

# BEST PRACTICES IN THE POPULATION ASSESSMENT OF PROBLEM GAMBLING

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## **Robert J. Williams**

Professor, Faculty of Health Sciences, &  
Coordinator, Alberta Gaming Research Institute  
University of Lethbridge, Lethbridge, Alberta, Canada

## **Rachel A. Volberg**

President, Gemini Research  
Northampton, Massachusetts, United States

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### Contact Information

Dr. Robert Williams  
Professor, Faculty of Health Sciences &  
Coordinator, Alberta Gaming Research Institute  
University of Lethbridge  
4401 University Drive  
Lethbridge, Alberta  
Canada  
T1K 3M4  
(403) 382-7128  
[robert.williams@uleth.ca](mailto:robert.williams@uleth.ca)

Dr. Rachel Volberg  
President  
Gemini Research  
PO Box 1390  
Northampton, Massachusetts  
United States  
01061-1390  
413-584-4667  
[rvolberg@geminiresearch.com](mailto:rvolberg@geminiresearch.com)

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## SUMMARY

Population prevalence surveys of gambling serve several important purposes. However, there has been some question about the accuracy of the prevalence rates obtained in these surveys. These questions concern whether non-gamblers are under-represented in 'gambling' surveys due to lack of interest/participation; whether different administration formats (telephone; face-to-face) produce equivalent results; the true status of the many instrument-identified problem gamblers who do not report any corroborating gambling behaviour; and the weak correspondence between problem gamblers identified in population surveys and their subsequent assessment in clinical interviews.

The need to resolve some of these issues motivated the present authors to embark on a program of research designed to bring clarity to the true rates of problem gambling and to help identify 'best practices' in the population assessment of gambling and problem gambling.

Part I of this study investigated the impact of survey administration format, survey description, and the need for corroborating gambling behaviour on obtained population prevalence rates of problem gambling using the Canadian Problem Gambling Index (CPGI), South Oaks Gambling Screen (SOGS), NORC DSM-IV Screen for Gambling Problems (NODS), and a new instrument, the Problem and Pathological Gambling Measure (PPGM). A total of 3,028 adults were surveyed about their gambling behaviour, with half of these surveys administered face-to-face and half over the phone, and half of the surveys being described as a 'gambling survey' and half as a 'health and recreation' survey. Prevalence rates of problem gambling were found to be 1.5 to 2.2 times higher in 'gambling' versus 'health and recreation' surveys. The primary mechanism for this effect appears to be that 'gambling surveys' are intrinsically more interesting to gamblers and problem gamblers resulting in them participating at significantly higher rates. Problem gambling prevalence rates were found to be 1.3 to 1.6 times higher in face-to-face administration compared to telephone administration. The primary mechanism for this effect is that face-to-face surveys recruit higher rates of demographic groups with elevated rates of problem gambling (i.e., younger people and males). A secondary mechanism is that face-to-face administration appears to result in more honest/candid responding. Finally, if people with less than \$300 in annual net gambling expenditures are not eligible for problem gambling designation, then the obtained problem gambling prevalence rate decreases to only 50% - 70% of the original rate. When all three of these elements are aligned, they result in dramatically different prevalence rates. For example, a problem gambling prevalence rate of 4.1% (CPGI 3+) is obtained for a 'gambling survey' administered face-to-face and with no corroborating gambling behaviour being required for problem gambling eligibility. This compares to a 0.8% prevalence rate for a 'health and recreation survey' administered over the phone and excluding anyone without \$300 in annual expenditures from problem gambling eligibility.

These results indicate that prevalence rates are strongly determined by how the survey is conducted, and that prevalence rate differences between studies could just as easily be the result of procedural differences as due to true differences in population prevalence.

Fortunately, this may not be a serious problem, as the large majority of previous studies have used similar procedures and so have the same biases (i.e., telephone administration, 'gambling survey' description, and using any past year gambling as the only criterion for problem gambling eligibility). However, the present results also indicate that the population prevalence rates obtained in most previous studies are probably somewhat inflated. The present research shows that the procedures that appear to produce the most accurate rates are ones that use: face-to-face administration; do not specifically introduce or describe the survey as a 'gambling' survey; and require a certain minimal amount of gambling *frequency* (as opposed to expenditure) for problem gambling eligibility. In the present study, these procedures produce a prevalence rate that is 32% lower than the standard procedure obtained with telephone interviewing, a 'gambling survey' description, and any past year gambling for problem gambling eligibility.

The primary recommendations of Part I were to a) ensure that all future studies routinely contain a detailed description of survey description, administration format, thresholds for asking problem gambling questions, response rates, and all other potentially relevant procedural details; b) employ the same procedures as prior studies when the primary interest is to compare changes relative to these prior studies; and c) conduct periodic face-to-face surveys on a wide range of issues (including gambling) and that only ask problem gambling questions to people who report gambling at least once a month, so as to get a more accurate estimate of 'true' problem gambling prevalence rates and to better contextualize the findings of these other studies.

Part II reexamined the classification accuracy of the main problem gambling assessment instruments (NODS, SOGS, CPGI) for general population samples. It is unclear whether their lack of correspondence with subsequent clinical assessment represents poor instrument validity or methodological problems with how the clinical assessments have been conducted. To more fairly evaluate the classification accuracy of these instruments, the clinical assessments in the present study were done using *comprehensive* and *concurrently* obtained information from *all selected participants*; using *two independent clinicians*; *explicitly identifying all relevant information* pertaining to the determination of gambling categorization; and providing *clear definitions* of the categories being assessed.

Two data sets were used in this analysis, the Best Practices data set described in Part I and a sample of 5301 individuals from 105 different countries who completed an online survey of gambling (International Online data set). The second data set was used to significantly increase the number of problem gamblers in the analysis (i.e., a combined total of 977 clinically assessed problem gamblers) and to determine whether the results from the Canadian (Best Practices) data set would replicate to an international sample. The NODS, SOGS, CPGI, and PPGM were administered to all participants in both studies. This was done for two reasons. First, to compare the relative performance of each instrument, and second, to collect exhaustive information on all possible signs, symptoms, and diagnostic criteria relevant to the determination of whether someone was or was not a problem gambler. Two independent clinicians were provided with answers to each of these problem gambling questions, as well as

comprehensive information about the person's reported gambling behaviour, the person's responses to validity questions, and relevant demographic characteristics of the individual (e.g., income, debt) to use in their assessment of the person's problem gambling status.

Results showed that the ability of the NODS, SOGS, and CPGI to distinguish problem from non-problem gamblers was better than had been suggested in prior research, but that overall accuracy was still modest. By contrast, the PPGM had excellent classification accuracy across both data sets with sensitivity, specificity, positive predictive power, and negative predictive power all above 90%. In general, all instruments correctly classified most non-problem gamblers. Because non-problem gamblers constitute the large majority in most general population prevalence surveys, this also means that these instruments all have good overall diagnostic efficiency and level of agreement (kappa). However, a significant problem with the CPGI and SOGS is that roughly half of the people labeled as problem gamblers by these instruments (using a 3+ criterion) are not confirmed as such by clinical assessment. This also means that the obtained prevalence rate with these instruments is too high (1.85 times higher than the actual rate with the CPGI 3+ and 1.52 times higher with the SOGS 3+). The 'upside' to this over-identification is that the large majority of genuine problem gamblers are identified (i.e., good sensitivity), and thus, the CPGI and SOGS are fairly good screening tools. The main problem with the NODS concerns the fact that it only correctly identifies 68.5% of the genuine problem gamblers, and, even with this lower rate of over-identification, its positive predictive power is still only 76.8%. On the other hand, relative to the SOGS and CPGI, the NODS has higher specificity, higher positive predictive power, better overall diagnostic efficiency, and it produces a problem gambling prevalence rate closest to the true rate.

Although the overall classification accuracy of these instruments did not vary substantially as a function of gender, age, and ethnic origin, some differences were observed. None of the assessment instruments had significant variation on classification accuracy as a function of gender. However, the CPGI, SOGS, and NODS all had higher classification accuracy with people age 30 and younger. The NODS also had better classification accuracy with people of non-Western origins. The classification accuracy of the PPGM was consistently high for all demographic subgroups.

The final part of this study investigated whether improvements to the classification accuracy of these instruments could be obtained using different cut-off scores. It was found that significant improvements to the classification accuracy of the CPGI occurs when a 5+ cut-off is used for the designation of problem gambling, and when a 4+ cut-off is used with the SOGS. The current 3+ cut-off continues to be optimal for the NODS. No improvements were needed in the PPGM. The use of these new thresholds would allow all of these instruments to produce fairly accurate prevalence rates of problem gambling when used in population surveys. However, if the purpose was to have a screening tool that detects 90% or more of the true problem gamblers (regardless of false positives), then the optimal cut-offs would be 3+ for the CPGI; 2+ for the SOGS; and 1+ for the NODS.

The findings of Part I and Part II are incorporated into a comprehensive list of recommended Best Practices in the population assessment of problem gambling presented at the end of this report.



## INTRODUCTION

Population prevalence studies of gambling serve several important purposes. They establish the current prevalence of gambling, the prevalence of each form of gambling, personal expenditures on each form of gambling, and the prevalence of problem gambling. This information, in turn, is very useful in understanding the overall recreational value of gambling to society, the negative social impacts of providing legalized gambling, the actual number of problem gamblers in need of treatment, the proportion of gambling revenue derived from problem gamblers, and the types of gambling most strongly associated with problem gambling. Changes in the prevalence of problem gambling from one time period to the next, and/or differences between the prevalence in one jurisdiction relative to another, provides important information about the incidence of problem gambling and the potential effectiveness of policies implemented to mitigate gambling's harm (Volberg, 2007).

Telephone surveys are currently the most common way of administering population prevalence studies. There are several well established procedural elements to telephone surveys that need to be employed so as to maximize the reliability and validity of the results (Groves et al., 2001; Volberg, 2007). The failure to employ these procedures has the potential to compromise the quality of the data and the representativeness of the sample. However, even if these procedures are used, there have been several other methodological issues specific to gambling that have created uncertainty about obtained results. Questions include:

1. Are problem gamblers under-represented because they are less likely to be home, less likely to answer the phone, and less likely to have phone access (i.e., incarcerated, serving in the military, hospitalized, or in residential treatment) (Lesieur, 1994)?
2. How reliable and valid is self-report of gambling behaviour considering the frequent discrepancy between reported gambling expenditures in surveys and actual jurisdictional revenue? For example, in Australia, reported gambling expenditures in the 1998–1999 Household Expenditure Survey were only 17.3% of actual gambling revenues (Access Economics, 2003). In New Zealand in 1998 people reported spending \$103 per person, compared to \$280 per person in actual revenue (Statistics New Zealand, 1999). In a study of Canadian provinces by Williams & Wood (2004), self-reported expenditures were 2.1 times higher than actual provincial gaming revenues in that time period. In the national U.S. survey, gamblers reported being *ahead* \$3 billion at the casinos in the past year instead of having left more than \$20 billion, the actual total revenues reported by the casino industry. Gamblers also reported being ahead \$2 billion at the racetrack and \$4 billion in private gaming. Only when it came to lotteries did they admit to a loss of \$5 billion (Gerstein *et al.*, 1999).
3. Does describing the survey as a 'gambling' survey (as is typically done) create a sampling bias by causing greater participation by gamblers who are interested in this topic and greater refusal by non-gamblers who are not interested?
4. Do different survey administration formats (i.e., telephone vs. face-to-face vs. online) produce equivalent results?

5. What portion of the sample should be asked questions about problem gambling? The most common procedure has been to ask problem gambling questions of anyone who reports any past year history of gambling (usually about 60 – 80% of the sample). However, these questions are not relevant to the large majority of these people, and some individuals become irritated with being repeatedly asked questions that do not apply to them. The second issue is that every prevalence survey identifies a small but significant number of people who score in the problem gambling range but report very little actual gambling behaviour. The presumption has been that these are legitimate past year problem gamblers who failed to accurately convey their gambling involvement. However, it is equally possible that these are individuals who are not being truthful about their ‘gambling problems’ and/or individuals who may be speaking to their lifetime rather than past year history of problem gambling. Some clarity about the true status of these types of people is required so as to determine whether a higher gambling behaviour threshold should be used in determining who gets administered problem gambling questions.
6. Do problem gambling prevalence surveys overestimate the true rate of problem gambling in light of research showing that a significant portion of problem gamblers identified in telephone surveys are not confirmed by subsequent clinical interviews? For example, only 18% of pathological gamblers identified by the SOGS and/or CPGI were confirmed by clinical interview in Ladouceur et al. (2005). In Ladouceur et al. (2000), only 27% of grade 4-6 students (SOGS-RA), 56% of grade 9 – 11 students (SOGS-RA), and 77% of adults (SOGS) were confirmed as problem gamblers in a subsequent clinical interview. In Ferris & Wynne (2001) “none of the three measures (SOGS, DSM, CPGI) really correlated well with the results of the clinical interviews”. In Murray et al. (2005), 24% of people were identified by the NODS as having a more severe problem compared to what was determined in a subsequent clinical interview.

Answers to Questions 1 and 2 have since been provided in prior research conducted by the present authors and others:

People without residential phone access because of poverty, incarceration, being in the military, or being in residential treatment for psychiatric or substance abuse problems are indeed likely to have significantly higher rates of problem gambling (Crockford and el Guebaly; 1998; Ford, 1998; Pearson et al., 1994; Rönnerberg et al., 1999; Spunt 2002; Spunt et al. 1998; Williams, Royston, & Hagen, 2005). However, even if one assumes a rate that is 2 to 3 times higher, the very small numbers of people in these groups relative to the general population means that for most jurisdictions only a very small adjustment needs to be made to the population prevalence rate. Thus, in Ontario, the adjustment needed to account for these individuals was only .03% (Williams & Wood, 2007).

There is also some truth to the contention that problem gamblers with residential phone access are somewhat harder to contact. Two large scale prevalence studies (Williams & Wood, 2007,  $N = 6,654$ ; Wood & Williams, 2009,  $N = 8,450$ ) using exhaustive telephone contact attempts (up to 36 in the first study and 48 in the second study) over many months (12 months in the first study and 18 in the second study) found that the average number of telephone calls to

establish contact was 5.5 for problem gamblers compared to 4.9 for non-problem gamblers. However, it is also true that this difference in contactability can be leveled out with sustained attempts. Thus, these above studies also found that with 16 call attempts, 95% of contactable problem gamblers are contacted.

With regards to the reliability and validity of self-reported gambling expenditure, research conducted by Wood & Williams (2007) has confirmed that retrospective estimates of gambling expenditure tend to be unreliable and are very much influenced by how the question is worded. A random sample of 2424 Ontario adult gamblers were asked about past month gambling expenditure in one of 12 different ways. The relative validity of each question format was subsequently established by the correspondence of reported gambling expenditures with actual Ontario gambling revenue, as well as with amounts obtained by subsequent prospective diaries. Retrospective estimates were found to have weak correspondence to actual projected revenues and to prospective diaries. Furthermore, slight variations in question wording resulted in significant variation in reported expenditure amounts (by a magnitude of 5). That being said, there were certain question wordings that did produce significantly better correspondence to actual revenue and prospective diaries and were recommended for use in all prevalence surveys.

The focus of the present research is Questions 3, 4, 5, and 6, which have not been adequately addressed in prior research. The impacts of survey description (Question 3), administration format (Question 4) and thresholds for asking problem gambling questions (Question 5) are addressed in Part I. The classification accuracy of problem gambling assessment instruments for general population samples (Question 6) is addressed in Part II.

## PART I: Impact of Administration Format, Survey Description, and Thresholds for Administering Problem Gambling Questions

In 2002, Statistics Canada conducted the first national prevalence study of problem gambling in Canada as part of the Canadian Community Health Survey (CCHS) (Mental Health & Well-Being; Cycle 1.2). As is typical for Statistics Canada, both the sample size (36,984) and the response rate (77%) were excellent. However, there was considerable surprise associated with their finding that the overall past year Canadian prevalence of moderate plus severe problem gambling of 2.0% (using the Canadian Problem Gambling Index, CPGI) was about 80% less than what had been obtained from nine provincial problem gambling prevalence studies that had been conducted in roughly the same time period (2001 to 2003). A similar result was obtained for the CCHS 3.1 survey conducted in New Brunswick in 2005 (see Table 1).

Table 1. Obtained Prevalence of Problem Gambling in Canada

	2000	2001	2002	2003	2004	2005	2006
British Columbia			3.8% <b>1.9%</b>				
Alberta		5.2%	<b>2.2%</b>				
Saskatchewan		5.9%	<b>2.9%</b>				
Manitoba		3.4%	<b>2.9%</b>				
Ontario		3.8%	<b>2.0%</b>	4.8%		3.4%	
Quebec			1.8% <b>1.7%</b>				
New Brunswick		3.2%	<b>1.5%</b>			<b>1.1%</b>	
Nova Scotia			<b>2.0%</b>	2.1%			
Prince Edward Island			<b>1.9%</b>			1.6%	
Newfoundland			<b>1.9%</b>			3.4%	
CANADA			<b>2.0%</b>				

Note. Bolded numbers reflect figures obtained from the CCHS 1.2 (2002) and CCHS 3.1 (2005) surveys administered by Statistics Canada.

Note. Figures represent the past year rate of moderate plus severe problem gambling from the Canadian Problem Gambling Index (Ferris and Wynne, 2001).

There are three important differences between the national and provincial studies that might explain this discrepancy. The first concerns a **difference in administration format**. The large majority (86%) of the Statistics Canada CCHS 1.2 survey was done face-to-face at the person's residence using a 'Computer-Assisted Personal Interview' (CAPI) procedure, whereas all of the provincial studies were done over the telephone using a 'Computer-Assisted Telephone Interview' (CATI) procedure. (Rates of CAPI utilization were 78.6% in CCHS 3.1 in 2005).

Self report of sensitive subject matter (e.g., substance use, sexual behaviour) is known to be strongly influenced by respondents' perceptions of how positively or negatively others will evaluate their responses (Fowler, 1993; Schaeffer, 2000; van der Heijden et al, 2000). Consequently, administration formats that provide more anonymity (e.g., self-administered surveys) generally obtain more valid reports of socially sensitive behaviour (see Tourangeau & Yan, 2007 for a review). Thus, it is quite possible that the face-to-face format used in CCHS may have produced some under-reporting of problem gambling. The fact that Statistics Canada also asked all participants for their name, address, telephone number and date of birth at the outset of each interview may have exacerbated this problem, as might the fact that 13% of the interviews were conducted with other family members present. Although this 'social desirability effect' has never been investigated or documented for gambling behaviour, it seems a plausible explanation for the obtained differences.

The impact of CCHS administration format has been investigated for some health indicators (but not gambling) by Statistics Canada researchers (St-Pierre & Beland, 2004). Several significant differences were obtained in self-reported health behaviours between the telephone-based interview (CATI) and the face-to-face interview (CAPI). The results are complex, and vary as a function of the variable examined, as well as age, ethnicity, income group, province, and question sensitivity. However, it is interesting to note that Statistics Canada researchers did *not* obtain higher rates of behaviour on ostensibly 'sensitive' questions in CATI versus CAPI administration (i.e., consuming 5 or more drinks on one occasion; fair or poor mental health; smoking status). Furthermore, there was a tendency for some 'sensitive' questions to produce higher rates with *CAPI* administration (i.e., self-reported height and weight). It would appear that the opportunity for objective (i.e., visual) verification in the CAPI administration may produce more valid reports in some situations. Furthermore, it is possible that face-to-face administration may foster better rapport, which may favour more valid responses. Indeed, existing research tends to support the contention that more candid responding occurs with face-to-face over telephone administration in most circumstances (see Holbrook, Green & Krosnick, 2003; Tourangeau & Yan, 2007 and the meta-analysis by de Leeuw & van der Zouwen, 1988).

Thus, it seems clear that administration format *does* impact self-report, but that no presumptions can be made about the nature or direction of this impact on gambling behaviour without a direct test.

The second important difference between the national and provincial studies of problem gambling concerns **how the survey was described**. All of the provincial gambling studies were described as ‘gambling surveys’ whereas the Statistics Canada study was described as a study assessing ‘well-being and health practices’ (as gambling behaviour was only one component of the survey).

A primary reason for survey nonparticipation is lack of interest in the topic (Groves, Presser & Dipko, 2004; Groves et al., 2006; Tourangeau & Yan, 2007). For example, Groves et al. (2006) showed that teachers participated at a much higher rate in a telephone survey described as being on “Education and the Schools” than in one described as being on “Issues Facing the Nation” (56% versus 39%). Topic disinterest is virtually never taken into account or adjusted for in surveys even though it has an obvious potential for biasing the data. Thus, in the provincial studies it is quite possible that gamblers participated at a higher rate because of their greater interest in the topic, resulting in an artifactually high obtained prevalence of gambling (and consequently, problem gambling) among the participants. Support for this is seen in the fact that the provincial surveys obtained an average past year gambling prevalence rate of 81.9% compared to 76.0% for the CCHS (Canadian Partnership for Responsible Gambling, 2005).

The third important difference between the national and provincial studies of problem gambling concerns a **difference in the threshold for asking questions about problem gambling**. Almost all of the provincial surveys asked questions about problem gambling of everyone who reported *any* gambling in the past year, regardless of frequency and expenditure. However, the CCHS surveys used a higher threshold in that they did not administer questions about problem gambling to a) anyone who said ‘they were not a gambler’ even if they had reported gambling expenditures in the past 12 months; and/or b) respondents who reported gambling no more than 5 times for each type of gambling in the past year. As a consequence of this difference, the provincial problem gambling prevalence numbers include a small but significant number of people who score in the past year problem gambling range, but who report minimal past year gambling involvement. It is unclear whether these are legitimate past year problem gamblers who failed to accurately convey their gambling expenditures, or people who misinterpreted the problem gambling questions (perhaps reporting a ‘lifetime’ rather than a ‘past year’ history of problem gambling). If it is the former, then the Statistics Canada prevalence figures are artifactually low. If it is the latter then the provincial prevalence figures are artifactually high.<sup>1</sup>

Thus, the primary purpose of Part I of the present project is to determine the relative impact of administration format, survey description, and ‘thresholds’ for asking problem gambling questions on obtained rates of problem gambling, so as to speak to the relative validity of the national and provincial rates that have been reported and potential ‘best practices’ for population prevalence surveys.

