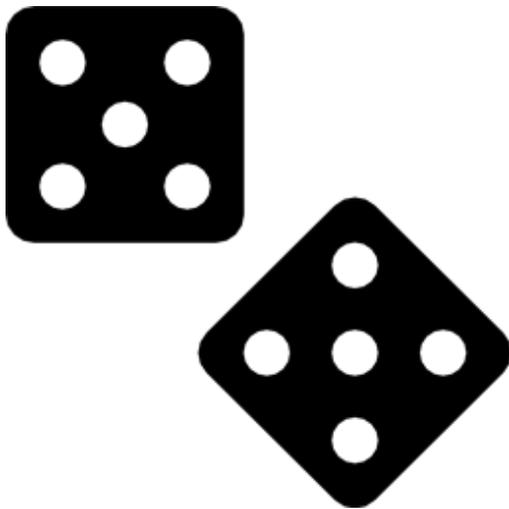

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People who play machines in bookmakers: secondary analysis of loyalty card survey data



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Prepared for: The Responsible Gambling Trust

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Executive Summary

Background

- In 2014, a survey of 4001 people who gambled on machines in bookmakers (called B2 machines hereafter) and who held a loyalty card for William Hill, Ladbrokes or Paddy Power was conducted by NatCen Social Research.
- This survey collected information about gambling behaviour, including problem gambling, and linked survey responses with data held by bookmakers about each person's gambling behaviour on B2 machines between September 2013 and June 2014.

Aims and objectives

- The objective of this study was to conduct further analysis of the data to:
 - a. estimate the proportion of losses on B2 machines that were attributable to problem gamblers;
 - b. investigate the distribution of losses on B2 machines between problem and non-problem gamblers;
 - c. explore the profile of people who lost the most money on B2 machines;
 - d. examine the profile of those who used the maximum stake (£100) on B2 machines;
 - e. examine whether there were different types of problem gamblers and, if so, to explore how their profile varied and;
 - f. explore differences between machine players who mainly played B2 games (those with a maximum stake of £100), mainly played B3 games (those with a maximum stake of £2) and those who played both.

Caveats

- The results in this report are generalisable only to those use loyalty cards when playing B2 machines. It is estimated that only around 10% of machine gambling in bookmakers is attributable to loyalty card holders. Loyalty card holders are, typically, frequent gamblers and it is likely that the non-problem gamblers included in this study are systematically different from non-problem gamblers generally, because of this higher frequency of engagement.
- Loyalty card holders do not always use their card when they play machines. Therefore, estimates of total losses presented in this report may be conservative as they are based on the data recorded when loyalty cards are used.

- These data were collected prior to the Department of Culture, Media and Sport's (DCMS) new regulations about how people place bets of £50 or more on B2 machines. The results around the use of the maximum stake on machines should be viewed as baseline information prior to this change.

Losses on B2 machines

- Overall, around 65-70% of losses on B2 machines among loyalty card holders were attributable to 20% of people.
- There was a somewhat uneven distribution of losses among problem gamblers; 26% of losses were attributable to 23% players who were problem gamblers; 15% higher than what would be expected if losses were evenly distributed.
- Mean and median losses on B2 machines between September 2013 and June 2014 were higher among problem gamblers (£450 on average) than non-problem gamblers (£340 on average).
- These differences were smaller than expected. This is likely because of the skewed nature of the sample. People who have a loyalty card for a bookmaker are very regular gamblers meaning that machine gambling behaviour between non-problem and problem gamblers maybe more similar than different.
- Those who lost the most money on B2 machines were more likely to be older, to have placed a maximum stake bet of £100, to say that gambling on B2 machines was their most frequent form of gambling and to gamble on machines for longer and more often than others.
- There was no evidence that those who lost the most money on B2 machines had greater income levels than those who lost the least.

Maximum stakes

- Between September 2013 and June 2014, 16% of loyalty card holders had placed a maximum stake bet of £100 on B2 machines. One in fifty (2%) staked £100 in 5% or more of all of their bets on machines.
- Rates of placing a £100 bet on machines were higher among those from minority ethnic groups. Over 30% of people from non-white ethnic groups had placed a maximum stake bet. Those from minority ethnic groups were also more likely to place a £100 bet on machines more frequently.
- Those who were unemployed were more likely to place a maximum stake bet more often; one in twenty (5%) loyalty card holders who were unemployed had placed a £100 bet in 5% or more of their bets on B2 machines.
- Higher problem gambling scores were significantly associated with greater frequency of use of the maximum stake.

Types of games played

- Overall, 45% of loyalty card holders gambled on a mix of B2 and B3 games, 34% played mainly B2 games and 21% played mainly B3 games.
- Those who played a mix of B2 and B3 games were more engaged with gambling generally and machine gambling specifically. On average, this group lost the most money on machines between September 2013 and June 2014 (£750).
- Those playing mainly B2 games were younger and more likely to be male and were less engaged in other forms of gambling than other groups.
- Those mainly playing B3 games were generally older and had a greater proportion of women than other groups.

Types of problem gambler

- Four different types of problem gamblers were identified. These were introspective problem gamblers (whose issues focused on feelings of guilt and awareness of problems); control-loss problem gamblers (who mainly chased losses, spent more than they could afford and needed to gamble with larger amounts of money to get the same excitement); diverse aware and severe aware problem gamblers (who experienced a broad spectrum of issues and were generally aware that their gambling was problematic).
- Both severe aware and diverse aware problem gamblers were more likely to say that machines were their most frequent form of gambling activity and that they felt that they had problems with their machine gambling behaviour.

Conclusions

- **Unequal distribution of losses**

Among loyalty card holders, losses on machines were not equally distributed. Around 20% of people accounted for 65-70% of all losses. Those who lost the most money were more engaged in machine gambling generally and were more likely to have placed a maximum stake bet of £100. However, they had similar income levels to those who lost the least, raising questions about whether those who lost the most could afford this or not.

- **Not all problem gamblers are the same**

This analysis shows that problem gamblers can experience a different range of problems. Much work has been done looking at whether algorithms can be applied to industry data to predict who might experience problems. These algorithms may be better at picking up one type of problem gambler than another. Control loss problem gamblers stated they chased losses and needed to gamble with increasing amounts of money to get the same excited; patterns of play which should be evident in industry data for individuals. However, introspective problem gamblers had issues with guilt and feeling that they had a

problem (alongside chasing) meaning it may be harder to identify these people using industry data alone.

- **Vulnerable groups**

This research has shown that those groups who are vulnerable to gambling problems have, in some cases, quite different patterns of gambling on B2 machines. Those from minority ethnic groups were more likely place a maximum stake bet and those who were unemployed were more likely to place a maximum stake bet more often. Review is needed to see if this has changed after the implementation of DCMS's new regulations.

1 Introduction

Among policy makers, the general public and the media, interest in the impact of category B gambling machines has increased in recent years. This is particularly true of category B2 machines found in bookmakers. In 2014, a survey of people who had a loyalty card with William Hill, Ladbrokes or Paddy Power was conducted. This survey focused on people who played machines in bookmakers and looked at how many loyalty card holders were problem gamblers. Most survey participants gave permission for their survey responses to be linked with their loyalty card usage data. This meant that for the first time in Great Britain survey responses could be analysed alongside objective data of machine play. The Responsible Gambling Strategy Board asked the Responsible Gambling Trust to commission a series of analysis projects to explore this data further. This report looks at five areas: first, the proportion of losses on machines in bookmakers that are attributable to problem gamblers; second, the profile of people who lost the most money on machines in bookmakers; third, examination of people who stake £100 on machines in bookmakers; fourth, whether there are different types of problem gambler and the factors that distinguish between them and finally, differences between people who play B2 games and/or B3 games on machines in bookmakers.

1.1 Policy context

In Great Britain gambling is considered by government to be a valid recreational and leisure pursuit. It is recognised that whilst many people gamble and experience no adverse consequences from their engagement, some people experience severe difficulties as a result of their gambling. Related to this, a critical debate in policy and regulatory circles is the extent to which profits from the gambling industry are driven disproportionately by losses from problem gamblers. The Pareto Principle is often quoted which assumes that 80% of industry profits are attributable to just 20% of players. However, recent research has suggested that whilst there is an uneven distribution in gambling losses, the 80/20 rule of the Pareto Principle may not apply to gambling (Tom, LaPlante, Shaffer, 2014). Using self-reported survey data and experimental estimation methods, Orford et al (2013) estimated that problem gamblers accounted for between 20% and 30% of gambling expenditure on certain products. When looking at spend on machines in bookmakers, the estimate was around 21%.¹ However, this work relied on taking self-reported estimates of gambling expenditure which are known not always to be accurate (Blaszczynski et al., 2006). Other research has shown that whilst low income households are less likely to take part in gambling overall, those that do are more likely to spend a higher proportion of their total income on gambling than their higher income counterparts (Reed, 2011). This suggests that a proportion of industry profits are driven by expenditure from those considered to be more vulnerable to gambling-related harm, though the exact proportions are unknown. In Great Britain to date, this has not been explored using objective data from industry about losses.

In 2014, NatCen Social Research conducted a survey of people who held a loyalty card for one of three major bookmakers and who had played on machines in bookmakers in the previous six months. Known as the loyalty card survey (LCS), this study included questions which measured problem gambling. Most LCS participants also gave permission for NatCen to link their survey responses with their loyalty card data so that patterns of gambling on machines could be explored in-depth (see Wardle et al, 2014 for full details). By linking these data together we are able to explore how losses on machines in bookmakers vary among different types of gambler, and specifically focus on how total losses among problem gamblers compares with total losses among non-problem gamblers.

1.2 Aims and objectives

The aims of this report are to use the LCS data to:

¹ According to the Problem Gambling Severity Index. The proportion of problem gamblers who played machines in bookmakers was 9.3% meaning that total expenditure attributable to problem gamblers was over 125% higher than expected if a proportionate distribution was assumed.

-
- 1) estimate the proportion of losses on machines in bookmakers which are attributable to problem gamblers;
 - 2) investigate the distribution of losses on machines in bookmakers between problem and non-problem gamblers;
 - 3) explore the profile of people who lose the most money on machines;
 - 4) to examine the profile of those who use the maximum stake (£100) on machines in bookmakers;
 - 5) examine whether there are different types of problem gamblers and, if so, to explore how their profile varies, and to
 - 6) explore differences between machine players who mainly played B2 games (those with a maximum stake of £100), mainly played B3 games (those with a maximum stake of £2) and those who played both.

These research objectives were set by the Responsible Gambling Strategy Board, in consultation with the Gambling Commission.

1.3 Caveats

The information presented in this report is generalisable only to the population of gamblers who hold and use loyalty cards when playing machines in bookmakers. It is estimated that only around 10% of machine gambling is attributable to loyalty card holders. Previous research has suggested that those who have a loyalty card for one of the three major bookmakers are systematically different from those who do not, the most obvious difference being that they are typically more frequent gamblers (Wardle et al, 2014). Therefore, the information in this report is not representative of all machine players, but rather of the subset of machine players who have a loyalty card for one of the three major bookmakers. Also, because loyalty card holders are very frequent gamblers, it is likely that the non-problem gamblers included in this study are systematically different from non-problem gamblers in the population generally, and potentially, have patterns of behaviour closer to that of problem gamblers. In national prevalence data, frequency of gambling and levels of engagement in gambling (such as number of activities undertaken) clearly distinguish between problem and non-problem gamblers. However, in the LCS sample, all participants are frequent gamblers, meaning there may be less differentiation between non-problem and problem gamblers for certain behaviours.

Previous research also showed that people who hold loyalty cards for bookmakers do not always use them, meaning we are likely to have incomplete records of machine play for some people and means that the total losses presented in this report may be conservative estimates. We discuss these limitations where relevant to analysis presented in this report.

1.4 Report conventions

The following conventions have been used in this report:

- Unless otherwise stated, the tables are based on the responding sample for each individual question (i.e., item non-response is excluded): therefore bases may differ slightly between tables.
- The group to which each table refers is shown in the top left hand corner of each table.
- The data used in this report have been weighted. The weighting strategy is described in the full LCS survey report, see Wardle et al, 2014. Both weighted and unweighted base sizes are shown at the foot of each table. The weighted numbers reflect the relative size of each group of the population, not the number of interviews achieved, which is shown by the unweighted base.
- The following conventions have been used in the tables:
 - No observations (zero values)
 - 0 Non-zero values of less than 0.5% and thus rounded to zero
 - [] An estimate presented in square brackets warns of small sample base sizes. If a group's unweighted base is less than 30, data for that group are not shown. If the unweighted base is between 30-49, the estimate is presented in square brackets.
 - * Estimates not shown because base sizes are less than 30.
- Because of rounding, row or column percentages in the tables may not exactly add to 100%.
- A percentage may be presented in the text for a single category that aggregates two or more percentages shown in the table. The percentage for that single category may, because of rounding, differ by one percentage point from the sum of the percentages in the table.
- Some questions were multi-coded (i.e., allowing the respondent to give more than one answer). The column percentages for these tables sum to more than 100%.
- The term 'significant' refers to statistical significance (at the 95% level) and is not intended to imply substantive importance.
- Only results that are significant at the 95% level are presented in the report commentary.

2 Proportion of losses attributable to problem gamblers

Between September 2013 and June 2014, loyalty card survey participants lost £3.8 million pounds on machines in bookmakers, an average of £975 each. When data are weighted to take into account response biases, the average loss per loyalty card survey holder fell to £392. Problem gamblers had higher losses on average (£449) than non-problem gamblers (£342). Among loyalty card holders, problem gamblers accounted for 26% of total losses on machines in bookmakers, though this was only marginally higher than the proportion of loyalty card holders who were problem gamblers (23%). Because of the skewed nature of the sample, non-problem gamblers had patterns of behaviour more similar to problem gamblers, meaning this cannot be taken to be representative of all machines gamblers where greater disparity in the proportion of losses attributable to problem and non-problem gamblers may be evident.

2.1 Total losses

Overall, loyalty card survey participants lost £3.8 million on machines in bookmakers between September 2013 and June 2014. This equates to an average loss of £975 per loyalty card survey participant. These estimates are based on the raw unweighted data. The sample design for the loyalty card survey included oversampling more frequent machines players meaning there is a significant skew in the unweighted data as very frequent gamblers were over-represented. Weighting adjustments were calculated to take this into account and to account for differences between those who responded to the survey and

gave permission to link their data and those who did not. Once data were weighted, the average loss per loyalty card holder was £392.

Unless stated, all estimates in this report use weighted data so that results take into account this sampling and response bias (see Wardle et al, 2014 for details of how the weights were calculated).

2.2 Total losses by problem gambling score

Figure 2.1 shows total losses (in £s) by problem gambling classification as measured by the Problem Gambling Severity Index (PGSI). Total losses were greater among moderate risk and problem gamblers than non-problem gamblers. However, these figures need to be contextualised by the number of people belonging to each group. Figure 2.2 shows both the proportion of people who were classified as non-problem, low risk, moderate risk or problem gamblers and the proportion of losses attributable to each group.

Figure 2:1 Total losses (£s) by problem gambling score

Base: All loyalty card survey participants

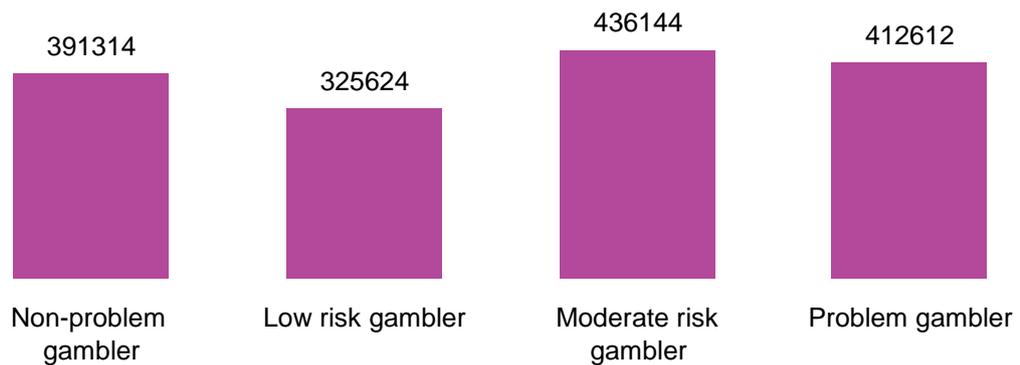
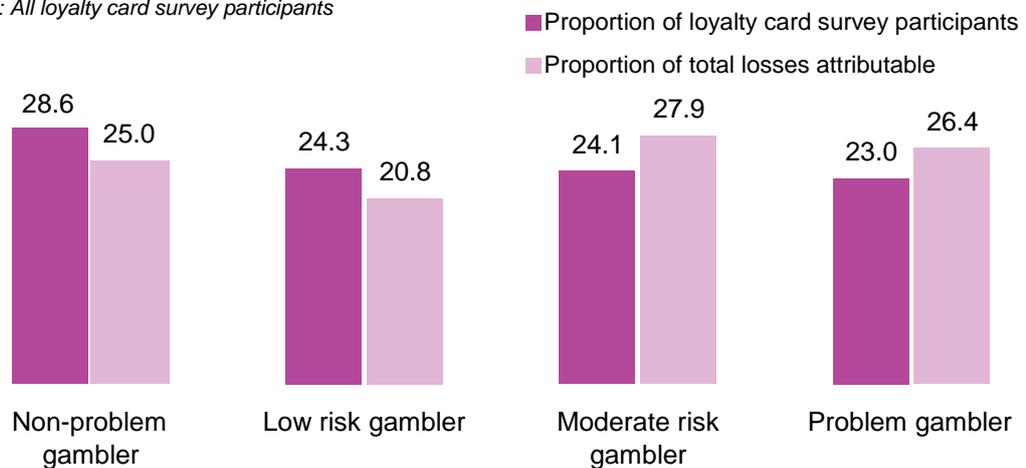


Figure 2:2 PGSI groups and a proportion of losses attributable to each

Base: All loyalty card survey participants

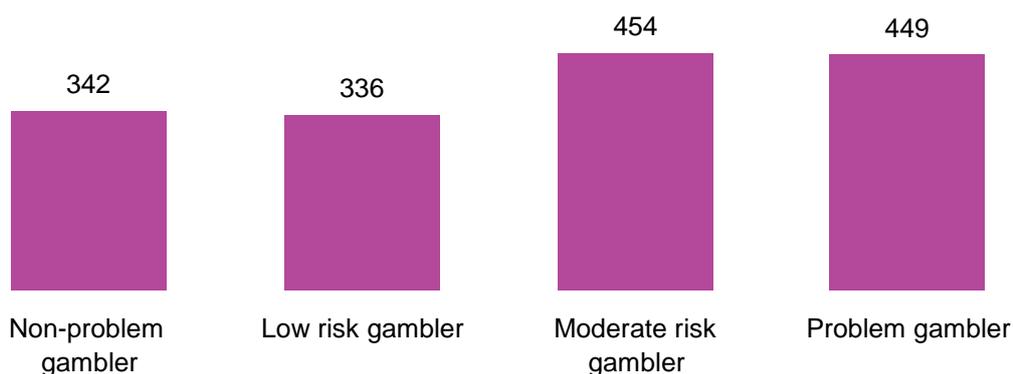


As Figure 2.2 shows, among loyalty card holders, problem gamblers accounted for 26.4% of total losses on machines in bookmakers. This was slightly higher than the proportion of loyalty card holders who were problem gamblers (23.0%). The same pattern was true for moderate risk gamblers, whereby 27.9% of total losses were incurred by moderate risk gamblers. Taken together, this means that the 47.1%² of loyalty card holders who were moderate risk or problem gamblers accounted for 54.3%³ of total losses. This is 15% higher than what would be anticipated if total losses were distributed proportionately among all types of gambler. The reverse is true for non-problem and low risk gamblers, who accounted for a lesser proportion of total losses (45.8%) than their relative population proportion (52.9%).⁴

Figure 2.3 shows the mean losses for each group and highlights how, on average, those who were moderate risk or problem gamblers lost a greater amount of money on machines in bookmakers than non-problem or low risk gamblers.

Figure 2:3 Mean losses (£'s) (Sept 2013 – June 2014), by PGSI group

Base: All loyalty card survey participants



Between September 2013 and June 2014, loyalty card holders who were problem gamblers typically lost around £100 more on machines in bookmakers than non-problem gamblers. Loyalty card holders who were non-problem gamblers or low risk gamblers lost around £340 each whereas moderate risk gamblers and problem gamblers lost around £450 each. These higher average losses may be due to a number of factors, such as problem gamblers betting with a higher average stake size or gambling on machines more frequently or both (see Wardle et al, 2014 chapter 7 for further details). Median figures were much lower than the means, £32 for non-problem gamblers and £66 for

² Confidence interval is 44.8% to 49.4%

³ Confidence interval is 52.0% to 56.6%

⁴ This analysis has also been replicated for the subset of participants who reported using their loyalty card always or most of the time when they played. The broad patterns are the same, with 23% of losses being attributable to the 20% of this subset who were problem gamblers.

problem gamblers, though it is notable that the median for problem gamblers is twice as high as for non-problem gamblers.

2.3 Distribution of losses by problem gambling score

The focus on average losses in Section 2.2 masks a great deal of individual variation in total losses. Figure 2.4 shows the full distribution of losses for all loyalty card survey participants.

Between 20-25% of loyalty card holders had net profit from their gambling on machines between September 2013 and June 2014. The highest total amount of profit for one individual was over £4500. Around 50% of loyalty card holders lost less than £250 in total between September 2013 and June 2014. For the final 25% of loyalty card holders, total losses increase sharply. For 5% of loyalty card holders, total losses on machines were in excess of £2000. The maximum amount lost on machines in bookmakers among a single loyalty card survey participant was £47,348.

