

Reliability, Validity, and Cut Scores of the South Oaks Gambling Screen (SOGS) for Chinese

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Abstracts We examined the reliability, validity, and classification accuracy of the South Oaks Gambling Screen (SOGS) when adopted for use in Chinese. The DSM-IV criteria for pathological gambling served as the standard against which the classification accuracy of the SOGS was tested. A total of 283 Chinese adults in the community and 94 Chinese treatment-seeking gamblers were recruited. The internal reliability of the SOGS was satisfactory for the general sample and acceptable for the gambling sample. The SOGS was correlated with the DSM-IV criteria items as well as psychosocial and gambling-related problems. Relative to the DSM-IV criteria, the SOGS tended to overestimate the number of pathological gamblers in both samples. In general, we were relatively confident that individuals were not pathological gamblers if the SOGS scores were between 0 and 4 and were pathological gamblers if the SOGS scores were between 11 and 20. There was about 50–50 chance of being pathological gamblers if the SOGS scores were between 8 and 10. However, the probability of individuals being pathological gamblers was about 0.30 if the SOGS scores were between 5 and 7. We proposed a SOGS cut score of 8 to screen for probable pathological gambling in Chinese societies.

Keywords Chinese SOGS · Chinese gambling screen · Pathological gambling

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Gambling research conducted in the United States, Canada, and Australia indicates that with greater access to new forms of gambling, there will be more individuals who have gambling-related problems and who are seeking help (Ladouceur et al. 1994; Shaffer et al. 1997; Victorian Casino and Gambling Authority 1997). This also happens in Chinese societies. With the expansion of legalized gambling in Chinese societies of Macau, Hong Kong, Taiwan, and Singapore, Chinese nowadays have more opportunities to engage in new forms of gambling such as betting on sports and internet games in addition to traditional gambling activities in casinos and mahjong games. Chinese gamblers nowadays tend to take high risks while gambling to seek instant rewards either for quick profits or for satisfying strong immediate sensations and excitement (Lau and Ranyard 2005; Vong 2007). Furthermore, Chinese tend to have difficulty in admitting their gambling problems and in seeking professional help for fear of losing face (Loo et al. 2008). Consequently, Chinese gamblers typically experience severe financial, family, and work difficulties as a result of their gambling by the time they seek services at gambling treatment centers in Hong Kong (Tang et al. 2007) and Singapore (Teo et al. 2007). This poses great challenge to the effectiveness of gambling treatment programs. In order to tackle problem gambling in Chinese societies, public education programs are urgently in need to enhance people's awareness of individual and societal consequences of disruptive gambling. These programs will also aim to de-stigmatize people with gambling-related problems and to emphasize the importance of early treatment. At the same time, a reliable and valid screening instrument is also essential for early identification of individuals who may require subsequent referrals and treatment.

In Western psychiatric taxonomy such as the DSM system, pathological gambling refers to destructive and recurring gambling behavior that interferes with many life domains (American Psychiatric Association 1994). The 20-item South Oaks Gambling Screen (SOGS) is a commonly used instrument to screen for probable pathological gambling (Lesieur and Blume 1987). A cut score of 5 or more is typically used to indicate that the individual is a probable pathological gambler (Lesieur and Blume 1987). Psychometric scrutiny of the SOGS tends to yield satisfactory test-retest reliability and internal consistency among Western general populations and clinical samples (e.g., Lesieur and Blume 1987; Petry 2005; Stinchfield 2002). The SOGS also shows good agreement with the DSM-IV criteria for pathological gambling (Stinchfield 2002). However, various shortcomings of the SOGS have also been identified (Lesieur 1994; Ladouceur et al. 2000). First, the SOGS tends to over-estimate gambling problems when lifetime estimates are used, as about one-third of the ever-afflicted individuals may have already resolved their gambling problems during the survey period (Shaffer et al. 1997). One suggested solution is to change the time frame from lifetime to a more current period such as the past year (Stinchfield 2002). Second, the SOGS tends to yield inflated prevalence estimates with high false positives relative to the DSM criteria when used with community samples (Ladouceur et al. 2000; Shaffer et al. 1997; Stinchfield 2002). One suggestion to address this concern is by raising the cut score (Duvarci et al. 1997), but this will at the same time increase the false negative error rate. An alternative solution is to have a two-stage assessment, with the SOGS as the initial screening tool to be followed by a clinical interview (Dickerson 1993) or to supplement the SOGS with a second diagnostic test such as the DSM-IV criteria for pathological gambling (Gambino and Lesieur 2006). Third, some items are easily misinterpreted and subject to acquiescence bias (Ladouceur et al. 2000). A possible solution is to have the research personnel available to clarify and explain the SOGS items to respondents or to follow-up with interviews.