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<sup>1</sup> It is interesting to note that the Quebec 2002 provincial study (Ladouceur et al., 2005) also utilized a high gambling threshold before asking problem gambling questions (i.e., person had to have spent more than \$520 annually on gambling or have ‘played too much’, ‘spent too much money’, or ‘spent too much time gambling’), and it is one of the few provincial studies that obtained problem gambling rates comparable to the CCHS.



a good base rate of problem gambling. The Kitchener CMA had one of the highest rates of problem gambling in Ontario in the CCHS 1.2 survey (3.6% compared to 2.0% for the rest of Ontario; Rush et al., 2005). The reason for this is uncertain, although this CMA does have the youngest median age in Ontario, partly due to one college and two universities in the area (University of Waterloo, Wilfred Laurier University, Conestoga College). Furthermore, college and university students have one of the highest documented past year rates of problem gambling (~7 or 8%) (Shaffer & Hall, 2001; Williams et al., 2006).

The sample was selected in one of two ways. Twenty nine percent came from a random selection of areas of two-kilometer diameter within the Kitchener CMA. Seventy one percent were randomly selected from Census Dissemination Areas (DA) having a higher than average prevalence of people aged 20 – 29, as this is the age group that generally has the highest rate of problem gambling. Within each of these circumscribed geographic areas, a comprehensive listing of listed phone numbers that had accompanying addresses was compiled.<sup>2</sup>

These listings were randomly assigned to either telephone recruitment or door-to-door recruitment. Within each modality, the sample was then randomly assigned to receive either a 'gambling' or 'health and recreational activities' description of the survey (even though the surveys were otherwise identical). Thus, there were four different groups: the Telephone Gambling Survey (TxG) group; Telephone Health & Recreational Survey (TxHR) group; Face-to-Face Gambling Survey (FxG) group; and the Face-to-Face Health & Recreational Survey (FxHR) group. Recruitment continued until there were at least 1,500 people in each of the two different administration formats and each of the two different survey description groups. In the end, there were 758 people in the TxG group, 755 in the TxHR group, 790 in the FxG group, and 725 in the FxHR group.

In advance of the actual recruitment, a postcard was delivered to most of the selected neighborhoods to alert people to our study in hopes of producing a better response rate (e.g., de Leeuw et al., 2005). Addresses assigned to the door-to-door approach were grouped together by streets for logistical ease. Face-to-face surveys were administered via a Palm III handheld device. For logistical and safety reasons, a second interviewer was usually present for the face-to-face interviews (but was silent and stayed in the background). The telephone surveys were administered using WinCATI software in the SRC telephone lab. The majority of contacts were made in the evening and on weekends.

The interviewee was randomly determined by requesting the interview be conducted with the adult (18+) in the household having the most recent birthday. If this person was not available, the person having the last birthday was interviewed. If this person was not available, the person answering the door was interviewed. There were only three attempts to interview someone in the household due to the logistical costs involved in returning to the person's house for a face-to-face survey. Although additional contact attempts could easily have been

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<sup>2</sup> ASDE Survey Sampler (from whom the sample was purchased) indicated that approximately 2% of listed numbers had no accompanying address.



made for the telephone surveys, this was not done in order to make the sampling procedure equivalent to the face-to-face protocol.

### **Questionnaire**

The questionnaire was introduced as follows: “Hello, I’m conducting a short 10-15 minute survey on gambling (or ‘health and recreational activities’) on behalf of the Survey Research Centre at the University of Waterloo. Do you have a couple of minutes?” People who said they do not gamble were told “we are just as interested in opinions of both non-gamblers and gamblers”. People asking about the types of recreational activities were told “leisure activities such as gambling”.

The questionnaire (Appendix A) took between 10 and 15 minutes and had six sections:

1. *Validity Questions.* The 12 questions that began the survey had two purposes. The first was to provide some transitioning for people who received the ‘health and recreation’ description, as almost all of the validity questions asked about general health or recreational behaviour. The second purpose was to gauge the relative validity of responses provided face-to-face versus over the phone. Hence, some of these questions asked about nonsensitive issues where no response distortion was expected (e.g., general health status; movie theatre attendance). Some questions asked about sensitive issues where response distortion was anticipated (e.g., frequency of illicit drug use; frequency of driving while intoxicated; voting in the past provincial election). Some questions investigated whether the person may have an enduring pattern of positive or negative impression management (whether they had ‘ever’ been ill; number of pleasant memories from childhood). Finally, some questions were designed to assess response acquiescence, not paying attention, or flippancy (lacrosse being their favorite sport to watch on TV; Arctic being their preferred vacation destination).
2. *Gambling Behaviour.* Information was obtained on the frequency and expenditure for 9 types of gambling, using questions with optimal wording for obtaining this information (i.e., Wood & Williams, 2007).
3. *Problem Gambling.* The problem gambling section was asked of everyone who reported any past year gambling. It consisted of the 29 unique questions that comprise the Canadian Problem Gambling Index (CPGI) (Ferris and Wynne, 2001)<sup>3</sup>, South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987), NORC DSM-IV Screen for Gambling Problems (NODS) (Gerstein et al., 1999), and the Problem and Pathological Gambling Measure (PPGM). All of these instruments used a past year time frame. A score of 3 or higher was used to designate problem gambling on the CPGI, SOGS, and NODS. The PPGM (Appendix B) is an

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<sup>3</sup> In the case of the CPGI, only the nine items that comprise the scored Problem Gambling Severity Index (PGSI) were included. In this report, whenever the CPGI scale is identified it is in reference to these 9 scored items that determine problem gambling status.

experimental measure of problem gambling under development by the present authors and is described in detail in Part II of this report. The order of the four instruments was randomized and, once a question was asked, its equivalent question in the other scale(s) was not asked. There were an additional two questions that inquired whether the person had any history of problem gambling prior to the past 12 months and whether the person had ever sought help for problem gambling. The purpose of administering all 4 scales was twofold. The first purpose was to comprehensively ask the ‘universe’ of questions of potential relevance to whether the person was or was not a problem gambler. This information was subsequently used to judge the person’s gambling status in our Clinical Assessment procedure (described later in this report). The second purpose was to examine the influence of survey description and administration format on each scale.

4. *Inconsistency Questions.* An algorithm was built into the questionnaire to automatically prompt the interviewer to ask an additional open-ended question if the person provided a pattern of answers whereby a) he/she had a score of 3 or more on the CPGI in the absence of at least \$300 in past year gambling losses, or b) the person had an aggregated past year gambling loss of > \$1,000 but scored 0 on the CPGI. The question in the first situation was “I notice you report having some potential problems with gambling, but your total reported loss in the past 12 months is less than \$300. Can you explain?” The question in the second situation was “I notice you report having lost over \$1000 to gambling in the past 12 months, but don’t report any problems or concerns with this. Can you explain?” The purpose of these questions was to shed light on the validity of the obtained CPGI, SOGS, and NODS categorizations for people with these inconsistent patterns (and thus, the potential utility of using a higher threshold before asking questions about problem gambling).
5. *Participant Demographics.* Specifically, age, gender, marital status, highest level of education, employment status, household income, household debt, immigrant status, and ethnicity.
6. *Interviewer Demographics.* Age, gender, and ethnicity.<sup>4</sup>

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<sup>4</sup> The impact of interviewer characteristics is not reported in the present paper because these variables were not balanced across conditions. In any case, analysis of gender and ethnicity failed to show a consistent pattern of effects on problem gambling prevalence rates, although there was a tendency for higher rates of problem gambling with male interviewers.

## RESULTS

### Administration Format

A 2 way Analysis of Variance (ANOVA) was conducted on the distribution of raw scores obtained with each problem gambling assessment instrument (CPGI, SOGS, NODS, PPGM) as a function of administration format and survey description.<sup>5</sup> Chi-square tests were conducted on the percentage of gamblers and problem gamblers for each problem gambling assessment instrument as a function of administration format and survey description. Results are reported in Table 2 and Table 3 respectively. As can be seen in the top left half of Table 2, the ANOVAs found a significant main effect of administration format on raw scores, with these scores being consistently higher in the Face-to-Face versus the Telephone administration format for all instruments. Similarly, the top left part of Table 3 illustrates that both the percentage of gamblers and the percentage of problem gamblers is also significantly higher for all assessment instruments in the Face-to-Face compared to Telephone administration.

The primary mechanism for this effect appears to be that the Face-to-Face format obtains higher rates of survey participation from demographic groups having higher rates of gambling and problem gambling. More specifically, relative to the Telephone administration group, the Face-to-Face group recruited significantly more: single people,  $\chi^2(5) = 109.4, p < .001$ ; fulltime students,  $\chi^2(2) = 69.7, p < .001$ ; males,  $\chi^2(1) = 26.4, p < .001$ ; immigrants,  $\chi^2(1) = 17.8, p < .001$ ; young people,  $t(2958) = 13.1, p < .001$ ; and people with lower incomes,  $t(2603) = 2.97, p = .003$ . The increased participation of these demographic groups is related to the greater overall participation rate obtained in the Face-to-Face format (48.6% versus 35.7% for Telephone administration<sup>6</sup>). (Door-to-door surveys typically obtain higher response rates than telephone surveys, which is partly due to fewer young people being contactable with the telephone administration format because of only having cell phones).

It is standard practice to conduct post-hoc data weighting to correct for demographic biases in the obtained sample to better match the known demographic profile of the population. Thus, the entire data set was weighted to match the age x gender x immigrant status of the Kitchener CMA as established in the 2006 national census. As can be seen in the lower half of Table 2, when this is done the higher scores in the Face-to-Face format are no longer significant different from the Telephone format. However, the percentage of gamblers is still significantly higher; as is the percentage of problem gamblers identified by the CPGI (the higher percentage of problem gamblers in the NODS is marginally significant).

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<sup>5</sup> ANOVA is not an optimal statistical approach, as there is severe and uncorrectable skewness, kurtosis, and heterogeneity of variance between some of the groups, which violates the statistical assumptions of ANOVA. However, violation of these assumptions may still produce valid results with the large sample size used in this study.

<sup>6</sup> Participation rate is calculated as the number of completions divided by the number of completions plus number of refusals.

The remaining differences after corrective demographic weighting point to a secondary mechanism for this format administration effect: more honest/candid responding in the Face-to-Face group. Analysis of covariance (ANCOVA) was conducted on each of the validity questions, entering all significant demographic differences as covariates (Chi square tests were conducted on the two questions with nominal level answers).<sup>7</sup> People in the Face-to-Face group reported significantly lower rates of voting (61% versus 72%)<sup>8</sup>  $F(6, 2978) = 71.3, p < .001$ ; a higher frequency of driving while intoxicated  $F(6, 2974) = 59.85, p < .001$ ; a higher frequency of illicit drug use  $F(6, 2988) = 59.31, p < .001$ ; a higher rate of alcohol use  $F(6, 2974) = 33.44, p < .001$ ; a lower rate of serious mental health problems  $F(6, 3003) = 6.27, p < .001$ ; a lower frequency of exercising  $F(6, 3005) = 4.42, p < .001$ ; and better general health  $F(6, 3005) = 3.31, p = .003$ . A z test of column proportions also showed that significantly more people in the Telephone group reported their preferred vacation destination to be the Arctic ( $p < .05$ ). Although not technically a validity question, it is also worth noting that significantly more people in the Telephone group refused to divulge their income (17% versus 11%) ( $p < .05$ ).

### **Survey Description**

As seen in Table 2, the ANOVAs also found a significant main effect of survey description on raw scores, with these scores being consistently higher in the Gambling survey group compared to the Health & Recreation survey group for all instruments. Similarly, Table 3 illustrates that both the percentage of gamblers and the percentage of problem gamblers also tends to be significantly higher for all assessment instruments in the Gambling survey group. (Note: the higher percentage of problem gamblers in the SOGS and NODS would be statistically significant in the Gambling survey group if a one-tail test was employed).

Unlike the administration format, survey description did not affect the overall participation rate in the survey (42.0% participation for Gambling survey and 42.3% for Health & Recreation survey). Survey description also did not affect the demographic mix of people in the Gambling survey versus the Health and Recreation survey (i.e., there were no significant differences in any demographic characteristic). Hence, as seen in the lower half of Tables 2 and 3, post-hoc demographic weighting had minimal effect on these results.

Thus, the primary mechanism for the survey description effect appears to be that a greater proportion of gamblers participated in the Gambling Survey, presumably because of greater intrinsic interest. This is further corroborated by the fact that 10.9% (238/2188) of the Gambling Survey refusals spontaneously indicated they were not participating because they do not gamble or have no interest in gambling.<sup>9</sup>

<sup>7</sup> The ANCOVA procedure permits all six confounding demographic variables to be controlled for whereas conducting ANOVA and Chi Square tests after data weighting only controls for the three demographic variables that have been weighted.

<sup>8</sup> 51% of adults in the Kitchener CMA voted in the 2007 provincial election.

Of final note, there were also no significant differences in any of the validity questions, with one exception: people in the Health and Recreation survey reported having significantly worse health status compared to people in the Gambling survey,  $F(1, 3018) = 16.54, p < .001$ . It would seem that, similar to the gambling survey effect, 'health' surveys appear to disproportionately attract people with health concerns.

### **Administration Format x Survey Description Interaction**

The right half of Tables 2 and 3 show the interaction between administration format and survey description. Although the ANOVAs showed no significant interaction effects on raw scores (with or without weighting), the average raw score tends to be consistently lowest in the Telephone x Health & Recreation groups and highest in the Face-to-Face x Gambling groups. This tendency is more pronounced when examining the percentage of gamblers and problem gamblers in Table 3, with most of the comparisons being significantly different, even after weighting.

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<sup>9</sup> The SRC was asked to record any stated reasons for nonparticipation.

Table 2. Scores on each of the Four Problem Gambling Assessment Instruments as a Function of Administration Format and Survey Description

	Face-to-Face (F) <i>M (SD)</i>	Telephone (T) <i>M (SD)</i>	ANOVA <i>p</i> value	Gambling (G) <i>M (SD)</i>	Health & Recreation (HR) <i>M (SD)</i>	ANOVA <i>p</i> value	F x G <i>M (SD)</i>	F x HR <i>M (SD)</i>	T x G <i>M (SD)</i>	T x HR <i>M (SD)</i>	ANOVA <i>p</i> value
CPGI Score – Unweighted	.32 (1.2)	.19 (1.1)	.003**	.32 (1.2)	.18 (1.1)	.001**	.39 (1.3)	.24 (1.1)	.25 (1.1)	.13 (.9)	.707
SOGS Score – Unweighted	.18 (.8)	.12 (.7)	.024**	.19 (.9)	.12 (.6)	.011**	.22 (.9)	.15 (.7)	.16 (.8)	.08 (.5)	.947
NODS Score - Unweighted	.26 (.9)	.12 (.6)	.00003**	.21 (.8)	.14 (.6)	.010*	.26 (.9)	.20 (.7)	.15 (.7)	.09 (.5)	.888
PPGM Score – Unweighted	.23 (.9)	.13 (.7)	.0003**	.22 (.9)	.14 (.7)	.006**	.28 (1.0)	.18 (.8)	.15 (.7)	.10 (.6)	.415
CPGI Score – Weighted	.23 (1.1)	.20 (1.1)	.618	.28 (1.2)	.14 (1.0)	.001**	.28 (1.2)	.16 (1.0)	.28 (1.2)	.13 (.9)	.777
SOGS Score – Weighted	.12 (.6)	.13 (.8)	.482	.15 (.8)	.10 (.6)	.046*	.12 (.6)	.11 (.6)	.18 (.9)	.09 (.5)	.062
NODS Score – Weighted	.17 (.7)	.13 (.6)	.109	.19 (.7)	.11 (.5)	.001**	.21 (.8)	.13 (.6)	.18 (.7)	.09 (.5)	.943
PPGM Score – Weighted	.17 (.8)	.14 (.7)	.266	.19 (.8)	.11 (.6)	.003**	.20 (.9)	.13 (.6)	.17 (.7)	.10 (.6)	.974

\*  $p < .05$ ; \*\*  $p < .01$

CPGI = Canadian Problem Gambling Index. SOGS = South Oaks Gambling Screen. NODS = NORC DSM-IV Screen for Gambling Problems. PPGM = Problem and Pathological Gambling Measure.

Table 3. Gambling and Problem Gambling Categorizations on the Problem Gambling Assessment Instruments as a Function of Administration Format and Survey Description

	Face-to-Face (F)	Telephone (T)	$\chi^2$ <i>p</i> value (2 tailed)	Gambling (G)	Health & Recreation (HR)	$\chi^2$ <i>p</i> value (2 tailed)	F x G	F x HR	T x G	T x HR	$\chi^2$ <i>p</i> value (2 tailed)
% of Gamblers – Unweighted	74.9%	70.0%	.003**	74.7%	70.0%	.004**	75.8%	73.8%	73.6%	66.4%	.0002**
CPGI Problem Gamblers – Unweighted	4.1%	1.9%	.0003**	4.0%	1.0%	.001**	5.3%	2.8%	2.6%	1.1%	.00002**
SOGS Problem Gamblers – Unweighted	2.4%	1.3%	.023*	2.3%	1.4%	.067	2.9%	1.9%	1.7%	0.9%	.039*
NODS Problem Gamblers – Unweighted	2.7%	1.1%	.001**	2.3%	1.4%	.061	3.5%	1.8%	1.3%	0.9%	.0009**
PPGM Problem Gamblers – Unweighted	2.5%	1.1%	.004**	2.5%	1.4%	.027*	3.3%	1.7%	1.2%	1.1%	.003**
% of Gamblers – Weighted	74.2%	70.6%	.023*	75.0%	69.6%	.001**	75.7%	72.9%	74.3%	66.8%	.0004**
CPGI Problem Gamblers – Weighted	3.1%	2.0%	.033*	3.5%	1.6%	.001**	4.1%	2.3%	2.9%	1.1%	.002**
SOGS Problem Gamblers – Weighted	1.8%	1.4%	.405	1.9%	1.3%	.124	1.8%	1.8%	2.1%	0.8%	.189
NODS Problem Gamblers – Weighted	2.1%	1.3%	.053	2.3%	1.1%	.020*	2.9%	1.4%	1.6%	0.9%	.011*
PPGM Problem Gamblers – Weighted	1.7%	1.3%	.386	2.0%	1.0%	.009*	2.3%	1.1%	1.9%	1.0%	.114

\*  $p < .05$ ; \*\*  $p < .01$

A score of 3 or higher was used to categorize problem gambler on the CPGI, SOGS, and NODS. The PPGM has a more complicated scoring system (Appendix B).

### Gambling Behaviour Threshold to Administer Problem Gambling Questions

A final issue concerns the impact of different **gambling behaviour thresholds** used to determine whether to ask people the problem gambling questions, or alternatively, whether to be eligible for problem gambling designation. In the present study, anyone who had any gambling behaviour in the past year (i.e., 72% or 2193/3028 people), was asked all of the problem gambling questions. Most surveys use this same procedure (CCHS 1.2 being an important exception) and assign problem gambling status to anyone who scores in the problem gambling range without regard to how much gambling the person engages in. In the present study there were between 55 to 90 such individuals depending on the assessment instrument (producing a 1.5% - 2.6% weighted problem gambling prevalence rate). However, it is important to note that in most studies a significant portion of these people report minimal actual gambling involvement. Indeed, in the present study 43 of 90 CPGI problem gamblers reported aggregate net gambling losses of less than \$300 in the past year. It is hard to imagine how someone could be a problem gambler with such minimal loss. Thus, it would not be unreasonable to either exclude these people from problem gambling eligibility or to not even ask problem gambling questions to people with such low expenditure. This is a very important procedural decision that, if used, would markedly decrease prevalence rates. This is illustrated in Table 4.

Table 4. Problem Gambling Prevalence using Different Gambling Behaviour Thresholds  
(Weighted Data; Entire Sample)

	Problem Gambling designation allowed as long as person reports gambling once in past year	Problem Gambling designation allowed as long as person reports \$300 or more in net gambling losses in past year
CPGI 3+	2.6%	1.5%
SOGS 3+	1.6%	1.1%
NODS 3+	1.7%	1.0%
PPGM	1.5%	0.8%

It seems clear that further scrutiny of these individuals is required. To shed light on the true problem gambling status of these individuals, everyone in the present study who had a CPGI score of 3 or higher but less than \$300 in net past year gambling losses ( $n = 43$ ) was automatically asked to explain the discrepancy between their low expenditures and their reports of problems. Two clinicians then examined these verbatim explanations, along with a



comprehensive profile of the person's past year gambling behaviour (types, frequencies, expenditures); his/her answers to the 31 problem gambling questions (no aggregated scale scores were provided); his/her answers to the 12 validity questions; and certain relevant demographic variables (person's age, household debt, household income, current employment status, current marital status). These clinicians then independently assessed the person's problem gambling status using a commonly accepted definition: "Problem gambling is characterized by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the community" (Neal, Delfabbro, & O'Neil, 2005).

Using this procedure, 60% (26/43) of individuals with this discrepancy were judged to be *genuine* problem gamblers. For the majority of these people, their low net gambling expenditure was a result of their claiming to typically win large amounts of money for certain types of gambling (a statistically unlikely scenario) that offset their significant losses for other types. Of the 40% (17/43) of individuals who were judged not to be problem gamblers, most reported very little gambling involvement and had minimal symptomatology on the CPGI (all but two had a CPGI score of 3 or 4), suggesting that the CPGI thresholds for moderate problem gambling may be too low. There was one individual with a CPGI score of 12 despite not reporting any past year gambling. It is interesting to note that this person reported having a history of problem gambling *prior* to the past 12 months, which may have influenced his responses to the CPGI past year questions.

Thus, it seems clear that a) the majority of CPGI identified problem gamblers with low net gambling losses are likely genuine problem gamblers, but that a significant minority are also false positives, and b) requiring a \$300 past year net gambling expenditure to be designated as a problem gambler (or to be asked problem gambling questions) would not be an effective way of weeding out these false positives without inadvertently excluding genuine problem gamblers.

### **Reducing False Positives**

It is possible that using lower net expenditure levels or other types of gambling behaviour criteria may be more efficient way of excluding false positives. Thus, the impact of different criteria was investigated and the results presented below in Table 5. (This analysis is only done for the CPGI as the 'inconsistency questions' were more reliably evoked for the CPGI than the other instruments as a CPGI score of 3+ was part of the algorithm).

