Published in final edited form as:
Psychol Addict Behav. 2009 March ; 23(1): 113–121. doi:10.1037/a0013912.

Correlates of Gambling Among Youth in an Inner City Emergency Department

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Abstract

Correlates of past year gambling were examined in a diverse sample of 1128 youth ages 14–18 (45.9% female, 58.0% African American) presenting to an inner city emergency department (ED). Overall, 22.5% of the sample reported past year gambling. Male youth were more likely to gamble than female youth and African American youth reported higher rates of past year gambling than non-African American youth. Significant bivariate correlates of gambling included lower academic achievement, being out of school, working more than 20 hours per week, alcohol and marijuana use, alcohol problems, severe dating violence, moderate and severe general violence, and carrying a weapon. When examined simultaneously, being male, African American, out of school, working for pay, alcohol and marijuana use, severe general violence and carrying a weapon all emerged as significant correlates of past year gambling, largest amount of money gambled, and gambling frequency. In addition, involvement in severe dating violence was associated with frequency and largest amount gambled. The results suggest that gambling is common among youth in the inner city and is associated with several risk behaviors. The inner city ED may provide a context for screening and intervention to address multiple risk behaviors.

Keywords

Adolescents; Alcohol; Gambling; Emergency Department; Substance Use; Violence

Gambling among adolescents has been identified as a growing concern, particularly due to increased rates of gambling and increased availability of legal gambling venues over the past ten years. For example, in Michigan, legal gambling includes the state lottery, horse racing, charitable gaming, Native American-owned casino gaming, and non-Native American-owned casino gaming venues. Although adolescents do not meet the legal age required for entry into most gaming venues (i.e., 21 for entry in casinos, 18 for entry into some Native American

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gambling venues in Michigan), the mere presence of these venues may increase awareness and involvement in gambling. Although rates vary considerably, prevalence estimates indicate that the majority of adolescents have engaged in gambling, which typically includes any act that involves playing a game for money, (e.g., betting on card games, betting on sports or games of personal skill, playing the lottery; Winters, Stinchfield, Botzet, & Anderson, 2002). For example, Hardoon, Gupta, and Derevensky (2004) found that 66% of their sample of youth (ages 12–19) had gambled in the past year with 20% gambling at least once per week. Winters et al. (2002) found that 86% of their sample of 15 to 18 year olds reported any gambling in the past year. Lower rates of gambling may reflect samples with a larger percentage of female (e.g., Hardoon et al., 2004) or younger adolescents (Winters & Anderson, 2000), although older age is not always associated with higher rates (Gupta & Derevensky, 1998a). Although not all youth who experiment with gambling will go on to experience a range of gambling-related consequences (i.e., problem gambling), research shows that those who initiate gambling in adolescence are more likely to become problem gamblers in young adulthood (Winters et al., 2002) and are more likely to experience physical and psychiatric difficulties (Burge, Pietrzak, Molina, & Petry, 2004). Thus, identifying factors associated with adolescent gambling may assist in early detection and intervention to prevent the development of future problems. Several correlates of adolescent gambling have been identified, including alcohol, tobacco, other drug use, and delinquency (Duhig, Maciejewski, Desai, Krishan-Sarin, & Potenza, 2007; Gupta and Derevensky 1998a; 1998b; Hardoon et al., 2004; Lynch, Maciejewski, & Potenza, 2004; Shaffer & Korn, 2002; Vitaro, Ferlan, Jacques, & Ladouceur, 1998; Winters et al., 2002; Winters & Anderson, 2000), but previous studies have utilized primarily Caucasian, school based samples of youth. The purpose of the present study was to identify correlates of gambling among adolescents presenting to an inner city emergency department (ED), which includes a cross section of youth who may be missed by other gambling surveys.

