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Do Predictors of Gambling Involvement Differ Across Male and Female Adolescents?

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Abstract We examined gender-specific factors, which might be related to adolescent gambling behavior, using a comprehensive set of predictors from neighborhood, school, family, peer, and intrapersonal domains. Discriminate function analyses revealed a unique pattern of results for each gender. The noteworthy predictors for males were similar to what is found to be predictors of other risk behaviors, suggesting that there may be a similar etiology to gambling participation as found with other risk behaviors. Compared to males, the model for females suggests that parents and peers may have a greater influence on engagement in gambling behavior. Participation in unstructured activities, and risk attitudes/perceptions were the only consistent noteworthy predictors across both males and females. Implications are discussed.

Keywords Gambling · Gender differences · Adolescence

Researchers have become increasingly interested in exploring the impact of gambling on public health. For example, research findings have shown links between gambling and both increased rates of depression and lower self-esteem (Gupta & Derevensky, 1998a, 1998b). Researchers have suggested that problematic gambling might be even more prevalent with adolescents than with adults (Derevensky & Gupta, 2000b; Jacobs, 2000). Much of the research to date, however, has been descriptive in nature and only recently have researchers begun to explore factors associated with adolescent gambling behavior (see Hardoon, Gupta, & Derevensky, 2004; Langhinrichsen-Rohling, Rohde, Seeley, & Rohling, 2004).

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Adolescent problem gambling rates are reported to be more than double the adult rates (Derevensky & Gupta, 2000b; Jacobs, 2000). For example, it has been estimated that between 3.4 and 8.7% of the adolescent population are probable pathological gamblers (Derevensky & Gupta, 2000a), in contrast to lifetime prevalence rates of 0.1 to 3.1% for adult pathological gamblers range (NRC, 1999). In addition, between 1.4 and 12.0% of adult gamblers are classified as problem gamblers (NRC, 1999) while 10–14% of adolescent gamblers are classified as at-risk of developing problems related to their gambling behavior (Shaffer & Hall, 2001). While much of the gambling literature tends to focus on problem gambling, Derevensky and Gupta (2000a) found that, among a general adolescent sample, between 12.7% and 46.5% reported experiencing at least one negative consequence related to their gambling in the past 12 months.

Researchers have only recently begun to focus on gaining a better understanding of four groups of adolescents in relation to gambling involvement; that is, adolescents who do not gamble, adolescents who gamble at a non-problematic level, adolescents who gamble at an at-risk level and adolescents who gamble at a high-risk/problematic level (e.g., Langhinrichsen-Rohling et al., 2004). For example, it may be that the factors that predict non-problematic levels of adolescent gambling may be different from the factors that predict at-risk or problematic gambling. The determination of what factors differentiate among the varying levels of risk associated with gambling behavior is important for a better understanding of problem gambling and for more effective early intervention programs. Therefore, the present study examines four groups of adolescent gamblers (no-risk/non-gamblers, low-risk, at-risk, and high-risk).

In addition, gender differences related to problem gambling consistently have been identified in the literature (Stinchfield, 2000; Winters, Stinchfield, & Fulkerson, 1993b). Derevensky and Gupta (2000a) cite a gender difference for pathological gambling of between 8 and 11% for adolescent samples of male gamblers and between less than 1 and 3.5% for adolescent samples of female gamblers, depending on the tool used. This difference is not simply a matter of males being more likely than females to gamble, as these percentages are based on a sample of male and female gamblers, not the entire population. It is not clear, however, whether the predictors of gambling involvement are similar for male and female adolescents, and research addressing this issue with a sample of adolescents that represent the full range of gambling involvement (e.g., no involvement through to high-risk gambling) is limited. The present study specifically examined this issue.

Predictors of Risk-Behavior Involvement

Researchers to date have examined only a small number of predictors of adolescent gambling drawn primarily from the substance abuse literature (e.g., Gupta & Derevensky, 1998b; but see Langhinrichsen-Rohling et al., 2004).

Petraitis, Flay, and Miller (1995) reviewed 14 multivariate theories of adolescent experimentation with substance use (e.g., theory of planned behavior: Ajzen, 1988; social learning theory: Akers, 1977; problem-behavior theory: Jessor & Jessor, 1977) and attempted to integrate these theories into three distinct types of influence (social, attitudinal, and intrapersonal) referred to as the Theory of Triadic Influence (TTI). While the TTI specifically addresses adolescent experimentation with substances, the theory also has implications for other health risk behaviors such as adolescent gambling behavior.

The first type of influence, social factors, considers the characteristics and behaviors of the people who form an intimate support system for adolescents. Theories relating to the support system primarily focus on parents and peers (Petraitis et al., 1995). In fact, parental and peer involvement in and support of gambling has been found to be a predictor of adolescent gambling involvement (Hardoon & Derevensky, 2002; Langhinrichsen-Rohling et al., 2004). With respect to gambling and peer influence, Griffiths (1990) reported that 44% of adolescents initiated gambling behavior because their friends were engaging in similar practices.