Table 5. Impact of Different Exclusionary Criteria on Efficiency of Excluding False Positives  
(Unweighted Data)

	Including only people with _____ in determining the number of Problem Gamblers					
	\$300 or more in Past Year (PY) Net Losses	\$100 or more in PY Net Losses	\$300 or more in PY Losses (ignoring Wins)	\$100 or more in PY Losses (ignoring Wins)	Gambling at least 1/month on some form in PY	Gambling at least 2-3/month on some form in PY
Number of False CPGI Identified Problem Gamblers Effectively Excluded	17	15	16	7	8	12
Number of True Clinically Assessed Problem Gamblers Inadvertently Excluded	26	23	6	3	0	2

As can be seen, excluding people who do not report an aggregate net loss of at least \$100 in the past year is no more efficient than the \$300 threshold. However, using total losses on all forms of gambling, as opposed to total *net* losses, is a fairly efficient criterion for both a \$300 and \$100 level (i.e., adding up net losses reported on each form of gambling but not including any reported net wins).

Best of all, however, is a gambling *frequency* threshold that requires the person to have reported gambling at least once a month on some form of gambling in the past year. This criterion effectively excludes 8 false positives and no genuine problem gamblers. The majority of these individuals had CPGI scores of 3 or 4 and/or appear to be referring to their lifetime rather than past year history of problems. (Examination of the SOGS and NODS suggests it would effectively exclude 2 false positives in each case without the exclusion of any genuine problem gamblers).<sup>10</sup> This finding suggests that gambling frequency is easier for people to recall or calculate, or alternatively, that it is a less sensitive question than gambling expenditure and therefore less subject to response distortion. It is also important to note that if used as a threshold to determine who gets asked problem gambling questions, this criterion would have reduced the percentage of the sample in the present study administered these questions from

<sup>10</sup> The first author's experience with other population surveys is that this frequency criterion is a very efficient way of excluding false positives, but that it will occasionally exclude a few genuine problem gamblers. This occurs for the fairly uncommon individual who a) minimizes his/her true frequency of gambling, but is more forthright about his/her losses and b) individuals who engage in high risk stocks, but only buy and sell less than once a month. Thus, although not essential, the use of the once a month criterion is best done in conjunction with procedures or an assessment instrument that also reduce false negatives. It should also be noted that this criterion does exclude more people in the CPGI category of 'Low Risk' (i.e., people who would have scored a 1 or 2 on the CPGI). However, the importance or validity of the CPGI Low Risk category is unclear. It seems unlikely that someone would be 'at risk' for gambling problems if they gamble less than once a month.

72.0% to 41.0% (1241/3028 people). This would constitute a significant savings in time and resources as well as decrease the irritation that some non-problem gamblers experience when they are needlessly asked these questions.

### **Reducing False Negatives**

The other type of discrepancy investigated in this study concerns 114 people who reported a past year gambling loss of over \$1000 without any accompanying problems (CPGI score of 0). These individuals were clinically assessed in the same manner described above. In the absence of any self report of problems or loss of control, it is very difficult to judge anyone to be a problem gambler. Furthermore, none of these individuals admitted to problems when asked about the discrepancy, although 18% refused to answer the question or had no comment about the inconsistency. In all, the clinicians determined that only 4% (5/114) of these individuals had unsatisfactory explanations as well as gambling expenditures and frequencies that were unambiguously excessive relative to their income, debt, employment status, marital status, and age, and were therefore probable Problem Gamblers (in denial). Another 22% (25/114) were judged to be 'At Risk', as they were spending thousands of dollars a year on gambling when their income and current debt would suggest this was unwise. However, the large majority (74%) (84/114) were judged to be non-problem or 'Recreational' gamblers. Most of these individuals had relatively low expenditures (i.e., just over \$1,000) that were also low relative to their income and debt. Many of these individuals indicated that the past year aggregate expenditure total we had calculated from their monthly gambling on each form was too high. A significant percentage of these people (26%) also only engaged in the buying and selling of high risk stocks.

## **DISCUSSION**

Survey administration format, survey description, and gambling behaviour thresholds were all found to significantly and independently influence problem gambling prevalence rates. Survey description appears to be the strongest of these effects, with rates of problem gambling being 1.5 to 2.2 times higher in 'gambling' surveys depending on the assessment instrument. The apparent mechanism for this effect is that gamblers and problem gamblers are intrinsically more interested in 'gambling' surveys and therefore participate at a much higher rate than non-gamblers. Administration format is the next strongest effect, with face-to-face administration producing rates that are 1.3 to 1.6 times higher than telephone administration depending on the assessment instrument (even after weighting for demographic differences). This is primarily due to face-to-face administration resulting in increased participation of demographic groups (young people, males) that tend to have higher rates of gambling and problem gambling. A secondary mechanism is that face-to-face interviewing appears to elicit more candid/honest responding relative to telephone interviewing. Finally, if people with less than \$300 in annual gambling expenditures are not eligible for problem gambling designation, then

the obtained prevalence rate of problem gambling decreases to a ratio of 0.5 to 0.7 (i.e., 50% - 70% of the original prevalence rate).

When these variables are aligned, they result in radically different problem gambling prevalence rates that differ by up to a magnitude of 5, even after appropriate weighting to match the sample to the demographic characteristics for the population. This is illustrated in Table 6.

Table 6. Problem Gambling Prevalence using Different Procedures  
(Weighted Data; Entire Sample)

	Face-to-Face 'gambling' survey with any past year gambling to qualify as problem gambler	Telephone 'health & recreation' survey with \$300 in past year net losses to qualify as problem gambler
CPGI 3+	4.1%	0.8%
SOGS 3+	1.8%	0.7%
NODS 3+	2.9%	0.7%
PPGM	2.3%	0.7%

The above findings help explain the lower problem gambling prevalence rate found in the 'well-being and health practices' Statistics Canada CCHS 1.2 study that used face-to-face interviewing and did not pose problem gambling questions to people who gambled 5 or less times on each type of gambling in the past year. In the present study, the rate of CPGI problem gambling in the face-to-face 'health and recreation survey' group, excluding people who did not gamble at least once a month, was 2.2%, compared to 2.9% in the telephone 'gambling survey' group with no exclusionary criteria. This difference would likely be greater if the response rate in the present study was closer to that obtained with CCHS 1.2. Although the face-to-face 'health and recreation' group had a comparatively high participation rate of 48%, it is far from the 77% response rate obtained in the CCHS 1.2.

In conclusion, the present results indicate that obtained problem gambling prevalence rates are very much a function of how the survey is conducted. The obvious implication is that prevalence rate differences between studies could just as easily be the result of procedural differences as due to true differences in population prevalence. The extent to which these procedural differences are actually responsible for the different rates found in different studies

is uncertain. Fortunately, this may not be a serious problem, as the large majority of these studies have used similar procedures and so have the same biases (i.e., telephone administration, 'gambling survey' description, and using any past year gambling as the only exclusionary criterion).

A more serious concern is that the present results also suggest that the population prevalence rates obtained in most previous studies may not be accurate. Determining the 'true' rate of problem gambling is a difficult task. However, it is clear that surveys with more accurate rates of problem gambling will be the ones using procedures that:

- Achieve a good overall response rate. In the present study, the response rate in *face-to-face administration* (48.6%) is clearly superior to telephone administration (35.7%).
- Minimize known sampling bias. The *face-to-face administration* produces a more representative demographic because of its ability to better recruit young people and males, demographic groups almost always under-represented in telephone surveys. Although there were no major demographic differences between the 'health and recreation' versus 'gambling' survey, it is apparent that a disproportionate percentage of gamblers participate in a 'gambling' survey. Hence, it is reasonable to assume that a '*health and recreation*' survey is likely to contain a more representative group of both gamblers and non-gamblers.
- Produce the least response distortion. The present study confirms prior research showing that *face-to-face administration* favours more candid/valid reporting, possibly because it may foster better rapport (de Leeuw & van der Zouwen, 1988; Holbrook, Green & Krosnick, 2003; Tourangeau & Yan, 2007).
- Minimize false positives. False positives are created when no corroborating gambling behaviour is needed for people to be designated as problem gamblers. The most efficient strategy to weed out false positives without eliminating true problem gamblers is to *administer problem gambling questions only to people who have gambled at least once a month on some form of gambling.*
- Minimize false negatives. False negatives are created when there is no routine mechanism for identifying problem gamblers in denial. Although the rate of false negatives does not appear to be as high as the rate of false positives, there needs to be some procedure to identify people with unambiguously excessive gambling involvement as probable problem gamblers. This issue is addressed in Part II of this report.

Thus, face-to-face surveys that are not specifically introduced or described as gambling surveys and that use a once a month or more frequency of gambling before asking problem gambling questions likely obtain the most accurate rates of problem gambling, and are 'best practices'. In the present study, these procedures produced a 2.2% prevalence rate, which is **32% lower** than the 2.9% obtained with telephone interviewing, a 'gambling survey' description, and any past year gambling threshold, which are the procedures that have been used in most prior prevalence studies (the CCHS 1.2 study being the only known prevalence study to use all of these 'best practices').

Although prior problem gambling prevalence rates may be somewhat inflated, it is unclear whether future prevalence studies should be doing anything differently. The reality is that

jurisdiction-wide face-to-face surveys are very costly and logistically difficult to administer. Also, when the survey's primary interest is in gambling behaviour, it is somewhat deceptive and misleading to describe the survey as anything but a 'gambling' survey. Finally, a change in prevalence is equally, if not more important, than knowing precisely what the true rate is. The large body of prior studies that have used telephone 'gambling surveys' with liberal criteria for asking problem gambling questions serves as a very useful benchmark to compare prevalence rates between jurisdictions as well as make comparisons between different time periods within the same jurisdiction. Changing procedures at this point would make these future comparisons much more difficult.

Instead, we believe the most reasonable approach is to: a) acknowledge that previously obtained rates may be somewhat higher than they should be; b) acknowledge the importance of procedural variables in shaping obtained problem gambling prevalence rates; c) ensure that all future studies routinely contain a detailed description of response rates, survey description, administration format, thresholds for asking problem gambling questions, and all other potentially relevant procedural details; d) employ the same procedures as prior studies when the primary interest is to compare changes relative to these prior studies; and e) conduct periodic face-to-face surveys that inquire about a wide range of issues (including gambling) and that use a once a month or more gambling frequency threshold to get a more accurate estimate of 'true' problem gambling prevalence rates and to better contextualize the findings of these other studies (or add a standardized gambling module to large omnibus health surveys like the CCHS).

## **PART II: Classification Accuracy of Problem Gambling Assessment Instruments**

The classification accuracy of problem gambling assessment instruments is a fundamentally important issue when considering best practices in the population assessment of problem gambling. Several assessment instruments exist (for detailed reviews see Abbott & Volberg, 2006; Neal, Delfabbro, & O’Neil, 2005; Stinchfield, Govoni, & Frisch, 2007). However, relatively few have been used to assess population prevalence. Worldwide, of the 54 national studies conducted between 1984 and 2010, 27 have used a DSM-based instrument (i.e., NODS, Composite International Diagnostic Interview, Diagnostic Interview Schedule, Fisher Screen), 19 have used a version of the SOGS, 6 have used the CPGI, and 2 have used the Gamblers’ Anonymous 20 Questions (AGRI, 2010). Given this pattern of usage, the focus of this discussion will be on the DSM, SOGS, and CPGI.

It is fair to say that the reliability of these three instruments is well established as measured by their consistent evidence of internal consistency and test-retest reliability (Abbott & Volberg, 2006; Neal, Delfabbro, & O’Neil, 2005; Stinchfield, Govoni, & Frisch, 2007). However, a more serious concern relates to their conceptual underpinnings and validity. The specific criticisms of each instrument are as follows:

### **Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)**

- DSM criteria were adapted from criteria that already existed for substance dependence. However, some of these items (i.e., tolerance) have been shown to have limited applicability to gambling (Blaszczynski, Walker, Sharpe, & Nower, 2008).
- DSM uses a categorical approach where you are either a pathological gambler or you are not, and yet clinical experience and population prevalence surveys indicate that problem gambling lies on a continuum (i.e., the distribution of scores on the DSM or any other instrument has a continuous and steadily decreasing frequency).
- The term DSM uses to describe problem gambling (i.e., ‘pathological’) has contentious etiological connotations. Pathological means “indicative or caused by disease” and implies that the disorder resides exclusively within the individual as opposed to its manifestation partly being a function of environmental contingencies (i.e., availability of gambling and how safely it is provided) (Williams, West, & Simpson, 2008).<sup>11</sup>
- No time frame is specified (although adapted versions such as the NODS do provide one). Consequently, some people interpret these criteria to have a *current* time frame whereas others interpret it to be *lifetime*.
- The research basis for the DSM criteria is very weak, as the items were identified by expert group consensus rather than empirical research (Neal, Delfabbro, & O’Neil, 2005). The *only* empirical research that directly contributed to the DSM-IV criteria was a study that used discriminant function analysis to distinguish items best differentiating 222 self-identified

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<sup>11</sup> This is not to say that there are not many compulsive and ‘disease-like’ elements to the severest forms of disordered gambling, just that ‘pathological’ is probably not the best description for all individuals with this condition and that a more neutral descriptor such as ‘problem’ might be advisable.

pathological gamblers versus 104 substance abusers who gambled socially (Rosenthal & Lesieur, 1992). This information was provided to the committee designing DSM-IV who nonetheless opted to use a diagnostic threshold of 5 criteria even though the empirically optimal cut-off was 4 (e.g., Stinchfield, 2003; Stinchfield, Govoni, & Frisch, 2005).

- The committees that created the pathological gambling diagnostic criteria for the DSM-III, DSM-III-R, DSM-IV, and DSM-V are not broadly representative of cross-disciplinary or international expertise. Rather, they have been composed primarily of U.S. based psychiatrists. Furthermore, the main expertise of these individuals is substance abuse rather than gambling. (The current 11 member Working Group developing the DSM-V criteria for 'pathological gambling' only includes one gambling researcher).

### **South Oaks Gambling Screen (SOGS)**

- The items comprising the SOGS derive from a study of self-identified problem gamblers receiving inpatient hospital treatment (Lesieur & Blume, 1987). However, it is well known that people receiving treatment are not representative of the general population of problem gamblers, as they typically have a different demographic profile (older, less education, male, white), more severe problems, and greater self-recognition of their problem.
- The original classification accuracy of the SOGS was determined by examining SOGS scores obtained by members of Gamblers' Anonymous versus university students and hospital employees (Lesieur & Blume, 1987). However, classification accuracy is always inflated when evaluating it only against the extreme and most unambiguous ends of the gambling continuum.
- Although more empirical research has been conducted on the SOGS than the DSM, many attempts to validate the SOGS have consisted of showing that it bears a strong correlation with scores on the DSM (e.g., Stinchfield, 2002). This entire exercise becomes a 'house of cards' when criteria with limited established validity themselves become reified and used as the 'gold standard'.
- The SOGS explicitly uses a lifetime time frame (although revised versions of it use a 6 or 12 month time frame). However, people's reports of lifetime problem gambling appear to be very unreliable. Lifetime prevalence of problem gambling is much lower than it should be considering reported past-year rates (Shaffer & Hall, 2001; Slutske et al., 2003). The test-retest reliability of lifetime reports is also very low. A longitudinal study of 4,121 people in Ontario found that of the 58 people who reported a lifetime history of problem gambling in Year 1, only 25 repeated this claim in Year 2. Furthermore, an additional 34 people in Year 2 reported a lifetime history that they did not report in Year 1 (with these problems not occurring in the previous 12 months) (Williams, 2010). Similar findings have been reported by Abbott, Williams & Volberg (2004).
- The negative consequences of gambling in the SOGS are too heavily weighted toward financial problems (10 of the possible 20 scoring points can be obtained by indicating a range of financial problems). This not only affects face validity, but may cause over-identification of problem gambling among lower socioeconomic groups (Volberg & Wray, 2007; Young & Stevens, 2008).



### **Canadian Problem Gambling Index (CPGI)**

The CPGI has some important advantages over the SOGS and DSM and is viewed by many researchers to be the superior instrument (Abbott & Volberg, 2006; McMillen & Wenzel, 2006; Wenzel, McMillen, Marshall, & Ahmed, 2004; Neal, Delfabbro, & O'Neil, 2005; Stinchfield, Govoni, & Frisch, 2007). Specifically, it uses the more neutral term 'problem gambling'; it recognizes a continuum of disordered gambling with categories of non-problem, low risk, moderate risk/problem, and severe problem gambler; it provides a 1 year time frame; the criteria were developed and tested both with a clinical sample *and with* a general population sample; and a strong empirical approach was used to identify the final set of items comprising the scale.

However, the CPGI has some shortcomings as well:

- Many of the items are from existing scales (4/9 from SOGS; 3/9 from DSM). Thus it is somewhat unfair to establish the scale's criterion validity by its correlation with existing measures (as has often been done) (Svetieva and Walker, 2008).<sup>12</sup>
- The reliability of the scale may be artificially high due to the fact that most respondents do not utilize the full range of possible response options (not at all, sometimes, most of the time, almost always) to the individual items (Maitland & Adams, 2007; Volberg & Young, 2008)<sup>13</sup>.
- Although the 4 categories of the CPGI are theoretically sensible<sup>14</sup>, the classification criteria for most of these categories lacks solid empirical foundations (McCready & Adlaf, 2006). The presumption is that having problem gambling symptoms below what is required for severe problem gambling designation puts people at risk of subsequently developing problem gambling. Again, while this makes some sense, longitudinal research (which the CPGI is not based on) is the only way of a) establishing whether this is true, and b) how many and which symptoms put people into low versus moderate risk. Most of the developmental research on the CPGI was used to justify the severe problem gambler category and its demarcation. However, even here, many people now use the moderate risk threshold (3+) to designate problem gambling as the 8+ threshold appears to be too stringent.
- The content of the CPGI was driven by statistical rather than theoretical considerations, and hence, the end product lacks some face validity (Svetieva & Walker, 2008). The final set of 9 questions was winnowed down from 45 candidates by deleting items having low correlations with the other items and/or the total score, with little regard to their theoretical importance. Items that are deleted to increase internal consistency are typically ones with the lowest rates of endorsement (representing more severe or less common manifestations of the disorder). As a result, the CPGI does not assess some important problems deriving from gambling (i.e., work problems, school problems, involvement in

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<sup>12</sup> On the other hand, this does point to some consistency on the features that are thought to characterize problem/pathological gambling.

<sup>13</sup> The CPGI offers the options of not at all, sometimes, most of the time, and always.

<sup>14</sup> Although the 'Low Risk' category is probably better described as an 'At Risk' category.

illegal activities) as well as important signs of loss of control (i.e., difficulty cutting back, signs of withdrawal).<sup>15</sup> (In a similar vein, the DSM-V proposes to eliminate engagement in illegal activities for the same reason; APA, 2010). The problem with this approach is that people with less common signs and symptoms of problem gambling have the potential of not being correctly identified.

- A potential response to this is that for many people the problems associated with gambling are sequential and hierarchical (i.e., financial problems and mental health problems tend to occur long before illegal behaviour or work problems) (Strong & Kahler, 2007; Strong et al., 2003; 2004; Toce-Gerstein, Gerstein & Volberg, 2003). Consequently, if you know about the presence of some symptoms you can infer the presence or absence of others. However, while a standard sequencing of symptomatology may apply to many problem gamblers, it does not apply to all of them. Because there are multiple routes to problem gambling and multiple contexts in which it develops, there are also multiple manifestations. Work problems may precede financial problems for people with higher incomes. Female gamblers often have a different profile compared to male gamblers (Blaszczynski & Nower, 2002; Maitland & Adams, 2007). Social problems may have more prominence than financial problems for Asian gamblers (Raylu & Oei, 2004). Furthermore, analysis of the DSM has confirmed there to be a different sequential/hierarchical ordering of items as a function of both age and gender (Strong & Kahler, 2007).<sup>16</sup>
- Similar to the SOGS, the CPGI uses a self-report quantitative approach with higher scores assumed to correlate with greater problem severity. It is possible, however, that higher scores may simply reflect greater insight into one's own problems.

### **All Instruments**

- In all three instruments all items have an equal weighting, so that *any* pattern of endorsement that meets the necessary quantitative threshold is sufficient for designation of problem/pathological gambling (i.e., despite the fact that some items are more serious and/or diagnostic than others). Consequently, it is possible to be classified as a problem/pathological gambler without actually endorsing any significant problems or harm deriving from one's gambling. Similarly, it is possible to indicate the presence of significant problems deriving from one's gambling without being classified as a problem gambler. Most people would agree that for someone to be a problem gambler there *needs* to be evidence of a) significant negative consequences, and b) impaired control (Neal, Delfabbro, & O'Neil, 2005).

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<sup>15</sup> Another result of this approach to deleting items without strong correspondence to other items was the artifactual reduction in the number of factors in the CPGI from 3 to 1.

<sup>16</sup> Thus, it is potentially problematic to apply weights to items depending on their typical rank order of appearance (as is done with Item Response Theory (IRT) approaches to scale development) as this approach is also premised on the assumption that problem gambling is a unitary construct with a consistent sequencing of items for all individuals regardless of age, gender, culture/ethnicity, income, pre-existing mental health problems, etc. The optimal assessment instrument for problem gambling is not one that requires 'one shoe to fit all', but rather, one that is able to recognize and capture all of the different manifestations of the disorder.

