Journal of Child & Adolescent Substance Abuse
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/wcas20

Anxiety and Social Stress Related to Adolescent Gambling Behavior and Substance Use

Chantal Ste-Marie MA [a], Rina Gupta PhD [a] & Jeffrey L. Derevensky PhD [a]

[a] International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University, Montreal, Quebec, Canada

Available online: 02 Oct 2008

To cite this article: Chantal Ste-Marie MA, Rina Gupta PhD & Jeffrey L. Derevensky PhD (2006): Anxiety and Social Stress Related to Adolescent Gambling Behavior and Substance Use, Journal of Child & Adolescent Substance Abuse, 15:4, 55-74

To link to this article: http://dx.doi.org/10.1300/J029v15n04_03

Anxiety and Social Stress Related to Adolescent Gambling Behavior and Substance Use

Chantal Ste-Marie
Rina Gupta
Jeffrey L. Derevensky

ABSTRACT. The relationship between anxiety, social stress, substance use, and gambling behavior was examined in a sample of 1,044 high school students from grades 7-11. Adolescents completed several instruments assessing their state, trait, and generalized anxiety, social stress, substance use, and gambling behavior. Results reveal that probable pathological gamblers report more daily and weekly alcohol consumption, use more uppers, downers, and hallucinatory drugs, and smoke more cigarettes on a daily basis compared with non-gamblers, social gamblers, and gamblers at-risk for serious problems. Probable pathological gamblers similarly reported higher levels of state anxiety, trait anxiety, and social stress compared with non-gamblers, social gamblers, and at-risk gamblers. Adolescents with the highest state and trait anxiety scores had more severe gambling and substance abuse problems. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <http://www.HaworthPress.com>*

Chantal Ste-Marie, MA, Rina Gupta, PhD, and Jeffrey L. Derevensky, PhD, are affiliated with International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University, Montreal, Quebec, Canada.

This is a revision of a paper presented at the annual meeting of the National Council on Problem Gambling, Dallas, June, 2002.

Journal of Child & Adolescent Substance Abuse, Vol. 15(4) 2006
Available online at http://www.haworthpress.com/web/JCASA

doi:10.1300/J029v15n04_03

KEYWORDS. Adolescent gambling behavior, anxiety, social stress, substance use

Adolescents continue to exhibit an interest in legalized gambling activities despite its prohibition for underage minors in most jurisdictions. Recent prevalence studies have shown that between 12.7% and 46.5% of youth admitted to having some gambling-related problems (Derevensky & Gupta, 2000; Ste-Marie, Gupta, & Derevensky, 2002). Further, 4-6% of these youth reported having a serious gambling problem (Derevensky et al., 2000; Ste-Marie et al., 2002). The fact that youth engage in a variety of gambling behaviors coupled with their reported early age of onset (Griffiths, 1990; Gupta & Derevensky, 1998a; Wynne, Smith, & Jacobs, 1996) suggests the need to examine factors which may help identify youth who may be at-risk for developing a gambling addiction.

The comorbidity of adolescent high-risk behaviors has been well established. Correlations have been found between gambling behavior and substance use, where substance use was found to increase with the severity of gambling-related problems (Gupta et al., 1998a,b; Kusyszyn, 1972; Lesieur & Klein, 1987; Ste-Marie et al., 2002; Winters & Anderson, 2000). As such, there appears to be a number of underlying factors which have a role in initiating and maintaining these high-risk behaviors.

Individuals experiencing different addictions report similar experiences, pointing to commonalities underlying these disorders (Gupta & Derevensky, 1996). These common experiences include similar patterns of abstinence and relapse, self-help approaches, and treatment approaches (Lesieur, Blume, & Zoppa, 1986). Further, studies examining personality dimensions of individuals suffering from different addictions have often found concordance in their profiles (Ciarrocchi, Kirschner, & Fallik, 1991; Graham, 1990; Graham & Lowenfeld, 1986; Kagan, 1987). Given the relationship between pathological gambling, and substance and chemical addictions, it may be useful to examine factors linked with these addictions in order to gain insight into gambling behavior.

Anxiety has been found to play a substantive role in addictive behaviors. Several researchers have proposed possible explanations for the link between anxiety and different addictions. One of the most widely held theories accounting for the relationship between anxiety and addiction is the "tension-reduction" hypothesis (Brady & Lydiard, 1993; DuPont, 1995, 1997; Kushner, Sher, & Beitman, 1990). According to this theory, anxiety disorders can predispose certain individuals to develop multiple addictions due to the addiction's self-medicating effect.

As such, individuals are thought to engage in addictive behaviors as a means of coping with their heightened levels of anxiety (Brady et al., 1993; Kushner et al., 1990; Ste-Marie et al., 2002; Wesner, 1990).