The link between substance use and gambling is well established. Researchers have identified a direct linear relationship between levels of involvement in substance use and gambling (Gupta & Derevensky, 1998b) and adolescents who frequently use substances are more likely to engage in frequent gambling (Duhig et al., 2007; Winters & Anderson, 2000). Pathological gambling shares many features with substance use disorders (e.g., a preoccupation with the behavior, a need for increased involvement, repeated unsuccessful attempts to control or cut back on the behavior, and significant social, occupational and legal consequences) and the continuum of problem gambling (i.e., gambling associated with multiple consequences; Winters et al., 2002) to pathological gambling is similar to the substance use disorder continuum (i.e., substance abuse/dependence; Hardoon et al., 2004). In addition, pathological gambling and substance use disorders share similar biopsychosocial mechanisms (for reviews see Petry, 2006; Potenza, 2006). The overlap between gambling and substance use behaviors may reflect what Jacobs (1986) referred to as a general theory of addictions, in which all addictive behaviors emerge from a desire to reduce negative affect, with gambling serving the same self-medicating purpose as alcohol or other drug use. Several theories also support overlap between gambling, substance use, and violence/aggression among adolescents. Jessor and Jessor's (1977) problem behavior theory suggests that involvement in co-occurring risk behaviors, including substance use and aggression is likely among youths who demonstrate a general propensity for involvement in deviant behaviors (Donovan & Jessor, 1985). Recently, however, researchers have suggested that gambling may not be part of a general problem behavior syndrome (Willoughby, Chalmers, & Busseri, 2004) and that general deviance may not fully account for the correlation between gambling and other risk behaviors (i.e., alcohol use, drug use, delinquency; Welte, Barnes, & Hoffman, 2004). Alternatively, the link between substance use and aggression may reflect acute effects of alcohol and other substances (for a review see Chermack & Giancola, 1997) and similar mechanisms may result in increased gambling during substance use episodes. In particular, alcohol-related risk and aggression is thought to be due to alcohol's effects on attentional capacity or alcohol myopia (Steele &

Josephs, 1990), in which alcohol use results in disinhibition due to a narrowing of attention to salient cues for engaging in risky behavior. Laboratory findings support the attention-allocation model linking alcohol with aggression (Giancola & Corman, 2007) and gambling persistence (Knydon & Dickerson, 1999).

Despite hypothesized theoretical and situational (i.e., violence associated with owing money, betting on fights) relationships between gambling and violence, researchers tend to focus on the link between gambling and delinquency, a composite measure which includes aggression along with several other behaviors, including theft and property damage (e.g., Stinchfield, 2000; Vitaro, Brendgen, Ladouceur, & Tremblay, 2001; Winters et al., 2002). In a recent study of urban youth, Martins, Storr, Ialongo, and Chilcoat (2007) examined childhood aggression (i.e., aggression in the first grade) as a predictor of adolescent gambling and found no aggression-related differences among gamblers and nongamblers, although gamblers were more likely to report past year use of tobacco, alcohol and drugs. Among female substance abusers who were classified as pathological gamblers, higher rates of aggression emerged as significant predictors of pathological gambler status, even when controlling for African-American race and non-violent social acts (Cunningham-Williams, Ben Abdallah, Callahan, & Cottler, 2007). Recently, Korman et al. (2008) found higher rates of intimate partner violence in their sample of adult problem gamblers than among the general population, with 62.9% of problem gamblers reporting involvement in intimate partner violence. The relationship between dating violence and gambling in adolescence is less well established.

The literature is limited in several other respects. First, the majority of studies have been conducted via school-based questionnaires. Although this tends to provide large samples (Hardoon et al., 2004), generalizability is limited to youth who are available on the particular day the survey is administered. This is problematic when assessing risk behaviors among youth as those most likely to be absent from school (i.e., due to school dropout or truancy) may also be most likely to engage in problem behaviors. In addition, studies conducted with non-school attending youth have been limited to a restricted age range (e.g., 16–17 year olds; Duhig et al., 2007; Lynch et al., 2004) and have relied on primarily Caucasian samples (Duhig et al., 2007; Winters et al., 2002), with a few exceptions (Stinchfield, 2000; Martins et al., 2007). Among adults, when race is examined as a predictor of gambling, non-Caucasian participants tend to have higher rates of gambling (Morasco, vom Eigen, & Petry, 2006) and are more likely to be classified as problem or pathological gamblers (Cunningham-Williams et al., 2007; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001). When race is examined as a predictor of gambling among adolescents, the findings are similar (Martins et al., 2007; Stinchfield, 2000), although these studies tend to be restricted by other sampling issues including use of an all female sample (Martins et al., 2007) and school-attending youth only (Stinchfield, 2000). Thus, further research is needed to understand gambling involvement and markers of gambling among adolescents from non-school based settings and to determine the extent to which race and other background variables impact gambling involvement among adolescents. In addition, due to consistent findings that male youth are more likely to gamble than female youth (e.g., Lynch et al., 2004; Winters & Anderson, 2000), it is important to have both genders adequately represented in analyses. Finally, important potential correlates of adolescent gambling, including school achievement and employment, have not yet been examined and further research is needed to determine their impact.

The purpose of the present study was to examine correlates of gambling, including substance use, violence, school achievement and attendance, and employment, among adolescents presenting to an inner city emergency department (ED), which comprises a cross section of youth, including those who may not be attending school. Recently, researchers have identified the ED as an important context for screening adolescents for various mental health and behavioral concerns (e.g., alcohol abuse, substance abuse, violence, suicide; Chung, Colby,

Barnett, & Monti, 2002; Goldstein, Walton, Cunningham, Trowbridge, & Maio, 2007; Maio et al., 2005; Monti et al., 1999). To date, no prior studies have examined gambling and concomitant risk behaviors among adolescents presenting to the ED. Because African-American adolescents from low socioeconomic backgrounds may be more likely to use the urban ED as their primary source of care (Wilson & Klein, 2000), screening for co-occurring risk behaviors in the ED (e.g., substance use, violence, gambling) is an important first step in identifying the prevalence and correlates of gambling in a diverse sample of urban youth that may not be identified in school based samples.

