

# Gambling and the Trait of Addiction in a Sample of New Zealand University Students

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A recent national survey (Amey, 2001) found that proportionately more young people in New Zealand gambled on cards, scratch tickets and gaming machines than older age groups. From North American surveys, young urban males in college are at risk of being problem gamblers. The present study compared the prevalence of gambling and problem gambling among a sample of 171 first year university students with the prevalence found nationally and internationally. The students, median age 23 years, completed a questionnaire consisting of demographic items, questions about gambling behaviour, the Revised South Oaks Gambling Screen (SOGS-R), a depression inventory, and the Eysenck Addiction scale. Approximately 97% of the sample gambled for money and 16% of the 165 gamblers were classified as problem gamblers. Maori gambled on more activities than the European/Pakeha, Pacific Island or Asian groups did, but there were no other significant sociodemographic differences. There were significant differences between problem and non-problem gamblers on gambling frequency, number of activities, amount gambled, parents' gambling, continuous gambling, depression and Addiction. Logistic regression analysis showed that after controlling for gambling frequency, number of activities, amount gambled, continuous gambling and parents' gambling, Addiction was a significant predictor in discriminating between problem and non-problem gamblers. Combining initiatives in the prevention and treatment of drug and gambling addiction was suggested.

In a previous study (Clarke & Rossen, 2000) the prevalence of adolescent gambling and problem gambling recalled by a sample of New Zealand university students was compared with that of Reid & Searle's (1996) representative national sample. Generally, the students reported that they were more involved during adolescence in all forms of gambling for money than either the national sample or samples of adolescents overseas were. The sample also had a larger proportion of problem gamblers than the other groups.

Problem gambling is typically defined by three or more symptoms on the widely-used South Oaks Gambling Screen (SOGS; Abbott & Volberg, 1996, 1999; Lesieur & Blume, 1987). Probable pathological gambling is defined by five or more symptoms. The inclusion of "probable" is to distinguish SOGS' respondents from pathological gamblers identified in clinical interviews (Abbott, 2001). The SOGS is a 20-item, self-report questionnaire based on DSM-III-R criteria. It consists of questions about problems associated with gambling in the respondent's lifetime on a "yes-no" basis. The symptoms include trying to recoup losses, borrowing or stealing money to gamble, and escaping from dysphoric moods (anxiety, depression). However, the symptoms do not include frequency of gambling, range of activities, or amount of money spent on gambling. Nine of the items are sources of borrowing money, so that effectively only 12 items measure distinct symptoms of problem gambling. Abbott and Volberg (1996) have provided data to support the validity of the SOGS' criteria for problem and probable pathological gambling in New Zealand.

In a partial replication of the earlier survey, the first purpose of the present study was to ascertain the extent of gambling in a group of first year university students compared with a similar age group in the most recent representative national sample (Amey, 2001). The second purpose was to compare problem gamblers to non-problem gamblers on frequency of gambling, number of different gambling activities, amount gambled, continuous gambling, parents' gambling, depression and the trait of addiction. The third purpose was to assess the relative importance of each

of these variables in predicting the classification of problem gamblers.

### Problem versus Non-problem Gamblers

A number of variables have been associated with problem gambling. Previous research in New Zealand and other countries has found that compared to non-problem gamblers, problem gamblers play for money more frequently, on more activities and with greater amounts of money; they also perceive that their parents were more likely to gamble excessively (Abbott, 2001; Abbott & Volberg, 1996; Bergh & Kuhlhorn, 1994; Brown, 1996; Browne & Brown, 1994; Buchta, 1995; Carroll & Huxley, 1994; Clarke & Rossen, 2000; Coventry & Brown, 1993; Dubé et al., 1996; Fisher, 1993; Hendriks et al., 1997; Ladouceur et al., 1997; Moore & Ohtsuka, 1997). Whether or not their parents actually gambled excessively, the important point is that their perception may influence their own assessment of their gambling behaviour. They may think that they also have a problem with gambling, and this perception could bias their answers on the self-report, problem gambling measures. Further, problem gamblers are more likely to be involved in continuous gambling, whereby winnings can be immediately risked again within the same session (Abbott, 2001; Clarke & Rossen, 2000). Continuous forms of gambling include scratch tickets, gaming machines, track betting, card games, and casinos.