Studies have revealed that when individuals engage in a particular addiction, they experience a reduction in negative anxiolytic effects. It has been argued that this reduction in noxious effects is at least partly explained by the process of dissociation which many addicts report experiencing when engaged in their addictive behavior (Gupta et al., 1998a,b,c, 2000; Jacobs, 1987, 1988; Ste-Marie et al., 2002). It appears that certain individuals who experience high-anxiety levels or anxiety-related disorders may develop an addiction in order to escape from the negative physiological effects resulting from their anxiety. The resulting reduction in aversive physiological effects, which occurs while engaging in the addictive behavior, acts to reinforce and maintain the behavior.

Risk factors for youth with serious gambling problems have been identified throughout the literature. Adolescent problem and pathological gamblers, when compared with other adolescents, have been found to have lower self-esteem, higher rates of depression, higher rates of dissociation when gambling, are at an increased risk for developing multiple addictions, and score higher on measures of excitability, extroversion, and anxiety, and lower on conformity and self-discipline personality scales (Gupta & Derevensky, in press; Gupta, Marget, & Derevensky, 2000; Jacobs, Marsten, & Singer, 1985; Kusyszyn, 1972; Lesieur & Klein, 1987; Vitaro, Ferland, Jacques, & Ladouceur, 1998; Winters & Anderson, 2000). Adolescents with gambling problems have also been found to be greater risk takers (Arnett, 1994; Breen & Zuckerman, 1996; Gupta et al., 1996), and youth between the ages of 14-17 are at heightened risk for suicide ideation and suicide attempts (Gupta et al., 1998a).

The importance of examining other possible adolescent risk factors for the development of an addiction is important. As previously noted, prevalence rates for adolescent problem gambling behavior and substance use is on the rise, and the age of onset for these behaviors is decreasing. Further, it is apparent that some adolescents may not have developed appropriate coping mechanisms for dealing with the myriad of stresses they face on a daily basis. As such, some youth are at an increased risk of turning to an addictive behavior such as gambling and/or substance use as their coping mechanism of choice; albeit a negative and potentially damaging one.

While there is research that has related general anxiety with adolescent problem gambling, the aim of this study was to examine more closely the link between state anxiety, trait anxiety, social stress, gambling problems, and substance use among adolescents. If anxiety is found to be related to these behaviors, this information will provide insight regarding another set of risk factors that may be associated with adolescent gambling behavior and substance use. If predisposing factors can be identified for high-risk behaviors such as gambling and substance use, this will help in the development of effective, science-based, prevention and intervention programs. More generally, it is hoped that the information obtained from this research program will help further our current knowledge base of youth and adolescent high-risk behaviors.

METHODS

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. The participants were between 12 and 17 years of age (M = 14.31, SD = 1.49) and all students voluntarily participated after obtaining parental consent.

Instruments

Gambling Activities Questionnaire (GAQ). The GAQ (Gupta & Derevensky, 1996) ascertains the type of gambling activities in which individuals engage, the frequency of their gambling behavior, where they gamble, with whom they gamble, as well as items describing other characteristics of their gambling behavior. Items related to the frequency and type of gambling activities in which the participants engaged were included.

Diagnostic and Statistical Manual-Fourth Edition-Multiple Response-Juvenile. DSM-IV-MR-J (Fisher, 2000) is a screen for adolescent problem gambling. This recently revised scale consists of 9 domains (12 items) which describe psychological states and symptoms associated with problem gambling. The 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 are categorized as *social gamblers*, *at-risk gamblers* or *probable pathological gamblers,* according to the severity of their gambling behavior. This screening device was selected due to its high reliability (Cronbach's alpha = 0.75), as well as its good construct validity. An earlier version of this instrument, DSM-IV-J, has been found to be a conservative measure of problem/pathological gambling (Derevensky et al., 2000; Gupta et al., 2000; Nower, Gupta, & Derevensky, 2000; Volberg, 1996).

State-Trait Anxiety Inventory. STAI (Spielberger et al., 1983) consists of two separate self-report scales for measuring state and trait anxiety. This scale differentiates between the temporary condition of *state anxiety*, which assesses the current level of anxiey, and the more general and long-standing quality of *trait anxiety,* which assesses how the participant "generally feels." Each of the 40 questions has a range of 4 possible responses: (1) not at all, (2) somewhat, (3) moderately so, and (4) 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 was selected due to its widespread use and its strong reliability (r = .92 for the State Anxiety scale, r = .90 for the Trait Anxiety scale), as well as its concurrent validity with the Jackson's Personality Research Form (r = .65), and the Cornell Medical Index (r = .70) (Spielberger et al., 1983).

