Psychology of Addictive Behaviors
2007, Vol. 21, No. 2, 165–173

0893-164X/07/$12.00 DOI: 10.1037/0893-164X.21.2.165

Youth Gambling Behaviors: An Examination of the Role of Resilience

Isabelle Lussier, Jeffrey L. Derevensky, Rina Gupta, Tanya Bergevin, and Stephen Ellenbogen
McGill University

The study of resilient children has overturned many deficit-focused models concerning the ontogenesis of children raised in adversity. This study explored the relationship between risk and protective factors, resilience, and youth gambling behavior. More specifically, this study examined the relative contribution of various risk and protective domains in relation to problem gambling behavior and examined whether youth identified as resilient (high risk exposure–high internalized protection) were as likely as those identified as vulnerable (high risk exposure–low internalized protection) to engage in excessive gambling behavior. The sample consisted of 1,273 students ages 12 to 19. The findings demonstrated that risk and protective factors each provide a unique contribution to the prediction model of gambling problems. Resilient and vulnerable youth differed significantly in their self-reported gambling severity. As well, resilient youth were not statistically distinguishable from low-risk exposure groups in terms of their gambling severity. Findings are interpreted with respect to resilience and prevention research.

Keywords: youth, resilience (psychological), gambling, prevention

Young people are regularly exposed to high-risk activities. Among the more frequently recognized risky behaviors are smoking, substance use, and risky sexual activity. Yet few parents, family members, and educators recognize the prevalence or implications of excessive youth gambling behavior (Wood & Griffiths, 1998). Recent reviews suggest that upwards of two thirds of underage youth have gambled in regulated and licensed gambling venues (Jacobs, 2000, 2004). Adolescents have been reported to have pathological gambling prevalence rates 2 to 4 times those of adults, and a young onset age of gambling participation, usually beginning at age 10 (Gupta & Derevensky, 1998a). As well, excessive gambling among adolescents has been shown to be correlated with participation in increased delinquency, substance use, and antisocial behaviors (Derevensky & Gupta, 2004; Ladouceur, Dubé, & Bujold, 1994). The serious nature of gambling problems is especially disconcerting considering that gambling is perceived to be a highly acceptable activity among adults and adolescents, with little recognition of the inherent risks (Azmier, 2000; Gupta & Derevensky, 1997).

A developmental psychopathology perspective has led to an interest in identifying and understanding the role of protective factors across a wide range of prevention applications in part because it may be more difficult to eliminate risk factors (e.g., poverty). Youth gambling researchers have similarly specified a need for effective ways to strengthen resilience in children (Derevensky, Gupta, Dickson, & Deguire, 2004; Dickson, Derevensky, & Gupta, 2002, in press; Winters, Arthur, Leitten, & Botzet, 2004). Educating children to develop the strengths and resources required for them to resist and overcome adversity is a rational and increasingly effective approach. The research on adolescent resilience has demonstrated a strong relationship between healthy, resilient behaviors and successful outcomes (Werner & Smith, 1992).

Resilience

Traditionally, the major focus of prevention and intervention research has been to identify risk factors and high-risk individuals (Leshner, 1999). However, many youths exposed to high levels of risk never develop the anticipated negative problem behavior(s), and many thrive in spite of them, a concept referred to as *resilience*. Although there is substantial variation in the definition of resilience, two central constructs exist in most definitions, that is, *risk*, or *adversity*, and *positive adaptation*, or *competence* (Luthar, 1997). A widely accepted and simplified definition of resilience therefore relates to the presence of manifest competence despite exposure to significant adversity (Rolf, 1999). *Manifest competence* generally refers to internal states of well-being and/or effective functioning in the environment (Masten, Best, & Garmezy, 1990). Resilience is not a single-dimensional or even global construct, such that individuals may be resilient in one domain or several, but rarely in all (Luthar, 1997). For example, many resilient adolescents who demonstrate high social competence despite much adversity in their lives also report depressive symptoms. In light of these findings, resilience researchers are increasingly cautious in using the term *resilience*, opting instead for more specific terms such as *educational resilience*, *emotional resilience*, and *behavioral resilience* (Luthar, Cicchetti, & Becker, 2000). Resilience research pertaining to addictive behaviors including youth problem gambling may best be conceptualized as *behavioral resilience*.

Isabelle Lussier, Jeffrey L. Derevensky, Rina Gupta, Tanya Bergevin, and Stephen Ellenbogen, International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University, Montreal, Quebec, Canada.

Tanya Bergevin is now at the Allan Memorial Institute, Department of Psychiatry, Royal Victoria Hospital, Montreal, QC, Canada. Stephen Ellenbogen is now in the School of Social Work, McGill University.

Correspondence concerning this article should be addressed to Isabelle D. Lussier, International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University, 3724 McTavish Street, Montreal, Quebec H3A 1Y2, Canada. E-mail: isabelle.lussier@mail.mcgill.ca

A *risk factor* includes individual attributes, characteristics, situations, or contexts within the environment that increase the likelihood of acquiring and maintaining maladaptive behaviors (Kaplan, 1999). The more deficits a child exhibits, the less likely that child is to build internal or external assets (Benson, Galbraith, & Espeland, 1995). Investigators have recognized that as the co-occurrence and accumulation of risk factors a child is exposed to over time increases, so too do maladaptive behaviors (Jessor, 1998; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995; Rutter, 1990). In contrast to risk factors, *protective factors* are conditions that improve an individual's resistance to risk factors and disorders. Protective factors may include personal attributes (e.g., temperament, IQ), familial factors (e.g., encouragement of trust, autonomy, and initiative), and community characteristics (e.g., external support systems including church, youth groups, and school) that moderate a person's reaction to adversity in a positive manner (Werner, 1995; Werner & Smith, 1992). Fostering the growth and presence of protective factors thus moderates the undesired effects of internal or external risk such that development is more positive than if the protective factors had not existed (Masten et al., 1990). Although risk and protective factors are broadly defined and are multidimensional, the current research focuses on self-perceived internalized protective factors and on self-reported behavioral and environmental risk factors.

