# Gambling disorder in the UK: key research priorities and the urgent need for independent research funding

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**Gambling in the modern era is pervasive owing to the variety of gambling opportunities available, including those that use technology (eg, online applications on smartphones). Although many people gamble recreationally without undue negative effects, a sizeable subset of individuals develop disordered gambling, which is associated with marked functional impairment including other mental health problems, relationship problems, bankruptcy, suicidality, and criminality. The National UK Research Network for Behavioural Addictions (NUK-BA) was established to promote understanding of, research into, and treatments for behavioural addictions including gambling disorder, which is the only formally recognised behavioural addiction. In this Health Policy paper, we outline the status of research and treatment for disordered gambling in the UK (including funding issues) and key research that should be conducted to establish the magnitude of the problem, vulnerability and resilience factors, the underlying neurobiology, long-term consequences, and treatment opportunities. In particular, we emphasise the need to: (1) conduct independent longitudinal research into the prevalence of disordered gambling (including gambling disorder and at-risk gambling), and gambling harms, including in vulnerable and minoritised groups; (2) select and refine the most suitable pragmatic measurement tools; (3) identify predictors (eg, vulnerability and resilience markers) of disordered gambling in people who gamble recreationally, including in vulnerable and minoritised groups; (4) conduct randomised controlled trials on psychological interventions and pharmacotherapy for gambling disorder; (5) improve understanding of the neurobiological basis of gambling disorder, including impulsivity and compulsivity, genetics, and biomarkers; and (6) develop clinical guidelines based on the best contemporary research evidence to guide effective clinical interventions. We also highlight the need to consider what can be learnt from approaches towards mitigating gambling-related harm in other countries.**

## Introduction

Gambling disorder is a recognised mental health condition characterised by persistent and recurrent maladaptive patterns of gambling behaviour, leading to substantial functional impairment and reduced quality of life.[1,2] The primary aim of this Health Policy paper is to present a consensus view from the National UK Research Network for Behavioural Addictions (NUK-BA) regarding the top unmet research priorities and funding issues in the area of gambling disorder in the UK. We first discuss contextual information about gambling disorder. We then describe the NUK-BA outlining the state of clinical and research provisions for gambling disorder in the UK, and draw on international perspectives. Lastly, we present the top research priorities for gambling disorder in the UK and how these priorities might be addressed.

Gambling disorder is the archetypal behavioural addiction, as it is the only one currently included in the same category as substance use disorders in DSM-5.[3] DSM-5 criteria require endorsement of at least four of nine symptom domains in the past year for a diagnosis of gambling disorder.[3] However, research has found that people who meet fewer diagnostic criteria (ie, sub-threshold problem gambling) exhibit many of the negative characteristics seen with gambling disorder, including objective impairments in decision making.[4] Accordingly, problem gambling is often defined as gambling behaviour that leads to adverse consequences for individuals, families, and communities,[5] which is consistent with public health frameworks that conceptualise gambling problems across a continuum of risk.[6] Although previously some societal groups might not have gone into gambling arenas (eg, betting shops or casinos), gambling is now pervasive owing to online technology. It is no longer necessary to leave one's home to gamble. Gambling disorder appears to be more common in men than in women, and distinct risk factors have been found as a function of gender.[7]

People with gambling disorder have high rates of other—often undetected—mental health problems, including anxiety disorders, mood disorders, substance use disorders, impulse control disorders, and ADHD.[8–10] A systematic review and meta-analysis of treatment-seeking patients found that 75% of patients had one or more comorbidities, including nicotine dependence (56%), major depressive disorder (30%), alcohol misuse (18%), and alcohol dependence (15%).[9] There are complex bidirectional relationships between these disorders.[11]

Disordered gambling can lead to financial, emotional, and relationship problems, including interpersonal violence, and—for a smaller proportion—engagement in illicit activities to fund gambling.[12] As with substance use disorders, gambling disorder often develops during adolescence and young adulthood, and can follow a relapsing–remitting course long term.[13] Gambling disorder has high rates of familial transmission.[1] It is also associated with considerably increased risk of suicidality, an association that is robust after controlling for relevant

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For more on **NUK-BA** see http://www.nuk-ba.co.uk

***Panel:*** **UK services offering evidence-based treatments for gambling disorder**

- The National Problem Gambling Clinic in London, founded in 2008, was the first NHS clinic designated specifically for the treatment of gambling disorder
- The NHS England Long Term Plan of 2019 incorporated treatment for gambling disorder into its list of services and 15 or more clinics were planned: some are now fully functioning, including the Northern Gambling Services in Leeds, and the National Problem Gambling Clinic in London
- Other NHS services have been funded and will open from 2022 onwards, such as the Gambling Harms Treatment Service in Southampton, which will focus on digital interventions and improving evidence-based practice through research
- GamCare is a counselling treatment service associated with 17 other providers across the UK
- Gamblers Anonymous support groups, adapted from Alcoholics Anonymous support group formats
- The Gordon Moody Association, a charity, provides residential treatment

comorbidities.[14] Additionally, some minorititised and vulnerable groups (eg, minority ethnic groups, underrepresented socioeconomic groups, particular age groups) appear to be disproportionately affected by gambling disorder. For example, a UK study showed despite participation in gambling being higher in White and White British individuals, Black and Black British individuals were more likely to have gambling disorder.[15] The reasons for this apparent disparity are unclear.

Studies have highlighted the importance of screening for gambling disorder in primary healthcare, secondary healthcare, and mental health settings. Screening for gambling disorder is important because individuals might present with other mental and physical problems (including those secondary to gambling), but often do not seek help for gambling itself, or do not mention the gambling problem without prompting.[16–18] When help-seeking occurs, it is typically crisis driven, occurring only after experiencing severe harm (eg, suicide attempt).[19] Unfortunately, disordered gambling remains low on the list of priorities in UK health care because of an absence of investment and acknowledgment, which means that the true extent of gambling-related harm and the related resource pressure is ignored or unrecognised.

