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# Youth gambling in Melbourne's west: Changes between 1996 and 1998 for Anglo-European background and Asian background school-based youth<sup>1</sup>

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## Abstract

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In this study of gambling frequency and problem gambling in school-based young people from the western suburbs of Melbourne, 710 students from Years 10, 11 and 12 were surveyed in 1996, and 776 students from the same years and from the same schools were surveyed in 1998. The mean age of both cohorts was 16.3 years. The major aim of the study was to assess changes in youth gambling patterns over this two-year period. A second aim was to compare gambling patterns among Asian youth in comparison with their Anglo-European counterparts. Results indicated that gambling frequency (including use of poker machines) had significantly reduced over the two-year period, as had problem gambling. Contrary to the stereotype, young Asian background students were less likely to gamble than Anglo-European students, spent less money on gambling, but paradoxically, scored higher on the problem gambling scale. Possible reasons for this anomalous finding were discussed.

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## Introduction

In 1992 legalised electronic gaming machines (EGMs) were introduced into the state of Victoria, Australia. Although there is an upper limit to the number of gaming machines allowable in the state, they are currently widespread in hotels, sporting and social clubs in city and country Victoria. In addition, in 1994 a casino opened in Melbourne (state capital of Victoria) which has 2,500 EGMs and 330 gaming tables (Productivity Commission 1999). Victoria also provides extensive facilities for gambling in areas such as lotteries, scratch tickets, keno tickets, bingo halls, plus on- and off-course betting facilities for horse racing, harness racing and dog racing. However these types of gambling have been available for many years in comparison with the relatively recent EGMs. Not surprisingly given this wealth of opportunity, many Victorians (and Australians in general) gamble. The Victorian Casino and Gaming Authority (1997) survey of gambling patterns over five years indicated that

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participation rates of Victorians in gambling activities ranged from 75% in 1992 to 86% in 1997. These rates did not steadily increase across the five years but showed fluctuations up and down, with the highest participation rate in 1996 (87%). The perceived weekly outlay claimed by gamblers in 1997 remained at a similar level to the previous four years, at about \$16. The Productivity Commission Report on Australia's gambling industries (1999) indicated a relatively similar figure with their statement that across all Australian adults the average yearly loss to gambling is \$760, or 3% of household disposable income.

How do the gambling rates compare for young people?<sup>2</sup> A Victorian Department of Human Services report (1999) on youth and family gambling indicated that Victorian young people participated in gambling at much lower rates than young people in international studies (about 41% of children in Year 8 at school). However among somewhat older young gamblers (18-24 years), the Productivity Commission (1999) found participation rates to be 85%, higher than any other above-18 age group. Our own study (Moore and Ohtsuka 1997) conducted in 1996 provides the baseline data for this current investigation into change/stability in gambling patterns. In that study we showed that among a sample of 1,017 young people aged 14 to 25, about 90% of the under-18s and 92% of the 18 to 25 years age group had gambled for money at some time in their lives. However, the frequency of gambling and the amounts wagered were, for the most part, very low.

Gambling as a leisure activity does not necessarily imply that problems with control will be experienced. Problem gambling rates are difficult to ascertain, as the validity of diagnostic measures designed for clinical settings (for example the South Oaks Gambling Screen [SOGS]) have not been adequately tested with community samples. These instruments may overestimate the extent of problem gambling, while observation of help seeking rates may underestimate it. With these provisos in mind, some data is available on the Australian population. The Productivity Commission's (1999) inquiry found that rates of help-seeking by individuals who felt unable to control their gambling behaviour had increased rapidly since the advent of legalised EGMs, especially in Victoria and South Australia. Dickerson et al. (1996) estimated the prevalence of problem gambling in Australia to be about 1% of the adult population, and this rate is also reported by the Productivity Commission (1999). The Commission also estimated the existence of another 1% of adults with moderate problems, which while not requiring treatment warrant policy concern. Among young people, a meta-analysis of North American studies by Shaffer, Hall and Vander Bilt (1997) reported by the Productivity Commission (1999, p. 6.50) indicated rates of problem gambling among young people as high as 3.88%. The Commission recommended that the rates for underage gamblers in Australia needed to be ascertained. In our 1996 study (Moore and Ohtsuka 1997) the rate of problem gambling as assessed by an adapted South Oaks Gambling Screen score of 5 or above was 3.8%, similar to the rates evidenced in North American studies.