The SOGS has been translated into many languages for use in different countries. It has also been used with Chinese immigrants in developed countries of Canada, Australia, and

the United States as well as with Chinese residing in Chinese societies (Loo et al. 2008; Tang et al. 2007). To the best of our knowledge, only one published study has examined the psychometric properties of the SOGS when it was used in Chinese societies. In a recent study conducted in Singapore (Arthur et al. 2008), the English version of the SOGS was administered to 148 undergraduate students, of which 82% were Chinese and the remaining was of Malay, Indian, and other ethnic groups. The SOGS was found to be internally consistent with an alpha value of 0.83. Three factors were identified that accounted for 46% of the total variance. The SOGS also had high correlations with other gambling measures such as the Gamblers Anonymous 20 ($r = 0.74$), the Canadian Problem Gambling Index ($r = 0.79$), and the DSM-IV criteria for pathological gambling ($r = 0.60$). However, it should be noted that in this study, the SOGS was administered in English to a small sample of college students in Singapore.

For the present study, we aimed to determine the usefulness of the SOGS in Chinese societies in terms of identifying probable pathological gamblers for subsequent referrals and treatment. Psychometric properties of the Chinese version of the SOGS when adopted for use with Chinese samples would be examined in detail. We first investigated the reliability and validity of the SOGS among Chinese adults in the community as well as among Chinese treatment-seeking gamblers. We then examined the usefulness of various SOGS cut scores in identifying individuals whose gambling behavior significantly interfered with their personal, familial, and occupational functioning. We tested the classification accuracy of SOGS cut scores against the DSM-IV criteria for pathological gambling.

Method

Participants

Two samples of Chinese adults who resided in Hong Kong at the time of the study were recruited. The general community sample included 283 Chinese adults in the community (170 men and 113 women), and the gambling treatment sample included 94 treatment-seeking gamblers (83 men and 11 women). Table 1 summarizes the demographics and gambling information of the two samples.

For the general community sample, about 70% of participants aged between 20 and 29. About 70% of them reported at least one form of gambling activities in their lifetime, and the gambling debt incurred at the time of the study was typically below US \$1,200. The commonest forms of gambling activities were mahjong games, lottery, cards, and betting on horse races. A local survey with a large sample of 2,004 community adults also showed similar pattern of gambling activities (Hong Kong Home Affairs Bureau 2002; Table 1).

For the gambling treatment sample, the majority of participants aged between 30 and 39. About 13.5% of them had gambled for 5 years or less, 18.8% for 6–10 years, 38.6% for 11–20 years, and 26.1% for more than 20 years. Only 6.3% of them did not have a gambling debt at the time of the study, and about 25% were indebted to less than US\$1,200, 40% were indebted between US\$1,200 and US\$5,100, and 25% were indebted to more than US\$5,100. The commonest forms of gambling activities were betting on horse races, gambling in casinos, and betting on soccer games. The present gambling treatment sample showed similar demographic and gambling characteristics as compared to a large sample of 952 gamblers who seek services from a local gambling treatment center (Tang et al. 2007; Table 1).

Table 1 Demographics and gambling background of participants (%)