Individually, factors such as youth, unemployment, lower education, lower socio-economic status and non-Caucasian ethnicity have also been associated with problem gambling (Abbott, 2001; Abbott & Volberg, 1999; Rossen, 2001; Volberg, 1994). Although some investigations have found that young males are more likely to be problem gamblers than young females (Abbott & Volberg, 1996; Buchta, 1995; Griffiths 1995b; Moore & Ohtsuka, 1997; Winters, et al., 1993), other studies noted that gender differences are not important or decrease with time (Browne & Brown, 1994; Fisher, 1993; Hraba & Lee, 1996; Ladouceur et al., 1997; Lopez Viets, 2001). Problem gambling among women of all ages may be on the increase, with problem gambling rates becoming equivalent to men's rates (Abbott & Volberg, 2000; Amey, 2001).

The relationship of depression to problem gambling has been demonstrated in a number of studies (Abbott & Volberg, 1996; Echeburua et al., 2001; Fisher, 1993; Getty et al., 2000; Griffiths, 1993, 1995a, b; Gupta, 2000; Gupta & Derevensky, 1998; Ladouceur et al., 1997; Lopez Viets, 2001; Lumley & Roby, 1995; Murray, 1993; Raviv, 1993; Sullivan, 1994a; Vitaro et al., 1999). Problem gamblers are likely to have more symptoms of depression than non-problem gamblers, possibly because losing is a depressing experience.

### Addiction and Gambling

Substance abuse is frequently associated with problem gambling (Abbott, 2001; Bergh & Kuhlhorn, 1994; Echeburua et al., 2001; Griffiths, 1995b; Hendriks et al., 1997; Hraba & Lee, 1996; Ibanez et al., 2001; Ladouceur et al., 1997; Murray, 1993; Orford et al. 1996; Petry, 2000;

Shaffer & Hall, 1996; Winters, et al., 1993). In New Zealand, a recent national survey (Abbott, 2001) reported that 37 percent of lifetime problem gamblers engaged in hazardous alcohol use, more than double that of the adult population. In the 12 months up to Abbott's survey, 16% of the problem gamblers used cannabis, and 12% other illicit drugs, compared to the adult population rates of 7% and 1%, respectively. Some evidence (Orford et al. 1996; Rozin & Stoess, 1993) suggests that problem gamblers are as attached to gambling as drinkers are to drinking, but do not seem to suffer to the same extent the problems of neurological adaptation, tolerance and withdrawal. Thus, there seems to be some overlap between substance abuse and problem gambling.

Recent research has provided some support for the existence of a cluster of characteristics that could be described as an addictive personality trait (Hudak, 1993; Ibanez et al., 2001). For example, Valeithian (1999) found that there was a high degree of similarity on the Millon Clinical Multiaxial Inventory (MCMI-II) traits among women with addictions to chemicals, food and harmful relationships. The MCMI-II measures personality disorders related to Axis II of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association, 1994). The women's personality pattern was distinct from other personality types, and described as a combination of neurotic and antisocial traits. Similarly, Lavelle et al. (1999) reported that adolescent female drug users had higher scores on the MMPI scales related to neuroticism, and on the psychopathic deviance (Pd) and mania (Ma) scales than female non-users. The male adolescent drug users also had higher scores on Pd and Ma than male non-users, but not on the neuroticism scales. However, the authors suggested that Pd and Ma might merely be measuring delinquency, rather than an addictive personality trait.

From their research and from other empirical studies reported in the literature, Gupta and Derevensky (1998; Gupta 2000) examined the possibility of an addictive personality trait among adolescent problem gamblers. For example, multiple addictions have been found among more than half of adolescents who have a compulsive behaviour problem (Griffin-Shelley, Sandler & Lees, 1992, in Gupta and Derevensky, 1998). Compulsive problems can include substance abuse, food, sex, relationships and gambling. From earlier surveys (e.g., Sharma, 1995, in Gupta and Derevensky, 1998) the trait of addiction among adolescents precedes the addiction itself; in other words, addiction to an activity does not create the addictive personality.

Eysenck and Eysenck (1975) have devised a scale from the original Eysenck Personality Inventory (EPQ) to measure the addictive personality trait. Their Addiction scale has been found to correlate with neuroticism and various drinking measures (Patton et al., 1994). Other investigators (Blaszczynski et al, 1985) reported similarities between heroin addicts and pathological gamblers on the Addiction scale, but did not examine if addiction was still involved in problem gambling when other variables were controlled. Hence, it was decided to include addiction in

the present study and in the regression equation for the classification of problem gamblers.

