Anxiety and Social Stress Related to Adolescent Gambling Behaviour

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Abstract

This study examined the relationship between anxiety, social stress, and gambling behaviour among 1,044 high school students in grades 7 to 11. Adolescents completed questionnaires concerning their state, trait, and generalised anxiety, social stress, and gambling behaviour. Results reveal that adolescent probable pathological gamblers report more state anxiety, trait anxiety, and higher levels of social stress compared to non-gamblers, social gamblers, and gamblers at-risk for serious problems. Gamblers with high state and trait anxiety engaged in more severe gambling behaviours, greater substance abuse, reported different reasons for gambling, and endorsed more dissociation items. The results provide additional support for Jacobs' (1986) *General Theory of Addictions*. The implications for treatment and prevention programs are discussed.

In an attempt to gain a better understanding of the etiology of gambling behaviour, researchers have been examining the risk factors thought to be associated with problem gambling. Of particular concern are those personality traits found to be characteristic of problem gamblers. High levels of anxiety have been found to be characteristic of adult pathological gamblers (Cocco, Sharpe, & Blaszczynski, 1995; Henry, 1996; McConaghy, Armstrong, Blaszczynski, & Allcock, 1983; Zimmerman, Meeland, & Krug, 1985). Adult pathological gamblers have been reported to have elevated *state* and *trait* anxiety scores as compared to the general population (Blaszczynski, Wilson, & McConaghy, 1986). The comorbidity between anxiety disorders and problem gambling has led some researchers to suggest that gamblers are not

necessarily sensation seekers but rather gamble in an attempt to reduce aversive physiological states, thus accounting for anxiety as an important component of the etiology and maintenance of problem gambling behaviour.

Anxiety has similarly been found to be associated with other addictive disorders including alcoholism, drug abuse, food addiction, and cigarette smoking (Kayloe, 1993; Regier, Rae, Narrow, Kaelber, & Schatzberg, 1998). Similar to adult pathological gamblers, adult alcoholics have been found to have higher anxiety levels and to be more susceptible to generalised anxiety disorders, agoraphobia, social phobia and panic disorders (Kushner, Sher, & Erickson, 1999). Not only has the comorbidity between alcohol and anxiety disorders been well established, but the order of onset of alcoholism and anxiety disorders reveals that anxiety disorders generally occur prior to the development of alcoholism (Brady & Lydiard, 1993; Merikangas, Dierker, & Szamari, 1998; Swendsen et al., 1998). When taken together, these results suggest that individuals with anxiety disorders often rely on addictive substances and behaviours in order to help them cope with their heightened anxiety; albeit in an ineffective way.

Recently, the psychological literature has focused on the increasing number of adolescents gambling and those experiencing severe gambling problems (e.g., Fisher, 1991; Gupta & Derevensky, 1996, 1998a, 1998b, 2000a; Jacobs, 2000; Ladouceur, Dubé, & Bujold, 1994; National Research Council, 1999). Current research efforts targeting adolescents are attempting to understand the risk factors and underlying mechanisms associated with youth gambling problems (Derevensky, Gupta, Dickson, & Deguire, 2001; Dickson, Derevensky, & Gupta, in press). The necessity of examining anxiety as a possible risk factor leading to a gambling addiction amongst adolescents is important given the previously established adult connection.

Several researchers have proposed possible explanations for the association between anxiety and addictive behaviours. A widely held theory focuses upon the "tension-reduction" hypothesis (Brady & Lydiard, 1993; DuPont, 1995, 1997; Kushner et al., 1990). This hypothesis has been primarily investigated with adult alcoholics, but may also be applied to other addictions (i.e., pathological gambling). Accordingly, anxiety disorders predispose individuals to alcoholism due to alcohol's acute anxiolytic effects. In this sense, alcohol use is viewed as a way to "self-medicate" against the negative symptoms resulting from high anxiety (Brady & Lydiard, 1993; Kushner et al., 1990; Wesner, 1990).

