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PSYCHIATRIC DIAGNOSIS (MB FIRST, SECTION EDITOR)

Internet Gaming Disorder in the DSM-5

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Abstract The fifth revision of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) includes in its research appendix a potential new diagnosis—Internet gaming disorder. This article outlines the debate surrounding non-substance addictions and the rationale for including this condition in the "Conditions for Further Study" chapter in DSM-5 Section III. It also describes the diagnostic criteria that DSM-5 recommends and methods to assess Internet gaming disorder. The paper details international research related to prevalence rates, demographic, psychiatric, and neurobiological risk factors, the natural course of the condition, and promising treatment approaches. The paper concludes by describing important issues for research to address prior to official recognition of this condition as a mental disorder.

Keywords DSM-5 · Internet gaming · Addiction · Behavioral addiction

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Introduction

The vast majority of children, along with many adults, play video or electronic games. A nationally representative study of US youth between the ages of 8 and 18 found that 88 % played games electronically and 68 % indicated that they played at least weekly and 23 % daily [1]. Although most videogame playing is harmless and some may even be associated with cognitive, social, or physical benefits [2], excessive play can lead to psychosocial and even medical problems in some individuals, with reports of game-induced seizures and even deaths [3–5]. Although very few cases rise to these extremes, governments of some Asian countries have declared excessive game playing to reach near epidemic proportions.

The fifth revision of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) [6] includes a condition known as Internet gaming disorder (IGD) in Section III, "Conditions for Further Study." This paper outlines controversies behind the classification of and rationale for including this condition in the DSM-5. It also details methods for assessing IGD, prevalence rates from countries around the world, risk factors, longitudinal studies assessing its course, and treatment. The paper concludes by providing suggestions for future research.

Non-substance Addictions and the DSM-5

During the development of DSM-5, the American Psychiatric Association convened workgroups to review the scientific literature regarding diagnosis and recommend changes, including introduction of new disorders. They charged the Substance Use Disorder Workgroup to consider behavioral or non-substance addictions. After review of potential non-substance addictive behaviors, including gambling, Internet gaming, Internet use generally, work, shopping, sex, and

exercise, the Workgroup proposed to realign gambling disorder with substance use disorders due to their overlap with respect to etiology, biology, comorbidity, and treatment [7]. Of the remaining possible non-substance addictions, the Workgroup voted to include only IGD in the research appendix because it was the condition with the most evidence of clinically significant harms.

Other non-substance addictions may be added in the future if sufficient evidence reveals unique and clinically significant impairment associated with them. For example, some contend that Internet use more generally can lead to addictive behaviors [8], but studies that evaluated game playing along with other Internet activities generally found that excessive game playing appears distinct and is more apt to lead to severe consequences [9–11]. Moreover, excessive use of the Internet for some activities appears better aligned with other disorders. For example, gambling excessively online is likely reflective of gambling disorder [7]. Because the Internet is simply a medium through which one accesses potentially troublesome activities, it seemed prudent to disentangle the source of access from types of activities that may lead to problems. Relatedly, the DSM-5 [6] explicitly states that IGD applies to excessive gaming through non-Internet sources as well as via the Internet, and playing offline on personal computers, consoles, or handheld devices *can* be classified under this rubric. The term "Internet" prefaces the condition to distinguish it from "gambling disorder" [7] and because Internet-based play is associated with more frequent usage and greater rates of problems [12–17].

Although the DSM-5 Workgroup concluded that a growing body of evidence suggests risks of clinically significant impairment in individuals with IGD [18, 19••], they noted that sufficient data do not yet exist to confirm it as a mental disorder. No diagnostic criteria are accepted by all or most researchers, and assessment tools vary markedly [19••, 20]. The intent of including IGD in Section III is to stimulate further research that may firmly establish it as a unique mental disorder in subsequent revisions of the DSM.