The first aim of the present study was to compare the prevalence of gambling and problem gambling in a group of university students with a similar age group in a recent, representative New Zealand national sample, and with university students in other countries. The second aim was to examine the variables associated with problem gambling using the present student group.

On the basis of the literature reviewed above, the following hypotheses were generated. Compared to non-problem gamblers, problem gamblers will:

Hypothesis 1. gamble more frequently and on more activities;

Hypothesis 2. spend more money on any one bet in the last twelve months;

Hypothesis 3. be more likely to think that their parents gambled excessively;

Hypothesis 4. be more involved in continuous gambling activities;

Hypothesis 5. have greater depression; and,

Hypothesis 6. be stronger on the addiction trait.

A seventh hypothesis was:

Hypothesis 7. the addiction trait will distinguish problem gamblers from non-problem gamblers, after controlling for the other variables noted in Hypotheses 1 to 6.

## Method

### Participants

A gambling questionnaire was completed by a class of 137 female and 34 male students who were enrolled in an introductory psychology course at the Albany campus of Massey University in 2001. The age distribution was moderately skewed (0.98), with no outliers. Ages ranged from 15 to 57 years, with a median age of 23 years ( $M = 27.90$ ,  $SD = 10.49$ ). Seventy-two percent of the sample identified themselves as Caucasian or New Zealand European, 7.6% as Maori, 6.4% as Pacific Islander, and 9.4% as Asian. Most of the participants (84%) were in the average and above average socio-economic groups. Six of the students (all female) had never gambled. Their data were excluded from further analysis because there were too few of them to warrant meaningful comparisons to the two gambling groups. Thus, there were 165 students who had gambled for money at least once on any activity in their lifetimes, and their data were used in this analysis. The sample consisted predominately of young, female, Caucasian adults with moderate to high socio-economic status.

### Materials

An anonymous questionnaire consisting of five sections was given to the participants. The sections appeared in the order below.

**Prevalence of Gambling.** The participants indicated which of 13 gambling activities they played for money at least once in their lifetime, and if they gambled, the frequency for each activity during the past 12 months, with categories

of 0 (not in the last 12 months), 1 (less than monthly), 2 (monthly), 3 (weekly), or 4 (daily). The activities appear in Table 1. From the data, two scores were calculated for each person: the total number of activities tried at least once in their lifetime, ranging from 1 to 13, and frequency, the total ratings for all the games played during the past 12 months. For gambling frequency, the 13 rating scales could be considered equivalent to Likert five-point scales, ranging from "never" to "very frequently", so that total scores reflect a continuous range from 0 to 52. Respondents also indicated the largest amount of money gambled in the last 12 months: 1 (\$1 or less), 2 (more than \$1, up to \$10), 3 (more than \$10, up to \$49), 4 (\$50 to \$99), 5 (\$100 to 199), or 6 (\$200 or more). To compare problem to non-problem gamblers and for logistic regression, the data were re-classified into two categories: \$10 or less, and more than \$10.

**Problem Gambling.** Problem gambling and respondents' perceptions of parents' excessive gambling were measured by the Revised South Oaks Gambling Screen (SOGS-R). The SOGS-R is the same 20-item questionnaire as the original SOGS which screens for problem and pathological gambling, except that it surveys over a limited time frame (Abbott & Volberg, 1999; Ladouceur et al., 1997). The SOGS-R used in the present study asks questions on a "yes-no" basis about problems associated with gambling in the last 12 months, rather than in one's lifetime, for comparisons with the national sample, also based on gambling within the past year. It is also more reliable and produces fewer false negatives than the SOGS (Abbott, 2001). A score of 3 or more indicates that a person is at least a problem gambler, and less than 3, a non-problem gambler. Probable pathological gamblers have a score greater than 4, and were included in the present study as problem gamblers. Abbott and Volberg (1996) have provided some support for the reliability and validity of the SOGS-R with New Zealand samples. For the present sample, the coefficient of internal consistency was .94. Although it is not included in the SOGS-R scoring scheme, one item asks the respondents if they thought that either of their parents gambled excessively. Respondents circled either "yes", "no", or "don't know". The item was used to measure parents' gambling behaviour as a dichotomous variable, with either "yes" or "no" defining the dichotomy.

**Addiction.** The Eysenck Addiction scale (Eysenck & Eysenck, 1991) was developed from the EPQ by comparing the responses of 221 drug addicts to those of 310 normal people. It consists of 32 items from the original Psychoticism (P), Extraversion (E), Neuroticism (N), and Lie (L) scales answered on a yes-no basis. Addicts score high on P and N, and low on E and L. The coefficient of internal consistency for the present sample was .69.

