FINAL REPORT

Prevention of Problem Gambling:
A School-Based Intervention

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EXECUTIVE SUMMARY

The current generation of North American youth are the first to have been raised in an environment of extensive legalized and government-sanctioned gambling. Perhaps as a consequence, the prevalence of problem gambling in North America is highest in adolescents and young adults. Campaigns to increase community awareness of problem gambling have been undertaken in several jurisdictions. However, systematic school-based programs are lacking, and the few published evaluations of these programs have obtained equivocal results.

The purpose of the present research was to design, implement, and evaluate a school-based prevention program in an attempt to prevent problem gambling. The nature and content of the curriculum was derived from existing programs and a careful study of what was known to be effective in other primary prevention programs. The end result was a 5 session program that contained the following elements:

1. Information concerning the nature of gambling and problem gambling.
2. Exercises to make students less susceptible to the cognitive errors often underlying gambling fallacies.
3. Information on the true odds involved in gambling activities and exercises on how to calculate these odds.
4. Teaching and rehearsal of generic decision-making and social problem-solving skills.
5. Teaching and rehearsal of adaptive coping skills.

The format of the program was as important as the content. Important elements of the format included:

1. An entertaining and engaging delivery. All lessons were highly interactive and involved group discussions, games, and small group exercises.
2. A strong emphasis on skill learning and application of knowledge.
3. Targeting the social environment of the people receiving the intervention. At one site this was accomplished by placing 'problem gambling' posters around the school and ensuring that all students in grade 10 received the program by the end of the school year

Implementation of the program occurred in the September 2001 to June 2002 school year. Two different sites were chosen, the Calgary high school system and Aboriginal high schools in southern Alberta. Each site had a randomly chosen school that received the intervention and a control school that did not. In Calgary, the program was delivered by a graduate student. In the Aboriginal school the program was delivered by a qualified teacher and specialist in the Blackfoot language and culture. The program was contained in the Career and Life Management Class (CALM) for both intervention schools. In Calgary it was primarily grade 10 students who took the CALM course, whereas in the Aboriginal school there was a wider grade range (9 – 12). The assessment questionnaire was administered prior to the intervention (Baseline); one week after the intervention (Post-Intervention); and three months after the intervention (3 Month Post-Intervention).

Low enrolments and poor attendance did not permit analysis of the results from the Aboriginal site. At the Calgary site, relative to Baseline and individuals in the Control group, adolescents in the Experimental group demonstrated:

1. Significantly better knowledge of gambling at Post-Intervention and 3 Months Post-Intervention.
2. Significantly more negative attitudes toward gambling at Post-Intervention and 3 Months Post-Intervention.
3. Significantly fewer cognitive errors at Post-Intervention and 3 Months Post-Intervention.
4. Significantly better ability to calculate gambling odds at Post-Intervention, although this advantage was not significantly different from the Control group at 3 Months Post-Intervention.
5. Significant decreases in the frequency of gambling at 3 Months Post-Intervention relative to Baseline, but not to the Control group.
6. Nonsignificant decreases in the amount of time spent gambling at 3 Months Post-Intervention.
7. Significant decreases in the amount of money spent gambling at 3 Months Post-Intervention relative to Baseline. Decreases relative to the Control group were close to significance ($p = .06$).

The robust and enduring changes in attitudes toward gambling, knowledge about gambling, and cognitive errors associated with gambling were expected effects of the program. The failure to obtain enduring changes in the ability to calculate gambling odds suggests that this aspect of the program did not receive sufficient emphasis. The changes in gambling behaviour that occurred were not necessarily anticipated, as this program was advocating responsible gambling, not abstinence. Almost all adolescents in the study were gambling at nonproblem levels before the intervention and almost all adolescents continued to be gambling at nonproblem levels after the intervention. The true test of this program's effectiveness concerns its impact on the future incidence of problem gambling among students who received the program compared to students who did not. It is anticipated that the robust and enduring changes in the knowledge, attitudes and errors in thinking achieved in the Experimental group should successfully inoculate many of these adolescents from becoming future problem gamblers. The decreases in gambling behaviour that were obtained should further strengthen this effect. However, a longer term follow-up of these students is necessary to evaluate this hypothesis.

INTRODUCTION

Even though it has only been 30 years since the first lotteries were introduced, there are now over 50 permanent casinos, 21,000 slot machines, 38,000 video lottery terminals, 20,000 annual bingo events, and 44 permanent horse race tracks in Canada (Canada West Foundation, 2000). Alberta has the distinction of having the widest array of gaming entertainment options available to its citizenry of any jurisdiction in North America (Wynne, 2000).

The impact of the extensive availability, advertising and sanctioning of legalized gambling is of concern in the fields of public health and addictions. Among adults, the prevalence of disordered gambling has increased significantly from 1977 to 1993 (Shaffer, Hall & VanderBilt, 1997). It is estimated that 3.9% of adults in North America currently meet criteria for problem or pathological gambling in the past year (Shaffer et al., 1997). In Alberta, the most recent data using the newly developed Canadian Problem Gambling Index suggests that roughly 1.3% of adult Albertans currently are problem gamblers and another 3.9% are moderate risk gamblers (Smith & Wynne, 2002).

Of even greater concern is the impact on the current generation of Canadian adolescents, as they are the first to have been raised in an environment of extensive legalized and government-sanctioned gambling. An analogous situation may be the sudden wide availability and acceptability of illicit drug use in the late 1960s and 1970s, resulting in youth and young adults from this period having the highest prevalence rates of substance use since records have been kept (U.S. Department of Health & Human Services, 1998). A recent meta-analysis of prevalence studies in the United States and Canada estimated the prevalence of both clinical and sub-clinical disordered gambling to be significantly higher among adolescents than adults (Shaffer et al., 1997). In a random telephone survey of over 1000 Iowa residents stratified into eight age cohorts (ranging from 18 to 85+) it was found, even after controlling for other variables, that gambling prevalence was strongly related to the age of the cohort, with the older cohorts having the lowest prevalence and the youngest cohorts having the highest (Mok & Hraba, 1991). Recent provincial surveys in Quebec, Atlantic Provinces, Ontario, Manitoba and Alberta have found the prevalence of problem gambling in adolescents to range from 3% to 8% (Alberta reporting the 8%) (Hardoon, Gupta & Derevensky, 2002; Ladouceur, Bourdreault, Jacques & Vitaro, 1999; Poulin, 2000; Wiebe, 1999; Wynne, Smith & Jacobs, 1996).

Prevention efforts targeting young people make sense from a public health perspective because gambling typically begins early. Evidence from North American studies indicates that the average age of onset of gambling behaviour is about 11 (Gupta & Derevensky, 1998b; Westphal, Rush, Stevens, & Johnson, 2000), with earlier ages for adolescent problem gamblers (Wynne et al., 1996). Today's youth are relatively well informed about the risks of smoking, using drugs, and experimenting with sex, but many have yet to see that gambling has its own risks. Gambling has deep cultural roots and exists today as a widely available and socially accepted recreational activity. A recent study of Canadian gambling attitudes and behaviour indicated that, in 1999, 72% of Canadians gambled in the past year (87.4% of Albertans) and 63% feel that, on the whole, gambling is an acceptable activity in their province (Canada West

Foundation, 2000). Further compounding the problem is that gaming revenue is often directed at well-publicized charitable initiatives, lending support to the notion that gambling is a beneficial activity. In this social climate, students need to be shown the other, less glamorous side of gambling – that the odds cannot be beaten, and that gambling can sometimes become so consuming that it can devastate a person's life.

Efforts to prevent problem gambling have recently been undertaken. Here in Alberta, the Alberta Alcohol and Drug Abuse Commission has produced brochures and educational materials designed to increase the public's awareness of problem gambling and the available treatment resources. Initiatives include an adolescent gambling high school presentation kit and videos on gambling for high school students ("A Gambler's Nightmare…How Gambling Abuse Affects the Family"; "Teens Talking About Gambling"; "Playing With Fire"). AADAC staff also provides a presentation on problem gambling to any school or organization that requests it. Similar initiatives are taking place in other provinces.

As laudable as these efforts are, they are insufficient to significantly impact the incidence of problem gambling due to their short duration (i.e., 1-session presentations) and their focus primarily on increasing people's awareness and knowledge. While knowledge is a necessary antecedent to changing or preventing pathological behaviour, it is often not sufficient on its own (Williams & Gloster, 1999). A consistent finding in the field of primary prevention is that programs are fairly effective at changing people's knowledge, but much less effective at changing behaviour (Durkal & Wells, 1997; Foxcroft, Lister-Sharp, & Lowe, 1997; Franklin, Grant, Corcoran, Miller, & Bultman, 1997; Mazza, 1997; Rooney & Murray, 1996; Tobler, 1992). Prevention programs that are able to produce both knowledge and behavioural changes are usually those that also repeatedly teach and rehearse specific skills relevant to the problem (e.g., peer-refusal skills for substance use) (Ellickson & Bell, 1990; Tobler, 1992; Tobler et al., 2000; Wilson, Gottfredson & Najaka, 2001).

There is a clear need for more substantive interventions. In recognition of this, some jurisdictions have recently begun introducing gambling prevention programs into the school curriculum. Examples of this are "Don't Bet On It" in South Australia for ages 6 to 9; "Gambling: Minimising Health Risks" in Queensland for grades 5; "Facing the Odds" in Louisiana for grades 5 to 8; and "Kids Don't Gamble…Wanna Bet" in Minnesota for grades 3 to 8 and "Count me Out" in Quebec for ages 8-17.

To date, however, there has been no published evaluation of these programs. In fact, the literature only contains one published evaluation of a gambling prevention program, by Gaboury and Ladouceur (1993) who evaluated a 3-session program in Quebec that was based on an alcohol prevention model. It covered an overview of gambling, discussion of legal issues, how the gambling industry manipulates the chances of winning, beliefs and myths about gambling, and the development of pathological gambling. A sample of 289 juniors and seniors from 5 high schools completed the program. Whereas the evaluation showed that the students did learn about gambling and coping skills, what they learned did not significantly influence their gambling attitudes or behaviour six months later.

A more recent study by Ferland, Ladouceur & Jacques (2000) also obtained mixed results. This program targeted 1207 youths in grades 8, 9 and 10 in Quebec, with half receiving three "interactive meetings" and the other half acting as the control group. The program provided information on knowledge and misconceptions toward gambling activities; social problem solving; and excessive gambling. Results at three months post-intervention indicated that the program produced a significant improvement in knowledge about gambling (e.g., "lottery is a gambling activity") and decrease in gambling misconceptions (e.g., "when I play bingo I have more chance to win if I bring lucky charms"). However, there was no improvement in social problem solving ability, a skill thought to be lacking in individuals at risk for problem gambling. The impact of the program on actual problem gambling behaviour is unknown, as this was not assessed.

