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## Greater involvement and diversity of Internet gambling as a risk factor for problem gambling

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**Background:** Concerns that Internet gambling has elevated the prevalence of problem gambling have not been substantiated; however, evidence suggests a subgroup of Internet gamblers do experience higher rates of gambling harms. Greater overall involvement in gambling appears to be predictive of harms. The purpose of this study was to examine differences between Internet gamblers with a single or multiple online gambling accounts, including their gambling behaviours, factors influencing their online gambling and risk of experiencing gambling problems. **Methods:** Internet gamblers (3178) responding to an online survey that assessed their gambling behaviour, and use of single or multiple online gambling accounts. **Results:** Results revealed that multiple account holders were more involved gamblers, gambling on more activities and more frequently, and had higher rates of gambling problems than single account holders. Multiple account holders selected gambling sites based on price, betting options, payout rates and game experience, whereas single account holders prioritized legality and consumer protection features. **Conclusion:** Results suggest two different types of Internet gamblers: one motivated to move between sites to optimize preferred experiences with a tendency to gamble in a more volatile manner; and a smaller, but more stable group less influenced by promotions and experiences, and seeking a reputable and safe gambling experience. As the majority of Internet gamblers use multiple accounts, more universal responsible gambling strategies are needed to assist gamblers to track and control their expenditure to reduce risks of harm.  
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### Introduction

Gambling opportunities have expanded worldwide particularly with the availability of Internet gambling. This has led to concerns that the easy accessibility of gambling will contribute to and elevate the prevalence of problem gambling. These concerns have partially been addressed by evidence that communities adapt to gambling, with problem gambling prevalence remaining relatively stable worldwide.<sup>1, 2</sup> However, there is some evidence that problem gambling is more common among online gamblers.<sup>3</sup> As problem gambling is associated with poor psychosocial health,<sup>4</sup> understanding risk factors is important to inform harm minimization policies. This study investigates whether more involved and diverse use of Internet gambling as characterized by multiple gambling accounts is associated with an increased risk of gambling problems. This is important as several studies examining the risk of online gambling are based on users of a single site,<sup>5–7</sup> and many harm minimization measures, such as spending limits, are designed only for use on a single site.

Internet gambling is increasing globally, for example, 15% of UK adults reported gambling online in 2013, compared with 3% in 2007.<sup>8, 9</sup> Similarly, 8% of Australians reported gambling online in 2011, compared with an estimated 1% in 1999.<sup>10</sup> One stated benefit of legalized Internet gambling is greater market competition, allowing consumers greater choice in selecting preferred websites to gamble.<sup>11</sup> This competitive environment allows customers to easily shift between websites.<sup>12</sup>

Numerous studies have demonstrated the tendency for online gamblers to use multiple accounts, including unregulated offshore sites.<sup>3, 13–16</sup> Surveys of Australian Internet wagering site users found that one-half to one-third of respondents reported visiting only one website and these respondents appeared to be less broadly and less

frequently involved in online gambling compared with multiple account holders (MAHs).<sup>16</sup> A study of 10838 Internet casino and poker players found that 75–85% of respondents gambled on multiple sites. Poker players were more likely to play on only one to two sites as compared with casino players,<sup>13</sup> suggesting that specific subgroups of gamblers are more likely to hold multiple accounts.

Internet gambling itself is not a risk factor for experiencing problems, but greater overall involvement and engagement with gambling, including greater expenditure and gambling on multiple forms, has been found to be predictive of gambling problems.<sup>17–20</sup> Using multiple forms and modes to gamble is not unique to Internet problem gamblers, for instance, problem gamblers report frequenting multiple gambling venues more often than at-risk or non-problem gamblers.<sup>21</sup> A study of Internet gamblers found that a greater proportion of problem gamblers reported that they were influenced by incentives provided by online gambling sites as compared with non-problem gamblers.<sup>22</sup> Conversely, professional gamblers may be more likely to hold multiple gambling accounts, to increase their ability to seek favourable returns.

This study aimed to compare gamblers with a single Internet gambling account (single account holders; SAHs) to those with multiple accounts (MAHs) in terms of their demographic characteristics, gambling, factors that influence their gambling, and risk of harm. The objective was to determine whether MAHs are more likely to be at-risk of gambling problems than SAHs to enable implications to be drawn regarding the appropriate provision of consumer protection strategies. Understanding behavioural markers that are associated with gambling problems can enable early interventions that may reduce gambling-related harms.