As gambling becomes more established in our society, we need to ask the question of whether rates of both problem gambling and gambling frequency are increasing among young people. It is important to include underage gamblers in this analysis

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<sup>2</sup> The legal gambling age in Australia is 18 years or older.

because of ample evidence which suggests that early age of onset of gambling is related to the development of problems of control (e.g. Arcuri et al. 1985; Shaffer et al. 1994; Winters et al. 1993). In the current study, we focussed on gambling among school-based youth in the western suburbs of Melbourne for two reasons. First, we had the opportunity to collect data in 1998 at the same schools in which we conducted a major survey in 1996. Second, concerns have been expressed about the large number of gambling venues available in these suburbs in comparison with more affluent areas of the city (Coward 1998). The ready availability of venues may render young people in these areas more vulnerable to problem gambling.

Along with assessment of change in gambling patterns over a two-year period for this school-based population, a second focus of this study was to explore the gambling frequency and problem gambling rates among Asian youth in comparison with their Anglo-European counterparts. We wished to investigate the stereotype that appears to exist of high levels of gambling among the Asian population, specifically to see if there was any evidence for this stereotype among young people. It is, for example, a common belief that Asians are over-represented among casino patrons. Although this view is not limited to Australia (e.g. manager, Le Casino de Montreal, personal communication, June 1997), this stereotype is often reinforced by observational evidence of ubiquitous casino patrons of East Asian appearance. For example, the Victorian Casino and Gaming Authority (1997) reported that patrons of East Asian appearance accounted for approximately 25% to 31% of the total number of people who entered the casino (this group would include Asian Australians and Asian tourists from overseas).

A public perception of excessive gambling in South East Asian communities compared with other ethnic populations has not, however, been supported by empirical evidence. For example, Blaszczynski, Huynh, Dumlao and Farrel's (1999) study of a Chinese speaking community in Sydney found a low participation rate in gambling (40%), but among those who did gamble, a high rate of pathological gambling (using 10 as a cut-off score for the South Oaks Gambling Screen). In addition, the Victorian Casino and Gaming Authority (2000) conducted a survey of 664 Arabic, Chinese, Greek and Vietnamese speaking people in Melbourne. Data from this sample also showed relatively low rates of gambling participation for these ethnic minorities, but higher problem gambling scores than for the general population.

Although some ethnic communities such as Vietnamese and Chinese express high levels of concern regarding the effects of problem gambling (e.g. Tran 1999), there is little evidence to suggest psychological vulnerability of particular ethnic groups to problem gambling (Duong and Ohtsuka 2000). Sociological factors, such as level of acculturation or socio-economic status of migrant groups, need to be taken into account when analysing prevalence rates of gambling in ethnic communities. Signs of problem gambling are likely to become apparent sooner in poorer communities. Relatively disadvantaged groups such as newly arrived migrants, may find the spotlight of media and community attention more directly focussed on them because problem gambling in such groups can lead to particularly negative financial and social outcomes (Leber and Rodd 1997). The frequency of problems among these groups may be over-represented in the public perception, leading to stereotypes of particular groups as inveterate problem gamblers.

In summary, the aims of this study were to (a) investigate stability/change in gambling frequency and problem gambling rates over a two-year period among young people in upper level secondary school; and (b) within the same sample, compare gambling frequency and problem gambling of young people from Asian and Anglo-European backgrounds.