- As mentioned earlier, not all the possible harms of problem gambling are covered in these instruments, which means that people experiencing certain valid signs/symptoms of problem gambling may not be correctly identified. Mental health problems are not asked about in the DSM and only indirectly in the SOGS (i.e., presence of guilt). Physical health problems are not addressed in either the DSM or SOGS. School and work problems are not covered in the CPGI. Engagement in illegal activities to support gambling is not addressed in the CPGI and only partially addressed in the SOGS (i.e., passing bad cheques). Financial problems are not well addressed in the DSM (i.e., relies on others to provide money). Similarly, not all the signs and symptoms of impaired control are covered. For example, the CPGI does not assess whether the person has experienced any problems in cutting back or stopping gambling.
- Almost all the harm questions refer to problems experienced by the gambler, rather than harms that he/she may be causing in his/her immediate social network. However, a problem still exists if the person's gambling negatively impacts the gambler's family, even if the gambler does not experience the harm to the same degree. This is explicit in the CPGI's own definition of problem gambling, which is "gambling behaviour that creates negative consequences for the gambler, others in his or her social network, or for the community" (Ferris & Wynne, 2001).
- None of these instruments is capable of identifying problem gamblers in denial (i.e., people whose frequency and expenditure on gambling is clearly excessive but who fail to self report any significant problem gambling symptomatology).
- None of these instruments require the person to report corroborating gambling behaviour to support their report of problem gambling symptomatology. All population surveys contain a small but significant portion of people who score in the problem gambling range but report very little past year history of gambling behaviour. Evidence presented in Part I of this report indicates that a significant portion of these individuals are not really problem gamblers. Requiring a minimal amount of gambling frequency (e.g., gambling once a month or more) before being designated as a problem gambler effectively excludes these false positives without excluding any genuine problem gamblers.
- Research shows reasonably good correspondence between classification on these instruments and in-person clinical assessments for clinical samples (e.g., people receiving treatment; Stinchfield, 2002; Stinchfield, Govoni, Frisch, 2001). However, as mentioned earlier, clinical samples are not representative of problem gamblers more generally, and also do not provide a fair test of the classification accuracy of these instruments for the *continuum* of problem gambling. For an instrument to have utility as a measure of problem gambling prevalence in the general population it needs to have good correspondence to the clinical assessment of individuals identified in population surveys. However, the evidence presented below shows there to be only fair to weak correspondence between problem gamblers identified in population surveys and the subsequent classification of these same individuals in clinical interviews:
  - Abbott & Volberg (1992) conducted in-person assessments of 217 individuals who had been previously administered the SOGS over the phone in the 1991 New Zealand prevalence survey. The clinical interviews were guided by DSM-III-R criteria and the assessment occurred 2-3 months after SOGS administration. Only 18/65 SOGS (lifetime) pathological gamblers and 10/26 SOGS (6 month) pathological

- gamblers were confirmed as such in the clinical interview. A total of 3/152 (lifetime) and 11/191 (6 month) SOGS non-pathological gamblers were classified as pathological in the clinical interviews.
- Abbott (2001) conducted a similar in-person assessment of individuals who had been administered the SOGS in the 1999 New Zealand telephone prevalence survey. The interviewers were again guided by DSM-III-R criteria and the assessment occurred several weeks after the SOGS administration. Only 5/11 people identified by the SOGS (current) as pathological were confirmed in the clinical assessment. However, it was noted that similar to the Abbott & Volberg (1992) study, the overall prevalence rate of current pathological gambling may still be reasonably accurate due to the SOGS failing to correctly identify almost an equal number people who were genuine pathological gamblers.
  - Ladouceur et al., (2000) found that 30 out of 60 individuals recruited via newspaper advertisement met criteria for pathological gambling when administering the SOGS over the phone. However, subsequent in-person administration of the SOGS (after ensuring the person understood the meaning of each question) decreased the number of pathological gamblers to 23. This same study reported more dramatic decreases in problem gambling prevalence in a sample of grade 4-6 and 9-11 students administered the SOGS-RA in their classroom and then readministered it individually after ensuring the students understood the meaning of each question (30/84 changing to 12/84 and 43/126 changing to 24/126 respectively).
  - Ferris & Wynne (2001) compared the SOGS, DSM, and CPGI classifications of 143 individuals who had been administered these instruments over the phone in a population prevalence survey against a clinical telephone assessment conducted approximately 3 months later. They found that “none of the three measures (SOGS, DSM, CPGI) really correlated well with the results of the clinical interviews” and that the CPGI had the highest correlation ( $r = .48$ ). Overall, the CPGI had 78% sensitivity and 100% specificity.
  - Ladouceur et al. (2005) recontacted 133 people administered the SOGS and CPGI in a population survey of Quebec adults. These individuals were then reinterviewed by phone by clinical psychologists. Only 22% of SOGS identified and 12% of CPGI identified problem/pathological gamblers were confirmed as such by clinical assessment.
  - Murray, Ladouceur, & Jacques (2005) reassessed a sample of 200 individuals who had been recruited for a study on video lottery terminals (VLT) and administered the NODS over the phone. Of 71 NODS current pathological gamblers, only 50 were assessed as pathological in the clinical interview. None of the 63 Low Risk NODS individuals were assessed as pathological gamblers in the clinical interview.

### **Importance of Demonstrating Classification Accuracy in General Population Samples**

The lack of good correspondence between survey assessed classifications and classifications as determined by more thorough clinical assessment casts doubt on the validity of these instruments. However, there are some important methodological issues that need to be considered in evaluating this evidence.

- The sample sizes of problem/pathological gamblers used in most of these reassessments are relatively small.
- The clinical assessments have always been done *subsequent* to the instrument administration (usually several weeks later), rather than concurrently. However, problem gambling appears to have some inherent temporal instability (e.g., Abbott, Williams & Volberg, 2004; Slutske et al., 2003; Wiebe et al., 2003). The 3-4 week test-retest reliability of the SOGS and CPGI is only .71 and .78 respectively (Ferris & Wynne, 2001) (the DSM-IV tends to be higher).
- Problem gambling may be minimized in the subsequent clinical interview because of social desirability biasing:
  - Unlike the initial telephone assessment, participants are no longer anonymous and may feel 'targeted' because of their earlier report of problems and the fact they are now being interviewed by someone they understand to be a clinician (a possibility suggested by Ferris & Wynne, 2001).
  - People who are repeatedly assessed often report lower rates of clinical problems so as to convey improvement, independent of whether improvement has actually occurred (e.g., Fenrich et al., 1997; Jorm et al., 1989).
- Sampling bias exists, as a significant proportion of people in most of these studies declined to be reassessed or could not be recontacted. In general, hard-to-contact participants tend to have higher rates of pathology compared to easy-to-contact participants (e.g., Stinchfield, Niforopulus, & Feder, 1994).
- The clinical assessments have tended to be done by a single clinician, and usually in an unstructured way. Thus, there is no guarantee that the interview covered all areas relevant to the determination of problem gambling, or that the clinician objectively applied accepted criteria for the determination. (It is also important to note that using the DSM criteria to guide these clinical assessments is inappropriate when the DSM criteria have significant validity issues of their own). In general, it is a mistake to use unstructured subjective clinical judgment as the 'gold standard' as it is usually less accurate than simple actuarial formulas or assessment instruments (Dawes, Faust, & Meehl, 1989; White et al., 2006). Clinicians have superior ability to integrate information and to see connections and inconsistencies. However, this advantage only manifests itself in terms of superior diagnostic accuracy when clinicians are required to follow explicit and rigorous assessment procedures that minimize subjectivity and require attention to all relevant information (Gambrill, 2006).

The presumption has been that the high percentage of instrument-identified problem gamblers that are not subsequently confirmed by clinical interview reflects a false positive problem with the instruments. However, the above points suggest the possibility that the clinical interviews may also be producing false negatives. In order to fairly evaluate the classification accuracy of these instruments, it seems clear that the clinical assessment needs to be done using **comprehensive** and **concurrently** obtained information from **all selected participants**; that **more than one clinician** should be involved in the assessment; that the **clinicians need to explicitly attend to all relevant information**; and that the clinical classifications should be guided by **clear, widely accepted, and valid definitions** of the categories being assessed.

The optimal situation would be to have a group of clinicians conducting the initial prevalence survey so they could immediately engage in supplementary questioning of anyone who reports any signs or symptoms of problem gambling. Unfortunately, this is cost prohibitive when thousands of people are being surveyed. However, a reasonable compromise is to:

- Ask all participants an exhaustive list of questions that inquire about the ‘universe’ of potentially relevant signs, symptoms, and correlates of problem gambling.
- Have two experienced clinicians independently examine this comprehensive set of information for each individual and clinically assess the person’s appropriate gambling categorization using widely accepted definitions of ‘problem’ and ‘non-problem’ gambling (with all cases lacking unanimity being jointly reviewed to obtain a consensus judgment).

Thus, the purpose of the present investigation is to re-evaluate the classification accuracy of the DSM, SOGS, and CPGI in population survey samples using the above described methodology and a much larger sample. A secondary purpose is to investigate the reliability and validity of a new instrument, the Problem and Pathological Gambling Measure, which was developed by the first author to address the identified weaknesses of these other instruments.

### **Problem and Pathological Gambling Measure (PPGM) (Appendix B)**

The PPGM is a 14 item assessment instrument with questions organized into 3 sections: Problems (7 questions), Impaired Control (4 questions), and Other Issues (3 questions). Similar to the CPGI, it uses a 12 month time frame, recognizes there to be a continuum of gambling with 4 categories (Recreational Gambler, At-Risk Gambler, Problem Gambler, Pathological Gambler), and has been field tested and refined with both clinical *and* general population samples (unpublished work). However, it diverges from other instruments in several important respects:

- *All* potential harms of problem gambling are addressed (financial, mental health, health, relationship, work/school, legal) with these questions ordered from least commonly to most commonly endorsed. To better capture problem gamblers in denial or who lack insight, these questions allow for either direct admission of a problem/harm, or endorsement of something that indicates harm is occurring regardless of whether the person is willing to call it a problem.
- All harm questions are phrased to inquire whether the person’s gambling has created difficulties either for the individual himself/herself “or someone close to you”.
- To provide better face and construct validity, to be classified as a ‘**Problem Gambler**’ the person is normally required to endorse 1 or more items from the Problems section and 1 or more items from the Impaired Control section.<sup>17</sup> Endorsement of several problems and

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<sup>17</sup> This procedure thereby accomplishes the goal of assigning greater value/weight to the more serious and/or diagnostic items (the intent of IRT approaches), but does it in a simpler way; in a more theoretically rigorous way; and in a more flexible way that will better capture the different manifestations of the disorder (see Footnote 15). This system also means that the PPGM has a lower total score requirement for problem gambling than the CPGI, SOGS, and DSM (i.e., potentially a total score of only 2). The advantage of a low score requirement is that it makes it less likely that identified problem gamblers will simply be the people with the greatest awareness of their condition (i.e., people who are able to recognize and endorse the several other signs and symptoms that typically accompany the presence of harm and/or impaired control).

indices of impaired control will typically lead to the person being classified as a **'Pathological Gambler'**. Endorsement of a problem or impaired control, but not both, typically leads to classification as an **'At Risk'** Gambler. Longitudinal research in Ontario and Alberta has empirically confirmed this profile to put people at high risk of subsequent problem gambling.<sup>18</sup> Gamblers who do not meet the criteria for Problem, Pathological, and At Risk, are deemed to be **'Recreational'** Gamblers.

- To minimize false positives, to be labeled as either a Problem or Pathological gambler the person also has to report gambling at least once a month on some form of gambling in the past year.
- To minimize false negatives (i.e., to better capture problem gamblers in denial), a person can be classified as a Problem Gambler if:
  - He/she indicates a) there are *other* people who would say he/she has significant problem(s) deriving from his/her gambling and b) there are *other* people who would say he/she has significant difficulty controlling his/her gambling.
  - OR
  - He/she endorses 3 or more items from any of the 3 categories as long as their frequency of gambling and gambling losses are equal to or greater than the median for unambiguously identified Problem and Pathological Gamblers.
  - Similarly, an individual can be designated as an At Risk gambler without endorsement of any problem gambling questions if his/her frequency of gambling and gambling losses are equal to or greater than the median for unambiguously identified Problem and Pathological Gamblers. Here again, longitudinal research in Ontario and Alberta has confirmed that people with this profile are at significant risk of subsequently being classified as a problem gambler.

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<sup>18</sup> Unpublished research from the Quinte Longitudinal Study (Williams, 2010) and the Leisure, Lifecycle, Lifestyle Project (el-Guebaly et al., 2008).

## METHODOLOGY

### Samples

Two data sets were used in the present investigation. The first comprised the data described in Part I of this report, consisting of a sample of 3028 adults from the Kitchener Census Metropolitan Area in Ontario, Canada. This will be known as the '**Best Practices**' data set.

A second sample from a different study was added to a) increase the number problem gamblers (as there were only 46 - 79 individuals from the Best Practices set classified as problem gamblers by either the NODS, SOGS, CPGI, or PPGM), b) determine whether the results from the Best Practices Canadian data set would be replicated in an international sample. This second data set ('**International Online**') consisted of 12,521 adults from 105 countries who completed an online survey of gambling in 2007. The details of this study and the sample are comprehensively described in Wood & Williams (2009). Briefly, the study's main purpose was to conduct comprehensive online gambling surveys of a large number of gamblers from around the world. People were recruited from a banner ad on a prominent gambling web portal ([www.casinocity.com](http://www.casinocity.com)) that provided a worldwide listing and links to all land-based and online gambling venue/sites. The banner ad invited participants to "test your gambling knowledge", and "see how your gambling knowledge, attitudes and behavior compare to other people". The survey contained 177 questions offered in 7 different languages (English, French, German, Italian, Spanish, Mandarin, and Japanese). The exact number of questions that any individual received depended on which parts of the questionnaire the person chose to complete. At the end of each section they were provided normative feedback about their scores. The questionnaire had several modules including: gambling behaviour; gambling attitudes; gambling fallacies; problem gambling; and demographics. The gambling behaviour module and the problem gambling module used the exact same questions that were employed in the Best Practices data set (i.e., including the 29 unique items that collectively comprise the CPGI, NODS, SOGS, and PPGM).

A total of 5301 individuals completed all sections of the survey, thus allowing for a comprehensive profile of their gambling behaviour, problem gambling symptomatology, and demographics. Depending on the assessment instrument, this sample of 5301 individuals contained between 813 and 1714 problem gamblers. This very high prevalence of problem gamblers was anticipated because of where the advertisement was placed and the presumed greater interest of heavy gamblers and problem gamblers to 'test their gambling knowledge' and to receive normative feedback about their behaviour.

### Clinical Assessment

Of the 3028 individuals in the Best Practices data set, 607 were selected for Clinical Assessment based on having 1 or more positive responses to any of the 29 problem gambling questions and/or reporting more than \$49/month in gambling losses. All the rest were designated as either Recreational Gamblers or Non-Gamblers (if no gambling in past 12 months was reported).



Of the 5301 individuals in the International Online data set, 3464 people were selected for Clinical Assessment based on having 1 or more positive responses to any of the 29 problem gambling questions and/or having more than \$49/month in gambling losses. All the rest were designated as either Recreational Gamblers or Non-Gamblers (if no gambling in past 12 months was reported).

A Research Assistant created a one page profile of each individual selected for Clinical Assessment. An example of one of these profiles along with the accompanying coding sheets is presented in Appendix C (Best Practices) and Appendix D (International Online). These profiles provided:

- A detailed report of the person's past year gambling behaviour (frequency of each type; spending on each type; total frequency; total spending).
- The person's answer to each of the 29 problem gambling questions from the CPGI, SOGS, NODS, and PPGM (38 questions if including the sub-questions of the SOGS). Questions from each instrument were mixed together, no summary scores for any scale were provided, and the scale origin of each question was not identified.
- Answers to questions about lifetime history of problem gambling, help-seeking for gambling problems, third-party beliefs about the person's gambling, and the types of gambling causing the most problems.
- Verbatim answers to open-ended questions posed to individuals to explain either their a) problem gambling designations in the absence of significant past year money expenditures or, b) very high past year money expenditures in the absence of a problem gambling designation (Best Practices only).
- Answers and scores on the validity questions (described in Part I) (Best Practices only).
- Answers to questions about substance use and mental health issues (International Online only).
- Relevant demographic characteristics (age, marital status, employment, past year income, current debt).

In total, the Best Practices profile provided answers to 95 questions posed to the participant and the Internet Online provided answers to 104 questions.

These 4071 profiles were then given to two experienced clinicians (a psychiatrist and a psychologist). Over a period of several months these clinicians independently read each of these profiles and assessed the person's gambling status. The choices available to them were Recreational Gambler, At Risk Gambler, Problem Gambler, and Pathological Gambler. A detailed written definition of each of these categories was provided to guide their assessment (Appendix E). These definitions were derived from the literature and refined based on feedback the authors received from international gambling experts in the United States, Canada, and Sweden.

The definition of problem gambling put forward by Neal et al. (2005) captures the essential elements of this phenomenon common to almost all definitions and was used in the present study: "**Problem Gambling** is characterized by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the

community.” The other definitions were as follows: “**Pathological Gambling** is equivalent to severe problem gambling and is characterized by severe difficulties in controlling gambling behaviour leading to serious adverse consequences”. An “**At-Risk Gambler** is someone who is at risk for becoming a problem or pathological gambler either because: a) they evidence some adverse consequence(s) from gambling but no symptoms of loss of control; OR b) they evidence some symptoms of loss of control but no adverse consequences; OR c) they evidence some adverse consequences and loss of control, but not at a level sufficient to meet criteria for problem or pathological gambling; OR d) they have a gambling frequency and/or expenditure that is significantly above average (especially in the context of their employment status, income, and debt)”. A “**Recreational Gambler** is someone who gambles without meeting criteria for either At-Risk, Problem, or Pathological Gambling”.

## RESULTS

### Inter-Rater Reliability

Very high correspondence was obtained between the independent ratings of the two clinicians. An intraclass correlation coefficient of .973 was obtained ( $p < .0001$ ) in the Best Practices data set ( $\kappa = .950$   $p < .0001$ ). An identical intraclass correlation coefficient of .973 was also obtained ( $p < .0001$ ) for the International Online data set ( $\kappa = .925$ ,  $p < .0001$ ). There were a total of 189 cases in the 2 data sets where the 2 judges did not agree. The 2 clinicians jointly reviewed each case and a consensus judgment was arrived at. With the two data sets combined, and adding in the individuals automatically assigned to Recreational Gambler status, there were 4266 people classified as Recreational Gamblers; 2030 as At Risk Gamblers; 455 as Problem Gamblers; and 522 as Pathological Gamblers.

### Internal Consistency

The internal consistency of each instrument was assessed with Cronbach’s alpha, with the results presented in Table 7. As can be seen, all four instruments have reasonably good internal homogeneity, with the CPGI having the highest and the NODS having the lowest.

Table 7. Cronbach’s Alpha as a Function of Data Set and Assessment Instrument

<b>Best Practices</b>	CPGI	SOGS	NODS	PPGM
Alpha	.800	.789	.690	.759
<b>International Online</b>	CPGI	SOGS	NODS	PPGM
Alpha	.900	.825	.716	.808

### Correlation between the Instruments

Correlations between the instruments were examined both in terms of raw scores and gambling categorizations. A ranking measure of association (Kendall tau-b) was used because of the skewness of the data and to help level out score range differences between the instruments. As seen in Table 8, all of these correlations were substantial and highly significant. This is hardly surprising considering that several of the same items are used in each instrument. No one instrument was noticeably more or less correlated with the other instruments.

Table 8. Correlation between Assessment Instruments (Kendall tau-b)

	Total Scores		
<b>Best Practices</b>	CPGI	SOGS	NODS
SOGS	.478**		
NODS	.758**	.500**	
PPGM	.606**	.659**	.693**
<b>International Online</b>	CPGI	SOGS	NODS
SOGS	.789**		
NODS	.673**	.658**	
PPGM	.698**	.746**	.821**
	Categorizations		
<b>Best Practices</b>	CPGI	SOGS	NODS
SOGS	.904**		
NODS	.941**	.905**	
PPGM	.905**	.901**	.926**
<b>International Online</b>	CPGI	SOGS	NODS
SOGS	.700**		
NODS	.709**	.704**	
PPGM	.695**	.693**	.780**

\*\*  $p < .001$

One area where the instruments do not correspond well is their obtained problem gambling prevalence rate. This is a large enough data set with a sufficient number of problem gamblers to estimate the approximate weighting factor that would be needed to convert a prevalence rate obtained with one instrument to a prevalence rate determined by another instrument. Table 9 presents the multiplication factor that would have to be applied to the prevalence rate as determined by criteria listed in the rows to obtain the equivalent prevalence rate as determined by the criteria listed in the columns:

Table 9. Problem Gambling Prevalence Rate Conversion Factors (Combined Data)

	CPGI 3+	CPGI 5+	CPGI 8+	SOGS 3+	SOGS 5+	NODS 3+	NODS 5+	PPGM
CPGI 3+ TO	1.000	0.556	0.266	0.806	0.387	0.484	0.222	0.577
CPGI 5+ TO	1.797	1.000	0.478	1.449	0.696	0.884	0.399	1.036
CPGI 8+ TO	3.758	2.091	1.000	3.030	1.455	1.818	0.833	2.167
SOGS 3+ TO	1.240	0.690	0.330	1.000	0.480	0.600	0.275	0.715
SOGS 5+ TO	2.583	1.438	0.688	2.083	1.000	1.250	0.573	1.490
NODS 3+ TO	2.067	1.150	0.550	1.667	0.800	1.000	0.458	1.192
NODS 5+ TO	4.509	2.509	1.200	3.636	1.745	2.182	1.000	2.600
PPGM TO	1.734	0.965	0.462	1.399	0.671	0.839	0.385	1.000

### **Correlation with Gambling Frequency and Expenditure**

Table 10 illustrates that all instruments displayed concurrent validity by their significant association between gambling classification level and average monthly gambling frequency (measured as the highest frequency of gambling reported on any form) and gambling monthly expenditure (both net and losses only). The strength of the association was much stronger for frequency compared to expenditure.

Table 10. Correlation between Instrument Determined Gambling Classifications and Aggregate Measures of Gambling Involvement (Kendall tau-b)

<b>Best Practices</b>	CPGI	SOGS	NODS	PPGM
Gambling Frequency	.693**	.718**	.692**	.707**
Gambling Net Expenditure	.099**	.087**	.086**	.107**
Gambling Losses	.231**	.148**	.223**	.241**
<b>International Online</b>				
Gambling Frequency	.334**	.318**	.337**	.409**
Gambling Net Expenditure	.179**	.165**	.143**	.198**

\*\*  $p < .001$

### **Classification Accuracy**

The classification accuracy of these assessment instruments is the central question in the present study. The following Tables show the classification accuracy for each of the 4 assessment instruments against clinical assessment. Table 11 shows classification accuracy for the Best Practices data set, Table 12 for the International Online data set, and Table 13 for the Combined data sets. Measures of classification accuracy (in terms of the instrument's ability to distinguish problem from non-problem gamblers) are provided at the end of each table in the form of sensitivity, specificity, positive predictive power, negative predictive power, diagnostic efficiency, kappa, and the ratio of instrument identified problem/pathological gamblers relative to the number of clinician identified problem/pathological gamblers (the latter index showing the degree to which the obtained prevalence rate deviates from the true rate).

