
Personality Characteristics and Risk-Taking Tendencies Among Adolescent Gamblers

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Abstract

Eight hundred and seventeen high school students in the Montreal region completed the DSM-IV-J diagnostic gambling measure, High School Personality Questionnaire (HSPQ), Zuckerman Sensation Seeking Scale (SSS), along with a gambling questionnaire ascertaining gambling participation and gambling-related behaviours. Eight of fourteen personality factors assessed by the HSPQ, as well as three of the four subscales of the SSS differed by gambling severity. A discriminant analysis found that high levels of Disinhibition, Boredom Susceptibility, Cheerfulness and Excitability, as well as low levels of Conformity, and Self-Discipline are strongly associated with the function that best predicts problem gambling severity level. The findings suggest that there exist qualitative differences in personality and risk-taking styles for adolescents based upon the severity of their gambling behaviour, lending support to the premise that certain types of individuals are more susceptible than others to developing a gambling problem.

Résumé

Huit cent dix-sept étudiants provenant d'écoles secondaires de la région de Montréal ont répondu à une mesure diagnostique de jeu établie à partir du DSM-IV-J, au High School Personality Questionnaire (questionnaire d'évaluation de la personnalité des étudiants de l'école secondaire) (HSPQ), à l'échelle de recherche de sensation de Zuckerman (SSS), ainsi qu'à un questionnaire sur le jeu qui permet d'établir la participation au jeu et les comportements liés au jeu. Huit des quatorze facteurs de la personnalité évalués par le HSPQ, ainsi que trois des quatre sous-échelles du SSS différaient selon le niveau de gravité des problèmes liés au jeu. Une analyse discriminante a permis de déterminer que des niveaux élevés de désinhibition, de susceptibilité à l'ennui, de jovialité et d'excitabilité, ainsi que des niveaux faibles de conformité et d'autodiscipline étaient fortement liés à la fonction qui prédit le mieux le niveau de gravité de la dépendance au jeu. Les résultats indiquent que les styles de personnalité et la prise de risque varient qualitativement chez les adolescents selon la gravité de leur comportement de jeu et

que certains types de personnes sont plus susceptibles que d'autres de présenter des problèmes de jeu.

The gaming industry has emerged as one of the fastest growing segments in the economy supported by both the government and private sectors. For most individuals, gambling remains an enjoyable, harmless diversion from everyday life, and is simultaneously stimulating and entertaining. Nevertheless, a small yet significant percentage of individuals remain unable to control their gambling behaviour, and report feeling compelled to gamble repeatedly despite adverse consequences. Unlike previous generations, today's North American adolescents are faced with a multitude of gambling opportunities. Lotteries (draws, scratch tickets, interactive lotteries), video lottery terminals (machines that play a number of games, including blackjack, roulette, poker, keno), poker machines, casinos, sports betting, and online casinos are widespread. While minors under the age of 18 (this age varies between jurisdictions and gambling venues) are generally not meant to have access to gambling venues, the majority of adolescents report readily gaining access to many of these activities. They also are gaining access to online casinos and poker tournaments (Messerlian, Byrnes, & Derevensky, 2004), two relatively new forms of wagering that currently have few controls designed to restrict youth from participating. It is also apparent that teens organize their own gambling, such as sports pools and card games, activities that do not involve the violation of any laws. As such a significant portion of the underage population is engaging in some form of gambling activities (Derevensky & Gupta, 2000a; Gupta & Derevensky, 1998a, b; Jacobs, 1989, 2000; NRC, 1999).

Researchers, clinicians, and educators remain concerned because severe gambling problems have been shown to originate during childhood and adolescence (e.g., Griffiths, 1990; Gupta & Derevensky, 1998a; Wynne, Smith, & Jacobs, 1996). Based on

prevalence studies conducted in Canada, the U.S., and in Europe, it is estimated that adolescent pathological gambling prevalence rates lie somewhere between 3.5% and 6%, and that a minimum of 20% of youth engage in some form of weekly gambling behaviour (Chevalier, Gupta, Martin, & Derevensky, 2005; Derevensky & Gupta, 2000a; Gupta & Derevensky, 1998a, 2000; Jacobs, 2000; NRC, 1999; Shaffer & Hall, 1996), with rates of pathological gambling higher amongst adolescents compared to adults (e.g., Derevensky & Gupta, 2000a; Gupta & Derevensky, 1998a, b; Jacobs, 1987, 2000; Lesieur & Klein, 1987; Shaffer & Hall, 1996; Wynne et al., 1996). Research has clearly indicated a high rate of co-morbidity with problem gambling and other addictive behaviours (Arseneault, Ladouceur, & Vitaro, 2001; Gupta & Derevensky, 1998a; Stinchfield, Cassuto, Winters, & Latimer, 1997; Vitaro, Ferland, Jacques, & Ladouceur, 1998).

Adolescents with significant gambling problems find themselves preoccupied and thinking about gambling activities, planning their next gambling excursion, lying to family and friends, chasing losses, and stealing money (Derevensky & Gupta, 2000a; Gupta & Derevensky, 2000). Poor academic performance, socialization, familial problems, and legal problems are but a few of the consequences for adolescents exhibiting problem gambling behaviour. Equally concerning are the findings that parents are often unaware of the negative consequences that can result from gambling at a young age (Gupta & Derevensky, 1997; Ladouceur, Vitaro, & Coté, 2001).

