Psychiatric Correlates of Gambling in Adolescents and Young Adults Grouped by Age at Gambling Onset

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Background: Gambling is a prevalent behavior, yet few studies have investigated its mental health correlates. Although early-onset engagement in behaviors with addictive potential has generally been associated with more severe problems, direct investigation of a nationally representative sample of gamblers grouped by age at onset of gambling has not been performed.

Objective: To identify differences in psychiatric correlates of gambling and gambling-related attitudes and behaviors in adolescents (aged 16-17 years) and in young adults (aged 18-29 years) with early-onset (before age 18 years) and adult-onset gambling.

Design: Logistic regression analysis.

Setting: Public access data set derived from random-digit-dialing telephone surveys.

Patients: The study analyzed data from adolescent (n = 235), early-onset adult (n = 151), and adult-onset (n = 204) past-year gamblers and adolescent (n = 299) and adult (n = 187) nongamblers in the Gambling Impact and Behavior Study.

Main Outcome Measures: Gamblers and nongamblers were compared within each group on measures of sociodemographics and psychiatric health. Adolescent, early-onset adult, and adult-onset past-year gamblers were compared on measures of gambling attitudes and behaviors.

Results: Adolescent gamblers were more likely than adolescent nongamblers to report alcohol and drug use and abuse/dependence and depression. Elevated rates of alcohol and drug use and abuse/dependence were observed in early-onset adult gamblers vs adult nongamblers, and only elevated rates of alcohol use were observed in adult-onset gamblers vs adult nongamblers. Substantial differences in reasons for and patterns of gambling were observed among the 3 groups of gamblers.

Conclusions: Adolescent-onset gambling is associated with more severe psychiatric problems, particularly substance use disorders, in adolescents and young adults. More research is needed to investigate the relationships and inform prevention and treatment strategies.

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nal investigations), although existing data suggest that early onset of gambling is associated with more severe gambling problems. Most studies of adult gamblers do not assess differences related to age at gambling onset. Given that there exist age-at-onset and treatment-related differences in the characteristics of individuals with alcohol dependence, a disorder frequently co-occurring with pathological gambling and linked at a genetic level, further examination of the effect of age at gambling onset on adult gambling and substance use behaviors is warranted.

Few studies have directly compared adolescent gamblers with adult gamblers, particularly on a national level. Criteria used to define disordered gambling frequently vary between studies, and they are generally less stringent in studies of adolescents, complicating comparisons of gambling in adolescents and adults. The 1998 Gambling Impact and Behavior Study (GIBS) surveyed adults and adolescents to examine their gambling attitudes and behaviors. The present study sought to investigate the characteristics of adolescent (aged 16-17 years) and young adult (aged 18-29 years) past-year gamblers on measures of psychiatric health and gambling. The young adult group of gamblers was separated into early-onset (gambling onset at age <18 years) and adult-onset (gambling onset at age ≥18 years) groups. We hypothesized that (1) each group of gamblers would report more psychiatric problems than nongamblers, (2) adolescent and early-onset gambling would show stronger associations with adverse measures of psychiatric health compared with adult-onset gambling, and (3) adolescent, early-onset adult, and adult-onset adult gamblers would differ on reasons for and patterns of gambling, with adolescent and early-onset adult gamblers demonstrating greater gambling severity (higher quantity/frequency) than adult-onset gamblers.

### METHODS

#### SAMPLE

Data analyzed were obtained from the GIBS, a national US civilian household survey conducted by the National Opinion Research Center (NORC). The goal of the GIBS was to examine the impact of gambling in the United States. Participants were interviewed through the use of random-digit-dialing (RDD) surveys (534 adolescents and 2417 adults) and face-to-face interviews at selected gambling venues (530 adults only). Because face-to-face interviews were not conducted with adolescent gamblers and different questionnaires were used for the gambling venue and RDD adult samples, only data from the RDD surveys were analyzed in the present study.

Data for the adult RDD survey were obtained using a list-assisted approach and one-plus sampling (selecting from banks of 100 telephone numbers with at least 1 listed telephone number), as is typical for the NORC, and they are described elsewhere. Telephone numbers purchased from Survey Sampling International (Fairfield, Conn) were stratified by state lottery status, and working residential telephone numbers were identified in part through screening by Survey Sampling International. The individual interviewed from the contacted household was determined via a variant of the Troldahl/Carter/Bryant method. The adolescent population screened in the GIBS consisted of 16- and 17-year-olds, a population representing less than 7% of US households. In an effort to increase access to this population, adolescents were recruited using not only the RDD telephone lists like those used for adults but also “enriched” lists that had a higher probability of providing access to adolescents. Screening of adolescents required consent from the adolescent’s parent or guardian and the adolescent.