In the UK, the minimum legal age for most types of gambling is 18 years. In the 2020 annual statistics from the National Gambling Treatment Service (Great Britain), 9008 individuals were recorded as having been treated within gambling services.[20] Given the conservative estimated prevalence of gambling disorder of 0·4% in the UK population of approximately 50 million adults, this prevalence suggests that roughly less than 5% of adults with gambling disorder received treatment by services under this framework. The treatment services for gambling disorder currently operating in England are funded in a variety of ways (panel). Generally, such services offer psychotherapy for the treatment of gambling disorder, which can range from cognitive behavioural therapy in NHS clinics to more counselling-based therapies in the charitable sector.

The scarcity of research into gambling-related harms has been noted in the UK and contrasts with a more extensive public health focus on gambling-related harms in some other countries.[21] Remarkably, data on gambling-related harms across the UK, and whether these harms are escalating longitudinally, are scant. Existing data on gambling in the UK are largely from Gambling Commission reports, which focus on rates of gambling participation and problem gambling; the latter is quantified using a brief rating tool or a non-validated interview tool.[22] Data from 2016 indicated that 0·7% of people in England identified as problem gamblers, and 3·6% of people in England were deemed to be at low or moderate risk of developing problems with their gambling.[22] However, how these rates translate to actual harms is unclear.

Although in this Health Policy paper we focus on the gambling situation in the UK, specifically regarding clinical and research provision for disordered gambling, this is a global public health concern, so the perspectives should have wider geographical implications and relevance.[21] For example, a WHO discussion paper noted massive unprecedented increases in gambling in recent decades, driven by online access to gambling, substantial increases in disordered gambling, and increases in gambling-related harms, which were reported to be of similar magnitude to harms arising from depression or substance use problems.[23] In this Health Policy paper, we focus on research and health care, but in the UK gambling-related harms are also a source of concern for many charitable organisations, social care, and politically. For example, in the UK, the House of Lords has, through the years, formed more than one evidence-gathering committee specifically looking into gambling-related issues such as gambling-related societal harm.[24] Currently, the Peers for Gambling Reform is one such committee.

## National UK Research Network for Behavioural Addictions (NUK-BA)

The NUK-BA was established in recognition of the absence of a cohesive network to identify unmet needs in terms of research and treatment provision for behavioural addictions, including gambling disorder, in the UK. The network includes expertise across disciplines of public health, psychiatry, clinical psychology, neuroscience, brain imaging, genetics, study design (including longitudinal cohorts), validation of clinical rating tools, transdiagnostic vulnerability markers, and cognitive assessment. Members are invited to join on the basis of their expertise; most members are based in UK. The group comprises not only

experts in addictions, but also experts in complementary areas of impulsive and compulsive disorders and symptoms, such as gaming disorder, problematic usage of the internet, ADHD, obsessive compulsive disorder, eating disorders, anxiety disorders, mood disorders, and substance use disorders. NUK-BA has an International Advisory Board to ensure work is grounded in international best practice. To maintain independence, NUK-BA is not funded by, nor does it accept funding from, industry bodies or companies.

## Current status of gambling disorder research and treatment services in the UK

Although there is research into gambling disorder in the UK, a search of traditional funding bodies found no dedicated explicit independent funding for research into gambling disorder, and related conditions, in the UK. Historically, some independent bodies did provide funds for gambling research, which led to highly-cited successful outcomes.[25–27]

In the past two decades, a UK charity has been tasked with the distribution of voluntarily donated industry funds, for the purpose of treatment education and research. These charities have historically been close to industry (eg, in terms of Board representation, trustees, and frequency of contact with industry bodies). GambleAware is the charity that is currently operating. GambleAware collects funds, liaises with industry, sets its own research agenda, and has its own gambling research funding scheme. Some individuals in the field argue that research funding administered through a third party dependent on the gambling industry could be acceptable provided safeguards are in place (such as transparency, disclosures, governance procedures, and open science). However, this type of funding route is not acceptable to many involved in research, both nationally and internationally, for several reasons including perceived conflicts of interest and institutional rules. Many universities, researchers, and clinicians in the UK cannot accept funding administered through this route. The problematic nature of this way of administering funding has been highlighted widely by researchers and clinicians, including internationally.[28]

## How can research funding for gambling disorder best be facilitated in the UK?

The most efficient way to fund independent gambling disorder research in the UK could be to implement the 1% statutory levy placed on industry earnings, for which many stakeholders have campaigned for in the UK Parliament.[29] The money designated to gambling research each year should then be entrusted to, and administered by, a reputable independent research body unrelated to the gambling industry, such as the Medical Research Council. The independent research body would distribute funds by placing national calls on research areas of current interest to policy, prevention, treatment, and biological research. The funds should not be held or administered by any organisation that has potential conflicts of interest in relation to the gambling industry, such as dependency on the industry for the existence and future of its organisation. Once a suitable body to distribute the funds had been identified, and confirmed as acceptable by independent experts and clinicians, other charitable organisations could apportion funds to research this disorder through the same impartial mechanism.

## Top priorities for UK research into gambling disorder

The following top six UK research priorities were identified by NUK-BA during several meetings, through open discussion and consensus.

### Conduct independent longitudinal research on prevalence of disordered gambling and gambling harms, including in vulnerable and minority groups

The British gambling prevalence survey of 2010 showed a prevalence of gambling disorder of 0·9% in the general adult population, equating to around 451 000 adults aged 16 years and older.[30] Previous surveys were conducted with similar methodologies in 2000 and 2007. These surveys were discontinued when the prevalence of gambling disorder was seen to be increasing, at a time when the implementation of the 2005 Gambling Act in 2007 had created a deregulated market for gambling. More recent surveys show that prevalence of gambling disorder remains concerningly high. For example, the 2019 Gambling Commission report estimated that the prevalence of gambling disorder was 0·7%, with 3·5% displaying low-risk or moderate-risk gambling.[31] The UK YouGov Gamble Aware survey in 2019 indicated a prevalence of 2·7% for gambling disorder in adults, which is considerably higher than that reported in other surveys. Research indicates that endorsement of even low levels of diagnostic criteria can be associated with impairments in quality of life, similar to impairments seen in individuals meeting full diagnostic criteria for gambling disorder,[4] highlighting the need to consider the full spectrum of symptoms at the population level.