Method

Participants and Procedure

Participants were ED patients who completed a brief self-administered computerized screening questionnaire as part of a randomized controlled trial of an alcohol and violence intervention over a year (September 2006 through August 2007) in Flint, Michigan. Participants were recruited during the afternoon/evening shift (triaged from 3 PM-10 PM for the first half of the year and from 1 PM-10 PM for the second half of the year). The study site, Hurley Medical Center ED, is a 540-bed teaching hospital, and a Level I Trauma Center. Compared to other U.S. cities, Flint, Michigan ranks second in the nation in poverty, based on percentage of children living below the poverty level (US Census Bureau, 2006), and third in the nation in violent crime (Federal Bureau of Investigation, 2006). Study procedures were approved and conducted in compliance with the University of Michigan's and Hurley Medical Center's Institutional Review Boards (IRB) for Human Subjects guidelines. A Certificate of Confidentiality was obtained from NIAAA for this study.

Potential participants included both consecutive medical and injured patients with the exception of Level I trauma patients who were unconscious, intubated, or in need of immediate life-saving procedures. Patients were excluded if they: could not provide informed consent (i.e., no parent or guardian present and the patient was under age 18, in police custody, or impaired cognitive functioning/intoxication). Patients who were actively suicidal, were being treated for sexual assault, or being treated for symptoms associated with a diagnosis of schizophrenia were also excluded. Consenting/assenting participants self-administered a 15-minute computerized survey with audio via headphones and received a token $1.00 gift (e.g., notebook, pens, umbrella, lip balm) for their participation in the screening. In rare cases in which participants could not physically complete the survey (e.g., hold the stylist due to a broken arm, etc.), a research assistant administered the survey privately (n = 61; ~5%).

Among eligible patients who were approached, 81.0% (n=1128) completed the screen and 16.2% (n=218) refused to participate. Reasons for refusals included: parent refused access (31.2%), too sick (24.8%), too much pain (20.6%), didn't want to participate (11.9%), too stressed (6.9%), and other (4.6%). Among those who screened, 54.1% were female, 58.0% were African American, 36.1% were Caucasian, and 5.9% were of another race (i.e., Asian, American Indian). Regarding injury type, 59.7% were in the ED for a medical issue, 35.5% for an unintentional injury and 5.9% for an intentional injury. On average, participants were 16 years old (SD =1.47). The majority of participants lived with a parent or guardian (91.8%) and more than half of the sample (55.8%) reported their family received public assistance. Most participants (85.1%) were still in school and reported average grades of B and above (57.6%). Regarding employment status, 73.5% of the sample did not work at all, 17.8% worked under 20 hours per week, and 8.7% worked 20 or more hours per week.

Measures

All measures were selected or adapted to ensure brevity and keep the screening questionnaire within 15 minutes. Demographic items were selected from the National Longitudinal Study of Adolescent Health (Add Health, Harris et al., 2003).

Gambling—Three gambling items were adapted from the Ontario Student Drug Use Survey (Adlaf, Paglia-Boak, Beitchman, & Wolfe, 2006). The items assessed involvement in gambling in the past 12 months, with gambling defined as "buying lottery tickets or betting money on playing cards, bingo or other games, sports, horse races, dog fighting, gambling machines at a casino, or over the internet." Participants also noted the frequency with which they gambled in the past 12 months, ranging from once to 12 or more times and the largest amount of money they had gambled in the last 12 months ranging from $1.00 or less to $200 or more (Winters, Stinchfield, & Fulkerson, 1993).

Substance use—Participants were asked to indicate whether they had consumed alcohol more than two or three times in the past 12 months (Harris et al., 2003) and how often they used cigarettes and marijuana in the past year based on questions from the Monitoring the Future Study, which have been well-validated in adolescent samples (Johnston, O'Malley, Bachman, & Schulenberg, 2007). For the present analyses, we created three dichotomous variables reflecting alcohol use two to three times in the past year (yes/no), marijuana use in the past year (yes/no) and cigarette use in the past year (yes/no). In addition, the 6-item CRAFFT (Knight et al., 1999) was used to screen participants for alcohol abuse. The CRAFFT was originally developed as a screening tool for alcohol or drug abuse. Using a cut-off of 2 or higher, the CRAFFT demonstrates both sensitivity (92%) and specificity (82%) in screening adolescents for substance-related problems, with rates comparable to other lengthier measures (Knight, Sherritt, Harris, Gates, & Chang, 2001). We revised the items so that they were alcohol-specific and removed any reference to drug use.