The adolescent and adult RDD samples were weighted to be representative of the US population for 16- and 17-year-old adolescents and adults 18 years and older, respectively. The weighting procedure has been described previously for adolescents and adult populations (see http://cloud9.norc.uchicago.edu/dlib/ngis.htm). Sample weights for the adolescent and adult RDD samples were scaled to sum to the actual sample sizes for these surveys (534 adolescents and 2417 adults), and sample sizes reported refer to sums of sample weights.

Studies involving analysis of publicly accessible GIBS data were presented to the Yale Human Investigations Committee and were exempted from review. Only participants aged 16 to 29 years, inclusive, were studied to minimize recall bias with respect to age at gambling onset and confounding of cohort effects. Participants were categorized by age (16-17 vs 18-29 years), past-year gambling status (yes vs no), and age at gambling onset (<18 years vs ≥18 years) to form 5 groups: adolescent gamblers (n = 235), adolescent nongamblers (n = 299), early-onset adult gamblers (n = 131), adult-onset gamblers (n = 204), and adult nongamblers (n = 187). Past-year gambling was defined as “placing a bet [during the past 12 months] on the outcome of a race or game of skill or chance, or playing a game—including for charity—in which one might win or lose money.” Data from individuals missing data on gambling status (n = 13 adults) and adults missing data on age at gambling onset (n = 7 adults) were excluded from analyses. Sample weights were adjusted for individuals included in the analyses.

### MEASURES

Variables were derived from questions in the GIBS as described previously. Alcohol and drug use and abuse/dependence measures were based on DSM-IV criteria as implemented in the National Household Survey on Drug Abuse. Past-year alcohol use was defined as use of alcohol at least once or twice per month for a minimum of 12 days in the past year. Past-year drug use was defined as use of an illicit drug for a minimum of 5 days in the past year. Respondents needed to meet a threshold criterion of use of a substance (not including nicotine or caffeine) for nonmedical purposes on at least 5 days in the previous year to be asked follow-up questions that assess DSM-IV criteria for abuse/dependence (eg, questions about tolerance, withdrawal, and adverse physical or social effects of use). Substance abuse/dependence variables assessed abuse/dependence of alcohol; marijuana and hashish; cocaine and crack; stimulants such as methamphetamine, amphetamines, and speed for nonmedical reasons; and tranquilizers such as diazepam and alprazolam for nonmedical reasons.

Two screening questions from the Diagnostic Interview Schedule measured depression, assessing a lifetime history of 2 weeks when the respondent either felt sad, empty, and depressed all the time or lost interest in most things previously found enjoyable. As with drug and alcohol use measures, screening questions were designed to capture most respondents with a history of major depression while minimizing respondent burden.

Most gambling measures (reasons for gambling, age at gambling onset, and quantity/frequency measures) were adapted directly from the GIBS. At-risk or problem gambling was defined as a lifetime NORC Diagnostic Screen score of 1 or more DSM-IV inclusionary criteria for pathological gambling. Although large-scale, population-based psychometric tests of the
NORC Diagnostic Screen have not been published, existing data suggest that the instrument has strong internal consistency and test-retest reliability (lifetime and past-year version test statistics of \( r = 0.99 \) and \( r = 0.98 \), respectively) and strong validity in the identification of pathological gamblers. Types of gambling were grouped into categories of strategic, nonstrategic, machine, casino, and noncasino, as described previously.

### DATA ANALYSIS

Adolescent, early-onset adult, and adult-onset past-year gamblers were compared with similarly aged nongamblers on sociodemographic and psychiatric measures. Some sociodemographic variables were not included in the analysis for adolescent gamblers because they were judged to be of limited heterogeneity (age, marital status, and employment) or reliability (household income). A logistic regression procedure implemented in SAS (SAS Institute Inc, Cary, NC) was used to determine odds ratios (ORs) adjusted for between-group differences as follows. Odds ratios associated with past-year alcohol use and abuse/dependence, past-year drug use and abuse/dependence, any past-year substance abuse, and lifetime depression were adjusted for sociodemographic factors. Adolescent, early-onset adult, and adult-onset past-year gamblers were compared on gambling measures. Odds ratios corresponding to gambling measures were adjusted for sociodemographic variables, past-year substance abuse/dependence, and lifetime depression.