Similar to the stress-reduction model associated with alcoholism and other substance addictions, Jacobs' (1986) General Theory of Addictions, postulates that the addiction of choice (in this case a behavioural addiction such as gambling) is reinforced and maintained by allowing the individual to escape from painful realities. According to Jacobs, the individual's need to escape problems is the driving force resulting in addictive behaviours. Jacobs contends that although there are multiple forms of addictions, they all serve the common purpose of providing escape. Empirical support for this theory comes from several studies and clinical observations of adolescent problem gamblers (Gupta & Derevensky, 1998a, 1998b, 2000b). The attempt to alleviate painful states and current problems may be especially desirable during adolescence, which has often been perceived to be the turbulent developmental period. The fact that certain youth have not yet developed successful coping skills places them at further risk for developing an unhealthy way of coping with daily stressors (Gupta, Marget, & Derevensky, 2000; Derevensky & Gupta, 2000; Nower, Gupta, & Derevensky, 2000).

Other anxiety-based models for the etiology of problem gambling behaviour have also provided evidence for anxiety disorders among pathological gamblers (Abt & McGurrin, 1992; Dickerson, 1993; Henry, 1996). Blaszczynski et al. (1989), assessing 75 pathological gamblers, found them to have higher state and trait anxiety scores when compared to a control group. Blaszczynski and his colleagues contend that pathological gamblers engage in addictive behaviours in order to reduce or avoid noxious physiological states. Accordingly, pathological gamblers are prone to exhibit either heightened anxiety or depression when confronted with a stressful situation. As a result, increased gambling serves to distract the individual, providing escape from daily life problems and stress. This assumption appears to be consistent with an anxiety-reduction model, whereby pathological gambling is used as a maladaptive coping strategy employed to deal with high anxiety and stressful life events. Additional support has come from Linden, Pope, and Jonas (1986) who reported 28% of pathological gamblers displayed symptoms of anxiety disorders and Black and Moyer (1998) who suggested that upwards of 40% of pathological gamblers met lifetime criteria for an anxiety disorder. Similar studies have reported adult pathological gamblers to have both elevated state and trait anxiety scores (Blaszczynski & McConaghy, 1989; Blaszczynski et al., 1986; Martinez-Pina et al., 1991). Clearly, anxiety has been shown to play a significant role in the development and maintenance of adult addictive behaviours. Although results remain somewhat inconsistent, much research supports the self-medicating theory, whereby addictive behaviours help individuals cope with their anxiolytic states. If this hypothesis is found to be true for adolescent problem gamblers, the implications for identification of youth with gambling problems and prevention and treatment programs will be significant. This may be especially true for adolescents, as it has been found that anxiety disorders appear to have an earlier onset during adolescence (Kessler, McGonagle, Zhaos, Nelson, Hughes, Wittchen, & Kendler, 1994; Kessler, Nelson, McGonagle, Edlund, Frank, & Leaf, 1996; Regier et al., 1998).

Although previous research has not directly examined the relationship between anxiety and gambling behaviour among youth and adolescents, reports of the personality traits of youth gamblers provides preliminary evidence for the presence of anxiety in this population. In several studies, adolescent pathological gamblers were found to have higher levels of generalised anxiety when compared to non-problem gamblers (Derevensky & Gupta, 1998; Gupta & Derevensky, 1997; in press). Results from these studies suggest the presence of elevated levels of anxiety in some adolescent problem gamblers. However, these studies failed to differentiate whether anxiety differences were more related to *state* or *trait* anxiety.

Specific measures of trait and state anxiety are important as these two dimensions of anxiety measure distinct constructs. State anxiety comprises the degree of anxiety an individual is experiencing *at that exact moment*. As such, state anxiety is a transitory emotional condition, which varies in intensity and fluctuates over time. The essential qualities evaluated by state anxiety scales are feelings of apprehension, tension, nervousness, and worry. In contrast, trait anxiety is conceptualised as a more stable and enduring characteristic, assessing the degree of generalised anxiety an individual perceives on a daily basis.

The present study investigates whether adolescent problem gamblers have higher state and/or trait anxiety when compared to non-problem gamblers and provides valuable information concerning anxiety as a potential risk factor for problem gambling.

Method
Participants
The sample included 1,044 adolescents (512 males, 532 females) in grades 7 (n = 209), 8 (n = 232), 9 (n = 215), 10 (n = 199), and 11 (n = 189) from six high schools in the greater Montreal region. Adolescents were between 12 and 17 years of age (M = 14.31, SD = 1.49) and had agreed to participate after obtaining parental consent.

