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Age of first arrest varies by gambling status in a cohort of young adults

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Abstract

Background and objectives—To describe the association between social and problem gambling and first criminal arrest by age 23 in a cohort of urban, mainly African-American youth. Methods: Data for this study was derived from several annual interviews being completed on a community sample of 617 participants during late adolescence until age 23. Information on gambling status, engagement in deviant behaviors, illegal drug use, and arrest history were collected through yearly interviews. Analysis was carried out using Nelson-Aalen cumulative hazard models and simple and adjusted Cox proportional hazards models.

Results—More problem gamblers had been arrested before age 23 than social gamblers and non-gamblers, i.e. 65% of problem gamblers were arrested before age 23, compared to 38% of social gamblers and 24% non-gamblers. Social gambling was only significantly associated with the hazard of first arrest by age 23 in the unadjusted model (HR: 1.6, $p < .001$), but not after adjustment for covariates (HR: 1.1, $p = 0.47$). Problem gambling was significantly associated with the hazard of first arrest by age 23 years in the unadjusted (HR: 3.6, $p < .001$) and adjusted models (HR: 1.6, $p = 0.05$).

Conclusions and Scientific Significance—Problem gambling was significantly associated with earlier age of being arrested. Dilution effects after adjustment for several deviant behaviors and illegal drug use by age 17 suggest that youth exposed to certain common factors may result in engagement in multiple risky behaviors, including problem gambling. Studies are needed to investigate the developmental pathways that lead to these combined behaviors among youth.

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Keywords

gambling; adolescent; arrest; juvenile delinquency; risk

Introduction

Gambling is recognized as a behavior that may lead to social, economical, and psychological problems when individuals lose their capacity to control the frequency and severity of gambling activities.^{1–3} Evidence suggest that gambling in youth is associated with poor academic outcomes,^{4,5} substance use and dependence,^{6–10} severe and frequent conduct problems,^{11–14} and even criminal activities.^{10,15,16} This study investigates the association between gambling status and age of first arrest in a community-based sample of urban, mainly African-American youth who completed several annual interviews from adolescence to age 23.

In this context, criminological theories such as the social control theory,¹⁷ self-control theory¹⁸ and social learning theory,¹⁹ offer alternative approaches to understand the association between problematic gambling and crime. Increased pressure due to gambling debts or need to continue gambling may impair the rational calculation of costs and benefits of criminal activities, and thus increase the likelihood of one committing crime. Further, Jessor and Jessor's problem behavior theory²⁰ posits that both gambling problems and antisocial/criminal activities may be manifestation of a general problem behavior syndrome,^{10,20,21} and share similar precursors (impulsivity, sensation seeking and low self-control)^{10,13,22,23}, traits commonly found in individuals with a risk-taking personality.

Most of the evidence of the association between gambling and criminal activity in youth and young population rely upon studies based on offender populations. Surveys on juvenile offenders conducted in Plymouth, South West England and Louisiana, United States, have estimated that 4–13% of the criminal activities were gambling-related, the most common being burglary or theft (86%).¹⁵ Evidence from a general adolescent/young adult population survey in Montreal, Canada, estimated that among problem/pathological gamblers 21% had committed illegal activities, and 42% borrowed or stole money to cover debts from family and friends.^{16,24} Similar results have been reported in US adolescent populations, where higher frequencies of both gambling and gambling-related arrests were observed in offender populations than in school samples.¹⁵ Westphal and Johnson⁹ compared a group of offenders with a random sample of public school students aged 10–19 years, and found that the prevalence of probable pathological gambling was five times greater in the group of offenders than among the public school students.¹⁵ Other risk factors that may lead juvenile gamblers to commit criminal activities include peer pressure, presence of deviant peers, and needs for financial resources to support gambling activities or to pay gambling debts.²⁵ None of these studies examining the association between gambling and criminal behavior have examined age of first arrest (those arrested at earlier ages are more likely to persist with criminal behaviors). In addition, they were based upon convenience cross-sectional samples. This is the first study to examine the association between age of first arrest and gambling status using data from several annual interviews from an existing cohort.