Gambling and Related Personality Constructs

The view that there is some underlying personality type at the root of addictive behaviour initially originated with personality trait theorists. The research to date indicates that there may be several different personality profiles that characterize pathological gamblers. Early on in the youth gambling literature, Bellaire and Caspari (1992) reported that pathological gamblers could be divided into three distinct personality subgroups: those suffering from serious personality disorders (48%), individuals with severe debilitating interpersonal relationships (29%), and those with severe psychiatric disorders (22%) (i.e., schizophrenia and manic depressive illness). Other researchers reported male pathological gamblers to have personality disorders, paranoia, emotional instability, alcoholism (Graham & Lowenfeld, 1986), be highly impulsive (Hraba, Mok, & Huff, 1990), score higher on neuroticism and psychoticism scales (Roy, Custer, Lorenz, & Linnoila, 1989), be highly energetic and of above average intelligence

(Peck, 1986), and be highly distractible individuals who become easily bored (Custer, 1980).

More recently, Blaszczynski (2000) has argued that a prototypical model explaining problem gambling should integrate biological, personality, developmental, cognitive, and environmental factors. In fact, his pathways model outlines three subgroup typologies, one of which includes emotionally disturbed gamblers with neurotic personality traits. This model has also been theoretically applied to youth gambling (Nower & Blaszczynski, 2004).

Although personality tests have been used in research with adult pathological gamblers, no real clear "gambler's personality" profile has emerged. Zuckerman's research suggests that individuals with higher sensation-seeking needs exhibit greater drug and alcohol consumption, more frequently engage in gambling activities, and are more likely to engage in high-risk activities such as drinking while driving (Zuckerman, 1994). Utilizing Zuckerman's Sensation Seeking Scale, Kuley and Jacobs (1988) found that the total sensation seeking scores of problem adult gamblers were significantly greater than those of social gamblers. Problem Gamblers also scored significantly higher than Social Gamblers on the Disinhibition, Boredom Susceptibility, and Experience Seeking subscales. Similar findings were obtained by Dickerson, Hinchey, and Fabre (1987). However, Parke, Griffiths, and Irwing (2004) tested three personality traits, namely, sensation seeking, competitiveness, and deferment of gratification, and concluded that sensation seeking was not strongly associated with problem gambling. Nonetheless, the other two traits did surface as being significant predictors. Therefore, unlike in youth research, the relationship between sensation seeking and adult problem gambling is inconsistent and unclear to date.

While the ideal research design would involve prospective investigations, examining personality characteristics in adolescent gamblers provides meaningful insight into the occurrence of pre-existing personality traits since their gambling patterns are relatively new and are unlikely to have significantly altered their personality profiles. Support for this hypothesis comes from Sharma (1995), who examined the relationship between drug dependence and personality traits, and concluded that the addictive personality precedes addiction, and that the addiction itself does not create the addictive personality. Such statements of unidirectional causality, however, are tenuous since there is not yet sufficient research information to support such a strong claim. Furthermore, it is unclear whether findings on drug dependence apply to gambling addiction.

TABLE 1
Description of High School Personality Questionnaire (HSPQ) Factors

Low score	HSPQ Factor	High score
Cool reserved, impersonal, detached, aloof, formal	Warmth	Warm outgoing, kindly, easy going, likes people
Concrete-thinking less intelligent	Intelligence	Abstract-thinking more intelligent, bright
Affected by feelings emotionally less stable, easily annoyed	Emotional Stability	Emotionally stable mature, faces reality, calm
Phlegmatic undemonstrative, deliberate, placid, inactive	Excitability	Excitable impatient, demanding, overactive, easily distracted
Submissive humble, mild, easily led, accommodating	Dominance	Dominant assertive, aggressive, stubborn, competitive, bossy
Sober restrained, prudent, taciturn, serious	Cheerfulness	Cheerful enthusiastic, impulsive, heedless, expressive
Expedient disregards rules, self-indulgent, nonconforming	Conformity	Conforming – conscientious, staid, persistent, moralistic, rule-bound
Shy threat-sensitive, timid, hesitant, intimidated	Boldness	Bold venturesome, uninhibited, can take stress
Tough-minded self-reliant, no-nonsense, rough, realistic	Sensitivity	Tender-minded sensitive, over-protected, intuitive, refined
Vigorous goes readily with group, zestful, given to action	Withdrawal	Withdrawn guarded, circumspect individualism, internally restrained
Self-assured secure, feels free of guilt, untroubled, self-satisfied	Apprehension	Apprehensive self-blaming, guilt-prone, insecure, worrying
Group-oriented a “joiner” and sound follower, listens to others	Self-sufficiency	Self-sufficient – resourceful, prefers own decisions
Undisciplined self-conflict, lax, careless of social rules	Self-discipline	Self-disciplined – controlled, socially precise, compulsive, self-respecting
Relaxed tranquil, composed, has low drive, unfrustrated	Tension	Tense frustrated, overwrought, has high drive

There appears to be predisposing characteristics that place individuals at heightened risk for an addiction. For example, Harrison and Luxenberg (1995) studied alcohol abusers from Grades 6, 9, and 12 and concluded that they were 15 times more likely than other students to report lower self-esteem, more emotional distress, greater antisocial behaviour, and an increased number of suicide attempts. Other researchers found that drug use was associated with high impulsiveness, neuroticism, low self-esteem, anxiety, and depression (Cookson, 1994). The onset of cigarette smoking is associated with alcohol use, risk-

taking, and low self-esteem (Simon, Sussman, & Dent, 1995). Comorbidity of addictive behaviours has been shown to be associated with learning difficulties, poor self-esteem, social alienation, antisocial behaviour, and frequent histories of abuse (Gupta & Derevensky, 1998b; Harrison & Hoffmann, 1989). By reconciling clinical diagnostic categories, such as an addiction, with psychologically relevant personality dimensions, a greater understanding of the underlying mechanisms placing individuals at-risk may be achieved. This ultimately will result in improved theoretical models and the development of more appro-

priate prevention and treatment programs (Blaszczynski, 2000).