Measures

Gambling Activities Questionnaire (GAQ). The *GAQ* (Derevensky et al., 1996) ascertains the type of gambling activities in which individuals engage, the frequency of their gambling behaviour, where they gamble, with whom they gamble, as well as items describing other characteristics of their gambling behaviour.

Diagnostic and Statistical Manual-Fourth Edition-Multiple Response-Juvenile (DSM-IV-MR-J) (Fisher, 2000) is a screen for adolescent problem gambling consisting of 9 domains (12 items) describing psychological states, symptoms and behaviours associated with problem gambling. These domains include 1)

preoccupation, 2) tolerance, 3) loss of control, 4) withdrawal, 5) escape, 6) chasing, 7) lies, 8) illegal acts, and 9) risking job, education, and relationships. Most of the items have four response options; never, once or twice, sometimes, or often. Individuals were categorised as *social gambler, problem gambler* or *probable pathological gambler,* according to the number of items endorsed (severity of their gambling behaviour). This gambling screen has high reliability (Cronbach's alpha = 0.75) as well as good construct validity. An earlier version of this instrument, the DSM-IV-J, has been found to be a conservative measure of problem/pathological gambling (Derevensky & Gupta, 2000; Gupta et al., 2000; Nower et al., 2000; Volberg, 1996).

State-Trait Anxiety Inventory (STAI) (Spielberger, Gorusch, Luschene, Vagg, & Jacobs, 1983) consists of two separate self-report scales for measuring state and trait anxiety. This scale differentiates between the temporary condition of *state anxiety* (S-Anxiety), which assesses the current level of anxiety, and the more general and long-standing quality of *trait anxiety* (T-Anxiety), that is, how the individual *generally feels*. Each of the 40 questions has a range of 4 possible responses; a) not at all, b) somewhat, c) moderately so, and d) very much so. Although the STAI was developed for use with high school, college students, and adults, it has also been used with younger students. This measure has strong reliability (r = .92 for the S-Anxiety scale, r = .90 for the T-Anxiety scale) as well as concurrent validity with the Jackson Personality Research Form (r = .65), and the Cornell Medical Index (r = .70) (Spielberger et al., 1983).

Behaviour Assessment System for Children (BASC) (Reynolds & Kamphaus, 1992) is a paper and pencil questionnaire evaluating the behaviour and self-perceptions of children aged 2½ to 18 years on many dimensions. The BASC consists of five components; a parent rating scale, teacher rating scale, structured developmental history, record form for observable behaviour, and a self-report scale. For the present study, only the 14 items assessing anxiety (BASC Anxiety Scale - BAS) and 13 items assessing social stress (BASC Social Stress Scale – BSSS) were included. The BASC has high reliability (.78 - .82) and concurrent validity with the Burks Behaviour Rating Scales (.85), and the Revised Behaviour Problem Checklist (.36 - .58) (Burks, 1977; Quay & Peterson, 1983; Reynolds & Kamphaus, 1992).

Procedure

Adolescents were group-administered the instruments in either the school cafeteria, auditorium, library, or in their classrooms which took approximately 30-50 minutes to complete. Participants were informed that all information was confidential. Terms found to be troublesome for some students were explained before completing the questionnaires. Trained research assistants, who remained present at all times to answer any questions, administered all questionnaires.

Results

Problem Gambling Amongst Adolescents

Based upon their responses on the GAQ and the DSM-IV-MR-J criteria for problem gambling, the participants were categorised into one of four groups according to their past year gambling activities (See Table 1). Participants who answered "no" to all of the gambling items on the GAQ were categorised as *non-gamblers* (28.6%), those who reported gambling but endorsed 0 or 1 items out of the 9 domains on the DSM-IV-MR-J were categorised as *social gamblers* (57.2%), those who answered positively to 2 or 3 items on the DSM-IV-MR-J were categorised as *at-risk for problem gambling* (9.7%), and individuals who endorsed 4 or more items were categorised as *probable pathological gamblers (PPG)* (4.5%).

