Psychosocial Variables Associated With Adolescent Gambling

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The authors empirically examined the relations between several psychosocial variables associated with adolescent problem gambling. Participants were 2,336 students in Grades 7–13, and all completed a questionnaire regarding gambling activities, gambling severity, perceived social support, drug and alcohol dependence, and various social, emotional, and behavioral problems. With respect to gambling severity, 4.9% of adolescents met the criteria for pathological gambling, and 8.0% were found to be at risk. Psychosocial difficulties associated with problem gambling include poor perceived familial and peer social support, substance use problems, conduct problems, family problems, and parental involvement in gambling and substance use. A set of predictor variables that may lead to problem gambling includes having family problems, having conduct problems, being addicted to drugs or alcohol, and being male.

The main purpose of this article is to examine the contribution of certain psychosocial variables (social support, substance use, and behavior and learning problems) to the development of serious gambling problems among teens. Adolescents who engage in excessive gambling and are experiencing serious gambling-related problems are often referred to as *probable pathological gamblers*. This nomenclature is currently used as a result of the controversy regarding whether adolescents can, in fact, be *pathological gamblers*, as well as from the notion that adolescent gambling screens are not diagnostic instruments (Derevensky, Gupta, & Winters, 2003). It has been stated that gambling behavior may best be conceptualized on a continuum ranging from nongambling, to social and recreational gambling, to problem gambling, to pathological gambling (National Research Council [NRC], 1999). At the most extreme level, pathological gambling is characterized by a continuous or periodic loss of control while gambling, a preoccupation with gambling and obtaining money with which to gamble, irrational thinking, and a continuation of gambling despite multiple adverse consequences (American Psychiatric Association [APA], 1994).

Familial Contributions to Gambling Behavior

Adolescent pathological gamblers report that their initial gambling experiences occurred with family members in their own homes (Gupta & Derevensky, 1997), with older siblings appearing to be an early predominant influence. A strong correlation has

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similarly been found between adolescent gambling and parental gambling involvement (Wood & Griffiths, 1998). Retrospective studies indicate that 25% to 40% of the parents of pathological gamblers were themselves problem gamblers (Custer, 1982; Jacobs, Marston, & Singer, 1985) and were more likely to have an addiction or to be involved in illegal activities (Griffiths, 1995; Gupta & Derevensky, 1998a; Wood & Griffiths, 1998). The effects of parental gambling have far-reaching consequences. For example, children from homes where parental gambling is a problem report feelings of insecurity and an increased need for acceptance (Lesieur & Rothschild, 1989). In a qualitative study examining the experiences of Australian children (aged 7–18) who live in families where a parent or caregiver has a serious gambling problem, Darbyshire, Oster, and Carrig (2001) showed that children reported feelings of a "pervasive loss," encompassing both physical and existential aspects of the child's life, including parental loss, the loss of peer relationships, trust, security, and a sense of home as well as material goods.

Family factors have often been linked with other risky behaviors. For example, research has indicated that poor parental and family functioning are consistently linked as factors contributing to a drug addiction and that they increase one's risk for conduct problems and delinquency (Loeber & Stouthamer-Loeber, 1986; Sampson & Laub, 1993). Nurco, Kinlock, O'Grady, and Hanlon (1996), in a retrospective study of adult drug users, found a positive relation between exposure to adverse family circumstances and subsequent deviance. More specifically, their results revealed that significantly more addicts reported experiencing one or more family risk factors involving deviant behavior among family members and family disruption before age 11. Nurco et al. hypothesized that the most unfavorable home environments were likely characterized by increased conflict and neglect that resulted from parental deviance or parental separation.

Substance Abuse and Gambling Behavior

Six percent to 10% of adolescents are estimated to meet the criteria for chemical dependency (Wheeler & Malmquist, 1987). Similar to gambling, substance use falls on a continuum with abuse on one end and nonuse on the other. Between these two extremes

is a large proportion of youth who can be categorized as either experimental or casual users (Bailey, 1989).

Compared to nongamblers, adolescent gamblers are more likely to drink alcohol, smoke tobacco, and use drugs (Griffiths & Sutherland, 1998; Potenza et al., 2000; Shaffer & Korn, 2002). In an examination of a series of Minnesota youth studies, high frequencies of comorbidity were consistently found between gambling involvement and alcohol and other drug use. Compared to drug users, adolescents were three times more likely to have never gambled if they had never used drugs. Students were almost four times more likely to be a weekly or daily gambler if they were also a weekly or daily user of drugs, compared to students who used drugs less frequently or who did not use drugs (Winters & Anderson, 2000). Adolescents who experience problems associated with both gambling and substance abuse are more likely to engage in delinquent or illegal behaviors (Griffiths & Sutherland, 1998). Although the nature of the association between drug use and gambling involvement is still open to debate (Winters & Anderson, 2000), Stinchfield and Winters (1998) identified several common risk factors for both drug abuse and problem gambling, including low self-esteem, depression, suicidality, being a victim of abuse (physical or sexual), poor school performance, history of delinquency, poor impulse control, being male, early onset, parental history of respective problems, and community and family norms that promote accessibility to the respective activity. Winters and Anderson (2000) concluded that the association between these two behavior patterns is not trivial given the overlap between the risk factors. Additional research is needed to shed light on how these common factors lead to the coexistence of gambling and drug use in some youth and not in others and the extent to which distinct risk factors can be identified.

