Student gambling, erroneous cognitions, and awareness of treatment in Scotland

Crawford Moodie, Glasgow Caledonian University, Glasgow, Scotland.
E-mail: cmo3@gcal.ac.uk

Abstract

Rates of probable pathological gambling in colleges and universities across Scotland were investigated with a nationally distributed sample consisting of students (n = 1,483) and members of staff (n = 492). Gambling-related erroneous cognitions (Gambling Beliefs Questionnaire [GBQ]) and gambling severity (South Oaks Gambling Screen [SOGS]) were measured, with additional questions enquiring about awareness of treatments available for gambling problems. Rates of past-year problem and probable pathological gambling for students were 4.0% and 3.9%, respectively. An exploratory factor analysis of the GBQ resulted in a 24-item five-factor model, with gambling severity (as indicated by SOGS scores), indices of increasing gambling involvement (gambling frequency and number of gambling activities), and male gender being positively correlated with higher levels of erroneous cognitions, suggesting erroneous cognitions may not be prominent for females with gambling problems. Less than a fifth of students were aware of where to go to receive help for gambling-related problems.

Keywords: student gambling, erroneous cognitions, treatment

Introduction

Shaffer, Hall, and Vander Bilt's (1999) meta-analysis revealed 16 North American and Canadian studies examining student gambling. The main problem encountered by Shaffer et al. (1999) involved the taxonomy used to classify gambling groups across studies, where participants with some degree of gambling problems were classified using terminology ranging from problem, at-risk, and in-transition to potential pathological gamblers, and those with some degree of pathology were referred to as probable pathological, pathological, or compulsive gamblers. The different criteria employed to assess gambling problems and the nomenclature used to classify gambling groups complicated the synthesis of existing estimates. In an attempt to resolve this issue, Shaffer et al. (1999) reclassified non-problem gamblers and non-gamblers as Level 1 gamblers, those considered to have a problem with gambling as Level 2 gamblers, and those considered to have some level of pathology as Level 3 gamblers. Following reclassification, the mean lifetime rate of Level 3 (or probable pathological) gambling for gamblers in the 14 student gambling studies that used the South Oaks Gambling Screen (SOGS) was found to be 5.0%, with an additional 7.0% being Level 2 (or problem) gamblers. A refinement of these estimates, employing three additional student gambling studies, has shown Level 3 gambling to have increased to 5.5% (Shaffer & Hall, 2001).

Although the extant literature concerning student gambling in America and Canada continues to grow (e.g., Adams, Sullivan, Horton, Menna, & Guilmette, 2007; Huang, Jacobs, Derevensky, Gupta, & Paskus, 2007), the rates of probable pathological gambling remain unclear. Shaffer et al. (1999) concede that reclassification of past student gambling studies involved subjective interpretation, which may bring into question the accuracy of the figures obtained, with Poulin (2002) considering Shaffer et al.'s multi-levelled classification scheme inappropriate for everyday and professional usage. The main problems that exist, however, with American and Canadian student gambling research are not related to Shaffer et al.'s (1999) attempt to integrate existing studies, but the limitations inherent in the studies themselves. Shaffer et al. (1999) describe how some of the earlier studies did not employ suitable gambling screens nor indicate the time frame of gambling problems (i.e., lifetime or past-year). More recent studies assessing student gambling are not without their problems, either; for example, by only incorporating males or students who gamble, the levels of problem and probable pathological gambling found are often disproportionately high and not generalisable to student populations (Clarke, 2003; Langewisch & Frisch, 1998; Neighbors, Lostutter, Cronce, & Larimer, 2002). The problem of small sample sizes is evident in many of the student gambling studies used in Shaffer et al.'s (1999) meta-analysis (e.g., Browne & Brown, 1993; Devlin & Peppard, 1996; Frank, 1990) and is highlighted by the relatively small combined sample size for the 16 studies ($n = 8,918$).

Unfortunately, the recruiting of insufficient numbers (Clarke, 2006), the reliance on assessing students from either single colleges or universities (Williams, Connolly, Wood, & Nowatzki, 2006) or employing only specific sub-groups of students such as student athletes (Huang et al., 2007; Rockey, Beason, & Gilbert, 2002), and the failure to employ gambling screens are issues that have not been remedied in subsequent student gambling studies (Clarke, 2003; Hira & Monson, 2000; LaBrie, Shaffer, LaPlante, & Wechsler, 2003; Skitch & Hodgins, 2005).

The previous concerns regarding the methodological limitations of student gambling studies from around the globe are trivial, however, when it is considered that such a population has never been examined in Britain and specifically in Scotland. When it is considered that almost 10% of the adult population of Scotland are students (full time or part time), then the absence of research into student gambling is mystifying. Given that student life is likely to be associated with an increase in risk-taking behaviour, whether it is alcohol, illicit drugs, risky sexual behaviour, or gambling (Winters, Bengston, Dorr, & Stinchfield, 1998), students would be expected to be a high-risk, high-priority group. Furthermore, Moore and Ohtsuka (1999) claim that because students struggle with issues of independence whilst being constrained by the fact that financial independence is unlikely, this in itself may constitute a risk factor for problem gambling.

