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An Integrative Review of Transparency for Safer Gambling

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Abstract. Online gambling, comprising 43% of the UK's Gross Gambling Yield (GGY) in April 2022- March 2023, raises concerns about harmful gambling due to its easy accessibility, personalized marketing, and persuasive and immersive technology. Safer Gambling (SG) is naturally related to transparency (e.g., clear display of terms and conditions and odds of winning) to mitigate these risks. Using an integrative review approach which enables synthesis of knowledge, we examined a range of data sources and methodologies, identifying a scarcity of literature on this topic. Key themes of transparency emerged from 172 articles in this review, involving information and education for SG, SG tools, data-driven approaches and persuasive technologies, advertising, Corporate Social Responsibility (CSR) and individual responsibility, research evidence and funding sources. These themes form a conceptual framework to guide best practices for stakeholders, including the gambling industry, policymakers, and researchers for SG-driven transparency. Recommendations emphasize providing clear, accessible educational content about gambling risks, correcting misperceptions, ensuring SG tools are well-communicated, tailored, and transparent, and protecting individual data through informed consent and algorithmic transparency. Gambling advertisements should avoid misleading content, focus on fairness, and include SG information. CSR initiatives should clarify responsibilities and undergo independent assessment, while governments must update SG policies and encourage industry accountability. The review calls for more longitudinal research to evaluate and refine this framework while addressing the complexities of balancing transparency with user experience in SG interventions, ultimately reducing risks and promoting responsible and safer gambling attitudes and behavior.

Keywords: Transparency, Safer Gambling, Integrative Review, Conceptual Framework.

Introduction

According to the UK Gambling Commission (UKGC), online gambling (Remote Casino, Betting and Bingo Sector) dominated the market, constituting 43% of the total Gross Gambling Yield (GGY) between April 2022 and March 2023. Total GGY for online gambling rose by 13.3% on the last pre-lockdown period of April 2019 to March 2020, while land-based betting experienced a 2.5% GGY increase on the last pre-lockdown period (UKGC, 2024a). Interactive online platforms extensively incorporate persuasive, immersive technology and personalized marketing content to engage users (Abbas, 2024; Dwivedi et al., 2021; Shareef et al., 2018), prompting higher interaction and gambling activities (Cemiloglu et al., 2023). Internet gambling offers users round-the-clock accessibility, easy transactions, personalized and persuasive marketing components, immersive and rewarding betting experiences, and heightened privacy for perceived escapism from real-life challenges (Wang et al., 2023). These attributes potentially foster a context in which individuals are prone to chasing losses and losing control. Evidence indicates that Internet gambling carries a greater risk of problem gambling and related harm compared to land-based alternatives (Effertz et al., 2018; Kairouz et al., 2012; Papineau et al., 2018; Wu et al., 2014). The term 'problem gambling' is widely misunderstood to potentially lead to stigmatization and underestimation of the wide range of risks associated with gambling (Biggar & Wardle, 2024). In this review paper, the term is used when necessary to reflect what was used in the literature reviewed, and by 'problem gambling' we refer to the gambling associated with the most severe gambling harms, i.e., highest risk level of gambling harms (e.g., classified by a score of 8+ on Problem Gambling Severity Index; Ferris & Wynne, 2001). This does not indicate the fault of the individuals who gamble; instead, by sticking to guidance on stigmatizing language (Pliakas et al., 2022; Victorian Responsible Gambling Foundation, 2024) throughout this paper, we focus on the issue and recognize that multiple sectors including gambling industry, government, and community all have a role to play in prevention and intervention of gambling harms.

Addressing the risks of problem gambling is a central objective of the UKGC, which enforces active promotion of Safer Gambling (SG) among operators for the prevention of gambling-related harm. The importance of SG practices has grown significantly since the COVID-19 pandemic, as online gambling consumers increasingly engaged with new products, correlating with higher levels of moderate-risk and problem gambling (UKGC, 2020b). Responsible gambling (RG) and SG are often used interchangeably in literature and by the gambling industry (Awo et al., 2024; GamCare, 2019; Revealing Reality, 2021), though subtle distinctions between the two terms, RG and SG, have been noted - RG typically emphasizes the individual customer's responsibility in managing their

gambling behavior, promoting self-control and informed decision-making, whereas, SG shifts more of the obligation onto gambling operators, requiring them to implement proactive measures and safeguards to protect customers from gambling-related harm (UKGC, 2019). Nonetheless, both terms are intertwined with information transparency, accountability, and grounded in informed decision-making, as the core principle is to facilitate informed choices through transparent information about games such as winning odds (UKGC, 2024b; GamCare, 2021). In our present review, we primarily use SG to recognize responsibilities from multiple sectors for harm minimization unless necessary to use RG to reflect the literature reviewed where it was discussed as a term. Gambling operators and governments have implemented programs and policies (e.g., age restrictions, deposit limits, and self-exclusion) to advance SG and minimize gambling-related harm. There is a growing trend in using individuals' online gambling behavior data and persuasive technologies to prevent and address problem gambling by identifying behavior patterns, at-risk behaviors, and offering personalized real-time advice (Drosatos et al., 2019; Perrot et al., 2022). This further accentuates the necessity for transparency for mitigating gambling-related harm. Transparency, in the context of online gambling, refers to the clear, accessible, and honest communication of information about gambling products, services, and associated risks. It encompasses multiple dimensions, including user autonomy, system clarity, data privacy and transparent advertising that integrates SG-related information without misleading promotional content. These dimensions are essential for supporting individuals' informed decision-making and minimizing harm.

Nevertheless, evidence and guidelines for SG-driven transparency in promotions and games remain limited. There is no clear consensus on its key components, and there is a dearth of research that has comprehensively reviewed literature on this topic. Drawing from a narrative review encompassing transparency in persuasive technology, immersive technology, and online marketing (Wang et al., 2020; Wang et al., 2023), closely related to the online gambling domain, we propose that SG-driven transparency operationalizes SG by enabling effective communication and comprehension of gambling risks, tools, and safeguards. This includes practices such as disclosing winning odds, clarifying data usage, and providing straightforward terms of service. Within an integrative review framework (Toronto & Remington, 2020), the present study pursues three objectives:

1. Investigate evidence concerning transparency in SG practices within the gambling industry;
2. Formulate a conceptual understanding of SG-driven transparency by categorizing elements implied in literature, thereby enhancing comprehension of SG-driven transparency in games and promotional materials; and,

3. Provide stakeholders with clear principles and considerations to foster best practices in SG-driven transparency, alongside implications for future endeavors.

Methods

The present study adopted an integrative review approach following the step-by-step guide outlined by Toronto and Remington (2020). This allows for the integration of diverse data sources and methodologies, prioritizing inclusivity and diversity over uniformity in study design or nature, culminating in a comprehensive synthesis of available evidence to offer a holistic comprehension of a given topic (Hopia et al., 2016; Whittemore & Knafl, 2005). This work was undertaken as part of the EROGamb 2.0 project (Arden-Close et al., 2023).

Inclusion and Exclusion Criteria

Table 1 outlines the criteria guiding the inclusion and exclusion of studies within this review. The review encompasses English-language literature falling within the realm of transparency in SG practices. Quantitative studies, encompassing both Randomized Controlled Trials (RCT) and Non-Randomized Studies (NRS), were included if they reported interventions pertinent to SG practices. Qualitative studies, literature reviews, and position articles were incorporated if their research question or focus pertained to SG practices. SG practices are understood as strategies within online games on gambling websites (e.g., pop-up messages, personalized feedback, self-exclusion, deposit limits) or SG-related information (e.g., educational messages, gaming fairness details) displayed alongside promotional materials on gambling websites or social media platforms. No restrictions were imposed on study outcome variables, which could span gambling behavior, perceptions, and use of SG tools.