UK prevalence surveys have tended to use relatively small samples, compared to what would normally be regarded as acceptable for mental health prevalence studies for a country. Surveys also did not include adequate independent input from diverse experts, and are likely to have under-represented vulnerable groups, who are more exposed to developing gambling problems, such as people from certain minoritised ethnic groups.[32] Moreover, studies have tended to be ad hoc rather than longitudinal in their design. Data from UK treatment settings indicate that the nature of gambling has changed markedly over time (eg, growing use of online applications and other forms of online gambling[33]), and

gambling is now accessible to a large proportion of the population irrespective of time and place. This is also likely to be the case in the general population but has not been addressed by prevalence surveys. As such, there is an urgent need to understand the scale of harms attributable to gambling (eg, domestic violence, housing problems, debt, and criminal involvement) in the UK. This harm should be assessed with high-quality, independent, and large-scale longitudinal prevalence studies that include input from an appropriate range of experts. Such studies will require funding sufficient to enroll enough people to account for participant attrition over time.

Another approach could be to leverage existing large-scale datasets in the UK (ie, register-based data studies) when they include information about gambling disorder.[34] The use of register-based data has been very successful for longitudinally examining other areas of mental health in the UK,[35] as well as for characterising gambling problems in other countries such as in Norway.[36] Of course, this approach would be contingent on the datasets containing appropriate measurements, which is often not the case for gambling disorders.

### Select and refine pragmatic measurement tools

A variety of self-rated and clinician-administered instruments are available to assess gambling disorder and at-risk gambling, but there is little consensus on the most suitable tool or tools to use for specific contexts.[37] In particular, it is likely that different pragmatic measurement tools will be needed for: (1) diagnosing disordered gambling and measuring symptom severity; (2) screening for disordered gambling; (3) measuring treatment response; (4) measuring gambling-related harm; and (5) screening for the most relevant comorbidities.

For example, in terms of procedures used in prevalence surveys in the UK, some refer to using the DSM diagnostic criteria to identify gambling disorder, but this approach has unknown reliability and validity, and depends on the exact form used. The DSM criteria are not a structured clinical interview, they are simply a list. The gold standard would be a structured clinical interview that had been rigorously validated, but this is relatively labour-intensive and requires adequate funding to train raters and monitor quality. Validated clinical interviews exist, such as the Minnesota Impulse Disorder Inventory,[38] but have generally not been included in gambling disorder prevalence surveys. Some UK surveys used the Problem Gambling Severity Index, which has good properties for identifying gambling disorder, but is less suitable for differentiating between milder, potentially clinically relevant forms of gambling problems.[39] Also, such instruments do not provide information on the precise forms of gambling (eg, casinos, racing, online, bingo) which have already been reported to change substantially over time.[33] These instruments have been inappropriately used in clinical settings to measure response to treatment,[40] although they are not validated for that purpose.

Another consideration is that many instruments have not been thoroughly psychometrically validated in UK populations. Psychometric scale properties, including optimal thresholds to determine classification as a clinical case or severity, can differ across countries,[41] particularly when forms of gambling are likely to be culture dependent. Additionally, many instruments have not been subjected to rigorous statistical validation procedures such as statistical item response theory analysis.[42]

The application of the public health framework to gambling has resulted in growing concern that gambling research, and subsequent gambling policy, have conflated the severity of problem gambling and gambling-related harm.[43] In recognition that problem gambling severity and harm are closely coupled, but conceptually distinct, constructs, instruments specifically measuring gambling-related harm are emerging.[44] However, these instruments have not yet been used in UK prevalence surveys.

Brief screening instruments, which are necessary to facilitate the early identification of disordered gambling in clinical and research settings, are increasingly available but few can satisfactorily identify both at-risk and problem gambling.[37] Moreover, gambling disorder is highly comorbid with impulsive and compulsive conditions, such as ADHD, and formal impulse control and obsessive-compulsive disorders; however, screening for these disorders does not often occur,[38,44,45] which means that the contribution and role of other common disorders cannot be evaluated.

Therefore, we need a range of experts to identify and refine the most suitable tools for UK research into gambling disorders, for specific purposes, based on detailed psychometric analyses with the latest statistical approaches.

### Identify predictors of disordered gambling in people who gamble recreationally, including in vulnerable and minoritised groups

Some research has been conducted on longitudinal trajectories of gambling in young people, including candidate vulnerability and resilience markers.[46] Because many young people who gamble stop gambling later in life, show remission of sub-syndromal disordered gambling, or are lost to follow-up, large sample sizes are needed to identify such markers. For example, in a US study following 575 non-treatment seeking young adults over 3 years, three latent subtypes were identified: a high harm group (5·6%) who had moderate to severe gambling disorder at baseline, and remained symptomatic at follow-up; an intermediate harm group (19·5%) who had problem gambling that decreased over time; and a low harm group (75·0%) who were essentially asymptomatic over time.[47] The high and intermediate

harm groups had higher traits of impulsivity and compulsivity, cognitive deficits, and prevalence of mental disorders, including substance misuse, at baseline. These results suggest the existence of distinct trajectories in the natural history of gambling disorder, highlighting the need for a better understanding of antecedents at multiple biopsychosocial levels.[48]