Central to the theories on the second type of influence, attitudinal factors, are the adolescents' orientations toward their own experimentation with substances. After reviewing the theories, Petraitis et al. (1995) suggest that adolescents may be more likely to experiment with substances if they are not committed to conventional society, religion, school, or people who hold negative views of experimentation.

The third type of influence proposed by Petraitis et al. (1995), intrapersonal influences, focuses on personality traits, dispositions, and affective states, general behavioral skills, and adolescents' beliefs about their behavioral skills relating to substance use. In the review of the theories, Petraitis et al. (1995) cited an extensive list of intrapersonal influences such as impaired cognitive functions, impulsiveness, emotional distress, tendencies toward risk-taking and thrill-seeking, low self-esteem, poor coping skills, deficient social interaction skills, and poor academic skills. Research specifically on risk factors for adolescent gambling behavior has found that when compared to non-problem gamblers, problem gamblers report gambling at an early age (Gupta & Derevensky, 1998a; Lynch, Maciejewski, & Potenza, 2004); have higher rates of depression (Gupta & Derevensky, 1998a; Lynch, et al., 2004); and score higher on impulsivity (Vitaro, Ferland, Jacques, & Ladouceur, 1998). Pathological gamblers also have been found to have lower self-esteem (Gupta & Derevensky, 1998b). In addition, both at-risk and probable pathological gamblers have been found to report higher numbers of major and minor life events than non-gamblers and social gamblers (Gupta & Derevensky, 2001). Social, attitudinal, and intrapersonal factors may each contribute to whether an adolescent will choose to participate in gambling activities.

Overall, the TTI offers the most comprehensive approach to the examination of potential factors which may be associated with gambling behavior. The purpose of this study was to examine gambling behavior in a normative adolescent population and to gain insight into the gender-specific factors

which might be related to adolescent gambling. Further, this study includes a comprehensive set of variables in predicting gambling behavior, and examines the range of gambling involvement for each gender.

Method

As part of a larger project examining adolescent lifestyle choices, a 23–page self-report questionnaire was administered to students in classrooms by trained research staff. Participating students were from 25 high schools encompassing a school district in a southern Ontario region in Canada. The overall participation rate was 76% of enrolled students (N = 7,430). Non-participation was largely due to student absenteeism (17%). A total of 2% (n = 140) of respondents were screened out due to acquiescent rating styles. Of the 7,290 remaining participants, those who completed less than 50% of the gambling questions were removed (48%, n = 3,523), given that over 50% of the data would have to be imputed for these individuals. The final analysis sample included 3,767 participants. Differences between the analysis sample and the non-included students were minimal.[1]

Participants (49% male) ranged in age from 13 to 18 years (M = 15.7, SD = 1.4). Consistent with the broader Canadian population (Statistics Canada, 2001), 91% of the adolescents were born in Canada. SES status indicated mean levels of education for mothers and fathers fell between ''some college/university/apprenticeship program'' and ''a college/apprenticeship/technical diploma''.

Measures

The present study included 56 predictor variables encompassing multiple domains (school, neighborhood, family, intrapersonal, friends, peers). Further information regarding the measures is found in Table 1 and is available from the first author. The measures were conceptually reduced to 19 constructs

[1]Sensitivity checking was conducted between the sample of adolescents (N = 3,767) who had less than 50% missing on both the gambling measure and the sample of adolescents who had more than 50% missing data on either of the gambling behavior measures (n = 3,253). Mean comparisons using one-way ANOVAs were based on demographics (age and gender) and variables/behaviors that appeared before the mid-part of the survey (e.g., school grades, attachment to mother and to father, depression, self-esteem). Due to the large sample size, many comparisons based on group averages were statistically significant. In general, the excluded group was slightly younger, comprised of a slightly greater percentage of males, and reported lower average grades. A discriminant function analysis was conducted to determine the extent to which the two samples could be differentiated based on these variables. Together, the demographic and intra/interpersonal variables explained only 2.2% of the separation between groups, Wilkes Λ = .978, χ^2 = 149.67, df = 9, p < .001. Discriminant function analyses also were conducted using the full sample (N = 7,290) with missing data imputed. Analyses revealed consistent results with the smaller sample (n = 3,767) suggesting that, when compared to participants excluded from the sample due to missing data, the sample of respondents in this study was not meaningfully different in terms of demographics or inter/intrapersonal variables.