Employing a prospective design, Vitaro, Arseneault, and Tremblay (1999) concluded that disinhibited youth and those with modulation difficulties were more likely to experience gambling problems at later ages. From the same subject pool, Vitaro et al. (1998) further concluded that the impulsivity trait was more predictive of comorbid problems (gambling and substance use) than problem gambling alone. Research to date has not yet examined a wider range of personality traits potentially associated with varying degrees of gambling involvement and severity amongst youth. The purpose of this study is to investigate whether adolescents involved in varying levels of gambling severity differ in their overall personality profiles and risk-taking tendencies. This study is exploratory in nature, and as such no specific hypotheses are advanced.

Method

The data presented in this paper represent part of a larger study. Please see Gupta and Derevensky (1998a) for information pertaining to the correlates of problem gambling in youth, as it pertains to the current sample of participants.

Participants

The participants included 817 adolescents, 417 males and 400 females, from Grades 7, 9, and 11. Students represented a community sample from five public, English high schools in the greater Montreal region, and included a wide range of socio-economic status (SES) levels. Based on data from a recent survey (Cowley & Marceau, 2000), the mean student SES of the schools involved in the present study ranged from 1.6 standard deviations (SD) above to 1 SD below the Québec average. In more concrete terms, the mean family income of the most affluent school was \$127,000, while that of the least affluent school was \$36,200. The distribution among the grades is 258 in Grade 7 (117 males, 141 females), 336 in Grade 9 (190 males, 146 females), 223 in Grade 11 (110 males, 113 females). Schools agreeing to participate were provided with appropriate student consent forms. Eighty-four percent of the students in these schools were given parental permission to participate in this study.

Instruments

DSM-IV-J (Fisher, 1992). This 12-item, 9-category instrument is a screen for adolescent pathological gambling, adapted from the DSM-IV (APA, 1994) criteria for diagnosis of adult pathological gambling. A

score of 4 or greater out of 9 satisfies the criteria for pathological gambling. Fisher concluded, with her population of young fruit machine players, that the DSM-IV-J was as an effective discriminator of pathological gambling in youth. Validity is reported in Derevensky and Gupta (2000b) ($\alpha = .97$).

High School Personality Questionnaire (HSPQ) (Cattell, Cattell, & Johns, 1984). The HSPQ is a self-report instrument focusing on 14 personality traits. A summary of trait descriptions is presented in Table 1. The HSPQ contains 142 items and requires approximately 45 minutes to complete. Raw scores are converted into scaled scores with separate conversion tables for males and females. Test-retest reliability for the HSPQ is reported to be .83 for Forms A and B. The validation of the HSPQ was accomplished using both construct and criterion validation, with no fewer than 12 replications of its personality structure using factor analytic techniques (Cattell et al., 1984), all indicating a similar factor structure. Separate norms were also established for institutionalized adolescents.

Sensation Seeking Scale-Form V (SSS) (Zuckerman, Eysenck, & Eysenck, 1978). The SSS consists of 40 forced choice items with individuals selecting statements that best describe them. Examples include, "I like wild uninhibited parties," and "I would like to try parachute jumping." Because the SSS assumes that sensation seeking is a multidimensional construct, it has four subscales, each comprising 10 items. Thrill and Adventure Seeking, Disinhibition, Boredom Susceptibility, and Experience Seeking. Internal reliabilities for the total scale have been found to range from .83 to .86.

Gambling Activities Questionnaire. This is a revised version of the questionnaire developed by Gupta and Derevensky (1996) and identifies correlates of gambling behaviour such as frequency and duration of play, types of gambling activities played, amounts wagered, and other descriptive information (see Gupta & Derevensky, 1998a). This instrument has face validity since all questions are asked directly and no theoretical constructs were assessed. For the purpose of the present study, only the question pertaining to the frequency of gambling behaviour is relevant. This questionnaire contains 38 items and takes approximately 25-30 minutes to complete.

Procedure

Students were asked to individually complete the paper-pencil instruments in groups in their classrooms or a large hall. To assure confidentiality, teach-

TABLE 2
A Comparison of the Four Groups on Personality Scores

HSPQ Factor	Non-Gambler		Social Gambler		At-Risk Gambler		PPG		Univariate <i>F</i>	Eta ²
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Warmth	5.65	2.34	5.57	2.38	5.71	2.37	5.94	2.27	0.31	
Intelligence	5.99	1.87	5.56	1.85	5.33	1.86	5.03	2.19	3.86**	1 > 3, 4
Emotional Stability	6.51	2.19	6.51	1.87	6.11	1.90	5.48	2.29	3.49*	1, 2 > 4 ^d
Excitability	4.99	2.19	5.44	1.85	6.32	1.87	7.00	1.75	15.54***	3, 4 > 1, 2 ^d
Dominance	6.32	1.91	6.63	1.96	6.31	2.04	6.48	1.57	1.42	
Cheerfulness	4.94	2.14	5.79	2.12	6.68	2.22	7.35	1.96	18.72***	3, 4 > 2 > 1
Conformity	6.49	2.03	5.76	2.25	4.45	1.90	4.32	2.30	20.73***	1 > 2 > 3, 4
Boldness	5.74	2.18	6.00	2.03	5.78	1.86	6.03	1.47	0.80	
Sensitivity	6.06	2.12	5.20	1.95	4.86	2.15	5.13	1.86	9.24***	1 > 2, 3, 4
Withdrawal	6.09	2.20	5.86	1.85	5.78	1.70	6.10	1.94	0.79	
Apprehension	4.69	2.27	4.90	2.04	5.05	1.87	5.35	1.80	1.18	
Self-Sufficiency	6.14	1.98	5.71	1.72	5.44	1.82	5.68	1.66	3.44* n.s.	
Self-Discipline	6.12	2.19	5.49	2.02	4.49	2.16	4.03	2.32	16.31***	1, 2 > 3, 4
Tension	5.05	1.90	5.26	1.98	5.52	2.03	6.39	1.89	4.45**	4 > 1, 2, 3
<i>N</i> ^c	154		487		87		31		759	

Notes. Post hoc for self-sufficiency revealed no significant between group differences

^aHigh School Personality Questionnaire

^bProbable Pathological Gambler

^cNumber of students who completed the HSPQ

^dIndicates that homogeneity of variance was not assumed and that a Dunnett C post-hoc test was used; otherwise, the post-hoc test was a Tukey HSD.

