

Sports Betting and Prevention of Problem Gambling: Proposals for Regulatory Changes in Brazil and the Use of Responsible Gambling Algorithms

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Abstract

Growing access to the internet and smartphones and social isolation during the COVID-19 pandemic are related to the expansion of the online gambling market, which increases the risk of addiction for vulnerable players, but also the possibilities of controlling and preventing negative externalities and harm to gamblers. This study aims to examine mechanisms for preventing pathological gambling with reference to sports betting, considering recent changes in Brazilian legislation. Based on a literature review and documentary research and on the experience of the United Kingdom, it intends to propose improvements in Brazil's current legislation in order to prevent problem gambling which can also be useful for other jurisdictions that face similar problems. In particular, the adoption of players monitoring algorithms is analyzed, proposing possible models and data that can be used by regulators from different jurisdictions in defining the policies and rules to be followed by companies that exploit this activity.

Keywords

Online Sports Betting, Pathological Gambling, Right to Health, Responsible Gambling Algorithms

1. Introduction

Increasing access to the internet, the dissemination of smartphones, the development of information and communication technology and, more recently, social isolation in the context of the COVID-19 pandemic are related to the growth of

the online gaming and lottery sector. In the last 20 to 30 years, a variety of factors had already converged to shift gambling from a “cottage industry” to a billion-dollar expanding global activity comparable to extractive industries like intensive mining and native forestry (Adams, 2020: p. 5). Governments interested in the tax revenue it generates, local entrepreneurs interested in exploiting it, international gambling corporations aiming at consolidating their power and even community organizations that receive funding from it (Adams, 2020: pp. 5-6). Technological and social changes added more momentum to this trend. On the other hand, despite its potential for addiction and the correlated harms, gambling is object of far less attention from researchers and also from the World Health Organization, if compared to alcohol, tobacco and illegal substances (El-Guebaly, 2020: p. xviii).

This study will focus on sports betting in Brazil. The activity has been legal since 2018 and between 2021 and 2023 there was a 160% growth in the number of websites dedicated to fixed-odd bets (Lungui, 2023). Brazil would already be the third largest sports betting market in the world, behind only the United States and England (Exame, 2023) and Brazilians expenditures on online gaming and betting, between January and November 2023, reached US\$ 11.1 billion, equivalent to R\$ 54 billion reais (Jornal do Comércio, 2024). Legal provisions in different jurisdictions tend to focus on tax collection, licensing of the activity by the State and protection of the integrity of the sector, preventing manipulation of results, fraud and its use for money laundering. A relevant aspect to consider, often neglected, is protecting the health of bettors through the prevention of pathological gambling.

Online platforms pose a greater risk of addiction for vulnerable people due to their availability, 24/7. In 2023, Brazil changed its legislation, through Law 14,790/2023, starting to provide for a policy of responsible gambling and prevention of pathological gambling, through prohibitions, informative measures and restrictions on advertising in the sector. The new law also made legal betting not related to actual sports events, but whose results depend on a random generator of numbers, symbols, figures or objects, defined by the games’ rules. Such online games have been called online casinos and will be mentioned briefly in this study.

Law 14,790/2023 also provided that the Ministry of Finance, the regulator and supervisory body, should regulate the obligation for operators to develop effective systems and processes to monitor bettor activity in order to identify harms, including potential ones, associated with gambling. The possibility of using algorithms to identify players at risk and to prevent harm, such as debt and dependence, opens up. Based on factors indicative of risk, such as time spent online, amount spent and other behavioral tracking data, such as increases in the amount bet even after successive losses (chasing behavior), protective measures and nudging can be adopted, such as sending messages advising setting expenditure limits, referral to medical and psychological care services, self-exclusion from the platform and even compulsory exclusion.

The objective of this study is to examine how the use of responsible gambling algorithms can contribute to preventing pathological gambling, based on a lite-

rature review and the experience of other countries, notably the United Kingdom, seeking to propose improvements to Brazilian legislation. The discussion may also be useful for other jurisdictions that face similar problems. Regulators in several countries, such as Spain and the United Kingdom, require online gaming operators to monitor player behavior and identify risk of problem gambling (Auer & Griffiths, 2023a). In the United States, a 2018 Supreme Court decision struck down the federal ban on state authorization of sports betting provided for by the Professional and Amateur Sports Protection Act (1992), thus opening the way for the practice (Murphy vs National Collegiate Athletic Association, 584 U.S. 453). Commercial sports betting revenue has increased 12-fold in the US since 2019 (Lopez, 2024).

This paper aims to highlight the harms of online gambling and also the potential of algorithms that track players' data for initiating prevention and harm reduction actions on the part of operators. Considering that substantial research is dedicated to outline the risks related to algorithms (O'Neil, 2016; Zuboff, 2019; Bar-Gill et al., 2023), the present discussion main contribution is to focus on benign aspects of such tools. In this regard, the experience of the United Kingdom is of utmost importance, since gambling companies that operate there have been using tracking algorithms for some time and in 2023 changes to the country's legislation were proposed and the use of such tools was subject to public scrutiny (United Kingdom, 2023a). Before examining UK's contributions, it was considered necessary to present a brief history of gambling in Brazil, since the country's experience is different from others in which gambling has been legal for more time, what led to the absence, before 2023, of legal provisions regarding responsible gambling. Current Brazilian legislation will then be discussed and finally the main findings presented in a White Paper published in the UK in 2023 regarding gambling regulation (United Kingdom, 2023a).

2. A Brief History of Gambling in Brazil and Some Harms It Entails

In Brazil, the first betting houses appeared in the 18th century, aimed at the elites (Instituto Brasileiro de Jogo Responsável—IBJR, 2024). Lotteries were authorized by the Portuguese Crown (Brazil was then a Portuguese colony), mainly intended to maintain charitable activities, such as *Santas Casas*, orphanages and prisons. In 1892, after the Proclamation of the Republic, in Rio de Janeiro, *Jogo do Bicho* was created. It was intended to increase revenue from the zoo maintained by Baron João Batista Viana Drummond. When purchasing a ticket to the zoo, the visitor received a card with the image of one of the twenty-five animals from a list. At the end of the day, there was a draw and whoever had the card with the image of the drawn animal won a cash prize. The game still exists today, even though it is illegal.