This suggests that the Pareto Principle is in operation for gambling machine losses, whereby a greater proportion of losses come from a smaller proportion of people. Using weighted estimates, we calculated that 68% of total losses came from 20% of loyalty card holders and using unweighted estimates that 80% of total losses came from 20% of loyalty card survey participants.

Figure 2:4 Distribution of total losses (£) between September 2013 and June 2014

Base: Loyalty card survey participants who agreed data linkage

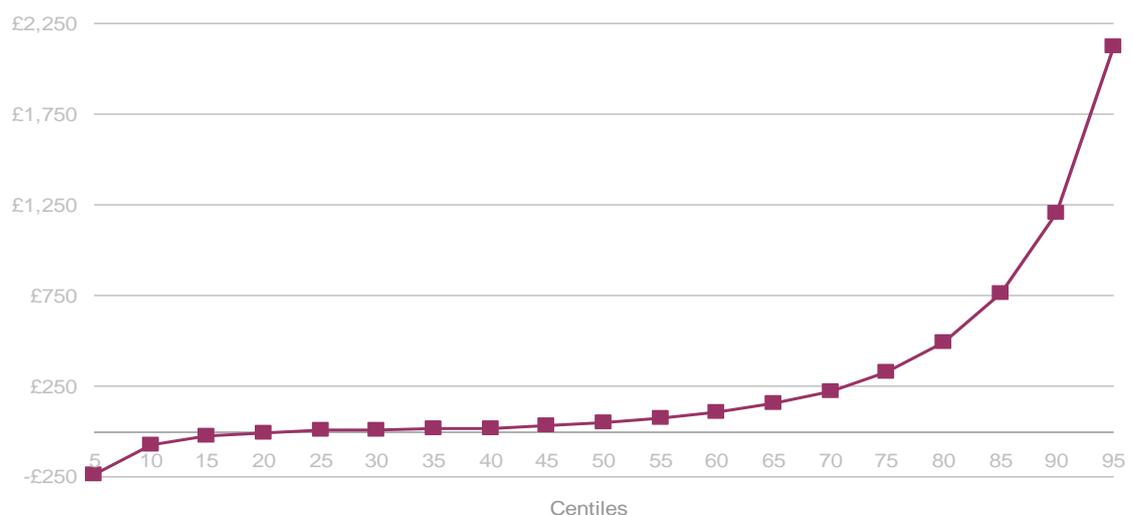
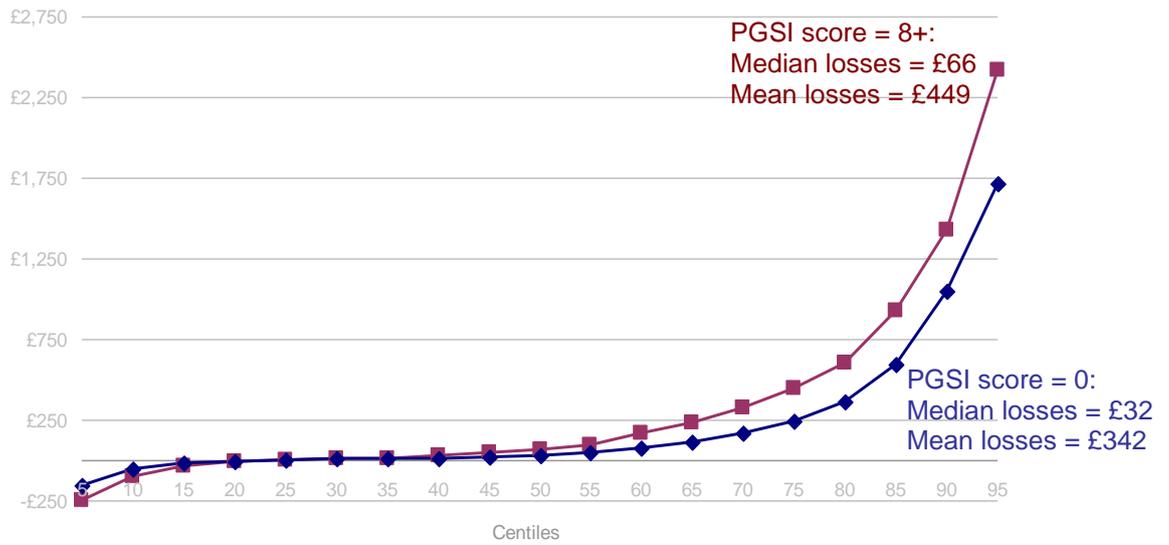


Figure 2.5 shows the distribution of total losses for those with a PGSI score of 0 (non-problem gamblers) and those with a PGSI score of 8 or more (problem gamblers). For both the broad pattern is similar though a greater proportion of

problem gamblers lost more money on machines in bookmakers than non-problem gamblers. For example, around 25% of non-problem gamblers had total losses on machines in excess of £250 whereas around 35% of problem gamblers had total losses in excess of this amount.

Figure 2:5 Distribution of total losses (£) between September 2013 and June 2014, by problem gambling status

Base: Loyalty card survey participants who agreed data linkage



3 The profile of people who lost the most money

Loyalty card holders who lost the most money on machines in bookmakers were more likely to be older adults who were heavily engaged in machine gambling. Machines in bookmakers were more likely to be their most frequent form of gambling activity and they played machines for longer and more often than those who lost less. Those who lost the most money on bookmaker's machines were more likely to have ever placed a maximum stake of £100 and to have started their session of gambling with a £100 stake. Those who lost the most money were more likely to be problem gamblers than those who lost the least.

3.1 Methods

To explore the profile of those who lost the most money on machines in bookmakers we first needed to examine how complete the data records were for each person. Because of the nature of the data, it was possible that a participant had lower recorded losses than others because:

- they genuinely spent less;
- they did not use their loyalty card every time they played machines;
- they registered for a loyalty card at a later date than others.

For this analysis, we need to minimise the risk of the latter two options influencing results. For this reason, analysis in this chapter was limited to the group of participants who, when asked, stated that they used their loyalty card most of the time or always when they played machines. The original survey sampled people who had used a loyalty card at least once between September

2013 and November 2013. For the majority of participants (n=3119), the first recorded use of the loyalty card in a machine was September. We took all data from September 2013 to June 2014, meaning there were 10 months of data available for these people. However, for a minority, the month of first use was October (n=578) or November (n=291). For these people, we only have nine months and eight months of data available respectively. What we don't know is whether these people only signed up to the loyalty card scheme in these months, or whether they already had a loyalty card but gambled on machines less frequently and so did not use it in September (or some mix of the two). For this analysis, we want to exclude the former but include the latter. Looking at self-reported frequency of playing machines in bookmakers shows that participants whose first loyalty card use was in October or November 2013 generally gambled on machines less frequently than those who used their loyalty card in September 2013.

To explore this further, the loss distributions of participants with different levels of data available were compared (see Figure 3.1). Those who 'always' used their loyalty card when they played machines had very similar distributions to those who used their cards 'most of the time'. However, participants whose first recorded use of their loyalty card in October or November had lower total losses than those who used their card in September. However, as these people typically played machines less frequently than the September cohort, this is consistent with expectations. Those who used their loyalty card only rarely or sometimes had a distribution of losses what was similar to the October/November data, suggesting that their losses would be higher if they used their card more frequently (data not shown).

Figure 3:1 Loss distributions by completeness of data (month of first recorded use and frequency of use of loyalty cards)

Base: Loyalty card survey participants who agreed data linkage



Therefore, the following analysis is based on those participants who reported that they used their loyalty card at least most of the time when they played machines. No adjustment has been made for month of first use as it appears that the subset of people who first used their card in October/November are more likely to be less frequent gamblers.⁵

Total loss data for this subset of participants was quintiled. This identifies the top 20% of regular loyalty card holders who lost the most money and we can compare their profile and behaviours with those who lost less. We focus on the top quintile (80th percentile) as this is the point at which losses increase sharply (see Figure 3.1).

Those in the top monetary losses quintile lost an average of £3377 on machines in bookmakers, though this was skewed by some extreme outliers. Median losses were £2564. In total, this group accounted for 64% of all losses from this subset of loyalty card survey participants.

3.2 Socio-demographic profile of those who lost the most money

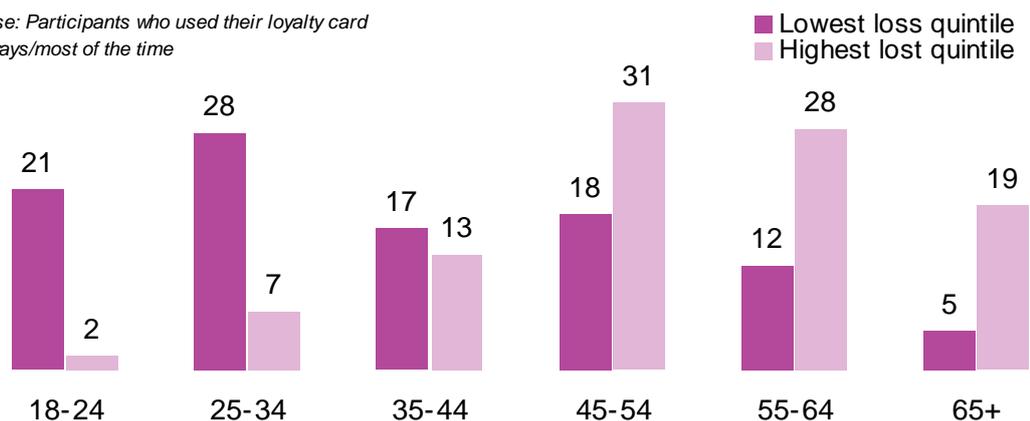
⁵ Analysis have also been conducted using the full sample and patterns tend not vary from those reported for this subset.

Table A.2 shows the socio-economic profile of participants by loss quintile. The profile of regular loyalty card holders who lost the most money was similar to other groups in respects to sex, ethnicity, personal income and whether the participant lived in one of the most deprived areas in England, Scotland or Wales. The lack of pattern by personal income is particularly noteworthy. It is often assumed that those who lose the most money gambling have more money to lose. However, the data in this study does not support this. Those who lost the most money had levels of personal income similar to those who lost the least. For example, 34% of those who lost the most and 32% of those who lost the least had an income of £26,000 per annum or more. Likewise, the prevalence of low income did not vary by total losses on machines providing no evidence that among this subset of loyalty card holders those who lost the most money had significantly higher incomes than others. However, this data does not take into account all sources of income, for example, that from partners or spouses, or adjust income based on the number of people who are dependent on that income (for example children). It may be that there are broader variations between groups based on household income, but this is unknown as equivalised household income was not measured in this survey.

As Figure 3.2 shows, those who lost the most money on machines in bookmakers were significantly older than other groups.

Figure 3:2 Age profile of those who lost the least (loss quintile 1) and those who lost the most (loss quintile 5) on machines in bookmakers

Base: Participants who used their loyalty card always/most of the time



Related to their older age profile, those who lost the most money were more likely to be retired than those who lost less. Rates of unemployment or paid employment did not vary by total loss quintile.

3.3 Gambling behaviour of those who lost the most money

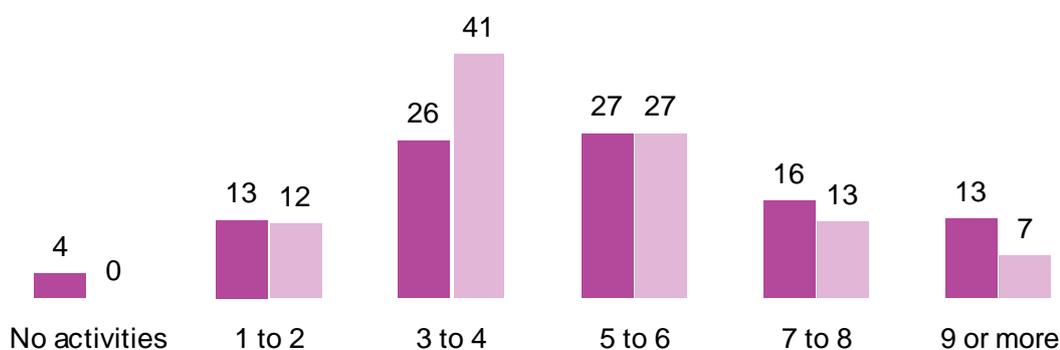
Table A3 shows the profile of regular loyalty card holders who lost the most money by a range of self-reported measures of gambling participation. A broad pattern emerges. Those who lost the most money on machines were more likely to report that this was their most frequent form of gambling activity (61% vs 30%) and that they engaged in their most frequent gambling activity more often than others. For example, 52% of those who lost the most money on machines said they gambled at least four days a week on their most popular gambling activity compared with 40% for those who lost the least amount of money.

As Figure 3.3 shows, those who lost the most money also had a slightly different pattern of engagement in other gambling activities. Whilst they typically engaged in other forms of gambling, the range of other activities undertaken was not as extensive as those who lost the least. This suggests that the differentiating factor between those who lost the most money on machines is both frequency of machine play itself and a slightly less broad gambling repertoire in terms of engagement in other activities.

Figure 3:3 Number of gambling activities undertaken, by loss quintile

Base: Participants who used their loyalty card always/most of the time

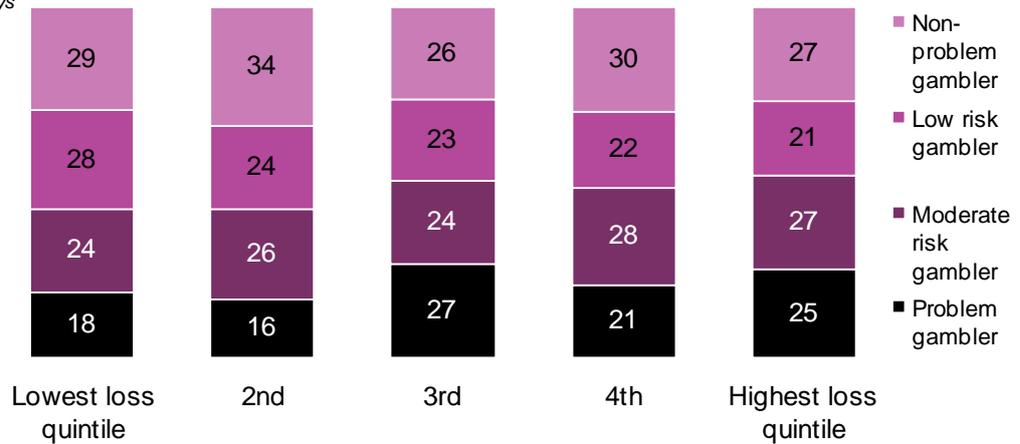
■ Lowest loss quintile
■ Highest lost quintile



Those who lost the most money were more likely to feel that they experienced problems with their machine play at least some of the time when they gambled on machines (45% vs 26%). Problem gambling prevalence was also significantly higher among those lost the most money on machines (25% vs 18%). Over half (52%) of those who lost the most money were either problem or moderate risk gamblers. See Figure 3.4.

Figure 3:4 PGSI scores by loss quintile

Base: All who agreed data linkage and used loyalty card most of the time/always



3.4 Machine play behaviour of those who lost the most money

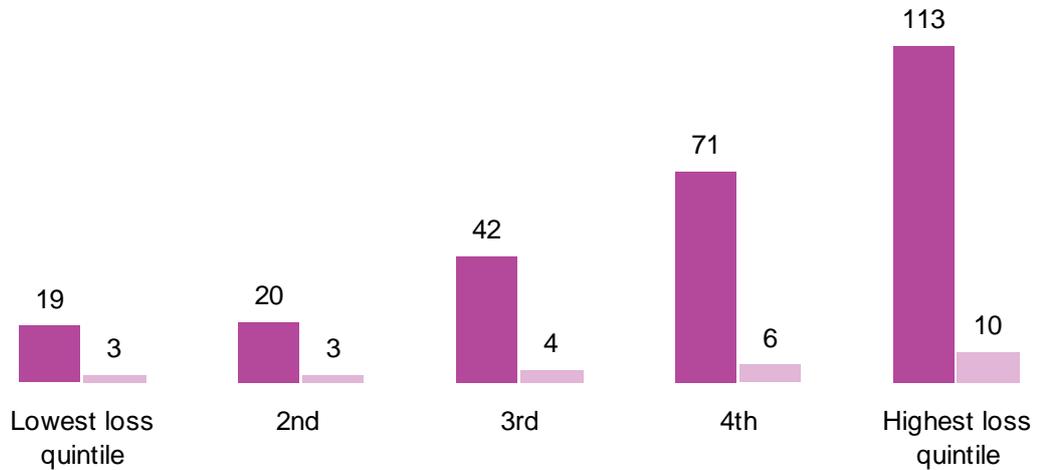
Table A.4 shows how average machine play behaviour varied between those who lost the most money and those who lost the least. Key findings were that those who lost the most money on machines tended to have:

- a higher average stake size (£8.04 per bet vs £5.63 for those who lost the least);
- longer average session lengths. Among those who lost the most money, the average session length was around 22 minutes whereas among those who lost the least it was around 15 minutes;
- more days spent gambling on machines and more machine gambling sessions per week (see Figure 3.5);
- placed a maximum bet of £100 at least once. 52% of those who lost the most money on machines had ever placed a maximum bet of £100 on machines in bookmakers whereas only 9% of those who lost the least money reported the same. Likewise, those who lost the most money were more likely than those who lost less to ever have started their session of play with a maximum bet of £100.

Figure 3:5 Number of days and number of sessions gambled on machines, by loss quintile

Base: All participants who agreed data linkage and use their loyalty card most times/always

■ Number of days gambled on machines
 ■ Average number of machine gambling sessions per week



3.5 Factors associated with losing the most money on machines

Binary logistic regression was used to model the factors associated with belonging to the highest loss quintile. Factors entered into the model were the key variables from Tables A.2 to A.4.⁶ Factors significant in the final model were:

- Age
- Whether ever placed a £100 stake
- Number of days played machines
- Average session length
- Average number of sessions per week

There was a significant association with age, with the odds of being in the highest loss quintile being between 5 to 9 times higher among those aged 25 and over than those aged 18-24. The odds were 3 times higher (2.96) among those who had ever placed a maximum stake bet of £100. For every additional day when machines were played, the odds of being in the highest losses quintile increased by 2% (odds ratio = 1.02) and for every additional second of

⁶ Variables included: sex, ethnicity, economic activity, self-reported frequency of playing machines, problem gambling status, average stake size, income, deprivation and number of gambling activities undertaken along with the five that were significant in the final model. The same modelling procedure used by Wardle et al (2014) was used for this analysis.

average session length, odds increased by 1.0003. Finally, odds of being in the highest loss quintile increased by 11% for every increase in average sessions per week⁷, see Table A.5.

⁷ This variable is an average computed by dividing the total number of sessions by the number of unique weeks in which the respondent gambled. Results are recorded to 1 decimal place, meaning that the odds increase by 11% for every 0.1 unit increase in sessions per week.

4 £100 stakes

Overall, 16% of regular loyalty card holders had ever placed a maximum stake bet of £100 on machines in bookmakers. 1 in 50 (2%) loyalty card holders used the maximum stake in 5% or more of their total bets. Among regular loyalty card users, those from minority ethnic groups were more likely than White/White British to ever have placed a maximum stake bet and to have done so more often. Those who were unemployed were more likely to use the maximum stake more often, even though the prevalence of ever placing a maximum stake bet was the same as average. This means that those who are unemployed who place a maximum stake bet do so more often than others. Those ever placing a maximum stake bet were more likely to be more frequent gamblers. Higher problem gambling scores were significantly associated with more frequent use of the maximum stake bet on machines.

4.1 Methods

As with the previous Chapter, the analysis that follows is limited to those who stated that they used their loyalty card almost always/most of the time. This means we have more complete records of machine play for these people.

There are four main variables considered:

- Whether ever placed a maximum stake bet between September 2013 and June 2014.
- The proportion of bets which were placed at the maximum stake (never, placed maximum stake bet, used maximum stake in less than 1% of all bets, used maximum stake in between 1% to less than 5% of all bets; used maximum stake in 5% of bets or more).

-
- Whether ever started a session with a maximum stake bet between September 2013 and June 2014.
 - The proportion of sessions which started with a maximum stake bet (Never, less than 1% of sessions, between 1% but less than 5% of sessions and 5% of sessions or more).

More detailed analysis of patterns of use of the £100 stake is included in a separate report (see Excell & Grundzien, 2016). This current report provides top level descriptive statistics only.

4.2 Caveats

- The data in this chapter covers the period between September 2013 and June 2014. In April 2015, the Department for Culture, Sport and Media (DCMS) introduced new rules where anyone wanting to place a stake of £50 or more on machines had to do so by either loading the cash over the counter with a member of staff or use a verified account so that player behaviour could be tracked. The evaluation of this initiative has shown that it has reduced the number of maximum stake bets placed. Therefore, the analysis presented in this chapter should be viewed as useful contextual information about who was most likely to place a maximum stake bet *prior* to the £50 intervention being implemented. Further research is needed to explore the impact of DCMS's £50 stake intervention on different groups of people.
- Loyalty card holders are more frequent gamblers and it appears that they are more likely to have placed a maximum stake bet than non-loyalty card holders. Prior analysis of machines data from all players showed that 3% of sessions used a maximum stake bet (Wardle et al, 2014). Whilst analysis in this chapter does not compare like with like, we see that 5% of loyalty card holders had ever started a session with a maximum stake bet, showing that loyalty card holders were more likely to use maximum stakes than non-loyalty card holders. We again caution readers that results in this chapter should not be extrapolated to all machine players.