## Methods

### Participants

Respondents were recruited through advertisements on various websites, including legal Australian online wagering and lottery sites (53.9%), Facebook (17.6%), and Google (6.3%). Of the 4594 survey respondents, 3178 (69.2%) indicated that they gambled online and were included in the subsequent analyses.

### Instrument and measures

Respondents completed an online survey. The completion rate was 68.7% and the mean completion time was 23.1 min. The survey was designed based on a previous study on Internet gambling ( $N = 6682$ ) and questions were refined based on these results.<sup>23</sup> For the purpose of this study, data from specific sections of the survey were used in analyses and information about these sections is presented here (Results from the dataset on which the current study is based were published in a report submitted to the funding body.<sup>24</sup>

### Demographics

Respondents were asked about general demographic information including gender, age, location of residence, country of birth and language spoken at home.

### Gambling participation

Respondents were asked whether and how frequently they took part in 10 forms of gambling (including online and offline participation; see table 1).

### Internet gambling participation

Respondents were how many separate online betting/gambling accounts they had with different operators. Respondents were asked whether they considered themselves to be a professional, semi-professional or amateur/recreational gambler to list the top three factors that influenced their decision to gamble at a specific Internet site, and the top three advantages and disadvantages of Internet over land-based gambling (from a specified list). Respondents were asked to describe the impact of using electronic payment and viewing promotions for online gambling on the amount they gambled.

### Gambling related problems

Respondents completed the Problem Gambling Severity Index (PGSI),<sup>23</sup> a nine-item questionnaire used to classify gambling

**Table 1** Number and percentage of respondents who reported taking part in each form of activity online within the last 12 months by number of sites with which respondents have Internet gambling accounts

Form of gambling	Single account		Multiple accounts		P
	N	%	N	%	
Instant scratch tickets	12	23.5	39	76.5	<0.001
Lottery lotto pools tickets	669	55.9	528	44.1	<0.001
Sports betting	728	33.5	1,447	66.5	<0.001
Horse or dog race betting	683	33.4	1,361	66.6	<0.001
Bingo	9	20.9	34	79.1	<0.001
Keno	12	29.3	29	70.7	0.008
Poker	86	17.6	404	82.4	<0.001
Casino table games	36	20.7	138	79.3	<0.001
Betting on games of skill	32	34.4	61	65.6	0.003
Electronic gaming machines	46	27.1	124	72.9	<0.001

status. Each item was coded using a four-point Likert scale with a total score obtained by summing the scores for each item. Cut-off scores adhered to those used in original validation of the PGSI. The PGSI has a demonstrated test-retest reliability score of 0.78.<sup>25</sup> Cronbach's alpha for the PGSI in this sample was 0.93, indicating good internal consistency and stability. The Kessler 6 scale<sup>26</sup> was used to assess the presence of non-specific psychological distress experienced over the most recent four weeks. Questions were framed to specifically relate to gambling-related psychological distress. This measure was selected for its brevity, strong psychometric properties, and ability to discriminate pathological gambling cases from non-cases in general-purpose health surveys. Cronbach's alpha for the K6 was 0.93.

### Analyses

The independent variable was recoded into those who had one online account (SAHs) compared with those who had two or more (MAHs). All analyses were also run retaining the original data (number of accounts); no differences in results between the two approaches were found. Where the dependent variable was continuous, assumptions for parametric analyses were checked and independent samples *t*-tests were used. Where the dependent variable was ordinal, non-parametric correlations (Spearman's rho) were used to compare the groups. For nominal dependent variables, chi-square tests of independence were employed with *post hoc* pairwise comparisons (*Z*-tests) used for all dependent variables with more than two response options. The results in table 1 were conducted using chi-square goodness of fit tests.

Categorical Principal Component Analysis was conducted on the 17 reasons that may have influenced the decision to choose one operator over another and no clear dimensions emerged. Instead, a Bonferroni correction was applied to correct for the multiple comparisons, with critical alpha for these analyses set at  $0.05/17 = 0.0029$ . A multivariate binary logistic regression was run in order to determine whether the significant results from the univariate analyses were relatively independent.