## Method

### *Participants*

The 1996 sample comprised 710 young people from Years 10, 11 and 12 of five secondary schools in the western suburbs (a predominantly working class area) of Melbourne, Australia (314 boys, 356 girls). The mean age of the sample was 16.3 years ( $SD = 1.2$  years), and the age range was 13 to 19 years. All participants were volunteers. There were 312 in Year 10, 294 in Year 11, and 144 in Year 12. Cultural backgrounds of this sample could be described as Anglo-European ( $n = 604$ ), Asian ( $n = 96$ ) or other ( $n = 10$ ).

The 1998 sample comprised 776 young people aged between 13 and 19 years (356 boys, 420 girls). Participants were volunteers from Years 10 ( $n = 311$ ), 11 ( $n = 296$ ) and 12 ( $n = 169$ ) from the same five secondary schools as the 1996 sample. The mean age of the sample was 16.3 years ( $SD = 0.9$  years). Cultural backgrounds of this sample were Anglo-European ( $n = 640$ ), Asian ( $n = 112$ ) or other ( $n = 24$ ).

### *Measures*

The survey consisted of subsections designed to measure gambling behaviour, problem gambling, and demographic variables (age, year, sex, ethnic background).

- 1. Gambling behaviour:** Respondents were asked to rate their level of participation in 10 different types of gambling using a rating scale which ranged through 0 = never participated, 1 = once a year; 2 = more than once/year, less than once/month; 3 = more than once/month, less than once/week; 4 = once a week or more. The 10 items (shown in Table 1) were summed to form a gambling behaviour (frequency) scale, with a range of scores from 0 to 40. High scores on this scale represent higher frequencies of gambling - 'frequency' referring to a combination of types of gambling in which the person participates and amount of participation for each type. The scale has been used successfully in several studies and shows adequate construct validity and internal reliability (Cronbach alphas of 0.7 and above) in these studies (e.g. Moore and Ohtsuka 1999a; 1999b; Trevorrow and Moore 1998). In the current study the Cronbach alpha of the scale was 0.77. Participants were also asked to name the largest amount of money they had ever spent on gambling in a week. Response categories ranged through nothing, between \$1 and \$9, between \$10 and \$99, and over \$99.
- 2. Problem gambling:** A modified version of the South Oaks Gambling Screen (Lesieur and Blume 1987) was used as the measure of problem gambling, with statements in the screen adapted to Australian idiom (see Moore and Ohtsuka 1997 for details). Participants were asked to rate 10 statements about their gambling behaviour on a 5-point scale ranging from 1 = strongly disagree to 5

= strongly agree. Ratings across the 10 items were added to form a measure with a possible range of scores of 10 to 50, high scores representing higher levels of perceived problem gambling. The construct validity for this scale has been demonstrated in previous studies (Moore and Ohtsuka 1997; 1999a; 1999b) and its internal reliability shown to be high, with a Cronbach alpha of .87 (Moore and Ohtsuka 1997). In the current study, the Cronbach alpha was .92.

The statements used in this measure were as follows: (1) To some extent, I have a gambling problem; (2) I have at times gambled more than I meant to; (3) People sometimes comment on the extent of my gambling; (4) People sometimes criticise the amount I gamble; (5) At times I feel guilty about my level of gambling; (6) I would like to cut down my level of gambling but it's difficult; (7) I often try to win back on another day the money I lose in gambling; (8) Sometimes I try to keep the amount I gamble secret from family or friends; (9) On occasions I have borrowed money to gamble or pay gambling debts; (10) On occasions I have taken time off school or work in order to gamble.

- 3. Ethnic background** was assessed through country of birth and self-nomination. Participants who were born in Australia or a European country and self-identified as Australian or European were grouped into the Anglo-European category. Students who were born in Australia or an Asian country and who self-identified as Asian were so grouped.

### *Procedure*

The research was scrutinised and approved by the Human Ethics Committee of the authors' employing institutions. For the school sample, permission to approach schools was obtained from the relevant state body. In 1996, principals of ten western suburbs schools were requested to allow the research to proceed in their schools, and six agreed. By 1998, one of these schools had closed, so data for the five remaining schools only are reported in this study (for both the 1996 and 1998 samples).

