THE CANADIAN PROBLEM GAMBLING INDEX: FINAL REPORT

Jackie Ferris and Harold Wynne

Consultants: Robert Ladouceur, Randy Stinchfield and Nigel Turner

Canadian Consortium for Gambling Research

FEBRUARY 19, 2001

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February 19, 2001

Submitted for the Canadian Centre on Substance Abuse (CCSA)

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Executive Summary

This report provides an overview of the development, validation and reliability testing of the Canadian Problem Gambling Index, developed over the last three years. This research was conducted by a research team under the aegis of the Canadian Centre on Substance Abuse for the Inter-Provincial Task Force on Problem Gambling. The goal was to develop a new, more meaningful measure of problem gambling for use in general population surveys, one that included more indicators of the social and environmental context of gambling and problem gambling.

The project was divided into two phases. Phase I was an examination of how problem gambling had been conceptualized, defined and measured in the literature, and the development or synthesis of a new conception, definition and means of measurement. This phase of the project involved an extensive review of the literature, and synthesis of the relevant literature into an integrated conceptual framework for our definition of problem gambling. The framework and the resulting definition were then put before a panel of experts in the field to ensure the new construct was adequately defined. After several rounds of consultation and feedback, a draft index based on the literature and feedback process was produced

The second phase of this project was the fine tuning, validity and reliability testing of the index developed in Phase I. This was accomplished using a pilot test of 143 people, followed by a general population survey of 3,120 Canadian adults, a re-test (for reliability) of 417 respondents from the general population survey, and clinical validation interviews with 143 respondents who initially responded to the general population survey.

The result of Phase II is a 31-item measure called the Canadian Problem Gambling Index. Nine of the items can be scored to produce a prevalence rate for problem gambling, and the remaining items are indicators of gambling involvement (types of gambling activity, frequency of play, spending on gambling), and correlates of problem gambling that can be used to develop profiles of different types of gamblers or problem gamblers.

The prevalence rate for problem gambling produced by the CPGI falls between the rates obtained using the DSM-IV and the SOGS, much as anticipated. It does produce higher rates for those considered to be at risk, and this again was an anticipated result given the definition of problem gambling that directed the development of this index. Using the CPGI, survey respondents are divided into 5 groups:

- Non-gambling
- Non-problem gambling
- Low risk gambling
- Moderate risk gambling
- Problem gambling

The prevalence rate for problem gambling obtained with the CPGI is roughly equivalent to the prevalence rate obtained using the DSM-IV in this survey.

The CPGI goes one step further than most of the measures currently in use because of its relative emphasis on social and environmental factors related to problem gambling. This emphasis is reflected in both the composition of the nine scored items, and in the correlates that compose much of the rest of the index. We feel that it is this emphasis that has resulted in a larger proportion of the population being categorized as at low or moderate risk. In the past, prevalence surveys have used measures developed using clinical samples of problem gamblers, which are known to be demographically different than problem gamblers in general. Treatment program populations have traditionally under-represented women, ethnic minorities and individuals with lower socio-economic status than average. We feel that the inclusion of items addressing social and environmental context may have captured some of these typically under-represented populations. The inclusion of the correlates of problem gambling also allows for the development of profiles of specific types of problem gambling, using type of gambling activity and level of involvement as well as the correlates to develop a more detailed picture of those with problem or at risk levels of gambling.

The Canadian Problem Gambling Index:

Final Report

February 19, 2001

Table of Contents

4. CONCLUSIONS

5. CANADIAN PROBLEM GAMBLING INDEX – VERSION 1.0

6. FURTHER RESEARCH

See separate document titled *The Canadian Problem Gambling Index: Draft – User Manual** **(draft dated January 28, 2001) for more detail on how to use the CPGI and benchmarking data:** http://www.ccsa.ca/pdf/ccsa-009381-2001.pdf

The Canadian Problem Gambling Index:

Final Report

February 19, 2001

List of Tables

1. INTRODUCTION

1.1 Background

This report provides an overview of the development, validation and reliability testing of the Canadian Problem Gambling Index. This research was conducted by a research team under the aegis of the Canadian Centre on Substance Abuse for the Inter-Provincial Task Force on Problem Gambling. The goal was to develop a new, more meaningful measure of problem gambling for use in general population surveys, one that reflected a more holistic view of gambling, and included more indicators of social context.

The project was initiated in September of 1996, when representatives of Canadian provincial governments met in Winnipeg to discuss common priorities. This group generated a sub-committee, the Inter-provincial Task Force on Problem Gambling, which issued a Request for Proposals in June 1997. The RFP specified that the goal was to develop a new approach to problem gambling, based on theory and including the development and testing of a new measurement instrument for problem gambling for use in general population surveys. The first phase, involving a clarification of the concept of problem gambling, the development of an operational definition, and the development of a draft instrument for measuring problem gambling in the general population, was awarded in December of 1997, and the Final Report submitted in April 1999. More detailed information on the development process may be found in the report from Phase I of this project (Measuring Problem Gambling in Canada: Final Report – Phase I, April 22, 1999 – available through the Canadian Centre on Substance Abuse).

Phase II of the project began in May 1999, with a pilot test of the general population survey developed in Phase I, and the final report on the pilot test was submitted January 10, 2000. For those interested in more detail on the Pilot Test, the final report can be obtained from the CCSA (Validating the Canadian Problem Gambling Index: Report on the Pilot Phase of Testing, January 10, 2000). The second half of Phase II involved validating and reliability testing for the CPGI that resulted from the Pilot Test. A large general population survey, a retest of a sub-sample from the general population survey, and clinical validation interviews with another sub-sample from the general population survey were conducted in order to allow us to assess the validity and reliability of the new CPGI. This report presents the results from these studies, as well as a draft of the new CPGI.

1.2 Overview of the Research Goals and How We Met Them

For this stage of the research, the goals were:

- to produce the most valid and reliable instrument possible for use in general population surveys
- to produce psychometric data supporting the validity and reliability of the CPGI
- to produce a user manual with sufficient detail that replication of these results would be possible, as would replication of the entire methodology of these studies for future studies.
- to attempt to provide a means to compare CPGI results with previous prevalence studies using DSM-IV and SOGS as the method of measurement.

These research goals will be addressed in order. First, in order to produce the most valid and reliable instrument possible for use in general population surveys, we needed to decide what sort of measure we wanted to produce, a prevalence measure or a general screen. In Phase I, we were assuming that the answer was "a general screen". However, as our work evolved, it became clear that what was required was an index that could serve both purposes. This of course is a thorny problem. For prevalence, we needed to be able to relate our findings to the current diagnostic standard, the DSM-IV. For screening, we needed to be able to include a variety of other indicators, and broaden the concept of "at risk" as it is defined by prevalence measures. To measure prevalence, we needed items measuring behaviour and adverse consequences. For screening, we wanted to incorporate items that provided more social context or background information on problem gambling, but couldn't be "scored" per se because they were soft, or indicative, signs of gambling problems rather than hard or diagnostic signs like the behavioural or consequence items (Culleton, 1989).

To balance the two possible uses of the CPGI, we developed a multi-component measure of 31 items, 9 of which are scored to provide prevalence information. The remaining items address "soft" indicators of gambling problems, such as gambling involvement, and correlates of problem gambling including some items on the social and environmental context of the gambler (e.g. family background of gambling, alcohol or drug problems, exposure to stimulus from which individual wishes to escape) and predispositions of the gambler (some types of comorbidity, distorted cognitions).

The validity and reliability have been established, and are discussed in both the Results and the Conclusions sections (3 and 4) of this report. Comparisons with other measures have been included here in terms of validity and reliability results, but a discussion of direct comparisons, or "conversion" of results, is contained in the User Manual, a separate document developed for those wishing to use the CPGI themselves.

Given that the stated goal for this study was to produce a valid and reliable *general population* measure, we felt that we had to address likely differences between treatment populations (the basis for most other measures of problem gambling) and those in the general population with gambling problems.

We felt that it was important to include items that would be more likely to capture the "non-traditional" problem gamblers – women, ethnic minorities, and those at the lower end of the socio-economic scale. Our hypothesis is that asking more questions about the social environment of the gambler may tilt the balance in this direction slightly. We also conducted a literacy review, to ensure our items were at about a Grade 6 reading level.

In terms of more general research goals, we intended to produce a measure that derived from our operational definition and conceptualization of problem gambling, as presented in Phase I. We defined problem gambling as follows:

> **Problem gambling is gambling behavior that creates negative consequences for the gambler, others in his or her social network, or for the community.**

We feel that the instrument developed and presented here fits with this definition very well. Of the nine scored items in the final CPGI, five addressed gambling behavior specifically (needed to gamble with larger amounts of money to get the same feeling of excitement, chasing losses, borrowing money or selling things to get money to gamble, betting more than could really afford to lose, and feeling like one might have a problem with gambling) and four addressed consequences (problems with health and financial problems within the household, feeling guilty about one's gambling, and being criticized for one's betting or gambling). Several of the scored

items tap into the social context of gambling, including the items about financial difficulties for one's household, and being criticized for one's betting or gambling, as well as a number of the unscored items (family background, gambled while drunk or high).

The second research goal was to produce psychometric data supporting the validity and reliability of the CPGI. While establishing prevalence was only one goal of this study, much of the effort in analysis was expended on ensuring that the nine scored items in the CPGI were subjected to appropriate validation and reliability testing, according to established epidemiological practice. The remaining items, while important conceptually, are not used to determine prevalence. The discussion in the validity and reliability testing sections focuses, therefore, on the nine scored items of the index. We feel that we have demonstrated strong validity and reliability for the scored portion of the CPGI, and sections 3 and 4 of this report provide detailed descriptions of these analyses and results.

The third research goal was to produce a user manual with sufficient detail that replication of these results would be possible, as would replication of the entire methodology of the CPGI for future studies. The User Manual also contains tables with benchmarking data for Canada as a whole and by region.

Finally, we committed to attempting to provide a means to compare CPGI results with previous prevalence studies using DSM-IV and SOGS as the method of measurement. Because the CPGI contains items from both of these measures, some direct comparison is possible, and the User Manual outlines how to compare the CPGI results with results from previous studies using DSM-IV and/or the SOGS using the component items, or positive predictive values.

2. RESEARCH DESIGN AND METHODOLOGY

2.1. Research Design

The project was split into two phases, a development phase (I) and a testing phase (II). The development phase involved the clarification of the concept of problem gambling, the development of an operational definition, and the development of a draft instrument for measuring problem gambling in the general population. The second phase involved validity and reliability testing of the instrument developed, as well as fine-tuning of the measure.

2.1.1 Phase I

Phase I was structured to answer two general research questions:

1) How is problem gambling conceptualized, defined and measured?

2) How *should* problem gambling be conceptualized, defined and measured?

The first question was addressed through a review of the literature, and synthesis of the relevant literature into an integrated conceptual framework for our definition of problem gambling. This framework, and the resulting definition, were then put before a panel of experts in the field to answer the second question (how should problem gambling be conceptualized, defined and measured?).

This consultation was accomplished through internet dissemination of the reports and material generated in Phase I. We conducted two rounds of semi-structured feedback and integration of feedback, with experts responding to a list of questions developed by the project team on the validity and applicability of the framework and definition developed. The feedback generated in

this manner was integrated into the final product, with the result being a new approach to conceptualizing, defining and measuring problem gambling. A draft index based on the literature and feedback process was one of the results of this phase. More detail is available on the methodology, the expert panelists who participated, and the breadth of literature covered in the report from Phase I (Measuring Problem Gambling in Canada: Final Report – Phase I, April 22, 1999 – available through the Canadian Centre on Substance Abuse). In brief, the consensus was that the CPGI developed for testing reflected "problem gambling" as it is currently understood very well.

2.1.2 Phase II

The second phase of this project was the fine tuning, validity and reliability testing of the instrument developed in Phase I. This was accomplished using a pilot test of 143 people, followed by a general population survey of 3,120 Canadian adults, a re-test of 417 respondents from the general population survey, and clinical validation interviews with 143 respondents who initially responded to the general population survey. Table 1 below provides an outline of the various groups/samples used in this phase of the study.

Table 1   Sample and Recruitment for All Components of Phase II

Test/Groups		Sample Size	Source of Sample/Recruitment
Pilot Test			
	General Population Group	53	Random digit dialing (Windsor area)
	Regular Gambling Group	44	Newspaper ads (national)
	Self-designated Problem Gambling Group	46	Treatment centres and newspaper ads (national)
General Population Survey		3,120	Random digit dialing (national)
Re-Test Reliability Survey		417	Sub-set of general population survey sample (national)
Clinical Validation Interviews			
	Problem Gambling	20	Sub-set of general population sample -- 5 + on DSM-IV or SOGS
	At Risk Gambling	21	Sub-set of general population sample – 3-4 on DSM-IV or SOGS
	Low DSM/SOGS Scores	91	Sub-set of general population sample – 1-2 on the DSM-IV or SOGS
	No problems/no gambling	16	Sub-set of general population sample – 0 on DSM-IV or SOGS – included some non-gamblers

The Institute for Social Research at York University conducted all of the fieldwork for Phase II with the exception of the clinical validation interviews. ISR/York was chosen as the field work provider because of the quality of their fieldwork and their experience with the subject matter. Not only had most of the interviewers worked on "sensitive" studies before (including work on alcohol consumption, risky sex, and mental health issues), but also many of their interviewers have worked specifically on gambling studies before.

Prior to beginning the any field work, ISR conducts a pre-test of 20 interviews, to check programming, question ordering and "understandability" of the questionnaire. This pre-test stage is also used as training for interviewers. In this study, there were two stages of pre-testing, one prior to the pilot test, and one prior to the general population survey. This allowed for some fine-tuning of the survey instrument before the pilot test was conducted, and also allowed us to check programming and wording changes prior to the general population survey. All of the pilot test pre-test interviews were conducted in English, and the pilot test itself was conducted entirely in English. All of the other studies were conducted in English and French, however, and the second round of pre-testing consisted of 15 English-language interviews and 5 French-language interviews.

The pilot test was conducted using three separate groups of about 50 persons each, intended to represent three potential sub-groups in terms of CPGI scoring. The three groups were: a random, general population sample (unlikely to have gambling problems), a group of regular gamblers (who may be at risk in terms of gambling problems because of increased exposure to gambling in terms of frequency and spending on gambling) and those who feel that they have a problem, at the severe end of the continuum. This pilot test was used to determine if there were items from the original CPGI that did not discriminate between groups and so could be eliminated in the next rounds of testing. Several items were deleted, but the SOGS and DSM-IV screens were maintained in their entirety for comparative purposes.

The general population survey of 3,120 was conducted for several reasons. First, it allowed fine-tuning of the CPGI in terms of items to be included because of the large sample size. Second, it provided prevalence information for Canada that can be used as a benchmark in subsequent studies. Finally, it provided the basis for comparison between the CPGI, the DSM-IV and the SOGS measures.