Table 1 Description of measures

Domain	Measure	Items (Alpha)	Scale range
Demographics	Age	1	1-"10" to 9-"18 or over")
	Gender	1	"male" or "female"
Neighborhood	Neighborhood Quality	5 (α = .66)*	1 = "strongly agree" to 5 = "strongly disagree"
	Substance Availability - neighborhood	4 (α = .93)*	1 = "almost never" to 4 = "almost always"
	Substance Availability - school	4 (α = .86)*	1 = "almost never" to 4 = "almost always"
School	School Culture	30 (α = .93)*	1 = "strongly agree" to 5 = "strongly disagree"
	Grades	1	1 = "A+" to 6 = "below 50%"
	School Goals	1	1 = "don't know" to 6 = "obtaining professional training (e.g., Masters, Ph.D., physician)"
	Bored at School	1	1 = "all the time" to 4 = "never or almost never"
	Planfulness	1	1 = "almost always or always" to 4 = "almost never or never"
	Do well in school (self, friends, parents)	3	1 = "very important" to 5 = "don't know"
Family	Background	5	Categorized as high risk if indicated being abused, mother was a teen mom, in foster care, parents receiving social assistance, OR parents with alcohol/drug problems
	Mother's (Father's) Education	2 (1 per parent)	1 = "did not finish high school" to 6 = "completed a professional and/or graduate degree
	Curfew (week and weekend)	2 (1 weekday, 1 weekend)	1 = "not allowed out" to 9 = "as late as I want"
	Talk with Parents	1	1 = "almost every day" to 4 = "almost never"
	Fun with Parents	1	1 = "almost every day" to 4 = "almost never"
	Parents Know	9 (α = .90)*	1 = "they always know" to 4 = "they never know"
	Attachment – Dad	17 (α = .87)*	1 = "almost always or always" to 4 = "almost never or never"
	Attachment - Mom (same as above but with wording changed to mother)	17 (α = .89)*	1 = "almost always or always" to 4 = "almost never or never"

Table 1 continued

Domain	Measure	Items (Alpha)	Scale range
	Parents Ask	9(α = .81)*	1 = "1 tell them without their asking" to 4 = "they never ask"
	Siblings Risk Behavior	4 (α = .83)*	1 = "almost never or never" to 4 = "almost always or always"
Peers	Dating	1	1 = "every day" to 5 = "never"
	Hung out with friends	1	1 = "every day" to 5 = "never"
	Partying	1	1 = "every day" to 5 = "never"
	Skipping Class	1	1 = "6 or more times" to 5 = "never"
Peer's cont'd	Clubs – School	1	1 = "every day" to 5 = "never"
	Sports – School	1	1 = "every day" to 5 = "never"
	Clubs - Community	1	1 = "every day" to 5 = "never"
	Sports – Community	1	1 = "every day" to 5 = "never"
	Best Friend	18 (α = .91)*	1 = "almost always or always" to 4 = "almost never or never"
	Friendship Quality	18 (α = .94)*	1 = "almost always or always" to 4 = "almost never or never"
	Victimization - Direct and Indirect	(a) 4 direct (α = .81)* (b) 4 indirect (α = .72)*	1 = "every day" to 5 = "never"
Intrapersonal	Temperament – Separate Subscales for Adaptability, Activity, Rhythmicity, Flexibility, Mood, Distractibility, Persistence	(a) 3 activity level (α = .79)* (b) 4 sleep/ rhythmicity (α = .58)* (c) 5 adaptability/approach/ avoidance (α = .68)* (d)4 flexibility (α = .36)* (e) 4 affect/mood (α = .85)* (f)4 distractibility (α = .53) (g) 3 persistence (α = .68)*	1 = "almost always or always" to 4 = "almost never or never"
	Social Anxiety	14 (α = .93)*	1 = "almost never or never" to 4 = "almost always or always"

Table 1 continued

Domain	Measure	Items (Alpha)	Scale Range
	Self-Esteem	10 (α = .90)*	1 = "strongly agree" to 5 = "strongly disagree"
	Depression	20 (α = .92)*	1 = "none of the time" to 5 = "most of the time"
	Daily Hassles	25 (α = .72)*	1 = "almost never bothers me" to 3 = "often bothers me"
	Life Satisfaction	1	1 = "almost always or always" to 4 = "almost never or never"
	Religiosity	1	1 = "yes" to 3 = "no
	Church Attendance	1	1 = "every day" to 5 = "never"
	Tolerance of Deviance	11 (α = .89)*	1 = "very wrong" to 4 = "not at all wrong"
	Risky for You	7 (α = .84)*	1 = "every day" to 5 = "never"
	Risky for Others	7 (α = .88)*	1 = "every day" to 5 = "never"
	Friends Upset	6 (α = .89)*	1 = "very upset" to 4 = "not at all upset"
	Parents Upset	6 (α = .79)*	1 = "very upset" to 4 = "not at all upset"
Gambling	Gambling Behavior – Frequency and Consequences	(a) 8 Frequency (α = .83)* (b) 6 Consequences (α = .88)	Frequency: 1 = "never" to 5 = "every day" Consequences: 1 = "never" to 4 = "every time"

Note. * Average composite score was created

(see Table 2). For constructs with more than two variables, a principal components analysis was used to identify those variables with loadings of .50 or greater on the construct. Two of the constructs, temperament and academic orientation, resulted in two components each. Component scores were computed by averaging standardized scores for these predictors using a unit-weighting procedure (Grice & Harris, 1998; Grice, 2001). Single measures also were standardized prior to analysis. The final analysis, therefore, was based on 21 predictors.