## Results

A total of 1438 respondents (45.2%) indicated that they had only 1 account (SAHs), with 734 (23.1%) indicating 2 accounts, 623 (19.6%) indicating 3–4 accounts, 143 (4.5%) indicating 5–6 accounts and 240 (7.6%) indicated more than 6 accounts.

### Demographic variables

Respondents mostly lived in a major metropolitan city (63.9%) or major regional city (18.4%). The most commonly reported marital statuses were married (42.6%), living with a partner/*de facto* (17.1%) or were never married (30.8%). Most worked full- (57.5%) or part-time (10.4%) and 89.8% spoke English as their primary language at home.

MAHs were significantly more likely to be male (91.9%) compared with SAHs (78.5%),  $P < 0.001$ . MAHs were significantly younger ( $M = 39.7$ ,  $SD = 13.7$ ) than SAHs ( $M = 42.4$ ,  $SD = 14.6$ ),  $P < 0.001$ . Significant differences were also observed in terms of education, with MAHs significantly more likely to have a university or college degree (28.4%) compared with SAHs (23.7%), but significantly less likely to have a trade, technical certificate or diploma (22.4%) compared with SAHs (27.1%),  $P = 0.001$ . No differences were observed between the groups in terms of post-graduate qualifications or other levels of education.

### Gambling participation

MAHs participated (online and offline) in a significantly greater number of different forms of gambling ( $M = 4.77$ ,  $SD = 1.96$ ) compared with SAHs ( $M = 3.90$ ,  $SD = 1.92$ ),  $P < 0.001$ . SAHs

bought lottery/lotto/pools tickets significantly more frequently than MAHs ( $P < 0.001$ ). In contrast, MAHs gambled significantly more frequently than SAHs on: sports betting ( $P < 0.001$ ), horse or dog race betting ( $P < 0.001$ ), poker ( $P < 0.001$ ) and electronic gaming machines ( $P = 0.003$ ).

Table 1 illustrates the proportions of SAHs and MAHs who reported having gambled online at least once over the last 12 months, for each gambling form. With the exception of lottery/lotto/pools tickets, the majority of individuals who gambled online on all other activities were MAHs. The effect sizes ( $w$ ) indicate that the effects are at least of a medium size ( $>|0.3|$ ) and most are large effects ( $>|0.5|$ ).

When asked about their Internet gambling behaviour, MAHs were significantly more likely to do most or all of their gambling online (73.8%) compared with SAHs (58.2%), while SAHs (28.4%) were significantly more likely than MAHs (12.6%) to mostly gamble offline,  $P < 0.001$ .

### Factors that influence Internet gambling behaviour

SAHs were significantly more likely to state that they were amateur gamblers compared with MAHs (96.2% vs. 83.8%), whereas MAHs were significantly more likely to state that they were professional (2.7% vs. 0.4%) or semi-professional gamblers (13.5% vs. 3.4%) compared with SAHs,  $P < 0.001$ .

MAHs were significantly more likely to rate price, number of betting options/games and lower secondary costs as advantages of Internet gambling, while SAHs were significantly more likely to rate the use of free-play sites as advantages. MAHs were significantly more likely to rate the following as disadvantages of Internet gambling compared with SAHs: unreliable technology or Internet

access, difficulty verifying fairness of games, Internet gambling is more addictive, and that it is easier to spend money (table 2).

MAHs were significantly more likely to choose a site based on price, number of betting options and games available, fast payout rates, better game experience/interface, and because of the software used on the site. In contrast, SAHs were significantly more likely to choose a site based on advertising/marketing, the jurisdiction where the site is regulated, whether the site is licensed, customer protection and responsible gambling tools (table 3).

SAHs were significantly more likely than MAHs to say that promotions have no impact on how much they gamble online (68.0% vs. 60.5%), whereas MAHs were significantly more likely to say that promotions increase their likelihood of gambling (38.2% vs. 29.9%),  $P < 0.001$ . MAHs were significantly more likely to say that the use of credit cards or electronic funds transfer had increased the amount that they gamble (34.1% vs. 19.3%), whereas SAHs were significantly more likely to say that it had had no impact on how much they gambled (74.1% vs. 59.8%).