Although reliability can be assessed using a measure of internal consistency, and so could be calculated based solely on the general population survey, it was determined that a re-test of a small sub-sample of the general population survey's sample would add to the rigour and credibility of the CPGI's reliability and validity testing process. A sample of 417 was re-called, and asked to complete the survey for a second time.

Finally, as a test of the validity of the new measure, a series of clinical validation interviews were conducted, by telephone, with a sub-sample of 148 from the general population survey. This study was conducted to provide support for the CPGI scoring and grouping schema, developed with the full, general population sample. The methodology for all of the components of the CPGI's validity and reliability testing is discussed in the next section.

2.2 Methodology

This section provides a detailed description of the methodologies used in Phase II of the project, the validation and reliability testing of the CPGI. More detail is available on the pilot test in the report from that component of the project (Ferris and Wynne, 2000).

2.2.1 Pilot Test

2.2.1.1 Sampling

The sample for the pilot test consisted of three separate groups, and each group was recruited separately, using different methods. With the exception of the general population group, these are NOT random samples, nor were they intended to be. They were purposive samples, recruited as a result of a search for a specific, qualifying criteria. The general population group was recruited using random digit dialing techniques, and was drawn from the Windsor area in Ontario. Windsor was selected for several reasons. Resistance to telephone interviewing is relatively low in this area, so response rates are higher than the Canadian average and the sample obtained is, therefore, likely to be more representative. There is a casino in this marketplace in addition, which increased the likelihood that there would be respondents participating in casino games.

The regular gambling group was recruited from across Canada, through newspaper advertisements. Ads were placed in Calgary, Edmonton, Halifax, Vancouver and Toronto. The criteria for inclusion in this group was that respondents spent on average $100 per month, and gambled at least once a week. These criteria capture approximately the top 10% of gamblers, in terms of frequency and spending, according to a 1995 Ontario study. This group was expected to produce a number of people who might be at risk of gambling problems. Respondents called the toll-free number in the newspaper ad, and were given the details about the study, including the offer of a $20 honourarium for their time. This information was not included in the newspaper ads.

The self-designated problem gambler group proved quite difficult to reach. Initially we approached treatment providers from Ontario and Alberta, where team members had personal contacts, and asked that they talk to their clients, and mention our study. If the client was interested in participating, the clinician forwarded clients' first names and telephone numbers, as well as possible times to contact them for an interview. There was some resistance to this methodology from respondents, a few of whom were anxious or upset when called, despite the safeguard of obtaining contact information through the respondent's clinician to ensure potential respondents' willingness to complete an interview. We decided to use a less intrusive way to reach potential respondents, and to expand the scope of our search for respondents nationally. We distributed a brief overview of the project, including a toll-free number to call, to gambling counselors and other contacts across Canada, and asked that clinicians pass it on to potential participants, and ask clients interested in participating to call the toll-free number. We provided guidance to clinicians on how to present the study to their clients. We suggested that it be presented as a "good deed", in no way related to a client's treatment or relationship with his/her clinician. This group was informed about the $20 honourarium in the information sheet distributed by the clinicians.

After looking at the final sample characteristics, we decided to move some individuals from the regular gambling group to the self-designated problem gambling group, based on their responses to two items in the survey. If they responded with a "yes" to either of the following two CPGI questions, they were moved into the self-designated problem gambling group:

- Have you felt that you might have a problem with betting money or gambling?
- Have you gone to anyone for help to control your gambling?

This change resulted in more homogeneous groups for analysis, and in a more equal distribution of respondents between groups. There is also evidence in the literature to support this reallocation of subjects to the self-designated problem gambling group. Many self-referred regular or "social gamblers" are individuals with gambling problems (Ladouceur, Arsenault, Dubé and Freeston, 1997). We also have heard from several Canadian researchers that this self-referral is in fact the best way to recruit gamblers who score as "problematic" by a variety of criteria for research studies. Robert Ladouceur, Nigel Turner, and David Hodgins (Director of Research

Addiction Centre, Foothills Hospital, Calgary) have all used this method of recruitment. In the end, we obtained 28 problem gamblers through referral from treatment centres, and incorporated a further 18 into the self-designated problem gambling group from the regular gambling group.

2.2.1.2 Data Collection

All of the interviews for this study were completed over the telephone. Respondents from the regular gambling group who called responding to the newspaper ads were given more detail initially, and then the contact person at York University's Institute for Social Research set up a convenient time for an interviewer to call. A similar protocol was established with those calling in from the treatment group – at the initial contact, more detail about the study was provided if necessary, and an appointment was set up.

Interviews were conducted at the appointed times, when possible, but when respondents were not available at the scheduled time, interviewers called back at random times to try to catch the respondent at home. Interviewers made at least 12 attempts to reach each respondent and calls were randomly scheduled during the day, evenings and on weekends, to maximize the likelihood of reaching the designated respondent. Because of the difficulty in reaching the regular gambling and the self-designated problem gambling groups, these two groups were paid an honourarium of $20 for participation. In order to receive this, they provided a name and address upon completion of the interview, and this identifying information was stored in a separate file, so that the personal information was never linked with the individual's survey responses.

The random sample group was dialed by the interviewer, and then within each household, the most recent birthday method was used to choose the individual in the household who would be our designated respondent. As with the other two groups, interviewers placed at least 12 calls to try to reach the designated respondent, and substitutes were not permitted (substitution has been shown to bias the sample toward those who answer the phone, often females who are 35 or older). Participants in this group did not receive any payment for participation.

2.2.1.3 Data Analysis

For the purposes of data analysis, some of the regular gambling group was moved into the self-designated problem gambling group (see the discussion in 2.2.1.1). The statistical analysis for this component of the study was guided by a set of research questions, specifically:

- What dimensions underlie the CPGI?
- Are there items that should be deleted or revised to obtain better measures of the CPGI dimensions or indices?
- How reliable are the individual CPGI dimensions/indices?
- Which items are the best predictors of membership in the three gambling groups?

In brief, the results of the factor analysis suggested that the individual measures, the SOGS, CPGI and DSM-IV might be unifactorial. When the items themselves were looked at using item analysis and discriminant analysis, there were clearly items that did not discriminate between gambling groups and these items were eliminated. In terms of reliability, the CPGI had very good internal consistency, resulting from the fairly large number of items included in the measure at this point, most of which had four-point response scales.

The CPGI revisions after the pilot were minor, with some activities added (craps, and some stock trading items) and an open-ended, "other" gambling item deleted. In all, 16 CPGI items were retained, and 6 deleted.

2.2.2 General Population Survey

2.2.2.1 Sampling

The target sample was 3,000 adult Canadians (over the age of 18), and ISR (the field work agency) delivered 3,120. The sample was stratified by region, so that regional estimates could be computed, but was otherwise a random sample, selected using random digit dialing (with some modifications to the dialing algorithm to exclude inactive banks of numbers or business or institutional numbers). Respondent selection was done in two stages, first through random digit dialing, and then once a household was reached, the individual adult in the household who would be the respondent was selected using the most recent birthday method.

2.2.2.2 Data Collection

Interviews were conducted over the telephone between February 1st, 2000 and April 26th 2000. The interviewers received four hours of training, including a full review of the questionnaire and some background on problem gambling, before beginning their interviewing. One out of every 10 interviews was verified for accuracy by a supervisor. Interviews were conducted in French and English, with English-language interviewers dialing all provinces other than Quebec. Approximately 17% of the interviews were conducted in French (522). Women were slightly more likely to complete the questionnaire than men were, accounting for 54.5% of the survey sample (1,700). The interviews, on average, lasted about 17 minutes, but ranged from 4 minutes to 54 minutes in duration.

As a component of this study, a portion of the 3,120 respondents were re-interviewed to allow us to assess for time 1 to time 2 reliability. Sample for this reliability sub-sample was taken randomly, with roughly every fifth interview completed selected for re-sampling. Re-test interviews were conducted three to four weeks after the initial contact was made, and on occasion the gap was longer, if the respondent could not be reached. Field work for this study was conducted between March 1st, 2000 and April 30th, 2000. The final sample for this study was 417, and again, women were more likely to respond than men were, as they constituted 57.0% of the sample. Interview length averaged 12 minutes, and ranged from 4 minutes to 42 minutes.

The French language interviews for the general population survey were conducted later in the survey period than the English language interviews, due to time spent translating the questionnaire, and this meant that relatively few of the retest interviews were conducted in French (14 interviews or 3.5%). The field work provider was responsible for the translation, which they completed with the help of Lotto Quebec staff familiar with Francophone gambling language, but the translation process went through several iterations before a satisfactory version was available, hence the later start.

None of the respondents interviewed in the final two weeks in the general population survey were re-interviewed. Most of these respondents were Francophone. While timing was the major factor in the low number of French re-test interviews, the field work provider has suggested that this topic generally didn't "fly well" with the Francophone population, and that responses were more difficult to obtain in Quebec as a result. This may mean that more work is necessary on the French version of the CPGI, particularly in terms of an introductory piece that maximizes response.

Because a certain proportion of participants refuse to be re-interviewed (ranging from about 28% in the non-problem gambling group to about 5% in the group reporting 3-4 problems according to SOGS or DSM-IV – see Table 3, p.13), we felt it was important to address the issue of non-response bias for the re-test portion of the study. We anticipated that those who were less involved with gambling, or less likely to have gambling problems, would be more likely to

participate in the re-test portion. Table 2 below shows some key demographic and gambling involvement/problem indicators for the two groups, and gives an indication of the extent of the non-response bias. There is a slight tendency toward lower gambling involvement and problems in the re-test group, but these are very small differences.

Table 2 Characteristics of Re-Test and General Population Survey Samples – Key Variables for Assessment of Non-Response.

Indicator	General Population Survey	Re-test Sample
Length of Interview (mean)	16.8	16.2
Spending (mean)	$77.8	$72.3
Age(mean)	44.8	45.8
Sex (% Female)*	54.5	57.1
DSM 5+ (%)	0.7	0.5
SOGS 5+ (%)	1.3	1.0
SAMPLE SIZE	3,120	417

*percent female is given as this is the majority in this study, as in many general population surveys.

2.2.2.3 Data Analysis

The choice of analytical techniques was dictated by the research questions that we wished to address, and these are presented in the Results section that follows. Initial factor structure was assessed using a factor analysis procedure, and we chose to use the maximum likelihood extraction method which typically produces fewer factors and is generally seen as more robust with this type of data than other forms of extraction, and the varimax rotation, again, a standard approach for this type of data. Due to the complexity of the data, several iterations of models were tested before the best fit was found.

Factor analysis was followed by item by item analysis using reliability functions of the SPSS package, as well as correlational analysis, to determine which items correlated well with the clinical assessment interview results, as well as the DSM-IV results. The goal was to determine which item(s) were irrelevant to the CPGI. As with any statistical procedure, some items may be retained despite statistical evidence suggesting deletion in order to prove or develop a theory. In this case, retaining less-than-optimal items in terms of factor loading or reliability was not necessary. Once item analysis was complete, factor analysis was conducted once more on the newly pruned CPGI to confirm factor structure.

Data analysis of the test-retest data focused on assessing the reliability of the CPGI in comparison to the DSM-IV and the SOGS, and of individual items comprising the CPGI, in addition. Reliability was assessed using Cronbach's alpha.

2.2.2.4 Limitations

The analyses described above included summary variables that addressed spending on gambling overall and frequency of gambling overall as well as total number of gambling activities, but not gambling by type of activity. While gambling involvement is integral to monitoring gambling problems, difficulties determining the impact of spending in particular (due to income differences) as well as interactions with other indicators of involvement like frequency and duration of activity by each activity need to be the subject of a follow-up research project.

Similarly, the correlates' relationship with the CPGI was examined using a correlation analysis, but the correlates were not included in the factorial analysis, as they so obviously constitute a dimension of their own that is peripherally related to the central construct of problem gambling. While the correlates will not be scored, they may be used to develop profiles of different types of gamblers, and may be particularly useful in the assessment of those considered to be at low or moderate risk of gambling problems.

2.2.3 Clinical Validation Study

2.2.3.1 *Sampling*

Initially, we had planned to have clinicians interview 180 individuals to confirm the results of the quantitative surveys, but once we saw the results of the general population survey, this proved to be impractical. The first group of 90 was intended to be the top 3% of the sample in terms of scores on the DSM-IV and SOGS. The second group of 90 was to be a randomly selected group of other respondents. Given the goal of this portion of the research it seemed more reasonable to conduct fewer interviews and to break those interviewed into three groups.

The first group of roughly 50 people consisted of those who might be considered to have gambling problems. Those in this group scored 5 or more on the SOGS and/or the DSM-IV. Only 44 respondents met the requirements for this group, 33 of whom had agreed to be recontacted, and all of them were included in the sample for clinical assessment. The second group was composed of those who might be considered to be at risk, and this was determined by including those who scored 3-4 on the SOGS, and/or scored 3-4 on the DSM-IV. This group was composed of only 53 people, 51 of whom had agreed to be recontacted, and all of them were included in the sample. The final group was composed of those who were not at risk according to either of the measures. In order to make sure that we were not missing any individuals who might be at risk of gambling problems, this final group was composed of those who had scored 1-2 on either the DSM-IV or the SOGS or both. This group consisted of 345 individuals, 244 of whom had agreed to be recontacted. A small sample of those who reported being gamblers who had no problems was also included in the third group to take the total sample for the clinical validation group to 350. Table 3 below shows how the sample, and the completions, for this study were laid out.

Table 3 Sampling for the Clinical Assessment Interviews

Group	# in the Sample	# Agreeing to Recontact	% Agreeing to Recontact	# Completing Interview	% Completed (of those agreed)
Problem gambling (5+ SOGS/DSM)	44	33	75%	20	61%
At risk gambling (3-4 SOGS/DSM)	53	51	96%	21	41%
Low DSM/SOGS (1-2 SOGS/DSM)	345	244	71%	91	37%
No DSM/SOGS*	22*	NA*	NA*	16*	73%*
TOTAL	464	350	75%	148	42%

*Only 22 of those scoring nothing on the DSM IV or SOGS (2,678 in total) were included in this sample. All of them had agreed to be recontacted, and 16 were interviewed, for a completion rate of 73%.

The proportion that agreed to be recontacted is about 10% lower than average for surveys in general in Canada, and there are several possible reasons for this. First, the subject matter is very specific, which means that it is really of interest only to those who are at least regular gamblers (see the high recontact rate for those who might be called "at risk", for instance). It is this interest factor which we feel reduced the recontact rate for the low DSM/SOGS group. Secondly, the survey included some very sensitive questions about background and personal behaviour, which may have made heavier gamblers, or potentially problem gamblers, uncomfortable, leading to a refusal for recontact. Finally, the study was fairly long, as telephone interviews go, and repetitive because of the three different types of gambling problem measures included, and the lower than average recontact rate may be a reflection of the onerousness of the chore. This factor, at least, will be reduced in future applications of the CPGI.

