Measuring Problem Gambling: Assessment of Three Prevalence Screens

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Measuring Problem Gambling: Assessment of Three Prevalence Screens

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ABSTRACT   *Monitoring the prevalence of problem gambling has become a major issue for regulators and policy-makers in several countries as legalised gambling has expanded. However, there has been considerable debate about the definition of problem gambling and the most appropriate ways of measuring it. This paper presents a comparative evaluation of three problem gambling screens: the Victorian Gambling Screen (VGS), the Canadian Problem Gambling Index (CPGI) and the South Oaks Gambling Screen (SOGS, version 5 +). Using methods of concurrent validation, the study is based on a population survey of 8479 adult residents in the state of Victoria, Australia. While finding limitations with all three screens, overall the study found that the CPGI demonstrated the best measurement properties of the three gambling instruments. As well as essential questions about screen validity, the paper discusses issues for future consideration in prevalence studies and the measurement of problem gambling in general populations.*

Introduction

Following public criticism of the harmful impacts of commercial gambling, particularly casinos and electronic gaming machines (EGMs), several national governments have commissioned studies into the prevalence of problem gambling in the community (Cox *et al*., 2005; National Gambling Impact Studies Commission [NGISC], 1999; Orford *et al*., 2003a; Productivity Commission, 1999; Rule and Sibanyoni, 2000; Abbott and Volberg, 2000; Volberg *et al*., 2001). However, the precise definition of problem gambling and the most valid and reliable way to measure prevalence rates have been the subject of recent debate. To summarise, the definition of problem gambling has often been categorised into two main streams of thought: the 'disorder' model that sees problem gambling as a clinical pathology or maladaptive behaviour, and a more broadly defined 'public health' or social view of problem gambling (Blaszczynski and Nower, 2002). Confusion over terminologies (problem vs pathological gambling) has further compounded the debate.

Different theories or societal conceptions of problem gambling can produce different screening tools, thus generating different empirical findings about the prevalence of the problem. For example, theoretical models that conceive problem gambling as an addiction, mental disorder or impaired control are likely to regard it as a dichotomous phenomenon, as being either present or absent in an individual gambler (Ferris and Wynne, 1999; Shaffer, 2003). Moreover, the research purpose of the measurement instrument will affect whether problem gambling is measured on a continuum or as discrete categories (Jackson *et al*.,

2003). For example, the theory implicit in screening tools such as SOGS (South Oaks Gambling Screen) classifies gamblers into discrete categories of 'probable pathological' versus problem gamblers (Lesieur and Blume, 1987). In contrast, theories that regard problem gambling as a social problem view it as a continuum where gambling can be more or less harmful and where a gambler's social environment may affect their gambling involvement (Blaszczynski and Nower, 2002; Productivity Commission, 1999).

Early conceptualisations and measurement tools for problem gambling were based on the experience of counsellors in clinical practice and thus had a strong psychological and psychiatric perspective (Dickerson *et al.*, 1997; Ferris *et al.*, 1999). From the 1980s, psychologists and psychiatrists in the USA dominated both clinical practice and published research on problem gambling, which was defined as a medical disorder/mental health problem. SOGS was based on the diagnostic criteria of pathological gambling applied in the Diagnostic Statistical Manual (DSM) and Diagnostic Statistical Manual-Revised (DSM-R) (American Psychiatric Association, 1980 and 1987). The screen was developed in a medical context with clinical groups in the USA, originally for clinical purposes with 'probable pathological' gamblers. Even so, SOGS has been widely used to measure the prevalence of problem gambling in general populations. Consequently, SOGS has been subject to growing criticisms that a medical or disease model underlies its conception and understanding of problem gambling, and that the screen is being applied inappropriately. In response, during the 1990s a public health approach to problem gambling emerged that focuses on gambling-related 'harm' to the individual and others (Dickerson *et al.*, 1997; Korn *et al.*, 2003; McMillen, 1998). This debate is not merely a matter of semantics or academic interest; it has profound public policy implications. The way a problem is defined will determine what is done about it.

What is Problem Gambling? The Conceptual Debate

In Australia, there has been considerable debate about the nature and definition of problem gambling and consequently about the most effective strategies to minimise gambling-related harm. In many countries, the most common tool to measure problem gambling has been the SOGS. Developed in the USA in the 1980s (Lesieur and Blume, 1987), SOGS quickly was adopted as the *de facto* standard in the field (Volberg and Banks, 1990). At that time Australia lacked a systematic body of gambling research and scholars were guided largely by psychological literature from the USA (Dickerson *et al.*, 1997).

However, from the 1980s a growing body of Australian researchers have challenged the popular conception of problem gambling as an 'addiction' or disorder in which problem gamblers are categorically distinct from other gamblers (see for example, Allcock, 2003; Blaszczynski, 1985; Blaszczynski and McConaghy, 1989; Walker and Trimboli, 1985; Walker, 1996). By the late 1990s, when the Productivity Commission conducted its national inquiry, there was strong disagreement among Australian researchers about the validity of the different problem gambling measures commonly in use (Productivity Commission, 1999, pp. 6.1–6.64). Many researchers and service providers had become increasingly critical of SOGS as a research tool, arguing that it did not accurately assess problem gambling in large population studies or the Australian context (Battersby *et al.*, 2002; Dickerson *et al.*, 1997; Walker and Dickerson, 1996). A key

issue was whether problem gambling can be adequately assessed using a psychological framework with a clinical emphasis on behavioural responses or whether criteria that are more sensitive to socio-cultural and environmental factors should also be included.

Although several variations of SOGS had been developed based on updated DSM criteria, e.g. SOGS-R (Abbott and Volberg, 1996), the reliability, validity and classification accuracy of SOGS had not been rigorously tested (Lesieur, 1994; Orford *et al.*, 2003b; Stinchfield, 2002). Critics argued that SOGS tended to result in a high rate of false positives and thus overestimate problem gambling levels; and that 'borrowing' items were over-represented in the screen. Conceptualisation of problem gambling as a lifetime disorder also resulted in debates and uncertainty about whether to measure the prevalence period as lifetime, 12 months or six months (Culleton, 1989; Abbott and Volberg, 1991; Dickerson, 1993; Walker, 1992). In the majority of Australian studies, screens have measured the 12-month prevalence of problem gambling.

After considering these debates, the Productivity Commission used several versions of SOGS in its 1999 national survey, but drew its findings mainly on the SOGS5 + score for problem gambling. Significantly, the Commission found that anyone who gambles has the potential to develop problems, especially if they regularly gamble on EGMs (Productivity Commission, 1999, pp. 6.1–6.64). They found no psychological factors or psychiatric conditions predisposing an individual to problem gambling. Rather, people with gambling problems are a heterogeneous group. The Productivity Commission and other Australian research have found that socio-demographic aspects such as gender, ethnicity, education or income do not seem to affect the likelihood of a person experiencing gambling related problems, although in some (but not all) prevalence studies younger people are more highly represented among people with gambling problems (McMillen *et al.* 2001; McMillen *et al.*, 2004a; Productivity Commission, 1999; Queensland Government, 2002).