Perceived Social Support

Adolescents' social relationships are believed to have a strong impact on their emotional health and well-being (Rutter, 1995). As such, the study of adolescents' perceptions of these relationships and the way in which they cope with stress and social experiences is important.

Social support has been listed as a possible protective factor against the development of substance use problems (Kandel & Andrews, 1987; Wills & Cleary, 1996). This is particularly true for family support; close, supportive family relationships have been linked with lower drug and alcohol use (Brook, Brook, Gordon, Whiteman, & Cohen, 1990). However, adolescents have been found to place greater importance on peer relationships than family relationships, leading many to conclude that perceived peer support may be more influential on adolescent behavior than family support (Brown, 1990; Ohanessian & Hesselbrock, 1993). Nevertheless, the psychological literature is inconsistent as to the nature of this influence. In some cases, a strong supportive peer network may partially buffer a vulnerable child from negative outcomes (Dodge, Cois, Pettit, & Price, 1990), whereas in other cases close friendship support promotes an adolescent's risk for substance use (Averna & Hesselbrock, 2001; McCubbin, Needle, & Wilson, 1985). Given the uncertainty of the role of social support in the development of substance use, it is important to examine its role.

Behavioral Problems

Adolescent probable pathological gamblers often have a history of delinquency and are more likely to engage in current delinquent and criminal behaviors (Ladouceur, Dubé, & Bujold, 1994; Lesieur & Klein, 1987; Maden, Swinton, & Gunn, 1992; Stinchfield, 2000; Winters, Stinchfield, & Fulkerson, 1993; Wynne, Smith, & Jacobs, 1996). Winters and Anderson (2000) hypothesized that one of the possible pathways leading to substance abuse and gambling disorders is that high-risk status plays a role in the development of a disorder (e.g., conduct disorder), which may then influence substance use and problem gambling. Adolescent probable pathological gamblers are also more likely to have difficulty in school, including increased truancy to gamble, decreased academic performance, and poor grades (Gupta & Derevensky, 1998a; Ladouceur & Mireault, 1988; Lesieur et al., 1991; Wallisch, 1993). A recent study by Ladouceur, Boudrealt, Jacques, and Vitaro (1999) reported that problem gamblers were suspended and failed a course or an academic year significantly more often than nonproblem gamblers and potential problem gamblers. Thus, the study of behavioral problems, particularly conduct disorder, reflects an important and interesting component of research pertaining to youth gambling.

There has been a call for basic and applied research to investigate psychosocial risk factors, familial risk and protective factors, and the comorbidity of gambling with other addictions (see Derevensky, Gupta, Dickson, & Deguire, 2001; Dickson, Derevensky, & Gupta, 2004). There is a paucity of empirical research supporting the relation among several familial, emotional, social, and behavioral variables associated with risk taking and youth gambling problems.

The main objectives of this research were to achieve a greater understanding of the factors that place youth at increased risk for serious gambling-related problems. More specifically, the hypotheses of the current research are the following: (a) participants experiencing serious gambling-related problems will report lower perceptions of familial support; (b) those experiencing serious gambling-related problems will report lower perceptions of social support; (c) those experiencing serious gambling-related problems will perceive their parent(s) as engaging in problematic gambling and/or substance use behavior; and (4) those experiencing serious gambling-related problems will report more behavior/conduct problems, including substance abuse and behaviors common to those experiencing attention-deficit/hyperactivity disorder.

Method

Participants

The sample consisted of 2,336 adolescents (981 males and 1,326 females; 29 did not report their gender) in Grades 7 through 13 (age range: 12–19; $M = 14.76$, $SD = 1.91$). Participants were selected from eight school boards in the province of Ontario, Canada, representing diverse geographic (both urban and rural) locations. The total number of schools that consented to participate was 34 (17 elementary schools and 17 high schools). The number of participants from each grade level was as follows: Grade 7, $n = 359$; Grade 8, $n = 398$; Grade 9, $n = 336$; Grade 10, $n = 372$; Grade 11, $n = 413$; Grade 12, $n = 238$; and Grade 13, $n = 220$.

Instruments

Gambling Activities Questionnaire. The Gambling Activities Questionnaire (GAQ; Gupta & Derevensky, 1996) consists of 13 items and assesses four general domains related to gambling behavior: (a) descriptive information, including prevalence and types of activities, (b) familial gambling and substance abuse history, (c) social networks, and (d) academic achievement. Questions within each section domain are discrete and analyzed individually, and no cumulative scores are calculated.

DSM–IV–MR–J. A revised version of the *DSM–IV–J* (Fisher, 1992), the *DSM–IV–MR–J* (MR = multiple response, J = juvenile; Fisher, 2000), includes 12 items (nine categories) used to screen for pathological gambling during adolescence. Items are modeled after the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–IV*; APA, 1994) criteria for diagnosis of adult pathological gambling. The *DSM–IV–MR–J* was developed for use with adolescents who have gambled during the past year. To compensate for the lack of opportunity for probing, most of the questions in the revised instrument have been given four response options: (a) "never," (b) "once or twice," (c) "sometimes," or (d) "often." The *DSM–IV–MR–J* represents a more conservative classification system of problem and pathological gambling groups in that various questions now require an endorsement above a certain severity level to receive a score of 1. A score >4 out of 9 categories is indicative of pathological gambling. The instrument assesses a number of important variables related to pathological gambling: progression and preoccupation, tolerance, withdrawal and loss of control, escape, chasing, lies and deception, illegal activities, and family or school disruption. Internal consistency reliability for this scale is adequate, with Cronbach's alpha = .75 (which is slightly lower than .78 for the original *DSM–IV–J* screen; Fisher, 2000).

