



## Sociodemographic predictors of latent class membership of problematic and disordered gamblers



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### ABSTRACT

This paper reports a series of analyses examining the predictors of gambling subtypes identified from a latent class analysis of problem gambling assessment data, pooled from four health and gambling surveys conducted in Britain between 2007 and 2012. Previous analyses have indicated that gambling assessments have a consistent three class structure showing quantitative and potentially qualitative differences. Bringing this data together is useful for studying more severe problem gamblers, where the small number of respondents has been a chronic limitation of gambling prevalence research. Predictors were drawn from sociodemographic indicators and engagement with other legal addictive behaviours, namely smoking and alcohol consumption. The pooled data was entered into a multinomial logistic regression model in which class membership was regressed along a series of demographic variables and survey year, based on previous analyses of gambling prevalence data. The results identified multiple demographic differences (age, general health, SES, being single, membership of ethnic minority groups) between the non-problem and two classes endorsing some problem gambling indicators. Although these two groups tended to share a sociodemographic profile, the odds of being male, British Asian and a smoker increased between the three groups in line with problem gambling severity. Being widowed was also found to be associated with the most severe gambling class. A number of associations were also observed with other addictive behaviours. However these should be taken as indicative as these were limited subsamples of a single dataset. These findings identify specific groups in which gambling problems are more prevalent, and highlight the importance of the interaction between acute and determinant aspects of impulsivity, suggesting that a more complex account of impulsivity should be considered than is currently present in the gambling literature.

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### 1. Introduction

The aims of population-wide measurements of disordered gambling are to examine or uncover trends in gambling involvement and assess whether problem gambling prevalence is changing. Identifying these trends is crucial to directing appropriate resources towards reducing or mitigating harm and informing interventions, particularly as disordered gambling appears to show considerable heterogeneity and may require distinct treatment goals (Błaszczynski & Nower, 2002). There is also a close degree of correspondence between the assessments used in UK gambling prevalence research and screens administered by healthcare practitioners to gamblers seeking treatment (Bowden-Jones & George, 2015). Recent commentaries have suggested that rather than comparing disordered gambling prevalence across timeframes or jurisdictions, the greatest benefit from prevalence research has emerged from comparing across sub-samples of gambler (Markham & Young, 2016). This paper pools data from multiple British surveys

using similar survey designs to uncover the predictors of latent class membership from socio-demographic correlates and other addictive behaviours, building on latent class analyses (LCAs) of problem gambling assessments that have consistently observed three subtypes of gambler (McBride, Adamson, & Shevlin, 2010; Carragher & McWilliams, 2011; James, O'Malley, & Tunney, 2016). Pooling data has the potential to be beneficial in uncovering the demographic correlates of those showing the greatest difficulties with gambling, where individual gambling surveys have tended to be unable to sample enough of these gamblers to draw strong inferences about this group.

Previous LCAs of disordered gambling data have indicated that the measures of pathological gambling included in representative samples of the British population have a similar latent structure that appears to be similar across time. LCAs have been conducted on two adaptations of the DSM-IV Pathological Gambling criteria (American Psychiatric Association, 2000), the South Oaks Gambling Screen (Lesieur & Blume, 1987) and the Problem Gambling Severity Index (Ferris & Wynne, 2001), suggesting that a broadly similar profile emerges (James et al., 2016). These tended to produce consistent results which suggest the presence of three interpretative categories of gambler across the

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measurements analysed. These identify an initial category of gamblers who have minimal likelihood of endorsing a problem gambling indicator, making up 85–95% of the sample, a second category of gamblers who showed some problems with gambling but mostly at a sub-clinical level (with endorsement primarily limited to loss-chasing and preoccupation indicators) and a third category of gamblers all of whom exceeded the most severe category of the instrument being used. These categories appeared to be quantitatively and qualitatively distinguishable. Subtypes differed in problem severity and showed relatively little overlap, strongly indicative of a dimension of severity. However, the indicators that showed maximal differences between the second and third highest severity categories were the loss of control items, similar to other analyses of problem gambling data testing the presence of a latent category (James, O'Malley, & Tunney, 2014).

