Risks and harms associated with online gaming and gambling

Report

POMPIDOU GROUP

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Executive summary

Over the past three decades, technological advancements have revolutionised various aspects of our lives, presenting both advantages and disadvantages. One significant challenge is the addictive use of online technologies and digital devices. This report addresses the excessive and addictive nature of online video games and gambling, now recognised as mental disorders by the World Health Organization (WHO). The risks associated with these behaviours extend beyond individual well-being, impacting physical and mental health, relationships, work, education and finances. Additionally, societal costs are substantial.

Prevalence rates indicate a significant portion of the population is at risk, particularly males, adolescents and young adults. The development of such problems is influenced by the characteristics of the activity, individual traits and environmental factors. The intentional design of online activities to be immersive and addictive exacerbates the issue. Moreover, the convergence of gambling and gaming, with features like paid random outcomes, blurs boundaries and targets vulnerable populations, including children and young people.

Regulation is lacking, especially in the video gaming industry, where measures to reduce excessive gaming among minors have shown limited effectiveness. Financial interests often conflict with efforts to address problem behaviours in gambling. Prevention programmes, especially those targeting adolescents, are essential and should focus on social support and sustained effects. While prevention, treatment and harm minimisation measures exist, their effectiveness for online forms and new populations needs further study and implementation. Co-operation with industries is vital for efficient harm reduction, prevention and intervention. Constant monitoring is necessary to identify emerging challenges and inform timely responses.

Addressing the evolving landscape of online gambling and gaming requires a multifaceted approach involving research, regulation, prevention, treatment and industry collaboration. Prioritising efficient measures across all levels is crucial to mitigate harms to individuals and reduce societal costs associated with addictive behaviours in the digital age.

The present report focuses on the excessive and addictive use of online video games and online gambling, which were declared mental disorders by WHO in the 11th revision of the International Classification of Diseases (ICD-11).

Key findings

- Risks and harms associated with online gambling and gaming include negative consequences for physical and mental health, relationships, work and educational performance, and finances. In addition to the harm caused to individuals, online gambling and gaming problems can be linked to significant economic and societal costs corresponding to a considerable burden of disease in both cases.
- Besides addictive use, the report briefly discusses other challenges related to online gaming and gambling, such as cyberbullying and toxic behaviour within online environments, cybersecurity issues, problems related to streaming and esports (electronic sports), and the convergence of gambling and gaming.
- Prevalence estimates for problem online gambling risk range from 2.7% to 6.5% in the adult population and are about 1% among adolescents despite age restrictions. Male gender and younger age are factors consistently associated with online gambling problems.
- Prevalence estimates for problem online gaming risk range from 1.96% to 2.4% and are higher for males, adolescents, young adults and players from Asia.
- The development of online gambling and gaming problems usually results from the interplay of three interrelated factors: (i) the characteristics of the online activity; (ii) the individual's psychological and biological characteristics; and (iii) the environment's characteristics (for example family and peer-related factors, cultural context).
- The structural characteristics and game mechanics of both online gambling and online video gaming are carefully and intentionally crafted in ways that make the activities as immersive and addictive as possible. Online gambling and gaming providers use persuasive design elements or so-called "dark patterns" to manipulate gamers in ways that serve their own commercial interests and are likely to cause direct or indirect consumer detriment in various ways.
- One of the most striking phenomena is the convergence between gambling and gaming, namely that gambling activities increasingly incorporate video gaming features (the "gamification of gambling"), and video games are increasingly integrating gambling elements in their gameplay (the "gamblification of gaming"), such as paid random outcomes and rewards.
- The integration of gambling elements in online video games is especially problematic as minors are heavily targeted, and regulations to protect them are completely lacking at present.
- The video gaming industry is largely unregulated. The few policy measures that exist do so in Asian countries and mainly aim to reduce the time spent on online games among minors. Research on the efficacy of such measures is rare, although existing research shows that such measures are ineffective.
- Another group of regulations targets "loot boxes" (in-game, consumable virtual items that can be purchased with real money or obtained in-game as rewards, which comprise a random selection of virtual items, with a low probability of desired items being offered). Such measures range from content labels to disclosing loot box drop rates to banning them entirely in specific countries or among minors. Research on the efficacy of such measures is again rare, with existing research indicating failure, inefficient implementation or unclear objectives.
- In gambling (both land-based and online), financial interests are in constant tension with efforts to address problem gambling and broader community harm, and social responsibility efforts are imposed or volunteered predominantly to legitimise the progression to secure more revenue and profit.
- Regulation of online environments has always been challenging. In this global market, several countries and dependent territories have established themselves as attractive hosts for online gambling companies through a combination of lower tax rates, lower licensing and registration fees, less prescriptive regulatory frameworks, and access to European or other markets.
- Given the vast amount of data collected in online gambling regarding individual play behaviour, service providers could potentially identify risk profiles before harm occurs. However, there is no evidence that collecting and analysing such data has led to meaningful interactions with players and reduction in risk or harm.
- There is a lack of research to guide public policy and regulatory approaches to gambling, including research that assesses the impact on the public good of various regulatory frameworks or evidence regarding the effectiveness of specific compliance requirements.

- The treatment modality with the strongest evidence of effectiveness for both online gambling and gaming problems is cognitive-behavioural therapy (CBT). CBT is effective in reducing problem severity in the short term; however, its lasting effect on individuals after treatment is unclear.
- Given the high vulnerability of the adolescent population to both problem behaviours, the most widespread prevention programmes are those targeting this age group in schools. To be successful, such school-based prevention programmes should be psycho-educational, comprehensive and theory-based, with a focus on social support and sustained long-term effects.
- Several prevention, treatment and harm minimisation measures exist for problem gambling; however, their effectiveness for online forms and new populations (for example minors or women) is not sufficiently studied, or they are often not effectively implemented. Similar measures for problem online gaming are much less available, and efficacy studies are rare and often lack methodological rigour.
- Interventions of all kinds need to be based on research results and prepared and executed with the involvement of all potential stakeholders. The most important stakeholders are user groups, the families and friends of players, prevention specialists and educators, health care professionals, policy makers, national governmental bodies, international organisations, legislators, and the gaming and gambling industry.
- There is a great need for more research of better quality, especially to identify efficient measures on all levels, including prevention, treatment and policy.
- Due to rapid technological advancement, online gambling and gaming are continuously changing, posing constant and novel challenges to individuals, families and society. To address this constant change and deal with possible negative consequences, monitoring systems should be established to detect new products, monetisation models, marketing strategies and structural characteristics that may contribute to an increased potential for addiction at an early stage.
- It is of utmost importance to achieve co-operation with both online gambling and gaming industries for efficient harm reduction, prevention and intervention, and to reduce the economic and societal costs deriving from online gambling and gaming.
- Prevention, intervention, and regulatory/policy approaches and measures cannot be "one size fits all". Rather, they should be as specific and tailored to individual needs as possible, while also paying attention to the international harmonisation of responses to such a global problem.

Introduction

Aims and scope

Technological advancements have substantially changed our lives in the past three decades. The spread of personal computers (PCs), the increasing availability of the internet in our homes, and then the rapid advancement of mobile technology have transformed how we live and communicate, and qualitatively changed how we carry out many activities. Thirty years ago, we used the post to communicate regularly with people living far from us, spent a lot of time in different institutions to administer our overhead expenses or conduct banking, used television and radio ads to promote local events, used (paper) maps to navigate while travelling, did our shopping in person, and left our homes to learn or work. Today, if we wish, we can do all of these from our homes using our PCs, laptops or even smartphones. Changes have taken place both on the level of software and hardware. We now use social media to connect with others, for entertainment, to get information, to update ourselves on the news, or just to pass the time. And with the extremely high rate of smartphone ownership, we have everything within arm's reach. This change is absolutely dramatic. We are available 24/7, and most of humanity's knowledge is readily available to us whenever we want to access it.

Unsurprisingly, this incredible and fast-paced change has both its advantages and challenges. Most of the advantages lie in the ease and comfort of communication, administration, entertainment and work, while the most significant challenges include excessive and addictive use of online technologies and digital devices, data safety and privacy issues, and recently, the use of artificial intelligence. The present report focuses on excessive and addictive use and related challenges, which were first noted regarding electronic and video games in the 1980s, and in relation to internet use during the 1990s. These have become the subject of massive research since, and include a list of online activities such as online gaming and gambling, social media use, online shopping, online pornography consumption and others.

Intense research on behavioural addictions, including the excessive and addictive practice of specific online activities, led to the creation of the "Substance-related and addictive disorders" category in the *Diagnostic and statistical manual of mental disorders, fifth edition* (DSM-5) produced by the American Psychiatric Association in 2013. This comprised "Gambling disorder", besides substance-related addictive disorders. In addition, "Internet gaming disorder" was included in the "Emerging measures and models" section, warranting further research (American Psychiatric Association 2013). The other major diagnostic manual, the 11th revision of the International Classification of Diseases (ICD-11) by the World Health Organization (WHO), went a step further in 2019 in creating the "Disorders due to addictive behaviours" category in which both "Gambling disorder" and "Gaming disorder" (i.e. video game playing addiction) were included as official mental health diagnoses. Both conditions have two separate types: "predominantly online" and "predominantly offline" (World Health Organization 2019). Consequently, among potential online addictions, online gambling disorder and online gaming disorder are now considered mental disorders. The present report focuses on these two disorders because of their acknowledgement as mental disorders. However, considering that their addictive feature is only one of the problematic issues of these phenomena, the report also briefly discusses other problems related to online gambling and video gaming. These related problems include excessive use with negative consequences (even if not meeting the diagnostic criteria for disorder or hazardous use), cyberbullying and toxic behaviour within the online environments, cybersecurity issues, problems related to streaming and esports, and the convergence of gambling and gaming.

The current report does not discuss the initiatives aiming to improve health using online applications, either. The spread of the internet opened the way for several online activities and initiatives revolutionising specific fields. For instance, telemedicine, or eHealth, refers to the distribution of health-related services and information over the internet. It allows remote patient and clinician contact, care, advice, intervention, monitoring and remote admissions. Another example is gamification, the strategic attempt to enhance systems, services, organisations and activities by creating similar experiences to those experienced when playing video games in order to motivate and engage users. The present report, although it acknowledges all these and similar online activities and initiatives, does not discuss them, as it solely focuses on gambling and gaming disorders and related aspects.

Public health approach

The public health approach is a fundamental perspective applied throughout this report. It covers a broad range of approaches. The traditional approach deals with disease control, reducing risks and preventing injuries, whereas the newer approach aims to promote health and well-being, create supportive environments, and focus on education and empowerment (Sallnow et al. 2016). By integrating these two approaches, today's public health policies target specific problems in different populations, identify at-risk groups, and provide guidance for prevention to government and community agencies in the public and private sectors to promote health. The main principles guiding public health models are as follows.

1. They take a population-based approach that aims to improve the health of entire communities and populations rather than only individuals (Childress et al. 2002). They examine how the environment affects individual behaviour (Korn and Shaffer 1999) and how society can promote people's health. They also explore why different groups within populations manifest different health outcomes (Browne et al. 2016).
2. They endorse holistic, multidimensional and interdisciplinary perspectives by identifying multiple risk factors across the bio-psycho-social, cultural and financial domains and the interaction between them, and by suggesting solutions and developing effective interventions (Childress et al. 2002).
3. They emphasise the need for a comprehensive and interdisciplinary approach and call for collaboration across various sectors and disciplines, stakeholders, government agencies, industries and healthcare providers (Donkin et al. 2017).
4. They lean on evidence-based data and rely on scientific evidence stemming from population-based observations. This evidence is used to inform policies, decision making and interventions (Wardle et al. 2019).
5. Many disorders and behaviours can be differentiated based on a continuum of severity (Delfabbro and King 2020; van Schalkwyk et al. 2021), so that there is a different intervention strategy for each level.
6. One important aspect of the public health approach is the continuum of care, that is prevention, intervention, treatment, harm reduction and recovery (Korn and Shaffer 1999). However, prevention and harm reduction are the key components (Shaffer et al. 2020). The rationale is that it is more efficient to treat a large number of minor problems before they develop further than to treat major problems, and that a small improvement in health across a large number of people reduces the total burden of disease as well as economic and social costs.
7. They aim for the optimal cost-benefit trade-off to maintain public health (ibid.).

Both gaming and gambling behaviours have been recognised as public health concerns (Abbott 2020; Long et al. 2022; Shaffer and Korn 2002). This report will thus use the public health lens to provide a better understanding of their online manifestations.

Definition of the problems

Online gambling

Gambling is the betting or staking of something of value, with consciousness of risk and hope of gain, on the outcome of a game, a contest or an uncertain event whose result may be determined by chance or accident or have an unexpected result by reason of the bettor's miscalculation. Online gambling is any kind of gambling conducted on the internet. It is also often labelled as remote, internet or interactive gambling.