1 = Non-Gamblers, 2 = Social Gamblers, 3 = At-Risk Gamblers, 4 = Probable Pathological Gamblers.

* *p* < .05; ** *p* < .01; *** *p* < .001.

ers were not present during the administration of the questionnaires, and research assistants were present at all times to answer questions. Each participant was assigned an identification code, which was noted on all forms. Depending upon the school, either one session of 1.5 hours or two 45-minute sessions were needed for completion of the instruments.

Results

Using a classification strategy recommended by Fisher (2000), participants were grouped into one of four categories, based upon frequency and severity of gambling behaviour. Non-Gamblers (*n* = 162 or 20%) are defined as individuals who reported never gambling during the previous 12 months. Social Gamblers (*n* = 525 or 64%) include individuals who gambled in the past 12 months and reported little or no gambling-related problems on the DSM-IV-J (score of 0 or 1), At-Risk Gamblers (*n* = 93 or 11%) received a score of 2 or 3 on the DSM-IV-J, and Probable Pathological Gamblers (PPG) (*n* = 31 or 3.8%) had a score of 4 or more.

The gender distribution within each group included the following: Non-Gamblers (48.1% males, 51.9% females), Social Gamblers (46.5% males, 53.5% females), At-Risk Gamblers (73.1% males, 26.9% females), PPGs (80.6% males, 19.4% females). As

anticipated, a test for gender differences in the four gambling groups proved significant with males over-represented in the At-Risk, $\chi(1, 811) = 20.25, p < .0005$, and PPG, $\chi(1, 811) = 11.20, p < .001$, categories, and underrepresented in the Social Gambler category, $\chi(1, 811) = 13.14, p < .0005$. The distribution by grade level for each group included 33.3% of Grade 7, 44.4% of Grade 9, and 22.2% of Grade 11 students in the Non-Gambler group; the Social Gambler group comprised 33.7% of Grade 7, 37.1% of Grade 9, and 29.1% of grade 11 students; the At-Risk group consisted of 18.3% of Grade 7, 50.5% of Grade 9, and 31.2% of Grade 11 students. Finally, the PPG group consisted of 32.3% of Grade 7, 51.6% of Grade 9, and 16.1% of Grade 11 students.

Analytic Strategy

Our sample fails to meet the assumptions of normality due to the unequal numbers in the four groups, a MANOVA analysis cannot be used. Instead, separate one-way ANOVAs were performed for each HSPQ and SSS variable to test for gambling severity (group), developmental, and gender differences. GLM Anovas were used to test for interaction effects. The Welch statistic, a robust test for equality of means, was used to verify the significance of each univariate analysis. Finally, a discrete discriminative analysis

TABLE 3
A Comparison of the Four Groups on Sensation Seeking Scale (SSS)

	Non-Gambler		Social Gambler		At-Risk Gambler		PPG		Univariate <i>F</i>	Eta ²	
	<i>M</i> (<i>n</i> ^a)	<i>SD</i>	<i>M</i> (<i>n</i> ^a)	<i>SD</i>	<i>M</i> (<i>n</i> ^a)	<i>SD</i>	<i>M</i> (<i>n</i> ^a)	<i>SD</i>			
Boredom Susceptibility (<i>n</i> = 805)	3.21 (160)	2.18	3.77 (521)	2.14	5.13 (93)	2.19	5.16 (31)	2.37	19.62***	3, 4 > 1, 2 ^b	.069
Disinhibition (<i>n</i> = 803)	2.52 (159)	2.27	3.76 (520)	2.67	5.85 (93)	2.47	6.90 (31)	2.49	48.07***	3, 4 > 2 > 1	.153
Excitement seeking (<i>n</i> = 807)	3.77 (162)	2.04	4.33 (521)	2.06	4.58 (93)	1.74	5.06 (31)	2.08	23.62**	4 > 1	.021
Thrill & adventure seeking (<i>n</i> = 809)	5.36 (162)	2.64	5.72 (523)	2.79	5.92 (93)	2.65	6.71 (31)	2.31	2.48		
Total SSS score (<i>n</i> = 795)	14.97 (158)	6.48	17.41 (514)	6.43	19.12 (93)	6.97	23.05 (31)	5.83	29.50***	3, 4 > 2 > 1	.100

Notes. All subscores range from 0 to 10.

^aNumber of students who completed each subscale

^bTukey HSD post hoc

1 = Non-Gamblers, 2 = Social Gamblers, 3 = At-Risk Gamblers, 4 = Probable Pathological Gamblers.

* $p < .05$; ** $p < .01$; *** $p < .001$.

was performed to see how well clusters of variables predict problem gambling (in conjunction with gender).

Group Differences in Personality Factors (HSPQ) and Sensation Seeking (SSS)

The means and standard deviations for the 14 personality factors of the HSPQ, the results of one-way ANOVAs, and a measure of effect size (eta) are presented in Table 2. The normative mean score for each of the HSPQ factors is 5.5, $SD = 1.00$. Thus, any score below 4.5 or above 6.5 is considered to deviate from the norm (Cattell et al., 1984). The results of the ANOVAs indicate that significant differences exist between the four groups on 9 of the 14 personality factors: Intelligence, Emotional Stability, Excitability, Cheerfulness, Conformity, Sensitivity, Self-Sufficiency, Self-Discipline, and Tension. However, no significant between-group differences were found in the subsequent post-hoc analysis of the Self-Sufficiency subscale.