### RESULTS

#### SOCIODEMOGRAPHICS

Compared with adolescent nongamblers, adolescent past-year gamblers were more likely to be Hispanic and less likely to be girls (Table 1). Compared with adult nongamblers, early-onset adult past-year gamblers were more likely to never have been married and less likely to be women, to earn less than $24,000 annually, and to acknowledge nonwhite race/ethnicity. Adult-onset gamblers were less likely than adult nongamblers to be African American, to report less than full-time employment, and to earn less than $24,000 annually.

#### PSYCHIATRIC HEALTH

All groups of gamblers were more likely than nongamblers to report past-year alcohol use (Table 2). Adolescent gamblers and early-onset adult gamblers compared with adolescent and adult nongamblers, respectively, were more likely to report past-year alcohol abuse/dependence.
Table 2. Psychiatric Health Measures*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gamblers, %</th>
<th>Nongamblers, %</th>
<th>Adjusted Odds Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adolescent</td>
<td>Early-Onset</td>
<td>Adult-Onset</td>
</tr>
<tr>
<td></td>
<td>(n = 235)</td>
<td>Adult (n = 151)</td>
<td>Adult-Onset (n = 294)</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>31.4</td>
<td>61.6</td>
<td>45.1</td>
</tr>
<tr>
<td>Alcohol abuse/dependence</td>
<td>21.0</td>
<td>30.0</td>
<td>10.6</td>
</tr>
<tr>
<td>Drug use</td>
<td>18.2</td>
<td>23.9</td>
<td>7.3</td>
</tr>
<tr>
<td>Drug abuse/dependence</td>
<td>12.6</td>
<td>15.8</td>
<td>4.2</td>
</tr>
<tr>
<td>Any substance abuse/dependence</td>
<td>24.1</td>
<td>35.3</td>
<td>13.4</td>
</tr>
<tr>
<td>Depression (lifetime)</td>
<td>47.9</td>
<td>32.1</td>
<td>30.1</td>
</tr>
</tbody>
</table>

*Sample sizes indicate weighted values. Significance levels are based on Wald χ². The numbers missing (based on sample weights) for each variable are as follows: alcohol abuse, n = 1; drug abuse, n = 1; any substance abuse, n = 1; and depression, n = 5. Odds ratios are adjusted for sex and race/ethnicity.

†P < .05.
‡P < .01.
§P < .001.

...dence, drug use, drug abuse/dependence, and substance abuse/dependence. Adolescent gamblers were more likely than adolescent nongamblers to report lifetime depression. Relationships between psychiatric health measures and gambling status for adolescent gambling compared with those for adult-onset gambling (ie, [adolescent gamblers vs adolescent nongamblers] vs [adult-onset gamblers vs adult nongamblers]) were significant for alcohol use (adjusted OR, 4.39; P < .001), drug abuse/dependence (adjusted OR, 4.96; P = .01), and substance abuse/dependence (adjusted OR, 3.01; P = .01). Relationships between psychiatric health measures and gambling status for early-onset adult gambling compared with those for adolescent gambling (ie, [early-onset adult gamblers vs adult nongamblers] vs [adult-onset gamblers vs adult nongamblers]) were significant for alcohol use (adjusted OR, 1.73; P = .01), alcohol abuse/dependence (adjusted OR, 3.43; P < .001), drug use (adjusted OR, 4.02; P < .001), drug abuse/dependence (adjusted OR, 4.39; P < .001), and substance abuse/dependence (adjusted OR, 3.25; P < .001). There were no such differences in relationships between psychiatric health measures and gambling status for adolescent gambling compared with those for early-onset adult gambling.

GAMBLING ATTITUDES AND BEHAVIORS

Reasons for Gambling

Compared with both groups of adult gamblers, adolescent gamblers were more likely to report gambling for social reasons and less likely to report gambling for the personal services received (ie, friendly or respectful treatment from staff) or to win money (Table 3). Early-onset adult gamblers were more likely than adult-onset gamblers to gamble for excitement.