This study addresses the above gaps and investigates the association between gambling status (non-gamblers, social and problem gamblers) and age of first arrest among a sample of urban mainly African-American youth from Baltimore, MD. This study employs a time to event approach by takes advantage of the existence of a cohort with several annual interviews being completed in a short timeframe, which minimizes subject recall. The aims of this study were to: 1) Examine differences in arrest status by demographic and behavioral characteristics of the sample; 2) compare risk of first arrest by age 23 by gambling status (i.e., non-gamblers, social gamblers, and problem gamblers); and 3) estimate the association between risk of first arrest by age 23 and gambling status adjusted by behavioral, sociodemographic, and environmental factors.

Methods

Design and sample

Data for this study consists of cumulative lifetime measures up to young adulthood that were derived from responses gathered over several annual follow-up waves from participants of a randomized prevention trial that recruited them as they entered first grade. Details of the trial are available elsewhere.²⁶ In brief, in Fall 1993, first grade classrooms at nine urban primary public schools were randomly assigned as a control or one of two intervention classroom. . The interventions lasted for one year and included one that created opportunities for more positive attention from teachers and peers and the other targeted enhanced parent-school communication, while the control group received the customary curriculum.³² The cohort (n=678, entry mean age=6.2 years, 53% male) is assessed annually. Youth that dropped out of school or those incarcerated were not excluded. Of the original cohort, approximately 80% have been successfully followed up for each assessment through the age of 23 years.

Information on both key variables (i.e., arrest history and gambling status) is available for 91% of the original cohort (n=617); there were no differences by race, percentage receiving subsidized lunches (a proxy for low SES), or intervention condition between the study sample and the original sample (p values>.05). A description of the study sample is provided in Table 1. Study protocols were approved by the institutional review board (IRB) of Johns Hopkins University.

Measures

Arrest History—Between the ages of 17–23 years, self-reports of arrest history were collected via the question: “Have you ever been arrested?” Individuals who reported having ever been arrested were next asked to provide their age at first arrest. If a participant provided more than one age of first arrest throughout the six annual assessments, the youngest age reported was chosen as the age of first arrest. For those who had been arrested but did not provide their age at first arrest, their age at the time of the interview when they first reported an arrest history was inserted (5.0% imputed).

Adolescent Gambling—The South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA)²⁷ was piloted for the first time in the study when participants were 17, 19 and

20 years of age respectively. This instrument is a 12-item adaptation of the adult orientated South Oaks Gambling Screen, that assesses gambling behaviors and problems in the 12 months preceding the interview using wording of items and response options that reflect adolescence gambling behavior at an age-appropriate reading level.³⁵ Its internal consistency Cronbach's alpha was found to be 0.80.³⁵ The scale correlates with gambling activity ($r=0.39$), gambling frequency ($r=0.54$), and the amount of money gambled in the past year ($r=0.42$).²⁷ Those who reported not having gambled in the past 12 months are classified as 'nongamblers'. Gamblers who reported gambling but scored 0–1 were classified as "social gamblers," and those with a score of 2 or more were classified as "problem gamblers (combines at/risk and problem gamblers)".²⁸ A cumulative measure categorizing the gambling status was created based on their highest SOGS score at any time point.

Types of Deviant Behavior—To focus specifically on the criminal aspects of conduct disorder as they could be more closely associated with one's arrest history, three subtypes of involvement in adolescent deviant behavior were derived from the Conduct Disorder module of the Diagnostic Interview Schedule for Children (DISC-IV)²⁹ administered at ages 13–17 years: Theft (i.e., stolen with confrontation; stolen without confrontation), Property Damage (i.e., broken into a house, building, or car; destroyed property; fire setting), and Violence (i.e., bullies or threatens others; initiates physical fights; physically cruel to people; physically cruel to animals; used a weapon; forced sex). A cumulative combined measure was created based upon responses to any of these three items from ages 13 to 17.