Most importantly, personality was found to differentiate youth with gambling problems from those with no such difficulties. Problem Gamblers demonstrate higher levels of Excitability and Cheerfulness, as well as low levels of Conformity and Self-Discipline. They also scored lower than nongamblers on the Intelligence subscale. PPGs distinguish them-

selves from the other groups with somewhat higher scores on the Tension trait. Though not significantly different from At-Risk Gamblers, they also reported the highest levels of excitability and cheerfulness, and the lowest levels of Emotional Stability. Non-Gamblers demonstrated a particular personality profile as well, distinguished by high levels of Sensitivity and Conformity, and a low level of Cheerfulness. As well, although not significantly different from Social Gamblers, they also reported relatively high levels of Intelligence, Self-Discipline, and Self-Sufficiency, and a low level of Excitement.

In relation to the normative subscale scores, both At-Risk Gamblers and PPGs scored on average one SD above the normative mean in Cheerfulness (the mean score for PPGs was nearly two SD s higher), and one SD below the normative mean for Conformity and Self-Discipline. In addition, PPGs exhibited higher Excitability scores. Both Non-Gamblers and Social Gamblers scored an average of one SD above the mean for Emotional Stability. On the Dominance subscale, all groups had unusually high scores. Given that Non-Gamblers and Social Gamblers would be expected to score close to the normative mean, the results of these two subscales should be interpreted with caution.

The gambling groups were compared with respect to the SSS scale and subscales. The means and stan-

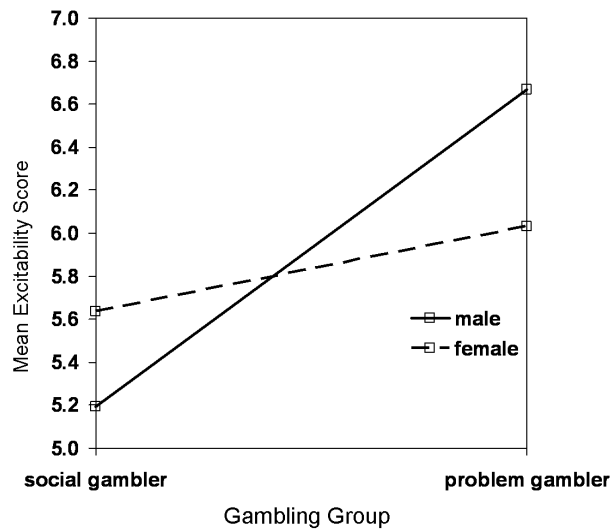


Figure 1. Interaction between gender and gambling problem severity on Excitability subscale of the High School Personality Questionnaire.

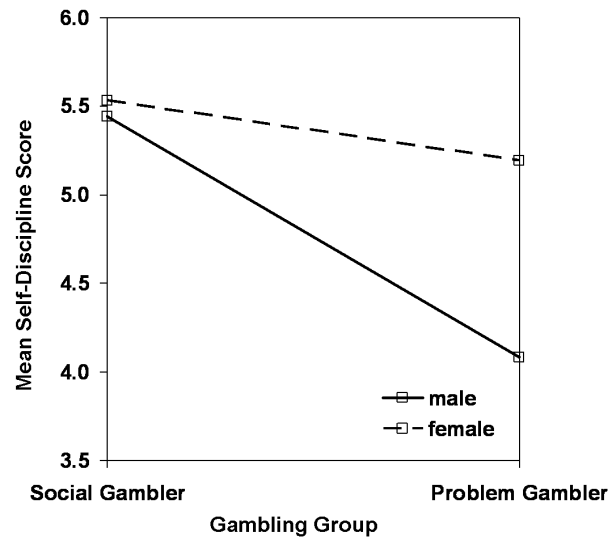


Figure 2. Interaction between gender and gambling problem severity on Self-Discipline subscale of the High School Personality Questionnaire.

standard deviations, the results of ANOVAs, and a measure effect size are reported in Table 3. Significant between-group differences were found for Boredom Susceptibility, Disinhibition, Experience Seeking, and total SSS score. Post-hoc analyses indicate that both problem-gambling groups reported higher levels of Disinhibition and Boredom Susceptibility than the two nonproblematic groups. As well, Non-Gamblers scored lower than PPGs on the Experience Seeking subscale.

Gender Differences and Interaction Effects

Scaling of the HSPQ scores for males and females is performed using separate normative tables, thus controlling for gender differences. Despite the scaling procedure, ANOVA analyses revealed several gender differences. Females scored higher than males on measures of Warmth, $M = 5.80$ and 5.46 , respectively; $F(1, 816) = 4.18, p < .041$, Dominance, $M = 6.87$ and 6.19 ; $F(1, 764) = 24.03, p < .0005$, Withdrawal, $M = 6.19$ and 5.62 ; $F(1, 764) = 17.68, p < .0005$, Apprehension, $M = 5.13$ and 4.67 ; $F(1, 764) = 9.67, p < .002$, and Self-Discipline, $M = 5.87$ and 5.66 ; $F(1, 764) = 7.04, p < .008$. Males scored higher than females on measures of Intelligence, $M = 5.98$ and 5.20 , respectively; $F(1, 764) = 35.09, p < .0005$, and Sensitivity, $M = 5.85$ and 4.78 ; $F(1, 764) = 56.88, p < .0005$. Since some of these results seem counterintuitive, it is assumed that the scaling procedure may have overcompensated for expected gender differences in Dominance, Intelligence, and Sensitivity.

To test for Gender \times Problem Gambling Group interaction effects, the At-Risk and PPG groups were merged into one category (due to an insufficient number of female PPGs), and compared to the Social Gamblers. The univariate ANOVA with Gender and Gambling group (Problem or Social Gambler) entered as fixed factors revealed significant interaction effects for Excitability, $F(1, 764) = 6.60, p < .010$ (see Figure 1) and Self-Discipline, $F(1, 764) = 4.83, p < .028$ (see Figure 2).

