Internet Gaming Disorder

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What follows is a real case of Internet Gaming Disorder (IGD). Xi Wang's first day in a Chinese Internet addiction treatment center for IGD came as a surprise [1]. The night before, his parents had him drugged and institutionalized. Xi Wang's parents had no idea how to handle their son's behavior nor did they know anything about video games. They just knew they were losing their son. He had grown apathetic to his health, school, friends, and family. They had also heard reports of teenagers dying of blood clots, starvation, and dehydration at Internet cafes, the same ones Xi Wang had lied about attending when he should have been at his friend's house or in school. In the past, his parents tried punishing him, bribing him, and even hiding his computer cables, but all of these measures proved unsuccessful. Ultimately, institutionalization was their last resort.

The Wangs are not alone in their experience: news reports of severe video game addiction include stories about seizures, childhood neglect, and deaths after marathon game playing sessions [2–4]. This coverage has contributed to public concerns about the potentially pathological effects of excessive video game play. Although most cases are not life-threatening, they have drawn attention which has driven an increase in video gaming and Internet addiction research over the past 10 years.

Most researchers have defined IGD based on damage to psychological functioning, social support, school performance, family relationships, and occupational performance [5]. Even though Xi Wang reported more than 10 h of video game playing a day, he denied having a problem. He described himself as enjoying the virtual world more than the physical world. He did not get any sense of happiness from the world around him and found the games and Internet to be a source of happiness. He suspected his behavior would not be labeled problematic if he had played the same amount of hours but kept up his grades and followed the social norms of what a "good boy" is supposed to be. Even as he suffered nausea, physical pain, restlessness, fatigue, and insomnia from Internet withdrawal, Wang claimed that the definition of IGD would result in 80% of the population suffering from IGD.

Symptoms

Work on IGD has led to the inclusion of pathological gaming as a potential formal disorder in the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* [6]. The American Psychiatric Association (APA) tasked 12 experts and more than 20 outside advisors to review over

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240 publications concerning pathologic Internet and video game use. Their conclusion, based on the evidence they reviewed, was sufficient to warrant inclusion of IGD in the research appendix of the DSM-5 to encourage future research on the prevalence, etiology, risk factors, clinical course, and treatment of IGD [6]. This section aims to provide an overview of IGD as described by the DSM-5.

The DSM-5 appendix has nine criteria to identify individuals with IGD. Five or more of these criteria must be met within a 1-year period to diagnose IGD. To meet the criteria, a patient must show dysfunction or impairment in their lives from their symptoms. Symptoms include a preoccupation with Internet gaming, withdrawal, tolerance, unsuccessful reduction in gaming behaviors or cessation of attempts to stop gaming, disinterest in other hobbies, escapism, excessive use despite problems, deception of game playing habits, and the jeopardizing of significant relationships or life opportunities [6].

Preoccupation

Preoccupation is the tendency for individuals to think excessively about playing video games in non-game situations. Constant intrusive thoughts about and preoccupation with video games cause individuals to have difficulty focusing on anything besides video games. In practical terms, such preoccupation leads to missed deadlines, overlooked details, and inattention to other life domains. Preoccupation must cause dysfunction. A lifeguard and a professional gamer may spend the same amount of time thinking about video games, but it may only be dysfunctional preoccupation for the lifeguard.

Preoccupation can be assessed with scales where people rate their agreement with statements such as "I [often] think about playing League of Legends when I am not using a computer" [7]. Prevalence of this symptom in the general population ranges from 5 to 25% [8–13].

Withdrawal

Withdrawal symptoms are unpleasant physical effects and/or negative emotions that occur when an individual stops or reduces their video game playing. Withdrawal is more than just craving or compulsions to play again. It is normal to want more of a fun and engaging activity. It is dysfunctional when withdrawal leads to uncontrollable physical feelings, emotions, behaviors, and moods. Both withdrawal and tolerance (described below) are consequences of physiological and psychological dependence, similar to biologically based addiction, which can result in anxiety, uncontrollable physical tics, depression, or more.