In each of the participating schools, the aim was to survey from one class at each of the Year 10, 11, and 12 levels, and this aim was largely achieved. For each cohort, students under 18 were given parental permission slips to be returned confirming approval to participate in the study. Volunteer students with parental permission (for the under 18s) were surveyed in class groups, while non-participating students within the class either engaged in other work or went to the library. The survey took 15 to 30 minutes to complete and was anonymous.

### **Results**

Most young people in the sample had gambled for money at least once, with only 11.1% of the 1996 cohort and 11.2% of the 1998 cohort never having done so. The percent of participants who had ever gambled in each of the gambling types is shown in Table 1. The most popular forms of gambling across both cohorts were cards, horses/dogs (particularly popular in Melbourne where the annual 'Melbourne Cup' is a traditional family betting day), lotteries, and betting on the outcome of pool and other games. Sports betting and bingo were also quite popular.

**Table 1. Percentage of Year 10, 11 and 12 students who ever engaged in gambling activities, 1996 and 1998.**

Activity	1996	1998
Played cards for money	57.7	54.8
Bet on horses/dogs	55.5	50.3
Bet on sports	38.2	30.2
Bought lottery tickets, e.g. Tattsлото	60.7	63.0
Bet on gaming tables at a casino	7.4	6.8
Played poker machines at a casino	12.6	10.2
Played poker machines at pubs/hotels	25.3	17.8
Played poker machines at sporting clubs	15.9	11.6
Played bingo	38.2	24.7
Played pool or other games of skill and bet on the result	49.7	41.0

**Table 2. Gambling frequency and problem gambling mean scores of males and females in upper secondary school, 1996 and 1998**

		Gambling frequency		Problem gambling	
		1996	1998	1996	1998
Males	Year 10	5.91 N=141	6.43 N=161	17.95 N=139	15.00 N=161
	Year 11	7.23 N=124	6.30 N=124	16.05 N=124	15.77 N=123
	Year 12	9.61 N=51	6.87 N=70	20.35 N=51	13.43 N=70
Females	Year 10	5.11 N=133	4.04 N=150	15.40 N=132	12.15 N=150
	Year 11	5.44 N=170	4.18 N=171	13.48 N=170	12.15 N=171
	Year 12	5.98 N=93	4.84 N=99	13.97 N=93	11.62 N=99
Total		6.15 N=710	5.29 N=775	15.72 N=709	13.37 N=774

Gambling frequency and problem gambling scores for all students were subjected to three way analyses of variance (sex by year of school by year of testing). Results are shown in Table 2.

Analysis of variance results combined with Tukey LSD post hoc tests for gambling frequency indicated that students in 1996 had participated in significantly more gambling than students in 1998,  $F(1,1476) = 12.57, p < .001$ , that males gambled more than females,  $F(1,1476) = 59.78, p < .001$ , and that Year 12s gambled more than Year 11s or 10s,  $F(2,1476) = 6.98, p < .001$ . There were no significant interactions between sex, year of school and year of testing for the gambling frequency data.

Specific gambling behaviours which had decreased in frequency over the two year time span were betting on sports,  $F(1,1476) = 18.62, p < .001$ ; betting on poker machines at pubs/hotels,  $F(1,1476) = 9.38, p < .01$ ; poker machines at sports clubs,  $F(1,1476) = 7.68, p < .01$ ; bingo,  $F(1,1476) = 24.16, p < .001$ ; and betting on pool and other games,  $F(1,1476) = 13.00, p < .001$ . Betting on cards, poker machines at the casino, gaming tables at the casino (very uncommon) or horses/dogs had not decreased.

For problem gambling, using the modified SOGS scale, significant effects were evident for sex and year of testing. Males were more likely to score high on problem gambling than females,  $F(1,1471) = 78.74, p < .001$ , and the 1996 sample included more high problem gambler scorers than the 1998 sample,  $F(1,1471) = 58.72, p < .001$ . There were no main effects of year of school on this variable,  $F(2,1471) = 1.88, p > .05$ . A significant interaction between sex, year of testing and year of school showed that in 1996, boys in Year 12 were more likely than other groups to be high problem gambling scorers, that is, this group appeared particularly vulnerable,  $F(2,1471) = 4.59, p = .01$ .