Conners–Wells Adolescent Self-Report Scale: Long Version. The Conners–Wells Adolescent Self-Report Scale: Long Version (CASS:L; Conners & Wells, 1997) is an 87-item self-report scale designed for children ages 12 to 17 (both male and female profiles are provided). This scale is composed of 10 subscales: Family Problems (12 items), Emotional Problems (12 items), Conduct Problems (12 items), Cognitive Problems (12 items), Anger Control Problems (8 items), Hyperactivity (8 items), ADHD (attention-deficit/hyperactivity disorder) Index (2 items), and *DSM–IV* Symptoms Subscales reflecting Inattentiveness (9 items) and Hyperactive–Impulsiveness (9 items). Respondents indicate whether the item is "not at all true" (never, seldom), "just a little true" (occasionally), "pretty much true" (often, quite a bit), or "very much true" (very often, very frequently). This scale contains rationally derived subscales that relate directly to *DSM–IV* criteria (APA, 1994). Reliability, internal consistency coefficients range between .75 and .90 and test–retest reliability was reported to be .60 to .90 for the different subscales. Factor analysis on derivation and cross-validation samples was conducted. Convergent, divergent, and discriminant validity was strongly supported (Conners, 1997).

Perceived Social Support From Friends and Family Scale. The Perceived Social Support From Friends and Family Scale (PSS; Procidano & Heller, 1983) consists of two, 20-item scales, representing perceived social support available from friends (PSS-Fr) and family members (PSS-Fa). Both scales are considered global measures of perceived social support with items reflecting emotional, informational, feedback, and reciprocal supports. The PSS scales have been found to have high internal consistency (α = .90) and test–retest reliability (r = .83).

Personal Experience Screening Questionnaire. The Personal Experience Screening Questionnaire (PESQ; Winters, 1991) is a 40-item adolescent alcohol and other drug abuse screening instrument, for youth aged 12 to 18. It is divided into the following subscales: Problem Severity (the extent to which one is psychologically and behaviorally involved with chemicals), Psychosocial Items, and Drug Use History. Internal consistency analyses included youth from school settings, juvenile detention centers, and drug clinics. Alpha coefficients across all samples are reported to range between .90 and .95 (Winters, 1991). With respect to content validity, heavy reliance was placed on expert judgment and research

knowledge in assessing the content of PESQ items. It is connected to the content validity of the Personal Experience Inventory (PEI; Winters & Henley, 1989), a comprehensive clinical instrument providing a complete diagnostic and treatment readiness profile of a substance-abusing adolescent. The content validity of the PESQ Problem Severity scale is reported to be highly correlated with scores on the PEI Problem Severity scale, in particular on the PEI Personal Involvement With Chemicals Scale (r = .94; Winters & Henley, 1989). Criterion validity was assessed through demonstration of the PESQ scores to past treatment and current diagnoses, agreement between PESQ scores and counselor referrals, and derivation and efficacy of the red flag cutpoint. All were considered within reliable limits (Winters, 1991).

Procedure

Thirty school boards in the province of Ontario, Canada, located in both urban and suburban districts, were randomly selected to participate. Informed consent was obtained from parents and children prior to their participation. Research assistants from McGill University administered the surveys and were present at all times to answer any questions. Participating students completed the instruments in one 50-min period and were assured total anonymity and confidentiality.

Results

Data Analyses

Participants were divided into groups on the basis of gambling severity as measured by their gambling behavior (GAQ) and severity (*DSM–IV–MR–J* gambling screen). The GAQ was used to ascertain whether individuals had gambled in the past year. If they reported gambling on the GAQ, then the *DSM–IV–MR–J* was used to further categorize them. These groups include nongamblers, social gamblers (*DSM–IV–MR–J* score = 0–1), at-risk gamblers (*DSM–IV–MR–J* score = 2–3), and probable pathological gamblers (*DSM–IV–MR–J* score >4).

Gambling Prevalence

The results indicate that 66% of the sample reported gambling in the past year, and 20% indicated gambling at least once per week. As depicted in Table 1, 33.3% of youth were classified as nongamblers, 53.8% as social gamblers, 8.0% as at-risk gamblers, and 4.9% as probable pathological gamblers. With respect to gender differences in gambling severity, results revealed that males had significantly more gambling problems than females, $\chi^2(3, N = 2,299) = 157.43, p < .001$. More specifically, males appeared to be five times more likely to be classified as probable pathological gamblers and 2.5 times more likely to be classified as at-risk gamblers relative to females.

Probable pathological gambling was lowest in Grade 7, remained relatively steady in Grades 8 through 12, and jumped significantly in Grade 13, $\chi^2(18, N = 2,328) = 69.84, p < .001$. The same pattern was observed for the at-risk gambling group. Although Grade 13 students are approximately 18 years of age ($M = 17.95, SD = 0.53$) and are legally permitted to gamble on the lottery (scratch tickets, sports betting, and draws), they are prohibited from engaging in casino wagering in Ontario (the legal age is 19).