Therefore, large-scale, longitudinal UK research is needed. This research should include measurement domains implicated in the manifestation of disordered gambling, such as childhood experiences (eg, trauma, parenting, friendship groups), antisocial behaviours, impulsive and compulsive traits, cognition, and comorbid mental health and substance use problems.[46] Moreover, given that most of the available research examines individual vulnerability markers, there is a need for longitudinal research to investigate resilience and vulnerability markers across relationship, community, and societal domains.[46] Such research should consider pathways to gambling, including the role of internet gaming disorder or problematic usage of the internet.[49,50]

Using the finding that approximately 5·6% of people who gamble recreationally had moderate to severe gambling disorder and remained symptomatic,[47] power calculations can be conducted to ensure such longitudinal studies would be sufficiently powered statistically. Because of the large sample sizes needed, this research is likely to require the use of internet-enabled data, including self-report questionnaires and validated online cognitive tests.[38,51–55] These approaches have been shown to be valuable when used at scale to monitor mental health and other consequences of the COVID-19 pandemic.[56]

### Conduct randomised controlled trials on psychological interventions and pharmacotherapy for gambling disorder

Findings published over the past 20 years support the use of cognitive behavioural therapy (CBT) and motivational interviewing for problem gambling.[57] CBT takes many forms, including individual cognitive therapy, group or individual CBT, use of imaginal desensitisation, and brief interventions using bibliotherapy.[58–60] In addition, several double-blind, placebo-controlled studies support the use of the opioid antagonist naltrexone for reducing gambling urges and behaviour.[1,61,62] However, there has been little research on what predicts who will benefit from these options, which variables hinder successful outcomes,[63] the neurobehavioural mechanisms by which treatments achieve remission, and whether other forms of pharmacotherapy might also be effective. Data regarding how much therapy is needed by any single individual, or how treatment options should be sequenced, are also scarce. Thus, personalised medicine in gambling disorder treatment is urgently needed.

Additionally, the role of innovative treatment approaches should be considered, including the application of transdiagnostic approaches that potentially target common features across disorders;[64] third-wave CBT interventions such as mindfulness and acceptance-based approaches;[65] neurocognitive interventions;[66] non-invasive neuromodulation;[67] and digital tools to support stimulus control in treatment and to deliver early phase interventions.[68,69] There are few studies in this area but lessons can be learned from the use of similar approaches for other conditions, notably substance use disorders.[70,71]

### Improve our understanding of the neurobiological basis of gambling disorder

Much of the understanding of the neurobiology involved in gambling disorder is informed by research on substance use disorders, including alcohol use disorder. Relative to other areas of mental health, understanding of gambling disorder is relatively poor. For example, a PubMed search done in 2021, for papers using the keywords "gambling" and "neuroimaging" yields just 761 results, compared with 4898 results for "alcohol" and "neuroimaging."

Broadly, gambling disorder has been associated with abnormalities in brain reward pathways (including the striatum).[72] It has also been associated with cognitive problems, reflecting loss of top-down control over urges and habits controlled by parts of the cortex, especially the prefrontal cortex.[54,73,74] Despite similarities in clinical presentation,[75] differences are emerging between the patterns of brain abnormalities reported in gambling disorder and in alcohol use disorder.[76] However, direct comparison is problematic since substance intake has complex and different acute, sub-chronic, and chronic effects on the brain. As highlighted earlier, brain research into gambling disorder often does not measure or control for the influence of other disorders, such as ADHD, impulse control problems, compulsive symptoms, and substance use.

The neurobiology of gambling disorder should also be informed by other areas of research, drawing together experts from traditionally disparate disciplines. For example, a study could investigate gambling disorder and impulse control disorders in patients with Parkinson's disease, because there is evidence of comorbid overlap between these conditions, including in a subset of patients treated with dopaminergic medications.[77–79]

International efforts have also been made towards developing transdiagnostic tools to identify factors that contribute to a variety of addictive problems.[80] By identifying common risk factors, we might be able to intervene to reduce harms related not only to gambling disorder, but also to other impulsive and compulsive behaviours. The concepts of impulsivity and compulsivity are likely to be important in the search for biomarkers for gambling disorder, both in terms of vulnerability and chronicity.[80] Validated self-report tools to quantify impulsivity have long existed, and now there are also validated tools to measure compulsivity

trans-diagnostically.[42] Ultimately, studies are needed that incorporate an appropriate comprehensive range of measures in one setting, including genetics, blood markers, cognition, and neuroimaging.

### Develop clinical guidelines based on the best contemporary research evidence to guide effective clinical interventions

The Australian National Health and Medical Research Council clinical guideline for problem gambling was one of the first evidence-based guidelines to be developed internationally, and made clear recommendations and practice points based on evidence.[81] In the UK, the National Institute for Health and Care Excellence is developing a UK guideline for disordered gambling, with work scheduled to commence during 2022. The integration of high-quality evidence into such guidelines and their translation into clinical practice for behavioural addictions should ensure that treated individuals with gambling problems are given the best possible chance of recovery. Guideline development committees should include appropriate representation in terms of gender, ethnicity, culture, as well as sufficient breadth of gambling research and clinical expertise.

## Limitations

This Health Policy paper reflects the collective perspectives of NUK-BA membership and provides a UK-specific focus, rather than a detailed overview of the situation in other countries. The views of other individuals and organisations may differ, and the perspectives of other experts are also important. The top priorities are a consensus perspective rather than a perspective generated through a formal research methodology (eg, Delphi). This paper could set the ground and inform a future Delphi study. It focuses mainly on the clinical and research aspects of gambling disorder, rather than broader aspects of social care, charitable work, or political debate around minimising gambling-related harms.