	Community adults		Treatment-seeking gamblers	
	General community <i>N</i> = 283	Hong Kong Home Affairs Bureau (2002) <i>N</i> = 2004	Gambling treatment <i>N</i> = 94	Tang et al. (2007) <i>N</i> = 952
Gender				
Male	60.0	52.2	88.5	88.3
Female	40.0	47.8	11.5	11.7
Missing data	–			
Age				
Below 19	4.2	9.5	–	} 18.2
20–29	69.3	} 74.5	17.9	
30–39	7.8		41.0	33.9
40–49	10.6		26.3	30.9
50 or above	8.1	16.0	14.7	17.0
Missing	–	–	1.0	–
Year of gambling				
0–5	NA	NA	13.5	8.8
6–10	NA	NA	18.8	18.2
11–20	NA	NA	38.6	} 75.0
More than 20	NA	NA	26.1	
Missing data	NA	NA	3.0	–
Amount of gambling debt				
Nil	32.2	NA	6.3	} 34.9
Under US\$1200 (10 K)	66.8	NA	25.0	
US\$1200–2500 (20 K)	0.4	NA	14.6	} 30.2
US\$2501–3800 (30 K)	–	NA	13.5	
US\$3801–5100 (40 K)	–	NA	13.5	} 34.9
Above US\$5100	–	NA	25.0	
Missing data	0.6	NA	2.1	–
Gambling activities				
Cards (poker, blackjack)	42.4	–	NA	NA
Horse racing	25.6	30.4	78.1	69.4
Soccer betting	6.0	2.9	56.2	51.6
Mahjong	67.1	45.1	45.8	39.8
Casino	NA	NA	62.9	56.8
Slot machine	17.3	NA	NA	NA
Lottery	46.9	64.2	NA	NA

NA = Information not available

Instrument

Screening for Probable Pathological Gambling

We used the 20-item South Oaks Gambling Screen (SOGS) (Lesieur and Blume 1987) to evaluate participants' lifetime gambling-related behavior and problems. The SOGS is a widely used screening instrument for problem gambling and shows good reliability and validity in community and clinical samples (Lesieur and Blume 1987; Petry 2005; Stinchfield 2002). The Chinese version of the SOGS was available and correlated with somatic

complaints of Chinese gamblers (Tang et al. 2007). The average lifetime SOGS scores for treatment-seeking gamblers in the United States (Petry 2005) and Hong Kong (Tang et al. 2007) is about 12. A total SOGS score of 5 or higher is typically used to classify probable pathological gambling (Lesieur and Blume 1987; Shaffer et al. 1997; Stinchfield 2002), although some researchers have suggested using higher cut scores for different samples (Blaszczynski et al. 1998; Duvarci et al., 1997). Participants responded to the SOGS items with “yes” or “no”, and affirmative responses were summed to form a total score.

Diagnostic Criteria for Pathological Gambling

The DSM-IV criteria for pathological gambling are currently recognized as the “gold standard” against which the classification accuracy of the SOGS is tested (Stinchfield 2002; Stinchfield et al. 2005). The DSM-IV criteria include 10 common symptoms reported by pathological gamblers (American Psychiatric Association 1994). Examples of these symptoms are “preoccupied with gambling” and “repeated unsuccessful efforts to control, cut back, or stop gambling.” These symptoms are presented as a checklist, with “yes” and “no” responses. The items also showed satisfactory reliability, validity and classification accuracy (Stinchfield et al. 2005). Typically, a cut score of 5 or more is used to classify individuals as pathological gamblers (Stinchfield 2002; Stinchfield et al. 2005), including research conducted with Chinese samples (Arthur et al. 2008; Wong and So 2003). The Chinese version of the DSM-IV diagnostic criteria has also been used to determine the prevalence of pathological gambling in Hong Kong (Wong and So 2003). For the present study, we asked participants to use the lifetime time frame in their responses to the items.

Psychosocial Symptoms

A checklist of somatic and psychological problems commonly reported by gamblers was used (Tang et al. 2007). These symptoms include physical discomfort, psychological distress as in feeling unhappy, insomnia, loss of appetite, drinking and drug problems, work-related problems, and financial problems. Participants were asked to indicate with “yes” or “no” responses regarding whether or not they had experienced these symptoms during the last year.

Gambling Activities

Participants were asked to indicate whether or not they had engaged in various gambling activities, such as gambling in casinos, betting on soccer games and horse races, buying lottery, and playing with mahjong, cards, or slot machines. For the general community sample, the frequency of engaging in these gambling activities was asked. For the treatment gambling sample, participants were to indicate the number of years they took part in these gambling activities. Both samples were also asked to provide information on the amount of gambling debt that they had incurred at the time of the study.

Demographics

We asked participants to provide information on their age, gender, and marital status.