4.3 Prevalence of using maximum stake bets by socio-economic factors

Overall, 16% of regular loyalty card holders had ever placed a maximum stake bet and 2% used the maximum stake of £100 in 5% or more of all bets placed. Those who were older were more likely to have ever placed a maximum stake

bet (24% of those aged 44-54; 20% of those aged 65 and over compared with 9% of those aged 18-24).

Figure 4.1 shows proportion of bets placed at the maximum stake by minority ethnic group. Those from non-White ethnic groups were much more likely to have ever placed a maximum stake bet (varying between 37% – 25%). They were also more likely to have used the maximum stake in 5% or more of the bets they placed on machines (6-5%).

Figure 4:1 Proportion of bets placed at the maximum stake, by minority ethnic group

Base: All who agreed data linkage and used loyalty card most of the time/always

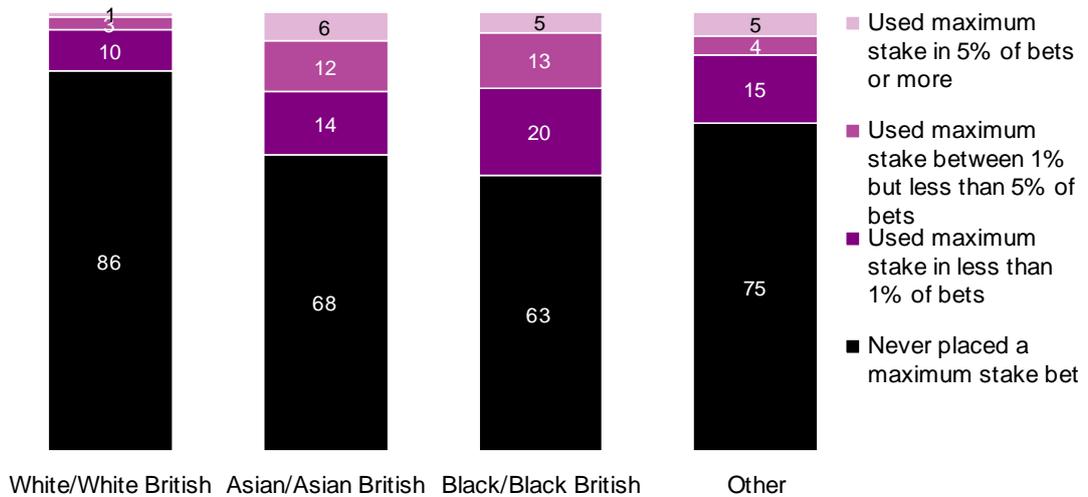


Table A.6 also shows use of the maximum stake by economic activity, income and area deprivation. Prevalence of ever placing a maximum stake bet did not vary by income or area deprivation, meaning that those with lower incomes were just as likely to place a £100 bet as those with higher incomes. Estimates did vary by economic activity, being higher among those who were retired (likely related to age) and among those who were self-employed (23% of which had ever placed a £100 bet on machines in bookmakers).

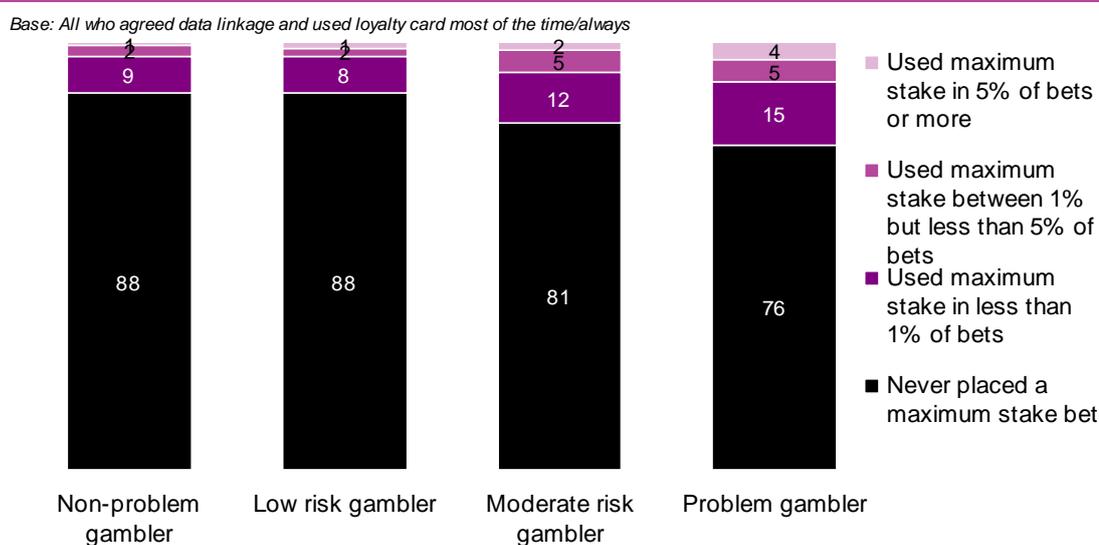
Table A.7 shows the prevalence of starting a session with a maximum stake bet. Overall, 5% of regular loyalty card holders started a session with a £100 bet. This proportion did not vary by age, sex, deprivation or income. However, those from non-White ethnic groups (10-11%) and those who were self-employed (8%) were more likely to have started a session with a maximum stake bet. Notably, 6% of those who were Asian/Asian British started 5% or more of their sessions with a maximum stake bet.

4.4 Prevalence of using maximum stake bets, by self-reported gambling behaviours

Table A.8 and A.9 show the prevalence of placing a maximum stake bet and starting a session with a £100 bet among regular loyalty card holders by a range of self-reported gambling behaviour. These tables show common themes:

- The prevalence of ever placing a £100 bet or starting a session with a maximum stake bet was higher among those who gambled more often on their most frequent gambling activity.
- Prevalence was also higher among those who said that playing machines was their most frequent form of gambling.
- Prevalence of ever placing a £100 bet, of using the maximum stake in 5% or more of all bets and of starting a session with a £100 bet was higher among problem gamblers than non-problem gamblers (See Figure 4.2).

Figure 4:2 Proportion of bets placed at the maximum stake, by problem gambling status



4.5 Prevalence of using maximum stake bets, by machine gambling behaviour

Tables A.10 and A.11 shows how machine gambling behaviour varied according to whether people had placed a maximum stake bet or not. The machine gambling behaviours considered were:

-
- Average stake size
 - Average number of machine gambling sessions per week
 - Total number of days played machines
 - Average session length
 - Total losses on machines between September 2013 and June 2014.

Key findings include:

- A higher average number of machine gambling sessions, higher number of machine gambling days, greater total losses and higher average stake sizes among those who placed a maximum stake bet.
- Similar patterns were evident among those who started their session with a maximum stake bet.

However, there were some interesting variations in how often the maximum stake was used. For example, those who used the maximum stake but did so in less than 1% of their bets played machines on 80 days, on average, between September 2013 and June 2014. For those who used the maximum stake in 5% or more of bets, their average number of machine gambling days was lower: 41 days. This suggests that this group may, on average, use higher stakes more frequently when they gamble but actually gamble on machines less frequently than those who use the maximum stake less often (see Figure 4.3). What this meant was that average losses for both groups were broadly similar (around £1800 each).

However, among all groups using the maximum stake, frequency of gambling, number of sessions per week and losses were higher than those who had never placed a maximum stake bet.

Figure 4:3 Proportion of bets placed at the maximum stake, by problem gambling status

Base: All participants who agreed data linkage and use their loyalty card most times/always

■ Average number of days played machines
■ Average number of machine gambling sessions per week

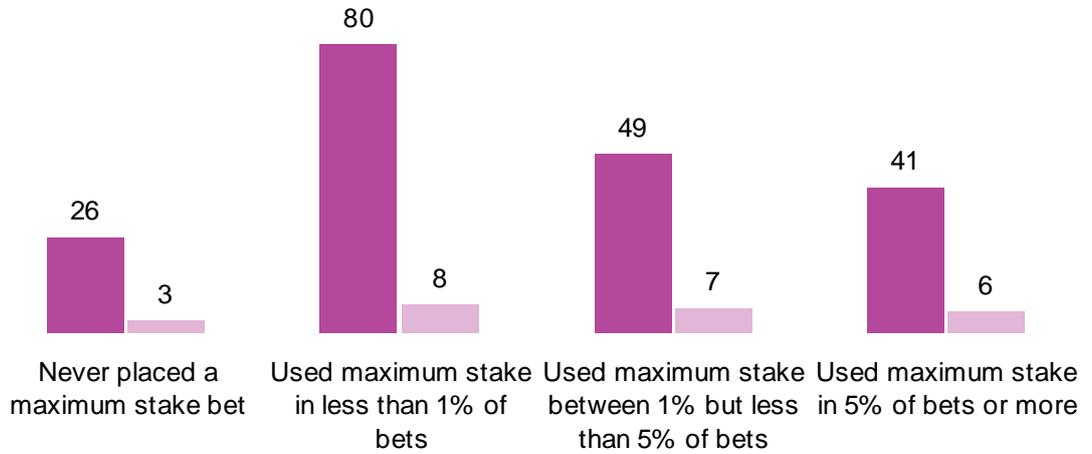
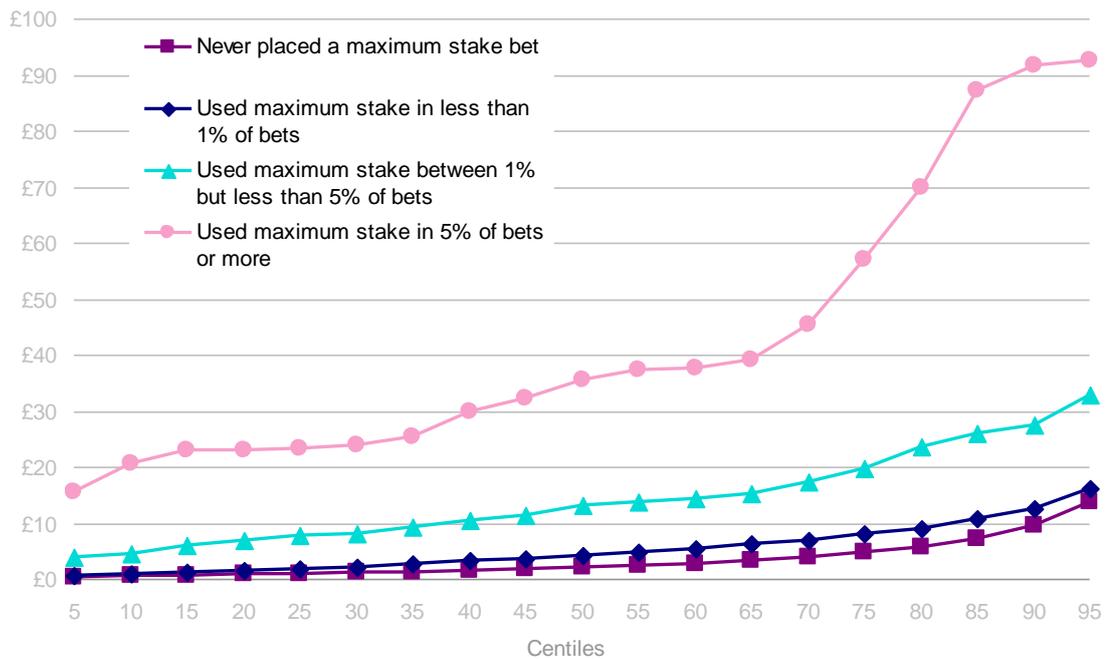


Figure 4.4 shows the distribution of stakes by use of maximum stakes and Figure 4.5 shows total losses for each group. Looking at averages in stakes and losses masks some interesting patterns in the overall distribution for each group.

Figure 4:4 Distribution of stake sizes, by proportion of bets placed at the maximum stake

Base: Loyalty card survey participants who agreed data linkage and used card most times/always

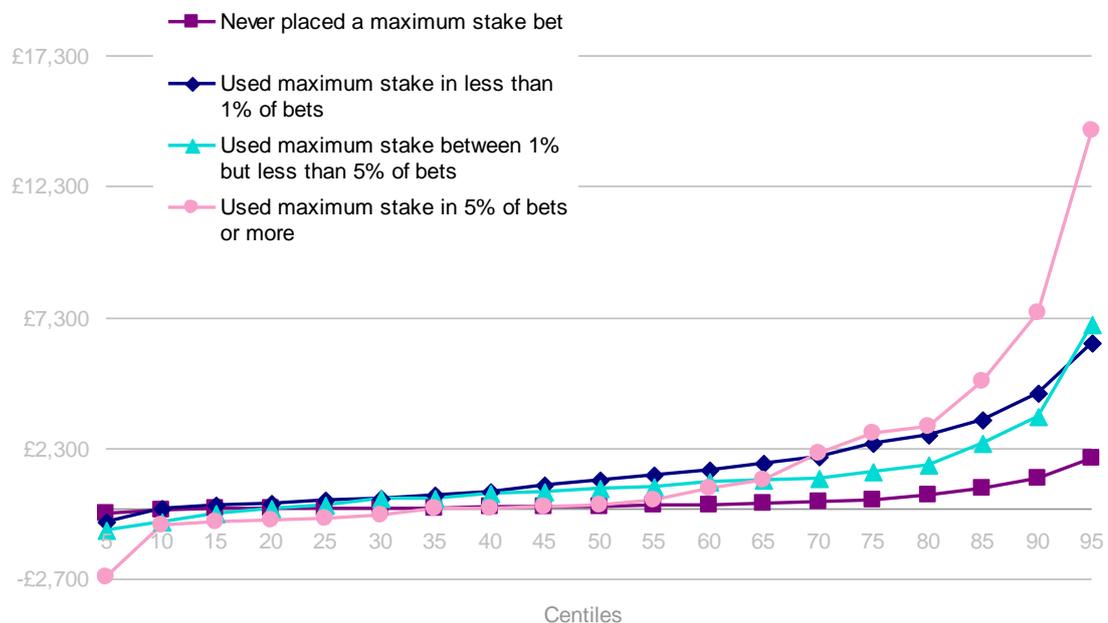


As Figure 4.4 shows, the stake size distribution was similar for those who had never placed a maximum stake bet and those who had done so in less than 1% of all bets. Stake sizes for 95% of the people in each group were less than £20 per bet. Stake sizes were higher than these two groups among those who had used maximum stakes in 1% to less than 5% of bets, though for 95% of people in this group, average stakes were less than £35.

For those who used a maximum stake in 5% of more of bets, average stake sizes were £35 up to the 45th centile and were under £40 up to the 65th centile, with average staking amounts increasing sharply thereafter.

Figure 4:5 Distribution of losses, by proportion of bets placed at the maximum stake

Base: Loyalty card survey participants who agreed data linkage and used card most times/always



As Figure 4.5 shows, total losses on machines in bookmakers between September 2013 and June 2014 were below £2300 for 70% of each group. Losses were (typically) lowest among those who had never placed a maximum stake bet. This group, however, also won less money. Of those who used a maximum stake in 5% or more of bets, losses were typically lower or at similar rates to others for 80% of this group. Losses only increased sharply from the 80th centile onwards. In fact, among those who placed maximum stake bets more often over 90% of losses were attributed to just 20% of people.

4.6 Factors associated with placing a maximum stake bet

Binary logistic regression was used in two separate models. The first model looked at the factors associated with ever placing a £100 bet on machines in

bookmakers. The other examined the factors associated with using the maximum stake in 5% or more of all bets. Factors entered into the model were the key variables from Tables A.6 to A.11.⁸

Looking at the factors associated with ever placing a £100 bet, variables significant in the final model were:

- Age
- Ethnicity
- Frequency of gambling on most frequent activity
- Whether machines were the most frequent form of gambling
- Average number of machine gambling sessions per week.

Odds of ever placing a £100 bet were 2.86 times higher among those who were non-White relative to those who were White/White British. The odds were 50% higher (OR=1.51) among those who said that machines were their most frequent form of gambling. For every unit increase in the average number of machine gambling sessions per week, the odds of ever placing a £100 bet increased by 18% (OR=1.18). Likewise, relative to gambling everyday, the odds of ever betting the maximum stake on machines were typically lower among those who gambled less often. Age was significantly associated with ever placing a £100 bet on machines in bookmakers, though the odds only differed significantly from the reference group (those aged 18-24) for those aged 44-54 (odds being 1.91 times higher) (see Table A.12).

The following factors were associated being a regular loyalty card holder who used the maximum stake in 5% or more of their bets:

- Ethnicity
- Sex
- Problem gambling score
- Average number of machine gambling sessions per week.

Odds of using the maximum stake in 5% or more of bets were 3.2 times higher among those from non-White groups and were 0.13 times lower among women.

⁸ Variables included: age, sex, ethnicity, economic activity, self-reported frequency of playing machines, problem gambling score, income, deprivation, whether machines were the most frequent form of gambling and number of sessions undertaken per week. Multinomial regression models were also run and gave broadly similar results. The same modelling procedure used by Wardle et al (2014) was used for this analysis.

For every unit increase in problem gambling scores (as measured by the PGSI), the odds increased by 5% (OR=1.05) as did the odds for every unit increase in the average number of machine gambling sessions per week. It is particularly interesting that problem gambling scores were not significant in the model looking at the factors associated with ever placing a £100 bet but were significantly associated with placing a £100 bet more often. This was true even when frequency of gambling participation was taken into account.

5 Types of problem gamblers

Four types of problem gamblers were identified. This ranged between those whose problems were dominated by feelings of guilt and recognition of problems (called introspective problem gamblers), those whose problems related to control-loss, those who had a range of problems (diverse-aware problem gamblers) and those with very severe problems. A mix of gambling behaviour and socio-demographic variables distinguished between these groups. Those from non-White ethnic groups were less likely to be introspective problem gamblers and more likely to be diverse aware problem gamblers. Younger people were more likely to be control-loss problem gamblers and less likely to be introspective problem gamblers. Severe problem gamblers were more likely to say they had problems with machine gambling and that playing machines was their most frequent form of gambling. Examination of the distribution of PGSI scores indicated that men from non-White/White British groups experienced particularly acute problems, as did those who were unemployed and who had lower incomes.

5.1 Introduction

Previous analysis showed that among loyalty card customers the factors associated with problem gambling were age, unemployment and area deprivation (Wardle et al, 2014). In the loyalty card survey, we identified over 900 problem gamblers. To our knowledge, this is the largest sample of problem gamblers who have not been recruited through treatment facilities. This provides an opportunity to explore how those classified as 'problem gamblers' differ from one another. It is recognised that problem gamblers are not a homogenous group and have different behaviours, characteristics and pathways into problematic behaviour. Previous attempts to explore this using survey data have been stymied by the low number of problem gamblers

identified within nationally representative studies (Carragher & McWilliams, 2011) and subject to issues of generalisability when focused on treatment seeking samples alone.

This chapter looks at the distribution of problem gambling scores according to the PGSI among different types of people, outlines item endorsement for each PGSI item and uses Latent Class Analysis (LCA) to determine if different types of problem gamblers are evident within this sample, based on the patterns of problems reported.

LCA has been used to identify different types of problem gamblers in other studies. However, the results of these studies have generally been limited because they are based on general population and include only a small number of problem gamblers. This means that the groups identified tend to follow PGSI scores (for example, identifying a group of non-problem gamblers, a moderate group with higher problem gambling scores and a severe group with the highest problem gambling scores). These studies provide insight on how groups of people vary based on their PGSI scores but have not been able to identify if the types of problems experienced are qualitatively different. Analysis in this chapter attempts to do this.

5.2 Distribution of PGSI scores

Figures 5.1 and 5.2 show the distribution of PGSI scores for men and women by age. Looking at these distributions is useful as it shows broader patterns than focusing on average scores alone. For example, average PGSI scores significantly varied by age group for men but not women, being higher among younger age groups among men (4.9 for those aged 18 to 34 and 5.4 for those aged 35 to 54). Among women, mean scores did not vary by age and median scores were 1.0 for all age groups. However, Figures 5.1 and 5.2 show that patterns in the distribution of PGSI scores for men and women were similar by age. In general, the distribution of PGSI scores for both men and women were very similar among those aged 18-34 and 34-54. The main differences occurred for those aged 55 and over, where PGSI scores tended to be lower among men from the 55th centile and lower among women from the 65th centile. Focus on average PGSI scores alone would have missed this nuance.

