Published in final edited form as:

J Adolesc Health. 2009 October ; 45(4): 396–401. doi:10.1016/j.jadohealth.2009.02.002.

The Association Between Problem Gambling and Conduct Disorder in a U.S. National Survey of Adolescents and Young Adults

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Abstract

Purpose: The purpose of this analysis is to examine the relationship between current problem gambling and current conduct disorder.

Method: Data were analyzed for a U.S. national survey of respondents age 14-21.

Results: A strong co-morbidity between current problem gambling and current conduct disorder was found. However, this co-morbidity was much stronger among younger respondents, declined in strength with increasing age, and was absent among the oldest respondents. Further analyses showed that early-onset problem gamblers had a higher risk for conduct disorder than late-onset problem gamblers.

Conclusions: Gambling problems which emerge early are likely to be part of a general pattern of problem behavior, while gambling problems that emerge later may have an etiology unique to gambling.

Keywords

problem gambling; adolescents; conduct disorder

Introduction

Researchers and theoreticians have long noted that problem behaviors, including substance abuse and delinquency, co-occur among youth. The influential theorist Richard Jessor (Jessor and Jessor, 1977) referred to this phenomenon as the problem behavior syndrome, and posited a complex system of environmental and personality factors as the common causes of youthful problem behaviors. Criminologists Gottfredson and Hirschi (1990) noted that the same individuals often display criminal offending, drug and alcohol abuse, poor work and marital records, and proneness to accidents. They implicated negligent parenting in early childhood

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as the common cause. Other researchers have identified genetic factors (Ishikawa and Raine, 2002) in the etiology of both youthful and adult problem behaviors.

Problem gambling, a condition that suggests sensitivity to immediate gratification and insensitivity to unfortunate long-range consequences, easily fits into the problem behavior syndrome. Numerous studies have shown that the same adolescents and young adults who are problem gamblers tend to be involved in other problem behaviors. Our own research group (Barnes et al., 2009), using the same U.S. youth survey used for the analyses in the current article, found a positive correlation between problem gambling and involvement with alcohol, tobacco and marijuana. Petry et al. (2005) examined data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), and found significant co-morbidity of pathological gambling with antisocial personality disorder, alcohol use disorders, drug use disorders, and nicotine dependence. Stinchfield (2000) found that in a sample of Minnesota high school students gambling frequency was positively correlated with antisocial behavior, alcohol and tobacco use, and sexual activity. Winters et al. (1998) also found that college problem gamblers were more likely than average to be illicit drug users and have poor grades. Paternoster and Brame (1998) found that heavy gambling and criminal offending were strongly correlated with each other among youth in the Cambridge Study. Following the problem behavior theme into adulthood, researchers also have shown that adult problem gamblers are likely to exhibit substance abuse (Welte et al., 2001), as well as such problem behaviors as compulsive buying and compulsive sexual behavior (Black & Moyer, 1998).

Known precursors of anti-social behavior, such as impulsivity (Vitaro et al., 1999), poor familial support (Hardoon et al., 2004), and hyperactivity (Martins et al., 2008) have been shown to also predict problem gambling among adolescents. Blaszczyński and Nower (2002) hypothesized that the “antisocial impulsivist” problem gambler represents one of three possible etiological pathways into problem gambling. There is therefore reason to expect that problem gambling among adolescents and young adults will co-occur with conduct disorder. Conduct disorder is defined by the American Psychiatric Association Diagnostic and Statistical Manual Version IV (DSM) as a persistent pattern of behavior of young people characterized by violation of age-appropriate social norms. Its definition is formalized in the DSM as the presence of three or more out of 15 types of anti-social behavior, such as physical cruelty, arson, stealing and truancy. It has prevalence in the 5-15% range for males and in the 2-9% range for females, depending on the sample and measurement method (Loeber et al., 2000). Not surprisingly, conduct disorder is strongly co-morbid with substance involvement and various other manifestations of deviance (Crowley and Riggs, 1995). Adult studies have found positive comorbidity between problem gambling and antisocial personality disorder (ASPD), the adult analog of conduct disorder. In an analysis of data from the St. Louis Epidemiologic Catchment Area study, Cunningham-Williams et al. (1998) showed a strong co-morbidity between ASPD and problem gambling. Black (1998, 2006) found elevated rates of ASPD among adult problem gamblers and their relatives. Abbott et al. (2005) found elevated rates of childhood conduct disorder among adult male prisoners who were problem gamblers. In addition to finding co-occurrence, Slutske et al. (2001) and Black et al. (2006) found that problem gambling and ASPD have a familial and genetic vulnerability in common.