Patterns of Gambling

Compared with both groups of adult gamblers, adolescent gamblers were more likely to usually gamble with someone and less likely to experience large wins or losses (Table 3). Adolescent gamblers were also less likely than early-onset adult gamblers to gamble weekly or daily and more likely than adult-onset gamblers to report at-risk or problem gambling. Early-onset gamblers were more likely than adult-onset gamblers to report usually gambling with someone and largest wins of $100 or more.

Types of Gambling

Adolescent gamblers were less likely than both groups of adult gamblers to report past-year nonstrategic, machine, and casino gambling (Table 3). Adolescent gamblers were more likely than adult-onset gamblers to report past-year strategic gambling. Compared with adult-onset gamblers, early-onset gamblers were more likely to report past-year strategic and noncasino gambling and less likely to report past-year casino gambling.

COMMENT

This study examined psychiatric health and gambling-related attitudes and behaviors in adolescent, early-onset adult, and adult-onset past-year gamblers using data from younger age groups in a recent national survey. Although gambling was associated with psychiatric problems (eg, substance abuse/dependence) in adolescents and young adults, these relationships were largely confined to the groups reporting an early age at gambling onset. Between-group differences in reasons for and patterns of gambling were observed, with some measures suggesting that early-onset adult gamblers display heavier patterns of gambling than do adult-onset gamblers. Taken together, these results suggest that gambling during adolescence may influence adult psychiatric functioning.

DEMOGRAPHICS

The finding that adolescent and early-onset adult past-year gamblers were more likely than adolescent and adult nongamblers, respectively, to be male is consistent with findings from other studies.21-23 of adolescent and young...
adult gambling. A study of 21,297 students in grades 8 to 12 in Vermont found male sex to be associated with past-year gambling and past-year problem gambling. Data suggest that of adult problem gamblers, women begin gambling later in life, but once they begin gambling, they develop gambling problems more rapidly than men. Thus, the findings suggest that gambling prevention interventions that target youth groups should preferentially focus on boys. However, given the sex-related differences in adult gambling and problematic gambling behaviors, more research is needed to investigate sex-related differences in the characteristics of adolescent gamblers to inform youth gambling and adult problem gambling prevention efforts.

**Psychiatric Health**

Strong associations with alcohol and other drug use and abuse/dependence were observed with gambling in adolescent and early-onset adult gamblers, and these associations were, except for alcohol use, not observed in the adult-onset gamblers. In part, these findings may reflect aspects of adolescent risk taking, decision making, and experiential learning. Studies support the notion that risky behaviors (eg, drug use) often begin in adolescence, peak in early adulthood, and diminish over time. Moreover, risky behaviors often co-occur during adolescence. For example, past-year gambling has been shown to be associated with alcohol consumption, tobacco smoking, drug use, seat belt nonuse, aggressive behavior, and sexual activity in adolescents. These findings not only suggest that gambling and other risky behaviors be considered within a neurodevelopmental framework, but they also highlight the importance of age-appropriate public health guidelines for gambling. The findings also suggest that screening and treatment efforts for a variety of adolescent risk behaviors, including those involving gambling and substance use, should be integrated. However, the present finding of a similar pattern of differences in psychiatric measures in the adolescent and early-onset adult gamblers suggests that these effects are not due exclusively to a simple effect of age but rather are related to the onset of gambling during or before adolescence.

Adolescent gamblers were more likely than adolescent nongamblers to report lifetime depression. Depression has been reported in association with recreational and problem or pathological gambling in adults. As in studies of adults, the nature of the association between depressed mood and gambling in adolescents cannot be easily discerned from association studies such as the present investigation. The extent to which depressed mood leads to increased gambling (eg, to escape), gambling leads to depressed mood (eg, through financial losses or other adverse consequences), or a mutual factor leads to both (common environmental or genetic factors) requires direct examination.

**Gambling-Related Attitudes and Behaviors**

Adolescent and adult gamblers reported differences in motivations to gamble. Compared with adult gamblers, adolescent gamblers more frequently acknowledged gambling for social activity and less frequently for personal...
services and to win money, and these differences may, in part, reflect the types of gambling performed. Compared with adult gamblers, few adolescent gamblers reported casino gambling, a finding presumably reflecting legal efforts to restrict adolescent casino gambling or decreased availability (eg, restricted or limited access to automobile transportation). Previous research \(^2\) suggests that adolescent gambling is socially oriented, similar to substance use behaviors in adolescents. Adolescents more frequently than adults acknowledge past-year gambling in private settings (28.5% vs 11.0%) and report comparable or lower rates of past-year gambling on other forms of gambling. \(^3\) The importance adolescents place on socializing during risk behaviors has implications for teen gambling prevention strategies, for example, money may not represent the major motivating factor for adolescent gambling. As such, prevention efforts that focus on increasing the availability of nongambling social activities warrant consideration.