The definition of gambling disorder according to the DSM-5, as seen in Table 1, can be applied to the online, land-based and mixed forms of the disorder. According to the ICD-11, gambling disorder, predominantly online, is characterised by a pattern of persistent or recurrent gambling behaviour that is primarily conducted over the internet and is manifested by:

1. impaired control over gambling (for example, onset, frequency, intensity, duration, termination, context);
2. increasing priority given to gambling to the extent that gambling takes precedence over other life interests and daily activities; and
3. continuation or escalation of gambling despite the occurrence of negative consequences. The behaviour pattern is of sufficient severity to result in significant impairment in personal, family, social, educational, occupational or other important areas of functioning.

The pattern of gambling behaviour may be continuous or episodic and recurrent. The gambling behaviour and "other features are normally evident over a period of at least 12 months in order for a diagnosis to be assigned, although the required duration may be shortened if all diagnostic requirements are met and symptoms are severe". (World Health Organization 2019)

Besides gambling disorder, the ICD-11 also specifies another category for less severe cases, which still pose considerable harms for the individuals involved:

> Hazardous gambling and betting refer to a pattern of gambling or betting that appreciably increases the risk of harmful physical or mental health consequences to the individual or to others around the individual. The increased risk may be from the frequency of gambling or betting, the amount of time spent on these activities, the context of gambling or betting, the neglect of other activities and priorities, risky behaviours associated with gambling or betting or its context, the adverse consequences of gambling or betting, or from the combination of these factors. The pattern of gambling or betting often persists in spite of awareness of increased risk of harm to the individual or to others. This category may be used when the pattern of gambling or betting warrants attention and advice from health professionals but does not meet the diagnostic requirements for Gambling Disorder. (ibid.)

Online gaming

Gaming refers to playing video games that are played on digital devices (for example PCs, gaming consoles, smartphones, virtual reality devices). Online gaming refers to any kind of video gaming conducted on the internet. The definition of internet gaming disorder according to the DSM-5, as seen in Table 1, most often involves specific internet or online games, but could involve non-internet computerised games (offline games) as well.

According to the ICD-11, the definition of "gaming disorder, predominantly online" mirrors the definition of "gambling disorder, predominantly online", only the term "gambling" is replaced by "gaming" in reference to digital gaming or video gaming. Similarly, the ICD-11 specifies another category for less severe cases of problematic gaming, namely "hazardous gaming". The definition of hazardous gaming mirrors that for hazardous gambling, with the term "gambling" replaced by "gaming".

Table 1. Definitions of gambling disorder and internet gaming disorder according to the DSM-5

	Gambling disorder	Internet gaming disorder (a condition warranting further research, not an official diagnosis)
General description	Persistent and recurrent problematic gambling behaviour leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period:	Persistent and recurrent use of the internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period:
Criterion 1	Needs to gamble with increasing amounts of money in order to achieve the desired excitement.	Preoccupation with internet games. (The individual thinks about previous gaming activity or anticipates playing the next game; internet gaming becomes the dominant activity in daily life).
Criterion 2	Is restless or irritable when attempting to cut down or stop gambling.	Withdrawal symptoms when internet gaming is taken away. (These symptoms are typically described as irritability, anxiety or sadness, but there are no physical signs of pharmacological withdrawal.)
Criterion 3	Has made repeated unsuccessful efforts to control, cut back or stop gambling.	Tolerance – the need to spend increasing amounts of time engaged in internet games.
Criterion 4	Is often preoccupied with gambling (for example having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble).	Unsuccessful attempts to control participation in internet games.
Criterion 5	Often gambles when feeling distressed (for example helpless, guilty, anxious, depressed).	Loss of interest in previous hobbies and entertainment as a result of, and with the exception of, internet games.
Criterion 6	After losing money gambling, often returns another day to get even ("chasing" one's losses).	Continued excessive use of internet games despite knowledge of psychosocial problems.
Criterion 7	Lies to conceal the extent of involvement with gambling.	Has deceived family members, therapists or others regarding the amount of internet gaming.
Criterion 8	Has jeopardised or lost a significant relationship, job or educational or career opportunity because of gambling.	Use of internet games to escape or relieve a negative mood (for example feelings of helplessness, guilt, anxiety).
Criterion 9	Relies on others to provide money to relieve desperate financial situations caused by gambling.	Has jeopardised or lost a significant relationship, job or educational or career opportunity because of participation in internet games.

Note	The gambling behaviour is not better explained by a manic episode.	Only non-gambling internet games are included in this disorder. Use of the internet for required activities in a business or profession is not included; nor is the disorder intended to include other recreational or social internet use. Similarly, sexual internet sites are excluded.
Specify current severity	*Mild*: 4-5 criteria met. *Moderate*: 6-7 criteria met. *Severe*: 8-9 criteria met.	Internet gaming disorder can be mild, moderate or severe depending on the degree of disruption of normal activities. Individuals with less severe internet gaming disorder may exhibit fewer symptoms and less disruption of their lives. Those with severe internet gaming disorder will have spent more hours on the computer and suffered more severe loss of relationships or career or school opportunities.
Specify if:	*Episodic*: Meeting diagnostic criteria at more than one time point, with symptoms subsiding between periods of gambling disorder for at least several months. *Persistent*: Experiencing continuous symptoms, to meet diagnostic criteria for multiple years.	
Specify if:	*In early remission*: After full criteria for gambling disorder were previously met, none of the criteria for gambling disorder have been met for at least 3 months but for less than 12 months. *In sustained remission*: After full criteria for gambling disorder were previously met, none of the criteria for gambling disorder have been met during a period of 12 months or longer.	

Other behaviours related to online gambling and gaming

There are several other potentially problematic online behaviours that are related to gambling and gaming. These behaviours are not necessarily problematic because of their addictive nature but due to other aspects. In this section, we briefly present these behaviours, considering that these are closely related to gaming and gambling. Other problematic online behaviours that are not related to gambling or gaming, however, are not discussed in this report.

Cyberbullying/toxic behaviour

The proliferation of hostile communication and disruptive behaviours in online gaming has recently received scientific attention. Indeed, toxic behaviours, defined as emotions or actions targeted at individuals or teams that weaken team collaboration and enjoyment of social gaming experience, has become an emerging field of cyberbullying research (Kou 2020). Novel forms of peer aggression in multiplayer gaming can include the use of offensive language, cheating, spamming, sabotaging teammates' actions, or aiming at the enemy team

(Blackburn and Kwak 2014; Kowert 2020). Further forms of toxicity involve "griefing" (i.e. intentionally irritating other gamers by destroying buildings created by teammates or stealing others' possessions), sexist or racist comments, and doxing (i.e. sharing private information about a player publicly; Kowert 2020). Toxic behaviours are frequently reported (Zsila et al. 2022), suggesting that aggression in online gaming environments has become a common experience among gamers in multiplayer settings (Monge and O'Brien 2022). According to recent studies, such incidents of aggression generate frustration and anger in gamers (Kordyaka 2018), while some individuals may experience severe psychological distress as a result of toxic interactions (TaeHyuk Keum and Hearns 2022). Similar to victims of cyberbullying, gamers with repeated experiences of toxic behaviours from others report more symptoms of depression and gaming disorder, while gamers involved in toxic interactions from both sides display higher anxiety levels and anger ruminative tendencies (Zsila et al. 2022). Female, younger and beginner players are at a higher risk of becoming targets of toxic behaviours (Lemercier-Dugarin et al. 2021; Türkay et al. 2020). Moreover, members of ethnic or sexual minority groups are also more likely to become involved in toxic interactions (TaeHyuk Keum and Hearns 2022). Playing multiplayer online battle arena (MOBA) and first-person shooter (FPS) games has been associated with an elevated risk of engagement in toxic behaviours (Engelhardt and Bartholow 2013; Zsila et al. 2022), suggesting that increasing prosocial behaviours in gamer communities are needed to improve safety in competitive online gaming environments.

Cybersecurity

While cybersecurity initially referred to computer hacking (Choi and Lee 2017), it today encompasses a wide range of harmful internet-related activities and crimes. This includes different forms of harassment, such as cyberbullying (i.e. the use of technology to harass, threaten, embarrass or target another person), sexting (i.e. sending, receiving or forwarding sexually explicit messages, photographs or videos via digital devices) and defamation (i.e. the action of damaging the reputation of someone) (Choi, Cho and Lee 2019; Ngo and Patemoster 2011), which can also occur in multiplayer gaming environments (Kowert 2020). Studies suggest that spending more time on social networking sites and using multiple platforms generally increases the risk of victimisation through online harassment (Craig et al. 2020; Näsi et al. 2017). This also includes the risk of being enticed into illegal activities such as drug dealing in online games. In terms of frequency and intensity, those engaging in excessive online activity are significantly more vulnerable to such crimes and related harms. These risks are further aggravated by the cyber-routine activities theory, which suggests that both weaker digital security and online lifestyles can explain cybercrime victimisation (Choi 2008).

Social gaming and social casino games

"Social gaming" refers to games that are connected to social media sites or through smartphone applications ("apps"). "Social casino games" are a subtype of social gaming referring to games that simulate gambling activities (for example poker, slots, roulette, bingo, keno, betting). The difference between social casino games and gambling is that they do not require payment to play and do not provide a direct pay-out or monetary prizes. In case of wins, players are awarded virtual currency and move up on leader boards, which can be shared with others for acknowledgement of their success. Users interact directly through gameplay, communicating and sharing outcomes. In contrast with gambling activities, social casino games are not always based on random outcomes and chance but employ algorithms designed to increase user enjoyment and engagement (Sapsted 2013). Users usually get a small amount of virtual currency at the beginning, and they can purchase additional currency to enable further gameplay or an enhanced game experience (for example access to additional game features). However, users are not able to exchange the virtual currency for monetary equivalents (Gainsbury et al. 2017).

Social casino games could be a gateway to gambling activities or otherwise normalise the experience of gambling for young people, including children and adolescents, because they do not employ strict age verification methods and are thus easily accessed by minors. Relatedly, the early onset of gambling and the normalisation of the experience may contribute to the development of problem gambling (King et al. 2016).

Streaming

The live streaming of video games is an activity where people broadcast themselves playing games to a live audience online. The practice became popular in the mid-2010s on the US-based site Twitch.tv, before spreading to YouTube, Facebook and other services. According to Newoo, a trusted source for video games and esports analytics and market research, the games live-streaming audience have crossed the billion mark in 2023. Professional streamers often combine high-level play and entertaining commentary and earn income from sponsors, subscriptions, ad revenue and donations.

The main concern regarding online video streaming services is also excessive and problematic use, which may cause significant harm to individuals (Chen and Chang 2019). Furthermore, it is important to note that this activity is highly popular among children and adolescents who may consider some of the streamers their role models and thus be influenced by them. Concerns have also arisen because gambling-related videos and promotions on major streaming platforms draw more and more viewers, leading to the possible risk of age-inappropriate content access as effective age restrictions are missing from these sites (Koncz et al. 2023).

Esports, esports betting and skin gambling

Esports refers to competitive or professional video gaming where teams or individuals compete against each other in a video game. As with other sports, esports now have organised and sanctioned competitions, such as esports tournaments. The events are hosted by sponsors, have live sports commentary, have a large following audience (particularly via streaming platforms like Twitch.tv and YouTube), and offer big money prizes for the winners. Due to the widespread popularity of competitive video gaming, esports are under consideration for recognition as a legitimate sporting activity (Bányai et al. 2019).

One concern regarding esports is whether it will result in a higher prevalence of problematic gaming (Chung et al. 2019). Research findings are mixed in this regard so far. Participation in esports, especially at the higher levels, is a structured and goal-oriented activity, requiring continuously intense and focused training, which is unlikely to lead to symptoms of gaming disorder. Nevertheless, the huge time investment in esports may demand so many sacrifices (for example neglect of other activities, hobbies and duties) that it can still be harmful to the individual, even without their developing gaming disorder (Czakó et al. 2023).

Another concern relates to esports gambling, and especially "skin gambling". While esports gambling resembles traditional sports betting (the targets of the bets are esports matches or related aspects) and is similarly regulated, "skin gambling" is largely unregulated and, therefore, raises serious concerns. Skins are virtual items players can collect inside a video game to decorate characters, weapons, and so on. The attraction and value of skins lie in their rarity: the rarer the skin, the harder it is to obtain it. Thus, rare skins provide a distinct status within the gamer community. Skins from some games (for example Counter-Strike: Global Offensive [CSGO], Dota 2, Battlegrounds [PUBG]) can be traded for real-life money, and some skins are exchanged for thousands of dollars, creating a skin marketplace worth billions. In addition, skins can be transferred to third-party websites for skin gambling, which means people bet using "skins", usually on the outcomes of esports matches. The main concern with these newer forms of gambling is that they blur the lines between gambling and gaming, potentially placing underage consumers at risk of harm (Gambling Commission 2017).