To summarize: very few school-based prevention programs exist; very few of these have been evaluated; and the two programs that have been evaluated have not obtained any meaningful behavioural change. Needless to say, it is essential that school-based programs be put in place and that these initiatives be rigorously evaluated. It is important to avoid the situation found in the substance abuse area, where the most commonly used (and entrenched) interventions tend to be the less effective ones (Miller et al.,1995; Tobler, 1992).

METHOD

Program Development

Development of the program occurred between January 2001 and August 2001 and was primarily the task of Meghan Davis, a graduate student in the Medical Science program at the University of Calgary (Dr. Williams as her supervisor). The nature and content of the curriculum was derived from existing programs and a careful study of what was known to be effective in other primary prevention programs (Capuzzi et al., 2000; Durlak, 1997; Durkal & Wells, 1997; Lipsey & Wilson, 1993; Mullen et al., 1997; Weissberg & Gullotta, 1997). As much as possible, there was also incorporation of what was known about effective educational strategies in the schools (e.g., Borich, 1995; Elliot, Kratochwill, & Cook, 1999; Hunt, Touzel, & Wiseman,1999). The end result was a program that contained the following elements:

1. *Information concerning the nature of gambling and problem gambling* (prevalence, signs and symptoms of problem gambling, factors that contribute to the development of problem gambling, consequences of problem gambling, where to get help).
2. *Exercises to make students less susceptible to the cognitive errors* that often underlie gambling fallacies (e.g., illusory beliefs of control, beliefs of superior predictive power, misunderstandings of randomness, selective memory for events, denial of their gambling situation, and superstitious beliefs/conditioning) (Moore & Ohtsuka, 1999; Toneatto et al., 1997).
3. *Information on the true odds involved in most gambling activities* (i.e., house advantage for all games, actual odds of winning the lottery, etc.) and *exercises on how to calculate the odds* involved in certain games (cards, dice, roulette, VLTs).
4. *Teaching and rehearsal of decision making and social problem-solving skills.* For adolescents, gambling activities are typically social in nature, such as playing cards for money, betting against friends on a sporting event, etc (Gupta & Derevensky, 1998a; Hardoon & Derevensky, 2001). Successful treatment of adolescent substance abuse usually requires addressing issues of peer pressure and peer group activities (Williams & Chang, 2000). It is almost certain that the same holds true for problem gambling. There is also good evidence that problem gambling is typically part of a pattern of high-risk behaviours characterized by core deficits in decision-making and problem solving skills (Dickson, Derevensky, & Gupta, 2002).
5. *Teaching and rehearsal of adaptive coping skills.* Gambling serves a function for many problem gamblers as evidenced by its strong association with substance abuse, depression, impulsivity, risk-taking, and the tendency to dissociate during gambling (Crockford & el-Guebaly, 1998; National Research Council, 1999; Gupta & Derevensky, 1998b; Stinchfield & Winters, 1998; Vitaro, Areseneault, & Tremblay, 1997; Volberg, 2002). Training alternate methods of dealing with problems was included so as to decrease the tendency to resort to gambling as an escape.

The format of the program was as important as the content. Important elements of the format included:

1. An *entertaining and engaging delivery.* There was a strong reliance on visual elements (e.g., video on problem gambling) and all lessons were presented via PowerPoint. The

person delivering the program had a dynamic style. All lessons were highly interactive requiring the active participation of all students in group discussions, games, and small group exercises.

2. A *strong emphasis on skill learning and application of knowledge*. Changing behaviour continues to be the most difficult task of gambling prevention programs. The potential to actually produce behavioural change is enhanced when the knowledge learned is put into practise and corrective feedback provided.

3. A *5 consecutive session program, with each session lasting 80 minutes*. This is two sessions longer than was used in the Quebec programs. Knowledge and skills are almost always better learned and retained with additional practice.

4. A program that also *targeted the social environment of the people receiving the intervention*. The impact of individual skill development is limited unless there are also environmental changes that decrease the opportunities, acceptability, and pressure to participate in gambling activities. This is especially true of the more socially oriented types of gambling engaged in by adolescents. At one site this was accomplished by ensuring every grade 10 student in the intervention school received the program, as the primary peer group of grade 10 students are other grade 10 students in the same school. In addition, several posters were placed thoughout the hallways of this school to raise awareness of problem gambling. At the other site this was accomplished by making the school program coincident with a more general community awareness program (involving the media, meetings with parents, etc.). The greater effectiveness of these more pervasive approaches has been demonstrated both in primary prevention (Durlak & Wells, 1997; Ellickson & Bell, 1990; Sowden & Arblaster, 2002; Tobler, 1992) and in the treatment of addictive behaviours (e.g., community reinforcement approach, Miller et al., 1995); Studies have also found that prevention programs operating from a model of community empowerment show good potential for success on Aboriginal reserves (Cheadle et al., 1995; Petoskey, Van Steele, & De Jong, 1998; Wallerstein & Sanchez-Merki, 1994).

Assessment Questionnaire

The lack of established assessment instruments also necessitated the development of a questionnaire to assess the impact of the program (Appendix A). It assessed five areas:

1. *Awareness and knowledge of gambling and problem gambling*.
2. *Attitudes toward gambling*.
3. *Susceptibility to cognitive errors underlying gambling fallacies* (some of these items drawn from the work of Moore and Ohtsuka (1999) and Ferland, Ladouceur, and Jacques (2000)).
4. *Ability to recognize and calculate true gambling odds*.
5. *Coping and Problem Solving Skills* (as measured by the adolescent modification of the Ways of Coping Checklist, Halstead et al. (1993)).
6. *Gambling Behaviour* (frequency, time, and money spent gambling, adapted from section 1 of the Canadian Problem Gambling Index; and the DSM-IV-Multiple Response-Juvenile (Fisher, 2000) to measure problem gambling).

Two Implementation Sites

Implementation of the program occurred in the September 2001 to June 2002 school year. Two different sites were chosen, the Calgary high school system and Aboriginal high schools in southern Alberta. Each site had a randomly chosen school that received the intervention and a control school that did not. Dr. Robert Williams was the coordinator of the Calgary site and Dr. Virginia McGowan (School of Health Sciences, University of Lethbridge) was the coordinator of the Aboriginal site. In Calgary, the program was delivered by a graduate student (Meghan Davis) who also made this project her Master's thesis in the Medical Science Program at the University of Calgary. In the Aboriginal school the program was delivered by a qualified teacher and specialist in the Blackfoot language and culture, who was also a Blackfoot Elder. This individual along with Dr. McGowan also made some adaptations to the curriculum to make it more appropriate for the Blackfoot culture. For example, there was greater emphasis given to strengthening resilience, developing gambling-incompatible activities, and involvement of the community and families. Many of the curriculum examples were also different because of differences in gambling activities (e.g., bingo much more common on reserves).

The program was contained in the Career and Life Management Class (CALM) for both intervention schools. In Alberta, all senior high school students (grades 10 – 12) are required to take CALM at some point before graduating. In Calgary it was primarily grade 10 students who took the CALM course, whereas in the Aboriginal school (Siksika Nation High School) there was a wider grade range (9 – 12).

Procedure

The assessment questionnaire was administered prior to the intervention (Baseline); one week after the intervention (Post-Intervention); and three months after the intervention (3 Month Post-Intervention). In order to ensure honesty and accuracy of responses, the questionnaires were made anonymous. Matching of the questionnaires from the three time points was achieved by matching their mother's first name, the last two digits of their phone number, their grade, their school, and their date of birth.

Prior to administration of the Baseline Questionnaire students were informed they were going to fill out a questionnaire which assessed their knowledge, attitudes and gambling behaviors to evaluate the "gambling presentation" they were about to participate in for the remainder of that week. It was emphasized that the questionnaire was anonymous and the only individual who would be viewing it was the presenter. It was then explained that for completing this questionnaire and two subsequent questionnaires they would receive $10. However, in order for them to fill out the second and third questionnaire they needed to have their parental consent forms turned in. At this point the parental consent forms were administered to all students whose parents had not already submitted the form.

The Post-Intervention Questionnaire was administered on the Monday following the week-long intervention. For the 3-month Follow-Up Questionnaire, students were informed by

means of daily announcements and posters placed throughout the school that they could receive $10 by completing the 3-Month Follow-up Questionnaire in an assigned classroom during one of four consecutive lunch hours.

In the Control School all grade 10 students were called out of classes to an assembly where the goals of the program were described. They were told their school had been designated as the Control School that they would be administered the questionnaires, but not receive the curriculum. That same day during each of the student's respective classes the Baseline Questionnaire was administered. The following Friday the students underwent an extended tutorial assistant period where students who had handed in their parental consent forms filled out the Post-Intervention Questionnaire. Three months later these same students were administered the 3-Month Follow-up Questionnaire and received their ten dollar reward for their participation.

Research Questions & Hypotheses

1. Will the prevention program positively change adolescents' knowledge of gambling and problem gambling? It was hypothesized that the knowledge in the Experimental School would be significantly better at both Post-Intervention and 3-month Follow-Up relative to both the Control School and Baseline.
2. Will the prevention program change adolescents' attitudes towards gambling? It was hypothesized that the attitudes in the Experimental School would be significantly more negative at both Post-Intervention and 3-month Follow-Up relative to both the Control School and Baseline.
3. Will the prevention program decrease the cognitive errors typically made by gamblers? It was hypothesized that cognitive errors in the Experimental School would be significantly decreased at both Post-Intervention and 3-month Follow-Up relative to both the Control School and Baseline.
4. Will the prevention program increase students' ability to calculate gambling related odds? It was hypothesized that the ability to calculate gambling related odds in the Experimental School would be significantly improved at both Post-Intervention and 3-month Follow-Up relative to both the Control School and Baseline.
5. Will the prevention program increase students' coping skills. It was hypothesized that coping skills in the Experimental School would be significantly improved at both Post-Intervention and 3-month Follow-Up relative to both the Control School and Baseline.
6. Will the prevention program reduce the actual frequency, time spent and money spent gambling at 3-month Follow-Up? Considering that the program was advocating responsible gambling rather than abstinence and that only a very small percentage of students would be gambling at problem levels, it was hypothesized that there would be no significant change in the frequency, time spent and money spent gambling in the Experimental School at 3-month Follow-Up relative to both the Control School and Baseline.