Table 11. Correspondence between Instrument Assessment and Clinical Assessment for the Best Practices Data Set (Unweighted Data)

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
CPGI Severe PG (8+)	10	2	1	0	13
CPGI Moderate PG (3-7)	7	24	42	4	77
CPGI Low Risk (1-2)	0	10	96	110	216
CPGI Non-problem (0)	1	0	116	1770	1887
TOTAL	18	36	255	1884	2193
	Positive PG	Negative PG	TOTAL		
CPGI 3+ Positive PG	43	47	90		
CPGI Negative PG	11	2092	2103		
TOTAL	54	2139	2193		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
SOGS Pathological (5+)	14	14	4	0	32
SOGS Problem (3-4)	2	7	13	3	25
SOGS Non-problem (0-2)	2	15	238	1881	2136
TOTAL	18	36	255	1884	2193
	Positive PG	Negative PG	TOTAL		
SOGS 3+ Positive PG	37	20	57		
SOGS Negative PG	17	2119	2136		
TOTAL	54	2139	2193		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
NODS TYPE E (Pathological) (5+)	13	7	2	0	22
NODS TYPE D (Problem) (3-4)	4	13	19	0	36
NODS TYPE C (1-2)	1	16	137	83	237
NODS TYPE B (0)	0	0	97	1801	1898
TOTAL	18	36	255	1884	2193
	Positive PG	Negative PG	TOTAL		
NODS 3+ Positive PG	37	21	58		
NODS Negative PG	17	2118	2135		
TOTAL	54	2139	2193		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
PPGM Pathological	18	3	0	0	21
PPGM Problem	0	30	4	0	34
PPGM At Risk	0	3	233	3	239
PPGM Recreational	0	0	18	1881	1899
TOTAL	18	36	255	1884	2193
	Positive PG	Negative PG	TOTAL		
PPGM Positive PG	51	4	55		
PPGM Negative PG	3	2135	2138		
TOTAL	54	2139	2193		

	CPGI	SOGS	NODS	PPGM
Sensitivity	79.63%	68.52%	68.52%	94.44%
Specificity	97.80%	99.06%	99.02%	99.81%
Positive Predictive Power	47.78%	64.91%	63.79%	92.73%
Negative Predictive Power	99.48%	99.20%	99.20%	99.86%
Diagnostic Efficiency	97.36%	98.31%	98.27%	99.68%
Kappa	0.58	0.66	0.65	0.93
Instrument Prev/Clinician Prev	1.67	1.06	1.07	1.02

Sensitivity: % of individuals clinically assessed as problem gamblers that also receive this designation on the assessment instrument.

Specificity: % of individuals clinically assessed as non-problem gamblers that also receive this designation on the assessment instrument.

Positive Predictive Power: % of individuals that are designated as problem gamblers by the assessment instrument that are confirmed as problem gamblers in the clinical assessment.

Negative Predictive Power: % of individuals that are designated as non-problem gamblers by the assessment instrument that are confirmed as non-problem gamblers in the clinical assessment.

Diagnostic Efficiency: Number of true positives (correctly identified as problem gamblers) + true negatives (correctly identified as non-problem gamblers) divided by the total sample size.

Kappa: A quantitative measure of overall agreement after taking chance agreement into account.

Instrument Prev/Clinician Prev: The prevalence rate of problem gambling as determined by the assessment instrument divided by the prevalence rate of problem gambling as determined by clinical assessment.

Table 12. Correspondence between Instrument Assessment and Clinical Assessment for the International Online Data Set (Unweighted Data)

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
CPGI Severe PG (8+)	342	77	48	0	467
CPGI Moderate PG (3-7)	156	273	719	99	1247
CPGI Low Risk (1-2)	5	64	713	703	1485
CPGI Non-problem (0)	1	5	294	1580	1880
TOTAL	504	419	1774	2382	5079
	Positive PG	Negative PG	TOTAL		
CPGI 3+ Positive PG	848	866	1714		
CPGI Negative PG	75	3290	3365		
TOTAL	923	4156	5079		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
SOGS Pathological (5+)	418	134	111	1	664
SOGS Problem (3-4)	75	184	438	33	730
SOGS Non-problem (0-2)	11	101	1225	2347	3684
TOTAL	504	419	1774	2381	5078
	Positive PG	Negative PG	TOTAL		
SOGS 3+ Positive PG	811	583	1394		
SOGS Negative PG	112	3572	3684		
TOTAL	923	4155	5078		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
NODS TYPE E (Pathological) (5+)	346	16	16	0	378
NODS TYPE D (Problem) (3-4)	124	146	164	1	435
NODS TYPE C (1-2)	34	221	1018	121	1394
NODS TYPE B (0)	0	36	576	2260	2872
TOTAL	504	419	1774	2382	5079
	Positive PG	Negative PG	TOTAL		
NODS 3+ Positive PG	632	181	813		
NODS Negative PG	291	3975	4266		
TOTAL	923	4156	5079		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
PPGM Pathological	481	12	0	0	493
PPGM Problem	23	407	64	0	494
PPGM At Risk	0	0	1711	117	1828
PPGM Recreational	0	0	0	2265	2265
TOTAL	504	419	1775	2382	5080
	Positive PG	Negative PG	TOTAL		
PPGM Positive PG	923	64	987		
PPGM Negative PG	0	4093	4093		
TOTAL	923	4157	5080		

	CPGI	SOGS	NODS	PPGM
Sensitivity	91.87%	87.87%	68.47%	100.00%
Specificity	79.16%	85.97%	95.64%	98.46%
Positive Predictive Power	49.47%	58.18%	77.74%	93.52%
Negative Predictive Power	97.77%	96.96%	93.18%	100.00%
Diagnostic Efficiency	81.47%	86.31%	90.71%	98.74%
Kappa	0.53	0.62	0.67	0.96
Instrument Prev/Clinician Prev	1.86	1.51	0.88	1.07

Sensitivity: % of individuals clinically assessed as problem gamblers that also receive this designation on the assessment instrument.

Specificity: % of individuals clinically assessed as non-problem gamblers that also receive this designation on the assessment instrument.

Positive Predictive Power: % of individuals that are designated as problem gamblers by the assessment instrument that are confirmed as problem gamblers in the clinical assessment.

Negative Predictive Power: % of individuals that are designated as non-problem gamblers by the assessment instrument that are confirmed as non-problem gamblers in the clinical assessment.

Diagnostic Efficiency: Number of true positives (correctly identified as problem gamblers) + true negatives (correctly identified as non-problem gamblers) divided by the total sample size.

Kappa: A quantitative measure of overall agreement after taking chance agreement into account.

Instrument Prev/Clinician Prev: The prevalence rate of problem gambling as determined by the assessment instrument divided by the prevalence rate of problem gambling as determined by clinical assessment.



Table 13. Correspondence between Instrument Assessment and Clinical Assessment for the Combined Data Set (Unweighted Data)

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
CPGI Severe PG (8+)	352	79	49	0	480
CPGI Moderate PG (3-7)	163	297	761	103	1324
CPGI Low Risk (1-2)	5	74	809	813	1701
CPGI Non-problem (0)	2	5	410	3350	3767
TOTAL	522	455	2029	4266	7272
	Positive PG	Negative PG	TOTAL		
CPGI 3+ Positive PG	891	913	1804		
CPGI Negative PG	86	5382	5468		
TOTAL	977	6295	7272		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
SOGS Pathological (5+)	432	148	115	1	696
SOGS Problem (3-4)	77	191	451	36	755
SOGS Non-problem (0-2)	13	116	1463	4228	5820
TOTAL	522	455	2029	4265	7271
	Positive PG	Negative PG	TOTAL		
SOGS 3+ Positive PG	848	603	1451		
SOGS Negative PG	129	5691	5820		
TOTAL	977	6294	7271		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
NODS TYPE E (Pathological) (5+)	359	23	18	0	400
NODS TYPE D (Problem) (3-4)	128	159	183	1	471
NODS TYPE C (1-2)	35	237	1155	204	1631
NODS TYPE B (0)	0	36	673	4061	4770
TOTAL	522	455	2029	4266	7272
	Positive PG	Negative PG	TOTAL		
NODS 3+ Positive PG	669	202	871		
NODS Negative PG	308	6093	6401		
TOTAL	977	6295	7272		

	Clinical Assessment				
	Pathological	Problem	At Risk	Recreational	TOTAL
PPGM Pathological	499	15	0	0	514
PPGM Problem	23	437	68	0	528
PPGM At Risk	0	3	1944	120	2067
PPGM Recreational	0	0	18	4146	4164
TOTAL	522	455	2030	4266	7273
	Positive PG	Negative PG	TOTAL		
PPGM Positive PG	974	68	1042		
PPGM Negative PG	3	6228	6231		
TOTAL	977	6296	7273		

	CPGI	SOGS	NODS	PPGM
Sensitivity	91.20%	85.87%	68.47%	99.69%
Specificity	85.50%	90.42%	96.79%	98.92%
Positive Predictive Power	49.39%	56.52%	76.81%	93.47%
Negative Predictive Power	98.43%	97.78%	95.19%	99.95%
Diagnostic Efficiency	86.26%	89.84%	92.99%	99.02%
Kappa	0.56	0.62	0.68	0.96
Instrument Prev/Clinician Prev	1.85	1.52	0.89	1.07

Sensitivity: % of individuals clinically assessed as problem gamblers that also receive this designation on the assessment instrument.

Specificity: % of individuals clinically assessed as non-problem gamblers that also receive this designation on the assessment instrument.

Positive Predictive Power: % of individuals that are designated as problem gamblers by the assessment instrument that are confirmed as problem gamblers in the clinical assessment.

Negative Predictive Power: % of individuals that are designated as non-problem gamblers by the assessment instrument that are confirmed as non-problem gamblers in the clinical assessment.

Diagnostic Efficiency: Number of true positives (correctly identified as problem gamblers) + true negatives (correctly identified as non-problem gamblers) divided by the total sample size.

Kappa: A quantitative measure of overall agreement after taking chance agreement into account.

Instrument Prev/Clinician Prev: The prevalence rate of problem gambling as determined by the assessment instrument divided by the prevalence rate of problem gambling as determined by clinical assessment.

The main findings can be summarized as follows:

- The general pattern of results in the Best Practices data set is replicated in the International Online data set, although the International Online data tended to find:
  - higher sensitivity and lower specificity for the CPGI and SOGS
  - higher positive predictive power and lower negative predictive power for the NODS
  - lower overall diagnostic efficiency for the CPGI, SOGS, and NODS
  - a higher ratio of instrument versus clinician assessment prevalence for the SOGS
- In terms of being able to distinguish problem gamblers from non-problem gamblers, the PPGM instrument was highest on all measures of classification accuracy across both data sets, providing strong evidence for this instrument's validity. This is partly a function of the very close correspondence between definitions used in the clinical assessments and the scoring criteria for the PPGM categories, plus the fact that this instrument has been repeatedly tested, retested, and refined over the past 7 years of development so as to optimize its reliability and validity (unpublished research). Note: the relatively small number of misclassifications ( $n = 71$ ) in the PPGM allowed for a more in-depth examination of the basis for these discrepancies between the clinical assessment and PPGM categorization (as well as the discrepancies between the 2 clinicians). The results of this investigation are contained in Appendix F.
- In general, all instruments perform well at correctly classifying most non-problem gamblers as non-problem gamblers. Because non-problem gamblers constitute the large majority in any prevalence survey, this also means that these instruments have good overall diagnostic efficiency and level of agreement (kappa).
- The main weakness of the CPGI and SOGS is that roughly half of the people labeled as problem gamblers by these instruments (using a 3+ criterion) are not genuine problem gamblers. This also means that the obtained prevalence rate with these instruments is too high (1.85 times higher than the actual rate with the CPGI and 1.52 times higher with the SOGS). The 'upside' to this over identification is that the large majority of genuine problem gamblers are correctly identified by these two instruments (i.e., good sensitivity), and thus, they are reasonably effective screening tools from a clinical perspective.
- The main problem with the NODS concerns the fact that it only correctly identifies 68.5% of the genuine problem gamblers, and, even with this lower rate of over identification, its positive predictive power, while significantly better than the CPGI and SOGS, is still only 76.8%.
- Comparing the 3 traditional instruments to one another, the CPGI has the highest sensitivity and negative predictive power, and the NODS the highest specificity, positive predictive power, overall diagnostic efficiency, and also produces a problem gambling prevalence rate closest to the true rate. The SOGS has intermediate values on most of these indices.

### **Classification Accuracy as a Function of Demographic Characteristics**

The utility of these assessment instruments is also a function of their invariance across different demographic groups. Consequently, classification accuracy and invariance in classification accuracy was also examined as a function of gender, age, and ethnic origin. Results are presented in Table 14.

The main findings are as follows:

- In most cases, classification accuracy did not vary substantially as a function of gender, age, and ethnic origin.
- The same general strengths and weaknesses of each instrument that have been identified also tend to occur for each demographic subgroup.
- Classification accuracy for the PPGM was consistently high for all demographic subgroups.
- There was no significant variation on classification accuracy on any of the instruments as a function of gender.
- The main variation in classification accuracy occurred with age, as the CPGI, SOGS, and NODS had higher classification accuracy with people age 30 and younger.
- The NODS had better classification accuracy with people of non-Western European origins.

The specific variations observed as a function of instrument are as follows:

#### **CPGI**

- Better positive predictive power for people age 30 and younger
- Better estimate of true problem gambling prevalence for people 30 and younger

#### **SOGS**

- Better positive predictive power for people age 30 and younger
- Better overall agreement (kappa) for people age 30 and younger
- Better estimate of true problem gambling prevalence for people age 30 and younger

#### **NODS**

- Better sensitivity for people age 30 and younger
- Better overall agreement for people age 30 and younger
- Much better sensitivity for people with non-Western European origins
- Much better positive predictive power for people with non-Western European origins
- Better overall agreement for people with non-Western European origins

Table 14. Classification Accuracy of the 4 Assessment Instruments as a Function of Demographic Characteristics (Combined Data; Unweighted)

<b>CPGI 3+</b>	Male	Female	≤ Age 30	> Age 30	Western European Origins	Other Origins
Sensitivity	89.16%	94.57%	89.81%	92.25%	89.71%	93.59%
Specificity	85.18%	85.28%	86.64%	85.03%	88.08%	79.70%
Positive Predictive Power	50.18%	48.20%	58.73%	47.50%	46.68%	51.94%
Negative Predictive Power	97.91%	99.09%	97.57%	98.68%	98.66%	98.15%
Diagnostic Efficiency	85.75%	86.45%	87.19%	85.96%	88.25%	82.34%
Kappa	0.56	0.57	0.63	0.55	0.55	0.56
Instrument Prev/Clinician Prev	1.78	1.96	1.53	1.94	1.92	1.80
<b>SOGS 3+</b>	Male	Female	≤ Age 30	> Age 30	Western European Origins	Other Origins
Sensitivity	85.39%	89.13%	88.83%	86.47%	85.94%	87.96%
Specificity	90.59%	89.72%	92.51%	89.79%	91.59%	87.30%
Positive Predictive Power	60.32%	55.69%	71.48%	55.43%	54.38%	61.89%
Negative Predictive Power	97.37%	98.28%	97.51%	97.83%	98.24%	96.87%
Diagnostic Efficiency	89.85%	89.65%	91.86%	89.37%	91.00%	87.42%
Kappa	0.65	0.63	0.74	0.62	0.62	0.65
Instrument Prev/Clinician Prev	1.42	1.60	1.24	1.56	1.58	1.42
<b>NODS 3+</b>	Male	Female	≤ Age 30	> Age 30	Western European Origins	Other Origins
Sensitivity	68.47%	68.48%	77.67%	66.14%	51.57%	71.12%
Specificity	96.95%	96.46%	96.61%	96.76%	97.16%	95.72%
Positive Predictive Power	78.98%	73.68%	82.90%	75.00%	60.74%	79.61%
Negative Predictive Power	94.84%	95.48%	95.34%	95.11%	95.92%	93.38%
Diagnostic Efficiency	92.86%	92.92%	93.31%	92.84%	93.58%	91.04%
Kappa	0.69	0.67	0.76	0.66	0.52	0.70
Instrument Prev/Clinician Prev	0.87	0.93	0.94	0.88	0.85	0.89
<b>PPGM</b>	Male	Female	≤ Age 30	> Age 30	Western European Origins	Other Origins
Sensitivity	99.67%	99.73%	100.00%	99.47%	98.75%	99.81%
Specificity	98.96%	98.82%	98.56%	98.92%	99.09%	98.41%
Positive Predictive Power	94.11%	92.44%	93.64%	93.11%	87.13%	93.62%
Negative Predictive Power	99.94%	99.96%	100.00%	99.92%	99.92%	99.95%
Diagnostic Efficiency	99.06%	98.93%	98.81%	98.99%	99.07%	98.67%
Kappa	0.96	0.95	0.96	0.96	0.92	0.96
Instrument Prev/Clinician Prev	1.06	1.08	1.07	1.07	1.13	1.07

### **Different Scoring Thresholds to Improve Classification Accuracy**

There has historically been some variability in the cut-off thresholds used in the CPGI, SOGS, and NODS. For example, the original CPGI specifies 8+ as the cut-off for problem gambling (Ferris & Wynne, 2001). The subsequent use of the 3+ criteria in many studies (including this one) has been due to the fact that the 8+ criteria was seen as too stringent, failing to detect many problem gamblers. For the SOGS, some people have used a 1-4 criterion rather than the 3-4 criterion for the problem gambler categorization, whereas other people do not recognize any problem gambling subcategory to this instrument (i.e., just the 5+ cut-off for pathological gambling). Similarly, the NODS 3-4 classification for problem gambling is not recognized by everyone (only the 5+ criteria for pathological).

Thus, different cut-off criteria for problem/pathological gambling were tested to determine whether improved classification accuracy could be obtained. The results are presented below in Tables 15, 16, and 17. As can be seen, the overall performance of the CPGI is significantly improved using a 5+ cut-off.<sup>19</sup> Significant improvements occur also when a 4+ cut-off is used with the SOGS. The current 3+ cut-off continues to be optimal for the NODS. The use of these new thresholds would allow all of these instruments to produce fairly accurate prevalence rates of problem gambling when used in population surveys. However, if the purpose was to have a screening tool that detects 90% or more of the true problem gamblers (regardless of false positives), then the optimal cut-offs would be 3+ for the CPGI; 2+ for the SOGS; and 1+ for the NODS.

Table 15. Classification Accuracy of the CPGI using Different Scoring Thresholds (Unweighted Data)

	CPGI 3+	CPGI 4+	CPGI 5+	CPGI 6+	CPGI 7+	CPGI 8+
Sensitivity	91.20%	83.11%	74.21%	64.59%	54.35%	44.42%
Specificity	85.50%	92.47%	95.63%	97.57%	98.70%	99.22%
Positive Predictive Power	49.39%	63.14%	72.50%	80.48%	86.62%	89.86%
Negative Predictive Power	98.43%	97.24%	95.98%	94.67%	93.30%	92.00%
Diagnostic Efficiency	86.26%	91.21%	92.75%	93.14%	92.74%	91.86%
Kappa	0.56	0.67	0.69	0.68	0.63	0.55
Instrument Prev/Clinician Prev Ratio	1.85	1.32	1.02	0.80	0.63	0.49

<sup>19</sup> The kappa statistic and the instrument/clinician ratio are probably the best overall measures to judge this.

Table 16. Classification Accuracy of the SOGS using Different Scoring Thresholds (Unweighted Data)

	SOGS 2+	SOGS 3+	SOGS 4+	SOGS 5+	SOGS 6+
Sensitivity	95.95%	85.87%	71.96%	56.52%	42.20%
Specificity	80.49%	90.42%	95.66%	98.16%	99.41%
Positive Predictive Power	41.63%	56.52%	70.65%	81.65%	91.21%
Negative Predictive Power	99.27%	97.78%	95.92%	93.96%	92.20%
Diagnostic Efficiency	82.45%	89.84%	92.66%	92.88%	92.15%
Kappa	0.49	0.62	0.67	0.63	0.54
Instrument Prev/Clinician Prev Ratio	2.30	1.52	1.02	0.69	0.46

Table 17. Classification Accuracy of the NODS using Different Scoring Thresholds (Unweighted Data)

	NODS 1+	NODS 2+	NODS 3+	NODS 4+	NODS 5+
Sensitivity	96.32%	84.75%	68.47%	51.59%	39.10%
Specificity	75.20%	91.17%	96.79%	98.84%	99.73%
Positive Predictive Power	37.61%	59.83%	76.81%	87.35%	95.74%
Negative Predictive Power	99.25%	97.47%	95.19%	92.93%	91.34%
Diagnostic Efficiency	78.04%	90.30%	92.99%	92.49%	91.58%
Kappa	0.43	0.65	0.68	0.61	0.52
Instrument Prev/Clinician Prev Ratio	2.56	1.42	0.89	0.59	0.41

## DISCUSSION

The primary purpose of Part II of this investigation was to use improved methodology to reevaluate the previously identified fair to weak correspondence between gambling classifications obtained in population prevalence surveys against clinical assessment of these categorizations. Although classification accuracy in the present study tended to be better than what previous research has found, the overall classification accuracy of the traditional instruments (DSM, SOGS, CPGI) continues to be modest.

The classification 'adequacy' of the CPGI, SOGS, and NODS depends on how the instrument is intended to be used. The CPGI appears to be a fairly good *screening* tool for detecting most cases of potential problem gambling (91.2%). However, it is less useful in accurately assessing the overall population prevalence of problem gambling as the 3+ cut-off produces a rate that is 1.85 times higher than the true rate, and the 8+ cut-off results in a rate that is only 49% of the true rate. Use of a 5+ cut-off significantly improves the overall classification accuracy of the CPGI and produces a fairly accurate prevalence rate. The NODS is not a good screener (only detecting 68.5% of problem gamblers), but does produce a prevalence rate that is reasonably accurate (89% of the true rate). Results for the SOGS show it to have fair screening ability (85.9% of problem gamblers detected) and to produce a somewhat inflated prevalence rate (1.52 times higher than the true rate). The overall classification accuracy of the SOGS is

significantly better when using a 4+ cut-off. None of these assessment instruments had significant variation on classification accuracy as a function of gender. However, the CPGI, SOGS, and NODS all had higher classification accuracy with people age 30 and younger. The NODS also had better classification accuracy with people of non-Western origins.

Another option is to use the PPGM. In addition to having better face validity than the traditional instruments, the PPGM was consistently highest on all measures of classification accuracy across both data sets. It has exceptionally high sensitivity, specificity, positive predictive power, negative predictive power, diagnostic efficiency, overall agreement (kappa), and also produces a prevalence rate very close to the true rate (1.07 ratio). In contrast to the other instruments, there was no significant variation in these indices as a function of age or ethnic origins. The PPGM has good internal consistency and its classification levels have good correspondence to gambling frequency and expenditure. Within the next year, analysis of a longitudinal cohort of 4,121 individuals underway in Ontario (under the direction of the first author) will establish its stability and predictive validity over a 5 year period relative to the NODS and CPGI.