General violence—General violence items were drawn from Add Health (Sieving et al., 2001) and the Conflict Tactics Survey (CTS; Strauss, 1979). These questions refer to fights with siblings, parents, strangers and friends and do not include fights with someone you're dating or "going with." We created two violence categories, moderate and severe violence, each reflecting the sum of items endorsed by participants. Moderate violence items were drawn from the CTS and included: pushed or shoved, hit or punched, slammed someone into a wall, and slapped someone (from the CTS). Severe violence items were drawn from the Add Health and CTS questionnaires and included: getting into a serious physical fight, getting into a group fight, causing someone to need medical care (from Add Health), beat up someone, kicked someone, and used a knife or gun on someone (from the CTS). Numerous studies have been published using the Add Health items documenting their reliability/validity (e.g. Dahlberg, Toal, Swahn, & Behrens, 2005; Borowsky & Ireland, 2004). Similarly, the CTS has been shown to be reliable and valid in adolescent samples (Straus, 1990). In our sample, Chronbach's alpha for both the moderate and severe violence composites were adequate (0.77 for moderate, 0.81 for severe).

Dating violence—Dating violence was assessed using a collapsed version of the Conflict in Adolescent Dating Relationships Inventory (CADRI; Wolfe et al., 2001), which asks about fighting with someone you're dating, "going with" or a boyfriend or girlfriend. The CADRI has demonstrated good internal consistency, test-retest reliability and validity (Wolfe et al., 2001). Only participant physical aggression toward a partner was assessed; physical victimization received from a partner was not assessed. The original four item physical abuse/aggression subscale was collapsed into two items assessing frequency of moderate (e.g., threw something that could hurt, twisted arm or hair, pushed, shoved, grabbed, or slapped) and severe

aggression (e.g., punched or hit with something that could hurt, choked, slammed against a wall, beat up, burned or scalded on purpose, kicked, or used a knife or gun on). Note that in order to be parallel to general violence, additional descriptors were added to the list (e.g., burned, used a knife or gun) and response choices were modified to be identical to the CTS (Straus, 1979): never, 1 time, 2 times, 3–5 times, 6–10 times, 11–20 times, and more than 20 times.

Weapon carriage—Participants were asked two questions regarding how often in the past year they had carried a knife/razor or a gun. These questions were modified from the Youth Risk Behavior Survey (CDC, 2005), which has established reliability (Brener, Collins, Kann, Warren, & Williams, 1995; Brener et al., 2002). In order to be parallel to the violence questions, response choices were identical to the CTS (Straus, 1979) items: never, 1 time, 2 times, 3–5 times, 6–10 times, 11–20 times, and more than 20 times. For the purposes of the present study a dichotomous weapon carriage variable (yes/no) was created given the significant correlation between items in our sample (r=0.14, p<.0001).

Data Analysis

Data were analyzed using SAS Version 9.0 (SAS Institute, Cary, NC). Descriptive statistics are provided for frequency of gambling and largest amount gambled in the past year. We first conducted bivariate analyses using Pearson's chi-squared tests to compare past year gamblers (0 = no, 1 = yes) based on each of the correlates. Correlates included: background variables [gender, African American, grades in school, hours working at a job for pay, school status (currently in school or not in school) and received public assistance,], substance use (any alcohol use in the past year, any marijuana use in the past year, any cigarette use in the past year, met cut-off of 2 or more on CRAFFT), general violence (none vs. moderate, none vs. severe), dating violence (none vs. moderate, none vs. severe) and weapon carriage (carried a gun, knife or razor). For school status, those not currently in school had either dropped out of school or had completed high school and were no longer enrolled in school. After examining bivariate relationships between each of the correlates and past year gambling, a series of regression analyses were conducted where all correlates were examined simultaneously. Logistic regression was used for the categorical dependent variable of any gambling (yes/no). Separate cumulative logit models were used for ordinal dependent variables: frequency of gambling in the past year (0 times, 1 to 5 times, 6 to 9 times, 10 or more times) and largest amount of money spent on gambling in the past year (none, $1 to $10, $11 to $99, >=$100). The proportional odds assumptions tests were not significant indicating appropriate use of the cumulative logit models (Agresti, 2002).