Although gambling does not involve the ingestion of a substance and is unique in its emphasis on attributions of luck, skill, and attitudes about money, pathological gambling and drug dependency share common consequences including dissociative states, tolerance, and altered physiological arousal (American Psychiatric Association, 2000). Stinchfield and Winters (1998) identified several commonalities between risk factors identified in the substance abuse and youth gambling literature including family history of the respective problem, low self-esteem, depression, family norms (e.g., attitudes that promote the respective problem), physical or sexual abuse, poor academic performance, delinquency, community norms (e.g., promotion and access related to drug use or gambling), and early onset. Similarly, Dickson and colleagues (2002) demonstrated a large degree of overlap in risk factors shared by people experiencing problem gambling and other addictions over a wide breadth of domains including biological, social environmental, perceived environment, personality, and behavior. The overlap in risk factors identified in the gambling and substance abuse literature have led several researchers to defer to Jacobs' (1986) "general theory of addictions" as a framework for conceptualizing addiction (Gupta & Derevensky, 1998b; Winters & Anderson, 2000).

Jessor's (1998) adolescent risk behavior model provides a theoretical foundation for general mental health prevention programs geared toward fostering resiliency. Within this model, risk and protective factors operate interactively in and across a number of domains (biological, social environment, perceived environment, personality, and behavior). The domains of the model correspond to the broad dimensions of resilience including *social bonding* (prosocial ties to one's school, family, and community), *personal competence* (one's individual identity and sense of personal development), and *social competence* (one's ability to adjust in social situations; Springer & Phillips, 1992). Youth gambling researchers have suggested that Jessor's model may be a useful framework for conceptualizing gambling behavior, hypothesizing that the protective factors that apply to other addictions will also buffer against the acquisition, development, and maintenance of youth gambling problems (Dickson et al., 2002, in press).

Research Goals

Despite the presence of established risk factors, many youth never go on to experience gambling problems. As a result, a number of questions come to the forefront. What other factors are at play? Why is it that their patterns of gambling participation are less affected by the adversity in their lives? Although extremely important, the systematic examination of risk and protective factors as they pertain to underage problem gambling is in its infancy. To date, several studies have identified the shared and unique risk factors operant in youth problem gambling and substance abuse, yet few studies have examined the commonalities in protective factors. It is plausible that there exists significant overlap between the protective factors identified in substance abuse research and those yet to be identified in gambling research. No studies to date have examined the concept of resilience in relation to adolescent problem gambling, despite the recent literature's having emphasized the benefits of such an approach (Dickson et al., 2002).

The primary goals of this research were (a) to identify whether individual protective factors relevant to other addictions play a meaningful role in the moderation of adolescent problem gambling onset; (b) to explore the interrelationship between self-reported risk, individual protection, and problem gambling; and (c) to explore the concept of resilience as it pertains to problem gambling.

Method

Participants

The sample included 1,273 adolescents (605 male, 660 female, 8 undefined) in Grades 7 through 11 (ages 12–19). Participants were selected from 12 schools across four school boards in Montreal, Quebec, Canada. The selection of classes for data collection within each school was determined by the administration and/or teachers' willingness to allow entry into their classes. Students volunteered to participate, and responses were anonymous.

Instruments

The Gambling Activities Questionnaire (GAQ; Gupta & Derevensky, 1996) is a measure that consists of 16 items designed to assess four domains related to problem gambling. For the current study, the GAQ was used solely for the purpose of identifying nongamblers. To be identified as a nongambler, respondents could not endorse any gambling-related activities (e.g., bingo, lottery tickets, racetrack betting, wagering on sports, Internet gambling, slot machines, playing cards for money, etc.) during the past 12 months.

The *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.) *Multiple Response—Juvenile (DSM–IV–MR–J*; Fisher, 2000) is a revised version of the *DSM–IV–J* (Fisher, 1992) diagnostic survey used to assess the severity of adolescent problem gambling. On the basis of the frequency of gambling over the past 12 months, individuals are categorized as either social gambler, at-risk gambler, or probable pathological gambler (PPG). A score of 4 or more

out of the 9 categories is indicative of probable pathological gambling. A score of 2 to 3 reflects an at-risk level of gambling, whereas 0 to 1 is indicative of social gambling. Internal consistency reliability for the current sample was adequate, with a Cronbach's alpha of .79 (slightly higher than the Cronbach's alpha of .75 reported by Fisher, 2000).

The Individual Protective Factors Index (IPFI; Part I; Springer & Phillips, 1992) consists of 61 items rated on a 4-point Likert-type scale designed to assess adolescent resiliency in at-risk youth. The IPFI was developed as a measure of evaluation for juvenile prevention programs and was standardized on a sample of 2,416 youths in the United States. The internal consistency reliability for this scale is adequate, with a Cronbach's alpha of .93 (Springer & Phillips, 1992). Resilience is identified by the three domains of Social Bonding (family bonding, prosocial norms, school bonding), Personal Competence (self-concept, self-control, positive outlook, self-efficacy), and Social Competence (assertiveness, confidence, cooperation, contribution).

