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A brief psychological overview of disordered gaming

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In the latest (eleventh) revision of the *International Classification of Diseases* (ICD-11), the World Health Organization (WHO) recognized Gaming Disorder (GD) as an official diagnostic entity. Furthermore, in the latest (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), the American Psychiatric Association (APA) proposed Internet Gaming Disorder (IGD) as a tentative disorder in need of further study. The present review provides a brief analysis on the current state of the art of the field. Even though there has been an ongoing debate concerning the proposed diagnostic criteria, there are now a number of assessment tools that have been developed using the diagnostic frameworks devised by the WHO and APA which have provided greater accuracy and consistency in IGD research. The prevalence rates of IGD reported in representative samples have ranged from approximately 1% to 5%. However, the discrepancy in the prevalence rates is mainly due to the reliance on non-representative samples, inconsistent assessment, and conceptual heterogeneity. In terms of treatment approaches, the literature suggests that pharmacological treatment and cognitive behavioral therapy-based treatments have been successfully employed to reduce the symptoms of IGD. Despite the latest clinical advances in IGD research, there are still major drawbacks in treatment and existing intervention studies due to key limitations relating to sample sizes in treatment studies, small effect sizes, and scarcity of research on intervention studies. Taken together, these issues highlight the need for further studies into disordered gaming.

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Classification and diagnosis of disordered gaming

In the past three decades, increased scholarly research on disordered gaming has led to formal diagnostic criteria for a now recognized disorder [1]. In 2013, the American Psychiatric Association (APA) [2] introduced ‘Internet Gaming Disorder’ (IGD), as a tentative disorder in the 5th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5). IGD was defined as ‘persistent and recurrent use of the internet to engage in games, often with other players, leading to clinically significant impairment or distress’ (p. 795) [2]. More recently, the World Health Organization (WHO) [3,4] followed by acknowledging ‘Gaming Disorder’ (GD) as a formal diagnosis in the 11th revision of the *International Classification of Diseases* (ICD-11).

The WHO outlined that GD manifests itself when the pattern of gaming behavior is so severe that it negatively affects an individual’s personal, social, and/or educational/occupational activities in the previous 12-month period [3]. Similarly, the DSM-5 suggested that the provision of the IGD diagnosis required that, five out of nine criteria must be endorsed over a 12-month period (see [Table 1](#) for the WHO and APA criteria). The nine IGD criteria proposed by the APA have been subject to extensive conceptual debate and empirical scrutiny [5,6], prompting concerns regarding the legitimacy of disordered gaming as a mental health issue [7,8]. Furthermore, IGD psychometric studies have illustrated inter-criterion differences in diagnostic power [9–11]. Interestingly, the WHO [3,12] proposed a different set of three core criteria (see [Table 1](#)) to assess GD (with much less psychometric scrutiny to date).

Nevertheless, skepticism still exists considering the acceptance of disordered gaming as a bona fide addictive disorder. Indicatively, the possibility of the proposed criteria leading to the overdiagnosis of passionate gamers as disordered has been highlighted [6]. These have been accompanied by broader concerns regarding overpathologizing and defining new non-problematic behaviors as behavioral addictions including disordered gaming [13]. Despite the continuing debates in the field, empirical evidence supports the sensitivity and specificity for most of the proposed nine symptoms of IGD in both clinical interview and cross-sectional designs [9,14].

Prevalence and assessment of disordered gaming

The prevalence of IGD has varied across studies mainly due to the various definitions, instruments, and/or self-selected

Table 1**Official diagnostic criteria for gaming disorder**

Diagnostic criteria	
IGD (APA, 2013)	
1	Excessive preoccupation with gaming.
2	Experiencing withdrawal symptoms when unable to engage in gaming.
3	Increasing levels of gaming over time.
4	Experiencing relapse when attempting to cease or reduce the behavior.
5	Losing interest in previous hobbies because of gaming.
6	Continuing to engage in gaming despite problems.
7	Deceiving significant others about the amount of time spent on gaming.
8	Using gaming to achieve a positive mood.
9	Risking, jeopardizing, or losing a job or relationship due to gaming.
GD (WHO, 2019)	
1	Impaired control over gaming (e.g. onset, frequency, intensity, duration, termination, context).
2	Increasing priority given to gaming to the extent that gaming takes precedence over other life interests and daily activities.
3	Continuation or escalation of gaming despite occurrence of negative consequences.

Note. IGD = Internet Gaming Disorder; GD = Gaming Disorder; APA = American Psychiatric Association; WHO = World Health Organization.

samples used [15]. According to recent studies, prevalence rates of disordered gaming have been found to vary between 1% to 15%, with studies employing nationally representative samples reporting lower rates ranging from 1.2% to 5.5% across several countries [6,9,16–18,19**]. In a recent meta-analysis, the estimated adolescent rate for GD was 4.6% globally [19**,20].