Other online behaviours not discussed in this report

The ICD-11 comprises the category "Other specified disorders due to addictive behaviours", coded as 6C5Y, besides gambling disorder (6C50) and gaming disorder (6C51). This category reflects the idea that other specific poorly controlled and problematic behaviours may also be considered disorders due to addictive behaviours. The most researched potential candidates include problematic pornography use, problematic social media use, problematic online shopping/buying, problematic smartphone use and cyberchondria (i.e. extreme, unwarranted anxiety manifested through using the internet to search for medical information) (Brand et al. 2022). However, to date, scientific evidence regarding these problematic behaviours has not been convincing enough to result in the establishment of additional diagnoses. Consequently, the present report excludes these topics and focuses on problematic behaviours (i.e. gambling and gaming) and their related aspects that are supported by solid scientific evidence, reflected by their inclusion in the ICD-11 as mental illnesses.

Similarities and differences between gambling and gaming

The main difference between gaming and gambling is that in video gaming, the outcome is achieved by skill, whereas in gambling, it is achieved by chance. In some cases, gambling may also involve skills such as those needed for successful sports betting, but chance is a substantial component of the outcome. While gambling activities are heavily regulated and closely scrutinised in most jurisdictions, games have minimal regulatory requirements and few impediments to implementing new mechanics. Relatedly, another crucial difference is that, in general, gambling (including online gambling) is illegal for children and adolescents, while video games are legal for minors as well.

An important similarity is the behavioural conditioning aspect of both activities, namely the use of intermittent variable-ratio reinforcement schedules (for example when rewards are provided following an unpredictable

schedule) to keep players involved. Other similarities include the use of persuasive design elements in both gaming and gambling services (for example near misses, artificially created last-minute deals and flexible pricing of virtual goods). These are based on numerous psychological ploys that most users may be unaware of and/or unable to understand and that sometimes are even optimised with collecting, tracking and analysing in-game user behaviour (for example which marketing strategies are most effective in driving sales). This gives providers an informational advantage that is exploited at the expense of users. Consequently, these design aspects are arguably predatory in both activities.

Convergences between gambling and gaming

The distinction between gambling and video gaming is increasingly blurring as technology advances. Gambling activities are increasingly incorporating gaming features that focus on skill, social interaction, progress, achievement and competition. Conversely, games have integrated gambling elements, including randomly determined outcomes and rewards, including those that require payment, and increased monetisation of in-game items through legitimate and illegitimate marketplaces (Gainsbury 2019).

Two of the most prominent examples of this convergence are social casino games (i.e. games that simulate gambling activities and are played with virtual currency rather than real-life money) and loot boxes. Loot boxes are in-game consumable virtual items that can be purchased with real money or obtained in-game as rewards, comprising a random selection of virtual items, with a low probability of desired items being offered. Although officially, these virtual items hold no real-world monetary value, desired items provide players with competitive advantages or are highly praised within the gaming community because of their rare status, thereby increasing the social status of their owner. Gambling mechanisms within video games, such as loot boxes, have generated heated debate because these features evade regulations and, according to certain researchers, permit and promote underage gambling (Király et al. 2022). It is assumed that gambling elements within video games can normalise gambling, creating favourable attitudes and encouraging migration to gambling. According to a recent meta-analysis, loot box spending is consistently weakly to moderately associated with both excessive gaming and problem gambling, two potentially clinically relevant associations (Garea et al. 2021). Moreover, research suggests that individuals who purchase loot boxes in video games appear to be at considerably higher risk of psychological distress compared to non-purchasers, regardless of gender, age, other video game-related spending or problem gambling symptoms (Drummond, Hall and Sauer 2022).

Overview of the problem: online gambling and gaming

Assessment

Instruments that are currently most recommended for measuring gambling disorder symptoms include the Massachusetts Gambling Screen (MAGS-DSM-IV subscale) (Weinstock et al. 2007), the Problem Gambling Severity Index (Dellis et al. 2014) and the South Oaks Gambling Screen (Goodie et al. 2013). Of these tests, the latter, originally based on DSM-III gambling disorder criteria, has been utilised most frequently in clinical and scientific contexts. The 20-item South Oaks Gambling Screen has a short 5-item version, too (Room, Turner and Ialomiteanu 1999). Short screens are most useful when approaching individuals with concurrent mental conditions.

As a gambling-vulnerable group, adolescents might require specific questioning targeting their developmental stage. Several questionnaires have been developed for this purpose and are available to use. Among the most recommended are the Canadian Adolescent Gambling Inventory (Tremblay et al. 2010) and the Gambling Addictive Behavior Scale for Adolescents (Park and Jung 2012). The South Oaks Gambling Screen has also been used and revised specifically for the adolescent population (Winters, Stinchfield and Fulkerson 1993) and is in fact the most widely used measure for this particular population.

Based on the most recent systematic review (King et al. 2020), the most psychometrically sound instruments to measure gaming disorder symptoms are the Assessment of Internet and Computer Addiction Scale – Gaming (Wölfling, Beutel and Müller 2012), the 7-item Game Addiction Scale for Adolescents, the Internet Gaming Disorder Scale-9 Short Form (Pontes and Griffiths 2015), the 10-item Internet Gaming Disorder Test (Király et al. 2017) and the 9-item Internet Gaming Disorder Scale (Lemmens, Valkenburg and Gentile 2015). The authors of this systematic review also concluded that the use of a universally recognised instrument on a global level would be of immense value in furthering gaming disorder research.

Epidemiological overview

Given the large variety of assessment instruments, the prevalence estimates of problem online gambling differ considerably. In the most recent systematic review of studies analysing the prevalence of problem online gambling, which collected data between 2006 and 2019, prevalence estimates ranged from 2.7% to 6.5% in the general population, and at its highest reached 29.8% in underprivileged and often uninsured populations (Mora-Salgueiro et al. 2021). A systematic review of studies published between 2000 and 2020 comprising adolescent populations found that between 0.89% and 1% of adolescents exhibited symptoms of problem online gambling.

Similarly to gambling disorder, it was consistently shown that the occurrence of gaming disorder is higher among those who engage in online gaming as compared to those who participate in offline gaming. According to two recent meta-analyses (Kim et al. 2022; Stevens et al. 2021), the worldwide prevalence estimate of gaming disorder was found to range from 3.05% to 3.3%. When evaluating only studies with representative samples, the prevalence estimates ranged from 1.96% to 2.4%. Prevalence estimates for males were higher compared to females, and were higher in Asia than in Europe. In a similar vein, a further meta-analysis conducted on prevalence estimates of gaming disorder in Southeast Asia (Chia et al. 2020) yielded an estimated prevalence of 10.1%. Children and adolescents are one of the most vulnerable groups with, according to a systematic review, a mean prevalence estimate of gaming disorder of 5.5% when clinical samples were included; the estimate in nationally representative samples was, on average, around 2% (Paulus et al. 2018). Nevertheless, it is important to highlight that in the case of uncommon conditions like gaming disorder prevalence estimates are overestimated when assessed using screening instruments (Maráz, Király and Demetrovics 2015; Király, Potenza and Demetrovics 2022).

Demographic issues

Several socio-demographic factors have been found to be associated with problematic online gambling. These factors include not only male gender and younger age, but also belonging to a culturally varied background. Residence with non-biological parents, higher financial status within the family, greater involvement in gambling activities, and a preference for online gambling mediums have also been reported as factors contributing to the increased likelihood of developing problematic online gambling behaviour. Indeed, the prevalence of problem gambling among young individuals is significantly elevated among those who engage in online gambling, with rates five times higher compared to other forms of gambling.

It has also been observed that men tend to display symptoms of gaming disorder more often than women across age cohorts. There is evidence that suggests that the prevalence rates of gaming disorder are greater among younger individuals, particularly teenagers (Stevens et al. 2021). Lower prevalence rates of gaming disorder symptoms have been indicated among individuals with higher levels of education, income and employment in general. However, the socio-demographic data regarding gaming disorder is rather inconsistent, suggesting the need for more research, while acknowledging the potential influence of cultural variations (Király et al. 2023).

Cultural differences

A systematic review analysing data from studies published between 2000 and 2015 found that the prevalence rates of problem gambling were between 2% and 5% in North America. In Asia, the corresponding rates ranged from 0.5% to 5.8%, while in Europe, the prevalence rates of problem gambling fell within the range of 0.1% to 3.4% (Calado and Griffiths 2016). It is important to acknowledge that the predominant types of gambling seen in the aforementioned research conducted in various countries were lotteries, scratch cards, sports betting and gambling machines. However, online gambling games were one of the predominant activities engaged in by individuals experiencing problematic gambling (ibid.). The sociocultural context of this behaviour is broad and various explanations for behavioural differences exist, including traditions of the past, gambling offerings and cultural/national regulation of gambling practices.

The available research indicates that gaming disorder is a matter of worldwide significance and that research on gaming disorder has been undertaken globally. The most recent meta-analysis (Stevens et al. 2021) reveals a higher pooled prevalence estimate of 5.08% for gaming disorder in Asian nations in comparison to a 2.72% estimate of gaming disorder in Europe. Cultural variations seem to play a role in the prevalence of gaming disorder. However, they do not significantly impact the gender ratio across nations, with gaming disorder being more prevalent among men. Correlation between gaming disorder and psychological difficulties was also observed consistently across the various countries, indicating the presence of a universal association (Cheng, Cheung and Wang 2018). Similarly, associations between gaming disorder and factors such as psychiatric symptoms, gaming motives and gaming duration have been confirmed cross-culturally (Király 2018; Király et al. 2018).

Minority groups

Belonging to an ethnic or racial minority group is considered a risk factor for gambling disorder. This evidence has been mainly supported by the fact that gambling disorder has a higher prevalence among those groups. However, it has also been suggested that it is not the racial or ethnic minority status itself but the underlying possible risk factors, such as cultural history, immigration stress and post-immigration adjustment, discrimination and the acculturation experienced by the minority groups that may lead to higher risk of problematic gambling behaviour (Okuda et al. 2016).

Certain characteristics may be elevated among individuals belonging to lesbian, gay, bisexual, transgender, queer and non-cisgender and non-straight (LGBTQ+) communities that contribute to the emergence of addictive behaviours (Stanmyre et al. 2023). These characteristics include social isolation and a higher susceptibility to various mental disorders. However, as belonging to a minority group is not necessarily directly related to increased levels of gambling behaviour, but is perhaps mediated by the aforementioned factors of isolation and so on, the results are inconclusive (Devault-Tousignant et al. 2023). Further research is needed to examine the specific elements that directly contribute to and mediate the vulnerability of minority groups to gambling. Individuals with mental disorders as well as individuals with disabilities are also considered to be disproportionally harmed by gambling (Gáspár-Szilágyi and Pearson 2022).

As with gambling, belonging to an ethnic and racial minority group is considered a risk factor for excessive online gaming in both young adults and children (Carson et al. 2012; TaeHyuk Keum and Hearns 2022).

However, it is important to note that further research is required to draw definitive conclusions. The current body of evidence on the significance of ethnicity is limited, indicating that this issue is not well investigated. Furthermore, the existing studies that do provide data on this subject present conflicting results. While the role of race and ethnicity in the development of gaming disorder may have some significance, doing research on this topic is challenging due to the varying interpretations of research findings across various cultures and the substantial societal influence it carries. However, as in gambling, this possible association might not only be mediated via cultural history, immigration stress, and so on, but also through direct experiences of racism, as this might be an embedded element in certain games. The same reasoning applies for the LGBTQ+ communities, where cyberbullying is one of the reported problems associated with online gaming.

Children and adolescents

The accessibility of online gambling activities has significantly broadened in the last decade, making it an appealing activity for young individuals, especially now that age restrictions are much easier to evade on online platforms. Additionally, the emergence of esports and esports gambling has further contributed to the popularity of gambling among minors. A recent analysis suggested that online gambling has a worldwide prevalence of roughly 5-15% among young individuals aged 12-17 (King et al. 2020). The results of the 2019 European School Survey Project on Alcohol and Other Drugs (ESPAD) study revealed somewhat similar patterns as, on average, 15% of students aged 16 years who had gambled in the last 12 months met the criteria for excessive gambling, compared to 3.8% of all students participating in the survey. In addition, 5% of students who had gambled in the last 12 months met the criteria for problem gambling, compared to 1.4% of all students surveyed (students aged 16 years) (ESPAD 2019).

There is also evidence to suggest that the prevalence of gaming disorder is higher among younger individuals, particularly teenagers compared to adults (Stevens et al. 2021). One aspect to consider is that there is stronger video game engagement among younger persons, who are also more motivated to play video games compared to their older counterparts (Király et al. 2022). Moreover, teenagers exhibit transitional qualities, such as reduced impulse control and novelty seeking, which are recognised as significant risk factors for addictions, including gaming disorder.