### Problem gambling

On average, MAHs had significantly higher Kessler 6 scores, indicating greater psychological distress ( $M = 3.50$ ,  $SD = 4.62$ ) compared with SAHs ( $M = 2.95$ ,  $SD = 4.44$ ),  $P = 0.001$ . MAHs were significantly more likely to be classified as moderate risk (31.4% vs. 19.0%) or problem gamblers (18.1% vs. 9.7%) and significantly less likely to be non-problem gamblers (24.9% vs. 46.7%) than SAHs,  $P < 0.001$ .

### Multivariate comparison of SAHs and MAHs

The dependent variable was single vs. MAH status (coded as 0 and 1, respectively). Positive coefficients indicate higher scores are related

**Table 2** Perceived advantages and disadvantages of Internet gambling over land-based gambling by number of Internet gambling accounts

Reason	Single account		Multiple accounts		P
	N	%	N	%	
<b>Advantages</b>					
Price including bonuses, free credit, odds and payout rates	295	20.5	832	47.8*	<0.001
Greater number of betting options and games available	216	15.0	505	29.0*	<0.001
Use of free-play sites	61	4.2*	46	2.6	<0.001
Lower secondary costs, e.g. petrol, food and beverages	151	10.5	226	13.0*	<0.001
<b>Disadvantages</b>					
Unreliable technology or Internet access	220	15.3	390	22.4*	<0.001
Difficulty verifying fairness of games	160	11.1	234	13.4	0.048
More addictive	229	15.9	342	19.7*	<0.001
Easier to spend money	518	36.0	686	39.4	0.049

Note: asterisks (\*) mark significantly higher endorsement of each factor.

**Table 3** Number and percentage of respondents who stated that each reason influenced their decision to choose one operator over another by number of Internet gambling accounts

Reason	Single account		Multiple accounts		P
	N	%	N	%	
Advertising/marketing	183	12.7*	165	9.5	<0.001
Price including bonuses, free credit, odds and payout rates	337	23.4	1,035	59.5*	<0.001
Greater number of betting options and games available	198	13.8	554	31.9*	<0.001
Jurisdiction where site is regulated	155	10.8*	101	5.8	<0.001
Legally provided/licensed site	296	20.6*	184	10.6	<0.001
Fast payout rates	173	12.0	320	18.4*	<0.001
Customer protection, fairness of games, security of deposits and account information	296	20.6*	290	16.7	<0.001
Responsible gambling tools and resources e.g. account information and personal limits	105	7.3*	51	2.9	<0.001
Better game experience/interface	96	6.7	242	13.9*	<0.001
Software used	53	3.7	116	6.7*	<0.001

Note: Asterisks (\*) mark significantly higher endorsement of each reason.

to MAHs. Predictors included in the model were: gender, level of education, age, proportion of gambling done via the Internet and in land-based gambling venues, participation in each gambling form (last 12 months), professional gambling status, Kessler 6 scale score, PGSI group, perceived advantages of Internet gambling, perceived disadvantages of Internet gambling and reasons for choosing one online operator. This model was initially run through a linear regression procedure to check for tolerance between predictors. The lowest recorded tolerance was 0.451 for one of the education dummy variables and thus the predictors were considered to be acceptably independent of each other.

The overall model (table 4) included 42 predictors (including dummy variables) and was significant,  $P < 0.001$ . Overall prediction success was 74.9%, with the model correctly predicting 69.5% of SAHs and 79.5% of MAHs.

Controlling for all other variables, SAHs were significantly more likely to do most of their gambling in land-based venues (compared with Internet gambling), to engage in lottery/lotto/pools tickets

gambling and to report advertising/marketing as a reason to choose one site over another. MAHs were significantly more likely to have an undergraduate level of education (compared with those with less than 12 years of education), to engage in sports betting, horse or dog race betting or poker, to classify themselves as semi-professional or professional gamblers (compared with amateur gamblers), to be moderate risk or problem gamblers (compared with non-problem gamblers), to perceive the price and lower secondary costs as advantages of Internet gambling over land-based gambling, to report the difficulty of verifying the fairness of Internet gambling games as a disadvantage of Internet gambling and to choose operators based on price, greater selection of games, better game experience and the software used. Contrary to the results above, when controlling for all other variables, MAHs were significantly more likely to be older than SAHs. Variables that no longer significantly differentiated between MAHs and SAHs in the multivariate analysis were: gender, having a trade certificate, diploma or TAFE qualification, mostly gambling online, Kessler 6 scores, two of the