A number of factors related to student gambling have been investigated, such as impulsivity (Holt, Green, & Myerson, 2003), depression (Clarke, 2006), suicide (Ladouceur, Dubé, & Bujold, 1994), alcohol and drug use (Lesieur et al., 1991; Winters et al., 1998), sensation seeking (Langewisch & Frisch, 1998), criminal activity (Ladouceur et al., 1994), and gambling motivation (Neighbors et al., 2002). Despite erroneous gambling-related cognitions receiving far more attention in recent times, they are rarely investigated with educational populations and as such merit investigation.   There are a number of methods available to measure erroneous gambling-related cognitions, such as the "think-aloud" method (Gaboury & Ladouceur, 1989; Griffiths, 1994), interviews (Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997), and screens for assessing erroneous cognitions.

Instruments available to investigate erroneous gambling-related cognitions include the Gambling Attitudes and Beliefs Scale (Breen & Zuckerman, 1999), the Gamblers' Beliefs Questionnaire (Steenbergh, Meyers, May, & Whelan, 2002), the Informational Biases Scale (Jefferson & Nicki, 2003), the Gambling Related Cognitions Scale (Raylu & Oei, 2004), the Drake Beliefs about Chance Inventory (Wood & Clapham, 2005), and the Gambling Beliefs Questionnaire (GBQ; Joukhador, MacCallum, & Blaszczynski, 2003). Unfortunately, these instruments are largely untested, have been developed using small samples, or have questions relating to only a limited range of erroneous beliefs or cognitions (see Moodie, 2007). The GBQ, however, appears to show promise, as it comprises questions relating to a wider range of cognitive distortions than the instruments previously mentioned. The GBQ has been employed with problem and social gamblers (Joukhador et al., 2003), although as the problem gambling group were all in treatment, this study may not be representative of pathological gamblers in the community (Winters & Kushner, 2003). However, in a study employing multiple assessments to examine the gambling-related cognitions of a small number of non-treatment-seeking fruit machine gamblers, Moodie (2007) found that both social and pathological gamblers considered the GBQ a more effective measure of assessing gambling-related thoughts than either the think-aloud method or an interview. As such, the GBQ would appear to be a useful instrument for assessing erroneous gambling-related cognitions in an educational setting.

The Gambling Act (2005) in Britain was fully implemented in September 2007, with the government claiming to bring gambling in Britain into the 21st century. The Gambling Act has been contested by those within the gambling field (Orford, 2005a) and has also encountered "a stormy reaction from an unusually broad political spectrum" (Room, 2005, p. 1226). This is hardly surprising considering that one of the intentions of the Act is to (supposedly) protect children from the dangers of gambling, while simultaneously making Britain the only country in the world to permit juveniles to continue gambling legally on category D fruit machines (electronic gaming machines [EGMs] with low stakes and low prizes). Juvenile gambling aside, the easing of restrictions on most forms of gambling is a cause for public concern, as there has never been a period in history when gambling has been more widely available and socially and culturally accepted. Despite the relaxation of the gambling laws, there appears to be a lack of treatment available for those with gambling problems (Orford, 2005b). The present study, conducted prior to the full implementation of the Gambling Act, provided the opportunity to assess the awareness of treatments available for gambling problems before the Act's official application.

The study was exploratory in nature, but had a number of aims and hypotheses:

1. The first aim was to establish a baseline rate for problem and probable pathological gambling for students in Scotland, and to rectify the problems inherent in many of the student gambling studies identified by Shaffer et al. (1999) by employing a large sample from colleges and universities across the whole of Scotland. The sample consisted of both university and college students and staff, with the rates of probable pathological gambling calculated separately for students and staff.

2. It was hypothesised that probable pathological gamblers would have significantly higher levels of gambling-related erroneous cognitions than would problem and non-problem gamblers, as measured by the GBQ (which is not suitable for non-gamblers).

3. The final aim was to investigate awareness of treatments available for gambling problems.

Methodology

Design and participants

A questionnaire-based design was employed across colleges and universities extending the length and breadth of Scotland. Of the 66 colleges and universities in Scotland, 45 were targeted for data collection on the basis of geographical distribution. The intention was to obtain a nationally distributed sample, with the 21 colleges or universities not contacted all being from major cities that were well represented. A total of 37 of the 45 colleges or universities approached agreed to participate in the research, giving a response rate of 82.2% with all colleges and universities returning questionnaires.

Over 2,000 participants were obtained ($n = 2,056$) from the colleges and universities approached, with the final sample being reduced to 1,975 after 81 questionnaires were eliminated, as they had been returned but not completed. Three-quarters of the final sample were college or university students ($n = 1,483$), with college or university staff ($n = 492$) making up the other quarter of the sample.

Members of staff were included in the sample to investigate differences between students and staff in terms of probable pathological gambling and awareness of treatments available for those with gambling problems. An additional reason for including members of staff was to provide as large a sample as possible, which was beneficial for factor analysing the GBQ, as large samples produce more accurate solutions (Costello & Osborne, 2005).