Table 1. Inclusion and exclusion criteria

Domain being studied	To investigate the evidence and implications for transparency in SG practices
Participants	≥the legal minimum age for gambling in the country where the study took place
Intervention(s)/Research question/focus	Quantitative studies: with an intervention relating to SG practices that were/can be applied to online gambling, i.e., SG strategies embedded in games or SG information displayed with promotion materials in various forms
	Others: with a research question or focus relating to SG practices as stated above

	Excluded: empirical studies on SG practices in the context of land-based gambling; articles with a focus on treatment programs for problem gamblers
Study design	Quantitative studies: Randomized Controlled Trials (RCT) and Non-randomized studies (NRS) Others: Qualitative studies, Literature reviews, Position articles, and Other articles accessible online including reports and news.
	Quantitative studies: Randomized Controlled Trials (RCT) and Non-randomized studies (NRS) Others: Qualitative studies, Literature reviews, Position articles, and Other articles accessible online including reports and news.
Comparators/Control	No restriction
Follow-up	No restriction
Outcome	No restriction
Language	English
Peer-reviewed	No restriction
Period	No restriction

Studies lacking interventions or a clear research focus on SG practices were excluded. This encompassed the articles concentrating on gambling-related harm, problem gambling assessment tools, gambling prevalence, or gambler characteristics. However, excluded studies were examined for relevant data or links to supplementary research to contribute to our conceptualization of SG-driven of transparency (e.g., risk factors pertinent to transparent information disclosure for raising individuals' awareness and informed choices). Empirical studies solely addressing land-based SG practices were also excluded, in line with the review's emphasis on online gambling platforms in the current digital age. However, general SG-related literature reviews and position articles that did not specify type of gambling (online/land-based) were eligible. Furthermore, studies involving underage participants within the country that the study took place were excluded as the aim was to explore transparency in legal gambling.

Literature Searches

This interdisciplinary literature review was conducted between January 25th and February 9th, 2021, during the COVID-19 pandemic, and spanned multiple fields, including psychology, behavioral science, persuasive technology, Human Computer Interaction (HCI), gambling addiction, cognitive bias, marketing, and business. Given the limited research and discussions on transparency in gambling, the review did not

require the explicit use of the term "transparency" for inclusion. Instead, transparency aspects were identified in various forms across the literature.

Building on a prior narrative review that incorporated multidisciplinary perspectives (Wang et al., 2020), the following search terms were used to retrieve relevant literature: ("responsible gam*" OR "safer gam*") AND (transparency OR explainab* OR interpretab* OR accountab* OR "informed consent" OR "informed decision making" OR risk OR "user control" OR "user autonomy" OR personali* OR design OR "game features" OR "promotion materials" OR "online marketing" OR "online advertis*" OR "social media" OR "limit setting" OR "warning messages" OR "pop-up messages", OR "behavio* tracking", OR "behavio* markers", OR "behavio* indicators". In addition, ("responsible gam*" OR "safer gam*") were searched independently.

Due to the interdisciplinary nature of the topic, searches were conducted across multiple databases, including IEEEXplore, DBLP (computer science bibliography website), Google Scholar, Web of Science, PsycINFO (EBSCO), Medline (National Library of Medicine), Scopus (Elsevier), and SocINDEX (EBSCO). Additionally, reference lists of included studies and grey literature, including UKGC reports and those from key gambling operators (e.g., William Hill, Entain, Bet365, Flutter Entertainment) were sourced.

Data Extraction and Study Selection

Two reviewers from multidisciplinary backgrounds (HCI and Psychology) independently screened titles and abstracts, eliminating duplicates from search results. Full texts of potentially eligible studies were procured if either reviewer deemed them suitable based on the including and exclusion criteria outlined above. For these studies, one reviewer read the full texts, with discrepancies discussed and resolved by both reviewers.

Risk of Bias Assessment

Given that the focus was not on SG effectiveness, but rather extracting and synthesizing transparency aspects of SG practices, researcher bias and quality were not significant concerns. Existing literature reviews aligned with our scope were lacking, and transparency could be implied by both empirical evidence and subjective author positions; therefore, theoretical (non-empirical) articles were included in the review in addition to empirical articles. This is a distinctive feature that sets integrative reviews apart from systematic reviews (Toronto & Remington, 2020). Theoretical articles cannot be appraised using the same tools employed for assessing research literature in terms of reliability and study design (Campbell et al., 2014), so assessments for risk of bias were not applied to such articles. Quantitative studies identified in this review often lacked randomized designs, control groups, or blinding of assessors or participants, according to the Cochrane Collaboration's tool (Higgins et al., 2011). Qualitative studies often raised concerns in more than two items on the Critical

Appraisal Skills Programme (CASP) checklist for qualitative studies (Spittlehouse et al., 2000), in aspects such as recruitment strategy, participant-researcher relationships, and data collection and/or analysis rigor. Therefore, risk of bias would be estimated as high overall. However, due to the varied study types (quantitative, qualitative, literature reviews, position articles, reports) and the review objectives, the impact of bias on the quality of the review was considered minimal.

Data Synthesis and Analysis

An integrative review aims to create a new whole by integrating discrete units of data (evidence) from diverse sources within the sampled literature (Booth, 2012, cited by Toronto & Remington, 2020). Due to study heterogeneity and involvement of qualitative and mixed-methods research, quantitative synthesis and meta-analysis were deemed inappropriate; instead, a narrative synthesis using inductive thematic analysis following established guidance (Popay et al., 2006; Whittemore & Knafl, 2005) was pursued as a commonly used approach in integrative reviews (Hopia et al., 2016). General findings of eligible articles were summarized initially. Thematic synthesis of implications for SG-driven transparency was conducted by identifying relevant implications from article findings or positions, and analyzing patterns, commonalities, and differences of relevant concepts, practices, and discussions across the review sample, which might involve SG information content, purpose, medium, and target audience of SG communication. Subthemes explaining SG-driven transparency were identified and clustered into overarching themes. Multidisciplinary expertise in the team was leveraged to discuss the results and enhance analysis credibility.

Results

Searches and Selection

Fig. 1 illustrates a flow diagram detailing search procedures and resulting articles, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page et al., 2021).