## BEST PRACTICES IN THE POPULATION ASSESSMENT OF PROBLEM GAMBLING

The following is a summary of current best practices in the population assessment of problem gambling that incorporates a) procedures that have previously been established for survey research generally (Groves et al., 2001; Volberg, 2007); b) previous research by the present authors, and c) the findings of the present investigations. These are:

1. Pilot test the questionnaire to ensure it is properly programmed and all questions are clear to participants.
2. Employ a survey company with the greatest potential to achieve a high response rate. The highest rate will typically be obtained by the federal agency that conducts the national census (although there are often constraints in working with such agencies). Respondents are also more likely to agree to participate in surveys conducted by university affiliated survey companies compared to private commercial firms.
3. Conduct a training session with survey firm management and their interviewers to clarify the purpose of the survey and how each of the questions should be answered and scored.
4. When possible, provide pre-notification of the impending survey so as to increase response rates.
5. Use either telephone or door-to-door administration, as these methods are currently the best way of obtaining representative sampling ('online panels' do not appear to be representative of the general population except on basic demographic variables).
6. Use computer assisted interviewing methods (CATI, CAPI or CASI<sup>20</sup>) to standardize survey administration.
7. Endeavour to use a self-administered format (e.g., CASI) when possible, especially for sensitive questions.
8. In situations where a large percentage of the population of interest does not have residential telephone service (e.g., First Nation reserves), supplement or replace telephone survey coverage with door-to-door or mail-out surveys.<sup>21</sup>
9. When employing telephone or door-to-door surveys, randomly select the person to be interviewed within the household to compensate for the tendency of females to answer the phone or door.
10. When employing telephone surveys, use random digit dialing so as to include unlisted numbers.
11. Use sustained efforts to contact the randomly selected individual to ensure that the obtained sample does not consist only of easily contactable people (i.e., accomplished by making multiple contact attempts over an extended period of time and attempting

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<sup>20</sup> CATI: Computer assisted telephone interview; CAPI: computer assisted personal interview; CASI: computer assisted self interview.

<sup>21</sup> Households without residential telephone service historically have had significantly higher rates of poverty, unemployment, health problems, and substance use (Ford, 1998; Pearson et al., 1994) (probably problem gambling as well, e.g., Rönnerberg et al., 1999). However, because only about 0.5%-2% of the population in most western jurisdictions do not have residential phone service (at least between the period ~1960 to ~2000), the failure to include these individuals in jurisdiction-wide studies usually did not have a marked effect.

contact primarily in the evening and on weekends). Sixteen contact attempts is usually sufficient to contact 95% of contactable problem gamblers and level out differences in the contactability between problem and non-problem gamblers.

12. Recontact 'soft refusals' at a later point to see if they would be willing to participate.
13. Keep the interview short to increase the chances of participation (under 20 minutes being optimal).
14. For quality assurance, have a supervisor conduct periodic visual and audio evaluation of the interviewers' work.
15. Have the ability to conduct the interview in different languages, depending on the language abilities of the population being surveyed.
16. If the primary goal is to establish changes since the last prevalence study, then attempt to replicate the exact procedures used in the previous survey. However, if the goal is to produce the most accurate prevalence rate, then conduct a face-to-face survey where either the gambling survey is just one component of a multi-topic survey or the fact you are conducting a 'gambling' survey is not clearly identified.
17. Use question wordings about gambling frequency and expenditure that are documented to have the best reliability and validity (see Wood & Williams, 2007).
18. For improved efficiency and to minimize false positives, do not ask problem gambling questions unless the person indicates they have gambled at least once a month on some form of gambling in the past year. (Although not essential, this is optimally done in conjunction with an assessment instrument that also minimizes false negatives).
19. Use a problem gambling assessment instrument with good established correspondence between gambling classifications obtained in population prevalence surveys and clinical assessment of these categorizations. The Problem and Pathological Gambling Measure is the best instrument for this purpose. Alternatively the NODS is adequate, as is the CPGI with a 5+ cut-off for problem gambling or the SOGS using a 4+ cut-off.
20. Provide thorough documentation of response rates, survey description, administration format, exclusionary criteria, and all other potentially relevant procedural details.
21. Conduct post-hoc weighting of the obtained sample to compensate for:
  - a. Oversampling of single person households and undersampling of individuals from large households.<sup>22</sup>
  - b. Oversampling of households with more than one landline (if this is a telephone survey).
  - c. Sampling deviations from the known demographic profile of the population (typically age x gender distributions, but could include other relevant attributes).  
Note: it is usually good practice to impose some degree of stratified sampling (e.g., minimal age x gender quotas) so as to minimize the amount of post-hoc weighting that has to be done.

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<sup>22</sup> A few studies have tried to compensate for this bias by attempting to interview everyone within the contacted household. However, the effect of this strategy is unknown. It is possible this approach may decrease anonymity and thereby, the validity of the responses.

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## APPENDIX A: Best Practices Questionnaire

### GROUP ASSIGNMENT

#### G1. Randomized Modality Assignment

- Telephone (1)
- Face-to-Face (2)

#### G2. Randomized Survey Description Assignment

- Gambling Survey (1)
- Health & Recreational Activities Survey (2)

### RECRUITMENT

R1. Hello, I'm conducting a short 10-15 minute survey on gambling (or 'health & recreational activities') on behalf of the Survey Research Centre at the University of Waterloo. Do you have a couple of minutes?

**Note:** Actual time will depend on gambling involvement: estimated 8 minutes for non-gamblers to 18 minutes for problem gamblers.

**Note:** People who say they don't gamble are told that "we are just as interested in opinions of both non-gamblers and gamblers". People who ask about they type of gambling questions are told "whether or not you gamble; what you gamble on; how much you spend, etc." People who ask what sort of recreational behaviours are asked about are told "leisure activities such as gambling".

- No (0)
- Yes (1) (go to R6)

R2. Would there be a better time to contact you?

- No (0) (treat this as a firm refusal and do not callback)
- Yes (1) (go to R5)

R2a. Thank you for your time. Before we go I'd just like to ask: Did you receive the postcard we delivered informing you of the study?

- No (0)
- Yes (1)
- DK/unsure (2)

R3. Refusal gender

- Male (1)
- Female (2)
- Don't know/unsure (9999)

R4. Any stated reason for refusal

- None (0)
- No time (1)
- Not interested (2)
- Do not gamble/have no interest in gambling (3)
- Other \_\_\_\_\_

End of Survey

R5. When would that be? \_\_\_\_\_. Thank you very much.

### End of Survey

R.6a. We delivered a postcard to everyone in the area informing them of this study. Did you receive it?"

- No (0)
- Yes (1)
- DK/unsure

R6b. Great. Could you tell me how many adults age 18 or older live in your household?

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5+ (5)

R7. I would like to speak with the adult whose birthday comes next. Is that person available?

- No (0)
- Yes (1) (go to BEGIN SURVEY)

R8. Is the adult who last had a birthday available to speak?

- No (0)
- Yes (1) (go to BEGIN SURVEY)

Note: To increase the yield of problem gamblers, beginning March 7, 2008:

- The oversampled proportion increased to 75% of total sample
- The oversampled demographic expanded to 18 – 29 year olds (preliminary data showed that 25 – 29 year olds had the highest rates of problem gambling)
- R7 & R8 changed for the oversampled group (only):

R7. For your household we are randomly selecting the youngest adult to speak with. Is that person available?

- No (0)
- Yes (1) (go to BEGIN SURVEY)

R8. Is the next youngest adult available to speak?

- No (0)
- Yes (1) (go to BEGIN SURVEY)

R9. Would you be willing to participate yourself?

- No (0) (treat this as a firm refusal, and do not callback)
- Yes (1)

### BEGIN SURVEY

Reintroduce initial script if speaking to a different person.

I'll start by giving you information about this survey to help you make a decision concerning your participation.

- It is a short 10-15 minute survey on gambling (or 'health & recreational activities') administered by the Survey Research Centre at the University of Waterloo.
- You do not have to answer questions that you do not want to, and you can stop participation at any time.
- We do not need to know your name, and your address and telephone number will be removed from the data set once all data collection is completed.

- All information you provide is strictly confidential.
- Although you may not benefit personally, your participation will be quite helpful in determining best practices in the assessment of [gambling/health & recreational activities].
- Some of the questions deal with information that may be emotionally sensitive to some people. We offer contact information to anyone who may want to seek support. Because a few of the questions are more sensitive than others we suggest that you may wish to answer the survey in private.
- The data will be stored on a computer in a secure location in the Survey Research Centre at the University of Waterloo. The only people having access to this data are members of the Survey Research Centre, as well as the two principal investigators: Dr. Robert Williams of Williams and Associates in Lethbridge, Alberta, and Dr. Rachel Volberg at Gemini Research in Northhampton, Massachusetts.
- If you have any questions regarding this study, feel free to contact Dr. John Goyder at the Survey Research Centre, University of Waterloo at 519-888-4567 x32643.
- This study has received ethics clearance through the University of Waterloo Office of Research Ethics. If you have any comments or concerns resulting from your participation, please contact Dr. Susan Sykes in the Office of Research Ethics at 519-888-4567, x36005.
- If you are interested in seeing the Final Report for this study, it will be available from the Survey Research Centre (telephone: 519 888 4567 ext. 35071 or email: [uwsrc@math.uwaterloo.ca](mailto:uwsrc@math.uwaterloo.ca)) in June 2009.

Do you have a few minutes to begin the survey with me now?

- No (0)
- Yes (1)

All people involved in face-to-face interviews are given an Information Letter with this above information.

## VALIDITY QUESTIONS

I'm going to start with a few general health questions.

V1. How would you describe your general health over the past 12 months? Would you say it was excellent, good, fair or poor?

- Excellent (1)
- Good (2)
- Fair (3)
- Poor (4)
- Refused/don't know (9999)

V2. How often have you exercised in the past 12 months? Would you say

- Rarely (1)
- About once a month (2)
- About once a week (3)
- Several times a week (4)
- Daily (5)
- Refused/don't know (9999)

V3. Have you consumed alcohol in the past 12 months?

- No (0) (go to V5 and code V4 as 0)
- Yes (1)
- Refused/don't know (9999)

V4. In your lifetime, how often have you driven while intoxicated? Would you say

- Never (0)
- Once or twice (1)
- 3 to 50 times (2)
- More than 50 times (3)
- Refused/don't know (9999)

V5. In your lifetime, how many times have you used illicit drugs? (e.g., marijuana, hash, LSD, PCP, Ecstasy, Cocaine/crack, heroin, or any other street drugs). Would you say

- Never (0)
- Once or twice (1)
- 3 to 50 times (2)
- More than 50 times (3)
- Refused/don't know (9999)

V6. Have you ever been ill? Would you say....**Note: if asked, this refers to lifetime and includes minor illnesses such as colds, flu, etc.**

- No, never (0)
- Yes, occasionally (1)
- Yes, frequently (2)
- Yes, I've always been unwell (3)
- Refused/don't know (9999)

V7. In the past 12 months have you suffered from any serious mental health problem, such as depression or anxiety?

- Yes (1)
- No (0)
- Refused/don't know (9999)

V8. Do you have pleasant memories from your childhood? Would you say

- None at all (0)
- Several (1)
- Most, or (2)
- All of my childhood memories are pleasant (3)
- Refused/don't know (9999)

Okay, now I have a few questions about recreational behaviour.

V9. If you had to watch a sport on TV which would it be?

- Lacrosse (1)
- Hockey (2)
- Football, or (3)
- Basketball (4)
- Refused/don't know (9999)

V10. Roughly how often do you go out to see movies at the theatre? Would you say

- Never (0)
- Couple times a year (1)
- Several times a year (2)
- One to three times a month (3)
- Once a week or more (4)
- Refused/don't know (9999)

V11. Did you vote in the recent provincial election?

- Yes (1) **Note: 51.0% in the Kitchener CMA voted in 2007**
- No (0)
- Refused/don't know (9999)

V12. Which place would you most like to vacation at?

- Caribbean (1)
- Europe (2)
- Asia (3)
- South America (4)
- North America, or (5)
- The Arctic (6)
- Refused/don't know (9999)

## GAMBLING BEHAVIOUR

Now, the primary recreational activity we are interested in is gambling.

G1a. In the past 12 months, how often have you purchased **lottery tickets** (e.g. 6/49; super 7; not scratch n win)?  
Would you say about

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) **(Go to G2a and score G1b as '0')**
- Refused/don't know (9999)

G1b. Roughly how much money do you spend on lottery tickets in a typical month? For all of these questions, spend means how much you are ahead or behind, or your net win or loss in an average month in the past 12 months \_\_\_\_\_

**Note: If person reports winning money or being ahead in a typical month indicate '+'.**

- Refused/don't know (9999)

G2a. In the past 12 months, how often have you purchased **instant win tickets** such as scratch & win, pull tabs, breakopens, or Nevada tickets? Would you say

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) (Go to G3a and score G2b as '0')
- Refused/don't know (9999)

G2b. Roughly how much money do you spend on instant win tickets in a typical month? \_\_\_\_\_

Note: if this is the first time the expenditure question is asked need to add "For all of these questions, spend means how much you are ahead or behind, or your net win or loss in an average month in the past 12 months".

Note: If person reports winning money or being ahead in a typical month indicate '+'.

G3a. In the past 12 months, how often have you bet money on **sporting events**? (Note: This includes sports pools or sports lotteries). Would you say

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) (Go to G4a and score G3b as '0')
- Refused/don't know (9999)

G3b. Roughly how much money do you spend on sports betting in a typical month? \_\_\_\_\_

- Refused/don't know (9999)

Note: If person reports winning money or being ahead in a typical month indicate '+'.

G4a. In the past 12 months, how often have you bet money on **horse racing or dog racing**? Would you say

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) (Go to G5a and score G4b as '0')
- Refused/don't know (9999)

G4b. Roughly how much money do you spend on horse or dog race betting in a typical month? \_\_\_\_\_

- Refused/don't know (9999)

Note: If person reports winning money or being ahead in a typical month indicate '+'.

G5a. In the past 12 months, how often have you played **bingo** for money? Would you say

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) (Go to G6a and score G5b as '0')
- Refused/don't know (9999)

G5b. Roughly how much money do you spend on bingo in a typical month? \_\_\_\_\_

- Refused/don't know (9999)

Note: If person reports winning money or being ahead in a typical month indicate '+'.

G6a. In the past 12 months, how often have you **played games of skill for money against other individuals**? This includes things such as face-to-face or online poker, pool, darts, bowling, golf, video games, board games, strategy games, checkers, etc.

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) (Go to G7a and score G6b as '0')
- Refused/don't know (9999)

G6b. Roughly how much money do you spend playing games of skill for money against other individuals in a typical month? \_\_\_\_\_

- Refused/don't know (9999)

Note: If person reports winning money or being ahead in a typical month indicate '+'.

G7a. In the past 12 months, how often have you played **slot machines, video lottery terminals, or other electronic gambling machines** (e.g., electronic keno, electronic racing) at a casino, bar or over the Internet? Would you say

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) (Go to G8a and score G7b as '0')
- Refused/don't know (9999)

G7b. Roughly how much money do you spend on slot machines, video lottery terminals, or other electronic gambling machines in a typical month? \_\_\_\_\_

Note: If person reports winning money or being ahead in a typical month indicate '+'.

G8a. In the past 12 months, how often have you played **casino table games** such as blackjack, roulette, craps, or baccarat at a casino, bar, or over the Internet? (Note: does not include poker). Would you say

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) (Go to G9a and score G8b as '0')
- Refused/don't know (9999)

G8b. Roughly how much money do you spend on casino table games in a typical month? \_\_\_\_\_

- Refused/don't know (9999)

Note: If person reports winning money or being ahead in a typical month indicate '+'.

G9a. In the past 12 months, how often did you purchase **high risk stocks, options or futures or day trade** on the stock market?

- 4 or more times a week (6)
- 2-3 times a week (5)
- once a week (4)
- 2-3 times a month (3)
- once a month (2)
- less than 10 times in total (1)
- not at all (0) (Go to next section and score G9b as '0')
- Refused/don't know (9999)

G9b. What do you estimate is your net loss or gain in a typical month from high risk stocks, options, futures, or day trading?

-\$ \_\_\_\_\_ or +\$ \_\_\_\_\_

- Refused/don't know (9999)

Go to D1 if person answered 'not at all' to G1a, G2a, G3a, G4a, G5a, G6a, G7a, G8a, and G9a.

## PROBLEM GAMBLING

Note: If people remark that they don't have problems with gambling, say "I need to ask the rest of these questions in any case". However, if people make this remark in a very insistent way, or repeat this remark, then they are not asked the rest of the questions and receive a score of 0 on each of the unanswered questions.

Note: The order of the CPGL, SOGS, PPGM, and NODS is randomized. Furthermore, once a question is asked its equivalent question in the other scale(s) is not asked. There are 29 unique questions.



### Canadian Problem Gambling Index

CPGI1. Thinking about the past 12 months, have you bet more than you could really afford to lose? Would you say:

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

CPGI2/SOGS6. Thinking about the past 12 months, have you felt guilty about the way you gamble or what happens when you gamble? Would you say:

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

CPGI3/PPGM11/NODS2. In the past 12 months, have you needed to gamble with larger amounts of money to get the same feeling of excitement? Would you say:

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

CPGI4/SOGS1/PPGM8b/NODS6. In the past 12 months, when you gambled, did you go back another day to try to win back the money you lost? Would you say

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

CPGI5/PPGM1a/NODS10. In the past 12 months, have you borrowed money or sold anything to get money to gamble? Would you say

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

CPGI6/PPGM1b. In the past 12 months, has your gambling caused any financial problems for you or your household? Would you say:

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

CPGI7. In the past 12 months, has your gambling caused you any health problems, including stress or anxiety? Would you say:

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

CPGI8/SOGS5. In the past 12 months, have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? Would you say:

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

CPGI9/SOGS3. In the past 12 months, have you felt that you might have a problem with gambling? Would you say

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

### **South Oaks Gambling Screen (SOGS)**

SOGS1/CPGI4/PPGM8b/NODS6. In the past 12 months, when you gambled, did you go back another day to try to win back the money you lost? Would you say

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

SOGS2. In the past 12 months, have you ever claimed to be winning money gambling when you were, in fact, losing? Would you say

- never (or never gamble) (0)
- yes, less than half the time I lost (1)
- yes, most of the time (1)
- Refused/don't know (9999)

SOGS3/CPGI9. In the past 12 months, have you felt that you might have a problem with gambling? Would you say

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

SOGS4/PPGM8a. In the past 12 months, have you often gambled longer, with more money or more frequently than you intended to?

- no (0)
- yes (1)
- Refused/don't know (9999)

SOGS5/CPGI8. In the past 12 months, have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? Would you say:

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

SOGS6/CPGI2. Thinking about the past 12 months, have you felt guilty about the way you gamble or what happens when you gamble? Would you say:

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

SOGS7. In the past 12 months, have you ever felt like you would like to stop gambling, but you didn't think you could?

- no (0)
- yes (1)
- Refused/don't know (9999)

SOGS8. In the past 12 months, have you ever hidden betting slips, lottery tickets, gambling money, IOUs or other signs of betting or gambling from your partner, children or other important people in your life?

- no (0)
- yes (1)
- Refused/don't know (9999)

SOGS9/PPGM3/NODS9a. In the past 12 months, has your gambling resulted in arguments with people you live with over how you handle money?

- no (0)
- yes (1)
- Refused/don't know (9999)

SOGS10. In the past 12 months, have you ever borrowed from someone and not paid them back as a result of your gambling?

- no (0)
- yes (1)
- Refused/don't know (9999)

SOGS11/PPGM5/NODS9b&NODS9c. In the past 12 months, have you missed time from work or school due to gambling?

- no (0)
- yes (1) (Scoring Note: person cannot receive an imputed '1' for NODS9b or NODS9c if they have already received a 1 on NODS9a; they would still receive a '1' for SOGS11 and PPGM5 however)
- Refused/don't know (9999)

SOGS12. Did you borrow money to gamble or to pay gambling debts in the past 12 months?

- no (0) (Skip SOGS 12abcdefghi)
- yes (1)
- Refused/don't know (9999)

Did you borrow from....

- a. household money (no = 0; yes = 1)
- b. your partner (no = 0; yes = 1)
- c. other relatives or in-laws (no = 0; yes = 1)
- d. banks, loan companies or credit unions (no = 0; yes = 1)
- e. credit cards (no = 0; yes = 1)
- f. loan sharks (no = 0; yes = 1)

Did you...

- g. cash in stocks, bonds or other securities (no = 0; yes = 1)
- h. sell personal or family property (no = 0; yes = 1)
- i. write cheques for more money than you had in your chequing account (no = 0; yes = 1)

### Problem & Pathological Gambling Measure (PPGM)

Note: If people ask what 'significant' means, say 'significant means something that either you or someone else would say is considerable, important, or major', either because of its frequency or seriousness.'

PPGM1a./CPGI5/NODS10. Has your involvement in gambling caused you to borrow money or sell things to gamble in the past 12 months? Would you say

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

PPGM1b/CPGI6. Has your involvement in gambling caused significant financial concerns for you or someone close to you in the past 12 months? Would you say

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

PPGM2. Has your involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months?

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM3/SOGS9/NODS9a. Has your involvement in gambling caused significant conflicts with friends or family in the past 12 months? (NOTE: Family is whomever the person themselves defines as “family”).

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM4. Has your involvement in gambling caused significant health problems for you or someone close to you in the past 12 months?

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM5/ SOGS11/NODS9b&NODS9c. Has your involvement in gambling caused significant work or school problems for you or someone close to you in the past 12 months or caused you to miss a significant amount of time off work or school? (NOTE: score 'no' for people who do not work or go to school).

- no (0)
- yes (1) (Scoring Note: person cannot receive an imputed '1' for NODS9b or NODS9c if they have already received a 1 for NODS9a; they would still receive a '1' for SOGS11 and PPGM5 however)
- Refused/don't know (9999)

PPGM6/NODS8. Has your involvement in gambling caused you or someone close to you to write bad cheques, take money that didn't belong to you or commit other illegal acts to support your gambling in the past 12 months?

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM7. Is there anyone else who would say that your involvement in gambling has caused any significant mental, financial, family, health, school, work, or legal concerns/problems for you or someone close to you in the past 12 months?

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM8a/SOGS4. Have you often gambled longer, with more money or more frequently than you intended to in the past 12 months?

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM8b/CPGI4/SOGS1/NODS6. In the past 12 months, how often have you gone back to try and win back the money you lost?

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

PPGM8c/NODS3a. In the past 12 months, have you made attempts to either cut down, control or stop gambling?