Table 1

Males and Females by Gambling Severity			
DSM-IV-MR-J			
Groups	Males	Females	Total
Non-Gambler	9.6%	19.0%	28.6%
Social Gambler	29.2%	28.0%	57.2%
At-Risk Gamblers	6.1%	3.6%	9.7%
Probable Pathological Gambler	4.1%	0.4%	4.5%

As can be seen, males reported more problem gambling behaviour than females. Chi-square tests of independence revealed a statistically significant relationship between gender and DSM-IV-MR-J categories, $\div 2$ (2, $N = 1,029$) $= 69.30$, $p < .05$. The distribution of males and females in each of the DSM-IV-MR-J categories according to grade level are presented in Table 2.

Table 2

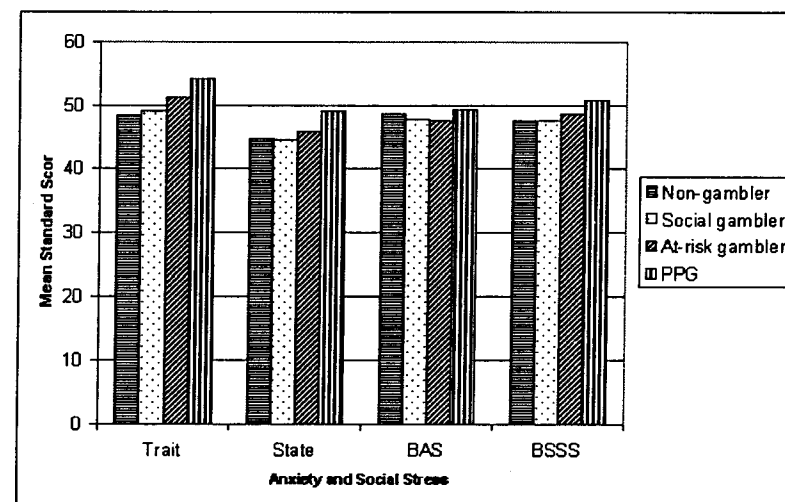| Gambling Severity by Grade and Gender					
	Grade				
Group	7	8	9	10	11
Non-Gambler					
Male	31.9%	20.2%	11.4%	18.2%	17.5%
Female	46.8%	43.7%	30.3%	23.7%	39.6%
Total	39.9%	32.5%	21.0%	20.9%	28.2%
Social Gambler					
Male	56.4%	63.3%	59.0%	57.6%	60.8%
Female	50.5%	48.7%	52.3%	70.1%	56.0%
Total	53.2%	55.7%	55.6%	63.8%	58.5%
At-Risk Gambler					
Male	7.4%	10.1%	20.0%	14.1%	10.3%
Female	1.8%	6.7%	15.6%	6.2%	4.4%
Total	4.4%	8.3%	17.8%	10.2%	7.4%
Probable Pathological Gambler					
Male	4.3%	6.4%	9.5%	10.1%	11.3%
Female	0.9%	0.8%	1.8%	0.0%	0.0%
Total	2.5%	3.5%	5.6%	5.1%	5.9%

Anxiety and Problem Gambling

A Multivariate Analysis of Variance (MANOVA) was used to determine whether there were significant differences in the level of reported anxiety and social stress between gamblers and non-gamblers. The mean standard scores for the State Anxiety and Trait Anxiety scales, as well as the BASC Anxiety and BASC Social Stress T-scores are presented in Table 3. As depicted in Figure 1, the mean standard scores of trait anxiety are greater in the groups with heavy gambling compared to the non-gambling or social gambling groups. A similar trend is noted for state anxiety and social stress. Although PPGs ($M = 49.24$) reported more anxiety on the BASC Anxiety Scale compared to non-gamblers ($M = 48.61$), these differences were not statistically significant. The results across all DSM-IV-MR-J groups, for both anxiety and social stress scales, revealed females reported greater anxiety and social stress compared to males.