Ethical Considerations

Ethics approval was obtained from the University of Calgary, the University of Lethbridge and the respective school districts. Parental consent forms were mailed out in June 2001to all grade 10 students expected to be attending the Experimental and Control Schools in Calgary in September 2001. Consent forms were re-distributed at Session 1 to students for whom parental consent had not yet been received. Parental consent was only sought for participation in completion of the questionnaires. Consent was not sought for participation in the curriculum, as the curriculum was consistent with the usual intent of the Well-Being section of CALM.

RESULTS (ABORIGINAL SITE)

It was originally anticipated that upwards of 380 students would be available to participate in the designated Experimental and Control Schools. However, approval for the program to be delivered in the Kanai High School in Standoff was not obtained. Approval was subsequently obtained for the Siksika Nation High School in Siksika to serve as the Experimental School and the Piikani High School in Brocket to serve as the Control School. The adapted curriculum was implemented at Siksika Nation High School in a CALM class during the final week of November 2001. The Baseline and Post-Intervention questionnaires were administered in both the Experimental and Control Schools according to the study protocol. The 3-month Follow-Up questionnaire was administered in March 2002. Unfortunately, due to low enrolments and poor attendance, only 12 questionnaires were collected from the Experimental School and 10 from the Control School. Various problems prevented a second administration of the curriculum.

RESULTS (CALGARY SITE)

Sample

There were a total of 735 students registered in the Career and Life Management Class in September 2001, and thus, potentially eligible for participation: 424 in the Experimental School and 311 in the Control School. However, to be included in the study, students in the Experimental School needed to be present when the Baseline Questionnaire was administered, which was session 1 (or session 2 for students not present at session 1). There were 53 students from the Experimental School who were thus excluded, leaving 371 students. For students in the Control School to be included in the study they had to be present the day the Baseline Questionnaire was administered. There were 85 students absent that day, leaving 226 students in the Control School group. Thus, a total of 597 students filled out the Baseline Questionnaire.

Parental consent was required in order for the completed questionnaires to be included in the analysis. Seventy-nine percent of students (469/597) provided parental consent: 86% of students in the Experimental School (320/371) and 67% of students in the Control School (149/271). Table 1 shows the demographic characteristics of the total sample. The mean age of the students was 15.4 ($SD = .76$) ranging from 14 to 19 years of age. Fifty one percent were male. The Control School sample consisted exclusively of a tenth grade cohort. The Experimental School was composed primarily of grade 10 students, but also included some grade 11 and 12 students.

Table 1

Sample Characteristics of Students Providing Parental Consent

Variable	*n*	%
Gender		
Male	233	51.5
Female	219	48.5
Age		
14	9	2
15	295	65.6
16	116	25.8
17	17	3.8
18	10	2.2
19	3	0.7
Grade		
10	398	87.9
11	45	9.9
12	10	2.2

Ninety-seven percent of the students (454/469) who provided parental consents also completed the Posttest Questionnaires one week following the intervention: 95% of students in the Experimental School (305/320) and 100% of students in the Control School (149/149). However, 15 Posttest Questionnaires could not be matched to the Baseline Questionnaires, and were eliminated from the analysis, leaving 439 students in total.

The 3 month Follow-Up data was only available for the first three-quarters of students who participated in the program (data from this last quarter has just recently been collected, but is not available for this report). Of the 383 students available from the first three-quarters, 74% provided data at 3-month Follow-Up: 176/234 (75%) from the Experimental School and 106/149 (71%) from the Control School.

Analysis of Multivariate Parametric Assumptions & Data Pre-screening

Prior to analysis, all variables were examined for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate parametric analysis. When missing values comprised less than 5% of the total data set for that variable then values were imputed using SPSS Linear Trend at Point. This occurred for the following variables: age, grade, math grade, largest amount of money won gambling, parental gambling, depression, gambling frequency, amount of time spent gambling, amount of money won and spent gambling, attitudes, knowledge, cognitive errors, knowledge and calculation of gambling-related odds. There were no cases identified to be outliers through examination of frequency distributions and Mahalanobis distances with $p < 0.01$.

The individual variables were screened for normality through significance tests of skewness and kurtosis. Logarithmic transformations were applied to the strongly skewed

variables: grade, gambling frequency, time spent gambling, and amount of money won and spent gambling. Square root transformations were applied to the moderately skewed variables: cognitive errors, and calculation of gambling-related odds.

Analysis of Baseline Differences and Effects of Attrition

Table 2 offers a comparison of characteristics between experimental and control conditions at baseline. A multivariate analysis of variance (MANOVA) investigated whether the Experimental and Control groups differed at baseline on the following variables: gender, age, last year's math grade, risk-taking, impulsivity, delinquency, cigarette smoking, depression, parental gambling, frequency of gambling, time spent gambling, money spent gambling, attitudes toward gambling, knowledge about gambling, calculation of gambling-related odds, and gambling-related cognitive errors. There was a significant multivariate main effect for group, λ = .87, F (17, 436) = .4.38, $p < .01$, indicating the Experimental and Control School differed significantly on the baseline measures.

Therefore, a series of post-hoc GLM ANOVA's were conducted to examine the differences in the Experimental and Control Schools on the baseline variables. There were no significant differences between the Experimental and Control Schools on gender, age, risk-taking, impulsivity, delinquency, cigarette smoking, parental gambling, depression, frequency of gambling, time and money spent gambling, attitudes, knowledge, and cognitive errors. However, there were significant differences across conditions on baseline measures of grade (higher in the Experimental School) $F(1, 452) = 29.53$, $p < 0.01$, final reported grade in math the previous year (higher in the Control School), $F(1, 452) = 19.14$, $p < 0.01$, ability to calculate gambling-related odds (higher in the Control School), $F(1, 452) = 15.94$, $p < 0.01$, and level of cognitive errors (lower in the Control School), $F(1, 452) = 4.37$, $p < 0.05$. The statistically significant difference between the Control and Experimental Schools for grade was expected given the fact that the Control School was exclusively a grade 10 group and the Experimental School was not. Although, it should be noted that the difference in grade was not practically different as the mean grade of students in the Experimental and Control Schools was 10.20 (SD = .48) and 10.00 (SD = .00) respectively. In general, there was a high degree of comparability between conditions at the pretest. Nevertheless, for these variables, which were deemed to be significantly different across conditions, multivariate repeated measures analysis of covariance was used (MANCOVA), entering pretest scores as covariates.

Table 2
Baseline Characteristics of the Sample ($N = 271$)

Variable	Experimental	Control
Gender		
M	1.47	1.51
SD	.50	.50

Age
M	15.45	15.31
SD	.84	.52

Grade
M	10.21***	10.00***
SD	.48	.00

Math Grade
M	66.80***	73.22***
SD	15.66	12.44

Parental Gambling
M	.26	.25
SD	.52	.56

Depression
M	.37	.29
SD	.48	.45

Risk-taking
M	1.67	1.72
SD	.79	.84

Impulsivity
M	1.26	1.19
SD	.84	.85

Delinquency
M	.24	.18
SD	.43	.38

Cigarette Smoking
M	.38	.26
SD	.65	.60

Gambling Frequency
M	3.70	3.79
SD	4.17	4.53

Time Gambling
M	4.42	4.47
SD	4.55	4.93

Money Won
M	1.56	1.52
SD	2.48	2.48

Money Lost
M	.81	.60
SD	1.51	1.31

Attitudes
M	12.62	12.43
SD	2.17	2.24

Knowledge
M	3.58	3.70
SD	1.18	1.23

Cognitive Errors
    M   5.77*   4.89*

    SD   3.72   3.39

Odds Calculations
    M   6.16***   6.98***

    SD   2.11   1.86

Note. Symbols adjacent to the means represent results of the ANOVA indicating significant levels, $* p < 0.05$ and $*** p < 0.001$

Previous research often finds higher attrition rates for individuals exhibiting problematic levels of the behavior under study (Botvin et al., 1990). Therefore, analyses were conducted to determine whether this was the case in the present study. Multivariate analysis of variance (MANOVA) was conducted to analyze whether there were any statistically significant differences between those subjects who completed the 3-Month-Follow-up Questionnaire and those who did not. There was no statistically significant multivariate main effect for group $\lambda = .94$, $F(17, 357) = 1.43$, ns. Therefore, there were no statistically significant differences on the baseline variables between subjects who were lost to follow-up and the remainder whom complete follow-up data were available.

Baseline Gambling Behavior

Frequency and Time Spent Gambling

Seventy-one percent of the adolescents reported having participated in at least one gambling activity in the last three months. Twenty-six percent reported gambling weekly or more in the past three months. One percent reported gambling daily in the past three months. The mean summary score on the gambling frequency scale was 3.73 ($SD = 4.41$) with scores ranging from 0 to 25 (The response options for each type of gambling were assigned a value: 0 = never; 1 = 1/month; 2 = 2-3 times/month; 3 = 1/week; 4 = 2 – 6 times/week; 5 = daily. These values were summed across the eight types of gambling to provide a summary score).

Seventy-two percent reported gambling for 30 minutes or less on at least one activity in the last three months. Forty-seven percent reported spending 2 - 4 hours on at least one gambling activity in the past three months. The mean summary score on the amount of time spent gambling scale was 4.44 ($SD = 4.82$) and ranged from 0 to 32.

Types of Gambling

Table 3 shows the frequency of involvement in various gambling activities in the past three months. There was no single activity that was particularly popular. However, there were many types of gambling behaviors that were engaged in occasionally. The most popular forms of gambling in order of preference were games of skill, playing cards and sports betting.

Table 3
Frequency of Different Types of Gambling at Baseline ($N = 271$)

Gambling Activity	Did not play %	≥1/month %	≥1/week %	Daily %
Games of Skill	49.1	49.9	18.8	5.8
Card Games	52.8	47.2	15.0	3.5
Sports Betting	73.2	26.9	6.1	1.4
Dice Games	76.5	23.5	5.3	0.9
Lottery/instant win tickets	82.2	17.9	1.7	0.0
Bingo	89.0	11.0	1.2	0.2
Sports lotteries	91.9	6.1	1.4	0.7
Other	94.1	3.0	1.8	1.2

Amount of Money Spent on Gambling

The adolescents in the present sample reported the mean largest amount of money they had ever won to be $52 ($SD$ = $154.25). Six students reported that they had once won between $500 and $2,000 while gambling.