In a longitudinal study conducted with a sample of German pupils from Grades 4 to 9, it was found that teenagers at the age of 15 who exhibited problematic gaming behaviours had already manifested multiple risk indicators at the age of 10 (Rehbein and Baier 2013). An important risk factor identified in this study was the experience of being raised in a single-parent household. The observed effect remained consistent over time, even after accounting for parental dedication and supervision. This finding implies that the increased risk experienced by children in single-parent households is not solely attributable to a deficiency in parental nurturing. Rather, it is likely a result of limited time and resources available to single parents, which hinders their ability to offer well-supervised leisure activities for their children. A prospective research study (Jeong et al. 2020) conducted over a period of 12 months, focusing on children aged 9-10 years, revealed a clear association between parental marital conflict occurring at an early stage of the child's life and subsequent manifestation of symptoms related to gaming disorder. Furthermore, a secondary route was also discovered, namely, that the degree of gaming disorder symptoms in children was shown to be impacted by parental marital conflict, leading to negative outcomes such as a poor father–child connection and reduced self-esteem after a period of one year.

The results of the review indicate that implementing parental monitoring and management of gaming activity may be useful in preventing gaming disorder (Bussone et al. 2020). Parents who exercise control over their children's gaming habits are also more inclined to assist them in discovering and engaging in other recreational pursuits. This aspect is of utmost importance in preserving a well-rounded lifestyle and is advocated as a preventive measure (Király et al. 2020).

Childhood maltreatment, such as emotional, sexual or physical abuse, as well as physical or emotional neglect, have been identified as additional risk factors contributing to the development and persistence of gaming disorder. When children are subjected to maltreatment, their parents or carers may neglect to fulfil their fundamental physical and psychological requirements, such as providing nurturing and a sense of belonging. This can result in significant and enduring adverse outcomes, including emotions of guilt and shame, low self-esteem, impaired psychological well-being and compromised social interactions. Young individuals may engage in playing video games as a means of addressing their unfulfilled needs, such as the desire for success or social connection. Additionally, they may use video game playing as a strategy to manage psychological symptoms, such as despair or anxiety.

Subsequent research has shown that a healthy parent–child relationship is protective against gaming disorder while non-supervision, non-discipline and violent discipline are positively associated with it (Cuong et al. 2021). Another study documented that the associations between attachment styles, namely anxious and avoidant styles, and gaming disorder were completely mediated by the presence of stressful experiences (Sung, Nam and Hwang 2020). Moreover, some studies have also acknowledged the significance of the father–child relationship as a potential protective factor against problematic gaming (Schneider, King and Delfabbro 2017; Su et al. 2018; Throuvala et al. 2019).

Aetiology

The aetiology of gambling disorder is complex. The interplaying factors include the following.

1. Gambling-related factors, which pertain to the structural aspects of the gambling experience (see Section 1.7).
2. Biological mechanisms with certain genetic and neurobiological factors putting individuals at risk of online gambling (Potenza et al. 2019). For example, a national community-based Australian twin study (N=4 764 participants) found that genetic factors that contributed to variations in personality characteristics within the normal range accounted for more than 40% of the genetic susceptibility to gambling disorder, with a greater impact seen in females compared to males (Slutske et al. 2013). Another study analysing familial influences on gambling behaviour of N=3 359 twin pairs found that inherited factors were in 34% - 54% liable for individual gambling disorder symptoms (Eisen et al. 1998).

   Gene association studies primarily reported the involvement of the dopaminergic and serotonergic systems in the aetiology of gambling disorder (Gyollai et al. 2014). Several studies have offered genes and their polymorphisms as possible candidates for gambling disorder, including dopamine D1 and D2 receptor genes (DRD1, DRD2) (Sabbatini da Silva Lobo et al. 2007), TaqIA polymorphism of the ANKK1 gene (Gyollai et al. 2014), the transporter-gene promoter region (5-HTTLPR) in men (Perez de Castro et al. 2002), and C allele and C/C genotype of 5HT-2A T102C polymorphism (Wilson et al. 2013). However, to date no genome-wide association studies have confirmed these associations as reaching genome-wide significance (Lang et al. 2016; Lind et al. 2013).
3. Psychological factors including impulsivity (Mestre-Bach et al. 2020), reward and punishment sensitivity (Fauth-Bühler and Mann 2017), escape and coping (as a way to escape negative emotions and cope with already existing emotions, such as depression, anxiety, etc.) (Neophytou et al. 2023), competitiveness (Pace et al. 2021) and novelty seeking are other factors that are considered as having a role in the aetiology of gambling disorder.
4. Social/environmental factors including peer influence (Kim et al. 2017), online gambling communities (Sirola, Kaakinen and Oksanen 2018), cultural characteristics (see sections 1.3/1.4), as well as availability and advertising strategies (Parke et al. 2014).

The aetiology of gaming disorder is a significant area of study within the discipline. Like other forms of addiction, gaming disorder is characterised by the interplay of various factors, which may contribute to its development in some individuals. The components under consideration are as follows.

1. Gaming-related factors, which pertain to the structural aspects of the gaming experience (see Section 1.7).
2. Individual factors, which refer to the personal qualities that influence gaming behaviour. These factors could be dissected into:
   i. biological factors with certain neurobiological and genetic factors predisposing individuals to addictive behaviours;
   ii. psychological factors, such as reward mechanisms, impulsivity, perfectionism and competitiveness, as well as motives for gaming (for example escapism – playing games to avoid everyday problems and difficulties);
   iii. mental health co-morbidities whereby individuals with depression, anxiety, attention-deficit/hyperactivity disorder may be at higher risk of developing gaming disorder.
3. Environmental factors, which include the characteristics an individual might be exposed to, such as peer influence, accessibility, family dynamics, cultural norms (see Section 1.3), online communities, and so on. Individually, none of these factors have the capability to induce a disordered state. Rather, certain combinations of these factors may lead to such a condition. For example, individuals who possess low

self-esteem may engage in the pursuit of in-game achievements and elevated social standing as a means of enhancing their self-worth, potentially resulting in the development of disordered gaming behaviours (Cudo, Kopiś and Zabielska-Mendyk 2019). Similarly, players who struggle with impulse control issues may exhibit heightened vulnerability to the gambling-like features embedded within video games, leading to substantial expenditures on micro-transactions (Spicer et al. 2022).

Structural characteristics of gambling and gaming

The term "structural characteristics" pertains to the attributes of online gambling and gaming that potentially support the initiation, progression and continuity of the activity. First and foremost, studies and surveys confirm online gambling to be more addictive than offline gambling, with some respondents admitting that it is easier to spend money online than in an offline gambling environment. In general, gambling has certain characteristics that may pose a risk of addiction for vulnerable individuals. Among the best-known are the possibility to choose from a large variety of betting options, including different games, bets and wager sizes, or the "near-miss" phenomenon, when the individual falsely believes that they are about to win, but ultimately loses. This encourages them to play more.

Some forms of gambling offer promotions, bonuses and loyalty programmes to attract and retain players. Furthermore, online gambling has certain characteristics that may further increase the risk of gambling disorder:

1. internet access (Fineberg et al. 2018), in the sense that online gambling is accessible from anywhere – for example, from the comfort of the individual's own home;
2. 24/7 availability, giving an opportunity to individuals who gamble to immerse themselves into the experience whenever they like, as online gambling platforms usually never close;
3. a large variety of online forms of gambling activities, including virtual slot machines, table games (for example poker, blackjack, roulette), sports betting, bingo and more;
4. the possibility of engaging in video streams with live dealers, thus giving the individual the illusion of social immersiveness;
5. the opportunity to gamble from the individual's mobile phone;
6. in-play live betting;
7. the possibility to pay for the gambling experience through various formats (for example credit cards, e-wallets), easing the financial transaction;
8. cross-platform play, that is the ability of players using different platforms (for example PCs, smartphones) to play with each other simultaneously (for example poker);
9. anonymity.

Online video gaming activities include structural attributes that render them very alluring to those individuals who play online. These attributes encompass specific elements such as the:

1. persistent nature of the game world;
2. presence of advancement and reinforcement systems;
3. inclusion of social interaction aspects (Billieux et al. 2015; King, Delfabbro and Griffiths 2010; Rehbein et al. 2021).

Massively multiplayer online role-playing games (MMORPGs) have demonstrated a notable proficiency in facilitating operant conditioning through the use of intermittent reinforcement. This form of reinforcement entails the inconsistent administration of rewards. More precisely, players receive insignificant virtual items repeatedly before eventually being granted a substantial reward at an unpredictable time. These virtual incentives have been shown to stimulate the release of dopamine in the brain, leading to a sense of euphoria among players. Additionally, the implementation of variable-ratio reinforcement schedules has been seen to effectively motivate players to continue engaging with the game in anticipation of experiencing similar states and emotions. The efficacy of including and encouraging social interactions between players is also noteworthy in numerous game genres. For example, in the realm of MMORPGs, participants engage in collective endeavours by affiliating themselves with expansive collectives known as "guilds". Concurrently, these affiliations foster profound and significant interpersonal connections among players throughout their immersive gameplay experiences. It should be noted that MMORPGs were most popular in the 2000s. Since then, their popularity

has decreased compared to other (newly emerging) genres, such as "battle royale" games, but they remain a beloved and frequently played type of game across different age groups and genders.

In first-person shooter games, it is common for players to engage in persistent team-based gameplay, whereby they actively collaborate with other players to enhance their individual abilities as well as their collective performance. In addition, character modifications in video games offer individuals the opportunity to generate distinct virtual avatars that may be seen as extensions of their own identities. By means of identification, these avatars can be used to mitigate the incongruity between one's actual and desired self. The compensating mechanism serves as a means for individuals who experience greater levels of body dissatisfaction to enhance their self-esteem and meet their social requirements, all while mitigating the potential onset of social anxiety in the context of video games (Szolin et al. 2022). The aforementioned structural qualities have the potential to enhance engagement and may also facilitate the development of gaming disorder among those who are psychologically vulnerable.

It is important to acknowledge that certain game genres, such as the multiplayer online battle arena (i.e. "MOBA") and the battle royale genres, have gained significant popularity in recent times. Some of these games apply cartoonish design aesthetics and portray violence in a less realistic way so they are seen as appropriate for younger audiences, too (for example Fortnite can be played from the age of 13, in contrast with PUBG, which has more realistic graphics and thus is recommended only from the age of 16). While there is limited research on these genres, it is highly probable that they possess a considerable addictive potential. This can be attributed to the effective integration of various structural elements within these genres (Dreier et al. 2017; King et al. 2019a).

The video game industry has seen significant expansion since its inception, evolving into a billion-dollar global market. Numerous technologies have contributed to this expansion. One significant development was the incorporation of internet technology in video games, leading to the emergence of multiplayer online games. These games enable a substantial number of users from various locations worldwide to engage in simultaneous gameplay inside a shared virtual environment.

Two additional significant advancements from an economic perspective are the proliferation of smartphone utilisation and their emergence as the most readily available gaming platform, with the advent of digital purchasing options inside the video games. The business model of "free-to-play" gaming has rapidly gained significant popularity, emerging as one of the most prevalent approaches (Dreier et al. 2017). This model generates money via micro-transactions, the acquisition of virtual items such as textures/skins, weapons or levels as extra game content. Certain monetisation practices (strategies and methods used to generate revenue or financial gain from a certain product, service or platform) commonly employed in the free-to-play business model can be characterised as predatory due to their utilisation of in-game purchasing systems that obscure or withhold the actual long-term expenses of the activity until players have already made substantial financial and psychological investments (King and Delfabbro 2018).

As noted earlier, the loot box has emerged as a monetisation method that is widely discussed and disputed in contemporary discourse. This refers to a reward system within video games, whereby players have the option to acquire virtual objects that can be consumed. Typically presented as boxes or crates, these items can be obtained by exchanging real-world currency via micro-transactions. Upon opening items, players are bestowed with randomised prizes whose precise worth is uncertain.

The psychological process that underlies micro-transactions is associated with the phenomenon known as the "sunk-cost effect". The concept of sunk costs pertains to the inclination to persist in a certain behaviour due to prior expenditures of financial resources, physical exertion or time. Consequently, in cases when individuals have previously spent money on loot boxes without obtaining their intended outcomes, they are inclined to engage in more transactions to get the specific item(s) they want. Intermittent reinforcement, in the case of loot boxes, refers to the occasional acquisition of unusual and high-quality gifts.

