Mental health and gambling in urban female adolescents

Silvia S. Martins, M.D., Ph.D. a,*, Carla L. Storr, Ph.D. b, Nicholas S. Ialongo, Ph.D. a, and Howard D. Chilcoat, Ph.D. a, b

a Department of Mental Health, Johns Hopkins Bloomberg School of Public Health
b GlaxoSmithKline Worldwide Epidemiology.

Abstract
This study explores differences in mental health and behavioral disturbances between female gamblers versus nongamblers from a community sample of 232 female urban youth. Female adolescent recreational gambling was associated with high levels of childhood hyperactivity measured at age 6, past-year substance use, and past-year anxiety symptoms.

Keywords
recreational gambling; urban youth; female adolescents; substance use; problem behaviors; anxiety symptoms; depressive symptoms

Introduction
Adolescent gambling has been linked to a wide array of mental health and behavioral disturbances [1-3]. Little is known about characteristics associated with gambling in urban, predominantly African-American youth despite the high rates of gambling problems among African-Americans [4]. Research has indicated that gender considerations are important in understanding youth gambling and the relationship between gambling and psychiatric problems in adolescents [1-2]. Because the prevalence of gambling and gambling problems are usually lower among females, female adolescent gamblers are largely understudied. Substance use and internalizing behaviors have been associated with gambling among girls [2]. This study explores differences in substance use, emotional problems (depression and anxiety symptoms) and behavioral problems (childhood aggression, impulsivity and hyperactivity) as a function of being a gambler among a community sample of females growing up in an urban environment.

Methods
Sample
Since 1993, a cohort of 678 students (47% girls) beginning first grade in 27 classrooms in 9 urban public elementary schools in the western half of Baltimore, MD, have been assessed annually as part of a group randomized prevention trial that targeted academic achievement
and aggression [5]. A randomized block design was employed, with schools serving as the clustering factor. Details about the sample design and trial are available elsewhere [5]. In 2004, when most of the cohort was in 11th grade, 73% (n=232) of the original female cohort participated in a 60-90 minute self-administered computer with audio interview: 90% African American, mean age 17.0 years. Tracking was not limited to those still attending school. Study protocols were approved by institutional review boards (IRB) of Johns Hopkins University. Parental signed consent and child assent were obtained.

Measures

Assessed in 2004—Adolescents with past-year gambling behaviors and problems were identified by their score on The South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA) [6]. A score of 1 or greater indicates any past-year gambling behavior (e.g., 0=nongambler). A score equal to 1 is a gambler with no gambling-related problems. Several gambling-related problems are experienced by at-risk gamblers (score 2-3) and problem gamblers (score 4 or more). Our internal consistency reliability was comparable to other samples, alpha=0.71. A 45-item assessment, The Baltimore How I Feel Adolescent Version (BHIF-AY), measured the frequency of emotional problems over the preceding two weeks on a four-point scale from “never” (0) to “most times” (3) (alpha=.89 for depressive symptoms; alpha=.79 for anxiety symptoms) [7]. High levels of depressive and anxious feelings were calculated by dividing the symptom scores at the mean (data was skewed to the left). Past-year substance use was assessed via questions from the Monitoring the Future National Survey [8]. Illegal drug use included any use of: marijuana, cocaine, crack, heroin, ecstasy (3,4-methylenedioxymethamphetamine, MDMA), hallucinogens, or inhalants.

Baseline and previous waves—Data was gleaned from previous survey rounds in order to assess the association of gambling with early childhood problem behaviors. When the child was in first grade, parents rated their child’s adaptation to family/home task demands over the preceding three week period using a 4-point frequency scale (1 = almost never to 4 = almost always) [10]). The sum of the items in the domains of aggressive/disruptive behavior (11 items), students’ self-regulation (impulsivity) (3 items), and motor control (hyperactivity) (3 items) were tertiled (low, moderate, high). Substance use reported in the grade 6 to 11 assessments provided a cumulative lifetime measure of substance use. Demographic characteristics of the sample (e.g., age, race, and free lunch status) were obtained from school records. Free lunch eligibility has been found to correlate highly with family income and other traditional measures of socioeconomic status [9].

Statistical Analyses

Exploratory and contingency table analyses explored differences in the association between gambling status and substance use, emotional problems, and childhood behavior problems via chi-square tests ($\chi^2$). Logistic regression models estimated odds ratios (aOR) and 95% confidence intervals in the presence of other covariates: free lunch status, race, and first grade intervention status. To accommodate the initial sample design (clustering of students within schools), we used a variant of the Huber-White sandwich estimator of variance to obtain robust standard errors and variance estimates.

Results

Thirty-seven percent of females (36.6%, n=85) had gambled in the year preceding the interview (36.5% of the African-American females and 37.5% of the White females). Six percent (5.9%) of the female gamblers (all African-American) had past-year gambling problems (4 at-risk gamblers and 1 problem gambler), representing 2.5% of the overall sample. There were no
statistically significant differences between gamblers and non-gamblers in regards to eligibility for free lunch status (as a proxy for SES), race, and first grade intervention status.

Table 1 provides the prevalence estimates and adjusted odds ratios of the various factors explored. Past-year substance use (tobacco, alcohol, and illegal drug use) was associated with gambling. Female gamblers were more likely than non-gamblers to report high levels of past-year anxious feelings (OR=2.10, 95%CI=1.08-4.06, p-value=.029). Female gamblers were two times more likely than their non-gambling counterparts to have had high levels of childhood hyperactivity as rated by parents (OR=2.23, 95%CI=1.03-4.82, p-value=.043).