Part II of the IPFI, the EMT Risk Measures Addendum (EMT–Risk), includes 55 questions concerning risk factors in the respondent's environment and behavior and 7 demographic questions. The EMT–Risk has no standardization data, but internal consistency reliability for this scale is adequate, with a Cronbach's alpha of .91. The EMT–Risk manual scores 39 questions across 8 subscales separately but with no formal composite score. For the purpose of this study, an EMT–Risk composite score was calculated in the same way as the IPFI, by adding each score and dividing by the total number of items. Composite scores were calculated such that high scores on the EMT–Risk reflected greater risk in the domains of Family (supervision and interaction), Peer Group (positive peer associations, peer alcohol and other drug [AOD] use exposure), Environment (neighborhood environmental risk, AOD use exposure), and Personal Behavior (risk behaviors and self-reported AOD use). The term *risk exposure* in this study therefore refers to both environmental and behavioral risk.

Procedure

Data collection was group administered in classrooms and took approximately one 50-min period. This research was part of a larger study funded by the Ministry of Health and Social Services of Quebec, Canada. As such, questionnaires included some measures not analyzed for this research study. Surveys consisted of approximately 300 items. Teachers were requested to either leave or remain at the front of the classroom in order to respect participants' confidentiality. Surveys that were visibly problematic (e.g., silly names, zigzag or patterned responses, illegible responses, or questionable information) were discarded entirely. A total of 96 (7%) questionnaires were discarded, leaving a total overall sample size of 1,273 participants.

Preliminary analyses of the data revealed that some participants did not complete all items on the IPFI or EMT–Risk scales, likely due to time constraints. Participants missing 10% or more items were not included in statistical analyses relevant to these scales. Consequently, 7 participants were removed from analyses regarding the IPFI and 60 participants were removed from analyses regarding the EMT–Risk. The high number of missing participants for the EMT–Risk is likely due to the fact that it was located at the end of the 14-page questionnaire. As a result, some students did not have time to complete it within the allotted time.

Results

Prevalence of Gambling Behavior

Results revealed that 18.9% of adolescents (16.9% male and 21.1% female) were classified as nongamblers (no reported gambling in the previous 12-month period), 70.6% (67.4% male and 73.6% female) as social gamblers (a score of 0–1 on the *DSM–IV–MR–J*), 7.2% (10.6% male and 3.9% female) as at-risk gamblers (a score of 2–3), and 3.2% (5.1% male and 1.4% female) as PPGs (a score $\geq$ 4). These findings are similar to recent youth gambling prevalence research which suggests that 3% to 6% of youth meet the criteria for pathological gambling, and another 8% to 21% are at risk for the development of a severe gambling problem (Shaffer & Hall, 2001).

IPFI

High scores on the IPFI reflect greater internalized protective factors in Personal Competence, Social Bonding, and Social Competence. Possible scores on the IPFI range from 1 to 4. The mean score for the total sample (M = 3.15, SD = 0.35) was within the range of standardized scores (M = 3.07–3.34) for this measure (Springer & Phillips, 1992). An analysis of variance (ANOVA) revealed that the mean level of individual protective factors significantly differed between gambling groups, $F(3, 1262) = 48.37$, $p < .001$. Tukey's honestly significant difference (HSD) statistic for post hoc comparisons revealed significant differences between mean IPFI scores for all gambling-group pairwise comparisons with the exception of the nongambler versus social gambler groups. More specifically, there was a significant negative linear relationship denoting that as gambling severity increased, reported individual protective factors decreased. As seen in Table 1, PPGs had the lowest mean scores compared to at-risk gamblers, social gamblers, and nongamblers. The mean score for PPGs (M = 2.64, SD = 0.42) and at-risk gamblers (M = 2.93, SD = 0.35) were lower than the lowest mean standardization score (M = 3.07) as reported by Springer and Phillips (1992).

EMT–Risk

Possible scores on this measure range from 1 to 3.18, with higher scores denoting the greatest possible behavioral and environmental risk. The mean overall score for the total sample was 1.77 (SD = 0.34). The EMT–Risk is not a standardized measure. As such, there are no cutoffs denoting normative level of risk exposure. An ANOVA revealed that the mean level of exposure to risk factors significantly differed between gambling groups, $F(3, 1209) = 44.25$, $p < .001$. Tukey HSD post hoc comparisons revealed significant differences between mean risk scores for all gambling-group pairwise comparisons. More specifically, a significant positive linear relationship denoted that as gambling severity increased, self-reported risk exposure also increased. (See Table 2.)

Table 1
Individual Protective Factors Index (IPFI) by Gambling Severity

	Gambling group								
	Nongambler[a] (n = 241)		Social gambler[b] (n = 899)		At-risk gambler[c] (n = 92)		PPG[d] (n = 41)		
IPFI measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*
Social Bonding	3.22	0.43	3.14	0.40	2.84	0.47	2.45	0.56	52.67*
Personal Competence	3.22	0.36	3.17	0.35	2.92	0.36	2.63	0.41	46.20*
Social Competence	3.22	0.38	3.20	0.35	3.04	0.39	2.81	0.48	20.07*
Total	3.22	0.35	3.17	0.33	2.93	0.35	2.64	0.42	48.37*

[a] Gambling Activities Questionnaire score (0). [b] *DSM–IV–MR–J* score (0–1). [c] *DSM–IV–MR–J* score (2–3). [d] *DSM–IV–MR–J* score (≥ 4). IPFI range = 1–4, high scores reflect greater levels of internalized protective factors.
* $p < .001$.