There were small but significant differences between age categories in gambling frequency and problem gambling. Those under the legal age of gambling (13 to 17 year olds) scored significantly lower on gambling frequency than those 18 years and over ( $M$  younger group = 5.60;  $M$  older group = 6.50;  $F(1,1476) = 7.97, p < .05$ ). The younger group was also lower on problem gambling ( $M$  younger group = 14.46;  $M$  older group = 15.62;  $F(1,1476) = 4.80, p < .05$ ). Age differences were consistent across the 1996 and 1998 cohorts, that is, there was no cohort by age interaction.

Table 3 shows the mean scores for gambling frequency and problem gambling in both 1996 and 1998 for students who self designated as Anglo-European background or Asian background. For each year of testing, there was a significant difference between the two cultural groups on both gambling frequency and problem gambling. Contrary to the stereotype, in both 1996 and 1998, Anglo-European background students gambled significantly more than Asian background students (1996 cohort:  $F(1,696) = 14.07, p < .001$ ; 1998 cohort:  $F(1,755) = 18.43, p < .001$ ). However the direction of cultural difference was reversed for problem gambling scores, which were significantly higher for Asian- than Anglo-European background students in both years of testing (1996 cohort:  $F(1,696) = 8.51, p < .01$ ; 1998 cohort:  $F(1,746) = 16.56, p < .001$ ).



**Table 3. Mean scores for Anglo-European and Asian background students on gambling behaviour and problem gambling, 1996 and 1998.**

	<b>1996</b>			<b>1998</b>		
<b>Gambling behaviour</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Anglo-European background	7.38	5.69	6.43 <i>N</i> =604	6.77	4.63	5.60 <i>N</i> =638
Asian background	5.77	3.08	4.34 <i>N</i> =96	5.02	2.38	3.71 <i>N</i> =112
Problem gambling						
Anglo-European background	17.42	13.85	15.41	14.33	11.68	12.88
Asian background	19.18	16.86	17.95	17.31	13.42	15.33

In terms of amount of money spent on gambling (largest amount spent in a week), in both 1996 and 1998 Asian students were significantly over-represented in the spending ‘nothing’ category. They were under-represented or at the statistically expected level in each of the higher spending categories in comparison with Anglo-European students (1996 cohort:  $\chi^2(3, N = 700) = 47.63, p < 0.001$ ; 1998 cohort:  $\chi^2(3, N = 752) = 30.62, p < 0.001$ ). In other words the largest amount spent in any one week for young Asians was significantly less than that for young Anglo-Europeans. Nevertheless there were six Asian-background students in 1996 and three in 1998 who had spent more than \$99 in any one week.

In an attempt to explore these seemingly anomalous results further, a K-means cluster analysis was performed on the 1998 data in order to ascertain how gambling frequency and problem gambling group together. The most meaningful and viable number of clusters was found to be four. This clustering of participants led to (a) groups of a viable size which were therefore unlikely to comprise only outliers (a five group clustering had a fifth group of  $n = 1$ ); and (b) a meaningful differentiation of participants, as will now be described. The four groupings comprised individuals low on gambling behaviour but with high problem gambling scores (tentatively named ‘worriers’); a large group very low on both gambling behaviour and problem gambling (‘non-gamblers’); a small group high on both variables (problem gamblers or ‘at-risk’ individuals); and a moderate sized group with low problem gambling scores but moderate scores on the gambling frequency measure (non-problem or

‘leisure gamblers’). Table 4 shows the mean gambling frequency and problem gambling scores for each of these clusters and the number in each group.