Perceived Familial and Peer Problem Behavior

Results revealed that probable pathological and at-risk gamblers reported perceiving significantly more family members and peers

Table 1

Gambling Severity by Gender and Developmental Level

		Gambling groups[a]			
Sample	N	Nongambler $(n = 775)$	Social gambler[b] $(n = 1,254)$	At-risk gambler[c] $(n = 186)$	Probable pathological gambler[d] $(n = 113)$
Gender					
Male	978	22.8	56.3	11.8	9.1
Female	1,321	41.2	52.3	4.8	1.7
Grade					
7	356	48.9	43.8	4.5	2.8
8	398	34.7	51.5	8.8	5.0
9	335	34.0	53.4	7.8	4.8
10	371	29.4	58.2	7.8	4.6
11	412	32.5	52.7	9.2	5.6
12	237	24.1	62.9	8.4	4.6
13	219	22.4	60.3	10.0	7.3
Total[e]	2,328	33.3	53.8	8.0	4.9

[a] These values are percentages. [b] *DSM–IV–Multiple Response–Juvenile (DSM–IV–MR–J)* score 0–1. [c] *DSM–IV–MR–J* score 2–3. [d] *DSM–IV–MR–J* score ≥4. [e] Eight participants did not complete the *DSM–IV–MR–J*.

as having a gambling problem than did nongamblers and social gamblers. Linear trends were observed for all individuals across gambling groups such that nongamblers reported the fewest perceived gambling problems, and probable pathological gamblers reported the most perceived gambling problems. With respect to family members, probable pathological gamblers reported significantly more fathers or stepfathers (13.3%), $\chi^2(3, N = 2,328) = 27.44, p < .001$, and other relatives (25.7%), $\chi^2(3, N = 2,328) = 33.96, p < .001$, with perceived parental gambling problems compared to at-risk gamblers (9.7% and 18.8%, respectively). Both the probable pathological and at-risk groups equally reported (although significantly greater than the other groups) that their mothers or stepmothers (7.1% and 7.5%, respectively), their brothers (8.0% and 7.5%, respectively), and sisters (5.3% and 3.2%, respectively) had perceived gambling problems. As for peers, a linear trend was observed for the reported gambling problems of friends, with probable pathological gamblers reporting a significantly greater percentage of friends (43.4%), $\chi^2(3, N = 2,328) = 173.65, p < .001$, having gambling problems. Moreover, this same trend was observed for classmates (32.7%), $\chi^2(3, N = 2,328) = 87.22, p < .001$.

Probable pathological and at-risk gamblers reported significantly more family members and peers who are thought to suffer from a drug or alcohol problem. More specifically, they reported significantly more substance use for their fathers or stepfathers (22.1%), $\chi^2(3, N = 2,328) = 15.43, p < .001$; brothers (19.5%), $\chi^2(3, N = 2,328) = 53.93, p < .001$; and other relatives (35.4%), $\chi^2(3, N = 2,328) = 42.41, p < .001$; than at-risk gamblers (15.6%, 8.1%, and 25.3%, respectively). Although rates were still significantly higher than nongamblers and social gamblers, no significant differences were found between adolescent probable pathological gamblers and at-risk youths' reported knowledge regarding the gambling problems of their mothers or stepmothers (5.3% and 5.9%, respectively) and sisters (8.8% and 5.9%, respectively).

With respect to peers, probable pathological gamblers reported significantly more friends (59.3%), $\chi^2(3, N = 2,328) = 103.65, p < .001$, and classmates (36.3%), $\chi^2(3, N = 2,328) = 30.03, p < .001$, with perceived substance use problems. Finally, no group differences were found with respect to the perception of a drug or alcohol problem of other significant people in the participants' lives.

Psychosocial Factors and Youth Gambling: CASS:L

Participants' raw scores on each of the 10 subscales were calculated and transformed into T scores ($M = 50$, $SD = 10$; covaried for age and gender). The manual suggests a clinical cutoff of a T score that is one and a half standard deviations above the mean (>65), which is the cutoff we used in the present study. Frequencies for the total sample revealed that 11.4% of adolescents had scores in the clinical range on the Family Problems subscale and 15.3% had scores in the clinical range on the Conduct Problems subscale.

Overall, across all subscales, probable pathological gamblers were found to exhibit significantly more psychopathology than all other groups (a greater percentage had scores in the clinical range for all subscales, as compared to other groups of gamblers and nongamblers; see Table 2). As can be seen in Table 2, conduct problems appears to be the largest clinical problem for probable pathological gamblers, with approximately 55% of probable pathological gamblers reported experiencing such problems at clinical levels. Furthermore, approximately 32% of probable pathological gamblers reported experiencing familial problems. These endorse-

Table 2

Conners–Wells Adolescent Self-Report Scale: Long Version (CASS:L) Normal Scores Versus Clinical Cutoff: Familial and Behavioral Problems

CASS:L subscale	Normal (≤64)	Clinical (≥65)
Family Problems**		
Nongamblers	92.1	7.9
Social gamblers[a]	84.9	10.6
At-risk gamblers[b]	80.6	19.4
Probable pathological gamblers[c]	68.1	31.9
Emotional Problems**		
Nongamblers	92.8	7.2
Social gamblers[a]	89.5	10.5
At-risk gamblers[b]	84.9	15.1
Probable pathological gamblers[c]	72.6	27.4
Conduct Problems**		
Nongamblers	92.5	7.5
Social gamblers[a]	85.8	14.2
At-risk gamblers[b]	68.8	31.2
Probable pathological gamblers[c]	44.2	55.8
Anger Control Problems**		
Nongamblers	95.0	5.0
Social gamblers[a]	92.9	7.1
At-risk gamblers[b]	87.6	12.4
Probable pathological gamblers[c]	77.9	22.1

Note. All table values are percentages.
[a] *DSM–IV–Multiple Response–Juvenile (DSM–IV–MR–J)* score 0–1.
[b] *DSM–IV–MR–J* score 2–3. [c] *DSM–IV–MR–J* score ≥4.
** Significant differences across gambling groups, $p < .001$.

ments are in stark contrast to at-risk, social, and nongamblers and are higher than expected.