- no (0) (go to PPGM10)
- yes (1)
- Refused/don't know (9999)

PPGM8d/NODS4. Were you successful in these attempts?

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM9/NODS3b. In the past 12 months, when you did try cutting down or stopping did you find you were very restless or irritable or that you had strong cravings for it?

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM10/NODS1a & NODS1b. In the past 12 months, would you say you have been preoccupied with gambling?

- no (0)
- yes (1)
- Refused/don't know (9999)

PPGM11/CPGI3/NODS2. In the past 12 months, did you find you needed to gamble with larger and larger amounts of money to achieve the same level of excitement?

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

PPGM12. In the past 12 months, is there anyone else who would say that you were either preoccupied with gambling; or had a loss of control; or had withdrawal symptoms; or that you needed to gamble with larger amounts of money to achieve the same excitement?

- no (0)
- yes (1)
- Refused/don't know (9999)

#### **NORC DSM-IV Screen for Gambling Problems (NODS)**

NODS1a/PPGM10. In the past 12 months, have there been any periods lasting 2 weeks or longer when you spent a lot of time thinking about your gambling experiences or planning future gambling venture or bets?

- no (0)
- yes (1)
- Refused/don't know (9999)

NODS1b/PPGM10. In the past 12 months, have there been periods lasting two weeks or longer when you spent a lot of time thinking about ways of getting money to gamble with?

- no (0)
- yes (1) (Scoring Note: person cannot receive 1 on this question if already receiving 1 on 1a)
- Refused/don't know (9999)

NODS2/CPGI3/PPGM11. In the past 12 months, have there been periods when you needed to gamble with increasing amounts of money or with larger bets than before in order to get the same feeling of excitement?

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

NODS3a/PPGM8c. In the past 12 months, have you tried to stop, cut down, or control your gambling?

- no (0) (go to NODS 5a)
- yes (1)
- Refused/don't know (9999)

NODS3b/PPGM9. In the past 12 months, on one or more of the times when you tried to stop, cut down, or control your gambling, were you restless or irritable?

- no (0)
- yes (1)
- Refused/don't know (9999)

NODS4/PPGM8d. In the past 12 months, have you tried but not succeeded in stopping, cutting down, or controlling your gambling 3 or more times?

- no (0)
- yes (1)
- Refused/don't know (9999)

NODS5a. In the past 12 months, have you gambled as a way to escape from personal problems?

- no (0)
- yes (1)
- Refused/don't know (9999)

NODS5b. In the past 12 months, have you gambled to relieve uncomfortable feelings such as guilt, anxiety, helplessness, or depression?

- no (0)
- yes (1; unless already have a 1 for 5a)
- Refused/don't know (9999)

NODS6/CPGI4/SOGS1/PPGM8b. In the past 12 months, has there ever been a period when, if you lost money gambling on one day, you would often return another day to get even?

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

NODS7. In the past 12 months, have you lied to family members, friends, or others 3 or more times about how much you gamble or how much money you lost on gambling?

- no (0)
- yes (1)
- Refused/don't know (9999)

NODS8/PPGM6. In the past 12 months, have you written a bad cheque or taken money that didn't belong to you from family members of anyone else in order to pay for your gambling?

- no (0)
- yes (1)
- Refused/don't know (9999)

NODS9a/ SOGS9/PPGM3. In the past 12 months, has your gambling caused serious or repeated problems in your relationships with any of your family members or friends?

- no (0)
- yes (1)
- Refused/don't know (9999)

NODS9b/ SOGS11/PPGM5. In the past 12 months, has your gambling caused you any problems in school, such as missing classes or days of school or getting worse grades?

- no (0)
- yes (1) (person cannot receive a '1' for NODS9b if they have already received a 1 for NODS9a; however a '1' should still be imputed for SOGS11 and PPGM5)
- Refused/don't know (9999)

NODS9c/ SOGS11/PPGM5. In the past 12 months, has your gambling caused you to lose a job, have trouble with your job, or miss out on an important job or career opportunity?

- no (0)
- yes (1) (person cannot receive a '1' for NODS9c if they have already received a 1 for either NODS9a or NODS9b; however a '1' should still be imputed for SOGS11 and PPGM5)
- Refused/don't know (9999)

NODS10/ CPG15/PPGM1a. In the past 12 months, have you needed to ask family members or anyone else to loan you money or otherwise bail you out of a desperate money situation that was largely caused by your gambling?

- never (0)
- sometimes (1)
- most of the time (2)
- almost always (3)
- Refused/don't know (9999)

### Other Problem Gambling Questions

PG1. Do you have any history of problem gambling *prior to the past 12 months*? We would define a problem gambler as someone whose gambling has caused *significant* problems for themselves or people in their immediate social network (e.g., psychological, health, financial, school/employment, social, illegal activity) as a result of their gambling.

- no (0)
- yes (1)
- Refused/don't know (9999)

PG2. Have you ever sought help for a gambling problem?

- no (0)
- yes (1)
- Refused/don't know (9999)

The following question only asked of people who have a score of 3 or higher on the CPGI, but report a total past year gambling net loss of \$300 or less.



PG3. I notice you report having some potential problems with gambling, but your total reported loss in the past 12 months is less than \$300. Can you explain?

- 
- Refused/don't know (9999)

The following question only asked of people who have a score of 0 on the CPGI, but report a total past year gambling net loss of \$1000 or more.

PG4. I notice you report having lost over \$1000 to gambling in the past 12 months, but don't report any problems or concerns with this. Can you explain?

- 
- Refused/don't know (9999)

PG End. Record reason for exiting problem gambling section

- Respondent insisted (1)
- Interviewer decided respondent was fed up (2)

PG0. Last question respondent was asked.

## DEMOGRAPHICS

Note: The purpose of this section is to:

- Establish how representative the sample is to the Kitchener CMA
- To determine if survey modality effects are specific to certain demographics groups/characteristics
- To collect information relevant to problem gambling status

I just have a few final questions about your background so we can keep track of the characteristics of people who respond to the survey. Just a reminder that you do not have to answer questions that you do not want to, and all information you provide is strictly confidential.

D1. Gender (do not ask)

- Male (1)
- Female (2)

D2. In what year were you born? \_\_\_\_\_

- Refused/don't know (9999)

D3. At the present are you married, living with a partner, widowed, divorced, separated, or have you never been married?

- never married (0)
- living with partner (1)
- married (2)
- divorced or separated (3)
- widowed (4)
- Refused/don't know (9999)

D4. What is the highest level of education you have completed? \_\_\_\_\_

- Less than high school graduation (1)
- Completed high school and/or some post-secondary (2)
- Trades certificate or diploma (3)
- College certificate or diploma (4)
- University certificate, diploma or degree (5)
- Refused/don't know (9999)

D5. Are you currently a full or part-time student?

- No (0)
- Part time student (1)
- Full time student (2)
- Refused/don't know (9999)

D6. Are you presently working for pay in a full-time or in a part-time job?

- No (0)
- Employed part-time (1)
- Employed full-time (2)
- Refused/don't know (9999)

D7. To the nearest \$10,000, what was your approximate income last year? Would you say (keep on reading options until respondent provides answer)

- less than \$20,000 (1)
- \$20,000 (2)
- \$30,000 (3)
- \$40,000 (4)
- \$50,000 (5)
- \$60,000 (6)
- \$70,000 (7)
- \$80,000 (8)
- \$90,000 (9)
- \$100,000 (10)
- \$110,000 (11)
- \$120,000 (12)
- More than \$120,000 (13)
- Exact amount \_\_\_\_\_ (14)
- Refused/don't know (9999)

D8. What do you estimate your current debt to be? This would include mortgages, credit cards, loans, car payments, etc.? Would you say (keep on reading options until respondent provides answer)

- Less than \$10,000 (1)
- \$10,000 (2)
- \$20,000 (3)
- \$40,000 (4)
- \$60,000 (5)
- \$80,000 (6)
- \$100,000 (7)
- \$120,000 (8)
- \$140,000 (9)
- \$160,000 (10)
- \$180,000 (11)

- \$200,000 (12)
- \$300,000 (13)
- \$400,000 (14)
- \$500,000 (15)
- More than \$500,000 (16)
- Exact amount \_\_\_\_\_ (17)
- Refused/don't know (9999)

D9. Were you born in Canada?

- No (0)
- Yes (1)

D10. What are the main ethnic or cultural origins of your ancestors? Would you say...

- Western European (*i.e., Austria, Belgium, Denmark, England, Finland, France, Germany, Greece, Holland, Ireland, Italy, Norway, Portugal, Scotland, Spain, Sweden, Switzerland, Wales*) (1)
- Eastern European (*i.e., Belarus, Bulgaria, Czechoslovakia, Hungary, Moldavia, Poland, Romania, Russia, Slovakia, Ukraine*) (2)
- South Asian (*i.e., Bangladesh,, India, Pakistan, Sri Lanka*) (3)
- East Asian (*i.e., Cambodia, China, Hong Kong, Indonesia, Japan, Korea, Laos, Malaysia, Phillipines, Thailand, Vietnam*) (4)
- Aboriginal, Inuit or Métis (5)
- African (6)
- Latin American (*i.e., Mexico, all Central American countries, all South American countries*) (7)
- Other \_\_\_\_\_ (8)
- Refused/don't know (9999)

If person provides a specific country that fits into one of these categories then code it into that category. If person answers 'Canadian', 'white', or something similar, then ask a clarifying question (e.g., Where did your ancestors live before coming to Canada, etc.).

D11. What is your postal code?

D12. How many telephone lines in the house/apartment?

- None, cell only or no telephone connected (0)
- One (1)
- Two or more (2)
- Refused/don't know (9999)

D13. How long have you lived at this address?

That is the end of the survey. Thank you very much for your time.

End of survey.

Face-to-face interviews only:

D14. Record whether other member(s) of the household were present or heard some of the entire interview.

- No one present or within 'earshot' of the interview (0)
- Yes, someone heard at least part of the interview (1)

D15. Numbers of Interviewers present for interview

- One (1)
- Two (2)

### INTERVIEWER DEMOGRAPHICS

I1. Interviewer gender (Interviewer 1 is the person asking the questions)

- Male (1)
- Female (2)

I2. Interviewer year of birth \_\_\_\_\_

I3. Interviewer ethnic/cultural origins

- Western European (*i.e., Austria, Belgium, Denmark, England, Finland, France, Germany, Greece, Holland, Ireland, Italy, Norway, Portugal, Scotland, Spain, Sweden, Switzerland, Wales*) (1)
- Eastern European (*i.e., Belarus, Bulgaria, Czechoslovakia, Hungary, Moldavia, Poland, Romania, Russia, Slovakia, Ukraine*) (2)
- South Asian (*i.e., Bangladesh,, India, Pakistan, Sri Lanka*) (3)
- East Asian (*i.e., Cambodia, China, Hong Kong, Indonesia, Japan, Korea, Laos, Malaysia, Phillipines, Thailand, Vietnam*) (4)
- Aboriginal, Inuit or Métis (5)
- African (6)
- Latin American (*i.e., Mexico, all Central American countries, all South American countries*) (7)
- Other \_\_\_\_\_ (8)

## APPENDIX B: Problem and Pathological Gambling Measure (PPGM)

1a. Has your involvement in gambling caused you either to borrow a significant<sup>23</sup> amount of money or sell some of your possessions in the past 12 months? (Yes/No).

1b. Has your involvement in gambling caused significant **financial concerns** for you or someone close to you in the past 12 months? (Yes/No). (Note: do not score 1 for 1b if 1 has already been scored for 1a).

2. Has your involvement in gambling caused significant **mental stress** in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months? (Yes/No).

3a. Has your involvement in gambling caused serious problems<sup>24</sup> in your **relationship with your spouse/partner, or important friends or family** in the past 12 months? (Note: Family is whomever the person themselves defines as “family”)(Yes/No).

3b. Has your involvement in gambling caused you to repeatedly neglect your children or family in the past 12 months? (Yes/No). (Note: do not score 1 for 3b if 1 has already been scored for 3a).

4. Has your involvement in gambling resulted in significant **health problems** or injury for you or someone close to you in the past 12 months? (Yes/No).

5a. Has your involvement in gambling caused significant **work or school problems** for you or someone close to you in the past 12 months? (Yes/No).

5b. Has your involvement in gambling caused you to miss a significant amount of time off work or school in the past 12 months? (Yes/No). (Note: do not score 1 for 5b if 1 has already been scored for 5a).

6. Has your involvement in gambling caused you or someone close to you to write bad cheques, take money that didn't belong to you or commit other **illegal acts** to support your gambling in the past 12 months? (Yes/No).

7. Is there anyone else who would say that your involvement in gambling in the past 12 months has caused any significant problems regardless of whether you agree with them or not? (Yes/No).

<b>PROBLEMS SCORE</b>	<b>/7</b>
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<sup>23</sup> If people ask what ‘significant’ means, say ‘significant means something that either you or someone else would say is considerable, important, or major’, either because of its frequency or seriousness.

<sup>24</sup> If people ask what ‘problem’ means say ‘a difficulty that needs to be fixed’.

8. In the past 12 months, have you often gambled longer, with more money or more frequently than you intended to? (Yes/No).

9. In the past 12 months, have you often gone back to try and win back the money you lost? (Yes/No).

10a. In the past 12 months, have you made any attempts to either cut down, control or stop your gambling? (Yes/No). (go to 11 if 'no') (this item not scored)

10b. Were you successful in these attempts? (Yes/No). (score '1' for no and '0' for yes)

11. In the past 12 months, is there anyone else who would say that you have had difficulty controlling your gambling, regardless of whether you agreed with them or not? (Yes/No).

<b>IMPAIRED CONTROL SCORE</b>
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<b>/4</b>
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12. In the past 12 months, would you say you have been preoccupied with gambling? (Yes/No).

13. In the past 12 months, when you were not gambling did you often experience irritability, restlessness or strong cravings for it? (Yes/No).

14. In the past 12 months, did you find you needed to gamble with larger and larger amounts of money to achieve the same level of excitement? (Yes/No).

<b>OTHER ISSUES SCORE</b>
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<b>/3</b>
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<b>TOTAL SCORE</b>
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<b>/14</b>
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## PPGM Scoring and Classification

### **PATHOLOGICAL GAMBLER (4)**

1. Problems Score of 1 or higher, plus
2. Impaired Control Score of 1 or higher, plus
3. Total Score of 5 or higher, plus
4. Reported gambling frequency of at least once a month on some form of gambling.

### **PROBLEM GAMBLER (3)**

1. Problems Score of 1 or higher, plus
2. Impaired Control Score of 1 or higher, plus
3. Total Score of 2 to 4, plus
4. Reported gambling frequency of at least once a month on some form of gambling.

OR

1. Total Score of 3 or higher, plus
2. Frequency of gambling<sup>25</sup> AND average reported gambling loss (not net loss)<sup>26</sup>  $\geq$  median for unambiguously identified Problem and Pathological Gamblers in the population (i.e., as established by the most recent population prevalence survey).

### **AT RISK GAMBLER (2)** (this category also includes people who may be problem gamblers in denial)

1. Does not meet criteria for Problem or Pathological gambling, plus
2. Total Score of 1 or higher

OR

1. Frequency of gambling<sup>1</sup> AND average reported gambling loss (not net loss)<sup>2</sup>  $\geq$  median for unambiguously identified Problem and Pathological Gamblers in the population (i.e., as established by the most recent population prevalence survey).

### **RECREATIONAL GAMBLER (1)**

- Gambler who does not meet criteria for Pathological, Problem or At-Risk gambler.

### **NON-GAMBLER (0)**

- No reported gambling on any form in past year.

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<sup>25</sup> Simplest way of establishing this is using the highest frequency of gambling reported for any individual form in the past year.

<sup>26</sup> Reported gambling losses tend to be a more accurate estimate of true losses compared to net loss, especially in problem gamblers (i.e., problem gamblers often report winning as much or more than they lose and thus may not report any net loss) (Wood, R.T. & Williams, R.J. (2007b). How much money do you spend on gambling? The comparative validity of question wordings used to assess gambling expenditure. *International Journal of Social Research Methodology: Theory & Practice*, 10 (1), 63-77. <http://hdl.handle.net/10133/752>. Note: The person's income and net worth/debt can be taken into account when deciding whether the gambling loss criterion should apply.

**APPENDIX C: Participant Profile and Coding Sheets (Best Practices Data Set)**

ID	110010	PC1	3	INC1	I spent more than I indicated earlier.
BIRTH	1957	PC2	0		
MARITAL	0	PC3	0		
STUDENT	0	PC4	0		
JOB	0	PC5	0		
INCOME	1	PC6	0		
INCOME2		PC7	0	INC2	
DEBT1	5	PC8	0		
DEBT2		PO1	0		
		PO2	1		
		PO3	0		
LF	3	PO4	0		
LL	5	PO5	1	V1	1
LW	0	PP1	0	V2	5
IWF	4	PP2	0	V3	1
IWL	1	PP3	0	V4	3
IWW	0	PP4	0	V5	3
SBF	0	A	0	V6	1
SBL	0	B	0	V7	0
SBW	0	C	0	V8	2
HRF	0	D	0	V9	2
HRL	0	E	0	V10	1
HRW	0	F	0	V11	1
BF	0	G	0	V12	1
BL	0	H	0		
BW	0	I	0	ID	110010
GSF	0	PP5	0	T	2
GSL	0	PP6	0	RATER	2
GSW	0	PP7	0	GCAT	2
EGMF	2	PP8	0	<i>Notes: some evidence of denial?</i>	
EGML	5	PP9	0		
EGMW	0	PP10	0		
TGF	0	PP11	0		
TGL	0	PP12	0		
TGW	0	PP13	0		
STF	0	PP14	0		
STL	0	PP15	0		
STW	0	PP16	0		
MGF	4	PLife	0		
TML	132	PHelp	0		
TMW	0	STOP	0		



ID	<b>Participant ID</b>
BIRTH	<b>Year of Birth</b> (9999 = Refused/don't know)
MARITAL	<b>Marital Status</b> (0 = never married; 1 = living with partner; 2 = married; 3 = divorced/separated; 4 = widowed; 9999 = refused/don't know)
STUDENT	<b>Student</b> (0 = no; 1 = part time; 2 = full time)
JOB	<b>Employment</b> (0 = unemployed; 1 = employed part time; 2 = employed full time; 9999 = refused/don't know)
PERSONAL INCOME	<b>Past Year Personal Income:</b> less than \$20,000 (1); \$20,000 (2); \$30,000 (3); \$40,000 (4); \$50,000 (5); \$60,000 (6); \$70,000 (7); \$80,000 (8); \$90,000 (9); \$100,000 (10); \$110,000 (11); \$120,000 (12); More than \$120,000 (13); Exact amount (14); Refused/don't know (9999)
INCOME2	<b>Past Year Personal Income Exact Amount</b>
DEBT1	<b>Current Personal Debt</b> (includes mortgages, credit cards, loans, car payments, etc.): Less than \$10,000 (1); \$10,000 (2); \$20,000 (3); \$40,000 (4); \$60,000 (5); \$80,000 (6); \$100,000 (7); \$120,000 (8); \$140,000 (9); \$160,000 (10); \$180,000 (11); \$200,000 (12); \$300,000 (13); \$400,000 (14); \$500,000 (15); More than \$500,000 (16); Exact amount (17); Refused/don't know (9999)
DEBT2	<b>Current Personal Debt Exact Amount</b>

LF	<b>Lottery</b> Frequency	<u>Frequency of play in past year</u> 0 = not at all 1 = < 10 times 2 = once a month 3 = 2-3 times a month 4 = once a week 5 = 2-3 times a week 6 = 4 or more times a week 9999 = refused/don't know
LL	Lottery Typical Monthly Loss	
LW	Lottery Typical Monthly Win	
IWF	<b>Instant Win</b> Frequency	
IWL	Instant Win Typical Monthly Loss	
IWW	Instant Win Typical Monthly Win	
SBF	<b>Sports Betting</b> Frequency	
SBL	Sports Betting Typical Monthly Loss	
SBW	Sports Betting Typical Monthly Win	
HRF	<b>Horse Racing</b> Frequency	
HRL	Horse Racing Typical Monthly Loss	
HRW	Horse Racing Typical Monthly Win	
BF	<b>Bingo</b> Frequency	
BL	Bingo Typical Monthly Loss	
BW	Bingo Typical Monthly Win	
GSF	<b>Game of Skill against other People</b> (e.g., poker, pool, golf, etc.)	
GSL	Skill Typical Monthly Loss	
GSW	Skill Typical Monthly Win	
EGMF	<b>EGMs</b> Frequency (slots & VLTs)	
EGML	EGM Typical Monthly Loss	
EGMW	EGM Typical Monthly Win	
TGF	<b>Table Game</b> Frequency	
TGL	Table Game Typical Monthly Loss	
TGW	Table Game Typical Monthly Win	
STF	<b>High Risk Stocks</b> Frequency	
STL	High Risk Stocks Typical Net Monthly Loss	
STW	High Risk Stocks Typical Net Monthly Win	
MGF	Maximum Gambling Frequency (maximum frequency from above)	
TML	Total Money Lost in Past 12 months	
TMW	Total Money Won in Past 12 months	