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

Substance Use Measure. The substance use measure consists of 5 items inquiring about the frequency of alcohol use, use of illicit drugs (i.e., "uppers," "downers," hallucinatory drugs), and cigarette smoking. Each item is based on a Likert scale consisting of four possible data points: "never," "less than once per week," "once per week or more," and "every day."

Procedure

Students were group-administered the instruments which were completed in the school cafeteria, auditorium, library, or in their classrooms. All instruments took approximately 30 to 50 minutes to complete. Participants were informed that all information would remain confidential and they could withdraw from the study at any time. Terms found to be troublesome for some students were explained before completing the instruments. The instruments were administered by several trained research assistants, who were present at all times to answer any questions.

RESULTS

Problem Gambling Amongst Adolescents

Based upon their responses on the GAQ and the DSM-IV-MR-J, the participants were categorized into one of four groups (see Table 1). Participants who answered "no" to all of the gambling items on the GAQ, were categorized 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 categorized as *social gamblers* (57.2%), those who answered positively to 2 or 3 items on the DSM-IV-MR-J were categorized as *at-risk for problem gambling* (9.7%), and those who endorsed 4 or more items were categorized as *probable pathological gamblers* (PPG) (4.5%).

Substance Use Amongst Adolescents

The frequency and type of substance use was examined through questions ascertaining their use of alcohol, illicit drugs (i.e., "uppers," "downers," hallucinatory drugs) and cigarettes, less than once per week, once per week or more, or daily. When collapsing across substances, 77.2% of the adolescents reported they never engaged in any substance use, 12.7% indicated using substances less than once per week, 6.2% indicated using substances once per week or more, and 3.9% indicated daily use of at least one substance.

Males tended to report more frequent alcohol and illicit drug use compared with females; however, females engaged in more frequent cigarette smoking compared with males (see Table 2). Chi-square analyses revealed a statistically significant relationship between gender and

alcohol use, $\chi^2(3, N = 1{,}040) = 13.67$, $p < .05$, and between gender and cigarette smoking, $\chi^2(3, N = 1{,}040) = 8.10$, $p < .05$. An examination of developmental differences revealed that generally substance use increased with age (see Table 3). Developmentally significant differences were found for alcohol use, $\chi^2(12, N = 1{,}040) = 223.37$, $p < .05$, cigarette smoking, $\chi^2(12, N = 1{,}040) = 89.46$, $p < .05$, and illicit drug use, $\chi^2(12, N = 1{,}038) = 95.03$, $p < .05$. Interestingly, with the exception of

TABLE 1. 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

TABLE 2. Frequency of Substance Use

Substance Use	Males (%)	Females (%)
Alcohol		
Never	42.5	45.7
< 1/week	40.0	43.4
Weekly	14.9	10.6
Daily	2.5	0.4
Illicit Drugs		
Never	74.7	79.5
< 1/week	12.5	12.9
Weekly	7.6	4.7
Daily	5.1	2.8
Cigarettes		
Never	77.3	70.0
< 1/week	9.6	14.3
Weekly	3.7	5.1
Daily	9.4	10.6

daily alcohol use, weekly and daily substance use tends to decrease in grade 10 after peaking in grade 9, and then increases again in grade 11. This peaking in grade 9 was similarly found with gambling frequencies. Further, more adolescents consumed alcohol on a weekly basis (26%), than used illicit drugs (12%) and smoked cigarettes (9%). Daily substance use was greatest for cigarette smoking (20%), followed by illicit drug use (8%) and alcohol use (3%).

Gambling and Substance Use

The relationship between gambling behavior and substance use was examined. As can be seen in Table 4, generally, substance use increases with severity of gambling behavior. Probable pathological gamblers' weekly and daily use of all substances except for daily cigarette smoking, is greater than that of the at-risk gamblers, social gamblers, and non-gamblers. For example, 13.3% of PPGs consume alcohol on a daily basis compared with 1.0% of at-risk gamblers, 1.2% of social gamblers,

TABLE 3. Substance Use by Grade Level

Substance Use	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Alcohol					
Never	76.6	59.6	33.0	27.3	19.7
< 1/week	18.7	33.5	47.4	57.6	54.3
Weekly	4.3	6.5	18.1	10.6	25.5
Daily	0.5	0.4	1.4	4.5	0.5
Illicit Drugs					
Never	96.2	84.8	66.4	71.7	64.7
< 1/week	2.9	10.4	16.4	16.7	18.2
Weekly	0.5	3.5	8.4	8.1	11.2
Daily	0.5	1.3	8.9	3.5	5.2
Cigarettes					
Never	91.4	77.4	66.5	73.2	57.4
< 1/week	3.8	13.9	14.0	13.1	15.4
Weekly	2.4	4.8	7.0	3.0	4.8
Daily	2.4	3.9	12.6	10.6	22.3

