IN SUPPORT OF THE NATIONAL STRATEGY TO REDUCE GAMBLING HARMS

Research Expertise and the Framework of Harms: Social Network Analysis, Phase One

December, 2020

Abstract

In 2019, the Gambling Commission announced a [National Strategy to Reduce Gambling Harms](#). Underlying the strategy is the Framework of Harms, outlined in [Measuring gambling-related harms: A framework for action](#). "The Framework" adopts a public health approach to address gambling-related harm in Great Britain across multiple levels of measurement. It comprises three primary factors and nine related subfactors. To advance the National Strategy, all components need to be supported by a strong evidence base. This report examines existing research expertise relevant to the Framework among academics based in the UK. The aim is to understand the extent to which the Framework factors and subfactors have been studied in order to identify gaps in expertise and provide evidence for decision making that is relevant to gambling harms research priorities.

A social network analysis identified coauthor networks and alignment of research output with the Framework. The search strategy was limited to peer-reviewed items and covered the 12-year period from 2008 to 2019. Articles were selected using a Web of Science search. Of the 1417 records identified in the search, the dataset was refined to include only those articles that could be assigned to at least one Framework factor ($n = 279$). The primary factors and subfactors are: Resources: Work and Employment, Money and Debt, Crime; Relationships: Partners, Families and Friends, Community; and Health: Physical Health, Psychological Distress, and Mental Health. We used Gephi software to create visualisations reflecting degree centrality (number of coauthor networks) so that each factor and subfactor could be assessed for the density of research expertise and patterns of collaboration among coauthors.

The findings show considerable variation by framework factor in the number of authors and collaborations, suggesting a need to develop additional research capacity to address under-researched areas. The Health factor subcategory of Mental Health comprised almost three-quarters of all citations, with the Resources factor subcategory of Money and Debt a distant second at 12% of all articles. The Relationships factor, comprised of two subfactors, accounted for less than 10% of total articles. Network density varied too. Although there were few collaborative networks in subfactors such as Community or Work and Employment, all Health subfactors showed strong levels of collaboration. Further, some subfactors with a limited number of researchers such as Partners, Families, and Friends and Money and debt had several active collaborations. Some researchers' had publications that spanned multiple Framework factors. These multiple-factor researchers usually had a wide range of coauthors when compared to those who specialised (with the exception of Mental Health). Others' collaborations spanned subfactors within a factor area. This was especially notable for Health.

The visualisations suggest that gambling harms research expertise in the UK has considerable room to grow in order to support a more comprehensive, locally contextualised evidence base for the Framework. To do so, priority harms and funding opportunities will need further consideration. This will require multi-sector and multidisciplinary collaboration consistent with the public health approach underlying the Framework. Future research related to the present analysis will explore the geographic distribution of research activity within the UK, and research collaborations with harms experts internationally.

Introduction

Contents

Background to the report

Approach: Social Network Analysis

Findings

Discussion

Future directions

Summing Up

References

About this report

Background to the Report

Background to the report

Exploring gambling-related harm, situating research networks

In recent years, attention has begun to shift from a focus on identification and treatment of the small percentage of people with gambling problems to preventing and reducing harm among a much larger segment of the population. This transition has been described as moving from "counting heads" to "counting harms".¹ It aligns with a new direction for research and policy, where there is a growing interest in adopting a public health approach to prevent, reduce, and mitigate harm.

Harm from gambling is a serious public health concern. Although harms are experienced most severely by people with gambling problems, harms are present across the gambling risk spectrum.²⁻⁴ These harms can extend beyond the individual gambler to include their significant others, workplaces, and communities.

A medical model perspective has dominated gambling research in past,⁵ and it remains the most cited gambling research to date⁶ concentrates on the

including specialised therapies, counselling, psychiatric services, and recognising comorbidities like alcohol and substance abuses, depression, and anxiety. Evidence for policy making is closely tied to prevalence rates of people with gambling problems.⁷

The public health model adopts a whole population approach. The policy goal is healthy communities, resilient and healthy individuals, and a focus on changing the gambling environment.⁷ Its emphasis is on reducing or preventing gambling harm and addressing the many contextual factors that can contribute to harm from a social determinants of health perspective.

The historical emphasis on adopting a medical model approach to informing policy means that research from a public health model is less well developed. This has implications for researcher networks, expertise, and opportunities for multidisciplinary collaborations.

Background to the report

National Strategy to Reduce Gambling Harms

The goal of the *National Strategy to Reduce Gambling Harms* (the "National Strategy"), released by the Gambling Commission in 2019, is to "make better and faster progress to reduce gambling harms".^{8, p.4} The National Strategy aligns with the public health policy model by including people across the gambling risk spectrum and addressing harm by implementing measures directed towards the whole population ("universal"), at-risk groups ("selected") and at-risk individuals ("indicated"). To do so, different people and organisations will need to adopt a wide range of beneficial practices and approaches to prevent harm from gambling taking place.

The National Strategy rests on two pillars: Prevention and Education, and Treatment and Support. The four enablers are regulation and oversight, evaluation, collaboration, and research to inform action.

Underlying the National Strategy is the *Framework of Harms*,⁹ (the "Framework"). It both informs understanding of gambling-related harms in Great Britain and provides a preliminary set of harm metrics to monitor over time to assess stability and change in levels of gambling-related harm. Research expertise is essential to supporting and refining the gambling harms metrics. Therefore, it is important to understand the extent to which research expertise exists for each harm factor. With that in mind, GREO has conducted a social network analysis of researchers whose research experience aligns with the Framework.