Perceived Social Support

The PSS includes two scales representing perceived social support available from friends and family members. Results for the entire sample revealed that PSS-Fr scores ($M = 12.69$, $SD = 4.79$) were significantly higher than PSS-Fa scores ($M = 11.53$, $SD = 5.70$), $t(2,328) = 9.20$, $p < .001$.

We performed an analysis of variance to evaluate differences in the PSS for gambling severity, revealing significant differences between the groups on both the PSS-Fr, $F(3, 2324) = 3.89$, $p < .01$, and PSS-Fa scales, $F(3, 2318) = 20.45$, $p < .001$. Post hoc analyses (Tukey's honestly significant difference) revealed that social gamblers had significantly higher mean scores on PSS-Fr than did at-risk gamblers ($p < .05$); nongamblers and social gamblers had significantly higher mean scores on PSS-Fa than did at-risk and probable pathological gamblers ($p < .001$).

Substance Use and Gambling Among Youth

To assess participants' use of drugs and alcohol, we administered the PESQ. We calculated Problem Severity Scale mean scores by summing all items related to problem severity. On the basis of their mean scores, participants were classified into high- and low-risk categories depending on gender and age. A score in the low-risk category indicates no problems with alcohol or drug use, whereas a score in the high-risk category (one and a half standard deviations above the mean of a general school sample) suggests the need for a comprehensive chemical dependency assessment.

Results revealed that 15.8% of the total sample scored in the high-risk category, revealing psychological and behavioral involvement with chemicals to a potentially problematic degree. With respect to gender, significantly more males (17.8%) compared to females (14.2%) were classified in the high-risk category, $\chi^2(1, N = 2,295) = 5.44$, $p < .01$. Developmentally, older children (Grades 10–12) were found to be significantly more at risk than younger children (Grades 7–9), $\chi^2(6, N = 2,323) = 112.81$, $p < .001$.

Finally, with respect to gambling involvement, the percentage of risk with regard to substance use significantly increased with gambling involvement, such that probable pathological gamblers were at greatest risk, $\chi^2(3, N = 2,316) = 175.83$, $p < .001$ (see Table 3). A one-way analysis of variance revealed that severity of problems with substances significantly increased with degree of gambling problems, $F(3, 2315) = 102.53$, $p < .001$. Levene's test of homogeneity of variances was significant, and the null hypothesis of equal variances was rejected, necessitating the use of Tamahane's $T2$ statistic for post hoc comparisons. Significant differences between all of the gambling groups with respect to problem severity (substance use) were found. More specifically, a linear increase was found such that problem severity increased with gambling severity. Probable pathological gamblers had the highest mean scores compared to at-risk ($p < .01$), social ($p < .001$), and nongamblers ($p < .001$).

Table 3

Substance Use (Personal Experience Screening Questionnaire) Gender, Developmental, and Gambling Severity Differences

Sample	Problem Severity score		
	At risk[a]	M	SD
Gender*			
Male	17.8	24.53	9.98
Female	14.2	23.85	8.54
Grade**			
7	1.7	19.11	3.01
8	8.3	20.98	5.45
9	14.9	23.29	5.52
10	23.8	25.56	10.29
11	22.1	27.15	10.87
12	22.8	27.50	9.93
13	20.5	27.90	10.41
Gambling groups**			
Nongambler	7.7	21.35	7.00
Social gambler[b]	15.4	24.22	8.51
At-risk gambler[c]	31.9	29.61	12.09
Probable pathological gambler[d]	50.9	34.41	13.04

[a] Percentage of participants scoring in the high-risk category. [b] DSM–IV–Multiple Response–Juvenile (DSM–IV–MR–J) score 0–1. [c] DSM–IV–MR–J score 2–3. [d] DSM–IV–MR–J score ≥4.
*p < .01. **p < .001.

Logistic Regression

We selected a hierarchical cluster procedure using the entire data set, with the clusters being nested rather than mutually exclusive. A Pearson correlation proximity matrix was generated and analyzed using the between-groups linkage (average) for the cluster analysis. This preferred method considers information about all pairs of distances in forming clusters, not just the closest and farthest. On the basis of the results of the cluster analysis we selected several variables, which were not largely correlated with one another, for the logistic regression (CASS:L subscales of Family Problems, Emotional Problems, Conduct Problems, Anger Control Problems, Hyperactivity, DSM–IV: Inattentive, the PSS-Fr and PSS-Fa scales, and the Problem Severity Scale of the PESQ).

We performed the regression analyses with a training sample in order to cross-validate the results. The model was developed on the training sample (60%) and validated on the validation sample (40%; which was not included in the development of the model). This procedure, called *hold-out sample* (Tabachnick & Fidell, 2001), enables the generalizability of the results to the population.

