# Internet Gaming Disorder in Children and Adolescents

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abstract

The American Psychiatric Association recently included Internet gaming disorder (IGD) as a potential diagnosis, recommending that further study be conducted to help illuminate it more clearly. This paper is a summary of the review undertaken by the IGD Working Group as part of the 2015 National Academy of Sciences Sackler Colloquium on Digital Media and Developing Minds. By using measures based on or similar to the IGD definition, we found that prevalence rates range between ~1% and 9%, depending on age, country, and other sample characteristics. The etiology of IGD is not well-understood at this time, although it appears that impulsiveness and high amounts of time gaming may be risk factors. Estimates for the length of time the disorder can last vary widely, but it is unclear why. Although the authors of several studies have demonstrated that IGD can be treated, no randomized controlled trials have yet been published, making any definitive statements about treatment impossible. IGD does, therefore, appear to be an area in which additional research is clearly needed. We discuss several of the critical questions that future research should address and provide recommendations for clinicians, policy makers, and educators on the basis of what we know at this time.

## BACKGROUND

Over 90% of children and teenagers in the United States now play video games, and they spend substantial amounts of time playing.[1,2] The increasing prevalence of digital media has led to growing public concerns about potential detrimental effects, including the possibility that video

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game play may be "addicting." There is now a considerable body of research literature suggesting that some heavy users of video games indeed develop dysfunctional symptoms that can result in severe detrimental effects on functional and social areas of life.

The American Psychiatric Association recently included Internet gaming disorder (IGD) as a potential diagnosis.[3] It is defined as "persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress."[3] They concluded that the evidence was strong enough to include IGD in the research appendix of the *Diagnostic and Statistical Manual, Fifth Edition* (*DSM-5*), with the goal of encouraging additional research.

## CURRENT STATE

Despite its name, IGD does not require that individuals exhibit symptoms of addiction solely with online video games. Problematic use can occur in both offline and online settings,[3] although reports of video game "addiction" often involve online games such as Massively Multiplayer Online Role-Playing Games. Importantly, frequent video game play cannot, alone, serve as the basis for diagnosis. The *DSM-5* states that video game playing must cause "clinically significant impairment" in the individual's life. Indeed, studies have revealed that pathologic video game use and high game play frequency are functionally distinct,[4] although they are typically highly correlated.

The *DSM-5* suggests that IGD may be identified by 5 or more of 9 criteria within a 12-month period. These criteria include:

1. Preoccupation with games: The individual thinks about previous gaming activity or anticipates playing the next game; gaming becomes the dominant activity in daily life;
2. Withdrawal symptoms when gaming is taken away: These symptoms are typically described as irritability, anxiety, or sadness;
3. Tolerance: The need to spend increasing amounts of time engaged in games;
4. Unsuccessful attempts to control or reduce participation in games;
5. Loss of interest in real-life relationships, previous hobbies, and other entertainment as a result of, and with the exception of, games;
6. Continued excessive use of games despite knowledge of psychosocial problems;
7. Has deceived family members, therapists, or others regarding the amount of gaming;
8. Use of games to escape or relieve a negative mood (eg, feelings of helplessness, guilt, or anxiety); and
9. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in games.

An elaboration regarding the conception and assessment of each of these criteria was recently published in *Addiction*,[5] which is further discussed in commentary articles.[6–12]

The *DSM-5* explicitly points out that "the literature suffers . . . from lack of a standard definition from which to derive prevalence data."[3] No single screening or diagnostic instrument applying the *DSM-5* criteria has been widely applied or subjected to substantial psychometric testing. Nonetheless, although prevalence estimates can vary depending on the instrument used, the general pattern of overall adverse effects and comorbidities has been fairly consistent across multiple methods of definition. The fact that many methods have converged on similar results suggests that the construct of IGD may be robust to measurement variations.

### Prevalence

The authors of several studies have used criteria similar to those proposed by the *DSM-5*, finding a range of prevalence estimates. One study of American youth 8 to 18 years revealed that 8.5% of gamers met 6 of 11 criteria,[4] whereas a study of Australian youth revealed that ~5% of video game players met 4 of 9 criteria.[13] The authors of 2 recent European studies strictly applied the *DSM-5* criteria and provided general prevalence numbers that included nongamers. The authors of a study of German ninth graders reported a general prevalence of 1.2% (2.0% for boys, 0.3% for girls),[14] and the authors of a study from the Netherlands covering different age groups found a general prevalence of 5.5% among adolescents 13 to 20 years of age and a prevalence of 5.4% among adults.[15]

### Etiology

The etiology and course of development of IGD are not well understood. One study measured IGD-like symptoms over a 2-year period among more than 3000 children in Singaporean elementary and secondary schools.[16] Of the roughly 9% of children who were classified as suffering from IGD at the beginning of the study, IGD persisted 2 years later for 84%. There were not many clear indicators in this sample of who was most at risk for developing more symptoms (impulsivity, lower social competence, higher amounts of game play), but those who had increased gaming symptoms evidenced greater levels of depression, academic declines, and worsened relationships with parents over time, along with increased aggressive tendencies. In contrast, the authors of another study found that only 26% of problematic

gamers maintained a high level of symptoms over a 2-year period,[17] whereas the authors of a third study reported an ~50% resolution rate over a 1-year period.[18]

### Treatment

Reviews of the literature indicate that there are no randomized, well-controlled studies for treatment of IGD.[19–21] Although various iterations of cognitive behavioral therapy are most widely represented in published literature and practice,[21] other approaches, including family therapy and motivational interviewing, have also been used alone or in conjunction with cognitive behavioral therapy.[22–24] Definitive conclusions about the efficacy of any one approach or set of combined approaches or their comparative effectiveness cannot yet be made because of the lack of randomized, controlled research.