Table 3

Mean Anxiety and Social Stress Scores by Gambling Severity

Scales	Non-Gambler		Social Gambler		At-Risk Gambler		Probable Pathological Gambler	
	M	SD	M	SD	M	SD	M	SD
Trait Anxiety								
Male	47.43	8.30	47.02	8.21	50.41	8.27	53.76	11.49
Female	49.05	9.29	51.33	9.14	52.70	8.80	58.25	6.50
Total	48.51	8.99	49.13	8.94	51.26	8.50	54.15	11.17
State Anxiety								
Male	43.34	8.47	42.69	8.72	44.81	10.81	48.60	13.11
Female	45.68	7.80	46.67	7.44	47.59	8.57	55.50	8.89
Total	44.89	8.09	44.65	8.35	45.84	10.09	49.20	12.88
BASC Anxiety								
Male	45.86	7.48	44.83	7.46	45.51	7.32	49.05	8.11
Female	50.01	8.21	50.89	7.93	51.59	7.90	51.25	13.15
Total	48.61	8.20	47.80	8.27	47.76	8.06	49.24	8.48
BASC Social Stress								
Male	46.66	8.74	45.84	7.81	47.37	9.51	50.88	10.35
Female	47.93	8.75	49.38	9.28	51.11	8.79	51.75	11.24
Total	47.50	8.75	47.58	8.74	48.75	9.38	50.96	10.30

Figure 1

Mean standard scores on anxiety and social stress measures by gambling severity.

The relationship between gambling severity and anxiety measures was also examined by grade level. No appreciable developmental differences were found in terms of reported state anxiety, trait anxiety, and social stress.

The 2 x 5 x 4 (Gender x Grade x DSM-IV-MR-J Groups) independent groups MANOVA revealed a significant main effect for gambling severity (based upon DSM-IV-MR-J groups) on anxiety, $F(3, 991) = 1.88$, $p < .05$. Although the T-scores on the BASC Anxiety Scale and BASC Social Stress Scale and the standard scores on the STAI were covaried for age and gender according to their test manuals, a significant main effect for gender [$F(1, 991) = 3.21$, $p < .05$] was found, with no significant main effect being found for age (grade level). No significant interactions were found (see Table 4).

Table 4

MANOVA on anxiety measures by DSM Group, Grade, and Gender

Source	Wilks' ë Power	F	df	p	Observed
DSM Group	.98	1.88	3, 991	< .03	.86
GRADE	.98	1.41	4, 991	.13	.74
GENDER	.99	3.21	1, 991	< .01	.83
DSM Group * GRADE	.95	1.02	12, 991	.44	.97
DSM Group * GENDER	.99	0.95	3, 991	.49	.51
GRADE * GENDER	.99	0.56	4, 991	.92	.30
DSM Group * GRADE * GENDER	.96	1.10	10, 991	.31	.96

Significant differences on trait $[F(3, 991) = 3.92, p < .05]$ and state anxiety $[F(3, 991) = 4.02, p < .05]$ were found with respect to gambling severity. A main effect for gender was also found on the state anxiety scale $[F(1, 991) = 6.66, p < .05]$ and the BASC anxiety scale $[F(1, 991) = 9.53, p < .05]$.

Scheffe Post Hoc tests revealed that within trait anxiety, the differences between the means of non-gamblers and PPGs $(p < .01)$, and social gamblers and PPGs $(p < .01)$ were significant. Within state anxiety, differences between the means of non-gamblers and PPGs $(p < .01)$ and social gamblers and PPGs $(p < .01)$ were significant.

Anxiety, Social Stress, and Gambling Behaviour

In order to examine the relationship between gambling severity, anxiety, and social stress, Pearson correlations were computed. Correlation coefficients were obtained between the DSM-IV-MR-J score and standard scores on the Trait and State Anxiety scales, as well as with T-scores on the BASC Anxiety Scale, and BASC Social Stress Scale. Results revealed significant, but modest positive correlations between total DSM-IV-MR-J and State Anxiety, $r(735) = .16, p < .01$, Trait Anxiety, $r(735) = .18, p < .01$, and the BASC Social Stress Scale, $r(735) = .14, p < .01$. No significant correlation was found between DSM-IV-MR-J and the BASC Anxiety Scale.

State anxiety, trait anxiety and gambling behaviour

In order to examine the relationship between state anxiety, trait anxiety, social stress, and gambling behaviour more closely, T-scores on the anxiety scales and standard scores on the BASC scales were divided into quartiles. Three groups were formed; the highest scores (25%), the middle (50%), and lowest (25%) groups on the anxiety measures. Chi-square tests of independence were performed in order to examine differences between the anxiety scales and the DSM-IV-MR-J categories (see Table 5). It is important to bear in mind that the two extreme groups (highest and lowest) each contain 25% of the

sample population, while the middle group contains 50% of the sample population. In order to interpret the results, one must examine the dispersions from the percentage of students expected within each group.

