Omnipresent: Online Gambling in Ireland

MBANC2 Dissertation

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Abbreviations

DSM-4 - Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, 1994.

DSM-5 - Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, 2013.

HRB – Health Research Board

NDAS 2014/15 – 2014/2015 Survey on the prevalence of drug use and gambling in Ireland and Northern Ireland

NDAS 2019/20 – The 2019-20 Irish National Drugs and Alcohol Survey

PGSI – Problem Gambling Severity Index

SOGS – South Oaks Gambling Screen

Abstract

Introduction: The gambling industry (GI) has undergone significant changes in recent years as it has embraced new technologies encompassing online gambling which have altered business models and the functioning of operators. Through the medium of mobile phones and other portable technologies, changes can be seen in the behaviours of those who gamble and indeed the type of gambling taking place. A persistent lack of knowledge about the impacts that such changes are having on individuals, communities and societies persists. Online gambling has been shown to have significant associations with increased risk for disordered gambling behaviours with significant , with specific analysis of online gambling and multi-modal gambling being sparsely examined in Ireland and the wider European region.

Sample: Access to the dataset of the recently published Health Research Board's gambling sub-section of the 2019-20 National Drugs and Alcohol Survey in the Republic of Ireland enabled analysis of 152 online gamblers contained within 5762 total respondents.

Methods: Individual analysis of respondents' problem gambling severity, gambling behaviours across specific gambling activities, gambling frequency, average monthly expenditures and socio-demographics was performed with comparisons made to those who do not gamble online and all gamblers cumulatively. Linear regression analysis was performed relating to online gamblers and predictors of increased gambling severity.

Results: Significant results related to the presence of multi-modal gambling and increased gambling severity in at-risk or problem online gamblers when compared to non-online at risk or problem gamblers. Regression analysis demonstrated a positive relationship between multi-modal gambling, male gender and online gambling individually and cumulatively.

Conclusion: Further research with larger, more representative datasets of online gamblers is necessary. Specific examination of the extent to which multi-modal gambling in an online setting can become an independent risk factor for risky gambling behaviours and disordered gambling is recommended. This can help to further establish the extent of online and multi-modal gambling's impact in Ireland and help to shape and distil the research agenda and impact on policy and regulation of online gambling.

Chapter 1: Introduction

1.1 Background

Gambling is an activity that has transcended many generations and cultures around the world for thousands of years. While taking many shapes and forms, its basics have remained the same in terms of the wagering of something of value on an uncertain event or outcome in the hope of receiving something of benefit. While for the majority of people, these activities can occur in the absence of significantly negative outcomes and indeed can act in numerous settings as a recreational activity, for others, addiction and negative personal, community and societal sequelae can arise. (Calado and Griffiths, 2016)

A persistent challenge to gambling-related research has been the use of different screening instruments to classify problem gambling. Researchers and governmental bodies alike often differ on preferable tools when assessing gambling severity, an issue exacerbated by differing definitions of disordered levels of gambling in the literature. This is particularly relevant when considering new treatments and changes in gambling regulation and policy that could have a profound impact on rates of disordered gambling. (Calado and Griffiths, 2016) After a protracted period of lobbying from scientific and medical fields, (Petry, 2006, Potenza, 2006) a fundamental change in the classification of disordered gambling occurred in 2013. 'Pathological gambling' was reclassified as 'Gambling Disorder' in the '*Diagnostic and Statistical Manual of Mental Disorders, 5th Edition'. (DSM-V)* The hope is that increased conformity in gambling severity classifications will result as widespread adoption of the new international standard definition steadily increases (APA, 2013). Acknowledgement of this and indeed formal analysis of the economic impacts of gambling are scarce worldwide, something which is awaited in an Irish setting. This need co-exists alongside the requirement for cross-cultural studies that conform to the same definitions, typologies and methodologies

to enable improved cross-comparison of data within and between countries, as well as to quantify changes over time.

Further, the likely continued trend towards online gambling instead of in person gambling is considered to per perhaps have been accelerated by social lockdowns imposed during 2020, 2021 and in some regions also in 2022. (Håkansson, 2020a) Whether or not the continued trend of online gambling and documented associations with problem gambling continue to proliferate is worthy of extensive research and careful following over the coming years in Ireland and indeed around the world. This paper forms part of the early acknowledgement of these paradigm shifts not only in gambling typology, but also with the inherent risks that follow.

Addressing this matter should be borne not only from Psychiatry, Psychology and Addiction fields but also from a public health perspective (Adrian, 2019, Melendez-Torres et al., 2020). Health profiling, including investigation of the biopsychosocial factors affecting non-problem gamblers, at-risk gamblers and problem gamblers, both pre-morbidly and post-onset as well as the knock-on family, community and societal impacts are largely unexplored. No large-scale, comprehensive studies having been carried out. It is particularly relevant when considering potential governmental, regional or cultural regulations akin to those addressing other addiction types of particular concern from a public health viewpoint, such as the association with alcohol and smoking as well as ever-increasing links with sport and the impact of marketing and advertising strategies.

The impact of upcoming regulatory changes to the Irish gambling landscape is awaited. Ireland is noteworthy for the very low gambling tax rates which is absorbed by gambling operators as part of the odds offered to consumers. In the past this gambling tax had reached rates of 20% yet were reduced to a low of 1% in the last decade before being increased to 2% in 2018. How and why this low level of taxation has been allowed to persist is likely due to

the absence of formal economic studies addressing the societal costs of gambling in Ireland. This was alluded to by renowned economist professor Cormac McCarthy on the issue of gambling taxation in a 2015 report, with many facets of his recommendations still under review and awaiting implementation (McCarthy, 2017).

The Inter-Departmental Working Group on the Future Licensing and Regulation of Gambling has been noted to have met numerous times in the last three years at the behest of Mr. David Stanton TD, Minister for State at the Irish Department of Justice (2019). While it is encouraging to see that there is some activity underway regarding the implementation of a gambling regulator, the sluggish and delayed response of governmental and regulatory bodies to the issue of gambling in Ireland in the 21st century and its potentially drastic health related problems is frustrating to many advocacy groups and those voices from psychiatric and public health fields in Ireland. In the absence of any concrete actions bar the increase in gambling taxation from 1% to 2%, passivity while pondering what may or may not be the very best action to implement last decade is deeply regrettable.

Chapter 2: Literature Review

2.1 Literature Review Search Strategy

The academic databases included in the database search were the following: Pubmed; Scopus; Science Direct; Wiley Online Library; Proquest/PsychINFO. As is the case with many recent research outputs regarding gambling and online gambling, broad searches of the topics were noted to include literature from many fields, predominantly psychology, psychiatry/medicine, social studies, marketing/business and economics. So as not to exclude important pieces of literature, a representative sample was sought from numerous databases thought to be commonly engaged by each of the respective fields.

It should also be noted that the time-limiting of database searches from 2017 to May 2022 was performed in order to ensure that included studies had a greater level of conformity with gambling disorder's reclassification and inclusion in Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-V). Such time-limiting of literature would also ensure that this paper would be able to encompass some of the many recent changes in products, behaviours and trends relating to the gambling industry and consumers alike as the era of online gambling predominates (Chóliz, 2016).

2.2 Data Extraction

The database search was carried out in April 2022 while the literature review was conducted between April and May of 2022. The search terms utilised in the review were 'online gambling', 'online gambler', 'online betting', 'gambling', 'gamble', 'betting', 'bet', 'online', 'web' and a filter of January 2017 to March 2022. The keywords and explicit operators engaged are contained in Appendix 1, while Table 1 summarises the inclusion and exclusion criteria. The search terms and use of operators as well as time-limits and geographical searches were optimised following initial scoping searches. It is important to note that subsequently, following reference list searches of the included articles, that seminal pieces of

literature that were published prior to 2017 have also been included in this review due to their relevance in shaping the subsequent research agenda.

Title and abstract screening of the papers was then performed using the Covidence platform. If doubts were raised regarding the validity of a paper's inclusion, a full-text review was undertaken prior to formal inclusion.

Table 2.1. Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion Criteria
• Peer-reviewed studies undertaken in the UK, EEA, Australia, Canada, USA and New Zealand. • Studies published since 2017 to the end of March 2022 • Studies in English including commentary articles with a primary article focus on online gambling.	• Grey literature • Studies published before 2017 or after March 2022 • Studies undertaken outside of the specified countries • Studies published in languages other than English • Papers without a primary focus on online gambling.

In total, 3463 studies were imported to the Covidence platform. 1457 duplicates were removed, leaving 2006 records eligible for title and abstract screening. Of these, 1859 were deemed irrelevant based on a content analysis of their title and abstract. Of the remaining 147 full-texts that were reviewed, 93 studies were then included. A PRISMA diagram outlining this literature review process can be seen in Figure 2.1.

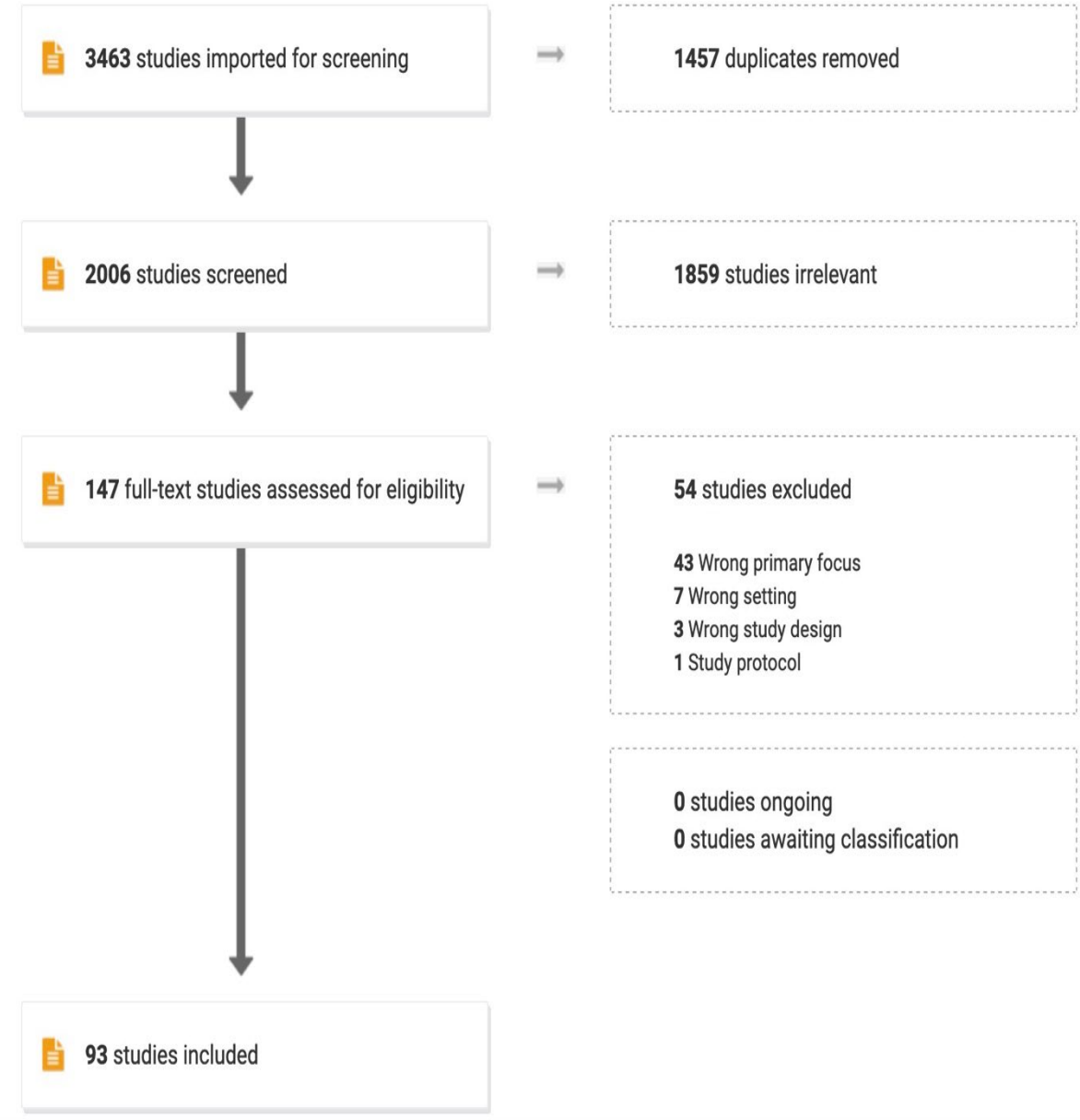

Figure 2.1: PRISMA Diagram

2.4 Literature Review

Where and why?

An extensive search of relevant previous studies and reports that have been performed to investigate online gambling, problem gambling and gambling related-research. European literature was deemed preferable for consideration given the relatability of regulatory and cultural landscapes to the Irish setting, although numerous studies from North America and Oceania were also deemed important and relevant, meriting their inclusion.

Gambling - a public health concern?

Gambling has become firmly established as a public health concern in recent years, a recognition that gathered pace while online gambling has proliferated in Ireland and around Europe in particular. (Effertz *et al.,* 2018) This elevation into the public consciousness can be seen to be due in part because of the perceived growth in quantity and intrusiveness of the gambling industry alongside a greater recognition of the potential negative consequences for the individual online gambler, their families, communities and wider society as a whole. (Gunter, 2019, Reith et al., 2019).

Online Gambling – why does it need to be focussed on?

Internet-based or online gambling has been seen to be one of the most significant gambling-related changes in the last 25 years. (Griffiths, 1999, Wood and Williams, 2007, Canale *et al.*, 2016) A paradigm shift in gambling operators first acknowledging the online business opportunities before fully committing to online gambling, through strategic and financial backing, has been unequivocal. Resulting increases in online gambling participation rates and how the gambling industry presents itself through various online settings and platform types, as well as types of gambling opportunities offered has continued to evolve, particularly in the

last decade. innovative marketing and advertising strategies, as well as significant investments in mobile application technology and customer engagement has created a 24 hour, 365 days per year product available to potential consumers. (Newall *et al.*, 2019, Canale *et al.,* 2016)

Added to this increased availability of products, the inherent structural characteristics of online gambling has been proven to be more addictive than any other type of game or gambling activity. (Chóliz, 2016) This can be seen to have been influenced by the immediacy of betting products, its ease of access and consumer-friendly interfaces. (Bonnaire, 2012, Whelan et al., 2021, Columb and O'Gara, 2018) The particular attraction of mobile and online gambling are particularly attractive to young people, likely secondary to the gaming aspect of many online and mobile gambling products. As a result, there have been notable increases in rates of underage gambling and indeed underage problem gambling statistics. (Calado *et al*., 2017) A pressing need for more rigorous national and regional regulation regarding youth gambling online and greater levels of age verification and responsible gambling measures have been advised in order to being engaged by gambling operators is essential to prevent a growing generational wave of gambling. (Andrie et al., 2019, Canale et al., 2016)

What Online Gambling Studies are particularly relevant to this research?