Despite these discrepancies, significant progress has been made because psychometric tools employed before the introduction of IGD in DSM-5 involved several weaknesses [21] (see Table 2). Since then, a number of robust psychometric tools based on the nine IGD criteria in the DSM-5 have been developed [9,15,22–24]. These IGD-based assessment tools have been psychometrically

Table 2**Weaknesses of gaming disorder psychometric assessment instruments**

Weaknesses (King, Haagsma, Delfabbro, Gradisar, and Griffiths, 2013)	
1	Inconsistency in the core criteria used for disordered gaming.
2	Lack of a temporal dimension in the assessment of disordered gaming.
3	Variety in the cut-off scores adopted to identify disordered gaming.
4	Inadequate inter-rater reliability and predictive validity.
5	Low consistency in the dimensionality of such tools.

assessed across countries and over time indicating the sufficient psychometric performance of the nine criteria suggested by DSM-5 [25,26].

The latest wave of advances in the psychometric assessment of disordered gaming were prompted by the introduction of the WHO's criteria for GD. More specifically, the Gaming Disorder Test (GDT) [10] is a brief standardized psychometric tool that includes four items assessing the key defining features of GD as specified in the ICD-11. The first three items of the GDT were developed to map on the following clinical criteria: (i) impaired control over gaming (i.e. *'I have had difficulties controlling my gaming activity'*), (ii) increased priority given to gaming (*'I have given increasing priority to gaming over other life interests and daily activities'*), and (iii) continuation despite negative consequences (*'I have continued gaming despite the occurrence of negative consequences'*). The fourth item of the GDT reflects the experience of major problems in life when the severity of GD is markedly high, reflecting the potential functional impairments that GD can cause at extreme levels (*'I have experienced significant problems in life [e.g., personal, family, social, education, occupational] due to the severity of my gaming behavior'*).

A recent systematic review study evaluated a total of 32 English-language psychometric tools for disordered gaming published across 320 studies using 462,249 participants [27*]. In their study, King *et al.* [27*] suggested that the Assessment of Internet and Computer Addiction Scale-Gaming (AICA-Sgaming), Game Addiction Scale (GAS-7), Internet Gaming Disorder Test (IGDT-10), Internet Gaming Disorder Scale-Short-Form (IGDS9-SF), and the Internet Gaming Disorder Scale (IGD-9) were the most psychometrically consistent tools in the assessment of disordered gaming. Despite these important developments, existing scholarly controversies and concerns [28] imply that further large-scale research is still needed to bridge the existing gaps in the field. Although this recent review represents an important study, the analysis of the recent GD assessment tools is limited as the study not include more recent GD-based psychometric tests such as the Gaming Disorder Scale for Adolescents (GADIS-A) [29].

Etiological factors in disordered gaming

Many studies have attempted to provide empirical insights concerning the etiology of disordered gaming in light of key individual differences such as personality factors and psychiatric comorbidities. A recent review that identified 21 studies suggested that disordered gaming was negatively correlated with extraversion, conscientiousness, agreeableness, histrionic traits, openness to experience, grit, oppositional traits, and self-demeaning traits [30]. The same review concluded that disordered gaming was positively correlated with negative valence, neuroticism, sensation seeking, inhibition, introversion,

egotism, narcissism, sadism, Type D personality traits, negative affectivity, detachment, antagonism, disinhibition, psychoticism, novelty-seeking, harm avoidance, and schizotypal traits [30]. However, the authors emphasized that the reviewed studies presented with several types of limitations including (i) sampling problems (e.g. non-probability sampling, sampling homogeneity, low sample sizes), (ii) measurement problems (e.g. use of non-validated and modified measurements), and (iii) lack of longitudinal data.

Several additional studies have explored the relationship between disordered gaming and psychiatric comorbidities. A recent review study examining 24 studies identified significant correlations between disordered gaming and depression, anxiety, attention deficit hyperactivity disorder (ADHD), social phobia/anxiety, and obsessive-compulsive symptoms [31^{*}]. The authors concluded that disordered gaming strongly linked with anxiety and weakly linked with social anxiety/phobia. However, the direction of these relationships remains unclear [31^{*}]. Nevertheless, the authors emphasized the homogeneity of the geographical distribution of the research in disordered gaming, indicating that the comorbidity of disordered gaming and psychiatric distress is an emerging global problem.

More recently, Burleigh, Griffiths, Sumich, Stavropoulos, and Kuss [32] reviewed 20 studies and reported that disordered gaming can co-occur with other potential behavioral addictions (e.g. social media addiction, internet addiction, and gambling disorder) mostly among adolescents, and potential substance addictions (e.g. alcohol, nicotine, and caffeine use disorder) mostly among adult gamers. The authors argued that the co-occurrence of different addictions might be related to the use of (i) maladaptive coping strategies (e.g. emotional avoidance) as a means to avoid unpleasant affective states and associated mental disorders, and (ii) diminished emotional regulation which leads to engagement in risky behaviors including elevated substance use [32]. A recent large-scale study comparing the co-occurrence of psychiatric symptoms in gamers assessed with both the APA and WHO diagnostic frameworks for disordered gaming found that both diagnostic frameworks were relatively consistent in predicting the potential psychopathological symptoms associated with disordered gaming, further supporting the utility of the APA and WHO diagnostic frameworks in the assessment of disordered gaming and its accompanying comorbidities [33^{**}].