[GREO](#) is an independent knowledge translation and exchange organisation with experience in generating, synthesising, and mobilising research across the health and wellbeing sectors. As part of its work programme, GREO provides support to the National Strategy, primarily in the areas of research to inform action and evaluation.

The Framework of Harms

The Gambling Commission and GambleAware released *Measuring gambling-related harms: A framework for action*⁹ in 2018. A goal of the report was to create a working definition of gambling-related harm that could be used to inform strategic policy development and practice. The report considers how to conceptualise and track gambling-related harm, explores the potential to estimate the social costs of gambling harm, and recommends specific metrics.

The Framework organises gambling-related harms into three primary, interrelated categories of *Resources*, *Relationships*, and *Health*, with a total of eight associated subfactors. The original Framework includes suggested metrics, or indicators, to assess the associated social costs. For this report, we focus on the three higher level factors and eight related subfactors. They will be used to guide understanding of gambling-related harms expertise in the UK.

Background to the report

Exploring research expertise

To build research expertise that will help to support and advance the National Strategy, it is important to understand the existing research landscape in the UK as it pertains to the Framework. For this end, we undertake a closer examination of who is participating in research that aligns with the Framework. Although many international experts in gambling harm collaborate with UK-based researchers, this phase of the project explores research expertise within the UK only.

The focus of Phase One of this project is to learn more about research expertise relevant to the Framework among UK academics from multiple disciplines. To do so, we explore:

- The extent to which each factor and subfactor in the Framework is being addressed and by whom (over a 12-year period);
- With whom gambling harms researchers collaborate, and the strength of their networks; and,
- The degree to which researchers specialise in a specific area or extend beyond their primary factor specialisation to contribute to research in other factor areas.

It should be noted that this report addresses Phase One only. Phase Two will examine the international research networks of UK-based authors. Phase Three will explore the geographic location of authors aligned with each framework factor to gain a more accurate understanding of where relevant gambling harm research activity is situated within the UK.

A physical model of a social network graph is shown on a white surface. It consists of several black pins acting as nodes. On the left, a cluster of pins is interconnected by blue string, forming a dense web. On the right, another cluster of pins is interconnected by red string, also forming a dense web. A single blue string connects a pin in the left cluster to a pin in the right cluster, representing a bridge or connection between two different groups or communities. The background is a plain white surface.

Approach: Social Network Analysis

Approach: Social Network Analysis

Why use a social network perspective?

Social network analysis uses quantitative methods to examine the structure of relationships among people, groups, or organisations. It is commonly used in studies of social capital, and increasingly in health research.¹⁰ Social network analysis provides information about the number (or density) of actors in a network, with whom they interact, and how frequently this occurs. But it can also show other things, such as central actors who may be in a position of power or influence within it, as well as those who operate on the periphery. This information helps to illuminate the extent to which members may have access to resources such as social, informational, and material supports.

A social network perspective allows us to see each person as part of a network and then look for explanations about the structure of the network behaviour, rather than the behaviour of individuals alone. Networks are normally captured in a *visualisation*, which can reveal patterns of relationships.¹¹ The patterns can indicate who are the connectors or brokers, who works independently, where research clusters exist and who belongs to them, and who is in a position of influence within the network.¹²

Conducting a social network analysis of researchers who examine gambling-related harms provides an overview of research expertise in relation to the Framework, and each of the factors and subfactors. The visualisations provide evidence of the coverage (or lack of coverage) of research expertise in each. By examining and comparing these visualisations, priorities may emerge for new research directions and capacity development.

Approach: Social Network Analysis

Assessing research expertise

Information about how the social network analysis was undertaken is provided in the next section. This includes the search strategy and refinement of results, the coding process, how the data were processed, and basic information about how to interpret the visualisations.

A set of visualisations for the overall Framework and each of the factors and subfactors is then presented, with commentary related to what both the visualisations and statistical results suggest. Networks of expertise are reviewed in terms of how they differ or are similar, raising questions about how the information might be used to guide future research priorities.

Note that that **the social network analysis does not depict *all* people active in gambling research in the UK**. Instead, it is limited to those whose research aligns with the harms focus of the Framework.

Approach: Social Network Analysis

Searching for and coding data

Search strategy

- We searched for research articles on Web of Science, the single largest academic publication database with multidisciplinary coverage.
- To ensure a broad search, we searched for all articles with "gambl*" in the title, abstract, or keywords, and at least one author from the UK. Searches for 2008-2018 publications were performed on 25 June 2019, and the search for 2019 publications was performed on 29 June 2020.

Inclusion/exclusion and coding

- We included peer-reviewed research articles and reviews, editorials and letters, and conference presentations not yet published as full papers. We excluded books, book chapters, book reviews, and journal issue introductions.
- To determine if articles were relevant to gambling harms and code them to eight sub-categories of gambling harms in the Framework, two coders read the Framework in full before coding any articles.
- The two coders then independently coded 15 randomly selected articles and compared answers to reach consensus on inclusion/exclusion and factor coding. This process was repeated until >90% agreement was reached (a total of eight times). One coder then coded the remaining articles.

Consultation to fill in missing data

- Once the 2008-2019 articles were coded, the dataset included 255 articles relevant to the Framework. We then emailed the publication list to all UK authors in the dataset, inviting them to add any articles we may have missed.
- Sixteen authors responded to the consultation, adding 24 more articles, resulting in a final dataset of 279 articles.

