentiate them from those who were not sexually active.

Risk Behavior Index

A Risk Behavior Index, comprising an aggregate score of the number of risk behaviors each adolescent engaged in, was created from the 13 target behaviors. Each behavior reported was counted as 1 point, creating a possible range in scores from 0 to 13. The Cronbach α for this scale was 0.77.

Statistical Analysis

The Vermont YRBS does not use the randomized cluster design used by the CDC in most states, but rather surveyed all students in the 79 schools. Because of this sampling strategy, SPSS for Windows, rather than software for complex survey designs, was used to analyze the data. Because the linearity of many of the scales of frequency in the YRBS cannot be assumed, each of the risk factor variables were initially dichotomized. This was performed in such a way as to compare adolescents who did not engage, or had experimented once or twice with a particular behavior, to those who reported the behavior more regularly. Bivariate analyses, using Pearson χ² tests, were used to analyze the association between gambling and the independent variables. Because all of the bivariate analyses were significant with a P < .0001, contingency coefficients (CC) were used to measure the strength of the association.

One-way analysis of variance with a post hoc comparison using the Tukey B test assessed the relationship between the three groups of students who had either not gambled, had gambled without reporting problems, or had reported problems with gambling, and the Risk Behavior Index. Although the distribution of the Risk Behavior Index was skewed, the assumption of normality was made based on the Central Limit Theorem.13

Because of the lack of linearity of some of the scales of frequency in the YRBS, variables were entered into the multiple logistic regression models as categorical variables. Variables, including age and gender, were entered into the model simultaneously to control for the influence of each variable. Two models were created using the two outcomes: gambling in the past 12 months and problem gambling.

RESULTS

A total of 16,948 students consistently answered both gambling questions and were included in the present analysis. The demographic characteristics of these students are described in Table 1. The sample was 49% male. The mean age was 15.5 years (SD ± 1.4, range 12 to 18), and the mean grade was 10th grade (SD ± 1.4, range 8 to 12). The average family income of the counties where the YRBS was administered was $21,429 (SD ± $2822, range $16,458 to $26,170), the counties were 68% rural (SD ± 34 to 100), and 16% of the children living in the counties surveyed lived in poverty (SD ± 3, range 12 to 22). There were no significant differences between the students who reported gambling and those who reported problems attributable to gambling in any of these three sociodemographic variables.

Fifty-three percent of students reported gambling in the past 12 months, and 7% reported problems caused by gambling. Gambling behavior was strongly related to gender: 67% of males reported...
gambling in the past 12 months compared with only 39% of females \( (P < .0001, \text{contingency coefficient } [CC] = 0.28) \). The gender difference in problem gambling was much weaker, with 10% of all males and 4% of all females reporting problems attributable to gambling \( (P < .0001, CC = 0.09) \).

### Bivariate Associations

The associations between the 13 target risk behaviors and gambling and problems attributable to gambling are presented in Table 2. Although all the risk behaviors analyzed were significantly associated with gambling and problems related to gambling, interesting differences emerged. Cocaine use was reported three times as often by students who reported gambling compared with those who did not. Of the students who reported gambling without problems, 4% also reported cocaine use. In contrast, 17% of students who reported problems attributable to gambling also reported cocaine use. Inhalant use was reported by 10% of the students who did not report gambling. This doubled to 20% of students who reported gambling. Of those students who gambled, one third of students who reported problems attributable to gambling also reported using inhalants. Although only 1% of nongambling students reported anabolic steroid use, this increased to 4% of students who reported gambling. Of those students who gambled, anabolic steroid use was reported by 15% of the students who also reported problems related to their gambling. Illegal drug use was reported by 8% of nongambling students. This nearly doubled to 15% of students who reported gambling in the past year. This nearly doubled again, with 28% of students reporting problems related to gambling also reporting using illegal drugs.

Analysis of the violence-related risk behaviors showed that although 28% of students who reported gambling also reported carrying a weapon at least once in the past 30 days, this increased to 47% of students who reported problems related to gambling. Nearly 25% of nongambling students reported having fought in the past 30 days. This proportion increased to 45% of students who reported gambling.