Table 5

Anxiety and Gambling Severity

Scales	Non-Gambler	Social Gambler	At-Risk Gambler	Probable Pathological Gambler
Trait Anxiety				
Low	34.3%	31.9%	21.0%	13.0%
Medium	42.2%	40.9%	44.0%	39.2%
High	23.5%	27.2%	35.0%	47.8%
State Anxiety				
Low	26.9%	32.1%	33.0%	21.7%
Medium	47.6%	39.2%	35.0%	37.0%
High	25.5%	28.7%	32.0%	41.3%
BASC Anxiety				
Low	28.9%	32.1%	30.0%	21.8%
Medium	40.8%	42.3%	46.0%	54.3%
High	30.3%	25.6%	24.0%	23.9%
BASC Social Stress				
Low	35.0%	35.3%	31.0%	19.5%
Medium	41.8%	40.1%	40.0%	37.0%
High	23.2%	24.6%	29.0%	43.5%

For trait anxiety, state anxiety, and social stress, a large percentage of the adolescents whose anxiety scores were within the high anxiety group were classified as PPGs. Forty-eight percent of PPGs' standard scores on the trait anxiety scale were within the highest anxiety group, 35% of at-risk gamblers had trait anxiety scores within the highest anxiety group, and 27% of social gamblers had trait anxiety scores within the highest anxiety group, compared with 24% of non-gamblers. Chi-square tests revealed a statistically significant relationship between gambling severity and reported trait anxiety, $\div 2 (6, N = 1,029) = 20.2, p < .05$. For state anxiety, 41% of PPGs' standard scores were within the high anxiety group, compared with 32% of at-risk gamblers, 29% of social gamblers, and 26% of non-gamblers. The relationship between the levels of gambling severity and levels of state anxiety, while approaching statistical significance, failed to reach statistical significance, $\div 2 (6, N = 1,029) = 11.74, p = .068$.

For social stress, 44% of PPGs had the highest anxiety scores compared to 29% of at-risk gamblers, 25% of social gamblers, and 23% of non-gamblers. Although a higher percentage of PPGs reported social stress within the top quartile, no statistically significant relationship between the frequency percentages in each DSM groups were found for the BASC Social Stress Scale, $\div 2$ (6, $N = 1,029$) = 10.9, $p = .09$ and Anxiety Scale, $\div 2$ (6, $N = 1,029$) = 5.9, $p = .43$.

Anxiety, social stress, and reported reasons for gambling

Chi-square tests were performed in order to examine the relationship between levels of anxiety, social stress, and reported reasons for gambling. Interesting results appear for four items in particular. For example, 89% of adolescents who endorsed "because I'm unhappy," as one of their reasons for gambling, had trait anxiety scores within the highest quartile group and 67% had high state anxiety scores. Similarly, 85% of individuals who reported gambling to "escape from problems of home and school" were individuals with the high trait anxiety standard scores, and 65% had state anxiety scores within the highest group. All of the adolescents (100%) who reported gambling because they were lonely had high trait anxiety scores. Approximately 67% of youth who reported loneliness as one of their reasons for gambling had state anxiety scores within the highest group. This is compared to 8% who had state anxiety scores in the lowest group, and 25% in the middle group. Finally, differences between the three anxiety groups were also found for gambling in order "to feel older." Of the gamblers who endorsed this item as one of their reasons for gambling, 45% had high trait anxiety scores, 29% had trait anxiety scores within the lowest group, and 26% had scores in the middle group. Those adolescents who reported gambling because they were unhappy, lonely, to escape from problems, and wanting to feel older, had the highest trait and state anxiety scores.