In the first half of the 20th century, the Federal Lottery was created, promoted by the State. Casinos, which had been banned in 1917, were legalized in the 1930s. In 1946, they were banned again, a situation that continues today, even though

clandestine gaming and betting houses have always existed. Exploring games of chance constitutes a criminal offense, according to art. 50 of Decree-Law 3688/1941. Decree-Law 204/1967 regulated the Federal Lottery as a Union service, carried out by Caixas Econômicas (Federal Union owned banks). The 1988 Constitution, in its article 22, number XX, granted the Federal Union the exclusive competence to legislate on lottery systems. The Brazilian Supreme Court, in September 2020, ruled that the Union, despite having the normative competence to legislate on the subject, does not have the exclusivity of exploration, admitting that States of the Federation also explore their own lotteries. Horse racing is permitted, in accordance with Law 7291/1984.

Regarding bingo, through Law 8672/1993, called Lei Zico, it was excluded from the general ban on games of chance. The idea was to use the revenue to be collected from the game to finance sporting activities. In 1998, after a series of corruption scandals (University of Kent, 2016: p. 12), the so-called Pelé Law (Law 9615/1998) changed the competence to regulate and authorize the activity, which was transferred to a federal entity. Law 9,981/2000 provided that the licenses previously granted would no longer be renewed, pointing to the closure of the sector and, in 2007, after new scandals, including bribery of judges who authorized the operation of bingos through court decisions, the Supreme Court ruled in a binding precedent that it is up to the Union, and not States and Municipalities, to regulate consortiums and sweepstakes, including bingos and lotteries, which led to the ban of the activity once again.

In 2018, through Law 13,756/2018, fixed-odd bets were made legal. The Government failed to issue regulations in the following years, resulting in a regulatory limbo. Companies operating in Brazil followed regulations from other countries, such as Malta and Curaçao, and did not collect taxes, a situation that began to change in 2023, when, initially through Provisional Measure 1182 and, later, through Law 14,790, new rules came into effect. In Brazil, thus, before Law 13,756/2018, modified by Law 14,790/2023, with the exception of lotteries operated by the Union or States, bingos for a brief period of time, from 1993 to 2007, and horse racing, gambling was legally banned. A draft bill is currently in discussion in Brazilian Congress aiming to make casinos, bingos and Jogo do Bicho legal under federal licensing (Agência Senado, 2024). In Brazil, since there was a general ban on gambling, there were no regulations concerning responsible gambling.

Social determinants influence how gambling will affect individuals, such as age, gender, religion and cultural traditions, socioeconomic status and legal jurisdictions. Internet gambling raises additional concerns, due to its availability 24/7, difficulties in controlling access, relative anonymity of users and operators, lack of physical boundaries between jurisdictions and disparity in the locations of players and providers (El-Guebaly, 2020: p. xviii).

Gambling addiction has similarities and differences in relation to addiction to chemical substances (Long, 2023: p. 410). Studies indicate that in both cases the dependent person experiences cognitive impairments and cravings due to the

absence of the substance or the game (withdrawal crisis). The danger of relapse for addicts in rehabilitation exists in both situations. Pathological gambling, however, does not affect the brain tissue as much as dependence on alcohol and illegal substances does. Literature shows that gambling may lead to behavioral addiction and harms related to loss of money, of time and psychological impacts. Among them are indebtedness, loss of savings, bankruptcy, conflicts in relationships, neglect, divorce, feelings of distress and regret, loss of sleep, lack of self-care, reduced performance in work and school, violence, criminality and higher suicide rates (Browne, 2020: p. 16). Thus, not only the gambler but also families and society are affected. And even though only a minority of users tend to suffer in most severe manners and may be considered problem gamblers, there is a larger number of people who may experience mild to moderate harm (Browne, 2020: p. 17). Social costs and negative externalities elicited by gambling are also unfairly distributed, affecting poorer and more disadvantaged people (Browne, 2020: p. 20). Thus, regulation must focus on social impacts of gambling, and not only on individual ones. It is worth mentioning that the availability of data on gambling and its consequences is important to guide and to assess public policy and that there is no updated information on the subject in Brazil.

Auer and Griffiths (2023b: p. 1274) point to a prevalence of 0.5% of the adult population, although there is a worldwide variation ranging from below 1% to 5% - 6%. There is evidence that patients diagnosed with Parkinson's disease and treated with dopaminergic agents have a greater tendency to become pathological gamblers (Kontoangelos et al., 2018: p. 350). The prevalence of gambling disorder in such patients was reported of ranging between 2% to 8% against 1% in the general population. Drugs like Pramipexole seem to affect the dopaminergic reward system leading to changes in the risk and reward assessment activity. This finding must lead to a better assessment of the vulnerability of Parkinson's disease patients in relation to other gamblers. In Sub-Saharan Africa, Sichali et al. (2023: pp. 141-143) point to the lack of studies on harms caused by gambling and propose measures to control advertising and to protect young people and children. More than a discourse on responsible gambling, effective measures are needed on the part of companies in order to establish safeguards against the harms of online gambling. Poverty and informal work lead many young people to look to gambling as a source of income and subsistence. Studies must also take into account age, gender, religion and cultural aspects, in order to identify how they affect consumption and gaming habits. A neocolonial logic was also perceived in the expansion of gambling in Sub-Saharan Africa, since there is a tendency of exploiting in African countries sports that were also preferred in their previous colonial powers. A study conducted by Elie et al. (2022: p. 422) in Parakou, northern Benin, pointed to the high prevalence of pathological gambling in the population and concluded that factors like age, access to online gambling, access to video games, exposure to gambling advertisement, having gambling friends and debt accumulation are related to the condition. The authors also found that there is a link between

pathological gambling and anxiety and depression. In Brazil, a recent survey conducted by *Anbima (2024)*, an association of financial market entities, found that more people placed at least one bet online in Brazil in 2023 (14% of the population or 22 million people) than invested in the stock market (2% of the population). Otherwise, 40% of these 22 million people consider betting as an opportunity of making money in times of need and 22% of them think online betting is a kind of investment. Such figures highlight the need for financial education as well as protective and informative measures aiming at emphasizing that gambling must be considered an entertainment and that there is high risk of losing money.

Rama (2016: p. 28) mentions that, in Europe, the Green Paper on online gambling in the internal market, from 2011, pointed out that the regulation of the activity must consider the free movement of people and goods, freedom of establishment and free provision of services, but also consumer protection, in the face of compulsive gambling and addiction, protection of minors and vulnerable people, protection of public order, protection against fraud and manipulation of results and also money laundering. This requires Member States of the European Union to adhere to the aforementioned principles and also to create online gaming supervisory authorities, as well as administrative cooperation between member countries. Portugal would be among the countries that belatedly regulated online gambling, in 2015, with pioneers being, among others, Spain (Madrid Region), Malta and the United Kingdom.