TABLE 4. Gambling Behavior and Substance Use

	Non-Gambler (%)	Social Gambler (%)	At-Risk Gambler (%)	Probable Pathological Gambler (%)
Alcohol consumption				
Never	67.1	38.3	17.0	22.2
< 1/week	28.4	47.6	55.0	28.9
Weekly	4.1	12.9	27.0	35.6
Daily	0.3	1.2	1.0	13.3
Illicit drug use				
Never	88.7	77.8	53.0	40.0
< 1/week	8.6	13.1	22.0	17.8
Weekly	21.0	6.1	12.0	22.2
Daily	0.7	2.9	13.0	20.0
Cigarette use				
Never	84.2	73.6	55.0	35.6
< 1/week	8.9	13.1	12.0	22.2
Weekly	1.4	3.9	10.0	20.0
Daily	5.5	9.4	23.0	22.2

and .3% of non-gamblers. Similar trends are evident for the use of illicit drugs, and cigarette smoking. Chi-square tests revealed significant differences between the gambling groups for alcohol use, $\chi^2(9, N = 1{,}025) = 182.31$, $p < .05$, illicit drug use, $\chi^2(9, N = 1{,}023) = 122.88$, $p < .05$, and cigarette smoking, $\chi^2(9, N = 1{,}025) = 91.87$, $p < .05$.

Anxiety and Problem Gambling

A Multivariate Analysis of Variance (MANOVA) was used to determine whether there were significant differences in the amount of reported anxiety and social stress between gamblers and non-gamblers (Table 5). The mean standard score of reported trait anxiety significantly increases as the amount of reported gambling problems increase; however, the differences between non-gamblers and social gamblers were not statistically significant. A similar trend is noted for state anxiety and social stress. Although PPGs (M = 49.24) reported slightly

TABLE 5. MANOVA: Anxiety Measures by DSM Group, Grade, and Gender

Source	Wilks' λ	*F*	df	*p*	Observed Power
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	.95	3, 991	.49	.51
Grade * Gender	.99	.56	4, 991	.92	.30
DSM Group * Grade * Gender	.96	1.10	10, 991	.31	.96

higher anxiety scores on the BASC Anxiety Scale compared with 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 with males. The means for the State Anxiety and Trait Anxiety standard scores, as well as the BASC Anxiety and BASC Social Stress T-scores are presented in Table 6. For more details regarding the relationship between anxiety and problem gambling behaviors see Ste-Marie, Derevensky, and Gupta (2002).

Anxiety and Substance Use

Univariate Analyses of Variance (ANOVA) were conducted in order to examine the differences in anxiety and social stress scores between males and females for each substance (see Table 7). The mean anxiety and social stress scores are presented in Table 8. For alcohol use, no significant differences on trait and state anxiety scores and social stress scores were found between males and females. However, there were significant gender differences on the BASC Anxiety scores, $F(1, 1{,}032) = 24.62$, $p < .05$. For illicit drug use, gender differences were found for trait anxiety, $F(1, 1{,}030) = 12.77$, $p < .05$, state anxiety, $F(1, 1{,}030) = 11.69$, $p < .05$, and social stress, $F(1, 1{,}030) = 6.18$, $p < .05$, but not for the BASC Anxiety scores. Finally, for cigarette use, significant gender differences were also found for trait anxiety, $F(1, 1{,}032) = 7.32$, $p < .05$, state anxiety, $F(1, 1{,}032) = 11.99$, $p < .05$, social stress, $F(1, 1{,}032) = 7.86$, $p < .05$, and BASC Anxiety scores, $F(1, 1{,}032) = 41.26$, $p < .05$.

TABLE 6. 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	6.67	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

Anxiety, Social Stress, and Gambling Behavior

In order to examine the relationship between state anxiety, trait anxiety, social stress, gambling behavior, and substance use more closely, T-scores on the anxiety scales and standard scores on the BASC scales were divided into three groups: the 25% highest scores, the middle 50%, and the lowest 25% on the anxiety measures. The division of the scores into these three groups would allow us to investigate better whether there are differences between high-anxiety, average-anxiety and low-anxiety adolescents, in terms of their gambling behavior and substance use. Chi-square tests were performed in order to examine differences between the gambling categories on the anxiety measures (see Table 9).

TABLE 7. ANOVA: Anxiety Measures by Gender and Substance Use

Source	Substances	Dependent Variable	*F*	df	*P*
GENDER	Illicit drugs	Trait anxiety	12.77	1, 1,030	.000
	Cigarettes	Trait anxiety	7.32	1, 1,032	.007
	Illicit drugs	State anxiety	11.69	1, 1,030	.001
	Cigarettes	State anxiety	11.99	1, 1,032	.001
	Alcohol	BAS	24.62	1, 1,032	.000
	Illicit drugs	BAS	30.61	1, 1,030	.000
	Cigarettes	BAS	41.27	1, 1,032	.000
	Illicit drugs	BSS	6.18	1, 1,030	.013
	Cigarettes	BSS	7.86	1, 1,032	.005

It is important to bear in mind that the two extreme groups (highest and lowest) each are expected to contain 25% of the sample population, while the middle group contains 50% of the sample population. In order to interpret the results, it is important to examine the dispersions from the percentage of students expected within each group.