Methods of Assessment

The DSM-5 lists nine criteria for IGD, and an international group [19••] provided suggestions for their interpretation. Many of the criteria for IGD are drawn from those of gambling and substance use disorders, as noted in Table 1. The first criterion relates to preoccupation, which relates to being all-absorbed by gaming thoughts and should be present not only while playing but throughout the day when engaged in other activities as well. The second criterion, withdrawal, refers to symptoms that arise in situations in which the person does not have the opportunity to play or attempts to stop. The third, tolerance, represents an increase in time spent playing due to a growing desire to play or need for more exciting games. The fourth criterion describes unsuccessful attempts to control or stop playing, thereby acknowledging a desire to reduce playing; this criterion also reflects a tendency to relapse. Regarding the fifth criterion, loss of interests refers to a constriction of behaviors in favor of game playing, as one ceases or reduces other activities that were previously enjoyable. Criterion 6 relates to continued excessive play despite knowledge of problems caused by the excessive gaming; these problems should be clinically significant, not simply mild or transient issues such as getting less sleep but not so little that it does not interfere with functioning. Individuals may also conceal or overtly lie about the extent of playing (criterion 7), and another (criterion 8) refers to playing to forget about real-life problems or to relieve negative mood states. Criterion 9 is severe in that it refers to risking or losing a relationship or opportunity at school or work because of excessive game playing. The DSM-5 suggests a conservative cut-point of endorsing at least five criteria in the past 12 months [6]. This threshold is likely to prevent overdiagnosis as lower thresholds would be easier to meet, but the DSM-5 acknowledges that the specific criteria and recommended threshold may not accurately or best represent IGD [19••].

Recently, Ko and colleagues [21••] administered clinical interviews based on the DSM-5 criteria to three subgroups: persons with current gaming problems, person with past but not current gaming problems, and persons who never had gaming problems. Meeting five or more of these DSM-5 criteria best distinguished individuals with "normal" levels of play from those who had experienced clinically significant harms. In terms of specific criteria, most had adequate to good diagnostic accuracy in classifying IGD, with the exception of the "deception" and "escape" criteria (criteria 7 and 8, respectively) in this sample of young adults.

Rehbein et al. [22••] developed a screening instrument based on the DSM-5 criteria and administered it to 11,003 ninth-grade German students. Those who endorsed five or more criteria played games more often and evidenced significantly more impairment in school and sleep problems than those who did not. Students who responded affirmatively to symptoms related to "give up other activities" and "tolerance" were most likely to meet five or more DSM-5 criteria for IGD whereas denying "give up other activities" and "withdrawal" basically ruled out a DSM-5 classification of IGD, suggesting these criteria are particularly relevant for assessment of IGD in this younger sample. The "escape" criterion was often endorsed, but it was least associated with meeting four or more other criteria for IGD. In a Dutch study, Lemmens et al. [23••] surveyed a sample of 2444 adolescents and young adults with another DSM-5-based instrument. Higher scores were correlated with greater gaming time, loneliness, and aggression and lower prosocial behaviors, life satisfaction, and self-esteem. Endorsement of five or more DSM-5 criteria had high classification accuracy,

Table 1 *Diagnostic and Statistical Manual of Mental Disorders*, revision 5, Internet gaming disorder criteria and their relation to substance use and gambling disorder criteria

Internet gaming disorder criteria	Substance use disorder criteria	Gambling disorder criteria
1. Preoccupation with playing	–	X
2. Withdrawal symptoms when not playing	X	X
3. Tolerance	X	X
4. Unsuccessful attempts to reduce or stop playing	X	X
5. Gives up other activities to play	X	–
6. Continues playing despite problems caused by it	X	–
7. Deceives or covers up playing	–	X
8. Plays to escape adverse moods	–	X
9. Risks or loses relationships or career opportunities because of excessive playing	–	X

An X indicates the disorder has a similar criterion for diagnosis

and again, the "escape" criterion had the lowest diagnostic accuracy. Together, these initial studies of the DSM-5 classification system suggest that the criteria and threshold of five appear appropriate for distinguishing clinically significant levels of play from non-problematic levels.

Prevalence Rates

Because no standard instrument exists for classifying IGD, its prevalence rates in various populations are elusive. Table 2 details studies [1, 13, 14, 16, 20, 22••, 23••, 24–26, 27••, 28–34] of IGD, recognizing that the classification is applied loosely and refers to persons who developed problems with playing however problems were defined within the individual studies. Only two studies applied entirely DSM-5-based instruments to assess prevalence rates. Rehbein et al. [22••] found that 1.2 % of German students met DSM-5 criteria for IGD, and Lemmens et al. [23••] found the prevalence rate to be 5.4 % in a Dutch sample involving adolescents and young adults. Studies conducted prior to the DSM-5 found rates ranging from as low as 0.5 % [24] to as high as 9.9 % [33]. The large discrepancy relates to differences in methods of classification. Some instruments categorized individuals if they endorsed symptoms of relatively little clinical significance, such as "going to bed late," "playing longer than intended," or "thinking about games." Rates of IGD ranged between 0.5 % and 6 % in studies that used instruments with more stringent criteria, and the actual prevalence probably falls somewhere within this range.