Pathological gambling, then, leads to loss of money and health, and affects disproportionately more vulnerable people, especially financially. In order to cope with such consequences, attention must be given to education, with an emphasis on financial education, and to protection of children and young adults, by means of informative actions and nudging, as well as forbidding access of minors to games. Greater access to information and to specialized treatment in national healthcare systems are other steps that can be taken. To ban advertising, non-certified gambling platforms and sponsoring of sports events by gaming corporations are also measures that seem to be necessary and must be discussed. Although it seems unlikely that preventing gambling completely may be achieved, the measures mentioned above may contribute to reducing the negative externalities already outlined. A harm reduction strategy seems to be more realistic. It is also important to discuss a coordinated international response to the problem and maybe to draft an instrument similar to the Framework Convention on Tobacco Control for discussion in the World Health Organization and its regional counterparts.

The use of online responsible gambling tools is one possible response, since operators collect a huge amount of data from gamblers (*Griffiths, 2020: p. 129*) and such data may be used not only for research but also to guide public policy in favor of responsible gambling. *Auer and Griffiths (2023b: p. 1276)* point out that the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) classifies pathological gambling as a behavioral addiction, proposing

data that can be tracked and that allow identifying its presence, such as number of hours spent playing online, number of bets placed and amount of money spent.

Before considering such tools, the main features of Brazilian legislation on fixed-odd bets and online bets will be referred.

3. An Outline of Brazilian Legislation on Sports Betting

In Brazil, as already mentioned, the fact that gambling, with the exception of that promoted by state entities and horse racing, and bingos in the 1990s and early 2000s, was banned until 2018, accounts for the absence of provisions on responsible gaming or its advertising. Law 13,756/2018 allowed fixed-odd bets, related to actual sports events, to be explored in the national territory, upon authorization, on a competitive basis. It was expected to be regulated within two years, which did not happen. In 2023, initially through Provisional Measure 1182, new rules were issued, but this normative act lost its validity and the matter was regulated by Law 14,790/2023.

Law 14,790/2023 allowed, in addition to the exploration of games related to actual sports events, the so-called virtual online gaming events. An online game is considered to be an “electronic channel that enables virtual betting in a game in which the result is determined by the outcome of a random future event, based on a random generator of numbers, symbols, figures or objects defined in the system of rules”. This expanded the possibility of offering online games.

Bettors are entitled to all rights granted to consumers provided for in the Brazilian Consumer Protection Code. It is worth highlighting the right to information, health and safety, present in article 6th of the Consumer Protection Code. In addition to these, or specifying these rights, article 27 of Law 14,790/2023 mentions the protection of personal data, in accordance with the General Data Protection Law, and clear and adequate information and guidance regarding the risks of loss of money waged and pathological gambling disorders. In articles 28, it provides for the right to assistance and guidance, through telephone or electronic channels, with free access and use, in Portuguese language. There will be a bettor's graphic account with the operator and financial institutions must offer a transactional account that allows deposits and withdrawals to be made to the said graphic account as well as collecting of the due prizes (art. 22 of Law 14,790/2023).

Law 14,790/2023 modified article 33 of Law 13,756/2018, which deals with communication, advertising and marketing actions of the fixed-odds betting lottery. Such actions will comply with the best corporate social responsibility practices in accordance with regulations. In Law 14,790/2023, the topic of advertising is addressed in articles 16 to 18, and will be subject to regulation by the Ministry of Finance, with self-regulation being encouraged. Other mandatory corporate policies are addressed in article 8th of Law 14,790/2023, including responsible gambling and prevention of pathological gambling. Some persons are forbidden to betting such as athletes, referees, certain public officials, minors under eighteen years of age and those who have been diagnosed with gambling disorder, according

to a report from a qualified health professional (art. 26, items I and VI, of the Law 14,790/2023).

Self-exclusion was not provided for in either Provisional Measure 1,182/2023 or Law 14,790/2023. However, it was included as one of the control mechanisms that operators must make available to bettors by article 18, item IV, of Portaria 1330/2023, of the Ministry of Finance. Regarding self-exclusion for problem gamblers, behavioral economics consider it a measure that can help deal with addiction. Sunstein and Thaler (2009: pp. 231-232) mention that, in several North American states, gamblers can voluntarily sign up to a list of people banned from entering casinos, thus protecting them from their compulsion. Self-exclusion is provided for in different jurisdictions across the globe (Long, 2023: p. 408). In Canada, a self-exclusion agreement is provided, which prevents people from entering places where games are exploited. However, as Bell (2015: p. 393) points out, there have been difficulties in complying with such agreements, as highlighted by a class action filed in 2009 against the Ontario Lotteries and Gaming Corporation (OLG) by more than ten thousand problematic gamblers who claimed that, despite having signed such contracts, were not prevented from entering casinos. The situation involved land-based casinos. When it comes to online gambling, it is possible to enforce more effectively such agreements, especially if identification checks are performed, also preventing access of minors and unregistered gamblers, and if regulators supervise closely the operators conduct regarding requests for exclusion. As will be discussed ahead, a centralized scheme for self-exclusion, allowing exiting all platforms and operators at once, is considered most suitable for dealing with problem gambling, since problem gamblers tend to bet on more than one operator.

The prohibition on the participation of people registered in national credit protection registries, with bad credit scores, given the risk of increasing their indebtedness, was provided for by Provisional Measure 1182/2023, but was not maintained in Law 14,790/2023. Law 14,790/2023, in its art. 29, item I, prohibits the granting of advances, bonuses or prior advantages to bettors, even if for the purpose of publicity, promotion or advertising.

Likewise, advertising that exploits the image of celebrities and athletes should be prohibited, as is already done with regard to alcoholic beverages and cigarettes. Article 17, item III, of Law 14,790/2023, forbids advertising that presents betting as socially attractive or contains statements from well-known personalities or celebrities that the game contributed to personal or social success. There is also the possibility here of discussing the responsibility of celebrities or digital influencers for false statements about gambling, for advertising prohibited games and for losses caused to gamblers. Article 16, sole paragraph, item I, provides for the operators' obligation of issuing messages or warnings about the danger of pathological gambling and the existence of medical services to assist people in this situation.

In April 2024, the Ministry of Finance issued Portaria SPA/MF 615, which provides for the payment methods that must be accepted in fixed-odd bets. Payment

by credit cards, cash, checks and cryptocurrencies were forbidden.