Demographics: Participants were asked to indicate their gender and age.

School Domain: School culture (Kelly et al., 1996) assessed perceptions of teachers, peers, and school administration. Higher scores reflected more negative school perceptions. Academic orientation assessed grades, goals, frequency of planning ahead, etc. In the composite academic orientation index, higher scores indicated a weaker orientation towards school and education.

Neighborhood Domain: Neighborhood quality assessed perceptions of one's neighborhood from Health Canada's Community Action Programs for Children (1994). Higher scores indicated poorer perceived neighborhood conditions. Substance availability assessed the availability of substances in one's neighborhood and school. Higher scores indicated greater perceived availability.

Family Domain: Parental education was assessed with two items (one per parent). Higher scores indicated greater parental education. At-risk family background was defined as any one of the following: self-reported abuse, having a teenage mother, living in foster care, parental alcohol/drug problems, or family receiving social assistance. Parental monitoring assessed curfew on school nights and on weekends. Higher scores indicated later curfews.

Relationships with one's parents was assessed in several ways: paternal and maternal attachment were measured separately using the Inventory of Parent and Peer Attachment (Armsden & Greenburg, 1987), two items measured the frequency of talking and having fun with one's parents, and parental knowledge assessed how much one's parents/guardians really know about how the respondent spends their free time. In the composite parental relationship index, higher scores indicated less positive parental relationships.

Sibling modeling of risk behaviors assessed how often one's brothers or sisters used a variety of substances. Higher scores indicated more frequent sibling modeling of risk behaviors. Respondents with no siblings were assigned the lowest score.

Peer Domain: Frequency of involvement in unstructured (e.g., hanging out with friends) and structured activities (e.g., clubs and sports) in the previous month were assessed. Higher scores indicated less involvement. Relationships with friends were assessed using two scales, the quality of one's ''best friendship'' (Gauze, Bukowski, Aquan-Asse, & Sippola, 1996), and the quality of one's general friendships (Armsden & Greenburg, 1987). Higher scores indicated weaker friendship attachments. Peer victimization (Marini, Spear, & Bombay, 1999) assessed the frequency of experiencing direct and indirect

Table 2 Principal component loadings by construct

Construct	Variable	Component	Variance accounted for	Loading
Age	Age			–
Gender	Gender			–
Background	Background			–
Temperament	Rhythmicity	1	32.6 %	.51
	Distractibility	1		.68
	Persistence	1		.75
	Approach	2	22.8 %	.65
	Activity level	2		.64
	Mood	2		.58
Parental education	Father's education			–
	Mother's education			–
Neighborhood quality	Sense of neighborhood			–
Substance availability	School availability			–
	Neighborhood availability			–
School culture	School culture			–
Parental monitoring	Weekday curfew	1	57.1%	.88
	Weekend curfew	1		.89
	Parents ask	1		–.39*
Parental Relationship	Attachment to mother	1	53.5%	.75
	Attachment of father	1		.71
	Have fun with parents	1		.74
	Talk with parents	1		.80
	Parental knowledge of activities	1		.65
Peer victimization	Direct victimization			–
	Indirect victimization			–
Friendship quality	Best friendship quality			–
	Friendship quality			–
Sibling risk behavior	Sibling risk behavior			–
Academic orientation	Grades	1	34.2%	.68
	Educational goals	1		–.62

Table 2 continued

Construct	Variable	Component	Variance accounted for	Loading
	Importance of doing well –self	1		.80
	Planfulness	1		.58
	Bored at school	1		–.53
	Importance of doing well – parents	2	15.9%	.66
	Importance of doing well - friends	2		.62
Religiosity	Spirituality			–
	Attendance at religious services			–
Structured activities	Sports at school	1	45.0 %	.54
	Sports outside of school	1		.69
	Clubs at school	1		.74
	Clubs outside of school	1		.70
Well-being	Depression	1	53.3%	.81
	Social anxiety	1		.52
	Self-esteem	1		.87
	Life Satisfaction	1		.76
	Daily hassles	1		.63
Unstructured activities	Partying	1	50.5%	.79
	Hanging out with friends	1		.74
	Skipping classes	1		.60
	Dating	1		.69
Risk attitudes / perceptions	Parents upset by risk	1	51.6%	.70
	Friends upset by risk	1		.77
	How wrong / Tolerance	1		.68
	Risky for you	1		.68
	Risky for others	1		.76

Note. N = 3,767. * Variables with loadings < .50 were excluded from the component scores

forms of bullying in the past year. In the composite peer victimization index, higher scores indicated greater victimization from one's peers.

