Gambling Disorder: Future Perspectives in Research and Treatment

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15.1 Gambling Disorder: Why It Needs More Attention

From a clinical viewpoint, the phenomenon of problem gambling is clearly a relevant public health concern. It is the first non-substance-use behavior formally recognized as a possible addiction by the American Psychiatric Association, appearing in the fifth edition of the organization's *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) in 2013. It similarly is recognized by the World Health Organization in the 11th edition of the International Classification of Diseases (ICD-11). However, its relevance to affected people and to society more broadly is relatively independent of the scientific debate on the appropriate diagnostic criteria and its categorization within diagnostic systems. Basic learning theory and research on habit formation in addictions suggest that engaging in specific behaviors with high frequency at the expense of other activities and in spite of negative consequences increases the probability of developing related health problems [1]. For gambling-related problems, very serious negative consequences, especially in social,

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psychological, and financial domains, are common. Gambling-related problems often include missing work and losing jobs, impaired relationships with spouses and other family members, and large debts that may lead to bankruptcy. Suicidal thoughts or behaviors may be prompted by gambling losses. Further, psychiatric comorbidity is the rule, not the exception. It is estimated from community data that 96% of individuals with gambling disorder have one or more psychiatric disorders and that 64% have three or more such conditions [2]. The prevalence of gambling disorder is approximately 0.5% [2, 3], slightly less than psychiatric disorders like bipolar disorder or schizophrenia. The impact of gambling disorder extends beyond those with the disorder as family, friends, employers, and others are affected. Thus, gambling disorder is a significant mental health issue that unfortunately receives relatively rather limited attention compared with other disorders [4]. Due to its relevance to society, gambling disorder should be of interest not only to physicians, psychologists, and other mental health care practitioners but also to government agencies, which typically pay too little attention to gambling-related problems. Although the possible harms related to problem gambling are well-documented, there is not a widespread public call for a strict regulation or even prohibition on gambling. Gambling is typically seen as a legitimate leisure-time pursuit, which most people can enjoy without problems. However, in order to protect the freedom of how individuals spend their time while at the same time promoting public health, it is important to understand how best to regulate gambling and prevent and treat gambling problems.

From a scientific perspective, gambling disorder deserves more attention. Albert Einstein once said, "Play is the highest form of research." More research is needed to understand why people play or gamble and how these common human behaviors may lead to harm in the case of gambling disorder and also gaming disorder. One of the most important scientific journals in the world, *Nature*, titled in its editorial in January 2018: "Science has a gambling problem." In this editorial, a criticism is raised that relatively few studies exist investigating the phenomenon of gambling and gambling problems in well-designed manners and which are conducted in real gambling environments [4, 5]. Such studies are needed to inform policymakers and clinicians as how best to handle the development of diverse online and offline gambling activities offered to people and potential gambling-related problems. Further, this approach should be applied to a broader range of behavioral addictions [6], particularly as gaming disorder will be included in ICD-11. Some countries have regulations to protect those who are most vulnerable to developing gambling problems – e.g., agreements with gambling establishments to ban people suffering from gambling disorder for fixed time periods. More empirical evidence is needed to show which strategies work best and to expand such approaches in order to better protect high-risk populations like adolescents. Ideally, this research should be independent from the related industry (e.g., funded by the government that is charged with protecting the public health).

In the above-mentioned Nature editorial, it is also argued that there may be some stereotypes associated with people spending money in the casino, at the racetrack, or elsewhere. Some portrayals of gambling in society may conjure images of glitter and luxury and of people seeming to take little responsibility for the consequences

of their behaviors. Although the reality of most people affected by gambling disorder is typically far from this, such prejudices may decrease empathic reactions toward people suffering from significant gambling problems. Such stigmatizations share some similarities with historical views of people with substance-related disorders who may have been considered "weak-minded" or morally flawed in the past. Research on the development and maintenance of substance-use disorders has helped to mitigate such views by expanding the knowledge about these disorders. Thus, there is the need for governments to support research into gambling problems as is done for problematic alcohol and drug consumption.