Article 23 of Law 14,790/2023 provides, on the one hand, for the use of facial recognition technology to guarantee the identity of bettors, preventing, for example, access to minors under the age of eighteen. It also provides, in its § 3, for the regulation by the Ministry of Finance of the obligation for operators to develop effective systems and processes to monitor bettors, in order to identify damages, observing criteria such as bettor expenses, spending patterns, time spent in-game, behavior indicators, bettor contact and use of gambling management tools. A tool for limiting usage time must also be developed by operators, in accordance with § 4 of article 23 mentioned above.

The regulator, the Ministry of Finance of Brazil, is gradually issuing rules to render effective the law's provision. Such rules may be accessed online ([Brazil Ministry of Finance, 2024](#)). Among them, it is worth mentioning Portaria MF 1330/2023, which defines general conditions for exploitation of fixed-odd bets in Brazil, Portaria SPA/MF 300/2024, which provides for the requirements that entities that will certify online games and platforms must meet, Portaria SPA/MF 561/2024, that defines the Ministry's regulatory policies and agenda, Portaria SPA/MF 615/2024, which provides for the accepted means of payment of online games and bets, Portaria SPA/MF 827/2024, that provides for the licensing requirements platforms willing to legally operate in Brazil must meet, Portaria SPA/MF 1143/2024, which provides for policies, procedures and controls related to prevention of money laundering, terrorism financing and proliferation of weapons of mass destruction and Portaria SPA/MF 1231/2024, which regulates responsible gambling, advertising and marketing actions and gamblers' rights and duties. Companies and platforms operating in Brazil must comply with regulations until December 31, 2024, and those which fail to do so will be subject to penalties as of January 1st, 2025.

4. Problem Gambling Algorithms in Literature and UK's Experience

One of the methodologies used worldwide to identify people with a tendency to pathological gambling is the so-called PGSI (Problem Gambling Severity Index). Scores are assigned to the answers offered to nine questions, and the identification of a player at risk is possible if the sum of the answers is equal to or greater than 8. The questions are:

Thinking about the last 12 months...

- 1) Have you bet more than you could really afford to lose?
- 2) Have you needed to gamble with larger amounts of money to get the same feeling of excitement?
- 3) When you gambled, did you go back another day to try to win back the money you lost?
- 4) Have you borrowed money or sold anything to get money to gamble?
- 5) Have you felt that you might have a problem with gambling?

- 6) Has gambling caused you any health problems, including stress or anxiety?
- 7) Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?
- 8) Has your gambling caused any financial problems for you or your household?
- 9) Have you felt guilty about the way you gamble or what happens when you gamble?

The answers to each of the questions correspond to the following scores:

- never = zero.
- sometimes = one.
- most of the time = two.
- almost always = three.

When the scores for each question are added together, a sum ranging from 0 to 27 is possible. A score of eight or more represents a “problem gambler”. It is possible to identify four levels of gambling severity: non-problem, low-risk, moderate-risk and problem gambling.

There are, however, limitations in studies based only on responses to surveys, as they are subject to bias and there is a tendency for respondents to incorrectly assess their relationship with gambling, underestimating their losses and overestimating their gains (Auer & Griffiths, 2023a). Another possible format would be to obtain tracking data from players based on their accounts, especially those who have self-excluded from the platform, and retrospectively examine the indicative signs that would predict the risk of problem gambling.

Griffiths (2020: p. 136) highlights that tracking methodologies offer advantages and disadvantages. Among the former, a more objective dataset and record of an individual behavior on a particular gambling site, compared to surveys, providing a record of events that can be revisited after the event has finished and large sample sizes. The latter comprise the fact that the data can tell only how the gambler behaves in relation to a particular site, not in general as an internet gambler (since most of them gamble on more than one site), the samples may be unrepresentative of large populations and the data tell nothing why people gamble. Behavioral tracking tools, on the other hand, may help detect problem gambling signs and lead to warnings and other actions on the part of platforms, thus contributing to minimize harm. Studies that take into account how responsible gambling tools, such as limit setting and personalized feedback, affected subsequent player behavior seem to be promising. Griffiths points out that more studies are necessary, but that the referred tools seem to have high efficacy.

Auer and Griffiths (2023a) refer to some of such studies and point out the variation in the money bet in each session as the most relevant variable for identifying possible problems. They also mentioned studies that refer as factors indicative of future self-exclusion: a high number of changes to the money limit in each session, high number of self-exclusions, high number of different payment methods, higher average number of deposits per gaming session and a higher number of

different games in which one participated. Ghaharian et al. (2023: p. 305), on the other hand, point out studies that considered the self-exclusion factor to be an unsatisfactory standard for identifying risk for pathological gambling, since the reasons that lead players to self-exclude are varied, not therefore allowing them to be treated as a homogeneous group.

Perrot et al. (2022: pp. 875-877), in a study that used tracking data from online gamblers supplied by French regulatory authorities (number of active accounts and date of creation of each account) and weekly aggregated data representative of the raw gambling activity (e.g., number of bets, deposits, use of loyalty bonuses), considered as most relevant indicators associated with problem gambling chasing behavior, breadth of involvement and longitudinal variability of gambling behavior over time. Chasing behavior is present when one keeps on gambling and/or intensifies gambling after a sequence of losses. Breadth of involvement is engagement in multiple forms of gambling (more than one platform or operator or kind of game). Variation of gambling behavior, when compared with the “usual” behavior (in the previous three months), is another indicator. A survey was sent to the gamblers and the authors collected the respondents tracking data retrospectively in order to assess and predict how likely they would be problem gamblers considering PGSI scores. Machine learning algorithms were applied and the authors came to the conclusion that the models were good for predicting extreme categories (no-problem and problem gamblers) and weak to predict intermediary ones (low and intermediary risk gamblers). Random forest was considered the best performing algorithm to predict PGSI thresholds.

Auer and Griffiths (2023a) carried out another study considering it important to detect the signs of pathological gambling as early as possible, as soon as a player registers on a platform, as he may leave it when he reaches a certain amount of money spent or when he self-excludes, looking for other platforms. This early detection also makes it possible to adopt preventive measures tailored to each player, such as personalized messages, establishing value limits and mandatory breaks. They used anonymized secondary data relating to 37,986 players who registered on the online platform of a European casino between January 1 and April 30, 2020, and examined their transactions on their respective accounts, in addition to age, gender and other data. Two machine learning models were used (Random Forest and Gradient Boost Machine). Eight variables were considered (in addition to gender and age) to verify the players’ behavior in each session (for example, average number of deposits per session and number of games per session) and five variables for the amount of money spent for the first seven days after registration (such as total money deposited and lost).