Intrapersonal Domain: Seven dimensions of temperament were assessed by items from the DOTS-R (Windle & Learner, 1986). In the composite temperament index, higher scores indicated a more difficult temperament. Well-being was measured using several scales. Depression-related symptoms were measured using the CES-D (Centre for Epidemiological Studies Depression Scale, 1972). Social anxiety-related symptoms were assessed using a scale by Ginsburg, LaGreca, and Silverman (1998). Self-esteem was measured using the Rosenberg self-esteem scale (Rosenberg, 1965). Daily hassles assessed the frequency of experiencing potential life stressors/hassles. Satisfaction with life was assessed using one item. In the composite well-being index, higher scores indicated less positive psychological well-being. Two items assessed the importance of religion in one's life. Higher scores indicated less religiosity.

Five scales assessed risk attitudes/perceptions regarding risk behavior involvement. Attitudes concerning how wrong it is to engage in unconventional and anti-social behaviors were assessed using Jessor et al.'s (1977) tolerance of deviance scale. Higher scores indicated a greater tolerance of deviant behaviors. The expected costs of involvement in health-risk behaviors were assessed using two items, how risky the respondent believed it was for them to engage in various behaviors, and how risky the respondent believed it was for other people their own age to engage in these behaviors. In each case, higher scores indicated less perceived risk. Two items assessed perceived social approval of involvement in health-risk behaviors: how upset one's parents would be by their involvement with risk behaviors, and how upset one's friends would be by their involvement in these behaviors. In both cases, higher scores indicated greater perceived social approval. For the composite index, higher scores indicated a less permissive orientation towards risk behavior involvement.

Gambling Activities: Participants were asked to indicate their involvement in eight gambling activities during the past month. Gambling scores were averaged to form an overall gambling score with higher scores indicating more frequent gambling. Correlations among the activities ranged from .23 to .68.

Gambling Consequences: The original 12-item South Oaks Gambling Screen—Revised for Adolescents (SOGS-RA) (Winters, Stinchfield, & Fulkerson, 1993a) was adapted to include six questions that examined the frequency of consequences that occurred as a result of gambling involvement in the past 12 months. Scores were summed for an over-all gambling problem score, with higher scores indicating greater gambling consequences. The six consequences were correlated between .39 and .69.

Gambling Levels of Risk: Participants were classified in one of four levels of gambling risk: no risk (non-gamblers), low-risk, at-risk, and high-risk. Youth who responded *never* to all eight gambling activities in the past month *and* never to all six gambling consequences in the past year were classified as no risk. Gamblers then were classified as one of three levels of risk: low-risk, at-risk, and high-risk. The low risk gamblers were those students who reported

gambling no more than weekly on any one gambling activity *and* who responded *never* on all six gambling consequences (Poulin, 2000). At-risk gamblers were those gamblers who reported gambling two times or more each week and experienced no consequences (Poulin, 2000) *or* who reported gambling no more than *2 times per week or more* and reported experiencing one consequence (Derevensky & Gupta, 2000b; Poulin, 2000) *or* who reported participating in any one gambling activity no more than monthly and reported experiencing two or three consequences (Ladouceur et al., 2002; Poulin, 2000). High-risk gamblers were those students who reported experiencing four or more gambling consequences (Derevensky & Gupta, 2000b; Poulin, 2000, 2002), *or* who reported participating in any one gambling activity daily (Poulin, 2000, 2002; Winters et al., 1993b), *or* who reported participating in any one gambling activity either *weekly* or *two times or more each week* and reported experiencing two or more consequences (Poulin, 2000, 2002; Winters et al., 1993b).

Treatment of Missing Data

The amount of missing data was directly related to survey length, i.e., missing values were greatest towards the end of the survey. Thus, missing data was likely due to time constraints, fatigue, and survey length. Composite (average) scale scores were computed for participants who responded to at least 50% of the items within a scale. For students who did not give a sufficient number of responses within a scale, composite scores were imputed using the EM (expectation-maximization) algorithm in SPSS.

Plan for Analysis

First, frequency analyses were conducted to determine the prevalence of each group of gamblers (no risk, low-risk, at-risk, and high-risk) and the gambling consequences experienced by each group. Gender differences were assessed using chi-square analyses. Second, discriminant function analyses (DFA) were performed to describe the separation among the four groups of gamblers for each gender using the 20 predictors in one block. DFA allows for the assessment of the overall amount of variance explained by the separation among groups captured by the discriminant functions, and the contribution of each predictor to the separation among risk levels in the context of the other variables.