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 significant relationships between gambling severity and reported trait anxiety, $\chi^2(6, N = 1{,}029) = 20.16, p < .05$. 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, failed to reach statistical significance, $\chi^2(6, N = 1{,}029) = 11.74, p = .07$.

For social stress, 44% of PPGs had the highest anxiety scores compared with 29% of at-risk gamblers, 25% of social gamblers, and 23% of non-gamblers. Although a higher percentage of PPGs reported social stress scores within the highest group, no statistically significant

TABLE 8. Mean Anxiety and Social Stress Scores by Substance Use

Substance Use	Trait Anxiety				State Anxiety				BASC Anxiety				Social Stress			
	Male		Female		Male		Female		Male		Female		Male		Female	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Alcohol																
Never	47	7.6	48	8.7	42	8.0	45	6.9	45	7.4	50	8.0	46	7.7	48	8.9
< 1/week	49	8.8	53	9.4	44	9.1	48	8.0	46	7.0	51	8.0	47	8.3	50	9.3
Weekly	50	10	53	7.9	46	12	49	7.9	45	8.8	51	7.8	48	10	49	8.9
Daily	51	14	49	15	48	17	51	11	46	8.9	61	11	50	11	52	19
Illicit Drugs																
Never	48	8.6	50	9.1	43	8.9	46	7.4	45	7.6	51	8.0	46	8.5	49	9.1
< 1/week	49	8.4	52	8.8	45	10	48	7.5	46	7.4	51	8.1	47	8.4	50	9.7
Weekly	50	8.9	53	11	43	10	49	9.5	45	7.2	51	7.2	46	8.1	48	9.4
Daily	50	11	55	7.2	47	14	49	9.0	46	7.8	49	9.7	48	9.8	49	7.9
Cigarettes																
Never	48	8.4	50	9.0	43	8.8	46	7.5	45	7.4	50	7.9	46	8.3	49	8.9
< 1/week	50	8.9	53	9.4	44	9.1	47	7.4	46	7.0	51	8.7	47	8.5	51	10
Weekly	50	9.6	51	8.7	44	7.7	48	7.9	46	7.2	52	7.9	47	8.8	51	9.4
Daily	50	11	54	9.2	47	15	49	8.1	46	9.0	51	7.9	48	9.9	49	9.4

relationships were found between the gambling groups and the BASC Social Stress Scale, $\chi^2(6, N = 1{,}029) = 10.91$, $p = .09$, and Anxiety Scale, $\chi^2(6, N = 1{,}029) = 5.94$, $p = .43$.

Anxiety, Social Stress, and Substance Use

The relationship between substance use, levels of anxiety, and social stress was similarly examined (Table 10). Among youth who consumed alcohol once a week or more, 40% were in the highest state anxiety group, compared with 37% in the average state anxiety group, and 23% in the lowest state anxiety group. Chi-square tests revealed a significant relationship between the levels of state anxiety for alcohol consumption, $\chi^2(6, N = 1{,}040) = 16.29$, $p < .05$. For trait anxiety, 40% of adolescents who consumed alcohol daily had standard scores in the highest

TABLE 9. 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

group, compared with 27% in the middle group, and 33% in the low-trait anxiety group. Significant relationships between trait anxiety levels and alcohol consumption were also found, $\chi^2(6, N = 1{,}040) = 41.24$, $p < .05$. No relationship between the levels of anxiety on the BASC, nor between the levels of social stress and alcohol consumption was found.

For those individuals (12.3%) who used illicit drugs once a week or more, 34% had state and trait anxiety scores within the highest group. Of the adolescents who used illicit drugs daily (7.9%), 44% reported state and trait anxiety levels which fell within the highest group. The state anxiety groups were significantly different for illicit drug use, $\chi^2(6, N = 1{,}038) = 18.76$, $p < .05$. Similarly, the trait anxiety groups for these drugs also differed significantly, $\chi^2(6, N = 1{,}038) = 14.12$, $p < .05$. The BASC anxiety levels and the BASC social stress levels failed to yield any discernable relationships with drug use.