Table 4 shows the percentage of adolescents who reported winning or losing money in the past month while gambling. Forty-eight percent reported having won $1 - $10 on at least one gambling activity in the past month. Twenty-one percent reported having won more than $21 in the past month. Thirty percent reported having lost $1 - $10 on at least one gambling activity in the past month. Four percent reported having lost more than $51 on at least one gambling activity in the past month.

Table 4
Percentage of Sample Who Reported Winning or Losing Money by Gambling Activity ($N = 271$)

Gambling Activity	Broke Even or did not Play %	Won %	Lost %
Lotteries/Instant win tickets	82.6	11	6.4
Sports Lotteries	92.6	4.0	3.4
Bingo	91.2	5.7	3.1
Card Games	71.0	19.5	9.5
Dice Games	84.5	10.4	5.1
Sports Betting	89.4	3.2	7.4
Games of Skill	63.4	24.4	12.2
Other	95.4	2.9	1.7

Attitudes, Knowledge, Cognitive Errors, and Odds Calculations

In general, the adolescents were neutral or slightly positive in their attitudes towards gambling at baseline. The mean score on the attitude scale was 12.6 ($SD = 2.3$) (on a scale that ranged from 4 to 18).

Overall the adolescents possessed relatively little knowledge about gambling or problem gambling at baseline. The mean score on the knowledge scale was 3.6 ($SD = 1.2$) (on a scale that ranged from 0 to 10).

Students had high levels of cognitive errors about gambling ("gambling fallacies") at baseline, with the average number of correctly endorsed items being 5.5 ($SD = 3.7$) on a scale that ranged from 0 to 19.

Finally, adolescents had average ability to calculate true gambling odds at baseline, with the mean score on this scale being 6.4 ($SD = 2.1$) on a scale that ranged from 0 to 11.

Prevalence of Problem Gambling

In the present sample, 2.5% of the students were classified as problem gamblers according to the DSM-IV Multiple Response for Juveniles (score of 4 or more). A total of 23.2% of the students reported at least one symptom of problem gambling. The mean score on the 9 item problem gambling scale was .42 ($SD = .98$) ranging from 0 to 6.

Correlates of Gambling Behaviour at Baseline

Total gambling frequency, total amount of time spent gambling, total money won, and total money lost served as dependent variables in separate multiple regressions to examine characteristics that most strongly predicted these gambling behaviours at baseline. SPSS Forward Stepwise Multiple Regression was employed. Each regression included 15 predictor variables: age, gender, grade, grade in math, risk-taking, impulsivity, largest amount of money won gambling, parental gambling, cigarette smoking, having been in trouble with the police, depression, attitudes, knowledge, cognitive errors, and calculation of gambling related odds.

Table 5 displays the standardized regression coefficients (ß), R, multiple R^2, R^2 increase, and F following entry of the six variables that contributed significantly to the prediction of gambling frequency. The overall correlation for gambling frequency was moderate to high, with $R = .63$ being significantly different from zero, $F(6, 266) = 28.32$, $p < 0.01$. Larger amounts of money won while gambling (ß = .24, $t = 4.30$, $p < 0.01$), positive attitudes towards gambling (ß = -.25, $t = -4.69$, $p < 0.01$), impulsivity (ß = .19, $t = 3.55$, $p < 0.01$), more gambling-related cognitive errors (ß = .16, $t = 3.13$, $p < 0.01$), greater risk-taking (ß = .13, $t = 2.78$, $p < 0.01$), and less knowledge about gambling (ß = 0.10, $t = 2.12$, $p < 0.05$), were the variables that significantly contributed to the prediction of higher gambling frequency in order of predictability.

Table 5
Results of a Forward Stepwise Multiple Regression in Examining the Correlates of Gambling Frequency ($N = 271$)

Variable	Multiple		Change		Standardized	
	R	R^2	R^2	df	F	B
Largest Amount of						
Money Won	.47	.22	.22	1, 271	75.71***	.24
Attitudes	.55	.30	.08	2, 270	58.04***	-.25
Impulsivity	.59	.35	.05	3, 269	48.68***	.19
Cognitive Errors	.61	.37	.02	4, 268	39.08***	.16
Risk-taking	.62	.38	.01	5, 267	32.65***	.13
Knowledge	.62	.39	.01	6, 266	28.32***	-.10

Note. Symbols adjacent to the F values indicated significant levels, *** $p < 0.001$.

Table 6 displays the standardized regression coefficients (ß), R, multiple R^2, R^2 change, and F following entry of the seven variables that contributed significantly to the prediction of <u>time spent gambling</u>. The overall correlation was moderate to high, $R = .53$ and was statistically significant from zero, $F(7, 271) = 14.62$, $p < 0.01$. Having won a large sum of money gambling (ß = .22, $t = 3.68$, $p < 0.01$) was the best predictor of increased time spent gambling. In addition, spending more time gambling was also associated with higher levels of impulsivity (ß = .16, $t = 2.90$, $p < 0.01$), possessing more positive attitudes towards gambling (ß = -.19, $t = -3.15$, $p < 0.01$), having been in trouble with the police (ß = .12, $t = 2.17$, $p < 0.01$), having suffered from depression (ß = .10, $t = 1.82$, $p < 0.01$), possessing less knowledge about gambling (ß = .11, $t = 2.11$, $p < 0.01$), and having greater cognitive errors (ß = .11, $t = 2.02$, $p < 0.01$), in descending order of predictability.

Table 6
Results of a Forward Stepwise Multiple Regression in Examining the Correlates of Amount of Time Typically Spent Gambling ($N = 271$)

Variable	Multiple		Change		Standardized	
	R	R^2	R^2	df	F	B
Won	.39	.16	.16	1, 271	50.95***	.22
Impulsivity	.45	.21	.05	2, 270	35.98***	.16
Attitudes	.49	.24	.03	3, 269	27.53***	-.19
Trouble with police	.49	.25	.01	4, 268	22.18***	.12
Depression	.51	.26	.01	5, 267	18.67***	.10
Knowledge	.52	.27	.01	6, 266	16.19***	.11
Cognitive Errors	.53	.28	.01	7, 265	14.62***	.11

Note. Symbols adjacent to the F values indicate significant levels, *** $p < 0.001$.

Table 7 displays the standardized regression coefficients (ß), R, multiple R^2, R^2 increase, and F following entry of the six variables that contributed significantly to the amount of money won gambling in the past month. The overall correlation was moderate to high, with $R =$ .57 statistically significant from 0, $F(7, 270) = 17.84$, $p < 0.01$

Table 7
Results of a Forward Stepwise Multiple Regression in Examining the Correlates of the Amount of Money Won Gambling ($N = 271$)

Variable	Multiple		Change			Standardized
	R	R^2	R^2	df	F	B
Largest Amount of Money Won	.47	.22	.22	1, 271	75.77***	.31
Delinquency	.50	.25	.03	2, 270	44.18***	.15
Attitudes	.53	.27	.03	3, 269	34.03***	-.16
Gender	.54	.29	.02	4, 268	27.37***	-.12
Impulsivity	.55	.30	.01	5, 267	23.26***	.10
Knowledge	.56	.31	.01	6, 266	20.06***	.10
Math Grade	.57	.32	.01	7, 265	17.84***	.10

Note. Symbols adjacent to the F values indicate significant levels, *** $p < 0.001$.

Having won a large amount of money gambling was the best predictor of reported amount money won gambling in the past month (ß = .31, $t = 5.31$, $p < 0.01$). This was followed by positive attitudes towards gambling (ß = -.16, $t = -2.77$, $p < 0.01$), having been in trouble with the police (ß = .15, $t = 2.77$, $p < 0.01$), male gender (ß =-.12, $t = -2.34$, $p < 0.01$), greater impulsivity (ß = .10, $t = 1.89$, $p < 0.01$), less knowledge about gambling (ß = .11, $t = 2.06$, $p < 0.01$), and poorer grades in math in the previous year (ß = -.10, $t = -1.85$, $p < 0.01$).

Table 8 presents the findings for the amount of money lost gambling. There were only three significant predictors.   They contributed to an fairly small correlation, with $R = .27$, which was significantly different from 0, $F(3, 271) = 7.24$, $p < 0.01$.

Table 8
Results of a Forward Stepwise Multiple Regression in Examining the Correlates of the Amount of Spent Lost Gambling ($N = 271$)

Variable	Multiple		Change			Standardized
	R	R^2	R^2	df	F	B
Attitudes	.21	.04	.04	1, 271	11.96***	-.15
Cognitive Errors	.25	.06	.02	2, 270	8.83***	.13
Impulsivity	.27	.08	.01	3, 269	7.24***	.12

Note. Symbols adjacent to the F values indicate significant levels, *** $p < 0.001$.

Only positive attitudes towards gambling (ß = -.15, t = -2.50, p < 0.01), increased cognitive errors (ß = .13, t = 2.22, p < 0.01), and higher impulsivity (ß = .12, t = 1.97, p < 0.01) were significant predictors of the amount of money lost gambling in the past month.

Finally, a forward stepwise logistic regression was also performed to determine which variables maximally differentiated the <u>problem from the non-problem gamblers</u>. A test of the full model with three predictors (increased risk-taking, positive attitudes, and greater cognitive errors) entered against a constant-only mode was statistically reliable, χ^2 (3, N = 271) = 26.92, p < 0.01, indicating that the predictors as a set, reliable distinguished between problem and non-problem gamblers. The variance in problem gambling accounted for was small with Nagelkerke's R^2 = .37. Prediction success was 96.3%. However, this was due to 99.6% of the non-problem gamblers being correctly classified but none of the problem gamblers being correctly classified. Table 9 shows the regression coefficients, Wald statistics, and odds ratios for each of the three predictors.

Table 9
Results of a Forward Selection Logistic Regression in Predicting Problem Gambling Membership (N = 271)

Variable	B	Odds Ratio	Wald Test (z-ratio)	Sig.
Risk-taking	1.36	3.90	5.86	0.02
Attitudes	-0.32	.73	4.67	0.03
Cognitive Errors	-4.39	1.27	3.10	0.01

Effects of the Prevention Program

The most important results concern the effectiveness of the prevention program. This was assessed by means of Analysis of Variance (ANOVA) for repeated measures. A separate 2 x 3 [Group (Experimental, Control) x Time (Baseline, Posttest, 3-Month Follow-up)] analysis was performed on each of the following dependent variables: Attitudes, Knowledge, Cognitive Errors, Odds Calculations, Gambling Frequency, Time Spent Gambling, and Money Spent Gambling. Tables 10 and 11 summarize these results. An a priori decision was made not to analyze the Coping scores as it was felt that the coping scale chosen did not appropriately capture the content of the curriculum.