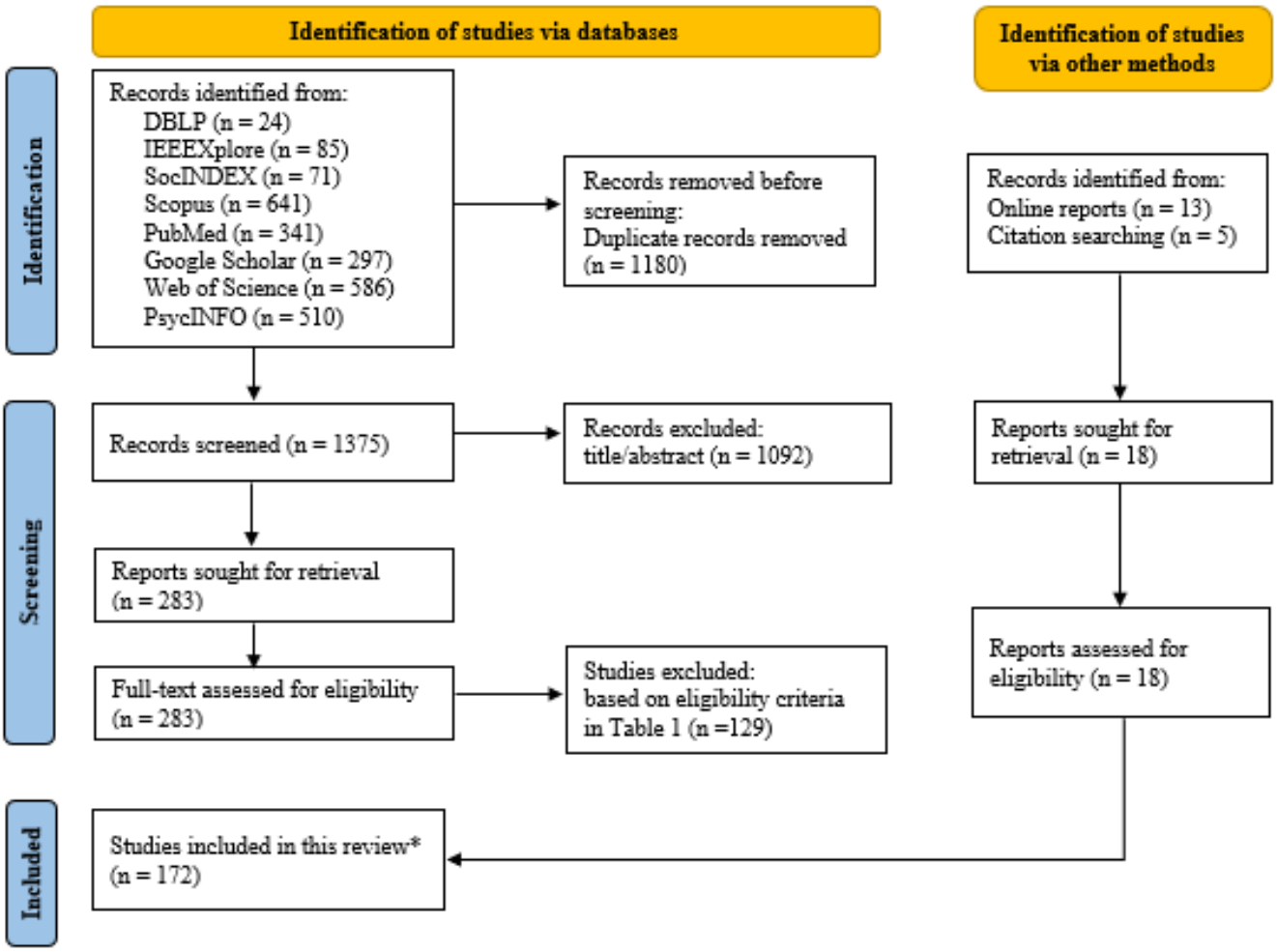

Fig. 1 Flow diagram of search results and study selection. *A full list of included articles reviewed can be found in the Appendix.

Findings

Our integrative review revealed an absence of literature reviews concerning transparency in existing SG practices. Examined empirical studies focused exclusively on specific SG strategies or tools. A lack of consensus regarding what SG-driven transparency comprised was observed.

Themes for SG-driven transparency emerged from a synthesis of evidence and viewpoints in literature. Given the diversity in study designs and outcome measures, and our focus not being on assessing SG practice effectiveness, we refrained from extracting interventions, participants, and outcome measure details. Instead, the following information was extracted from included articles: authors, publication dates, study designs, overarching findings or positions, and implications (subthemes or themes) for SG-driven transparency. Themes encompass: Transparency of

Information and Education for Safer Gambling, Transparency of SG Tools, Transparency of Data-driven Approaches and Persuasive Technologies, Transparency of Corporate Social Responsibility and Individual Responsibility, Transparency in Advertising, and Transparency of Research Evidence and Funding Sources, and Design Considerations for Improving Transparency. These themes encapsulate diverse facets of SG-driven transparency, which stakeholders should consider for best SG practices. Definitions and examples from literature supporting the themes were summarized in Table 2. Detailed explanations for each theme follow.

Table 2. Definitions and examples of themes of SG-driven transparency

Themes	**Subthemes**	**Definition**	**Examples of knowledge gained from the literature**
Transparency of Information and Education for Safer Gambling	Fairness of games and gamblers' fallacy	Transparency pertains to the likelihood of winning, game mechanics, gambling risks, misperception, and erroneous beliefs, and promoting safer gambling behavior.	Safer gambling guidelines advise gamblers to "stop if they are not having fun, keep a household budget, …, engage in other leisure activities, avoid gambling when upset or depressed" (Hing et al., 2019a, p. 1). Online gambling carries an elevated risk of gambling-related harm in contrast to land-based gambling. (Effertz et al., 2018; Kairouz et al., 2012; Papineau et al., 2018; Wu et al., 2014).
	Potential risks and negative consequences		
	Safer gambling cognition and behavior		
	Boundary between gaming and gambling		
Transparency of SG Tools	Availability and accessibility of SG tools	Transparency encompasses the availability and accessibility, effectiveness, target user groups of SG tools, and how they have been personalized to individual user characteristics/needs and game genres.	In contrast to non-problem gamblers, problem gamblers exhibited more negative experiences with SG tools and demonstrated a greater inclination to discontinue an online gambling service due to perceived excessive exposure to these tools. Addressing individuals' responses to SG tools could be beneficial in deterring them from seeking alternative gambling services from operators with less customer protection programs (Ivanova et al., 2019).
	Effectiveness of SG tools		
	Personalization of SG strategies		
Transparency of Data-driven	Purposes and benefits of	Transparency pertains to elucidating the intentions	The General Data Protection Regulation (GDPR) has

Approaches and Persuasive Technologies	using personal data Data usage and privacy protection Individual autonomy Algorithmic transparency Trade-off determination	and rationales of data-driven approaches and persuasive technologies, outlining personal data handling, and safeguarding measures, clarifying the mechanisms underlying AI-based decisions and their precision within the online gambling domain. Individual autonomy should be granted in relation to decisions about data consent and its extent. Striking a balance between transparency and other factors such as accuracy and efficiency is crucial in practice.	established compliance guidelines to ensure robust safeguarding of individual data privacy rights (GDPR.EU, 2018). Prior to sharing individuals' data, gambling operators should undertake a Privacy Impact Assessment concerning data collection and processing (Drosatos et al., 2019). Using a simpler form of rules than high performing trees seems to offer the best trade-off between accuracy and interpretability of algorithms predicting harmful gambling behavior (Sarkar et al., 2016).
Transparency in Advertising	N/A	Transparency pertains to incorporating SG information into gambling adverts and clarifying the utilization of personal data for targeted advertising. Advertisements must refrain from containing misleading content, and measures must be in place to safeguard minors from exposure to such adverts.	Misleading content and the normalization of gambling have been identified (Lopez-Gonzalez, Estevez & Griffiths, 2019), alongside deficiencies in SG information and tools (Columb et al., 2020; Killick & Griffiths, 2020) within sports betting advertisements.
Transparency of Corporate Social Responsibility (CSR) and Individual Responsibility	Division of Responsibility Gambling policy and staff training CSR reporting and assessment	Transparency involves diffusion of responsibility among stakeholders for SG outcomes, including individuals, governments, and gambling companies. It further entails clarity on gambling policies, adequate staff training as well as regular reporting and assessment of CSR practices in a standardized format in the gambling industry.	Safer gambling responsibility is distributed among three key entities: individuals, gambling companies, and government (UKGC, 2021a). In Canada, a template was developed to foster socially responsible and accountable gambling. This framework entails the inclusion of consumer protection laws, the incorporation of the impact of commercial gambling into both operator and regulator annual reports, and a

			consideration of whether profit motives have compromised adherence to core principles of honesty, integrity, and social responsibility (Smith & Rubenstein, 2011).
Transparency of Research Evidence and Funding Sources	N/A	Transparency pertains to revealing research evidence substantiating the effectiveness of SG practices as well as disclosing the funding sources of research to mitigate potential research bias.	Evidence underscores the absence of agreement concerning the implementation and methodologies for data collection and analysis in gambling research focused on preventive measures (Planzer & Wardle, 2017). The integration of Open Science principles and practices with prevailing guidelines for industry-funded research helps to ensure an ethical, transparent, and impartial research process (Louderback et al., 2020).
Design Considerations for Improving Transparency	N/A	Design considerations and strategies for enhancing transparency encompass not only the content of SG information but also its quality.	Terms and conditions related to incentives on race and sports betting websites often employ intricate, hard-to-comprehend, obscured, and legalistic language (Hing et al., 2017).