Results

Overall, 22.5% (n = 253) of the sample reported engaging in gambling in the past year (Table 1). Nearly half of current gamblers (49.4%) reported gambling 1–3 times, a quarter (26.1%) reported gambling 4–9 times and a quarter (24.5%) reported gambling 10 or more times in the past year. Similarly, the largest amount gambled was variable with about half of current gamblers spending $10 or less (52.6%), 34.4% spending between $11-100, and 13.0% spending more than $100. Approximately one-quarter (27.9%) of the sample reported past year alcohol use, 28.6% reported marijuana use, and 26.6% reported cigarette smoking in the past year, with 7.3% meeting the cut-off for alcohol problems (i.e., 2 or more) on the CRAFFT. The majority of participants reported engaging in severe general violence (58.6%), whereas 16.7% engaged in moderate general violence. Fewer participants were involved in severe (12.8%) and moderate (14.7%) dating violence and 16.9% of participants reported carrying a knife, gun, or razor in the past year.

Bivariate comparisons between participants who reported gambling in the past year and those who did not report any gambling are shown in Table 2. Men were significantly more likely to gamble than women, and African American youth were significantly more likely to gamble than non-African American youth. Participants were more likely to gamble if their average grades were a C or lower (compared to average grades of a B or higher), if they were not currently in school, and if they worked at a job for 20 hours or more per week, compared to not working at all. In addition, past year alcohol use, past year marijuana use, and problem alcohol use (i.e., scoring 2 or more on the CRAFFT) were all significantly and positively associated with past year gambling. Regarding violence, participants who reported severe dating violence, those who reported moderate and severe general violence, and those who carried a knife, gun, or razor were more likely to gamble than those with no violence in the past year and no past year weapon carriage. Only receiving public assistance and cigarette smoking did not emerge as significant correlates of gambling in the past year.

Following the bivariate analyses, a multivariable logistic regression analysis was conducted with past year gambling (yes/no) as the outcome variable. As listed in Table 3, once all correlates were included in the model, gender, African-American race, hours per week worked for pay, school status, alcohol use, marijuana use, general violence, and carrying a weapon emerged as significant correlates of gambling. Specifically, males were four times more likely to report gambling in the past year and African-American youth were over 2 times more likely to report gambling. In addition, participants who were not in school were approximately two times more likely to have gambled and those who worked 20 hours or more per week were over 2.5 times more likely to have gambled compared to non-working teens. Both past year alcohol and marijuana use were associated with a higher likelihood of gambling as were severe general violence and carrying a weapon.

Finally, logistic regression with cumulative logit models was used to examine the association between background variables, substance use, and violence and two ordinal dimensions of gambling behavior: frequency of gambling in the past year (0 times, 1 to 5 times, 6 to 9 times, 10 or more times; see Table 3) and largest amount of money gambled during an occasion in the past year (none, $1 to $10, $11 to $99, $100 and higher; see Table 3). The last two categories for frequency of gambling (i.e., 10 to 11 times and 12 or more times) were combined due to low response rates for the 10 to 11 times category. The findings from these models were similar and fairly consistent with the multivariable model examining any gambling in the past year. That is, male youth and African-American youth gambled more frequently in the past year and spent higher amounts of money on a single gambling occasion. In addition, youth who were not in school, those worked more than 20 hours per week, those who used alcohol or marijuana in the past year, and those who reported severe dating violence, severe general violence, and carried a weapon all gambled more frequently and spent higher sums of money on gambling.

Discussion

This study extends previous research by examining correlates of gambling among a large, racially diverse sample of male and female adolescents, ranging in age from 14 to 18 years old. This study presents the first published data regarding rates and correlates of gambling among adolescent patients presenting to an inner city ED, which may include adolescents missed in school-based studies due to poor attendance or dropout. Although almost one quarter (22.5%) of the sample reported involvement in gambling in the past year, this is less than rates reported elsewhere in the literature (e.g., Gupta & Derevensky, 1998a; Hardoon et al., 2004; Winters et al., 2002). This may reflect the measure used for the current study, which does not specify whether gambling activities involved friends (e.g., making bets with friends) or informal gambling venues (e.g., playing cards at home). As a result, participants may have interpreted the gambling activities as illegal forms of gambling (e.g., casino gambling),

resulting in lower endorsement rates. When the same measure was used in a large school-based survey, rates of past year gambling were more similar to those reported here (e.g., 24.9% in 2001 and 32.7% in 2005; Adlaf et al., 2006).

We found that male and African-American youth were more likely to engage in gambling, which is consistent with previous research indicating higher rates of gambling among male youth (Hardoon et al., 2004) and among African American adults (Morasco et al., 2006). In addition, although the majority of youth reported gambling five times or fewer in the past year, a large percentage (21%) were gambling 12 or more times, indicating monthly gambling among a significant percentage of inner city youth. An additional finding is that 29% of adolescents gambled more than $50 on a single occasion, with 13% gambling more than $100 on a single occasion. Thus, despite lower rates of gambling overall, the amount of money spent is particularly significant given that, as noted above, the community in which these adolescents reside is socio-economically impoverished, ranking second in the nation based on the percentage of children living below the poverty level (51%) in 2006 (US Census Bureau, 2006), with over half of the adolescents' families receiving public assistance.