**Depression.** The depression symptom inventory is an existing instrument developed with medical inpatients and outpatients, and respondents in cross-sectional surveys in New York State (Bell et al., 1982). It was used rather than the Beck Depression Inventory (BDI; Beck et al., 1961) because the BDI was designed to assess the severity of depression in clinically diagnosed groups (Davison & Neale, 2001), whereas the depression symptom inventory is more

applicable for non-clinical populations. Each item is rated on a five-point scale, from "often" to "never", with scores ranging from 18 to 90. For the present study, item one was re-worded from "Do you feel in good spirits?" to "Do you have a feeling of well-being?", to avoid Maori connotations relating to the spirits of their ancestors; and item 18 from "How does the future look to you?" to "Does your future seem uncertain to you?" to make sense in terms of the rating scale. The modified depression scale had an internal consistency coefficient of .82 for the present sample.

**Demographics.** The participants were asked to indicate their gender, age, which socio-economic group best described their family background (low, moderately low, average, moderately high, high) and which ethnic group they primarily identified with (Caucasian, New Zealand European or Pakeha, New Zealand Maori, Pacific Island group, Asian, or Other).

### Procedure

Participants were recruited according to the guidelines of the Massey University Human Ethics Committee which approved the research. Volunteers were treated in accordance with the "New Zealand Psychological Society Code of Ethics" (New Zealand Psychological Society, 1986). After the second lecture, information sheets were distributed to the introductory psychology class by the author, before asking for volunteers to complete the questionnaire in their own time, and to return it anonymously to the School of Psychology. The information sheet included details about the purposes of the survey, respondents' rights as participants, the handling and confidentiality of the anonymous data, and the contact details at the Student Health and Counselling Services if they were distressed by the questionnaire. It clearly specified that all responses were confidential and that no identifying details such as name or university identification number would be sought. The information sheet also told them that they could withdraw from the study at any time until returning the questionnaire. After that time, it was not possible to identify an individual's questionnaire for retrieval. The questionnaire took about 30 minutes to complete.

### Results

Prior to inferential analyses, the data for each scale were examined for assumptions of normality. Gambling frequency was moderately skewed (1.23), so logarithmic transformations were computed to approximate normal distributions for the frequency data (Tabachnik & Fidell, 1989). For all other scales, except the SOGS-R, the distributions of data were within normal ranges and raw data were used in the computations.

### Prevalence of gambling

The prevalence of gambling in the past 12 months (recent gambling) among the present sample was compared with that of a recent similar representative national sample (Amey, 2001).

Only respondents who gambled on one or more activities were included in the comparisons. Table 1 shows the percentages of the university participants' and the national sample's recent gambling for each activity, and the prevalence of recent gambling for the group 15 to 24 years of age, compared with the same age group in the national sample. The most popular, recent gambling activities were Lotto and instant scratch tickets (73% each), lotteries/raffles (57%), and gaming machines (50%). The prevalence rates for these activities among the national participants (Amey, 2001) were 75%, 48%, 67% and 34%, respectively. For the present total sample, the chi-squares of differences between the observed rates and the rates expected from the representative national sample were statistically significant for casinos (30.25), card games (20.00), scratch tickets (13.02), and gaming machines (7.83),  $\chi^2(1, N = 165)$ ,  $ps < .01$ . Proportionately more of the present sample (79%) tried four or more activities, compared with the national sample (37%),  $\chi^2(1, N = 165) = 48.36$ ,  $p < .001$ . The chi-squares of differences expected for the 15 to 34 year-olds in the present sample were significant for casinos (25.00), gaming machines (15.11), and betting on sports events (7.36),  $\chi^2(1, N = 85)$ ,  $ps < .01$ . For at least 50% of each age group, buying scratch tickets was the favourite activity for the 15 to 19 year-olds, gaming machines for those 20 to 24, and Lotto for those 25 or older,  $\chi^2(9, N = 107) = 39.59$ ,  $p < .001$ .