Paired comparisons revealed that male Problem Gamblers reported significantly higher scores of Excitability ($M = 6.67$), compared to male Social Gamblers, $M = 5.19$; $t(306) = 6.19, p < .0005$. This latter group also reported significantly lower Excitability scores than female Social Gamblers, $M = 5.64$; $t(485) = 2.64, p < .009$. The Excitability scores of male and female Problem Gamblers were not statistically different, but this may be due to the small sample sizes. Male Problem Gamblers reported significantly lower Self-Discipline scores ($M = 4.08$), compared to both male Social Gamblers, $M = 5.44$; $t(306) = 5.26, p < .0005$, and female Problem Gamblers, $M = 5.19$; $t(116) = 2.47, p < .015$.

Gender differences were obtained for all SSS subscales with the exception of the Boredom Susceptibility factor. Males outscored females on measures of Disinhibition, $M = 4.34$ and 3.36 , respectively; $F(1, 808) = 25.84, p < .0005$, and Thrill and Adventure Seeking, $M = 5.98$ and 5.40 , respectively; $F(1, 814) = 9.09, p < .003$, whereas females reported

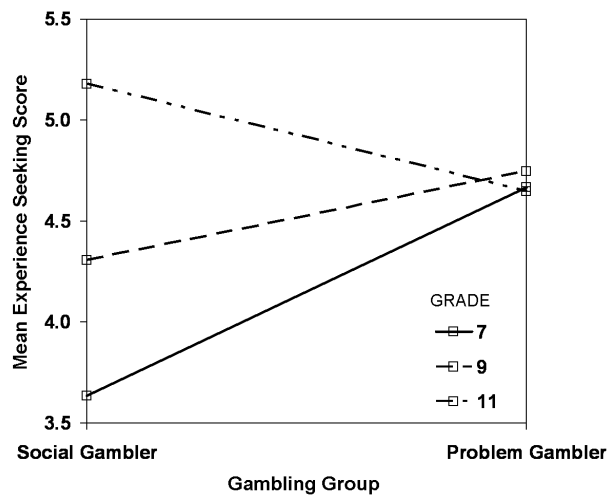


Figure 3. Interaction between school grade and problem gambling severity on Experience Seeking subscale of the Sensation Seeking Scale.

higher scores than males in Experience Seeking, $M = 4.66$ and 3.91 , respectively; $F(1, 812) = 28.10$, $p < .0005$. No significant Group \times Gender interaction effects were found.

Developmental Differences and Interaction Effects

Three HSPQ factors revealed a significant effect for grade level. Grade 11 and 9 students reported higher levels of Intelligence than Grade 7 students, $M = 5.97$, 5.81 and 4.94 , respectively; $F(2, 764) = 21.70$, $p < .0005$, and Tension, $M = 5.40$, 5.48 , and 4.91 ; $F(2, 764) = 6.12$, $p < .002$. Grade 7 students scored higher than Grade 9 and 11 students in Self-Discipline, $M = 5.80$, 5.34 , and 5.25 , respectively; $F(2, 764) = 4.41$, $p < .012$. No Group by Grade interactions were noted for the HSPQ factors.

With respect to sensation seeking, an effect for grade was obtained for the SSS Disinhibition, $F(2, 808) = 31.96$, $p < .0005$, and Experience Seeking, $F(2, 812) = 33.11$, $p < .0005$, subscales. Both risk-taking scores increased with age, with Grade 11 students ($M = 4.80$ and 5.04 , respectively) scoring significantly higher than Grade 9 ($M = 4.00$ and 4.31) students, who in turn had higher scores than Grade 7 students ($M = 2.86$ and 3.57). A significant grade by Gambling Group interaction effect, $F(2, 806) = 4.15$, $p < .016$, was found for Experience Seeking (Figure 3). In subsequent paired comparisons, Problem Gamblers ($M = 4.67$) were found to report significantly higher scores than Social Gamblers ($M = 3.63$) for Grade 7 students only, $t(200) = 2.73$, $p < .007$. For social gamblers but

not problem gamblers, Experience Seeking scores increased significantly by grade level, $M = 3.63$, 4.30 , and 5.18 for Grades 7, 9, and 11, respectively; $F(2, 518) = 24.93$, $p < .0005$; Grades $7 < 9 < 11$.

Discriminant Analysis

A direct discriminant analysis was performed using personality and sensation-seeking dimensions as predictors of membership in the four groups: Non-Gambler, Social Gambler, At-Risk Gambler, and PPG. The Apprehension dimension of the HSPQ had an unacceptably high correlation with the Emotional Stability ($r = .539$, $p < .01$) dimension of the same scale. As the gambling severity groups demonstrated no significant differences with respect to mean Apprehension score, this variable was dropped from the analysis. Gender but not school grade was found to be related to gambling severity, so the former was included in the model as well.

Of the original 817 cases, 75 were omitted because of missing variables: 6 failed to complete the DSM-IV-J; 4 Non-Gamblers and 11 Social Gamblers did not complete the SSS; 8 Non-Gamblers, 38 Social Gamblers, and 6 At-Risk Gamblers had missing data on the HSPQ. Given the HSPQ was the last and longest section of the questionnaire, it was not unexpected that a number of participants failed to complete this questionnaire in the allotted time period. However, since none of the PPGs were lost, the principal objective of the study (i.e., understanding adolescents with severe gambling problems) should not be overly affected. As well, the SSS Disinhibition scores of two social gamblers and the SSS Boredom Susceptibility score of one Non-Gambler were in excess of four standard deviations above the mean. These three cases were identified as univariate outliers, and dropped from further analyses. Using the outlier command of the SPSS Logistic Regression function, two cases were identified as multivariate outliers (Z score > 3). However, these were PPGs with a personality profile typical of someone without gambling problems. They were not eliminated from the analysis, because this may have produced overfitting (Tabachnick & Fidell, 1996). The discriminant analysis was limited to 742 cases, including 149 Non-Gamblers, 475 Social Gamblers, 87 At-Risk Gamblers, and 31 PPGs.