Predictability of Risk and Protection Factors on Gambling Severity

Sequential binary logistic regressions were carried out to (a) determine the combination of risk and protection domains that best predicts problem gambling, (b) explore the relative contribution of the risk scale in the prediction of problem gambling over and above the predictive power of the protection scale (and vice versa), and (c) explore the possibility of an interaction effect between the risk and protection variables. The outcome variable was coded as 0 = nongambler or social gambler and 1 = at-risk gambler or PPG. Gender and age were both considered as potential dummy variables. However, age was not significantly related to problem gambling and as such was subsequently removed from the model. For all regressions, the Hosmer and Lemeshow test was nonsignificant, indicating an adequate model fit. Colinearity diagnostics revealed no significant multicollinearity among the examined variables as ascertained by tolerance and variance inflation factor statistics. Also, tests for possible outliers revealed no more than 1 individual with a z residual score above 3; this is acceptable in analyses involving a large sample size (Newton & Rudestam, 1999).

The first logistic regression consisted of the four EMT–Risk domains (Family, Peer Group, Environment, and Personal Behaviors) as well as gender. Only Personal Behaviors and Environment were retained in the model. The three IPFI protection domains (Social Bonding, Social Competence, and Personal Competence) were entered into a second logistic regression. Only Social Bonding and Personal Competence were retained in the model.

In a third regression, all seven domains (i.e., the four EMT–Risk and the three IPFI domains) were entered into a final prediction model. As presented in Table 3, the Personal Behaviors, Social Bonding, and Family domains were retained as significant contributors. However, the Environment and Personal Competence domains were excluded from the model as they no longer improved the prediction of problem gambling. Of interest, Family, though not a significant predictor in the logistic regression of EMT–Risk domains, now significantly improved the prediction of problem gambling. Most unusually, Family was negatively associated with problem gambling. That is, reporting low Family risk in combination with the other variables in the model improved the prediction of problem gambling.

To further investigate the relationship between Family risk and problem gambling, we performed post hoc tests. Personal Behaviors, Social Bonding, and the two Family domain subscales (Family Interaction and Family Supervision) were entered into a logistic regression. According to the Wald criterion, Family Interaction (z = 9.99, p = .002) and not Family Supervision (z = 2.649, *ns*) proved to be a significant predictor. Separate regressions were then

Table 2
EMT Risk Measures Addendum Scores by Gambling Severity

	Gambling group								
	Nongambler[a] (n = 230)		Social gambler[b] (n = 856)		At-risk gambler[c] (n = 89)		PPG[d] (n = 38)		
EMT measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*
Family	1.82	0.41	1.89	0.38	1.91	0.43	1.99	0.47	2.84
Peer Group	1.81	0.47	1.95	0.43	2.06	0.46	2.30	0.39	16.67*
Environment	1.74	0.38	1.89	0.41	2.13	0.39	2.42	0.45	43.28*
Personal Behavior	1.39	0.40	1.52	0.38	1.75	0.46	2.17	0.44	52.88*
Total	1.64	0.33	1.77	0.32	1.93	0.31	2.22	0.33	44.25*

Note. Range = 1–3.18; higher scores reflect greater levels of risk.
[a] Gambling Activities Questionnaire score (0). [b] *DSM–IV–MR–J* score (0–1). [c] *DSM–IV–MR–J* score (2–3). [d] *DSM–IV–MR–J* score (≥ 4).
* $p < .001$.

Table 3
Sequential Logistic Regression of Domains Predicting Problem Gamblers

Model and variable	β	*SE*	*z*	*p*
Model with EMT–Risk domains only				
Gender (female = 0, male = 1)	0.989	0.218	20.543	.000
Environment	0.876	0.296	8.727	.003
Personal Behavior	1.283	0.279	21.219	.000
Model with IPFI protection domains only				
Gender	1.169	0.223	27.498	.000
Social Bonding	−1.253	0.344	13.231	.000
Personal Competence	−1.228	0.402	9.324	.002
Model with all domains				
Gender	0.894	0.229	15.253	.000
Personal Behavior (EMT–Risk)	1.145	0.258	19.748	.000
Family (EMT–Risk)	−1.270	0.329	14.930	.000
Social Bonding (IPFI)	−2.067	0.308	44.929	.000

Note. For the IPFI and EMT scales, a higher score indicates greater individual protection and risk exposure. EMT–Risk = Risk Measures Addendum of the IPFI; IPFI = Individual Protective Factors Index.

performed with Family Interaction paired with each domain from the final prediction model (Personal Behaviors and Social Bonding), as well as their subscales. Family Interaction ($z = 12.56, p < .001$) remained a significant predictor of problem gambling when it was paired with the IPFI Social Bonding domain ($z = 86.18, p < .001$). More specifically, Family Interaction ($z = 10.05, p = .002$) remained a significant predictor when it was paired with the Family Bonding subscale of the Social Bonding domain ($z = 66.74, p < .001$). In other words, the combination of being in a family that interacts frequently while concurrently feeling a lack of bond to one's family appears to be a significant predictor of problem gambling.

To explore the relative contribution of risk in the prediction of problem gambling over and above the predictive power of protection (and vice versa), we performed two stepwise logistic regressions. The addition of the IPFI protection variable to a submodel (consisting of EMT–Risk and gender) produced a significant reduction in the log-likelihood statistic, $\chi^2(1, N = 1{,}193) = 35.96$, $p < .001$, an improvement of 5.5% in model fit. The addition of the EMT–Risk variable to a submodel (consisting of protection and gender) also produced a significant reduction in the log-likelihood statistic, $\chi^2(1, N = 1{,}193) = 12.01$, $p < .001$, an improvement of 1.8%. Given these statistics, the IPFI protection measure appears to be the stronger predictor of problem gambling.

To explore the possibility of an interaction effect between the risk and protection variables, a final logistic regression was calculated whereby gender was entered in the first step, EMT–Risk and IPFI composite scores were entered in the second step, and the interaction term for EMT–Risk and IPFI was entered in the third step. The interaction term proved to be nonsignificant. In order to investigate what factors appear to distinguish between those who gamble socially and those who reported gambling problems, we performed the same logistic regressions with nongamblers excluded from the analysis. No appreciable differences in the results were found.