Procedures

The General Community Sample

A convenience community sample of adult Chinese residing in Hong Kong was recruited to the study. Invitations to individuals to participate in a study that examined gambling behavior and problems were distributed through notices and posters in university campuses, community centers, and public libraries as well as through personal network. Participants were assured of the confidentiality of their personal information and responses to the study. They participated in the study voluntarily and were paid US\$6.4 as a token of appreciation for completing the questionnaire. After trained research assistants explained the purpose of the study, participants signed a written consent and completed the questionnaire that took about 15–20 min to finish.

The Gambling Treatment Sample

Chinese treatment-seeking gamblers were recruited from one of the two publicly funded treatment centers that provided free, non-residential, and voluntary gambling treatment services. A trained research assistant approached clients of the treatment center to invite them to participate in a study that examined their lifetime gambling behavior and related problems. They were assured of the confidentiality of their personal information and responses provided for the study. After obtaining their written consent, participants were individually interviewed by the research assistant for about 20 min. Participation in the study was voluntary and no monetary reward was provided to participants. About four in every ten invited clients agreed to be interviewed, yielding a response rate of about 40%. The major reasons for declining the interview were not having time and having no interest in the study.

Results

Item Endorsement Rate, Reliability, and Factors of the SOGS and DSM-IV Criteria

Table 2 shows the endorsement rates of the SOGS for the two samples. The general sample had the highest endorsement rates (about 20%) on: “gambling more than intended to” and “claiming to be winning money gambling but weren’t really.” About 95–99% of the gambling sample endorsed items on “feeling guilty” and “feeling having a problem”, and about 89% on “being criticized for gambling” and “gambling more than intended to.”

The reliability of the SOGS was determined by the principal component analyses and internal consistency estimates. For the general sample, the principal component analysis of the SOGS indicated one primary factor with an eigenvalue of 6.13 that accounted for 31% of the variance. In calculating the reliability of the SOGS, we deleted two items with zero endorsement, “borrowing money from loan sharks” and “borrowing money from the checking account”. We found that the 18-item SOGS scale was internally consistent, with a Cronbach alpha value of 0.84. For the gambling sample, the principal component analysis of the 20-item SOGS scale also yielded one primary factor with an eigenvalue of 3.13 that accounted for 26% of the variance. The SOGS showed acceptable internal consistency, with a Cronbach alpha value of 0.69.

Table 2 Endorsement frequency of the SOGS items (%)

SOGS item	General community N = 283	Gambling treatment N = 94
Go back another day to win money back	13.8	68.8
Claimed to be winning money gambling but were not really	18.0	57.3
Feel you have a problem	7.8	94.8
Gamble more than you intended to	19.8	88.5
People criticized your gambling	14.5	88.5
Felt guilty	14.8	99.0
Felt like you would like to stop gambling but could not	8.8	75.0
Hidden betting slips	11.0	82.3
Money arguments centered on gambling	6.7	75.0
Borrowed money and not paid them back	2.1	66.7
Lost time from study/work	5.7	53.1
Borrowed household money	8.8	49.0
Borrowed from parent/partner/spouse	4.6	43.8
Borrowed from relatives or in-laws	3.2	53.1
Borrowed from banks	1.8	72.9
Borrowed from credit cards	2.1	75.0
Borrowed from loan sharks	–	30.2
Cashed in stocks	0.7	3.1
Sold personal or family property	0.4	9.4
Borrowed from checking account	–	4.2

Similarly, the reliability and factor structure of the items on the DSM-IV criteria for pathological gambling were examined for the two samples. For the general sample, the DSM-IV items had an internal consistency Cronbach alpha value of 0.89 and one primary factor (eigenvalue = 5.1) that accounted for 52% of the variance. For the gambling sample, the internal consistency Cronbach alpha value was 0.74 and the primary factor (eigenvalue = 2.7) accounted for 27% of the variance.

For the combined sample, the reliability consistency alpha values were, respectively, 0.94 and 0.92 for the SOGS and DSM-IV criteria. Primary component analyses of the SOGS showed that one primary factor (eigenvalue = 6.14) accounted for 46% of the variance. For the DSM-IV criteria, the primary factor (eigenvalue = 5.68) accounted for 57% of the variance.