Several papers are especially relevant and should be explicitly commented upon when addressing the context to this study. Previous research has noted that there are numerous different factors relating to the individual, the situation they are in and indeed the structural characteristics of their society and online gambling platform which impact the commencement and maintenance of online gambling, something which is especially relevant when considering the adolescent population (Canale et al., 2016). While it can be seen that research outputs relating to online gambling have increased in recent years, (Teichert et al., 2017, Gainsbury, 2015, Dowling et al., 2017, Tomei et al., 2022) there are several issues at

play relating to the methodological approaches of the studies. While self-reported data can be useful (as can be seen in the NDAS 2019/20 dataset), the use of self-reported data in the context of self-selected participants can provide non-representative samples (McCormack et al., 2014, Calado and Griffiths, 2016). Further, while certainly advisable from an accuracy of data and behavioural trends tracking perspective, behavioural modelling and tracking of online gamblers on certain online gambling sites has been performed using non-representative data (Auer and Griffiths, 2019, Luquiens et al., 2016). Many studies, although relevant and important additions to the research base, are also not longitudinal in their construction, with cross-sectional and cohort analyses being limited in their validity given the frequent changes in definitions of problem gambling and use of various screening instruments. It is also seen that numerous studies suffer from non-representative samples. Therefore, and for the first time in an Irish context, this study aims to explicitly examine the type of gambling, gambling behaviours and socio-demographic factors associated with online problem gambling, utilising a nationally representative dataset.

Online Gambling Marketing and Advertising

Online gambling marketing and advertising strategies and the financial motivations and return on investment by gambling operators remain under-researched (Parrado-González and León-Jariego, 2020, Newall *et al.*, 2019, Guerrero-Solé *et al.*, 2017). What is known is that a definitive and explicit differentiation between online marketing and advertising strategies needs to be performed, specifically attempting to examine the gambling industry's likely financial motivations for focussing on online products in the majority of advertisements in recent years. Ever-increasing budgets for gambling advertising, and in particular relating to online gambling advertising, is especially noteworthy (Labrador et al., 2021, Newall et al., 2019)

Online Gambling and associated machine-learning and algorithmic modelling

Further analysis of the need for a uniform and regulated solution to how gambling operators present their responsible gambling policies alongside integrating machine-learning data in order to quantify the impact of such approaches on real online gambling behaviours should be prioritised (Luquiens et al., 2019, Peres et al., 2021)

Access to the internal data modelling algorithms developed by gambling operators to identify trends in consumers' online gambling behaviours is essential to seeing this happen (Auer and Griffiths, 2019). Such technological advances are already in existence and have been engaged by the industry for numerous years in their financial and consumer behavioural modelling systems, as alluded to by 'Flutter' in their 2020 Annual Report (Flutter, 2021). Affording researchers greater access to such innovations will greatly increase the accuracy and quality of the quantitative analysis of data in the sector. This is likely to provide a firm context as to why the design and marketing of gambling products takes shape in its current form, and may provide avenues for improvements in consumer protection and corporate responsibility.

It should be also noted that these 'predictive modelling' capabilities could have a darker side to them, such as being used to identify high-yield customers from a revenue perspective. Numerous accounts exist of gambling operators encouraging such revenue-producing consumers to continue gambling in spite of significant financial losses through financial incentives including free betting opportunities, presents and sub-standard background verification checks. (Hing *et al.*, 2014)

What about Policy and Regulation and use of online responsible gambling tools?

Some responsible gambling measures have been seen to be effective in reducing online gambling-related harms. Specifically, some high-yield measures include deposit limit-setting and time-limiting measures.(Auer and Griffiths, 2019, Wall et al., 2021) These tools have been seen to not only be effective independently but when combined, their effectiveness is

amplified with gambling product interaction rates significantly reduced as well as reduced levels of gambling frequencies and expenditures. The inconsistent availability of such measures, and indeed the complete lack of them in some cases in the Irish and European online gambling marketplace is surprising. (Salonen et al., 2018, Gainsbury et al., 2018) Regulatory interventions regarding both operator-imposed and self-imposed breaks and online gambling limit-setting are high on the agenda for consideration. (Parke and Parke, 2019, Motka et al., 2018)

A Swedish study recently demonstrated that use of an online national self-exclusion tool saw uptake of 4% of total online gamblers (Håkansson and Henzel, 2020). Significant predictors of self-exclusion were seen to be psychological distress associated with online gambling, self-reported over-indebtedness and problem gambling itself.

The Gambling Industry's self-promoted responsible messaging "Gamble Responsibly" or "When the fun stops, stop" advertising seen in Ireland and the UK over the last number of years in multiple formats, including on TV, radio and online is seen to be peripheral and inconsistent to many online gamblers. Attempted self-regulation by gambling operators relating to responsible gambling messaging and tools has been criticised by many (Parke *et al.*, 2015).

Further, and perhaps surprisingly, responsible gambling messaging that form either part of or the entirety of an offline or online gambling advertisement has been demonstrated to paradoxically enhance the average consumer's gambling intent (Lemarié and Chebat, 2015). This needs to be considered when anticipated gambling advertising regulation, relating to both online and offline, is implemented in Ireland and around Europe in the coming years.

This is a key consideration for gambling advertising and marketing regulations moving forward as even in the absence of explicit gambling advertisements in countries that have either initiated industry-led or state-imposed bans on such advertisements, passive and third-part advertising has been noted to be widespread. This has been seen to have followed

previous events in other related industries where bans were initiated on advertising, such as when considering the tobacco and alcohol industries. (Noel *et al*., 2020, National Center for Chronic Disease *et al*., 2012)

Video-gaming, e-spectator sports, loot-boxes and online gambling

Advances in technology have been mirrored by greater proportions of younger people engaging with video games, video games in recent years that have been noted to contain increasing levels of simulated and real gambling opportunities in certain online game-types (Molde *et al., 2019)*. While this type of game can be analysed independently, one must not ignore the increasingly concerning evidence-base relating to 'loot-boxes' contained in video games. These games have been shown to lead to increased rates of youth problem gambling, and can also act as avenues to problem gambling in adulthood (Zendle and Cairns, 2018, Etchells et al., 2022). Loot-boxes can be considered to essentially be gambling events, as they are financial transactions marketed with the element of chance and bonuses, which have proven particularly attractive to younger people. As a result, they have belatedly come to the attention of regulatory authorities, with test cases in Denmark and the Netherlands outlawing them recently (Etchells et al., 2022). Ireland lags behind on this issue. The underling matter of links between disordered levels of gaming, also known as problem gaming, and problem gambling is an area of current research interests, with data up to now being conflicting on whether a true association actually exists (Macey and Hamari, 2018, John *et al.,* 2020).

Simulated gambling and online social media – a gateway to real gambling?

Similarly to loot-boxes, online products featuring simulated gaming and gambling opportunities have been hypothesised in recent research to be significantly related to future conversion to 'real gambling' (Hayer *et al*., 2018). This has been verified through logistic regression analysis from Hayer *et al.*, which also noted that advertising of such gambling opportunities was significantly impactful in enabling such a conversion to occur. This is particularly concerning given how such advertising is able to circumvent some regulatory bans

on gambling advertising in certain countries as there is no financial transactions required, something which also evidently appeals to younger people given that they are likely to not have the financial means for 'real gambling' at younger ages. Widespread advertising of these products, especially on social media such as Facebook, Twitch and Twitter, is concerning (Kim *et al*., 2017). This highlights further the necessity for rigorous regulatory controls on the gambling industry relating to simulated gambling and related advertising, as further efforts by the gambling industry to mitigate such controls and safety measures should be expected over the coming years (Kristiansen *et al*., 2018). Further, collaborations between gambling operators and 'brand ambassadors' or online personalities may require regulation given the wide audience that such passive advertising can have. The context of understanding the motivations of those viewing such live gambling feeds and videos as well as online gambling and gaming communities alongside potential impacts on current or future gambling should be examined before regulatory frameworks are enacted (Sirola et al., 2021, Skiba et al., 2019)

What about the neuroscientific aspects of online gambling?

Understanding the neuroscientific background regarding links between problem gambling and potential biochemical and hormonal disturbances is an absolute necessity when considering current and future individuals at risk of developing risky gambling behaviours and problem gambling (Li et al., 2014, Paliwal et al., 2014) This is especially relevant when considering impulsivity control measures and responsible gambling policy and regulation (Yücel et al., 2017). A distinct lack of in-depth research on this matter is evident (Goudriaan *et al.,* 2014). What we do know is that there is a significant link between stress and risky decision-making when confronted with formal gambling tasks. However, how translatable this data can be to real-world gambling is debateable and needs to be formally analysed (Simonovic *et al.,* 2018).

The online ”Gamblification” of sport

Some papers focussing on sports-related gambling marketing have shown that consumers awareness and recollection of specific sports-gambling advertisements and marketing offers is related to a higher risk of risky gambling behaviours and problem gambling (Newall *et al*., 2019). When this is considered alongside links that have been discovered between the modern gambler's enjoyment of sport and betting on the event in question, we have quite quickly developed a situation in the European region where gambling and sports are now considered hand-in-hand (McGee, 2020) This is exacerbated when media organisations are content to be able to gain revenues from gambling operators, such as Gary Neville's "The Overlap" on Sky Sports and Youtube, sponsored by Sky Bet, or 'Off the Ball' sports in Ireland having frequent segments sponsored by Boylesports. The matter of Sky Bet being able to be able to use the Sky brand and sponsor multiple instances of Sky Sports coverage is in itself difficult to understand from a regulatory perspective, and is likely to contribute to the creeping 'Gamblification' of sport in recent years (Lopez-Gonzalez and Griffiths, 2018).

The 'bookies in your pocket'

The innovative and user-friendly designs of mobile betting applications has created a sea-change in gambling behaviours and potential gambling motivations in the last decade (Newall, 2019, Whelan et al., 2021). New types of betting opportunity have emerged, with 'live-betting', 'cash-out' betting and increasingly complex betting opportunities reducing consumers' ability to make rational assessments of the likelihood of events involved are now at the forefront of much of the external advertising and in-app marketing being engaged by gambling operators. (Killick and Griffiths, 2021, Newall et al., 2019, Newall, 2017) The anonymised and 'faceless' and always available nature of mobile and online gambling is also being linked to greater risk of problem gambling development, especially when considering potential associations with 'screen addiction' reported in many paediatric settings (McGee, 2020). What gambling operators are doing to attempt to mitigate such factors, or exacerbate

in some instances such as blurring the lines between sports-betting and casino games, is worthy of thorough investigation (White *et al*., 2018). Mergers between gambling operators, such as Paddy Power, Betfair and PokerStars has mixed various forms of gambling together into one platform and has contributed to increased multi-product availability and essentially herding consumers towards one product or another. (Reuters, 2019, Bramley and Gainsbury, 2015, Gainsbury et al., 2018) This is pertinent when considering significant links between problem gambling and playing casino games online (Wall *et al*., 2021).

The biopsychosocial considerations of online gambling

Some studies have been conducted into the wider biopsychosocial and physical health associations of disordered levels of gambling, yet there is still a clearly evident paucity of research on the matter. (Fong, 2005, Butler *et al.,* 2020) An interesting argument could also be made for reframing what gambling disorder and lesser forms of problematic gambling have actually come to mean in today's society and what its effects on the individual are. A considerable amount of the research that has been carried out on the topic has been performed from the domain of psychiatry. This has been instrumental in ensuring that the classification of gambling disorder in the DSM-IV and DSM-V has enabled people to be diagnosed with a recognised condition and which opens the door to greater services and treatments for those affected. Yet it could also be argued that this has perhaps lessened the focus on the wider health effects that gambling can have on the individual and indeed on the collective, as well as potentially only focussing on those patients who meet the commonly defined thresholds for problem gambling, such as the aforementioned DSM-V criteria. (Butler *et al.,* 2020)

Gambling behaviours and financial considerations were the focus of other articles in this analysis, several of which noted that excessive gambling activity is often made possible due to funding acquired with consumer debt. Some articles demonstrated a potential

accumulation of financial stressors and psychological distress from gambling being observed. (Oksanen *et al*., 2018) Recent changes in some European jurisdictions banning credit card deposits is a step in the right direction on the matter, but further analysis of this potentially significant issue is required. Swedish analysis of predictors of loan payback problems and defaults in the setting of problem gambling is interesting in how it has posed the question of whether banks and financial institutions could also be doing more to protect their consumers from periods of severe and intense problem gambling. (Håkansson, 2020b) Such an approach raises potentially contentious questions of civil liberties and privacy concerns, although the potential benefit of such measures could be considerable. Further, evidence of rejection of loan and mortgage applications of online gamblers due to the risk posed by their gambling activity is also a fact that may have to be explored in the transparency and disclosure agreements made between gambling operators and consumers moving forward. These issues may be unknown to many consumers who place bets online, and there could potentially be a role for the promotion of this information as an effective deterrent of gambling activity in the future.

The normalisation of gambling in Europe and further afield

Gambling and online gambling and its increasing pervasiveness and normalisation in modern society was noteworthy in numerous papers. Targeting gambling marketing and advertising with restrictive measures is likely necessary to allay this upward trajectory (Rossow and Hansen, 2016, Lopez-Gonzalez and Griffiths, 2018) This may be easier said than done however, given the significant revenue streams that benefit media and sporting organisations. This is where governmental action will be crucial, on a national and regional level.

The wider societal costs of gambling and online gambling

A recent estimation of the societal costs of problem gambling in Sweden observed national equivalent costs of gambling amounted to approximately 1/6th of alcohol related costs and

1/3rd of those attributed to smoking (Hofmarcher *et al*., 2020). These costs don't include the likely significant at-risk gambling- related costs. Quantifying the effects of online gambling in general, as well as non-problem, at-risk and problem levels of gambling is essential and requires an accurate assessment based on internationally accepted standards to fully acknowledge the costs and harms of gambling and problem gambling (Hofmarcher et al., 2020, Productivity-Commission, 1999, Productivity-Commission, 2010, Williams et al., 2011, Beynon and Atherton, 2018, Winkler et al., 2017, Browne et al., 2021).

Chapter 3: Research Methods

3.1 Research Question

This research paper aims to understand the impact of online gambling with levels of at-risk gambling and problem gambling severity in Ireland using a nationally representative, self-reported population sample. Further, potential impacts of online gambling on gambling behaviours across specific gambling activities, frequency of gambling and monthly expenditures relating to gambling activities will be assessed. Associations between multi-modal gambling, problem gambling and online gambling will also be elucidated.

3.2 Hypotheses

Three distinct hypotheses have been constructed citing previous, impactful studies performed in other European countries relating to online gambling.

Hypothesis A: Online gamblers are more likely to be problem gamblers than non-online gamblers in Ireland (Canale et al., 2016)

Hypothesis B: Online at-risk or problem gamblers in Ireland are more likely to engage in multi-modal gambling compared to non-online at-risk gamblers or problem gamblers in Ireland (Hubert and Griffiths, 2018, Marmet et al., 2021).

Hypothesis C: Problem gambling is positively associated with online gambling in Ireland (Griffiths et al., 2012)

3.3 Background

This study aims to examine the extent to which participation in online or over the phone gambling in the last 12 months has an impact on the prevalence of at-risk and problem gambling as well as an examination of the extent of online or over the phone gambling relationship with the intensity of gambling, multi-modal gambling and gambling-related expenditures. Furthermore, this study aims to ascertain whether or not any predictive risk factors exist in relation to at-risk and problem gambling, relating to demographic or behavioural variables.

This piece of literature will analyse data pertaining to online gambling that is contained within the gambling sub-section of the 2019-20 National Drugs and Alcohol Survey in the Republic of Ireland. This population-based study was undertaken by the Health Research Board This study was commissioned by the Health Research Board (HRB), with preliminary results released in early 2022. The author and his supervisor has been granted access to the encrypted database after approval from the HRB.