TABLE 10. Anxiety and Substance Use

Scales	Alcohol/Beer (%)		Stimulants (%)		Depressives (%)		Hallucinatory Drugs (%)		Cigarettes (%)	
	Weekly	Daily	Weekly	Daily	Weekly	Daily	Weekly	Daily	Weekly	Daily
Trait anxiety										
Low	21.2	33.3	0.0	66.7	29.0	19.0	0.0	40.0	23.9	22.1
Medium	37.9	26.7	28.6	0.0	42.0	33.3	0.0	20.0	39.1	36.5
High	40.9	40.0	71.4	33.3	29.0	47.7	100.0	40.0	37.0	41.4
State anxiety										
Low	22.7	40.0	0.0	66.7	40.6	28.6	0.0	60.0	17.4	22.1
Medium	37.1	26.7	28.6	0.0	27.5	28.6	0.0	0.0	47.8	36.5
High	40.2	33.3	71.4	33.3	31.9	42.9	100.0	40.0	34.8	41.4
BASC anxiety										
Low	35.6	40.0	42.9	66.7	36.2	28.6	0.0	40.0	19.5	26.0
Medium	39.4	33.3	57.1	0.0	46.4	47.6	100.0	20.0	52.2	44.2
High	25.0	26.7	0.0	33.3	17.4	23.8	0.0	40.0	28.3	29.8
BASC social stress										
Low	38.6	40.0	28.6	66.7	42.0	28.6	0.0	40.0	23.9	33.7
Medium	33.4	20.0	28.6	0.0	37.7	38.1	50.0	20.0	39.1	38.5
High	28.0	40.0	42.8	33.3	20.3	33.3	50.0	40.0	37.0	27.8

In terms of smoking, 41% of daily smokers reported anxiety levels within the highest-anxiety group. This was true for both state [$\chi^2(6, N = 1{,}040) = 17.42$, $p < .05$] and trait anxiety [$\chi^2(6, N = 1{,}040) = 27.97$, $p < .05$]. It appears that overall, adolescents who report having the higher state and trait anxiety scores, also tend to be the same individuals who engage in the most frequent substance use (see Table 10).

DISCUSSION

Approximately 70% of adolescents between the ages of 12 and 17 reported engaging in some type of gambling activity during the last year. Although the majority of youth (57%) reported engaging in gambling behavior as a social activity, 9.7% of adolescents are classified as

"at-risk" for developing a gambling problem. Further, based on their results on the DSM-IV-MR-J, 4.5% of adolescents were classified as probable pathological gamblers. It appears that gambling behavior continues to be a popular activity among adolescents, despite the fact that minors are prohibited from engaging in legalized forms of gambling (e.g., lotteries, casino, VLTs).

Not only are a large number of adolescents readily engaging in gambling behavior, but they are also frequent substance users. Although the majority of adolescents report never having tried alcohol, cigarettes, or illicit drugs (i.e, "uppers," "downers," hallucinatory drugs), 12.7% of adolescents between 12-17 years of age report using substances less than once per week, 6.2% use substances on a weekly basis, and 3.9% use them daily. Interestingly, these results indicate that adolescents are more likely to engage in gambling behavior than use illegal substances such as cigarettes, drugs, and alcohol. Further, a higher percentage of these youth meet the criteria for probable pathological gambling (4.5%), than for daily substance use (3.9%). Males reported more alcohol and illicit drug use compared with females; however, females reported more frequent cigarette smoking. Similar to gambling behavior, substance use is generally found to increase with age.

Upon examing the relationship between gambling behavior and substance use, it was found that substance use increases with severity of gambling activity. Probable pathological gamblers consumed more alcohol, used more "uppers," "downers," and hallucinatory drugs, and smoked more cigarettes than non-gamblers, social gamblers, and problem gamblers. These findings corroborate previous findings (Gupta et al., 1998a; Jacobs, 2000; Winters & Anderson, 2000).

Analyses were performed in order to examine the relationship between gambling severity and anxiety scores, based on their division into three groups (i.e., low, medium, high). It was found that gamblers with the highest scores on state and trait anxiety, as well as for social stress, were likely to meet the criteria for probable pathological gambling (41%, 48%, and 44%). As expected, only 24% of non-gamblers and 27% of social gamblers reported trait anxiety scores within the highest group. Similarly, for state anxiety, 26% of non-gamblers and 29% of social gamblers reported scores in the highest group, and for social stress, non-gamblers and social gamblers had lower percentages of gamblers in the highest group (23% and 25%) as well. It appears that PPGs not only report the greatest amount of gambling-related problems, but also, in general, indicated the highest levels of state anxiety, trait anxiety, and social stress.