Chi-squared tests comparing problem to non-problem gamblers, males to females and the four main ethnic groups to one another on the dichotomous variables of amount gambled, parents' gambling, and continuous gambling, were computed. The proportions of women to men were not

Table 1: Percentage Distributions of Recent Gambling Activities for University and National Samples, and for Groups Aged 15 to 24 years

Activity	Total Sample		Ages 15 to 24	
	University (N = 165)	National <sup>a</sup> (N = 1,305)	University (n = 85)	National (n = 189)
Lotto	73	75	69	75
Raffles/lotteries	57	67	61	83
Instant Kiwi/scratch tickets	73	48	78	69
Bets with friends on events	20	24	34	37
Gaming machines	50	34	58	35
Horse/dog races	22	17	23	19
Casinos	38	16	36	16
Gaming/casino evenings	20	10	22	14
Sports betting	14	8	20	11
Card games	15	5	23	17
Housie (bingo)	8	4	9	7
Dice games	5	2	5	8
Video parlour games	14	-	23	-

Note. Percentages were rounded to the nearest whole numbers. National data were from the 2000 survey (Amey, 2001).

<sup>a</sup> Of 1500 respondents, 87% had gambled in the past 12 months.

significantly different on amount spent (\$10 or less, vs. >\$10),  $\chi^2(1, N = 165) = 0.58$ , perception of parents' excessive gambling (yes, no),  $\chi^2(1, N = 165) = 1.61$ , or continuous gambling,  $\chi^2(1, N = 165) = 0.67$ ,  $ps > .05$ . A MANOVA showed that there were no significant differences for gender on gambling frequency, number of activities, depression or Addiction, Wilks' lambda = .94,  $F(4, 157) = 2.42$ ,  $p > .05$ .

Using post hoc tests of significance of differences between means with Bonferroni corrections for multiple comparisons, a MANOVA showed that the 13 Maori gambled on significantly more activities ( $M = 8.92$ ,  $SD = 2.99$ ) than the European/Pakeha ( $M = 6.64$ ,  $SD = 2.30$ ), Pacific Island ( $M = 6.73$ ,  $SD = 2.65$ ) or Asian ( $M = 5.46$ ,  $SD = 2.82$ ) groups,  $F(3, 151) = 4.78$ ,  $p < .01$ . There were no significant differences in proportions of ethnic groups on amount gambled, parents' gambling, continuous gambling, gambling frequency, depression or addiction. Compared with Maori in the national sample ( $n = 117$ ; Amey, 2001), they were also more likely to try casino gambling (69% versus 14%), gaming machines (69% versus 31%), sports betting (38% versus 13%), and housie (31% versus 10%). These findings are consistent with the results from New Zealand national surveys, that the involvement of women in gambling has increased to equal that of men, and that Maori are more likely to be involved in heavy gambling than other ethnic groups in New Zealand (Abbott & Volberg, 2007; Abbott, 2001; Amey, 2001).

#### Gambling in Casinos

More casino gamblers (76%) than non-casino gamblers (25%) spent \$10 or more on any one bet,  $\chi^2(1, N = 160) = 24.87$ ,  $p < .001$ . They also gambled more frequently,  $F(1, 162) = 29.33$ , and on more activities of all kinds,  $F(1, 162) = 40.21$ ,  $ps < .001$ , but did not have significantly higher depression or addiction scores. For the 15 to 19 year-olds ( $n = 46$ ) in the present sample, the prevalence rates of gambling on all activities were almost identical to the rates for the rest of the sample ( $n = 119$ ), except that 15% of them gambled in casinos, compared with 39% of the other age groups.

#### Problem versus Non-problem Gamblers

Gamblers were classified into groups according to their scores on the SOGS-R (Ladouceur et al., 1997): problem gamblers (scores 3 or greater) versus non-problem gamblers (scores of less than 3). Problem gamblers were compared to non-problem gamblers on gambling frequency, number of gambling activities, amount gambled, parents' gambling, continuous gambling, depression, and the trait of addiction.

According to the criterion of scores of three or greater on the SOGS-R, 26 of the 165 gamblers (16%) were classified as problem gamblers. Six of these (4%) met the criterion for probable pathological gamblers. There were proportionately equivalent numbers of male (6 of 34) and female (20 of 131) problem gamblers,  $\chi^2(1, N = 165) = 0.12$ ,  $p > .05$ . Similarly, there were no significant differences in proportions of problem gamblers for age,  $\chi^2(3, N = 165) = 3.31$ , or

ethnicity,  $\chi^2(3, N = 165) = 1.83$ ,  $ps > .05$ .

In answer to the question if they thought that either of their parents gambled excessively, 36 of the participants circled *yes* and 114 circled *no*. A significantly greater proportion of problem gamblers thought that their parents gambled excessively (44%) compared with non-problem gamblers (20%),  $\chi^2(1, N = 150) = 6.58$ ,  $p = .01$ . Similarly, a significantly greater proportion of problem gamblers (73%) spent more than \$10 per bet in the last 12 months than non-problem gamblers (7%),  $\chi^2(1, N = 161) = 21.74$ ,  $p < .001$ .