Conceptualization of SG-driven Transparency

Drawing from the integrative review, we organized the outcomes into themes and subthemes, shaping the concept of SG-driven transparency. This framework, accompanied by relevant principles, serves as a reference model to guide best practices and regulations in advancing responsible and safer gambling.

Transparency of Information and Education for Safer Gambling

Fairness of Games and Gamblers' Fallacy

Individuals who gamble often succumb to the cognitive distortion known as the *gambler's fallacy* – the mistaken belief that after a series of deviations from the average in random events, the opposite outcome becomes more likely, despite odds remaining unchanged (Tversky & Kahneman, 1971). For instance, if a roulette ball repeatedly lands on red, some gamblers may expect black to appear soon, even those each spin is independent. This fosters an inflated and erroneous belief in the probability

of personal success(Goodie, 2005; Langer, 1975), further reinforced by an illusion of control rooted in sympathetic magic principles (Wohl & Enzle, 2002). Sympathetic magic leads gamblers to attribute causal forces such as personal luck or external forces beyond physical laws, fostering misplaced confidence and optimism (Wohl & Enzle, 2002). These cognitive distortions drive gambling decisions, culminating in problematic behavior and harm.

Research shows that conveying accurate game contingencies curbs gambling expenses and trials, prompting individuals to stop playing earlier in the final phase of the game with money left (Jardin & Wulfert, 2009). These transparent messages, correcting gamblers' misbeliefs about chance games and control, surpass mere SG promotion in communicative effectiveness (Mouneyrac et al., 2017). Considering the prevalence of cognitive distortions, it is crucial to prevent the unintended misuse of transparency-related information. When disclosing data on wins and losses, transparency efforts should be accompanied by educational content that addresses the nature of gambling and the true probabilities of winning. Providing such context can help correct erroneous beliefs, such as the gambler's fallacy or illusion of control, thereby promoting safer gambling behaviors.

Potential Risks and Negative Consequences

Gambling disorder stems from an underestimated risk of gambling-related harm (Spurrier et al., 2014). Environmental and gaming factors could amplify this risk. For instance, fast-paced games captivate both non-problem and problem gamblers, particularly the latter, hindering cessation. Faster gameplay holds allure for both non-problem and problem gamblers, posing challenges to quitting, particularly for the latter (Harris & Griffiths, 2018). Amid COVID-19 lockdowns, data revealed increased online gambling prevalence, with a shift from land-based to online platforms (UKGC, 2020a). A study conducted in Ontario found that COVID-19-related reduced work hours heightened problem gambling risk among those identified by the Problem Gambling Severity Index (Ferris & Wynne, 2001) as at risk, driving migration to online platforms (Price, 2020). Compared to land-based gambling, online gambling carries higher risk (Effertz et al., 2018; Kairouz et al., 2012; Papineau et al., 2018; Wu et al., 2014), which could be related to 24/7 accessibility and tech-driven features such as targeted advertising and rewards, fostering prolonged engagement and loss of control. On the other hand, online platforms also enable behavior tracking and persuasive technologies for SG. Research counters the notion that online gambling is inherently riskier than traditional methods (Wood & Griffiths, 2015). In this context, online gambling stands as the preferred medium for positive players—those without at-risk or problem gambling behavior—enabling better adherence to their limits, as seen with the National Lottery (Wood & Griffiths, 2015).

Moreover, a substantial number of problem gamblers display comorbid mental health conditions including substance use, anxiety and impulse control disorders (Crockford & El-Guebaly, 1998; Dowling et al., 2015; Lorains et al., 2011). Among high-risk online gamblers, risks center on anxiety, depression, gambling influenced by substance use, and motivations linked to mental health concerns (Price, 2020), underscoring a noteworthy comorbid connection between high-risk online gambling and broader health concerns.

Safer Gambling Cognition and Behavior

Evidence in our reviewed literature indicates that cognitive interventions fostering critical thinking and self-reflection about gambling can effectively reduce gambling time (Armstrong et al., 2020). Hing et al. (2019a) proposed safer gambling guidelines for individuals, encompassing cognitive and behavioral dimensions. These guidelines advise players to stop gambling if it ceases to be enjoyable, set spending limits, engage in alternative leisure activities, avoid gambling for mood regulation, and eschew gambling for profit. However, these guidelines require further market testing with a representative sample to refine wording for effective and comprehensible delivery (Hing et al., 2019a). Moreover, cognitive processes and social influences play a crucial role in shaping behavior. For example, Procter et al. (2019) found that positively shifting attitudes, perceived social norms, and prior tool usage increases the likelihood of customers who bet online adopting consumer protection tools. Similarly, Martin et al. (2010) demonstrated that addressing subjective norms – misconceptions about others' approval of gambling – and enhancing perceived behavioral control can strengthen SG efforts, improving gambling management among college students and other groups. In summary, effective educational content and SG interventions should go beyond simply promoting SG tool usage. Instead, they should integrate messages that challenge common gambling misconceptions while incorporating prompts that encourage behavior change.

Boundary between Gaming and Gambling

The gambling industry often interchanges the terms 'gaming' and 'gambling,' as the distinction blurs. Casino games, classified as gambling, encompass gaming features, while games can blend elements of both chance and real money spending. Concerns arise regarding the gaming-gambling relationship and whether video games correlate with heightened gambling and problem gambling risk. Molde et al. (2019) found video gaming problems could potentially serve as a gateway to problem gambling. Similarly, adolescents who played video games exhibited significantly increased likelihood of online gambling for money (McBride & Derevensky, 2016). Drummond and Sauer (2018) investigated video game loot boxes (random in-game rewards purchasable) as a potential form of gambling. They highlight significant psychological and structural parallels,

necessitating further longitudinal studies to explore these aspects of online gaming.

The UKGC differentiates skill-based and chance-based games, requiring licenses for machines used in the latter but not the former (UKGC, 2021b). Simulated gambling, like free-to-play online casino games, also raises concerns due to access by youth. King and Delfabbro (2016) reviewed potential risks and benefits of early exposure to simulated gambling activities (e.g., 'free-to-play' online casinos, gambling-like video games, social casino games). They observed that early exposure might heighten future problem gambling risk, yet it also has the potential to encourage safer gambling practices or reduce interest in gambling.

Transparency of SG Tools

Availability and Accessibility of SG Tools

Several studies in our review extensively explored tools and technologies designed to enhance SG, emphasizing the importance of transparent communication about available SG features to support responsible online gambling and reduce harmful gambling. Ensuring these tools are easily accessible and user-friendly, with clear instructions on dedicated SG web pages, is essential. Additionally, actively promoting these tools alongside marketing materials can further encourage their use.

Gainsbury et al. (2013) identified widespread mistrust, concerns, and confusion regarding the regulation of online gambling, suggesting that integrating SG features (e.g., spending limits) directly into gambling platforms can help build customer trust and foster more positive attitudes toward online gambling operators.

For individuals struggling with harmful gambling, the implementation of automatic identification tools using machine learning or novel detection algorithms is recommended to recognize risky behaviors and enable timely interventions (Cemiloglu et al., 2020). Furthermore, improving access to telephone helplines and streamlining pathways to professional support services should be prioritized to ensure individuals can easily seek assistance when needed (Aster et al., 2018).

Effectiveness of SG Tools

An examination of Australian gambling sites by Gainsbury et al. (2020) found that customers predominantly refrained from utilizing consumer protection tools, such as activity statements, deposit limits, and time-outs (temporary self-exclusion). Customers perceived such tools as irrelevant to their own gambling habits and believed that they were intended for problem gamblers. This highlights the necessity for increased efforts in promoting SG tools to enhance their adoption and effectiveness. When promoting SG tools, it is important to emphasize their universal benefit in preventing harm for all individuals, rather than framing them solely as interventions targeted at those experiencing gambling harms. Highlighting

their preventative value can foster broader acceptance and encourage safer gambling behaviors across the entire spectrum of users.