Although there is a small literature on the co-occurrence of problem gambling and ASPD among adults, there is little research on the relationship between conduct disorder and problem gambling among youth. Because of the theory and evidence linking problem gambling with anti-social behavior, we included a measure of conduct disorder in our national U.S. survey of youth and gambling. In this article, we investigate the relationship between problem gambling and conduct disorder in a national survey of adolescents and young adults.

Methods

A sample of 2,274 U.S. residents aged 14 to 21 years were interviewed from August, 2005 through January, 2007. Computer-Assisted Telephone Interviewing was used. The telephone sample, purchased from Survey Sampling International, was stratified by county and by telephone block within county. This resulted in a sample that was spread across the U.S. according to population, and not clustered by geographic area. Because we used a sample of household telephone numbers, cell phone numbers were not intentionally included. Nonetheless, some cell phone numbers became a part of the sample because phone numbers from land-line exchanges may be ported to cell phones; and some telephone exchanges (often in less populated areas) contain both land-line and cell numbers. A total of 156,000 numbers were called; 4,467 numbers were determined to be households with an eligible respondent aged 14 to 21 years old. Of the 4,467 eligible respondents, 2,274 respondents completed interviews, 935 individuals refused to participate, 923 could not be contacted, 329 were unable to participate primarily for mental or physical reasons, and 6 interviews were omitted from the dataset based on interviewer concerns about truthfulness of responses. The response rate was 51% based on completed interviews divided by completed interviews plus refusals plus non-contacts plus those unable to participate plus omitted interviews. The response rate based on completed interviews divided by completed interviews plus refusals was 71%. Each telephone number was called at least seven times to determine if that household contained an eligible respondent. Once an eligible respondent was located, the number was called until an interview was obtained or refusal conversion had failed. When there was more than one resident aged 14 - 21 years in a household, the person with the next birthday was designated. Parental permission to participate in the survey was obtained for respondents under 18 years of age. Subjects were paid \$25. Interviews were conducted in all 50 states and the District of Columbia. To compensate for multiple eligible respondents in the household, cases were statistically weighted inversely to their probability of selection. Weighting adjustments were also used to align the sample with the gender, age and race distributions from the U.S. census. The SPSS software used for the current statistical analysis assumes a simple random sample. Because we are actually analyzing a sample that is stratified (but not clustered), standard errors would typically be smaller than with a simple random sample, so that statistical tests might be somewhat conservative.

Current Problem gambling was measured with the South Oaks Gambling Screen, Revised for Adolescents (SOGS-RA; Winters et al., 1993). Respondents were asked whether which they had experienced each of 12 gambling problems in the past 12 months. Examples are: going back another day to win back money you lost ("chasing"), telling others you were winning money when you really weren't winning, gambling with more money than you had planned to, and borrowing or stealing money in order to bet or cover gambling debts. Response choices for the "chasing" question were: "some of the time," "most of the time," and "every time." To be counted as a symptom of problem gambling, chasing had to occur "most of the time" or "every time." The other 11 items on the SOGS-RA were yes/no questions that merely required a positive response to count. A score of 2 or 3 is considered "at-risk" gambling, and 4 or more is considered problem gambling (Winters et al., 1995). For each problem they endorsed, respondents also were asked how old they were when they experienced that problem the first time. In the current study, the SOGS-RA items had a Cronbach's Alpha of .74, demonstrating good internal consistency reliability. The SOGS-RA also demonstrated good convergent validity in our sample, because the SOGS-RA current symptom count had a correlation of .76 with the current symptom count from the Fisher DSM-IV-MR-J scale for adolescents (Fisher, 2000), which we also employed in our study.

Our measure of antisocial behavior was the current conduct disorder measure from the NIMH Diagnostic Interview Schedule for Children (DISC). This measure operationalizes the DSM-

IV criteria for conduct disorder. The DISC was developed by researchers at Columbia University to be used by lay interviewers in epidemiological studies (Shaffer et al., 2000). The DSM-IV standard for conduct disorder uses 15 criteria: frequent bullying, frequent initiating of fights, using a dangerous weapon, physical cruelty to people, physical cruelty to animals, stealing with confrontation, forcing someone into sexual activity, arson, vandalism, breaking and entering, frequent lying for money or favors (“conning”), stealing without confrontation, often staying out too late beginning before age 13, running away overnight at least twice, and frequent truancy from school beginning before age 13. The DISC conduct disorder section asks 26 behavioral questions, each of which maps onto one of the 15 criteria. Examples are: “Have you ever shoplifted - that is, stolen something from a store when no one is looking?” and “Have you ever broken into a house, a building or a car?” Respondents were also asked how often they had done each behavior in the past 12 months. To be classified for current conduct disorder, respondents had to have at least 3 symptoms in the past 12 months. While a classification of conduct disorder formally requires that the respondent be not classified for Antisocial Personality Disorder (ASPD), in the current study we have not assessed ASPD, and have applied the criteria for conduct disorder to all respondents.