This phenomenon serves as a powerful incentive for gamers to persist in purchasing loot boxes with the expectation of obtaining further desirable rewards. In addition, it is common practice for game developers to provide complimentary loot boxes to players at the beginning of gameplay to facilitate their acclimation to the gaming environment. Furthermore, studies have shown that the release of dopamine occurs throughout the anticipation of a reward, in addition to its release upon actual receipt. In the context of loot boxes, it is often hypothesised that the brain experiences an influx of "joy hormones" during the act of opening a loot box, regardless of its actual content (Brady and Prentice 2021).

The presence of notable parallels between loot boxes and slot machines has elicited significant apprehension, mostly due to the fact that, unlike the majority of slot machines, loot boxes are accessible to individuals in

younger age groups, including children and adolescents. This accessibility raises worries that loot boxes may serve as a potential catalyst for engagement in gambling activities. Several studies have reported a correlation between micro-transaction spending and degree of problematic gambling (Castrén, Järvinen-Tassopoulos and Raitasalo 2021). However, findings on the connection between spending on loot boxes and problematic gambling, as well as excessive gaming, are more consistently aligned.

It may be inferred that players who spend large amounts on loot boxes, often referred to as "whales", are not necessarily affluent gamers, but rather, tend to be associated with problematic use patterns (Close et al. 2021). As a result, it appears that gaming companies, whether intentionally or unintentionally, are generating a disproportionate amount of profit from individuals who are vulnerable, specifically problem gamblers, rather than from customers with higher incomes. This observation carries significant implications for discussions surrounding harm reduction and policy considerations related to loot boxes and other methods of monetisation in video games. Furthermore, some websites promote the use of virtual skins (graphic downloads that alter the visual attributes of in-game objects [for example weapons] or characters) for gambling/betting, therefore intensifying the potential hazards associated with problematic gambling.

Another noteworthy monetisation strategy that might be classified as predatory is the practice of personalising offers and pricing. Companies use in-game behaviour monitoring techniques to gather data pertaining to gamers, encompassing their gameplay patterns as well as their expenditure tendencies (King et al. 2019b). Based on the data provided, behavioural and psychological profiling is conducted, and these profiles are used to customise offers and perhaps adjust prices to particular players. This implies that players are offered the purchase of the same virtual object, which incurs little manufacturing cost, at varying prices. In addition, it is worth noting that games have the potential to use coercive strategies to incentivise monetary expenditures.

One approach that is often used is the utilisation of "limited time offers". This strategy aims to sway gamers into making purchases by creating a sense of artificial scarcity and fostering the belief that the opportunity will not be accessible in the future. Another predatory marketing strategy game designers may apply is when the system recognises a specific in-game item (for example a weapon or armour) that holds potential significance for a novice player and subsequently identifies an experienced player who possesses the said item and proceeds to pair the two players together in a match. The intention behind this pairing is to allow the novice player to observe the effectiveness and efficiency of the aforementioned item, thereby motivating them to make a purchase in order to enhance their prospects of achieving victory in subsequent matches. When combined with other aspects, such as specific environmental and individual factors, these structural characteristics may lead to the onset, progression and maintenance of gaming disorder.

Many of the listed structural characteristics and game mechanics can be viewed as persuasive design elements or so-called "dark patterns". These refer to design practices commonly found in online user interfaces, including online gambling and gaming, that lead individuals to make choices that often are not in their best interests, but generally serve the commercial interests of the provider (for example individuals spending more money on gambling or on micro-transactions than originally intended) (5Rights Foundation 2023). According to the Organisation for Economic Co-operation and Development (OECD) Committee on Consumer Policy, "Dark commercial patterns are business practices employing elements of digital choice architecture, in particular in online user interfaces, that subvert or impair consumer autonomy, decision-making or choice. They often deceive, coerce or manipulate consumers and are likely to cause direct or indirect consumer detriment in various ways, though it may be difficult or impossible to measure such detriment in many instances" (OECD 2022).

Risks and harms related to online gambling and gaming

Consequences for physical health

The evidently immersive quality of online gambling is further substantiated by findings indicating that individuals who engage in online gambling are more prone to reporting disturbances in their physical health compared to those who participate in gambling activities at a physical establishment (Gainsbury, Parke and Suhonen 2013; Hing et al. 2014; Siemens and Kopp 2011). Sleep quality, a sedentary lifestyle, poor nutrition, physical neglect, as well as neglecting chronic health conditions are reported consequences of problem online gambling. A study conducted in Australia surveyed a total of 3 760 individuals to investigate the relationship between at-risk gambling, alcohol misuse and sleep patterns. The findings revealed that at-risk gambling was significantly connected with alcohol misuse, which in turn was linked to insomnia. On the other hand, gambling problems alone were shown to be more closely associated with worse sleep quality (Thorne et al. 2021).

While gaming is a leisure activity or a personal interest for many individuals, there is a subset of gamers who encounter adverse symptoms that have detrimental effects on their mental and physical well-being, leading to impairments in their daily functioning. Prolonged engagement with screens and digital media can have a direct, strenuous impact on the visual system (possibly related to the necessity for prolonged near-term adaptation, but also related to the mechanical consequences of prolonged attention to the screen, for example dry-eye syndrome). In addition to this, poor posture and prolonged physical immobility (Mylona et al. 2020), obesity, as well as wrist, neck, back and elbow pain, skin blisters, calluses, weakness or numbness in the hands (peripheral neuropathy), and even blood clots can be the negative consequences of gaming disorder.

Mental health consequences and co-occurring disorders

Research has shown an elevated prevalence of physical and mental health problems, such as smoking, substance use and mood disorders, among those who engage in online gambling in comparison to those who gamble offline. Thus, gambling disorder is often found in conjunction with anxiety and mood disorders, post-traumatic stress disorder and schizophrenia. Moreover, it is commonly observed that individuals with gambling disorder often exhibit personality disorders, such as antisocial, borderline and narcissistic personality disorders (Shaffer and Korn 2002). The identification of the exact causes of the co-occurring disorders may be challenging. However, genetic factors have been considered and it has been seen that other forms of psychopathology precede gambling disorder in 75% of instances (Kessler et al. 2008; Potenza et al. 2019).

Existing research indicates that, as with other forms of addiction, co-occurring disorders are often seen in individuals with gaming problems, rather than being an exceptional occurrence (Kuss, Pontes and Griffiths 2018). Depression, depressive symptoms, generalised anxiety disorder and anxiety symptoms have consistently been associated with gaming disorder (Ji et al. 2022; Ostinelli et al. 2021). Individuals who are afflicted with symptoms of depression and anxiety may exhibit a tendency to seek solace in online games as a means of evading the challenges of daily life and difficult emotional states. In these instances, engaging in gaming functions as a means of temporary relief rather than a genuine resolution to difficulties that potentially results in disordered gaming. This, in turn, may exacerbate psychopathological symptoms owing to compromised cognitive abilities, diminished productivity and reduced social interaction. In a similar vein, an additional significant worry pertaining to gaming disorder and the coexistence of depression is the increased susceptibility to experiencing thoughts of suicide (Sharman et al. 2022; Yu et al. 2020).

Attention-Deficit/Hyperactivity Disorder (ADHD) is another co-occurring disorder that has been extensively researched (Koncz et al. 2023). There are several variables that might potentially lead to the development of gaming disorder in persons who exhibit signs of ADHD, including decreased social and emotional functioning as well as impulsivity. Moreover, individuals diagnosed with autism spectrum disorder who engage in video game playing had a higher propensity to display signs of gaming disorder, as shown by the varied impact sizes among studies (Murray et al. 2022). Indeed, both conditions exhibit impairments in impulse control and response inhibition, which have been associated with the potential development of gaming disorder (Mazurek and Engelhardt 2013). The direction of these relationships remains uncertain due to the prevalent use of cross-sectional methodology. Longitudinal studies are urgently required in this field. However, it is quite probable that the link is reciprocal.

Substance use

Gambling disorder often co-occurs with behavioural and substance use disorders. Individuals diagnosed with gaming disorder tend to have higher rates of substance use throughout their lifetime, with alcohol use disorder (73%) and drug use disorder (38%) being especially common (Petry, Stinson and Grant 2005). The Health Survey for England and the Scottish Health Survey data sets included information on gambling in England and Scotland for the years 2012, 2015 and 2016, with the total sample reaching more than 40 000 respondents. This survey found a clear relationship between health habits and problematic online gambling, as seen by the association between smoking, drinking and instances of problematic online gambling.

In general, research suggests a consistent positive association between online gaming and substance use disorders. Furthermore, there have been documented instances of co-occurring substance use in individuals with gaming disorder symptoms (Horváth et al. 2022). However, the association between online gaming and substance use is not always straightforward. For example, in a 2015 ESPAD study (Strizek et al. 2020) analysing differences in the relationship between gaming and substance use across 35 countries, patterns across European countries were inconsistent. In high-income countries, there was a tendency for the correlation to be negative. The observed negative correlation between online gaming and drug use may be justified based on the premise that computer game engagement often occurs inside the home environment, where parental supervision is more prevalent, whereas substance use tends to occur in settings with less parental oversight. Also, negative correlation between online gaming and substance use may be due to the fact that one compulsive activity is replaced by another. This correlation further substantiates the hypothesis that the use of digital media might potentially be a contributing element to the decrease in drug use among teenagers in several Western European countries (Kraus et al. 2020). On the other hand, the ESPAD study revealed a significant correlation between problem gaming and drug use in nations characterised by a low GDP per capita (Strizek et al. 2020).

Interpersonal consequences: families and social relationships

The detrimental effects, including both psychological and economic aspects, of gambling disorder on individuals' family members are often observable, and the participation of family members is often crucial in the process of recovering from gambling disorder (Hodgins, Shead and Makarchuk 2007). However, several studies have shown that the significant others of the problem gambler often demonstrate a limited knowledge or comprehension of the latter's gambling issue (Corney and Davis 2010). Furthermore, a number of research studies have shown that spouses encounter various repercussions at the individual, familial and societal levels in relation to problem gambling. One notable outcome, documented in many studies, is the heightened amount of stress experienced by the significant others of persons with gambling addiction; financial loss and subsequent economic ruin may occur in addition to impact on the broader familial structure. The inclusion of a family member often yields favourable treatment results in individuals with gambling disorder, leading to a decrease in relapse and dropout rates (Jimenez-Murcia et al. 2017).

According to a comprehensive analysis of 14 studies investigating family factors in adolescent problematic gaming (Schneider, King and Delfabbro 2017), it is evident that the primary emphasis has been placed on parent–child dynamics, specifically pertaining to aspects such as affection, discord and maltreatment. These studies consistently indicate an inverse correlation between the relationship quality and the extent of problematic gaming behaviour. Positive family functioning, which encompasses effective parent–child communication, shared social activities, a sense of togetherness, acceptance, secure emotional bonds, warmth and emotional expression, has been identified as a protective factor against problematic gaming. Conversely, poor family functioning, marked by conflicts, hostility and the presence of demanding, authoritarian, neglectful or permissive parenting styles, has been identified as a risk factor for problematic gaming (Nielsen, Favez and Rigter 2020). It is acknowledged that family conflicts may arise because individuals engage only in gaming activity, rather than fulfilling their duties in other areas of life, including taking care of the needs of their families.

Society at large

Some suggest that gambling problems and the damage they cause constitute a substantial worldwide public health concern. The quantification of gambling-related harm further strengthens the argument for addressing gambling as a matter of public health (Abbott 2020b). The accessibility of gambling online fuels the problem further – for example, approximately 50% of the games available on Facebook include elements of gambling (Jacques et al. 2016). Research suggests that the burden associated with gambling disorder surpasses the damage associated with substance use disorder and other prevalent chronic physical conditions (Browne et al.

2017; Browne et al. 2020). Thus, the adverse consequences associated with gambling disorder are significant and disproportionately affect marginalised and underprivileged populations (Abbott 2020a).

To date, no estimation of the burden of problematic use of the internet (including online gaming) is available. However, addictive, hazardous and harmful gaming can be linked to significant economic and social costs (Rumpf, Effertz and Montag 2022). There is an urgent need to assess the costs arising from problematic internet use in terms of mental and physical health, social functioning, productivity loss, brain development and unsafe use associated with accidents, along with the burden for the growing number of persons affected and economic costs for society (Fineberg and Potenza 2023).

Legal issues

The legal considerations surrounding online gambling can be categorised into several key areas: (i) the acquisition of licences and adherence to regulatory frameworks; (ii) the implementation of age and geographical restrictions; (iii) the safeguarding of consumer rights and protection; (iv) compliance with Anti-Money Laundering and Know Your Customer regulations; (v) the preservation of data privacy; (vi) the establishment of responsible gambling initiatives; and (vii) the ability to adapt to evolving regulations governing online gambling, particularly in diverse jurisdictions.