Resilience

To examine the relationship between resilience and gambling severity, resilience categories were established using extreme groupings of individuals. The reasoning for using extreme groups was that the IPFI, though a compilation of internalized protective factors ready to be implemented in the face of adversity, is not itself a measure of adversity and is intended to be used with at-risk populations. Given that resilience, by definition, occurs only under concurrently high-risk conditions and adequate protective processes (Masten & Coatsworth, 1998), and that the present sample is community-based and therefore composed of youths exposed to varying levels of adversity, the IPFI alone would not be a sufficient measure to explore the relationship between resilience and gambling behavior in the current sample.

Using tertile splits, we retained only scores that fell within the first and third tertiles (extreme highest and lowest risk exposure scores). On the basis of their IPFI scores, participants were also rank ordered into first and third tertiles (extreme lowest and highest levels of internal protective factors). Participants within these extreme groups were then combined to create four new categories: high risk–low protective, high risk–high protective, low risk–low protective, and low risk–high protective. Students demonstrating a moderate level of risk or protection were omitted from resilience analyses because we wished to identify participants belonging to categories that, by definition, are extreme.

The high risk–low protection group was renamed the vulnerable group, as these participants were simultaneously reporting the greatest levels of risk and lowest levels of protective factors, and the high risk–high protection group was renamed the resilient group, as these individuals were reporting the same high levels of risk as the vulnerable group but were also reporting the highest levels of internalized protective factors (i.e., personal competence, social bonding, and social competence traits). The low risk–high protection group was renamed the insulated group, as individuals in this group simultaneously reported the lowest levels of risk and the highest levels of internalized protective factors, an insulated situation. Finally, the low risk–low protection group, considered somewhat of an anomaly, was named the safe group, as the low levels of risk appeared to neutralize them against low levels of internal protection.

A one-way ANOVA testing for mean differences on the cumulative *DSM–IV–MR–J* scores and resilience categories revealed

that the level of gambling severity significantly differed between categories, $F(3, 606) = 30.55$, $p < .001$. Tukey HSD post hoc comparisons revealed significant differences between mean gambling severity scores for all pairwise comparisons that included the vulnerable group. More specifically, the insulated group (low risk–high protection) had the lowest gambling severity score ($M = 0.11$, $SD = 0.37$), followed by the resilient group (high risk–high protection; $M = 0.30$, $SD = 0.78$), the safe group (low risk–low protection; $M = 0.37$, $SD = 1.17$), and finally the vulnerable group (high risk–low protection; $M = 1.12$, $SD = 1.74$). Although the vulnerable group mean score is only 1.12 (an average ranking of social gambler on the *DSM–IV–MR–J*), it is more than double that of the mean cumulative *DSM–IV–MR–J* score for the entire community sample ($N = 1,273$, $M = 0.46$, $SD = 1.11$). There were no significant differences between the resilient, safe, and insulated groups despite the same high level of risk exposure reported by the resilient group as that reported by the vulnerable group.

Perhaps the most interesting results were demonstrated by analyses examining the relationship between the resilience categories and *DSM–IV–MR–J* groupings, which revealed significant differences between the resilience categories with respect to gambling severity, $\chi 2(9, N = 610) = 97.56$, $p < .001$. A total of 11.0% of the vulnerable youth were classified as PPGs. This figure is more than 3 times that of the overall community sample (3.2%). Conversely, only 1.6% of the resilient, 1.7% of the safe, and none of the insulated youth were classified as PPG. Despite the same level of risk exposure, vulnerable youth were 4 times more likely to be classified at-risk gamblers compared with resilient youth (15.9% vs. 3.3%, respectively). Within the resilient classification, 95.1% of participants were identified as non-problem gamblers (nongamblers and social gamblers combined). Similarly, 98.3% of the insulated group and 93.2% of the safe group were classified as such. However, of the vulnerable youth, only 73% were identified as non-problem gamblers (see Table 4).

A configural frequency analysis (CFA) was performed to further analyze the cross-tabulations. CFA is a method for analyzing whether groupings of individuals in cross-tabulations are more likely than chance alone to belong to a particular cell (Von Eye, 2002). CFA addresses whether the observed data differs significantly from expected values. The expected values are calculated using methods used in log-linear modeling on a priori information. This statistical method allows one to make statements about empty data space in cross-tabulations. The CFA revealed that within the extreme tertile groupings, vulnerable–nongamblers, insulated/at-risk gamblers, and insulated–PPGs occurred less often than one could expect by chance alone. Conversely, insulated–nongamblers, vulnerable–at-risk gamblers, and vulnerable–PPGs occurred more frequently than one could expect by chance alone (see Table 4).

Discussion

Resilience appears to be an important factor in the prevention of problem gambling. More specifically, high levels of internal protection may inhibit the development of problem gambling behavior in youth who would otherwise be vulnerable to developing gambling problems. The current findings imply that a causal relationship between behavioral resilience and gambling behavior is at least tenable given the limitation of the cross-sectional design and that such factors may be identified by way of paper-and-pencil tests. However, longitudinal research is necessary to confirm and further investigate this finding.

Risk and Protection

Findings from the current research indicate that as internal protection increases, gambling severity decreases and that the Social Bonding and Personal Competence domains improve the prediction of problem gambling over and above Social Competence. Conversely, as risk exposure increases (except Family), gambling severity also increases. Although the Family domain was not significantly associated with gambling severity, scores were in the anticipated direction with PPGs reporting the greatest amount of familial risk. The Personal Behavior and Environment domains were found to improve the prediction of problem gambling over and above the Family and Peer Group domains. Of all seven risk and protection domains, poor Social Bonding emerged as the strongest predictor of problem gambling, followed by negative Personal Behaviors and positively oriented Family scores.