Approach:
Social Network Analysis

Modified PRISMA Flow
Diagram¹³ for article
inclusion

Approach: Social Network Analysis

Visualising academic collaboration networks

The 279 articles that could be coded to the Framework were collected as plain text files from *Web of Science*.

We processed the plain text using the metaknowledge software package¹⁴ to produce a list of all authors on these articles. Across all papers, there were 728 authors. Of those authors, 283 were affiliated with UK research institutions.

From this metadata, we created a coauthorship network that represents academic collaboration within UK gambling research. Subnetworks were generated by filtering authors based on their research in different factors of the Framework.

We visualized all networks using Gephi,¹⁵ a network visualisation software.

We recognise that much research on gambling-related harm crosses factor categories. We have chosen to assign authors to the factor and subfactor category that most closely aligns with the publication as either single factor "specialists" or as "multiple factor" authors.

Approach: Social Network Analysis

Visualising academic collaboration networks

There are many ways to measure how central a node is in a network. For this report, we have chosen **degree centrality**, which measures how many unique people with whom an author has collaborated.

This measure is the easiest to interpret and is directly relevant to understanding the connectedness of research networks.

The networks have been visualised with a force-directed algorithm. In this algorithm, all nodes repel each other but connected nodes are pulled together, and the centre of the visualisation attracts all nodes, creating the circular shape. This means there is no relationship between nodes that are close together but unconnected.

In the following visualisations, we provide statistics for **node counts** and **average degree**.

Each **node** represents a UK-based author. A **node count** is a count of all UK-based authors who have published papers related to the scope of the network or subnetwork.

The **average degree** of a network is the average number of UK-based coauthors an author has in the network. In effect, it indicates how collaborative each network is. The higher the average degree, the greater the level of collaboration within the network.

An aerial photograph of a large, open public space, likely a plaza or park, filled with many people walking. The ground is paved with light-colored tiles and features a prominent geometric pattern of dark lines forming a network of triangles and polygons. The people are scattered throughout the space, some walking alone, some in small groups, and some pushing strollers. The overall scene suggests a busy, public environment.

Findings: Research
expertise relevant to the
Framework of Harms

Findings

A guide to the visualisations

We begin by presenting the overall network of UK-based authors whose research expertise aligns with the Framework. By using degree centrality as the approach to analysis, we can assess the number of UK-based collaborations for each author. This, in turn, facilitates an understanding of research capacity relative to each of the factors and subfactors.

Each factor is colour coded (Health, **blue**; Resources, **pink/red**; and, Relationships, **green**), and subfactors are assigned a distinct colour within the colour family of each main factor. Author nodes are symbolized by circles. The size of each node varies depending on the number of coauthors they have worked with both within and across Framework factors. Nodes are linked by lines or "edges" of varying thickness. Edges represent relationships. The edge thickness indicates the frequency with which collaborations have occurred between two UK-based coauthors.

The first visualisation shows the alignment of coauthors to the framework by primary area of research interest. The second and all subsequent visualisations include a colour code for researchers whose collaborations span multiple primary, or "super", factors ("Multi-super", **yellow**). This group could be influential when considering broad expertise, pathways to knowledge dissemination, and research networks that may cross disciplinary lines. Researchers may also span more than one subfactor within a primary factor area ("Multi-sub", **mauve**). Their research is focused in one primary factor area, with expertise across the subfactors within. They are included in the factor and subfactor visualisations only. Some "multi-super" authors also cross subfactors within a specific factor area. When this occurs, the "multi-super" designation is prioritized. Finally, note that some nodes are unconnected to others. These may represent an author's solo publication, or the author may have collaborated with internationally-based coauthors (not depicted here).

Findings

Framework factor alignment, primary domain focus, 2008-2019

Legend

This visualisation represents the alignment of UK authors and coauthors with subfactors of the Framework by their focal research area. It shows the number of authors, whether clusters of authors are tightly linked, and if authors work solo or collaborate with other UK authors. There were 283 nodes, and the average degree was 4.636.

There are a few dense clusters, and many authors who work independently or as part of a dyad or triad. With the exception of Mental Health, there are few large, dense coauthor clusters among subfactors.

Dominating the visualisation is the subfactor of Mental Health, which comprises three-quarters (74.91%) of the authors, with Money and Debt a distant second at 12.01%. Work and Employment (1.77%) and Community (2.83%) were least well represented.

Findings

Framework factor alignment, multiple domain focus, 2008-2019

Legend

- Health (Mental Health)
- Health (Physical Health)
- MultiSuper
- Resources (Money and Debt)
- Health (Psychological Distress)
- MultiSub
- Relationships (Partners Families and Friends)
- Resources (Crime)
- Resources (Work and Employment)
- Relationships (Community)

This visualisation builds on the previous figure with one important difference. Highlighted in yellow are authors whose publications span multiple framework factors. Authors who work across factors, the "Multi-super" category, tend to have larger nodes. They are normally senior researchers who collaborate widely, and whose research programme has exposed them to a broad range of authors in different focal areas. These authors may be better positioned than others to facilitate information exchange and, potentially, interdisciplinary research.

The "Multi-super factor" node accounts for almost 7.07% ($n = 41$) of the authors. Most of them have published in the Health factor area, which effectively reduces the percentage of specialist authors in that domain. Multi-subfactor authors represent just 5.30% of authors overall.

Findings

Resources

This category consists of three subfactors: work and employment, money and debt, and crime. Examples of harms could include job loss, financial insecurity, and crimes committed to support gambling activities.

Findings

Framework factor alignment, Resources – overall, 2008-2019

Legend

In total, the Resources factor represented 17.31% of authors. There were 49 nodes and the average degree was 2.408.