The British Gambling Prevalence Survey (BGPS) was a series of nationally representative surveys that assessed gambling attitudes and behaviours, and problem gambling prevalence, between 1999 and 2010 in the United Kingdom (Sproston, Erens, & Orford, 2000; Wardle et al., 2007, 2011). The first survey was conducted in light of major changes to the gambling market over the 1990s, and the second and third were conducted to provide baseline and follow-up measurements in light of major gambling legislation (the Gambling Act 2005, enacted in July 2007). Further data was also collected in a module of the Health Survey for England 2012 and the Scottish Health Survey 2012. The survey in 2010 (Wardle et al., 2011) found a significant increase in the prevalence of 'problem' gambling between 2007 and 2010, using an assessment that was adapted from the DSM-IV Pathological Gambling criteria ( $p = .046$ ). Although the DSM criteria doesn't have a subtype of problem gambling, a cutoff of three has often been used to identify individuals who exhibit significant subclinical difficulties with gambling (Sproston et al., 2000; Chou & Afifi, 2011; Nower, Martins, Lin, & Blanco, 2013). This increase was identified using a logistic regression model in which problem gambling status was predicted for each survey year, age, sex, marital status, ethnicity, socio-economic status, general health status and incidence of cigarette smoking. Many caveats were applied to this finding at the time, as the authors of the BGPS report noted that other, unobserved factors may explain this difference (Wardle et al., 2011). Recent commentaries (Sharman, Aitken, & Clark, 2014) have pointed out that the absolute number of individuals driving this difference was very small; for example, the 2010 dataset contained around twenty additional problem gamblers, with both surveys having fewer than one hundred problem gamblers each. This highlights one of the limitations of using gambling prevalence survey data to compare between subgroups of gambler (Doughney, 2007; Lorains, Cowlshaw, & Thomas, 2011). Although it is desirable to make comparisons across data that can generalised to the wider population it has proven to be highly problematic because of the difficulties in sampling a sufficient number of the gamblers reporting the greatest number of problems to uncover consistent associations. Pooling data across surveys can potentially make this problem more tractable. The British prevalence data lends itself better than many other datasets to pooling because the different studies had similar approaches to sampling and weighting, recruited similar sample sizes and used the same problem gambling assessments that have a similar latent class structure. The response rates across the surveys are similar (52%, 47%, 56%), and are much higher than some other gambling prevalence surveys (Markham & Young, 2016), where responses have fallen as low as 20%. The British prevalence surveys also appear to concord with many of the best practices identified by Williams and Volberg (2010).

Nevertheless, there are a number of caveats that result from pooling data from the datasets covered in this analysis, in addition to the limitations associated with gambling prevalence surveys. To start, the amount of missing data for problem gambling assessments is different between the surveys conducted. The completion rates across the three datasets amongst the respondents who were administered them were 89.97% (BGPS 2007), 99.75% (BGPS 2010) and 88.94% (SHS & HSE 2012). The

higher completion rate on the BGPS 2010 data is likely due in part to the utilisation of a computer aided procedure to administer the questionnaire, whereas the other surveys were paper based. In addition, only around three in four respondents (77.39%) to the HSE/SHS surveys were asked any questions from the gambling module. It is unclear whether the difference between the respondents who were given the gambling module or not was random or systematic. The BGPS and HSE/SHS surveys were framed very differently to one another; the British Gambling Prevalence Survey was presented as a leisure survey, but the problem gambling questions were situated towards the end of an extensive questionnaire probing gambling behaviour. The Health Survey for England was explicitly framed as a health questionnaire, and asked a range of questions about health and wellbeing related behaviours. The way in which a gambling questionnaire is framed has an important impact on estimates of gambling involvement (Williams, Volberg, & Stevens, 2012), with health surveys eliciting lower rates of responding to questions about gambling behaviour.

Although there are important limitations with comparing across the different sets of data, we believe that the potential benefits outweigh the costs. As mentioned previously the greater sample of problem gamblers allows identification of commonalities, if any exist, where it has been difficult to do so previously. The health survey data contains more granular data on a number of areas pertinent to gambling, particularly on other licit addictive behaviours such as drinking and smoking. Given that models of problem gambling identify the role of impulsive personality traits and hypothesize that the causal mechanism behind the most severe problem gamblers is a common risk factor for addictive behaviours, comparing across sub-samples using this data can provide broader information on the interaction between gambling and addictive behaviours across a wider spectrum. Some of this data has been utilised previously. Wardle et al. (2014) used alcohol and smoking frequency data from two health surveys in studying the predictors of at risk gambling (defined as a score between 3 and 7 on the PGSI), and problem gamblers (identified using either the PGSI or DSM screen), using a logistic regression procedure to compare between these groups and respondents who did not fall into the target group (or a higher severity group). This was based on a simulated stepwise procedure to determine which predictors were significant from a set of socio-economic and health indicators. These other addictive behaviours, along with being more likely to be younger, male and Muslim, were associated with 'at risk' gambling, but not problem gambling. The health survey data includes a wider range of data about these behaviours that may provide valuable insights into the engagement gamblers have with other addictive behaviours, including several variables not considered in previous analyses. There is also the issue that coding the DSM data using the underlying logic of the DSM (i.e. a behaviour is classified as present or absent) identifies a much greater rate of endorsement than the PGSI, with around twice as many gamblers typically endorsing a problem gambling behaviour than using the PGSI (McBride et al., 2010; James et al., 2016). This also applies to the proportions of at-risk and problematic gamblers.

In this report we examine the correlated of subtypes of problem gambling derived from latent class modelling. A three latent class model was estimated as previous research that has found this consistently captures the different subtypes of gambler that emerge from gambling assessment data. From this, we estimated a multinomial logistic regression using the most likely latent class each case belonged to as the outcome variable. We subsequently examined the relationship between gambling and smoking and alcohol use in the health survey data.

## 2. Method

### 2.1. Sample

This study pooled data from past-year gamblers that completed the problem gambling assessment derived from the DSM-IV Pathological

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