Theories of adolescent substance use have largely been organized around four major themes: *cognitive–affective, social learn-*

Table 4
Configural Frequency Analysis

	Resilience group ($n = 610$)			
DSM–IV–MR–J group	% vulnerable (high risk–low internal protection)	% resilient (high risk–high internal protection)	% safe (low risk–low internal protection)	% insulated (low risk–high internal protection)
Nongambler[a]	**10.6**	14.8	25.4	***31.0***
Social gambler[b]	62.4	80.3	67.8	67.3
At-risk gambler[c]	***15.9***	3.3	5.1	**1.6**
PPG[d]	***11.0***	1.6	1.7	**0**
Total	100	100	100	100

Note. Values in bold italics represent frequencies that occurred more often than one would expect by chance alone. Values both in bold and underlined represent frequencies that occurred less often than one would expect by chance alone. PPG = probable pathological gambler.
[a] Gambling Activities Questionnaire score (0). [b] *DSM–IV–MR–J* score (0–1). [c] *DSM–IV–MR–J* score (2–3). [d] *DSM–IV–MR–J* score (≥ 4).

ing theory, conventional commitment and social attachment, and *intrapersonal characteristics* (Petraitis, Flay, & Miller, 1995; Winters & Anderson, 2000). The strong association between Social Bonding and problem gambling denoted in the current research suggests that conventional commitment and social attachment theories warrant greater attention in the area of gambling research. The finding that the family bonding and school bonding subscales of the Social Bonding domain are associated with problem gambling reflects findings from the few existing gambling studies that have explored protective factors. Family cohesion and school connectedness (Dickson, Derevensky, & Gupta, 2003) and family support (Kaufman, 2002) were identified in prior research as protectively associated with youth gambling problems. Although no prior youth gambling research has explored the protective association between problem gambling and prosocial norms (the third subscale of the Social Bonding domain), Jessor and colleagues (1995) identified intolerant attitudes toward deviance as one of the main protective factors for substance use.

As might be expected, Personal Behaviors emerged as one of the major predictors of problem gambling. The co-ocurrence of various risk behaviors has been well documented in youth gambling research (Dickson et al., in press; Winters, Bengston, Dorr, & Stinchfield, 1998). More surprisingly, Family risk, though retained by the final prediction model, was negatively associated with problem gambling. The relationship between Family Interaction and problem gambling is perplexing. On its own, the association between lack of family interaction and problem gambling was in the anticipated direction (though not significantly so). However, the combination of being in a family that interacts frequently while concurrently feeling a lack of bond to one's family appears to contribute to the prediction of problem gambling. It may be that a curvilinear relationship exists between family interaction and gambling behavior. A curvilinear relationship for parental control–monitoring has been demonstrated in adolescent sexual behavior research (Miller, McCoy, Olson, & Wallace, 1986). As well, it has been noted that drug-using adolescents often report their parents as being overcontrolling (Meschke & Patterson, 2003). However, given the large number of variables and numerous tests, it is also possible that the relationship is coincidental.

Resilience

An interactive relationship between risk and protection was not revealed using the logistic regression procedure. However, interaction terms between risk and protective factors typically result in small effect sizes (Luthar & Cushing, 1999), logistic regressions are known to be a relatively insensitive test for such effects (Jessor et al., 1995; Preacher, MacCallum, Rucker, & Nicewander, 2005), and the power for detecting such differences is reduced if sample sizes are highly unequal (Fleiss, Tytum, & Ury, 1980) as was the case in the current research. The CFA procedure denotes that in fact such a multiplicative relationship may exist but was not identifiable using the logistic regression model.

The technique of selecting individuals with extreme scores within a sample to examine the relationship between two variables is sometimes referred to as the extreme groups approach (EGA). This technique, though sometimes considered controversial (McClelland & Judd, 1993), was believed to be appropriate for the current research given its exploratory nature and that there is reason to speculate that a relationship between resilience and problem gambling exists and that the direction of its effect would be similar to that in other addictions research (Jessor et al., 1995; Preacher et al., 2005). The use of EGA in this research is further supported by the notion that risk and protective factors are additive in their effects (Jessor et al., 1995; Masten, 2001). This study ensured that participants retained for resilience analyses demonstrated additive effects of risk and protective factors, emphasizing the quantity of their experienced risk and protection.

Tertile splits revealed significant differences in gambling severity across all resilience categories, with members of the vulnerable group reporting significantly higher levels of gambling problems than the other three. Resilient participants were not significantly discrepant from low-risk exposure groups (safe and insulated) despite their reporting equally high levels of risk as the vulnerable youth. The finding that resilient children are comparable to low-risk children has been reported before, whereby various indicators of well-being were found to be similar for both groups (Masten et al., 1999).

There are no resilience prevalence rates denoting the proportion of children that may be resilient in society, although researchers have theorized that the occurrence of resilient youth may be more common than initially anticipated (Masten, 2001). Of the youth classified as high-risk in the current research, only 20% were identified as resilient. However, the resilience categories established in this research reflect greater than normal levels of individual protection (upper third of scores) and as such may be an underrepresentation of resilience when resilience is defined as effective, reasonable (average) competence (Masten, 2001).