Further, proportionately more problem gamblers (64%) engaged in the continuous gambling activities of scratch tickets, gaming machines, track betting, card games, and casinos, than non-problem gamblers (24%),  $\chi^2(1, N = 110) = 12.83$ ,  $p < .001$ . Playing on gaming machines was by far their most favourite activity compared with non-problem gamblers (60% versus 16%, respectively),  $\chi^2(1, N = 107) = 19.42$ ,  $p < .001$ . Table 2 shows that compared to non-problem gamblers, problem gamblers had significantly higher mean scores on gambling frequency, number of activities, depression, and addiction,  $F(4, 157) = 4.91$ ,  $p < .001$ .

For the 101 gamblers with complete sets of data, logistic regression (Walsh & Ollenburger, 2001) was computed to ascertain the unique contribution of each of the relevant variables related to the SOGS-R classification of problem and non-problem gamblers, while controlling for the other variables in the model (Kerlinger & Lee, 2000). Depression was omitted from the analysis because of its collinearity with Addiction. The results appear in Table 3. Amount gambled, continuous gambling, parents' gambling and Addiction were significant predictors in discriminating between problem and non-problem gamblers. The Wald statistic is used to test for the significance of each predictor in the model. The Hosmer-Lemeshow goodness-

Table 2: Means and Standard Deviations for Gambling Frequency, Number of Activities, Depression, and Addiction of Non-Problem and Problem Gamblers

Variable <sup>a</sup>		Non-Problem	Problem	F
		Gamblers n = 137	Gamblers n = 25	
Gambling frequency	M	4.59	9.36	8.98**
	SD	5.60	3.43	
Number of activities	M	6.47	8.08	8.99**
	SD	2.56	1.82	
Depression	M	44.76	50.12	6.87**
	SD	9.05	11.22	
Addiction	M	11.31	13.96	7.60**
	SD	4.56	3.57	

\*\* $p < .01$

Note: <sup>a</sup>Means reported are raw score means. Because the distribution of raw scores for gambling frequency was positively skewed, before statistical analysis the scores were transformed logarithmically to the base 10 to approximate a normal distribution.

Table 3: Logistic Regression: The Effects of Gambling Frequency, Number of Activities, Amount Gambled, Continuous Gambling, Parents' Gambling and Addiction on Distinction Between Current Problem and Non-Problem Gamblers

Variable	B	S.E.	Wald	Odds Ratio	Confidence Intervals
Gambling frequency <sup>a</sup>	0.18	0.90	0.04	1.19	(0.20, 6.99)
Number of activities	0.09	0.15	0.40	1.10	(0.82, 1.47)
Amount gambled	1.57	0.70	4.96*	4.79	(1.21, 19.01)
Continuous gambling	-1.65	0.70	5.59*	5.21	(0.05, 0.75)
Parents' gambling	-1.68	0.73	5.34*	5.35	(0.05, 0.78)
Addiction	0.15	0.08	4.08*	1.17	(1.01, 1.36)
Constant	-0.91	1.90	0.23	2.48	

$R^2 = .292$  \* $p < .05$

Note: <sup>a</sup> Because the distribution of raw scores for gambling frequency was positively skewed, before statistical analysis the scores were transformed logarithmically to the base 10 to approximate a normal distribution.

of-fit test was not significant,  $\chi^2(8, N = 101) = 5.69, p = .68$ , indicating that there was an adequate fit to a perfect model (Tabachnick & Fidell, 1996). Overall, 87% of the gamblers were correctly classified.

The odds ratios of 5.21 and 5.35 for continuous gambling and parents' gambling, respectively, indicate that students who engaged in continuous gambling or thought that their parents gambled excessively, were more than five times as likely to be problem gamblers as those who gambled non-continuously or who did not think that their parents gambled excessively. Participants who gambled more than \$10 were more than four times (4.79) at risk of being problem gamblers than those who gambled \$10 or less. For Addiction, with every one point increase in score (out of 32), there was a 17% increase in odds of being classified as a problem gambler.

## Discussion

The university students had gambling preferences similar to the representative national participants, except for gambling in casinos, card games, scratch tickets and gaming machines. More than twice as many gambled on four or more activities as the national sample, perhaps because of the greater choice and ready availability of gambling activities in the Auckland region (Abbott & Volberg, 2000). As in the earlier study (Clarke & Rossen, 2000), many of them were underage when they gambled illegally in casinos.