In evaluating effectiveness, it is crucial to consider both the research evidence and the target audience. The empirical studies reviewed aimed to assess the efficacy of SG tools, utilizing either self-reported data (Auer et al., 2020), or gambling behavior data (Luquiens et al., 2019). These investigations encompassed both traditional SG tools such as voluntary limit setting (Auer et al., 2020), mandatory limit setting (Delfabbro & King, 2020), and self-exclusion (Luquiens et al., 2019), as well as data-driven SG tools such as expenditure-specific warning messages (McGivern et al., 2019). The effectiveness of SG tools may differ across user groups. For instance, one study found no age or gender-related variations in online gambling expenditure, but among the most gambling-intense players, those who voluntarily set limits wagered significantly less money a year later than those who did not (Auer et al., 2019b). In contrast, another study found no link between the use of SG strategies and the risk of problem gambling among older adults, casting doubt on the utility of SG strategies (Theriault et al., 2018). In general, more longitudinal research employing robust controlled designs is needed to assess the effectiveness of transparency and promotion concerning SG tools.

Personalization of SG Strategies

The effectiveness of SG tools can vary among different user groups (Auer et al., 2019b; 2020), implying that SG strategies should be individually tailored to optimize efficacy across diverse target groups. Diverse user categories encompass varying risk profiles, age ranges, gambling types, and cultural contexts. A survey (Ivanova et al., 2019) exploring experiences and attitudes towards SG tools, encompassing measures such as monetary or time limits, self-assessment, and the option to freeze specific gambling categories or the entire account, revealed that non-problem gamblers had positive interactions with SG tools. Conversely, problem gamblers were more prone to abandoning online gambling services due to experiencing disruption and perceiving excessive exposure to SG tools. The survey findings recommended targeting individual gamblers responses to SG tools to deter them from seeking alternative operators with less extensive customer protection measures. Furthermore, Gainsbury et al. (2018) found divergent preferences and responses to message archetypes among distinct age groups. While older adults favored limit-setting messages, young adults and frequent gamblers showed a preference for messages regarding their own gameplay and expertise. In Asian communities, a qualitative study highlighted the significant role families played in implementing SG interventions among older adults (Subramaniam et al., 2017).

Moreover, SG strategies should be customized for different game types. For example, pop-up messages might prove more beneficial during rapid continuous games (e.g., virtual slot machines, live-action sports

betting, card games, casino games) with brief time intervals between bets and outcomes. In contrast, this might not be as effective for activities like purchasing lottery tickets or gambling on sites with significant delays between placing bets and obtaining results (Monaghan, 2009). In the context of skill games like poker and sports betting, individuals tend to exhibit a preference for SG messages that offer information about winning probabilities and their personal performance trends over time, rather than other types of messages such as limit setting (Gainsbury et al., 2018).

Transparency of Data-driven Approaches and Persuasive Technologies

Purposes and Benefits of using Personal Data

The realm of online gambling, coupled with persuasive technologies, has opened avenues for employing data-driven methodologies to observe individuals' gambling behavior, detect potential risk patterns, and supply personalized, persuasive feedback (Drosatos et al., 2019). The integration of behavioral tracking tools and personalized feedback brings forth objectivity and transparency, fostering trust through its capacity to measure actual usage against self-reported estimations. These strategies and technologies have been leveraged for targeted advertisements and push messages promoting betting options based on user profiles (Gainsbury et al., 2020). Emotional resonance in messages, in conjunction with behavioral data, can enhance attention capture beyond conventional SG communication (Harris et al., 2018).

Given that these data-driven methodologies necessitate the collection and utilization of personal data, transparency should be upheld to ensure individuals are fully cognizant of the objectives and benefits associated with using their personal information. Such transparency becomes pivotal in augmenting perceptions of brand authenticity, subsequently influencing customer loyalty (Busser & Shulga, 2019).

Data Usage and Privacy Protection

In the past, privacy concerns were prominent due to the lack of clear regulations pertaining to issues such as information disclosure, ownership, and intended use. The General Data Protection Regulation (GDPR), a data privacy law in the European Union, set guidelines to ensure robust protection of individual data privacy rights (GDPR.EU, 2018). The GDPR permits gambling operators to share individuals' data for their benefit, provided a Privacy Impact Assessment is conducted on data collection and processing (Drosatos et al., 2019).

Despite these advances, aligning data use, especially data-driven technologies with regulations, remains work in progress. McMullan and Kevin (2012) analyzed 71 international poker sites and found that most sites lacked publicly announced policies to safeguard players from staff misconduct, including unauthorized access, sharing, or misuse of personal information. Further, while most poker platforms offered ample

opportunities for comprehensive data collection, capturing consumers' journeys from initial contact to point of purchase to return, culminating in marketing databases capable of targeting individuals and groups, most of these sites did not disclose protocols for securing and transferring monetary data to customers. Therefore, incorporating privacy into design and offering users the opportunity to comprehend the process, concerns, and risks associated with data usage and privacy protection are critical steps forward.

Individual Autonomy

Research involving individuals who gamble has yielded slightly conflicting perspectives regarding platforms having access to their information. While some view collecting data from multimodal sensors about factors like location, emotion, and stress as beneficial, others argue that such levels of information access are overly intrusive (Drosatos et al., 2020). Therefore, in addition to the informed consent for data usage and privacy protection discussed in Section 4.3.2, individual autonomy should be elevated. Individuals should not only have the binary choice to opt in or out of enrolment with a system that that utilizes their data for SG/marketing purposes, but also the functionality of the gambling platform should offer a spectrum of options, allowing users to customize their consent preferences. For instance, awareness about when this happens across the duration of a gambling session or the usage of the system should be provided as good practice in human-computer interaction in a broader sense (Jacucci et al., 2014).

The GDPR (GDPR.EU, 2018) aligns with this perspective by recognizing individuals' right to access their own data. Users should be empowered to access their gambling profile and behavioral data, including metrics such as win-loss percentages, time and money expended on the platform, and even multi-modal sensor data (e.g., emotion and stress levels if collected). Furthermore, individuals should be able to share this information with other entities to obtain specific services. To facilitate this process, clear guidance and accessible instructions should be provided. This approach can also aid users in gaining a more accurate understanding of their own gameplay, circumventing potential cognitive distortions, as highlighted in Section 4.1.1. However, as noted in Section 4.3.5, there are often trade-offs between individual autonomy and considerations of well-being. For instance, studies suggest that mandatory limit-setting tools may lead to more effective behavioral changes compared to voluntary limit-setting tools (Delfabbro & King, 2020; Marionneau & Jarvinen-Tassopoulos, 2017). Although such interventions may appear to limit personal autonomy, they can be effective in curbing excessive gambling by providing a stronger deterrent against impulsive, risky behaviors.

Algorithmic Transparency

The integration of Artificial Intelligence (AI) techniques, particularly machine learning, into safer gambling efforts presents a

significant opportunity to detect potentially problematic gambling behavior. This aids gambling operators in providing timely interventions to prevent such behavior (Drosatos et al., 2019). Algorithmic transparency has gained increasingly more interest in the Computing and AI realm (Felzmann et al., 2019; Naiseh et al., 2020), and the same ethos should extend to AI-driven SG. Individuals ought to comprehend how algorithms employ their data to determine results, encompassing behavior classifications (e.g., problem gambling detection), service personalization, predictions, and recommendations, along with algorithm precision.

Furthermore, individuals can be granted the chance to offer input or feedback on such outcomes. In terms of explainable AI, users can participate in the process of optimizing machine learning algorithms, refining AI-based decisions in persuasive systems, and enhancing user comprehension and trust in these systems. An exemplar is a combined model developed for early gambling problem detection, which exhibits heightened validity and classification rates by amalgamating human ratings and automated text analysis as opposed to relying solely on automated text analysis (Haefeli et al., 2015).