Figure 5:1 Distribution of PGSI score among men, by age

Base: Male Loyalty card survey participants

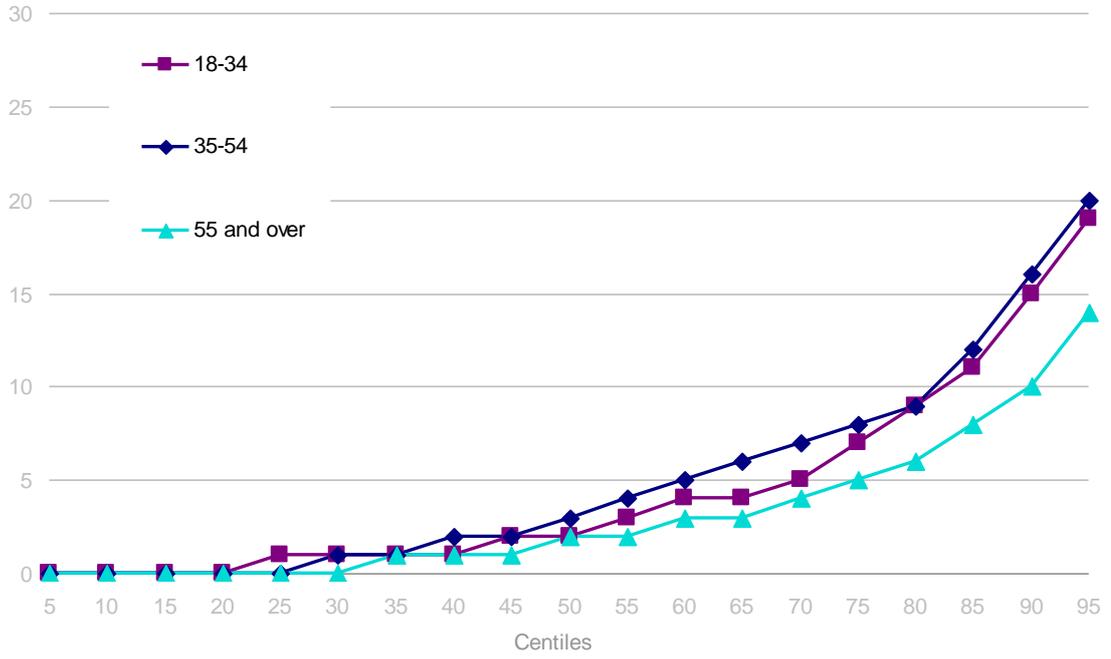
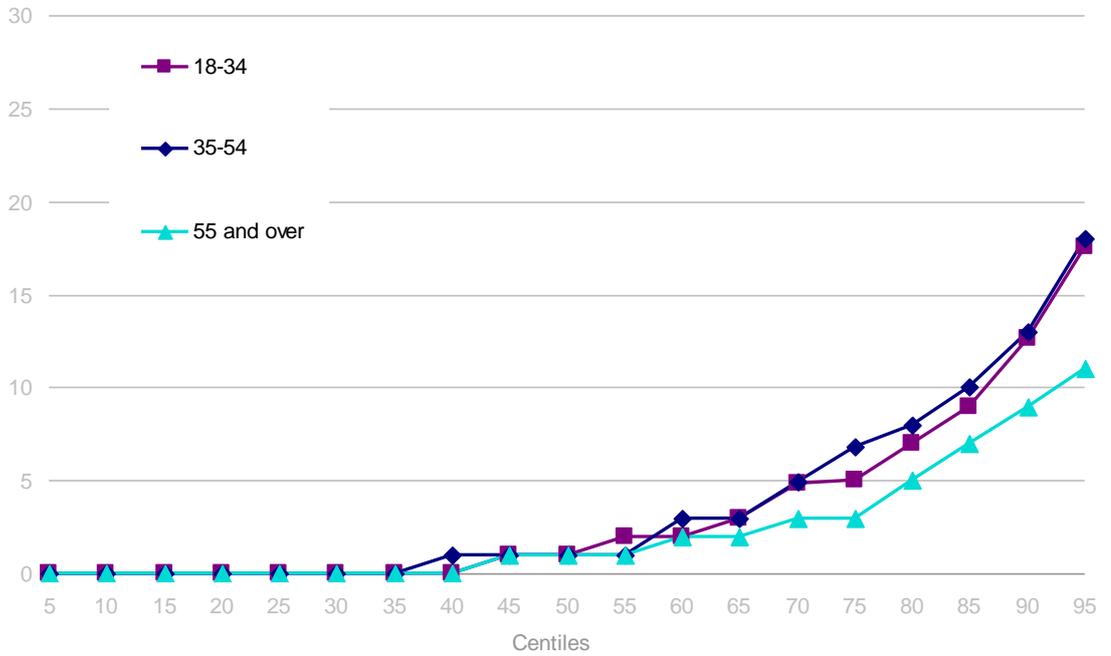


Figure 5:2 Distribution of PGSI score among women, by age

Base: Female loyalty card survey participants



The distribution of PGSI scores was also examined by ethnic group, economic activity, income and area deprivation. Figures 5.3 and 5.4 show the distribution in scores by ethnic group.⁹

Figure 5:3 Distribution of PGSI score among men, by ethnic group

Base: Male loyalty card survey participants

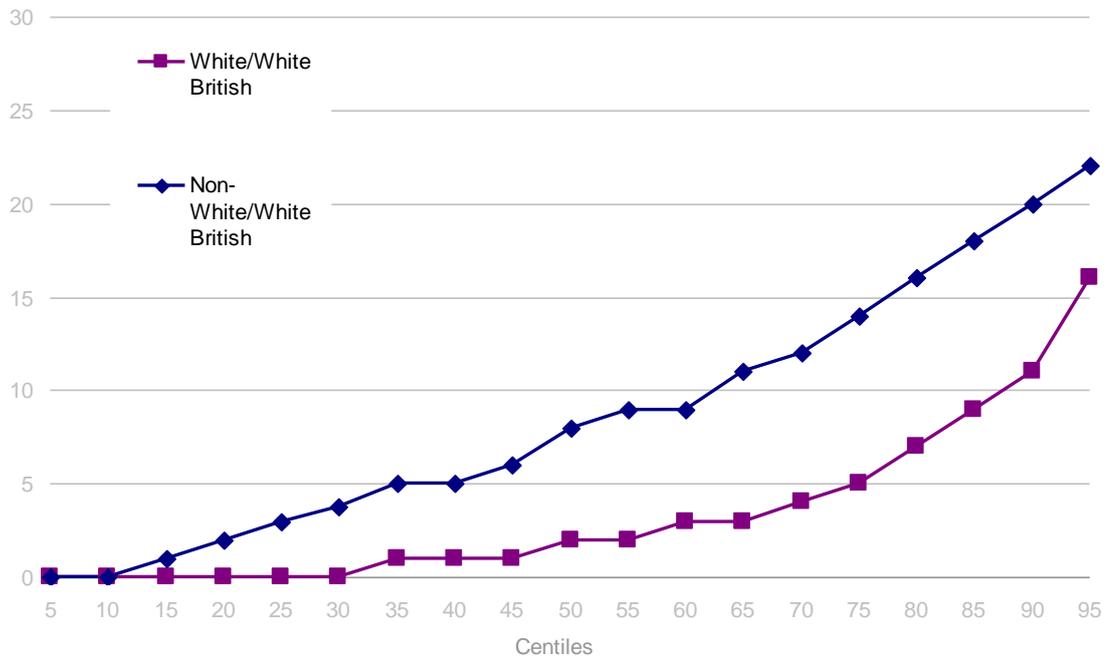
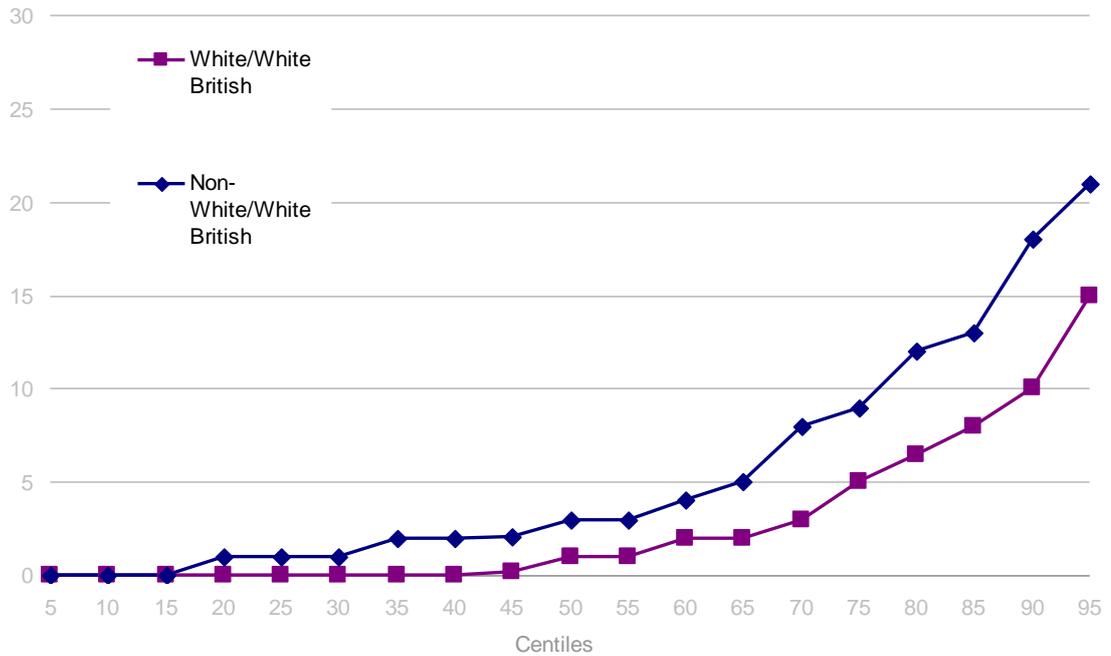


Figure 5:4 Distribution of PGSI score among women, by ethnic group

⁹ Because of small base sizes for women, categories have been collapsed into White/White British and non-White/White British.

Base: Female loyalty card survey participants



What is particularly interesting is the almost linear distribution of PGSI score among non-White men. For White/White British men and women from either ethnic group, PGSI scores are fairly low up to the 50th centile and start to increase sharply thereafter, indicating that for at least half of White/White British men or women of either group, gambling problems exist only at a low level, according to PGSI scores. The shape of the distribution for these groups is exponential, with larger increases in scores among a smaller fraction of the population. For example, PGSI scores start to increase more rapidly for women of either ethnic group from the 65th to 70th centile onwards. The same is broadly true for White men. However, for non-White men, the increase in PGSI scores start from the 15th to 20th centile and increased in a linear fashion. At the 50th centile for non-White men PGSI scores are 8, indicating that half of this group were categorised as problem gamblers. Among non-White men, between 20%-15% (the 80th to 85th centile) had a PGSI score of 8 or more. Ethnicity has long been highlighted as a risk factor for gambling-related problems. It seems this is particularly acute among men.

Figures 5.5 to 5.7 show the distribution of PGSI scores among those with higher and lower incomes, those in paid employment and who are unemployed and those who were living in the most deprived areas in Great Britain and those who did not. For each, average PGSI scores were statistically different, being higher among those with low incomes, those who are unemployed and those who live more deprived areas. Looking at Figure 5.5, we can see that up until the 35th centile for both low and higher income groups, PGSI scores were broadly similar. From the 40th centile onwards, PGSI score began to increase with the size of the increase being greater among those with lower incomes. Among low

income groups, it was at the 70th centile where PGSI scores were consistent with being a problem gambler. Among higher income groups, this threshold was crossed between 85th and 90th centile. Looking at economic activity in Figure 5.6, there are further interesting patterns. For those who were unemployed, PGSI scores began to increase from the 25th centile and did so in a fairly linear way. Among those who were in paid employment, PGSI scores started to increase from the 45th centile and increase more sharply from the 55th centile, showing that those who are unemployed, like those on low incomes, have a greater range of problems with their gambling. Finally, of note is Figure 5.7 which shows that the distribution of PGSI scores is very similar between those who lived in deprived and non-deprived areas. Up until the 55th percentile, PGSI scores were the same for both groups, they then started to increase, with scores being slightly higher among those living in deprived areas.

Figure 5:5 Distribution of PGSI scores, by income

Base: All loyalty card survey participants

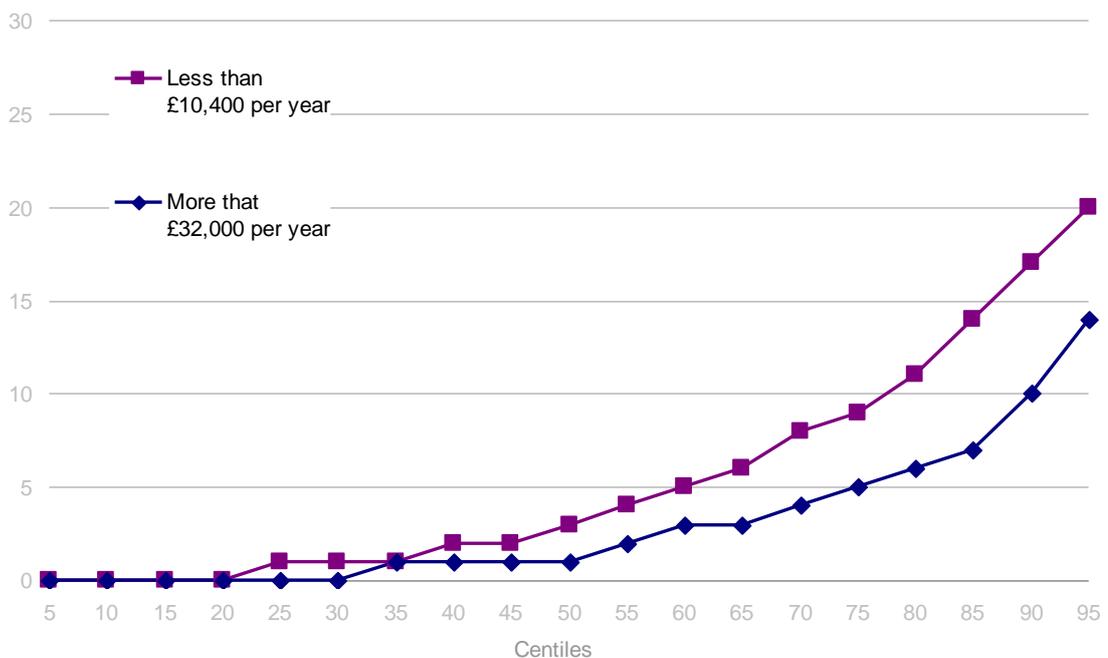


Figure 5:6 Distribution of PGSI scores, by economic activity

Base: All loyalty card survey participants

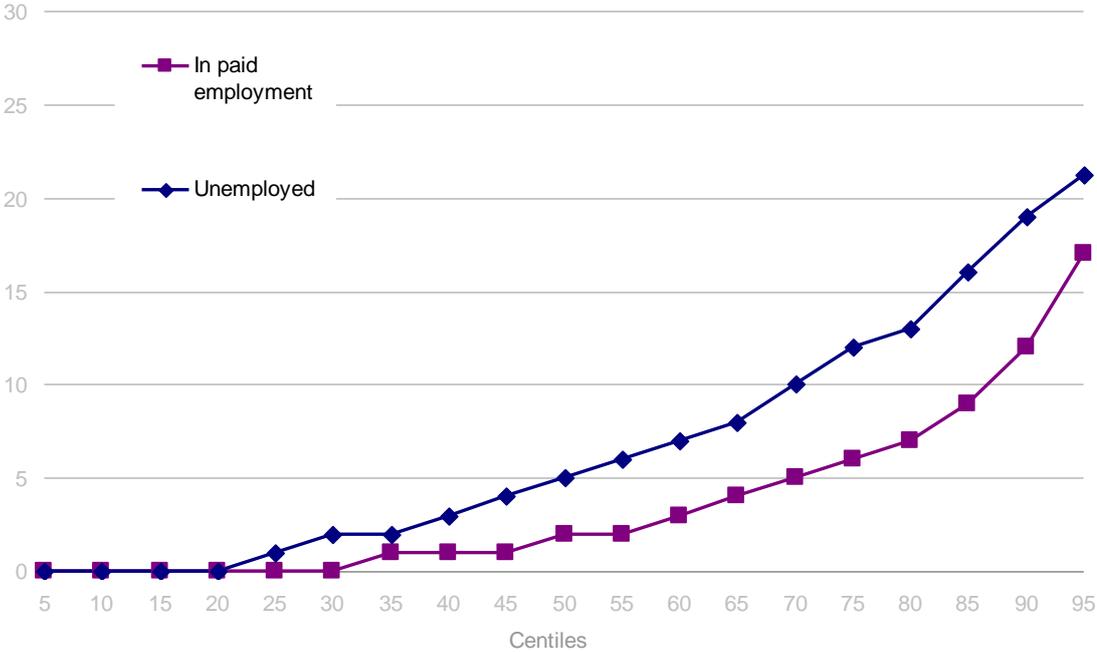
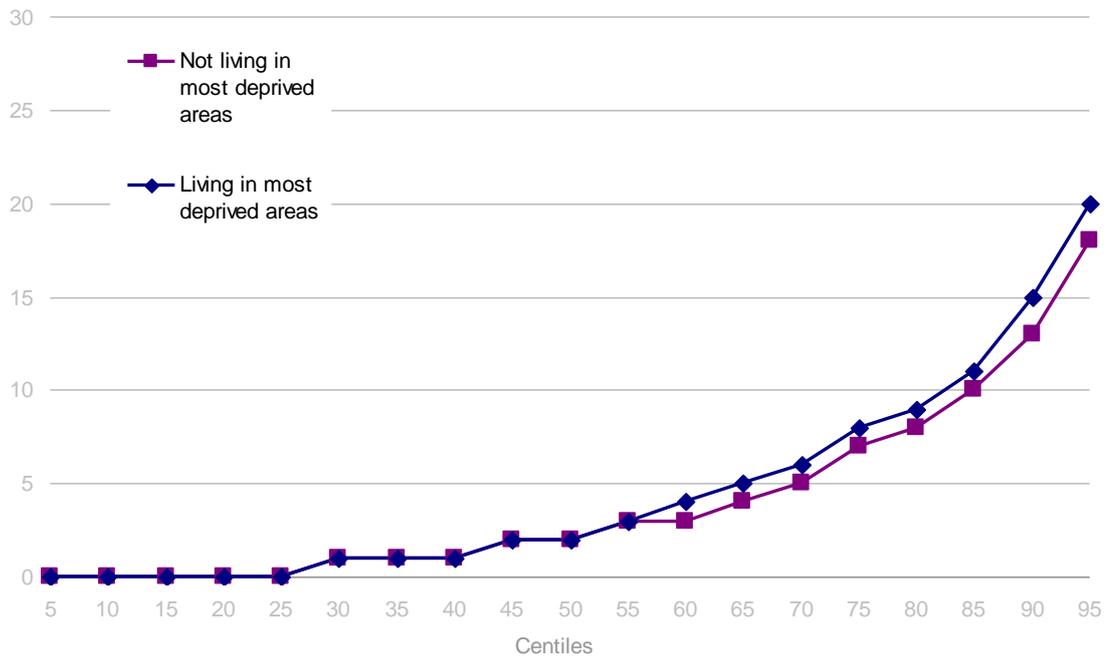


Figure 5:7 Distribution of PGSI scores, by area deprivation

Base: All loyalty card survey participants



5.3 PGSI item endorsement

The previous section showed how PGSI scores varied among different groups. This section focuses on the types of problems reported by problem gamblers and looks at how this varies by age. This analysis is extended in Section 5.4 where LCA is used to identify different types of problem gambler based on their responses to the individual PGSI items.

Table A.14 shows endorsement rates for each of the nine PGSI items. Estimates ranged from 66% of problem gamblers who said that they chased their losses most of the time/always to 19% of problem gamblers who borrowed money to gamble most of the time/always. Borrowing money to gamble stood out as having the lowest endorsement rates and typically between 40- 54% of problem gamblers endorsed the other behaviours most of the time/always.

There were some variations in endorsement by age. For example, those aged 55 and over were less likely to say that they chased their losses at least most of the time when they gambled than younger age groups (53% for those aged 55 and over, 77% for those aged 18-34). Also related to finances, younger problem gamblers were more likely to say that they bet more than they could afford to lose most of the time or more often when they gambled (65% for those aged 18-35; 51% for those aged 55 and over). Finally, at the margins of statistical significance, older participants were less likely to endorse that their gambling caused health problems most of the time, 28% vs 41% for those aged 18-34.

Along with these variations, the most highly endorsed items also varied among each age group. For those aged 18-35, chasing losses, feeling guilty about gambling and betting more than you could afford to lose were the items endorsed most often. For those aged 35-54, it was feeling guilty, chasing losses and gambling causing financial difficulties whereas for those aged 55 and over, the most highly endorsed items were feeling guilty, feeling that you had gambling problems and betting more than you could afford to lose.

This suggests that within problem gamblers some groups of people may experience a different range of problems with their gambling behaviour, and specifically that chasing losses is not as prominent among older problem gamblers as it is for younger ones. The next section explores this in more detail.

5.4 Latent Class Analysis of problem gamblers

5.4.1 LCA classes

As Section 5.3 showed problem gamblers displayed a different range of issues with their gambling behaviour. In this section, LCA was used to identify different types of problem gamblers based on their pattern of responses to the nine PGSI

criteria. Once these types were identified, regression models were produced to identify the factors associated with membership of each group.

The LCA technique identifies how gambling behaviours cluster into homogeneous groups of gamblers based on individual response patterns to the PGSI questions. LCA has advantages over traditional clustering methods as it allows membership of classes to be assigned on the basis of statistical probabilities. The process of classification allows the identification of those behaviours which cluster together, and the labelling of the classes in a manner which is meaningful and interpretable.

A key question in exploratory LCA is how many classes the sample should be divided into. There is no definitive method to determine the optimal number of classes. Because models with different numbers of latent classes are not nested, this precludes the use of a difference likelihood-ratio test. Therefore, we rely on measures of fit such as Akaike's Information Criterion (AIC) and the Bayesian Information Criterion (BIC) instead. When comparing different models with the same set of data, models with lower values of these information criteria are preferred. The resulting classes also have to be interpreted. For this report, interpretability had primary importance when deciding on the final number of classes. The technical details behind the chosen LCA models are presented in Appendix B.

Using LCA, four classes of problem gambler were identified:

Class 1: This group represented 50% of problem gamblers and people assigned to this group had average PGSI scores of 10.4. This was the lowest of all problem gambling classes, though mean scores were similar to Class 3. After chasing losses, the most heavily endorsed PGSI item among this group was feeling guilty about what happens when you gamble. 42% of this group reported this was something that they felt most of the time when they gambled. 19% said that they always felt guilty about what happens when they gamble. Around one in three of this group (31%) also said that they felt that they had problems with their gambling behaviour at least most of the time. Therefore, whilst there were a diverse range of problems reported among people within this group, feelings of guilt, feeling that they had a problem when gambling and chasing were the primary issues noted. This group has been named **introspective problem gamblers**.