Surprisingly, we found that familial socioeconomic status, assessed by asking youths whether their families received public assistance, was not associated with gambling, perhaps due to restriction of range, whereas employment status was associated with gambling across all gambling dimensions and when controlling for other correlates. Youths who worked more than 20 hours per week were more likely to gamble, spent more money during a single gambling occasion, and reported more frequent gambling in the past year. In addition, compared to youth who did not work, those who worked less than 20 hours per week were more likely to gamble in the past year and reported more frequent gambling. Although prior research has found that hours worked per week is positively associated with heavy episodic drinking among youth (Breslin & Adlaf, 2005), few researchers have examined the relationship between employment and gambling. There are several possible explanations for the present findings. First, youth who work more hours per week have greater funds to spend on gambling than those who don't work at all. Second, youth who work more hours per week may have greater exposure to older teens and young adults and this affiliation with older peers may be associated with increased gambling. We also found a positive relationship between not attending school and gambling. This is consistent with previous research identifying a positive relationship between truancy and gambling (Langhinrichsen-Rohling, Rohde, Seeley, & Rohling, 2004). In addition, researchers have identified dropping out of high school as a significant correlate of a subsequent alcohol abuse or dependence diagnosis (Crum, Ensminger, Ro, & McCord, 1998), a trajectory that may be shared by gambling. Finally, individuals who are not in school have more time available to engage in gambling and other problem behaviors. Additional research is needed to determine the specific mechanisms through which not attending school and increased work hours are associated with gambling.

Regarding substance use behaviors, our findings suggest that gambling is more likely among adolescents who consume alcohol and among those who use marijuana. This is consistent with other adolescent gambling research indicating that any past year gambling is associated with alcohol and drug use (Duhig et al., 2007; Martins et al., 2007) and that gambling and substance use are positively correlated (Hardoon et al., 2004; Winters et al., 1993). These findings are also consistent with Jacobs' (1986) general theory of addictions and suggest that substance use and gambling may serve similar functions (i.e., alleviation of negative affect). Despite the significant bivariate relationship between problem drinking (as assessed by a score of 2 or more on the CRAFFT) and gambling, once all correlates were included in the model, only past year alcohol use predicted any gambling, maximum amount spent, and frequency of gambling in the past year. These findings are likely due to complete overlap between not drinking in the past year and the CRAFFT < 2 category.

We also found that gambling was more likely among youth who were involved in moderate or severe peer violence or severe dating violence in the past year. There are several possible explanations for the relationship between gambling and other risk behaviors as outlined in this paper. First, all behaviors may be linked by a common personality trait: impulsivity (Petry, 2001; Vitaro et al., 1998; 2001). Impulsivity in early adolescence has been linked with gambling frequency in mid-adolescence (Vitaro et al., 2001) and, among male adolescents, earlier impulsivity (i.e., ages 12–14) has been linked with problem gambling in late adolescence (i.e., age 17; Vitaro, Arsenault, & Tremblay, 1999). In addition, adolescence represents a period where normal neurodevelopment is consistent with an impulsive "phase" where vulnerability to engage in risk behaviors is heightened (Chambers & Potenza, 2003). Alternatively, all behaviors may be part of a general tendency towards deviance (Donovan & Jessor, 1985; Jessor & Jessor, 1977), with violence, substance use and gambling all influenced by similar psychosocial and contextual variables, as hypothesized by problem behavior theory. Vitaro et al. (2001) found modest support for common influences on substance use, delinquency and gambling among youth, including impulsivity and peer deviancy, but the predictors explained a small proportion of the variance in each of the problem behaviors, indicating the involvement of other unmeasured factors. Although further research is needed to clarify these relationships, it may be the case that substance use plays a causal role in adolescent gambling involvement and aggression, where substance use leads to poorer judgment and disinhibition, resulting in making bets for money and stronger responses to seemingly aggressive cues (Giancola & Corman, 2007; Knydon & Dickerson, 1999; Steele & Josephs, 1990). Similar mechanisms may be involved in both severe general and dating violence, with alcohol use cited as a frequent precursor to dating violence among adolescents (Molider, Tolman, & Kober, 2000). In addition, an increased need for money to pay for alcohol and drugs may lead to involvement in non-traditional money-making ventures, such as gambling. Alternatively, gambling may play a causal role in general violence and substance use via use of severe violence to get back money owed from gambling and use of substances to self-medicate distress associated with gambling losses. Regarding dating violence, involvement in gambling may result in conflict with intimate partners due to monetary losses or other gambling-related stressors (Korman et al., 2008). It should be noted that these causal mechanisms are speculative and further research is needed to determine the causal chain linking substance use, violence, and gambling among adolescents.