Validity and Classification Accuracy of the SOGS

We examined the convergent validity of the SOGS by measuring correlations between the SOGS total scores and other gambling problem domains. Results were summarized in Table 3. For both general and gambling samples, the SOGS had strong correlations with the DSM-IV criteria for pathological gambling ($r = 0.72, 0.57$, respectively, $P < 0.001$); modest correlations with financial problems ($r = 0.29, 0.24$, respectively, $P < 0.01$), psychosocial symptoms ($r = 0.29, 0.22$, respectively, $P < 0.01$), and frequency of

Table 3 Correlations between SOGS scores and gambling-related domains

	General community N = 283	Gambling treatment N = 94
DSM-IV diagnostic criteria for pathological gambling	0.72***	0.57***
Gambling frequency	0.24**	NA
Years of gambling	NA	0.25**
Psychosocial symptoms	0.29**	0.22*
Work-related problems	0.15*	0.21*
Financial problems	0.29**	0.24*
Amount of gambling debt	0.05	0.10

NA = Information not available

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

gambling/years of gambling ($r = 0.24, 0.25, P < 0.001$); weak to modest correlations with work-related problems ($r = 0.15, 0.21$, respectively, $P < 0.05$); and insignificant correlations with the amount of gambling debt ($P > 0.05$).

We determined the construct validity of the SOGS by investigating whether or not it could discriminate between community adults and treatment-seeking gamblers. An independent t -test showed that the gambling sample (Mean = 11.89, SD = 2.94) as compared to the general sample (Mean = 1.40, SD = 2.35) had higher scores on the SOGS ($t_{375} = 31.40, P < 0.0001$). In addition, the gambling sample (Mean = 5.86, SD = 2.30) as compared to the general sample (Mean = 0.58, SD = 1.64) also scored higher on the DSM-IV criteria for pathological gambling ($t_{375} = 20.57, P < 0.0001$). We also conducted a series of two-by-two cross-tabulation of the SOGS and group membership in the general and gambling groups with cut scores of 5, 6, 7, 8, 9, 10, and 11 (Table 4). If we used the conventional cut score of 5 or more, the SOGS was able to classify the two groups with a hit rate of 0.93, a sensitivity of 0.99, a specificity of 0.90, a false negative rate of 0.004, and a false positive rate of 0.23. However, results showed that a cut score of 8 was more desirable in terms of maximizing the hit rate (0.95), maintaining satisfactory sensitivity (0.92) and specificity (0.97), and balancing false positive (0.10) and negative errors (0.03).

Examining Cut Scores of the SOGS Using DSM-IV Criteria

Prior to examining cut scores of the SOGS, we calculated the probability of meeting the DSM-IV criteria for pathological gambling (score 5 or above) at any given SOGS scores with the combined sample. Figure 1 showed that regardless of the group membership, we were relatively confident that participants were not pathological gamblers if the SOGS scores were between 0 and 4, and were pathological gamblers if the SOGS scores were between 11 and 20. There was about 50–50 chance of being pathological gamblers if the SOGS scores were between 8 and 10. However, the probability of participants being pathological gamblers was about 0.30 if the SOGS scores were between 5 and 7.

We used 5 or more items on the DSM-IV as the diagnosis criteria and then calculated various classification accuracy estimates of the SOGS cut scores ranging from 5 to 10. Results were summarized in Table 5. For the general sample, the conventional SOGS cut score of 5 had a hit rate of 0.94, a sensitivity rate of 0.86, specificity rate of 0.95, false positive rate of 0.52, and a false negative rate of 0.007. A cut score of 10 would have no