The discriminant functions significantly improved the prediction model from chance, as the Wilks' Lambda was equal to $.725$, $p < .0005$. As there were four groups, three functions were extracted. The first function, with an eigenvalue of $.307$, accounted for 84.9% of the explained between-group variance. On their own, the second and third functions, with

TABLE 4

Group Classification Matrix Using Personality and Sensation Seeking Dimensions as Predictors of Problem Gambling Severity Group Membership

Group	Predicted Group Membership			
	Non-Gambler	Social	At-Risk	PPG
Non-Gambler	92 (61.7%)	33 (22.1%)	13 (8.7%)	11 (7.4%)
Social	158 (33.3%)	180 (37.9%)	84 (17.7%)	53 (11.2%)
At-Risk	9 (10.3%)	9 (10.3%)	39 (44.8%)	30 (34.5%)
PPG	1 (3.2%)	3 (9.7%)	6 (19.4%)	21 (67.7%)

Note. Percentage of original grouped cases correctly classified: 44.7%.

TABLE 5

Structure Matrix: Pooled Within-Groups Correlations Between Discriminating Variables and Standardized Canonical Discriminant Functions

Predictor variable	Function		
	1	2	3
Disinhibition‡	.782*	-.014	.072
Boredom susceptibility‡	.514*	.006	-.301
Conformity	-.513*	.057	.231
Cheerfulness	.486*	-.263	.141
Self-discipline	-.456*	.080	-.005
Excitability	.451*	.097	.137
Sensitivity	-.271	.710*	.185
Gender (male)	.324	.552*	-.076
Dominance	-.007	-.381*	.188
Self-sufficiency	-.172	.376*	.193
Boldness	.019	-.301*	.199
Emotional stability	-.179	-.282*	-.225
Intelligence	-.209	.269*	-.124
Experience seeking‡	.232	-.256*	.182
Withdrawal	-.034	.239*	.174
Tension	.213	.042	.399*
Thrill & adventure seeking‡	.151	-.150	.305*
Warmth	.022	-.050	-.110*

‡ indicates a dimension from the Sensation Seeking Scale

* indicates largest absolute correlation between each variable and any discriminant function.

eigenvalues of .033 and .022, respectively, did not significantly improve the prediction model. The Wilks' Lambda of both functions combined was .947, $p = .240$. From Table 4, it is observed that PPGs and Non-Gamblers were predicted with the greatest accuracy. Overall, these results suggest that Problem Gamblers share a common personality profile.

The structure matrix (Table 5) presents the degree to which the predictor variables are correlated to each of the three discriminant functions. It is observed that high levels of Disinhibition, Boredom Susceptibility, Cheerfulness, and Excitability, as well as low levels of Conformity and Self-Discipline are strongly associated with the function that best predicts problem-gambling severity level (i.e., Function 1). Table 6 provides the mean value of the functions

TABLE 6

Discriminant Functions at Group Centroids

	Function		
	1	2	3
Non-Gambler	-0.657	0.288	-0.010
Social Gambler	-0.077	-0.130	0.021
At-Risk Gambler	1.009	0.117	-0.288
PPG	1.511	0.281	0.535

Note. Unstandardized canonical discriminant functions evaluated at group means.

for each of the groups (e.g., the average Function 3 score for Non-Gamblers is -.010). Widely varying means indicate that the function contributes largely to the separation of the groups. As one would expect, the means are most different for Function 1. Furthermore, Table 6 indicates that individuals with the lowest Function 1 scores are likely to be Non-Gamblers, followed by the Social Gamblers, At-Risk Gamblers, and the PPGs.

Discussion

Are there distinguishing characteristics that predispose adolescents to a gambling addiction? There appear to be specific personality traits that may play such a role. Adolescents with moderate to severe gambling-related problems were found to differ from the rest of the sample on 8 of 14 personality factors. More importantly, they deviated from the normative mean of four personality traits (Excitability, Conformity, Self-Discipline, Cheerfulness), which are reflected in behaviours of impulsivity, distractibility, over-activity, self-indulgence, and difficulty conforming to group norms. These results further suggest that pathological gamblers exhibit less self-regulatory behaviour than others, and exude the impression of being carefree and outgoing. Vitaro and colleagues' (1999) findings concerning impulsivity are in line with the current results. Parke et al. (2004) obtained similar results with adults inasmuch as deferment of

gratification can be conceptualized as a self-regulatory behaviour. Other research studying adult pathological gamblers yielded similar findings with regard to low conformity (Taber, Russo, Adkins, & McCormick, 1986) and high impulsivity (Zimmerman, Meeland, & Krug, 1985). Several researchers (e.g., Bland, Newman, Orn, & Stebelsky, 1993; Chen, Wong, Lee, & Chan-Ho, 1993) have characterized adult pathological gamblers as having characteristics common to antisocial personality disorder.

While the youth problem and pathological gamblers in the current sample present as outgoing and sociable on the surface (Cheerfulness), their overall profile deviates somewhat from established norms and is actually more similar to the personality profile of institutionalized adolescent delinquents (Cattell et al., 1984, p. 49), specifically on the Excitability, Self-Discipline, and Conformity personality factors. It may be that traits that affect impulse control provide impetus to both disordered gambling and antisocial behaviours, or it could be that one behaviour contributes to the development of the other. As many of these youth are gambling on activities that are prohibited to them, such as lottery products, casino, and sports pools (Gupta & Derevensky, 1998a), one must wonder whether this is part of the attraction. Such questions are best addressed with prospective research designs. Nevertheless, based upon the personality and sensation-seeking traits that surfaced as meaningful predictors to problems and pathological gambling, the current study suggests that adolescents with the most severe gambling problems appear to be most frustrated, impulsive, anxious, impatient, demanding, and easily annoyed.