Functional magnetic resonance imaging studies have shown that addicted gamers have similar brain activity to substance abusers when it comes to cravings associated with their addictions [14]. A recent experimental study found that addicted gamers have stronger and more extreme emotional reactions in response to games than nonaddicted gamers, similar to how alcoholics have strong reactions when seeing a shot glass, a reaction known as cue reactivity [15]. Further suggesting their similarity, treatments designed to help those with substance abuse were effective in addicted gamers, reducing their cravings and brain activation in response to game cues [16]. Prevalence of withdrawal symptoms in the general population ranges between 2 and 22% [8–12, 17].

Unsuccessful Reduction or Cessation Attempts

One of the core symptoms for any type of addiction is difficulty controlling, reducing, or ceasing their addictive habits. Given that video games are designed to be as compelling as possible, unsuccessful cessation attempts are not surprising. Many online games depend on a loyal player base. As such habitual game play or occasional failure to reduce game play is normal. However, these unsuccessful events are dysfunctional when gamers are unable to inhibit their playing behavior after realizing they have a problematic relationship with games. Gamer addicts often describe life as "dark" or "boring" without games in their lives [18].

Many games are designed to motivate play through a combination of variable reward schedules, instant feedback rewards, enveloping narratives, a sense of personal development, social opportunities, and social costs [19]. Because they

are designed to elicit compulsive, habitual playing behavior, not playing games can become a personal and a social struggle. Wang and Zhu [20] note that players often feel "all [their] closest friends today are playing games." As such, when players try to reduce their own gaming habits, they find "it's hard to find new friends." Prevalence of unsuccessful reduction attempts in the general population ranges between 2 and 36% [8–10, 12, 17].

Escapism

Escapism is the use of games to avoid daily stressors or negative emotions. While relying on entertainment for escapism is normal, escapism becomes a clinical concern when it becomes the individual's main coping strategy for responding to stressors. Wan and Chiou [18] found that addicted gamers tend to turn to games to avoid discomfort, in comparison with nonaddicted people who typically play games seeking satisfaction [21].

Escapism delays productive resolution of stressors' causes. While useful when it comes to unsolvable stressors, escapism can lead to escalation of solvable stressors. For example, a student can avoid finishing a dreaded school project by playing games, but the school project remains undone, their grades suffer, and the next school project becomes more dreadful. In contrast, a child can use escapism in games to avoid the pain of chemotherapy. Escapism is normal but dysfunctional in its excessiveness when it comes to IGD. Prevalence of escapism in the general population ranges from 8 to 30% [8–13, 17].

Excessive Gaming Despite Problems

Excessive gaming despite problems is closely tied to disinterest in other hobbies and the inability to cease game playing habits. That is, despite noticing that the gaming is causing problems in other areas of life, the person is unable to make the changes needed to reduce those problems. For example, a vicious cycle could occur when habitual gaming is itself the source of strained social relationships, financial concerns, or deteriorating health, and the addicted gamer retreats further into games to cope with the stress. Nearly 20% of massively multiplayer online role-playing games (MMORPG) players report that their video game playing had negatively affected their relationships with their non-playing partners [22].

Peng and Liu [23] note that video game dependency (defined as "psychological discomfort experienced by online gamers when they are unable to play online games as they wish"), but not weekly play time, is highly associated with problems in physical health, personal life, and professional/academic opportunities. Prevalence of excessive gaming despite problems in the general population is between 9 and 29% [8, 10, 12].

Deception with Regard to Gaming Habits

Similar to other addictions, loved ones' concerns about the problematic behavior can be met with deception from the addicted person with regard to the scope of their behavior. The addicted gamer may underreport the time or money they spend on gaming, may misrepresent their intentions for not participating in other activities, or may simply avoid admitting to the addictive behavior. This deception need not be intentionally malicious. An addicted gamer may not be aware of how much they spend on gaming, may have different intentions but be compelled to game when they otherwise would have done something else, or may be afraid to admit to themselves that their gaming habits are a problem. Nonetheless, deception is damaging for social relationships and trust and is therefore dysfunctional. Prevalence of deception of gaming habits in the general population is between 5 and 14% [8, 9, 11, 12, 17].