Table 6
Trait Anxiety, State Anxiety, BASC Anxiety, BASC Social Stress Levels and Reported Reasons for Gambling

Anxiety	Enjoyment	Relaxation	Excitement	Friendship	Unhappiness	Escape	Loneliness	Older	Win money
Trait Anxiety									
Low	29.0%	27.0%	27.2%	26.5%	0.0%	0.0%	0.0%	28.9%	27.3%
Medium	41.8%	36.0%	44.3%	45.8%	11.1%	15.0%	0.0%	26.4%	41.6%
High	29.2%	37.0%	28.5%	27.7%	88.9%	85.0%	100.0%	44.7%	31.1%
State Anxiety									
Low	31.2%	31.5%	33.3%	28.9%	11.1%	15.0%	8.3%	31.6%	30.1%
Medium	40.6%	38.2%	37.3%	39.8%	22.2%	20.0%	25.0%	28.9%	39.9%
High	28.2%	30.3%	29.4%	31.3%	66.7%	65.0%	66.7%	39.5%	30.0%
BASC Anxiety									
Low	30.5%	32.6%	31.9%	28.9%	0.0%	10.0%	0.0%	26.4%	30.9%
Medium	44.5%	46.1%	42.0%	42.2%	44.4%	55.0%	50.0%	44.7%	44.0%
High	25.0%	21.3%	26.1%	28.9%	55.6%	35.0%	50.0%	28.9%	25.1%
BASC Social Stress									
Low	33.6%	28.1%	33.9%	28.9%	0.0%	5.0%	0.0%	18.4%	35.0%
Medium	40.7%	38.2%	39.1%	39.8%	11.1%	15.0%	8.3%	36.8%	40.1%
High	25.7%	33.7%	27.0%	31.3%	88.9%	80.0%	91.7%	44.8%	24.9%

Discussion

Similar to other studies, 4.5% of youth, as measured by the DSM-IV-MR-J, were probable pathological gamblers with the majority of adolescents gambling with few gambling-related problems (57%) (Derevensky & Gupta, 2000; Gupta & Derevensky, 1998a; Jacobs, 2000; Shaffer & Hall, 1996). The results further suggest that males were found to gamble more than females, and gambling activity was found to increase slightly as the students got older. Not only do more adolescents gamble as they get older, but the severity of male problem gambling-related behaviours increase with age.

Based upon findings from the adult addictions literature, it was predicted that adolescent problem gamblers would report higher levels of state and trait anxiety as well as more social stress compared to non-gamblers and social gamblers. Results demonstrating such differences would lend partial support for a self-medicating model of gambling behaviour, as suggested by Jacobs' *General Theory of Addictions*. Significant positive correlations were found between DSM-IV-MR-J and state anxiety, DSM-IV-MR-J and trait anxiety, and DSM-IV-MR-J and the BASC Social Stress Scale. The higher the state and trait anxiety, and social stress reported by adolescents, the more gambling problems adolescents reported. These findings are consistent with studies of adult pathological gamblers and those with other addictions who have been reported to have anxiety-related disorders (Cocco et al., 1995; Henry, 1996; Kayloe, 1993; McConaghy et al., 1983; Regier et al., 1998; Zimmerman et al., 1985).

Reported levels of trait and state anxiety differed significantly between non-gamblers, social gamblers, and at-risk gamblers, however, no statistically significant differences were found between these groups on the BASC Anxiety Scale, nor on the BASC Social Stress Scale. The problem and pathological gamblers reported significantly more state and trait anxiety compared to non-gamblers and social gamblers. Although the results of this study revealed that more social stress was reported by PPGs compared to non-gamblers, this difference was not found to be statistically significant. Furthermore, no significant relationship was found with the BASC Anxiety Scale. When comparing the questions on the STAI to the BASC Anxiety Scale, it appears that the BASC items are targeting more severe anxiety. Whereas the State-Trait Anxiety Inventory manual describes the measures as evaluating "feelings of apprehension, tension, nervousness, and worry" (Spielberger et al., 1983), the BASC anxiety subscale is described as assessing "generalised fears, oversensitivity, and worries that typically are irrational and poorly defined in the mind of the individual." Further, considering that behaviour varies across time and settings, the BASC's forced-choice format may have been difficult for adolescents to interpret, compared to the STAI's 4-item Likert response scale (Merenda, 1996). It is plausible that they indicated their response as "False"

when unsure what to answer or when the item was true only some of the time. Finally, weaknesses in the reliability and construct validity of the BASC's Self-Report of Personality (SRP) construct (which contains the anxiety subscale) have been reported (Merenda, 1996; Witt, 1998). In particular, Merenda (1996) reported the weak test-retest coefficients of the SRP, and Witt (1998) claims that although the BASC is a reliable instrument with psychometric qualities that are generally quite good, the internal consistency coefficients for individual scales fall below the recommended criterion level of acceptance. Taken together, these weaknesses may help explain the lack of results obtained with the BASC Anxiety Scale.