Probable Pathological Gamblers

Several essential steps were involved in the logistic regression. First, we performed the logistic regression with the selected variables as the covariates along with gender and grade as categorical covariates and probable pathological gambling as the dependent variable (i.e., a dichotomous variable with probable pathological gamblers receiving a 1 and the rest of the sample a 0) using the *enter* method (i.e., the variables are entered in a single step without checking any of the entry criteria except tolerance; Tabachnick & Fidell, 2001). This procedure was performed for both an un-

weighted sample and a sample with a weight of 2, with no significant differences found between the weighted and unweighted models. Further, all parameters (β) were in the same direction. Thus, it was determined that a model with a weight of 2 was perceived to be conservative and could be used to select predictor variables.

Second, we performed a backward stepwise logistic regression analysis (weight of 2) to assess prediction of membership into the group of probable pathological gamblers. Results generated a good model fit at Step 7 on the basis of four predictor variables, identified as (a) Model 2: Family Problems subscale (CASS:L), (b) Conduct Problems subscale (CASS:L), (c) Problem Severity scale (PESQ), and (d) gender.

The third step in the regression involved rerunning the logistic regression with the retained variables in Model 2, as the final model. The model was run using the *enter* method with three different weightings: (a) unweighted, (b) weight of 2, and (c) weight of 5. Again, there were no statistical differences found between the weighted and unweighted models, and all parameters (β) were in the same direction. In fact, the parameters for the model with weights of 2 and weights of 5 were nearly identical. Thus, it was determined that a model with a weight of 5 would be used to report significance, as it is more robust given the larger N (see Table 4).

Results generated a good model fit on the basis of the four predictor variables in the final model: (a) Family Problems subscale (CASS:L), (b) Conduct Problems subscale (CASS:L), (c) Problem Severity scale (PESQ), and (d) gender. This model was able to correctly classify 80.3% of gamblers not in the specified group and 80.6% of probable pathological gamblers. The validation sample was used to test the current model; the model was able to predict 83.7% of individuals not in the specified group and 74.5% of probable pathological gamblers in the validation sample. Accordingly, the odds of developing a probable pathological gambling problem are approximately 1.1 times greater for individuals with family problems, conduct problems, and chemical dependency, and approximately 22 times greater for males. Furthermore, the adjusted R^2 was found to be .591. Thus, the final model accounts for 60% of the variance in the criterion variable. The model chi-square indicates how well the model fits the data. The chi-square results for the current model, $\chi^2(4, N = 2,328) = 378.237, p < .001$, indicate that the variables allow better prediction of probable pathological gambling than without the variables.

At-Risk and Probable Pathological Groups Combined

We performed another set of logistic regression analyses, combining the at-risk and probable pathological gamblers as a single group. The purpose of this was to determine whether at-risk gamblers were similar to or different from probable pathological gamblers. A number of researchers have suggested that at-risk gamblers are similar to probable pathological gamblers and that a proportion of at-risk gamblers transition quickly to probable pathological gamblers (Gupta & Derevensky, 1998a). At-risk gamblers and probable pathological gamblers were given a 1, and the rest of the sample received a 0. The regression steps involved in selecting a model were conducted exactly as reported above. The models were based on the same group of initial variables selected from the output of the hierarchical cluster analysis as well as grade and gender as categorical covariates and the at-risk and problem group as the dependent variable.

In the final step in determining the model, we performed logistic regression with the retained variables, which ended up being the same as those for the probable pathological gambling group: (a) Family Problems subscale (CASS:L), (b) Conduct Problems subscale (CASS:L), (c) Problem Severity subscale (PESQ), and (d) gender, as the final model. Using the *enter* method with three different weightings—unweighted, weight of 2, and weight of 5—we found no differences between the weighted and unweighted models in terms of the significance of the Wald statistic. Furthermore, all parameters (β) were going in the same direction. In fact, the parameters for the model with weights of 2 and of 5 were nearly identical. Thus, a model with a weight of 5 was again selected to report significance, as it is more robust given the larger N (see Table 5).

The results obtained were almost identical to the ones generated with the probable pathological gambler group, generating a good model fit on the basis of the four predictor variables in the final model. This model correctly classified 80.1% of gamblers not in the specified group and 85.0% of at-risk and probable pathological gamblers. The validation sample was used to test the current model, with the results suggesting the model predicted 82.2% of individuals not in the specified group and 76.3% of at-risk and probable pathological gamblers in the validation sample. Furthermore, the adjusted R^2 was .610, meaning that the final model accounts for 61% of the variance in the criterion variable. The chi-square for the current model, $\chi^2(4, N = 2,328) = 395.024, p < .001$, indicates that the variables allow better prediction of at-risk and probable pathological gambling than by chance. Results revealed that the Hosmer and Lemeshow statistic for the weight-of-5 final model, $\chi^2(3, N = 2,328) = 18.404, p < .001$, was significant, indicating no difference between the observed and predicted values of the dependent variable. Examination of the Hosmer and Lemeshow statistic for the unweighted final model, $\chi^2(8, N = 2,336) = 14.931, p = .061$, indicates that the final model provides adequate fit ($p > .05$).