Three discriminant functions were extracted and were considered statistically significant at $p \leq .001$. The relative usefulness of a given predictor in a DFA model was determined by the standardized discriminant function coefficients. Structure coefficients also are reported to identify other variables that may have meaningful correlations with the discriminant function, but may not have noteworthy function weights (Courville & Thompson, 2001; Dunlap & Landis, 1998). In light of the number of predictors in the DFA model, a variable was considered 'noteworthy' if the standardized function coefficient

was .15 or greater, *and* the structure coefficient was .30 or greater. For noteworthy variables, one-way ANOVA's and Tukey pairwise comparisons were used to test for mean differences across risk levels, and between pairs of risk levels respectively.

Results

Table 2 displays the 56 original variables sorted by construct, as well as the factor loadings for constructs with three or more indicators. Correlations among the composite predictors and gambling involvement were low to moderate ranging from .001 to .244.

Prevalence of Groups of Gamblers

Participants were divided into four gambling groups, (1) no risk (non-gamblers), (2) low-risk gamblers, (3) at-risk gamblers, and (4) high-risk gamblers. Of the 3,767 participants in this sample, 1,462 (38.8%) were classified as no risk (non-gamblers), 1,330 (35.3%) were classified as low-risk gamblers, 690 (18.3%) were classified as at-risk gamblers, and 309 (8.2%) were classified as high-risk gamblers. The percentage of high-risk gamblers is consistent with past research (Derevensky & Gupta, 2000a; Winters, et al., 1993b). There also was a significant gender difference (χ^2 (3, N = 3,767) = 202.95, $p < .001$) in the composition of the gambling groups. Consistent with past research (Gupta & Derevensky, 2001), more males were classified in the at-risk and high-risk gambling groups than females (at-risk gamblers: 21.5% (n = 370) vs. 15.6% (n = 320); high-risk gamblers: 14.1%, n = 242 vs. 3.3%, n = 67).

Experiencing of Consequences

The number of consequences experienced also was examined among the at-risk and high-risk gambling groups (see Table 3). Overall, chi-square analyses reveal significant gender differences (χ^2 (6, N = 999) = 47.70, $p < .001$). When each gambling group was examined separately, however, no significant gender difference was revealed (at-risk gambling group: χ^2 (3, N = 690) = 7.40, p = .06; high-risk gambling group χ^2 (6, N = 309) = 5.70, p = .457).

Table 3 Reported gambling consequences by gender

Gambling classification		N	% who experienced gambling consequences				
			0	1	2	3	4+
At-Risk	Overall	690	14.8%	66.5%	14.1%	4.6%	
	Male	370	14.1%	64.3%	15.1%	6.5%	
	Female	320	15.6%	69.1%	12.8%	2.5%	
High-Risk	Overall	309	14.9%	4.2%	24.9%	11.3%	44.6%
	Male	242	13.6%	5.0%	23.1%	12.0%	46.2%
	Female	67	19.4%	1.5%	31.3%	9.0%	38.8%

Factors Discriminating Among Groups of Gamblers by Gender

To examine which variables best discriminate among the groups of gamblers for each gender (no risk, low-risk, at-risk, and high-risk) in the overall model, 20 predictors were simultaneously entered into discriminant function analyses. The model for males explained a total of 18.1% of the variance in gambling. The first two functions were significant explaining a total of 93.7% (76.4% and 17.3% for functions 1 and 2 respectively) of the explainable variance. Similarly, the model for females explained a total of 13.3% of the variance in gambling. The first two functions were significant explaining 89.4% of the explainable variance (72.1% and 17.3% for functions 1 and 2 respectively). For both models, the first function differentiated among each of the four groups with the greatest separation between the non-gamblers and high-risk gamblers. For the model for males and the model for females, function 2 differentiated the greatest between the low and high-risk gamblers.

For a summary of noteworthy predictors across models for each gender, see Tables 4 and 5. Within the two models (male, female), the following variables were noteworthy for function 1: unstructured activities (male, female), risk attitudes/perceptions (male, female), parental monitoring (female), friendship quality (female), approach/activity/mood (male, female), sibling risk behaviors

Table 4 Predictors discriminating among groups of gamblers for the model for males