3.4 Overview of Research Methods

Study population

The HRB asked respondents questions relating to two different problem and at-risk gambling screening tools. These are called the "PGSI" (Problem Gambling Severity Index) and the "DSM-IV" (Modified Criteria from the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition 1994). Comparisons with previous data from the 2014-2015 "Survey on the prevalence of drug use and gambling in Ireland and Northern Ireland" (2014/15 NDAS) were able to be made using only the DSM-IV criteria, as the PGSI was not engaged in that dataset.

In spite of this, for the purposes of this study, the PGSI was engaged to quantify levels of at-risk gambling and problem gambling. This was performed for several reasons. Firstly, although other screening tools do exist and have been validated independently, such as the South Oaks Gambling Screen, the PGSI has been widely adopted in many jurisdictions over the last decade and provides a good opportunity for data comparisons over time and between jurisdictions. The PGSI also enables a better evaluation of low-risk, moderate-risk and problem gamblers as opposed to just non-pathological and pathological gambler differentiation as per the DSM-IV and DSM-V criteria. Clinicians currently engage a cut-off of a DSM-IV score of 5 or more to represent pathological gambling (often used interchangeably with problem gambling, or "disordered gambling" since the publication of DSM-V).

The DSM-IV criteria (and subsequent DSM-V criteria) lack recognised thresholds for low and moderate-risk gambling and lacks the depth of scale of the PGSI. Several renowned gambling researchers have noted that the DSM-IV and modified DSM-IV (engaged by the British Gambling Prevalence Survey) has been seen to likely underestimated the true prevalence of problem gambling, with scores near the threshold of 5 being disregarded in spite of the likely very significant impacts that gambling is having on them without necessarily hitting the cut-off threshold for a formal diagnosis. Since the adoption

Further, the PGSI data is able to be converted to a 28 point scale (0 through 27), enabling analysis of four categories to occur:

1. Non-problem gamblers (PGSI = 0)
2. Low-risk gamblers (PGSI = 1-2)
3. Moderate-risk gamblers (PGSI = 3-7)
4. Problem gamblers (also known as disordered gamblers since 2013 – PGSI score of 8 or above)

NDAS gambling questions

The 2019–20 NDAS contained a set of gambling questions that sought to:

- Measure the prevalence of participation in gambling activities in the Irish population, and to compare levels of participation with results from 2014–15
- Measure the prevalence of at-risk and problem gambling
- Examine the demographic and socioeconomic characteristics associated with gambling and problem gambling
- Estimate the monthly spend on gambling, and to identify the methods used to pay for gambling.

Three exceptions were noted in the gambling-related questions included in the 2019–20 NDAS compared with the 2014-15 NDAS. Firstly, only respondents in the Republic of Ireland were contacted for the purposes of the study. Secondly, the PGSI was engaged to measure problem gambling, as well as respondents also being asked about their gambling expenditures in the last month instead of the last year. These changes were made to improve the accuracy of gambling related data explicitly in the Republic of Ireland and to improve recall relating to expenditures. Initial analysis by the HRB's authors noted that overall crude gambling prevalence levels were seen to be approximately 1.4%, in keeping with European population prevalence levels of 1-3%. Relative prevalence levels of problem gambling among those respondents who have gambled in the last 12 months are also commented upon without further analysis (N.A.C.D.A, 2019).

Data Extraction

Data was supplied by the HRB an encrypted database on a private laptop by the author. This data was crudely analysed on Microsoft Excel before the Stata file being transferred to the

SPSS Statistics platform for analysis (SPSS, v26). This platform was engaged to be able to subdivide datasets based on applied conditions and to enable thorough analysis, correlations and significance testing to occur. An example of an SPSS output process engaged by the author can be seen in the Supplementary Tables in the appendix of this paper.

In order to enable a regression analysis to take place, some variables had to be recoded and computed into the same variable. This is particularly relevant for the PGSI gambling screen tool. By recoding positive response to the PGSI gambling screen (response of 'some of the time', 'most of the time' or 'almost always') into a distinct numerical value, further analysis of the gambling behaviours of the 164 at-risk and problem gamblers. A regression analysis was then performed on this cohort versus the 2603 non-problem gamblers across multiple variables, individually and cumulatively.

Statistical significance testing was performed by carrying out Pearson chi-square analyses between documented proportions of variables of interest. Examples of this significance testing can be seen below in Supplementary Table 1, with further workings accessible in the Supplementary Tables contained in the Appendix.

Supplementary Table 1: Comparing Multi- Modal Gambling in online problem gamblers vs non-online problem gamblers	
Difference	83.30%
95% CI	38.0532% to 95.2884%
Chi-squared	11.657
DF	1
Significance level	**P = 0.0006**

Two-way ANOVA tests were then conducted for the analysis of continuous dependent variables, with associations between online and non-online gamblers investigated relating to

multi-modal gambling, gambling frequency and gambling expenditures. A linear regression model was then performed enabling determination of what factors relating to gambling behaviour and documented sociodemographic factor. Reference categories were sequentially noted as non-at-risk or non-problem gamblers and results have been reported quoting a 95% confidence interval.

Chapter 4: Results

Weighted or Unweighted?

For the purposes of this research paper and due to consideration of the validity of cross-population and cross-study comparisons, the crude, unweighted figures will be used for analysis. By equating these unweighted figures across the board for this study, comparisons of problem and at-risk gambling remain valid when comparing rates between different forms of gambling and can be useful for building a profile of risky and disordered gambling behaviours in Ireland as well as the construction of potential risk factors for same.

Table 4.1: Gambling participation rates and typology (unweighted)	
Gambling Typology in last 12 months	**n (%)**
Any type	2767 (48)
Lottery ticket or scratch card in person	2447 (42.5)
Lottery games online	141 (2.5)
Gambled in a bookmaker's shop	438 (7.6)
Gambled online or by telephone	152 (2.6)
Placed a bet at a horse or dog racing meeting	372 (6.5)
Played games at a casino	55 (1)
Played gaming/slot machines	66 (1.1)
Played a card game for money with friends/family	166 (2.9)
Played Bingo in person	218 (3.8)
Other (specify)	9 (0.2)
Did not gamble in last 12 months	2996 (52)
Total	**5762 (100)**

Table 4.2: Gambling participation rates and typology (weighted)	
Gambling Typology in last 12 months	**(%)**
Any type	49
Lottery ticket or scratch card in person	42.4
Lottery games online	3.2
Gambled in a bookmaker's shop	9
Gambled online or by telephone	3.9
Placed a bet at a horse or dog racing meeting	7.8
Played games at a casino	1.6
Played gaming/slot machines	1.8
Played a card game for money with friends/family	3.7
Played Bingo in person	3.6

All Respondents sociodemographic factors

It is also important to acknowledge demographic related factors in the dataset. Although this was acknowledged by the authors of the HRB report with corrective action taken through the means of a weighting being applied, the crude results are still noteworthy. The age-related data for the full sample of 5762 responses showed a minor leftward skew, with a significant proportion of data being provided by those individuals over the age of 60. (skewness: -0.098).

Figure 4.1: All survey respondents age histogram

2997 respondents who have gambled in the past 12 months were female (52%), while 2765 were male (48%).

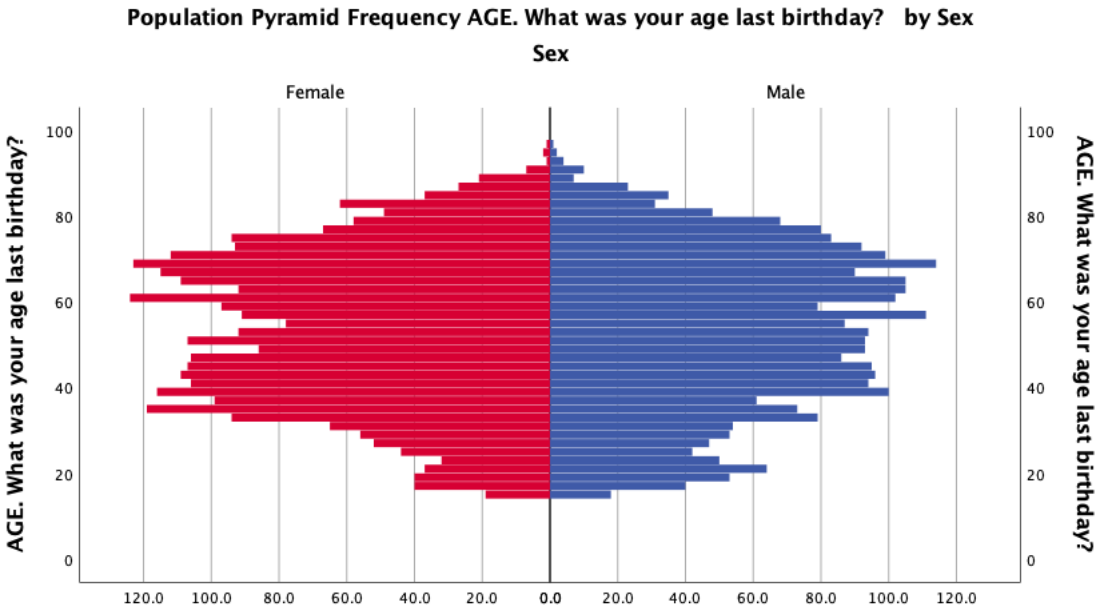

Figure 4.2: Gender and age population pyramid of all survey respondents

Problem or at-risk gambling Sociodemographic factors

When considering those gamblers who scored 1 or more on the PGSI scale, indicating at-risk and problem gamblers, age-related data is significantly skewed to the right, indicating most PGSI > 1 responses have come from younger individuals (skewness: 0.317). The mean age of at-risk and problem gamblers is 43.43, similarly with 43.33 years being the mean age of only problem gamblers (PGSI > 8).

Further, considering those gamblers who are either at-risk gamblers (PGSI 1-7) or problem gamblers (PGSI 8 or above), the gender split is dramatically different with the breakdown being 31 females (18.9%) and 133 males (81.1%). The statistics are more dramatic still when analysing only problem gamblers, with 100% being male (n=19).

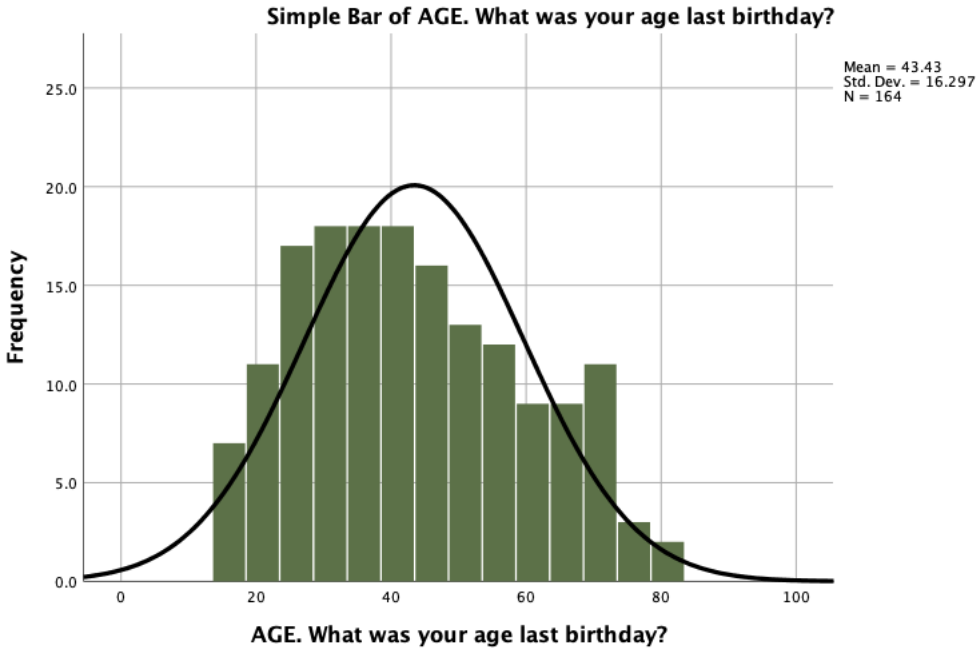

Figure 4.3: Problem or at risk gamblers age histogram

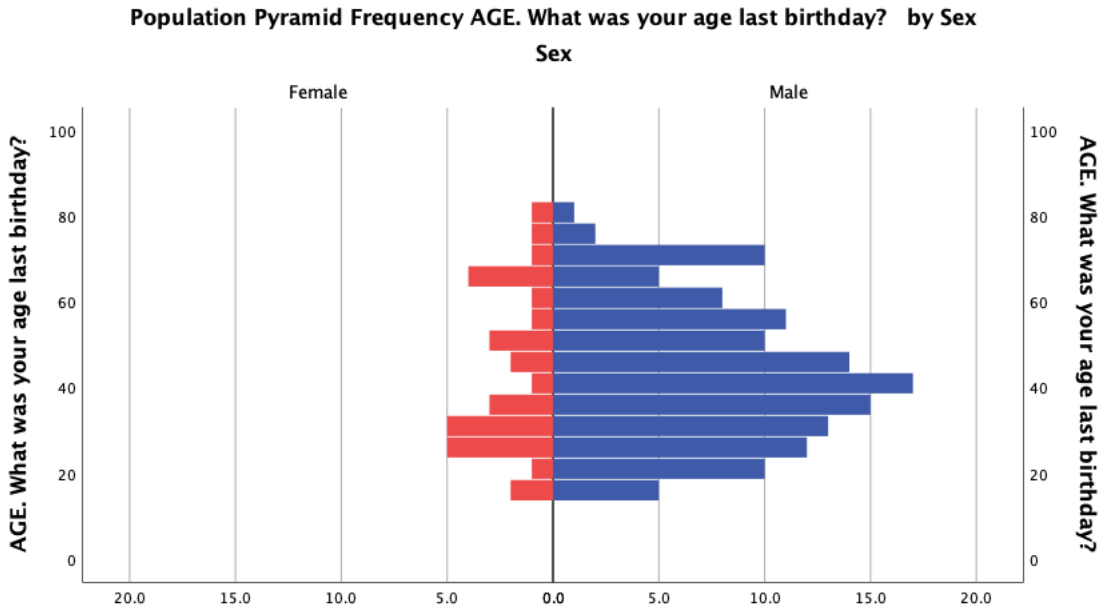

Figure 4.4: Gender and age population pyramid of at-risk and problem gamblers

Online gambling Sociodemographic factors

Analysis of those gamblers who have only gambled online is noteworthy (n=152). Firstly, data is significantly skewed to the right, indicating that again, most online gamblers are younger individuals (skewness: 0.512). The mean age of online gamblers is 39.24. (Figure 4.5)

Further, considering online gamblers' genders, there is a significant predominance of males evident, breakdown being 21 females (15.2%) and 131 males (84.8%). Again, the statistics are more dramatic still when analysing only online moderate risk or problem gamblers, with all 23 of these individuals being male. (Figure 4.6)

Just under half of all online gamblers are married (n=79), with the vast majority of the remained being single (never married) (n=55). 79 online gamblers work part-time, with the remainder principally constituted with those who are self-employed, students and part-time workers. (Figures 4.7 and 4.8)