The time frame for the clinical assessment interviews was relatively short and further, the time frame included the last two weeks of May and the month of June, which may have contributed to the relatively low response rates for the clinical validation interviews. All telephone numbers were called at least 10 times, at a variety of evening and weekend time slots, in an attempt to book interviews. An interview booker booked the interviews for the clinicians in English Canada, and the clinicians themselves booked the interviews in Quebec. Respondents were told that participation involved a short telephone interview, for which they would be paid $20.

2.2.3.2 Data Collection

The clinical assessment interviews were conducted by 10 clinicians, 8 in Ontario and 2 in Quebec. The Ontario clinicians were all affiliated with the Centre for Addictions and Mental Health, and all involved in the problem gambling clinical program at CAMH. All 8 had extensive experience with problem gambling and with telephone assessment and counseling (CAMH does a fair amount of telephone work). All of them had been working with clients with gambling problems for at least two years, and several were certified by the National Council on Problem Gambling, based in Washington, D.C. The 2 Quebec clinicians were certified clinical psychologists at a youth clinic at McGill University, both of whom had worked with youth with gambling problems in a treatment context. Many of the clinicians (both Quebec and Ontario) were also heavily involved in research in the field of problem gambling.

The clinicians were provided with a checklist, based on the CPGI survey (see Appendix 1), and asked to cover these areas in their interview in whatever way they thought best. They were asked to provide an assessment of the individual's gambling (not at risk, at risk or problem), as well as any qualifying information or background information elicited which was pertinent to assessing gambling problems. The goal was to have clinicians cover a standard list of topics, but to provide enough leeway to allow for each clinician to assess respondents according to their best clinical judgment. They were not given the CPGI scoring key, and did not know how their assessments would be used other than validation of survey responses.

Anecdotal evidence from the clinicians suggests that most interviews were about 20 minutes, on average. When respondents missed appointment times, clinicians were responsible for tracking them down and completing the interview. Clinicians were asked to be careful to repeat guarantees of confidentiality, and to reassure respondents that identifying information provided to allow for payment of the honouraria would not be connected in any way to the file containing their responses to the interviews.

2.2.3.3 Data Analysis

In the context of a validation study, analysis has thus far been limited strictly to data entry of the clinician's assessments of respondents as not at risk, at risk or problem, and to a review of the qualitative feedback in terms of identifying the thematic content of clinician's responses. In many cases, the assessments provided were qualified in some way, and this has meant that group placement was difficult in a number of situations (see limitations, below).

2.2.3.4 Limitations

It is important to note that these clinical interviews are unstandardized, with unknown reliabilty and validity. This must be taken into account when using the results to assess the CPGI. In this type of study, ideally clinician's assessments are cross-checked by having some interviewees interviewed by more than one clinician. Given the number of clinicians involved, and the burden on the respondent of answering another lengthy interview, we decided not to do this, but instead tried to recruit clinicians working together within one program (one in Quebec, one in Ontario) who might reasonably be assumed to have similar clinical approaches.

Another limitation is the study's relatively low response rate. Response rate may have been affected by the timing of the study, as most of the interviews were conducted in June. Typically it is more difficult to reach people at home in the summer months. Secondly, once a respondent missed an interview time, the clinicians were responsible for re-contacting and re-scheduling. The clinicians all had full time jobs outside of this study, and found it difficult to make enough attempts and to time attempts in order to reach respondents.

Another difficulty with interpretation of the results here is that the assessments provided by clinicians were often qualified, and as such, not as clear as quantitative analysis requires. For example, one clinician classified a senior citizen as "not at risk" for problem gambling, but suggested that he "would at be high risk in some circumstances for problem gambling – if spouse died for instance". This person's DSM and SOGS scores had placed him in the "problematic gambling" category, however, in the previous quantitative telephone interview. Another issue that clouded assessment in some cases was the presence of a mental health issue, which may have meant that the respondent's initial categorization was most likely inaccurate. Clinicians, on occasion, were barred from speaking with the respondent who had agreed to participate by an angry family member, and in those cases, the interviews were not pursued.

Finally, the subject matter itself is sensitive, and respondents may have felt unduly "targeted" when called for the follow-up study, despite our assurances to the contrary. This last point is

particularly important, given the number of people who had hostile reactions to being recalled, or whose relatives had hostile reactions when told why we were calling.

3. RESULTS

In this section, we provide the results of specific analyses used to address the validity and reliability of the CPGI. SPSS 9.0 for Windows is the statistical package used to conduct the analyses discussed in most cases, and exceptions are noted. The statistical data from the general population survey and prevalence estimates per se are not included in this report. The User Manual will include crosstabulations and frequency tables as reference material for the benchmarking of future studies.

3.1 Dimensions of the CPGI

Factor analysis was used to examine the underlying structure of the CPGI items. We anticipated that the dimensions initially posited (gambling involvement, problem gambling behaviour and adverse consequences) would be reflected in the factor structure, although the results from the pilot test had suggested that a unifactorial model might also be a possible fit.

The data reduction procedure used involves an initial extraction of factors, and then a rotation. We used the maximum likelihood method, which is the method that typically produces the fewest factors, and the varimax rotation, to examine the factor structure for all of the "scorable" items (DSM-IV, SOGS and CPGI items).

Is there just one or multiple dimensions underlying the CPGI individual items?

In order to determine the dimensionality of the CPGI, we conducted a factor analysis, as described above. Although the DSM-IV and SOGS items were included for validation purposes, it seemed prudent to include them in this factor analysis. These items have been tested and used for some time, and some might prove a better fit with the data than the CPGI items tapping the same dimensions. While this presents some problems for validation (see the validation section later in this report) it does result in a stronger index. For the factor analyses, the criteria used to determine the number of factors to rotate were:

- The a priori hypothesis that the underlying structure had 1 (as suggested by the pilot test) or 3 dimensions (as our theory leads us to believe: gambling motivation, problem gambling behaviour, and adverse consequences).
- The results of the scree plot test.
- The interpretability of the factor solution.

In these analyses, we included 46 variables, including all of the scored DSM-IV and SOGS items, all of the CPGI behaviour and consequences items, and three indicators of gambling involvement, an overall spending variable, an overall frequency variable, and an indicator for the total number of gambling activities in which the respondent engaged. The correlates were excluded (e.g., family background, big win or loss early in gambling career, use of alcohol or drugs while gambling etc.) in this round of analysis as they will not be scored. In addition, some items that were "scorable" were not included in this initial analysis, due to lack of variance (e.g., a dichotomous item that loaded heavily on one response or the other, usually a "no" response). Items excluded were:
- B24 "anyone told you they were concerned or upset with time or money spent gambling".
- B33 "asked others to help you out of serious financial difficulty as a result of your gambling".
- So13b "arguments centering on gambling".
- So16f "borrowed from loan sharks".

These items were included in the item analysis that followed the factor analysis, however.

The initial factor analysis, containing all of the DSM-IV, SOGS and CPGI items (except, as noted above, for some yes/no items with low variance) resulted in eleven factors with eigen values of more than one, accounting for about 56% of the variance. The scree plot was inconclusive, and it appeared that there were three possible models that would fit the data, a unifactorial model, a two-factor and a three-factor model.

The three-factor model was tested first, and it proved to have 3 interpretable factors that lined up much as anticipated along the lines of problem gambling behaviour, gambling involvement and adverse consequences. However, there was a great deal of cross-factor loading, with many items showing significant weights on more than one factor. There were also a number of items that had very low loadings on all factors, with the most significant loading less than 0.4. This 3-factor model explained 38.5% of the variance. Table 4 below shows the rotated factor matrix for this analysis.

Table 4 Rotated Factor Matrix – Initial 46-Item Factor Analysis

Item	Factor		
	1	2	3
b17 bet more than you could really afford to lose?	**.527**	.490	-093
b18 gambled as a way of escaping problems or to help you feel better when you were depressed?	**.455**	.358	-.098
b19 needed to gamble with larger amounts of money to get the same feeling of excitement?	.364	**.528**	-.231
b20 set yourself a spending limit for gambling, and then broken it?	.298	**.509**	-.097
b22 lied to family members or others to hide your gambling?	**.508**	.468	-.156
b23 go back another day to try to win back the money you lost?	.451	**.496**	.011
b25 gambling caused problems between you and any of your family members or friends?	**.600**	.278	-.149
b29 had difficulty sleeping because of gambling?	**.554**	.364	-.057
b30 gone without eating or sleeping, so you could gamble longer?	.274	**.455**	-.009
b31 borrowed money or sold anything to get money to gamble?	.334	**.453**	-.224
b34 unable to stop thinking about gambling, or how to get money to gamble?	**.500**	.230	-.034
b35 bet or spent more money than you wanted to on gambling?	.401	**.534**	-.078
b36a gambled for longer than you had planned?	.270	**.674**	-.043
b36b lost track of time?	.197	**.629**	-.079
b37 trance or a dream while gambling?	**.527**	.156	.008
b41 felt might have a problem with gambling?	**.783**	.288	-.072
b42 thought about stopping, or cutting down on your gambling?	**-.390**	-.314	.229
b43 tried to quit, or cut down on your gambling but were unable to do it?	**-.470**	-.226	.356
b44 gone to anyone, such as a friend, counsellor or GA, for help to control your gambling?	-.329	.068	**.397**

Item	Factor		
b46 any health problems, including stress or anxiety?	**.785**	.206	-.140
b47 any financial problems for you or your household?	**.644**	.419	-.242
b28 almost lost a relationship, a job, or an educational or career opportunity because of your gambling?	-.248	-.052	**.632**
so5 go back another day to win back money you lost?	.339	**.469**	.200
so6 claimed to be winning money gambling when you were, in fact, losing?	-.109	**-.435**	.182
so7 have had a problem with betting money or gambling?	**-.636**	-.146	.185
so8 gamble more than intended to?	-.274	**-.560**	.134
so9 criticised your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?	**-.404**	-.322	.210
so10 guilty about the way you gamble or what happens when you gamble?	**-.573**	-.357	.234
so11 would like to stop betting money or gambling but you didn't think you could?	**-.617**	-.257	.240
so12 hidden betting slips, lottery tickets, gambling money, IOUs or other signs of betting or gambling from your partner, children or other people in your life?	**-.408**	-.252	.341
so14 borrowed from someone and not paid them back as a result of your gambling?	-.171	-.331	**.544**
so15 lost time from work or school due to betting money or gambling?	-.242	-.062	**.572**
so16a borrow from household money?	**-.310**	-.150	.167
so16b borrow from partner?	**-.307**	-.008	.178
so16c borrow from other relatives or in-laws?	**-.358**	-.252	.328
so16d borrow from banks, loan companies or credit unions?	-.253	.020	**.326**
so16e borrow from credit cards?	-.133	-.177	**.347**
so16f borrow loan sharks?	.075	.072	**.758**
so16g cashed in stocks, bonds, or other securities so you could gamble or pay off gambling debts?	-.182	-.253	**.566**
so16h sold personal or family property?	-.139	-.216	**.571**
so16i borrowed on your chequing account by passing bad cheques?	-.002	-.110	**.539**
Frequency of Gambling	.038	**.289**	-.039
Total Spending/Typical Month	-.001	**.474**	.000
Number of activities	.084	**.452**	-.249
b32 stolen anything or done anything else illegal such as write bad cheques so that you could have money to gamble?	-.002	.004	**.565**
b45 felt irritable or restless when you tried to cut down or stop gambling for a while?	**-.637**	-.095	.411

Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 8 iterations.

Because of the significant cross-factor loading, the 2-factor model was also tested, and essentially, it resulted in a behaviour/involvement dimension, where the first two factors from the three-factor model combined, and a consequences factor. This model explained 35% of the variance. Again, significant factorial complexity meant that this model was less than ideal.

Finally, we examined a unifactorial model, with a single factor explaining 28.6% of the variance. This model had a number of items with very low loadings (less than 0.4). All of the borrowing items from the SOGS screen had loadings of less than 0.4, as did help seeking (b44), claiming to be winning when losing (so6), having lost time from work or school due to gambling (so15), having stolen something or done something else illegal to finance one's gambling (b32), and all 3 of the gambling involvement indicators (frequency of gambling, spending, and number of activities).

Given that none of the three models were ideal, we decided to proceed with the 3-factor model to the item analysis stage, as we expected that the item analysis process would clarify factor structure significantly.

3.2 Item Analysis

Based on the previous factor analysis, it was clear that specific item-by-item analysis was the next step in analysis. The first question we needed to answer was:

<u>Are there items that can be excluded from the CPGI based on irrelevance, redundancy or low reliability?</u>

Before proceeding to individual item analysis, we conducted a reliability analysis, to determine whether or not there were any items that were obvious candidates for deletion due to low reliability. This process is based on the computation of an alpha for the set of items as a whole, and then a list of the included variables with an attached alpha for the scale as a whole if the specific variable is deleted. After four rounds of reliability analysis, we had improved the scale's alpha from 0.927 to 0.928, and deleted 9 items, most of which had loaded on factor 3, the adverse consequences factor (see Table 4 above). The items deleted at this stage were:

- When you gamble, how often do you go back another day to win back money that you lost? (so5)
- Have you claimed to be winning money gambling when you were in fact losing? (so6)
- Borrowed from your partner to pay gambling debts or to gamble (so16b)
- Borrowed from banks, loan companies or credit unions (so16d)
- Borrowed from credit cards (so16e)
- Borrowed from loan sharks (so16f)
- Sold personal or family property (so16h)
- Borrowed on your chequing account by passing bad cheques (so16l)
- Stolen anything or done anything else illegal such as write bad cheques for money to gamble (b32)

Item analysis was conducted on the remaining variables, plus the dichotomous variables originally excluded from the factor analysis (b24 "anyone told you they were concerned or upset with time or money spent gambling; b33 "asked others to help you out of serious financial difficulty as a result of your gambling"; and so13b"arguments centering on gambling" – so16f was eliminated in the reliability testing).

Item analysis was used as the follow up procedure to factor analysis for three reasons. First, we were able to include the items with low variance that the factor analysis procedure will not accept

(as noted above). Second, item analysis allowed us to more rigorously examine the need for removal of low-loading items. Finally, this procedure helped to clarify data structure, allowing us to determine whether or not individual factors should be interpreted as indexes or scales in their own right.

Item analysis involves computing correlations between each item and the sum of the items belonging to the same factor. This process clarifies factor structure. At this stage, we deleted items that were clearly irrelevant due to low correlations with factors (less than 0.5), items that were redundant (several SOGS items were re-written and included as CPGI items, for instance), or just confusing, in that they loaded moderately on several different factors.