Importantly, the Productivity Commission found that problem gambling can occur along a continuum of severity and duration (Figure 1). Research has suggested that problem gambling can also manifest in various ways. Some gamblers appear to move progressively from unproblematic gambling to moderate problems to a severe problem. This pattern conforms to the view derived from
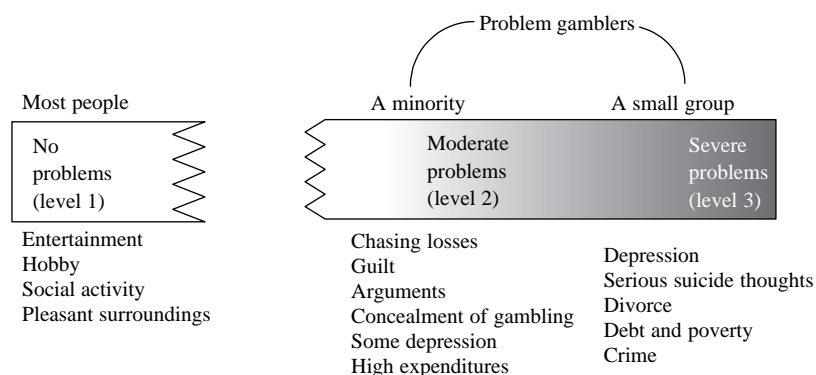

Figure 1. The gambling continuum. (*Source*: *Productivity Commission, 1999. Australia's Gambling Industries. Final Report No. 10*. AusInfo, p. 6.10)

the medical model that an uncontrollable 'gambling career' develops over time. Yet other gamblers plunge rapidly into gambling problems—sometimes as the result of a gambling 'binge' (Blaszcynski and Nower, 2003). For others, 'problem' gambling is episodic, with intermittent periods of controlled gambling and problem gambling. Natural 'recovery' also appears to be common (Abbott *et al.*, 1999). In this regard, it is critical to note that the development of problem gambling may follow multiple pathways (Blaszczynski and Nower, 2002).

Australian research now defines problem gambling as a broadly social and *public health* issue rather than an addiction or disordered behaviour originating in the individual. This contrasts with the predominant 'medicalised' view in the USA and many other countries that problem or 'pathological' gambling is a psychiatric disorder or mental illness, identifiable by clinical tests that differentiate problem gamblers from other gamblers. Underlying the new public health approach has been a shift towards a different understanding of problem gambling. Rather than a problem of individual pathology or psychological disorder, the prevailing view in Australia is that problem gambling occurs when gambling gives rise to *harm* to the individual gambler, families, other groups and the community as a whole. Whereas screens developed in the medical model defined problem gambling by the attributes of the behaviour itself, Australian researchers have emphasised a 'harm' model defined by the consequences of behaviour (Dickerson *et al.*, 1997).

This redefinition has influenced the way problem gambling prevalence is measured and policy responses to address the issue. Since the Productivity Commission's study it has been generally accepted that gambling-related problems are situated in a broader context of environmental, social, political and economic factors (Figure 2). As depicted in Figure 2, problem gambling can emerge as a result of a confluence of factors incorporating both the individual gambler and the wider gambling and social environment. The risk factors associated with problem gambling have been identified as a combination of many factors, including:
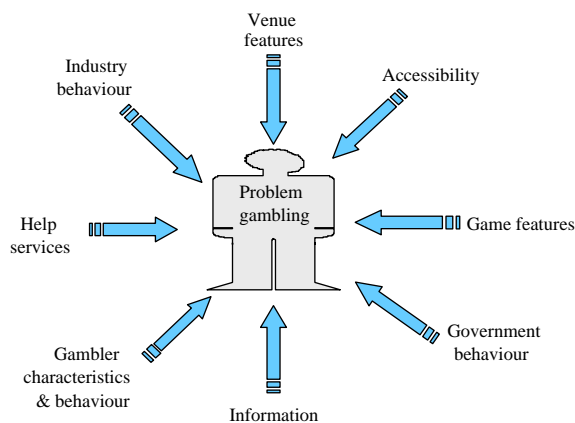

Figure 2. An epidemiological framework for problem gambling. (*Source*: *Productivity Commission, 1999. Australia's Gambling Industries. Final Report No. 10.* AusInfo, p. 6.20)

- Accessibility of gambling, especially to gaming machines (e.g. in casinos, clubs and hotels);
- Gambler behaviour such as regular playing of continuous forms (EGMs, casino Table games, race betting), and misconceptions about gambling and prospects of winning;
- Environmental factors such as the spatial distribution and location of machines, and the socio-cultural vulnerability of particular populations and communities;
- Industry practices such as the features of machine game design (e.g. repetitive and continuous play); linked jackpots and games that encourage maximum bets; marketing, advertising and inducements to gamble; and
- Government policies and regulation. The Productivity Commission found that gambling policies of Australian governments have been driven by revenue imperatives at the expense of consumer protection.

Consequently, under the broad epidemiological approach to problem gambling that currently prevails in Australia, policies and regulations to address problem gambling are not confined to the individual gambler. In response to the Productivity Commission findings, state and territory governments have introduced a range of harm minimisation measures, many directed to enhance regulation of industry practices, game design, venue features and accessibility (Banks, 2002; Delfabbro, 2003; Independent Pricing and Regulatory Authority [IPART], 2004; Marshall *et al.*, 2004; McMillen and Pitt, 2005; Queensland Gaming Commission, 2003). Other policies focus on changing gambler behaviour (Blaszczynski *et al.*, 2004) and incorporate strategies for prevention as well as treatment and rehabilitation.

In this context, the Australian research and policy emphasis has shifted to not only estimate the existing prevalence of problem gambling in the community, but also to identify who might be at risk of developing a gambling problem.

The Political and Regulatory Environment

Using SOGS5 + , the Australian Productivity Commission's 1998–99 national survey found that problem gambling affects approximately 2% of the adult Australian population; 1% of surveyed adults were found to experience severe problems related to gambling. Since then, subsequent population studies in several Australian states have reached similar conclusions (McMillen *et al.*, 2001; McMillen *et al.*, 2004a; Queensland Government Treasury, 2002; Roy Morgan Research, 2001; Taylor *et al.*, 2001). These studies consistently found that the most popular modes of gambling (EGMs, casinos, racing) attract different problem gambler groups, although the prevalence rates and social profiles of problem gamblers reflect the particular population and gambling context in each state.

However, inconsistency in the measurement tools used in different states, disputes among experts and criticisms from industry groups that the problem gambling screens did not accurately and reliably measure problem gambling in the community led to considerable public confusion and uncertainty. In the face of mounting criticism of commercial practices by gambling operators, for example, industry submissions to the Productivity Commission inquiry favoured conceptions of problem gamblers as 'addicts' with an impulse control disorder (Productivity Commission, 1999, pp. 6.1–6.64).

In response to the Commission's findings and recommendations for harm minimisation measures, many industry representatives argued vigorously that such regulations were misdirected—that problem gambling was defined by particular behavioural characteristics and pychological problems in the gamblers themselves. In their view the proposed industry regulations were excessive, given the small proportion of problem gamblers identified in the community. Moreover, harm minimisation measures designed to change the gambling environment would not address the issues; rather they would inconvenience the large majority of recreational gamblers.