Implications

Ultimately, the successful prevention and treatment of youth with gambling problems and other addictions is the desired outcome of youth gambling and resilience research. The empirical evaluation of resilience education efforts in prevention and intervention programs is therefore imperative to determining their effectiveness (Dickson et al., 2002). Resilience education programs have received some evaluative attention, supporting the plausibility of translating resilience research into effective practice-based prevention and intervention programs (Battistich, Schaps, & Wilson, 2004; Lynch, Geller, & Schmidt, 2004). For example, Battistich and colleagues examined the effects of an elementary school intervention program aimed at reducing risk and promoting resilience among youth. Students exposed to the program experienced greater levels of prosocial behavior and engaged in fewer problem behaviors than the control group. Similarly, social–emotional competence, positive coping skills, and suppression of antisocial and aggressive behavior were strengthened by a carefully designed, research-based resilience program for children (Lynch et al., 2004). As such, it appears plausible for resilience research to translate into effective practice-based prevention and intervention programs.

Limitations and Future Directions

Given that the EMT–Risk has not been standardized, it would be useful in future research to apply a standardized measure of risk exposure to further examine differences between behavioral and

environmental risk and gambling severity and to compare these differences with normative data. As well, this research only examined one form of adolescent risky behavior: youth problem gambling. It would be important in future research to include diagnostic screens for other high-risk behaviors to examine the additive effects of multiple problem behaviors.

Historically, little attention has been given to the interface between resilience research and youth gambling. It is important to identify risk and protective factors relevant to youth gambling problems and to identify their commonalities (and differences) across other high-risk behaviors. Ultimately, it is necessary for resilience research in the area of addictions to address *how* risk and resilience influence one another (Cowen, Work, & Wyman, 1997). In addressing how these interactive relationships operate, gender, age, and ethnicity must also be explored and conceptualized within an integrated framework that promotes strengths as well as deficits.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Azmier, J. (2000). *Gambling in Canada: Triumph, tragedy, or tradeoff. Canadian gambling behavior and attitudes.* Calgary, Alberta, Canada: Canada West Foundation.

Battistich, V., Schaps, E., & Wilson, N. (2004). Effects of an elementary school intervention on students' "connectedness" to school and social adjustment during middle school. *The Journal of Primary Prevention, 24,* 243–262.

Benson, P., Galbraith, J., & Espeland, P. (1995). *What kids need to succeed: Proven practical ways to raise good kids.* Minneapolis, MN: Free Spirit.

Cowen, E. L., Work, W. C., & Wyman, P. A. (1997). The Rochester Child Resilience Project (RCRP): Facts found, lessons learned, future directions divined. In S. S. Luthar, J. A. Burack, D. Cicchetti, & J. Weisz (Eds.), *Developmental psychopathology: Perspectives on adjustment risk and disorder* (pp. 527–547). New York: Cambridge University Press.

Derevensky, J. L., & Gupta, R. (2004). Adolescents with gambling problems: A review of our current knowledge. *e-Gambling: Electronic Journal of Gambling Issues, 10,* 119–140.

Derevensky, J. L., Gupta, R., Dickson, L., & Deguire, A.-E. (2004). Prevention efforts toward reducing gambling problems. In J. Derevensky & R. Gupta (Eds.), *Gambling problems in youth: Theoretical and applied perspectives* (pp. 211–230). New York: Kluwer Academic/Plenum Publishers.

Dickson, L., Derevensky, J., & Gupta, R. (2002). The prevention of gambling problems in youth: A conceptual framework. *Journal of Gambling Studies, 18,* 97–159.

Dickson, L., Derevensky, J., & Gupta, R. (2003). *Youth gambling problems: The identification of risk and protective factors.* Report prepared for the Ontario Problem Gambling Research Centre, Guelph, Ontario, Canada.

Dickson, L. M., Derevensky, J. L., & Gupta, R. (in press). Youth gambling problems: An examination of risk and protective factors. *International Gambling Studies.*

Fisher, S. (1992). Measuring pathological gambling in children: The case of fruit machines in the UK. *Journal of Gambling Studies, 8,* 263–285.

Fisher, S. (2000). Developing the *DSM–IV* criteria to identify adolescent problem gambling in non-clinical populations. *Journal of Gambling Studies, 16,* 253–273.

Fleiss, J. L., Tytum, A., & Ury, H. K. (1980). A simple approximation for calculating sample sizes for comparing independent proportions. *Biometrics, 36,* 343–346.

Gupta, R., & Derevensky, J. (1996). The relationship between gambling and video game playing behavior in children and adolescents. *Journal of Gambling Studies, 12,* 375–394.

Gupta, R., & Derevensky, J. L. (1997). Familial and social influences on juvenile gambling behavior. *Journal of Gambling Studies, 13,* 179–192.

Gupta, R., & Derevensky, J. (1998a). Adolescent gambling behavior: A prevalence study and examination of the correlates associated with problem gambling. *Journal of Gambling Studies, 14,* 319–345.

Gupta, R., & Derevensky, J. L. (1998b). An empirical examination of Jacobs' general theory of addictions: Do adolescent gamblers fit the theory? *Journal of Gambling Studies, 14,* 17–49.

Jacobs, D. F. (1986). A general theory of addictions: A new theoretical model. *Journal of Gambling Behavior, 4,* 15–31.

Jacobs, D. F. (2000). Juvenile gambling in North America: An analysis of long term trends and future prospects. *Journal of Gambling Studies, 16,* 119–152.

Jacobs, D. F. (2004). Youth gambling in North America: Long term trends and future prospects. In J. Derevensky & R. Gupta (Eds.), *Gambling problems in youth: Theoretical and applied perspectives* (pp. 1–24). New York: Kluwer Academic/Plenum Publishers.

Jessor, R. (1998). *New perspectives on adolescent risk behavior.* Cambridge, England: Cambridge University Press.

Jessor, R., Van Den Bos, J., Vanderryn, J., Costa, F. M., & Turbin, M. S. (1995). Protective factors in adolescent problem behavior: Moderator effects and developmental change. *Developmental Psychology, 31,* 923–933.