Five items were deleted in the first round of item analysis due to very low correlations with the individual factors and with the index total (less than 0.5):

- Asked for help with serious financial difficulty resulting from gambling (b33).
- Unable to stop thinking about gambling or how to get money to gamble (b34) .
- Been in a trance while gambling (b37).
- Money arguments resulting from gambling (so13b).
- Borrowed from relatives or in-laws to gamble or pay gambling debts (so16c).

Two more items were deleted at this stage as a result of duplication of subject matter. Which item to delete was determined using correlations between items, and the factor loadings from the item analysis.

- Gambled more than intended to (so8) –duplicated b35 and b20 – high correlations between all 3 but b35 had the best factor loading.
- Set spending limit and broken it (b20) –as above –duplicated s08 and b35 – b35 was retained.
- Lost track of time (b36b) – high correlation with b36a, and b36a had a better factor loading.

In the second round of item analysis, there were still a number of significant cross-loadings between the first and second factors, and occasionally the third factor. At this stage, we chose to delete items with low loadings on the total, summary score (less than 0.5). Six items were deleted at this stage:

- Lost time from work or school due to gambling (so15).
- Cashed in stocks, bonds or other securities for money to gamble or pay gambling debts (so16g).
- Almost lost a relationship, job or educational or career opportunity due to gambling (b28).
- Gone without eating or sleeping so you could gamble longer (b30).
- While gambling, gambled for longer than you had planned (b36a).
- Thought about stopping, or cutting down on your gambling (b42).

In the third round of item analysis, only one item had a low overall loading (less than 0.5) and this one item was deleted -- Borrowed from someone and not paid them back due to gambling (so14). After the third round of item analysis, the item total was at 20, and all items had good factor loadings, but the factor structure was still not clarified.

The next step was a factor analysis with the 20 remaining items, using the procedure described above in the factor analysis section. This analysis produced 3 factors with eigen values of 1 or more, but the scree plot strongly suggested a unifactorial model. The unifactorial model was extracted, and accounted for 35% of the variance, but again, some items had low loadings.

The focus changed after the factor analysis, and we examined the remaining 20 items in light of their correlations with DSM-IV scores, factor loadings, SOGS scores and clinical interview results, in that order of importance. Two items with duplicate subject matter were eliminated at this stage:

- Felt had problem with betting or gambling (so7) – high correlation with b41 – b41 had much better correlations with DSM-IV, SOGS and clinical interview results, as well as a higher factor loading.
- Anyone said they were upset or concerned about time or money you spent on gambling? (b24) – duplicated so9 (people criticized your gambling). Factor loadings and correlations with DSM-IV were about the same, but so9 did better on correlations with the SOGS and clinical interview results.

The remaining 18 items were examined in great detail as the table below shows. The items were divided into two categories, problem behaviours (11 items) and adverse consequences (7 items). In terms of suitability these items were in most cases very similar, and the choice between items was based on our conceptual model, which places more emphasis on social context variables and consequences than other measures. The following is our rationale for the items retained, and while different choices might have been made, we are confident that we have selected the 9 items that have both the best empirical fit with the data as shown in Table 5 below, and the best conceptual fit with our definition of problem gambling. The nine items retained were:

- Bet more than could really afford (b17) – this variable had good correlations with the DSM-IV, the SOGS , and the interviews, more impact on reliability than many of the other items, and a good factor loading. While there is some overlap with b47 (financial problems – correlation of .46) we feel the two items are conceptually distinct in that this item relates to personal behaviour, while the financial problems item relates to *household* consequences.
- Needed to gamble with more money to achieve the same excitement (b19) – this item is a DSM-IV item, and so has good correlation with the DSM-IV, and moderate correlations with SOGS and interview results. Factor loading and reliability statistics were reasonably good. This item and b23 (next) were chosen chiefly because they are DSM-IV items, and so capture the more severe end of the gambling problem spectrum very well.
- Going back another day to win back money lost (b23) – this item is taken from the DSM-IV measure, and so had a good correlation with DSM-IV, as well as the SOGS and interview scores. In general, because the problem end of the spectrum in terms of gambling behaviour is relatively easy to measure or robust, we felt that we could use fewer items tapping the severe end of the spectrum.

Table 5 Comparison of Last 18 items on Relevant Correlations and Reliability

Item	Correlation with DSM	Factor Loading	Correlation with SOGS	Correlation with interviews	Reliability*
BEHAVIOURS					
B41—felt might have problem	.61	.78	.61	.43	.9027
So11—like to stop betting didn't think could	.52	-.56	.52	.16	.9076
So12 --hidden betting slips etc.	.36	-.49	.36	.13	.9095
B17—bet more than afford to lose	.56	.64	.51	.35	.9056
B18—Gamble to escape	.60	.49	.43	.31	.9095
B19 – need gamble more money same excitement	.62	.52	.49	.21	.9082
B22—lied family members/others to hide gambling	.57	.61	.46	.15	.9065
B23—went back another day to win back lost money	.66	.49	.54	.32	.9093
B31 borrowed/sold something for money to gamble	.47	.53	.47	.22	.9081
B35 bet/spent more than wanted to	.47	.52	.47	.22	.9083
B43—tried quit/cut down but unable to	.62	-.50	.62	.26	.9090
CONSEQUENCES					
So9—others criticized betting or gambling	.45	.58	.53	.43	.9073
S010—felt guilty about gambling	.51	.59	.62	.33	.9065
B29—difficulty sleeping	.45	.51	.38	.42	.9089
B46—health problems	.52	.67	.54	.49	.9054
B47—financial problems	.61	.70	.54	.23	.9046
B45—restless/irritable when tried to stop/cut down	.66	.66	.56	.23	.9056
B25—problems with family or friends	.51	.66	.49	.36	.9057

*Reliability refers to the reliability of the scale as a whole if the item is deleted – the more reliable the item, the lower the figure.

- Borrowed money or sold anything to gamble (b31) – All correlations were moderate, as were factor loading and reliability statistics. This item was chosen because of its conceptual importance in the gambling field – borrowing is a key indicator of problem status, and while there is some overlap with b17 (bet more than could afford – correlation of .35) and b47 (financial problems – correlation of .42) we felt that is was a critical variable to include.
- Felt might have a problem (b41) – If the scale were to be reduced to one item, this would be it. High correlations with all other measures, strong impact on reliability, and very strong factor loading.
- Health problems related to gambling (b46) – this one covers off a number of other important items. We felt that if we included this item, we could leave out b45 (restless or irritable when attempting to cut down – correlation of .53) and b29 (difficulty sleeping – correlation of .53 also). Moderate to good correlations with other measures, good factor loading, and strong impact on reliability also made this item a good candidate for retention.
- Financial problems related to gambling (b47) – as noted above, considered to be a good indicator of the social context of gambling because it is framed as a household item, despite some overlap with b17 and b31. Good correlations with DSM-IV and SOGS, high factor loading and good impact on reliability were also important determinants for retention.
- People criticized your betting or told you that you had a gambling problem (sogs9) – moderate to good correlation with all measures, but for this item, the most important factor for retention was its bearing on the social context of gambling. There was duplication between so9 and b25 (problems with family or friends – correlation .44), and the two items were roughly equal in terms of correlations with measures, so so9 was retained to allow for easier comparisons with the SOGS scale.
- Felt guilty about gambling (so10) – moderate to good correlation with all measures, reliability and factor loading also good. Conceptually, this behavioural item gets at social context indirectly, in that guilt results from a failure to meet responsibilities. This item also has the benefit of direct comparisons with SOGS scores.

A final factor analysis showed that this nine-variable, unifactorial model accounted for 38.3% of the items' variance, and had good actor loadings for all variables (at least 0.5).

3.3 Confirmatory Analysis

In order to confirm that a unifactorial model was the best fit for this data, we conducted a parallel confirmatory analysis. The skewness of the data (the very low proportion of people with gambling problems) can result in the appearance of spurious factors, and the parallel confirmatory analysis allowed us to rule out the existence of other factors in our data with conviction.

Traditionally parallel analysis has involved comparing the size of eigen values from the real data to the size of eigen values from simulated data with no factors present. Turner (1998) however found that when a real factor is present in the data, the size of subsequent "noise" eigen values was reduced. He also demonstrated that creating a simulated data set modelled closely after the true data could improve the accuracy of parallel analysis methods.

A parallel analysis of the data was conducted to determine what the eigen values would look like if there were only one true factor. Twenty-one gambling problem items were used for this analysis. These items were :

b17 b18 b19 b22 b23 b25 b29 b31 b34 b35 b41

b43 b45 b46 b47 so9 so10 so11 so14 so15 so16b

An initial factor analysis produced 4 eigen values greater than 1.0 suggesting 3 to 4 possible factors. The first eigen values was 7.2692, representing over 33% of the total variance, the three

remaining eigen values over 1.0 were 1.37177, 1.16658, and 1.02936. Given the large sample size, if the data were continuously distributed these eigen values would almost certainly represent real pockets of common variance. However given the skewed and discrete nature of this data, these eigen values might be due to chance.

A fake data set modeled closely after the real data (see Turner, 1998) was used to test for the presence of other factors. This method has an advantage over other methods in that it takes into account the effect of the distribution of the items so that you can determine what sort of factor structure could have created the observed data.

Parallel data was created using a Microsoft Qbasic program in which a person is first given a factor score using the RND function of the computer (from .0 to .99). This factor score is constant across items for that person. Then 21 new variables were created by adding some random variance to this factor score.

(1) $vx = factor * .88 + rnd * .12$

Notice that the loading of the factor score is very high (.88), so that most of the variance of vx comes from the factor score. Thresholds were then used to categorize the data into a frequency distribution modeled after each of the variables.

(2) $var(x) = 0$

         if $vx > .83$ $var(x) = 1$
         if $vx > .93$ $var(x) = 2$
         if $vx > .95$ $var(x) = 3$

This produced distributions very similar to the actual data, but had to be adjusted several times until the frequency of each of the items was reproduced. Since some of the data is dichotomous and the items vary in frequency, seven sets of different parameters were created so that the final result had items with distributions very similar to each of the variables in the real data. These parameters for the data were arrived at through a process of trial and error, until frequency analysis indicated that the fake data were very similar to the real data. In addition, the loading of the factor on the items was adjusted until the loadings on the first factor in factor analysis mimicked the real data, and the size of the first eigen value in the fake data was virtually the same as the first eigen value in the real data. The only difference was that with the fake data we know for certain that it has only one factor.

The fake data was factor analysed to see if it would produce a factor structure similar to the real data. Our expectation based on past experience with unifactorial data was that the factor structure of the fake data would have only one eigen value over 1.0. To our surprise the fake data with only one factor produced a distribution of eigen values almost identical to the real data. This procedure was conducted 11 times, each time the results confirmed that the real data was most likely produced by a single factor. For example, the 2nd eigen value from the real data was 1.37. The 2nd eigen value from the fake data ranged from 1.17 to 1.58, completely overlapping with the real data. Using +/- 2 times the standard deviation it was computed that the lower confidence level for the second eigen value is 1.07 and the upper confidence limit is 1.59. The same result was found for each of the noise eigen values. The noise eigen values from the parallel data are very similar to the real data and suggest very strongly that the real data contains only one real factor, and that thee other eigen values over 1.0 are just random noise. Figure 1, graphically shows the 95% confidence interval for eigen values the second through 21st eigen values, as would be created by pure chance given with discrete and skewed distributions and a single factor loaded on all items with an eigen value of 7.26. The line following between the upper and lower confidence lines shows the 2nd to 21st eigen values for the real data.

Figure 1
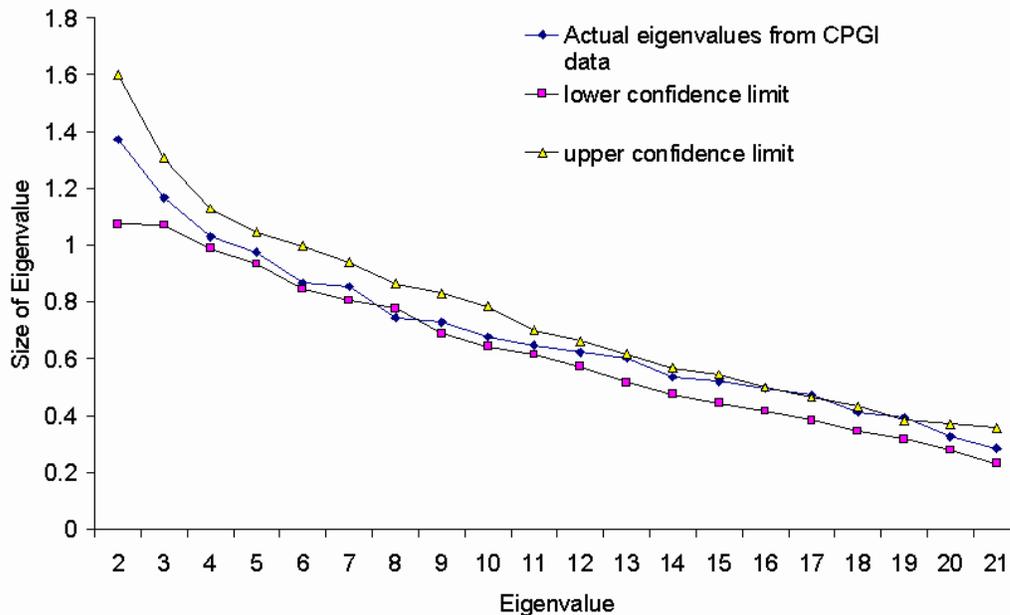
These findings suggest that if you have a unifactorial set of data, highly loaded on the first factor, but the data is discrete (2 or 4 point scale) and very skewed, the result will be a number of noise eigen values over 1.0. No evidence was found that these eigen values were not produced by chance combinations of the discrete and skewed data. The fact that some of these eigen values may be interpretable may say more about the constructive ability of the human mind than about the nature of the data set.

What is particularly interesting is that in order to create the observed parallel data we had to use a very high loading of the factor on each item, .88. This suggests that the true correlations between these items are in fact very high. If the data that we used in this study were analysed as continuous variables, only one eigen value would be greater than 1.0 and it would account for over 90% of the total variance. That is, in order to get the pattern of eigen values we found in this data, the true loadings have to be extremely large and the data, very strongly unifactorial.

The same procedure was also carried out using the final 9-item data set, the final set of CPGI items, and the same conclusions were found. The CPGI items appear to be strongly unifactorial.

3.4 Use of Correlates

What about the correlates, how will they be used in the CPGI?