The Resources factor has several networks, many of which include between two to four coauthors with a sole domain focus. Nine researchers work independently, with two having published work in other factor domains.

Researchers with collaborations that cross multiple primary factors generally have a denser network with more coauthor connections than those who work solely in the Resources area. They may have been invited to contribute to Resource harm projects due to substantive knowledge of another factor that could strengthen the understanding or interpretation of findings. All but three of these researchers are connected to others working solely in the Resources area. Most Resource harm "specialists" have networks that are limited to others in the same research area. Only one of the authors had publications that spanned at least two Resource subfactors.

Findings

Framework factor alignment, Resources – Work and Employment, 2008-2019

Legend

Multi
Resources (Work and Employment)

The Work and Employment subfactor of Resources examines topics such as unstable employment, reduced performance at work, and job loss. This subfactor represented a mere 1.77% of authors. There were 5 nodes, and the average degree was 0.400.

Only two authors have published together, and they share a strong link. Both are multi-factor authors and are based at institutions in Scotland. It may be that geographic proximity along with shared interests and prior research collaborations helped to facilitate this dyad. The three other specialist researchers worked solely in the Work and Employment subfactor area and, as of 2019, had not collaborated either with each other or the multi-factor authors.

Findings

Framework factor alignment, Resources – Money and Debt, 2008-2019

Legend

The Money and Debt subfactor of Resources examines topics such as financial insecurity, reduced disposable income, and debt. This subfactor represented 12.01% of authors. There were 34 nodes, and the average degree was 2.294.

The collaborations in this subfactor include many coauthors who specialise in this area, with a few collaborations that cross factor areas. Those specialising in the Money and Debt subfactor are drawn from diverse disciplines like economics, urban design, crime and justice, and business. By contrast, most of the coauthors that research multiple areas have disciplinary training in psychology.

The largest cluster has coauthors that focus on the Money and Debt factor only, as well as coauthors who cross multiple factors. The other research groups consist of specialists only, except for two dyads with one specialist and one multi-super author. This suggests that there is limited direct influence on the specialists from coauthors in other harm factor areas. Only one researcher worked in an another Resources subfactor area.

Findings

Framework factor alignment, Resources – Crime, 2008-2019

Legend

The Crime subfactor of Resources includes topics such as anti-social behaviour and crimes committed such as theft, fraud, and assault. This subfactor was poorly represented, with only 5.30% of authors in total. There were 15 nodes, and the average degree was 2.267.

There were two clusters, two dyads, and two researchers worked independently. The collaboration with three multiple super-factor coauthors had stronger ties. This collaboration also includes the author who had published in the Money and Debt subfactor.

Overall, however, the networks function mostly independently, suggesting relatively little collaboration among authors who examine crime in relation to gambling.

Findings

Relationships

The Relationship factor includes two subfactors: partners, families, and friends; and community. Examples of harms in this area would be disrupted, neglected, and exploited relationships. Harm to community may be experienced as a reduced sense of belonging and community engagement, and heightened community inequality.

Findings

Framework factor alignment, Relationships – overall, 2008-2019

Legend

- Multi
- Relationships (Partners Families and Friends)
- Relationships (Community)

The Relationships factor represented 8.13% of authors. There were 23 nodes, and the average degree was 2.435.

Almost equal numbers of UK coauthors specialised in the Relationship domain when compared to those whose work included multiple factors. All but two researchers specialising in Relationships harms had worked with others who specialised in the area, and just two of the specialist researchers collaborated with coauthors whose work aligned with multiple factors. Mostly, research groups were not interconnected. Some “multi-factor” authors had published articles in both of the Relationships subfactors, but the “multi-super” designation is prioritised for collaborations across primary factors.

Coauthor networks were larger for coauthors whose research covered multiple factors. Most were weakly connected to those who specialised in Relationship harms. The only exception is the triad at the right of the visualisation where there were strong links between one specialised Relationships researcher and two whose research crossed factor domains.

Findings

Framework factor alignment, Relationships – Partners, Families, & Friends, 2008-2019

Legend

- Multi
- Relationships (Partners Families and Friends)

This subfactor addresses harms from gambling that affect personal relationships such as divorce or separation, domestic violence, loss of trust, and relationship stress. It accounted for 6.36% of authors overall. There were 18 nodes, and the average degree was 2.778.

The subfactor is characterised by a high concentration of collaborations; none of the authors worked independently. There were three collaborator networks among those who specialise in this area, all with relatively weak ties. Only the coauthor dyad at the bottom right of the visualisation appears to have collaborated more than once.

Authors whose research spans multiple super factors have stronger ties than specialist researchers in this subfactor area. All of the multi-factor researchers are connected to one another, but only one of the specialist coauthors appears in a multi-factor coauthor network. All specialist authors are linked to at least one other specialist coauthor, with one exception. It could be that the specialists are experiencing less access to coauthors with a more diverse research programme.

Findings

Framework factor alignment, Relationships – Community, 2008-2019

Legend

Multi
Relationships (Community)

The Community subfactor examines areas such as increased use of community services, reduced social capital, and lower levels of connectedness to cultural relationships. This subfactor was poorly represented, accounting for only 2.83% of authors. There were 8 nodes, and the average degree was 0.750.

Only three specialists work in this area, but five others with multiple factor expertise have conducted research related to community harm.

Three multi-factor researchers and two specialist researchers had no links to specialists in the Community subfactor. There was only one collaboration with a mix of multiple and specialist factor researchers. The links for this collaboration are strong, indicating a history of conducting and publishing research together.