Illegal Drug Use—Between the ages of 13–17 years, self-report items from the Monitoring the Future National Survey³⁰ were administered to assess past-year use of illegal drugs (i.e., marijuana, crack cocaine, cocaine, heroin, inhalants, and ecstasy, dichotomous, yes/no variables for alcohol and each type of illegal drug investigated). These sections of the interview were completed using Computer Assisted Personal Interview (CAPI) to enhance truthful reporting. A youth indicating use in any of the interviews was classified as an illegal drug user (initiated drug use prior to age 17).

Demographic characteristics and intervention status (binary variable: control [no intervention] versus intervention [classroom-centered or family-school partnership intervention combined]). Race (African-American/White), household structure (two-parent or single-parent), lunch status (paid or subsidized) were collected from school and parent reports at baseline when the sample was age 6.

Analysis

Exploratory analyses with Chi-square statistics were first conducted to uncover differences in arrest status by demographic and behavioral characteristics of the sample. Next, the hazard, defined as the event rate at a certain time t conditional on survival until time t or later, and the cumulative hazard, defined as the hazard of the event prior to time t , of first arrest were examined by gambling status. That is, we examined whether the age of first arrest differed by gambling status. Nelson-Aalen cumulative hazard analyses compared the unadjusted hazards of arrests among gambling groups (i.e., nongamblers vs. social gamblers

vs. problem gamblers), censored at age 23 for respondents who had not been arrested until that age. This method allows the consideration of both event occurrence and the timing of events, and provides a visual presentation of the longitudinal patterns of event hazard and a comparison between subgroups.

Cox proportional hazards models were also fitted to provide an estimate of the magnitude as well as allow the importance of other covariates to be assessed.³¹ Simple Cox models first tested for the unadjusted hazard ratios of first arrest among each covariate (i.e., gambling status, race, household structure, lunch status, intervention status, theft/property damage/violence, and illegal drug use). An additional multivariate Cox models assessed the hazard ratios of first arrest among gambling status, adjusted for all of the covariates. All analyses were performed using STATA 11.0 (StataCorp et al., 2010)³² and the clustering of students within classrooms was accounted for by computing robust standard errors using a sandwich estimator.³³

Results

Among the 617 participants with complete arrest and gambling data, 36% reported having been arrested by age 23 years. Overall the mean age of first arrest was 16.0 years (nongamblers: 15.8 years; social gamblers: 16.4 years; problem gamblers: 15.5 years; $p=.10$), and ranged from 11 to 23 years in both sexes. Half of the sample (55%) reported they had gambled before the age of 21 (43% were social gamblers and 12% were problem gamblers). As seen in Table 1, gambling status and most of the other covariates were significantly associated with having been arrested.

Figure 1 shows the unadjusted Nelson-Aalen cumulative hazard curves, stratified by gambling status. By age 15, the cumulative hazards for having been arrested were 10.9% (95% CI=7.8%, 15.2%) among nongamblers, 11.2 (95% CI=8.0%, 15.7%) among social gamblers, and 32% (95% CI=22.7%, 43.8%). The absolute differences in cumulative hazards also grew larger with increasing age. By age 23, the cumulative hazard among nongamblers was 25.7% (95% CI=20.9%, 31.3%), among social gamblers was 39.9% (95% CI=33.9%, 46.5%), and among problem gamblers was 67.9% (95% CI=56.1%, 79.2%), which means that one would expect 67.9% of problem gamblers to have been arrested by age 23 and 39.9% of the social gamblers to have been arrested by that age.

Table 2 shows the results of the unadjusted and adjusted Cox regression models that examined the hazard ratio of age of first arrest by gambling status. (i.e., nongambling, social gambling, and problem gambling). The unadjusted Model 1 shows that compared to nongamblers, there is an association between having been arrested and being a social gambler (60% increased hazard) and a problem gambler (3.6-fold increased hazard). A positive association between arrest and problem gambling remains (aHR= 1.58, 95% CI= 1.01, 2.49) even in the presence of other covariates (Model 2)

Discussion

The main findings of this study can be summarized as follows: 1) Youth classified as a problem gamblers had the highest probability of being arrested by age 23 and at earlier ages

(nearly 50% by age 15); 2) Compared to nongamblers, there are positive associations between arrest and being either a social gambler (60% increased hazard) or a problem gambler (3.6-fold increased hazard), however only the problem gambling association remained significant upon adjustment for other covariates.