There was clearly scope for the development of more appropriate measures and methods to identify problem gambling in the community. If problem gambling is understood from a public health framework, as suggested by the Productivity Commission, the function of problem gambling screens should be to validly measure prevalence in the general population. The screen should also be sensitive to environmental and cultural factors so that it can be used with confidence in any context with all social and cultural subgroups. Problem gambling screens may have other functions, such as diagnostic and therapy design for problem groups and clinical purposes (Jackson *et al.*, 2003, p. 21); but the priority for Australian policy-makers at that time was a valid screen that would better inform policy decisions and allocation of resources and support services. Governments also wanted a reliable way of mapping prevalence trends over time and evaluating the effects of policies and environmental change.

Efforts to develop an improved problem gambling screen specifically for the Australian context had begun in the 1990s by researchers who expediently adapted the lifetime version of SOGS, but without validation tests (Dickerson *et al.*, 1996). In 2000, following a review of issues and evidence (Dickerson *et al.*, 1997) the Victorian Casino and Gaming Authority commissioned Flinders Technologies Pty Ltd to develop a new screen for application in large population surveys (Ben-Tovim *et al.*, 2001). The resulting Victorian Gambling Screen (VGS) was supposed to better accommodate the specific socio-cultural context in Australia and was conceptualised in terms of personal and social harm.

Around the same time, researchers in Canada had also developed a new problem gambling screen partly as a response to perceived shortcomings of the SOGS (Ferris and Wynne, 2001). The Canadian Problem Gambling Index (CPGI) was designed for prevalence surveys of the general population, including social groups that are typically underrepresented in clinical samples of problem gamblers. It also aimed to address the social and environmental contexts of problem gambling and to include measurement of correlates of problem gambling to permit a better understanding of the profiles of problem gamblers. Like the VGS, the CPGI claims to be built on a definition of problem gambling in terms of harm, although both screens continue to incorporate psychological aspects of problem gambling.

At the request of the Victorian Gambling Research Panel, the main purpose of the present research was to validate the new VGS, which until then had only been subject to a small preliminary validation study with 71 cases.[1] Evaluation of this instrument required a comparison with other established tools; we proposed to do this using SOGS5 + and the CPGI, the two screens which were receiving most support in Australia. Although the CPGI had been used effectively in many Canadian provinces, prior to our study it had been utilised only once in the Australian context, in a large statewide prevalence survey in Queensland (Queensland Government, 2002). The VGS had not previously been tested on

a large population sample. In the present study, we have replicated the conventional practice in recent Australian studies and used measures of the 12-month prevalence of problem gambling.

Method

Overview

For comparative evaluation, the three problem gambling screens (SOGS, CPGI, VGS) were included in a large state-wide gambling survey of 8479 adult residents in Victoria, Australia (McMillen *et al.*, 2004a). The cross-validation was therefore based on a representative sample of the adult population, consistent with the screens' purpose of measuring prevalence of problem gambling in the general population (Wenzel *et al.*, 2004).

Because of the funding agency's multiple objectives for the survey and budgetary constraints, practical measures had to be taken to keep it economical and manageable.

1. The screens were only applied to respondents who indicated they gambled relatively regularly (i.e. at least once a week, other than lottery or scratch tickets), as it was assumed that problem gambling was unlikely to occur among respondents who gambled only irregularly.[2] This also meant respondents were not bothered with questions that were likely to be irrelevant to them (which could have reduced their willingness to continue the general interview).
2. Each regular gambler was randomly administered only one of the three problem gambling screens, to limit the length of the survey and avoid repetition in the questions (which again could have encouraged respondents to terminate the interview prematurely). Note that, as a consequence, relationships between the three screens could not be investigated.

Subjects and Procedure

Households were randomly selected from residential telephone numbers in the latest Electronic White Pages for the state Victoria. In total, 20,274 households were sampled using a systematic method of positive identification (e.g. to ensure that respondents could be reached after repeated callbacks, were non-business, included someone of the correct age).[3] The adult (18 years or older) living in the household whose birthday was closest to the date of contact was selected for the interview. Interviews were conducted using Computer Assisted Telephone interviewing (CATI). Because the phone survey methodology tends to involve some sampling biases (e.g. older respondents being more likely to agree to the interview), and because the interviewing of one person per households implies that people living in smaller households have a greater probability of being selected, the survey data were weighted to increase representativeness (based on sex, age group, urban/regional location and household size).

In the end, 8479 respondents agreed to and completed the interview, amounting to a response rate of 41.8%. In an initial screening of their gambling involvement, 506 respondents (6.0% unweighted, 6.2% weighted) indicated they gambled at least once a week other than buying lottery or scratch tickets; these were here defined as regular gamblers. However, 73 of these regular gamblers declined

further participation, leaving 433 cases of regular gamblers for the present analysis. These cases were randomly subjected to one of the three problem gambling screens: 149 respondents completed the VGS, 141 respondents the CPGI, and 143 respondents the SOGS version used here. Table 1 shows the demographic profile of the sample of regular gamblers (compared with the Victorian adult population).

Instruments

Problem gambling screens

The VGS was originally developed as a 21-item instrument that tapped into three aspects: enjoyment of gambling, harm to others and harm to self. A pilot study testing this screen distinguished these three factors empirically, but found only the 15-item 'harm-to self' subscale to be significantly related to problem gambling externally defined (Ben-Tovim *et al.*, 2001). Only for this scale, the pilot study established cut-off scores. Hence, the present study focused on the 15-item scale, which is called here the VGS. The VGS uses for all 15 items on a five-point rating scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *always*), and items are summed up to yield the overall score.

   The pilot study was somewhat ambiguous about appropriate cut-off scores. Based on video-taped open-format interviews and raters' assessment of cases as displaying problem gambling or not, a cut-off of 21 + was established (minimising false positive and false negative classifications; see below). In contrast, using DSM-IV criteria as external criterion, a cut-off of 14 + seemed best.

   As part of a larger diagnostic instrument the CPGI includes nine items that are used as a problem gambling index. The original instrument uses 4-point rating scales for all items: 0 = *never*; 1 = *sometimes*; 2 = *most of the time*; and 3 = *almost always*. Item scores are summed up to yield a total s. A cut-off score of 8 + defines problem gamblers. In the present study, however, it was decided to use the same response format for all problem gambling screens, so as not to confound the evaluation of the reliability and validity of the instruments and their items. For all

Table 1. Demographic profile of regular gambler sample compared with the Victorian adult population (weighted data)

Variable	Regular gamblers (*n* = 433)	Population
Sex		
Male	64.8	48.5
Female	35.2	51.5
Age		
18-24	19.6	21.2
25–34	14.7	20.6
35–44	17.4	18.7
45–54	20.8	18.1
55–64	14.3	11.2
65 +	13.2	10.3
Location		
Metro	72.2	73.3
Rural	27.8	26.7

three screens, 5-point response scales as used for the VGS were therefore applied. However, in order to be able to use and evaluate the original cut-off score established for the CPGI, its response scale was transformed back into a 4-point scale by conflating the responses 'rarely' and 'sometimes' into a score of 1. This decision assumes that 'never' is a more absolute negation of a statement, whereas 'rarely' seems closer to the meaning of 'sometimes'. It should be noted that this back transformation into a 4-point scale may not yield exactly the same result as if the original 5-point scale had been used in the first place.