**Table 4. Cluster analysis of 1996 and 1998 data, using gambling behaviour and problem gambling scores to produce clusters**

	<b>Worriers <i>n</i>=69</b>	<b>Non-gamblers <i>n</i>=494</b>	<b>Problem gamblers, ‘at- risk’ <i>n</i> =21</b>	<b>Non-problem gamblers <i>n</i>=184</b>
Mean gambling behaviour score (range 0-40)	6.69	2.58	20.33	9.27
Mean problem gambling score (range 10-50)	27.70	10.53	26.57	13.89

To check whether the naming of these groups was consistent with the amount of money spent on gambling, the association between group membership and largest amount of money spent in any one week was assessed. Of those in the non-gambling category, almost all had spent either nothing (41%), or less than \$99 (58.4%) in any one week. Among the leisure/non-problem gamblers, only 8.2% said they had spent nothing, 86.9% between \$1 and \$99, and the rest (4.9%) had spent \$100 or more. Among those classified as problem or ‘at-risk’ gamblers, none had spent no money, 52.4% had spent less than \$100 and 47.6% had spent \$100 or more. Thus the patterns of spending for these three groups were relatively consistent with their names. For those classified as ‘worriers’, the situation was somewhat more complex. A moderate number (22%) said they had spent nothing, most (72%) had spent between \$1 and \$99, and a few (6%) had spent \$100 or more. This pattern is somewhat similar to the non-gamblers, although most of the ‘worriers’ had spent relatively small amounts of money on gambling at some time, even though they did not gamble frequently. Their moderately high problem gambling scores may represent concern about future gambling problems not yet experienced, or worry about experiences past. These possibilities will be considered further in the discussion section.

The relationship between gambling cluster and ethnic group was assessed through a chi-square test, shown in Table 5. Chi-square was significant,  $\chi^2 (3, N= 752) = 16.80$ ;  $p < .001$ , with Asian groups over-represented in the ‘worrier’ group and under-represented in the non-problem/leisure gambling group. The non-gambling and problem gambling categories included Anglo-European and Asian groups as expected in relation to their frequencies in the sample population.

**Table 5. Gambling clusters by ethnic group**

		<b>Anglo/ European</b>	<b>Asian</b>	<b>Total</b>
Worriers	Count	46	20	66
	Expected	56.2	9.8	
Non-gamblers	Count	411	72	483
	Expected	411.1	71.9	
Problem gamblers	Count	18	3	21
	Expected	17.9	3.1	
Non-problem gamblers	Count	165	17	182
	Expected	154.9	27.1	
Total		640	112	752

## **Discussion**

Gambling frequency and problem gambling were at significantly lower levels in the 1998 cohort of young people in Years 10, 11 and 12 of western suburbs secondary schools than they were in the 1996 cohort. Poker machine gambling in hotels and clubs was significantly down, as were several others of the more common types of gambling like playing bingo and sports betting. These results suggest that fears expressed about the large number of gambling venues in Melbourne's western suburbs leading to increasing rates of gambling and particularly of problem gambling, have not been realised, at least not for this group of (mainly) 16- to 18-year old students.

The findings run counter to some US studies (e.g. Shaffer, Hall and Vander Bilt 1997; Volberg 1994) which suggest that problem gambling increases in communities in direct relation to the length of time that gambling facilities are available in those communities. However, the evidence is somewhat contentious (Productivity Commission 1999). Whyte (1997) from the American Gaming Association notes that overall, survey evidence suggests that increases in gambling and problem gambling do not always occur following longer term access, and that in a few cases problem gambling rates have decreased following the expansion of the number of venues in a region.

Several possible explanations for the decrease in youth gambling over the two-year period in our study are offered.

- First, it could be that venues became stricter after 1996 in preventing access to underage gamblers. If this were the case, it is likely that age differences in gambling frequency and problem gambling might be larger in 1998 than they

were in 1996. This did not occur. In both years, the differences between the under-18s and the 18 and over group were small, significant and in the expected direction. Gambling reduced across the full age range, not just among the under-aged gamblers.