Individuals who gamble online have identified several disadvantages associated with it. These include the ease of spending money online, the high level of convenience it offers, and concerns regarding the safety of their accounts. Additional concerns revolve around the potential impact of easy access to online gambling on the prevalence of gambling behaviour, particularly among technologically proficient young individuals. This heightened accessibility may contribute to an escalation in the occurrence and frequency of disordered gambling (Gainsbury and Wood 2011). These aforementioned issues have prompted recommendations to either outlaw or restrict internet gambling in order to mitigate potential negative consequences (Gainsbury 2015).

High levels of involvement in gambling activities may be achieved by the integration of psychologically manipulative elements, such as the use of a variable ratio of reinforcement, the presentation of losses disguised as wins, and the cultivation of a feeling of control (see more in Section 1.7) (Fineberg et al. 2018). Additionally, the encouragement of the perception of "near misses" has been identified as a contributing factor in maximising engagement in gambling activities (Murch and Clark 2016). Hence, researchers have emphasised the importance of directing attention towards the interplay between the individual engaging in gambling activities and the gambling product itself, with a particular emphasis on its implications for public health (ibid.).

The legal concerns regarding online gaming may be categorised under: (i) age limitations; (ii) virtual assets and in-game transactions; (iii) safeguarding privacy and data; (iv) cyberbullying and harassment; (v) regulation of gambling components; (vi) cross-border gameplay; and (vii) compliance with regulatory frameworks. Nevertheless, as with online gaming, apart from implementing regulatory measures, it is imperative to incorporate screening methods and public education programmes with the objective of reducing possible harm.

Current responses to online gambling and gaming

Regulatory approaches and policies

Models and frameworks that map the evolution of gambling legalisation and regulation describe a linear progression beginning with gambling being perceived as an immoral, illegal activity, followed by a middle stage where state-owned monopolies apply profits to good causes, resulting in gambling as a legitimate form of entertainment for private profit (Kingma 2004; Korn 2000; McMillen and Wright 2008; Munting 1989; Sauer 2001; Young and Markham 2015; Zborowska et al. 2012). Some models articulate the stages of this progression and the implications at each stage for public policy, licensing and regulatory requirements (Gainsbury, Angus and Blaszczynski 2019; Kaburakis and Rodenberg 2012; Laffey, Della Sala and Laffey 2016; Miers 2015; Rohsler 2022), resource allocation, consumer responsibility (Alexius 2017) and the role of gambling in the larger economy (Gandullia and Leporatti 2019; Nickerson 1995; Selin 2016).

Throughout this progression, financial interests are in constant tension with efforts to address inherent consumption risks such as problem gambling and broader community harm, and social responsibility efforts are imposed or volunteered predominantly to legitimise the progression towards more revenue and profit (Cosgrave 2010; Fiedler, Kairouz and Reynolds 2021; Marionneau, Egerer and Nikkinen 2021; Planzer, Gray and Shaffer 2014; van Schalkwyk et al. 2021, 2022). In this context, the industry's adoption of a social responsibility mandate may be understood as the quid pro quo for a government's shift from a restricted to a liberal market (Miers 2015, 2016).

Existing models assume that jurisdictions move in one direction through the progressive stages over time. This assumption does not fit with recent events in jurisdictions such as Norway, the United Kingdom and Australia, where there have been significant shifts from competitive liberal markets to more restrictive regulatory approaches following extensive political and public attention to the negative effects of gambling on society. This suggests the need for a more dynamic model that accounts for shifts in societal discourse surrounding the regulation of gambling (Kingma 2004; Marionneau, Egerer and Nikkinen 2021), for example by applying a flexible, learning perspective to improve regulatory governance arrangements (McMillen and Wright 2008).

Regulation of online environments continues to provoke issues around borders and sovereignty. In this global market, several countries and dependent territories have established themselves as attractive hosts for online gambling companies through a combination of lower tax rates, lower licensing and registration fees, less prescriptive regulatory frameworks and access to European or other markets (Zborowska et al. 2012). However, jurisdictions have increasingly asserted their right to enforce their own licensing and regulatory framework (Häberling 2012; Kaburakis and Rodenberg 2012; Laffey, Della Sala and Laffey 2016; Myllymaa 2017), rather than accept that of an operator regulated at the point of supply. Whether online gambling is regulated at the state or national level, geofencing is being used to delineate legally licensed versus black market offerings.

Regulation in online environments should offer unique advantages. All players are identified, preventing anonymous play, and the data available include play-by-play behaviour and source of wealth and income. This combination of data was part of the promise of legalising online gambling, which operators would be able to analyse to identify risk before harm occurred. In reality, while many operators have invested heavily in player risk analytics, including the use of artificial intelligence, there is no evidence demonstrating that such analytics have led to meaningful interactions with players and reduction in risk or harm. Some regulators have added a duty of care to their compliance regime and provided explicit guidance for customer interaction along with programme evaluation to demonstrate the effectiveness of their harm minimisation initiatives.

A content analysis of gambling literature reveals a lack of research on the regulatory and policy environment in comparison to other hospitality sectors, despite a steady increase in policy changes affecting the gambling industry (Repetti 2011). Overall, there is a lack of literature to guide public policy and regulatory approaches to gambling, including research that assesses the impact on public good of various regulatory frameworks (Gainsbury and Wood 2011) or evidence regarding the effectiveness of specific compliance requirements. Rather, jurisdictions have tended to copy and paste from those regarded as leaders in this area.

More current literature includes a call for co-operation between regulators of financial and gambling markets to address similar and overlapping consumer risks (Weidner 2022). Two trends dominate the recent literature. First, there are longstanding and accelerating calls to apply a public health perspective to the regulation of gambling (Abbott 2020; Bowden-Jones et al. 2019; Korn 1999; Lacy-Nichols et al. 2023; van Schalkwyk et al. 2021; Wardle et al. 2021). Second, there is pressure to address the evidence regarding the uneven burden of gambling harm on those who are economically disadvantaged (Hahmann et al. 2021; Ortiz and Hernandez 2019), with an emphasis on financial harm (Muggleton et al. 2021) and an affordability approach to harm reduction (Nower and Glynn 2022), as adopted by regulators in the UK and Netherlands.

In general, it can be claimed that, in contrast with the highly regulated gambling industry, the video game industry is largely unregulated. A few exceptions exist. In Asian countries like China and South Korea, gaming disorder was considered a public health threat long ago, and as a consequence of this recognition, several regulatory attempts have taken place in the last decade. One of the most prominent regulations involve so-called "shutdown systems", when governments oblige game service providers to block access to their online games at specific times in the day for specific groups of users, usually minors.

China, in 2019, introduced a prescribed limit of 1.5 hours of online games on weekdays and 3 hours on weekends, with no gaming allowed during the night (from 10 p.m. to 8 a.m.) for children and adolescents younger than 18 years. In 2021, the restrictions became even harsher: minors can only play online games for 1 hour between 8 p.m. and 9 p.m. on Fridays, Saturdays, Sundays and public holidays. Similar but much less severe restrictions have also been applied in Thailand, Vietnam and South Korea (Király, Browne and Demetrovics 2022). These regulations are based on the assumption that gaming time is the main problem, and that by forcefully cutting down gaming time, gaming disorder can be prevented.

The China Game Industry Research Institute has released a report that claims that the problem of minors' addiction to online games has been largely solved through these regulations (Global Times 2022). However, according to a recent study by a group of independent international researchers, these policies may be ineffective at changing behaviour. In practice, they may not reduce heavy gaming among minors as intended (Zendle et al. 2023), despite the claims of the research institute. If that is the case, assumptions regarding the effectiveness of policies aiming to reduce time spent gaming (Colder Carras et al. 2021; Király, Browne and Demetrovics 2022) seem to be unfounded. Nevertheless, additional studies are necessary to explore the effectiveness of these measures.

Another regulatory attempt by the Chinese government in 2007 was the so-called "fatigue system" or "anti-online game addiction system". Online game providers were obliged to monitor their users' playtime and discourage minors from playing for more than three hours by gradually decreasing in-game rewards (for example experience points) if they played for longer. To the best of our knowledge, no reliable efficiency studies have been conducted. Therefore, the impact of this measure is largely unknown. However, according to a study (Zhan and Chan 2012), many stakeholders have argued that the regulation may fail on the practical level as nothing stops children from using their parents' or other adults' IDs. Also, children may switch accounts or switch among different online games to bypass daily time restrictions. Consequently, such regulations also seem rather ineffective.

Another set of regulations concerns loot boxes. Playing for loot boxes closely resembles gambling, and there is an intense debate surrounding this feature. In recent years, in the US and Canada, numerous class-action lawsuits have alleged that loot boxes constitute "unlawful gambling" and that game developers, game publishers and even platforms should be responsible for the supposed harm caused by loot boxes in mobile or other electronic games. However, all these lawsuits have failed on different grounds. For instance, it was accepted by the courts that virtual items in the games won from the loot boxes are not "things of value" as they cannot be "cashed out" to gain real money (Philips 2023; JDSUPRA 2022).

In contrast with North America, in Europe, the Belgian Gaming Commission declared that such mechanisms constitute gambling under existing law and "banned" loot boxes. More specifically, non-compliant companies implementing paid loot boxes without a gambling licence could be prosecuted. However, according to a recent empirical study examining the 100 highest-grossing iPhone games in Belgium, 82.0% continued to generate revenue from loot boxes, and the majority of these games were rated suitable for individuals aged 12+. Consequently, it seems that the Belgian "ban" on loot boxes has not been effectively enforced.

Another loot box-related regulation concerns loot box drop rates. In 2017, China's Ministry of Culture introduced a regulation that requires video game developers to reveal the odds of players receiving items from loot boxes. The law has led to numerous big companies revealing the drop rates for rare items in their loot boxes. Games releasing odds on treasure chests and loot boxes included Perfect World, Dote 2 and League of

Legends (Gartenberg 2017). To the best of our knowledge, no studies have been conducted to test the degree of compliance by companies with the law or the efficiency of this policy regarding the number of users with gambling problems.

The video game industry has two self-regulatory authorities responsible for assigning age and content ratings to video games in North America and Europe, namely the Entertainment Software Rating Board (ESRB) and the Pan European Game Information (PEGI). In 2020, the two authorities introduced the "In-Game Purchases (Includes Random Items)" and the "Includes Paid Random Items" labels, intended to ensure consumer protection by informing them more efficiently about the randomised nature of certain in-game purchases. The same label has also been adopted by the International Age Rating Coalition (IARC) and thereby assigned to games available on digital storefronts, such as Google Play Store. However, it has been argued that this measure is flawed and misleading because it provides insufficient information to consumers (for example when these "Random Items" become purchasable, information about how much they cost, whether they affect gameplay or are merely cosmetic, and whether they can be exchanged for real-world currency or not) while giving the impression that consumer protection is improved and ensured.

The ESRB and PEGI deny the potential gambling-related harms of in-game random reward mechanisms and refuse to categorise them as gambling or simulated gambling, which would be the appropriate step to protect consumers, especially minors. The "Random Items" label is an inferior substitute, much less capable of protecting children (Xiao 2021). Relatedly, a recent empirical study found that the majority of popular games containing loot boxes on Google Play Store (whose age rating system is regulated through IARC) did not display the label, while Apple App Store does not even implement a warning label for the presence of loot boxes (Xiao 2023). This means that in the case of mobile games, where micro-transactions and random reward mechanisms are most prevalent, consumers cannot even rely on these imperfect labels. Consequently, it is argued that existing age rating systems should be improved to achieve their purpose satisfactorily.

Treatment

Psychological interventions are considered to be evidence-based in the treatment of gambling disorder (Cowlishaw et al. 2012; Ribeiro, Afonso and Morgado 2021). The treatment modality most supported by evidence is cognitive-behavioural therapy (CBT). Behavioural and cognitive methods consist of trigger control, exposure in imagination and in vivo, problem-solving training, social competence training, activity planning, cognitive restructuring and relapse prevention.

CBT is effective in reducing gambling severity, frequency and intensity. However, its lasting effect on individuals following treatment is unclear (Bergeron et al. 2022; Pfund et al. 2023). CBT has proven to be effective in reducing co-occurring anxiety and depression in gamblers and improves their quality of life (Higueruela-Ahijado et al. 2023). There is not enough evidence on the superiority of individual over group settings in CBT. However, group treatment appears to have some potential benefits, as it utilises group cohesion and social support, promotes observational learning, and is also time and cost-efficient (Ribeiro, Afonso and Morgado 2021).

Another psychological approach with positive results in the treatment of gambling disorder is motivational interviewing (MI) (Cowlishaw et al. 2012, Yakovenko et al. 2015). MI consists of reflective listening, summarising and promoting self-efficacy. The therapist seeks to reflect on the patient's ambivalence, and together, they review the advantages and disadvantages of the change under consideration and, conversely, the advantages and disadvantages of staying with the current behaviour. MI is often successfully combined with CBT approaches (Ribeiro, Afonso and Morgado 2021).