Attitudes

Statistically significant main effects were obtained for Group (Experimental, Control), $F(1, 271)$ = 5.53, p < 0.01 and Time (Baseline, Post-Test, 3-month Follow-up), $F(2, 542)$ = 12.99, p < 0.01. In addition, there was statistically significant Group x Time interaction, $F(2, 542)$ = 6.14, p < 0.01. Follow-up univariate ANOVA's revealed a statistically significant main effect of Time in the Experimental group, $F(2, 510)$ = 12.07, p < 0.001, and no significant main effect for Time in the Control group. Post-hoc t-tests revealed significant reductions in positive

attitudes from baseline to posttest, $t = -2.59$, $p < 0.001$, and from baseline to 3-month follow-up, $t = -6.65$, $p < 0.001$, in the Experimental group.

Knowledge

Statistically significant main effects were obtained for Group, $F(1, 271) = 26.94$, $p < 0.001$ and Time, $F(2, 542) = 43.45$, $p < 0.001$. In addition, there was statistically significant Group x Time interaction, $F(2, 542) = 34.01$, $p < 0.001$. Follow-up univariate ANOVA's revealed a statistically significant main effect of Time in the Experimental group, $F(2, 510) = 71.21$, $p < 0.001$, and no significant main effect for Time in the Control group. Post-hoc t-tests revealed significant increase in knowledge from baseline to posttest, $t = -13.04$, $p < 0.001$, and from baseline to 3-month follow-up, $t = -8.87$, $p < 0.001$, in the Experimental group.

Cognitive Errors

A significant main effect was obtained for Time, $F(2, 542) = 19.90$, $p < 0.001$ but not Group. In addition, there was statistically significant Group x Time interaction, $F(2, 542) = 17.27$, $p < 0.001$. Follow-up univariate ANOVA's revealed a statistically significant simple main effect of Time in the Experimental group, $F(2, 510) = 22.18$, $p < 0.001$, and no significant main effect for Time in the Control group. Post-hoc t-tests revealed significant reductions in cognitive errors from baseline to posttest, $t = 8.23$, $p < 0.001$, and from baseline to 3-month follow-up, $t = 8.02$, $p < 0.001$, in the Experimental group.

Calculation of Gambling-Related Odds

A statistically significant main effect was obtained for Time, $F(2, 542) = 63.46$, $p < 0.001$, but not group. In addition, there was a statistically significant Group x Time interaction, $F(2, 542) = 7.97$, $p < 0.001$. Follow-up univariate ANOVA's revealed a statistically significant main effect of Time in the Experimental group, $F(2, 510) = 20.77$, $p < 0.001$. In addition, a statistically significant main effect for Time was obtained in the Control group, $F(2, 295) = 21.66$, $p < 0.001$. Post-hoc t-tests revealed a significant increase in ability to calculate gambling-related odds from baseline to posttest, $t = -5.55$, $p < 0.001$, in the Experimental group. However, in the Experimental group, there was a significant reduction in ability to calculate gambling-odds from baseline to 3-month follow-up, $t = 3.24$, $p < 0.001$. In the Control group, there was significant increase in ability to calculate gambling-related odds from baseline to posttest, $t = -9.44$, $p < 0.001$, and no significant difference in ability to calculate gambling-related odds from baseline to 3-month follow-up.

Table 10
Univariate *F* Values and Mean Scores over Time for the Psychosocial Variables

Measure by Condition	Baseline n	M	SD	Posttest M	SD	3-month M	SD	F	df	p
Attitudes										
E	171	12.6	(2.1)	13.0**	(2.2)	13.8**	(2.2)	12.07	2, 510	0.00
C	101	12.5	(2.4)	12.5	(2.8)	12.7	(2.3)	0.28	2, 295	0.75
Knowledge										
E	171	3.6	(1.2)	5.3**	(1.4)	4.8**	(1.5)	71.21	2, 510	0.00
C	101	3.8	(1.3)	3.9	(1.5)	3.9	(1.5)	0.17	2, 295	0.85
Cognitive Errors[a]										
E	171	2.3	(0.9)	1.7**	(1.1)	1.6**	(1.2)	22.18	2, 510	0.00
C	101	2.0	(0.8)	2.0	(1.0)	1.9	(1.1)	0.19	2, 295	0.83
Math Skill at Calculating Gambling Odds[a]										
E	171	2.4	(0.4)	2.6**	(0.4)	2.2**	(0.6)	20.77	2, 510	0.00
C	101	2.2	(0.4)	2.6**	(0.5)	2.3	(0.5)	21.69	2, 295	0.00

Note. E = experimental group; C = control group; [a] = values reported are the square root transformations. Symbols adjacent to the means represent paired t-test analyzes indicating significant differences compared to baseline , * $p < .01$, **$p < .001$.

Gambling Frequency

There was no significant main effect for Group. There was a nonsignificant trend for gambling frequency to decrease with time, $F(2, 542) = 2.66$, $p = 0.07$. The Group x Time interaction was also nonsignificant, $F(2, 542) = 1.97$, $p = 0.15$. The failure to obtain a significant Group x Time interaction appears to be due to the decrease in gambling frequency in the Control group from baseline. When an ANOVA was run on just the Experimental Group, a significant main effect of Time was obtained, $F(2, 510) = 3.06$, $p < 0.05$).

Time Spent Gambling

There was no significant main effect for Group. However, there was a statistically significant decrease in time spent gambling from baseline to post-test and 3-month follow-up, $F(2, 542) = 9.53$, $p < 0.001$. The Group x Time interaction was nonsignificant, $F(2, 542) = 0.56$, $p = 0.57$. (ANOVA on just the Experimental group found a nonsignificant main effect of Time, $F(2, 510) = 3.60$, $p = 0.14$.)

Money Won Gambling

There was no significant main effect for Group. There was a nonsignificant trend for money won gambling to decrease with time, $F(2, 542) = 2.56$, $p = 0.08$. No statistically significant Group x Time interaction was obtained, $F(2, 542) = 0.06$, $p = 0.94$. (ANOVA on just

the Experimental group found a non-significant trend main effect of Time, $F(2, 510) = 1.95$, $p = 0.14$.)

Table 11
Mean Scores over Time on Gambling Behaviours

Measure by Condition	n	Baseline M	SD	Posttest M	SD	3-month M	SD
Frequency							
E	171	3.4	(4.2)	2.8	(3.7)	3.3	(4.0)
C	101	3.4	(4.6)	2.9	(4.9)	2.9	(4.4)
Time							
E	171	4.3	(4.6)	3.3	(4.1)	3.5	(4.0)
C	101	3.9	(5.0)	2.8	(4.5)	3.2	(4.7)
Money Won							
E	171	1.6	(2.9)	1.5	(2.6)	1.2	(2.3)
C	101	1.2	(2.2)	1.0	(2.0)	1.1	(2.5)
Money Lost							
E	171	.8	(1.7)	.6	(1.4)	.4	(1.1)
C	101	.4	(.9)	.3	(1.1)	.3	(1.2)

Note. E = experimental group; C = control group; Frequency = frequency of gambling; Time = time spent gambling; Money Won = money won gambling past month; Money Lost = money lost gambling past month.

Money Lost Gambling

There was no significant main effect for Group. There was a nonsignificant trend for money lost gambling to decrease with time, $F(2, 542) = 2.11$, $p = 0.12$. The Group x Time interaction also fell short of statistical significance, $F(2, 542) = 2.81$, $p = 0.06$. The failure to obtain a significant Group x Time interaction appears to be due to the decrease in money lost gambling in the Control group from baseline. ANOVA on just the Experimental ground revealed a significant main effect of Time, $F(2, 295) = 5.91$, $p < 0.01$.

Problem Gambling

There were eight students in the Experimental group who were classified as problem gamblers at baseline. Three month follow-up data was available for seven of these individuals. Only 1/7 was still classified as a problem gambler at the 3 month follow-up. There were three students in the Control group who were problem gamblers at baseline. Three month follow-up data was available for two of these individuals. One was still classified as a problem gambler and one was not.

The number of new problem gamblers from baseline to the 3-month follow-up period was compared between the Experimental and Control groups. There were 3/166 (1.8%) new problem gamblers in the Experimental Group during this time period compared to 4/105 (3.8%)

new problem gamblers in the Control Group during this time period.   A Chi-square test found these differences to be non-significant $\chi^2 (1) = 1.02$, $p > 0.05$.

Impact of Mediating Variables on Changes in Gambling Behaviour

Multiple regression analyses were carried out to identify factors related to changes in gambling behaviour. A forward stepwise multiple regression was performed with change scores in gambling frequency from baseline to follow-up as the dependent variable. The independent variables were age, grade, gender, baseline risk-taking, baseline impulsivity, baseline trouble with the police, baseline cigarette smoking, parental gambling, baseline depression, baseline attitudes, baseline knowledge, baseline cognitive biases, baseline ability to calculate gambling odds, attitudes change score (baseline to follow-up), knowledge change score (baseline to follow-up), cognitive errors (baseline to follow-up), and calculations of gambling odds (baseline to follow-up). The overall correlation was small, with $R = .25$, but statistically significant from 0, $F(3, 269) = 5.73$, $p < 001$. Reductions in positive attitudes towards gambling ($\beta = -.19$, $t = -3.26$, $p < 0.001$), having been in trouble with the police, ($\beta = .11$, $t = 1.81$, $p = 0.06$), and increased knowledge ($\beta = .10$, $t = 1.68$, $p = 0.09$), were the only three variables that significantly predicted decreased gambling frequency. However, only 6% of the variability in change in gambling frequency baseline to follow-up was predicted by knowing the scores on these three variables.

A forward stepwise multiple regression was performed with change scores in time spent gambling from baseline to follow-up as the dependent variable. The overall correlation was small, with $R = .14$, but statistically significant from 0, $F(1, 271) = 5.14$, $p < 0.05$. Having been in trouble with the police was the only variable significantly related to reductions in time spent gambling, $\beta = .14$, $t = 2.27$, $p < 0.05$. This variable accounted for 1.9% of the variance in the difference in amount of time spent gambling.

A forward stepwise multiple regression was performed with change scores in money won gambling from baseline to follow-up as the dependent variable. The overall correlation was moderate, with $R = .30$, and statistically significant from 0, $F(4, 268) = 6.38$, $p < 0.001$. The four variables related to changes in amount of money won gambling were attitudes becoming more negative towards gambling, ($\beta = -.15$, $t = -2.58$, $p < 0.01$), having been in trouble with the police, ($\beta = .15$, $t = 2.55$, $p < 0.01$), greater baseline knowledge about gambling ($\beta = .15$, $t = 2.55$, $p < 0.01$), and better baseline ability to calculate gambling odds ($\beta = 0.15$, $t = 2.42$, $p < 0.05$). The combination of these four variables accounted for 9% of the variance in change in amount of money won gambling.