**Table 4** Results from multivariate analysis (logistic regression) comparing SAHs and MAHs

Predictor	B	SE	Wald	P	OR	95% CI
Gender (ref. female)	0.201	0.135	2.209	0.137	1.223	0.938, 1.594
Education (ref. less than 12 years)						
Postgraduate education	0.244	0.169	2.093	0.148	1.276	0.917, 1.776
<b>Undergraduate university or college degree</b>	<b>0.316</b>	<b>0.147</b>	<b>4.614</b>	<b>0.032</b>	<b>1.372</b>	<b>1.028, 1.830</b>
Trade certificate, diploma or TAFE qualification	0.018	0.144	0.015	0.903	1.018	0.768, 1.349
12 years or its equivalent	0.112	0.147	0.577	0.448	1.118	0.838, 1.491
Age (years)	<b>0.013</b>	<b>0.004</b>	<b>11.977</b>	<b>0.001</b>	<b>1.013</b>	<b>1.005, 1.020</b>
Proportion of Internet vs. land-based gambling (ref. only gambled online in last 12 months)						
Mostly gambled online but some land-based gambling in last 12 months	0.163	0.124	1.739	0.187	1.177	0.924, 1.501
Half gambling online and half land-based gambling	-0.049	0.161	0.093	0.760	0.952	0.695, 1.305
<b>Mostly land-based gambling, but some online gambling</b>	<b>-0.870</b>	<b>0.154</b>	<b>32.066</b>	<b>&lt;0.001</b>	<b>0.419</b>	<b>0.310, 0.566</b>
Engagement in gambling forms (ref. no for each form)						
Instant scratch tickets	-0.019	0.097	0.037	0.847	0.982	0.812, 1.186
<b>Lottery/lotto/pools tickets</b>	<b>-0.284</b>	<b>0.123</b>	<b>5.301</b>	<b>0.021</b>	<b>0.753</b>	<b>0.592, 0.959</b>
<b>Sports betting</b>	<b>0.705</b>	<b>0.123</b>	<b>32.555</b>	<b>&lt;0.001</b>	<b>2.023</b>	<b>1.588, 2.577</b>
<b>Horse or dog race betting</b>	<b>0.465</b>	<b>0.118</b>	<b>15.593</b>	<b>&lt;0.001</b>	<b>1.592</b>	<b>1.264, 2.005</b>
Bingo	0.279	0.202	1.914	0.166	1.322	0.890, 1.964
Keno	0.175	0.107	2.688	0.101	1.191	0.966, 1.469
<b>Poker</b>	<b>0.814</b>	<b>0.115</b>	<b>50.059</b>	<b>&lt;0.001</b>	<b>2.256</b>	<b>1.801, 2.827</b>
Casino table games	0.013	0.103	0.016	0.900	1.013	0.828, 1.239
Betting on games of skill	-0.173	0.167	1.062	0.303	0.841	0.606, 1.168
Electronic gaming machines	-0.039	0.102	0.146	0.702	0.962	0.788, 1.174
Amateur vs. professional status (ref. amateur)	<b>0.940</b>	<b>0.174</b>	<b>29.324</b>	<b>&lt;0.001</b>	<b>2.561</b>	<b>1.822, 3.599</b>
Kessler 6 score	-0.006	0.012	0.288	0.591	0.994	0.971, 1.017
PGSI (ref. non-problem gambler)						
Low risk gambler	0.194	0.114	2.882	0.090	1.214	0.970, 1.519
<b>Moderate risk gambler</b>	<b>0.635</b>	<b>0.123</b>	<b>26.690</b>	<b>&lt;0.001</b>	<b>1.887</b>	<b>1.483, 2.401</b>
<b>Problem gambler</b>	<b>0.946</b>	<b>0.181</b>	<b>27.328</b>	<b>&lt;0.001</b>	<b>2.576</b>	<b>1.807, 3.673</b>
Perceived advantages of Internet gambling over land-based gambling (ref. no for each)						
<b>Price including bonuses, free credit, odds and payout rates</b>	<b>0.366</b>	<b>0.105</b>	<b>12.158</b>	<b>&lt;0.001</b>	<b>1.442</b>	<b>1.174, 1.770</b>
Great number of betting options and games available	0.109	0.113	0.930	0.335	1.115	0.894, 1.390
Use of free-play sites	-0.186	0.237	0.615	0.433	0.830	0.522, 1.321
<b>Lower secondary costs, e.g. petrol, food and beverages</b>	<b>0.273</b>	<b>0.134</b>	<b>4.148</b>	<b>0.042</b>	<b>1.314</b>	<b>1.010, 1.710</b>
Perceived disadvantages of Internet gambling over land-based gambling (ref. no for each)						
Unreliable technology or Internet access	0.211	0.113	3.478	0.062	1.234	0.989, 1.540
<b>Difficulty verifying fairness of games</b>	<b>0.322</b>	<b>0.138</b>	<b>5.449</b>	<b>0.020</b>	<b>1.380</b>	<b>1.053, 1.809</b>
More addictive	-0.018	0.122	0.023	0.880	0.982	0.773, 1.247
Easier to spend money	-0.004	0.098	0.002	0.965	0.996	0.821, 1.207
Reasons for choosing one operator over another (ref. no for each)						
<b>Advertising/marketing</b>	<b>-0.372</b>	<b>0.138</b>	<b>7.280</b>	<b>0.007</b>	<b>0.689</b>	<b>0.526, 0.903</b>
<b>Price including bonuses, free credit, odds and payout rates</b>	<b>0.981</b>	<b>0.102</b>	<b>92.295</b>	<b>&lt;0.001</b>	<b>2.667</b>	<b>2.183, 3.258</b>
<b>Greater number of betting options and games available</b>	<b>0.436</b>	<b>0.111</b>	<b>15.343</b>	<b>&lt;0.001</b>	<b>1.546</b>	<b>1.243, 1.923</b>
Jurisdiction where site is regulated	0.001	0.165	0.000	0.997	1.001	0.725, 1.382
Legally provided/licensed site	0.034	0.127	0.070	0.791	1.034	0.806, 1.326
Fast payout rates	0.028	0.121	0.052	0.819	1.028	0.811, 1.304
Customer protection: fairness of games, security of deposits and account information	0.056	0.116	0.235	0.628	1.058	0.843, 1.326
Responsible gambling tools and resources e.g. account information and personal limits	-0.336	0.205	2.672	0.102	0.715	0.478, 1.069
<b>Better game experience/interface</b>	<b>0.607</b>	<b>0.148</b>	<b>16.814</b>	<b>&lt;0.001</b>	<b>1.836</b>	<b>1.373, 2.454</b>
Software used	0.542	0.197	7.562	0.006	1.720	1.169, 2.532