**“In the past 12 months.....”**

PC1	When you gambled, did you go back another day to try to win back the money you lost? (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PC2	Have you often gambled longer, with more money or more frequently than you intended to? (0=N; 1=Y; 9999=DK/R)
PC3	Have you ever felt like you would like to stop gambling, but you didn't think you could? (0=N; 1=Y; 9999=DK/R)
PC4	Have you made attempts to either cut down, control or stop gambling? (0=N; 1=Y; 9999=DK/R)
PC5	Were you successful in these attempts to either cut down, control or stop gambling? (0=N; 1=Y; 9999=DK/R)
PC6	When you did try cutting down or stopping did you find you were very restless or irritable or that you had strong cravings for it? (0=N; 1=Y; 9999=DK/R)
PC7	Would you say you have been preoccupied with gambling? (0=N; 1=Y; 9999=DK/R)
PC8	Is there anyone else who would say that you were either preoccupied with gambling; or had a loss of control; or had withdrawal symptoms; or that you needed to gamble with larger amounts of money to achieve the same excitement? (0=N; 1=Y; 9999=DK/R)
PO1	Have you needed to gamble with larger amounts of \$ to get the same feeling of excitement? (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PO2	Have you gambled as a way to escape from personal problems? (0=N; 1=Y; 9999=DK/R)
PO3	Have you gambled to relieve uncomfortable feelings such as guilt, anxiety, helplessness, or depression? (0=N; 1=Y; 9999=DK/R)
PO4	Have you felt that you might have a problem with gambling? (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PO5	Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PP1	Have you bet more than you could really afford to lose? (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PP2	Have you borrowed money or sold anything to get money to gamble? (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PP3	Have you ever borrowed from someone and not paid them back as a result of your gambling? (0=N; 1=Y; 9999=DK/R)
PP4	Did you borrow money to gamble or to pay gambling debts? (0=N; 1=Y; 9999=DK/R) Did you borrow money from.....
PP4A	household money (0=N; 1=Y; 9999=DK/R)
PP4B	partner (0=N; 1=Y; 9999=DK/R)
PP4C	other relatives or in-laws (0=N; 1=Y; 9999=DK/R)
PP4D	banks, loan companies or credit unions (0=N; 1=Y; 9999=DK/R)
PP4E	credit cards (0=N; 1=Y; 9999=DK/R)
PP4F	loan sharks (0=N; 1=Y; 9999=DK/R)
PP4G	cash in stocks, bonds or other securities (0=N; 1=Y; 9999=DK/R)
PP4H	sell personal or family property (0=N; 1=Y; 9999=DK/R)
PP4I	write cheques for more money than you had in your chequing account (0=N; 1=Y; 9999=DK/R)
PP5	Has your gambling caused any financial problems for you or your household? (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PP6	Have you felt guilty about the way you gamble or what happens when you gamble? (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PP7	Has <u>your</u> involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you? (0=N; 1=Y; 9999=DK/R)
PP8	Has your gambling caused you any health problems, including stress or anxiety (0=never; 1=sometimes; 2=most of the time; 3=almost always; 9999=DK/R)
PP9	Has <u>your</u> involvement in gambling caused significant health problems for you or someone close to you? (0=N; 1=Y; 9999=DK/R)
PP10	Have you ever claimed to be winning money gambling when you were, in fact, losing? (0=N; 1=Y; 9999=DK/R)

PP11	Have you ever hidden betting slips, lottery tickets, gambling money, IOUs or other signs of betting or gambling from your partner, children or other important people in your life? (0=N; 1=Y; 9999=DK/R)
PP12	Have you lied to family members, friends, or others 3 or more times about how much you gamble or how much money you lost on gambling? (0=N; 1=Y; 9999=DK/R)
PP13	Has your gambling resulted in arguments with people you live with over how you handle money? (0=N; 1=Y; 9999=DK/R)
PP14	Has your gambling caused problems at work or school (missing days, poorer performance, etc.)? (0=N; 1=Y; 9999=DK/R)
PP15	Has <u>your</u> involvement in gambling caused you or someone close to you to write bad cheques, take money that didn't belong to you or commit other illegal acts to support your gambling? (0=N; 1=Y; 9999=DK/R)
PP16	Is there anyone else who would say that <u>your</u> involvement in gambling has caused any significant mental, financial, family, health, school, work, or legal concerns/problems for you or someone close to you? (0=N; 1=Y; 9999=DK/R)
PLife	Do you have any history of problem gambling <i>prior to the past 12 months</i> ? We would define a problem gambler as someone whose gambling has caused <i>significant</i> problems for themselves or people in their immediate social network (e.g., psychological, health, financial, school/employment, social, illegal activity) as a result of their gambling. (0=N; 1=Y; 9999=DK/R)
PHelp	Have you ever sought help for a gambling problem? (0=N; 1=Y; 9999=DK/R)
STOP	PG section ended prematurely (1=participant insisted; 2=interviewer decided person was fed up)
INC1	I notice you report having some potential problems with gambling, but your total reported loss in the past 12 months is less than \$300. Can you explain?
INC2	I notice you report having lost over \$1000 to gambling in the past 12 months, but don't report any problems or concerns with this. Can you explain?
V1	<b>How would you describe your general health over the past 12 months? Would you say it was excellent, good, fair or poor?</b> Excellent (1); Good (2); Fair (3); Poor (4); Refused/don't know (9999)
V2	<b>How often have you exercised in the past 12 months? Would you say</b> Rarely (1); About 1/mo (2); About 1/wk (3); Several times a week (4); Daily (5); Refused/don't know (9999)
V3	<b>Have you consumed alcohol in the past 12 months?</b> No (0) Yes (1); Refused/don't know (9999)
V4	<b>In your lifetime, how often have you driven while intoxicated? Would you say</b> Never (0); Once or twice (1); 3 to 50 times (2); More than 50 times (3); Refused/don't know (9999)
V5	<b>In your lifetime, how many times have you used illicit drugs? Would you say</b> Never (0); Once or twice (1); 3 to 50 times (2); More than 50 times (3); Refused/don't know (9999)
V6	<b>Have you ever been ill?</b> Note: if asked, this refers to lifetime and includes minor illnesses such as colds, flu, etc. No, never (0); Yes, occasionally (1); Yes, frequently (2); Yes, I've always been unwell (3); Refused/don't know (9999)
V7	<b>In the past 12 months have you suffered from any serious mental health problem, such as depression or anxiety?</b> Yes (1); No (0); Refused/don't know (9999)
V8	<b>Do you have pleasant memories from your childhood? Would you say</b> None at all (0); Several (1); Most, or (2); All of my childhood memories are pleasant (3); Refused/don't know (9999)
V9	<b>If you had to watch a sport on TV which would it be?</b> Lacrosse (1); Hockey (2); Football (3); Basketball (4); Refused/don't know (9999)
V10	<b>Roughly how often do you go out to see movies at the theatre? Would you say</b> Never (0); Couple times/yr (1); Several times/yr (2); 1-3/mo (3); 1/wk (4); Refused/don't know (9999)
V11	<b>Did you vote in the recent provincial election?</b> Yes (1); No (0); Refused/don't know (9999)
V12	<b>Which place would you most like to vacation at?</b> Caribbean (1); Europe (2); Asia (3); S. America (4); N. America (5); The Arctic (6); Refused/don't know (9999)
ID	Participant ID
T	Transcriber (1=DG; 2=LW)
RATER	Clinical Rater of Gambling Category (1 = NE; 2 = JK)
GCAT	Gambling Category (1 = Recreational Gambler; 2 = At Risk Gambler; 3 = Problem Gambler; 4 = Pathological Gambler; 9 = unsure or not enough information to judge)

### APPENDIX D: Participant Profile and Coding Sheets (International Online Data Set)

<b>ID</b>	1314	PC1	0	PG1	
BIRTH	1945	PC2	0	PG2_1	
MARITAL	2	PC3	0	PG2_2	
JOB	1	PC4	0	PG2_3	
INCOME	5	PC5		PG2_4	
DEBT	6000	PC6		PG2_5	
		PC7	0	PG2_6	
LF	4	PC8	0	PG2_7	
L\$	-4	PO1	0	PG2_8	
IWF	2	PO2	0	PG2_9	
IW\$	-1	PO3	0	PG2_10	
SBF	0	PO4	0	PG2_11	
SB\$	0	PO5	0	PG2_12	
HRF	0	PP1	0	PG2_13	
HR\$	0	PP2	1	PG2_14	
BF	0	PP3	0	PG2_15	
B\$	0	PP4	0	PHelp1	
GSF	0	PP4A		PHelp2	
GS\$	0	PP4B		Int1	4
GSInt	0	PP4C		Int2	
GSIntT		PP4D		Int3	
EGMF	2	PP4E		ALC	0
EGM\$	-300	PP4F		GALC	1
TGF	0	PP4G		TOBACCO	0
TG\$	0	PP4H		DRUGS	0
IntCasF	0	PP4I		GDRUGS	0
IntCas\$	0	PP5	0	SUBPROB	0
IntCasT	0	PP6	0	MHPROB	0
ST	0	PP7	0	OTHADD	0
STF	0	PP8	0	FAMILYPG	0
ST\$	0	PP9	0	Notes:	
ST\$PY	0	PP10	0		
ST\$LIFE	0	PP11	0		
DT	0	PP12	0		
DTF	0	PP13	0		
DT\$PY	0	PP14	0		
DT\$Life	0	PP15	0		
NET\$PY	-3660	PP16	0		
		PP17	0		

  

T	RATER	GCAT
2	2	2

ID	<b>Participant ID</b>
BIRTH	<b>Year of Birth</b>
MARITAL	<b>Marital Status</b> (1 = married; 2 = living with partner; 3 = widowed; 4 = divorced or separated; 5 = never married)
JOB	<b>Employment</b> (1 = employed full-time; 2 = employed part-time; 3 = unemployed and seeking work; 4 = retired; 5 = homemaker; 6 = full-time student; 7 = sick leave, maternity leave, on strike, on disability)
HOUSEHOLD INCOME	<b>Past Year Household Income:</b> less than \$20,000 (1); 20-30K (2); 30-40K (3); 40-50K (4); 50-60K (5); 60-70K (6); 70-80K (7); 80-90K (8); 90-100K (9); 100-120K (10); 120-150K (11); more than 150K (12)
HOUSEHOLD DEBT	To the nearest thousand dollars (in U.S. currency), what do you estimate your <b>current TOTAL household DEBT</b> to be?

<b>LF</b>	<b>Lottery Frequency</b>	<b>Frequency of play in past year</b> 0 = not at all 1 = < once a month 2 = once a month 3 = 2-3 times a month 4 = once a week 5 = 2-3 times a week 6 = 4 or more times a week
L\$	Lottery Typical Monthly Net Loss/Win	
<b>IWF</b>	<b>Instant Win Frequency</b>	
IW\$	Instant Win Typical Monthly Net Loss/Win	
<b>SBF</b>	<b>Sports Betting Frequency</b>	
SB\$	Sports Betting Typical Monthly Net Loss/Win	
<b>HRF</b>	<b>Horse Racing Frequency</b>	
HR\$	Horse Racing Typical Monthly Net Loss/Win	
BF	<b>Bingo Frequency</b>	
B\$	Bingo Typical Monthly Net Loss/Win	
<b>GSF</b>	<b>Game of Skill against other People</b> (e.g., poker, pool, golf, etc.)	
GS\$	Games of Skill Typical Monthly Net Loss/Win	
GSInt	Games of Skill on Internet? (0 = no; 1 = yes)	
GSIntT	Hours spent playing Games of Skill on Internet each time	
<b>EGMF</b>	<b>EGMs Frequency</b> (slots & VLTs)	
EGM\$	EGM Typical Monthly Net Loss/Win	
<b>TGF</b>	<b>Table Game Frequency</b> (e.g., roulette, craps, blackjack, baccarat, etc.)	
TG\$	Table Game Typical Monthly Net Loss/Win	
<b>IntCasF</b>	<b>Internet Casino Frequency</b>	
IntCas\$	Internet Casino Typical Monthly Net Loss/Win	
IntCasT	Hours spent playing on an Internet Casino each time	
<b>ST</b>	<b>High Risk Stocks</b> (0 = no; 1 = yes)	
STF	How often to you check the value of these investments (1 = 1/mo; 2 = 2-3/mo; 3 = 1/wk; 4 = 2-3/wk; 5 = 4-6/wk; 6 = daily; 7 = several times a day)	
ST\$	\$ put into High Risk Stocks in a TYPICAL YEAR	
ST\$PY	High Risk Stocks PAST YEAR Net Win/Loss	
ST\$LIFE	High Risk Stocks LIFETIME Net Win/Loss	
<b>DT</b>	<b>Day Trading</b> (0 = no; 1 = yes)	
DTF	Day Trading Frequency (1=1/mo; 2=2-3/mo; 3=1/wk; 4=2-3/wk; 5=4-6/wk; 6=daily)	
DT\$PY	Day Trading Net PAST YEAR Win/Loss	
DT\$Life	Day Trading LIFETIME Net Win/Loss	
NET\$PY	<b>Net Money Lost or Won on all forms of gambling in Past 12 months</b>	

PC1	When you gambled, did you go back another day to try to win back the money you lost? (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PC2	Have you often gambled longer, with more money or more frequently than you intended to? (0=N; 1=Y)
PC3	Have you ever felt like you would like to stop gambling, but you didn't think you could? (0=N; 1=Y)
PC4	Have you made attempts to either cut down, control or stop gambling? (0=N; 1=Y)
PC5	Were you successful in these attempts to either cut down, control or stop gambling? (0=Yes; 1=No)
PC6	When you did try cutting down or stopping did you find you were very restless or irritable or that you had strong cravings for it? (0=N; 1=Y)
PC7	Would you say you have been preoccupied with gambling? (0=N; 1=Y)
PC8	Is there anyone else who would say that you were either preoccupied with gambling; or had a loss of control; or had withdrawal symptoms; or that you needed to gamble with larger amounts of money to achieve the same excitement? (0=N; 1=Y)
PO1	Have you needed to gamble with larger amounts of \$ to get the same feeling of excitement? (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PO2	Have you gambled as a way to escape from personal problems? (0=N; 1=Y)
PO3	Have you gambled to relieve uncomfortable feelings such as guilt, anxiety, helplessness, or depression? (0=N; 1=Y)
PO4	Have you felt that you might have a problem with gambling? (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PO5	Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PP1	Have you bet more than you could really afford to lose? (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PP2	Have you borrowed money or sold anything to get money to gamble? (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PP3	Have you ever borrowed from someone and not paid them back as a result of your gambling? (0=N; 1=Y)
PP4	Did you borrow money to gamble or to pay gambling debts? (0=N; 1=Y). If yes, did you borrow money from.....
PP4A	household money (1=Y; 2 = N)
PP4B	partner (1=Y; 2 = N)
PP4C	other relatives or in-laws (1=Y; 2 = N)
PP4D	banks, loan companies or credit unions (1=Y; 2 = N)
PP4E	credit cards (1=Y; 2 = N)
PP4F	loan sharks (1=Y; 2 = N)
PP4G	cash in stocks, bonds or other securities (1=Y; 2 = N)
PP4H	sell personal or family property (1=Y; 2 = N)
PP4I	write cheques for more money than you had in your chequing account (1=Y; 2 = N)
PP5	Has your gambling caused any financial problems for you or your household? (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PP6	Have you felt guilty about the way you gamble or what happens when you gamble? (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PP7	Has <u>your</u> involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you? (0=N; 1=Y)
PP8	Has your gambling caused you any health problems, including stress or anxiety (0=never; 1=sometimes; 2=most of the time; 3=almost always)
PP9	Has <u>your</u> involvement in gambling caused significant health problems for you or someone close to you? (0=N; 1=Y)
PP10	Have you ever claimed to be winning money gambling when you were, in fact, losing? (0=N; 1=Y)
PP11	Have you ever hidden betting slips, lottery tickets, gambling money, IOUs or other signs of betting or gambling from your partner, children or other important people in your life? (0=N; 1=Y)
PP12	Have you lied to family members, friends, or others 3 or more times about how much you gamble or how much money you lost on gambling? (0=N; 1=Y)
PP13	Has your gambling resulted in arguments with people you live with over how you handle money? (0=N; 1=Y)

PP14	Has your gambling caused you to neglect your children or family in the past 12 months? (0=N; 1=Y)
PP15	Has your gambling caused problems at work or school (missing days, poorer performance, etc.)? (0=N; 1=Y)
PP16	Has <u>your</u> involvement in gambling caused you or someone close to you to write bad cheques, take money that didn't belong to you or commit other illegal acts to support your gambling? (0=N; 1=Y)
PP17	Is there anyone else who would say that <u>your</u> involvement in gambling has caused any significant mental, financial, family, health, school, work, or legal concerns/problems for you or someone close to you? (0=N; 1=Y)
Int1	Do you primarily use your home or work computer for Internet gambling? (1=home; 2=work; 3=home&work equally; 4=never gambled on Internet)
Int2	Has online gambling disrupted your sleeping patterns? (0=no; 1=yes)
Int3	Has online gambling disrupted your eating patterns? (0=no; 1=yes)
PG1	Is there a particular type of gambling that has contributed to your problems more than others? (0=no; 1=yes)
PG2_1	Lotteries (0=no; 1=yes)
PG2_2	Instant win (0=no; 1=yes)
PG2_3	Horse/dog racing (0=no; 1=yes)
PG2_4	Bingo (0=no; 1=yes)
PG2_5	VLTs (video lottery terminals) (0=no; 1=yes)
PG2_6	Slot machines (0=no; 1=yes)
PG2_7	Electronic keno (0=no; 1=yes)
PG2_8	Blackjack (0=no; 1=yes)
PG2_9	Baccarat (0=no; 1=yes)
PG2_10	Roulette (0=no; 1=yes)
PG2_11	Poker (0=no; 1=yes)
PG2_12	Games of skill (0=no; 1=yes)
PG2_13	Internet gambling (0=no; 1=yes)
PG2_14	High risk stock, options, futures (0=no; 1=yes)
PG2_15	Other (0=no; 1=yes)
PHelp1	Have you ever sought help for a gambling problem? (0=N; 1=Y)
PHelp2	Are you interested in knowing about resources to help with problem gambling? (1=Yes; 2 = No)

ALC	Have you consumed alcohol in the past month? (0=N; 1=Y)
GALC	How often do you drink alcohol when you gamble (0=never; 1=rarely; 2=sometimes; 3=often; 4=always)
TOBACCO	Have you used tobacco in the past month? (0=N; 1=Y)
DRUGS	Have you used any of the following in the last month: marijuana, hash, LSD, PCP, Ecstasy, Cocaine/crack, heroin, or any other street drugs? (0=N; 1=Y)
GDRUGS	How often do you use illicit street drugs when you gamble (0=never; 1=rarely; 2=sometimes; 3=often; 4=always)
SUBPROB	Has your use of drugs or alcohol ever caused significant problems for you or someone close to you? (0=N; 1=Y)
MHPROB	In the past 12 months, have you had any serious problems with depression, anxiety or other mental health problems? (0=N; 1=Y)
OTHADD	Do you have any history of addictions in other areas? (0=N; 1=Y)
FAMILYPG	Do you have a family history of problem gambling? (0=N; 1=Y)

T	Transcriber (1=DG; 2=LW)
RATER	Clinical Rater of Gambling Category (1 = NE; 2 = JK)
GCAT	Gambling Category (1 = Recreational Gambler; 2 = At Risk Gambler; 3 = Problem Gambler; 4 = Pathological Gambler; 9 = unsure or not enough information to judge)

## APPENDIX E: Definitions of Gambler Types

### **Problem Gambler**

The definition of problem gambling put forward by Neal et al. (2005) captures the essential elements of this phenomenon common to almost all definitions:

*“PROBLEM GAMBLING is characterized by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the community.”*

Diagnostically, what this definition means is that to be a problem gambler there has to be evidence of: a) impaired control over gambling behaviour, and b) adverse consequences deriving from this impaired control. Furthermore:

- Impaired control is something that occurs repeatedly.
- Adverse consequences have to be ‘significant’. A ‘significant consequence’ is a problem that either the person themselves or someone else would say is considerable, important, or major, either because of its frequency or seriousness. A ‘problem’ is a state of difficulty that needs to be rectified.
- Loss of control and adverse consequences are identified either by self-admission; endorsement of statement(s) *indicative* of loss of control and/or adverse consequences; and/or objective evidence of these things.
- A person cannot be a problem gambler unless he/she also reports some minimal amount of time, frequency or money spent gambling in the time frame in which he/she is reporting loss of control and adverse consequences.
- Person does not meet criteria for pathological gambling.

### **Pathological Gambler**

The term ‘pathological gambler’ tends not to be used in some countries (e.g., Canada, Australia, New Zealand) because of its dichotomous implications (i.e., evidence would indicate that problem gambling lies on a continuum) and because of its medical and etiological connotations (i.e., ‘pathological’ means ‘disease-like’). On the other hand, a) severe forms of problem gambling are very compulsive and disease-like, b) the term pathological gambling is still commonly used in many countries, and c) pathological gambling continues to be the formal designation in DSM-IV and DSM-V. Hence, ‘pathological gambling’ and ‘severe problem gambling’ should really be seen as equally legitimate and interchangeable terms.

*“PATHOLOGICAL GAMBLING is equivalent to SEVERE PROBLEM GAMBLING and is characterized by severe difficulties in controlling gambling behaviour leading to serious adverse consequences”.*

Essentially, the criteria for pathological gambling are the same as problem gambling except there is greater impaired control and more severe consequences. These consequences may be more severe either because they impact more areas (financial, psychological, health, relationship, school/work, legal) and/or because the problems are more serious.



**At Risk Gambler**

*“An AT-RISK GAMBLER is someone who is at risk for becoming a problem or pathological gambler either because:*

*a) they evidence some adverse consequence(s) from gambling but no symptoms of loss of control; OR*

*b) they evidence some symptoms of loss of control but no adverse consequences; OR*

*c) they evidence some adverse consequences and loss of control, but not at a level sufficient to meet criteria for problem or pathological gambling; OR*

*d) they have a gambling frequency and/or expenditure that is significantly above average (especially in the context of their employment status, income, and debt).*

**Recreational Gambler**

*“A RECREATIONAL GAMBLER is someone who gambles without meeting criteria for either AT-RISK, PROBLEM, or PATHOLOGICAL Gambling.*

**Time Frames**

The time frames for these categorizations can be past year or lifetime.

### APPENDIX F: Sources of Classification Error on the PPGM

Categories	Sources of Discrepancy Between the Two Clinical Assessments	Sources of Discrepancy Between the PPGM and the Clinical Assessment
Recreational Gambler versus At Risk Gambler	Individuals with scores of 0 on all the problem gambling questions, but high gambling frequency and expenditure. One clinician tended to designate more of these as At Risk relative to the other clinician who designated more of these to be Recreational.	Individuals with scores of 0 on all the problem gambling questions but gambling frequency and expenditure $\geq$ unambiguous problem/pathological gamblers. PPGM automatically designates these as At Risk, whereas Clinical Assessment designated some of these as Recreational (especially individuals with high income and low debt).
At Risk Gambler versus Problem Gambler		Individuals with either problems = 0 or loss or control = 0, but with total PPGM score > 3 & with gambling frequency and expenditure $\geq$ unambiguous problem/pathological gamblers. These are automatically designated as Problem Gamblers in PPGM, but are all designated as At Risk in Clinical Assessment as clinicians were instructed not to designate Problem Gambling unless both problems and loss of control were present.
Problem Gambler versus Pathological Gambler	Individuals with problems > 0 and loss of control > 0. One clinician had a tendency to designate more of these as Pathological rather than Problem gamblers (especially cases with high gambling frequency and expenditure).	Individuals with problems > 0 and loss of control > 0 and total PPGM scores of 3 – 4. These are all automatically designated as Problem gamblers in PPGM, but some are designated as Pathological by Clinical Assessment (especially cases with high gambling frequency and expenditure).