The participant response rate was based on the number of questionnaires distributed and the number returned by each college and university (40%), although this response rate is extremely conservative given that all colleges and universities were given an excess of questionnaires. The mean age of the sample was 23.7 years for students and 44.4 years for staff. There was a higher proportion of females (61%) than males (39%) in the sample. There are a greater number of females (52%) than males in Scotland, and an even greater number in higher education (54%; SCROL, 2004), although slightly fewer than obtained in this sample.

Materials

Gambling habits

Frequency of gambling in the past year was measured for 12 gambling activities, each activity being measured on a 4-point scale extending from never, less than monthly, monthly, to weekly. Respondents were also asked to identify their main form of gambling.

South Oaks Gambling Screen (SOGS). The SOGS (Lesieur & Blume, 1987), past-year as opposed to lifetime, was employed to assess current gambling problems. The SOGS is a widely used instrument that has been found to have satisfactory reliability and validity (Stinchfield, 2002), although it has been criticised for producing a number of false positives (Abbott & Volberg, 1996). Despite this, it is clear that there is currently no gold standard for measuring gambling problems (Collins & Barr, 2003; Gambino, 2005), and as the SOGS has been employed in the vast majority of previous student gambling studies (Shaffer et al., 1999), it was used for comparability.

Gambling Beliefs Questionnaire (GBQ). The second questionnaire employed was the revised 48-item (as opposed to the 65-item) version of the GBQ (Joukhador et al., 2003), kindly provided by Professor Blaszczynski, University of Sydney. The original 65-item GBQ assesses a number of cognitive distortions, irrational beliefs, and erroneous perceptions that fall into the following categories: personal skill and judgement (illusion of control), ability to influence outcomes (superstitious rituals and beliefs), selective recall and biased evaluation of outcomes, and erroneous perceptions regarding randomness and the independence of events. The 48-item GBQ remains largely untested, although it has been found to be a useful measure of assessing erroneous cognitions for non-treatment-seeking gamblers (Moodie, 2007). The 48 items on the GBQ are scored on a 5-point Likert scale, ranging from 0 (*not at all*) to 4 (*very much*). The overall score on the GBQ is calculated by summating the scores from the 48 items, with possible scores ranging from 0 to 192. The 48-item GBQ was used to investigate its potential value with a sample in higher education.

Treatment items

The author formulated seven questions concerning treatment: (1) Have you ever believed that you needed treatment for your gambling? (2) Would you know where to go for treatment for a gambling problem? (3) If you answered yes to question 2, where would you go? (4) Have you ever received treatment (outside of family and friends) for a gambling problem? (5) If you answered yes to question 4, where did you receive treatment for your problem? (6) Are you aware of any professional treatment in Scotland (e.g., psychologists, gambling counsellors) available for people with gambling problems? (7) Have you seen any advertisements, posters, awareness campaigns, and so forth, targeted specifically for people with gambling problems? All questions relating to treatment had yes or no responses except for the two open-ended questions (3 and 5) asking about where an individual would go, or has gone, to receive help for gambling-related problems.

Procedure

Ethical approval was obtained from the Psychology Department of Glasgow Caledonian University. The principals of colleges and universities were contacted by letter and subsequently by telephone, and asked if they would like to assist in a study relating to gambling in higher education. Those that agreed to participate were informed that the study required the distribution and collection of gambling questionnaires from a sample of their college or university, either students or staff. The exact method used for distribution of questionnaires varied across colleges and universities, depending on their preferred method of administration. Colleges and universities were given options as to how to distribute the questionnaires, such as by administering them in particular classes, seminars, workshops, tutorials, or lectures, or by positioning them at various appropriate places around the campus and providing a suitable place for return. Ultimately, it was left to each college and university to decide. Given that the questionnaire instructed individuals not to indicate their name for the sake of anonymity, and as each questionnaire had an accompanying envelope in which it was to be placed, either method ensured the privacy of the participant.

Results

Excluding the allocation to the gambling group and the items concerning treatment in which the results for both the student and staff sample are shown, all analyses are based exclusively on the student sample. The exception is the factor analysis of the GBQ in which the student and staff sample are combined to increase the sample size.

Allocation to the gambling group. The student sample was divided into one of the four gambling groups in accordance with past-year SOGS scores; 3.9% ($n = 57$) were probable pathological gamblers (5 or above), 4.0% ($n = 59$) were problem gamblers (3 or 4), 76.0% ($n = 1,114$) were non-problem gamblers (0-2), and 16.0% ($n = 235$) indicated that they were non-gamblers (0). The staff sample was also divided into four gambling groups, with 1.0% ($n = 5$) probable pathological gamblers (5 or above), 2.5% ($n = 12$) problem gamblers (3 or 4), 76.9% ($n = 372$) non-problem gamblers (0-2), and 19.6% ($n = 95$) who indicated that they were non-gamblers (0). Students were significantly more likely than staff to be problem or probable pathological gamblers, $\chi^2(3, N = 1,949) = 14.5, p < .005$.

Age, gender, and source of sample. Table 1 shows the number (and percentage) of students within each of the gambling groups by gender and age. It should be noted, as with all tables, that sample sizes may vary because of missing data, for example, regarding age or gender. Males had significantly higher levels of problem and probable pathological gambling than did females, $\chi^2(3, N = 1,420) = 95.8, p < .001$, with the ratio of problem and probable pathological gambling between males and females being 3.6:1 and 10.9:1, respectively. The student sample was divided into two groups, those aged less than 26 years (young students), and those aged 26 years and over (mature students). Young students had a tendency to be problem and probable pathological gamblers compared with mature students, although not significantly so, $\chi^2(3, N = 1,424) = 5.2, p = .2$.