The visualisation shows that Community harms is an under researched area, with potential for collaborations among and between both multiple factor and subfactor coauthors and Community harm specialists.

Findings

Health

Gambling harm is associated with diminished health in different ways. The subfactors of this domain include physical health, mental health, and psychological distress. Examples of harms that might be experienced are lower levels of health and well-being, and reduced happiness at individual, family, and community levels.

Findings

Framework factor alignment, Health - Overall, 2008-2019

Legend

The Health factor dominates the gambling harms research landscape in the UK. Fully 82.33% of authors have work attributed to this factor. There were 233 nodes, and the average degree was 5.082.

The Health factor consists largely of research that aligns with the Mental Health subfactor, with Psychological Distress and Physical Health only marginally represented. This aligns with gambling research internationally, where much research attention has been given to identifying, understanding, and treating gambling problems.^{5,16}

Several extensive collaborations with strong ties exist within the Health factor, reflecting a long history of research from a psychological perspective. Included are a number of multi-super factor and multi-subfactor coauthors, which differs from the Resources and Relationships factors. The multi-super factor authors tend to share dense networks. The number of networks for multi-subfactor authors is similar, but they are often less dense and have weaker ties.

Findings

Framework factor alignment, Health – Physical Health, 2008-2019

Legend

This subfactor focuses on gambling harm related to physical health. It can include issues such as poorer nutrition, high blood pressure levels, and less engagement in physical activity. The Physical Health subfactor represented 8.83% of authors. There were 25 nodes, and the average degree was 2.000.

Specialist researchers in this subfactor area mostly work independently or collaborate with one other coauthor. There is only one larger specialist network. Two collaborations are present that include one specialist researcher and coauthors who are part of larger, multi-super or multi-subfactor research groups. Like other subfactors, multi-super factor coauthors tend to have larger networks with stronger links than either multi-sub factor or specialist coauthors.

This suggests that opportunities exist for coauthors to broaden and deepen their research networks in future, both among specialists and between Physical Health specialists and those with multi-super and multi-subfactor expertise.

Findings

Framework factor alignment, Health – Psychological Distress, 2008-2019

Legend

The Psychological distress subfactor examines harms such as feelings of guilt, shame, and stigma. It accounts for 6.36% of authors. There were 18 nodes, and the average degree was 4.000.

This subfactor is populated mostly by coauthors whose work appears in other factor and Health subfactor areas. These authors are part of multiple super and subfactor author networks. Unlike other subfactors, the links between multi-subfactor researchers are stronger than among multi-super factor authors. Only three coauthors in this subfactor focus solely on psychological distress. Two work independently and just one specialist researcher is included in a larger coauthor collaboration.

Mental Health and Psychological Distress are closely related, so most multi-sub factor authors are also found in the Mental Health subfactor. Some Psychological Distress research also overlaps with the Relationships - Partners, Families and Friends subfactor area, and with the Money and Debt subfactor of Resources.

Findings

Framework factor alignment, Health – Mental Health, 2008-2019

Legend

Harms related to mental health range from increased depression and anxiety to suicide. This subfactor accounts for 74.91% of gambling harms authors. There were 212 nodes, and the average degree was 5.302.

Coauthor networks are well-established for Mental Health. It has been the focus of gambling research for many years,^{5,16} which has allowed networks to become firmly established, and more new researchers to be mentored in this area. Mental Health harm from gambling is the strongest area of harms expertise in the UK.

Many researchers who work in this area are highly prolific, with several having participated in collaborations that extend to other super and subfactor areas. All multi-super factor authors work within coauthor networks, and just one multi-subfactor researcher works independently without any links to others in the Mental Health area. Most Mental Health specialist coauthors are affiliated with larger research groups, with only a few dyads and triads. Several specialists work independently.

Findings

Summary of author distribution, number of authors, and average degree in Framework factor and subfactor networks

Factor/Subfactor	% of authors (nodes)	Number of authors	Average degree
Resources	17.31	49	2.408
Work and employment	1.77	5	0.400
Money and debt	12.01	34	2.438
Crime	5.30	15	2.267
Relationships	8.13	23	2.435
Partners, families, and friends	6.36	18	2.778
Community	2.83	8	0.750
Health	82.33	233	5.082
Physical health	8.83	25	2.000
Psychological distress	6.36	18	4.000
Mental health	74.91	212	5.302
All factors/ subfactors	107.77	283	4.636

This table allows general comparisons both within and between factors and subfactors, which are reviewed on the following pages. Note that the total subfactor nodes and percentages within each primary factor exceeds the factor total due to the presence of authors assigned to multiple subfactors.

The background of the slide is a dense, overlapping pattern of human head silhouettes. Each silhouette is filled with crumpled paper of a different color, including shades of pink, white, red, gold, grey, blue, yellow, purple, green, and teal. The silhouettes are arranged in a way that they appear to be floating or layered over each other, creating a textured and vibrant visual effect.

Discussion: What have we
learned about harms
research in the UK?

Discussion

About the number of peer-reviewed items related to gambling harm, 2008-2019

The modified PRISMA flow diagram provides some useful information when thinking about gambling harms research expertise in the UK.

The 279 peer-reviewed items included in the final dataset yielded 283 distinct authors who were based in the UK from 2008 to 2019. The discrepancy between the two numbers is easily accounted for since they refer to different things (i.e., number of eligible publications versus number of authors). British authors often publish more than one article with other UK-based coauthors. Further, many British gambling researchers collaborate internationally so some of the papers may have had only had one or two British coauthors.