This Health Policy paper has focused on gambling disorder. However, a far greater proportion of the population is negatively affected by gambling harms than just the individuals with gambling disorder. The true extent of the harms incurred by families, spouses, and employers must not be forgotten when research is being commissioned. Gambling in a sub-syndromal way (ie, endorsement of some diagnostic criteria, but falling short of the diagnostic threshold) is also associated with substantial harm and will affect a much greater proportion of the population. This also requires scrutiny, and a comprehensive examination of the full spectrum of severities and types of gambling is needed. Furthermore, it is important to consider what can be learnt from experiences in other countries, some of which have used very different approaches to regulate gambling than the UK, such as Finland; or given greater consideration to measuring and minimising gambling-related harms, such as Australia.

## Conclusions

Gambling Disorder is responsible for substantial personal, societal, financial, and professional harms in the UK and globally, but our understanding of the prevalence and course of this disease is poor, due to the severe dearth of high quality, independently funded research into this area; as well as by an absence of appropriate expert consultation. For example, in their 2020 consultation, the Gambling Commission stated that researchers and other experts had been consulted, but in our survey across the whole Cambridge Behavioural Addictions Group, no members reported having been consulted as part of this process. Unless consultations encompass national and international experts in the field, policy and research limitations will continue to be propagated.

Without adequate independently administered funding designated for research into behavioural addictions in the UK, it is probable that the UK will continue to fall short of what is achievable. Scholars should receive the necessary independent resources, allowing them to produce high-quality studies that this country urgently needs. The UK is fortunate to have globally renowned researchers in the field of addictions, including behavioural addictions, to develop more effective treatments and to train young scientists in the field. Given sufficient government and independent funding specifically designated for behavioural addition research, there is much that can be achieved. A targeted and strategic effort is now required to prevent problem gambling and improve the quality of life and wellbeing of individuals affected by it.

#### Contributors

All authors made substantial contributions to the conception of the work, drafted the work relating to important intellectual content, gave approval for publication, and agreed to be accountable for the work.

#### Declaration of interests

HB is the director of the National Problem Gambling clinic and the national centre for gaming disorders. These clinics have received funding from NHS England, CNWL NHS Trust, and GambleAware. HB is the President of the Psychiatry Section at the Royal Society of Medicine and sits on several national and international Boards. HB has been on research teams funded by the Medical Research Council, the Wellcome Trust, and the Wolfson Family Trust. SRC's role in this paper was funded by a Clinical Fellowship from the Wellcome Trust (reference 110049/Z/15/Z & 110049/Z/15/A). SRC consults for Promentis on work unrelated to the content of this paper. SRC also receives stipends from Elsevier for editorial work at *Comprehensive Psychiatry*, and at *Neuroscience & Biobehavioral Reviews*. JEG has received research grants from Biohaven, Promentis, and Otsuka Pharmaceuticals. JEG receives yearly compensation from Springer Publishing for acting as Editor in Chief of the *Journal of Gambling Studies* and has received royalties from Oxford University Press, American Psychiatric Publishing, Norton Press, and McGraw Hill. SC declares honoraria and reimbursement for travel and accommodation expenses for lectures from the following non-profit associations: Association for Child and Adolescent Central

Health, Canadian ADHD Alliance Resource, British Association of Pharmacology, and Healthcare Convention for educational activity on ADHD. OC has received royalties from Routledge, Springer, and Elsevier for editorial duties and advises the UK Parliament and the United Nations on addiction-related matters. OC held various research grants from the European Union, World Anti-Doping Agency, and University of Hertfordshire. SAT has received royalties from Elsevier and research grants from the National Health and Medical Research Council, Australian Research Council, and the Victorian and Australian Governments. SD has received funding from GambleAware and is the Director of the Gambling Research, Education and Treatment Network Wales, which is funded by the Welsh Government through Health and Care Research Wales. BJS consults for Cambridge Cognition, Greenfield Bioventures, and Cassava Sciences. BJS's research is funded by Eton College and the Wallitt Foundation, and is conducted within the National Institute for Health Research (NIHR) MedTech and in-vitro diagnostic Co-operative, and the NIHR Cambridge Biomedical Research Centre Mental Health Theme. In the past 3 years NAF has held research or networking grants from the European College of Neuropsychopharmacology (ECNP), UK NIHR, EU H2020 (COST), Medical Research Council, and University of Hertfordshire. In the past 3 years NAF has accepted travel and hospitality expenses from the British Association for Pharmacology, ECNP, Royal College of Psychiatrists, CINP, International Forum of Mood and Anxiety Disorders, World Psychiatric Association, Indian Association for Biological Psychiatry, and Sun. In the past 3 years NAF has received payment from Taylor and Francis and Elsevier for editorial duties and has accepted paid speaking engagements sponsored by Abbott and Sun. Previously, NAF has accepted paid speaking engagements in symposia supported by various pharmaceutical companies and has recruited patients for various pharmaceutical industry-sponsored studies in the field of obsessive compulsive disorder (OCD) treatment. NAF leads an NHS treatment service for OCD and holds Board membership for various registered charities linked to OCD. NAF gives expert advice on psychopharmacology to the UK Medicines and Healthcare products Regulatory Agency. NAD reports research funding from multiple sources, including government departments (through hypothecated taxes from gambling revenue), and is the recipient of a Deakin University Faculty of Health Mid-Career Fellowship. TWR consults for Cambridge Cognition, Takeda, Greenfield Bioventures, Cassava, Shionogi, Heptares, Arcadia. TWR reports grants from GlaxoSmithKline, Shionogi Royalties, and Cambridge Cognition; and Editorial Honoraria from Springer Nature and Elsevier. The rest of the authors declared no competing interests.

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**References**

1 Hodgins DC, Stea JN, Grant JE. Gambling disorders. *Lancet* 2011; **378:** 1874–84.

2 Bowden-Jones H. Pathological gambling. *BMJ* 2017; **357:** j1593.

3 American Psychiatric Association. Diagnostic and statistical manual of mental disorders, fifth edn. Washington, DC: American Psychiatric Publishing, 2013.