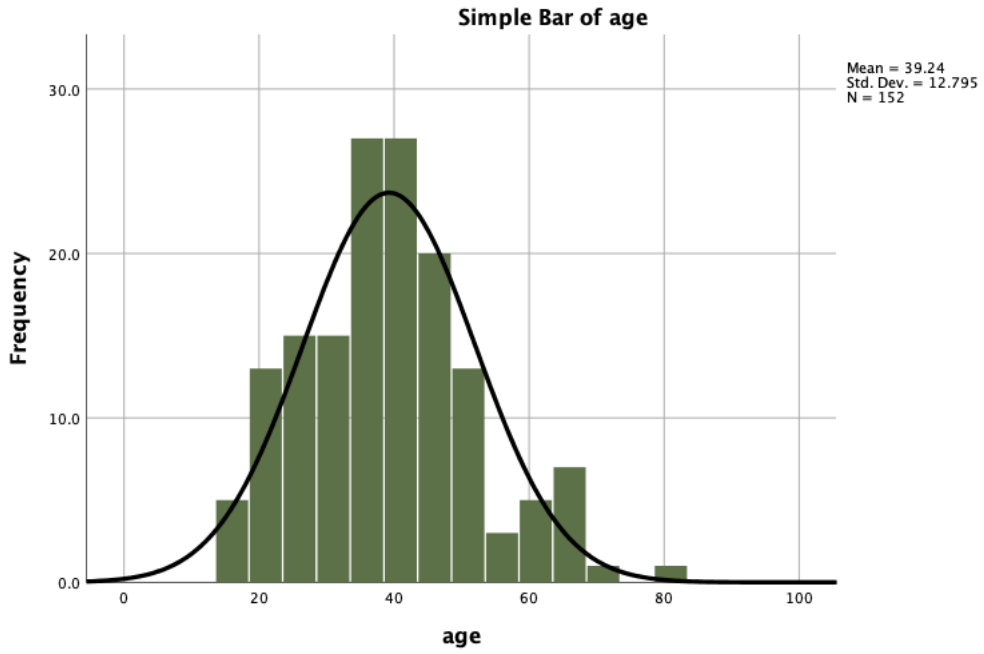

Figure 4.5: Online gamblers age histogram

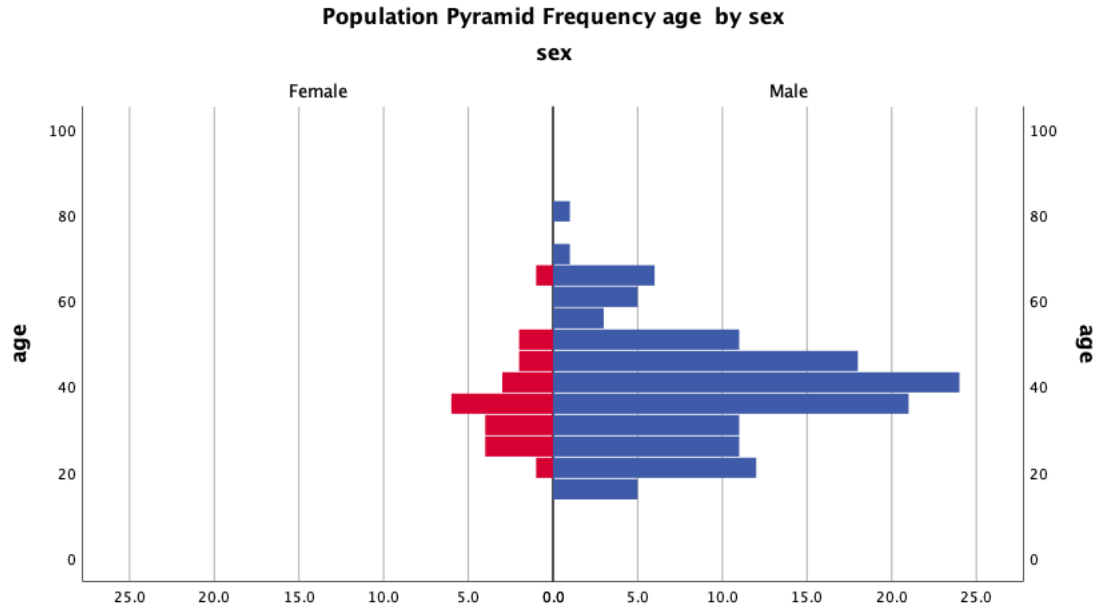

Figure 4.6: Gender and age population pyramid of online gamblers

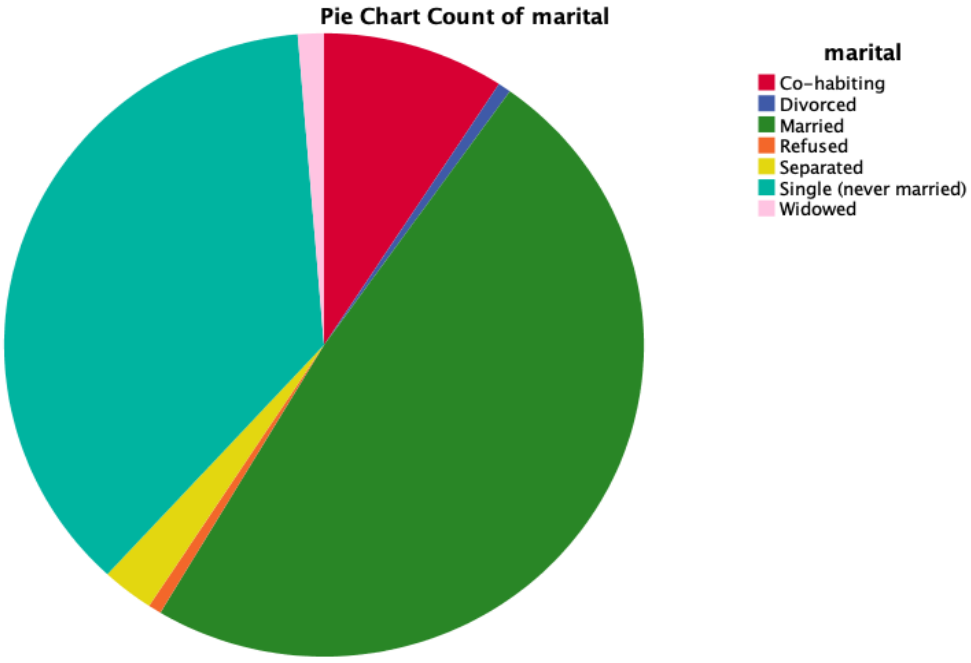

Figure 4.7: Marital status of online gamblers

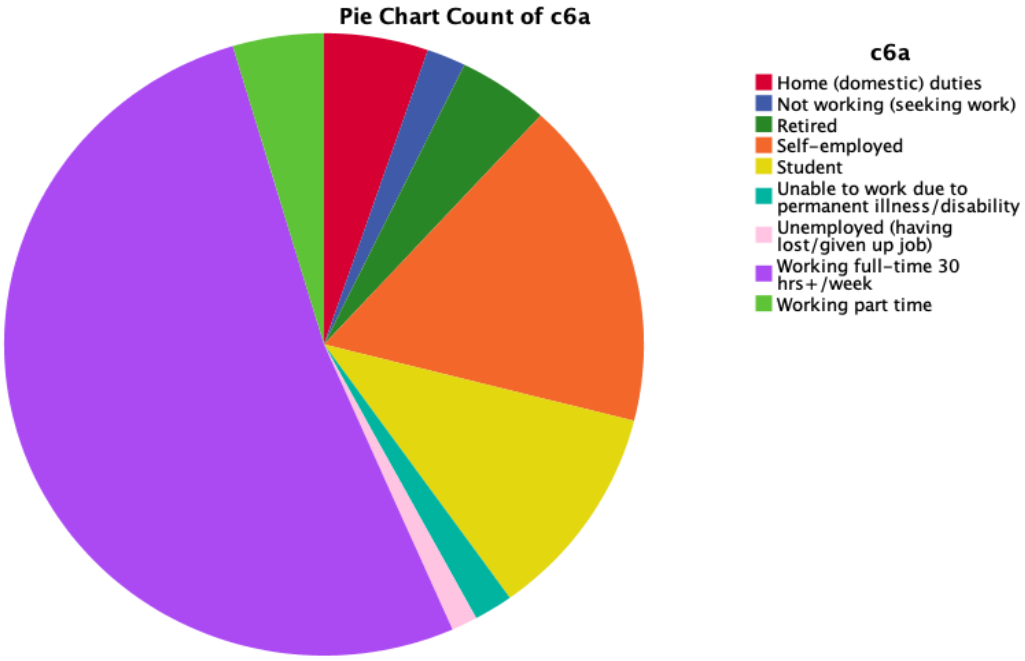

Figure 4.8: Employment status of online gamblers

All Gambling Activity

In total, 2767 respondents had gambled in the last year. This equates to 48% of the unweighted sample. Previous estimates of the prevalence of problem gambling in Ireland can be seen in the "2014/2015 Survey on the prevalence of drug use and gambling in Ireland and Northern Ireland". Based off of total overall problem gambling prevalence at that time of 1.4% (higher in males than females), it can be estimated that overall total prevalence in 2020-21 is in the region of 1 – 3% if in line with other European trends. (N.A.C.D.A, 2019)

Of the total number of those individuals who had gambled in the last 12 months, a significant proportion (n = 1689 (61%)) had only played the lottery or bought a scratch card in person, without participating in any other form of gambling. This is significant when considering relatively minor proportions of problem and at-risk gambling seen in population samples in Ireland and worldwide. The importance of this differentiation will be discussed in the Discussion chapter of this paper.

Gambling only on the Lottery and Scratch Cards

Of this 1689 respondents who had bought a lottery ticket or a scratch card in person and no other gambling activity (Table 4.3), 23 had a score of 1 or more on the PGSI screen (1.4%). 15 were seen to be low-risk gamblers (PGSI 1 or 2), 6 were moderate-risk (PGSI 3-7) and 2 were problem gamblers (PGSI 8 or above). It is important to note this sub-segment of gamblers given that there is evidence to show that those individuals who only gamble on the lottery or buy scratch cards in person are at a lower risk of developing gambling-related harms compared to those who engage in other gambling activities with or without also buying scratch cards or playing the lottery. (Costes et al., 2018) This can result in lower levels of at -

risk and problem gambling proportionally as a total of all gamblers when considering other forms of gambling activity apart from lotteries and scratch cards.

Table 4.3: Community-based PGSI Gambling Scores for individuals who have bought a lottery ticket or scratch card in person and who didn't partake in another form of gambling in the last 12 months

Non Problem Gambler (PGSI 0)	Sub-threshold Gambler Low Risk (PGSI 1-2)	Sub-threshold Gambler Moderate Risk (PGSI 3-7)	Problem Gambler (PGSI 8 or above)	Overall
n = 1666 (98.6%)	**n = 15 (0.9%)**	**n = 6 (0.4%)**	**n = 2 (0.1%)**	**n = 1689 (100%)**

Other Gambling types

1078 respondents were noted to have engaged in any form of gambling with or without also buying a scratch card or lottery ticket in person (Table 4.4). Of these 1078 respondents, 758 were noted to have bought a lottery ticket or scratch card and engaged in another form of gambling in the last 12 months (27.4% of all 2767 respondents who had gambled) (Table 4.4).

A sub-analysis of this cohort was undertaken regarding the prevalence of at-risk and problem gambling. Of this cohort, 141 were seen to be either at-risk or problem gamblers (13%). 81

were seen to be low-risk gamblers (PGSI 1 or 2), 44 (5.8%) were moderate-risk (PGSI 3-7) and 16 (2.1%) were problem gamblers (PGSI 8 or above).

Table 4.4: Community-based PGSI Gambling Scores for individuals who have bought a lottery ticket or scratch card in person and engaged in another form of gambling in the last 12 months

Non Problem Gambler (PGSI 0)	Sub-threshold Gambler Low Risk (PGSI 1-2)	Sub-threshold Gambler Moderate Risk (PGSI 3-7)	Problem Gambler (PGSI 8 or above)	Overall
n = 617 (81.4%)	**n = 81 (10.7%)**	**n = 44 (5.8%)**	**n = 16 (2.1%)**	**n = 758 (100%)**

320 respondents did not buy a lottery ticket or a scratch card in person but had partaken in another form of gambling in the last 12 months (11.6% of respondents who had gambled). A sub-analysis of this cohort was undertaken regarding the prevalence of at-risk and problem gambling (Table 4.5). Of this cohort, 49 were seen to be either at-risk or problem gamblers (15.3%). 30 were seen to be low-risk gamblers (PGSI 1 or 2), 16 (5.8%) were moderate-risk (PGSI 3-7) and 3 (2.1%) were problem gamblers (PGSI 8 or above).

Table 4.5: Community-based PGSI Gambling Scores for individuals who have not bought a lottery ticket or scratch card in person but engaged in another form of gambling in the last 12 months				
Non Problem Gambler (PGSI 0)	Sub-threshold Gambler Low Risk (PGSI 1-2)	Sub-threshold Gambler Moderate Risk (PGSI 3-7)	Problem Gambler (PGSI 8 or above)	Overall
n = 271 (84.7%)	**n = 30 (9.4%)**	**n = 16 (5%)**	**n = 3 (0.9%)**	**n = 320 (100%)**

The Online Gambler

An analysis was then undertaken of all respondents who have gambled online or by telephone in the last 12 months. In total, 152 respondents were categorised as such, 2.6% of the total survey respondents, 5.5% of all respondents who had gambled in the last year, and 14.1% of respondents who had partaken in a gambling activity other than buying a lottery ticket or scratch card in person.

Regarding the proportion of at-risk and problem gamblers in the online gambling cohort is a matter of considerable concern. This cohort has been assigned an average weighting of 1.46 based off all 152 responses, giving an effective base of (n = 223) 4.6% of those respondents who have gambled online in the last 12 months were categorised as problem gamblers, as per the PGSI. A further 28% are seen to be at low or moderate risk for problem gambling (17.7% and 10.5% respectively) Two-thirds of online gamblers are not problem gamblers according to their PGSI scores (67%).

An in-depth analysis of the cohort identified as problem gamblers (PGSI of 8 or above) who have gambled online in the last 12 months was undertaken, with some trends are important to note. Although we are dealing with small numbers (n = 7), this cohort is seen to be engaged in multi-modal, intense and higher stakes activity when compared to either those online gamblers at risk of problem gambling. Given the small numbers in this cohort, however, only the results relating to multi-modal gambling are statistically significant. Each of the online problem gamblers engage with over 3 distinct forms of gambling activity, gamble several times per week on average and are typically gambling hundreds of euro per month.

Regarding the frequency of gambling engaged by online and non-online gamblers, only two statistically significant results were noted. These related to non-online gamblers overall gambling in the "2-6 times per week" segment significantly more than online gamblers ($p = 0.013$), and online gamblers overall gambling in the "6-11 times per year" segment significantly more than non-online gamblers ($p = 0.047$). When considering the socio-demographic factors the cohort identified as problem gamblers who have gambled online in the last 12 months, male gender is to the fore. All problem gamblers were male (n=19) regardless of gambling online or offline, with all moderate risk and problem gamblers in online or non-online settings being male (n = 67)

On the matter of multi-modal gambling, low and moderate risk online gamblers as well as online problem gamblers (n = 50) are all seen to be engaging in more multi-modal gambling compared with non-online low and moderate risk gamblers and non-online problem gamblers. (all p values < 0.05) Multi-modal gambling has been defined for the purposes of this paper as being engages with 3 or more distinct forms of gambling activity in the last 12 months.