Of the 1,069 publications excluded from the final analysis as out of scope, half ($n = 534$) were related to gambling but not gambling harms. When examined as part of the total peer reviewed output for gambling literature, the percentage of harms-related publications was 34.3% in comparison to 65.7% for other gambling papers not focussed on harm. Many of these publications would have been centred on such topics as etiology, neurology, and treatment for problem gambling. These topics are essential to understand; still, there is room to expand harms research, especially in consideration of gaps in research and expertise in many Framework factor areas.

Framework factor coverage

- Focusing on the primary factors of Resources, Relationships, and Health provides some useful insights into the distribution of gambling harms research expertise in the UK.
- The gambling harms research landscape in the UK is dominated by publications concentrated in the **Health** factor, specifically the Mental Health subfactor. This is consistent with a psychological approach having accounted for the highest percentage of gambling studies research internationally for many years.¹⁶ There has been time to develop research expertise, coauthor relationships, set up research centres and labs, explore and participate in a range of funding opportunities, and acquire deeper knowledge of the topics and issues relevant to harm from gambling.
- Few articles focused on harm to **Relationships**, although some multi-super factor authors have extended their research into this area. With so few authors working in this area overall, it is not

surprising that research collaborations were limited or that there were few specialists. Relationship harm is vastly under-researched, especially since the consequences can be so devastating and may have a generational and intergenerational impact.⁴

- The amount of research expertise in the **Resources** factor was somewhat better than for Relationships. About twice as many researchers worked in this harms area, although the average number of collaborations was similar. The Work and Employment subfactor was the least well represented of all subfactors. Like the Relationships factor, much more research could be undertaken with a focus on Resources. While the economic impact on gamblers and their families is evident and can have generational implications as well, there are other social costs such as homelessness, use of foodbanks, job loss, lost educational opportunities, and experiences of marginalisation.

HIGHLIGHT

233 researchers authored peer reviewed articles in the Health domain, compared to 49 for Resources, and 23 for Relationships.

Subfactor coverage

- Consistent with the medical model approach to Gambling Studies that has dominated research for many years,⁵ the amount of researcher expertise in the Mental Health subfactor far exceeded that of all other subfactors combined. As anticipated, research collaborations were the highest for this subfactor, and included many multi-super and subfactor authors. Opportunities to conduct research addressing Mental Health harms and collaborate with others are well established.
- Gambling related harm to Physical Health is under-researched in the UK. This aligns with international trends, accompanied by a recent call for more evidence in this area.¹⁷ Physical Health had the third lowest level of coauthor collaborations, and most researchers worked independently or with coauthors based outside the UK.
- The other Health subfactor, Psychological Distress, had a much higher level of collaboration but very few subfactor specialist researchers. Psychological distress often accompanies experiences of harm in

other factor and subfactor areas, as indicated by the presence of authors spanning multiple areas.

- Research expertise in the Community and Work subfactor is scant, with the lowest second collaboration rate of all subfactors. Part of the reason may be that it is an emerging areas of research, only recently identified as a gambling harm domain (e.g., see Langham et al.⁴). Conceptually, the Community subfactor has strong links to the Crime and Work and Employment subfactors of Resources. Collaborations in these areas are also notably limited. More empirical work could be encouraged to build greater expertise in these areas, with the potential to build and strengthen subfactor networks.
- Research on harm to Partners, Families, and Friends had few authors, but a high level of collaboration for such a small network. Cross factor research could also stimulate researcher expertise for this area of gambling harm. It could be well suited to collaborations with those specialising in the Money and Debt and Psychological Distress subfactors.

HIGHLIGHT

With 212 authors, the Mental Health subfactor far exceeded all other subfactors.

Discussion

Bridging framework factors

- Just over 7% of researchers had publications in more than one primary framework factor. Most researchers were specialists in either Resources, Relationships, or Health.
- Multi-super factor researchers were most active in the Relationships domain. They also represented a high proportion of authors in the Resources subfactor of Money and Debt.
- Multi-super factor authors most often worked together within subfactor clusters. Although they sometimes worked with specialist authors, the links were rarely as strong as they were with other multi-super factor researchers. It would be important to more closely examine the specific coauthors and the nature of their collaborations to tease apart the working relationship. For example, are they consistent teams with varied research interests? Or are they specialists in their own sub-fields who collaborate on mostly specialist papers but with some crossover from another specialist?
- Most multi-super factor authors had large nodes, indicating greater involvement in coauthored publications. They may represent a core group of researchers with a long history of publications and mentorship in gambling harms research. It could also be that these authors have expanded their areas of specialisation over the 12-year period under review.
- Because a high proportion of multi-super factor researchers have larger nodes, they are well situated to transfer information about novel findings and new funding developments for harms research.
- Multi-super factor researchers may also be in the best position to stimulate interdisciplinary collaborations. Their coauthors are likely to span a wider range of disciplines and could contribute new insights to harms-related projects. Interdisciplinary research is well suited to a public health policy approach to preventing and reducing harm from gambling.

HIGHLIGHT

7.1% of gambling harms researchers had publications that were assigned to different primary Framework factors.