Adolescents with gambling problems also report higher risk-taking tendencies. Similar to the findings of Kuley and Jacobs (1988) with adults, the problem and pathological adolescent gamblers in our sample obtained significantly higher scores on Zuckerman's Sensation Seeking Scale than social gamblers, in particular on the Disinhibition and Boredom Susceptibility subscales, and to a lesser degree in Experience Seeking. The Thrill and Adventure Seeking subscale seemed to identify female sensation seekers. Adolescent problem gamblers are therefore inclined to being socially disinhibited (i.e., drinking, partying), easily bored with routine and repetition, and seekers of nonconventional lifestyles. Similar results were found with young adults (Derevensky & Gupta, 2000a; Powell, Hardoon, Baboushkin, & Derevensky, 1999). The sensation-seeking trait, however, is not always linked to problem gambling in adults (Parke et al., 2004), and this variability may be accounted for by the ages of the participants such that risk-taking

tendencies naturally decrease with age.

The results suggest that children experiencing Attention Deficit Hyperactivity Disorder (ADHD) may be at increased risk for the development of gambling problems, given that they are known to share several personality traits with the PPGs of the present study. The Excitability HSPQ factor comprises questions similar to the DSM-IV criteria for ADHD (APA, 1994), such as being easily distracted, frustrated, annoyed, overactive, and impulsive. Earlier studies investigating the potential link between pathological gambling and ADHD (Carlton & Manowitz, 1987; Carlton et al., 1987; Goldstein, Manowitz, Nora, Swartzburg, & Carlton, 1985) reported that a relationship does exist. More recent attempts at examining this relationship have also pointed to similar traits underlying ADHD and disordered gambling behaviours (Hardoon, Gupta, & Derevensky, 2004). Although pathological gambling is categorized as an impulse disorder and not an addiction in the DSM-IV (APA, 1994), several researchers and clinicians have argued that it appears to be more of an addictive disorder.

Despite the current findings highlighting impulse control and self-discipline as being issues that problem gamblers struggle with, the debate is no closer to being resolved. It is true that Vitaro and his colleagues' (1999) finding that impulsivity predicted problem gambling supports the current classification of pathological gambling as an impulse control disorder. However, previous analysis of the present data (Gupta & Derevensky, 1998a) demonstrated a clustering of high-risk behaviours, with problem gamblers being more likely to engage in alcohol and drug use than their peers. An important finding of the current study is that personality traits other than impulsivity show an association to problem gambling. Also, impulsivity has been strongly associated to substance abuse (Cookson, 1994; Harrison & Luxenberg, 1995; Simon, Sussman, & Dent, 1995), yet no one is suggesting that substance abuse be classified as an impulse control disorder. Therefore, we should not be too hasty in drawing conclusions as to the classification of problem gambling.

The capacity to identify children and adolescents at heightened risk for the development of problematic gambling on the basis of observable traits is of considerable usefulness. As such, the results of the discriminant analysis are encouraging. The best prediction model possible was capable of identifying over two thirds of PPGs. An analysis of the functions at group centroids (Table 6) suggests a linear relationship between Function 1 (i.e., the combination of personality traits that best predicts problem gambling:

disinhibited, susceptible to boredom, cheerful, excitable, nonconformist and undisciplined) and the four gambling groups wherein the personality profile that most typifies Non-Gamblers and the profile that most typifies youth with severe gambling problems appear to be at the opposite ends of the spectrum.

A caveat to the results of the discriminant analysis needing to be addressed is the false positive predictions. While the prediction model correctly identified approximately 68% of the PPGs, it also falsely classified 7.4% of Social and 11.2% of Non-Gamblers as PPGs. Knowledge of personality may prove useful in targeting youth who are at increased likelihood of developing gambling problems, but practitioners and policy-makers must be cognizant that some people who fit that personality profile will likely never develop gambling problems. Nevertheless, it would be interesting to examine whether youth who fit the personality profile of a PPG are at-risk for other youth problems.

The limitations of this study warrant mention. All of the measures are self-reports, which is always accompanied by possibility of inaccurate or untruthful completion. Also the emotional stability and dominance subscales of the HSPQ are a concern, because Non-Gamblers and Social Gamblers, two groups that would be considered a normative population, had unusually high scores. Finally, the numbers of PPGs were insufficient to permit a thorough examination of how age and gender influence the relationship between personality and the development of severe gambling-related problems.

While several personality differences were found, many questions remain unanswered. Are differences in preferred gambling activity associated with these different factors and, if so, for which individuals? Are the personality structures found with the problem and pathological adolescent gamblers similar for other addictions? How do cultural factors enter into the equation? It is clear that research on personality factors and gambling is in its infancy, with more sophisticated investigations warranted at this time. For example, it would be useful to examine whether certain personality traits are associated with particular gambling preferences (e.g., cards, poker, VLT).

Of great importance is the issue of causality. While personality traits are thought to be stable over time, we are nonetheless referring to a period of development (adolescence) that is known for instability and change. It is therefore unclear if the traits linked to problem gambling have emerged as a result of their gambling participation, or if they in fact contribute to problem gambling. Longitudinal research studying the personalities and biological predispositions of

pathological gamblers (including those linked to depression, anxiety, and impulsivity) will certainly help to provide information that ultimately will aid our understanding of why certain individuals develop an addictive dependence to gambling whereas others can enjoy an occasional evening of gambling without ever feeling the "pull" to put gambling ahead of all else.

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