Table 1
Gambling groups across gender and age

	Non-gambler (n = 235)	Non-problem gambler (n = 1,114)	Problem gambler (n = 59)	Probable pathological gambler (n = 57)
GENDER				
Males (n = 566)	57 (10.1%)	421 (74.4%)	39 (6.9%)	49 (8.7%)
Females (n = 854)	169 (19.8%)	662 (77.5%)	16 (1.9%)	7 (0.8%)
AGE GROUP				
16-25 (young students) (n = 1,063)	182 (17.1%)	795 (74.8%)	44 (4.1%)	42 (4.0%)
26 + over (mature students) (n = 361)	46 (12.7%)	290 (80.3%)	11 (3.0%)	14 (3.9%)

Frequency and number of gambling activities. Two-fifths (38.6%) of students gambled on a weekly basis, 13.5% monthly, 32.2% less than monthly, and 15.7% never, with probable pathological and problem gamblers significantly more likely than non-problem gamblers to gamble on a weekly basis, $\chi^2(2, N = 1,240) = 71.2, p < .001$. The mean number of activities gambled on was 3.2 ($SD = 2.6$), with almost half gambling on two or fewer activities (46.1%), a quarter on three or four activities (25.4%), and just over a quarter on five or above (27.5%). Probable pathological and problem gamblers gambled on an average of 6.7 and 6.2 gambling activities, respectively, which was significantly higher than non-problem gamblers who gambled on 3.5 gambling activities, as measured by ANOVA, $F(2, 1228) = 89.5, p < .001$, and confirmed by Tukey post hoc analysis ($p < .001$).

Gambling activities. The most popular gambling activities among students were the lottery (69.9%), fruit machines (49.7%), scratchcards (44.7%), games of skill (29.4%), racing – horses or dogs (28.1%), sports (25.6%), cards (24.2%), bingo (18.2%), casino (13.3%), dice games (8.0%), and stocks or shares (7.1%). Students were asked to identify their main form of gambling, with the lottery (30.9%) found to be the most popular, followed by fruit machines (9.2%), sports (6.9%), racing – horses or dogs (3.5%), and cards (3.5%). Almost a third (31.9%) indicated they had no main form of gambling, and a small number identified various other forms of gambling as their main form. Ten participants identified newer forms of gambling such as Internet gambling ($n = 2$) and fixed odds betting terminals ($n = 8$) as their main forms of gambling. Of these 10 individuals, 5 were probable pathological gamblers, 2 were problem gamblers, and 3 were non-problem gamblers. Technologically advanced forms of gambling aside, fruit machines were considered the main form of gambling for both problem and probable pathological gamblers, whereas the lottery was the main form of gambling for non-problem gamblers (see Table 2).

Table 2

Main forms of gambling across the three gambling groups

Main form of gambling (Rank)	Non-problem gamblers	Problem gamblers	Probable pathological gamblers
1.	Lottery (39.3%)	Fruit machines (22.0%)	Fruit machines (24.6%)
2.	Fruit machines (9.7%)	Lottery (16.9%)	Racing (15.8%)
3.	Sports betting (7.5%)	Sports betting (16.8%)	Sports betting (12.3%)

Factor analysis of GBQ. An exploratory factor analysis was conducted to eliminate any items that were not contributing to the scale. Kaiser's Meyer Olkin measure of sampling adequacy (0.94) was very high, and Bartlett's Test of Sphericity ($\chi^2 = 11026.2$, *df* = 276, *p* < .001) was highly significant, indicating both that factor analysis would produce distinct and reliable factors (Field, 2000) and that a relationship exists between the variables. A principal component factor analysis using orthogonal (varimax) rotation explained over 60% (63.3%) of the variance of the GBQ, and yielded five interpretable factors with loadings (0.55 or above) that can be considered to be good (Comrey, 1973). Varimax rotation was used, as it maximises the dispersion of the loadings within factors so that loading a smaller number of variables highly onto each factor results in more interpretable clusters of factors (Field, 2000). Varimax is also the most common form of rotation used to factor analyse data from screens measuring gambling-related cognitions (Breen & Zuckerman, 1999; Jefferson & Nicki, 2003; Raylu & Oei, 2004; Wood & Clapham, 2005). Although past research suggests the use of varimax rotation was appropriate, a second factor analysis using oblique (direct oblimin) rotation was conducted to reveal any differences between the two methods. Oblique and varimax solutions often produce virtually identical results because the correlation between the factors is so small that it is negligible (Kline, 1994), and this was found to be the case, with direct oblimin rotation revealing an identical five-factored model.