Our measure of socioeconomic status was based on the mean of four equally weighted factors: mother's years of education, father's years of education, mother's occupational prestige, and father's occupational prestige. Occupational prestige was coded from census occupation categories using the method described by Hauser and Warren (1997). Although only 13 cases had all four variables missing, approximately 10% of the cases were missing either mother's education or occupation; and approximately 30% of the respondents were missing either father's education or occupation. Because we knew from experience that some young respondents would be unable to supply information on their parents' education and occupation, we asked a series of questions (e.g., home ownership, number of books in the home, receipt of food stamps) which were gleaned from other studies in which the socioeconomic status of young respondents had to be estimated from their interview data. Among these variables, those that were correlated with parent's education and occupational prestige in our data set when occupation and job status were present were used as predictor variables to impute education or occupational prestige when missing. Imputation was performed by the SPSS Missing Value program, using the expectation maximization (EM) method. This imputation made essentially no change in the mean of the SES variable (not imputed = 5.76, imputed = 5.73) and little change in its standard deviation (not imputed = 2.11, imputed = 1.88).

Results

Table 1 shows the age and gender patterns of current at-risk/problem gambling and current conduct disorder in our sample. The overall prevalence is 6.5% for current at-risk/problem gambling and 7.2% for current conduct disorder. To test the trends shown in Table 1, we conducted logistic regressions predicting current at-risk/problem gambling and current conduct disorder and as a function of gender and age. Both are significantly more prevalent among males than among females. At-risk/problem gambling rate shows a tendency to increase with age, although this trend does not quite achieve significance at the .05 level. Conduct disorder rates decline significantly with age. The gender by age interaction is not significant in either logistic regression, indicating that the age trends are the same for males and females. Our data show a strong positive relationship between current problem gambling and current conduct disorder. Respondents who do not have current conduct disorder have a 1.7% rate of current problem gambling and a 5.2% rate for current at-risk/problem gambling. Respondents who have current conduct disorder have a rate of 6.1% for current problem gambling, and a 22.9% rate for current at-risk/problem gambling. This relationship can be seen even more strikingly in Figure 1. As the number of conduct disorder criteria increases, the number of problem gambling symptoms increases in step.

Table 2 shows the results of a logistic regression predicting current at-risk/problem gambling. The table contains the main effects model. The odds ratio of 1.4 on the number of conduct disorder criteria means that for each additional conduct disorder criteria in the past 12 months, the odds of being a current at-risk/problem gambler increase by 40%. Demographic variables serve as controls, and being male or older also increases the odds of at-risk/problem gambling. As a second step in this analysis, interaction terms between conduct disorder and each demographic variable were added to the model, to determine whether the relationship between conduct disorder and problem gambling differed across demographic groups. Interactions between number of conduct disorder symptoms and each of: gender, age, black (black=1, not black=0), Hispanic, Asian, American Indian, other/unknown race, and socio-economic status were tested. Only the interaction between number of conduct disorder symptoms and age was significant, and Table 3 demonstrates the nature of the interaction. For respondents aged 14-15, the odds ratio of 1.8 on the number of conduct disorder criteria means that for each additional conduct disorder criteria in the past 12 months, the odds of being a current at-risk/problem gambler increase by a remarkable 80%. As the age of the respondents increase, this effect weakens. For our 20-21 year old respondents, there is no discernable relationship between current conduct disorder and current at-risk/problem gambling.