That general and dating violence were associated with gambling in this ED sample may also reflect a sampling bias; because violent injuries often result in an ED visit, higher rates of violence are expected in ED patients compared to other community samples. Although this may explain the present findings, only 2% of participants reported that the ED visit was due to an intentional injury. As noted above, more detailed longitudinal analyses are needed to determine the mechanisms through which these behaviors are connected. Event-level analyses of gambling experiences (e.g., Weinstock, Whelan, & Meyers, 2004) would provide specific information concerning the proximal relationship among these variables, including the direct impact of substance use on gambling and gambling on subsequent violence.

One of the limitations of the present study is the use of cross-sectional data and retrospective reports. However, where prospective methods have been used, the research has been somewhat inconsistent. For example, Vitaro et al. (2001) found that, despite concurrent relationships between gambling, delinquency and alcohol/drug use, gambling frequency and problems at age 16 did not predict delinquency and drug/alcohol use at age 17; similarly, delinquency and drug/alcohol use at age 16 did not predict gambling frequency and problems at age 17. Thus, additional longitudinal research is needed to identify prospective predictors of gambling in youth, including both risk and protective factors. Another limitation of the present study is the use of a very brief measure of gambling involvement. Due to time constraints, the gambling questionnaire included in the screening package was extremely brief and adolescent focused

forms of gambling (e.g., betting money with friends) were not specified, which may have led to the lower than expected prevalence of past year gambling within this sample. In addition, we assessed current involvement in gambling behaviors, but did not determine whether participants were engaging in problem gambling. Future research should include a wider range of gambling activities (e.g., betting money with friends, betting on sports teams) and well validated measures of adolescent problem gambling [e.g., The South Oaks Gambling Screen Revised for Adolescents (SOGS-RA); Winters et al., 1993 or the Massachusetts Gambling Screen (MAGS); Shaffer, LaBrie, Scanlan, & Cummings, 1994)]. Similarly, to ensure adequate reliability, well established measures of general and dating violence should be included in future research examining gambling correlates. Finally, results may not generalize to adolescents from the general population (i.e., non-ED based samples or samples from a different ED) or to adolescents of other races/ethnicities that could not be examined in our sample (e.g., Hispanic/Latino, Asian, etc) and those from higher socioeconomic settings.

Despite these limitations, the present study builds on the previous literature and provides important novel information regarding rates and correlates of gambling among urban youth seen in an ED. The present findings support the feasibility of screening for gambling in the ED setting. Recent research suggests that the ED is an ideal setting for screening and brief interventions, particularly for risky behaviors, including alcohol use (e.g., Monti et al., 1999). In addition, the ED may serve as a resource for referrals to community agencies. Given the relationship among substance use, violence and gambling, strategies targeting multiple risk behaviors may be most effective in reducing gambling and pathological gambling among adolescents and young adults. These findings highlight the need for assessment of multiple risk behaviors and integrated interventions targeting several problem behaviors among youth.

Acknowledgements

This project was supported by a grant (#014889) from the National Institute on Alcohol Abuse and Alcoholism (NIAAA). We would like to thank Bianca Burch, Yvonne Madden, Tiffany Phelps, Carrie Smolenski, and Annette Solomon and for their work on this project. Special thanks to the patients and medical staff at Hurley Medical Center for their support of this project.

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Table 1

Gambling characteristics among current gamblers (N = 253)

Variable	N (%)
Frequency of Past Year Gambling	
Once	36 (14.2)
2 to 3 times	89 (35.2)
4 to 5 times	29 (11.5)
6 to 7 times	27 (10.7)
8 to 9 times	10 (4.0)
10 to 11 times	6 (2.4)
12 or more times	56 (22.1)
Largest Amount Gambled	
$1 or less	36 (14.2)
$2 to $10	97 (38.3)
$11 to $49	47 (18.6)
$50 to $99	40 (15.8)
$100 to $199	14 (5.5)
$200 or more	19 (7.5)

Note. Gambling included buying lottery tickets or betting money on playing cards, bingo or other games, sports, horse races, dog fighting, gambling machines at a casino, or over the internet.

Table 2

Bi-variate analyses examining past year gambling (yes/no) as a function of background variables, substance use, and violence.