Class 2: This group represented 31% of problem gamblers and people in this class had a mean PGSI score of 18.5, indicating that they generally experienced a broader range of problems with their gambling more often than Class 1. Over 80% of this group stated that they bet more than they could afford to lose (88%), chased their losses (87%), felt guilty about their gambling (84%) and that their gambling had led to financial difficulties (81%) at least most of the time when they gambled. 80% also said that they felt that they had

problems with their gambling most of the time they gambled, showing a good level of self-awareness of issues among this group. For this reason this group has been called **diverse self-aware problem gamblers**. They have a diverse range of issues but generally appear to be broadly aware that their gambling causes problems.

Class 3: This group represented 13% of problem gamblers and members of this class had an average PGSI score of 11.2, indicating a lesser range of problems experienced than Classes 2 and 4. The pattern of problems reported by this group were especially interesting as they were dominated by chasing losses (93%), betting more than one could afford to lose (85%) and needed to gamble with larger amounts of money (75%) to get the same excitement. Less than 25% of this group endorsed any of the other PGSI items. Notably only 8% reported feeling guilty about gambling and 18% felt they had a problem with their gambling at least most of the time. This group either did not believe their gambling was problematic or were in denial (or both). Their issues related to loss of control (chasing and spending more than you can afford) and tolerance. For this reason this group is called **control-loss problem gamblers**.

Class 4: This final group represented 6% of problem gamblers. They had mean PGSI scores of 25.5 meaning that this group experienced all of the PGSI criteria nearly all of the time. Their range of problems and the frequency with which they experienced these issues were very severe. For example, everyone in this group (100%) said that they chased their losses, bet more than they could afford to lose, had financial problems, felt guilty about their gambling and felt they had a gambling problem at least most of the time when they gambled. Everyone in this group stated that they almost always felt that they had a problem with their gambling (100%). The range and depth of the problems experience were very broad and this group were aware that their gambling was problematic. For this reason people in this this group were called **severe aware problem gamblers**.

5.4.2 Factors associated with LCA class membership

Table A.15 shows the socio-demographic profile of each LCA group. The only characteristics which significantly varied between LCA classes were age and ethnicity. Those who were younger (aged 18-34) were less likely to be introspective problem gamblers and more likely to be control-loss problem gamblers. With regards to ethnicity, those from non-white ethnic groups were more likely to be either control-loss or diverse self-aware problem gamblers. Nearly half of each class were from non-White/White British ethnic backgrounds.

Table A.16 shows the self-reported gambling behaviours of each class. Whilst the number of gambling activities engaged in did not vary between classes, self-reported frequency of gambling did (see Figure 5.8). Those who were

introspective problem gamblers reported gambling less often on their most frequent gambling activity than all other groups. 62% of severe aware problem gamblers gambled everyday and between 46-48% of diverse self-aware and control-loss problem gamblers gambled everyday. It is notable that the frequency of gambling between these two groups is similar despite having a very different depth and breadth of gambling problems.

Figure 5:8 Prevalence of gambling everyday, by LCA group

Base: Problem gamblers

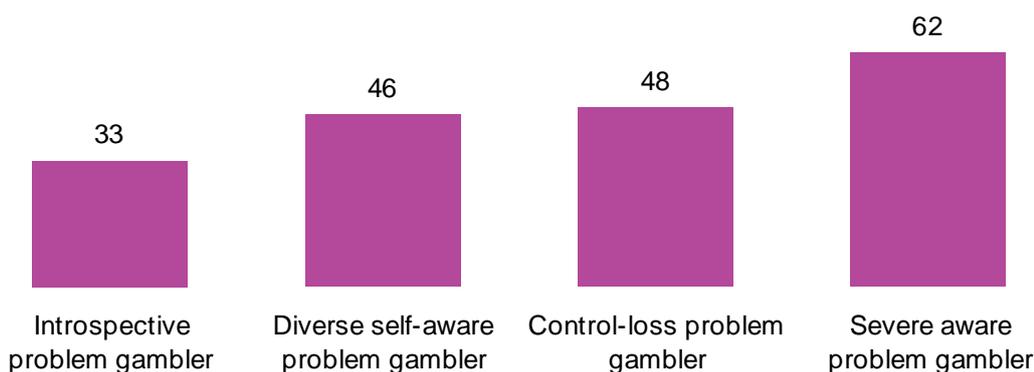


Table A.16 also shows that severe aware problem gamblers were most likely to report that machines were their most frequent form of gambling (64%) and that nearly all this group (91%) felt that they had problems with their machine play. Finally, some limited analysis was possible looking at how machine play behaviour varied between classes. There were no significant differences in average stake sizes between classes nor were there differences in the average sessions played per week. Average session length was shorter among severe aware problem gamblers than other groups (around 10 minutes vs 17 minutes or more for other classes). Because of small bases sizes, analysis looking at player losses could not be undertaken.

However, focus on these averages masks some interesting patterns in the distributions of machine play by each gambling group. For example, whilst average stake sizes did not vary significantly, the median stake size among severe problem gamblers was £12.14p compared with £7.60 for diverse self-aware problem gamblers. Figure 5.9 shows the distribution of stake sizes for each class of problem gambler and shows that from the 30th centile onwards, stake sizes among severe aware problem gamblers were consistently higher than those in other groups. Figure 5.10, however, shows that the distribution of sessions per week was broadly similar for each group up until the 80th centile when average sessions per week were slightly lower among severe aware problem gamblers than other problem gamblers.

Figure 5:9 Distribution of average stake sizes (pence), by LCA group

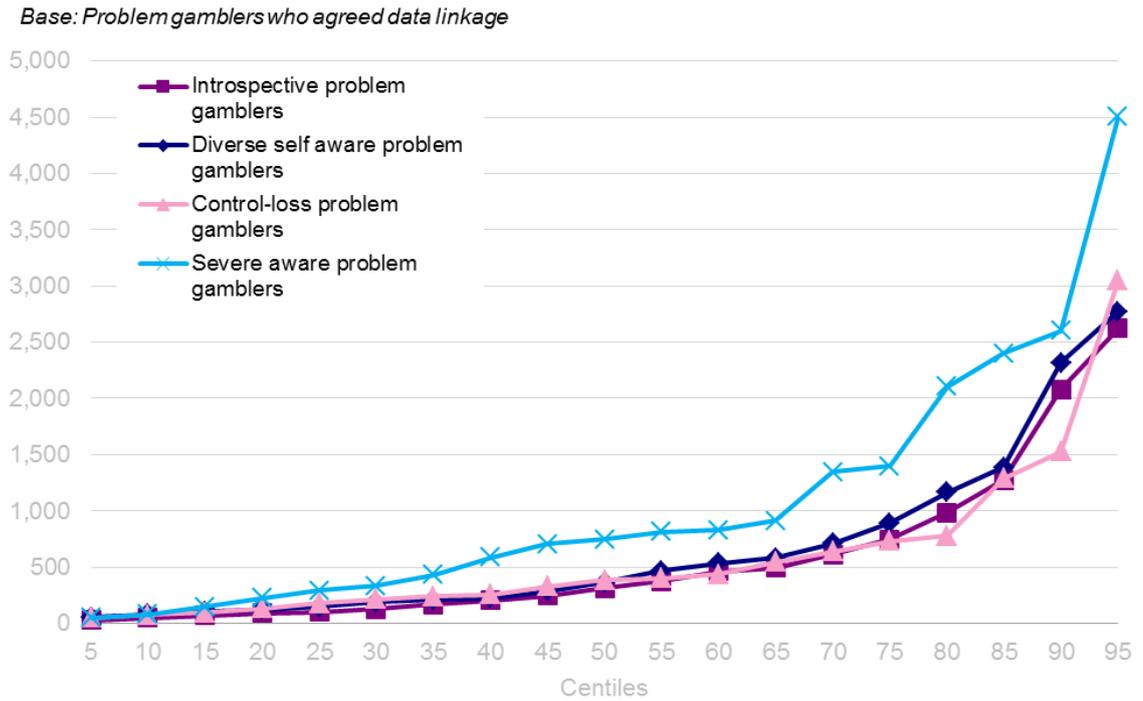
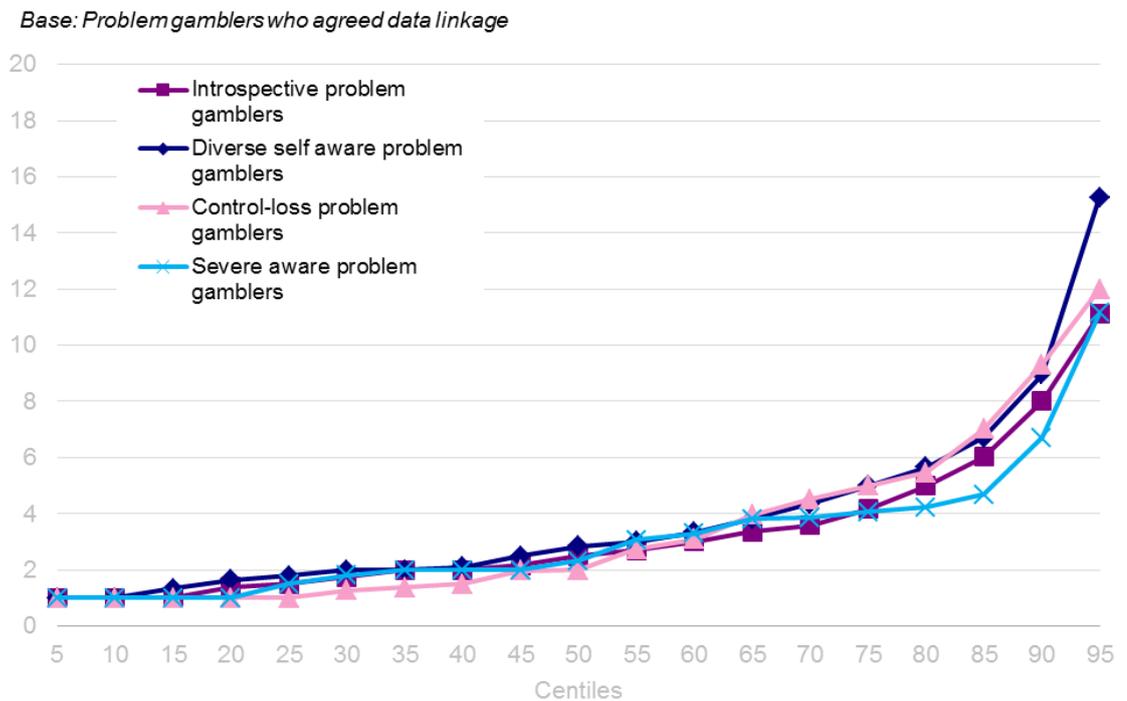


Figure 5:10 Distribution of average number of sessions per week, by LCA group



Finally, binary logistic regression was used to model the factors associated with being a member of each problem gambling class as opposed to be another type of problem gambler. The factors included in each model were:

-
- Age
 - Sex
 - Economic activity
 - Ethnicity
 - Income
 - Deprivation
 - Number of gambling activities undertaken
 - Frequency of gambling
 - Whether machines were problematic or not for the gambler
 - Whether machines were the most frequent form of gambling and,
 - Whether the player had ever placed a maximum bet of £100.

For **introspective problem gamblers**, factors significantly associated with membership of this group were age, ethnicity, frequency of gambling, whether machines were the most frequent gambling activity and self-perceived problems with machine gambling. Odds of being an introspective problem gambler were significantly higher among older age groups, being 2.14 times higher among those aged 55 and over than those aged 18-34. The odds of being an introspective problem gambler were lower among non-White ethnic groups than those who were White/White British. They were also 0.55 times lower among those for whom machines were the most frequent form of gambling. Odds of belonging to this group were higher if you gambled less frequently than other problem gamblers and higher if you had fewer problems with your machine play. Generally, this group seemed less involved in gambling generally and machine play specifically than other problem gamblers.

For **diverse self-aware gamblers**, ethnicity, whether machines were the most frequent form of gambling and self-perceived problems with machine play were significantly associated with membership of this group. Those from Asian/Asian British and Black/Black British groups had odds of being a diverse self-aware problem gambler that were between 1.59 to 2.15 times higher than those who were White/White British. The odds of belonging to this group were 1.53 times higher among those who said that machines were their most frequent form of gambling activity. Those who said that they always had problems with their machine gambling behaviour had higher odds of belonging to this group. Differentiating factors for this group of problem gamblers were both machine gambling and ethnicity.

For **control-loss problem gamblers**, factors associated with group membership were sex, age, frequency of gambling activity and machine problems. Compared with other problem gamblers, the odds of being a control-loss problem gambler were 3.1 times higher among women than men and were higher among younger age groups. Interestingly, the odds of belonging to this group were 10 times higher among those said that they had never felt they had a problem with their machine gambling than those who felt that they always had a problem with their machine play. Typically, the odds of belonging to this group were lower if people gambled less frequently than everyday. A range of socio-demographic and gambling behaviour characteristics distinguish this group from other problem gamblers. They are more likely to be highly engaged gamblers but not to feel that they have problems with their machine play.

Finally, the factors associated with being a **severe aware problem gambler** were whether machines were the most frequent form of gambling and whether people felt they had problems with their machine play. Odds of being a severe aware problem gambler were 2.13 times higher among those for whom machine gambling was their most frequent activity and 24 times higher among those who felt that they had problems with their machine gambling at least most of the time. This latter result is not surprising given the high levels of self-awareness of problems and high frequency of gambling on machines among this group.

6 Differences between B2, B3 and mixed game type machine players

Among regular users of loyalty cards, 45% played a mix of B2 and B3 games, 34% mainly played B2 games and 21% mainly played B3 games. Those who played a mix of B2 and B3 games were more engaged with gambling generally and machine gambling specifically. On average, this group lost the most money on machines between September 2013 and June 2014. Those playing mainly B2 games were younger and more likely to be male and were less engaged in other forms of gambling. Those mainly playing B3 games were generally older and had a greater proportion of women than other groups. Notably, the average losses and levels of gambling engagement among mainly B3 players were similar to those who played a mix of B2 and B3 games.

6.1 Methods

In order to examine the differences between machine players based on the types of games they preferred, three mutually exclusive categories were created:

- Those who mainly gambled on B2 games (those with a maximum stake of £100): this was anyone who played B2 games for more than 90% of their machine gambling.
- Those who mainly gambled on B3 games (those with a maximum stake of £2): this was anyone who played B3 games for more than 90% of their machine gambling.

- Those who gambled on a mix of B2 and B3 games: this was anyone where their gambling on either B2 games or B3 games was less than 90% of their total machine gambling. There were some participants (n = 16) whose preferred games were category C and they played B2 or B3 games less than 10% of the time. These people have been excluded from this analysis.

As previously, to ensure we have a full picture of participant’s machine play, analysis in this section is limited to those who reported using their loyalty card at least most of the time when they gambled on machines.

6.2 Prevalence of machine game preferences by socio-economic factors

Overall, 34% of participants who used their loyalty card regularly were mainly B2 game machine gamblers. 21% were mainly B3 game machine gamblers and 45% were mixed B2 and B3 game machine gamblers.

Table A.22 shows how prevalence of game preferences varied by a range of socio-economic characteristics. Significant differences were only observed for age and sex. Women were more likely than men to mainly play B3 games and conversely men were more likely than women to mainly play B2 games. Those who were younger (18-24) had significantly higher rates of mainly playing B2 games than other age groups. See Figures 6.1 and 6.2.

Figure 6:1 Prevalence of machine game preferences, by age group

Base: All who agreed data linkage and used loyalty card most of the time/always

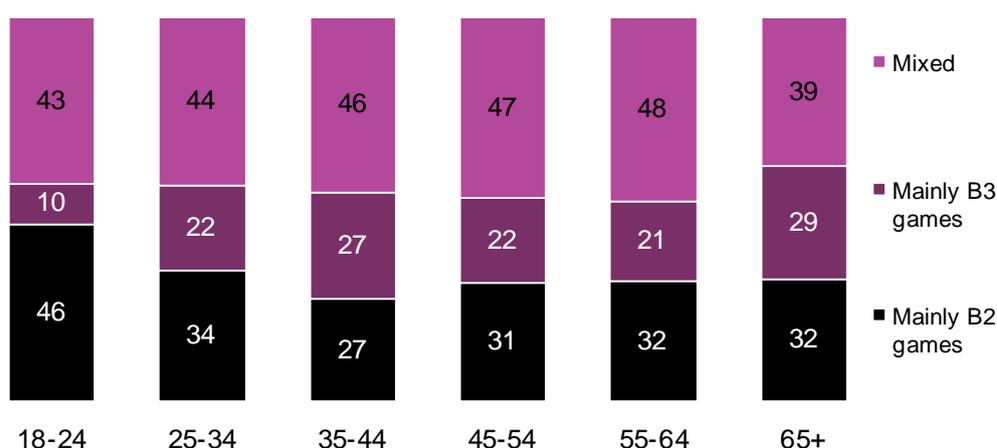
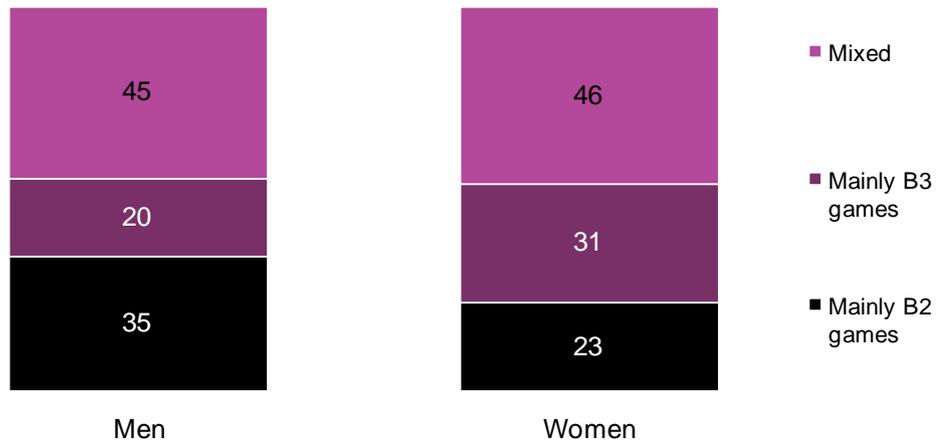


Figure 6:2 Prevalence of machine game preferences, by sex

Base: All who agreed data linkage and used loyalty card most of the time/always



6.3 Prevalence of machine game preferences by self-reported gambling behaviour

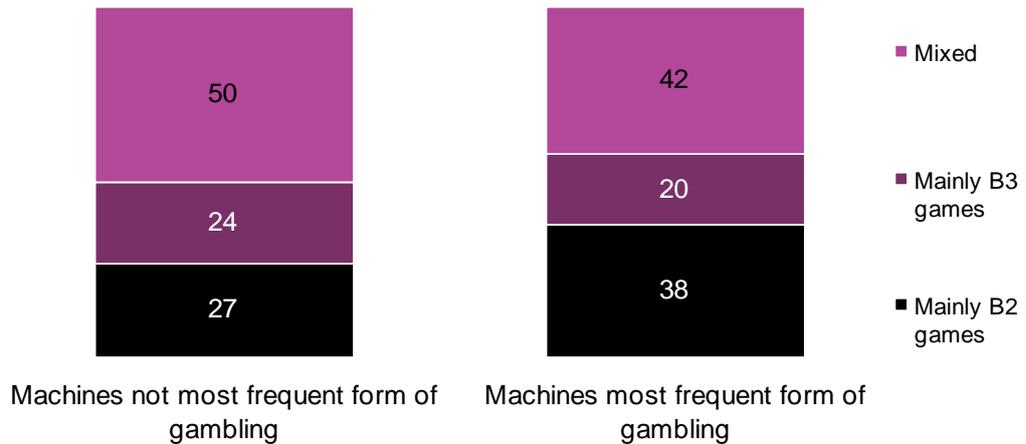
Table A.23 shows the prevalence of machine game preferences by self-reported gambling behaviour. The prevalence of mainly playing B2 games varied according to the number of other gambling activities undertaken and whether machines were the most frequent form of gambling. For example, rates of mainly playing B2 games were highest among those who engaged in less than two other gambling activities in the past four weeks (40%) and were lower among those who engaged in more than nine other gambling activities in the past four weeks (31%). Correspondingly, over half (51%) of those who engaged in nine or more gambling activities played a mix of B2 and B3 games whereas only 36% of those who engaged in less than two gambling activities reported the same. This suggests that those who mainly play B2 games are less engaged in other gambling activities whereas those who play a mix of both B2 and B3 are more engaged in other forms of gambling.

Figure 6.3 shows how machine game preferences varied based on whether machines were the most frequent form of gambling or not. Among those for whom machines were the most frequent form of gambling, the prevalence of mainly playing B2 games was higher (38%) than those who for whom machines were not the most frequent form of gambling (27%).

Therefore, among those for whom machines are the most frequent form of gambling there is an increased preference for B2 games.

Figure 6:3 Prevalence of machine game preferences, by sex

Base: All who agreed data linkage and used loyalty card most of the time/always



Prevalence of machine games preferences did not vary significantly according to any of the other self-reported gambling behaviours shown in Table A.23.

Problem gambling prevalence rates did not vary by machine game preference (21% for mainly B2 game gamblers, 19% for mainly B3 game gamblers and 20% for mixed game gamblers) and mean PGSI scores were broadly similar (table not shown).