Note: Bold text indicates significant predictors within the model.



perceived advantages of Internet gambling (greater number of betting options and games available, use of free-play sites), three of the perceived disadvantages of Internet gambling (unreliable technology or Internet access, more addictive and easier to spend money), and six of the reasons for choosing one operator over another (jurisdiction where the site is regulated, legally provided/licensed site, fast payout rate, customer protection, responsible gambling tools and resources and the software used).

## Discussion

The results suggest that the majority of Australian Internet gamblers use multiple Internet accounts. MAHs were more involved gamblers with respect to gambling frequency and engagement with multiple activities. In particular, betting on sports and races and playing poker were predictive of being a MAH. This may indicate that some gambling activities are more likely to be used by those who switch operators, or alternatively that online poker players may also wager and require additional accounts. The results are consistent with the findings that MAHs were more involved in both online and offline gambling than SAHs.<sup>16</sup> In contrast, SAHs were more likely to gamble on one just activity, most likely the lottery and were more likely to mostly gamble offline.

MAHs are likely to represent a different cohort to SAHs. Almost two-thirds of MAHs were influenced by price and gambling promotions in selecting a gambling operator and were more likely to be influenced by the greater selection of games and overall game experience. This may indicate MAHs are willing to 'shop around' to get their preferred experience and price for. The emphasis of MAHs on price, costs and experience is consistent with the greater proportion of this group stating that their gambling represented a main form of income. Professional gamblers are known to make more informed decisions and to treat gambling as work,<sup>27, 28</sup> making them more likely to search for the best offers requiring multiple accounts.