Risk Factors

Demographic Characteristics

Male gender is clearly a risk factor for IGD, with virtually all studies finding higher rates in males than females. For example, Mentzoni et al. [13] found males had a nearly sixfold increased risk of IGD relative to females in Norway. In the USA, Desai et al. [30] found that rates were 5.9 % among boys and 3.0 % among girls, and Gentile [1] reported 11.9 % of boys but only 2.9 % of girls were classified with IGD. Likewise, in Singapore, Choo et al. [32] noted that rates of IGD were 12.6 % among boys versus 4.7 % among girls. In German adolescents, IGD was found in 2.0 % of males but only 0.3 % of females [22••].

Younger age is consistently associated with increased risk as well. Festl et al. [27••] found that German youth under 19 years had a 7.6 % prevalence rate of IGD versus 3.7 % among those 20 years and older, and Haagsma et al. [14] found that young males were most likely to have IGD. Mentzoni et al. [13] noted that 15.4 % of males aged 16 and 21 years, and 9.7 % of males aged 22 and 27 years, had IGD, while rates in all other age and gender groups were under 3 %.

Despite reports of severe problems in Asian countries, relatively little research has assessed the relation between race or ethnicity and IGD or compared rates cross culturally. Desai et al. [30] noted that white youth in Connecticut had lower rates of IGD than non-whites and Hispanic youth had higher rates than non-Hispanic youth. Two studies using parallel procedures assessed youth in the USA and Singapore [1, 32] and found similar rates. More research is needed using assessment tools with established psychometric properties to address potential cross-cultural, as well as racial and ethnic, differences in IGD.

Psychological Risk Factors

Psychological symptoms and disorders are associated with IGD, with depression and social isolation particularly relevant. Multiple studies [13, 34, 35] have found persons classified with IGD had higher rates of depressive symptoms than those without IGD, and one [30] noted that students identified

Table 2 Prevalence rates of Internet gaming disorder (IGD)

Country	Study author [citation]	Age range	Number of samples	How Internet gaming disorder was classified	% with IGD
Germany	Schmidt et al. [24]	14–60+	600	Scores ≥42 on Video Game Dependency Scale	0.5
Germany	Rehbein et al. [22••]	13–18	11,003	Endorse ≥5 of 10 on DSM-5 adapted Video Game Dependency Scale	1.2
Netherlands	Haagsma et al. [14]	14–81	902	Endorse 7 of 7 on Game Addiction Scale	1.3
Netherlands	Van Rooij et al. [34]	13–16	4559	Statistical analysis of responses to Compulsive Internet Use Scale	1.5
Germany	Rehbein et al. [16]	Mostly 15	15,168	Scores ≥42 on Video Game Dependency Scale	1.7
Australia	King et al. [20]	12–18	1287	Scores >5 on Pathological Technology Use Checklist for Video Gaming	1.8
Germany	Mößle [25]	Mostly 12–13	806	Scores ≥42 on Video Game Dependency Scale	1.9
Norway	Johansson et al. [26]	12–18	3237	Endorse ≥5 of 8 on Young Internet Addiction scale revised for gaming	2.7
Germany	Festl et al. [27••]	14–90	4382	Endorse ≥4 of 7 on Game Addiction Scale	3.7
Hungary	Papay et al. [28]	Mostly 16	5045	Latent class analysis of Problematic Online Gaming Questionnaire	4.6
Norway	Mentzoni et al. [13]	15–40	816	Endorse ≥4 of 7 on Game Addiction Scale	4.7
Australia	Thomas and Martin [29]	Mostly 12–24	2031	Endorse ≥5 of 8 on Young Internet Addiction scale revised for gaming	4.8
USA	Desai et al. [30]	14–18	4028	Endorse 3 of 3 on Impulse Control Disorder revised for gaming scale	4.9
Netherlands	Lemmens et al. [23••]	13–40	2444	Endorse ≥5 of 10 on DSM-5-adapted Internet Gaming Disorder Scale	5.4
Netherlands	Lemmens et al. [31]	12–18	1217	Endorse ≥4 of 7 on Game Addiction Scale	5.6
USA	Gentile [1]	8–18	1178	Endorse ≥6 of 11 on Pathological Video Game Use Scale	8.5
Singapore	Choo et al. [32]	8–15	2988	Endorse ≥5 of 10 on Pathological Video Game Use Scale	8.7
Spain	Salguero and Moreno [33]	13–18	223	Endorse ≥5 of 9 on Video Game Addiction Scale	9.9

with IGD were more likely than their non-problem gaming peers to report extended periods of sadness or hopelessness.