Table 4 Crosstabulation of the SOGS and group membership

SOGS cut-off	Group membership		Row total	Hit rate	Sensitivity	Specificity	False positive	False negative
	General community	Gambling treatment						
<5	256	1	257	349/377	93/94	256/283	27/120	1/257
5+	27	93	120	0.93	0.99	0.90	0.23	0.004
<6	260	1	261	353/377	93/94	260/283	23/116	1/261
6+	23	93	116	0.94	0.99	0.92	0.20	0.004
<7	264	5	269	353/377	89/94	264/283	19/108	5/269
7+	19	89	108	0.94	0.95	0.94	0.17	0.02
<8	274	8	282	360/377	86/94	274/283	9/95	8/282
8+	9	86	95	0.95	0.92	0.97	0.10	0.03
<9	279	13	292	360/377	81/94	279/283	4/85	13/292
9+	4	81	85	0.95	0.86	0.98	0.05	0.04
<10	280	21	301	353/377	73/94	280/283	3/76	21/301
10+	3	73	76	0.94	0.78	0.99	0.04	0.07
<11	280	31	311	343/377	63/94	280/283	3/66	31/311
11+	3	63	66	0.91	0.67	0.99	0.05	0.10
<12	280	38	318	336/377	56/94	280/283	3/59	38/318
12+	3	56	59	0.60	0.60	0.99	0.05	0.12
Column total	283	94	377					

Base rate: $94/377 = 0.25$

false positives, but the sensitivity of the SOGS was reduced to 0.20. A cut score of 8 seemed to balance all estimates as it yielded a high hit rate of 0.96, a high specificity of 0.97, a marginal sensitivity of 0.47, a false positive rate of 0.22, and a false negative rate of 0.03. With a cut score of 8, the SOGS would identify about half of the participants who satisfied the DSM-IV criteria for pathological gambling. The two false positives cases had total SOGS scores of 8 and endorsed only one item on the DSM-IV criteria.

For the gambling sample, the SOGS cut scores ranging from 5 to 10 generally showed high sensitivity but low specificity rates in identifying participants who satisfied the DSM-IV diagnostic criteria (Table 5). However, cut scores of 11 or higher would significantly increase the false negative error rates. The conventional cut score of 5 had a sensitivity rate of 1, a specificity rate of 0.04, a false positive rate of 0.26, and no false negative. In other words, a cut score of 5 would identify all participants who fulfilled the DSM-IV criteria, but would only detect 4% of those who did not meet the DSM-IV criteria. Alternatively, a cut score of 8 would identify 99% of the participants who met the DSM-IV criteria (a sensitivity rate of 0.99) with a false negative rate of 0.12. However, this cut score would only detect 30% of the participants who did not meet the DSM-IV criteria (specificity of 0.30) with a false positive rate of 0.22.

Discussions

We examined the reliability, validity, and classification accuracy of the SOGS when adopted for use with Chinese residing in Hong Kong. Prior to generalizing our results to

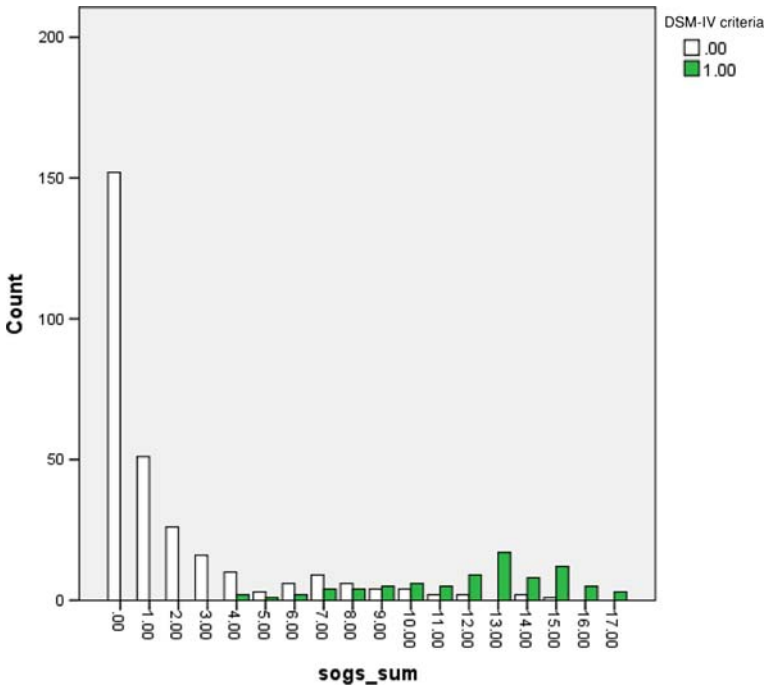


Fig. 1 Bar chart of SOGS scores and DSM diagnosis for the combined sample ($N = 377$)