To further clarify this result, we examined the relationship between current conduct disorder and current at-risk/problem gambling according to the age of onset for at-risk/problem gambling. Table 4 shows a multinomial logistic regression in which respondents who are not at-risk/problem gamblers are contrasted with both at-risk/problem gamblers whose first symptom appeared at age 14 or earlier (left side of Table 4), and with those whose first symptom appeared at age 15 or later (right side). We chose this age for the cutoff because it divided the at-risk/problem gamblers into two approximately equal groups, with Ns of 74 and 72. The demographic variables are included for controls, which is necessary in the case of age. Age and age of onset are confounded, since age of onset cannot be greater than age. The odds ratio on number of current conduct disorder criteria for the contrast between respondents who were not at-risk or problem gamblers and respondents who were early-onset at-risk/problem gamblers show that each additional current conduct disorder criteria is accompanied by a 60% increase in the odds of being an early-onset at-risk/problem gambler. The corresponding odds ratio for the contrast with late-onset at-risk or problem gamblers indicates a 20% increase. The Wald statistics are included to emphasize the huge difference in these effects (67.3 vs. 6.0). (The odds ratios on age, which are less than one for respondents with an age of onset 14 or younger and greater than one for respondents with an age of onset 15 or older, are artifacts of the manner in which we restricted the membership in these two groups. Respondents with a later age of onset must be older, while respondents with an early age of onset can be any age.) Table 4 shows that when age is controlled, conduct disorder has a much stronger relationship with early-onset problem gambling than with late-onset problem gambling. Another analysis, not shown in a table, shows that among 439 respondents who currently have at least one symptom of both conduct disorder and problem gambling, conduct disorder started earlier than problem gambling in 77% of the cases, at the same age in 13% of the cases, and later in 10% of the cases.

Discussion

In our sample of U.S. adolescents and young adults, we have seen that there is a strong association between current conduct disorder and current problem gambling, consistent with problem behavior theory. However, this association is much stronger for respondents whose problem gambling began in the early to mid teens, than for those whose problem gambling began later. This result is consistent with work of Slutske mentioned earlier. Both Slutske et al. (2001) and Black et al. (2006) found results that support a common familial and genetic vulnerability between problem gambling and conduct disorder or antisocial personality

disorder. Slutske, who was primarily interested in rebutting the notion that problem gambling is a cause of antisocial behavior, also noted that symptoms of conduct disorder usually started earlier than problem gambling. Pietrzak and Petry (2005) also found in a clinical sample that pathological gamblers with antisocial personality disorder, as opposed to those without antisocial personality disorder, began gambling earlier in life and had a more extensive portfolio of antisocial traits. These results, and our own result, are similar to the findings of McGue et al. (2001) with respect to alcohol involvement. McGue found that subjects who initiated drinking early in life tended to have “a broad array of indicators of disinhibitory behavior and psychopathology, including nicotine dependence, illicit drug abuse and dependence, conduct disorder, antisocial personality disorder, underachievement in school ...” He also found that early alcohol use was partly genetic in origin. Cloninger and colleagues (Sigvardsson et al., 1996) also observed that early onset of alcohol dependence is associated with an increased likelihood of antisocial behavior.

The picture that emerges from our results, considered in context with the work of Slutske, McGue, Cloninger and others, is that in certain individuals, a cluster of problem behaviors emerge early in life, and that problem gambling can be part of that cluster. Cloninger (1987) made a distinction between Type 2 alcoholics, who have early-onset alcohol dependence, along with likely drug involvement and antisocial personality, and Type 1 alcoholics, who develop alcohol dependence later and have fewer anti-social traits. When gambling problems emerge in late adolescence, they are less likely to be part of a general pattern of problem behaviors, and are more likely to be associated with some other etiological factors. It is helpful to look at our results in the context of Blaszczynski and Nower's pathways model, which proposes three etiological routes to problem gambling. The group that Blaszczynski and Nower referred to as “behaviorally conditioned” problem gamblers have no psychopathology, and are influenced by conditioning or irrational beliefs about gambling. Their gambling involvement may occur at any age. Emotionally vulnerable problem gamblers are likely to have depression, anxiety disorders or stressful life events accompanied by ineffective coping. They are gambling for emotional escape. Antisocial impulsivist problem gamblers are distinguished by impulsiveness and features of ASPD or conduct disorder. Their problem gambling may have a biological/genetic basis, and will tend to emerge early in life. The problem gamblers with conduct disorder that we have highlighted in the current analysis very likely fit into the last category. However, of the 146 respondents who qualified for current at-risk or problem gambling, 37 qualified for current conduct disorder and 109 did not. These 109 obviously constitute the majority, and presumably most of them fall into one of the other two Blaszczynski/Nower categories. Lacking measures of affective disorders, stressful life events etc. (and also lacking a longitudinal study), we cannot say into which category that they fall, but we are not insisting that all problem gambling is a product of a general tendency for problem behaviors. Our results are consistent with the Blaszczynski/Nower model, since they show respondents whose gambling problems seem to be part of general antisocial behavior, and also respondents whose gambling problems probably arise from some other factor.