Individuals who are socially isolated or have poor interpersonal skills may be particularly attracted to games that allow one to develop online relationships and take on new personalities. Several studies have reported that low sociability or social competence correlated with gaming problems [16, 27••, 31]. A study [36] surveyed 174 Taiwanese college-age online players and found that quality of interpersonal relationships decreased, and social anxiety intensified, as time spent playing games increased over time. In the USA, Romer et al. [37] interviewed 719 youth aged 14–24 and found that heavy game playing was associated with an increase in depression over time, and greater depression predicted more videogame playing as well as withdrawal from sports and other organized activities.

Impulsivity and attention problems have also been linked to IGD. Cross-sectional studies note a relationship between attention deficit hyperactivity disorder, impulsivity, and IGD [10, 16, 32]. In a 13-month prospective study, Swing et al. [38] evaluated video game use and attention problems in over 1300 children aged 6–12 years. Game playing correlated with more attention problems at the initial interview, and this relationship persisted throughout the study period, even when accounting for earlier attention problems. Together, these data suggest that videogame playing is associated with attention difficulties and impulsivity.

Only limited data exist on IGD and substance use [39]. Porter et al. [15] found no differences between those with IGD and those without in terms of alcohol use, but persons with IGD were more likely to use illicit drugs. Desai et al. [30] also found that alcohol use did not differ based on Internet gaming problems, but smoking cigarettes and using illicit drugs other than marijuana were more common in those with IGD. In a Dutch sample [35], excessive online gaming was associated with drinking, smoking, and marijuana use. Walther et al. [40] evaluated frequency of substance use, gambling, and game playing in over 2500 German students and found no association between alcohol and tobacco use and gaming but a positive relationship between marijuana use and gaming. This study also evaluated associations between personality characteristics and substance use, gambling, and game playing and found all these excessive behavior patterns had impulsivity as a common feature. Impulsivity is a core aspect of substance use disorders, and it may play a role in the development and/or maintenance of IGD as well.

Biological Basis

The neurobiological basis of IGD is undergoing investigation. Voxel-based morphometric studies demonstrate decreased gray matter in persons with IGD relative to controls in the inferior frontal lobe [41–43], insula [41, 42], cingulate [41, 43, 44], dorsolateral prefrontal cortex (DLPFC) [43], precuneus [41, 44], supplement motor area [42–44], amygdala [45••], and occipital lobe [46]. These brain areas are involved in cognitive control, error processing, decision-making, and reward. However, the number of different regions identified is extensive, and inconsistencies are noted across studies. In addition, it is difficult to interpret the meaning of these changes in gray matter. For example, videogame playing has been reported to enhance gray matter in the insula [47], but persons with IGD are reported to have smaller insula [41, 42].

Functional magnetic resonance imaging (fMRI) is an important tool for investigating mechanisms of addiction [48], and the cue-induced craving paradigm is a common strategy to investigate brain correlates of urges. This procedure involves having participants view or imagine objects or situations that often lead to the problem behavior to elicit cravings or urges. Studies using this paradigm in IGD reported cue-induced reactivity in the parahippocampus, anterior cingulate, and DLPFC [49, 50, 51••, 52••, 53••, 54], and these changes resemble those in substance use disorder [50]. However, this pattern of brain activation is also similar to that which occurs in response to other pleasurable activities such as in response to palatable food [55, 56] or sex [57]. Whether findings in IGD reflect reward in general or responses to "addictive" behaviors therefore is unclear.

Response inhibition can also be evaluated by fMRI and reflects cognitive control, which is impaired in subjects with substance use disorder [58]. Ko et al. [59] found higher activity in the left orbital frontal lobe and bilateral caudate nucleus in persons with IGD relative to controls in the Go/No Go task, a cognitive test that measures impulse control by the ability to inhibit responses, and lower activity in the right insula, which is involved with error processing [59]. Ding et al. [60] reported hyperactivity in the left superior medial frontal gyrus, right anterior cingulate cortex, right superior/middle frontal gyrus, and left precuneus in Go/No Go task. Together, these results suggest that the altered response inhibition function observed in IGD resembles that in substance use disorder. However, whether greater brain activation among persons with IGD results from a deficit, compensatory, or functional response in cognitive control remains unclear.