Only factors with eigenvalues over 1.0 were included in the analysis and although rotation suggested that five factors were appropriate, a scree plot was consulted to confirm that this was the case. In addition, a parallel analysis, based on 48 variables (number of items on the GBQ) and 950 cases (number of participants completing the GBQ), was conducted to confirm the suitability of the existing factor structure (Steenbergh et al., 2002). A parallel analysis performs the same statistical analysis on a random uncorrelated sample of data, ensuring no non-essential factors are accepted (O'Connor, 2000). A parallel analysis informs how large an eigenvalue should be before the factor is accepted, revealing that only factors with eigenvalues exceeding 1.37 should be employed. There were five factors with eigenvalues over 1.37 and therefore the parallel analysis, like the scree plot, revealed that five factors should be retained.

The 48 items of the GBQ were reduced to 24 after items were eliminated for the following reasons: items with communalities below 0.5 ($n = 18$); hyperplane items, that is, those that did not load on any of the salient factors ($n = 5$); and a single item that had loaded upon the first two factors. The reasoning behind the exclusion of items with communalities below 0.5 was to produce factors that were strongly related. The internal consistency of a scale is the most widely accepted test of reliability, and the 24-item five-factored GBQ was found to have a high degree of internal reliability (0.89). The items comprising each factor were systematically removed and replaced to see how the exclusion of a particular factor, that is, the items that made up that factor, would affect the internal reliability of the scale. The internal reliability of the scale was lower than 0.89 if any of the first four factors were removed (0.86, 0.83. 0.83, 0.87), but higher if the fifth factor was excluded from the analysis (0.93); that is, when the three items that made up factor 5 were removed from the scale, the internal reliability increased. This suggests that a four-factor model may actually be more appropriate than a five-factor model, although this requires further investigation.

The five factors obtained from factor analysis were named in relation to the erroneous cognitions that they appeared to be assessing, these being coping, personal illusory control, general illusory control, winning expectancy, and rational beliefs. The five factors are shown in Table 3, along with the percentage of variance explained by each factor, the number of items in each factor, the Cronbach's alpha of each factor, the actual items comprising each factor, and their corresponding factor loadings and communalities. The first four factors all had a Cronbach's alpha above 0.75 and as such the internal reliability can be considered good (Coolican, 2004). The fifth factor, however, had a less satisfactory Cronbach's alpha (0.65).

Table 3
Description of factors obtained from GBQ

Factor	% of variance explained	Number of items in factor	α	Items included in factor	Loadings	Commu-nalities
1-Coping	37.8	6	0.87	* Gambling is the only way I can cope with the problems in my life	0.75	0.64
				* Gambling is the only way I can enjoy myself	0.75	0.64
				* The only way I can pay my debts is by gambling	0.87	0.81
				* Gambling is the only way I can get enough money to buy the things I need	0.60	0.60
				* I've lost so much money I might as well keep going	0.70	0.67
				* I have the psychic ability to predict a winner	0.65	0.51
2-Personal illusory control	8.9	6	0.87	* I know I can win if I follow my strategies	0.70	0.70
				* I believe I can beat the system	0.68	0.64
				* The chances of winning improve after a near win	0.61	0.55
				* If I lose it's because something unforeseen has happened	0.69	0.64
				* I have more skills at gambling than the average person	0.67	0.62
				* I can win money back	0.63	0.61
3-General illusory control	7.3	6	0.86	* Skill is a big determinant of winning	0.65	0.57
				* The more often you gamble the more skilful you become	0.73	0.63
				* Winning at gambling is the result of good judgement	0.74	0.64
				* Identifying a pattern helps me predict a winner	0.64	0.56
				* When I've lost it's because I've made a hasty decision or didn't concentrate	0.61	0.55
				* I believe I can repeat previous big wins	0.63	0.65
4-Winning expectancy	4.8	3	0.76	* I feel that I'm due for a win	0.72	0.67
				* The big win is just around the corner	0.63	0.65
				* I don't want to miss out on a win	0.74	0.66
5-Rational beliefs	4.5	3	0.65	* I believe I can resist the opportunity to gamble	0.80	0.67
				* I do not expect to win	0.70	0.60
				* Winning is based on chance	0.80	0.71

GBQ = Gambling Beliefs Questionnaire

GBQ scores. A total of 1,043 students and members of staff attempted the GBQ, with 93 questionnaires eliminated because they were incomplete, that is, had one or more items missing. The decision to exclude questionnaires with any items missing was made for two reasons; first, even after excluding these 93 questionnaires, the remaining sample size was still large, and, second, the author could be sure that the results were not tainted by the inclusion of missing values. Of the 950 participants who completed the instrument, there were 836 non-problem gamblers, 60 problem gamblers, and 53 probable pathological gamblers, with one participant not completing the SOGS. Differences between the gambling groups on overall GBQ scores and each of the five factor scores were examined using ANOVA, and confirmed by Tukey post hoc tests ($p < .001$) unless otherwise stated. Probable pathological gamblers (38.7) had significantly higher scores on the 24-item GBQ than did problem (27.0) and non-problem gamblers (11.9), $F(2, 948) = 182.0$, $p < .001$ (see Table 4). The probable pathological gambling group had significantly higher scores on the first factor (coping), $F(2, 948) = 135.7$, $p < .001$; the second factor (personal illusory control), $F(2, 948) = 125.6$, $p < .001$; and the third factor (general illusory control), $F(2, 948) = 139.0$, $p < .001$, compared with the other gambling groups. The probable pathological gambling group had significantly higher scores on the fourth factor (winning expectancy), $F(2, 948) = 77.2$, $p < .001$, compared with the non-problem gambling group, but not compared with the problem gambling group. Similarly, the probable pathological gambling group had significantly higher scores on the fifth factor (rational beliefs), $F(2, 948) = 4.1$, $p < .01$, compared with the non-problem gambling group, but not compared with the problem gambling group, although this effect disappeared with post hoc analyses. This series of analyses highlights another problem with factor 5, which is that it is unable to discriminate between the gambling groups. Differences across gambling groups in terms of factor scores are shown in Table 4.