It was concluded that it is possible to identify a player at high risk of developing problems based on their behavior in the first seven days after registering on the platform. In general, men were at higher risk than women, and older men, ages 39 - 55, had a higher risk of problem gambling than younger men, ages 21 and under, and those ages 22 - 28. This last finding was not considered contradictory

to other research that identified a greater risk for younger players because younger players may consider smaller losses to be harmful due to their lower income and, conversely, older players may have greater availability of income which leads to greater losses and a higher risk rating.

A study carried out in the United Kingdom (Regan et al., 2022: p. e714), bringing together experts from different countries, established a set of 40 measures with a greater degree of consensus aimed at reducing the damage associated with gambling, among which the following were highlighted: 1) operators should send players' data to an independent database; 2) make it mandatory for banks to provide customer data to an independent database; 3) provide customers with real-time data on time spent playing and money lost; 4) show harm reduction messages during online gaming sessions; 5) establish a single operator for self-exclusion of players from all platforms.

In England, as early as 2016, a round table bringing together fifteen market executives and researchers from the Research Centre of Machine Learning at City University, London, as well as representatives from the Gambling Commission and the United Kingdom's Responsible Gaming Strategic Committee, discussed relevant issues regarding responsible gambling algorithms (Betbuddy Ltd., 2016). Among such issues, was the need for predictive models that combine accuracy and transparency. It was emphasized, however, that models that bring transparency are more relevant. It seems that transparency and explainability are important to guide policies concerning protection of problem gamblers. So, the discussion concerning such tools is not new. Since the United Kingdom is the country where such discussion is more advanced, it is worth considering the path it has followed.

The Gambling Act has been in force in UK since 2005. In 2023, changes to legislation were proposed (United Kingdom, 2023b), aiming to expand the protection of vulnerable users. Among them are: the collection of a tax from betting companies to finance the treatment of pathological gambling, the establishment of limits on the value of online bets, consultations to discuss and identify protection measures for bettors who are between 18 and 24 years of age, the age group most exposed to risks, according to existing evidence, and the imposition on betting companies of the duty to monitor users who lose larger sums, warning them so that they can stop gambling and avoid irreversible damage.

Condensed in a White Paper (United Kingdom, 2023a), which received more than sixteen thousand suggestions, the proposals aim to maintain a free environment, in which people can play, but in which the most vulnerable are protected.

In the United Kingdom, there are an estimated three hundred thousand problem gamblers and around 1.8 million gamblers at risk (United Kingdom, 2023a: p. 3). The individual initiatives of each operating company stand out, but as it is possible for a player to have multiple accounts on more than one platform, a collaborative strategy of sharing data, between multiple companies, in a cross manner, to prevent damage, when it comes to higher risk players, is more appropriate,

since such data is not used for commercial purposes (United Kingdom, 2023a: p. 5). In the case of online products, the need for them to be safe-by-design is emphasized, that is, to incorporate features that minimize risk, such as game speed and the illusion of control on the part of the player. The incorporation of behavioral science tools, like mandatory spending limit setting, rather than optional, was also emphasized.

In the field of advertising, targeting, that is, the directing of promotions, bonuses or advantages to people who play higher stakes, encouraging them to play even more, should not be allowed. Algorithms that promote such targeted advertisement must be banned. Targeting may be considered a case of algorithmic harm, as defined by Bar-Gill, Sunstein and Talgam-Cohen (2023: p. 1), that is, the exploitation of the absence of sufficient information or a behavioral bias, disproportionately affecting members of identifiable groups. Discrimination that leads to harm can affect, in different ways, vulnerable people of a different ethnicity or gender, or who are elderly, or even suffering from a mental disorder (Bar-Gill, Sunstein, & Talgam-Cohen, 2023: p. 4), such as the tendency towards pathological gambling.

All advertising aimed at children and adolescents must be prohibited. On the other hand, messages and warnings that warn of the risks associated with gambling must be reinforced, and which messages work best in certain contexts must be evaluated. Similarly, in the United Kingdom, renowned sportspeople, such as Premier League players, are prohibited from advertising. The Premier League teams, by the way, voluntarily, have committed, from the 2025/2026 season onwards, to remove gambling companies advertising from their uniforms (United Kingdom, 2023a: pp. 5-6).

The White Paper also propose setting loss limits that should lead to action on the part of the platforms, starting from 125 pounds in a month or 500 pounds in a year, or, in cases of greater risk, loss of a thousand pounds in a single day or two thousand pounds in ninety days. For those between 18 and 24 years old, the limits may be lower (United Kingdom, 2023a: p. 26). The possibility of self-exclusion is another tool remembered, and, in the United Kingdom, since 2020, there is the possibility of self-exclusion covering multiple platforms, in the case of players who register with GAMSTOP. In addition to monitoring players' losses, and the possibility of setting spending limits, the use of monitoring algorithms is also remembered. As online gambling is based on an account opened by each player, it is possible to monitor all aspects of the game, identifying signs of risk and initiating intervention measures without human intervention (United Kingdom, 2023a: pp. 28-29).

All operators must monitor player behavior and identify those at risk, taking measures such as encouraging the establishment of value and time limits, seeking medical or psychological support services, suspending advertising, and unilaterally suspending or closing accounts of players (United Kingdom, 2023a: p. 31).

In the United Kingdom, since September 2022 and March 2023, there are seven

categories of damage indicators that operators must monitor and which must guide the conduct to be adopted, according to rules issued by the Gambling Commission, as shown in **Table 1**:

Table 1. Indicators operators in the UK must monitor.

Patterns of spend	Behaviour
<ul style="list-style-type: none"> • Binges • High amounts at set times (e.g. payday) • Escalation of gambling 	<ul style="list-style-type: none"> • Gambling on multiple products • Chasing losses • Choice of higher risk products
Customer-led contact	• In-play betting
<ul style="list-style-type: none"> • Complaints • Indicators of vulnerability, e.g. bereavement • Hints of not coping • Chat room comments 	• Erratic patterns
Consumer spend	Use of gambling management tools
<ul style="list-style-type: none"> • Amounts spent, taking into account affordability • Amounts spent compared to other consumers 	<ul style="list-style-type: none"> • Refusal to use tools • Changing limits • Previous self exclusion • Repeated use of time out
Time indicators	Account indicators
<ul style="list-style-type: none"> • Amounts of time spent gambling • Time of day, e.g. late night 	<ul style="list-style-type: none"> • Failed deposits • Multiple payment methods • Types of payment

Source: White Paper published in 2023 (United Kingdom, 2023a: p. 32).