Variables were then recoded into the same variables for PGSI scores, and then recoded into a distinct 'PGSI overall score' variable, with cumulative values attained from each of the 9 PGSI questions through the computing function on SPSS. This gave a scale variable from 1-27

for all individuals who registered at least a score of 1 on any of the 9 questions. This enabled regression analysis to be performed, such as when considering the number of gambling activities being undertaken per year (this process was the same as for the PGSI score conversion). A regression analysis was undertaken to analyse the 164 gamblers who were noted to be either low risk, moderate risk or problem gamblers. This was performed by recoding positive response to the PGSI gambling screen (response of 'some of the time', 'most of the time' or 'almost always') into a distinct numerical value ranging from 1 to 3 with statistically significant results noted in Table 4.11. Further discussion regarding this can be found in Chapter 5.

Table 4.6: Community-based PGSI Gambling Scores for individuals who have gambled online or by telephone in the last 12 months

	Non Problem Gambler (PGSI 0) (n = 102)	Sub-threshold Gambler Low Risk (PGSI 1-2) (n = 27)	Sub-threshold Gambler Moderate Risk (PGSI 3-7) (n = 16)	Problem Gambler (PGSI 8 or above) (n = 7)	Overall (n = 152)
Gambling Activity, Frequency & Expenditures					
Number of distinct gambling activities engaged with in the last 12 months (%)					
3 or more	52.9	**70.4***	**68.8***	**100***	**58.6***
1 or 2	47.1	**29.6***	**31.2***	**0***	**41.4***
Frequency of gambling activities in the last 12 months (%)					
Daily	2.9	3.7	6.3	14.3	3.9
2-6 times a week	9.8	29.6	31.3	71.4	**18.4***
Once a week	31.4	33.3	31.3	14.3	30.9
Less than weekly, more than monthly	10.8	7.4	25	0	11.2
Monthly	14.7	11.1	6.3	0	12.5
6 to 11 times per year	16.7	14.8	0	0	**13.8***
2 to 5 times per year	12.7	0	0	0	8.6
Once per year	1	0	0	0	0.7
Max net spend on any one gambling activity in the last month (%)					
More than €1000	2	0	0	14.3	2
€501 - €1000	2	0	0	28.6	2.6
€101 - €500	2.9	11.1	6.3	0	4.6
€50 - 100	9.8	7.4	43.8	14.3	13.1
€26 - €50	21.6	44.4	18.8	42.9	26.3
€0 - €25	61.8	37	31.3	0	51.3

*** = p < 0.05, statistically significant results**

Table 4.7: Community-based PGSI Gambling Scores for individuals who have gambled in person but not online or by telephone in the last 12 months

	Sub-threshold Gambler Low Risk (PGSI 1-2) (n = 69)	Sub-threshold Gambler Moderate Risk (PGSI 3-7) (n = 32)	Problem Gambler (PGSI 8 or above) (n = 12)	Overall (n = 113)
Gambling Activity, Frequency & Expenditures				
Number of distinct gambling activities engaged with in the last 12 months (%)				
3 or more	**23.2***	**25***	**16.7***	**23***
1 or 2	**76.8***	**75***	**83.3***	**77***
Frequency of gambling activities in the last 12 months (%)				
Daily	7.2	0	8.3	5.8
2-6 times a week	26.1	40.6	41.7	**31.9***
Once a week	30.4	43.8	33.3	34.5
Less than weekly, more than monthly	14.5	12.5	8.3	13.3
Monthly	4.3	0	0	2.6
6 to 11 times per year	7.2	3.1	0	6.2
2 to 5 times per year	5.8	0	8.3	**3.5***
Once per year	4.3	0	0	2.6
Max net spend on any one gambling activity in the last month (%)				
More than €1000	0	0	0	0
€501 - €1000	1.5	0	0	0.9
€101 - €500	10.2	9.4	8.3	9.7
€50 - 100	8.7	21.9	50	16.8
€26 - €50	24.6	28.1	25	25.7
€0 - €25	55.1	40.6	16.7	46.9

*** = p < 0.05, statistically significant results**

Table 4.8: Regression analysis of PGSI scores of 1 or above with gambling type (n=164)

(includes low-risk, moderate-risk and problem gamblers)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.979	0.719		2.751	0.007
Q.210 Gambling Bought a lottery ticket or scratch card in person	0.373	0.714	0.041	0.523	0.602
Q.210 Gambling Played lottery games online	-1.68	1.011	-0.134	-1.66	0.099
Q.210 Gambling Gambled in a bookmaker's shop	1.993	0.67	0.239	2.975	**0.003***
Q.210 Gambling Gambled online or by telephone	1.56	0.744	0.175	2.097	**0.038***
Q.210 Gambling Placed a bet at a horse or dog racing meeting	-0.724	0.744	-0.083	-0.97	0.332
Q.210 Gambling Played games at a casino	-1.012	1.303	-0.069	-0.78	0.439
Q.210 Gambling Played a gaming/slot machines	1.334	1.276	0.088	1.045	0.298
Q.210 Gambling Played a card game for money with friends/family	0.598	1.01	0.053	0.592	0.555
Q.210 Gambling Played bingo in person	-1.068	1.286	-0.068	-0.83	0.408
Q.210 Gambling Other	2.195	4.486	0.042	0.489	0.625

a Dependent Variable: Overall PGSI SCORE

*** = p < 0.05, statistically significant results**

Table 4.9: Regression analysis of PGSI scores of 3 or above with gambling type (n=68)
(includes moderate-risk and problem gamblers)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.27	1.693		1.932	0.058
Q.210 Gambling Bought a lottery ticket or scratch card in person	0.373	1.7	1.532	0.159	1.11
Q.210 Gambling Played lottery games online	-1.68	-3.616	2.218	-0.226	-1.63
Q.210 Gambling Gambled in a bookmaker's shop	1.993	2.115	1.462	0.201	1.447
Q.210 Gambling Gambled online or by telephone	1.56	1.424	1.431	0.141	0.995
Q.210 Gambling Placed a bet at a horse or dog racing meeting	-0.724	1.16	1.454	0.11	0.798
Q.210 Gambling Played games at a casino	-1.012	-1.741	3.059	-0.093	-0.57
Q.210 Gambling Played a gaming/slot machines	1.334	1.922	2.641	0.112	0.728
Q.210 Gambling Played a card game for money with friends/family	0.598	0.807	2.269	0.063	0.356
Q.210 Gambling Played bingo in person	-1.068	0.034	3.871	0.001	0.009
Q.210 Gambling Other	-0.65	6.854	-0.016	-0.1	0.925

a Dependent Variable: Overall PGSI SCORE
*** = p < 0.05, statistically significant results**

Table 4.10: Regression analysis of PGSI scores of 8 or above with gambling type (n=19)

(includes only problem gamblers)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.618	4.578		1.009	0.337
Q.210 Gambling Bought a lottery ticket or scratch card in person	0.373	3.77	3.591	0.28	1.05
Q.210 Gambling Played lottery games online	-1.68	-2.473	6.306	-0.101	-0.39
Q.210 Gambling Gambled in a bookmaker's shop	1.993	4.691	3.554	0.348	1.32
Q.210 Gambling Gambled online or by telephone	1.56	8.588	4.908	0.755	1.75
Q.210 Gambling Placed a bet at a horse or dog racing meeting	-0.724	-3.194	4.479	-0.281	-0.71
Q.210 Gambling Played games at a casino	-1.012	-7.685	6.752	-0.43	-1.14
Q.210 Gambling Played a gaming/slot machines	1.334	-5.794	7.183	-0.324	-0.81
Q.210 Gambling Played a card game for money with friends/family	0.598	4.255	5.387	0.316	0.79
Q.210 Gambling Played bingo in person	-1.068	4.618	4.578		1.009
Q.210 Gambling Other	3.77	3.591	0.28	1.05	0.319

a Dependent Variable: Overall PGSI SCORE

*** = p < 0.05, statistically significant results**

Table 4.11: Regression analysis of PGSI scores (dependent) with sex, multiple gambling platforms and gambling online or by telephone in the last 12 months (n=2767)

(includes all gamblers)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.231	0.052	-4.47	0	(Constant)
Multi-modal gambling	0.198	0.03	0.136	6.542	**0.000**
Male	0.206	0.048	0.08	4.261	**0.000**
Gambled online or by telephone	0.828	0.118	0.146	6.996	**0.000**

a Dependent Variable: Overall PGSI SCORE

*** = p < 0.05, statistically significant results**

Chapter 5: Discussion

5.1 Key Findings and Recommendations

This analysis of the recently published HRB dataset on gambling in the Republic of Ireland has highlighted several interesting findings. Firstly, it is important to note that data on gambling in Ireland at a population level is very much in its infancy, with alterations to how gambling questionnaires are constructed and delivered needed in future to fully elicit data, especially when considering online gambling and the hypotheses set out in this study:

Hypothesis A: Online gamblers are more likely to be problem gamblers than non-online gamblers in Ireland (Reject the null hypothesis).

Hypothesis B: Online at-risk or problem gamblers in Ireland are more likely to engage in multi-modal gambling compared to non-online at-risk gamblers or problem gamblers in Ireland (Reject the null hypothesis).

Hypothesis C: Problem gambling is positively associated with online gambling in Ireland (Reject the null hypothesis).

Younger males gambling on multiple activities online

Statistically significant regression results were obtained highlighting the impact of:

- **Multi-modal gambling**
- **Online gambling**
- **Male gender when gambling online**

Multi-modal gambling is defined in this paper as being engaged with at least three distinct gambling formats as outlined by the HRB questionnaire (e.g. gambling online or by telephone, playing bingo and buying a lottery ticket or scratch card in person). Other research outputs have described it as “mixed” gambling (Marmet et al., 2021) (at least one online and one non-online gambling activity)

The matter of lottery and scratch card gambling is importance to acknowledge. Given the depth of literature that suggests that lottery gambling tends towards being less intense and fewer severe instances of gambling disorder.

Much is often made in gambling literature of links between problem gambling and sociodemographic factors, including deprivation level, employment status and level of educational attainment.

The dataset provides a firm baseline for justifying a study solely examining online gambling, as well as an explicit examination of multi-modal gambling with a specific focus on gambling in person in a bookmaker's shop as well as gambling online or over the telephone. Ideally, both of these variables should be included in a multi-modal analysis of gambling given the crossover between both activities seen in this study (44.7% of online gamblers also gambled in person in a bookmaker's shop) but also because of the duality of offerings by many gambling operators currently. Not only do in-person bookmakers offer betting opportunities, but they also serve as advertising platforms for the online offerings of the same operator, with many financial incentives and explicit advertising, both auditory and visual, encouraging consumers to open an online account.

It is important to relate this research back to what has been examined in Chapter 2, the Literature Review, and making sense of the data produced in that context. Several papers are especially relevant and should be explicitly commented upon. Specifically, the findings of this study support those seen recently relating to the increased risk of problem gambling in an online setting (Canale et al., 2016), as well as the increased risk of problem gambling in an

online setting in the context of multi-modal gambling (Marmet et al., 2021, Hubert and Griffiths, 2018) and the consideration of online gambling as a predictor of problem gambling.

Why is this important?

There are some factors to consider when analysing rates of at-risk and problem gambling, especially relating to the type of gambling engaged by the survey respondent. The overall title figures of problem gambling and at-risk gambling

Is it occurring in intense periods of gambling? Is it spread out relatively evenly across weeks / months? This is important to clarify as by having access to patterns of expenditures, researchers are able to correlate spending patterns that can be indicative of risky and disordered gambling. Quantification of net spend across all gambling activities is essential for future studies, as well as the nature of how this spend occurs. Is the net spend a figure capturing total amount wagered or is it quantifying losses over a period? It can be seen that total wagering amounts may be seen to represent an overly intense period of gambling but is only made possible through successive wins and losses on wagers. Net profit / loss of gambling activities and an average spend per wager may give some further insight on gambling intensity.

Indeed, verifiable anonymised evidence from gambling operators is essential for this analysis to occur and should be available for review for researchers and regulatory authorities alike. Full and open disclosure about this to current gambling account owners and future account holders is necessary and worthwhile. Online gambling is fast becoming the fulcrum to which gambling operators are targeting their business models around. Higher expenditures relating to internal marketing and platform enhancements, as well as external gambling marketing and advertising strategies are noteworthy (2018 Dowling).

An important and yet underexplored aspect of the impact of gambling is its associated societal costs in Ireland. Few studies have been carried out worldwide, although a recent Swedish

study had significant findings, noting that the direct and indirect costs of gambling totalled over €1.4bn and were a third of the national equivalent costs of smoking and one sixth of those associated with alcohol consumption. (Hofmarcher *et al*., 2020) Notably, these estimates do not account for potentially substantial costs associated with non-problematic gambling behaviours. Future studies should aim to address and quantify the direct, indirect and intangible societal costs of gambling in Ireland using established economic tools, including explicit epidemiological and unit-cost analysis relating to both disordered and non-disordered levels of gambling. This can help to further establish the extent of gambling's impact in Ireland and indeed help to shape the research agenda. This analysis will be based primarily on estimation of direct and indirect costs, as opposed to established datasets given the sparsity of relevant data. When such data becomes available, a repeat analysis would be warranted, although an analysis at this point in time is still necessary to fill an obvious and persistent research gap. It is highly likely that it will be at times difficult to assess causality when addressing some indirect and intangible costs and as a result, appropriate levels of adjustment factors will need to be engaged in such cases, following standard practice for studies of this nature.

Also of significance is the reported under-representation of young males in the dataset. This is important as it is known that it is this population cohort who are most commonly engaging in online gambling and at risk from risky and disordered levels of gambling. (Canale et al., 2016, Marmet et al., 2021) As such, it should be considered a priority for further studies in the future to ensure that not only is this cohort fully represented in population samples, but that specific studies are dedicated to examining this group in particular, be that both in cohort studies as well as in longitudinal studies. (Calado and Griffiths, 2016) The use of weighting in this study has been performed to try to mitigate the scarcity of data from younger people (specifically ages 15-25), as well as specifically relating to young males. This is especially relevant when considering at risk and disordered levels of gambling, as young males make up a significant proportion of these sub-groups. (Marmet et al., 2021) Whether the study has

gone far enough with its weighting on average of 1.54 (effective base size of 3743) is debateable. Weighting of data is noted to have a considerable effect on the data and presents some challenges for data interpretation and comparison to the officially reported outcomes. (152 online gamblers x 1.465 = effective online gambler base of 223).

Full examination of net spend on gambling activities in different formats, including on individual gambling activities and multi-modal gambling is a necessity for future research. We have seen some studies that have explicitly examined this issue in the context of online gambling analyses but the causative mechanisms for why multi-modal gambling results in greater risk of problem gambling is as of yet, unknown (Marmet *et al.*, 2021).

What is lacking in detail, however, is information relating to wagering amounts, profit/loss, deposit and withdrawal amounts. Further, the use or non-use of responsible gambling tools, type of website is being engaged, what form of gambling application is being used and the length of time gambling are variables that would add value to this dataset. This highlights the need for a formal analysis to take place examining online gambling as an independent risk factor for the development of risky gambling behaviours and disordered gambling.

A lack of data on an individual's motivations to gamble is a persistent drawback to population studies in Ireland and across many jurisdictions. This is necessary to enable effective public health policy development regarding both prevention and treatment programmes.