6.4 Machine play behaviour by game preferences

Table A24 shows how machine play behaviour varied among those with different game preferences. Some caution needs to be exercised when reviewing these results as many of the patterns evident are a direct reflection of structural differences between B2 and B3 games. For example, the average stake size was higher among those who played mainly B2 games and lower among those who mainly played B3 games. This is not surprising given differences in the maximum legal stake size between B2 and B3 games. Average session length did not vary by game preference though the average number of sessions played per week did, being lower among those who mainly played B2 games (2.8 sessions per week) and higher among those who played a mixed of B2 and B3 games (4.6 sessions per week). This further suggests that those who play a mix of B2 and B3 games are more highly engaged in gambling and machine gambling specifically.

Perhaps as a reflection of these different levels of engagement, average losses were lower among those who mainly played B2 games (£252 between September 2013 and June 2014) and higher among those whose played a mix

of B2 and B3 games (£750). Losses among those who mainly played B3 games were £693. This group played an average of 3.9 machine sessions per week, in terms of levels of engagement they were similar to mixed game players. B3 games have a lower return to player percentage than B2 games so greater losses compared with mainly B2 game gamblers, combined with increased engagement, are perhaps to be expected.

6.5 Factors associated with machine game preferences

Binary logistic regression was used to model the factors associated with being a mainly B2 game machine player, a mainly B3 game machine player and a mixed B2 and B3 game machine player. The factors entered into the model were those from Tables A22 and A23.

The results broadly support the findings from the bi-variate analysis presented in Sections 6.2 and 6.3.

The factors associated with being a mainly B2 game machine gambler were:

- Age (the odds were higher among older age groups than those age 18-34)
- Sex (the odds were 0.54 times lower among women)
- Number of gambling activities (the odds decreased by 0.94 for every additional gambling activity undertaken)
- Whether machines were the most frequent form of gambling (the odds were 0.6 times lower among those for whom machine gambling was their most frequent activity).

The factors associated with being a mainly B3 game machine gambler were:

- Sex (the odds were 1.6 times higher among women than men)
- Age (the odds were between 2-3 times higher among those aged 25 and over than those aged 18-24).

Finally, the factors associated with being a mixed B2 and B3 game machine gambler were:

- Number of gambling activities undertaken (odds were typically higher among those who engaged in a greater number of other gambling activities)

-
- Whether machines were the most frequent form of gambling (odds were 1.3 times higher among those for whom playing machines in a bookmakers were the most frequent form of gambling).

7 Conclusions

- This report analyses gambling behaviours among those holding a loyalty card for one of three bookmakers. Results are not generalisable to all machine players but are generalisable to loyalty card holders, especially those who use their card regularly.
- This report highlights that among loyalty card holders who play machines in bookmakers, there was a somewhat uneven distribution of losses by problem gambling and at-risk status.
- Those who were moderate risk or problem gamblers lost a higher amount of money per person than low risk or non-problem gamblers. They also lost a slightly greater amount of money than would have been expected if losses were distributed proportionately among all types of gambler. For example, 26% of losses were attributable to 23% of problem gamblers.
- These differences were of smaller magnitude than previous estimates have suggested. This is likely to be due to the skewed nature of the sample with non-problem gamblers sharing more similar attributes to problem gamblers.
- There was a wide variation in how much individuals lost and there is partial evidence that the Pareto Principle was in operation, with a greater proportion of losses coming from a minority of gamblers. Among loyalty card holders the distribution was roughly that 20% of people accounted for around 65-70% of losses.
- Those who lost the most money on machines tended to be older adults. There was no evidence that they had greater levels of personal wealth as income levels were broadly similar to those who lost the least.
- Those who lost the most were heavily engaged in machine gambling. For the majority, playing machines was their most frequent form of gambling engagement and they engaged in a slightly narrower range of other activities – suggesting greater focus on machine play.
- Problem gambling prevalence was significantly higher among those who lost the most money, with over half of this group being either a moderate risk or problem gambler.
- Losing more money on machines was also related to the way these people gambled on them, typically playing machines more often, for longer and staking greater amounts of money.

-
- In the regression models, two different measures of machine play frequency were associated with losing the most money – this was both the number of days played and the number of sessions per week. Whilst average stake size was not significant in the final model, whether someone had ever placed £100 bet was. This deserves further investigation of the staking patterns among this group. Session length was also significant; the longer the session length the greater the likelihood of losing the most money on machines.
 - Taken together, regular loyalty card holders who lost the most money on machines would appear to be more focused on machines as their primary activity and play them more frequently, at higher stakes and for longer periods of time than others.
 - Since April 2015, new rules have been brought in for those wishing to stake £50 per bet or higher on machines. The data in this report pre-dates this change and therefore provides useful background context for future assessment of the impact of this change.
 - Those from minority ethnic groups emerged as those most likely to have ever placed a maximum stake bet (£100), to have used it more often and to start their session of play with a £100 bet.
 - Those who were unemployed were just as likely as other groups to have ever placed a £100 bet but were more likely to use the maximum stake more often. Self-employed people were also more likely to ever placed a £100 bet.
 - Those using the maximum stake tended to be more highly engaged in machine gambling than those who did not, being more likely to say that playing machines in bookmakers was their most frequent form of gambling and having a higher average number of machine sessions per week.
 - The relationship between proportion of maximum stake bets placed and total losses was not linear. It appeared to be moderated by frequency of play resulting in similar levels of losses among those who used the maximum stake more often when they bet and those who used it less often.
 - Problem gamblers were also more likely to have ever used a maximum stake bet and to have used it more often. Higher problem gambling scores were significantly associated with using the maximum stake in 5% or more bets.
 - The new rules around how stakes of £50 or more are placed should be evaluated to see what impact they have on the (potentially) vulnerable groups identified in this report who were more likely to use a maximum

stake bet: namely the unemployed, problem gamblers and those from minority ethnic groups.

- There were four different types of problem gamblers evident. This ranged from those where feelings of guilt and awareness of problems, alongside chasing, were the primary characteristics. This group were called introspective problem gamblers. There was a further group whose problems were dominated by loss of control. The remaining two groups of problem gamblers had a broad diversity of problems. 6% of problem gamblers were aware that they had issues and reported experiencing nearly all difficulties asked about.
- A mix of gambling behaviour and socio-demographic variables distinguished between these groups. Those from non-white ethnic groups were less likely to be introspective problem gamblers and more likely to be diverse aware problem gamblers. Younger people were more likely to be control-loss problem gamblers and less likely to be introspective problem gamblers. Severe aware problem gamblers were more likely to say they had problems with machine gambling and that playing machines was their most frequent form of gambling.
- It is notable that both severe aware and diverse aware problem gamblers, who had the broadest range of issues with their gambling behaviour, were both most likely to say that machines were their most frequent form of gambling activity.
- Among regular users of loyalty cards, 45% played a mix of B2 and B3 games, 34% mainly played B2 games and 21% mainly played B3 games. Those who played a mix of B2 and B3 games were more engaged with gambling generally and machine gambling specifically. On average, this group lost the most money on machines between September 2013 and June 2014.
- Those playing mainly B2 games were younger and more likely to be male and were less engaged in other forms of gambling. Those mainly playing B3 games were generally older and had a greater proportion of women than other groups. Notably, the average losses and levels of gambling engagement among mainly B3 players were similar to those who played a mix of B2 and B3 games.
- Interestingly, although those who mainly played B2 games were, on average, less engaged in gambling generally and machines specifically, they had problem gambling rates similar to other groups (21% among mainly B2 game gamblers, 19% among mainly B3 game gamblers and 20% among mixed game gamblers). This may be related to the age and sex profile of this group (male, younger) but warrants further investigation.

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Appendix A. Tables

Appendix Table A.1 Total loss distribution (Sept 2013-June 2014), by problem gambling status

Base: All who agreed data linkage

Losses (pence)	PGSI status				
	Non-problem gambler	Low risk gambler	Moderate risk gambler	Problem gambler	All
Mean	34237	33624	45364	44883	39220
5 th centile	-16180	-25999	-27218	-25320	-24310
10 th centile	-5250	-9235	-7160	-10616	-7415
15 th centile	-1920	-4990	-2234	-3552	-2784
20 th centile	-758	-1528	-360	-940	-900
25 th centile	100	-100	200	66	60
30 th centile	500	200	723	500	427
35 th centile	920	500	1505	1240	1000
40 th centile	1356	1100	2547	2503	1660
45 th centile	1870	2020	4376	4317	2806
50 th centile	3180	3156	6455	6631	4300
55 th centile	4242	4723	9142	9640	6730
60 th centile	7055	7863	13349	16300	10300
65 th centile	10881	12607	17168	23458	15034
70 th centile	16440	17580	26076	32800	22141
75 th centile	24241	26878	39184	44404	32539
80 th centile	36166	44212	57388	60072	48990
85 th centile	59721	64350	87810	92238	76060
90 th centile	104295	105685	137261	142545	120570
95 th centile	171756	188551	245438	241693	212010
<i>Bases</i>					
<i>Weighted</i>	1143	968	961	919	3992
<i>Unweighted</i>	1089	923	1025	951	3988

Appendix Table A.2 Socio-economic profile by loss quintile

Base: All who agreed data linkage & used loyalty cards most of the time/always

Socio-economic characteristic	Total loss quintile				
	Lowest loss quintile	2 nd	3rd	4th	Highest loss quintile
	%	%	%	%	%
Sex					
Men	87	89	88	88	84
Women	13	11	12	12	16
Age					
18-24	21	22	14	2	2
25-34	28	24	15	19	7
35-44	17	18	20	17	13
45-54	18	18	26	28	31
55-64	12	10	18	21	28
65+	5	7	7	15	19
Ethnicity					
White/White British	85	90	85	82	88
Asian/Asian British	5	2	5	5	4
Black/Black British	6	4	5	9	4
Other	5	3	5	4	4
Economic activity					
Paid work	54	53	47	50	45
Self-employed/freelance	11	13	16	13	18
Retired	8	8	10	17	22
Student	5	2	1	-	-
Looking after family or home	3	3	5	4	4
Long term sick/disabled	6	10	9	10	3
Unemployed	12	11	13	6	8
Personal income					
Has personal income of less than £10,400	23	23	27	25	18
£10,400 to £15,599	19	21	24	20	21
£15,600 to £25,599	26	22	20	22	28
£26k +	32	35	29	32	34

Appendix Table A.2 Socio-economic profile by loss quintile

Area deprivation					
Lives in most deprived area in England, Scotland or Wales	27	31	37	32	28
<i>Bases</i>					
<i>Weighted</i>	630	600	322	229	158
<i>Unweighted</i>	448	448	448	448	447

Appendix Table A.3 Gambling behaviour, by loss quintile

Base: All who agreed data linkage & used loyalty cards most of the time/always

Gambling behaviour	Total loss quintile				
	Lowest loss quintile	2 nd	3rd	4th	Highest loss quintile
	%	%	%	%	%
Number of gambling activities undertaken in past 4 weeks					
None in the past 4 weeks	4	2	3	0	-
1-2	13	16	14	11	12
3-4	26	29	27	38	41
5-6	27	24	32	27	27
7-8	16	16	15	14	13
9 or more	13	12	10	9	7
Frequency of gambling on most frequent activity					
Everyday/almost everyday	27	22	30	28	33
4-5 days per week	13	17	14	16	19
2-3 days week	30	33	29	39	38
About once a week	19	20	18	13	9
Less than once a week	6	6	6	4	1
Did not gamble on this in past 4 weeks	4	2	3	0	-
Whether machines were most frequent activity					
Yes	30	27	43	54	61
No	70	73	57	46	39
Problem gambling severity index group and score					
Non-problem gambler (score 0)	29	34	26	30	27
Low risk gambler (score 1-2)	28	24	23	22	21
Moderate risk gambler (score 3-7)	24	26	24	28	27
Problem gambler (score 8+)	18	16	27	21	25
Whether felt had problems with machines					

Appendix Table A.3 Gambling behaviour, by loss quintile

Almost always	5	8	10	9	5
Most of the time	5	3	8	6	8
Some of the time	17	21	21	27	32
Never	74	69	61	58	55
<i>Bases</i>					
<i>Weighted</i>	630	600	322	229	158
<i>Unweighted</i>	448	448	448	448	448

Appendix Table A.4 Machine gambling behaviour, by loss quintile

Base: All who agreed data linkage & used loyalty cards most of the time/always

Machine gambling behaviour	Total loss quintile				
	Lowest loss quintile	2 nd	3rd	4th	Highest loss quintile
Ever staked a £100 bet					
Yes	9%	4%	20%	36%	52%
No	91%	96%	80%	64%	48%
Ever started a session with £100 bet					
Yes	3%	1%	5%	10%	21%
No	97%	99%	95%	90%	79%
Average stake size (pounds)					
Mean	5.63	4.05	4.86	5.30	8.04
Standard error of the mean	0.55	0.34	0.47	0.44	0.99
Median	2.68	2.19	2.27	2.30	2.64
Average session length (seconds)					
Mean	864	900	1014	1124	1320
Standard error of the mean	83.16	70.22	65.40	77.47	46.30
Median	413	491	718	874	1182
Number of days visited*					
Mean	19	20	42	71	113
Standard error of the mean	1.45	1.38	2.18	3.65	4.33
Median	8	11	31	61	107
Average sessions per week					
Mean	2.6	2.5	4.4	6.0	9.8
Standard error of the mean	0.13	0.09	0.26	0.30	0.43
Median	2.0	2.0	3.4	4.9	7.7
Bases					
<i>Weighted</i>	628	600	322	229	158
<i>Unweighted</i>	447	448	448	448	448

- This analysis is limited to those participants who used their loyalty card in September 2013 in order to standardise the time period under consideration.

Appendix Table A.5 Odds ratios for highest lost quintile

Base: All who agreed data linkage & used loyalty cards most of the time/always

Gambling behaviour	Odds ratio	95% Confidence interval	
		(lower)	(higher)
Age (p<0.000)			
18-24	1		
25-34	5.36	2.30	12.51
35-44	7.52	3.22	17.58
45-54	8.28	3.78	18.15
55-64	9.15	4.01	20.88
65 and over	7.53	3.11	18.19
Ever placed a £100 stake (p<0.000)	2.96	2.07	4.22
Number of days gambled on machines (p<0.000)	1.02	1.02	1.02
Average session length (p<0.000)	1.0003	1.0003	1.0004
Average number of sessions per week (p<0.000)	1.11	1.06	1.15

Appendix Table A.6 Prevalence of placing £100 bet, by various socio-economic characteristics

Base: All who agreed data linkage & used loyalty card most of the time/always

Socio-economic characteristics		Whether ever placed £100 bet						
		Never placed a £100 bet	Placed a £100 bet in less than 1% of bets	Placed a £100 bet in between 1% to less than 5% of bets	Placed a £100 bet in 5% of more of bets	Ever placed a £100 bet	Bases (weighted)	Bases (unweighted)
Sex								
Male	%	83	11	4	2	17	1942	1695
Female	%	88	9	3	-	12	297	243
Age								
18-24	%	91	5	3	2	9	216	317
25-34	%	89	6	3	2	11	377	421
35-44	%	86	9	4	1	14	345	335
45-54	%	76	17	4	3	24	563	416
55-64	%	82	12	4	2	18	446	286
65 and over	%	80	17	3	0	20	280	158
Ethnicity								
White/White British	%	86	10	3	1	14	1911	1915
Asian/Asian British	%	68	14	12	6	32	101	119
Black/Black British	%	63	20	13	5	37	123	140
Other	%	75	15	4	5	25	105	115
Personal income								
Less than £10,400	%	82	12	4	1	18	485	410
£10,400 to £15,599	%	85	10	4	1	15	424	360
£15,600 to £20,799	%	86	10	3	2	14	306	277
£20,800 to £31,199	%	87	10	2	2	13	461	404
£32k or more	%	81	10	6	2	19	341	303
Economic activity								
Paid employment	%	85	10	3	2	15	1085	995
Self-employed/freelance	%	77	14	7	2	23	306	253
Retired	%	81	15	3	1	19	335	204
Full time education	%	97	2	1	-	3	31	50

Appendix Table A.6 Prevalence of placing £100 bet, by various socio-economic characteristics

Looking after family/home	%	87	10	3	0	13	83	68
Long term sick or disabled	%	85	8	6	0	15	164	155
Unemployed	%	84	9	2	5	16	230	209
Area deprivation								
Lives in most deprived area in England, Scotland or Wales	%	87	8	3	0	11	1317	1291

Appendix Table A.7 Prevalence of starting a session with £100 bet, by various socio-economic characteristics

Base: All who agreed data linkage & used loyalty card most of the time/always

Socio-economic characteristics		Whether started a session with a £100 bet							
		Never placed £100 bet	Bet £100 but never started session with this amount	Started less than 1% of sessions with £100 bet	Started between 1% to less than 5% session with £100 bet	Started 5% or more of sessions with £100 bet	Ever started a session with £100 bet	Bases (weighted)	Bases (unweighted)
Sex									
Male	%	83	11	2	2	1	5	1942	1695
Female	%	88	8	3	2	0	5	297	243
Age									
18-24	%	91	6	-	1	2	3	216	317
25-34	%	89	6	2	2	2	5	377	421
35-44	%	86	10	1	3	0	4	345	335
45-54	%	76	18	3	3	1	6	563	416
55-64	%	82	12	4	1	1	6	446	286
65 and over	%	80	15	4	0	0	5	280	158
Ethnicity									
White/White British	%	86	9	2	1	1	4	1911	1673
Asian/Asian British	%	68	22	2	2	6	10	101	79
Black/Black British	%	63	26	4	6	1	11	123	103
Other	%	75	18	3	4	0	8	105	83
Personal income									
Less than £10,400	%	82	12	2	3	1	5	485	410
£10,400 to £15,599	%	85	12	2	1	1	3	424	360
£15,600 to £20,799	%	86	9	3	0	2	5	306	277
£20,800 to £31,199	%	87	7	3	2	1	6	461	404
£32k or more	%	81	12	2	2	2	7	341	303
Economic activity									
Paid employment	%	85	10	2	2	1	5	1085	995

Appendix Table A.7 Prevalence of starting a session with £100 bet, by various socio-economic characteristics

Self-employed/freelance	%	77	15	2	4	2	8	306	253
Retired	%	81	14	4	0	1	5	335	204
Full time education	%	97	3	-	-	1	-	31	50
Looking after family/home	%	87	11	0	1	-	2	83	68
Long term sick or disabled	%	85	11	2	1	0	4	164	155
Unemployed	%	84	11	2	2	1	6	230	209
Area deprivation									
Lives in most deprived area in England, Scotland or Wales	%	84	11	2	1	1	5	723	592

Appendix Table A.8 Prevalence of placing £100 bet by self-reported gambling behaviour

Base: All who agreed data linkage & used loyalty card always/most times

Socio-economic characteristics		Whether ever placed £100 bet						
		Never placed a £100 bet	Placed a £100 bet in less than 1% of bets	Placed a £100 bet in between 1% to less than 5% of bets	Placed a £100 bet in 5% of more of bets	Ever placed a £100 bet	Bases (weighted)	Bases (unweighted)
Number of gambling activities								
None in past 4 weeks	%	93	6	1	-	7	29	50
1 to 2	%	88	6	3	3	12	289	270
3 to 4	%	81	14	3	2	17	740	577
5 to 6	%	83	11	4	2	15	645	525
7 to 8	%	87	8	3	1	12	333	296
9 or more	%	83	10	6	1	16	204	219
Frequency of gambling in most frequent activity								
Everyday	%	76	15	6	3	21	690	515
4-5 days per week	%	82	13	3	2	16	378	292
2-3 days per week	%	85	10	3	2	13	758	631
About once a week	%	92	5	2	1	7	305	343
Less than once a week	%	89	6	1	3	7	79	106
Machines most frequent form of gambling activity								
Yes	%	77	15	5	3	20	1048	712
No	%	88	8	3	1	11	1192	1226
Problem gambling status								
Non-problem gambler	%	88	9	2	1	11	645	583
Low risk gambler	%	88	8	2	1	11	530	479
Moderate risk gambler	%	81	12	5	2	17	584	489
Problem gambler	%	76	15	5	4	20	481	388
Problems with machine play								
Almost always	%	72	17	8	2	25	171	137
Most of the time	%	78	14	4	3	18	141	103
Sometimes	%	79	14	5	2	19	510	408
Never	%	87	9	3	1	11	1417	1290

Appendix Table A.9 Prevalence of starting a session with £100 bet by self-reported gambling behaviour

Base: All who agreed data linkage & used loyalty card always/most times

Socio-economic characteristics	Whether started a session with a £100 bet								
	Never placed £100 bet	Bet £100 but never started session with this amount	Started less than 1% of sessions with £100 bet	Started between 1% to less than 5% session with £100 bet	Started 5% or more of sessions with £100 bet	Ever started a session with £100 bet	Bases (weighted)	Bases (unweighted)	
Number of gambling activities									
None in past 4 weeks	%	93	7	-	-	-	-	29	50
1 to 2	%	88	7	1	2	2	5	289	270
3 to 4	%	81	13	3	2	1	6	740	577
5 to 6	%	83	12	2	1	1	4	645	525
7 to 8	%	87	8	2	2	0	5	333	296
9 or more	%	83	11	2	3	1	5	204	219
Frequency of participating in most frequent activity									
Everyday	%	76	16	4	3	1	8	690	515
4-5 days per week	%	82	13	2	2	1	4	378	292
2-3 days per week	%	85	10	2	2	1	5	758	631
About once a week	%	92	6	1	0	1	2	305	343
Less than once a week	%	89	8	0	2	0	3	79	106
Whether machines were most frequent activity									
Yes	%	77	16	4	3	1	7	1048	712
No	%	88	8	1	1	1	4	1162	1174
Problem gambling status									
Non-problem gambler	%	88	9	2	1	1	3	634	561
Low risk gambler	%	88	8	2	1	1	4	522	469
Moderate risk gambler	%	81	13	3	1	2	6	580	484
Problem gambler	%	75	16	2	5	2	9	474	373
Problems with machine play									
Almost always	%	71	20	3	6	0	8	168	131
Most of the time	%	78	14	2	4	1	7	141	103
Sometimes	%	78	16	3	2	1	6	505	399
Never	%	87	9	2	1	1	4	1395	1253