15.2 Gambling Disorder: Future Directions

15.2.1 Rethinking Classification and Diagnostic Criteria

A significant change came with the publication of the DSM-5 in 2013. The condition "gambling disorder" was reclassified as a substance-related and addictive disorder, replacing pathological gambling that had been classified as an "impulse-control disorder not elsewhere classified" in earlier editions of the DSM. While the criteria remained nearly the same (with the removal of the illegal-acts criterion and changing of the diagnostic threshold from five of ten inclusion criteria to four of nine criteria), the reclassification of the disorder reflected evidence showing similarities with substance-use disorders in multiple domains including epidemiology, clinical phenomenology, genetics, neurobiology, prevention, and treatment [7, 8]. In an interview, Charles O'Brien, M.D., chair of the DSM-5 Work Group on Substance-Related and Addictive Disorders, stated: "The idea of a non-substance-related addiction may be new to some people, but those of us who are studying the mechanisms of addiction find strong evidence from animal and human research that addiction is a disorder of the brain reward system, and it doesn't matter whether the system is repeatedly activated by gambling or alcohol or another substance" [9]. Despite those clinical and neurobiological similarities which led to the changes in DSM-5 [10], future research should focus on both similarities and differences between gambling and substance-use disorders. For example, although tolerance development and withdrawal symptoms constitute core features of addictions in general [11], such symptoms in gambling disorder are usually milder than those in substance-use disorders. On the other hand, phenomena like craving and its influence on choice behavior as well as alterations in loss processing might be equally or even more relevant in non-substance-related problems due to the high generalizability of potentially triggering situations. Further, because non-substance-related addictions are not related to the use of specific substances, it may be possible to translate the concept of behavioral addictions to multiple aspects of human behavior. This comes with the potential danger and thus the responsibility for researchers as well as clinicians to consider the concept with caution in order to avoid stigmatization and to account adequately for variance in human behavior beyond mental illness (see also Chaps. 1 and 2).

Moreover, it is important to foster research that allows for a more complete view of the phenomena of gambling disorder. For example, different subtypes of gambling disorder have been proposed, like in the "pathways" model (see Chap. 3), and this model has gained empirical support. This and other models may be relevant in promoting advances in differential diagnosis and more targeted treatment options. It may also be helpful to include characteristics from cognitive research on gambling disorder, for example, gambling-related cognitive distortions may be assessed using psychometrically validated instruments in diagnosis and clinical practice (see Chap. 4).

Further, it is of interest for research in this field to move forward to a more continuous understanding of gambling behaviors and problems, with the understanding that gambling behaviors lie along a continuum of problem-gambling severity. From this viewpoint, there are many important reasons—including from a public health perspective [12]—to study continuous gambling phenotypes. This approach is also in line with efforts in understanding and treating psychiatric disorders from a dimensional perspective, including neurobiological approaches [13] and the research domain criteria (RDoC) initiative [14].

15.2.2 Understanding Neurobiological Mechanisms

From a neuroscientific perspective, gambling disorder may be of high interest to addiction research due to its non-substance-related nature. In contrast to substance-related addictive disorders, in gambling disorder there are not necessarily substance-related effects on the brain, e.g., neurotoxic effects of alcohol consumption on neurons in alcohol-use disorder. Thus, behavioral addictions such as gambling disorder may serve as an important model disease for studying the mechanisms underlying addiction. Therefore, it might also be of importance to better understand the neurobiological similarities as well as the differences between gambling disorder and substance-use disorders. Other behavioral addictions also warrant consideration. Research on other potentially relevant behavioral addictions, like compulsive buying, compulsive sexual behavior, and internet gaming disorder, appears rather scant to date (see Chap. 11), especially with regard to neurobiological studies.

As mentioned, neuroscientific research that identified neurobiological similarities between gambling and substance-use disorders contributed to a recategorization of gambling disorder in DSM-5. In comparison to the similarities, potential differences between substance-use disorders and gambling disorder have arguably received less attention. In order to deepen the understanding of differences (see Chap. 12), also specifically on a neural level (see Chap. 7), it is of high interest to further study gambling disorder in comparison to other conditions in domains like loss processing. The clinical phenomenon of loss chasing is a diagnostic criterion for gambling disorder that is not shared with substance-use disorders, although the concept of "chasing" (e.g., chasing drug highs or going on drug runs) may also apply more broadly to substance-use disorders. Alterations in loss processing as well as in the processing of near-misses on behavioral and neural levels may motivate loss chasing [15–20], but further research is needed to get a more complete picture. More research should also investigate relevant learning mechanisms at behavioral and neural levels that may lead to the development and maintenance of

gambling disorder. While recent research exploring alterations in learning mechanisms in substance-use disorders may help to explain key features of these disorders [21–23], the role of similar mechanisms is relatively unexplored in gambling disorder. To this end, it may also be helpful to consider gambling disorder from a transdiagnostic dimensional perspective, as proposed by the RDoC initiative mentioned above [14]. Further, the specific alterations in relevant neurotransmitter systems in addiction in general [24] and also in gambling disorder [25, 26] are an ongoing debate; thus new insights can be expected in the future.