## FUTURE RESEARCH

There are several important subsequent questions, many of which (especially questions 2–5) will require large-sample longitudinal studies to answer:

1. Research should consider the validity of the current *DSM-5* classification system, both with regard to criteria and cut points. After these aspects have been considered, it may be useful to evaluate differences between the usage of different media forms. Most existing work focuses on either video games or Internet use more generally. Because too broad a classification may obscure understanding of a mental disorder, we recommend that the *DSM-5* criteria for gaming are validated first and then broadened to other media;
2. What are the important risk factors for the development of IGD? Little is known about who is most at risk;
3. What is the clinical course of IGD? Little is known about how long it takes to develop, how long it lasts, or whether it is continuous or intermittent;
4. There is growing empirical evidence that IGD is comorbid with several other disorders and mental health issues.[16] Further longitudinal research examining comorbidities with anxiety, depression, and attention-deficit/hyperactivity disorder is important and will clarify whether IGD is an independent disorder that should be included as a separate category in *DSM-6*, or whether it is best seen as a symptom of other conditions. The overlap of IGD with other addictions, and problematic Internet use more generally, also requires greater study;
5. There is insufficient evidence regarding effective treatment of IGD. Randomized, controlled studies in large samples with adequate statistical power are needed to evaluate the efficacy of specific treatments. The trials need to apply well-validated outcome measures and include long-term follow-up assessments; and
6. It is likely that not every type of video game is equally associated with IGD. Further research is needed to outline characteristics of games that are more or less associated with IGD, as well as to determine the direction of influence.

## RECOMMENDATIONS

We concur with the recent statement from the American Academy of Pediatrics recommending that parents need to be directly involved with their child's use of media and need to ensure that children have ample media-free time and access to nongaming creative play opportunities.

### Clinicians and Providers

Clinicians such as pediatricians, nurse practitioners, and other primary care providers are basically "first responders" for issues related to children's media use.

#### *Prevention and Patient Education*

Pediatricians and other primary care providers should follow the Policy Statements of the American Academy of Pediatrics regarding media use in general.[25,26] Although the most recent guidelines call for a nuanced understanding on how technology is used, pediatricians should still discourage the placement of media in children's bedrooms and encourage parents to limit the total amount of entertainment screen time in general to <1 to 2 hours per day, given that access and amount of time gaming tend to be risk factors for IGD.

Pediatricians and other clinicians can help parents feel empowered to make household rules around media and gaming, including setting the limits for young children.[27] Adult supervision of children's media use is highly recommended. As the child matures, media use should be regulated in a way that teaches the child when and how to stop, such as, for example, agreeing to a set duration before starting play and providing a visible timer for both parent and child to monitor use. At all ages, it is recommended that media not be located in the bedroom and that video game play not begin within half an hour before sleep time. More generally, parents should model appropriate media use and ensure regular media-free family time. Recent longitudinal research has revealed that limiting the amount and content of media is a powerful protective factor for children.[28]

### *Assessment*

It is premature to recommend widespread adoption of any particular instrument, although there are several that can be used if indicated.[14,15] As part of routine care, however, pediatricians and other primary care providers should ask both the parent and child about the child's use of media to help with early diagnosis, as well as asking about children's interests and hobbies to ensure others exist beyond electronics and gaming. Because IGD frequently cooccurs with other conditions, children should be screened for behavioral problems and comorbid conditions more generally, including depression, anxiety, and attention-deficit/hyperactivity disorder.

### *Intervention*

For children or adolescents who screen positive for behavioral problems or psychopathology, pediatricians and other clinicians should work with parents to determine the best intervention strategy. These strategies may include referral to mental health professionals for psychological and/or pharmacological treatment. If parents are concerned about their child's screen engagement, yet are unable to place restrictions on it, professional aid at the family level is also warranted.

### *Patient Education*

Pediatricians are in a position to help educate parents and patients about the potential adverse (and beneficial) effects of video games (and other electronic media). They can recommend the use of rating systems for video games so that parents can limit use to age- and content-appropriate games (eg, www.esrb.org/ratings/search.aspx). Although there are many positive aspects of gaming and electronic media, excessive or inappropriate use can lead to problems for some individuals, and clinicians can help parents understand when use becomes excessive.

## Policy Makers

- Several countries, including South Korea, have established mental health facilities for treating IGD. American policy makers should similarly take this issue seriously and dedicate resources for education, prevention, and treatment of IGD; and
- Policy is also necessary to enhance research efforts on this condition, including large scale studies to evaluate the natural course of the condition. The National Institutes of Health has no dedicated institute or funding for this condition, and until it does, it is unlikely that research will progress at the necessary pace to develop evidence-based treatments.

## Educators

- Schools at all levels should routinely include education about IGD and expand the infrastructure they have in place for other potentially problematic behaviors (drugs, alcohol, risky sex, gambling, etc) to include problems with electronic media;
- Because of the consistent link between IGD and poor school performance, schools may be an excellent place for screening for IGD and for providing referrals for services when problems with IGD or related issues are uncovered;
- Many schools provide computers and/or encourage computer use in and out of classes, as this can have tremendous educational and practical benefit. Many schools consider "gamifying" their educational processes. What message does it send if a school supports gaming as education, in light of the real potential for the development of IGD? Schools should provide training to parents and educators to recognize potential problems; and
- Schools and community centers can be of particular value in helping parents to identify nongaming creative opportunities.


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## ABBREVIATIONS

*DSM-5*: *Diagnostic and Statistical Manual, Fifth Edition*
IGD: Internet gaming disorder


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