Jeopardizing Significant Relationships or Life Opportunities

When video games become a person's main priority, they may jeopardize significant relationships and life opportunities. Playing games can become more important than other people, career development, or important life goals. Overall, video game players received poorer grades in school, skipped school more often, got poorer sleep, and performed worse on the Scholastic

Aptitude Test when compared to those who did not play video games or played less [9, 23]. Gentile [17] reports that 23% of video game players skipped their homework to play and 20% perform poorly on subsequent homework or tests because of playing. Critically, Internet Gaming Disorder predicted poorer school performance even after controlling for time spent playing video games [17]. Students addicted to gaming had lower grades than nonaddicted students, even when they played the same amount of hours. Prevalence of jeopardizing important life opportunities in the general population ranges from 5 to 48% [8, 10–12, 17].

Loss of Interest in Previous Hobbies

Disinterest in previous hobbies results from gaming becoming a dominating force in the social and recreational life of the gamer. This may not always be negative. Video game play can be preferable than going outside in crime-struck neighborhoods or could replace riskier habits like drinking, smoking, or gambling. A dysfunctional loss of interest in previous hobbies results in discontinuing beneficial activities.

Addicted gamers demonstrate significant reductions in previously favored activities, spending less time or showing less interest in volunteering, playing sports, socializing with friends, or any other previously preferred activities in lieu of video game play. Prevalence of disinterest in previous hobbies in the general population ranges between 7 and 14.4% [9, 10].

Tolerance

Tolerance is the need for increasing amounts of something one is addicted to in order to achieve the same level of satisfaction. For gamers, tolerance results in needing more frequent and longer play sessions to feel similar levels of happiness, excitement, or fulfillment in their game playing habits. Prevalence of tolerance symptoms in the general population ranges between 6.7 and 9.8% [8, 9, 11, 12].

Prevalence

IGD has a prevalence rate between 2 and 10% among video game players [6]. However, the DSM-5 notes that "the literature suffers … from lack of a standard definition from which to derive prevalence data" [6]. Although this is technically correct, it may be less important than it appears at first. Despite using different definitional criteria, most studies in fact use very similar types of questions and yield similar results. For example, Fisher [11] reported 6% of children met four of nine criteria for IGD. A study of American youth 8–18 found that 8.5% of players met 6 of 11 criteria for addictive behavior [17]. Choo et al. [9] found that 9% of players met five of 10 criteria for addictive behavior. Thomas and Martin [13] reported approximately 5% of players met four of nine criteria for addictive behavior. In another recent study, 8% of individuals met 7 out of 14 criteria for addictive behavior [24]. Many of these studies use similar criteria to those now established by the DSM-5. Studies that most closely mirror the DSM-5 criteria and classification range between 3 and 9% prevalence rates.

Etiology and Comorbidities

Few studies have examined the etiology, comorbidities, and course of development of IGD. One study measured the IGD-style gaming symptoms of more than 3000 Singaporean elementary and secondary school children over a 2-year period [25]. Out of the approximately 9% of children who met the criterion for clinical significance at the beginning of the study (based on DSM-5 dichotomous criteria), 84% remained at that level 2 years later. Individuals with IGD also had greater levels of depression, poorer grades, worse relationships with parents, and increased aggressive tendencies. These comorbidities increased for those who reached IGD status during the study and decreased for those who dropped below the IGD threshold during the study. Similar results were found in a longitudinal study using a continuous scale measurement approach [26]. Additionally, Choo et al. [9] provided evidence

for the divergent validity of IGD by showing that pathological video game players scored no differently from non-pathological players on measures of intelligence or socioeconomic status.

Li, Liau, and Khoo [27] asked participants to respond to a total of ten yes/no/sometimes items about pathological gaming adapted from the DSM-IV-TR criteria for pathological gambling. Researchers examined the relations among discrepancies between individuals' ideal and actual selves, depression, and subsequent pathological game play. Individuals who felt that their ideal self was different from their actual self experienced increased feelings of depression when compared to their peers. This depression led to increased levels of self-reported escapism and the heightened escapism led to an increase in pathological video game use. Escapism and discrepancies between actual and ideal self also had direct effects on pathological gaming—indicating a complex, multi-causal etiology.