Much of their lifetime gambling preferences was similar to those of 1017 young people in Melbourne, Australia (Moore & Ohtsuka, 1997). However, more of them purchased lottery tickets than the Australians (74% versus 48%), played gaming machines (82% versus 43%), and gambled in casinos (47% versus 32%). Compared with university students in North America, the lifetime prevalence of lottery gambling (74%) was higher than that for Oregon students (31%; Browne & Brown, 1994), and the prevalence averaged across five American States (46%; Lesieur et al., 1991) including New York (69%) and New Jersey (66%). On any activity, 97% of the present sample, 87% of the national participants, 85% of the five United States' groups,

and 90% of the students in a Canadian survey (Ladouceur et al., 1994) had gambled at least once. It would thus seem that the prevalence of gambling among the students in the present sample was greater than that among overseas students. However, because the prevalence of gambling is on the increase in general populations with the increasing availability of gambling activities (Abbott, 2001; Sullivan, 1994a), it would be expected that North American students' current involvement in gambling would be comparable to that of university students in the present sample.

### *Problem Gamblers versus Non-problem Gamblers*

Compared with six-month problem gambling rates among general populations in New Zealand (1.3%), and in Australia, the United States of America, Canada and Sweden, ranging from 1.2 to 6.6 percent of the populations (Abbott & Volberg, 1999), the rate of 16% in the university sample was extremely high, even when taking into consideration that the SOGS-R measured problems over a twelve-month period. Higher levels of education are usually associated with lower rates of problem gambling (Abbott & Volberg, 1991; Browne & Brown, 1994; Reid & Searle, 1996). Yet more than four times as many gamblers in the present study were classified as problem gamblers, as compared to representative general population samples in New Zealand and in some other countries, rates comparable to representative samples overseas which included lower educated, troubled and disadvantaged youth (Fisher, 1993; Winters et al., 1995). Like substance abuse, however, over time gambling problems usually decrease (Abbott & Volberg, 2000; Buchta, 1995; Ladouceur et al., 1994; Winters et al., 1993).

All of the hypotheses were supported. As expected, there were significant differences between the problem and non-problem gamblers. The findings were very similar to findings with university students in other countries, indicating that similar variables are operating among New Zealand university students. Converging with previous research in the United States (Browne & Brown, 1994), Canada (Ladouceur et al., 1997), Australia (Steel &

Blaszczynski, 1996) and Europe (Hendriks et al, 1997), compared to non-problem gamblers, the problem student gamblers in the present New Zealand sample spent more money on gambling, gambled more frequently and on more activities, were more involved in continuous gambling activities, were more likely to consider that their parents gambled excessively, were more depressed and were stronger on the addictive personality trait.

#### *Problem Gambling and the Addictive Personality*

The present study provided some limited support for the possibility of an addictive personality trait in problem gambling. However, it would be only one part of a complex, integrated conceptualisation of problem gambling involving biological, psychological and ecological factors (Blaszczynski & Nower, 2002; Slutske et al., 2001). Blaszczynski and Nower (2002) have proposed an integrated pathways model of problem gambling, based on an extensive review of the literature and empirical research. The pathway to problem gambling begins with ecological factors such as availability and accessibility of gambling activities which are socially accepted, encouraged and promoted. It then continues via classical and operant conditioning with concomitant cognitive schemas of irrational beliefs and illusion of control, resulting in habituation, chasing and unexpected losses, to problem gambling symptoms. While drug addicts are consistently reinforced for their drug-taking behaviour, gamblers' steps to addiction are reinforced intermittently and randomly. The gamblers in this group may initially gamble for entertainment or socialization and have the least symptoms.

Another group follows the same path, except that before getting involved in gambling and associated conditioning, they are biologically and emotionally at risk for problem behaviours. Biologically, receptor genes and neurotransmitters are linked to reward deficiency, arousal levels, impulsivity and pathological gambling (Blum et al., 1996; cited in Blaszczynski & Nower, 2002). Eysenck (1997) suggested that addiction may have a biological or genetic basis. Others (Blanco et al., 1996; Shaffer, 1996) also indicated that changes in neurochemistry are involved in addictive gambling. Emotional vulnerability arises from childhood disturbances, boredom proneness, depression and/or anxiety due to biological and psychosocial deficiencies, and poor coping and problem-solving skills. This group escapes unpleasant physiological states by choosing monotonous gambling activities such as gaming machines to dissociate from their feelings, or by seeking stimulating activities such as increasing bets on horse racing and sports events. They are less likely to change than the first group because of their underlying biological and psychological predispositions toward emotional disturbances. It is this group that may be high on the addiction trait, due to predisposing biological and psychosocial conditions which could lead to various addictive behaviours.