Bridging subfactors

- A lower proportion of researchers (5.3%) had publications spanning subfactors within a primary framework area. The lack of cross-over within subfactor areas could be due, in part, to the distinct nature of each subfactor and the different approaches to research and disciplinary training typically associated with each.
- Multi-subfactor authors were strongly represented in the Health domain, specifically between the Mental Health and Psychological Distress subfactors. Where subfactors share stronger conceptual similarities, there a higher level of fluidity could be expected. Researchers trained in psychology, for example, would be well positioned to span Health subfactor areas.
- Somewhat surprising is the limited number of multi-subfactor Health researchers that have contributed to publications related to Physical Health. The relationship between physical and mental health is

well established.¹⁸ Encouraging collaboration between Mental and Physical Health researchers could help to support the WHO call for more physical health evidence of gambling harm consequences.¹⁷

- In almost all collaborations that included a multi-subfactor author, there was at least one multi-super factor author present. As indicated previously, more insight could be gained by examining the nature of their collaborations, and what underlying resources in terms of grants, institutional histories and support, or broader networks with international gambling researchers might have facilitated their collaborations.
- The lower proportion of multi-subfactor authors might indicate that people who tend to cross sub-factors are also more likely to cross super-factors. It could be that people who are willing to cross small boundaries are also likely to cross large boundaries.

HIGHLIGHT

5.3% of gambling harms researchers had publications that were assigned to different subfactors within a primary Framework factor area.

An aerial photograph of a large crowd of people walking on a light-colored, tiled plaza. A black line graph is superimposed on the image, starting from the bottom left, rising to a peak, falling to a trough, rising to a higher peak, and then continuing as an arrow pointing towards the top right corner. The text is overlaid on a dark grey rectangular area in the lower-left portion of the image.

Future Directions: How can this information be applied?

Considerations for building an evidence base in support of the National Strategy to Reduce Gambling Harms

Future directions

Building research expertise

The visualisations show that gambling harms research expertise in the UK has considerable room to grow in order to support a more comprehensive, locally contextualised evidence base for the Framework.

In reviewing the distribution of harms research expertise, questions arise about why certain areas have received less attention than others. We did not expect that all factors and subfactors would be equally represented. The focus on Mental Health has dominated gambling studies research in the UK and internationally for many years even though there have been calls for more research from a public health perspective since the 1990s.^{19,20} Further, some subfactors such as Community or Partners, Families, and Friends can be challenging to disentangle from other coincident factors such as experiences of trauma, poverty, and homelessness.

Research expertise could be expanded to effectively support each subfactor. To do so, priority harms will need to be considered. This will require multi-sector and multidisciplinary collaboration consistent with the public health approach underlying the framework.⁷

The network analysis also shows who is involved in collaborative publications and who is not. Questions such as why some authors don't collaborate with other UK-based authors, or why particular research groups within subfactors do not collaborate with others would be interesting to explore. Further, the disproportionate number of clusters that consist largely of multiple factor researchers with few specialist researchers raises questions about why this pattern exists and whether or how a greater diversity of factor specialists could be included in the mix.

Future directions

Supporting research expertise

The challenge of building research expertise to support the Framework will need to be addressed by key research and policy stakeholders in Great Britain. Directed long-term funding for more research with a gambling harms focus would allow academics to continue producing evidence and mentoring new researchers. It could also provide support for researchers who specialise in under-researched subfactor areas. These authors may have experienced more difficulties obtaining funding from traditional sources in the past due to the interdisciplinary nature of gambling harms research and, perhaps, a traditional medical model preference by funding agencies for empirical research.

Directed funding could support the application of newer measures that are better at capturing harm at the population level (e.g., see Browne, Goodwin & Rockloff²¹) than other commonly used gambling risk measures. Qualitative and mixed methods research will also play a strong role in

capturing insights and perspectives of people who have experienced harm from gambling. Such approaches can help to identify structural factors and underlying conditions relevant to Framework subfactor areas where the body of evidence is in a nascent stage.

A diversity of approaches and methodologies will be necessary to effectively capture the dynamics of harm

Interdisciplinary (i.e., academics from different disciplines) as well as transdisciplinary studies (research teams that include non-academic participants)²² could play a role in extending key metrics associated with the Framework,^{9, see p.17} with the intent to monitor them for stability and change over time. It would allow a more comprehensive assessment of the social costs of harm that could be acted upon by a diverse set of agencies and organisations.

Future directions

Extending the Social Network Analysis

Having completed **Phase One**, the dataset used for the Social Network Analysis has the potential to provide additional information that could help to support research efforts that address priorities of the National Strategy. The next two phases will focus on different aspects of gambling-related harms research for UK researchers.

Phase Two will explore coauthor collaborations between researchers based in the UK and those situated internationally. By doing so, links to international institutions and academics with strengths in specific areas can be assessed. It may also help to determine priorities in building and/or strengthening international connections and collaborations with academic and like-minded organisations.

Phase Three will map the geographic concentration of authors aligned with each framework factor to gain a more accurate understanding of where gambling harms research activity is situated within the UK. It will demonstrate by whom and in which region(s) work in Framework areas of expertise is being undertaken. It could help to support researchers who wish to establish networks with others working in different departments within their own and/or other institutions to enhance the potential for greater sharing of insights about gambling harm from different disciplinary perspectives.

Summing up

Phase One has outlined the depth and breadth of researcher expertise for each of the harms Framework factors and subfactors among academics based in the UK. It provides information about who has conducted research related to gambling harm, the extent to which factor and subfactor interests are shared, and whether harms researchers tend to collaborate or work in isolation. This provides a foundation from which evidence-based decisions can be made to determine priority areas for research capacity development.

As with any research report, there are limitations to consider.