4 Chamberlain SR, Stochl J, Redden SA, Odlaug BL, Grant JE. Latent class analysis of gambling subtypes and impulsive/compulsive associations: time to rethink diagnostic boundaries for gambling disorder? *Addict Behav* 2017; **72:** 79–85.

5 Neal P, Delfabbro PH, O'Neil M. Problem gambling and harm: towards a national definition. Commissioned for The Ministerial Council on Gambling, prepared by The SA Centre for Economic Studies with the Department of Psychology, University of Adelaide. Published on behalf of Gambling Research Australia; 2005. http://www.gamblingresearch.org.au/ (accessed July 7, 2021).

6 Shaffer HJ, Korn DA. Gambling and related mental disorders: a public health analysis. *Annu Rev Public Health* 2002; **23:** 171–212.

7 Hing N, Russell A, Tolchard B, Nower L. Risk factors for gambling problems: an analysis by gender. *J Gambl Stud* 2016; **32:** 511–34.

8 Lorains FK, Cowlishaw S, Thomas SA. Prevalence of comorbid disorders in problem and pathological gambling: systematic review and meta-analysis of population surveys. *Addiction* 2011; **106:** 490–98.

9 Dowling NA, Cowlishaw S, Jackson AC, Merkouris SS, Francis KL, Christensen DR. Prevalence of psychiatric co-morbidity in treatment-seeking problem gamblers: a systematic review and meta-analysis. *Aust N Z J Psychiatry* 2015; **49:** 519–39.

10 Dowling NA, Cowlishaw S, Jackson AC, Merkouris SS, Francis KL, Christensen DR. The prevalence of comorbid personality disorders in treatment-seeking problem gamblers: a systematic review and meta-analysis. *J Pers Disord* 2015; **29:** 735–54.

11 Sundqvist K, Rosendahl I. Problem gambling and psychiatric comorbidity-risk and temporal sequencing among women and men: results from the Swelogs case-control study. *J Gambl Stud* 2019; **35:** 757–71.

12 Langham E, Thorne H, Browne M, Donaldson P, Rose J, Rockloff M. Understanding gambling related harm: a proposed definition, conceptual framework, and taxonomy of harms. *BMC Public Health* 2016; **16:** 80.

13 LaPlante DA, Nelson SE, LaBrie RA, Shaffer HJ. Stability and progression of disordered gambling: lessons from longitudinal studies. *Can J Psychiatry* 2008; **53:** 52–60.

14 Wardle H, John A, Dymond S, McManus S. Problem gambling and suicidality in England: secondary analysis of a representative cross-sectional survey. *Public Health* 2020; **184:** 11–16.

15 Conolly A, Davies B, Fuller E, Heinze N, Wardle H. Gambling behaviour in Great Britain in 2016. NatCen, 2016. https://assets.ctfassets.net/j16ev64qyf6l/60qlzeoSZIJ2QxByMAGJqz/e3af209d552b08c16566a217ed422e68/Gambling-behaviour-in-Great-Britain-2016.pdf (accessed July 7, 2021).

16 Cowlishaw S, Gale L, Gregory A, McCambridge J, Kessler D. Gambling problems among patients in primary care: a cross-sectional study of general practices. *Br J Gen Pract* 2017; **67:** e274–79.

17 Cowlishaw S, Merkouris S, Chapman A, Radermacher H. Pathological and problem gambling in substance use treatment: a systematic review and meta-analysis. *J Subst Abuse Treat* 2014; **46:** 98–105.

18 Roberts A, Bowden-Jones H, Roberts D, Sharman S. Should GPs routinely screen for gambling disorders? *Br J Gen Pract* 2019; **69:** 226–27.

19 Evans L, Delfabbro PH. Motivators for change and barriers to help-seeking in Australian problem gamblers. *J Gambl Stud* 2005; **21:** 133–55.

20 GambleAware. Annual Statistics from the National Gambling Treatment Service (Great Britain). 1st April 2019 – 1st March 2020. 2020. https://www.begambleaware.org/sites/default/files/2020-12/annual-stats-2019-20_0.pdf (accessed July 7, 2021).

21 Johnstone P, Regan M. Gambling harm is everybody's business: a public health approach and call to action. *Public Health* 2020; **184:** 63–66.

22 Gambling Commission. Participation in gambling and rates of problem gambling – England 2016. 2018. https://www.gamblingcommission.gov.uk/news/article/gambling-commission-publishes-latest-combined-health-survey (accessed July 7, 2021).

23 Abbott M. WHO Forum on alcohol, drugs and addictive behaviour. The epidemiology and impact of gambling disorder and other gambling-related harm. Enhancing public health actions through partnerships and collaboration. 2017. https://www.who.int/docs/default-source/substance-use/the-epidemiology-and-impact-of-gambling-disorder-and-other-gambling-relate-harm.pdf?sfvrsn=5901c849_2 (accessed July 7, 2021).

24 House of Lords. Gambling Harm—Time for Action. Select Committee on the Social and Economic Impact of the Gambling Industry. Report of Session 2019–21. London, UK: Published by the Authority of the House of Lords, 2020. https://committees.parliament.uk/publications/1700/documents/16622/default (accessed July 7, 2021).

25 Wardle H. The Emerging Adults Gambling Survey: study protocol. *Wellcome Open Res* 2020; **5:** 102.

26 Limbrick-Oldfield EH, Mick I, Cocks RE, et al. Neural substrates of cue reactivity and craving in gambling disorder. *Transl Psychiatry* 2017; **7:** e992.

27 Muggleton N, Parpart P, Newall P, Leake D, Gathergood J, Stewart N. The association between gambling and financial, social and health outcomes in big financial data. *Nat Hum Behav* 2021; **5:** 319–26.

28 Nikkinen J. Funding of gambling studies and its impact on research. *Nordisk Alkohol Nark* 2019; **36:** 491–95.

29 Wardle H, Banks J, Bebbington P, et al. Open letter from UK based academic scientists to the secretaries of state for digital, culture, media and sport and for health and social care regarding the need for independent funding for the prevention and treatment of gambling harms. *BMJ* 2020; **370:** m2613.