Although the Eysencks' Addiction scale consists of items which do not refer to addiction at all, it seems to be useful for measuring a trait that is present in addiction to drugs and gambling. With further research, it might be

applied to other addictions such as shopping, food or sex.

#### *Limitations*

Because the sample consisted of psychology undergraduates, it was not representative of the university students in New Zealand. The findings have been based on data collected from a non-representative sample of well-educated and predominantly female, European New Zealanders living in a large city. Most came from families with average or above average socio-economic status. There were disproportionately fewer Maori (8%) in the sample than in the New Zealand population. Some students may have selected psychology to understand personal problems, including those associated with problem gambling.

Although Addiction contributed significantly to the classification of problem gamblers, the results need to be treated with caution. First, the internal consistency of the Addiction scale was satisfactory, but marginal (.69). Secondly, the size of the problem group was small, resulting in very large confidence intervals. With 95% confidence, the 17% increase in odds of being a problem gambler with each of 32 Addiction points falls between 1% and 36%. Thirdly, the logistic regression did not include interaction effects or demographic variables due to the small number of problem gamblers in the sample. Abbott and Volberg (2000) reported that logistic regression analysis of demographic data from a large, representative Australian national survey revealed that only age, marital status and city living were predictors of problem gambling. Gender, income and education were not significant predictors. The predictors may also be different for different gambling activities (Dickerson, 1993).

The present survey did not examine the prevalence of Internet gambling in the sample. Some authors (e.g., Griffiths & Parke, 2002) have expressed concern that Internet gambling may be conducive to problem gambling, especially for people prone to gambling addiction (Shaffer, 1996). Ladd and Petry (2002) found that among American 389 medical and dental patients treated at university clinics, the 32 Internet gamblers were more likely to be younger, non-Caucasian and have higher SOGS scores than the 367 non-Internet gamblers.

#### *Applications*

Some suggestions offered by Winters et al. (1995) to minimize the effects of gambling on youth could be applied to New Zealand. Families and whanau of adolescents and children at risk of becoming problem gamblers need to be educated about their modelling role and the need for safe and non-addictive gambling rules in their homes. Because the risk factors for problem gambling and substance abuse are very similar, education about both and sources for help could be integrated into school programmes, beginning at the primary level, to target the groups who are at risk. Gupta and Derevensky (1998) suggested that education programmes targeting at-risk substance abusers should also include gambling, and that building self-esteem, treating depression, and family interventions could make efficient use of professional resources.

In the recent national survey (Amey, 2001), many people stated that they would play "less" or "much less" if gaming activities had warnings about problem gambling on or with the activities. Like cigarette packages, gaming activities should have warnings attached to them, so that perhaps the level of involvement might be reduced. Although none of them met the criteria for problem gambling, 25 of the students were underage when they had gambled in New Zealand casinos. Therefore, in addition to warnings, underage gambling laws regarding casino entry, sales of lottery tickets and other regulated gambling sources, need to be strictly enforced.

Some of the treatment programmes for pathological gamblers (e.g., Ladouceur et al., 2002; Sullivan, 1994b) include elements borrowed from the Alcoholics Anonymous programme, such as group confessions and the "buddy" system. Problem gamblers have been successfully treated with alcoholics and substance abusers (Murray, 1993), thus lending support to the concept of an addictive personality trait.

## Conclusions

The extent of gambling and problem gambling in the present sample of highly educated, mostly female students was unexpected. In contrast to North American findings in which young urban college males are at risk of being problem gamblers, the present results show that even young urban females in university may be at risk too. Gaming machines are particularly attractive to problem gamblers. In this unrepresentative sample, except for differences between sociodemographic groups, the differences between problem gamblers and non-problem gamblers on all of the relevant variables were significant, confirming results from other investigations. Even when the contribution of these variables in the classification of problem and non-problem gamblers was controlled, there was some evidence that the trait of addiction seems to be involved in problem gambling as it may be for other addictive behaviours. For most of the students, however, problem gambling symptoms will probably decrease with maturity. A minority will continue to become pathological gamblers.

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