Predictor	Function 1			Function 2	
	SDFC	SC	Tukey	SDFC	SC
Age	.118	.004		.005	–.043
Background	–.001	.012		.177	.163
Rhymicity/distractability/persistence	–.043	–.218		–.051	.186
Approach/activity/mood	**.251**	**.304**	**3,4,2 < 1**	**.433**	**.533**
Parental Education	.054	.053		.039	–.105
Neighborhood Quality	.079	–.092		–.042	.325
Substance Availability	–.062	–.295		.164	.113
School Culture	–.120	–.245		–.025	.285
Parental Monitoring	–.173	–.195		–.019	–.049
Parental Relationship	.198	–.151		.094	.455
Peer Victimization	–.029	–.214		.109	.330
Friendship Quality	–.315	–.272		.032	.473
Sibling Risk Behavior	**–.171**	**–.334**	**1,2 < 4**	–.021	.078
Academic Orientation	.077	–.150		.016	.281
Academic Importance to Others	.036	–.001		**.189**	**.354**
Religiosity	–.041	–.175		–.352	–.212
Structured Activities	**.327**	**.334**	**4,3 < 1**	**.177**	**.335**
Well-Being	**–.365**	**–.357**	**2,3,1 < 4**	**.539**	**.716**
Unstructured Activities	**.529**	**.627**	**4 < 2 < 1; 3 < 1**	.124	.291
Risk attitudes/perceptions	**–.304**	**–.497**	**1,2,3 < 4**	.153	.235

Note. SDFC = standardized discriminant function coefficient, SC = structure coefficient. Tukey's results indicate the significant differences among the gambling groups (1 = non-gamblers, 2 = low-risk, 3 = at-risk, 4 = high = risk/problem). If a gambling group is not listed, there are no significant differences between that group and the other groups

Table 5 Predictors discriminating among groups of gamblers for the model for females

Predictor	Function 1			Function 2	
	SDFC	SC	Tukey	SDFC	SC
Age	.256	.292		–.101	–.185
Background	–.145	–.109		–.015	.017
Rhymicity/distractability/persistence	–.015	.217		–.107	.297
Approach/activity/mood	–.156	–.225		.036	.162
Parental Education	–.041	.047		–.060	–.295
Neighborhood Quality	–.103	.088		–.206	.185
Substance Availability	–.069	.231		–.004	.078
School Culture	.064	.215		–.003	.323
Parental Monitoring	**.372**	**.351**	**1 < 4**	–.175	–.240
Parental Relationship	–.030	.232		**.301**	**.563**
Peer Victimization	**.307**	**.370**	**1,2,3 < 4**	**.219**	**.381**
Friendship Quality	.238	.203		**.302**	**.530**
Sibling Risk Behavior	.118	.335		.028	.120
Academic Orientation	.044	.211		**.385**	**.628**
Academic Importance to Others	–.176	–.093		.110	.340
Religiosity	.079	.232		–.163	.049
Structured Activities	–.324	–.244		**.434**	**.569**
Well-Being	.045	.201		.043	.550
Unstructured Activities	**–.325**	**–.560**	**4,3 < 1**	.093	.107
Risk attitudes/perceptions	**.429**	**.578**	**1 < 3,4; 2 < 4**	.056	.334

Note. SDFC = standardized discriminant function coefficient, SC = structure coefficient. Tukey's results indicate the significant differences among the gambling groups (1 = non-gamblers, 2 = low-risk, 3 = at-risk, 4 = high = risk/problem). If a gambling group is not listed, there are no significant differences between that group and the other groups

(male), age (female), well-being (male), peer victimization (female), and structured activities (male). For function 2, within the two models (male, female), the following variables were noteworthy: structured activities (male, female), approach/activity/mood (male), academic importance to others (male), well-being (male), parental relationship (female), peer victimization (female), friendship quality (female), and academic orientation (female). In the model for males, the predictors approach/activity/mood, structured activities, and well-being were noteworthy and loaded on both functions. The loading for structured activities was evenly split between functions while the loadings for approach/activity/mood and well-being were greater on the second function. In the model for females, the predictor peer victimization was noteworthy and loaded on both functions; however, the loading was greater on the second function. In both the male and female models, the first function follow-up analyses revealed the most frequent separation was between the high-risk gamblers and the other groups of gamblers.

Discussion

The purpose of this research was to examine gender-specific factors which might be related to adolescent gambling behavior, using a comprehensive set

of predictors from neighborhood, school, family, peer, and intrapersonal domains. Consistent with past research, overall gender differences were found in the frequency of gambling and the experiencing of consequences, with males reporting gambling and experiencing consequences more often than females (e.g., Derevensky & Gupta, 2000a). This gender difference supports past research findings that have shown a male bias with other risk behaviors (e.g., delinquency and alcohol use: Griffin, Botvin, Scheier, Doyle, & Williams, 2003).

According to Wolfgang (1988), gambling involvement may be influenced by sex-role socialization. Sex-role socialization may contribute to opportunities, motives, and the development of skills, all of which may influence both interest and participation in gambling activities. For example, males may be socialized more than females to be risk-takers. Griffiths (1989) hypothesized that for males, the social environment of gambling allows them opportunities to test their courage (e.g., when taking risks to win), an important social trait in adulthood, and may explain the higher rates of gambling among males as compared to females. In addition, gambling participation may allow males to demonstrate greater maturity status (see Moffitt, 1993 for a discussion of delinquency and males). Further, males and females may be attracted to different types of leisure activities with males preferring gambling activities and females preferring games with verbal skill (Zenker & Wolfgang, 1982).