### Table 1.

Demographic Characteristics of 8th- Through 12th-Grade Students in the 1995 Vermont Youth Risk Behavior Survey

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total n = 16,948 (%)</th>
<th>Gambling n = 16,948</th>
<th>Problem Gambling n = 9,007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n = 9,007 (%)</td>
<td>No n = 7,941 (%)</td>
<td>Yes n = 11,81 (%)</td>
</tr>
<tr>
<td>Age</td>
<td>0.1</td>
<td>72</td>
<td>28</td>
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<tr>
<td></td>
<td>8.0</td>
<td>50</td>
<td>50</td>
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<tr>
<td></td>
<td>19.9</td>
<td>51</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>23.7</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>21.2</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>17.7</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>9.3</td>
<td>63</td>
<td>37</td>
</tr>
<tr>
<td>Gender</td>
<td>51</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>Male</td>
<td>49</td>
<td>39</td>
<td>61</td>
</tr>
</tbody>
</table>

### Table 2.

The Associations Between Gambling, Problem Gambling, and Risk Behaviors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total n = 16,948 (%)</th>
<th>Gambling n = 16,948</th>
<th>Problem Gambling n = 9,007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n = 9,007 (%)</td>
<td>No n = 7,941 (%)</td>
<td></td>
</tr>
<tr>
<td>Alcohol and drug use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol(^a)</td>
<td>42</td>
<td>50</td>
<td>32*** 0.18</td>
</tr>
<tr>
<td>Cigarettes(^a)</td>
<td>33</td>
<td>37</td>
<td>28*** 0.10</td>
</tr>
<tr>
<td>Marijuana(^a)</td>
<td>26</td>
<td>30</td>
<td>21*** 0.10</td>
</tr>
<tr>
<td>Cocaine(^b)</td>
<td>4</td>
<td>6</td>
<td>2*** 0.10</td>
</tr>
<tr>
<td>Inhalants(^b)</td>
<td>15</td>
<td>20</td>
<td>10*** 0.15</td>
</tr>
<tr>
<td>Steroids(^b)</td>
<td>3</td>
<td>4</td>
<td>1*** 0.10</td>
</tr>
<tr>
<td>Illegal drugs(^b)</td>
<td>12</td>
<td>15</td>
<td>8*** 0.10</td>
</tr>
<tr>
<td>Drink-driving(^c)</td>
<td>9</td>
<td>13</td>
<td>6*** 0.13</td>
</tr>
<tr>
<td>Seatbelt nonuse(^c)</td>
<td>24</td>
<td>30</td>
<td>18*** 0.14</td>
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<tr>
<td>Sexual behaviors</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ever sexually active</td>
<td>41</td>
<td>48</td>
<td>34*** 0.15</td>
</tr>
<tr>
<td>Violence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threatened(^d)</td>
<td>41</td>
<td>50</td>
<td>32*** 0.17</td>
</tr>
<tr>
<td>Weapon-carrying(^d)</td>
<td>20</td>
<td>28</td>
<td>11*** 0.21</td>
</tr>
<tr>
<td>Fighting(^d)</td>
<td>35</td>
<td>45</td>
<td>24*** 0.21</td>
</tr>
</tbody>
</table>

*** \( P < .0001 \).

\(^a\) At least monthly use compared with less than monthly use.

\(^b\) Used three or more times compared with two or fewer times.

\(^c\) Use sometimes or never compared with often to always.

\(^d\) One or more times compared with no times.
and 62% of students who reported problems attributable to gambling.

**Risk Behavior Index**

Students who reported not gambling had a Risk Behavior Index score of 2.2 (SD = 2.2) compared with 3.5 (SD = 2.7) among students who reported gambling without problems, and 5.1 (SD = 3.4) among students who reported problems attributable to gambling. The differences between each of these means were statistically significant (P < .0001).

**Multiple Logistic Regression**

Multivariate analysis also showed differences between students who reported gambling (Table 3) and those who reported problems attributable to gambling (Table 4). Any alcohol use, irregular cigarette use, any inhalant use, and irregular anabolic steroid use were all associated with reported gambling. Any marijuana use and regular illegal drug use were associated with a lower likelihood of reporting gambling. This pattern differed in students who reported problems attributable to gambling. Alcohol and cigarette use became nonsignificant predictors after adjustment for other risk behaviors. Regular cocaine use and any anabolic steroid use became significantly associated with a report of problems attributable to gambling. Only daily marijuana use was associated with problematic gambling, with other frequencies of marijuana use and illegal drug use becoming nonsignificant.