A limitation of our study is that the analyses do not consider respondents who are positive for either lifetime conduct disorder or at-risk/problem gambling or both, but do not have the current disorder. Therefore, our results might be biased towards respondents with chronic long-term problems.

Acknowledgments

This work was funded by grant R01MH63761 from the National Institute on Mental Health.

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Figure 1.
Mean Problem Gambling Symptoms by Number of Conduct Disorder Criteria

Table 1

U.S. Youth and Gambling Survey
Rates of Current Conduct Disorder and Current At Risk/Problem Gambling by Age and Gender Unweighted N = 2258

Age	Current At Risk/Problem Gambling			Current Conduct Disorder		
	Male	Female	Total	Male	Female	Total
14-15	7.3%	2.4%	5.0%	10.9%	7.2%	9.2%
16-17	10.9%	1.1%	6.2%	12.3%	5.1%	8.8%
18-19	14.3%	2.9%	8.5%	12.7%	3.1%	7.8%
20-21	10.2%	3.1%	6.6%	4.2%	1.4%	2.8%
Total	10.6%	2.4%	6.5%	10.2%	4.2%	7.2%

Table 2

U.S. Youth and Gambling Survey
Logistic Regression Predicting Current At-Risk or Problem Gambling Unweighted N=2258

Predictor	Odds Ratio	Sig. Level	95% Conf.
Number of current conduct disorder criteria	1.4	<.001	1.3 - 1.6
Gender (0 = female, 1 = male)	4.4	<.001	2.9 - 6.9
Age	1.1	.03	1.0 - 1.2
Black (0 = non-black, 1 = black)	1.1	NS	0.3 - 4.7
Hispanic	1.3	NS	0.3 - 5.8
Asian	1.0	NS	0.2 - 4.5
American Indian	1.2	NS	0.2 - 6.3
Other/Unknown	1.5	NS	0.2 - 10.6
Socioeconomic status	0.9	NS	0.8 - 1.0

Table 3

U.S. Youth and Gambling Survey

Odds Ratio Associated with Number of Current Conduct Disorder Criteria by Age Controls are Age, Gender, Race and Socioeconomic Status

Age	Unweighted N	Odds Ratio	Sig. Level	95% Conf.
14-15	692	1.8	<.001	1.4 – 2.2
16-17	688	1.5	<.001	1.3 – 1.8
18-19	533	1.3	.001	1.1 – 1.6
20-21	345	0.9	NS	0.5 – 1.5

Table 4

U.S. Youth and Gambling Survey
 Multinomial Logistic Regression Predicting Current At-Risk or Problem Gambling/
 Left side contrasts respondents with one or fewer PG symptoms (N=2112) with those with two plus symptoms and early onset (N=74)
 Right side contrasts respondents with one or fewer PG symptoms (N=2112) with those with two plus symptoms and late onset (N=72)

	Onset 14 or younger					Onset 15 or older				
	Wald Statistic	Odds Ratio	Sig. Level	95% Conf	Wald Statistic	Odds Ratio	Sig. Level	95% Conf	Wald Statistic	Odds Ratio
Number of current conduct disorder criteria	67.3	1.6	<.001	1.4 – 1.8	6.0	1.2	.01	1.0 – 1.4		
Gender (0 = female, 1 = male)	21.7	6.0	<.001	2.8 – 12.7	22.9	3.8	<.001	2.2 – 6.7		
Age	14.2	0.8	<.001	0.7 – 0.9	33.7	1.4	<.001	1.3– 1.6		
Black (0 = non- black, 1 = black)	0.0	1.1	NS	0.5 – 2.2	0.4	1.2	NS	0.7 – 2.3		
Hispanic	0.0	1.1	NS	0.5 – 2.2	0.5	0.8	NS	0.4 – 1.6		
Other/Non-white	1.2	0.4	NS	0.1 – 2.0	0.4	1.4	NS	0.6 – 3.1		
Socioeconomic status	0.0	1.0	NS	0.8 – 1.2	5.9	0.8	.01	0.7 – 1.0		

/ Dependent variable has values: 0 = not at risk or problem gambling, 1 = at risk or problem gambling, first symptom 14 or younger, 2 = at risk or problem gambling, first symptom 15 or older.