Table 4

*Mean scores (*SD *and range) on 24-item GBQ and five factors across gambling groups and gender*

	Non-problem gamblers	Problem gamblers	Probable pathological gamblers	Males	Females
	($n = 836$)	($n = 60$)	($n = 53$)	($n = 453$)	($n = 466$)
GBQ score	11.9 (10.6, 0-60)	27.0 (12.6, 6-50)	38.7 (17.7, 6-88)	18.7 (14.5, 0-88)	9.7 (9.6, 0-76)
Factor 1	0.6 (2.2, 0-24)	2.4 (3.7, 0-13)	6.7 (6.2, 0-23)	1.6 (3.4, 0-23)	0.6 (2.4, 0-24)
Factor 2	2.7 (4.0, 0-24)	7.8 (5.3, 0-18)	10.9 (5.7, 0-24)	5.2 (5.2, 0-24)	1.8 (3.3, 0-20)
Factor 3	1.9 (3.6, 0-24)	6.5 (4.6, 0-17)	9.9 (5.9, 0-24)	4.0 (5.0, 0-24)	1.2 (2.8, 0-22)
Factor 4	1.5 (2.4, 0-12)	4.1 (3.2, 0-12)	5.0 (3.3, 0-12)	2.4 (2.9, 0-12)	1.2 (2.2, 0-12)
Factor 5	5.1 (3.9, 0-12)	6.2 (3.0, 0-12)	6.2 (2.6, 0-12)	5.5 (3.5, 0-12)	4.9 (4.0, 0-12)

GBQ = Gambling Beliefs Questionnaire

Gambling involvement and gender across the five factors. Although the 24-item GBQ appears to be both reliable and able to discriminate between gambling groups (with the exception of factor 5), bivariate correlations were conducted using indices of increased gambling involvement to confirm if this was the case (see Table 5). Significant positive correlations across all five factors were found in relation to SOGS scores, gambling frequency, and gambling participation, that is, the number of gambling activities participated in, with higher SOGS scores, more frequent gambling, and gambling on a greater number of activities being associated with higher scores for each factor. The only correlation that did not reach significance was the correlation between factor 5 and gambling frequency. Bivariate correlations for gender were run separately, with male gender significantly correlated with the 24-item GBQ score and all five factors. Therefore, despite slight concerns regarding factor 5, it appears that a five-factored model is a useful measure for discriminating between those with some degree of gambling problems and those without any problems, and also between gender.

Table 5

Correlations of 24-item GBQ and the five factors over SOGS score, gambling frequency, and number of gambling activities participated in

	SOGS score ($n = 949$)	Gambling frequency ($n = 949$)	Gambling participation ($n = 949$)	Gender ($n = 919$)
24-item GBQ	$r = 0.58$ ($p < .001$)	$r = 0.25$ ($p < .001$)	$r = 0.44$ ($p < .001$)	$r = -0.34$ ($p < .001$)
Factor 1	$r = 0.51$ ($p < .001$)	$r = 0.16$ ($p < .001$)	$r = 0.24$ ($p < .001$)	$r = -0.16$ ($p < .001$)
Factor 2	$r = 0.52$ ($p < .001$)	$r = 0.22$ ($p < .001$)	$r = 0.42$ ($p < .001$)	$r = -0.36$ ($p < .001$)
Factor 3	$r = 0.52$ ($p < .001$)	$r = 0.25$ ($p < .001$)	$r = 0.41$ ($p < .001$)	$r = -0.33$ ($p < .001$)
Factor 4	$r = 0.42$ ($p < .001$)	$r = 0.26$ ($p < .001$)	$r = 0.33$ ($p < .001$)	$r = -0.23$ ($p < .001$)
Factor 5	$r = 0.07$ ($p < .05$)	$r = 0.01$ (ns)	$r = 0.11$ ($p < .001$)	$r = -0.08$ ($p < .05$)

GBQ = Gambling Beliefs Questionnaire; SOGS = South Oaks Gambling Screen

Knowledge of treatments available for gambling problems. A total of 987 students and members of staff answered the final section of the questionnaire regarding treatment, with 2.4% ($n = 24$) indicating that they believed that they had needed treatment for their gambling problems, and 1.1% ($n = 11$) that they had received treatment (outside of family and friends) for their gambling problems. Only 22.7% ($n = 224$) of those completing the treatment items indicated that they knew where to go for treatment, with the majority (62.0%) stating Gamblers Anonymous, followed by a general practitioner (15.1%), a gambling helpline (4.4%), a counselling service (3.9%), a rehabilitation centre (3.4%), the Citizens Advice Bureau (2.9%), and obtaining information from the Internet (2.9%). Other places mentioned included the Samaritans, the Yellow Pages, and psychologists or social workers. Not a single participant indicated seeking help within the college or university. Less than a quarter of the sample, 23.6% ($n = 233$), were aware of professional treatment in Scotland being available for gambling problems, and only 26.2% ($n = 259$) indicated they had seen advertisements, posters, or awareness campaigns targeted specifically for those with gambling problems. Table 6 shows that staff were significantly more likely to know where to go for gambling problems and have a greater awareness of professional treatment for gambling problems than were students, with approximately one in three members of staff being aware of treatment available for gambling problems, compared with only one in five students.