Discussion

A large percentage of youth reported gambling for money within the past year (66%) as well as on a regular basis (20%). With respect to problem gambling, 4.9% of adolescents were found to have a probable pathological gambling problem, and 8.0% were identified as at-risk gamblers. These findings are generally consistent with previous research (Adalf & Ialomiteanu, 2000; Derevensky & Gupta, 2000; NRC, 1999; Shaffer & Hall, 1996; Shaffer & Korn, 2002; Ste-Marie, Derevensky, & Gupta,

Table 4

Logistic Regression: Final Model (Weight of 5)

Variable	β	SE	Wald	df	p	Exp(β)
Family problems	0.066	0.014	23.365	1	<.001	1.068
Conduct problems	0.075	0.013	31.049	1	<.001	1.077
Problem severity	0.053	0.011	22.796	1	<.001	1.054
Gender	3.080	0.307	100.791	1	<.001	21.750

Note. Exp = exponent.

Table 5

Logistic Regression for At-Risk and Probable Pathological Gambler Groups Combined: Final Model (Weight of 5)

Variable	β	SE	Wald	df	p	Exp(β)
Family problems	0.060	0.014	18.974	1	<.001	1.062
Conduct problems	0.083	0.014	35.673	1	<.001	1.087
Problem severity	0.057	0.012	22.649	1	<.001	1.058
Gender	3.013	0.298	102.257	1	<.001	20.357

Note. Exp = exponent.

2002). However, several recent surveys also conducted in Ontario have found slightly lower prevalence rates for probable pathological gambling (2.8%) using the same gambling screen (*DSM–IV–MR–J*; Derevensky & Gupta, 2001; Gupta & Derevensky, 2001). Perhaps these differences may be attributed to regional divergence, school, or sampling bias. Nonetheless, a significant number of adolescents under the legal age of 19 are gambling and experiencing serious gambling-related problems.

Males were found to be significantly more likely to gamble and to have gambling associated problems than were females (e.g., significantly more males were found to be at-risk and probable pathological gamblers), corroborating past research (Gupta & Derevensky, 2000; Hardoon & Derevensky, 2002; Jacobs, 2000; Stinchfield, 2000).

Perceived Social Support

Consistent with previous findings in the literature, overall mean scores for perceived social support (as measured by the PSS) from friends were greater than from family (Averna & Hesselbrock, 2001). Adolescents have been found to place more importance on peer relationships than family relationships, leading many to conclude that perceived support from friends may be more influential on adolescent behavior than perceived support from family (Brown, 1990; Ohanessian & Hesselbrock, 1993). Probable pathological and at-risk gamblers in this study reported feeling a lack of social support from both friends and family. Thus, it appears that lack of perceived social support may be a risk factor for the development of gambling-related problems. Consequently, high perceived family and peer support appear to be protective factors against the development of gambling problems. Social support has been identified as a possible protective factor against the development of substance use problems, particularly for individuals with a family history of substance use (Kandel & Andrews, 1987; Wills & Cleary, 1996). This is predominantly true for family support; close, supportive family relationships have been linked with lower drug and alcohol use (Brook et al., 1990). The literature on social support and substance use has found that close friendship support and social support increase the risk for adolescent substance initiation and use (McCubbin et al., 1985). On the basis of the current results, this does not appear to hold true with our sample, such that probable pathological gamblers reported lower perceived peer social support. It is possible that young problem gamblers differ from youth who engage in excessive substance use in that they do not usually gamble with friends and tend to lose the friends in the downward spiral that results in gambling dependency due to failure of repaying debts, lying, and so on, whereas teens may be more

likely to drink excessively in the presence of friends. In the case of the present study, the perceived social support of peers appears to be a protective factor, although it was also found that adolescent probable pathological gamblers reported having significantly more friends as having gambling problems and substance abuse problems. Therefore, consistent with previous gambling research (Griffiths, 1990; Hardoon & Derevensky, 2001; McCubbin et al., 1985), the negative influence of peers remains a relevant factor. Social support and peer influence are therefore independent constructs. However, what is unclear in regard to these young gamblers is whether individuals seek out peers with similar interests with whom to engage in these activities or whether peer pressure is a precipitating factor in the development of these behaviors. It has been our experience, with youth undergoing treatment, that problem gambling happens in the absence of friends, whereas nonexcessive gambling often occurs as a social pastime. It may well be that once teens cross the line between social and problem gambling they hide their behaviors from friends and eventually shift their social group to other teens who gamble. Jessor, Van Den Bos, Vanderryn, Costa, and Turbin (1995) found that direct initiation or encouragement (e.g., lacking the resources to cope with difficulty or modeling and influence from peers), and greater accessibility and opportunity to engage in problem behavior (e.g., belonging to an antisocial peer group), contributed to the development of risk behaviors. In an investigation of the relations of psychosocial protective variables to involvement in problem behavior (alcohol and drug abuse, delinquency, and sexual precocity), the most influential risk factor for problem behavior was found to be a measure of instigation in the perceived social environment (e.g., having friends as models for problem behavior; Jessor et al., 1995). Thus, peers represent a large factor in the development and maintenance of risky behaviors, particularly addiction.

Familial Factors

We found strong support for the hypothesis that youth who report having family problems and perceive their families to be unsupportive are at an increased risk for the development of gambling problems. Probable pathological and at-risk gamblers appear to have decreased perceptions of social support from family. The items on the CASS:L suggest that they tend to perceive their parents and other family members as uncaring, harsh, or overly critical, and they may also feel emotionally detached or distant from family members. Thus, these results suggest that familial behaviors represent a critical factor in the development and maintenance of gambling behavior.