Compared with adults, adolescents less frequently acknowledge large wins or losses. These differences may largely reflect the financial situation of adolescents, who generally earn much less than adults. The high rates of at-risk and problem gambling in adolescents despite lower quantity/frequency measures warrant notice. Because the most widely used screen for adult problem gambling, the South Oaks Gambling Screen, \(^3\) heavily scores items related to finances (ie, debt), more research is needed into the suitability of specific measures for identifying adolescents with gambling problems.

Early-onset adult and adolescent gamblers were similar in several important ways. Specifically, both groups were more likely than adult-onset gamblers to report usually gambling with someone and engaging in strategic forms of gambling and less likely to participate in casino gambling. Thus, for both the adolescent and early-onset adult groups of gamblers, an element of competitive risk taking seems to exert a stronger influence on the reasons for gambling and the types of gambling performed. Adult-onset gamblers were less likely to report usually gambling with someone, suggesting that the social element present in adolescent gambling persists for adult gamblers who began gambling during adolescence. As with the alcohol and drug abuse/dependence measures, the most pronounced differences in rates of at-risk and problem gambling and strategic and casino gambling variables were observed in the comparisons between adolescent and adult-onset gamblers. Early-onset adult gamblers differed from adult-onset gamblers on the measure of large wins, which suggests that early onset may be associated with “heavier gambling,” similar to previous research, \(^4,5\) demonstrating an association between age at gambling onset and gambling severity. Consistent with this notion, early-onset gamblers were more likely than adult-onset gamblers to report high-frequency gambling (at least weekly; OR, 1.72), although this difference did not reach statistical significance.

**CONCLUSIONS**

This study is the first, to our knowledge, to compare adolescent, early-onset adult, and adult-onset gamblers systematically on measures of psychiatric health and gambling-related attitudes and behaviors. The strengths of the study include a representative sample of the US population acquired through an RDD method using a structured interview. One limitation involves the psychiatric health measures. These measures were limited to depression and alcohol and drug use and abuse/dependence and were assessed by a limited number of questions. These questions did not include complete diagnostic criteria, a limitation in part mitigated by incorporation of diagnostic criteria into the survey questions, following the precedent of other national surveys. \(^6,7\) Another limitation involves survey differences, particularly in the screening process for gambling pathology. The adolescent and adult surveys were conducted separately, introducing the possibility of selection bias, and the screening measures used differed. All adolescents who had ever gambled were asked the NORC Diagnostic Screen; in contrast, only adults who acknowledged ever losing $100 or more in a year were surveyed on the NORC Diagnostic Screen. This difference may contribute to lower levels of at-risk and problem gambling in the adult population. The use of the age of 18 years to distinguish adolescents and adults has pros and cons because states vary regarding ages at which specific forms of gambling become legal. However, 18 years is generally the youngest age at which individuals may gamble legally. Other limitations include use of a small sample size relative to statewide surveys and limitations inherent to cross-sectional surveys in general, including the potential for recall bias, cohort effects, differences in respondents' interpretations of questions, and the inability to discern cause and effect in the observed associations. Attempts were made to minimize the effect of recall bias and cohort effects by studying a narrowly defined age group of young adults (aged 18-29 years). The findings of differences in adolescent and early-onset adult gambling compared with adult-onset gambling in relation to measures of psychiatric health, and of differences in gambling attitudes and behaviors among groups of adolescent, early-onset adult, and adult-onset gamblers, hold multiple implications for youth gambling health guidelines and prevention and treatment strategies. The observation that the associations of gambling with substance use and abuse/dependence measures were most pronounced in groups reporting early-onset gambling suggests that gambling during adolescence may substantially impact adult function. These findings highlight the need for longitudinal studies to examine the effect of gambling on younger age groups, particularly as the availability and social acceptance of legalized gambling increases. Information gathered from such studies could be of great value in generating health guidelines for gambling in adolescents and adults.

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REFERENCES