Table 6
Treatment items across staff and students

	Staff (*n* = 238)	Students (*n* = 749)
Have you ever believed you needed treatment for a gambling problem?	3 (1.3%)	21 (2.8%)
Would you know where to go for treatment for a gambling problem? **	87 (36.6%)	137 (18.3%)
Have you ever received treatment (outside of family and friends) for a gambling problem?	2 (0.8%)	9 (1.2%)
Are you aware of any professional treatment available for people with gambling problems? *	72 (30.3%)	161 (21.5%)
Have you seen any advertisements, posters, awareness campaigns, etc., targeted specifically for people with gambling problems?	65 (27.3%)	194 (25.9%)

* Significantly higher for staff than for students as measured by Pearson chi-square (*p* < .01).
** Significantly higher for staff than for students as measured by Pearson chi-square (*p* < .001).

Discussion

The present study found the rates of student probable pathological and problem gambling to be 3.9% and 4.0%, respectively. Shaffer et al. (1999) reviewed 14 studies investigating student gambling, finding the mean lifetime rate of Level 3 (probable pathological) gambling to be 5.0% (range 3.6% to 6.6%), with an additional 7.0% being Level 2 (problem) gambling (range 4.5% to 9.5%). Inspection of these figures suggests that problematic student gambling in the present research is at the lower end of the scale. The figures, however, are based on past-year SOGS scores as opposed to lifetime SOGS scores, with lifetime SOGS scores thought to inflate the figures by two or three times (Volberg, 1996; Volberg, Abbott, Rönnberg, & Munck, 2001). The revised SOGS (including lifetime and past-year items) was not employed because although lifetime rates are useful for comparisons between past studies, no past British student gambling studies exist. Instead, the present study was intended to provide a baseline measure of current student gambling problems before the new Gambling Act was fully implemented.

Although the assessment of past-year gambling problems makes it difficult to make comparisons with Shaffer et al.'s (1999) findings, there are a number of studies in the United States and Canada that have also assessed past-year probable pathological gambling using the SOGS. For example, Ladouceur et al. (1994) recruited a sample (n = 1,471) of students from three colleges in Quebec, finding that 2.8% were past-year probable pathological gamblers. Similarly, Winters et al. (1998) found 2.9% of students, recruited from two Minnesota universities (n = 1,361), to be past-year probable pathological gamblers. Adams et al. (2007) found even lower rates (0.9%) in a student sample (n = 1,579) obtained from four universities in Ontario. Finally, Huang et al. (2007) found that only 0.8% of their large nationally distributed student athlete sample (n = 17,076) were classified as past-year pathological gamblers, although this low rate may be partly attributable to the use of a DSM-IV-based screen as opposed to the SOGS, with the DSM-IV criteria appearing to be more stringent. Therefore, whether comparing the findings of the second study to Shaffer et al.'s meta-analysis or the studies previously mentioned, it is clear that students in Scotland appear to be at high risk of developing gambling problems.

The availability hypothesis suggests that increased availability of gambling opportunities results in a simultaneous increase in gambling behaviour and gambling problems, receiving support in Australia, America, and Great Britain (Australian Productivity Commission, 1999; Grun & McKeigue, 2000; National Research Council, 1999; Shepherd, Ghodse, & London, 1998). It would therefore appear that with the relaxation of the gambling laws in Britain, an increase in problem and pathological gambling in Britain is inevitable, with Abbott (2005) envisaging a three- to four-fold increase in problem gambling in the short to medium term. This is likely given that one of the consequences of gambling liberalisation in Britain appears to be an increase in the availability of particular forms of gambling such as EGMs, which have been found to increase the likelihood of users developing gambling problems (Breen & Zimmerman, 2002). Problem and probable pathological gamblers in the present study were more likely to identify EGMs as their main form of gambling compared with any other form of gambling. Regardless of how accessible gambling becomes, Abbott anticipates a levelling out and eventual decline of problem gambling with the aid of public awareness, treatment facilities, and industry and public health measures. The measures mentioned by Abbott, however, are exactly what are lacking in Britain (Orford, 2005b), with treatment facilities for gambling problems in Scotland almost non-existent.