These studies indicate that IGD is not simply a symptom of other disorders, such as depression, but does undergo changes based upon any other pathologies. These comorbidities may make treatment more difficult.

Treatment

Research into the efficient treatment of IGD is still in its infancy [28], although some studies have reported successful treatments [29]. These studies usually modify strategies shown to be successful in other types of addictions to target video game playing habits. Of note, bupropion (antidepressant and smoking cessation aid) treatment and cognitive behavioral therapy (CBT) have been shown to have short-term benefits [16, 30]. Bupropion treatment reduced cravings to play and video game cue-induced activity in the dorsolateral prefrontal cortex. This suggests that IGD can be treated in a manner similar to substance abuse or dependence. That said, critics have argued that the majority of studies into IGD treatment have failed to provide long-term follow-up reports after treatment and that there are not any strong randomized controlled studies yet. Since there is inadequate evidence to assess relapse and remission rates following IGD treatments, researchers should be cautious in interpreting their initial success. If the reliability and the validity of the IGD diagnosis are improved, an optimal treatment can be designed and utilized.

Conclusion

Since IGD is now in the DSM-5 as an emerging diagnosis, more research can be done to display inconsistencies in the classification of IGD. The American Psychiatric Association's DSM-5 behavioral addiction work group investigated the literature on several potential behavioral addictions, such as Internet, shopping, exercise, work, video gaming, as well as excessive eating and sexual behaviors [31]. The researchers concluded that the literature was too limited on all topics other than gaming, particularly when connected to the Internet, and thus only Internet Gaming Disorder was recommended for inclusion in the DSM-5.

Are Pathological Gaming and Internet Distinct?

The literature tends to cluster into two study foci—video games or the Internet more broadly. At one level of analysis, this is simply a distinction made by how questionnaires are worded. At another, however, it may signify different disorders. If Internet Gaming Disorder and Pathological Internet Use (PIU) are distinct disorders, what evidence would be needed to differentiate them? No matter the conceptualization, all addictions are based on the assumption that they are only clinically relevant if they cause dysfunction.

Preoccupation for PIU would be the excessive thinking about using the Internet or a preoccupation with the Internet that would lead to difficulties focusing on normal tasks. Chen, Wang, and Su (2003) cross over into the withdrawal domain with their criteria for PIU. Withdrawal for PIU would be near identical as it is for IGD, people

would undergo unpleasant physical effects and/or negative emotions when attempting to cease or lower their Internet use. A requirement for Internet use to be problematic would be the inability to reduce usage overall, even after realizing the detriment it has. Davis, Flett, and Besser [32] mention social rejection as a drive for PIU, which leads to utilizing the Internet for escaping from the stressors of daily life. This becomes a problem when the only way that people are able to cope is through using the Internet.

Given the current state of the literature, we believe it is most parsimonious to consider PIU and IGD to be two different morphologies of a similar underlying technology addiction. This is similar to how people can be addicted to gambling despite doing almost nothing that looks the same—one puts money in a slot and pulls a lever, whereas another researches horses and jockeys. Nonetheless, we would diagnose both gambling addicts the same way, we would look for similar symptoms and outcomes, and treatment would share many characteristics. Thus, despite morphological differences, they are not distinct slot machine and horse racing addictions. Similarly, the vast majority of the research on video game or Internet addiction tend to show similar patterns of dysfunctional symptoms, similar outcomes, and similar responses to treatment.

That said, it is certainly possible that future research may find important distinctions between them. Within the past 5 years, work groups have been formed and given the task to further examine different disorders. More specifically, the "substance use disorder" (SUD) work group investigated different addictions, such as video gaming, shopping, exercise, work, as well as excessive eating and sexual behaviors [31]. The researchers concluded that the literature found on all other topics, besides video gaming, was limited, which resulted in the exclusion from Section III. Although there is no space to go into detail here, it is useful to consider what evidence would indicate that IGD and PIU were distinct taxons?