Relationships were found between state and trait anxiety and substance use, as well as with gambling behavior. However, fewer discernable relationships were found with the BASC Anxiety scale and BASC Social Stress scale. There are several possible explanations for why this occurred. When comparing the questions within the STAI with the BASC scales, it appears that the BASC items are targeting more severe anxiety. Whereas the STAI 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 "generalized fears, oversensitivity, and worries that are typically irrational and poorly defined in the mind of the individual." Further, considering that behavior varies across time and settings, the BASC's forced-choice format may have been difficult for the participants to interpret, compared with the STAI's 4-item response scale (Merenda, 1996). It is likely that adolescents indicated their response as "False" when they were unsure what to answer or when the item applied to be 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 and social stress sub-scales) have been reported (Merenda, 1996; Witt, 1998). In particular, Merenda (1996) discusses the weak test-retest coefficients of the SRP. 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. Taken together, these weaknesses may help explain the lack of results obtained with the BASC scales.

Within the adult literature, comorbidity has been found between substance use and anxiety, as well as between substance use and gambling behavior (Kayloe, 1993; Kushner et al., 1990; Regier, Rae, Narrow, Kaelber, & Schatzberg, 1998). The present study found similar relationships within the adolescent population. Analyses revealed that adolescent gamblers with scores in the highest-state anxiety, trait anxiety, and social stress groups reported more regular (weekly or more) alcohol consumption and illicit drug use compared with gamblers in the low or average anxiety groups. Furthermore, 41% of daily smokers were within the highest group on measures of state and trait anxiety. According to these findings, it appears that of the adolescents who report consuming alcohol, using drugs, and smoking cigarettes on a weekly or daily basis, the majority of them also indicate high levels of state and trait anxiety. This finding supports anxiety's significant relationship with adolescent problem

gambling and substance use (Kayloe, 1993; Kushner et al., 1990; Regier et al., 1998).

It would be interesting for future studies to examine these variables longitudinally. As opposed to the current cross-sectional design, a longitudinal study would allow for more information regarding causality. This paper is based on the first author's Master's Thesis, as such, the greater expense, time, and ethical constraints of a longitudinal study was not feasible. However, ways of compensating for these constraints are currently being explored for future studies.

Information from this study offers insight on how to identify factors for youth who may be at-risk for developing an addictive behavior. This apparent link between anxiety and high-risk behaviors such as gambling and substance use suggests that youth may be engaging in these risky behaviors as a means of coping with daily stresses and anxiety provoking situations. Although further research is needed to examine this relationship more closely, results from this study provide important information that should be considered when developing prevention, intervention, and treatment programs for youth. The results of this study also point to the need for educating society of the potential dangers of gambling for youth. In addition to developing and implementing substance use prevention programs, it is imperative that more preventive efforts be aimed at curbing youth gambling. Although many individuals still believe that adolescents do not gamble, the results clearly indicate otherwise.

REFERENCES

Arnett, J. (1994). Sensation seeking: A new conceptualization and a new scale. *Personality and Individual Differences, 16,* 289-296.

Brady, K. T., & Lydiard, R. B. (1993). The association of alcoholism and anxiety. *Psychiatric Quarterly, 64*, 135-149.

Breen, R. B. & Zuckerman, M. (1996). Personality and cognitive correlates of gambling participation and perseverance. Paper presented at the Tenth National Conference on Gambling Behavior, Chicago.

Burks, H. F. (1977). *Burks' Behavior Rating Sscales.* Los Angeles: Western Psychological Services.

Ciarrocchi, J. W., Kirschner, N. M., & Fallik, F. (1991). Personality dimensions of male pathological gamblers, alcoholics, and dually addicted gamblers. *Journal of Gambling Studies, 7*, 133-141.

Derevensky, J. L., & Gupta, R. (2000). Prevalence estimates of adolescent gambling: A comparison of the SOGS-RA, DSM-IV-J, and the GA 20 Questions. *Journal of Gambling Studies, 16*, 227-251.

DuPont, R. L. (1995). Anxiety and addiction: A clinical perspective on comorbidity. *Bulletin of the Menninger Clinic, 59*, A53-A72.

DuPont, R. L. (1997). Panic disorder and addictions: The clinical issues of comorbidity. *Bulletin of the Menninger Clinic, 61*, Suppl. A, A54-A65.

Fisher, S. E. (2000). Developing the DSM-IV-MR-J criteria to identify adolescent problem gambling in non-clinical populations. *Journal of Gambling Studies, 16*, 253-274.

Graham, J. R. (1990). *MMPI-2: Assessing Personality and Psychotherapy.* New York: Oxford University Press.

Graham, J. R., & Lowenfeld, B. H. (1986). Personality dimensions of the pathological gambler. *Journal of Gambling Behavior, 2*, 58-66.

Griffiths, M. D. (1990). The cognitive psychology of gambling. *Journal of Gambling Studies, 6*, 31-42.

Gupta, R., & Derevensky, J.L. (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. (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 experimental examination of Jacob's General Theory of Addictions: Do adolescent gamblers fit the theory? *Journal of Gambling Studies, 14*, 17-49.