The family also plays another important role in the development of problematic gambling behavior. Results revealed that adolescent at-risk and probable pathological gamblers reported having significantly more family members as having gambling problems and substance abuse problems than did nongamblers and social gamblers. The current results confirm past research that has found that individuals who have gambling-related problems are more likely to have a parent with an addiction (Fisher, 1993; Griffiths, 1995; Gupta & Derevensky, 1998a; Wood & Griffiths, 1998). One of the limitations of these findings is a lack of confirmatory evidence of parental problems (e.g., no diagnosis or screening has been made), as findings are based merely on self-report data. However, one could argue that the fact that adolescents are report-

ing their parents as having problems undoubtedly is having an impact on them regardless of whether the accuracy of problem gambling or substance abuse can be confirmed.

Drug and Alcohol Use

The finding that 15.8% of the youth were involved in use of chemicals (i.e., drugs and alcohol) to a problematic degree is consistent with findings reported in the literature and remains worrisome. Past research suggests that approximately 6% to 10% of adolescents are estimated to meet the criteria for drug dependency (Wheeler & Malmquist, 1987). If alcohol is included in the criteria, then rates range from 9% to 28% (NRC, 1999). Not surprisingly, significantly more males and older adolescents were classified in the high-risk category (substance use) compared to females and younger youth. Furthermore, risk for chemical dependency increases with gambling severity, such that a greater percentage of probable pathological gamblers is in the high-risk category on the Problem Severity Scale (of the PESQ) for substance use, having the highest mean scores compared to at-risk, social, and nongamblers.

A number of studies have found links between gambling and other addictions. Adolescent gamblers have been found to be significantly more likely to drink alcohol, smoke tobacco, and take drugs compared to nongamblers (Griffiths & Sutherland, 1998; Potenza et al., 2000). However, this is one of the few studies that measured adolescent substance dependence using a standardized screen, and the results clearly suggest that gambling and substance dependence are often comorbid disorders. What has yet to be determined is the nature of the coassociation between drug use and gambling involvement (Winters & Anderson, 2000). Common risk factors for both drug abuse and problem gambling include low self-esteem, depression, suicidality, being a victim of abuse (physical or sexual), poor school performance, history of delinquency, poor impulse control, being male, early onset, parental history of respective problem, and community and family norms that promote accessibility to the respective activity (Dickson, Derevensky, & Gupta, 2002; Dickson et al., 2004; Hardoon & Derevensky, 2002; Stinchfield & Winters, 1998). Winters and Anderson (2000) suggested that the association of these two behavioral patterns is not trivial given the overlap between the risk factors. However, the nature of the relation between drug abuse and gambling remains unclear. Additional research is needed to shed light on how these common factors lead to the coexistence between gambling and drug use in some youth and not in others and the extent to which unique risk factors can be identified.

Conduct Problems

Strong support was found for the hypothesis that adolescent probable pathological gamblers would report behavioral problems (conduct problems). More than half of probable pathological gamblers (5.8%) met the clinical criteria for conduct problems on the CASS:L, with a meaningful percentage of at-risk gamblers (31.2%) meeting the criteria as well. Individuals meeting the criteria on this subscale are likely to break rules, have more problems with individuals in authority, engage in antisocial activities, and display oppositional behavior. Such findings are consistent with previous research that has found that adolescent probable

pathological gamblers often have a history of delinquency and are more likely to engage in current delinquent and criminal behaviors (Ladouceur et al., 1994; Lesieur & Klein, 1987; Maden et al., 1992; Omnifacts Research Limited, 1993; Stinchfield, 2000; Winters et al., 1993; Wynne et al., 1996).

A Model for Problem Gambling

The results of the logistic regression analyses suggest that the path leading to addiction is the same for probable pathological and at-risk gamblers and includes family problems, conduct problems, chemical dependency, and gender (male) as risk factors. No other variables included in the analyses were found to be significant as predictor variables in the regression.

It is a meaningful finding that no differences were found between the regression models for at-risk and probable pathological gamblers. Perhaps, as some have argued (Gupta & Derevensky, 1998a, 1998b), at-risk gamblers are more like probable pathological gamblers than otherwise thought. Although they may currently demonstrate fewer problems (as measured by the DSM–IV–MR–J), the progression from at-risk to severe gambling problems may occur quickly. This finding has implications for the definition, identification, prevention, and treatment of gamblers experiencing serious problems. Perhaps there is no longer value in differentiating between at-risk and probable pathological gamblers and subsequent classification should combine the two groups into one "problem gambling" group. At this time, it is unlikely that all at-risk gamblers progress to more problematic gambling; some gamblers return to social and nonproblematic gambling. Nevertheless, longitudinal research is needed to examine these possibilities and the pathways leading to gambling severity. Given that at-risk gamblers have the same risk factors and potential trajectory as probable pathological gamblers, prevention programs must focus on these individuals before their symptomatology becomes severe.

Limitations

Although this study permits a larger understanding of psychosocial variables associated with the development of problematic gambling behavior, it is important to highlight several limitations of this research, resulting in the need to be cautious when generalizing these findings. First, the instruments used in this study are lengthy, requiring sustained attention and a willing attitude to be completed properly and truthfully. Furthermore, the total sample size of this study, though relatively large, is relatively small considering the number of variables examined. The data were collected in Ontario, Canada, which is known for its multicultural communities. As such, there may be significant cultural or ethnic factors that could limit the generalizability of these findings. Further research is needed in other regions of North America as well as other regions of the globe before we can be confident that similar psychosocial variables contribute to problem gambling in adolescents elsewhere.

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