There are also technical standards for remote gaming operations and game design, aiming to ensure that they operate in a socially responsible manner, without encouraging harmful conduct. This requires testing the randomness of the results and the fairness of the games and submitting them to audits. Games should be safe-by-design, eliminating features that may exacerbate risk to players, such as increasing gameplay intensity or feelings of control as mentioned above.

5. Main Lessons That Can Be Learned and Applied in Brazil and Other Jurisdictions

Adopting safe-by-design features may be interesting for Brazil, since Law 14,790/2023 admitted the practice of not only sports betting, but also of online games unrelated to real events. Age checks, to prevent access by minors, and a ban on the use of credit cards are other measures that have been adopted in the United Kingdom and are also provided for in Brazilian legislation.

Despite advances that have been made in the UK, there are reports from health professionals, academics and people who have had negative personal experiences

that the system of monitoring and adopting preventive interventions does not prevent signs of harm from going unnoticed and that it even continues to encourage people at risk to gamble (United Kingdom, 2023a: pp. 33-34). A 2019 report was mentioned which showed that just over 3% of player accounts in the United Kingdom spent more than two thousand pounds per year, but only 35.5% of these accounts underwent any control by platforms, whether individual contact, phone call or email. Many operators responded to this criticism by reporting that the number of interventions has increased since the time of the report and that algorithms are more sophisticated and can even predict risk situations in advance, although it is difficult to confirm this statement. Ghaharian et al. (2023: p. 305), by the way, in a systematic review of literature in English on data science applications used to identify problem gamblers, came to the conclusion that the usefulness of adopting such tools, in practice, is still unknown. They propose further studies, as these tools aim to guide public policy on responsible gambling and generate profiles by identifying at-risk players. They divided the studies analyzed into three types (cluster analysis, supervised machine learning with behavioral tracking data and other data science applications).

Another criticism expressed in the United Kingdom concerns the use that operators make of player data, with references to practices that are harmful to consumers, such as profiling (targeted advertising) and restricting the accounts of players who win more often and are not allowed to play again. In Brazil such conducts are in clear violation of General Data Protection Law, that only allows data processing aimed at legitimate purposes, after obtaining consent and forbids discrimination, and also of Law 14,790/2023, which provides for the respect of integrity of gaming practices.

An improvement proposal made in the United Kingdom suggests access to players' financial data to more accurately assess their vulnerability and risk of suffering losses that they cannot absorb. This would allow tailored interventions for these most vulnerable players to mitigate risk (United Kingdom, 2023a: p. 40).

There are clear implications for accessing such data, which is sensitive and must be protected. But its use for legitimate purposes may be considered. Ghaharian et al. (2023: p. 301) pointed to a study in which the use of anonymized financial data allowed a better assessment of the risk of harm to players, based on the consideration of gaming expenses as a proportion of monthly income. The authors considered this data on financial transactions as a viable and fruitful path for future analysis of the topic.

Another proposal involves sharing data between platforms to identify players with multiple accounts. In these cases, the isolated action of each operator is insufficient to guarantee protection and monitor the player's situation. It is recommended to establish a duty of cooperation between platforms in order to share players' data, identifying those who have registered on more than one, determining differentiated monitoring. The establishment of a centralized self-exclusion mechanism, with the regulator itself, for example, which allows the player to leave

all platforms, is another interesting measure to be adopted in Brazil. The verification, by gaming platforms, of signs indicating risk provided for in the legislation and the continuous improvement of monitoring mechanisms must be encouraged by the regulator. The mandatory adoption of spending limits when registering with an operator is also a timely measure and should be the default to be followed.

Regulation and monitoring must be carried out in a way that does not greatly affect the gaming experience, as this could lead to players removing themselves from regular and authorized platforms and looking for illegal games. Regarding player monitoring, artificial intelligence tools should be sought that favor explainability and interpretability, compared to accuracy, as those two requirements are essential for the good design of the policy, its implementation and subsequent evaluation. Furthermore, it is possible to gradually improve the accuracy mechanisms of the algorithms. Ghaharian et al. (2023: p. 304) consider the Random Forest model to be more understandable and applicable than neural networks. They propose that future research adopt more than one machine learning model, establishing an appropriate reference (benchmark) in terms of interpretability that allows comparison with levels of accuracy. A regulator must make clear the criteria it prioritizes and also constantly refine the criteria for assessment of the results.

The data must be as homogeneous as possible (for example, only consider those referring to one type of game, such as sports betting) and must evaluate patterns considering age, gender, location, income and others that can lead to future improvements in problem gambling prevention policies.

In relation to the United Kingdom's experience, and the suggestion of incorporating the financial vulnerability of players as a criterion to be verified, based on obtaining financial data that allows the risk to which they are effectively exposed to be assessed, it is necessary to think about combining data from credit protection services and possibly banks data, which should, however, be used with caution to prevent data breaches. Resorting to self-declaration of income by players themselves may lead to them reporting incorrect data that does not reflect their financial situation. One can think about establishing daily loss limits, or in periods of thirty, sixty and ninety days, which should lead to mandatory intervention on the part of operators (contact with the customer, suggestion of self-exclusion, use of time and amount of expenditure limits and referral for treatment). Such limits may be lower in the case of younger people and those with fewer resources. In Brazil, there is the possibility of using the positive record established by credit registry services.

Regarding the topic of financial vulnerability, a Datafolha survey carried out in Brazil (Terra, 2024) showed that 17% of beneficiaries of the Bolsa Família income transfer program spend on sports betting, with 32% of these 17% spending an average of R\$ 100.00 per month (around US\$ 20.00). Would it be allowed to prohibit Bolsa Família beneficiaries from participating in sports betting sites? After all, as it is a benefit for people in situations of poverty and extreme poverty, wouldn't spending on gambling be a distortion of the program? The ban would

be paternalistic and violate individual autonomy. In fact, one of the strengths of Bolsa Família is the direct transfer of money to families in situations of poverty and extreme poverty and the respect for the person's autonomy in deciding what they will spend on. It is possible, however, to consider establishing a lower daily, monthly, bimonthly and quarterly spending limit for the program beneficiaries, so that the platform's duty to adopt measures such as sending warnings and suggesting self-exclusion is established. Likewise, if people registered on credit restriction registries are not excluded from the platforms, as provided for by Provisional Measure 1182/2023, lower limits for their monitoring can also be considered.