As with the other two screens, the SOGS was here used in a format that referred to respondents' experiences in the last 12 months, in order to measure the 12-month prevalence of problem gambling. The SOGS is a 20-item instrument and originally used a binary *yes/no* response format for most questions; three questions included qualified responses that were nonetheless coded binarily. 'Yes' responses were coded as 1, 'no' responses as 0; all responses were summed up to yield a total score. In Australia it has been convention to define a cut-off score of 5 + as probable pathological gambling (or problem gambling). Again, however, the present study sought to evaluate reliability and validity aspects of the instruments irrespective of their particular response formats, while also being able to test their classification validity and cut-off scores. Hence, in line with earlier research (Productivity Commission, 1999; see also Lattimore and Phillips, 2000), we used a two-step approach:

- Respondents were first asked to respond to each question either *yes* or *no*. Total scores were based on these binary responses to be consistent with the original cut-off scores.
- In a second step, respondents were asked to specify their responses. If they had responded no, they were asked whether his meant *rarely* or *not at all*; if they had responded *yes*, they were asked whether this was *rarely, sometimes, often* or *always*—in line with the response format used for the VGS.

The specific items of the three problem gambling screens were investigated further as part of a content analysis, below (Table 2).

Problem Gambling Correlates

A number of known correlates of problem gambling were measured in the interview, which were used here to establish the construct validity of the different problem gambling screens.

1. A *self-rating* of having a gambling problem was included, where respondents were asked to rate on a scale of from 1 to 10 how they would rate their gambling right now (1 = *is not at all a problem*, 10 = *is a serious problem*).
2. Respondents were asked whether they had *wanted help* for gambling problems in the last 12 months (0 = *no*, 1 = *yes*; the same response format was also used for the following variables).
3. A question about *family history* of problem gambling asked respondents whether anyone in their immediate family had ever had a gambling problem.
4. In the sense of *gambling as escapism*, respondents were asked whether, in the last 12 months, they had had the urge to gamble when something painful happened in their life.

Table 2. Content analysis of problem gambling screens

Categories	VGS	CPGI	SOGS
Preoccupation	6. Has gambling been more important than anything else you might do? 8. Has the thought of gambling been constantly on your mind?		
Problem recognition	11. Have you felt bad or guilty about your gambling? 12. Have you thought you shouldn't gamble or should gamble less?	5. Have you felt that you might have a problem with gambling? 9. Have you felt guilty about the way you gamble or what happens when you gamble?	5. Have you felt guilty about the way you gamble or what happens when you gamble? 20. Do you feel you've ever had a problem with your gambling?
Loss of control	4. Nowadays, when you gamble, do you feel as if you are on a slippery slope and can't get back up again? 5. Has your need to gamble been too strong to control?		3. Have you gambled more than you intended to? 6. Have you felt that you would like to stop gambling but didn't think you could?
Escapism	10. Have you gambled in order to escape from worry or trouble?		
Chasing	7. Have you felt that after losing you must return as soon as possible to win back any losses?	3. When you gambled, did you go back another day to try to win back the money you lost?	1. When you gambled, how often did you go back another day to win back money you lost?
Tolerance		2. In the last 12 months, have you needed to gamble with larger amounts of money to get the same feeling of excitement?	
Money issues	19. How often have you spent more money on gambling than you can afford? 20. How often has your gambling made it harder to make money last from one payday to the next?	1. Have you bet more than you could really afford to lose? 4. Have you borrowed money or sold anything to get money to gamble?	9. Have you borrowed from someone and not paid them back because of your gambling? 11. Have you borrowed from household money to gamble or pay gambling debts?

	21. How often have you had to borrow money to gamble with?	8. Has your gambling caused any financial problems for you or your household?	12. Have you borrowed from your spouse or partner to gamble or to pay gambling debts?
			13. Have you borrowed from other relatives or inlaws to gamble or to pay gambling debts?
			14. Have you obtained cash advances using your credit cards to gamble or to pay gambling debts? This does not include using cards to make cash withdrawals from savings or cheque accounts.
			15. Have you arranged a personal loan from a bank, finance company or credit union to gamble or to pay gambling debts?
			16. Have you borrowed from loan sharks to gamble or to pay gambling debts?
			17. Have you cashed in shares, bonds or other securities to gamble or to pay gambling debts?
			18. Have you sold personal or family property to gamble or to pay gambling debts?
			19. Have you written a cheque knowing there was no money in your account to gamble or to pay gambling debts?
Lying, self-deception	9. Have you lied to yourself about your gambling? 14. How often have you lied to others to conceal the extent of your involvement in gambling?		2. Have you claimed to be winning money from gambling when in fact you lost? 7. Have you hidden betting slips, lottery tickets, gambling money or other signs of gambling from your spouse/partner, children, or other important people in your life?

(continued)

Table 2. (*continued*)

Categories	VGS	CPGI	SOGS
	15. How often have you hidden betting slips, Lotto tickets, gambling money or other signs of gambling from your spouse, partner, children or other important people in your life?		
Personal consequences		6. Has gambling caused you any health problems, including stress or anxiety?	10. Have you lost time from work or study because of your gambling?
Social consequences	13. How often has anyone close to you complained about your gambling?	7. Have people criticised your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?	4. Have people criticised your gambling or told you that you have a gambling problem, regardless of whether or not you thought it was true? 8 (a) Have you argued with people you live with over how you handle money? (b) Have these money arguments centred on your gambling?

5. Respondents were asked whether, in the last 12 months, they had been under doctor's care because of physical or emotional problems brought on by *stress*.
6. Considering *depression* is a known correlate of problem gambling, respondents were asked whether they had felt seriously depressed in the last 12 months.
7. Respondents were asked whether they had seriously thought about or attempted suicide as a result of their gambling, as an indicator of *suicidality*.

Results

The study undertook content analysis of the three screens to explore conceptual issues; analysis of item distribution and 'difficulty'; factor analyses to test the dimensionality of the problem gambling screens; analyses of internal consistency; and assessment of construct validity to examine correlative relationships between screen scores and correlates of problem gambling.

Content Analysis

As noted earlier, VGS and CPGI have been developed out of criticism of the SOGS and its underlying mental illness model of problem gambling. Rather, both subscribe to a socially oriented model around the concept of harm. We therefore first investigated whether the claims of adhering to different underlying conceptual models translated into different item content in the three screens. We conducted a qualitative content analysis of the different screens in order to see what aspects of gambling problems they tap into, whether they differ in the facets they measure and thus whether any differences in underlying theories are apparent.

   An inductive and iterative procedure was used to define categories that captured the meaning of the different items used in the screens. Table 2 shows the different facets identified and how each of them was represented in the three screens. As can be seen, the VGS shows the greatest spread across a variety of possible facets of problem gambling. The only categories that are not filled are 'tolerance' (the phenomenon that gamblers need to increase their stakes in order to maintain the same level of excitement) and 'personal consequences' (harm to oneself).

   The latter is interesting because of the claim that the VGS is more strongly based on the concept of harm (to self and others) and, in particular, because the scorable items were called a harm-to-self scale. Likewise, the CPGI has only one item each for personal and social consequences. So according to this analysis there is not as great a focus on issues of harm as the developers of these two screens claimed— unless of course we broaden the understanding of this concept. In any case, the SOGS seemed to address very similar facets to the other two screens.