Gupta, R., & Derevensky, J. L. (1998c, August). Youth gambling: Some risk-factors predicting probable pathological gambling behavior. Paper presented at the American Psychological Association Annual Conference, San Francisco, CA.

Gupta, R. & Derevensky, J. L. (2000). Adolescents with gambling problems: From research to treatment. *Journal of Gambling Studies, 16(2/3)*, 315-342.

Gupta, R. & Derevensky, J. L. (in press). Personality characteristics and risk-taking tendencies among adolescent gamblers. *Journal of Social Psychology.*

Gupta, R., Marget, N., & Derevensky, J. (2000, June). Youth problem gamblers: The importance of coping skills. Paper presented at the 11th International Conference on Gambling and Risk-Taking, Las Vegas.

Jacobs, D. F. (1987). A general theory of addictions: Application to treatment and rehabilitation planning for pathological gamblers. In T. Galski (Ed.), *The handbook of pathological gambling*. Springfield, Illinois: Charles C. Thomas.

Jacobs, D. F. (1988). Evidence for a common dissociative-like reaction among addicts. *The Journal of Gambling Behavior, 4*, 27-37.

Jacobs, D. (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., Marsten, A., & Singer, R. (1985). Testing a general theory of addiction: Similarities and differences among alcoholics, pathological gamblers, and overeaters. In J. J. Sanchez-Soza (Ed.), *Health and clinical psychology (Vol. 4).* Netherlands: Elsevier Science.

Kagan, D. M. (1987). Addictive personality factors. *The Journal of Psychology, 121*, 533-538.

Kayloe, J. C. (1993). Food addiction. *Psychotherapy, 30*, 269-275.

Kushner, M. G., Sher, K. J., & Beitman, B. D. (1990). The relation between alcohol problems and the anxiety disorders. *American Journal of Psychiatry, 147*, 685-695.

Kusyszyn, I. (1972). The gambling addict vs. the gambling professional. *International Journal of the Addictions, 7*, 387-393.

Lesieur, H. R., Blume, S. B., & Zoppa, R. M. (1986). Alcoholism, drug abuse, and gambling. *Alcoholism: Clinical and Experimental Research, 10*, 33-38.

Lesieur, H. R., & Klein, R. (1987). Pathological gambling among high school students. *Addictive Behavior, 12*, 129-135.

Merenda, P. F. (1996). BASC: Behavior Assessment System for Children. *Measurement and Evaluation in Counseling and Development, 28*, 229 - 232.

Nower, L. M., Gupta, R., & Derevensky, J. (2000, October). Coping and gambling: The relationship of stress coping styles, impulsivity, sensation-seeking, and substance use among youth gamblers. Paper presented at the annual meeting of the National Council on Problem Gambling, Philadelphia.

Quay, H. C., & Peterson, D. R. (1983). *Revised Behavior Problem Checklist.* Coral Gables, FL: University of Miami, Department of Psychology.

Regier, D. A., Rae, D. S., Narrow, W. E., Kaelber, C. T., & Schatzberg, A. F. (1998). Prevalence of anxiety disorders and their comorbidity with mood and addictive disorders. *British Journal of Psychiatry, 173*, 24-28.

Reynolds, C. R., & Kamphaus, R. W. (1992). *Manual for the Behavior Assessment System for Children (BASC).* Circle Pines, MN: American Guidance Service, Inc.

Spielberger, C. D., Gorusch, R., Luschene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory (Form Y)*. Palo-Alto: Consulting Psychologists Press.

Ste-Marie, C., Gupta, R., & Derevensky, J. (in press). *Anxiety and social stress related to adolescent gambling behavior*. International Gambling Studies.

Vitaro, F., Ferland, F., Jacques, C., & Ladouceur, R. (1998). Gambling, substance use, and impulsivity during adolescence. *Psychology of Addictive Behaviors, 12*, 185-194.

Volberg, R. A. (1996). Gambling and problem gambling in New York: A 10-year replication survey, 1986 to 1996. Report to the New York Council on Problem Gambling.

Wesner, R. B. (1990). Alcohol use and abuse secondary to anxiety. *Psychiatric Clinics of North America, 13*, 699-713.

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

Witt, J. (1998). Review of the Behavior Assessment System for Children. In Impara, J. C., & Plake, B. S. (Eds.), *The 13th Mental Measurements Yearbook* (pp. 131-133). Lincoln, Nebraska: The University of Nebraska Press.

Wynne, H., Smith, G., & Jacobs, D. (1996). Adolescent gambling and problem gambling in Alberta. A report prepared for the Alberta Alcohol and Drug Abuse Commission. Edmonton Alberta: Wynne Resources Ltd.

RECEIVED: 11/03/02
REVISED: 06/22/04
ACCEPTED: 06/24/04