Finally, a forward stepwise multiple regression was performed with change scores in money lost gambling from baseline to follow-up as the dependent variable. The overall correlation was small, with $R = .19$, but statistically significant from 0, $F(2, 270) = 5.21$, $p < 0.01$. The two variables related to changes in amount of money lost gambling were baseline cigarette smoking, ($\beta = .15$, $t = 2.54$, $p < 0.01$), and reduced cognitive errors, ($\beta = .11$, $t = 1.96$, p

< 0.05). The combination of these two variables accounted for 4% of the variance in change in amount of money spent gambling.

DISCUSSION

Patterns of Gambling Behaviour

The present study found that over 70% of adolescents had participated in at least one gambling activity in the past three months. These prevalence rates are fairly consistent with patterns obtained in other research (Derevensky & Gupta, 1998; Insight Research Canada, 1994; Ladouceur & Mireault, 1988; Poulin, 2000; Stinchfield, 2002; Wynne et al., 1996). Other consistencies involved the average amount of time spent gambling and the relatively small amounts of money won and lost gambling (Adalf & Ialmiteanu, 2000; Fisher, 1993; Fisher, 1999; Ladouceur, 1995; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987; Poulin, 2000; Westphal, Rush, Stevens, & Johnson, 2000; Winters, Stinchfield, & Fulkerson, 1993b; Winters, Stinchfield, & Kim, 1995).

Although the gambling preferences differed slightly from some studies, it should be noted that gambling preferences have tended to differ from study to study and location to location. In the present study games of skill were the most popular gambling activity (51%) followed by card games (47%), sports betting (27%), and dice games (24%). This is in contrast to some studies reporting greater rates of lottery participation by adolescents (Ide-Smith & Lea, 1988; Ladouceur & Mireault,1988; Lesieur & Klein, 1987). On the other hand, the present results are consistent with other recent studies in Alberta (Eckstrom, 1996; Wynne et al., 1996) which found greater involvement in card games, games of skills, and sports betting by adolescents as compared to other gambling activities.

The relationships between demographic characteristics and gambling are somewhat different that found in previous research. Unlike previous research, the present study found almost no relationship between male gender and gambling or problem gambling (Adalf & Iamiteanu, 2000; Derevensky & Gupta, 1998; Gupta & Derevensky, 1998a; Govoni, Rupcich, & Frisch, 1996; Hardoon & Derevensky, 2001; Ladouceur, 1996; Ladouceur et al., 1999; Stinchfield et al., 1998; Volberg, 1998; Wynne et al., 1996). The absence of any relationship between cigarette smoking and gambling or problem gambling is also at odds with previous research that found a strong relationship between adolescent substance use and gambling behaviour (Barnes, Welte, Hoffman, & Dintcheff, 1999; Ciarrocchi & Richardson, 1989; Fisher, 1993; Griffiths 1994a, 1994b; Griffiths & Sutherland, 1998; Kassinove, Doyle, & Milburn, 2000; National Research Council, 1999; Volberg, 1998; Vitaro, Ferland, Jacques, & Ladouceur, 1998; Westphal et al., 2000; Winters, Stinchfield, Fulkerson, 1993b; Winters & Anderson, 2000). Finally, the failure to find a relationship between parental gambling and adolescent gambling is puzzling and different from previous research (Griffiths & Wood, 2000; Gupta & Derevensky, 1997; Jacobs et al., 1989; Ladouceur, Boudrealt, Jacques, & Vitaro, 1999).

On the other hand, the robust association between impulsivity and both gambling and problem gambling is consistent with other research, as is the positive relationship obtained between risk-taking and gambling (Carlton & Goldstein, 1987; Cavedini et al., 2002; Coco, Sharpe, & Blaszczynski, 1995; Dube, Freeston, & Ladouceur, 1996; Gupta & Derevensky, 1998a; Vitaro, Areseneault & Tremblay, 1999; Vitaro, Ferland, Jacques, & Ladouceur, 1998).

The present results do not answer the question of whether risk-taking and impulsivity lead to gambling or whether gambling increases an individual's tendency to be impulsive and take risks.

The present study found a strong relationship between having gambling fallacies and both gambling and problem gambling. These findings are consistent with previous studies examining the correlates of adolescent gambling (Carroll & Huxley, 1994; Derevensky, Gupta, & Cioppa, 1996; Griffiths, 1990a; Moore & Ohtsuka, 1999; Wood & Griffiths, 1998).

The finding that gambling time and money won gambling is related to having been in trouble with the police supports the previous research of Ladouceur et al. (1999), as well as Stinchfield (2000). Gambling has been found to be highly associated with other forms of antisocial activity. For example, delinquency has been found to be positively related both to gambling frequency and problem gambling (Vitaro, Brendgen, Ladouceur, & Tremblay, 2001).

In addition, the present study found a positive relationship between time spent gambling and depression. These results are consistent with previous research (e.g., Griffiths, 1995, Gupta & Derevensky, 1998a).

Interestingly, the most consistent predictor of gambling behaviour as well as problem gambling was having a positive attitude toward gambling. Although intuitively sensible, this is one of the few studies that have examined this variable (see also Moore & Ohtsuka,1997; Wood & Griffiths, 1998). Also of interest is the strong association between the largest amount of money won gambling with both problem gambling and various measures of gambling behaviours. This provides support to the anecdotal evidence that "early big wins" are etiologically important to the escalation and maintenance of gambling behaviour. Finally, an expected (but understudied) relationship was obtained between knowledge and gambling. Specifically, people with less knowledge about gambling and problem gambling are more likely to gamble than those people who have greater knowledge about these things.

Prevalence of Problem Gambling

Although 23% of students reported one or more symptoms of problem gambling, only 2.5% met actual criteria for problem gambling. This prevalence rate is lower than found in most other studies (e.g., Adalf & Ialmiteanu, 2000; Fisher, 1993; Fisher, 1999; Hardoon & Derevensky, 2001; Ladouceur, Boudreault, Jacques, & Vitaro, 1999; Lesieur & Klein, 1987; Poulin, 2000; Westphal, Rush, Stevens, & Johnson, 2000; Wiebe, 1999; Wynne Resources, 1996; Winters, Stinchfield, & Kim, 1995). It is also lower than the Shaffer et al. (1997) meta-analysis which reported prevalence rates of adolescent problem gambling to be 3.9%. One of the reasons for the lower prevalence rate of problem gambling in the present study is most likely due to the more conservative measure utilized to diagnose problem gambling, the DSM-IV-MR-J (Fisher, 2000), as opposed to the most widely utilized measure of problem gambling the SOGS-RA which has questionable reliability and validity (Derevensky & Gupta, 2000; Ladouceur et al., 2000).

Effects of the Prevention Program on Knowledge, Attitudes, Cognitive Errors, and Calculation of Gambling Odds

As expected, and consistent with previous research, the prevention program produced robust and sustained changes in attitudes, knowledge, and cognitive errors. At 3-month follow-up the students demonstrated significantly more negative attitudes toward gambling than at baseline. They were more likely to indicate that gambling was harmful, more likely to report it to be immoral, more likely to believe there should be more restrictions on gambling, and less likely to report that gambling was a favored leisure activity. Their knowledge of what gambling is, signs and symptoms of problem gambling, risk factors for problem gambling, and where to access help for problem gambling was also significantly better three months after the intervention as compared to before the intervention. Finally, the intervention resulted in students who were significantly less susceptible to the gambling fallacies or cognitive errors that often accompany problem gambling.

These are all important results that support the contention that the content of the prevention curriculum was appropriate and delivered in a fashion that allowed for retention of this material. It is also our belief that changes in these attributes are preconditions for actual behaviour change.

The failure to obtain sustained changes in the ability to calculate true gambling odds was somewhat disappointing and likely attributable to the relatively small emphasis this received in the curriculum. It is interesting to note, however, that ability to calculate gambling odds was not related to either gambling behaviour or problem gambling at baseline. Williams & Connolly (2002) have found evidence that ability to calculate gambling odds is unrelated to gambling behaviour. These investigators failed to obtain any change in gambling behaviour following an intensive intervention among university students (in Introductory Statistics) that produced marked improvements in mathematical knowledge about gambling odds.

Effects of the Prevention Program on Gambling Behaviour

As the results indicate, there was no significant decrease in any of the gambling behaviour variables in the Experimental group relative to the Control group. One of the main reasons for this concerns the decrease in gambling behaviour in the Control group from baseline to post-test and 3-month follow-up on all four measures of gambling behaviour. Although the magnitude of these decreases was not large, they were large enough to prevent any changes in the Experimental group to be significantly different from the Control group. When ANOVA's were run on the Experimental group alone a significant main effect of Time was obtained for both gambling frequency and money lost gambling, and the changes in time spent gambling and money won gambling were very close to significance. The other factor working against an effect was the nonsignificant tendency for the baseline measures of gambling behaviour to already be lower in the Control group relative to the Experimental group.

Two possibilities exist for the decrease in gambling behaviour in the Control group. One of these is social desirability. There is evidence that repeated assessment of socially undesirable

behaviour sometimes results in reductions in reports of the undesirable behaviour even though the behaviour itself has not changed (e.g., Fendrich, Mackesy-Amitit, Wislar, Goldstein, 1997). Interestingly, in the present study, repeated assessment of gambling knowledge, attitudes, errors in thinking, and math skill did not result in changes in these variables over time in the Control group. However, the other possibility is that the behavioural changes are real. Repeated assessment of gambling and problem gambling may act as an intervention in and of itself to sensitize students to the potential harm.

It is important to realize that immediate behavioural change was not necessarily the objective of this program or the expected outcome. This program was advocating responsible gambling, not abstinence from gambling. Almost all the adolescents in the study were gambling at nonproblem levels before the intervention and almost all adolescents continued to be gambling at nonproblem levels after the intervention.

Rather, the primary purpose of this program was to prevent future problem gambling. The truest measure of the effectiveness of the present program is the *future* incidence of problem gambling among individuals in the Experimental group relative to the Control group. It is expected that the robust and enduring changes in the knowledge, attitudes and errors in thinking achieved in the Experimental group should successfully inoculate many of these adolescents from becoming problem gamblers. At 3-months after the intervention, 3.8% of the students in the Control Group were newly classified as problem gamblers as opposed to only 1.8% of the students in the Experimental Group. Although these differences are non-significant, they are in the right direction and encouraging

Summary

The purpose of the present research was to design, implement, and evaluate an empirically based prevention program in an attempt to prevent problem gambling.