   Overall, the three screens did not appear to differ very much in terms of their content. Indeed, there was considerable overlap in a number of issues and even items. The only remarkable difference is the pronounced focus on money issues in the SOGS. Specifically, the SOGS contains 10 items about borrowing money from different sources. This imbalance has been identified by other authors before (Dickerson *et al.*, 1997; South Australia Centre for Economic Studies, 2003; Jackson *et al.*, 2003). In our content analysis, however, given the spread and balance of

issues for what is likely to be a complex and multifaceted problem, the VGS seemed to provide the best coverage of the three screens under review.

Item Difficulty

Generally, in terms of the construct that they are supposed to measure, psychological test items differentiate better between respondents when they attract responses with greater variance, that is, when they have intermediate item difficulty (Anastasi, 1988). Item difficulty normally refers to the extent to which responses are negative rather than affirmative. Because problem gambling is a relatively uncommon phenomenon in the overall population, screen items tend to be difficult. However, items that are too difficult (i.e. too few people respond in ways other than 'no/never') are unlikely to contribute very much to the differentiation between problem and non-problem gamblers. The mean item difficulty of a screen therefore says something about the quality of these measures.

Usually, item difficulty is inspected by investigating the distribution of responses to individual items. However, for an indication of the quality of screen items in the aggregate, we can also look at the level and standard deviation of the average response to a screen. For each screen, using the same 5-point response scale, we calculated the mean across items. This showed for VGS and CPGI an average response of $M = 0.54$ and 0.55, respectively, which was significantly greater than the average response of $M = 0.31$ for SOGS, $t(306) = 3.39$, $p < 0.001$ and $t(290) = 3.30$, $p < 0.001$. Higher means indicate that, on average, a greater number of people answered the items affirmatively; this should correspond to a greater variance in responses. In fact, the standard deviations of the average response to VGS and CPGI were also greater than for SOGS, $SDs = 0.73$, $.84$ vs 0.39. Overall, VGS and CPGI showed a lower level of item difficulty and a greater variation in responses.

A closer examination revealed that for nine of the 20 SOGS items more than 90% of respondents answered 'no, never'. Most of these items were about borrowing money from different sources (specifically, Items 9, 12, 13, 15, 16, 17, 18 and 19, but also Item 10; cf. Table 2); as previously noted (above) the SOGS contains a relative disproportion of money questions. One SOGS item indeed attracted only negative responses and thus showed no variance at all, namely the question of whether respondents had borrowed money from loan sharks to gamble or to pay gambling debts. This item is practically useless. In contrast, none of the CPGI items attracted 'never' responses from more than 90% of respondents, and only one of the 15 VGS items. Interestingly, that VGS item was also about borrowing money to gamble with (Item 21).

Dimensionality and Consistency

For all three problem gambling screens it is claimed they can be validly represented by a single score. That is, responses to all screen items can be summed up to yield a single problem gambling score. Based on cut-off points this measure is used to indicate a single prevalence rate of problem gambling. If there were different dimensions of problem gambling, we would have to report the prevalence rates for each dimension separately. Whether problem gambling is a one- or multi-dimensional construct is of course not only an empirical question but also a theoretical question. However, in the present context, all three screens

have been claimed to be uni-dimensional and this claim was here tested empirically. (Note that development of the VGS started with three dimensions but only one of them proved sufficiently valid in a pilot validation study and was therefore retained for a cut-off score analysis; see Ben-Tovim *et al*., 2001.)

In our study, items of each screen were subjected to a principal component analysis, all with the same 5-point response scale.

1. The analysis for the VGS yielded a strong first factor with an eigenvalue of 8.18 and explaining 55% of variance. A weaker second factor with an eigenvalue of 1.21 explained only another 8% of variance. Moreover, all 15 items loaded sufficiently on the (unrotated) first factor, with loadings > 0.62. Hence, the assumption of uni-dimensionality of the VGS could be confirmed.
2. The analysis for the CPGI extracted a single factor with an eigenvalue of 5.66, explaining 63% of variance. All nine items loaded strongly on this factor, with loadings > 0.69. The assumption of uni-dimensionality of the CPGI was likewise confirmed.
3. The analysis for the SOGS (Item 16 had no variance and needed to be excluded) yielded six factors with eigenvalues greater than 1. The first factor had an eigenvalue of 6.29 and accounted only for 33% of variance. Moreover, seven out of the 19 items had insufficient loadings on this factor (< 0.50). Hence, the assumption of uni-dimensionality was not supported for the SOGS.

These findings were complemented by an analysis of the internal consistency of the screens, that is, the degree of intercorrelation and coherence of screen items. For the VGS the alpha coefficient was 0.94 and for CPGI 0.92, whereas it was lower for SOGS at 0.86. This is despite the fact that the SOGS contains the greatest number of items and the alpha coefficient is generally higher when there are more items. This is a further indication that the items of the SOGS are more heterogeneous and less coherent than for the other two screens.

Construct Validity

Given the resource constraints of the study, our survey methodology did not contain any gold standard or external criteria (such as clinical interviews) to establish the criterion validity of the three screens. However, survey respondents were asked about some well-known correlates of problem gambling. These could be used to evaluate the construct validity of the screens. A problem gambling screen that has a high level of validity (i.e. it measures what it is supposed to measure) should also be strongly related to correlates of problem gambling. More specifically, because it is unclear which level of correlation a screen should have with various problem gambling correlates to be considered valid, we can instead compare the three screens against each other and test whether they are differently strongly related to those correlates. The more valid screen, it can be argued, should be consistently more strongly related to problem gambling correlates.

Table 3 shows the correlations between screen scores and various problem gambling correlates: self-rating, family history, gambling as escapism, wanted help, stress, depression, and suicidality. Further, we constructed a sum score of the latter four correlates to indicate the number of experienced *harm* symptoms of problem gambling (ranging from 0 to 4). Based on a Fisher z transformation of the correlation coefficients, a z-test could be applied to test for pairwise differences between the three screens (Cohen *et al.*, 2003).

Table 3. Correlations between screen scores and problem gambling correlates

Correlate	VGS	CPGI	SOGS
Self-rating of problem	0.75_a^{***}	0.82_a^{***}	0.73_a^{***}
Family history	0.24_a^{**}	0.28_a^{***}	0.18_a^{*}
Gambling as escapism	0.43_a^{***}	0.43_a^{***}	0.40_a^{***}
Wanted help	0.66_a^{***}	0.65_a^{***}	0.53_a^{***}
Stress	0.24_{ab}^{**}	0.41_a^{***}	0.12_b
Depression	0.36_a^{***}	0.55_a^{***}	0.49_{ab}^{***}
Suicidal tendencies	0.36_a^{***}	0.44_a^{***}	0.27_a^{***}
Harm symptoms	0.36_b^{***}	0.73_a^{***}	0.56_b^{***}

Note: Correlations with different subscripts differ significantly at $p < 0.05$.
Harm symptoms is an aggregate variable, namely the total of any of the correlates wanted help, stress, depression, and suicidality being present. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

As can be seen, all three screens were strongly correlated with the self-rating of problem gambling; the correlation was descriptively stronger for the CPGI than for the other two screens, but the difference was not statistically significant. The same was true for family history as a correlate of problem gambling, even though correlations were generally weaker. The correlations between screen scores and gambling as escapism were overall moderately high and did not differ between screens. Correlations with respondents' self-report that they had wanted help were also strong and they were descriptively higher for CPGI and VGS than for SOGS. For suicidal tendencies, CPGI again had descriptively a stronger relationship than VGS and SOGS.