A further effective and brief intervention is personalised feedback interventions (PFIs) (Peter et al. 2019). PFI is a way of supporting the patient in reflecting on their situation and confronting the facts. On this basis, the patient is supported in deciding what they want to do about the situation and, if desired, is given practical recommendations on how to achieve change. PFIs are primarily effective when combined with MI interventions (ibid.). In treatment programmes utilising CBT, MI, PFIs or a combination, there is a positive relationship between the number of sessions and treatment outcomes (Pfund et al. 2020).

Despite efforts to validate the application of the described interventions via the internet, we have little high-quality evidence on the effectiveness of internet-based psychological interventions in the treatment of gambling disorder (Boumparis et al. 2022; Park 2022), and the same applies to mobile applications (McCurdy et al. 2023).

There is no on-label pharmacological treatment indicated to treat gambling disorder. Due to the lack of good quality studies, the use of psychopharmaceuticals in the treatment of gambling disorder should be approached with caution. Opioid antagonists (Dowling et al. 2022) and atypical antipsychotics appear to be the most

promising in reaching short-term improvements in gambling symptom severity. There is some evidence that mood stabilisers are effective (Goslar et al. 2019). However, the research so far has yielded inconclusive results.

There is growing evidence of the effectiveness of non-invasive brain stimulation (NiBS) methods on a reduction of craving for gambling (Del Mauro et al. 2023; Zucchella et al. 2020). Among NiBS, the two techniques mainly used are transcranial magnetic stimulation (TMS) and transcranial direct current stimulation (tDCS). TMS is a neurostimulation technique that uses a strong and short magnetic pulse over the patient's head. The pulse induces neuronal firing by suprathreshold neuronal membrane depolarisation.

tDCS is a neuromodulatory technique that delivers a weak constant current through two electrodes, an anode and a cathode, placed over the scalp. Unlike TMS, the intensity of tDCS is not strong enough to elicit action potentials but influences potential membrane excitability by depolarising or hyperpolarising it. The effect of these methods on actual gambling behaviour is unknown due to the lack of high-quality studies, and results related to craving reduction should also be viewed with caution (Del Mauro et al. 2023).

Availability of treatment for gaming disorder varies significantly from country to country. Few specified clinics or treatment centres are available in Western countries, while they are increasingly prevalent in East Asia, especially in China and South Korea, where gaming disorder is considered a public health crisis (Zajac, Ginley and Chang 2020) and a lot of effort is made on the governmental level to combat it. In Western societies, besides the few specialised treatment facilities, those with gaming problems can turn to professionals working in general psychiatric or addiction treatment services.

The most frequent psychological treatment for gaming disorder is CBT, which may be complemented with strategies that alter/improve (i) maladaptive cognitions (for example attitudes, beliefs, biases) that initiate and maintain problematic gaming; (ii) coping strategies used to deal with undesirable mood states (for example depression) and withdrawal symptoms when not gaming; and (iii) social skills. In addition, therapies aim to establish new behavioural routines, including physical and social activities, to replace gaming activities. For adolescents and emerging adults, it is recommended that caregivers or other family members also attend therapy (King, Wölfling and Potenza 2020).

Given that the co-occurrence of other mental disorders is the norm rather than the exception in the case of gaming disorder, it is always important to assess and treat co-occurring psychiatric issues. The most prevalent co-occurring psychiatric problems are depression, generalised anxiety disorder, ADHD, substance use, autism spectrum disorder and social anxiety (Király et al. 2023). Besides psychotherapy, treatment sometimes involves pharmacotherapy (or a combination of these), especially for treating comorbid disorders.

The medications most typically used in these treatments are drugs treating either depression, anxiety or ADHD (for example methylphenidate, atomoxetine). Although treatment is available in most of the countries where the problem exists, there is still a serious lack of effectiveness studies. Studies demonstrated high efficacy of CBT in shorter-term gaming disorder symptom and depression reductions, and moderate efficacy in shorter-term anxiety reduction. However, more studies with follow-up are needed to assess longer-term gains (Zajac, Ginley and Chang 2020). Another crucial question concerns the aim of the treatment as this varies between total abstinence and controlled gaming. Research suggests that abstinence may be more effective but more high-quality research is necessary to confirm this.

Self-help initiatives

The most historically anchored and well-known self-help initiative for people experiencing gambling problems is Gamblers Anonymous (GA). GA was founded in the 1950s. It is an international mutual aid fellowship comprising self-help groups based on the 12-step model as a theoretical framework. Members are encouraged to follow a specific programme to resolve their problems (Browne 1994). GA applies similar principles to their meetings as Alcoholics Anonymous (AA) (Shaji et al. 2021)). The emphasis on patience, the use of the Serenity Prayer as a way of achieving acceptance of financial problems and realities, and the absolute affirmation of the "compulsive gambler" identity are identified as important aspects of GA recovery (Schuler et al. 2016).

Despite the existence of convincing evidence for the efficacy of AA in the treatment of alcohol use disorder (Kelly, Humphreys and Ferri 2020), research addressing the efficacy of GA is limited, and the results of the studies are inconsistent (Schuler et al. 2016). Other fellowships based on and closely related to GA are Gam-Anon, which is a fellowship for family members and friends of gamblers, and Gam-A-Teen, which is a similar programme for the children of gamblers (Shaji et al. 2021). Further research employing randomised controlled design with larger samples and controlling for the impact of attendance on GA outcomes is needed to thoroughly evaluate the effectiveness of this programme (Schuler et al. 2016).

There are also other self-help initiatives organising support groups for people suffering from problem gambling, based on different principles. For example, Gambling Addiction Norway (GAN) offers information regarding gambling-related issues and support conversations with members of the organisation. GAN welcomes both problem gamblers and affected others, and does not endorse any specific set of beliefs (Syvertsen et al. 2020). However, there is no scientific evidence about the effectiveness of these self-help groups in reducing gambling disorder symptoms.

Other ways by which problem gamblers can help themselves to reduce or stop gambling, or self-management strategies, are self-exclusion programmes, workbooks (usually based on CBT), and money or time-limiting strategies (Matheson et al. 2019). Self-exclusion programmes, for example, seem to be effective in reducing gambling problems (Gainsbury 2014). The problem, however, is the low uptake of these programmes among gamblers (Gainsbury 2014). Also, limit-setting measures could be effective. However, this strategy suffers from several limitations (Harris and Griffiths 2017). Self-guided treatments, usually in the form of workbooks, demonstrate no or little effect on gambling severity, financial loss and frequency of gambling and are inferior to face-to-face treatment modalities (Goslar M. et al. 2017).

Some self-help initiatives are available for individuals suffering from gaming disorder, as well as their family members. Online Gamers Anonymous® is one of the oldest initiatives available (www.olganon.org/home) and was founded by the mother of a gamer suffering from gaming disorder who committed suicide. Another popular self-help initiative is Game Quitters (https://gamequitters.com), founded by a former gamer with addiction problems. Although numerous anecdotal success stories indicate the effectiveness of these self-help groups, they generally lack research-based evidential support (King, Wölfling and Potenza 2020).

Prevention

The prevention of online gambling harms requires a multifaceted approach. Educational and awareness programmes, self-exclusion programmes, cognitive-behavioural therapies, technological interventions and social support networks have been identified as effective strategies. However, it is essential to tailor interventions to the specific needs and characteristics of individuals and to continue evaluating their long-term effectiveness (Ortega-Barón et al. 2021). Further research is warranted to explore innovative prevention strategies that harness technological advancements and target vulnerable populations.

Given the high vulnerability of the adolescent population, the most widespread prevention programmes are those targeting this age group and being carried out in schools. To be successful, such school-based gambling addiction prevention programmes should be psycho-educational, comprehensive and theory-based, with a focus on social support and sustained long-term effects. These programmes should provide students with the knowledge and skills necessary to resist the temptation to gamble and help them develop a better understanding of the impact of gambling on their lives.

According to systematic reviews (Lozano and Rodrigues 2022; Oh, Ong and Loo 2017; Throuvala et al. 2019), the key components of gambling addiction prevention programmes are the following.

1. Early education and awareness:
    i. providing age-appropriate information about the risks and consequences of gambling;
    ii. raising awareness about the signs of gambling addiction and problem gambling;
    iii. promoting responsible attitudes towards gambling and fostering critical thinking skills.
2. Life skills development:
    i. teaching skills such as decision making, problem solving and impulse control;
    ii. enhancing students' ability to manage emotions, cope with stress and resist peer pressure;
    iii. providing tools for effective communication and assertiveness to prevent gambling-related harm.
3. Interactive and engaging activities:
    i. incorporating interactive activities, group discussions and role-playing exercises to promote active engagement and understanding;
    ii. utilising multimedia resources, videos and real-life case studies to illustrate the consequences of gambling addiction.

4. Empathy and empowerment:
    i. encouraging empathy towards individuals struggling with gambling addiction;
    ii. empowering students to take an active role in preventing and addressing gambling-related issues in their communities;
    iii. promoting a supportive and non-judgmental environment where students feel comfortable seeking help and supporting their peers.
5. Parental involvement:
    i. engaging parents and caregivers in prevention efforts through informational sessions or workshops;
    ii. providing resources and guidance for parents to monitor their children's online activities and set healthy boundaries;
    iii. collaborating with parents to reinforce consistent messages about responsible gambling behaviours at home and in school.
6. Partnerships and collaborations:
    i. collaborating with local community organisations, mental health professionals and gambling addiction support services to provide comprehensive prevention programmes;
    ii. establishing partnerships with relevant stakeholders to ensure the sustainability and effectiveness of prevention efforts.

By incorporating these key components, school-based gambling addiction prevention programmes can effectively raise awareness, equip students with the necessary skills and promote responsible attitudes towards gambling, ultimately reducing the risk of gambling-related harm among youth.

Prevention studies targeting video game playing have mainly involved school-based programmes to train adolescents in healthier internet and digital device use habits. The efficacy of selective prevention is promising but warrants further empirical attention. On an international scale, the formal recognition of gaming disorder has provided a basis for developing structured prevention responses. For instance, the South Korean model is a good example of a co-ordinated response to a public health threat, with strong government initiatives and long-term strategic plans at all three levels of prevention (i.e. universal, selective and indicated). In the West, on the other hand, prevention programmes are mostly developed and led by non-profit organisations and private enterprises (King et al. 2018).

Harm reduction and harm minimisation in gambling and gaming

Harm minimisation refers to efforts to reduce harm related to consumption. Policy makers and regulators specify the target of harm minimisation as minors and other vulnerable populations, with "vulnerable" sometimes defined narrowly as those with a gambling disorder but increasingly, more broadly as anyone who experiences gambling-related harm.

Gambling operators are required to prevent any consumption by minors through rigorous age checks, buttressed by regulatory policies that ensure operators cannot benefit financially from failures to identify minors, favourable consideration for prompt self-reporting, zero-tolerance enforcement, and financial and/or licence-related penalties.

Harm reduction tools for adults initially focused on two extremes: at one end to ensure informed consent through education of all gamblers, and at the other end, to react to those who developed a gambling disorder by offering self-exclusion programmes, the effectiveness of which is well-supported in the literature (Harris and Griffiths 2017; Hopfgartner et al. 2023).

However, the goals of harm minimisation have evolved to address a continuum of risk (Harris and Griffiths 2017). This evolution includes a shift to harm reduction that supports safer gambling for all (Langham et al. 2016; Quilty, Watson and Bagby 2015), the need to prioritise harms to affected others (Browne et al. 2017), the importance of prioritising financial harms (Haeusler 2016; Hilbrecht and Glynn 2019) and a growing recognition that incentivising ideal consumer behaviours (Giles et al. 2014; Lynagh, Sanson-Fisher and Bonevski 2011; Mantzari et al. 2015; Sutherland, Christianson and Leatherman 2008) can increase the effectiveness of harm reduction efforts.

So, how the harms can be reduced and minimised?

Education and awareness – Education and awareness are widely understood as fundamental to making gambling safer for all (Parke et al. 2015; Shaffer et al. 2019). Operator efforts have matured in this area, with branded programmes designed to help players understand games, odds, myths, risks and strategies for gambling more safely. Behaviour change, however, remains elusive across most player safeguards and prevention efforts (Gray, Shaffer and LaPlante 2018; Gray et al. 2019)

Responsible gambling (RG) tools – Operators increasingly provide RG tools for gamblers to self-monitor and control their activity. Limit-setting tools (time and money) promise much (Auer, Reiestad and Griffiths 2020; Auer and Griffiths 2013; Broda et al. 2008; Tabri, Hollingshead and Wohl 2019 but have not yet been widely adopted (Nelson et al. 2008; Shaffer et al. 2019). They may be more effective if players are educated on their use and presented with tools upon registration or first deposit (Nower et al. 2020), and incentivised for ongoing use (Hollingshead and Wohl 2022). Operators may use breaks in play to disrupt the gambling session and raise awareness of approaching time or spending limits; these have been proven effective when combined with effective messaging, such as pop-ups, that require an active response by the player (Hopfgartner et al. 2023; Tabri, Hollingshead and Wohl 2019). Gambling operators frequently offer self-assessment tools despite little research on their use in gambling settings (Monaghan and Blaszczynski 2010; Parke et al. 2015). However, evidence from other fields supports the value of this type of self-monitoring, suggesting the need for well-evidenced, standardised self-assessment tools.