The correlates were examined in terms of their relationship to gambling group, and with the exception of the age when the respondent first gambled, all of the correlates showed small but statistically significant correlations with the CPGI. The strongest correlations (still quite small) are shown in Table 6, below. These correlations may under-represent the relationships between the correlates and problem gambling because of the nature and skewness of the data. We typically

use the Pearson Product-Moment correlation, and this type of correlation assumes that the variables correlated are quantitative (e.g. not dichotomous or categorical) and have a normal distribution. While the procedure is fairly robust, the inclusion of variables that violate this assumption and the use of a skewed data set like the one we are examining in this study can lead to an underestimate of the correlations between variables. The correlations shown here in Table 6 are as expected, in the low to moderate range. For the sake of comparison, with the Pearson statistic, values of 0.10, 0.30 and 0.50 are interpreted as small, medium and large coefficients, or effect sizes, respectively (Green, Salkind and Akey, 1997, p.236).

Table 6 Correlations between the CPGI and Correlates

Item	Correlation with CPGI*
Gambled while drunk or high	.30
Gambled to escape something painful	.35
Used alcohol or drugs while gambling	.21
Remember big win	.22
Remember big loss	.22

*All correlations significant at the 0.01 level (2-tailed).

At this stage, no correlates will be used in the CPGI as scored items, however, with the exception of age when first gambled, these variables are all included in the CPGI for the purposes of comparison between gambling groups and profile development. The role of these variables in profiling can be seen in the discussion of construct validity (see p. 42).

3.5 Reliability of the CPGI

How reliable is the CPGI in comparison to other measures?

The reliability of the 9-item CPGI is examined using two methods. First, Cronbach's alpha reliability coefficient is computed, which provides an indication of the internal consistency of the measure. It compares well with the DSM-IV and SOGS reliability figures, as Table 7 below shows. Scale reliability and consistency tend to be related to the number of items in the scale, with more variables meaning a more reliable, consistent scale. The fact that the CPGI reliability is very good with only nine items reflects the inclusion of likert-type, multiple-point scales for response options. The more variability there is to individual items, the more reliable is the scale as a whole. All but two of the nine CPGI items have 4-point response scales. The remaining two items are adopted SOGS items, and so are dichotomous (yes/no) items.

Table 7 Reliability of CPGI, DSMIV and SOGS Measures

Measure	Number of items in measure	Alpha
CPGI	9	0.84
DSM-IV	10	0.76
SOGS	20	0.81

The reliability of the sub-components of the CPGI was assessed, as well as the CPGI as a whole. The two DSM items were checked for reliability, and for correlation with the full DSM-IV score and the CPGI score. The two SOGS items were checked for reliability together, and then for correlation with the full SOGS score and the CPGI score. The remaining CPGI items were looked at together for reliability, and then were examined with reference to their correlation to the CPGI score as a whole. The results of these analyses are presented in Table 8, below.

Table 8 Reliability of Individual Components of the CPGI

Component	Reliability	Correlation with DSM-IV Score	Correlation with SOGS Score
2 DSM Items (b19, b23)	.50	.79	.63
2 SOGS Items (so9, so10)	.48	.60	.71
5 CPGI Items (b17,b31,b41,b46, b47)	.80	.74	.72

The DSM items correlate well with the DSM score, and the two SOGS items included correlate reasonably well with the full SOGS score.

The second method for examining reliability is to re-test the same people on the same measure. For this validation study, we re-surveyed 417 of the original 3,120 for this purpose. Table 9 (below) shows the Pearson Product-Moment correlation coefficient for the three measures included in the survey. The DSM-IV measure has the highest reliability across time, with a correlation coefficient of 0.91. The CPGI follows with a test-re-test reliability of 0.78, and then the SOGS at 0.75.

Table 9 Test-Retest Reliability of CPGI, DSMIV and SOGS Measures and CPGI Items

Measure or Item	Correlation*
CPGI	0.78
DSM-IV	0.91
SOGS	0.75

*All correlations significant at the 0.01 level (2-tailed)

3.6 CPGI Scoring

In Phase I of this research we laid out four categories of gambling behaviour which we expected to see reflected in the results of Phase II. We expected to group respondents into non-gambling, non-problem gambling, at risk gambling, and problem gambling categories. These categories correspond to those used by Shaffer, et al.(1997) with the exception of one category. Shaffer et al chose to subdivide problem gambling into level 3, problem gambling, and level 4, those in

treatment for problem gambling. We also chose to use slightly different labels, labelling behavior rather than individuals.

In this study, our analysis suggested that we should split the non-problem group into non-problem and low risk groups, and call what had previously been the "at risk" group the moderate risk group.

Group characteristics are discussed below, as are the cut-off points used to determine group membership, and the differences between the groups are tested in the section on construct validity (see p. 42, Table 17).

Non-gambling: respondents in this group have not gambled at all in the past 12 months, and will have been skipped through the majority of the questionnaire, with the exception of the correlates section. Non-gamblers may have some of the correlates of problem gambling. This information is important in the context of long-term tracking, in that the correlates may predict those who were once or may become gamblers or problem gamblers.

Non-problem gambling: Score of 0 on the CPGI.
Respondents in this group will have responded "never" to most of the indicators of behavioral problems, although there may well be a frequent gambler with heavy involvement in terms of time and money. The "professional" gambler would fit into this category. This group probably will not have experienced any adverse consequences of gambling, nor will they agree with the distorted cognition items. Again, the information on correlates here is important for comparative purposes, and would be particularly useful in long-term tracking.

Low risk gambling: Score between 1 and 2.5 on the CPGI
Respondents in this group will have responded "never" to most of the indicators of behavioral problems, but will have one or more sometimes or more often responses. Gamblers may be at risk if they are heavily involved in gambling and if they respond positively to at least two of the correlates of problem gambling. This group likely will not have experienced any adverse consequences from gambling.

Moderate risk gambling: Score between 3 and 7.5 on the CPGI
Respondents in this group will have responded "never" to most of the indicators of behavioral problems, but will have one or more "most of the time" or "always" responses. Gamblers may be at risk if they are heavily involved in gambling and if they respond positively to three or four of the correlates of problem gambling. This group may or may not have experienced adverse consequences from gambling.

Problem gambling: Score between 8 and 27 on the CPGI
Respondents in this group are those who have experienced adverse consequences from their gambling, and may have lost control of their behavior. Involvement in gambling can be at any level, but is likely to be heavy. This group is more likely to endorse the cognitive distortion items. The correlates may be useful here in profiling capacity, as we would anticipate that this group would respond positively to more of the correlates than members of other groups, on average.

Once the survey data had been collected, we reviewed which items could be considered "scorable". Essentially, these are items related to gambling behaviour or consequences of that behaviour. Gambling involvement was considered as potentially scorable, but it didn't correlate well with the other "scorable" items, nor did it line up in terms of factor loading with other indicators of problem gambling. Correlates of gambling, by their nature, are not scorable. Although important, they have not been empirically shown to have the same direct relationship with problem gambling that the behavioural and consequences items have demonstrated. This means that, while the CPGI is composed of 31 items, only 9 are used to score for the prevalence of problem gambling.

Several scoring schemas were evaluated to determine the best fit with the data. We evaluated the scoring schema based on correlation with the other gambling measures, sensitivity and specificity with specific emphasis on the DSM-IV criteria (but also other measures) ease of administration, and also resulting prevalence rates. We expected the prevalence rate obtained to be somewhere between the SOGS and DSM-IV values. The weighting schemas evaluated are outlined briefly below.

1) Dichotomous Weighting.

- Dichotomous items - each "yes" positive response to an item was counted as 1
- 4-point response items treated like dichotomous items -- anything other than "never" was scored as 1 (so sometimes, most of the time, almost always treated equally).
- Nine items were scored.
- Scores varied from 0 to a maximum of 9, therefore.

2) Individual Item Weighting.

- Item weights were calculated on an individual, item by item basis to determine if the top two categories should be weighted equally.
- In most cases, for the 4-point items, the top 2 response categories were functionally equivalent answers (most of the time and always treated the as the same).
- Dichotomous items were weighted so that a positive answer was roughly equivalent to the weight given to the top 2 categories on the 4-point response scale items.
- Nine items were scored.
- Scores varied from 0 to a maximum score of 2.92.

3) Simple Weighting.

- Items were given integer weights that weren't item specific.
- All 4-point items were treated the same way, as were the two dichotomous variables.
- Weights were: Never=0, sometimes=1, most of the time=2, and always=3, yes =2.5
- Nine items were scored.
- Scores varied from 0 to a maximum score of 21.

As the first step in evaluating these scoring systems, the correlations with DSM-IV, SOGS and the interview results were examined (see Table 10, below). The individual item-scoring schema, while more complex and difficult to administer, shows minimal improvement in correlation with other gambling measures over the simple weighting schema. Correlation with the DSM-IV was deemed most important, followed by SOGS and finally interview results.

Table 10 Correlations between Weighting Schema and Gambling Measures*

Weighting Schema	DSM	SOGS	INTERVIEWS
Dichotomous	.81	.80	.54
Individual Item	.85	.82	.47
Simple	.83	.83	.48

* All correlations are significant, two-tailed, at 0.01.

The next step in the evaluation was an examination sensitivity and specificity of the weighting schemas using likely cut-points. For the figures given in Table 11 below, and by epidemiological convention, we are assuming that the comparison measure in each case is the "right" or "true" one. Two figures are given for each comparison. The first is sensitivity, which means, for example, the proportion of actual problem gamblers according to the reference measure who scored as problem gamblers on the CPGI weighting scheme. The second is specificity, which in this case means the proportion of those who did not score as having gambling problems on the reference measure who also score in the non-problematic range on the relevant CPGI scheme.

Cut points for each weighting scheme were determined with the goal of maximizing sensitivity and specificity, specifically with reference to DSM-IV. These cut points were then tested against the SOGS and the clinical interview results.

Table 11 Sensitivity and Specificity of Weighting Schema vs. Other Gambling Measures

Weighting Schema		VS. DSM	VS. SOGS	VS. Clinical Interviews
Dichotomous		78%	69%	78%
78%		100%	100%	94%
94%				
Individual Item		78%	64%	69%
	Sensitivity	100%	100%	100%
	Specificity			
Simple		83%	62%	78%
	Sensitivity	100%	100%	100%
	Specificity			

The simple weighting schema did particularly well in terms of sensitivity with reference to the DSM-IV measure, and also against the clinical interview results (see Table 11, above). All of the measures look good with regard to specificity because the underlying data are so skewed. Almost the entire sample is in the non-problem gambling group, so they are relatively easy to capture.

The final factor in the evaluation of the weighting schemes was the examination of prevalence rates, as a "common sense" check. As noted above, we anticipated that prevalence rates for problem gambling would fall somewhere between those obtained using SOGS and the DSM-IV. For the sake of comparison, we also looked at "at risk" gambling and cut off points (see Table 12, below).

The dichotomous weighting is the most generous with larger percentages in both problem and at risk groups. The individual item weighting is the closest to DSM-IV. The simple weighting is most like what we anticipated, with problem rates between DSM-IV and SOGS and "at risk" rates somewhat higher, given the inclusion of more items reflecting the social context of gambling.

Overall, the best weighting schema in terms of fit with the data and appropriate results appears to be the simple one. It has very good correlation with other gambling measures, strong sensitivity and specificity with specific reference to the DSM-IV criteria (but also other measures), is much easier to administer than the individual item weighting, and results in prevalence rates that look much as we expected them to look, given the content of the CPGI index.

Table 12 Prevalence Rate Comparisons between the Weighting Schema and Other Gambling Measures

Measure or Weighting Schema	Prevalence Rates	Cut off Points
DSM-IV --Pathological Gambling	0.7	Score of 5 or more
SOGS --Probable Pathological Gambling -- At Risk	1.3 1.3	Score of 5 or more Score of 3 or 4
Dichotomous -- Problem -- At Risk	1.1 3.4	Score of 7 or more Score of 3 to 6
Individual Item -- Problem -- At Risk	0.9 1.3	Score of 1.09 or more Score of 0.5 to 1.08
Simple -- Problem --Moderate Risk	0.9 2.4	Score of 8 or more Score of 3 to 7.5

For the sake of comparison, prevalence rates for problem gambling obtained using the CPGI with the final scoring schema selected, the simple scoring system, are shown in Table 13 below for Canada as a whole and various regions.

Table 13 Comparison of Prevalence Rates by Different Measures

Region (Sample Size)	CPGI		DSM-IV	SOGS	
	Moderate Risk (%)	Problem Gambling (%)	Pathological Gambling (%)	At Risk (%)	Probable Pathological Gambling (%)
CANADA (3,120)	**2.4**	**0.9**	**0.7**	**1.3**	**1.3**
ATLANTIC (406)	2.5	1.2	1.0	0.7	1.7
QUEBEC (598)	2.5	0.5	0.7	1.2	1.0
ONTARIO (871)	2.6	1.0	0.7	1.6	1.7
MAN/SASK (420)	2.1	1.4	1.2	1.4	1.7
ALB/BC (825)	2.0	0.6	0.9	1.3	0.9

In conclusion, the cut-off scores for the groups were determined with respect to the distribution of scores on the problem gambling continuum. It is important to keep in mind that we are clumping a *continuous* variable, and that no scheme is perfect. However, the system we've outlined in this report has some advantages:

- These groups represent a practical division in terms of what to DO with the groups once identified. The groups as they stand are possible targets for prevention (primary, secondary, and tertiary).
- The grouping represents sound epidemiological practice, in that any indication of problematic behaviour is scored as potentially at risk.

The low end of the problem gambling spectrum (non-problem gambling) and the high end of the problem gambling spectrum are fairly easy to identify. We would agree that more research is necessary in order to provide a strongly supported division between low and moderate risk groups. However, we feel that we have sufficient empirical evidence to make an initial distinction between groups (see the table below). What may change the dividing line between the two groups in future research is likely to be responses to specific variables, the gambling involvement items (e.g. type of game), and potentially even responses to gambling correlate items. This work is well beyond the scope of this project, however.

Table 14 Comparison of Prevalence Scores and Correlates by CPGI Gambling Group Classification

Correlates	Problem Gambling (Mean)	Moderate Risk (Mean)	Low Risk (Mean)	Non-Problem (Mean)
DSM-IV Score	2.5	1.43	1.01	1.00
SOGS Score	2.9	1.68	1.07	1.00
Spending /typical month	$539	$207	$238	$65
Frequency of Gambling (higher=more often)	5.9	5.7	5.1	4.2
Average # correlates reported	6.0	4.2	2.8	1.3
Average # adverse consequences reported	3	1	.25	0
Average age	38	37	40	44
Percent female*	39%	26%	45%	55%
SAMPLE SIZE	28	74	212	2,367

*percent female is given as this is the majority in this study, as in many general population surveys – see Table 2.