Considerable time and effort was spent in designing the program, adapting elements previously demonstrated to be effective in the area of substance use and abuse. Since gambling, alcohol, marijuana, tobacco, and other illicit drug use is initiated and maintained by similar demographic and etiological factors, it was hypothesized that this type of broad-spectrum prevention approach would also impact gambling behaviours. Thus, there was a heavy emphasis on training resistance to peer and media pressures; decision-making and social problem-solving skills; and ways to actively manage life's problems. However, because the program was intended to prevent problem gambling, the curriculum also needed to contain gambling specific elements. One of the ways this was accomplished was by making most of the didactic examples gambling related. The other way this was accomplished was by spending a significant amount of time addressing factors that may uniquely contribute to problem gambling: lack of knowledge about the signs/symptoms and potentially addictive nature of gambling; errors in thinking that underlie a lot of gambling and problem gambling behaviour; and unfamiliarity with the odds involved in gambling and how it is virtually impossible to win money over the long run.

Successful implementation of the curriculum required several things. First, was finding a school board willing to have the 5-session curriculum implemented in both an Experimental and Control school. Secondly, it was finding individual principals in that school district who were agreeable to having the program implemented. Thirdly, it was finding an appropriate course for the program to be contained in. Fourthly, it was imperative to obtain a sufficiently high percentage of parents who were willing to consent to have their son or daughter participate. Fifthly, it was necessary to ensure high program implementation fidelity across all classes. Finally, it was necessary to ensure a sufficiently high follow-up rate of adolescents at post-test and the 3-month follow-up. All of the above objectives were accomplished.

Evaluation of the effectiveness of the program was the third purpose of the present study. The results indicate robust and enduring changes in attitudes toward gambling, knowledge about gambling, and cognitive errors associated with gambling. These were intended effects of the program, and the changes in these attributes provide support for the design of the program and its potential effectiveness, as it is anticipated that these are all likely precursors to behavioural change. The present study did not find any significant change in gambling behaviour in the Experimental group relative to the Control group due to the fact that gambling behaviour decreased in both groups relative to baseline. Why this occurred in the Control group is unclear, but may be due to a social desirability effect or perhaps a true decrease in gambling behaviour because of being sensitized to problem gambling through administration of the questionnaires. In any case, immediate behavioural change was not necessarily an anticipated or expected change of this study. The true test of this program's effectiveness concerns its impact on the future incidence of problem gambling in the Experimental group compared to the Control group. It is anticipated that the robust and enduring changes in the knowledge, attitudes and errors in thinking achieved in the Experimental group should successfully inoculate many of these adolescents from becoming future problem gamblers. A longer term follow-up of these students is necessary to evaluate this hypothesis.

Limitations

There are several limitations of the present study. One concern is representativeness of the sample and the generalizability of the results. A small percentage of adolescents in these schools' catchment areas did not attend because they attended private schools, were home schooled, or had been expelled. Furthermore, not all registered grade 10 students in the two schools participated in the study. A significant percentage of students did not participate either because they were absent the day(s) the baseline questionnaire was administered or did not provide parental consent to allow their questionnaire data to be used. It is also unknown whether the same results would be obtained in other school districts or for students who are not in grade 10. Also limiting generalizability is the fact that the curriculum was delivered by just one person. The effectiveness or ineffectiveness of the program may have hinged on the style of this individual more than the actual content of the program.

Another limitation was the reliance on self-report data as opposed to direct assessment of the skills being taught. Students may have intentionally or unintentionally given false information about the variables under study. The extent to which "demand characteristics" of

the testing situation may have biased the self-reports is unknown. Since there was no objective, independent corroborating evidence for the student's responses, methods were utilized to enhance the likelihood of obtaining accurate information.

A further limitation of the study concerns the questionnaire, which was custom-designed for this study and had not been previously tested for its reliability and validity. There are several aspects of the questionnaire that were not optimal. A serious problem was the lack of an appropriate measure of the generic life and decision-making skills that comprised a significant portion of the prevention curriculum. Another problem was that only one item was used to measure impulsivity, depression, risk-taking, delinquency, and parental gambling. Therefore, the conclusions drawn regarding the relationship of these variables to the findings obtained are only tentative.

Future Research

Future work needs to build upon the results of the present pilot project. Although very promising, further enhancements and investigations are vital. First, longer-term follow-up of the students in the Experimental group to examine their incidence of problem gambling is important. Second, additional testing and refinement of the assessment questionnaire is needed. Thirdly, it is necessary that the program be tested in other schools on students in other grades and implemented by other implementers.

There is also a need to investigate ways of optimizing the program's effectiveness. The findings concerning which variables were related to changes in gambling behaviour provide some guidance concerning program optimization. Attitude toward gambling appears to be particularly important. Not only was it strongly related to all baseline measures of gambling and problem gambling, change in attitude toward gambling (i.e., becoming more negative) was one of the few variables significantly related to decreased gambling frequency at 3-month follow-up as well as amount of money won gambling. It is our belief that more negative attitudes were developed *because* the program was value-neutral, allowing students to form their own opinions. Our belief is that a more blatant, value-biased program may not produce the same results, although this is a hypothesis worth testing considering the importance of this variable.

Not surprisingly, the analysis revealed that improved knowledge about gambling and problem gambling was significantly related to decreases in gambling frequency at 3 months follow-up (which perhaps also accounts for the change in attitudes). This supports the common-sensical notion that people need to be aware of the potential problems with an activity before they are willing to change their behaviour with respect to it, and that this is an essential component of any prevention program.

The third important variable was gambling-related cognitive errors. Decreases in these errors were significantly related to decreases in the amount of money spent gambling at follow-up. Given that adolescent problem gamblers have higher levels of cognitive errors (e.g., illusion of control, belief that winning is based on "skill"), changing these erroneous perceptions intuitively would lead to reductions in money spent gambling.

Although robust, enduring changes appear to have been obtained with a 5-session program, it would be instructive to examine the impact of a program that is twice as long (perhaps with booster sessions). The program appears to have produced significant changes in almost all areas, yet the magnitude of the changes is not large, there was no change in gambling frequency, and the follow-up period was only 3 months post-intervention. It would not be surprising if the effects are stronger with 10 sessions, however, it is unclear how much stronger they might be. There may be diminishing returns after 5 sessions (i.e., only slightly better effects for twice as much time). On the other hand, there may be a larger or more enduring effect. The existing program attempts to cover all known skills that might positively impact problem gambling. However, 5 sessions is a relatively short period of time in which to learn this diverse array of skills. Five additional sessions would almost certainly allow these skills to be better solidified.

Greater parental involvement is something else that may enhance effectiveness. This could be accomplished by sending a brochure home on problem gambling along with the consent form the adolescent takes home to get signed; having some of the student's homework assignments involve interviewing both parents about their knowledge and experience with gambling (so as to promote discussion of the issue); and inviting parents to an information session about gambling and problem gambling one evening.   Here again, it would not be overly surprising if greater parental involvement promotes more effective and enduring changes in adolescents receiving the intervention. What is uncertain is the magnitude of the effect (i.e., it may be much less important than having addressed these issues with their peers) and the viability of this method of engaging parents. Parents who gamble themselves may be less likely than others to come out to an information evening on problem gambling or be receptive to discussions/brochures about this issue. Worse yet, being made aware of these initiatives may make them less willing to let their son or daughter participate in the study.

The program also needs to be tested on different ages. Targeting grade 10 students in the present study was somewhat arbitrary. It was largely due to the school district expressing an interest in having the program piloted in their high schools and the CALM course being designated by them as the course it would have to be provided in. CALM is only provided in grades 10 – 12. Although the pilot study appears to support the merit of targeting this age group, there is also a strong argument for starting at an earlier age. Evidence indicates that wagering something of value on an uncertain event often begins as early as grade school (Ladouceur et al., 1994), with age 11 being the average age of onset found in a couple of major studies (Gupta & Derevensky, 1998b; Westphal et al., 2000). Prevention programs are believed to be more effective when they begin prior to the onset of the behaviour. On the other hand, an argument can also be made that comprehension of some aspects of a problem gambling prevention program requires a greater degree of intellectual maturity than most 10 or 11 year olds have (e.g., calculation of odds, cognitive errors). It is also the case that unlike programs that are attempting to prevent any involvement in the behaviour (e.g., smoking, illicit drugs), programs such as ours recognize that most people eventually will gamble and will be able to do so responsibly. Both because of its normative nature and its continuum with risk assessment, our program does not try to avert involvement in these activities, but rather tries to make people more objective and

"smarter" at risk calculation. Thus, it may be less important to intervene before the typical onset of the behaviour. Comparison of the effectiveness of our program at two different age groups may shed some light on this issue.