**Discussion**

Our results suggest that, at least in urban samples of youth, females with high levels of childhood hyperactivity are more likely to gamble in adolescence. Substance use and anxious feelings were associated with female adolescent gambling.

Childhood problem behaviors, especially hyperactivity, might play a role in adolescent recreational gambling initiation not only among male adolescents [3], but also, among female adolescents. Future studies need to clarify whether childhood hyperactivity in girls could be early signs of adolescent anxiety, and if childhood hyperactivity is an early sign of gambling vulnerability for both genders. Studies have associated childhood impulsivity with gambling among boys, and childhood hyperactivity with problem gambling in male adults [3,11]. The association between anxiety symptoms and gambling still needs to be further explored, because in this sample they were both assessed in the same interview. Females might gamble to alleviate anxiety, or they might have developed symptoms secondary to gambling, or even there might be a common shared vulnerability between anxiety symptoms and gambling [2].

In this study, the factors associated with gambling were examined among a community epidemiologically defined sample of urban female adolescents. The availability of longitudinal data on drug use and parent ratings of childhood maladaptive behaviors is a major strength. One potential limitation is that self-reports could lead to response bias in cross-sectional results. In any longitudinal study there might be attrition, while 27% attrition was observed, it was non-differential in respect to baseline demographics.

In conclusion, gambling was associated with substance use, anxious symptoms, and high levels of childhood hyperactivity among female urban youth.

**Acknowledgements**

This study was supported by a Young Investigator Incentive Grant from the Institute for Research on Pathological Gambling and Related Disorders, Division on Addictions, Harvard Medical School, Cambridge Health Alliance (Dr. Martins). Dr. Martins received a postdoctoral scholarship from the Brazilian Council of Research (CNPq) while she conducted this study. JHU PIRC Second Generation Intervention Trial is funded by NIDA grant RO1 DA11796-01A1 (P.I. Dr. Nicholas S. Ialongo). We thank Scott Hubbard for the data management.

**References**

Table 1
Prevalence estimates and adjusted Odds Ratio of substance use, recent emotional feelings and childhood problem behaviors by gambling status in an urban sample of 17 year old females.

<table>
<thead>
<tr>
<th></th>
<th>Nongamblers (n=147) n (%)</th>
<th>Gamblers (n=85) n (%)</th>
<th>aOR † (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever use of tobacco</td>
<td>115 (78%)</td>
<td>74 (87%)</td>
<td>1.87 (0.88-3.99)</td>
<td>.105</td>
</tr>
<tr>
<td>alcohol</td>
<td>140 (95%)</td>
<td>85 (100%)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>any illegal drug</td>
<td>102 (69%)</td>
<td>67 (79%)</td>
<td>1.66 (0.88-3.14)</td>
<td>.120</td>
</tr>
<tr>
<td>Past year use of tobacco</td>
<td>26 (18%)</td>
<td>36 (42%)</td>
<td>3.54 (1.72-7.31)</td>
<td>.001</td>
</tr>
<tr>
<td>alcohol</td>
<td>75 (51%)</td>
<td>55 (65%)</td>
<td>1.76 (1.03-3.00)</td>
<td>.037</td>
</tr>
<tr>
<td>any illegal drug</td>
<td>31 (21%)</td>
<td>27 (32%)</td>
<td>1.75 (1.02-3.00)</td>
<td>.043</td>
</tr>
<tr>
<td>Past year high levels of depressive feelings</td>
<td>89 (61%)</td>
<td>53 (62%)</td>
<td>1.07 (0.52-2.23)</td>
<td>.843</td>
</tr>
<tr>
<td>anxious feelings</td>
<td>83 (56%)</td>
<td>62 (73%)</td>
<td>2.10 (1.08-4.06)</td>
<td>.029</td>
</tr>
<tr>
<td>Childhood *</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggression (ref=low)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>38 (31%)</td>
<td>25 (32%)</td>
<td>1.02 (0.50-2.08)</td>
<td>.958</td>
</tr>
<tr>
<td>High</td>
<td>37 (30%)</td>
<td>20 (26%)</td>
<td>0.83 (0.39-1.75)</td>
<td>.623</td>
</tr>
<tr>
<td>Hyperactivity (ref=low)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>53 (43%)</td>
<td>26 (34%)</td>
<td>0.93 (0.43-1.99)</td>
<td>.844</td>
</tr>
<tr>
<td>High</td>
<td>22 (18%)</td>
<td>25 (32%)</td>
<td>2.23 (1.03-4.82)</td>
<td>.043</td>
</tr>
<tr>
<td>Impulsivity (ref=low)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>40 (32%)</td>
<td>18 (23%)</td>
<td>0.64 (0.34-1.22)</td>
<td>.175</td>
</tr>
<tr>
<td>High</td>
<td>38 (31%)</td>
<td>27 (35%)</td>
<td>1.03 (0.48-2.22)</td>
<td>.937</td>
</tr>
</tbody>
</table>

† Adjusted Odds Ratio: adjusted for eligibility for free lunch status (SES), first grade intervention status, and race. Non-gamblers are the reference category.

§ Odds ratio not available because all female past-year gamblers were lifetime alcohol users.

* Parental report when child was beginning first grade (approximately age 6).