The ongoing use of self-reported data in behavioural research remains a contentious matter. Although it provides a platform for some research developments to occur, when considering something that has a stigma attached to it like many other addictions, gambling research in Ireland undoubtedly requires objective data to progress into the future. This is especially pertinent when considering online gambling data, where recall bias and interpersonal embarrassment can be seen to reduce the accuracy and reduce purported data on net spend, time spend and gambling frequency. This is not just a challenge unique to Ireland but is prevalent to gambling research all around the world. The key to getting around this is to have

formalised, open and transparent access to online gambling companies databases relating to anonymised customer data. This is the same data that is used by gambling companies to construct data-driven prediction models and algorithmic prompts to companies regarding customers' profitability and type of betting being undertaken.

It could be postulated that the classification of gambling disorder as a 'substance abuse disorder' is potentially hindering the measurement and understanding of gambling behaviours and such health-related harms in the constantly changing world of online gambling and associated activities, as evidenced by the recommendations of Macey and Hamari (2018). There is the potential for further associations to be made between multiple health issues that are directly and indirectly caused by gambling activity, such as hormonal and stress-mediated conditions, yet there is a persistent lack of research that explicitly examines these issues (Fong, 2005, Butler et al., 2020) Again, it may be worthwhile to look outside of the bounds of gambling activities and the gambling industry on this matter. We have seen how the trajectory of gambling marketing and advertising has in many ways followed on from the tobacco and alcohol industries among others in years gone by, industries that have been proven time and again to have direct consequences on an individual's physical health. At this time, however, such clear associations cannot be as easily drawn when considering the gambling industry. This is not to say that they don't exist, but rather that we don't have the robust and convincing evidence-base required to support such claims at this time. A reaffirmation of the type and indeed focus area of gambling-related research is required, building on the foundations of what has gone before.

5.3 Strengths and Limitations

There are some imitations of this study. Firstly, principally due to time constraints and delays in securing access to the dataset in question, it can be reasonable to assume that there have been literature updates in the time from March 2022 onwards when the literature search has

taken place to the time of writing. Further, owing to time constraints, further analysis of variables relating to at-risk and problem gambling, as well as gambling typology related variables and multi-regression analysis would have been very useful in the shaping of the gambling research agenda in Ireland going forward. In-depth evaluation of further sociodemographic factors is also worthwhile.

The dataset in question is also lacking in some respects. Firstly, the data had to be weighted to account for the non-representative nature of the crude data, owing to the fact that young men in particular were under-represented. This is unfortunate given that the outcomes of this study has pointed to the male gender as being associated with online gambling and increased gambling severity. Further, questions relating to gambling motivations, gambling intensity, multiple gambling site accounts, wagering amounts, profit/loss amounts, use of responsible gambling tools and credit issues are all very relevant when considering online gambling. Future surveys should consider up to data and relevant questions including the above when constructing a population survey.

This study does, however, provide to my knowledge the first analysis of online gambling in an Irish context, with significant associations and potential predictors of gambling severity produced from this nationally representative dataset. As rates of this modality appear to be increasing in the European, Australasian and North-American contexts (Wardle et al., 2019), inaction on these issues will lead to harm.

5.4 Conclusions

Gambling research in Ireland, continues to suffer from a dearth of investment of resources. Yet this dataset from the Health Research Board has provided researchers with the ability to dig deeper into a growing public health concern.

Longitudinal data should be prioritised, especially relating to online gambling, gambling treatments and gambling behavioural studies, all of which have not been performed explicitly in Ireland previously. What is also needed is for gambling-related research to not only to continue to address socio-economic data relating to gamblers, both online and non-online, but also to take heed of the wider biopsychosocial consequences that risky gambling behaviours and disordered gambling can have on the individual. Only then can real assertions be made about the social and societal costs of gambling, costs which need to be formally analysed and assessed through economic predictive models, as has been the case recently in Nordic countries.

We are dealing with small numbers and as such it is challenging to obtain statistically significant results from this subset of data relating to online gambling. As a result, it is imperative that through funding or otherwise, that provision for higher-powered research into specifically online gambling, especially when considering at-risk gamblers as well as problem gamblers who gamble online. Questionnaires relating to online gamblers need to build a baseline of data relating to gambling intensity, multiple gambling site accounts, wagering amounts, profit/loss amounts, use of responsible gambling tools. This can be seen to allow economic and societal cost projections to be made with some degree of accuracy when considering the impact of gambling in Modern Ireland. This would of course be easily facilitated with anonymous access to online gamblers' consumer tracking data that is overseen by various gambling operators. Access to such data should be prioritised as a matter of urgency, with many countries including Sweden and Norway providing plenty of evidence through research output that this can be done efficiently.

This dataset represents a wonderful opportunity for all those in the public health, social sciences and economic fields to build a firm foundation for the future of gambling-related research in Ireland. This is likely a topic that will stay close to the public consciousness and for good reason, with there being an onus on researchers, policy makers and the legal system in Ireland to sit up and take note of an established public health concern in Ireland in 2022.

Gambling research is long-overdue for significant investment and its own prevention, treatment and research budgets now and into the future to ensure we are collectively omniscient of something becoming so omnipresent in modern society.

References

2019. Inter-Departmental Working Group on Future Licensing and Regulation of Gambling. Department of Justice and Equality.

ADRIAN, O. D. 2019. Gambling: health experts investigate scale of harm. *BMJ : British Medical Journal (Online),* 366.

ANDRIE, E. K., TZAVARA, C. K., TZAVELA, E., RICHARDSON, C., GREYDANUS, D., TSOLIA, M. & TSITSIKA, A. K. 2019. Gambling involvement and problem gambling correlates among European adolescents: results from the European Network for Addictive Behavior study. *Soc Psychiatry Psychiatr Epidemiol,* 54**,** 1429-1441.

APA 2013. *Gambling Disorder, Diagnostic and Statistical Manual of Mental DIsorders,* Washington, DC, American Psychiatric Association.

AUER, M. & GRIFFITHS, M. D. 2019. Predicting Limit-Setting Behavior of Gamblers Using Machine Learning Algorithms: A Real-World Study of Norwegian Gamblers Using Account Data. *International Journal of Mental Health and Addiction*.

BEYNON, C. & ATHERTON, F. 2018. Is gambling an emerging public health issue in Wales, UK? An assimilation of literature and data. *The Lancet,* 392.

BONNAIRE, C. 2012. [Internet gambling: what are the risks?]. *Encephale,* 38**,** 42-9.

BRAMLEY, S. & GAINSBURY, S. M. 2015. The Role of Auditory Features Within Slot-Themed Social Casino Games and Online Slot Machine Games. *J Gambl Stud,* 31**,** 1735-51.

BROWNE, M., RAWAT, V., TULLOCH, C., MURRAY-BOYLE, C. & ROCKLOFF, M. 2021. The Evolution of Gambling-Related Harm Measurement: Lessons from the Last Decade. *Int J Environ Res Public Health,* 18.

BUTLER, N., QUIGG, Z., BATES, R., SAYLE, M. & EWART, H. 2020. Gambling with Your Health: Associations Between Gambling Problem Severity and Health Risk Behaviours, Health and Wellbeing. *J Gambl Stud,* 36**,** 527-538.

CALADO, F., ALEXANDRE, J. & GRIFFITHS, M. D. 2017. Prevalence of Adolescent Problem Gambling: A Systematic Review of Recent Research. *J Gambl Stud,* 33**,** 397-424.

CALADO, F. & GRIFFITHS, M. D. 2016. Problem gambling worldwide: An update and systematic review of empirical research (2000-2015). *J Behav Addict,* 5**,** 592-613.

CANALE, N., GRIFFITHS, M. D., VIENO, A., SICILIANO, V. & MOLINARO, S. 2016. Impact of Internet gambling on problem gambling among adolescents in Italy: Findings from a large-scale nationally representative survey. *Computers in Human Behavior,* 57**,** 99-106.

CHÓLIZ, M. 2016. The Challenge of Online Gambling: The Effect of Legalization on the Increase in Online Gambling Addiction. *J Gambl Stud,* 32**,** 749-56.

COLUMB, D. & O'GARA, C. 2018. A national survey of online gambling behaviours. *Ir J Psychol Med,* 35**,** 311-319.

DOWLING, N. A., MERKOURIS, S. S., GREENWOOD, C. J., OLDENHOF, E., TOUMBOUROU, J. W. & YOUSSEF, G. J. 2017. Early risk and protective factors for problem gambling: A systematic review and meta-analysis of longitudinal studies. *Clinical Psychology Review,* 51**,** 109-124.

EFFERTZ, T., BISCHOF, A., RUMPF, H. J., MEYER, C. & JOHN, U. 2018. The effect of online gambling on gambling problems and resulting economic health costs in Germany. *Eur J Health Econ,* 19**,** 967-978.

ETCHELLS, P. J., MORGAN, A. L. & QUINTANA, D. S. 2022. Loot box spending is associated with problem gambling but not mental wellbeing. *R Soc Open Sci,* 9**,** 220111.
FLUTTER 2021. Changing the Game. 2020 Annual Report. Dublin, Ireland: Flutter Entertainment PLC.
FONG, T. W. 2005. The biopsychosocial consequences of pathological gambling. *Psychiatry (Edgmont),* 2**,** 22-30.
GAINSBURY, S. M. 2015. Online Gambling Addiction: the Relationship Between Internet Gambling and Disordered Gambling. *Curr Addict Rep,* 2**,** 185-193.
GAINSBURY, S. M., ABARBANEL, B. L. L., PHILANDER, K. S. & BUTLER, J. V. 2018. Strategies to customize responsible gambling messages: a review and focus group study. *BMC Public Health,* 18**,** 1381.
GOUDRIAAN, A. E., YÜCEL, M. & VAN HOLST, R. J. 2014. Getting a grip on problem gambling: what can neuroscience tell us? *Frontiers in Behavioral Neuroscience*.
GRIFFITHS, M. 1999. Gambling Technologies: Prospects for Problem Gambling. *Journal of Gambling Studies,* 15**,** 265-283.
GRIFFITHS, M. D., DEREVENSKY, J. L. & PARKE, J. 2012. *Online Gambling among Youth: Cause for Concern?,* London, United Kingdom, Routledge.
GUERRERO-SOLÉ, F., HIBAI, L.-G. & MARK, D. G. 2017. Online Gambling Advertising and the Third-Person Effect: A Pilot Study. *International Journal of Cyber Behavior, Psychology and Learning (IJCBPL),* 7**,** 15-30.
GUNTER, B. 2019. *Gambling Advertising: Nature, Effects and Regulation,* UK, Emerald Publishing.
HAYER, T., KALKE, J., MEYER, G. & BROSOWSKI, T. 2018. Do Simulated Gambling Activities Predict Gambling with Real Money During Adolescence? Empirical Findings from a Longitudinal Study. *Journal of Gambling Studies,* 34**,** 929-947.
HING, N., CHERNEY, L., BLASZCZYNSKI, A., GAINSBURY, S. M. & LUBMAN, D. I. 2014. Do advertising and promotions for online gambling increase gambling consumption? An exploratory study. *International Gambling Studies,* 14**,** 394-409.
HOFMARCHER, T., ROMILD, U., SPÅNGBERG, J., PERSSON, U. & HÅKANSSON, A. 2020. The societal costs of problem gambling in Sweden. *BMC Public Health,* 20**,** 1-14.
HUBERT, P. & GRIFFITHS, M. D. 2018. A Comparison of Online Versus Offline Gambling Harm in Portuguese Pathological Gamblers: An Empirical Study. *Int J Ment Health Addict,* 16**,** 1219-1237.
HÅKANSSON, A. 2020a. Changes in Gambling Behavior during the COVID-19 Pandemic—A Web Survey Study in Sweden. *International Journal of Environmental Research and Public Health,* 17**,** 4013.
HÅKANSSON, A. 2020b. Role of Gambling in Payback Failure in Consumer Credit—Data from a Large Body of Material Regarding Consumer Loan Recipients in Sweden. *International Journal of Environmental Research and Public Health,* 17**,** 2907.
HÅKANSSON, A. & HENZEL, V. 2020. Who chooses to enroll in a new national gambling self-exclusion system? A general population survey in Sweden. *Harm Reduction Journal,* 17**,** 1-12.
JOHN, N., SHARMA, M. K., ANAND, N., GANDHI, S., THAKUR, P. C., SAHU, M., MONDAL, I., SINGH, P., SUMA, N., TADPATRIKAR, A., AHUJA, S., AJITH, S. J., MURTHY, K. D. & GUPTA, H. K. 2020. Pathways of migration from gaming to gambling. *Ind Psychiatry J,* 29**,** 159-161.

KILLICK, E. A. & GRIFFITHS, M. D. 2021. Why Do Individuals Engage in In-Play Sports Betting? A Qualitative Interview Study. *J Gambl Stud,* 37**,** 221-240.
KIM, H. S., WOHL, M. J. A., GUPTA, R. & DEREVENSKY, J. L. 2017. Why do young adults gamble online? A qualitative study of motivations to transition from social casino games to online gambling. *Asian J Gambl Issues Public Health,* 7**,** 6.
KRISTIANSEN, S., TRABJERG, M. C., LAUTH, N. R. & MALLING, A. 2018. Playing for fun or gambling for money: a qualitative longitudinal study of digitally simulated gambling among young Danes. *Young Consumers,* 19**,** 251-266.
LABRADOR, F. J., ESTUPIÑÁ, F. J., VALLEJO-ACHÓN, M., SÁNCHEZ-IGLESIAS, I., GONZÁLEZ-ÁLVAREZ, M., FERNÁNDEZ-ARIAS, I., LABRADOR, M. & BERNALDO-DE-QUIR´ÓS, M. 2021. Exposición de jóvenes y adolescentes a la publicidad de los juegos de azar: una revisión sistemática. *Anales de Psicología / Annals of Psychology,* 37**,** 149-160.
LEMARIÉ, L. & CHEBAT, J.-C. 2015. Temptation and prevention provided by the gambling industry: Main and interactive effects on gamblers. *Recherche et Applications en Marketing (English Edition),* 30**,** 51-63.
LI, Y., SESCOUSSE, G. & DREHER, J.-C. 2014. Endogenous cortisol levels are associated with an imbalanced striatal sensitivity to monetary versus non-monetary cues in pathological gamblers. *Frontiers in Behavioral Neuroscience*.
LOPEZ-GONZALEZ, H. & GRIFFITHS, M. D. 2018. Betting, Forex Trading, and Fantasy Gaming Sponsorships—a Responsible Marketing Inquiry into the 'Gamblification' of English Football. *International Journal of Mental Health and Addiction,* 16**,** 404-419.
LUQUIENS, A., DUGRAVOT, A., PANJO, H., BENYAMINA, A., GAÏFFAS, S. & BACRY, E. 2019. Self-Exclusion among Online Poker Gamblers: Effects on Expenditure in Time and Money as Compared to Matched Controls. *International Journal of Environmental Research and Public Health,* 16.
LUQUIENS, A., TANGUY, M.-L., BENYAMINA, A., LAGADEC, M., AUBIN, H.-J. & REYNAUD, M. 2016. Tracking online poker problem gamblers with player account-based gambling data only. *International Journal of Methods in Psychiatric Research,* 25**,** 333-342.
MACEY, J. & HAMARI, J. 2018. Investigating relationships between video gaming, spectating esports, and gambling. *Computers in Human Behavior,* 80**,** 344-353.
MARMET, S., STUDER, J., WICKI, M., KHAZAAL, Y. & GMEL, G. 2021. Online Gambling's Associations With Gambling Disorder and Related Problems in a Representative Sample of Young Swiss Men. *Front Psychiatry,* 12**,** 703118.
MCCARTHY, C. 2017. The Taxation of Betting in Ireland
Submission to the Tax Strategy Group on behalf of the Alliance for Racing and Breeding. Dublin.
MCCORMACK, A., SHORTER, G. W. & GRIFFITHS, M. D. 2014. An Empirical Study of Gender Differences in Online Gambling. *Journal of Gambling Studies,* 30**,** 71-88.
MCGEE, D. 2020. On the normalisation of online sports gambling among young adult men in the UK: a public health perspective. *Public Health,* 184**,** 89-94.
MELENDEZ-TORRES, G. J., ANTHONY, R. E., HEWITT, G., MURPHY, S. & MOORE, G. F. 2020. Prevalence of gambling behaviours and their associations with socioemotional harm among 11-16 year olds in Wales: findings from the School Health Research Network survey. *European journal of public health,* 30**,** 432-438.
MOLDE, H., HOLMØY, B., MERKESDAL, A. G., TORSHEIM, T., MENTZONI, R. A., HANNS, D., SAGOE, D. & PALLESEN, S. 2019. Are Video Games a Gateway to Gambling? A