Funding and withdrawal policies – Policies related to customers' financial behaviours overlap with anti-money laundering efforts that focus on identifying customers' sources of wealth and affordability (Nower and Glynn 2022). Gambling on credit is clearly associated with risk (Muggleton et al. 2021). However, options for cash/credit access are increasingly difficult to trace, suggesting the need for state-level action on the use of personal credit and opaque payment methods to co-ordinate harm minimisation and anti-money laundering objectives. Financial institutions should be engaged to provide enhanced self-management tools for those who gamble, for example hard limits on gambling spend, along with enhanced protections for joint account holders such as jointly agreed thresholds for spending alerts and limits to reduce the spread of harm to affected others. Gambling operator policies may include deposit limits commensurate with affordability, rapid processing of withdrawals and no withdrawal reversals, automatic prompts to pay out the full amount of winnings rather than encouraging players to spend them, and the use of declined deposits as a sign that a customer may be experiencing financial difficulty.

Identifying risk behaviour – The shift to proactive measures to identify risk was part of the promise of legalising online gambling, whereby operators could analyse play-by-play behaviour to spot potential for harm before it occurred. Player analytics can identify individual risk behaviours but also deepen understanding of player segments and trajectories (Finkenwirth et al. 2021; Perrot et al. 2018; Ukhov et al. 2021), so operators can customise responses to player needs. Player analytics are beginning to include non-play behaviours that provide clear signs of risk, such as those related to communication (Haefeli, Lischer and Haeusler 2015) and payment (Ghaharian et al. 2023; Haeusler 2016).

Responding to risk behaviour – The area of least maturity in online gambling environments and the target of recent regulatory guidance is responding to players who exhibit risk. Automated methods, such as well-designed messages that include self-appraisal, and normative and personally relevant content, are effective (Auer and Griffiths 2022; Bjørseth et al. 2021; Caillon et al. 2021; Celio and Lisman 2014; Gainsbury et al. 2015; Newall et al. 2023). However, further evidence on the effectiveness of messages to change behaviours is needed. Personal customer interactions are increasingly used to complement automated messages, with several jurisdictions incorporating innovative strategies for players who exhibit repeated or escalating risk (Auer and Griffiths 2022). This requires operators to have an RG case management process that monitors escalation of risk for individual customers, a process that is often lacking in the current online environment.

Broader stakeholder engagement – Evidence suggests that harm minimisation requires converging efforts from operators, regulators and other stakeholders to reduce harm, with practical strategies that target all gamblers, gamblers who exhibit risk, and affected others. Furthermore, the most efficient and effective method of accomplishing this is to focus on financial harm. This will require regulatory leadership, operator innovation and broader stakeholder engagement beyond the traditional boundaries of responsible gambling.

Harm reduction has been a widely accepted intervention strategy in the case of substance use disorders for several decades (for example opioid agonist treatment or needle exchange programmes), and as we have seen above, interventions aiming to provide a safer gambling environment and minimise gambling-related harm have also been introduced by many service providers all over the world. In contrast, in the case of video

gaming and gaming disorder, harm reduction practices are rare. The main reason is that the video gaming industry, in general, is largely unregulated (except in some Asian countries), and the industry itself tends to deny the fact that video games may cause harm.

Nevertheless, several potential harm reduction practices appear in the scientific literature, and some are implemented on regulatory levels in certain countries or in the case of specific video games. Two of these measures were discussed in Chapter 5, Section 1: (i) the introduction of the "In-Game Purchases (Includes Random Items)" and the "Includes Paid Random Items" labels by the two self-regulatory authorities, the ESRB and PEGI and (ii) the regulation or initiative to reveal loot box drop rates. In the case of the latter, it is important to note that this can only be effective and trusted if monitored by independent bodies rather than solely stated by the game developers/publishers themselves, who could easily falsify drop rates to maximise their profits by deceiving players. According to a letter to the editor (Xiao 2021) in one popular addiction-focused journal, "The protection of consumers from the potential gambling-related harms of random reward mechanisms requires legal restrictions on their sale in the short term and the adoption of ethical game design by the industry in the long term." Unfortunately, it is plausible to assume that the gaming industry will not stop applying "predatory" monetisation techniques or will apply more ethical game design without being compelled to by legal regulations.

Another potential harm reduction technique often discussed among researchers is the application of in-game warning messages pointing out the risks of excessive use. This could be done in several formats, for instance by loading screen tips (for example as in World of Warcraft) or pop-up messages. Moreover, game developers could use data obtained through in-game behaviour tracking to identify players at risk of excessive game playing and choose to target only them with such pop-up messages. Based on the efficiency of cigarette warning labels, it may be assumed that such warning messages could be useful in raising awareness related to the possible detrimental consequences of excessive gaming (Király et al. 2017).

Conclusions

Technological advancements have substantially changed our lives in the past decades. Besides the countless benefits of these advancements, we face severe challenges and negative consequences. Among these are the risks of excessive and addictive use of specific online activities such as online gambling and video gaming. While the majority of individuals gamble and play video games as a recreational activity in a healthy manner, a minority experiences addiction-like symptoms. Based on decades of research, gambling disorder and gaming disorder are now recognised mental health conditions, according to WHO. Individuals suffering from these disorders experience functional impairment and considerable harm across multiple life segments (personal, social, educational/work-related), resulting in considerable costs at individual, familial and societal levels.

As a result of technological advancement, gambling has changed both in quantitative and qualitative ways. In contrast with traditional land-based gambling (for example casinos and gambling arcades), online gambling activities are now easily accessible through mobile devices, attracting new population groups, such as youth and women. Furthermore, among other problems, regulations (for example age verification) are easier to evade in online gambling than in offline forms, attracting a large number of minors. A striking phenomenon is the convergence between gambling and gaming, namely that gambling activities increasingly incorporate video gaming features (the "gamification of gambling"), and video games are more frequently integrating gambling elements in their gameplay (the "gamblification of gaming"). The latter is especially problematic as minors are heavily targeted, and regulations to protect them are completely lacking at the moment.

Several prevention, treatment and harm minimisation measures exist for problem gambling. Still, their effectiveness for online forms and new populations (for example minors, women) is not sufficiently studied, or they are often not effectively implemented. Similar measures for problem gaming are much less available, and efficacy studies are rare and often lack methodological rigour. Furthermore, video gaming is among the most popular hobbies across all age groups and genders, with children, adolescents and young adults overrepresented among frequent players. Even if video games, and especially online multiplayer games, have a high addictive potential, we have to emphasise that the majority of gamers play them in a healthy and balanced way without experiencing any harm, or even experience benefits. The situation is similar to gambling in that gambling can also potentially become a serious addiction, although in most cases it remains a recreational activity.

It is of the utmost importance to avoid stigmatising these activities. Labelling them problematic will be difficult to justify for non-problematic recreational players. In fact, stigmatising these activities will result in further negative consequences for players already having problems. In addition, it will work against these individuals seeking therapeutic help and generally lead to the problem becoming hidden. It will also reduce the likelihood of the industry's potential involvement in solving the problem.

There are several areas that require more research attention, especially in relation to informing the design of interventions. For example, although both gambling and video gaming are less popular among females than males, female users are similarly at risk of becoming addicted. However, we have insufficient knowledge of the specific characteristics and needs of female gamers and gamblers. More research is also needed into whether abstinence is the only desired therapeutic goal for gaming disorder, or whether use in moderation can also be set as a goal in certain cases (for example in less severe cases such as those falling under the "hazardous gaming" category according to the ICD-11). One of the most important challenges is the lack of data regarding effective measures at all levels, including prevention, treatment and policy. More research with better quality is necessary, including longitudinal studies, studies with clinical samples, and studies investigating minors and women.

Another important challenge is that while the gambling industry is regulated, and several measures have been introduced to mitigate the potential harm caused by problem gambling, the video gaming industry does not acknowledge the potential risks associated with its products and completely rejects responsibility at the moment. Therefore, possible steps to mitigate harm through policy actions should be considered and thoroughly researched. Policy measures should target the gaming industry to make them accept their role in the development of the problem and to take at least as much responsibility as the gambling industry. Furthermore, even though evidence-based policies are preferred and needed in the long term, due to the clear harm video games can cause to vulnerable individuals, certain measures could be implemented even before their efficacy is fully proven to avoid delaying action.

Although addiction is the most emphasised problem with regard to internet use and online activities, it is certainly not the only one. The internet and mobile technology, including online gambling and gaming, are platforms for a series of other potentially harmful phenomena such as different types of toxic behaviours, cyberbullying, cybercrime and cybersecurity, which should also be thoroughly investigated and addressed by research and policy making.

Due to rapid technological advancement, online gaming, gambling and related phenomena (for example skin betting) are continuously changing, constantly posing novel challenges to individuals, families and society as a whole. To address this constant change and deal with possible negative consequences, monitoring systems should be established to detect new products, monetisation models and structural characteristics that may contribute to an increased potential for addiction at an early stage. Relatedly, increased research and monitoring of new forms of marketing targeting vulnerable groups are also much needed.

As mentioned earlier, it is of utmost importance to achieve co-operation with both gambling and gaming industries. Besides the issue of regulation, the data collected by the industry should also be made available for research purposes and to inform prevention and harm reduction measures. Through behaviour tracking (i.e. collecting data on users' online behaviour), the industry has acquired data that can be used to identify players at risk and could be effectively used in harm reduction, prevention and intervention at all levels. Therefore, the industry should be incentivised or even compelled to share such data with researchers to help identify vulnerable players and/or create safer games and gambling tools.

To summarise, while we can observe many aspects of the problem at the moment, further efforts are needed to understand its complexity. Moreover, the development of necessary responses is still at a very early stage and needs to take into account the complexity of the phenomenon. There are significant differences in how problem behaviours are manifested and how they are perceived, along with several key factors such as age, gender or culture. For instance, children and adolescents are specifically vulnerable, and treating the problem in their cases involves their parents and other family members more actively than it would in the case of adults. Furthermore, different generations tend to perceive these activities very differently; what is commonplace and natural to younger generations may feel very unnatural, scary or upsetting for older people. Women may have qualitatively different experiences while playing online games or gambling online compared to men, which again calls for group-specific interventions. Culture is also a crucial factor that should be fully considered. In sum, prevention, intervention and regulatory/policy approaches and measures cannot be "one size fits all". Rather, they should be as specific and tailored to individual needs as far as possible, while keeping in mind the need for the international harmonisation of approaches to a global problem.

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Excessive online gaming and online gambling can result in significant risks and harms, including addiction, social isolation, financial debt and psychological distress.

As online gaming and gambling addiction have become public health concerns, various policies, responses, programmes and interventions have been developed to address these issues. These initiatives involve regulatory policies, public-awareness campaigns, self-exclusion programmes, counselling and treatment services, and industry initiatives. However, continued research and evaluation are necessary to assess the effectiveness of these initiatives and identify areas for improvement.

The Pompidou Group has been mandated to address related challenges under its 2023-2025 work programme. This new area of work was initiated by setting up the Expert Group on Online Addictions, which consists of professionals from several member states. The expert group was entrusted to provide an initial study to better understand addictions facilitated by technologies and online practices. As a result of their work, the report "Risks and harms associated with online gaming and gambling" was finalised in 2024. The report focuses mainly on online gaming and gambling because of their acknowledgement as mental disorders by the World Health Organization in the 11th revision of the International Classification of Diseases (ICD-11). However, considering that their addictive feature is only one of the problematic issues of these phenomena, the report also briefly discusses other problems related to online gambling and video gaming, such as excessive internet use, cyberbullying and toxic behaviour within the online environments, cybersecurity issues, problems related to streaming and esports, and the convergence of gambling and gaming.

The Pompidou Group is the Council of Europe's International Co-operation Group on Drugs and Addictions. Its core mission is to contribute to the development of multidisciplinary, innovative, effective and human rights and evidence-based drug and addictions policies in its member states. This is achieved in a unique way, where the Group links policy, practice and science and focuses especially on the effective implementation and evaluation of programmes and interventions.

As an enlarged partial agreement of the Council of Europe, it is open to the member states as well as to non-member states from Europe and other parts of the world. As of 1 June 2024, the Pompidou Group gathers 41 countries from Europe and beyond.

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