Over one-fifth of SAHs chose a gambling site based on its legality and consumer protection provided, demonstrating that this cohort is seeking a legitimate gambling experience and may prefer the stability of gambling with a single provider rather than switching accounts to optimise price. However, a site's legality and consumer protection did not differentiate between SAH and MAH in the multivariate analysis. Although advertising was influential for a proportion of SAHs and differentiated this cohort from MAH, they were less likely to respond to promotions, suggesting that advertising may be influential in their initial decision to choose an operator, which they then remain with. This result aligns with previous findings that gambling advertising has a greater impact on more involved gamblers.<sup>29</sup> Research suggests that player retention is associated with greater profitability for gambling operators.<sup>30</sup> This may suggest that even if these players gamble less frequently, the lower cost of customer acquisition and retention makes this group more valuable than more active, but less loyal customers. However, SAH were also likely to do most of their gambling offline, reducing the need for multiple accounts.

Half of MAHs experienced at least moderate gambling-related problems, in comparison with less than one-third of SAHs. MAHs were almost twice as likely as SAHs to be classified as problem gamblers and were more likely to experience psychological distress. The tendency for MAHs to experience a greater level of gambling problems is likely to be related to their greater gambling involvement, consistent with existing research.<sup>17–20</sup> However, even when their gambling was controlled for being a moderate risk or problem gambler was still predictive of being an MAH. MAHs were more likely to be impacted by promotions and electronic payments, and one-fifth stated that this mode of gambling was 'more addictive' than land-based forms. Gambling through multiple accounts makes it difficult for individuals to track their

expenditure, which may result in more money spent than intended and subsequent problems.

This study included a large sample of Internet gamblers and included a range of relevant variables enabling it to be the first study known to the authors to specifically compare SAHs and MAHs. However, there are several limitations of the study; the results are based on self-report which is limited to the accuracy of individual's recall of their behaviour and truthful responses. Participants self-selected into the study meaning the results are not representative of all Internet gamblers. The extent to which gamblers actively used their various Internet gambling accounts was not measured and this is only one variable to indicate gambling involvement. Other variables may moderate the relationship between use of multiple sites and gambling problems. For example, the use of multiple sites may be an indicator of novelty seeking, which is associated with impulse control problems.<sup>31</sup> A propensity to seek different experiences and change actions in the pursuit of stimulation and excitement, such as opening new gambling accounts, may be explained by an underlying trait that is also more likely to lead to excessive and deviant behaviours. This would fit with the theory that arousal dysfunction requires increased stimulation such that if this is not fulfilled by one website, they may seek others. The current study does not allow inferences about the causal nature of relationships between variables. Further research is needed to explore how Internet gamblers use multiple sites and their motivations for doing so.

## Conclusions

The differences between gamblers with a single as compared with multiple online gambling accounts have important implications for the field. Behavioural tracking data are increasingly being used to understand how consumers use Internet gambling sites and identify potentially problematic play.<sup>5, 32–35</sup> However, the current study suggests that relying on data obtained from a single operator may underestimate online gambling for about half of all users. As such, results drawn from such studies may produce biased results that are not representative of Internet gamblers. Similarly, gambling operators who use behavioural tracking to identify potentially risky play are unable to evaluate gambling that occurs outside their own site.

The current results demonstrate that use of multiple websites for online gambling may also be an important behavioural marker of gambling-related problems. Internet gamblers may benefit from public awareness campaigns of the risks of gambling with multiple operators, including unregulated operators. The European Commission has recommended that Internet gambling operators take greater steps to identify risky gamblers and implement resources to facilitate responsible gambling, such as setting time and monetary limits.<sup>36</sup> Use of multiple accounts may obfuscate an individual's expenditure on Internet gambling sites, increasing the likelihood of spending more than intended, one of the principle causes of gambling problems. Therefore, tools that allow gamblers to track their gambling across multiple sites may be useful in enhancing the ability to track expenditure and reduce excessive gambling.

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## Key points

- This is the first study to examine the difference between Internet gamblers who hold multiple as compared with a single online gambling account.
- The study revealed that MAHs are more highly involved in gambling, more influenced by price and betting options and have a greater risk of experiencing gambling harms.
- Single Internet gambling account holders are a more stable but steady group of gamblers who are more concerned with legality and consumer protection.
- The results presented here question previous findings based on analysis of player behaviour from a single gambling operator and suggest that these may underestimate actual gambling behaviour.
- The results suggest that harm minimization strategies should be implemented that are effective across multiple operators, rather than restricted to use of a single gambling site.

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