Not only are the current findings of a positive association between problem gambling and arrest among youth consistent with past studies,^{15,16,24} these findings can also be consistent with various crime theories and the problem behavior theory.^{18–20} Problem gamblers, marked by an increased pressure by gambling debts, the compulsive need to continue gambling, and distorted cognitive processes resulting in faulty beliefs of personal skill and probability of winning,^{34–36} could be limited in their ability to rationally weigh the perceived costs and benefits of committing a crime, and thus increase their likelihood of arrest.

The increased hazards of arrest by age 23 among social and problem gamblers, were attenuated upon adjustment for sociodemographics, illegal drug use and deviant behaviors (i.e., theft, property damage, and violence). Despite the attenuation in associations, those who were problem gamblers during adolescence still had significantly higher covariate-adjusted hazards of arrest than those who did not gamble during adolescence. As such, adolescent problem gambling seems to be associated with arrests. This is an important area of study among the current sample of urban, predominantly African American youth. While the disproportionately high rates of arrest among urban African-American youth can be attributed to various factors such as racism,^{37,38} the current study still found an association between gambling and arrest, thus suggesting that the youth from urban environments who have gambling problems are also being arrested. Past studies have found that a history of juvenile arrest to be associated with various adverse consequences such as recidivism, low academic achievement, unemployment, and substance use.^{39–42} It is thus imperative for future studies to further examine the nature of the association between adolescent gambling and arrest so that effective programs can be created to lower both the risks of gambling and arrest among urban youth.

It is necessary to note strengths and potential limitations of this study. This sample was representative of all students entering first grade in one urban public school system in 1993. Thus, cohort effects are minimal and there is very little variation in age since they all began primary school in the same calendar year. First, the characteristics of the sample, hamper generalization to other students growing up in other metropolitan areas with different racial/cultural compositions. Due to limitations in data collection, we could not take full advantage of the longitudinal nature of the parent study when testing for these associations. Second, given the overlap in timing between gambling and first arrest, causality cannot be inferred from these findings. The age of gambling onset was not assessed thus we choose a strategy to explore group differences rather than examine predictors. Another limitation of the study is the sole reliance on self-reports, particularly of sensitive behaviors such as gambling and arrests that may be subject to reporting bias. Past studies have found self-reports of arrest to be moderately reliable and valid.^{43,44}

Problem gambling is associated with being arrested at an earlier age, which is consistent with the problem behavior theory²⁰ and several crime theories.^{18,19} Future studies need to further investigate the association between problem gambling with arrests can be explained by gambling-related illegal activities, association with deviant peers^{16,25,45–47} and different parenting styles,^{19,48,49} which were not explored in this study. In addition, future studies need to investigate more in-depth the developmental pathways that lead to these combined behaviors among youth.

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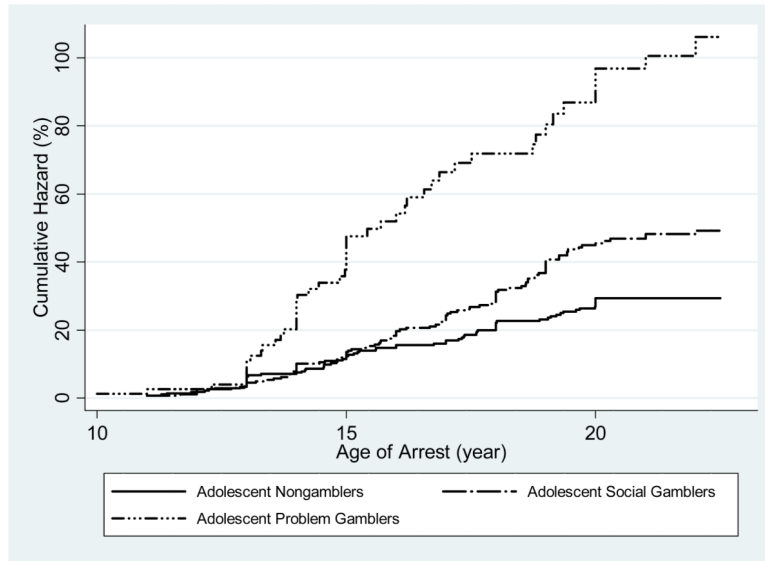


Figure 1. Cumulative hazard curves for age of first arrest by adolescent gambling status.