Longitudinal Study Based on a Representative Norwegian Sample. *Journal of Gambling Studies,* 35**,** 545-557.
MOTKA, F., GRÜNE, B., SLECZKA, P., BRAUN, B., ÖRNBERG, J. C. & KRAUS, L. 2018. Who uses self-exclusion to regulate problem gambling? A systematic literature review. *J Behav Addict,* 7**,** 903-916.
N.A.C.D.A 2019. National Advisorry Council on Drugs and Alcohol: Prevalence of Drug Use and Gambling in Ireland and Drug use in Northern Ireland
2014/15 Drug Prevalence Survey: Gambling Results. *In:* DEPARTMENT OF, H. (ed.).
NATIONAL CENTER FOR CHRONIC DISEASE, P., HEALTH PROMOTION OFFICE ON, S. & HEALTH 2012. Reports of the Surgeon General. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General.* Atlanta (GA): Centers for Disease Control and Prevention (US).
NEWALL, P. W. S. 2017. Behavioral complexity of British gambling advertising. *Addiction Research & Theory,* 25**,** 505-511.
NEWALL, P. W. S. 2019. Dark nudges in gambling. *Addiction Research & Theory,* 27**,** 65-67.
NEWALL, P. W. S., MOODIE, C., REITH, G., STEAD, M., CRITCHLOW, N., MORGAN, A. & DOBBIE, F. 2019. Gambling Marketing from 2014 to 2018: a Literature Review. *Current Addiction Reports,* 6**,** 49-56.
NOEL, J. K., SAMMARTINO, C. J. & ROSENTHAL, S. R. 2020. Exposure to Digital Alcohol Marketing and Alcohol Use: A Systematic Review. *J Stud Alcohol Drugs Suppl,* Sup 19**,** 57-67.
OKSANEN, A., SAVOLAINEN, I., SIROLA, A. & KAAKINEN, M. 2018. Problem gambling and psychological distress: a cross-national perspective on the mediating effect of consumer debt and debt problems among emerging adults. *Harm Reduction Journal,* 15.
PALIWAL, S., PETZSCHNER, F. H., SCHMITZ, A. K., TITTGEMEYER, M. & STEPHAN, K. E. 2014. A model-based analysis of impulsivity using a slot-machine gambling paradigm. *Frontiers in Human Neuroscience*.
PARKE, A., HARRIS, A., PARKE, J., RIGBYE, J. & BLASZCZYNSKI, A. 2015. Responsible Marketing and Advertising in Gambling: A Critical Review. *The Journal of Gambling Business and Economics,* 8**,** 21-35.
PARKE, A. & PARKE, J. 2019. Transformation of Sports Betting into a Rapid and Continuous Gambling Activity: a Grounded Theoretical Investigation of Problem Sports Betting in Online Settings. *International Journal of Mental Health and Addiction,* 17**,** 1340-1359.
PARRADO-GONZÁLEZ, A. & LEÓN-JARIEGO, J. C. 2020. Exposure to gambling advertising and adolescent gambling behaviour. Moderating effects of perceived family support. *International Gambling Studies,* 20**,** 214-230.
PERES, F., FALLACARA, E., MANZONI, L., CASTELLI, M., POPOVIČ, A., RODRIGUES, M. & ESTEVENS, P. 2021. Time Series Clustering of Online Gambling Activities for Addicted Users' Detection. *Applied Sciences,* 11**,** 2397.
PETRY, N. M. 2006. Should the scope of addictive behaviors be broadened to include pathological gambling? *Addiction,* 101 Suppl 1**,** 152-60.
POTENZA, M. N. 2006. Should addictive disorders include non-substance-related conditions? *Addiction,* 101 Suppl 1**,** 142-51.
PRODUCTIVITY-COMMISSION 1999. Australia's Gambling Industries. Report No 10. . Canberra: Ausinfo.

PRODUCTIVITY-COMMISSION 2010. Productivity Commission. Gambling. Report No 50. . *In:* GOVERNMENT;, A. (ed.). Canberra.
REITH, G., WARDLE, H. & GILMORE, I. 2019. Gambling harm: a global problem requiring global solutions. *The Lancet,* 394**,** 1212-1214.
REUTERS. 2019. *Paddy Power and Poker Stars owners to create online gambling leader* [Online]. Available: https://www.reuters.com/article/us-stars-group-m-a-flutter-idUSKBN1WH0H1 [Accessed].
ROSSOW, I. & HANSEN, M. B. 2016. Gambling and gambling policy in Norway—an exceptional case. *Addiction,* 111**,** 593-598.
SALONEN, A. H., KONTTO, J., PERHONIEMI, R., ALHO, H. & CASTRÉN, S. 2018. Gambling expenditure by game type among weekly gamblers in Finland. *BMC Public Health,* 18.
SIMONOVIC, B., STUPPLE, E. J. N., GALE, M. & SHEFFIELD, D. 2018. Performance Under Stress: An Eye-Tracking Investigation of the Iowa Gambling Task (IGT). *Frontiers in Behavioral Neuroscience*.
SIROLA, A., SAVELA, N., SAVOLAINEN, I., KAAKINEN, M. & OKSANEN, A. 2021. The Role of Virtual Communities in Gambling and Gaming Behaviors: A Systematic Review. *Journal of Gambling Studies,* 37**,** 165-187.
SKIBA, J., PETTY, R. D. & CARLSON, L. 2019. Beyond Deception: Potential Unfair Consumer Injury from Various Types of Covert Marketing. *Journal of Consumer Affairs,* 53**,** 1573-1601.
TEICHERT, T., GAINSBURY, S. M. & MÜHLBACH, C. 2017. Positioning of online gambling and gaming products from a consumer perspective: A blurring of perceived boundaries. *Computers in Human Behavior,* 75**,** 757-765.
TOMEI, A., PETROVIC, G. & SIMON, O. 2022. Offline and Online Gambling in a Swiss Emerging-Adult Male Population. *J Gambl Stud*.
WALL, H., BERMAN, A. H., JAYARAM-LINDSTRÖM, N., HELLNER, C. & ROSENDAHL, I. 2021. Gambler clusters and problem gambling severity: A cluster analysis of Swedish gamblers accessing an online problem gambling screener. *Psychology of Addictive Behaviors,* 35**,** 102-112.
WARDLE, H., REITH, G., LANGHAM, E. & ROGERS, R. D. 2019. Gambling and public health: we need policy action to prevent harm. *BMJ : British Medical Journal (Online),* 365.
WHELAN, E., LAATO, S., ISLAM, A. K. M. N. & BILLIEUX, J. 2021. A casino in my pocket: Gratifications associated with obsessive and harmonious passion for mobile gambling. *PLoS One,* 16.
WHITE, C. M., GUMMERUM, M. & HANOCH, Y. 2018. Framing of online risk: Young adults' and adolescents' representations of risky gambles. *Decision,* 5**,** 119-128.
WILLIAMS, R. J., BELANGER, Y. D. & ARTHUR, J. N. 2011. Gambling in Alberta: History, Current Status and Socioeconomic Impacts.
WINKLER, P., BEJDOVÁ, M., CSÉMY, L. & WEISSOVÁ, A. 2017. Social Costs of Gambling in the Czech Republic 2012. *J Gambl Stud,* 33**,** 1293-1310.
WOOD, R. T. & WILLIAMS, R. J. Internet Gambling: Past, Present and Future. 2007.
YÜCEL, M., CARTER, A., ALLEN, A. R., BALLEINE, B., CLARK, L., DOWLING, N. A., GAINSBURY, S. M., GOUDRIAAN, A. E., GRANT, J., HAYES, A., HODGINS, D., VAN HOLST, R., LATTIMORE, R., LIVINGSTONE, C., LORENZETTI, V., LUBMAN, D., MURAWSKI, C., PARKES, L., PETRY, N., ROOM, R., SINGH, B., THOMAS, A., TOWNSHEND, P., YOUSSEF, G. & HALL, W. 2017. Neuroscience in gambling policy and treatment: an interdisciplinary perspective. *Lancet Psychiatry,* 4**,** 501-506.

ZENDLE, D. & CAIRNS, P. 2018. Video game loot boxes are linked to problem gambling: Results of a large-scale survey. *PLoS One,* 13.

Appendices and Supplementary Materials

Search Strategy: Databases and operators employed

Academic Databases used: Pubmed, Scopus, Science Direct, Wiley Online Library, Proquest (PsychINFO)

Explicit search terms relating to titles/abstracts of literature from the last 5 years and operators employed with subsequent parameter-setting of inclusion and exclusion criteria:

(((((((((online gambling[Title/Abstract])) OR (online gambler[Title/Abstract])) OR (online betting[Title/Abstract])) OR (gambling[Title/Abstract])) OR (gamble[Title/Abstract])) OR (bet[Title/Abstract])) OR (betting[Title/Abstract])) AND (online[Title/Abstract])) AND (web[Title/Abstract]) AND (y_5[Filter])

Supplementary Tables

Supplementary Table 1: Comparing Multi- Modal Gambling in online problem gamblers vs non-online problem gamblers	
Difference	83.30%
95% CI	38.0532% to 95.2884%
Chi-squared	11.657
DF	1
Significance level	**P = 0.0006**

Supplementary Table 2: Comparing overall Multi- Modal Gambling in online gamblers vs non-online gamblers	
Difference	35.60%
95% CI	23.9119% to 45.7378%
Chi-squared	33.311
DF	1
Significance level	**P < 0.0001**

Supplementary Table 3: Comparing Multi- Modal Gambling in online moderate risk (MR) gamblers vs non-online MR gamblers	
Difference	43.80%
95% CI	14.0431% to 64.5206%
Chi-squared	8.377
DF	1
Significance level	**P = 0.0038**

Supplementary Table 4: Comparing Multi- Modal Gambling in online low risk (LR) gamblers vs non-online LR gamblers	
Difference	47.20%
95% CI	25.2683% to 63.3199%
Chi-squared	18.465
DF	1
Significance level	**P < 0.0001**

Supplementary Table 5: Comparing daily gambling frequency in online problem gamblers vs non-online problem gamblers	
Difference	6.00%
95% CI	-23.4807% to 43.6503%
Chi-squared	0.16
DF	1
Significance level	P = 0.6889

Supplementary Table 6: Comparing daily gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	6.30%
95% CI	-5.6009% to 28.3941%
Chi-squared	2.016
DF	1
Significance level	P = 0.1556

Supplementary Table 7: Comparing daily gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	3.50%
95% CI	-11.6419% to 12.6304%
Chi-squared	0.404
DF	1
Significance level	P = 0.5253

Supplementary Table 8: Comparing overall daily gambling frequency in online gamblers vs non-online gamblers	
Difference	2.30%
95% CI	-2.9187% to 8.5485%
Chi-squared	0.798
DF	1
Significance level	P = 0.3717

Supplementary Table 9: Comparing 2-6 times per week gambling frequency in online problem gamblers vs non-online problem gamblers	
Difference	29.70%
95% CI	-14.5503% to 59.9370%
Chi-squared	1.482
DF	1
Significance level	P = 0.2235

Supplementary Table 10: Comparing 2-6 times per week gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	9.30%
95% CI	-21.4784% to 34.3485%
Chi-squared	0.332
DF	1
Significance level	P = 0.5644

Supplementary Table 11: Comparing 2-6 times per week gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	3.50%
95% CI	-14.3913% to 24.3476%
Chi-squared	0.119
DF	1
Significance level	P = 0.7300

Supplementary Table 12: Comparing overall 2-6 times per week gambling frequency in online gamblers vs non-online gamblers	
Difference	13.50%
95% CI	3.0202% to 24.0301%
Chi-squared	6.423
DF	1
Significance level	**P = 0.0113**

Supplementary Table 13: Comparing once per week gambling frequency in online

problem gamblers vs non-online problem gamblers	
Difference	29.70%
95% CI	-14.5503% to 59.9370%
Chi-squared	1.482
DF	1
Significance level	P = 0.2235

Supplementary Table 14: Comparing once per week gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	12.50%
95% CI	-16.4083% to 36.5582%
Chi-squared	0.682
DF	1
Significance level	P = 0.4089

Supplementary Table 15: Comparing once per week gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	2.90%
95% CI	-15.8412% to 24.0380%
Chi-squared	0.075
DF	1
Significance level	P = 0.7839

Supplementary Table 16: Comparing overall once per week gambling frequency in online gamblers vs non-online gamblers	
Difference	3.60%
95% CI	-7.6221% to 14.9949%
Chi-squared	0.382
DF	1
Significance level	P = 0.5366

Supplementary Table 17: Comparing less than once per week, more than monthly gambling frequency in problem gamblers vs non-online problem gamblers	
Difference	8.30%

95% CI	-27.7841% to 35.3477%
Chi-squared	0.581
DF	1
Significance level	P = 0.4460

Supplementary Table 18: Comparing less than once per week, more than monthly gambling frequency in moderate risk (MR) gamblers vs non-online MR gamblers	
Difference	12.50%
95% CI	-8.9929% to 38.1294%
Chi-squared	1.175
DF	1
Significance level	P = 0.2784

Supplementary Table 19: Comparing less than once per week, more than monthly gambling frequency in low risk (LR) gamblers vs non-online LR gamblers	
Difference	7.10%
95% CI	-10.1056% to 18.5920%
Chi-squared	0.885
DF	1
Significance level	P = 0.3469

Supplementary Table 20: Comparing overall less than once per week, more than monthly gambling frequency in online vs non-online gamblers	
Difference	2.10%
95% CI	-5.7532% to 10.6243%
Chi-squared	0.268
DF	1
Significance level	P = 0.6048

Supplementary Table 21: Comparing once per month gambling frequency in online problem gamblers vs non-online problem gamblers	
Difference	0%

95% CI	-35.4330% to 24.2494%
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 22: Comparing once per month gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	6.30%
95% CI	-5.6009% to 28.3941%
Chi-squared	2.016
DF	1
Significance level	P = 0.1556

Supplementary Table 23: Comparing once per month gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	6.80%
95% CI	-3.7460% to 23.9797%
Chi-squared	1.524
DF	1
Significance level	P = 0.2170