Appendix Table A.10 Machine gambling behaviour by whether ever placed £100 bet

Base: All who agreed data linkage & used loyalty card always/most times

Machine play characteristics	Whether ever placed £100 bet				Total
	Never placed a £100 bet	Placed a £100 bet in less than 1% of bets	Placed a £100 bet in between 1% to less than 5% of bets	Placed a £100 bet in 5% of more of bets	
Stake size (pounds)					
Mean	3.87	5.89	14.41	42.55	5.17
Median	2.01	4.05	13.27	35.42	2.46
Standard error of the mean	0.17	0.38	1.23	5.29	0.24
Number of sessions per week					
Mean	3.2	7.8	6.9	5.7	3.9
Median	2.2	5.8	4.0	4.3	2.4
Standard error of the mean	0.09	0.32	0.95	0.79	0.09
Number of days played machines (Sept 2013 - June 2014)					
Mean	26	80	49	41	33
Median	11	62	31	21	14
Standard error of the mean	0.93	3.33	5.51	7.33	0.96
Session length (seconds)					
Mean	952	1047	969	1220	968
Median	549	806	668	709	579
Standard error of the mean	43.4	51.8	101.5	378.4	37.70
Total losses between Sept 2013 - June 2014 (pounds)					
Mean	356.80	1824.81	1152.28	1799.54	567.62
Median	60.75	1057.31	739.37	90.67	86.52
Standard error of the mean	21.59	134.39	231.98	629.96	28.04
<i>Bases</i>					
<i>Weighted</i>	1627	206	70	35	1627
<i>Unweighted</i>	1586	485	115	54	1586

Appendix Table A.11 Machine gambling behaviour by whether ever started a session with £100 bet

Base: All who agreed data linkage & used loyalty card always/most times

Machine play characteristics	Whether ever placed £100 bet				
	Never placed £100 bet	Bet £100 but never started session with this amount	Started less than 1% of sessions with £100 bet	Started more than 1% of sessions with £100 bet*	Total
Stake size (pounds)					
Mean	3.87	9.70	9.87	22.00	5.17
Median	2.01	6.20	6.24	10.34	2.46
Standard error of the mean	0.17	0.90	1.60	4.37	0.24
Number of sessions per week					
Mean	3.2	6.6	12.8	5.9	3.9
Median	2.2	5.2	9.3	4.0	2.4
Standard error of the mean	0.09	0.32	1.07	0.71	0.09
Number of days played machines (Sept 2013 - June 2014)					
Mean	27	67	121	39	33
Median	11	47	113	27	14
Standard error of the mean	0.93	3.26	6.46	4.49	0.96
Session length (seconds)					
Mean	953	985	1001	1324	968
Median	549	782	786	761	579
Standard error of the mean	43	45	78	267	37.70
Total losses between Sept 2013 - June 2014 (pounds)					
Mean	356.80	1351.25	3649.84	1396.81	567.62
Median	60.75	844.74	2507.48	574.11	86.52
Standard error of the mean	21.59	98.99	554.88	365.08	28.04
<i>Bases</i>					
<i>Weighted</i>	1627	213	42	56	1938
<i>Unweighted</i>	1586	434	126	94	2240

*This category has been combined with those who started more than 5% of sessions with a maximum stake bet because of small base sizes.

Appendix Table A.12 Odds ratios for ever placing a £100 bet

Base: All who agreed data linkage & used loyalty card most of the time/always

Gambling behaviour	Odds ratio	95% Confidence interval	
		(lower)	(higher)
Age (p<0.05)			
18-24	1		
25-34	0.96	0.52	1.77
35-44	1.09	0.58	2.02
45-54	1.91	1.08	3.38
55 and over	1.26	0.71	2.21
Ethnicity (p<0.01)			
White/White British	1		
Non White/White British	2.86	1.94	4.22
Machines were most frequent form of gambling (p<0.01)			
No	1		
Yes	1.51	1.11	2.06
Frequency of gambling (p<0.01)			
Gambled everyday/almost everyday			
4-5 days per week	0.77	0.51	1.17
2-3 days per week	0.69	0.49	0.97
About once a week	0.38	0.22	0.67
Less often	0.48	0.21	1.08
Average number of sessions per week (p<0.01)	1.18	1.13	1.24

Appendix Table A.13 Odds ratios for using a maximum stake in 5% or more bets

Base: All who agreed data linkage & used loyalty card most of the time/always

Gambling behaviour	Odds ratio	95%	95%
		Confidence interval (lower)	Confidence interval (higher)
Ethnicity (p<0.01)			
White/White British	1		
Non White/White British	3.20	1.46	7.03
Sex (p<0.01)			
Male	1		
Female	0.13	0.03	0.59
Problem gambling score (PGSI score) (p<0.01)	1.05	1.02	1.09
Average number of sessions per week (p<0.000)	1.05	1.01	1.09

Appendix Table A.14 PGSI item endorsement, by problem gambler LCA group

Base: All problem gamblers					
PGSI item	LCA group				
	Introspective problem gamblers	Diverse aware problem gamblers	Control-loss problem gamblers	Severe aware problem gamblers	All Problem gamblers
Mean PGSI score	10.4	18.5	11.2	25.5	14.0
Median	10	18	11	25	13
Standard error of mean	0.12	0.18	0.31	0.19	0.22
Bet more than could afford to lose most of the time/always	29%	88%	85%	100%	59%
Larger amounts of money most of the time/always	25%	60%	75%	93%	47%
Chased losses most of the time/always	43%	87%	93%	100%	66%
Borrowed money to gamble most of the time/always	5%	30%	15%	81%	19%
Felt had a problem with gambling most of the time/always	31%	80%	18%	100%	49%
Gambling caused health problems most of the time/always	19%	76%	4%	97%	40%
Gambling behaviour criticized most of the time/always	27%	58%	22%	93%	40%
Gambling caused financial problems most of the time/always	22%	81%	5%	100%	43%
Felt guilty about what happens when gamble most of the time/always	42%	84%	8%	100%	54%
<i>Bases</i>					
<i>Weighted</i>	511	318	137	65	1031
<i>Unweighted</i>	544	332	131	66	1073

Appendix Table A.15 Socio-economic profile, by problem gambler LCA group

Base: All problem gamblers

Socio-economic characteristic	LCA group				
	Introspective problem gamblers	Diverse aware problem gamblers	Control-loss problem gamblers	Severe aware problem gamblers	All Problem gamblers
	%	%	%	%	%
Sex					
Men	91	93	85	91	91
Women	9	7	15	9	9
Age					
18-34	35	41	54	46	40
35-54	49	49	36	42	47
55+	16	9	10	12	13
Ethnicity					
White/White British	70	52	56	67	62
Asian/Asian British	10	18	17	6	13
Black/Black British	11	16	18	23	14
Other	9	13	9	4	10
Economic activity					
Paid work	44	42	49	50	44
Self-employed/freelance	15	14	12	14	14
Retired	9	4	7	8	7
Student	3	1	3	2	2
Looking after family or home	3	6	6	1	4
Long term sick/disabled	11	9	6	11	10
Unemployed	16	25	17	14	19
Personal income					
less than £10,400	31	37	28	22	32
£10,400 to £15,599	23	22	24	30	23
£15,600 to £20,799	14	15	11	8	13
£20,800 to £31,199	21	17	21	34	21
£32k or more	10	9	16	6	10

Appendix Table A.15 Socio-economic profile, by problem gambler LCA group

Area deprivation					
Lives in most deprived area in England, Scotland or Wales	33	37	34	41	35
<i>Bases</i>					
<i>Weighted</i>	504	314	134	64	1016
<i>Unweighted</i>	539	327	127	64	1057

Appendix Table A.16 Gambling behaviour, by problem gambler LCA group

<i>Base: All problem gamblers</i>					
Gambling behaviour	LCA group				
	Introspective problem gamblers	Diverse aware problem gamblers	Control-loss problem gamblers	Severe aware problem gamblers	All problem gamblers
	%	%	%	%	%
Number of gambling activities undertaken in past 4 weeks					
None in the past 4 weeks	2	2	8	5	3
1-2	12	11	9	15	11
3-4	28	28	14	18	26
5-6	24	25	32	15	25
7-8	18	15	22	14	17
9 or more	16	20	15	32	18
Frequency of gambling on most frequent activity					
Everyday/almost everyday	33	46	48	62	41
4-5 days per week	21	19	14	14	19
2-3 days week	31	23	20	17	26
About once a week	9	7	5	0	7
Less than once a week	4	5	4	1	4
Did not gamble on this in past 4 weeks	2	2	8	5	3
Whether machines were most frequent activity					
Yes	46	60	53	64	52
No	54	40	47	36	48
Whether felt had problems with machines					
Almost always	17	52	13	91	32
Most of the time	21	23	15	5	20
Some of the time	45	18	39	0	33
Never	17	7	33	3	15
<i>Bases</i>					
<i>Weighted</i>	511	318	137	65	1031
<i>Unweighted</i>	544	332	131	66	1073

Appendix Table A.17 Machine gambling behaviour, by problem gambler LCA group

Base: All problem gamblers who agreed data linkage

Machine gambling behaviour	LCA group				
	Introspective problem gamblers	Diverse aware problem gamblers	Control-loss problem gamblers	Severe aware problem gamblers	All problem gamblers
Average stake size (pounds)					
Mean	6.94	7.61	6.56	12.14	7.43
Median	3.16	3.63	3.84	7.46	3.51
Standard error of the mean	0.68	0.83	0.91	2.65	0.47
Average session length (seconds)					
Mean	1271	1056	1272	625	1164
Median	700	661	590	499	647
Standard error of the mean	169.11	103.00	343.14	95.39	100.56
Average number of sessions per week					
Mean	3.7	4.2	4.1	3.5	3.9
Median	2.5	2.8	2.0	2.3	2.5
Standard error of the mean	0.18	0.31	0.59	0.44	0.16
<i>Bases</i>					
<i>Weighted</i>	452	283	122	59	917
<i>Unweighted</i>	478	297	116	59	950

Appendix Table A.18 Odds ratios for being an introspective problem gambler

Base: All problem gamblers

	Odds ratio	95% Confidence interval (lower)	95% Confidence interval (higher)
Ethnicity (p<0.05)			
White/White British	1		
Asian/Asian British	0.51	0.29	0.91
Black/Black British	0.53	0.31	0.93
Other ethnic group	0.69	0.37	1.26
Age (p<0.01)			
18-34	1		
35-54	1.66	1.11	2.47
55 and over	2.14	1.23	3.72
Frequency of gambling on most popular activity (p<0.01)			
Everyday	1		
4-5 days per week	1.63	0.99	2.68
2-3 days per week	2.23	1.44	3.44
About once a week	2.15	1.07	4.32
Less than once a week	1.06	0.42	2.65
Whether machines in bookmakers were the most frequent activity (p<0.01)			
No			
Yes	0.55	0.38	0.79
Whether had problems with machine gambling (p<0.01)			
Always/almost always	1		
Most of the time	2.65	1.61	4.36
Sometimes	5.17	3.31	8.06
Never	2.70	1.53	4.76

Appendix Table A.19 Odds ratios for being a diverse aware problem gambler

Base: All problem gamblers

	Odds ratio	95% Confidence interval (lower)	95% Confidence interval (higher)
Ethnicity (p<0.01)			
White/White British	1		
Asian/Asian British	2.14	1.23	3.71
Black/Black British	1.59	0.90	2.81
Other ethnic group	2.22	1.21	4.07
Whether machines in bookmakers were the most frequent activity (p<0.05)			
No	1		
Yes	1.53	1.05	2.24
Whether had problems with machine gambling (p<0.01)			
Always/almost always	1		
Most of the time	0.63	0.39	1.02
Sometimes	0.22	0.14	0.34
Never	0.18	0.08	0.37

Appendix Table A.20 Odds ratios for being a control-loss problem gambler

Base: All problem gamblers

	Odds ratio	95% Confidence interval (lower)	95% Confidence interval (higher)
Sex (p<0.01)			
Male	1		
Female	3.13	1.35	7.25
Age (p<0.05)			
18-34	1		
35-54	0.38	0.20	0.70
55 and over	0.41	0.19	0.89
Frequency of gambling on most popular activity (p<0.01)			
Everyday	1		
4-5 days per week	0.35	0.15	0.82
2-3 days per week	0.48	0.25	0.93
About once a week	0.30	0.10	0.92
Less than once a week	1.37	0.50	3.78
Whether had problems with machine gambling (p<0.01)			
Always/almost always	1		
Most of the time	2.30	0.95	5.54
Sometimes	4.00	1.87	8.58
Never	10.81	4.63	25.25

Appendix Table A.21 Odds ratios for being a severe aware problem gambler

Base: All problem gamblers

	Odds ratio	95% Confidence interval (lower)	95% Confidence interval (higher)
Whether had problems with machine gambling (p<0.01)			
Sometimes/Never	1		
Almost always/most of the time	23.9	5.0	115.8
Frequency of gambling on most popular gambling activity (p<0.01)			
Gambled less than everyday	1		
Gambled everyday	2.2	1.1	4.5

Appendix Table A.22 Prevalence of being a mainly B2, mainly B3 or mixed machine player, by various socio-economic characteristics

Base: All who agreed data linkage & used loyalty card always/most times

Socio-economic characteristics		Machine player type				
		Mainly B2 games	Mainly B3 games	Mixed	Bases (weighted)	Bases (unweighted)
Sex						
Male	%	35	20	45	1688	1936
Female	%	23	31	46	239	295
All	%	34	21	45	1927	2232
Age						
18-24	%	46	10	43	317	216
25-34	%	34	22	44	418	375
35-44	%	27	27	46	330	342
45-54	%	31	22	47	414	561
55-64	%	32	21	48	284	445
65 and over	%	32	29	39	158	280
Ethnicity						
White/White British	%	34	21	45	1662	1905
Asian/Asian British	%	38	25	37	79	101
Black/Black British	%	30	17	53	103	123
Other	%	33	24	42	82	103
Personal income						
Less than £10,400	%	36	21	43	410	484
£10,400 to £15,599	%	33	18	49	358	422
£15,600 to £20,799	%	35	21	44	275	305
£20,800 to £31,199	%	35	21	45	404	461
£32k or more	%	29	25	46	297	338
Economic activity						
Paid employment	%	34	21	45	989	1081
Self-employed/freelance	%	29	20	51	249	304
Retired	%	33	25	42	204	335

Appendix Table A.22 Prevalence of being a mainly B2, mainly B3 or mixed machine player, by various socio-economic characteristics

Full time education	%	[65]	[7]	[28]	49	30
Looking after family/home	%	17	33	50	68	83
Long term sick or disabled	%	40	23	37	155	163
Unemployed	%	33	20	47	209	230
Area deprivation						
Lives in the most deprived area in England, Scotland or Wales	%	36	20	44	1336	1510

Appendix Table A.23 Prevalence of being a mainly B2, mainly B3 or mixed machine player by self-reported gambling behaviour

Base: All who agreed data linkage & used loyalty card always/most times

Self-reported gambling behaviour		Machine player type				
		Mainly B2 play	Mainly B3 play	Mixed	Bases (weighted)	Bases (unweighted)
Number of gambling activities						
Less than 2	%	40	24	36	315	316
3 to 4	%	31	20	49	739	577
5 to 6	%	38	21	41	644	525
7 to 8	%	26	25	49	332	294
9 or more	%	31	18	51	202	215
Frequency of gambling in most frequent activity						
Everyday	%	34	23	43	689	515
4-5 days per week	%	35	17	49	377	292
2-3 days per week	%	30	21	48	755	626
About once a week	%	34	22	44	304	341
Less than once a week	%	42	25	33	107	153
Machines most frequent form of gambling activity						
Yes	%	27	24	50	1046	710
No	%	38	20	42	1186	1217
Problem gambling status						
Non-problem gambler	%	32	26	42	642	580
Low risk gambler	%	35	20	45	526	470
Moderate risk gambler	%	34	19	48	584	489
Problem gambler	%	34	20	46	480	388
Problems with machine play						
Always/Most of the time	%	27	24	49	311	240
Sometimes	%	34	19	47	510	408
Never	%	35	22	43	1410	1279

Appendix Table A.24 Machine gambling behaviour by machine gambler type

Base: All who agreed data linkage & used loyalty card always/most times

Machine play characteristics	Machine gambler type			
	Mainly B2 games	Mainly B3 games	Mixed	Total
Stake size (pounds)				
Mean	9.12	1.02	4.25	5.17
Median	5.31	0.70	2.46	2.46
Standard error of the mean	0.62	0.06	0.19	0.24
Number of sessions per week				
Mean	2.8	3.9	4.6	3.9
Median	2.0	2.4	3.1	2.4
Standard error of the mean	0.11	0.19	0.16	0.09
Average session length (seconds)				
Mean	923	907	1040	968
Median	476	662	624	579
Standard error of the mean	69.55	64.86	58.96	37.86
Total losses between Sept 2013 - June 2014 (pounds)				
Mean	252.34	692.88	749.72	567.62
Median	17.82	167.05	171.61	86.52
Standard error of the mean	34.63	59.12	48.72	28.20
<i>Bases</i>				
<i>Weighted</i>	648	414	866	1938
<i>Unweighted</i>	572	509	1151	2240

Appendix Table A.25 Odds ratios for being a mainly B2 game machine gambler

Base: All who agreed data linkage & used loyalty card most of the time/always

Socio-economic/gambling behaviour	Odds ratio	95% Confidence interval (lower)	95% Confidence interval (higher)
Age (p<0.05)			
18-34	1		
35-54	1.47	1.09	1.99
55 and over	1.09	0.79	1.51
Sex (p<0.01)			
Male	1		
Female	0.54	0.35	0.83
Machines were most frequent form of gambling (p<0.01)			
No	1		
Yes	0.61	0.46	0.80
Number of gambling activities (p<0.05)	0.94	0.90	0.99

Appendix Table A.26 Odds ratios for being a mainly B3 game machine gambler

Base: All who agreed data linkage & used loyalty card most of the time/always

Socio-economic/gambling behaviour	Odds ratio	95% Confidence interval	
		(lower)	(higher)
Age (p<0.01)			
18-24	1		
25-34	2.34	1.28	4.29
35-44	3.16	1.70	5.87
45-54	2.30	1.27	4.16
55-64	2.09	1.12	3.91
65 and over	3.41	1.78	6.53
Sex (p<0.05)			
Male	1		
Female	1.64	1.09	2.44

Appendix Table A.27 Odds ratios for being a mixed B2/B3 game machine gambler

Base: All who agreed data linkage and used loyalty card most of the time/always

Socio-economic/gambling behaviour	Odds ratio	95% Confidence interval	
		(lower)	(higher)
Number of gambling activities (p<0.05)			
Less than 2	1		
3-4	1.70	1.18	2.45
5-6	1.22	0.84	1.77
7-8	1.72	1.13	2.63
9 or more	1.82	1.13	2.93
Machines were most frequent form of gambling (p<0.05)			
No	1		
Yes	1.36	1.07	1.72

Appendix B. Loyalty card survey methods

This appendix provides further detail on the loyalty card survey methodology, including sample design, fieldwork processes, response rates and weighting.

Overview of methodological approach

The Loyalty Card Survey was a survey of people who held at least one loyalty card either for Ladbrokes, William Hill and/or Paddy Power and had used it at least once whilst gambling on machines in bookmakers between September and November 2013.¹⁰ The primary aim of the survey was to collect problem gambling information from these players and obtain consent to link their survey responses with their loyalty card data.

The survey was designed to be as representative as possible of loyalty card holders who had played machines. First, the three main operators provided information about the total number of loyalty cards held and whether contact details were available for each registered card. Overall, there were 131,275 cards with contact details available. This list also contained some basic information about how often the loyalty card had been used when gambling on machines between September and November 2013. From this information, a random probability sample (n=47,268) was drawn, with those cards which had been used most often being oversampled. This was to try to boost the number of gamblers who might be experiencing problems in the survey.

Operators first contacted each potential participant via text message to inform them that the study was taking place and that NatCen Social Research would be in touch unless they told the operator by a certain date that they did not want their details to be passed to NatCen. Overall, 902 people opted out of participating and were removed from the final sample. This process also identified a large number of cases with invalid contact details (n=18,801). The final issued sample size was 27,565.

Fieldwork was conducted between May and August 2014. Contact details available were either a mobile telephone number or an email address, or both. All sampled cases with a valid email address were contacted via email and invited to take part in a web survey. Email reminders were sent to those who had not participated to date. Between May and August 2014, a total of five email reminders were sent to each participant (unless they had already taken part in the survey). Those with telephone numbers available were contacted by NatCen's specialist Telephone Interviewing Unit in an attempt to interview them over the phone. A minimum of seven calls were made, at different times of day and night, to each phone number; the average number of calls made to each number was 3.6 ranging between a minimum of 1 call and maximum of 21.