30 Wardle H, Moody A, Spence S, et al. British Gambling Prevalence Survey 2010. 2011. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/243515/9780108509636.pdf (accessed July 7, 2021).

31 Gambling Commission. Gambling participation in 2018: behaviour, awareness and attitudes. Annual Report. Gambling Commission. 2019. https://assets.ctfassets.net/j16ev64qyf6l/7uIxjm1SNQMygdOFV2bzxN/ea74db1104925f015edb11db0596f98b/Gambling-participation-in-2019-behaviour-awareness-and-attitudes.pdf (accessed July 7, 2021).

32 Sharman S, Butler K, Roberts A. Psychosocial risk factors in disordered gambling: a descriptive systematic overview of vulnerable populations. *Addict Behav* 2019; **99:** 106071.

33 Sharman S, Murphy R, Turner JJD, Roberts A. Trends and patterns in UK treatment seeking gamblers: 2000-2015. *Addict Behav* 2019; **89:** 51–56.

34 Emond A, Nairn A, Collard S, Hollén L. Gambling by young adults in the UK during COVID-19 lockdown. *J Gambl Stud* 2021; published online May 17. https://doi.org/10.1007/s10899-021-10029-y.

35 Root A, Brown JP, Forbes HJ, et al. Association of relative age in the school year with diagnosis of intellectual disability, attention-deficit/hyperactivity disorder, and depression. *JAMA Pediatr* 2019; **173:** 1068–75.

36 Pallesen S, Mentzoni RA, Morken AM, Engebø J, Kaur P, Erevik EK. Changes over time and predictors of online gambling in three Norwegian population studies 2013-2019. *Front Psychiatry* 2021; **12:** 597615.

37 Dowling NA, Merkouris SS, Dias S, et al. The diagnostic accuracy of brief screening instruments for problem gambling: a systematic review and meta-analysis. *Clin Psychol Rev* 2019; **74:** 101784.

38 Chamberlain SR, Grant JE. Minnesota Impulse Disorders Interview (MIDI): validation of a structured diagnostic clinical interview for impulse control disorders in an enriched community sample. *Psychiatry Res* 2018; **265:** 279–83.

39 Currie SR, Hodgins DC, Casey DM. Validity of the Problem Gambling Severity Index interpretive categories. *J Gambl Stud* 2013; **29:** 311–27.

40 Merkouris SS, Greenwood C, Manning V, et al. Enhancing the utility of the problem gambling severity index in clinical settings: identifying refined categories within the problem gambling category. *Addict Behav* 2020; **103:** 106257.

41 Tiego J, Lochner C, Ioannidis K, et al. Problematic use of the Internet is a unidimensional quasi-trait with impulsive and compulsive subtypes. *BMC Psychiatry* 2019; **19:** 348.

42 Hook RW, Grant JE, Ioannidis K, et al. Trans-diagnostic measurement of impulsivity and compulsivity: a review of self-report tools. *Neurosci Biobehav Rev* 2021; **120:** 455–69.

43 Browne M, Greer N, Rawat V, Rockloff M. A population-level metric for gambling-related harm. *Int Gambl Stud* 2017; **17:** 163–75.

44 Browne M, Goodwin BC, Rockloff MJ. Validation of the Short Gambling Harm Screen (SGHS): a tool for assessment of harms from gambling. *J Gambl Stud* 2018; **34:** 499–512.

45 Theule J, Hurl KE, Cheung K, Ward M, Henrikson B. Exploring the relationships between problem gambling and ADHD: a meta-analysis. *J Atten Disord* 2019; **23:** 1427–37.

46 Dowling NA, Merkouris SS, Greenwood CJ, Oldenhof E, Toumbourou JW, Youssef GJ. Early risk and protective factors for problem gambling: a systematic review and meta-analysis of longitudinal studies. *Clin Psychol Rev* 2017; **51:** 109–24.

47 Chamberlain SR, Stochl J, Grant JE. Longitudinal subtypes of disordered gambling in young adults identified using mixed modeling. *Prog Neuropsychopharmacol Biol Psychiatry* 2020; **97:** 109799.

48 Ioannidis K, Askelund AD, Kievit RA, van Harmelen AL. The complex neurobiology of resilient functioning after childhood maltreatment. *BMC Med* 2020; **18:** 32.

49 Fineberg NA, Demetrovics Z, Stein DJ, et al. Manifesto for a European research network into problematic usage of the internet. *Eur Neuropsychopharmacol* 2018; **28:** 1232–46.

50 Ioannidis K, Treder MS, Chamberlain SR, et al. Problematic internet use as an age-related multifaceted problem: evidence from a two-site survey. *Addict Behav* 2018; **81:** 157–66.

51 Yucel M, Oldenhof E, Ahmed SH, et al. A transdiagnostic dimensional approach towards a neuropsychological assessment for addiction: an international Delphi consensus study. *Addiction* 2018; **114:** 1095–109.

52 Chamberlain SR, Tiego J, Fontenelle LF, et al. Fractionation of impulsive and compulsive trans-diagnostic phenotypes and their longitudinal associations. *Aust N Z J Psychiatry* 2019; **53:** 896–907.

53 Romero-Garcia R, Hook RW, Tiego J, et al. Brain micro-architecture and disinhibition: a latent phenotyping study across 33 impulsive and compulsive behaviours. *Neuropsychopharmacology* 2020; **46:** 423–31.

54 Ioannidis K, Hook R, Wickham K, Grant JE, Chamberlain SR. Impulsivity in gambling disorder and problem gambling: a meta-analysis. *Neuropsychopharmacology* 2019; **44:** 1354–61.

55 Guo K, Youssef GJ, Dawson A, et al. A psychometric validation study of the Impulsive-Compulsive Behaviours Checklist: a transdiagnostic tool for addictive and compulsive behaviours. *Addict Behav* 2017; **67:** 26–33.