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APPENDIX A: Baseline High School Questionnaire

Please complete this questionnaire. Your responses will be kept confidential. Neither your parents nor your teachers will see your answers. **Please do not write your name on this questionnaire.**

School_____ Today's Date_____

What grade are you in?_____   What are the last two digits of your phone number?   ____

What is your date of birth? _____ (day) _____(month)_____(year)

Are you a boy _____ or girl ____   What is your mother's first name?_____

What was your final grade in math last year? _____

What level of math were you enrolled in? _____

Do you like to take risks?
a.   Yes, very much
b.   Yes
c.   Sometimes
d.   No, not really

Do you tend to do things impulsively (without thinking of the consequences)?
a.   Yes, very much
b.   Yes
c.   Sometimes
d.   No, not really

What is the largest amount of money you personally have ever won from gambling? $_____

Have either one of your parents been regular gamblers, now or in the past?
a.   mother only
b.   father only
c.   both mother and father
d.   neither

How often do you smoke cigarettes?
a.   never
b.   occasionally
c.   daily

Have you ever been in trouble with the police?
a.   Yes
b.   No

Have you ever had a problem with depression?
c.   Yes
d.   No

Activity	Check off how often you bet or personally spent money on the following activities in the past **3 months.**						Check off how much time you typically spent **each time** you engaged in these activities In the past **3 months.**						In the past **1 month** how much money did you spend (or win), on each of these activities (i.e., the amount you have today as a result of the activity compared to the amount you started with **1 month** ago)?							
	Never	1/month	2 - 3 times/month	1/week	2 - 6 times/week	daily	did not play	< 30 minutes	.5 - 1 hour	1 - 2 hours	2 - 4 hours	4 - 8 hours	won > $21	won $11 - $20	won $1 - $10	did not play or broke even	spent $1 - $10	spent $11 - $20	spent $21 - $50	spent >$51
Lottery or instant win tickets																				
Sports lotteries (e.g., Sports Select)																				
Bingo																				
Card games (e.g., blackjack, poker)																				
Dice games																				
Sports betting																				
Games of skill (e.g., pool, golf, darts, video games)																				
Other _____																				

1) In the past 3 months how often have you found yourself thinking about gambling or planning to gamble?
    a. never
    b. once or twice
    c. sometimes
    d. often

2) During the course of the past 3 months have you needed to gamble with more and more money to get the amount of excitement you want?
    a. Yes
    b. No

3) In the past 3 months have you ever spent *much* more than you planned to on gambling?
    a. never
    b. once or twice
    c. sometimes
    d. often

4) In the past 3 months have you felt bad or fed up when trying to cut down or stop gambling?
    a. never
    b. once or twice
    c. sometimes
    d. often
    e. never tried to cut down

5) In the past 3 months how often have you gambled to help you to escape from problems or when you are feeling bad?
    a. never
    b. once or twice
    c. sometimes
    d. often

6) In the past 3 months, after losing money gambling, have you returned another day to try and win back money you lost?
    a. never
    b. less than ½ the time
    c. more than ½ the time
    d. every time

7) In the past 3 months has your gambling ever caused you to lie to your family?
    a. never
    b. once or twice
    c. sometimes
    d. often

8) In the past 3 months have you ever taken money from the following *without permission* to spend on gambling: school lunch money or fare money? Money from your family? Money from outside the family?
    a. never
    b. once or twice
    c. sometimes
    d. often

9) In the past 3 months has your gambling ever led to: Arguments with family/friends or others? Missing school?
    a. never
    b. once or twice
    c. sometimes
    d. often

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1) Complete the following statement, "I think gambling is _____"
    a. very harmful to people
    b. sometimes harmful to people
    c. rarely harmful to people
    d. never harmful to people

2) How would you rank gambling as a leisure pastime for you?
    a. It is my favourite pastime
    b. It is one of my favourite pastimes
    c. I like it, but it is not a favorite pastime
    d. There are many other things I would rather do
    e. It is my least favorite thing to do in my spare time

3) How do you feel about legalized gambling?
    a. all types of gambling should be made illegal
    b. certain types of gambling should be made illegal (e.g., VLTs)
    c. no opinion one way or the other
    d. the current situation is fine. Legalized gambling should not be further expanded or restricted.
    e. Legalized gambling should be expanded

4) Complete the following statement, "I think gambling _____"
    a. is immoral and wrong
    b. is a matter of personal choice, but I wouldn't gamble because I feel it is immoral
    c. is not immoral, but still a waste of time
    d. is a fun, harmless thing to do

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1) Buying lottery tickets is a form of gambling.
    a. True
    b. False
    c. Unsure

2) It is legal for persons under 18 years old to gamble as long as they stay out of the bars.
    a. True
    b. False
    c. Unsure

3) Gambling can become as addictive as alcoholism or drug dependence.
    a. True
    b. False
    c. Unsure

4) The most addictive form of gambling tends to be
    a. lottery tickets
    b. Video Lottery Terminals
    c. Sports Betting
    d. Bingo
    e. All of the above are equally addictive

5) Which of the following is **not** a risk factor for becoming a problem gambler?
    a. family history of gambling
    b. drug abuse
    c. gambling at an early age
    d. poor school achievement
    e. female

6) What is the name of the Alberta government agency that provides treatment for gambling problems?

    ………………………………………………..

7) Which age group has the highest rates of problem gambling?
    a. Teenagers and people in their early 20's
    b. people in their 30's
    c. people in their 40's
    d. people in their 50's
    e. people age 65 and older

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1) Your chances of winning a lottery are slightly increased if you are able to choose your own numbers.
    a. strongly agree
    b. slightly agree
    c. unsure
    d. disagree

2) Thinking positively increases your likelihood of winning money when playing bingo or VLTs.
    a. strongly agree
    b. slightly agree
    c. unsure
    d. disagree

3) When I gamble, I am more likely to win if I bring a good luck charm.
    a. strongly agree
    b. slightly agree
    c. unsure
    d. disagree

4) When given a choice, you're better off to pull the handle on a slot machine than to just push a button.
    a. strongly agree
    b. slightly agree
    c. unsure
    d. disagree

5) A few hands of Blackjack or Poker are enough to let you know whether you're "hot" or "cold." If you're "cold," it's a good idea to quit and play again some other day.
   a. strongly agree
   b. slightly agree
   c. unsure
   d. past luck has no influence on future luck

6) How lucky are you? There are roughly 30 students in this class. If everyone's name was put into a hat and one name drawn for a prize, how likely is it that your name would be chosen?
   a. Much less likely than other people
   b. Less likely than other people
   c. You have the same likelihood of being chosen as everyone else
   d. Your name is more likely to be chosen
   e. Your name is much more likely to be chosen

7) The last time someone won playing roulette at the casino they were accompanied by their best friend. What would be the person's best strategy to win at roulette the next time they go?
   a. make sure they take the same friend along
   b. make sure they take a different friend along
   c. who they bring will have no influence on their likelihood of winning

8) Gambling is a good way to win back money lost on gambling.
   a. strongly agree
   b. slightly agree
   c. unsure
   d. disagree
   e. strongly disagree

9) Which of the following Lotto 6/49 numbers has the greatest probability of being selected as the winning combination?
   a. 23, 24, 25, 26, 27, 28
   b. 9, 19, 21, 32, 33, 47
   c. 21, 26, 31, 36, 41, 46
   d. 2, 4, 6, 8, 10, 12
   e. all of the above have an equal probability

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1) You and a friend are betting on the outcome of flipping a coin. On the last 4 tosses, heads came up. What is the possibility that tails will come up next?
   a. 1 in 5
   b. 4 in 5
   c. 1 in 2
   d. 1 in 10

2) Toss two loonies in the air. If you get heads on at least one of the coins you win $100. Anything else you lose $30. This is a great game to play, you will win big playing this game all night.
   a. True
   b. False
   c. Unsure

3) What are the odds of throwing a pair of dice and rolling two 1's (snake eyes)?
   a. 1 in 36
   b. 1 in 6
   c. 1 in 12
   d. 2 in 6

4) Compared to getting two 1's on the roll of a pair of dice, the odds of getting two 6's are:
   a. The same
   b. 6 times greater
   c. 2 times greater
   d. half as much

5) Over the long term, a VLT machine is programmed to pay out 92% of the money put in. You've been playing the same machine all night and have put in $200. Approximately how much money should you have won back?
   a. $92
   b. $184
   c. $400
   d. $0

6) You have spent hours playing the same VLT. You have not had a win and have spent more than $500. Which of the following statements is closest to the truth?
   a. Your chances of winning are no different than they were a few hours ago when you sat down to play.
   b. You are now more likely to win because you've been practicing for hours and as a result your level of skill has increased.
   c. You've put so much money into the machine, it is now more likely to pay out.
   d. You're just having bad luck. You'll be luckier if you switch to another machine.

7) You are playing blackjack. The object of the game is to keep drawing cards until you get as close as possible to 21 without going over 21. So far, you have drawn a 10 of hearts and a 10 of spades. The dealer has a jack of hearts and a queen of diamonds (worth 20 points). You need to draw an ace to win. Assuming there are 52 cards in the deck and no other players, what are the chances of drawing an ace and winning?
   a. 1 in 48
   b. 1 in 12
   c. 1 in 4
   d. 3 in 4

8) Draw a card at random from a deck of 52 cards. If it's a jack you win $1000, draw any other card and you lose $70. This is a great game to play, you will win big playing this game all night.
   a. True
   b. False
   c. Unsure

9) Grandma never chooses a number with a three in it when playing Lotto 6/49. She is hurting her chances of winning.
   a. True
   b. False
   c. Unsure

10) If you were to buy a lottery ticket, which place would you be most likely to buy it from?
   a. a place that has sold many previous winning tickets
   b. a place that has sold few previous winning tickets
   c. a place that has never sold a winning ticket
   d. any place is as good as another

11) A roulette wheel has 37 numbers on it. Half are red and half are black. The wheel is not fixed and where the metal ball lands is completely random. What are the chances of the ball landing on the 28 red?
   a. 1 in 28
   b. 1 in 37
   c. 1 in 12
   d. 1 in 2

Think of the most stressful experience you have experienced in the past week. Indicate which of the following strategies were used in response to that event using the following scale:
0 = does not apply or not used; 1 = used a little bit; 2 = used a fair amount; 3 = used a great deal.

_____Bargained or compromised to get something good or positive from the situation.

_____Talked to someone about how you were feeling.

_____Concentrated on, or thought about something good that could come out of the whole thing.

_____Tried not to burn your bridges behind you, tried to have different possibilities open.

_____Hoped a miracle would happen.

_____Went on as if nothing had happened.

_____Felt bad that you could not avoid the problem.

_____Kept your feelings to yourself.

_____Got mad at the people or things that caused the problem.

_____Accepted sympathy and understanding from someone.

_____Tried to forget the whole thing.

_____Changed or grew as a person in a good way.

_____Made a plan of action and followed it.

_____Accepted the next best thing to what you wanted.

_____Let your feelings out somehow.

_____Came out of the experience better than when you went in.

_____Talked to someone who could do something concrete or specific about the problem.

_____Tried not to act too quickly or follow your first hunch.

_____Changed something so things would turn out all right.

_____Asked someone you respected for advice and followed it.

_____Kept others from knowing how bad things were.

_____Talked to someone to find out more about the problem.

_____Stood up for what you wanted.

_____Just took things one step at a time.

_____You knew what had to be done, so you doubled your efforts and tried harder to make things work.

_____Came up with a couple of different solutions to the problem.

_____Wished you were a stronger person, more optimistic and forceful.

_____Accepted your strong feelings, but didn't let them interfere with other things too much.

_____Wished that you could change what had happened.

_____Wished that you could change the way you felt.

_____Changed something about yourself so that you could deal with the situation better.

_____Daydreamed or imagined a better place than the one you were in.

_____Had fantasies or wishes about how things might turn out.

_____Thought about fantastic or unreal things (like the perfect revenge, or finding a million dollars) that made you feel better.

_____Wished that the situation would go away or somehow be over with.