If we look at what group those who simply score a "sometimes" as their highest score, in addition, it becomes clear that there is a justification for dividing groups into low and moderate risk, and for the drawing of the dividing line where it currently is. About 97% of the people that scored 1 or 2 on the CPGI as a whole scored sometimes on 1 or more items. That is, sometimes was the most frequent response to a problem indicator -- they did not report "most of the time" or more frequently on ANY items. Further, 90% of those that scored 3 or more on the CPGI as a whole (our moderate risk group, currently) also responded more frequently than "sometimes" on some items or responded to one of the 2 point scale items (SOGS items. What this shows is that the majority of people that are currently classified as at moderate risk score higher than "sometimes" on at least some of the CPGI scored items.

Also, we have identified two items as "low threshold" items on the CPGI. That is, these are the items endorsed most frequently of the 9 scored items. Nearly 80% of the people who scored less than 2 on the CPGI responded to one of the two low threshold items. These were items included to provide a better indication of low level risk, and that, it appears, is how they are functioning.

Table 15 Frequency of "Sometimes" Responses by CPGI Gambling Group Classification

Frequency of "Sometimes"	Non-problem (0)	Low Risk (1-2.5)	Moderate Risk (3-7.5)	Problem (8-21)
0	2,806			
1		167	11	
2		5	103	28
Total	2,806 (89.9%)	172 (5.5%)	114 (3.7%)	28 (0.9%)

In conclusion, we would suggest that while no classification system is perfect, there is have sufficient empirical justification to support the system proposed in this report.

3.7 Classification Accuracy of the CPGI

How well does the CPGI discriminate between gambling groups?

Although discriminant capability is important to the CPGI, it is important to note that we do not want to duplicate the categories used in previous measures. As Shaffer et al. (1997) noted, there is no real "gold standard" in the measurement of problem gambling, and therefore some difficulty establishing what the "true" prevalence rate might be in population research.

The CPGI was conceptualized as, and developed as, a measure that would elicit a more normal distribution of responses than clinically derived measures like the SOGS and the DSM-IV. While it is expected that there will be agreement in terms of those who exhibit the most problematic gambling behaviour, we expect to see less convergence in the middle range.

The first analysis conducted to assess the discriminant capacity of the CPGI was a correlation analysis, showing how well the CPGI correlates with the DSM-IV and SOGS measures, as well as the results of the clinical assessment interviews we conducted as a part of the CPGI validation process. We would expect that they would be at least moderately correlated, given that the SOGS and DSM are both based on earlier version of the DSM criteria, and five of the nine CPGI items are drawn in one form or another from these two measures. Table 10, in the previous section, shows that the CPGI correlates with both the DSM-IV and the SOGS at 0.83, which is a strong correlation, and with the clinical interview results at 0.48, which is a moderate correlation.

Clinical assessment interviews are often considered the "gold standard" in terms of assessment, but as noted above, there are some caveats to bear in mind. A "gold standard" is by necessity a theoretical construct, which is used to define a "case" (Sox, Blatt, Higgins and Martin, 1988), and is rarely if ever realized in practice (Kraemer, 1992). These interviews were conducted over the telephone, and the average interview was less than half an hour long, which means that there was not a great deal of personal contact or time to establish a rapport with respondents.

The clinicians involved in the validation interviews were asked to assess clients' gambling involvement pattern as "at risk", "not at risk" or "problem gambling", and these assessments were numerically coded and used here for comparative purposes. However, as is often the case with qualitative data, assessments cannot be considered definitive, and were often provided on a conditional basis. For example, one clinician classified a senior citizen as "not at risk" for problem

gambling, but suggested that he "would at be high risk in some circumstances for problem gambling – if spouse died for instance". This person's DSM and SOGS scores had placed him in the "problematic gambling" category, however, in the quantitative telephone interview. There were at least two individuals interviewed, in addition, who had unspecified mental health issues which may have meant that their initial categorization by the quantitative telephone interview was most likely inaccurate.

In light of these limitations, it is difficult to support the use of the clinical validation interviews as the "gold standard". While they provide valuable information, it must be used in conjunction with the other information available, the DSM-IV and SOGS scores.

The next step in evaluating the CPGI's discriminant capacity is a comparison of the classification structure of the CPGI in comparison with the SOGS, DSM-IV and clinical assessment interviews. This was shown in Table 13, above. Categorizations according to the CPGI (simple weighting) were compared to the DSM-IV, the SOGS, and the clinical assessment interview precisely because of the lack of a single definitive "gold standard" to use as a measuring stick.

4. CONCLUSIONS

4.1 Psychometric properties of the CPGI

A variety of statistical methods were used to determine the psychometric properties of the CPGI. Factor analysis suggested initially that the CPGI was composed of three dimensions, but once the factorial complexity had been reduced, only one underlying structure remained, that of problem gambling. This was the finding in the pilot test, too. The items remaining after item analysis line up fairly well with the dimensions as originally conceptualized in our development and pilot stages (see Table 16, below), although they did not constitute "factors" per se.

This finding of unidimensionality of problem gambling behaviour is in line with earlier research which suggests that regardless of the measure used, problematic gambling is a fairly robust concept that can be readily captured (Shaffer, Hall and Vander Bilt, 1997). We have incorporated items from previous measures that capture this severe end of the spectrum of gambling behaviour very well, and which will allow us to compare our results with earlier prevalence studies. However, the CPGI also taps into the consequences of gambling, and some cognitions around gambling. According to our clinical validation study, the inclusion of these aspects of problem gambling behaviour is important to capturing those who are truly at risk of gambling problems. This means, however, that as it is now constructed the "at risk" groups for the CPGI are larger than "at risk" groups as labeled by other instruments.

As Table 16 shows, the dimensions of the CPGI are gambling involvement, problem gambling behaviour, adverse consequences, and problem gambling correlates. All of the items in the problem gambling behaviour and adverse consequences sections are scored. Gambling involvement and correlates are not scored, although they will be used to develop profiles of different types of gamblers, particularly for the low and moderate risk groups.

The items that were removed due to item analysis procedures were often redundant, or simply added nothing to the reliability or validity of the scale.

Table 16 Outline of Items and Dimensions in the CPGI

DIMENSIONS	VARIABLES	INDICATORS	ITEMS AND QUESTION NUMBERS
Gambling involvement	Type/frequency	Gambling activities	1. How often did you bet or spend money on (list activities:daily weekly monthly yearly)?
	Duration	Time at play/type/session	2. Would you please try to tell me the number of hours or minutes you normally spend each time on(___)?
	Expenditure	Money wagered monthly	3. How much money, not including winnings, do you normally spend on this activity in a month?
		Largest amount wagered	4. What is the largest amount of money you ever gambled on this activity in any one day?
Problem Gambling Behavior	Loss of control	Bet more than could afford	5. Have you bet more than you could really afford to lose?
		Bet or spent more than wanted to	15. Have you bet or spent more money than you wanted to on gambling?
	Motivation	Increase wagers	6. Have you needed to gamble with larger amounts of money to get the same feeling of excitement?
	Chasing	Returning to win back losses	7. When you gambled, did you go back another day to try to win back the money you lost?
	Borrowing	Borrowing or selling for money to gamble	8. Have you borrowed money or sold anything to get money to gamble?
	Lying	Lied to family members or others	14. Have you lied to family members or others to hide your gambling?
	Problem recognition	Felt might have problem	9. Have you felt that you might have a problem with gambling?
		Wanted to stop, didn't think could	16. Have you wanted to stop betting money or gambling, but didn't think you could? (NOT SCORED)
Adverse Consequences	Personal Consequences	Negative effects on health	10. Has gambling caused you any health problems, including stress or anxiety?
		Criticism	11. Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?
	Social Consequences	Financial problems	12. Has your gambling caused any financial problems for you or your household?
		Feelings of guilt	13. Have you felt guilty about the way you gamble or what happens when you gamble?
Problem Gambling Correlates	Faulty cognition	Due for a win after losses	17. After losing many times in a row, you are more likely to win?
		Have a winning system	18. You could win more if you use a certain system or strategy?
	First experiences	Remember big win	19. Do you remember a big win when you first started gambling?

DIMENSIONS	VARIABLES	INDICATORS	ITEMS AND QUESTION NUMBERS
		Remember big loss	20. Do you remember a big loss when you first started gambling?
	Family problems	Family gambling problem	21. Has anyone in your family ever had a gambling problem?
		Family alcohol/drug problem	22. Has anyone in your family ever had an alcohol or drug problem?
	Co-morbidity	Alcohol/drugs/gambling use	23. In the last 12 months, have you used alcohol or drugs while gambling?
		Gambling under the influence	24. Again, in the last 12 months, have you gambled while drunk or high?
		Admit alcohol/drug problem	25. In the last 12 months, have you felt you might have an alcohol or drug problem?
	Relieve pain	Self-medication (gambling, drinking or drug use)	26. If something painful happened in your life did you have the urge to gamble?
			27. If something painful happened in your life did you have the urge to have a drink?
			28. If something painful happened in your life did you have the urge to use drugs or medication?
	Stress	Treated for stress	29. Have you been under a dr's care because of physical or emotional problems brought on by stress?
	Depression	Feelings of depression	30. Have you felt seriously depressed?
	Suicide	Suicide ideation/attempts	31. Have you seriously thought about or attempted suicide as a result of your gambling?

4.2 Classification accuracy of the CPGI

Classification accuracy is an awkward concept to apply to the CPGI, which was intended to capture a slightly different population than the measures developed based on clinical populations. As noted in the Results section of this report, we did not intend to reproduce categories from previous measures. It is, however, important to have congruence at the most severe end of the problem gambling continuum. What we found when we looked at the classification accuracy of the CPGI is that it works well to separate out those with the most seriously problematic gambling. Correlation between the CPGI and the DSM (0.83) and SOGS (0.83) measures was relatively high, which suggests that the aim of congruence at the high end has been achieved. The CPGI also achieved the highest correlation with the results of the clinical assessment interviews (0.48), although none of the three measures really correlated well with these results.

The apparent lack of congruence with the clinical assessment interviews is important to address. The skewed nature of the sample may mean that the correlation coefficient is underestimated, and in fact the relationship is a reasonably strong one.

However, there are some factors that may have reduced the correlation between the CPGI and the clinical interview results. The interview results were coded according to a rating provided by the clinician who conducted the assessment. Because of the qualitative nature of the interview,

many clinicians found it difficult to provide an unqualified assessment. For instance, an "at risk" rating might be accompanied by an assessment of the factors that would push a respondent into "problem" gambling, and the likelihood of that happening. In general, clinicians were less likely to assess individuals as having problem gambling than the survey instruments, although many of these assessments were, as noted above, qualified. It would be possible to adjust group placement of the interviews to more closely match the survey results, by using the qualitative information provided, but we felt that it was useful to show the discrepancy between qualitative and quantitative measures. Qualitative assessments, by their nature, are less predictable, and arguably less useful in an epidemiological context because it is difficult to generalize from the findings.

In terms of sensitivity, or the proportion of problem gamblers according to other measures who also score as problem gamblers on the CPGI, we chose cut off points that provided maximum sensitivity, and a minimum number of false positives. As the cut-off score for problem gambling declines, the rate of false positives increases. The optimum point for cut-off for problem gambling was 8 out of a possible 21. This gave us sensitivity of 78% for the clinical assessment interviews, 83% for the DSM-IV and 62% for the SOGS. We were specifically using the clinical assessment interviews and the DSM-IV as reference points, as these are the two most likely to be used as the "gold standard" in the field of measurement of gambling problems. As noted in the Results section, the 78% figure for the assessment interviews is somewhat misleading because of the low absolute numbers – the CPGI correctly classified 7 of 9 problem gamblers.

One possible cause for the low correspondence between the clinical assessment interviews and the survey results is that in the quantitative, structured interview, respondents were reminded frequently that the time frame for the questions was the past 12 months. This may not have been repeated in the qualitative interviews. We suspect that the two "problem" gamblers who were mis-classified by the CPGI were past problem gamblers who answered the questions differently in the qualitative interviews, perhaps framing the questions as lifetime by default.

Specificity looked good simply because of the nature of the data. Specificity is the number of people identified by other measures as having no gambling problems that are also categorized as having no gambling problems by the CPGI. Most of the sample was in the non-problem category, and because problem gambling was such a small proportion of the total, the remainder is bound to overlap significantly across all of the measures. With the DSM-IV and with the SOGS, specificity was 100%. With the clinical assessment interviews, however, specificity was lower, largely because of the very small sample size (148) compared with the other measures.

For the low and moderate risk groups, we used the distribution of the scores to determine optimal cut-off points. For the moderate risk group, we had determined the upper bound based on the lower bound of the problem gambling category, the score that maximized the problem gambling category's sensitivity. The lower bound was determined in comparison with proportions of individuals labeled "at risk" by the clinical assessment interviews, DSM-IV and SOGS measures. The low risk group's upper bound was determined by the lower bound of the moderate risk group, and the lower bound for the low risk group was the lowest score above 0 on the CPGI.

4.3 Comparison of CPGI-, SOGS- and DSM-IV-Based Research

In this report, we will discuss briefly how comparisons could be made. In the User Manual, more detailed comparison strategies will be offered, along with an attempt at a "conversion factor" based on the positive predictive value for the CPGI. In terms of direct comparison, the only option is to compare the items that the measures have in common. That is, in the CPGI, there are two items taken from the SOGS and two items taken from the DSM-IV measure. Comparing scores on these two items for each measure is the only directly comparable way to perform comparisons. However, given the high correlation between CPGI scores and SOGS and DSM-IV

scores, an indirect, or conversion comparison is also possible, although this may be subject to some criticism.

4.4 Reliability and Validity Issues

In this testing of the CPGI, we have tested reliability and validity by a number of means. Reliability is addressed in terms of internal consistency, and test-retest consistency. Validity is addressed in terms of face or content validity, criterion-related validity, and construct validity.

Reliability is an important aspect of testing a new measure, and this was assessed in two different ways. The first means of assessing reliability is to compute the internal consistency of the measure, or Cronbach's alpha coefficient. In this case, the alpha was good, at 0.84, compared with 0.76 for the DSM-IV and 0.81 for the SOGS. The individual sub-components of the CPGI, the two DSM-IV items, and the two SOGS items, did not provide acceptable reliability as stand-alone indices, but did correlate well with their parent measures, which means that cross-measure comparisons will be possible. Reliability was also assessed by re-surveying a sub-sample of the general population survey respondents, 417 of the total 3,120. Test-retest reliability was acceptable (0.78), but not stellar, as shown in Table 9 in the Results section.

The standard error of measurement, an index of error used to establish the range of values within which a person's true or "real" score would fall, varies inversely with the reliability coefficient (Aiken, 1996). What this means is that the test-retest reliability was affected by the relatively low prevalence of problem gambling, which means that several of the items in the retest portion of the study were not endorsed at all. Low prevalence also means small absolute numbers, which means relatively high fluctuations percentage-wise, and larger error margins.