Not surprisingly, it was found that university or college staff had a greater awareness than students of where to go to receive help for gambling problems, and of professional treatments available for gambling problems. However, as only a small percentage of staff were identified as problem (2.5%) or probable pathological gamblers (1.0%), it is not this particular group that is in the greatest need of assistance. Worthy of noting is that not a single participant indicated that he or she would seek help within the various educational establishments that participated in the research, suggesting that no higher educational institution in Scotland provides such a service. Further highlighting the dearth of treatments available across Scotland, for both students and members of staff who were aware of where to go for gambling-related problems, treatment was by and large restricted to Gamblers Anonymous. As Gamblers Anonymous and outpatient therapy have been considered by pathological gamblers to be equally ineffective (Grant & Kim, 2002), having particularly high levels of drop-outs and low rates of abstinence and active involvement (Stewart & Brown, 1988), this therapy is unlikely to provide an optimal opportunity for resolving such problems. The second most commonly cited source of help was from general practitioners, although Schofield, Mummery, Wang, and Dickson (2004) believe general practitioners may not be the most appropriate health practitioners to treat individuals with gambling problems, as they may not realise that the medical model is not suitable for most cases of pathological gambling.

In relation to erroneous cognitions, the GBQ was developed using pathological gamblers in treatment (Joukhador et al., 2003) and as such it was beneficial to examine the GBQ with probable pathological gamblers in higher education. Joukhador et al. (2003) believed larger scale studies allowing for factor analysis of the GBQ were required, and in the present study, a factor analysis of the GBQ revealed there to be five factors: coping, personal illusory control, general illusory control, winning expectancy, and rational beliefs. The 24-item five-factored GBQ appeared to have reasonable psychometric properties, as it was able to discriminate effectively between the gambling groups and also between indices of increased gambling involvement such as gambling frequency and gambling participation, that is, the number of gambling activities participated in. As hypothesised, probable pathological gamblers had significantly higher GBQ scores than did problem and non-problem gamblers, and the probable pathological and problem gambling groups had significantly higher scores on each of these five factors, with the exception being factor 5. The main concern about the five-factored model concerns the fifth factor, which was named rational beliefs. Unlike the first four factors, the reliability of the fifth factor was quite low, although still acceptable (alpha = 0.65). In addition, the fifth factor failed to discriminate between the gambling groups and gambling frequency. On the basis of these findings, exclusion of the fifth factor would appear to be an option, although a parallel analysis and scree plot did indicate that five factors would be most appropriate, and future research is required to confirm if this is the case.

Although males and females have not been found to respond preferentially to any of the various treatments available for gambling problems, Grant and Kim (2002) believe that cognitive behavioural therapy may be useful for males. Given that males had significantly higher scores than did females on all five GBQ factors, as has been found with four of the five factors on the Gambling Related Cognitions Scale (Raylu & Oei, 2004), the study provides support for this assertion, even taking into account that males were more likely than females to have a gambling problem. The evidence from this study is supported by research with youth populations, where young males have been found to be significantly more likely than females to view gambling as profitable (Moodie & Finnigan, 2006). These findings are important in relation to cognitive theory (Ladouceur & Walker, 1996), as they suggest that erroneous cognitions may not be salient for females in the development and maintenance of gambling problems. These findings also have significant implications for the treatment of pathological gamblers, suggesting that treatment needs differ depending upon gender. This is especially so given that treatment interventions aimed at cognitive correction of randomness and chance are prominent in the gambling literature (Ladouceur, Sylvain, Letarte, Giroux, & Jacques, 1998; Ladouceur et al., 2001; Ladouceur et al., 2003).

Limitations

The sample size was satisfactory for a country with a relatively small population such as Scotland (5 million), although the number of students and staff obtained from three-quarters of Scotland's colleges and universities was disappointing. The low response rates for students and staff may have impacted upon the findings, and bring into question whether or not the sample was representative of students and members of staff in Scotland. Furthermore, a second interview phase involving students and staff from a random selection of colleges would have been beneficial. Nevertheless, the study does provide the first estimates of probable pathological gambling among a nationally distributed student sample in Scotland.

Conclusions

The main aim of the study was to provide a baseline measure of problem and probable pathological gambling across colleges and universities in Scotland, which was necessitated given the absence of such research in Britain. The fact that the study was conducted just before the very liberalising Gambling Act comes into force is beneficial, as it enables comparisons to be drawn with similar future British research, which may help in assessing the impact that the easing of restrictions on gambling has in Britain. Almost 1 in 12 students were identified as problem or probable pathological gamblers, and gambling is clearly a common activity for those in higher education. Erroneous cognitions (as measured by the GBQ) were also investigated and were positively correlated with measures of gambling severity (SOGS scores), indices of increasing gambling involvement (gambling frequency and number of gambling activities participated in), and male gender. The 24-item GBQ appears to be a useful instrument for measuring erroneous cognitions and beliefs, although future research using this instrument is required. The study highlights the need to enhance awareness about gambling-related problems within colleges and universities, and to investigate the policies and training programmes of colleges and universities (e.g., examining the existence of in-service training for faculty and staff would be an interesting area of future research). The findings also point to a need for an increase in treatment resources in the community, and for a heightened public awareness of these resources.

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For correspondence: Dr. Crawford Moodie, Glasgow Caledonian University, Cowcaddens Road, Glasgow, Scotland, G4 OBA. Phone: +44-0141-331-3865, e-mail: cmo3@gcal.ac.uk

Crawford Moodie, PhD, is a gambling researcher within Glasgow Caledonian University, Scotland.