6. Conclusion

Online gambling introduces greater risks of addiction and compulsion for those who are vulnerable, but also allows for the adoption of appropriate monitoring and control tools to protect players. Self-exclusion, playtime and amount of expenditure limit setting, warnings, biometric and facial recognition technology, to prevent minors' access, and algorithmic monitoring are some of them. This paper main contribution is to highlight positive aspects of the use of algorithms in the realm of harm prevention in online gambling. Among them, greater accuracy in identifying and describing gamblers behavior and possibility of fastest and more tailored intervention by platforms. The findings of the present study may also contribute to other jurisdictions that face similar problems arising from online gambling, helping design policies and assess their impact.

However, there is still uncertainty about the best format and kind of algorithms that can be used and further research is needed to assess the benefits and limitations of such tools. But some lessons can be learned by Brazil and other jurisdictions from the experience of countries like the United Kingdom and from literature. Evidence shows that random forest algorithms help interpretability. Signs, such as amount of money waged, chasing behavior, involvement (number of games played and platforms accessed), and time (late hour gaming and playing for a long time), may lead to identifying problem gamblers and mandatory action on the part of the operators (messages, suggestion of adopting time and expenditure limits, of self-exclusion and even compulsory exclusion). Establishing the possibility of self-exclusion from all operators at once should be embodied in regulations since it helps tackling with problem gambling. Likewise, time and expenditure limits should be mandatory, not optional, according to evidence provided by behavioral economics.

Regulators must assess periodically the operators' records (how many problem gamblers were identified, which course of action was taken, how much was spent, how many self-excluded and so on). In this respect, Portaria SPA MF 1225/2024 provides for monitoring and supervision of operators by the Brazilian Ministry of Finance. It is important that such supervision takes into account compliance with rules that regulate gamblers rights and protection of more vulnerable players,

which are provided in Portaria SPA MF 1231/2024. The latter provides that each platform must define its responsible gambling policy and monitor gamblers accordingly. Time and expenditure limit setting, warnings, self-exclusion and other control mechanisms must be included in such policy, but the Ministry of Finance did not provide for how they should be applied. Article 5, III, of Portaria SPA MF 1231/2024 provides that the above mentioned policy must include “analytical tools and classification and data analysis methodology to monitor and assess gambler’s risk profile for pathological gambling and other problems associated with gambling”. In conclusion, each operator policy will define how gamblers will be monitored and the Brazilian regulator did not provide for risk indicators that operators must consider in order to adopt protective measures.

The use of algorithms may be subjected to a regulatory experimentalism, constantly revising results and findings and trying to improve monitoring aiming at greater accuracy. The regulator must consider age, gender, ethnicity, socioeconomic background, location and other factors when assessing those considered to be problem gamblers or at-risk gamblers by operators, tailoring the responses that should be given by the platforms. An open channel with customers and users, like an ombudsman, may also help obtaining feedback from the public.

The design of sports betting platforms should be changed in order to give more emphasis to problem gambling tools, making it easier for users to find information and management tools, like self-exclusion and time and money limit setting. Online casinos can also be subject to safe-by-design rules and regulators may impose constant audits to limit features that could lead to addiction.

Setting a mandatory duty to share data on players, to assess differently those who are registered in multiple platforms and operators, also makes sense and helps tackling with problem gambling. Players’ data may not be used for profiling and targeting publicity to those more prone to expending, neither to discriminating those who win more frequently.

Literature also shows that considering players’ financial data in order to assess their expenditure in proportion to their income is a possible path to be followed in the future. Accessing such data should be very careful though, protecting privacy. Excluding those beneficiaries of income transfer programs and those with bad records in credit registries must be assessed carefully, since this can be considered discriminatory and paternalistic. But the regulator may establish lower expenditure limits for them so as to lead to action on the part of operators. Finally, regulators should not issue too stringent limitations, since they can lead to players seeking illegal games. But must find a balance between game experience, that should be pleasant, and responsible gambling.

One difficulty found in this study was the lack of data on problem gambling in Brazil and on expenditures habits of Brazilian gamblers. Future research may also focus on quantitative data that will be collected by the country’s regulator, especially on gender, age, location, ethnicity, amount spent and number of players who self-excluded and how such data can be used to assess regulations and guide

policies.

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References

- Adams, P. J. (2020). Gambling and Democracy. In H. Bowden-Jones, C. Dickens, C. Dunning, & O. Simon (Eds.), *Harm Reduction for Gambling* (pp. 5-13). Routledge.
<https://doi.org/10.4324/9780429490750-2>
- Agência Senado (2024). *CCJ debate liberação de cassino, bingo, jogo do bicho e outros jogos de azar*.
<https://www12.senado.leg.br/noticias/materias/2024/05/07/ccj-debate-liberacao-de-cassino-bingo-jogo-do-bicho-e-outros-jogos-de-azar>
- Anbima (2024). *Raio X do investidor brasileiro*.
https://www.anbima.com.br/pt_br/especial/raio-x-do-investidor-brasileiro.htm
- Auer, M., & Griffiths, M. D. (2023a). Predicting High-Risk Gambling Based on the First Seven Days of Gambling Activity after Registration Using Account-Based Tracking Data. *International Journal of Mental Health and Addiction*.
<https://doi.org/10.1007/s11469-023-01056-4>
- Auer, M., & Griffiths, M. D. (2023b). Using Artificial Intelligence Algorithms to Predict Self-Reported Problem Gambling with Account-Based Player Data in an Online Casino Setting. *Journal of Gambling Studies*, 39, 1273-1294.
<https://doi.org/10.1007/s10899-022-10139-1>
- Bar-Gill, O., Sunstein, C. R., & Talgam-Cohen, I. (2023). Algorithmic Harm in Consumer Markets. *Journal of Legal Analysis*, 15, 1-47. <https://doi.org/10.1093/jla/laad003>
- Bell, K. (2015). Thwarting the Diseased Will: Ulysses Contracts, the Self and Addiction. *Culture, Medicine, and Psychiatry*, 39, 380-398.
<https://doi.org/10.1007/s11013-014-9416-5>
- Betbuddy Ltd (2016). *Responsible Gambling Algorithms: Roundtable*.
https://www.playtech.com/application/files/6816/1908/1881/Responsible_Gambling_Algorithms_Roundtable_1_August_2016_FINAL.pdf
- Brazil Ministry of Finance (2024). *Apostas de quota fixa*.
<https://www.gov.br/fazenda/pt-br/composicao/orgaos/secretaria-de-premios-e-apostas/legislacao/apostas>
- Browne, M. (2020). Measuring Harm from Gambling and Estimating Its Distribution in