- Gambling studies has a rich grey literature that was excluded from the analysis but could be included in future studies of research networks.
- Although researchers had the opportunity to check for missing data related to their own publications, we have no way of knowing if the search did not return other studies associated with harm from gambling.
- We recognise that **much research on gambling-related harm crosses factor categories**. It can be challenging to determine primary subfactor alignment, and it is possible that some citations could have been inadvertently miscategorised.
- It would have been useful to obtain feedback from subfactor specialists to "sense check" the network. They could, no doubt, provide contextual information and insights that would enhance understanding of the gambling harms research landscape.

References

1. Blaszczynski A. What do we mean by gambling-related harm? GambleAware Harm Minimization Conference; Dec. 7-8, 2016; London, UK: Available from <https://www.about.gambleaware.org/media/1381/alex-blaszczynski.pdf>; 2016.
2. Blaszczynski A. Problem gambling: We should measure harm rather than 'cases'. *Addiction*. 2009;104(7):1072-4. <https://doi.org/10.1111/j.1360-0443.2009.02505.x>.
3. Browne M, Langham E, Rawat V, Greer N, Li E, Rose J, et al. Assessing gambling-related harm in Victoria: a public health perspective. Victoria, Australia: Victorian Responsible Gambling Foundation; 2016. Available from: <https://www.responsiblegambling.vic.gov.au/information-and-resources/research/recent-research/assessing-gambling-related-harm-in-victoria-a-public-health-perspective>.
4. 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. Plain language summary available at <https://www.greo.ca/Modules/EvidenceCentre/Details/defining-and-categorizing-gambling-related-harms>.
5. Shaffer HJ, Stanton MV, Nelson SE. Trends in gambling studies research: Quantifying, categorizing, and describing citations. *Journal of Gambling Studies*. 2006;22(4):427-42.
6. Akçayır M, Nicoll F, Baxter D. Patterns of disciplinary involvement and academic collaboration in gambling research: A co-citation analysis. *Critical Gambling Studies*. Forthcoming 2021.
7. Productivity Commission. *Gambling - volume 1*. Melbourne, AU: Productivity Commission; 2010. Available from: <https://www.pc.gov.au/inquiries/completed/gambling-2010/report/gambling-report-volume1.pdf>.
8. Gambling Commission. *National strategy to reduce gambling harms*. Birmingham, UK: Gambling Commission; 2019. Available from: <http://www.reducinggamblingharms.org/asset-library/national-strategy-to-reduce-gambling-harms.pdf>.
9. Wardle H, Reith G, Best D, McDaid D, Platt S. *Measuring gambling-related harms: a framework for action*. Birmingham, UK: Gambling Commission; 2018. Available from: <https://www.gamblingcommission.gov.uk/PDF/Measuring-gambling-related-harms.pdf>.
10. Hawe P, Webster C, Shiell A. A glossary of terms for navigating the field of social network analysis. *Journal of Epidemiology and Community Health*. 2004;58(12):971.
11. Cheliotis G. Social Network Analysis. Communications & New Media, National University of Singapore; 2010 [cited 2020, August 18]. Available from: <https://www.slideshare.net/gcheliotis/social-network-analysis-3273045>.
12. Krebs V. Social Network Analysis: an introduction: Orgnet.com; n.d. [cited 2020, August 17]. Available from: <http://www.orgnet.com/sna.html>.

References

13. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Medicine*. 2009;6(7):e1000097.
14. McIlroy-Young R, McLevey J, Anderson JU. metaknowledge: A Python3 package for doing computational research on knowledge [2018]. Available from: <https://metaknowledge.readthedocs.io/en/latest/>.
15. Bastian M, Heymann S, Jacomy M. Gephi: an open source software for exploring and manipulating networks Oxford, UK2009 [updated May 26 - 29, 2015]. Available from: <https://gephi.org/users/publications/#:~:text=that%20has%20impact.,Cite%20Gephi,for%20exploring%20and%20manipulating%20networks>.
16. Baxter DG, Hilbrecht M, Wheaton CTJ. A mapping review of research on gambling harm in three regulatory environments. *Harm Reduction Journal*. 2019;16(1):12. Plain language summary available at <https://www.greo.ca/Modules/EvidenceCentre/Details/gambling-research-patterns-in-canada-australia-and-new-zealand>.
17. Poznyak V. Public health implications of gambling, gaming and psychoactive substance use [Video]. Keynote Address: International Gambling Conference, Auckland, NZ. Feb.2018 [cited 2018 Dec]. Available from: <https://youtu.be/vR2vsB0O3q8>.
18. Ohrnberger J, Fichera E, Sutton M. The relationship between physical and mental health: A mediation analysis. *Social Science & Medicine*. 2017;195:42-9.
19. Abbott MW, Volberg R. *Frequent gamblers and problem gamblers in New Zealand: Report on Phase Two of the National Survey of Problem Gambling*. Research Unit, Department of Internal Affairs; 1992.
20. Abbott MW, Volberg RA. The New Zealand national survey of problem and pathological gambling. *Journal of Gambling Studies*. 1996;12(2):143-60.
21. Browne M, Goodwin BC, Rockloff MJ. Validation of the Short Gambling Harm Screen (SGHS): A tool for assessment of harms from gambling. *Journal of Gambling Studies*. 2018;34(2):499-512. Plain language summary available at <https://www.greo.ca/Modules/EvidenceCentre/Details/a-tool-to-screen-and-monitor-the-population-level-impact-of-gambling-harms>.
22. Martin V. *The disciplinary continuum: From disciplinarity to transdisciplinarity*. Transdisciplinarity revealed: What librarians need to know. (p. 28-46). Santa Barbara, CA: Libraries Unlimited; 2017.

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