56 Hampshire A, Hellyer PJ, Soreq E, et al. Associations between dimensions of behaviour, personality traits, and mental-health during the COVID-19 pandemic in the United Kingdom. *Nat Commun* 2021; **12:** 4111.

57 Petry NM, Ginley MK, Rash CJ. A systematic review of treatments for problem gambling. *Psychol Addict Behav* 2017; **31:** 951–61.

58 Grant JE, Odlaug BL, Chamberlain SR, et al. A randomized, placebo-controlled trial of N-acetylcysteine plus imaginal desensitization for nicotine-dependent pathological gamblers. *J Clin Psychiatry* 2014; **75:** 39–45.

59 Cowlishaw S, Merkouris S, Dowling N, Anderson C, Jackson A, Thomas S. Psychological therapies for pathological and problem gambling. *Cochrane Database Syst Rev* 2012; **11:** CD008937.

60 Grant JE, Donahue CB, Odlaug BL, Kim SW, Miller MJ, Petry NM. Imaginal desensitisation plus motivational interviewing for pathological gambling: randomised controlled trial. *Br J Psychiatry* 2009; **195:** 266–67.

61 Grant JE, Kim SW, Hartman BK. A double-blind, placebo-controlled study of the opiate antagonist naltrexone in the treatment of pathological gambling urges. *J Clin Psychiatry* 2008; **69:** 783–89.

62 Kim SW, Grant JE, Adson DE, Shin YC. Double-blind naltrexone and placebo comparison study in the treatment of pathological gambling. *Biol Psychiatry* 2001; **49:** 914–21.

63 Merkouris SS, Thomas SA, Browning CJ, Dowling NA. Predictors of outcomes of psychological treatments for disordered gambling: a systematic review. *Clin Psychol Rev* 2016; **48:** 7–31.

64 Narayanan G, Naaz S. A transdiagnostic approach to interventions in addictive disorders- third wave therapies and other current interventions. *Indian J Psychiatry* 2018; **60:** S522–28.

65 Sancho M, De Gracia M, Rodríguez RC, et al. Mindfulness-based interventions for the treatment of substance and behavioral addictions: a systematic review. *Front Psychiatry* 2018; **9:** 95.

66 Challet-Bouju G, Bruneau M, Victorri-Vigneau C, Grall-Bronnec M, IGNACE Group. Cognitive remediation interventions for gambling disorder: a systematic review. *Front Psychol* 2017; **8:** 1961.

67 Zucchella C, Mantovani E, Federico A, Lugoboni F, Tamburin S. Non-invasive brain stimulation for gambling disorder: a systematic review. *Front Neurosci* 2020; **14:** 1–11

68 Merkouris SS, Rodda SN, Austin D, et al. GamblingLess: For Life study protocol: a pragmatic randomised trial of an online cognitive-behavioural programme for disordered gambling. *BMJ Open* 2017; **7:** e014226.

69 Goslar M, Leibetseder M, Muench HM, Hofmann SG, Laireiter AR. Efficacy of face-to-face versus self-guided treatments for disordered gambling: a meta-analysis. *J Behav Addict* 2017; **6:** 142–62.

70 Snippe L, Boffo M, Stewart SH, Dom G, Wiers RW. Innovative treatment approaches in gambling disorder. In: Heinz A, Romanczuk-Seiferth N, Potenza MN, eds. Gambling disorder. Cham: Springer International Publishing, 2019: 195–233.

71 Giroux I, Goulet A, Mercier J, Jacques C, Bouchard S. Online and mobile interventions for problem gambling, alcohol, and drugs: a systematic review. *Front Psychol* 2017; **8:** 954.

72 Clark L, Boileau I, Zack M. Neuroimaging of reward mechanisms in gambling disorder: an integrative review. *Mol Psychiatry* 2019; **24:** 674–93.

73 van Timmeren T, Daams JG, van Holst RJ, Goudriaan AE. Compulsivity-related neurocognitive performance deficits in gambling disorder: a systematic review and meta-analysis. *Neurosci Biobehav Rev* 2018; **84:** 204–17.

74 Moccia L, Pettorruso M, De Crescenzo F, et al. Neural correlates of cognitive control in gambling disorder: a systematic review of fMRI studies. *Neurosci Biobehav Rev* 2017; **78:** 104–16.

75 Singer BF, Anselme P, Robinson MJF, Vezina P. An overview of commonalities in the mechanisms underlying gambling and substance use disorders. *Prog Neuropsychopharmacol Biol Psychiatry* 2020; **101:** 109944.

76 Quaglieri A, Mari E, Boccia M, Piccardi L, Guariglia C, Giannini AM. Brain network underlying executive functions in gambling and alcohol use disorders: an activation likelihood estimation meta-analysis of fMRI studies. *Brain Sci* 2020; **10:** e353.

77 Voon V, Gao J, Brezing C, et al. Dopamine agonists and risk: impulse control disorders in Parkinson's disease. *Brain* 2011; **134:** 1438–46.

78 Voon V, Sohr M, Lang AE, et al. Impulse control disorders in Parkinson disease: a multicenter case–control study. *Ann Neurol* 2011; **69:** 986–96.

79 Weintraub D, Koester J, Potenza MN, et al. Impulse control disorders in Parkinson disease: a cross-sectional study of 3090 patients. *Arch Neurol* 2010; **67:** 589–95.

80 Yücel M, Oldenhof E, Ahmed SH, et al. A transdiagnostic dimensional approach towards a neuropsychological assessment for addiction: an international Delphi consensus study. *Addiction* 2019; **114:** 1095–109.

81 Thomas SA, Merkouris SS, Radermacher HL, et al. Australian guideline for treatment of problem gambling: an abridged outline. *Med J Aust* 2011; **195:** 664–65.