One might assume that they were distinct if the populations did not overlap much, that there would be limited comorbidity of IGD and PIU. Yet, there is no strong evidence of this. Only a small subset of slot machine addicts are also addicted to roulette or horse racing, but these are not distinctly different types of addiction. Therefore, we should not expect a majority of people addicted to video games to also be addicted to the Internet. IGD can also be viewed as dissimilar to PIU due to the distinctions and similarities with Internet use, gambling, and video gaming with the use of visual and auditory rewards [33].

One might also assume that if different scales are used to measure symptoms that they should be considered distinct issues. Yet, our experience with multiple video game addiction scales is that the disorder is robust to measurement differences. That is, we find essentially the same results no matter how we define or measure it. The good (?) news is that we can trust that the underlying problem seems to be real. The bad news is that it becomes more difficult to know what the specific characteristics are that might differentiate IGD and PIU.

Our current thinking is that we would be convinced that PIU is distinct from IGD if at least several of the following conditions were met:

- There are clearly different risk factors for who becomes addicted to the Internet or to games.
- There are clearly different protective factors between PIU and IGD.
- The etiologies and course of the pathologies were clearly distinct.
- There are different patterns of comorbidity with other mental health problems.
- The outcomes of each were clearly distinct.
- The treatments for one did not work for the other.

At present, there is not enough research to answer most of these questions, although the research on outcomes seems to show very similar outcomes for both (e.g., depression, anxiety, poor school performance, etc.). Therefore, given the dearth of clear evidence for most of these questions and the presence of similar outcomes, we argue that the argument over whether these are importantly different disorders is premature. It is, however, an important question that should motivate future research.

Clinical Implications

At our university, we have many first-year freshmen fail out at some point during their first year. Anecdotally, it seems that many of them have trouble with gaming, perhaps because they are away from home with no one checking up on them to see if they are going to class, they are in dorm rooms with other gamers, and they have 24-h high-speed Internet at their disposal. They may stay up all night gaming and skip classes. As their grades slip, they use games to help cope with the feelings of anxiety about failing. If they succeed in going to our student counseling service, they typically present with a complaint about failing grades. The therapist hears this and therefore asks grade-relevant questions in the clinical interview. These include, we expect, questions about their study habits, note-taking, class attendance, sleep, etc. The clinician does not ask about video games because the patient did not present with a complaint about gaming. The patient does not talk about video games, because to the patient, they are part of the solution, not the problem. That is, no one talks about what is likely to be an important part of the problem. One clinical implication, therefore, is that media habits should be part of standard intake questions. At a minimum, it would be useful to know how much time patients spend with electronic screens *not* for work or school purposes. We will note, however, that there is no magic number at which gaming or Internet appears to be clinically important. We recommend that children be limited to perhaps 1–2 h a day of total screen time (as the American Academy of Pediatrics used to recommend).We also recommend that screen time not be measured with a single item. In our experience, if you ask people how much time they play video games or watch TV a day or a week, they underestimate by more than half. If you ask them instead how much time they usually play from 6 am to noon, noon to 6 pm, 6 pm to midnight, and midnight to 6 am, separately for weekdays and weekends, then (in our experience) you get numbers that are more in line with the national averages. This can be done separately for games, for Internet, and for television (or other devices/uses) to get a detailed picture of screen time. It is important, however, to measure the use that is not for school or work, as these are functional uses and should not be used as a screen for potentially dysfunctional uses.

Screening: What tests should clinicians use in what ages (preferably validated instruments)?

For IGD we recommend using "The Internet Gaming Disorder Scale" [7] which is a scale that fits within the suggested APA guidelines for screening.

Conclusion

We feel that research on IGD (and also PIU) has been moving in the right direction. We are moving away from arguing over how to define and measure it and are starting to ask the more useful questions about risk and protective factors, etiology, comorbidity, and treatment. Asking these questions will also help to answer definitional and measurement questions.

As an example, we currently consider IGD (and PIU) to be likely to be a type of impulse control disorder. If this is correct, then treatments that are effective for those should work on these issues. This view is not universally accepted, however, and research that answers this question would be relevant for definitions and measurement.

Despite many questions still to be answered, the early research appears to be strong enough to warrant continuing to ask the questions and to treat seriously patients who present with concerns about gaming.

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