Validity is the other component to testing of a new measure, and there are several different types of validity that must be assessed. Face or content validity means an instrument looks as experts in the field would expect it to look, in terms of composition and scoring of items. In this case, the original CPGI has been through several rounds of expert feedback (see the report from Phase I), with 12 of the world's foremost gambling experts providing their feed back on the CPGI items and dimensions. The consensus was that the CPGI reflected "problem gambling" very well. The instrument as it stands now is a distilled version of the same instrument. Duplication and redundancy have been eliminated, along with some items that proved irrelevant, but the items that remain line up very well with the dimensions as originally posited. It is reasonable to suggest that the CPGI has very good face validity.

Criterion-related validity refers to the accuracy with which an instrument classifies respondents using another measure taken as the reference point. In this case we are talking about concurrent validity, in that the measures were all taken at the same point in time. The CPGI has good criterion-related validity because it lines up fairly well with the DSM-IV and the SOGS, correlating at 0.83 with both measures. The CPGI also had a higher correlation with the interview results than the DSM-IV or SOGS, although the correlation is still only in the moderate range (0.48).

One of the issues in establishing predictive validity is the very low base rate of problem gambling in the population, which means that very large samples are necessary to obtain acceptable levels of accuracy. The difficulties with error margin, and with predicting trends as a result of the low prevalence of problem gambling in the population, can be addressed only by ensuring adequate sample size, and by ensuring that the measure used has good reliability.

The final type of validity to address is construct validity, and this means, do high and low scores on the instrument behave in ways they might be expected to behave according to theory or logical reasoning? In terms of specific hypotheses, we would expect that:

- Spending would be highest among problem gambling respondents, followed by the moderate risk and then low risk groups, and lowest among non-problem gamblers.
- Gambling frequency would be highest among the problem gambling group, followed by the moderate risk and then low risk groups, and lowest among the non-problem gamblers.
- Those in the problem gambling group would be more likely to have responded positively to the correlates items than those in the at risk or non-problem groups.
- More adverse consequences, on average, would be reported by the problem gambling group, followed by the moderate risk group, the low risk group and finally the non-problem group.
- Some demographic variables, like age and sex would be unrelated to group membership.

Table 17 Construct Validity -- Differences by Gambling Group

Correlates	Problem Gambling (Mean)	Moderate Risk (Mean)	Low Risk (Mean)	Non-Problem (Mean)
Spending /typical month	$539	$207	$238	$65
Frequency of Gambling (higher=more often)	5.9	5.7	5.1	4.2
Average # correlates reported	6.0	4.2	2.8	1.3
Average # adverse consequences reported	3	1	.25	0
Average age	38	37	40	44
Percent female	39%	26%	45%	55%
SAMPLE SIZE	28	74	212	2,367

All of our hypotheses were proven correct. That is, the groups' characteristics line up the way we anticipated that they would. The various types of validity have been addressed, and we feel that the CPGI demonstrates very good validity on all fronts, by a number of different indicators.

4.5 Final Version of the CPGI

While we are presenting a version of the CPGI that is ready for use, it is important to note that this instrument is dynamic, and that secondary analysis of this data or data from other studies may result in adjustments to scoring, and to revisions in terms of the types of gambling included and the correlates included. The goal in the development of this measure was to better capture the social context of gambling, and this goal is best served by continuing to fit the measure to the purpose.

Scoring for the CPGI is simple, with only nine items of the 31 CPGI items scored, all in section 2.

- never = 0
- sometimes = 1
- most of the time = 2
- almost always = 3

At this stage, the dichotomous items originally from the SOGS that were included in the CPGI are now asked using the same 4-point response scale as the other CPGI items. These items are:

Has anyone criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?

Have you felt guilty about the way you gamble or what happens when you gamble?

Scores for the nine items are summed, and the results are interpreted as follows:

- 0 = non-problem
- 1-2 = low risk
- 3-7=moderate risk
- 8 + (to maximum of 27) = problem gambling

We suggest that you separate the non-problem group into gamblers and non-gamblers, as the groups have quite different characteristics.

While we've included a set of demographics items for reference, these are not part of the CPGI.

5. CANADIAN PROBLEM GAMBLING INDEX – VERSION 1.0

Section 1 – Gambling Involvement

First, we'd like to ask some questions about activities you may participate in.

People bet money and gamble on many different things including buying lottery tickets, playing bingo, or card games with their friends. I am going to list some activities that you might have bet money on.

1a. In the past 12 months, how often did you bet or spend money on Lottery tickets like the 649, Super 7, or POGO?

    Would you say daily, 2 to 6 times a week, about once a week, 2-3 times a month, about once a month, between 6-11 times a year, between 1-5 times a year, or never?

        <1> Daily

        <2> 2 to 6 times/week

        <3> About once/week

        <4> 2-3 times/month

        <5> About once/month

        <6> Between 6-11 times/year

        <7> Between 1-5 times/year

        <8> Never

        <97> R volunteers "I do not gamble" [n.b. If this response appears twice, skip to 17]

        <98> Don't know   <99> Refused

b. In the past 12 months, how often did you buy daily lottery tickets like Pick 3?

   (response categories for a. repeated for b. through w.)

c. In the past 12 months, how often did you buy instant win or scratch tickets like break open, pull tab, or Nevada strips?

d. In the past 12 months, how often did you buy raffle or fundraising tickets?

e. In the past 12 months, how often did you bet on horse races (i.e. live at the track and/or off-track)?

f. In the past 12 months, how often did you play bingo?

Screen for casino gambling:

 In the past 12 months, have you gambled at any type of casino including illegal or charity casinos?

        <1> yes [go to 1g]

        <5> no   [go to 1l]

        <97> R volunteers "I do not gamble" <98> don't know   <99>refused [go to 1m]

g. In the past 12 months, how often did you bet or spend money on coin slot machines or VLT's in a casino?

h. In the past 12 months, how often did you play poker in a casino?

i. In the past 12 months, how often did you play blackjack in a casino?

j. In the past 12 months, how often did you play roulette in a casino?

k. In the past 12 months, how often did you play keno in a casino?

l. In the past 12 months, how often did you play craps in a casino?

m. In the past 12 months, how often did you play video lottery terminals (VLTs)

   OTHER THAN AT CASINOS (VLT= coins are not dispensed)?

n. In the past 12 months, how often did you play a sports lottery like Sport Select (e.g. Pro Line, Over/Under, Point Spread)?

o. In the past 12 months, how often did you bet or spend money on sports pools?

p. In the past 12 months, how often did you bet on cards, or board games with family or friends?

q. In the past 12 months, how often did you bet or spend money on games of skill such as pool, bowling, or darts?

r. In the past 12 months, how often did you bet on arcade or video games?

s. In the past 12 months, how often did you gamble on the Internet?

t. In the past 12 months, how often did you bet on sports with a bookie?

u. In the past 12 months, how often did you personally invest in stocks, options, or commodities markets?

   INTERVIEWER: If asked, this does NOT include mutual funds, RRSPs

CHECK: If never to all gambling, or flagged as "do not gamble" at least twice, send to C section.

2. How many …

   (response categories for a. repeated for b. through v.)

a.   you buy lottery tickets like the 649, Super 7 or POGO?

b.   INTERVIEWER: Enter EXACT # of MINUTES here please [CONVERT HOURS, AND DO NOT ROUND!]

     <1-480> Enter number of MINUTES

     <481> more than 8 hours

     <998> Don't know   <999> refused

b. minutes do you normally spend each time you buy daily lottery tickets like Pick 3?

c. minutes do you normally spend each time you buy instant win or scratch tickets like break open, pull-tab or Nevada strips?

d. minutes do you normally spend each time on raffle or fundraising tickets?

e. hours do you normally spend each time you bet on live horse races at the track and/or off track?

f. hours or minutes do you normally spend each time you play bingo?

g. hours or minutes do you normally spend each time you play coin slot machines or VLT's in a casino?

h. hours or minutes do you normally spend each time you play poker in a casino?

i. hours or minutes do you normally spend each time you play blackjack in a casino?

j. hours or minutes do you normally spend each time you play roulette in a casino?

k. hours or minutes do you normally spend each time you play keno in a casino?

l. hours or minutes do you normally spend each time you play craps in a casino?

m. hours or minutes do you normally spend each time you play video lottery terminals (VLTs) OTHER THAN AT CASINOS (VLT = coins are not dispensed)?

n. minutes do you normally spend each time you play a sports lottery like Sport Select (e.g. Pro Line, Over/Under, Point Spread)?

o. hours or minutes do you normally spend each time you play sports pools?

p. hours or minutes do you normally spend each time you play cards or board games with family or friends?

q. hours or minutes do you normally spend each time you bet on games of skill such as pool, bowling or darts?

r. hours or minutes do you normally spend each time you bet on arcade or video games for money?

s. hours or minutes do you normally spend each time you gamble on the internet?

t. minutes do you normally spend each time you bet on sports with a bookie?

u. hours or minutes do you normally spend evaluating stocks, options, or commodities each time you invest?

3. How much money, not including winnings, do you spend on…

a. lottery tickets like the 649, Super 7 or POGO in a typical month?

   (response categories for a. repeated for b. through w.)

   INTERVIEWER: If asked for clarification, we mean spending that is out of pocket, and doesn't include money won and THEN spent.

      <1-7777> enter number of dollars

         <d> don't know   <r> refused

b. daily lottery tickets like Pick 3 in a typical month?

c. Instant win or scratch tickets like break open, pull tab or Nevada strips in a typical month?

d. raffle or fundraising tickets in a typical month?

e. live horse races at the track and/or off track in a typical month?

f. bingo in a typical month?

g. coin slot machines or VLT's in a typical month?

h. poker in a casino in a typical month?

i. blackjack in a casino in a typical month?

j. roulette in a casino in a typical month?

k. keno in a casino in a typical month?

l. craps in a casino in a typical month?

m. video lottery terminals (VLTs) OTHER THAT AT CASINOS (VLT=coins not dispensed) in a typical month?

n. sports lotteries like Sport Select (or, Pro Line, Over/Under, Point Spread) in a typical month?

o. sports pools in a typical month?

p. cards, or board games with family or friends, in a typical month?

q. games of skill such as pool, bowling or darts in a typical month?

r. arcade or video games in a typical month?

s. gambling on the internet in a typical month?

t. sports with a bookie in a typical month?

u. How much money, INCLUDING profits from earlier investments, do you spend on stocks, options, or   commodities in a typical month?

4. In the past 12 months, what is the largest amount of money you ever spent on…

a. lottery tickets like the 649, Super 7 or POGO in any one day?

a. (response categories for a. repeated for b. through w.)

      <1-7777> enter number of dollars

      <d> don't know   <r> refused

b. daily lottery tickets like Pick 3 in any one day?

c. Instant win or scratch tickets like break open, pull tab or Nevada strips in any one day?

d. raffle or fundraising tickets in any one day?

e. live Horse races at the track and/or off track in any one day?

f. bingo in any one day?

g. coin slot machines or VLT's in any one day?

h. poker in a casino in any one day?

i. blackjack in a casino in any one day?

j. roulette in a casino in any one day?

k. keno in a casino in any one day?

l. craps in a casino in any one day?

m. video lottery terminals (VLTs) OTHER THAN AT CASINOS(VLT = coins are not dispensed) in any one day?

n. sports lotteries like Sport Select (or Pro Line, Over/Under, Point Spread) in any one day?

o. sports pools in any one day?

p. cards or board games with family or friends in any one day?

q. the outcome of games of skill such as pool, bowling or darts in any one day?

r. arcade or video games in any one day?

s. gambling on the Internet in any one day?

t. sports with a bookie in any one day?

u. How much money, INCLUDING profits from earlier investments, do you spend on stocks, options, or commodities in any one day?

   CHECK: IF DON'T GAMBLE GO TO 18.

Section 2 – Problem Gambling Assessment

[Items 5 through 13 are scored. Score 1 for each response of "sometimes", 2 for each "most of the time" and 3 for each "almost always".

Some of the next questions may not apply to you, but please try to be as accurate as possible.

THINKING ABOUT THE LAST 12 MONTHS...

5. Have you bet more than you could really afford to lose? Would you say never, sometimes, most of the time, or almost always?

        <1> Never

        <3> Sometimes

        <5> Most of the time

        <7> Almost always

        <8> Don't know   <9> Refused

6. Still thinking about the last 12 months, have you needed to gamble with larger amounts of money to get the same feeling of excitement?

        <1> Never

        <3> Sometimes

        <5> Most of the time

        <7> Almost always

        <8> Don't know   <9> Refused

7. When you gambled, did you go back another day to try to win back the money you lost?

        <1> Never

        <3> Sometimes

        <5> Most of the time

        <7> Almost always

        <8> Don't know   <9> Refused

8. Have you borrowed money or sold anything to get money to gamble?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

9. Have you felt that you might have a problem with gambling?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

10. Has gambling caused you any health problems, including stress or anxiety?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

11. Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

12. Has your gambling caused any financial problems for you or your household?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

13. Have you felt guilty about the way you gamble or what happens when you gamble?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

14. Have you lied to family members or others to hide your gambling?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

15. Have you bet or spent more money than you wanted to on gambling?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

16. Have you wanted to stop betting money or gambling, but didn't think you could?

      <1> Never

      <3> Sometimes

      <5> Most of the time

      <7> Almost always

      <8> Don't know   <9> Refused

Section 3 -- Correlates

Next, we explore some of your beliefs about gambling, as well as any early experiences you have had with gambling or betting money.

For each of the following, please tell me if you strongly agree, agree, disagree, or strongly disagree?

17. After losing many times in a row, you are more likely to win. Do you strongly agree, agree, disagree, or strongly disagree?

      <1> Strongly agree

      <3> Agree

      <5> Disagree

      <7> Strongly disagree

      <8> Don't know   <9> Refused

18. You could win more if you used a certain system or strategy.

      <1> Strongly agree

      <3> Agree

      <5> Disagree

      <7> Strongly disagree

      <8> Don't know   <9> Refused

19. Do you remember a big win when you first started gambling?

      <1> yes

      <5> no

      <8> Don't know   <9> Refused

20. Do you remember a big LOSS when you first started gambling?

      <1> yes

      <5> no

      <8> Don't know   <9> Refused

21. Has anyone in your family EVER had a gambling problem?

      <1> yes

      <5> no

      <8> Don't know   <9> Refused

22. Has anyone in your family EVER had an alcohol or drug problem?
>   <1> yes
>   <5> no
>   <8> Don't know   <9> Refused

CHECK: IF DON'T GAMBLE, SKIP TO 25 HERE.