Trade-off Determination

Achieving a balance between transparency and other factors entails navigating numerous trade-offs. One such instance involves AI-based systems, wherein a trade-off exists between optimizing algorithms through heightened complexity and fostering interpretability for user autonomy. To reconcile this trade-off, Sarkar et al. (2016) extracted decision trees from intricate machine learning models to enable human interpretation with minimal accuracy loss. Other trade-offs encompass equity vs. efficiency (in user-centered design for algorithm or SG tool development, considering diverse user needs), autonomy vs. beneficence (e.g., mandatory vs. voluntary limit setting; Delfabbro & King, 2020) and User Experience (UX) vs. risk minimization (e.g., frequency and timing of pop-up messages; Drosatos et al., 2020; Engebo et al., 2019). The optimal timing and frequency for SG-related messages remain elusive, demanding strategic pop-up presentation that bolsters SG without undue disruption, preventing players from switching to alternate games or operators with less customer protection measures. Personalized content and timing of SG messages, accounting for user preferences and automatic behavioral detection, emerges as a potential solution, such as delivering pop-up messages during periods of low cognitive load, so they are perceived as less irritating (Monaghan, 2009). Personalization could also be a potential approach to trade-off determination, taking into account individuals' needs and preferences in regard to content, timing and frequency for receiving SG-related messages.

Primarily, research has concentrated on integrating novel technologies and machine learning models into the SG domain, which remains at an early stage. Yet, investigations into transparency issues about

data usage, privacy safeguards, algorithmic transparency, and trade-offs remain sparse. Therefore, further empirical evidence is required from user research to gain a deep understanding of what information is effectively consumed for safer gambling behavior and thus what information should be prioritized for transparency in practice. Establishing these transparency facets holds paramount importance, facilitating users' understanding of data-driven approaches and persuasive technologies for responsible use, critical thinking capabilities, informed decision-making, and individual autonomy.

Transparency in Advertising

Researchers have examined online gambling advertisements for potential misleading elements, gambling normalization, transparency gaps, and SG promotion. Existing strategies for marketing gambling inducements are likely to cause consumers to overvalue their appeal while underestimating their associated costs (Hing et al., 2019b). Particularly concerning are sports betting ads and social media usage which usually lacked SG-related information. For instance, Houghton et al. (2019), in their analysis of Twitter content posted by British gambling operators and gambling affiliates, found that the proportion of tweets classified as safer gambling was less than 1%, while most content was classified as direct advertising (30%), sports content (23%), betting assistance (20%), and customer engagement (11%). Columb et al. (2020) revealed that during live sporting events in Ireland, most SG-related gambling ads featured SG messaging, age limits, and an SG organization, but lacked information about SG tools. A UK Twitter analysis (Killick & Griffiths, 2020) during the 2018-2019 English Premier League opening weekend found that operators' tweets mostly lacked SG information. Deans et al. (2016) identified parallels in marketing tactics (e.g., symbolizing masculinity, accentuating social benefits) between Australian sports betting and other health comorbidity industries like alcohol. Normalization of gambling and misleading content were reported in sports-related advertisements (Lopez-Gonzalez et al., 2019) and positively framed social media promotions (Gainsbury et al., 2016). Website advertisements for inducements were prominently displayed, yet few included SG messages (Hing et al., 2017). When SG information was present, its design appeared ineffective in mitigating gambling harm. An eye-tracking study by Lole et al. (2019) revealed that SG messages received minimal visual attention, with significantly fewer fixations compared to other wagering-related information.

Furthermore, online platforms and AI have empowered marketers to provide personalized, targeted advertisements. For instance, poker players' prior online order data is utilized for personalized poker advertising (McMullan & Kervin, 2012). Targeted push messages align with users' profiles ("people like you bet on...") and discourage breaks (e.g., infinity scrolling), thereby exploiting human weakness regarding self-control

vulnerabilities (Gainsbury et al., 2020). This process necessitates transparency, aligning with Section 4.2 on the transparency of data-driven approaches and persuasive technologies.

Transparency of Corporate Social Responsibility and Individual Responsibility

Division of Responsibility

The RG concept encompasses both responsible consumption of gambling (RCG) and responsible provision of gambling (RPG); however, RCG is a paradigm that predominantly shapes industry, government and public health measures to prevent or reduce gambling-related harm (Hing et al., 2018). Despite a diffusion of responsibility across various stakeholders, there is a growing expectation that individuals should primarily assume responsibility for self-control and safer gambling behavior (Reith, 2008). Blaszczynski and colleagues (2021) differentiated RG as an outcome rather than a process, distinguishing it from the actions stakeholders must take to achieve it.

Clarifying each party's accountability enables stakeholders to target specific groups to achieve RG outcomes (Blaszczynski et al., 2021), positively influencing individuals' attitudes and behaviors towards gambling. Perceptions of stakeholder responsibilities for mitigating gambling harm can predict gambling behavior, comprehension of gambling concepts, and the utilization of SG strategies (Gray et al., 2019). According to the UKGC, responsibility for safer gambling is distributed among three entities: 1) individuals, 2) gambling companies, and 3) government (UKGC, 2021a). Governments are responsible for establishing legal gambling policies and ensuring regulatory compliance, while the industry must adhere to these regulations. Communities play a role in influencing public policy and advocating for public health. Ultimately, individuals act as decision-makers (Blaszczynski et al., 2021). This division of responsibilities underscores the need for stakeholder collaboration to minimize social, personal, and economic harms and costs associated with gambling.

Gambling Policy and Staff Training

Gaps in legislation require attention, particularly with regard to safeguarding minors and vulnerable individuals, and in regulating newer technologies such as loot boxes. The UKGC emphasizes the need to treat gambling-related harm as a public health concern, prioritizing the protection of the entire population, especially youth and vulnerable groups (UKGC, 2018). Significant concerns revolve around the lack of transparency in SG information in advertisements (Section 4.4) and the blurry line between gaming and gambling (Section 4.1.4), necessitating more robust legislation and regulation. Examples include free-to-play, gambling-like gaming sites and video game loot boxes, which are easily accessible to young people.

To address Corporate Social Responsibility (CSR) effectively, gambling companies should move beyond passive compliance and embrace intrinsic motivation for proactive efforts. Research in Australia revealed that staff training facilitates the implementation of a voluntary SG code of practice, while high staff turnover and managerial indifference hinder it (Breen et al., 2005). Additionally, strong CSR practices enhance brand reputation and consumer trust. For instance, individuals who set voluntary limits were found to display greater loyalty to the gambling operator over a period of a year (Auer et al., 2019a).

Corporate Social Responsibility Reporting and Assessment

Transparent reporting of CSR practices, including the assessment of these initiatives and the public dissemination of this information, is vital for ensuring the transparency of SG practices in the gambling industry. Effective transparency not only enhances the credibility of operators but also empowers citizens to hold their government accountable for its involvement in gambling operations (Smith & Rubenstein, 2011). However, there is significant variability among companies in the extent and nature of their CSR reporting, and most provide limited SG-related information (Jones et al., 2013; Jones et al., 2009).

A review of reports from four gambling operators — Bet365 Group Limited (2021), Flutter Entertainment (2021), GVC Holdings (2020), and William Hill (2021) — revealed inconsistencies in the availability, content, and depth of information. This underscores the urgent need for more regulatory requirements that mandate standardized templates for reporting and assessing CSR practices. Such requirements would enhance transparency and encourage the effective implementation of SG practices. Smith and Rubenstein (2011) developed a template for an optimally socially responsible and accountable gambling framework based on a comprehensive review of Canadian legislation and policies, as well as interviews with key stakeholders in the government. They claimed that transparency entailed disclosing information in various aspects, including an open, balanced discussion of the pros and cons of gambling, revenue generated from problem gamblers, the effectiveness of SG strategies, consumer protection laws, the impact of commercial gambling in annual reports issued by both operators and regulators, and whether the pursuit of profit aligned with principles of honesty, integrity, and social responsibility.