Any lack of seatbelt use was associated with reported gambling, but only total lack of seatbelt use was associated with problematic gambling. Although driving after drinking alcohol monthly or weekly was associated with reported gambling, it became a nonsignificant predictor of problems attributable to gambling.

Violence-related risk behaviors were all associated with reported gambling. In contrast, only carrying a weapon irregularly and being involved in at least one fight were significantly associated with problems attributable to gambling. Finally, the number of years of sexual activity was significantly associated with both reported gambling and problems attributable to gambling.

**DISCUSSION**

Little is known about the characteristics of adolescents who gamble. The importance of exploring and

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**TABLE 3. Logistic Regression Analysis of the Associations Between Gambling and Health Risk Behaviors**

| Risk Factor               | Male Gender | Alcohol use 1–2/Y | Alcohol use 1–2/Mo | Alcohol use 1–2/Wk | Alcohol use Daily | Cigarette use 1–2/Y | Cigarette use 1–2/Mo | Cigarette use 1–2/Wk | Cigarette use Daily | Marijuana use 1–2/Y | Marijuana use 1–2/Mo | Marijuana use 1–2/Wk | Marijuana use Daily | Cocaine use | Inhalant use 1–2 Times | Inhalant use ≥3 Times | Steroids use 1–2 Times | Steroids use ≥3 Times | Illegal drug use 1–2 Times | Illegal drug use ≥3 Times | Seatbelt use Never | Seatbelt use Rarely | Seatbelt use Sometimes | Seatbelt use Most times | Carrying a weapon 1 Day | Carrying a weapon 2–3 Days | Carrying a weapon 4–5 Days | Carrying a weapon ≥6 Days | Involved in a fight 1 time | Involved in a fight ≥1 time | Years of sexual activity |
|--------------------------|-------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|
| Adjusted Odds Ratio      | 2.67        | 1.64              | 2.03              | 2.43              | 3.24             | 1.08              | 1.11              | 2.43              | 3.24              | 0.84              | 0.69              | 0.67              | 0.72              | NS              | 1.34                 | 1.55                 | 1.74                 | NS                  | 0.80                 | 1.67                 | 1.43                | 1.41                | 1.23                 | 0.70                 | 1.41                | 1.29                | 1.10                |}
| 95% Confidence Interval  | 2.47, 2.89  | 1.49, 1.82        | 1.83, 2.24        | 2.08, 2.85        | 2.08, 5.03       | 1.01, 1.17        | 1.01, 1.22        | 1.01, 1.17        | 0.97, 0.91        | 0.74, 0.96        | 0.60, 0.80        | 0.56, 0.80        | 0.57, 0.91        | NS              | 1.19, 1.50           | 1.36, 1.76           | 1.25, 2.41           | NS                  | 0.67, 0.91          | 1.31, 2.13           | 1.22, 1.67          | 1.25, 1.59          | 1.13, 1.34          | 1.03, 1.76           | 1.26                | 1.05, 1.51          | 1.10                | 1.02, 1.18          |
defining further the nature of gambling behavior in adolescence is highlighted by the fact that most adult pathological gamblers start gambling in adolescence. Adult pathological gambling is associated with significant family, marital, and emotional discord, and economic and occupational disruption. Bland and associates found that suicide attempts, conviction for nontraffic offenses, and spousal and child abuse were more prevalent in pathological gamblers. They reported that up to 60% of pathological gamblers borrowed or stole to finance their gambling behavior. Given that retrospective studies show that development of adult pathological gambling typically takes 10 or more years, the development of early intervention programs for gambling adolescents may be helpful in preventing this disorder.

Our study confirms findings from earlier investigations that gambling is common in adolescence. Fifty-three percent of Vermont students reported gambling in the past year. Although the results of this analysis corroborate the hypothesis that gambling is associated with other health risk behaviors, it remains to be seen whether a particular profile or the number of risk behaviors are associated with later pathological gambling in adulthood. Longitudinal studies of gambling behavior are necessary to answer this question.