Kaplan, H. B. (1999). Toward an understanding of resilience: A critical review of definitions and models. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and development: Positive life adaptations* (pp. 17–84). New York: Kluwer Academic/Plenum Publishers.

Kaufman, F. D. (2002). *The relationship between gambling activity, the occurrence of life stress, and differential coping styles in an adolescent sample.* Unpublished doctoral dissertation, McGill University, Montreal, Quebec, Canada.

Ladouceur, R., Dubé, D., & Bujold, A. (1994). Prevalence of pathological gambling and related problems among college students in the Quebec metropolitan area. *Canadian Journal of Psychiatry, 39,* 289–293.

Leshner, A. I. (1999). Introduction. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and development: Positive life adaptations* (pp. 1–4). New York: Kluwer Academic/Plenum Publishers.

Luthar, S. S. (1997). Sociodemographic disadvantage and psychosocial adjustment: Perspectives from developmental psychopathology. In S. S. Luthar, J. A. Burack, D. Cicchetti, & J. R. Weisz (Eds.), *Developmental psychopathology: Perspectives on adjustment risk and disorder* (pp. 459–485). New York: Cambridge University Press.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The Construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71,* 543–562.

Luthar, S. S., & Cushing, G. (1999). Measurement issues in the empirical study of resilience. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and development: Positive life adaptations* (pp. 129–160). New York: Kluwer Academic/Plenum.

Lynch, K. B., Geller, S. R., & Schmidt, M. G. (2004). Multi-year evaluation of the effectiveness of a resilience-based prevention program for young children. *The Journal of Primary Prevention, 24,* 335–353.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist, 56,* 227–238.

Masten, A. S., Best, K. M., & Garmezy, N. (1990). Resilience and development: Contributions from the study of children who overcome adversity. *Development and Psychopathology, 2,* 425–444.

Masten, A. S., & Coatsworth, J. D. (1998). The development of compe-

tence in favorable and unfavorable environments: Lessons from research on successful children. *American Psychologist, 53,* 205–220.

Masten, A. S., Hubbard, J. J., Gest, S. D., Tellegen, A., Garmezy, N., & Ramirez, M. (1999). Competence in the context of adversity: Pathways to resilience and maladaptation from childhood to late adolescence. *Development and Psychopathology, 11,* 143–169.

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin, 114,* 376–390.

Meschke, L. L., & Patterson, J. M. (2003). Resilience as a theoretical basis for substance abuse prevention. *The Journal of Primary Prevention, 23,* 483–514.

Miller, B. C., McCoy, J. K., Olson, T. D., & Wallace, C. M. (1986). Parental discipline and control attempts in relation to adolescent sexual attitudes and behaviors. *Journal of Marriage and the Family, 48,* 503–512.

Newton, R. R., & Rudestam, K. E. (1999). *Your statistical consultant: Answers to your data analysis questions.* London: Sage.

Petraitis, J., Flay, B. R., & Miller, T. Q. (1995). Reviewing theories of adolescent substance use: Organizing pieces in the puzzle. *Psychological Bulletin, 117,* 67–86.

Preacher, K., MacCallum, R. C., Rucker, D. D., & Nicewander, W. A. (2005). Use of the extreme groups approach: A critical reexamination and new recommendations. *Psychological Methods, 10,* 178–192.

Rolf, E. J. (1999). Resilience: An interview with Norman Garmezy. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and development: Positive life adaptations* (pp. 5–14). New York: Kluwer Academic/Plenum Publishers.

Rutter, M. (1990). Psychosocial resilience and protective mechanisms. In J. Rolf, A. S. Masten, D. Cicchetti, K. H. Nuechterlein, & S. Weintraub (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 181–214). New York: Cambridge University Press.

Shaffer, H. J., & Hall, M. N. (2001). Updating and refining meta-analytic prevalence estimates of disordered gambling behaviour in the United States and Canada. *Canadian Journal of Public Health, 92,* 168–172.

Springer, J. F., & Phillips, J. L. (1992). *Extended national youth sports program 1991–1992 evaluation: II. Individual protective factors index (IPFI) and risk assessment study.* Folsom, CA: EMT Associates.

Stinchfield, R. D., & Winters, K. C. (1998). Gambling and problem gambling among youths. *Annals of the American Academy of Political and Social Sciences, 556,* 172–185.

Von Eye, A. (2002). *Configural frequency analysis: Methods, models, and applications.* Mahwah, NJ: Erlbaum.

Werner, E. (1995). Resilience in development. *Current Directions in Psychological Science, 4,* 81–85.

Werner, E. E., & Smith, R. S. (1992). *Overcoming the odds: High risk children from birth to adulthood.* Ithaca, NY: Cornell University Press.

Winters, K. C., & Anderson, N. (2000). Gambling involvement and drug use among adolescents. *Journal of Gambling Studies, 16,* 175–198.

Winters, K. C., Arthur, N., Leitten, W., & Botzet, A. (2004). Gambling and drug abuse in adolescence. In J. Derevensky & R. Gupta (Eds.), *Gambling problems in youth: Theoretical and applied perspectives* (pp. 57–80). New York: Kluwer Academic/Plenum Publishers.

Winters, K. C., Bengston, P., Dorr, D., & Stinchfield, R. D. (1998). Prevalence and risk factors of problem gambling among college students. *Psychology of Addictive Behaviors, 12,* 127–135.

Wood, R. T. A., & Griffiths, M. D. (1998). The acquisition, development and maintenance of lottery and scratchcard gambling in adolescence. *Journal of Adolescence, 21,* 265–273.

Received November 14, 2005
Revision received June 15, 2006
Accepted June 20, 2006 ■