Supplementary Table 24: Comparing overall once per month gambling frequency in online gamblers vs non-online gamblers	
Difference	9.90%
95% CI	3.3943% to 16.3329%
Chi-squared	8.335
DF	1
Significance level	P = 0.0039

Supplementary Table 25: Comparing 6-11 times per year gambling frequency in online problem gamblers vs non-online problem gamblers	
Difference	0%

95% CI	-35.4330% to 24.2494%
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 26: Comparing 6-11 times per year gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	3.10%
95% CI	-16.4285% to 15.7072%
Chi-squared	0.496
DF	1
Significance level	P = 0.4813

Supplementary Table 27: Comparing 6-11 times per year gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	7.60%
95% CI	-4.7765% to 25.7296%
Chi-squared	1.31
DF	1
Significance level	P = 0.2523

Supplementary Table 28: Comparing overall 6-11 times per year gambling frequency in online gamblers vs non-online gamblers	
Difference	7.60%
95% CI	0.0074% to 14.7216%
Chi-squared	3.949
DF	1
Significance level	**P = 0.0469**

Supplementary Table 29: Comparing 2-5 times per year gambling frequency in online problem gamblers vs non-online problem gamblers	
Difference	8.30%
95% CI	-27.7841% to 35.3477%

Chi-squared	0.581
DF	1
Significance level	P = 0.4460

Supplementary Table 30: Comparing 2-5 times per year gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	0%
95% CI	-19.3608% to 10.7179
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 31: Comparing 2-5 times per year gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	6.80%
95% CI	-3.7460% to 23.9797%
Chi-squared	1.524
DF	1
Significance level	P = 0.2170

Supplementary Table 32: Comparing overall 2-5 times per year gambling frequency in online gamblers vs non-online gamblers	
Difference	5.80%
95% CI	-7.1436% to 13.9831%
Chi-squared	1.617
DF	1
Significance level	P = 0.2035

Supplementary Table 33: Comparing once per year gambling frequency in online problem gamblers vs non-online problem gamblers	
Difference	0%
95% CI	-35.4330% to 24.2494%

Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 34: Comparing once per year gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	0%
95% CI	-19.3608% to 10.7179%
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 35: Comparing once per year gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	3.30%
95% CI	-1.9154% to 10.9990%
Chi-squared	1.957
DF	1
Significance level	P = 0.1619

Supplementary Table 36: Comparing once per year gambling frequency in online gamblers vs non-online gamblers	
Difference	1.90%
95% CI	-1.5598% to 6.7714%
Chi-squared	1.567
DF	1
Significance level	P = 0.2106

Supplementary Table 37: Comparing monthly expenditures in online problem gamblers vs non-online problem gamblers (More than €1000)	
Difference	14.30%
95% CI	-12.6364% to 51.3268%
Chi-squared	1.716

DF	1
Significance level	P = 0.1902

Supplementary Table 38: Comparing monthly gambling expenditures in moderate risk (MR) online gamblers vs MR non-online gamblers (more than €1000)	
Difference	0%
95% CI	-19.3608% to 10.7179%
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 39: Comparing monthly gambling expenditures in low risk (LR) online gamblers vs LR non-online gamblers (More than €1000)	
Difference	0%
95% CI	-12.4555% to 5.2737%
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 40: Comparing overall monthly gambling expenditures in online gamblers vs non-online gamblers (more than €1000)	
Difference	2%
95% CI	-1.5403% to 5.6794%
Chi-squared	2.278
DF	1
Significance level	P = 0.1313

Supplementary Table 41: Comparing monthly gambling expenditures in online problem gamblers vs non-online problem gamblers (€501 - €1000)	
Difference	28.60%
95% CI	-3.0663% to 64.1300%
Chi-squared	3.634

DF	1
Significance level	P = 0.0566

Supplementary Table 42: Comparing monthly gambling expenditures in moderate risk (MR) online gamblers vs MR non-online gamblers (€501 - €1000)		
Difference		0%
95% CI	-19.3608% to 10.7179%	
Chi-squared	N/A	
DF	N/A	
Significance level	N/A	

Supplementary Table 43: Comparing monthly gambling expenditures in low risk (LR) online gamblers vs LR non-online gamblers (€501 - €1000)	
Difference	1.50%
95% CI	-11.0159% to 7.8438%
Chi-squared	0.405
DF	1
Significance level	P = 0.5244

Supplementary Table 44: Comparing overall monthly gambling expenditures in online gamblers vs non-online gamblers (€501 - €1000)	
Difference	1.70%
95% CI	-2.5743% to 5.6955%
Chi-squared	1.014
DF	1
Significance level	P = 0.3139

Supplementary Table 45: Comparing monthly gambling expenditures in online problem gamblers vs non-online problem gamblers (€101 - €500)	
Difference	8.30%
95% CI	-27.7841% to 35.3477%
Chi-squared	0.581
DF	1

Significance level	P = 0.4460

Supplementary Table 46: Comparing monthly gambling expenditures in moderate risk (MR) online gamblers vs MR non-online gamblers (€101 - €500)	
Difference	3.10%
95% CI	-19.8332% to 18.8249%
Chi-squared	0.131
DF	1
Significance level	P = 0.7175

Supplementary Table 47: Comparing monthly gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers (€101 - €500)	
Difference	0.90%
95% CI	-10.9411% to 18.6128%
Chi-squared	0.017
DF	1
Significance level	P = 0.8974

Supplementary Table 48: Comparing overall monthly gambling frequency in online gamblers vs non-online gamblers (€101 - €500)	
Difference	5.10%
95% CI	-1.1257% to 12.3459%
Chi-squared	2.659
DF	1
Significance level	P = 0.1030

Supplementary Table 49: Comparing monthly gambling expenditures in online problem gamblers vs non-online problem gamblers (€51 - €100)	
Difference	35.70%
95% CI	-8.7659% to 62.9722%
Chi-squared	2.294
DF	1
Significance level	P = 0.1299

Supplementary Table 50: Comparing monthly gambling expenditures in moderate risk (MR) online gamblers vs MR non-online gamblers (€51 - €100)	
Difference	21.90%
95% CI	-4.7829% to 47.3923%
Chi-squared	2.423
DF	1
Significance level	P = 0.1196

Supplementary Table 51: Comparing monthly gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers (€51 - €100)	
Difference	1.30%
95% CI	-15.3237% to 11.7749%
Chi-squared	0.042
DF	1
Significance level	P = 0.8367

Supplementary Table 52: Comparing overall monthly gambling frequency in online gamblers vs non-online gamblers (€51 - €100)	
Difference	3.70%
95% CI	-4.8347% to 12.8250%
Chi-squared	0.706
DF	1
Significance level	P = 0.4008

Supplementary Table 53: Comparing monthly gambling expenditures in online problem gamblers vs non-online problem gamblers (€26 - €50)	
Difference	17.90%
95% CI	-21.2000% to 53.7998%
Chi-squared	0.621
DF	1
Significance level	P = 0.4307

Supplementary Table 54: Comparing monthly gambling expenditures in moderate risk (MR) online gamblers vs MR non-online gamblers (€26 - €50)	
Difference	9.30%
95% CI	-18.0182% to 30.4165%
Chi-squared	0.482
DF	1
Significance level	P = 0.4876

Supplementary Table 55: Comparing monthly gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers (€26 - €50)	
Difference	19.80%
95% CI	-0.5007% to 39.9892%
Chi-squared	3.574
DF	1
Significance level	P = 0.0587

Supplementary Table 56: Comparing overall monthly gambling frequency in online gamblers vs non-online gamblers (€26 - €50)	
Difference	3.60%
Difference	0.60%
95% CI	-10.2230% to 10.9874%
Chi-squared	0.012
DF	1
Significance level	P = 0.9125

Supplementary Table 57: Comparing monthly gambling expenditures in online problem gamblers vs non-online problem gamblers (€0 - €25)	
Difference	16.70%
95% CI	-20.7062% to 44.8385%
Chi-squared	1.238
DF	1
Significance level	P = 0.2658

Supplementary Table 58: Comparing monthly gambling expenditures in moderate

risk (MR) online gamblers vs MR non-online gamblers (€0 - €25)	
Difference	9.30%
95% CI	-19.3467% to 33.4960%
Chi-squared	0.385
DF	1
Significance level	P = 0.5347

Supplementary Table 59: Comparing monthly gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers (€0 - €25)	
Difference	18.10%
95% CI	-3.9856% to 37.1951%
Chi-squared	2.517
DF	1
Significance level	P = 0.1127

Supplementary Table 60: Comparing overall monthly gambling frequency in online gamblers vs non-online gamblers (€0 - €25)	
Difference	4.40%
95% CI	-7.6761% to 16.2801%
Chi-squared	0.5
DF	1
Significance level	P = 0.4795

Supplementary Table 61: Comparing 2-5 times per year gambling frequency in online problem gamblers vs non-online problem gamblers	
Difference	8.30%
95% CI	-27.7841% to 35.3477%
Chi-squared	0.581
DF	1
Significance level	P = 0.4460

Supplementary Table 62: Comparing 2-5 times per year gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	0%
95% CI	-19.3608% to 10.7179
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 63: Comparing 2-5 times per year gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	6.80%
95% CI	-3.7460% to 23.9797%
Chi-squared	1.524
DF	1
Significance level	P = 0.2170

Supplementary Table 64: Comparing overall 2-5 times per year gambling frequency in online gamblers vs non-online gamblers	
Difference	5.80%
95% CI	-7.1436% to 13.9831%
Chi-squared	1.617
DF	1
Significance level	P = 0.2035

Supplementary Table 65: Comparing once per year gambling frequency in online problem gamblers vs non-online problem gamblers	
Difference	0%
95% CI	-35.4330% to 24.2494%
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 66: Comparing once per year gambling frequency in moderate risk (MR) online gamblers vs MR non-online gamblers	
Difference	0%

95% CI	-19.3608% to 10.7179%
Chi-squared	N/A
DF	N/A
Significance level	N/A

Supplementary Table 67: Comparing once per year gambling frequency in low risk (LR) online gamblers vs LR non-online gamblers	
Difference	3.30%
95% CI	-1.9154% to 10.9990%
Chi-squared	1.957
DF	1
Significance level	P = 0.1619

Supplementary Table 68: Comparing once per year gambling frequency in online gamblers vs non-online gamblers	
Difference	1.90%
95% CI	-1.5598% to 6.7714%
Chi-squared	1.567
DF	1
Significance level	P = 0.2106

Supplementary Table 69: Example of Process Log - SPSS

```
GET  STATA FILE='/Users/kevinmcmahon/Desktop/MBA/Dissertation/Datasets/2019 KMc.dta'.
DATASET NAME DataSet1 WINDOW=FRONT.
FILTER OFF.
USE ALL.
SELECT IF (q210_1 = 1 AND q210_2 = 0 AND q210_3 = 0 AND q210_4 = 0 AND q210_5 = 0 AND q210_6 = 0
    AND q210_7 = 0 AND q210_8 = 0 AND q210_9 = 0 AND q210_10 = 0).
EXECUTE.
GET  STATA FILE='/Users/kevinmcmahon/Desktop/MBA/Dissertation/Datasets/2019 KMc.dta'.
DATASET NAME DataSet1 WINDOW=FRONT.
DATASET COPY  Lotteryonly.
```

```
DATASET ACTIVATE  Lotteryonly.
FILTER OFF.
USE ALL.
SELECT IF (q210_1 = 1 AND q210_2 = 0 AND q210_3 = 0 AND q210_4 = 0 AND q210_5 = 0 AND q210_6 = 0
    AND q210_7 = 0 AND q210_8 = 0 AND q210_9 = 0 AND q210_10 = 0).
EXECUTE.
DATASET ACTIVATE  DataSet1.
DATASET ACTIVATE DataSet1.
DATASET CLOSE LotteryonlyAtRisk.
DATASET COPY  LotteryonlyAtRisk.
DATASET ACTIVATE  LotteryonlyAtRisk.
FILTER OFF.
USE ALL.
SELECT IF (q210_1 = 1 AND q210_2 = 0 AND q210_3 = 0 AND q210_4 = 0 AND q210_5 = 0 AND q210_6 = 0
    AND q210_7 = 0 AND q210_8 = 0 AND q210_9 = 0 AND q210_10 = 0 AND (pgsi1 = 1) OR (pgsi1 = 2) OR
    (pgsi1 = 3) OR (pgsi2 = 1) OR (pgsi2 = 2) OR (pgsi2 = 3) OR (pgsi3 = 1) OR (pgsi3 = 2) OR (pgsi3 =
    3) OR (pgsi4 = 1) OR (pgsi4 = 2) OR (pgsi4 = 3) OR (pgsi5 = 1) OR (pgsi5 = 2) OR (pgsi5 = 3) OR
    (pgsi6 = 1) OR (pgsi6 = 2) OR (pgsi6 = 3) OR (pgsi7 = 1) OR (pgsi7 = 2) OR (pgsi7 = 3) OR (pgsi8 =
    1) OR (pgsi8 = 2) OR (pgsi8 = 3) OR (pgsi9 = 1) OR (pgsi9 = 2) OR (pgsi9 = 3)).
EXECUTE.
DATASET ACTIVATE  DataSet1.
DATASET ACTIVATE LotteryonlyAtRisk.
FILTER OFF.
USE ALL.
SELECT IF (q210_1 = 1 AND q210_2 = 0 AND q210_3 = 0 AND q210_4 = 0 AND q210_5 = 0 AND q210_6 = 0
    AND q210_7 = 0 AND q210_8 = 0 AND q210_9 = 0 AND q210_10 = 0 AND ((pgsi1 = 1) OR (pgsi1 = 2) OR
    (pgsi1 = 3) OR (pgsi2 = 1) OR (pgsi2 = 2) OR (pgsi2 = 3) OR (pgsi3 = 1) OR (pgsi3 = 2) OR (pgsi3 =
    3) OR (pgsi4 = 1) OR (pgsi4 = 2) OR (pgsi4 = 3) OR (pgsi5 = 1) OR (pgsi5 = 2) OR (pgsi5 = 3) OR
    (pgsi6 = 1) OR (pgsi6 = 2) OR (pgsi6 = 3) OR (pgsi7 = 1) OR (pgsi7 = 2) OR (pgsi7 = 3) OR (pgsi8 =
    1) OR (pgsi8 = 2) OR (pgsi8 = 3) OR (pgsi9 = 1) OR (pgsi9 = 2) OR (pgsi9 = 3))).
EXECUTE. SORT CASES BY pgsi3 (A).
```

Supplementary Table 70: Regression Analysis - Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.268a	0.072	0.071	1.2483

a Predictors: (Constant), Q.210 Gambling Gambled online or by telephone , Sex, Multimodal gambling

Supplementary Table 71: Regression. Analysis - ANOVA(a)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	332.533	3	110.844	71.13	.000b
	Residual	4305.459	2763	1.558		
	Total	4637.992	2766			

a Dependent Variable: Overall PGSI SCORE

b Predictors: (Constant), Q.210 Gambling Gambled online or by telephone , Sex, Multimodal gambling

Supplementary Table 72: Regression Analysis - Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.231	0.052		-4.47	0.000
	Multi	0.198	0.03	0.136	6.542	0.000
	Sex	0.206	0.048	0.08	4.261	0.000
	Q.210 Gambling Gambled online or by telephone	0.828	0.118	0.146	6.996	0.000

a Dependent Variable: Overall PGSI SCORE

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