- the Population. In H. Bowden-Jones, C. Dickens, C. Dunand, & O. Simon (Eds.), *Harm Reduction for Gambling* (pp. 14-22). Routledge.
<https://doi.org/10.4324/9780429490750-3>
- El-Guebaly, N. (2020). Preface. In H. Bowden-Jones, C. Dickens, C. Dunand, & O. Simon (Eds.), *Harm Reduction for Gambling—A Public Health Approach* (pp. xvii-xix). Routledge.
- Elie, A. I. N., Kemo, S., Sinet, K. D., Djibrilla, M., Oumou, O. Z., Elodie, A. Y. et al. (2023). Online Gambling Addiction in Parakou (benin, 2022). *Open Journal of Psychiatry*, 13, 421-437. <https://doi.org/10.4236/ojpsych.2023.135031>
- Exame (2023). *Bússola: Mercado 'bet' cresce e mira faturamento bilionário com regulamentação no Brasil*.
<https://exame.com/bussola/mercado-bet-cresce-e-mira-faturamento-bilionario-com-regulamentacao-no-brasil/>
- Ghaharian, K., Abarbanel, B., Phung, D., Puranik, P., Kraus, S., Feldman, A. et al. (2023). Applications of Data Science for Responsible Gambling: A Scoping Review. *International Gambling Studies*, 23, 289-312. <https://doi.org/10.1080/14459795.2022.2135753>
- Griffiths, M. D. (2020). Behavioural Tracking in Gambling: The Use and Efficacy of Online Responsible Gambling Tools. In H. Bowden-Jones, C. Dickens, C. Dunand, & O. Simon (Eds.), *Harm Reduction for Gambling* (pp. 128-139). Routledge.
<https://doi.org/10.4324/9780429490750-14>
- Instituto Brasileiro de Jogo Responsável (2024). *História das apostas no Brasil*.
<https://ibjr.org/historia-apostas-brasil/>
- Jornal do Comércio (2024). *Brasileiros gastaram mais de R\$50 bilhões em apostas online em 2023*.
<https://www.jornaldocomercio.com/esportes/2024/01/1139715-brasileiros-gastaram-mais-de-rs-50-bilhoes-em-apostas-online-em-2023.html#:~:text=Pesquisa%20Data-folha%20mostrou%20que%2015,apostar%20ou%20j%C3%A1%20ter%20apostado&text=Os%20gastos%20de%20brasileiros%20com,equivalente%20a%20R%24%2054%20bilh%C3%B5es>
- Kontoangelos, K., Ecomomou, M., & Papageorgiou, C. (2018). Pathological Gambling after Administration of Pramipexole. *Case Reports in Clinical Medicine*, 7, 349-351.
<https://doi.org/10.4236/crcm.2018.75032>
- Long, B. (2023). Theorising Gambling Self-Exclusion Agreements: The Inadequacy of Procedural Autonomy. *Canadian Journal of Law & Jurisprudence*, 36, 407-435.
<https://doi.org/10.1017/cjlj.2022.30>
- Lopez, G. (2024). The Rise of Sports Betting. *The New York Times*.
<https://www.nytimes.com/2024/04/05/briefing/the-rise-of-sports-betting.html>
- Lungui, S. (2023). *Sites de apostas esportivas cresceram 160% no Brasil em dois anos, diz pesquisa*.
<https://gizmodo.uol.com.br/sites-de-apostas-esportivas-cresceram-160-no-brasil-em-2-anos-diz-pesquisa/>
- O'neil, C. (2016). *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. Crown Publishers.
- Perrot, B., Hardouin, J., Thiabaud, E., Saillard, A., Grall-Bronnec, M., & Challet-Bouju, G. (2022). Development and Validation of a Prediction Model for Online Gambling Problems Based on Players' Account Data. *Journal of Behavioral Addictions*, 11, 874-889.
<https://doi.org/10.1556/2006.2022.00063>
- Rama, P. C. A. (2016). *Os jogos de sorte e azar em Portugal: o caso concreto dos jogos*

- online e sua regulação*. Master's Thesis, Faculdade de Direito da Universidade de Coimbra. <https://estudogeral.uc.pt/handle/10316/34949?locale=pt>
- Regan, M., Smolar, M., Burton, R., Clarke, Z., Sharpe, C., Henn, C. et al. (2022). Policies and Interventions to Reduce Harmful Gambling: An International Delphi Consensus and Implementation Rating Study. *The Lancet Public Health*, 7, e705-e717. [https://doi.org/10.1016/s2468-2667\(22\)00137-2](https://doi.org/10.1016/s2468-2667(22)00137-2)
- Sichali, J. M., Bunn, C., McGee, D., Marionneau, V. K., Yendork, J. S., Glozah, F. et al. (2023). Regulation of Gambling in Sub-Saharan Africa: Findings from a Comparative Policy Analysis. *Public Health*, 214, 140-145. <https://doi.org/10.1016/j.puhe.2022.07.018>
- Sunstein, C., & Thaler, R. (2009). *Nudge—Improving Decisions about Health, Wealth and Happiness*. Penguin.
- Terra (2024). *Quem recebe bolsa família chega a gastar mais de R\$100,00 por mês em apostas esportivas, diz DATAFOLHA*. <https://www.terra.com.br/economia/quem-recebe-bolsa-familia-chega-a-gastar-mais-de-r-100-por-mes-em-apostas-esportivas-diz-data-folha,3cc351c96e6159dfe1d66bea395512315fw14fz2.html>
- United Kingdom (2023a). *Department for Culture, Media and Sport. High Stakes: Gambling Reform for the Digital Age*. HH Associate Ltd.
- United Kingdom (2023b). *Department for Culture, Media and Sport. Major Reform of Gambling Laws to Protect Vulnerable Users in Smartphone Era*. <https://www.gov.uk/government/news/major-reform-of-gambling-laws-to-protect-vulnerable-users-in-smartphone-era>
- University of Kent (2016). *The Bingo Project—Rethinking Gambling Regulation*. https://www.kent.ac.uk/thebingoproject/resources/Bingo_Project_report_final.pdf
- Zuboff, S. (2019). *The Age of Surveillance Capitalism*. Public Affairs.