Overall, the percentage of high-risk gamblers in this study (8.2%) was consistent with proportions reported in the literature (between 3.4 and 8.7%, Gupta & Derevensky, 1996, 2001). Also consistent with past research, males were more likely than females to be categorized as problem gamblers (e.g., Gupta & Derevensky, 1997; Poulin, 2002). High-risk gamblers reported greater participation in all gambling activities and also reported experiencing more gambling consequences than other gamblers. These findings suggest that it is neither a specific gambling activity nor a specific gambling consequence that differentiates high-risk gamblers from other gamblers. Rather, what appears to distinguish the high-risk gamblers from other gamblers is frequency of participation.

Factors that Discriminate Among Groups of Gamblers

Discriminant function analyses revealed that almost 18% of the variance in gambling group separation for males was accounted for by the 21 predictors, while slightly less variance (13%) in gambling group separation was accounted for in the model for females. The models for each gender had two significant functions, with the first function accounting for most of the explainable variance (72% and 76% for females and males respectively), and the second function accounting for only 17% in both models. Across both models, the first function separated the four groups of gamblers—no risk, low-risk, at-risk, and high-risk. For the most part, the discrimination among the four gambling groups was monotonic with the high-risk gamblers reporting poorer outcomes

on each noteworthy variable and the non-gamblers reporting more positive outcomes.

Noteworthy predictors within the first function varied across models. The model for males revealed predictors that are commonly associated with engagement in risk behavior (e.g., Griffin et al., 2003), such as role modeling by siblings. The model for females revealed a greater influence by peers and parents in predicting their involvement with gambling (e.g., noteworthy predictors included parental monitoring and peer victimization). These findings again may reflect the sex-role socialization theory suggested by Wolfgang (1988) where parents may monitor the activities of females to a greater extent that those of males. As a result, participation in gambling activities may be less acceptable for females, increasing the likelihood of being victimized by their peers for increased gambling involvement. Alternatively, it may be that parents are more involved with female gambling activities (e.g., purchasing lottery tickets for them, Ladouceur, Jacques, Ferland, & Giroux, 1998) and thus, are more aware of their gambling activities. With respect to peer involvement, females may participate in gambling activities as a way of coping with peer victimization.

The two consistent predictors across both male and female models were participation in unstructured activities and risk attitudes/perceptions. These findings are consistent with past research examining the role of attitudes and perceptions on behavior, including problem behavior theory (Jessor & Jessor, 1977) and theory of planned behavior (Ajzen, 1988). Also, our finding regarding the link between unstructured activities and problem gambling behavior is consistent with results previously reported by Agnew and Peterson (1989) and Mahoney and Stattin (2000) relating to other problem behaviors. These results suggest that there may be a similar etiology to gambling participation as found with other risk behaviors. Participation in unstructured activities may facilitate associations with peers who engage in gambling behaviors, thus increasing the likelihood of subsequent participation in risk activities. Alternatively, adolescents may seek out activities and peers who support their gambling behaviors.

The second function in both male and female models separated the high-risk gamblers from the other three groups, with the greatest separation between the low-risk gamblers and the high-risk gamblers. Participation in structured activities (i.e., involvement in sports and clubs) was the only consistent discriminating variable of this function across models. This finding may be due to the opportunities that participating on sports teams provide for placing bets on the outcome of sports events. Because such a small amount of the variance was accounted for by this function, however, few conclusions can be drawn.

It is important to note that this study was a cross-sectional study of a relatively homogenous sample thus limiting the generalizability of results. In addition, the lack of longitudinal data limits the conclusions that can be drawn as no causal relations can be established. Further, the data collection was based on a self-report procedure. Researchers have demonstrated, however,

that when students are assured of confidentiality, self-report measures of risk behaviors have good validity (e.g., White, 1991).

Another limitation of this study was missing data due to the length of the survey and potential fatigue. Participants may not have been as careful answering questions at the end of the survey as they were at the beginning of the survey. In addition, only those who had answered at least 50% of the gambling questions were included for analysis.

Overall, it is not clear why there are consistent gender differences in adolescent gambling behavior. Do females engage in different gambling activities from those that were included in this research; are females' views of gambling different from males; or is it that females are less susceptible than males to becoming problem gamblers? Alternatively, if females just gamble less than males, what explains the difference in degree of gambling involvement? These questions need to be addressed in future studies in order to understand the gender difference consistently found in research. Importantly, the present study highlights that factors that may play an important role with adolescent females and therefore should be further explored, are the influence of parents and peers.

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