A significant main effect was also found for gender on anxiety and social stress. A closer examination of the mean scores reveals that this resulted from significantly higher scores reported by females on the state anxiety scale and on the BASC Social Stress Scale.

Once it was found that PPGs demonstrate higher state and trait anxiety compared to non-gamblers and social gamblers, analyses were conducted in order to investigate differences in severity of problems gambling between high, middle, and low anxiety gamblers. Although this part of the study was exploratory, it was hypothesised that there would be significant differences in gambling behaviour among adolescent gamblers who reported different levels of state anxiety, trait anxiety, and social stress. The relationship between the anxiety and social stress groups and DSM group membership was examined. It was found that for state and trait anxiety, as well as for social stress, gamblers with the highest anxiety scores were PPGs (41%, 48%, and 44%, respectively). Twenty-four percent of non-gamblers and 27% of social gamblers reported trait anxiety scores within the highest group. For state anxiety, only 26% of non-gamblers and 29% of social gamblers reported scores in the highest state anxiety group. Similarly, for social stress, non-gamblers and social gamblers had lower percentages of gamblers in the high social stress group (23% and 25%, respectively). It appears that PPGs not only report the greatest amount of gambling related problems, but also, in general, indicated the highest state anxiety, trait anxiety, and social stress.

Anxiety, social stress, and reported reasons for gambling

If problem gamblers report higher anxiety levels, it may well be that those gamblers who indicate high levels of anxiety would endorse different reasons for gambling. Previous research has suggested that gambling serves multiple functions for different individuals (Cocco et al., 1995; Dickerson, 1993; Zimmerman et al., 1985). For some, gambling is merely an activity engaged in periodically as a form of entertainment, while for others it is a social activity and a chance to meet new people or spend time with friends. Yet, for a minority of adolescents gambling is a maladaptive coping mechanism, engaged in to help reduce negative states (Derevensky & Gupta, 2000).

The current results seem to support the contention that adolescents, like adults, engage in gambling for multiple reasons. Still further, the data appear to suggest that gamblers with high anxiety scores endorse different reasons for gambling. Eighty-nine percent of adolescents with high trait anxiety and 67% with high state anxiety reported gambling because they were unhappy. As well, those adolescents with high trait and state anxiety reported gambling to escape from problems (home, school, peers). All (100%) adolescents who reported gambling because of loneliness had high trait anxiety and 67% had high state anxiety scores. Finally, 45% of gamblers who reported engaging in gambling to feel older had high state anxiety. These results were in marked contrast to adolescents with lower state and trait anxiety scores.

Both the high anxiety scores among adolescent problem gamblers and the reasons endorsed for gambling provide further evidence to support Jacobs' *General Theory of Addictions*. Many of the adolescents with the most severe gambling problems appeared to be gambling in an attempt to try to temporarily forget their unhappiness, escape from familial or school-based problems, and loneliness. Thus, these adolescents use gambling as a maladaptive coping mechanism. The results support the contention that PPGs experience more state and trait anxiety compared to non-gamblers and social gamblers. The negative life events, from which these youth are trying to escape, may be the cause of their heightened levels of state and trait anxiety.

Although additional research needs to be conducted, the current results provide preliminary support for a self-medicating model of gambling behaviour, whereby adolescents engage in gambling behaviours in order to help decrease negative anxiolytic states resulting from negative life events. These results provide valuable information regarding risk factors that may be associated with youth gambling behaviour, which may be used to help identify children in need of prevention and intervention programs. Knowledge gained from this research adds one more piece to the puzzle explaining youth and adolescent gambling behaviour. Gambling treatment providers would be well advised to assess their clients for anxiety disorders and provide anxiety reduction techniques for such high-risk groups.

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