Commonly used neuroimaging methods may be extended by using alternate analytic strategies or adding other approaches. For example, using connectivity-based approaches like independent component analysis may provide additional insight over standard general linear model-based approaches [20, 27]. Additionally, as both genetic and environmental factors have been linked to the development of gambling disorder (see Chap. 5), it will also be helpful in the future to more intensively study the interplay of genetic variations and alterations in neurocircuitry in gambling disorder by using an imaging genetics approach, as it has been done in some studies of gambling disorder [28, 29] and more extensively for other psychiatric disorders like depression [30].

In addition, animal models for gambling disorder may permit additional insight into the condition as has been the case for substance-use disorders. A more comprehensive understanding of subtypes of individuals with gambling disorder or an identification of the most relevant functional mechanisms may lead to delineating a conceptual framework for animal research in this field. This can in turn lead to refinement of animal models with high translational validity, including rodent gambling and slot-machine tasks, that may be employed in studies using procedures and manipulations that are not permissible in humans (see Chap. 6).

Further, as an addition to the more classical approaches in neurobiological research, using computational models often allows for an improved mapping of neural substrate functions to clinically relevant behaviors. Thus, strengthening the use of computational modeling in the research on gambling disorder is likely to further increase our knowledge of the neurobiological basis of disordered gambling (see Chap. 7), as is the case in substance-use disorders [23, 31]. Decisively, computational approaches may provide generative models describing the key steps processed in the brain when adapting to a changing environment [1, 32]. Thus, by helping to understand alterations of neuronal processing in gambling disorder, these approaches may also allow for the development of new treatment options targeting core features of gambling disorder in a more direct way.

15.2.3 Advancing Prevention and Treatment

Fortunately, increasing effort is spent on the development of specific treatment programs as well as prevention strategies. With a focus on psychotherapy, studies have shown that the studied treatment programs yield benefits in reducing gambling problems, particularly cognitive-behavioral therapy in individual as well as in group settings. Since many interventions for gambling disorder suffer from low engagement and completion rates, it is important to foster the development of brief

interventions and to find alternative ways of supplying help to affected people (see Chap. 9). Therefore, self-directed, computer-facilitated, web-based, and virtual reality interventions all warrant investigation and may extend the reach of existing treatments in the future. Moreover, the development of innovative approaches for the treatment of gambling disorder includes the evaluation of different cognitive and mindfulness trainings (see Chap. 10).

Despite the public health impact of gambling disorder and unlike in other psychiatric disorders, there are no medications formally approved for treatment of gambling disorder. Further, the above-described evidence shows that gambling disorder does not present with a homogeneous clinical picture, but different subtypes may exist [33]. This situation makes it important to understand the effects of medications on different symptoms of disordered gambling and, therefore, which medications may be best for specific subgroups of patients (see Chap. 8). Further insights are needed in order to develop customized pharmacological treatment strategies for the most severely affected. Moreover, there is a need for larger clinical trials, giving the opportunity of studying medication effects in different subtypes, doses, and treatment durations and/or with the focus on shorter-term and longer-term outcomes. To improve available treatment options, it is crucial to further elucidate how pharmacotherapy and other agents (e.g., nutraceuticals) may interact with psychotherapy [34, 35].

Further psychological and neurobiological insights may increase effectiveness and suitability of interventions by translating scientific results into clinical solutions. For example, some studies aim at the development of new pharmacological strategies based on the knowledge about neurobiological dysfunctions in addictions, like using a fast-working nasal spray containing naloxone that may potentially be used in high-craving situations [36].

Altogether, gambling disorder is associated with negative consequences in different domains of everyday life. Thus, developing more efficient prevention programs is essential for the general population and for specific groups like adolescents (see Chap. 14). Given elevated rates of gambling disorder in some populations (e.g., in immigrant groups), it is important to develop specific prevention strategies in high-risk populations and to ensure that such treatments reach affected people in a sufficient way by including multilingual material and cross-cultural skills into prevention and treatment (see Chap. 13). In general, it is necessary to incorporate the prevention of gambling disorder into our understanding of public health in order to draw public attention to this topic and to foster the development of new strategies for dealing with a changing landscape of gambling including new phenomena like mobile gambling and gambling elements in gaming.

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