- A second possibility is that negative publicity about gambling, including more media attention to issues such as the low odds of winning and the serious consequences of loss of control in gambling, influenced young people to reduce their rates of gambling.
- Yet a third possibility is that as gambling has become more widespread in the community (and to some extent associated with adult, even middle-aged, pursuits), something of the novelty and excitement of the activity may have been reduced for young people. Putting all this together, the rates of gambling frequency and problem gambling in our 1996 study may have been anomalously high because of the upsurge of gambling opportunities in Melbourne, the lack of concurrent public education and the high novelty value of gambling all occurring around that time. We have little empirical data to support any of these possible explanations; however they are worthy of further study.

The second major finding of the study was that Asian youth were gambling *less* than their Anglo-European peers, not more as the prevailing stereotype might suggest. This lower rate was reflected both in gambling frequency and amount spent. Paradoxically however, problem gambling scores were higher among Asian youth.

This finding is consistent with Blaszczyński et al. (1998) who found a very low rate of gambling participation among Chinese speaking respondents in Australia, but a high rate of problem gambling among those who were engaged in this activity. Blaszczyński et al. (1998) speculate that the Chinese community may not regard some activities as gambling (e.g. lotto) or if played for entertainment or on festive occasions (playing mahjong on Chinese New Year). Even taking into account different definitions and/or a possible reluctance within some ethnic communities to admit to gambling, most of the minority group respondents in the Blaszczyński et al. study participated in gambling at a rate which could be conservatively described as no different from that of general population. The high problem gambling scores are therefore difficult to explain, both in the Blaszczyński et al. study and our own.

Again, several possibilities present themselves. Perhaps Asians have a greater susceptibility to loss of control once they begin gambling, but this seems unlikely; there is no evidence for it from other studies (Duong and Ohtsuka 2000). The argument that Asian youth might under-represent their actual gambling rates (because of negative attitudes toward the behaviour or concern about cultural stereotypes) also seems unlikely when this group scored higher than the general population on the SOGS. This involves admitting to items about allowing one's gambling to get out of control. If self-censorship were occurring on one scale, it would be surprising if it did not occur on the other.

Explanations of the problem gambling data distribution may relate to measurement issues. As 'problem gambler' is a relatively rare category in the community, identification of such individuals is subject to errors of under-reporting and over-reporting (basically the issue of outliers, or false positives). We argue that in our

study, the likelihood is small that the high problem gambling scores among Asian youth were a function of measurement error. There are two reasons for this. First, we used a continuous measure of problem gambling (an 'adapted' SOGS) to enable a greater range of scores and therefore degree of differentiation in the measure. Second, and most importantly, the ethnic group effect occurred in both the 1996 and 1998 cohorts – in other words we have been able to replicate these seemingly anomalous cultural differences in gambling participation rates and problem gambling scores. Under-reporting of overall problem gambling is a possibility in this and any self-report study; however the pattern of results is unlikely to be affected unless there is systematic under-reporting of any one group. We can see no particular reason why there would be systematic under-reporting in the Anglo-European group that would have led to their lower problem gambling scores.

One explanation for our results which may be worthy of further investigation is the possibility that Asian youth are more anxious about gambling than the Anglo-European population, so respond more sensitively to the SOGS items. Certainly, this cultural minority was over-represented in the 'worrier' category in our study – the group which showed with quite low gambling frequencies, low amounts spent, but high problem gambling scores. This level of concern may arise because the cultural stereotypes are to some extent believed ('if I start I won't be able to stop'); or because of knowledge of distress among members of the ethnic community who are problem gamblers; or because of highly negative attitudes toward even low levels of gambling. Again, these speculations need to be the subject of further research, but the evidence presented here is suggestive.

This study would be strengthened by interview data or other mechanisms to check young people's perceived reasons for the drop in gambling rates between 1996 and 1998, and to explore further the perceptions of Asian young people about the findings characterising this subsample. In addition, it may be wise to supplement SOGS-based measurement of problem gambling with other measures. Multiple evidence concerning problem gambling is needed here, to check our hypotheses about young Asians' problem gambling scores being partly a function of 'worry'. One possibility would be to supplement the SOGS with the DSM-IV criteria, along with general measures of anxiety.

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