Studies have also investigated functional connectivity in IGD. However, they have varied greatly with respect to sample selection, regions of interest, methods of analysis, significant thresholds, presentation of results, and data interpretation [44, 45••, 47, 61–67], obscuring the ability to interpret findings across studies.

In sum, conclusions regarding the brain mechanisms of IGD are premature for a number of reasons. In most studies, persons with IGD were defined based on responses to self-report questionnaires, and no fMRI studies to date have applied the DSM-5 criteria. Further, the power of statistical analyses performed is limited by small sample sizes, without appropriate corrections for multiple testing. Interpretation and implications of results are also largely inconclusive. For example, most persons with IGD exhibited perfect gaming performance, despite alteration in brain functions related to decision-making, attention, concentration, and response inhibition in these brain imaging studies. Hypothesis-driven research based on clinical experience, existing literature, and sound theory is essential to better design fMRI studies and understand the neurobiology of IGD.

Natural History and Course

Several studies have evaluated changes in gaming problems over time. In these studies, prevalence rates of IGD at the initial assessment point ranged from 1.6 % to 9.9 % [34, 68, 69••]. Between 1.5 and 2 years later, rates were 1.5 %–7.6 %. Although overall rates decreased slightly over time in all three studies, some youth developed the disorder, some maintained difficulties with it, and others recovered from it. With respect to incidence rates, between 1 % and 1.5 % of youth who did not have IGD at the initial assessment point developed problems over the study period. Greater impulsivity and lower social competence at the beginning of the study period predicted development of IGD over time [68]. Across studies [34, 68, 69••], 50–86 % of adolescents with IGD persisted with their problems throughout the 1–2-year study periods, and conversely, 14 %–50 % recovered from it. Maintenance of IGD was associated with having lower grades in school, reporting poorer relationships with parents, and developing worsening of depression, anxiety, and social phobia symptoms over time [68]. In the van Rooij [34] study, youth with persistent IGD tended to play for extraordinarily long periods at the initial time point—about 55 h per week. This group also exhibited more depressive symptoms, suggesting that depression may relate to ongoing difficulties with game playing over time.

In sum, these studies point to a role of psychological symptoms in the development and maintenance of IGD. Specifically, difficulties with impulsivity and attention, along with low social competence and depression, may be associated with the onset of problems, and IGD may be more likely to persist or worsen in those with depression, anxiety, social phobia, and attention problems. These temporal associations, however, do not imply causality. Changes in psychological distress may coincide with other factors that relate independently or interactively with game playing.

Further, these studies reported upon natural changes in IGD that occur over time. They did not address how treatment may impact changes. The studies did not assess treatment seeking, although most likely none of the respondents received professional assistance for gaming problems.

Treatment

Relatively little is known about the treatment of IGD. Several reviews exist [70–72], but few randomized studies have been conducted. Media reports are abundant about "treatment camps" in Southeast Asian countries, although evidence of their effectiveness is limited. Rumpf et al. [73] describe the main camp in China. The camp is designed for treating Internet addiction more broadly, but the vast majority of patients report gaming as their primary problem. This camp applies group, individual, and family therapy to enhance motivation to change and improve social and cognitive-behavioral controls over gaming and Internet use more generally. Clinicians actively promote and encourage alternative activities, including participation in work and physical fitness programs. They also provide psychiatric assessments and administer pharmacotherapies for other mental disorders, such as depression, anxiety, and attention deficit hyperactivity disorder. Although they do not conduct formal evaluations of effectiveness, they estimate success rates at about 75 %. Similar camps are available in Korea, and Koo et al. [74] report that about half of patients treated remain improved a year later. Similarly, Shek et al. [75] describe multimodal treatment of adolescents with Internet addiction in Hong Kong. Of 59 adolescents treated, they obtained pretreatment and posttreatment information on about half of them, and symptoms decreased in those who participated in the posttreatment assessments. However, few studies to date systematically followed patients, and little is known about long-term relapse and how treatment may or may not improve upon natural recovery rates.