the Chinese population, various limitations of the study should be noted. First, we recruited convenience samples from the community and one gambling treatment center. Although the general sample reported gambling activities similar to a large sample of local community adults, the former included mostly young adults aged between 20 and 29. For the gambling sample, we were only able to recruit a small sample of 94 gamblers whose demographic and gambling characteristics were similar to gamblers seeking services from a local treatment center. However, information on past or current gambling treatment of our gambler sample was unavailable. Hence, the extent to which the general and gambler samples represented their respective populations remained unclear. Second, data collection strategies varied between the two samples, with the general sample self-administered their questionnaires and received token monetary incentives while the gambling treatment sample was interviewed and received no incentives. These variations were necessary in order to satisfy administrative requirements of the gambling treatment center. Furthermore, measures on gambling history and types of gambling activities also differed slightly between the two samples. As such, comparable information on these two measures was unavailable. Third, participants were asked to complete items on the SOGS and DSM-IV criteria with a lifetime time frame. This time frame was used in the development study on the SOGS (Lesieur and Blume 1987), but has been criticized for failing to discriminate between current cases and those in remission. Given the fact that there is a paucity of information on Chinese gambling, a lifetime time frame will be an important indicator of the potential burden on the community (Gambino and Lesieur 2006). Fourth, we relied solely on self-reports of participants, and there was no external verification of their gambling behavior and problems. Hence, the information we gathered from participants

Table 5 Classification accuracy estimates for various SOGS cut scores

SOGS cut-off	DSM-IV		Row total	Hit rate	Sensitivity	Specificity	False positive	False negative
	No	Yes						
General community sample (N = 283)								
<5	254	2	256	267/283	13/15	254/268	14/27	2/256
5+	14	13	27	0.94	0.86	0.95	0.52	0.007
<6	257	3	260	269/283	12/15	257/268	11/23	3/360
6+	11	12	23	0.95	0.80	0.96	0.48	0.008
<7	260	4	264	271/283	11/15	260/268	8/19	4/264
7+	8	11	19	0.96	0.73	0.97	0.42	0.02
<8	266	8	274	273/283	7/15	266/274	2/9	8/274
8+	2	7	9	0.96	0.47	0.97	0.22	0.03
<9	268	11	279	272/283	4/15	268/279	0/4	11/279
9+	0	4	4	0.96	0.27	0.96	0.00	0.04
<10	268	12	280	271/283	3/15	268/280	0/3	12/280
10+	0	3	3	0.96	0.20	0.96	0.00	0.04
Column total	268	15	283					
Gambling treatment sample (N = 94)								
<5	1	–	1	69/94	68/68	1/26	25/93	0/1
5+	25	68	93	0.73	1.00	0.04	0.26	0.00
<6	1	–	1	69/94	68/68	1/26	25/93	0/1
6+	25	68	93	0.73	1.00	0.04	0.26	0.00
<7	4	1	5	71/94	67/68	4/26	22/89	1/5
7+	22	67	89	0.76	0.99	0.15	0.25	0.20
<8	7	1	8	74/94	67/68	7/26	19/86	1/8
8+	19	67	86	0.79	0.99	0.30	0.22	0.12
<9	11	2	13	77/94	66/68	11/26	15/81	2/13
9+	15	66	81	0.82	0.97	0.42	0.18	0.15
<10	15	6	21	77/94	62/68	15/26	11/83	6/21
10+	11	62	83	0.82	0.91	0.58	0.11	0.28
<11	19	12	31	75/94	56/68	19/26	7/63	12/31
11+	7	56	63	0.80	0.82	0.73	0.11	0.39
<12	21	17	38	72/94	21/26	21/26	5/56	17/38
12+	5	51	56	0.77	0.75	0.81	0.09	0.45
Column total	26	68	94					

General community sample base rate: $15/283 = 0.05$

Gambling treatment sample base rate: $68/94 = 0.72$

might be subject to recall and social desirability bias. Finally, we used the conventional cut score of 5 on the DSM-IV criteria for pathological gambling as the standard against which the classification accuracy of the SOGS was tested. However, there is not yet any study on the psychometric properties of the DSM-IV criteria for pathological gambling when used with Chinese. It thus remained unclear the extent to which the DSM-IV criteria would reliably and accurately classify Chinese pathological gamblers.