Differential diagnosis of gaming disorder and excessive online behaviors

Before the inclusion of IGD in the DSM-5, scholars argued whether internet addiction should have been considered as a separate disorder [34,35]. More than two decades ago, Griffiths [36] argued that individuals

are not addicted *to* the internet but to the specific activities *on* the internet. Therefore, internet gaming addicts should not be classed as internet addicts but disordered gamers who use the internet to play games, indicating that IGD should be considered as disordered gaming rather than a subtype of internet addiction [37].

Recent empirical research concerning online addictions has separated unspecified internet use disorder and disordered use of specific online activities [38]. This line of research highlights that different types of online addictions to unspecified/specific activities present with shared and unique individual difference predictors, indicating that unspecified internet use disorder and specific internet use disorders (e.g. social media, gaming, gambling, pornography use, and shopping) are conceptually different behaviors [38]. Another cross-cultural study investigating the relationship between generalized and specific internet addiction using data from Germany, Taiwan, Sweden, and China concluded that internet addiction, internet gaming addiction, internet shopping addiction, social media addiction, and internet pornography use addiction were all overlapping but distinct forms of behaviors [39]. Therefore, it appears to be well established that disordered gaming and internet addiction are different nosological entities, an important distinction that can facilitate correct clinical assessment and identification of disordered gaming among a wide range of excessive online behaviors.

Table 3

Limitations of gaming disorder treatment and intervention studies

Limitations (King and Delfabbro, 2014)

- 1 The majority of the (reviewed) treatment studies did not tend to use an equivalent diagnostic method for disordered gaming.
- 2 Formative change in diagnostic status at post-treatment tended to not be assessed.
- 3 Inadequate follow-up duration was used to assess relapse and remission.
- 4 Researchers limited post treatment assessment mostly to disordered gaming symptomatology, comorbidity, and frequency of gaming.

Limitations (Zajac *et al.*, 2017)

- 1 Methodological flaws (e.g. small sample sizes, lack of control groups, lack of treatment adherence information).
- 2 A lack of consistent definitions of gaming disorder and assessment tools.

Limitations (Zajac *et al.*, 2020)

- 1 Pharmacological treatment research is inconclusive with the drugs being promising but remaining in early evaluation stages.
- 2 Cognitive-behavioral therapy treatment warrants more research because of the mixed results reported on its effectiveness.
- 3 Specific weaknesses of prior studies, including lack of appropriate control groups, non-random assignment to treatment conditions, and small sample sizes, prevent strong and conclusive inferences about the efficacy of disordered gaming treatments.

Treatment of disordered gaming

In the light of the emergence of GD related clinical cases, several types of treatment have been reported [40,41**]. In some of these attempts, pharmacological treatment approaches administering different drugs including bupropion, escitalopram, methylphenidate, and atomoxetine were employed. These approaches have been reported as successfully decreasing IGD symptoms with 6–12 week courses of medication trials (based on the use of drugs traditionally targeting depression or ADHD [42,43]). Nevertheless, with the exception of two studies using randomized designs with control groups, most of these findings were compromised by the absence of control groups [42–45].

Besides pharmacotherapy, psychological treatment approaches have also been employed to treat GD. Several attempts with variations of Cognitive-Behavioral Therapy (CBT) including mindfulness, gaming-specific CBT, CBT focusing on craving, and standard CBT have been reported to have promising results [44–49]. These studies comprised both randomized and non-randomized controlled trials, and all of them successfully managed to reduce individuals' time spent on gaming and disordered gaming symptoms. Interestingly, combined pharmacological and CBT IGD interventions have been accompanied with more efficient and successful results than using only medicine or only psychotherapy [44]. Despite these positive developments, disordered gaming treatment studies present with several limitations ([40,41**]; see Table 3).

Conclusion and further studies

Various inconsistencies and psychometric weaknesses have been reported by previous studies [27*]. Assessment and measurement consistency in regards to the officially introduced criteria in DSM-5 [2] and ICD-11 [3] are essential to avoid major limitations in GD research, which will facilitate researchers in examining GD and its psychosocial detrimental effects on society. As noted above, methodological shortcomings have been reported for almost all disordered gaming treatment studies and there are still large inconsistencies on the efficacy and treatment effectiveness of the interventions. Therefore, further large-scale research is still needed to bridge the existing gaps in the field. Finally, the adoption of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist methodology is required to have a better quality of reporting of observational IGD studies and their strengths, weaknesses, and generalizability [50].

Conflict of interest statement

Nothing declared.

CRedit authorship contribution statement

Kagan Kircaburun: Conceptualization, Writing - original draft, Writing - review & editing. **Halley M Pontes:**

Conceptualization, Writing - review & editing. **Vasileios Stavropoulos:** Conceptualization, Writing - review & editing. **Mark D Griffiths:** Conceptualization, Supervision, Writing - review & editing.

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