Table 1

Characteristics of the sample by arrest history by age 23.

	Overall (N=617) n (column %)	Never Arrested (n=396) n (row %)	Ever Arrested (n=221) n (row %)	p-value
Gambling Status				
Nongambler	275 (44.6)	205 (74.6)	70 (24.4)	<.001
Social Gambler	267 (43.3)	165 (61.8)	102 (38.2)	
Problem gambler	75 (12.2)	26 (34.7)	49 (65.3)	
Race				
African American	536 (86.9)	343 (64.0)	193 (36.0)	.80
Caucasian	81 (13.1)	53 (65.4)	28 (34.6)	
Gender				
Male	326 (52.8)	165 (50.6)	161 (49.4)	<.001
Female	291 (47.2)	231 (79.4)	60 (20.6)	
Household structure (age 6)				
Two-Parent	230 (37.3)	162 (70.4)	68 (29.6)	.04
One-Parent	304 (49.3)	186 (61.2)	118 (38.8)	
Missing	83 (13.4)	48 (57.8)	35 (42.2)	
Subsidized Lunch				
No	188 (30.4)	145 (77.1)	43 (22.9)	<.001
Yes	423 (68.6)	249 (58.9)	173 (41.1)	
Missing	6 (1.0)	2 (33.3)	4 (66.7)	
Intervention status				
No	209 (33.9)	127 (60.8)	82 (39.2)	.21
Yes	408 (66.1)	269 (65.9)	139 (34.1)	
Illegal Drug Use *				
No	252 (40.8)	209 (82.9)	43 (17.1)	<.001
Yes	313 (50.7)	151 (48.2)	162 (51.8)	
Missing	52 (8.5)	36 (69.2)	16 (7.2)	
Theft and/or Violence and/or Property Damage*				
No	313 (50.7)	235 (75.1)	78 (24.9)	<.001
Yes	250 (40.5)	125 (50.0)	125 (50.0)	
Missing	54 (8.8)	36 (66.7)	18 (33.3)	

* By age 17.

Table 2

Estimated associations between age of first arrest with adolescent gambling status and other behaviors and characteristics.

N=617	Model 1			Model 2		
	HR	95% CI	p	aHR	95% CI	p
Gambling Status						
Nongambler	1.00			1.00		
Social gambler	1.61	1.29,2.00	<.001	1.11	0.84,1.45	.47
Problem gambler	3.60	2.48,5.23	<.001	1.58	1.01,2.49	.05
Race						
African-American	1.00			1.00		
Caucasian	0.92	0.61,1.38	.68	0.89	0.64,1.24	.50
Gender						
Male	1.00			1.00		
Female	0.33	0.24, 0.44	<.001	0.36	0.24,0.52	<.001
Household structure (age 6)						
Two-parent	1.00			1.00		
One parent	1.44	1.12,1.86	.004	1.32	0.97,1.80	.08
Subsidized Lunch						
No	1.00			1.00		
Yes	2.08	1.43,3.03	<.001	1.90	1.29,2.81	.001
Intervention status						
No	1.00			1.00		
Yes	0.86	0.67,1.11	.24	0.89	0.68,1.17	.42
Illegal Drug Use*						
No	1.00			1.00		
Yes	4.07	3.11,5.31	<.001	3.44	2.46,4.81	<.001
Theft and/or Violence and/or Property Damage*						
No	1.00			1.00		
Yes	6.20	1.55,24.84	.01	1.58	1.14,2.17	.01

/ Simple Cox regression models of arrest and each individual covariate.

² Cox regression model of arrest and gambling status adjusted for race, household structure, lunch status, illegal drug use by age 17, and theft/violence/property damage by age 17.

* By age 17.