Despite the above limitations, we found that the internal reliability of the SOGS was satisfactory for the general sample and acceptable for the gambling sample. When compared to studies conducted with Western gamblers (e.g., Stinchfield 2002), the internal reliability coefficient value of the SOGS was lower in the present sample of Chinese gamblers. As mentioned in the limitation section, this may be partly attributable to the fact that some individuals in the gambling sample might have already resolved their gambling problems or were currently receiving treatment for their disruptive gambling. Similar to the development study by Lesieur and Blume (1987), we found that the SOGS showed a high internal reliability coefficient value of 0.94 by combining the two samples. We thus concluded that the SOGS is a reliable instrument for use with Chinese.

Regarding validity, the SOGS demonstrated acceptable convergent validity as it correlated with items on the DSM-IV criteria for pathological gambling and other gambling-related problems. It also showed satisfactory construct validity and was able to discriminate between community adults and treatment-seeking gamblers. Regarding classification accuracy of the SOGS using the DSM criteria as the standard, we were relatively confident that individuals were not pathological gamblers if the SOGS scores were between 0 and 4 and were pathological gamblers if the SOGS were between 11 and 20. There was about 30–50 chance of being pathological gamblers if the SOGS scores were between 5 and 10. In general, the SOGS tended to overestimate the number of individuals with pathological gambling relative to the DSM-IV criteria. This is also a frequent observation with Western adults and clinical samples using the SOGS (Ladouceur et al. 2000; Shaffer et al. 1997; Stinchfield 2002). Researchers have continued to raise concerns about the appropriateness of using the DSM criteria as the standard against which the classification accuracy of the SOGS is being tested (Gambino and Lesieur 2006; Stinchfield 2002). It is noted that the SOGS and DSM criteria refer to different aspects of pathological gambling—the SOGS tends to focus more on subjective experience of gambling and sources of borrowed money whereas the DSM criteria emphasize more on symptoms related to tolerance and withdrawal of gambling (Stinchfield 2002). Lesieur and Blume (1987) have argued that the SOGS represents early or less severe signs of problem gambling, whereas the DSM criteria represent the more severe stage of this disorder. In the absence of an alternate “gold standard”, the DSM criteria will continue to be used by researchers as a criterion in testing the classification accuracy of the SOGS.

One of the main purposes of using the SOGS in Chinese societies is to narrow down the population to a smaller number of individuals who are likely to be pathological gamblers for referrals and treatment. Blaszczynski et al. (1998) have suggested a cut score of 10 on the SOGS to identify probable pathological gambling for Chinese immigrants in Australia. Based on our results, we argued that this cut score would be too stringent for Chinese residing in Chinese societies. We found that a cut score of 10 had a low sensitivity (0.20) in identifying community adults who satisfied the DSM-IV criteria for pathological gambling, and a high false negative error rate (0.28) in misclassifying pathological gamblers as non-pathological gamblers in the gambling sample. We also cautioned the use of the conventional SOGS cut score of 5 for Chinese as it had a high false positive error rate (0.52) for community adults and a very low specificity rate for treatment-seeking gamblers (0.04). As suggested by previous researchers (Dickerson 1993; Gambino and Lesieur, 2006), Chinese who scored at or above the SOGS cut score of 5 should be further assessed with diagnostic clinical interviews in order to verify a pathological gambling diagnosis. When the above two-stage screening and assessment is not possible due to various practical constraints, a cut score of 8 on the SOGS might be considered in terms of maintaining sensitivity and specificity as well as balancing false positive and false negative errors.

In sum, we found the SOGS a reliable and valid instrument to screen for probable pathological gambling in Chinese societies. However, further research is needed to explore ways to improve the classification accuracy of the SOGS. Given that the DSM-IV diagnostic items are typically used as a “gold standard” against which the classification accuracy of the SOGS is tested, the reliability and validity of the DSM-IV items when used with Chinese samples should also be investigated. More research also needs to be conducted to determine whether or not there are other domains not covered by DSM-IV criteria that would improve the validity of the SOGS. Representative samples should be recruited from the community and gambling treatment centers so that results can be generalized to their respective populations. Finally, we would like to propose a cut score of 8 on the SOGS to screen for probable pathological gambling in Hong Kong and other Chinese societies.

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