The only significant differences for single correlates emerged for stress and depression. CPGI scores were significantly more strongly related to experiences of stress than SOGS scores were (with the VGS' correlation falling in-between); and CPGI scores were significantly more strongly related to experiences of depression than VGS scores were (with the SOGS' correlation falling in-between). Moreover, the CPGI had a significantly stronger relationship to number of harm symptoms ($r = 0.73$) than VGS ($r = 0.33$), $z = 5.02$, $p < 0.001$, as well as SOGS ($r = 0.50$), $z = 3.23$, $p < 0.01$.

Overall, the CPGI scores showed the strongest relationships to problem gambling correlates; this was significantly so for stress, depression and the aggregation of harm symptoms. It can be concluded that, in comparison to the other two problem gambling screens included here, the CPGI has superior construct validity.

Cut-off Scores and Classification Validity

In order for problem gambling screens to make statements about the prevalence rate of problem gambling, they require definition of cut-off points where scores greater or equal this point are deemed to indicate a gambling problem. In this sense, if we understand problem gambling as a continuum of severity, the classification of respondents into problem vs non-problem gamblers is an effective means of simplifying communication about the phenomenon. Nonetheless, the definition of these cut-off points (i.e. classification of continuous screen scores into discrete categories of problem vs non-problem gamblers) is arbitrary and mere convention, likely to be affected by cultural values and social norms.

However, methods of criterion and construct validation can be used to inform such a decision empirically, at least to some degree. For the SOGS, with binary responses being summed up across its 20 items to yield a total score, a cut-off point of 5 + has been conventionally used to define cases of problem gambling. For the CPGI, which uses 4-point scales from 0 to 3 that are summed up across its nine items, a cut-off of 8 + has been established to define cases of problem gambling.

For the VGS, using 5-point scales from 0 to 4 summed up across its 15 items, a pilot study was somewhat ambiguous about the appropriate cut-off point (Ben-Tovim *et al.*, 2001). The study used two alternative external standards for its cut-off point analysis. First, researchers assessed videotaped open-format interviews and classified participants as either non-problem, borderline, or problem gambler on the basis of given scoring criteria. Second, the interviewers also asked a range of structured questions addressing DSM-IV criteria on the basis of which respondents were diagnosed as being pathological gamblers or not. Receiver Operating Characteristic (ROC) analyses were used to establish cut-off scores with either external standard. This statistical technique calculates, and plots against each other, the rates of false positive and false negative classifications for each possible screen score. At the point where the two plots intersect, both forms of errors are simultaneously minimised and thus balanced against each other. The analysis suggested a cut-off score of 21 + for classifications based on open-format interviews, whereas it suggested a cut-off score of 14 + when the DSM-IV diagnoses were used. In the present study, we used both cut-off points and compared the results with the other two screens.

Our study did not include any independent assessment of respondents' gambling problems (e.g. clinical interviews) that could be used as external criteria to evaluate the classification validity of the three screens. However, again, we can resort to the problem gambling correlates included in the survey for a construct validation approach to evaluate classification accuracy. The six correlates were measured with a binary response format. Their cross-tabulations with the classifications based on each problem gambling screen can be used to emulate common procedures to evaluate classification validity, such as rates of false positives and false negatives. However, it is clear that these results cannot be interpreted in absolute terms, because the correlates are not true external criteria. Specifically, the correlates are not necessary, and some of them not even sufficient, criteria for problem gambling. For instance, not everybody who has a gambling problem (and may be identified as such through a screen) wants help. Conversely, people who want help are likely to have gambling problem. This means wanting help is probably a sufficient, but not a necessary, criterion of problem gambling. Likewise, not everybody who has a gambling problem has a family history of problem gambling; moreover, not everybody with a family history of problem gambling has a gambling problem him or herself. This means family history is neither a sufficient nor a necessary condition for problem gambling.

The correlates therefore cannot be used to establish absolute classification validity (e.g. absolute rates of false positive classification as problem gambler or false negative classification as non-problem gambler). Nonetheless, on their basis we can calculate rates of pseudo-false negatives and pseudo-false positives and compare these rates between the three screens. This procedure amounts to a comparative assessment of classification validity: a more valid screen with more

appropriate cut-off points should have a stronger association to problem gambling correlates and thus lower pseudo-false classification rates.

Specifically, we cross-tabulated the absence vs presence of each problem gambling correlate with the classifications as non-problem gambling vs problem gambling based on each of the three screens. Results for VGS and its two different cut-off points (14 + and 21 +) are shown in Table 4; results for CPGI and SOGS are shown in Table 5. Following Stinchfield (2002), we calculated for each correlate the screens' 'sensitivity', 'specificity', 'false positive rate', and 'false negative rate' (note again that these are pseudo versions). 'Sensitivity' refers to the rate of a screen's problem gambling classifications among cases where the correlate was present; 'specificity' refers to the rate of non- problem gambling classifications among cases where the correlate was absent. Both are obviously desirable qualities of a problem gambling screen. By subtracting each probability from 1 (or the percentage rates from 100%), we can inverse their meaning: 1-specificity and 1-sensitivity (note that these are often also referred to as rates of false positives and false negatives, respectively). 'False positives' in our terminology (see also Stinchfield, 2002) refers to the rate of correlate-absent cases among cases classified as problem gambling; 'false negatives' refers to the rate of correlate-present cases among cases classified as non-problem gambling.

Tables 4 and 5 show the data with respect to the single problem gambling correlates. However, the results can be grasped most quickly when we average the respective rates across the different correlates. The results can be seen in the most right-hand columns of Tables 4 and 5.

1. First, in terms of 'false negatives' and '1-sensitivity', the VGS 14 + and the CPGI yielded the best results: rates of 'false' negative classification were, with either calculus, lower for VGS 14 + (6.6% and 33.4%) and CPGI (6.5% and 34.1%) than for VGS 21 + (9.8% and 63.1%), and also somewhat lower than for SOGS (7.5% and 46.9%). The problems of a cut-off point of 21 + for the VGS are here particularly drastic for suicidal tendencies as a correlate. With a cut-off of 21 + the VGS classified as non-problem gamblers respondents who indicated having had thoughts about (or possibly attempts of) committing suicide as a result of their gambling.
2. Second, in terms of 'false positives' and '1-specificity', the CPGI alone yielded the best results: rates of 'false' positive classification were, with either calculus, clearly lower for the CPGI (49.6% and 8.8%) than for VGS 14 + (64.6% and 15.2%) and SOGS (67.6% and 14.0%). While the VGS 21 + yielded a similarly good result for '1-specificity' (9.2%), its rate of 'false positives' (66.3%) was clearly higher than for the CPGI.

Overall, the results suggest that the CPGI is superior to the other two screens in terms of classification validity.