Transparency of Research Evidence and Funding Sources

Research has highlighted the lack of consensus on the methods and practices for collecting and analysing data related to preventative measures in gambling studies (Planzer & Wardle, 2012). Additionally, there have been calls for greater transparency in disclosing funding sources (Ladouceur et al., 2019). The gambling industry has grappled with conflicting priorities, including profit generation, harm reduction, and

societal impacts, leading to a climate of tension and conflict (Blaszczynski, 2018).

Policies informed by data can be susceptible to unfounded claims about the nature and scope of gambling-related harm and the effectiveness of policy strategies. This susceptibility may be rooted in research funding from various sources, including industry, government, and charities affiliated with the industry, potentially introducing biases. To enhance research independence and reduce bias, certain Open Science practices have been proposed to bolster industry-funded research, including research pre-registration, the segregation of confirmatory and exploratory analyses, the provision of open materials, data accessibility, and open access to study manuscripts (Louderback et al., 2020).

Design Considerations for Improving Transparency

Transparency in SG practices involves both information availability and its accessibility to recipients (Granados et al., 2010). Enhancing the design of the medium that conveys information in online gambling context, such as user interface design or the wording of SG messages, can bolster information quality and recipients' comprehension. For instance, Lole et al. (2019) in an eye-tracking study found that displaying messages on a high-contrast/block-color background enhances their visibility in sports betting advertisements. Moreover, the wording of SG messages can influence the effectiveness of these messages in engaging players with harm-reduction tools (Gainsbury et al., 2018).

From a broader perspective, effective design encompasses not only content structure and formatting but also audience-specific considerations. A user-centered approach involves tailoring designs for diverse audiences, such as individuals experiencing gambling harms, casual players, regulators, or the wider community. For instance, designs targeting individuals at risk of gambling harms may emphasize SG tools and warnings using loss aversion and framing principles, while those for regulators might focus on compliance metrics and transparent reporting. However, literature reviewed reveals a scarcity of research and discussions on these considerations. The accessibility and usability of SG information for individuals who gamble online or access gambling information online are uncertain. For instance, content analysis research suggests a shortage of SG information in online promotional materials and advertisements (Hernandez-Ruiz, 2020; Hing et al., 2017; Killick & Griffiths, 2020). Few empirical studies assessed how effectively this SG information is designed and communicated to individuals.

Gambling operators have predominantly prioritized using marketing and design strategies to enhance the gambling experience and retain customers, with little attention to designing information that promotes SG in the public interest. For instance, terms and conditions on race and sports betting websites frequently employ complex, hard-to-comprehend, opaque, and legalistic language (Hing et al., 2017). Social media gambling

promotion messages tend to be positively framed and often misleading, with a conspicuous absence of risk information (Gainsbury et al., 2016). As a promising initiative, Ottosson (2019) developed prototypes and provided recommendations for the design of modal windows requiring users' immediate attention to effectively communicate SG information and warning messages to problem gamblers, employing a UX design approach which emphasizes UX aspects such as usability, pleasure and enjoyment and nudging concepts (e.g., loss aversion, framing).

As online gambling environments, facilitated by behavioral tracking tools and persuasive technologies, can be designed in ways that enable manipulation or unethical persuasion, it is essential to uphold ethical standards when providing SG information. This included ensuring the availability, clarity, accessibility, perception, comprehension, acceptance, and actionable nature of the information (Cemiloglu et al., 2020). Gray et al. (2018) identified five 'dark patterns' in UX design: Nagging, Obstruction, Sneaking, Interface interference, and Forced action. Design improvements aimed at SG-driven transparency should avoid these dark patterns of UX design. Caraban et al. (2018) suggested that any applications employing dark patterns should first address user concerns and misunderstandings, highlighting the responsibility of researchers and designers to ensure that interventions in persuasive systems are delivered ethically and transparently. In addition to designing interventions capable of challenging erroneous gambling beliefs (Armstrong et al., 2020; Drosatos et al., 2020), the gambling industry and policymakers must remain awareof the addictive elements present in game design (Mulkeen et al., 2017).

Discussion

Latest Progress in Literature

We conducted this integrative review during COVID-19 pandemic to address the absence of consensus of what constitutes transparency in SG practices within the gambling industry, and we conceptualized SG-driven transparency by categorizing elements implied in the literature reviewed, thereby providing stakeholders with clear principles and considerations to foster best practices in SG-driven transparency, alongside implications for future endeavors. Since completing our review, we recognize that some progress has been made in gambling literature regarding transparency. A notable shift is the critique of the traditional "responsible gambling" paradigm which often emphasizes individual accountability and that the prevailing research orthodoxy may have constrained knowledge expansion and failed to effectively mitigate harm (Livingstone, 2023). Instead, a public health approach is suggested (Livingstone, 2023; National Betting Authority, 2022) that recognizes collaboration required for prevention and reduction of gambling harms and emphasizes the importance of transparent funding and research independent from industry influence, which have been

covered in the themes of transparency in our review (e.g., Division of Responsibility, Transparency of Research Evidence and Funding Sources).

Furthermore, there have been more empirical studies that examined the efficacy of SG messages on gambling behaviors. For example, Newall et al. (2023) evaluated the UK's "Take Time to Think" initiative, suggesting that experimental research design could be adopted to test optimal placement and timing of SG messages for safer gambling behavior, and messaging alone is unlikely to effectively reduce gambling-related harm. Moreover, researchers suggest personalized messages which provide accurate information about an individual's own gambling behavior, could be potentially more effective than the generic, repetitive slogans currently adopted (Newall et al., 2023; Rintoul, 2022). These considerations have also been covered in our theme "Transparency of SG Tools" and the subthemes. In addition, more research has investigated relative risk of harm associated with different gambling products. For example, recent analyses of datasets from Australia (Browne et al., 2023) and Great Britain (Wang et al., 2025) consistently highlighted the potential risk of gambling harms associated with electronic gambling machines. This is in line with our theme 'Transparency of Information and Education for Safer Gambling', and as more research evidence corroborates heightened risks associated with certain types of products, the information and educational materials should be freely accessible to the public.

The latest progress in literature underscores a transparent, evidence-based approach to informing SG policy and practices, which moves beyond individual-focused models and embraces a collaborative perspective to prioritize player protection and harm minimization. An interesting new development is the application of blockchain technology to online gambling to foster transparency, but privacy and security concerns are prominent due to the technology's early stage of development, making it susceptible to cyberattacks (Chagas et al., 2024). Nonetheless, to our knowledge, no other literature review – of any form – has focused on transparency in safer gambling practices, though certain specific aspects of transparency covered in our integrative review have been further discussed or investigated such as transparency of SG information on gambling websites (Wang et al., 2024), transparency in online advertising (Parker et al., 2023), and transparency in video games with gambling-like mechanisms such as loot boxes (Xiao, 2025). This reinforces our unique contribution through integrating multiple aspects of transparency to lay the groundwork for more transparent, safer gambling practices in future.