23. IN THE LAST 12 MONTHS, have you used alcohol or drugs while gambling?
>   <1> yes
>   <5> no
>   <8> Don't know   <9> Refused

24. In the last 12 months, have you gambled while drunk, or high?
>   <1> yes
>   <5> no
>   <8> Don't know   <9> Refused

25. Have you felt you might have an alcohol or drug problem?
>   <1> yes
>   <5> no
>   <8> Don't know   <9> Refused

CHECK: IF DON'T GAMBLE SKIP TO 27

26. In the last 12 months, if something painful happened in your life, did you have the urge to gamble?
>   <1> yes (includes doing as well as having the urge)
>   <5> no
>   <8> Don't know   <9> Refused

27. In the last 12 months, if something painful happened in your life, did you have the urge to have a drink?
>   <1> yes (includes doing as well as having the urge)
>   <5> no
>   <8> Don't know   <9> Refused

28. In the last 12 months, if something painful happened in your life did you have the urge to use drugs? or medication?
>   <1> yes (includes doing as well as having the urge)
>   <5> no
>   <8> Don't know   <9> Refused

29. Still thinking about the last 12 months, have you been under a doctor's care because of physical or emotional problems brought on by stress?
>   <1> yes
>   <5> no
>   <8> Don't know   <9> Refused

30. Have you felt seriously depressed?
>   <1> yes
>   <5> no
>   <8> Don't know   <9> Refused

CHECK: IF NON-GAMBLER SKIP TO INTRO TO DEMOGRAPHICS.

31. Have you seriously thought about or attempted suicide as a result of your gambling?
        <1> yes
        <5> no
        <8> Don't know   <9> Refused

Section 4 -- Demographics

Finally, we would like to ask you some basic background questions. Like all your other answers, this information will be kept strictly confidential.

32. In what year were you born?
        <1890-1981> Enter year
        <9997> After 1981
        <9998> don't know   <9999> Refused

33. Currently are you married, living with a partner, widowed, divorced, separated, or have you never been married?
   <1> Married
   <2> Living with a partner
   <3> Widowed
   <4> Divorced
   <5> Separated
   <6> Never married
   <8> Don't know   <9> Refused

34.a. To what ethnic or cultural group did you or your ancestors belong on first coming to this country?
     INTERVIEWER: If R is not clear, say "Are you Scottish, Chinese, Greek, or something else?"

<1> Australian	<14> French	<26> Jewish	<8> Serbia
<2> Austrian	<10> Finnish	<27> Korean	<35> Sikh
<3> Bahamian	<15> German	<28> Lebanese	<36> Somalian
<4> Bangladeshi	<16> Greek	<8> Macedonian	<9> Slovakian
<5> BLACK/African	<17> Guyanese	<1> New Zealand	<37> Spanish
<6> British	<18> Haitian	<11> Netherlands	<38> Sri Lanka
<7> Chinese	<11> Holland	<29> Nigerian	<10> Swedish
<8> Croatian	<19> Hungarian	<10> Norwegian	<38> Tamil
<9> Czech	<20> Irish	<30> Pakistani	<39> Trinidadian
<10> Danish	<21> Italian	<31> Philipino	<40> Ukrainian
<11> Dutch	<22> Indian	<32> Polish	<41> Vietnamese
<6> ENGLISH	<23> Israeli	<33> Portuguese	<8> Yugoslavian
<12> El Salvador	<24> Jamaican	<34> Russian	<6> Welsh
<13> Ethiopian	<25> Japanese	<6> SCOTTISH	

<0>Other (specify)[specify]
<95> Native Indian, Inuit
<96>Canadian [go to 34c]
<98>Don't know [go to 36] <99> Refused [go to 36]
[go to 34b]

34.b. INTERVIEWER: Enter SECOND mention only here.
 <97> NO SECOND MENTION

<1> Australian	<14> French	<26> Jewish	<8> Serbia
<2> Austrian	<10> Finnish	<27> Korean	<35> Sikh
<3> Bahamian	<15> German	<28> Lebanese	<36> Somalian
<4> Bangladeshi	<16> Greek	<8> Macedonian	<9> Slovakian
<5> BLACK/African	<17> Guyanese	<1> New Zealand	<37> Spanish

<6> British	<18> Haitian	<11> Netherlands	<38> Sri Lanka
<7> Chinese	<11> Holland	<29> Nigerian	<10> Swedish
<8> Croatian	<19> Hungarian	<10> Norwegian	<38> Tamil
<9> Czech	<20> Irish	<30> Pakistani	<39> Trinidadian
<10> Danish	<21> Italian	<31> Philipino	<40> Ukrainian
<11> Dutch	<22> Indian	<32> Polish	<41> Vietnamese
<6> ENGLISH	<23> Israeli	<33> Portuguese	<8> Yugoslavian
<12> El Salvador	<24> Jamaican	<34> Russian	<6> Welsh
<13> Ethiopian	<25> Japanese	<6> SCOTTISH	

 <0> Other (specify)[specify]
 <95> Native Indian, Inuit
 <96> Canadian [go to 34c]
 <98> Don't know   <99> Refused
[go to 35]

34c. In addition to being Canadian to what ethnic or cultural group did you or your ancestors belong on first coming to this continent?

<1> Australian	<14> French	<26> Jewish	<8> Serbia
<2> Austrian	<10> Finnish	<27> Korean	<35> Sikh
<3> Bahamian	<15> German	<28> Lebanese	<36> Somalian
<4> Bangladeshi	<16> Greek	<8> Macedonian	<9> Slovakian
<5> BLACK/African	<17> Guyanese	<1> New Zealand	<37> Spanish
<6> British	<18> Haitian	<11> Netherlands	<38> Sri Lanka
<7> Chinese	<11> Holland	<29> Nigerian	<10> Swedish
<8> Croatian	<19> Hungarian	<10> Norwegian	<38> Tamil
<9> Czech	<20> Irish	<30> Pakistani	<39> Trinidadian
<10> Danish	<21> Italian	<31> Philipino	<40> Ukrainian
<11> Dutch	<22> Indian	<32> Polish	<41> Vietnamese
<6> ENGLISH	<23> Israeli	<33> Portuguese	<8> Yugoslavian
<12> El Salvador	<24> Jamaican	<34> Russian	<6> Welsh
<13> Ethiopian	<25> Japanese	<6> SCOTTISH	

 <0> Other (specify)[specify]
 <95> Native Indian, Inuit
 <96> Canadian
 <98> Don't know   <99> Refuse

35. What is the highest level of education you have completed?
   <1> No schooling
   <2> Some elementary school
   <3> Completed elementary school
   <4> Some high school/junior high
   <5> Completed high school
   <6> Some community college
   <7> Some technical school (College Classique, CEGEP)
   <8> Completed community college
   <9> Completed technical school (College Classique, CEGEP)
   <10> Some University
   <11> Completed Bachelor's Degree (Arts, Science, Engineering, etc.)
   <12> Completed Master's degree: MA, MSc, MLS, MSW, etc.
   <13> Completed Doctoral Degree: PhD, "doctorate"
   <14> Professional Degree (Law, Medicine, Dentistry)
   <98>Don't know   <99> Refused

36. What is your present job status? Are you employed full-time, employed part-time, unemployed, a student, retired or a homemaker?

INTERVIEWER: If respondent gives more than one answer, record the one that appears first on the list.

        <1> Employed full-time (30 or more hrs/week) [go to 37]

        <2> Employed part-time (less than 30hrs/week) [go to 37]

        <3> Unemployed (out of work but looking for work) [go to 37]

        <4> Student--employed part-time or full-time [go to 37]

        <5> Student--not employed [go to 38a]

        <6> Retired [go to 38a]

        <7> Homemaker [go to 38a]

        <0> Other (Specify)[specify][go to 38a]

        <98> Don't know [go to 38a]   <99> Refused [go to 38a]

37. What type of work do you currently do (or, do you do when you are employed)?

  INTERVIEWER: If necessary, say "what is your job title?"

        <1> enter text, end with /// [specify]

        <98> Don't know   <99> Refused

38.a. Could you please tell me how much income you and other members of your household received in the year ending December 31st 1998, before taxes? Please include income FROM ALL SOURCES such as savings, pensions, rent, and unemployment insurance as well as wages.

TO THE NEAREST THOUSAND DOLLARS, what was your TOTAL HOUSEHOLD INCOME before taxes and other deductions were made?

        <1-997> Enter actual income [go to 39]

        <998> Don't know   <999> Refused

38.b. We don't need the exact amount; could you tell me which of these broad categories it falls into...

        <1> less than $20,000

        <2> between $20,000 and $30,000 ($29,999.99)

        <3> between $30,000 and $40,000

        <4> between $40,000 and $50,000

        <5> between $50,000 and $60,000

        <6> between $60,000 and $70,000

        <7> between $70,000 and $80,000

        <8> between $80,000 and $90,000

        <9> between $90,000 and $100,000

        <10> between $100,000 and $120,000

        <11> between $120,000 and $150,000,

        <12> or more than $150,000?

        <98> Don't know   <99> Refused

39. How many people under 18 years-of-age live with you?

        <0> None

        <1-6> enter number of people

        <7> seven or more

        <8> don't know   <99> refused

40. What is your religion?

        <1> Protestant

        <2> Catholic

        <3> Jewish

        <4> Muslim

        <5> Eastern beliefs (Buddhism, Hinduism)

        <0> Other (Specify) [specify]

        <7> No religion [go to 42]

        <8> Don't know   <9> Refused

41. How important is religion in your life? Would you say very important, somewhat important, not very important, or not important at all?

        <1> Very important

        <3> Somewhat important

        <5> Not very important

        <7> Not important at all

        <8> Don't know   <9> Refused

42. We hope to speak to some people again. May we call you for a short follow up?

        <1> Yes   <5> No/Refused

Thank you for helping us with this survey. Your responses are very important to us, and we do appreciate the time it has taken to answer our questions. As a courtesy, we offer all participants a telephone number, in case they wish to speak to someone who knows more about gambling or gambling problems. I have a phone number available for your area, would you like that number?

Thanks again for helping us out.

6. FURTHER RESEARCH

This report presents the most important aspects of the analysis for the development of the CPGI as a prevalence tool. However, there are a number of other research topics to be explored based on this data. The most critical is, we believe, the development of profiles of gambling types, which might be constructed based on gambling involvement (some combination of type of gambling, frequency, spending, and duration of gambling) with the gambling correlates. We anticipate that the gambling profiles might be most useful in terms of delineating the levels of risk attached to specific forms of gambling, in particular.

Another important area for future research is examining CPGI results across time, ideally using a panel format so that incidence of problem gambling, and movement between gambling groups may be assessed. This is important from the point of view of developing predictive validity for the CPGI, in addition.

Finally we wish to point out that the CPGI cannot be a static instrument. While it is ready for use now, secondary analysis and future studies may result in refinements to scoring and more inclusions or exclusions in the non-scored sections, particularly gambling involvement and the correlates sections.

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APPENDIX 1: Clinical Evaluation Protocol FOR CPGI

-- May 24, 2000--

Brief Description of Study

This research is being conducted by a research team for the Canadian Centre on Substance Abuse, under contract to an Inter-Provincial Task Force on Problem Gambling, and is intended to result in the development of a new measure of problem gambling for use in general population surveys. All 10 provinces are represented on this Task Force, and all have contributed to funding this research program.

In earlier stages of this project, we developed and tested the new Canadian Problem Gambling Index (CPGI) on a sample from the general population, a clinical sample, and a sample of regular gamblers. The next stage of the validation process for the CPGI is a clinical validation interview, to determine how accurate the telephone survey results were in capturing the gambling situation and problems of the survey respondents.

The goal with this clinical validation is twofold: to independently provide confirmation of the gambling behavior of our survey respondents as well as any adverse consequences; and to obtain a deeper understanding of some of the dynamics of problem gambling behaviour, consequences, activities and correlates. This research will involve telephone interviews with a sub-sample of our general population survey for assessment by clinicians. We will re-call 150 people from the general population survey. This 150 will be composed of 50 people at the most severe end of the spectrum in terms of gambling-related problems, 50 who are regular gamblers, and might be considered "at risk", and 50 who could reasonably be considered as not at risk.

Because we expect that the individuals conducting the assessments are of diverse backgrounds and clinical approaches, we have laid out a basic protocol for use in these assessment interviews. While we recognize that the strength of the clinical approach is that it is personal and experience-driven, we do need to have some standard approach to the content, if not the process of the validation interview.

Protocol for study

Clinicians will be recruited through our personal networks, but all will have experience in the counseling of problem gamblers, and where possible, in telephone assessment. We will book interviews for clinicians, matching survey respondents' preferred times with blocks of time when clinicians are available. Project staff will be setting the appointments, and the clinicians will not have access to the previous survey data. This means that the clinicians are asked to assess each individual "blind". All clinicians are asked to password protect their notes and files on these interviews on their computers, or keep them in a locked file cabinet.

The initial contact requesting the interview is crucial, and we felt that it was important to have someone knowledgeable about the project make these contacts in order to answer any questions respondents may have, or allay any concerns. Clinicians may still be asked these questions, however, so we have provided an FAQ sheet, which should help answer any questions survey participants might have about the confidentiality of their information, how it will be used, and who they should contact for more information or to make a complaint.

Structure of the Interviews

It is anticipated that clinicians will spend anywhere from 15 to 45 minutes on the telephone with each survey respondent, depending on the respondent's gambling involvement. We would like clinicians to use our checklist (attached) as a starting point for the interview. The checklist covers gambling involvement, DSM-IV criteria, new CPGI items on social harms and consequences, and some items relating to the respondent's personal and family history, as well as involvement with alcohol, or other drugs.

We are anticipating that clinicians will cover the material in their own fashion, but we have provided the checklist as a way to keep track of topics we'd like covered, and also as a means of standardizing the content of each assessment.

What we are looking for from the clinicians

There are three basic components to the feedback we'd like from clinicians:

1. A rating of each respondent's gambling behaviour as not-at-risk, at-risk, or problem.

2. A checklist with the items relevant to the respondent checked off, with the respondent's ID number on it (but no other identifying information) and any relevant comments written in to the spaces provided.

3. Finally, a short note on any issues that the clinician feels were not addressed in any other way (e.g. feed-back on the whole process of testing, frustration with the interview process or interviewer, any emotional reactions from participants, and notes on any referrals, etc, provided, any co-morbidity issues with other drugs, or mental health problems). Please just add on a page for this feed back to the checklist provided.

4. A list of names and mailing addresses for participants, for payment – NOT with ID numbers, to maintain confidentiality.

Debriefing from Interviews

Please contact Jackie Ferris after the first interview or two, for debriefing, or to discuss any questions or issues arising from these initial interviews. Jackie Ferris can be reached at (telephone number and e-mail address).

Timing of the Interviews

We'd like all of the interviews completed by the end of June 2000. Jackie Ferris will be the contact person, and will be organizing the scheduling of the interviews. Please let us know if you are able to take on more interviews, as well as if you cannot complete scheduled interviews. We'd like each clinician to do at least 10 interviews.

Payment for Clinicians

Clinicians will be paid with one check, upon submitting an invoice.