Correlate	Gambled % (n)	OR	95%CI
Gender		0.27***	0.20–0.36
Female[R]	12.3 (75)		
Male	34.4 (178)		
Race		1.60**	1.21–2.13
Non African-American[R]	18.4 (105)		
African-American	26.6 (148)		
Grade		1.57**	1.18–2.07
Grade B and Above[R]	19.1 (124)		
Grades C and Under	27.0 (129)		
Hours per week worked for pay			
None[R]	20.4 (169)		
Less than 20 hours	21.9 (44)	1.09	0.75–1.59
20 hours or more	40.8 (40)	2.69***	1.74–4.16
Currently in school		1.93***	1.35–2.76
No	20.5 (197)		
Yes[R]	33.3 (56)		
Received Public Assistance		1.06	0.80–1.41
No[R]	21.8 (108)		
Yes	22.8 (143)		
Past Year Alcohol Use		2.95**	2.20–3.96
No[R]	16.8 (136)		
Yes	37.3 (117)		
Past Year Cigarette Use		1.89***	1.40–2.54
No[R]	19.3 (160)		
Yes	31.1 (93)		
Past Year Marijuana Use		3.44***	2.57–4.61
No[R]	15.6 (126)		
Yes	39.6 (127)		
CRAFFT Score		2.73*	1.72–4.35
Less than 2[R]	20.9 (219)		
2 or more	42.0 (34)		
Dating Violence			
None[R]	21.7 (177)		
Moderate	15.8 (27)	0.68	0.43–1.06
Severe	34.5 (50)	1.90***	1.30–2.79
General Violence			
None[R]	12.9 (36)		
Moderate	19.7 (37)	1.65*	1.00–2.73
Severe	27.3 (180)	2.53***	1.71–3.74

Correlate	Gambled % (n)	OR	95%CI
Carried a weapon	39.8 (76)	2.83***	2.03–3.95
No[R]	18.9 (177)		
Yes	39.8 (76)		

Note. The superscript R denotes the reference group for calculating the odds ratio.

* $p<.05$;

** $p<.01$;

*** $p<.001$

Table 3

Odds Ratios and 95% Confidence Intervals from Multivariable Model Predicting Past Year Gambling, Gambling Frequency and Largest Amount Spent on Gambling.

	Past Year Gambling		Gambling Frequency		Largest Amount Gambled	
Correlate	OR	95% CI	OR	95% CI	OR	95% CI
Female	0.22***	0.16–0.32	0.20***	0.14–0.28	0.21***	0.15–0.30
African-American	2.14***	1.50–3.06	2.36***	1.66–3.34	2.10***	1.49–2.96
Grades (Grade B and Above)	1.15	0.79–1.67	1.02	0.71–1.45	1.03	0.72–1.48
Hours/week work for pay (ref=none)						
Less than 20 hours	1.52*	1.00–2.30	1.52*	1.01–2.28	1.49	0.99–2.24
20 hours or more	2.06***	1.21–3.53	2.07***	1.26–3.40	2.15***	1.32–3.51
Not in school (ref=in school)	1.96*	1.16–3.32	1.75*	1.07–2.88	1.89*	1.16–3.09
Received Public Assistance	0.99	0.72–1.39	1.04	0.76–1.42	1.03	0.75–1.41
Past Year Substance Use						
Alcohol	1.87**	1.24–2.84	1.71**	1.14–2.55	1.68**	1.13–2.51
Cigarettes	0.86	0.57–1.31	0.78	0.52–1.17	0.90	0.61–1.34
Marijuana	2.15***	1.43–3.24	2.30***	1.55–3.41	2.10***	1.42–3.11
CRAFFT (2 or more)	1.08	0.60–1.94	1.12	0.64–1.94	1.11	0.64–1.91
Dating Violence (ref = none)						
Moderate	0.71	0.43–1.18	0.72	0.44–1.19	0.84	0.52–1.37
Severe	1.38	0.87–2.20	1.58*	1.03–2.45	1.56*	1.01–2.41
General Violence (ref = none)						
Moderate	1.65	0.96–2.85	1.63	0.96–2.80	1.62	0.95–2.78
Severe	1.77*	1.12–2.79	1.73*	1.03–2.45	1.74*	1.11–2.72
Carried a weapon	1.73**	1.16–3.32	1.87*	1.28–2.72	1.78**	1.22–2.59

Note. For frequency of gambling the categories were: 0 = no gambling in the past year, 1 = gambled 1–5 times, 2 = gambled 6–9 times, 3 = gambled 10 or more times. For largest amount gambled, the categories were: 0 = $0, 1 = $1 to $10, 2 = $11 to $99, 3 = $100 and higher.

Ref = reference group.

For past year gambling: Model χ^2 (N = 1122, df = 16) = 216.14, $p < .0001$.

For frequency of gambling: Model χ^2 (N = 1123, df = 16) = 242.17, $p < .0001$.

For largest amount gambled: Model χ^2 (N = 1123, df = 16) = 232.16, p < .0001.

* p < .05;

** p<.01;

*** p<.001.

Psychol Addict Behav. Author manuscript; available in PMC 2009 March 30.