Finally, we calculated the estimated prevalence rates of problem gambling in the surveyed Victorian adult population based on the different problem gambling screens. The percentage of regular gamblers classified as problem gambling was lowest at 12.0% for VGS 21 + , 15.6% for CPGI, 18.2% for SOGS and 20.6% for VGS 14 + . With 6.2% of total respondents being classified as regular gamblers, prevalence estimates could be obtained by multiplying the problem gambling rates among regular gamblers with 0.062. The estimated prevalence of problem gambling in the Victorian adult population thus was 0.74% based on VGS 21 + ,

Table 4. Cross-tabulations of absence/presence of different problem gambling correlates and classification as non-problem gambling vs problem gambling, based on the VGS

	Family history		Escapism		Want help		Stress		Depression		Suicidality		Average	
	no	yes	no	Yes	no	yes	no	yes	no	yes	no	yes		
VGS < 14	108	15	115	8	123	1	114	9	107	16	123	0		
% within row		12.2%		6.5%		0.8%		7.3%		13.0%		0.0%	false n.:	6.6%
% within column		57.7%		36.4%		7.7%		45.0%		53.3%		0.0%	1-sens.:	33.4%
VGS 14 +	21	11	18	14	20	12	21	11	18	14	26	6		
% within row	65.6%		56.3%		62.5%		65.6%		56.3%		81.3%		false p.:	64.6%
% within column	16.3%		13.5%		14.0%		15.6%		14.4%		17.4%		1-spec.:	15.2%
VGS < 21	116	21	122	14	133	3	120	16	114	23	133	4		
% within row		15.3%		10.3%		2.2%		11.8%		16.8%		2.9%	false n.:	9.8%
% within column		77.8%		63.6%		23.1%		80.0%		76.7%		57.1%	1-sens.:	63.1%
VGS 21 +	13	6	11	8	9	10	15	4	11	7	16	3		
% within row	68.4%		57.9%		47.4%		78.9%		61.1%		84.2%		false p.:	66.3%
% within column	10.1%		8.3%		6.3%		11.1%		8.8%		10.7%		1-spec.:	9.2%

Table 5. Cross-tabulations of absence/presence of different problem gambling correlates and classification as non-problem gambling vs problem gambling, based on CPGI and SOGS

	Family history		Escapism		Want help		Stress		Depression		Suicidality		Average	
	no	yes	no	Yes	no	yes	no	yes	No	yes	no	yes		
CPGI < 8	104	15	112	7	117	2	110	9	106	13	119	0		
% within row		12.6%		5.9%		1.7%		7.6%		10.9%		0.0%	false n.:	6.5%
% within column		57.7%		43.8%		11.1%		47.4%		44.8%		0.0%	1-sens.:	34.1%
CPGI 8 +	11	11	12	9	6	16	12	10	6	16	18	4		
% within row	50.0%		57.1%		27.3%		54.5%		27.3%		81.8%		false p.:	49.7%
% within column	9.6%		9.7%		4.9%		9.8%		5.4%		13.1%		1-spec.:	8.8%
SOGS < 5	98	25	117	5	119	3	113	7	109	14	121	1		
% within row		20.3%		4.1%		2.5%		5.8%		11.4%		0.8%	false n.:	7.5%
% within column		73.5%		31.3%		21.4%		58.3%		46.7%		50.0%	1-sens.:	46.9%
SOGS 5 +	18	9	16	11	17	11	23	5	11	16	26	1		
% within row	66.7%		59.3%		60.7%		82.1%		40.7%		96.3%		false p.:	67.6%
% within column	15.5%		12.0%		12.5%		16.9%		9.2%		17.7%		1-spec.:	14.0%

0.97% based on CPGI, 1.13% based on SOGS, and 1.28% based on VGS 14 + . However, the methodological limitations of the study and the standard error of estimates suggest caution when interpreting these prevalence rates.

Discussion

As legalised gambling has expanded, monitoring the prevalence of problem gambling has become a major issue for regulators and policy makers. Recent Australian research has questioned the validity of clinical problem gambling screens such as SOGS and moved towards instruments that are more suitable to general population surveys and that provide a more valid measure of the problem. This paradigm shift has involved a theoretical redefinition of problem gambling from a mental or behavioural disorder to a more social conception of gambling-related harm to oneself and to others.

This study was intended to clarify uncertainty and debate about the relative merits of screens being proposed for use in Australian prevalence studies. Based on a state-wide survey of 8479 Victorian residents, the newly developed VGS was validated on a large population sample and evaluated against the SOGS5 + and CPGI.

On the basis of this research the CPGI was found overall to be the superior screen and demonstrated the best measurement properties of all three problem gambling instruments examined in the study. This finding subsequently has been confirmed by a national review of research on problem gambling measures (Neal *et al.*, 2004) (see Table 6). The results of our validation tests indicate that the SOGS,

Table 6. Summary assessment of the CPGI by Neal *et al.*

Dimension	Comments
Reliability	• Excellent. Acceptable alpha and test–retest reliability
Construct validity	• Does not appear to have a strong theoretical foundation • Items are mostly subjective • Does not appear to provide a strong measure of 'harm'
Classification accuracy	• A cut-off score of eight yields more conservative estimates of 'problem gambling' prevalence than SOGS
Appropriate validation sampling	• Has been subjected to some validation testing with regular gamblers, but needs further testing
Dimensionality	• Excellent
External/criterion validation	• Very good. Correlates with other measures of gambling-related harm
Concurrent validity	• Highly correlated with other measures of problem gambling, including the DSM-IV and SOGS
Item variability	• Very good. However items taken from the SOGS may not discriminate between regular non-problem and problem gamblers
Practicality	• Extremely easy to use. Best of all measures • Acceptable validity in prevalence surveys
Applicability	• Little use in clinical or research settings • Items appear to be less biased towards higher SES groups or male gamblers
Comparability	• Used extensively in Canada, twice in Australia and in several European studies

Source: Neal *et al.* (2004, p. 83).

as used here, is an unsatisfactory instrument to measure the prevalence of problem gambling in the general population. The VGS, while an improvement over the SOGS, is limited by similar content and concepts to SOGS.

As well as being more robust, the nine-item problem gambling component of the CPGI is shorter and thus more practical to administer in large population surveys. The complete CPGI provides a larger and more comprehensive instrument which is currently being developed and modified for more differentiated diagnostics (Wynne, 2004). Thus it is compatible with an integrated public health approach that seeks to inform both prevention and treatment solutions.

Overall, however, there are relatively few differences in the actual contents of the three screens; several items overlap. One important issue for future research is whether any of the existing screens do in fact represent an appropriate understanding of problem gambling, particularly in culturally and socially diverse societies such as Australia (Ames *et al.*, 2004; Cultural Partners Australia Consortium, 2000; McMillen *et al.*, 2004a; Scull *et al.* 2003; Tan-Quigley *et al.*, 1998). The limitations of the screens examined in this study suggest that further development and refinement of their content facets is required.

Construction of problem gambling screens has been largely based on empirical evidence from problem gamblers in treatment and expert consensus about the nature of the problem. As noted previously, however, much of that expert opinion has come from psychology and psychiatry, and thus it has emphasised particular behavioural indicators and solutions. Moreover, despite evidence of high gambling participation rates among different cultural groups, problem gambling research has been dominated by western concepts, methodologies and solutions such as psychological counselling (McMillen, 1998; McMillen and Togni, 1999; Raylu and Oei, 2002; Tan-Quigley *et al.*, 1998).

In recent years governments in Australia have devoted extensive resources to the provision of problem gambling counselling and treatment services, as they have in New Zealand and many other countries. Despite considerable public investment in counselling services, however, evidence indicates that only 3–5% of people with gambling problems seek professional counselling—and then only when they have reached a crisis (Abbott and Volberg, 2000; Jackson *et al.*, 2000; McMillen *et al.*, 2001, 2004b). Males, indigenous and ethnic gamblers are less likely to utilise mainstream counselling services than other groups. Significantly, most people turn to families, friends and their social network for support.