Specialized inpatient and residential programs for Internet addiction also exist in the USA, perhaps the most well-known of which is reSTART in Washington State. This program institutes a total abstinence approach toward technology use for 45 to 90 days, and it applies a variety of psychotherapeutic approaches in individual, group, and family settings. Of 19 adults who completed 45 or more days of treatment, 74 % evidenced improvement in symptoms, 21 % did not show any changes, and 5 % deteriorated [76]. Young [77] uses a more focused cognitive-behavioral therapy (CBT) to treat individuals with Internet problems in an outpatient setting. In reviewing 114 individuals who received 12 sessions of CBT, Young [77] reported that most reduced symptoms by the eighth session, and improvements were generally maintained throughout a 6-month follow-up. These outcomes of uncontrolled follow-ups, while generally positive, should be considered preliminary due to the small number of patients and lack of random assignment to a treatment and control condition.

In one of the few randomized trials, Du et al. [78] assigned 56 youth from Shanghai to eight sessions of a group-based multimodal CBT or a no treatment control condition. Internet use decreased similarly in both groups, but those assigned to the CBT evidenced improvements in time management skills and reductions in psychosocial symptoms relative to those in the control condition. Jager et al. [79] describe an ongoing study in Germany. It will compare CBT, involving individual and group therapy for 4 months, to a wait-list control condition. Up to 200 persons, including both youth and adults, will be assigned to one of the two conditions and assessed throughout a 6-month follow-up. This will be the first large-scale randomized study of treatment for Internet addiction and IGD.

As controlled trials begin to evaluate treatments, it is important to consider their designs. Because up to 50 % of persons with IGD may recover naturally [34, 68, 69••], an efficacious treatment must be able to exceed unassisted recovery rates. Even if an intervention improves upon natural recovery rates, a wait-list control design cannot establish efficacy. These designs do not equate for attention or expectancy effects. Because wait-list controls cannot control for non-specific therapeutic effects, it is premature to consider an intervention efficacious if it is only compared to a wait-list control as likely any intervention will improve upon none. Further, wait-list control designs apply the treatment to all participants after relatively short periods, so they cannot evaluate long-term effects.

Assessment of outcomes is also critical. Much gaming behavior is based upon self-report, but self-reports can be biased, especially when external pressures (e.g., parents) influence the decision to initiate treatment. Gaming also appears distinct from other Internet activities, some of which may be necessary for school or work purposes, so expectations regarding controlled use may vary, especially when evaluating heterogeneous samples of those with general Internet and gaming-specific problems within the same sample.

Finally, although it can be appealing to apply multiple types of interventions (motivational, family, CBT, etc.), this practice makes training therapists difficult. It also reduces the likelihood of isolating important aspects of treatment or understanding mechanisms of change [80], both of which are integral to improving outcomes. Screening for and treating comorbid psychiatric conditions in the context of addressing IGD is also critical. As patients with IGD tend to have other psychiatric conditions, effective treatment for the comorbid condition, which may be delivered concurrently, may have pronounced effects on gaming problems. Research designs

and analyses of data derived from them need to consider these issues clinically and scientifically.

Conclusions

The inclusion of IGD as a research category in the DSM-5 is a major advance, allowing researchers and clinicians a standardized direction for studying and treating this condition. Development of psychometrically sound clinical interviews and brief screening tools is necessary to firmly establish the criteria for this condition. Once methods for diagnosis are ascertained and screening tools developed, large-scale epidemiological surveys are needed to determine prevalence rates in countries throughout the world. Care should be taken upfront to ensure that similar and clinically relevant constructs are evaluated, so that cross-cultural comparisons are valid.

Another important issue to address is the association of IGD with other mental disorders, and greater understanding of these relationships is needed to determine if IGD should be classified as a behavioral addiction or in another context. Epidemiological in conjunction with biological data may inform these decisions. Longitudinal studies are also required to ascertain the natural course of the condition as well as risk and protective factors. Better knowledge about the course of the condition will be important to guide both prevention and treatment efforts.

In sum, research on IGD is in the early stages. However, growing evidence of clinically significant harms derived from excessive game playing suggests that this is an important condition from a public health perspective. To treat and ultimately prevent or reduce problems with IGD, the field needs to converge to ensure that all are evaluating a similar condition. Research and clinical practice should also consider carefully and integrate lessons learned from related conditions to most rapidly advance the field and improve outcomes of persons living with or prone to develop IGD.

Compliance with Ethics Guidelines

Conflict of Interest Florian Rehbein and Chih-Hung Ko declare that they have no conflict of interest.

Nancy M. Petry and Charles P. O'Brien have served on the American Psychiatric Association Workgroup for Substance Use and Related Disorders for the DSM-5. The views and opinions expressed in this paper are those of the authors and should not be construed to represent the views of any sponsoring organizations, agencies, or governments.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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