Limitations of the Review

In this study, we conducted an integrative review to address the lack of consensus on SG-driven transparency. The review did not intend to provide prescriptive legislative and corporate guidelinest; instead, we focused on the fundamental aspects of transparency that should be considered and implemented by industry for the benefit of individuals who

gamble. Therefore, more practicalities and detailed guidelines for gambling operators on how to embed SG-driven transparency into games and promotion materials are required with efforts from multiple stakeholders in future. On a methodological reflection, the evidence base for conducting Integrative Reviews (IRs) remains limited, with no consistent set of standards or guidelines available for reviewers. This slow progress can be attributed to the necessity of merging diverse methodologies, including experimental research, nonexperimental research, and theoretical literature, which adds complexity to the processes of analysis, synthesis, and drawing conclusions (Whittemore & Knafl, 2005). The lack of formal guidelines for IRs has led researchers in nursing education to examine published IRs that discovered inconsistent review methods and a lack of rigor in many reviews conducted by nurse reviewers (Hopia et al. 2016; Toronto et al. 2020). Despite the challenges, IRs are frequently published in high-impact nursing research journals internationally (Soares et al. 2014), indicating the value of this review method in informing evidence-based practice in health-related domain. The primary reason for the popularity of the IR method, as well as its adoption in this study, is its ability to utilize diverse data sources, providing a more comprehensive exploration of complex practices compared to the narrower focus of research or clinical questions typically found in systematic reviews. Additionally, future review studies should incorporate recent developments and literature in the gambling field, such as the recent Gambling White Paper released by the UK's Department for Culture, Media & Sport (DCMS, 2023).

Recommendations for Future Practice and Research

Based on the evidence gathered through this integrative review, we have formulated a checklist of recommendations according to the themes and subthemes of SG-driven transparency. These recommendations aim to guide best practices in SG-driven transparency and should involve collaboration among all stakeholders, including the gambling industry, individuals who gamble, policymakers, and researchers. The gambling industry has a responsibility to provide not only accurate information about the probability of winning but also educational content that addresses common misperceptions about how games operate. This includes transparent explanations of risk factors associated with harmful gambling, such as behavioral addiction and its potential to negatively affect health-related quality of life. Educational initiatives should disclose these risks openly and clearly, equipping individuals with the knowledge they need to make informed decisions. Whether integrated into SG interventions or delivered separately, educational materials should target both cognitive and behavioral aspects to promote SG practices and reduce cognitive distortions.

Transparency must extend to the relationships, content, and boundaries between gaming and gambling. Such information should be made accessible not only to individuals who gamble, but also to educators

and regulators, ensuring clarity across all stakeholder groups. Online gambling products, in particular, should avoid creating an illusion of control. Instead, these products should be accompanied by clear, accessible SG information designed to help individuals understand the true nature of the games they are engaging with.

In terms of promoting SG tools, it is essential to provide information on how to access and use these tools, their effectiveness, and the specific user groups they are designed for. Transparency about how SG strategies are personalized for different risk categories, age groups, gambling types, and cultural contexts is equally important. Tailoring such tools to user needs ensures their proper utilization and promotes greater acceptance.

When personal data is collected, individuals must be given clear and transparent information about the purposes and processes involved, including how their data is used and shared. It is crucial to inform them of any potential privacy risks and to obtain informed consent, allowing users to customize their preferences regarding data usage. Autonomy should be respected, with individuals provided the means to access their own data and exercise control over its use.

For gambling products or safer gambling initiatives that leverage AI techniques, algorithmic transparency is critical. Details on data collection, usage, and algorithm accuracy should be made accessible to both laypersons and expert users. This openness fosters trust and ensures that the technology aligns with ethical standards.

Gambling advertising requires particular scrutiny. Advertisements must provide fair and accurate information about winning probabilities, avoiding misleading content. Regulatory reviews are needed to address the volume of gambling advertising, its use on social media, its impact on minors, and the inclusion of SG information within adverts. These steps would better protect vulnerable populations while ensuring that advertising practices align with societal expectations of fairness and responsibility.

Gambling policy and CSR practices should clearly delineate responsibilities among governments, individuals, and the gambling industry. Governments must develop and regularly update policies to create a responsible and safer gambling environment. Meanwhile, the industry should prioritize staff training and foster a deep understanding of SG requirements to ensure proactive and sustainable implementation of SG strategies. CSR reporting should focus on improving transparency, particularly in youth protection and avoiding misleading advertising in online gambling contexts. Externally and independently assessing industry-implemented SG policies and transparently reporting the results will enhance public trust and accountability.

Future research and funding sources play a pivotal role in advancing SG. Longitudinal studies are needed to evaluate the effectiveness of SG strategies, with empirical evidence made accessible to individuals, operators, and policymakers. To mitigate bias and ensure independence, funding sources for research should be disclosed transparently.

Additionally, more research is required to explore the relationships between game design, user experience design, and gambling behavior on online platforms. Understanding how SG content can be designed and delivered to maximize transparency and minimize unethical design patterns is crucial for creating a fairer and safer gambling environment.

Conclusion

In this integrative review, we conceptualized SG-driven transparency by identifying seven themes: Transparency of Information and Education for Safer Gambling, Transparency of SG Tools, Transparency of Data-driven Approaches and Persuasive Technologies, Transparency of Corporate Social Responsibility and Individual Responsibility, Transparency in Advertising, and Transparency on Research Evidence and Funding Sources, and Design Considerations for Improving Transparency. have Furthermore, we have developed a concise, fundamental checklist of recommendations that can serve as a valuable reference for various stakeholders, including gambling operators, regulators, researchers, and individuals who gamble. This checklist is designed to enhance understanding and implementation of SG-driven transparency, thereby promoting responsible and safer gambling practices. Looking ahead, future research efforts should focus on empirically validating this checklist of SG-driven transparency. Moreover, addressing the complex trade-offs related to transparency, such as balancing it with user experience requirements and the intentions of persuasive technologies within SG interventions, should be a priority. Achieving this balance requires iterative design methods and longitudinal studies, ensuring that these technologies and intervention strategies are aligned with psychological theories and evidence, maximising their benefits for users while reducing risks like privacy concerns and behavioral addiction.

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Availability of data and material

Data will be made available upon reasonable request.

Statement of Competing Interests

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Authors were coinvestigators or employed research staff on the EROGamb 2.0 project funded by GambleAware to Bournemouth University for which this review is part of a work package. **JM** is a member of the Gordon Moody Association Board of Trustees and was formerly Chair of the Clinical Governance Committee (unpaid role) and is the principal investigator. **RBE** was the principal investigator on a research project entitled 'Gambling, Personality and Wellbeing', funded by the Academic Forum for the Study of Gambling (AFSG) and has received funding from the AFSG for conference attendance. **RBE** received honoraria for peer-review of AFSG Exploratory Research Grants (2025). **RBE** had travel and accommodation expenses covered by Auckland University of Technology (AUT), New Zealand for Keynote presentation at the International Gambling Conference 2024 and presentation at the International Think Tank on Gambling Research Policy and Practice at AUT. **EAC** and **EB** are co-investigators on a research project entitled "Gap analysis: Research into gaming and gambling harms," funded by the Young Gamblers and Gamers Education Trust (Ygam) (November 2024). **RW** had travel expenses covered by UK Gambling Commission to present research at the spring conference (March 2024). **JM** (Principal Investigator), **RW, RBE, ST, EAC** and **EB** received regulatory settlement funding from Happy Tiger for a project entitled "The impact of gambling advertising on people with sub-clinical depression" (October 2023). **KP, SH, EAC** and **EB** were coinvestigators on 'GamInnovate', a research project which explores transparency and responsible gambling funded by the International Centre for Responsible Gaming, USA (2019 - 2022). If there are other authors, they declare that they have no known competing financial interests or personal

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Author's contributions

All authors conceived of the study. RW and RBE conducted the literature search and selection. RW synthesized information from the included literature and wrote the first draft of the paper. All authors revised the first draft. RW, RBE, EAC, JM, SH, EB revised the manuscript to address reviewers' comments. All authors approved of the final version.

Ethics Approval

N/A.

Research Promotion

The integrative review responds to the rapid expansion of online gambling and the urgent need for transparent safer gambling practices to mitigate risks posed by personalized marketing and emerging technologies. Drawing on 172 academic and industry sources, the review identifies key transparency themes, ranging from clear educational messaging and effective communication of safer gambling tools to data-driven interventions, responsible advertising, and corporate social responsibility. It introduces a conceptual framework of transparency with targeted recommendations for industry, policymakers, and researchers aimed at enhancing accountability, protecting users, and promoting safer gambling behaviors.

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