All data were collected using computer assisted interviewing methods. The first question asked about use of loyalty cards to establish eligibility: this is because the names of card holders are, typically, not recorded by gambling operators. Therefore,

¹⁰ This timeframe was chosen because this was the period covered in the original data provided by operators to the research team. In other words, it was based on what information was available at the time.

interviewers had to check they were talking to the correct person and asked the potential participant if they held a loyalty card for one of the three operators. If the participant said no, a further check question was asked to ascertain that they were certain that they had never had a loyalty card. Participants who said no to both questions were excluded from the study (see Appendix A for details). For those who were eligible, the questionnaire covered the following topics:

- engagement in a range of gambling activities in the past four weeks;
- frequency of gambling participation for each activity;
- use of loyalty cards;
- problem screening questions;
- attitudes to machines in bookmakers;
- motivations for playing machines in bookmakers;
- demographics;
- data linkage.

The data linkage question was of primary importance. All participants were asked if they would give permission for their survey responses to be linked to information from their loyalty card. Overall, 84% of those interviewed agreed that their data could be linked together.

The questionnaire took 15 minutes to complete on average. All participants who completed the questionnaire were sent a £5 Post Office voucher to thank them for their time. Ethical approval to conduct the study was obtained from NatCen's independent Research Ethics Committee.

Overall, 4727 people took part in the study. Taking into account those who were identified as ineligible to participate during the interview process, the estimated response rate for this study was between 17%-19%. This means that more people did not take part in the study than those who did. This introduces the potential for non-response bias, as those who did take part may be different from those who did not. All analysis was weighted to try to account for this bias and to adjust the survey results to take into account the unequal probability of selection introduced by oversampling more frequently used loyalty cards. However, few details about the profile of loyalty card holders were available, meaning that it was difficult to develop a sophisticated weighting strategy that took into account a fuller range of potential biases. The sections that follow give fuller detail on each of these processes.

Survey processes

Sample design

A listing of loyalty card numbers which had been used in machines between September–November 2013, and which also had a mobile telephone number or email address available, was obtained from Ladbrokes, William Hill and Paddy Power. In

total, there were 180,542 cards of which 131,275 had some form of contact detail available.

For each card, the following information was provided (these were calculated from the raw transactional data by a separate company, Featurespace):

- how long the loyalty card had been active for;
- how many machine play sessions per day between September–November were recorded against the card;
- how many consecutive days of machine play between September–November were recorded against the card;
- total loss on machines between September–November recorded against the card;
- total number of minutes of machine play between September–November recorded against the card;
- longest machine playing session (in minutes) recorded against the card.

These variables were used to identify and oversample cards which represented heavier engagement in machine gambling.¹¹ A primary aim of this study was to identify sufficient numbers of problem gamblers so that their machine play characteristics could be compared with non-problem gamblers. Therefore, it was necessary to boost the potential number of cards with machine play characteristics more likely to be associated with problem gambling. Based on inspection of the data, the following thresholds were set for sample selection.

- Any card where there had been more than one machine play session per day and the session had lasted for 30 minutes or more was selected (4504 cases).
- Any card where there had been more than three consecutive days of machine play and the session lasted for 30 minutes or more was selected (19,130 cases).
- Finally, a simple random sample of 23,634 cases was selected from the remaining list, stratifying the sample by:
 - operator;
 - average number of sessions per day;
 - maximum number of consecutive days of play;
 - longest playing session;
 - player loss.
- A total sample of 47,268 cases was selected.
- 902 cases were removed after the opt-out exercise.
- A further 18,801 cases were identified as having invalid contact details.¹²

¹¹ Given that the purpose of this research programme is to attempt to identify patterns of machine gambling that indicate that someone is experiencing problems, there was little prior evidence to help guide this process. Therefore, these metrics were arbitrarily chosen based on what might be most likely to indicate that someone was more engaged in gambling and, therefore, potentially more likely to experience problems.

¹² These cases were identified through a process called 'pinging' which sends a message to the telephone number to establish if it is working or not. Operators also advised of telephone numbers that were identified as invalid during the opt-out period.

- The final sample issued by NatCen was 27,565 cases.

Table AB.1 shows the breakdown of the final sample by available contact details.

Table AB.1		
Final issued sample, by contact method		
Contact details	Number of cases	%
Mobile phone only	18771	68
Email only	4278	16
Mobile phone and email	4516	16
Total	27565	100

Opt-out process

To ensure compliance with the UK Data Protection Act 1998, operators first had to contact all selected participants to inform them that their contact details would be passed to NatCen unless they stated they did not want this to happen. Operators sent all sampled participants text messages to inform them about the study and the fact that NatCen would attempt to contact them unless the participant refused. The text also included details of a project-specific website where participants could find out more information about the study and contact the researchers direct. Participants were given up to three weeks to respond to the text message before contact details were shared with NatCen. Overall, 902 participants opted out of the study. Any participants who subsequently contacted operators to ask to be removed from the study were removed from the NatCen sample on the same day and no further attempts to contact them were made.

Fieldwork

As can be seen from Table AB.1, 68% of sampled cases had a mobile telephone number as their only available contact method. A further 16% had only an email address, while 16% of the sample had both email and telephone details. Therefore, a multimode survey instrument was designed. This allowed for completion over the telephone with one of NatCen's trained interviewers but also gave all participants a unique web access code if they preferred to complete the questionnaire online. For mobile-only participants, individuals were encouraged to complete the questionnaire then and there while the interviewer had contact with them. The offer of web completion was only made if the interviewer felt that the potential participant was reluctant to take part. Where people did say they would complete online, this was monitored and if after one week they still had not done so, the Telephone Interviewing Unit placed a courtesy telephone call to them to remind them to do so. For email only participants, an email invitation to participate and up to five reminders were sent throughout the fieldwork period.

All fieldwork was conducted between 15th May 2014 to 13th August 2014.

All telephone interviewers attended a project-specific training session before working on the project, where all project protocols, including the importance of explaining and gaining consent for data linkage, were covered.

Response rates

Table AB.2 shows the total number of achieved interviews by mode of completion.

Table AB.2		
Achieved interviews, by mode of completion		
Mode	Number of cases	%
Telephone interview	4210	89
Web survey	517	11
Total	4727	100

Overall, interviews were obtained from 4727 people: 89% of interviews were conducted via computer-assisted telephone interviewing and 11% by web survey completion.

Calculating response rates for this study is complex. There are a number of technical criteria to be taken into account. For example, although 47,268 cases were selected as having valid contact details, when checked by operators and a 'pinging' process 18,801 cases did not actually have a correct telephone number or email address. Furthermore, NatCen telephone interviewers identified a further 5021 cases where the telephone number given was not valid. This highlights the difficulty of using operator records as a sampling frame for a survey: it appears that contact details are not routinely checked and verified, meaning that the accuracy of contact information is unknown. This creates challenges when attempting to calculate response rates for this study, as it is not clear what the denominator should be.

Table AB.3 gives an overview of the outcomes for the selected sample: 2% of the selected sample opted out of the study, and were therefore not included in the final sample issued by NatCen. A further 39% of the selected sample was removed because of insufficient contact details. Of the 27,565 cases issued by NatCen, a further 3% were identified as ineligible as participants stated they did not have a loyalty card (it may be that they were unwilling to admit this, or a genuine mistake with the contact details, this is unknown). 17% were interviewed, 21% refused, 2% were categorised as other unproductive (i.e., the participant was ill or away) and no contact was made with 58% of the issued sample. This last figure may seem large; however, this includes 3761 cases where only email addresses were available and the participants did not respond to our repeated invitations to participate. This category also includes 5021 cases where the given telephone number was unobtainable.

Table AB.3			
Final outcome for all selected sample			
	N	%	%
Selected sample	47268	100	
Opted out of survey	902	2	
Ineligible cases (no valid contact details)	18801	39	
Total number of issued cases	27565	58	100
Ineligible: screened out by interviewer	729		3
Interviewed	4727		17
No contact	15912		58
Refused	5755		21
Other unproductive – contact made	442		2
Estimated further ineligible*	3410		
* 5456 people agreed to take part in the survey. Of these, 729 or 13% were excluded as they did not have a loyalty card. The estimated further ineligible number is calculated assuming that the same proportion of unproductive cases would also be ineligible.			

As Table AB.3 demonstrates, there are considerable quality issues with this sample, making calculating response rates difficult. There are three main ways response could be calculated. These are shown in Table AB.4 below.

Table A.4			
Response rate options			
Option	Method	Calculation	Response rate
1	Use total selected as denominator	$(4727/47268)*100$	10%
2	Exclude ineligible cases from denominator	$(4727/(47268 - 18801 - 729))*100$	17%
3	Exclude ineligible cases and estimated further ineligible cases from denominator	$(4727/(47268 - 18801 - 729 - 3410))*100$	19%

The first option uses the total selected sample as the denominator and this gives a response rate of 10%. However, this is a very conservative calculation and does not take into account the ineligible cases identified (i.e., those who said they did not have a loyalty card). Option 2 takes this into account and gives an estimated response rate of 17%. Finally, option 3 follows procedures used on national surveys such as the Health Survey for England to obtain an estimate of what proportion of unproductive cases would also have been screened out as ineligible and calculated response rates with these cases removed. This gives a response rate of 19%. Options 2 and 3 are less conservative. It seems appropriate to base response rates on those for whom valid contact details were available, therefore the final response for this study can be said to be in the range of 17-19%.

Weighting

Two weights were computed to adjust the survey estimates to take into account non-response: one for all participants to the survey and the other for those who agreed to link their responses to other records. These weights were generated using a two-step process. First, a selection weight was calculated as the probability of selection differed across card holders. Second, calibration weighting was calculated to weight participants (or those who agreed to data linkage) for non-response. These weights ensure that the sample matches the population for key characteristics, thereby minimising the risk of non-response bias. Here the 'population' is all 181,581 loyalty cards which was our total sampling population. Only anonymized data for these 181,581 loyalty cards were available to NatCen and people who sign up to loyalty cards for operators agree to their using these data for a variety of purposes in the terms and conditions.

Selection weights

The selection weights are related to the sample design and are equal to the inverse of the probability of selection. At the sampling stage, available information about playing habits was used to identify the card holders more likely to be at risk of gambling problems. All cases at risk of gambling problems were included in the sample so, for this group, the selection weight was equal to one. A systematic random sample was then drawn among those who were not at risk of gambling problems. The selection weight for this group was equal to the ratio of the number of cases identified as not at risk of gambling problems to the number of sampled members within this group.

Calibration weights

Calibration weighting was used to weight the participants (and those who agreed to data linkage) back to the population of card holders using four relevant variables available at the population level:

- **operator** or the bookmaker where the card was held;
- **member days** or number of days holding the card of the operator;
- **player loss** which indicates the money won or lost between September and November;
- **playing habits** which is a combination of three variables: the longest session played (less than 30 minutes; 30 minutes or more); the maximum number of consecutive days they played (less than three days; three or more days); and the average of sessions per day (less than one; one or more). This variable has six categories to measure card holders' engagement, from low (1) to high engagement (6): See Table AB.5.

Table AB.5			
Playing Habits			
Category	Longest Session	Max Consecutive Days ¹³	Average of sessions per day
1 - Low engagement	Less than 30 minutes	Less than 3 days	Less than 1
2	Less than 30 minutes	3 or more days	Less than 1
3	Less than 30 minutes	Less than 3 days AND 3 or more days	1 or more
4	30 minutes or more	Less than 3 days	Less than 1
5	30 minutes or more	3 or more days	Less than 1
6 - High engagement	30 minutes or more	Less than 3 days AND 3 or more days	1 or more

Table AB.6 shows the performance of the final weights on the main variables involved in the weighting process.

¹³ Notice that the categories of the **max consecutive days** were merged for Playing Habits=3 and Playing Habits=6 in order to avoid cells with small frequencies since they could be problematic for the weighting.

Table A.6

Final weighting on the main variables						
Variable	Survey Responses			Agreed to Data Linkage		
	Population	Unweighted Sample	Weighted Sample	Population	Unweighted Sample	Weighted Sample
	%	%	%	%	%	%
Operator						
Ladbrokes	53	52.1	53	53	52.6	53
Paddy Power	9.9	10	9.9	9.9	9.3	9.9
William Hill	37.1	37.9	37.1	37.1	38.1	37.1
Member Days						
Less than 6 months	9.3	5.2	9.3	9.3	4.9	9.3
6-9 months	19.4	12.5	19.4	19.4	12.2	19.4
9 months or more	18.2	30.3	18.2	18.2	30.3	18.2
Missing	53	52.1	53	53	52.6	53
Total player loss						
> 50,000	11	25.7	11	11	25.5	11
50,000 to 10,000	18.9	25.1	18.9	18.9	25.4	18.9
10,000 to 2,000	18.8	13.7	18.8	18.8	13.3	18.8
2,000 to -2,000	34.5	17.4	34.5	34.5	17.7	34.5
Under -2,000	16.7	18.1	16.7	16.7	18.1	16.7
Playing Habits						
1 - Low engagement	52	24.9	52	52	25.1	52
2	4	3.1	4	4	3.2	4
3	0.2	0.1	0.2	0.2	0.1	0.2
4	25.4	13.2	25.4	25.4	12.9	25.4
5	14.8	44.4	14.8	14.8	44	14.8
6- High engagement	3.6	14.2	3.6	3.6	14.6	3.6

Limitations of the loyalty card survey

The original loyalty card survey recommended that the following limitations be taken into account when reviewing results. These also apply to this analysis and include:

- The response rate to the survey was low, and whilst weighting attempted to adjust for potential non-response biases, very little was known about the characteristics of loyalty card holders. Therefore, it was difficult to assess the range and type of biases that may be evident in the survey results. For example, those who provided valid contact details to operators may be systematically different from those who did not. This is currently unknown, and therefore we are uncertain as to how ‘representative’ these survey results are of all loyalty card holders.

-
- Those who took part in the loyalty card survey were heavily engaged in gambling. They had a younger profile and lived disproportionately in deprived areas. These are characteristics typically associated with greater risk of gambling problems. These findings are not surprising, as the study was of people who signed up for a loyalty card, therefore one would expect them to be more heavily engaged in gambling. The findings from this survey, however, should not be extrapolated to all machine players, as loyalty card customers represent only one segment of the player base. Furthermore, it was estimated that only around one in ten bookmakers' transactions were recorded via a loyalty card. Comparison of these data suggests that loyalty card information misses shorter sessions of play.
 - Finally, not all people with a loyalty card used it consistently and some used it very infrequently. Some participants had cards for more than one operator or more than one card for the same operator. There appeared to be some systematic biases around frequency of use of loyalty cards, with younger people reporting less frequent use. This means that for certain types of participants we are unlikely to have complete records of machine play when analysing their loyalty card data. There may be some systematic biases between those who always use their card and those who do not. This is an important limitation of using loyalty card data to identify potentially harmful patterns of play, as it introduces a potential source of error.

Appendix C. Statistical procedures

Latent Class Analysis

A key question in exploratory Latent Class Analysis (LCA) is how many classes the sample should be divided into. However, there is no definitive method of determining the optimal number of classes. Because models with different numbers of latent classes are not nested, this precludes the use of a difference likelihood-ratio test.

For LCA (for men and women), we produced six solutions (ranging from two to seven classes) and used the following five ways to check these and decide on the optimal solution:

- (a) Looking at measures of fit such as Akaike's Information Criterion (AIC and AIC3) and the Bayesian Information Criterion (BIC). In comparing different models with the same set of data, models with lower values of these information criteria are preferred.
- (b) Looking at the misclassification rate. The expected misclassification error for a cluster solution is computed by cross-classifying the modal classes by the actual probabilistic classes. The sum of cases in the diagonal of this cross-classification corresponds to the number of correct classifications achieved by the modal assignment of cluster probabilities. The following formula is then applied: $\text{error} = 100 * \text{correct classifications} / \text{all cases}$. Models with lower misclassification rates are preferred.
- (c) Looking at the percentage of cases in each cluster with a low probability of cluster membership. The vast majority of cases in a cluster should exhibit a high probability of belonging to the cluster, typically above 0.6.
- (d) The resulting classes should be stable. For example, when moving from a six- to a seven-cluster solution, one of the clusters from the six-cluster solution should split to form two clusters in the seven-cluster option with the other clusters remaining largely unchanged. Cluster stability is investigated by cross-classifying successive cluster solutions.
- (e) The resulting classes have to be interpreted. For the purposes of this analysis the main importance in deciding the number of classes was placed on interpretability.

The following tables and figures show checks (a) to (d) for each LCA.

Figure A1

Measures of fit

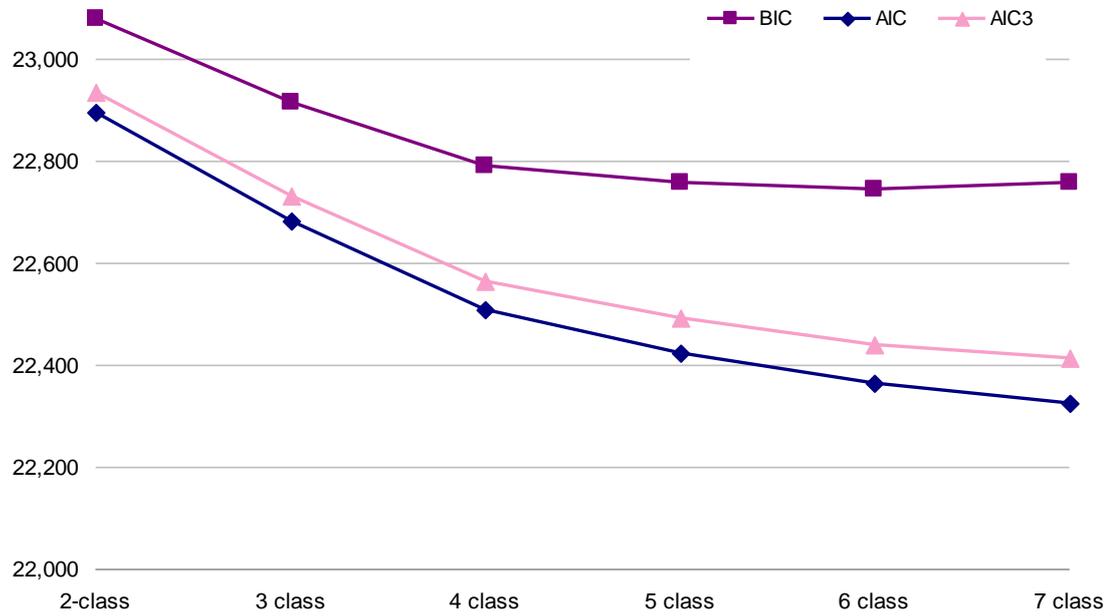


Table AB.1

Misclassification error (%)					
2-cluster	3-cluster	4-cluster	5-cluster	6-cluster	7-cluster
4	9	11	12	12	13

Table AB.2

% of cases with cluster membership probability less than 0.6 (four-cluster solution)				
	Cluster A	Cluster B	Cluster C	Cluster D
%	<0.06	<0.06	<0.15	<0.02
<i>n</i>	544	332	131	66

Table AB.3

Stability of clusters (four-cluster solution)						
	Cluster A	Cluster B	Cluster C	Cluster D	Cluster E	<i>All</i>
Cluster A	542	1	0	1	0	544
Cluster B	18	268	0	42	4	332
Cluster C	19	0	92	20	0	131
Cluster D	0	1	0	0	65	66
<i>All</i>	579	270	92	63	69	1073

Rationale for choice of final model

Based on the information above, a four-class solution was chosen as the final model. This was because the resulting model had a low BIC value, with values that flattened from class 4 onwards (BIC has been shown to be the most reliable goodness of fit statistic when determining LCA classes, see Nyland et al, 2007). Classification error was reasonable and this gave a stable result, both in terms of how it split groups when successive clusters were added and in terms of being replicable when the model was reproduced from scratch. Finally, the four-cluster solution was easily interpretable, giving four meaningful classes for analysis. Solutions with more than four classes were more complex to interpret, were not easy to distinguish from one another and produced a class with very small base sizes. Taking all of the above together, a four-class model was the preferred solution.

Logistic regression procedure for all models

For all models presented in this report, stepwise logistic regression was used to identify significant predictors of different gambling behaviours (i.e., predicting LCA class membership, problem gambling status, etc).

Missing values were recoded to the mode for each variable, except for income where they were included as a separate category.

All analyses were performed in STATA (a statistical analysis package) within the survey module (svy) which takes into account the weighting of the survey.

Because stepwise regression is not available in STATA's survey module, the stepwise procedure for each model considered was simulated using the following steps:

- A. A forward stepwise logistic regression with all independent variables was initially run outside the svy module (i.e. using the 'sw' command).
- B. The variables identified as significant (at the 95% significance level) were then included in a 'svy logit' regression to test whether they remained significant.

-
- C. If one variable was found to be not significant (if its p-value was greater than 0.05), it was removed from the model, and the model with the remaining variables was re-run and re-checked.
 - D. If more than one variable were found to be not significant, the one with the largest p-value was removed and the model with the remaining variables was re-run and re-checked.
 - E. When no more variables could be removed (because their p-value was less than 0.05), all other variables not in the model were added one by one (i.e., separate 'svy logit' models were run – as many as the remaining variables – with the existing variables plus one of the remaining ones at a time).
 - F. If none of the additional variables were significant, the procedure stopped and the initial model from step E was the final model.
 - G. If one of the additional variables was significant, then the variables already in the model were checked for removal. Variables were removed one at a time (the variable with the largest p-value was removed first), until no more variables could be removed.
 - H. If more than one additional variable was significant, the one with the smallest p-value entered the model and the remaining variables were checked for removal in the same way as in step G. The remaining significant variables were then entered, one at a time, based on their p-value (variables with the smallest p-value taking precedent) and after each entry the model was re-checked for variable removals.
 - I. If at this step the current model was different from the one at step E, the algorithm continued and steps E to H were repeated. The procedure stopped when there were no changes to the model (in terms of the significant variables included) between iterations.