Community-based gambling studies using qualitative, exploratory methodologies also reveal that people experience and define gambling problems in diverse ways and have differing expectations of support (Brown *et al.*, 2000; McMillen *et al.*, 2004b; Wynne *et al.*, 2004a, 2004b). This raises questions about the universality and relevance of the content items in existing prevalence screens. Emerging research suggests that problem gambling is much more than a financial, behavioural or psychological problem of individuals; it is a highly complex phenomenon that profoundly affects families and communities as well as gamblers.

The CPGI is a relatively new screen and is currently being refined to accommodate the findings of several completed Canadian studies. It is thus opportune to consider ways that the screen might also be modified to better conceptualise and measure problem gambling for application in different contexts. While this study was instructive as to the performance of the three

screens in Victoria, the sample sizes were smaller than indicated for optimal empirical analysis. If future validation studies are conducted we recommend that SOGS be excluded, thus increasing sample sizes. Future research should also include external criteria such as clinical interviews for the purpose of criterion validation.

Moreover, current screens record indicators of harm only from the perspective and experience of regular gamblers. None examine gambling-related harm as experienced by family members or the community. To properly measure the prevalence of problem gambling as generally defined in Australia—i.e. defined as the adverse effects of gambling for the gambler *and for others*—it is necessary to complement screens with research that measures gambling-related problems experienced by family members and the community. Some Australian prevalence surveys have briefly examined these issues, e.g. by asking all respondents whether anyone in their family or social network has had a gambling problem (e.g. McMillen *et al.*, 2001; Productivity Commission, 1999). However, none have explored the nature or extent of those negative effects to inform a definition of the gambling problem from the perspective of those who are affected more generally. Complementary research on this issue is indicated.

Specifically, to better understand the nature of the harm that problem gambling does to close others (family, friends and social networks), qualitative methods should be used to study these issues from the viewpoint of these groups (Franklin and Thoms, 1989; Petry, 2005). Moreover, it would be of interest to compare the accounts of gamblers with those of their close others in order to investigate whether there are perhaps perspective-related differences between the two. It could well be that gamblers are not aware of the harm they inflict on others and the damage their gambling does to their social relationships; or it may be that they are less willing to admit causing such harm. Based on a quantitative assessment of problem gambling it may be possible to operationalise the prevalence rate of problem gambling quite differently, namely as the percentage of a given population who have felt that (in the last 12 months) somebody's gambling habit affected them or their social relationships negatively. As with all public health problems that lie on a continuum, the magnitude of problem gambling needs to be assessed for everyone adversely affected by gambling, not just those people identified by screens as a 'problem gambler'.

This study also raises the question of whether it would be advantageous to have prevalence estimates that can easily be compared across all Australian states and territories and with international prevalence rates. It is not an easy matter for governments to abandon a screen and make the transition to a new one, even when there is convincing evidence that the proposed new screen has greater validity in the Australian context, as we have shown with the CPGI. Inevitably, adoption of the CPGI could affect comparability with previous prevalence studies that have used different screens. In federations such as Australia, Canada, the USA and South Africa, it may be difficult to achieve agreement by all the states and provinces to make the change. Governments and researchers who have invested years developing and working with previous screens may defend that tool vigorously and resist change. Industry also may be reluctant to accept new measures that have the potential to reveal higher levels of problem gambling prevalence or risk in the general population.

Since the 1999 Productivity Commission inquiry, Australian governments have made significant progress towards a coordinated national approach to gambling

research and policy development. A National Gambling Research Working Party (NGRWP) has been established to bring together all states and territories and the Commonwealth to regularly discuss policy options. In 2004 the working party commissioned a comprehensive review of national and international research to advise on definitions of problem gambling to assist the national research program and policy decisions in the various jurisdictions (Neal *et al.*, 2004). Subsequently NSW, South Australia and Tasmania (Roy Morgan Research, 2006) have commissioned prevalence studies using the CPGI, and Queensland has replicated its 2001 study with a population sample of 30,000 residents (Queensland Government, 2005). It will also be used in the 2006/2007 New Zealand National Health Survey and a prospective cohort study in New Zealand.

Reconsideration of the nature and measurement of problem gambling has had significant benefits for Australian gambling regulation. Informed by a broad epidemiological conception of the problem, the policy response in Australia has been a blend of individual therapeutic strategies, social policies and industry regulation (McMillen, 2005). People's right to either participation or abstinence is recognised; the policy focus is to prevent or reduce the problems and harmful consequences of gambling. The overall aim is *harm* reduction, achieving a shift from high risk to safe gambling. Harm minimisation is the core principle guiding strategic responses that aim to reduce the extent and effects of gambling-related problems, and prevention is the primary guiding principle to maximise both individual and community wellbeing. A wide range of possible public health strategies has been or is currently being considered (IPART 2004; McMillen, 2005; McMillen and Pitt, 2005). In general terms, however, the Australian public health response involves three core components:

1. Supply reduction and product control, involving regulatory restrictions on market entry, restrictions on the gambling environment (e.g. types of games and nature of bets permitted, location of ATMs), advertising and machine operations (return to players, bet limits, reduction in reel speed, limits on note acceptors). The most radical policy is the South Australian decision to withdraw 3000 gaming machines from licensed venues (Independent Gaming Authority, 2004).
2. Demand reduction policies that control accessibility to gambling, such as global or venue caps on the number of gaming machines; regional caps in vulnerable communities; requirements for impact studies that demonstrate existing demand (e.g. Queensland Gaming Commission, 2003; Victorian Casino and Gaming Authority, 2004); and reduction in venue operating hours or prescribed shutdowns (ACNielsen, 2003).
3. Programs for consumers such as information about gambling odds and how gaming machines work, community education and awareness campaigns, state-wide provision of treatment and counselling services, targeted programs for 'at risk' groups, and prevention (e.g. school curriculum programs). More recent initiatives are proposals to build community capacity and resilience (McMillen *et al.*, 2004b).

While re-regulation has generated considerable resistance by industry to harm minimisation policies that affect gambling venues, many of the strategies continue to focus on individual behaviour (e.g. signage, self-exclusion programs). However, with few exceptions (e.g. New Focus Research Pty Ltd, 2003; South

Australian Centre for Economic Studies, 2003) there has been little research to systematically evaluate the effects of policy initiatives and general environmental factors on gambling behaviour.

Lack of understanding and precision in the definition of problem gambling continues to impede effective policy development. Further clarification of the nature and extent of problem gambling is essential to provide a reliable indication of the need for services and preventative programs.

Acknowledgements

Notes

1. This paper builds on our two research reports to the former Victorian Gambling Research Panel: the *2003 Victorian Longitudinal Community Attitudes Survey* and the subsequent *Validation of the Victorian Gambling Screen*. Both detailed reports are available on the following website: http://grp.vic.gov. au/. The variant of SOGS used in most Australian studies was examined, rather than the original 'lifetime' version.
2. This sampling approach has been used in most Australian prevalence studies, although the precise definition of a 'regular gambler' used in the sampling frame sometimes varies.
3. A comprehensive discussion of the sampling methodology is provided in Wenzel *et al.* (2004, *Appendix B—Methodology and Technical Report*).

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