Interestingly, in this study 72% of students 12 and younger reported gambling in the past 12 months, whereas lower percentages in higher age groups reported this behavior. This may reflect the smaller sample sizes of the younger age groups involved, however, it also may partly reflect a societal nonacceptance of gambling at an early age. This point is illustrated by the higher number of younger students who reported problems associated with gambling, as defined by the self-perception of problems with friends or family as a consequence of gambling.

The association between gambling and health risk behaviors has been hypothesized and explored primarily in the context of alcohol and illegal drug use in adult pathological gamblers. Alcohol and drug use are more prevalent in pathological gamblers, with 40% of adult pathological gamblers meeting the criteria for drug or alcohol abuse in one study. In our study, gambling was associated with use of multiple drugs and alcohol and engagement in other risk behaviors. Notably, cocaine use was not a significant predictor of gambling. Marijuana use was significantly associated with a lesser likelihood of gambling. The typology of risk behaviors was different for students who reported problems with gambling. Regular cocaine use was a significant predictor of problems attributable to gambling. Cigarette smoking and alcohol were not significantly associated with problematic gambling in our study. Only daily marijuana use was significantly associated with a lesser likelihood of reporting problems attributable to gambling.

Jessor proposed the existence of organized patterns of risk behaviors. These patterns often reflect an adolescent’s way of belonging to the world. He suggested that adolescent life provides the social opportunity to learn and perform risk behaviors together. In contrast to Jessor, Osgood’s theory of deviant behaviors states that deviance is a unified phenomenon, and various behaviors serve as alternative manifestations of a more general tendency. He proposes two explanations for correlation among deviant behaviors. Deviant behaviors coexist because engaging in one behavior often leads to engaging in others as well. The second explanation is that these behaviors are related because they have shared influences. Our findings support the notion of co-variation of health risk behaviors and support further Jessor’s notion of adolescent psychosocial development. Our observation that a report of gambling or problems attributable to gambling both were associated with a higher Risk Behavior Index further supports this notion. The high standard deviations reported in the analysis of variance of the Risk Behavior Index reflect the larger prevalence of students who reported never having gambled.

Rates of youth gambling appear to vary according to ease of access of gambling venues. In one study, college students in New York, New Jersey, and Nevada, with access to Atlantic City and Las Vegas, had higher rates of gambling than did students in Texas and Oklahoma. With reports of poor control of underage entry to casinos and access to free alcoholic drinks while in casinos, improved regulation of access to gaming venues must be addressed. Presently, no casinos exist in Vermont. It is likely that gambling behaviors would increase if access to casinos was readily available to Vermont youth.

This study has several limitations. Because of the cross-sectional survey study design, direct causation between risk behaviors and gambling cannot be established. Although the results may be generalized to students who attend middle and high schools in Vermont, other high-risk adolescents who may have dropped out of school early are not included by these data. The two questions asked about gambling in the Youth Risk Behavior Survey are broad and reflect a high degree of self-perception about gambling behavior. Conclusions about the degree of gambling as a function of financial outlay are therefore not possible. Similarly, it is not possible to draw conclusions about the nature and severity of the problems related to gambling perceived by the adolescents answering this questionnaire. Both these issues would be interesting to address in a future study. Given that Vermont does not have any organized gambling venues, regional variations may account for some of the differences seen. Analysis of national data will therefore be relevant in assessing whether regional differences are significant. Underreporting may be an issue, given the sensitive nature of illegal drug use and sexual behaviors. The frequencies reported of these behaviors might therefore not reflect their true prevalence. Potential limitations of self-report questionnaires relate to their reliability and validity. The reliability and validity of adolescent self-reported behavior and of this CDC-developed instrument has been discussed previously.
The current Guidelines for Adolescent Preventive Services and the Bright Futures Guidelines for Supervision of Infants, Children and Adolescents recommend that health practitioners provide annual health guidance to adolescents to promote a better understanding of their psychosocial development. Our results show that adolescents who report gambling also engage in other risk behaviors. Level of involvement in gambling was associated with engagement in a higher number of risky behaviors. A simple screening question about gambling during a health visit may be a less confrontational introduction into discussions about other more sensitive risk behaviors. This would allow for identification of adolescents at high risk of having problems attributable to gambling, and subsequent pathological gambling in later adulthood. Additional research needs to be performed to determine whether intervention with these adolescents reduces rates of involvement in associated risk behaviors and in later development of pathological gambling.

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