

Literature Review on Internet Gaming Disorder:
Definition, Epidemiology, Proposed Symptoms, Course and Treatments

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Submitted to the Board of Psychology
School of Natural Sciences
in partial fulfillment of the requirements
for the degree of Bachelor of Arts

Purchase College
State University of New York

May 2020

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Abstract

In recent years, video game use has become extremely popular. While most people use video games for entertainment, there has been increased concern about people developing Internet gaming disorder. Video game addiction appears in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) as a condition that is not yet classified but warrants additional research, while the International Classification of Diseases (ICD-11) lists video game addiction as gaming addiction. The main goal of this literature review is to examine the research on the epidemiology, etiology, proposed symptoms, and course of Internet gaming disorder in the USA and internationally. In addition, this literature review will explore the existing research pertaining to treatment of Internet gaming disorder. Finally, recommendations will be for future research in psychology, and for public policy.

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In recent years, the evolution of video games has grown. Previous research on video games has provided information on both the benefits and consequences of the usage of video games. As much as video games are used for entertainment, for some people they have developed into something more. For instance, online streamers, YouTubers, and pro-gamers have taken up playing video games as a full-time job. Along with this, video game use has shown to be beneficial by creating a comfortable social environment for people who experience social anxiety. Some will play games for the enjoyment of winning, whether it is an in-game award or the feeling of finishing the game. The term, 'gameplay' is used to refer to the plot of a video or the way that the video game is played. Depending on the type of game, people will play for the gameplay or the story the game is trying to tell. For example, the *Fire Emblem* franchise is more known for its tactical strategy gameplay, rather than the storyline of the game. But a game like *Brothers: A Tale of Two Sons*, is a problem-solving game with a silent narrative that tells an excellent story of two brothers trying to collect rare medicine ingredients for their sick father.

Recent media has portrayed video games as exerting a negative influence on youth. For instance, the 20-year old shooter of the 2012 Sandy Hook Elementary School massacre owned and frequently played a lot of violent video games (Henderson, 2012). Video game addiction has become a concerning issue that has been included in the Diagnostic and Statistical Manual of Mental Disorders (DSM V; APA, 2013) as a condition that is not yet classified but warrants additional research.

While this literature review will focus primarily on excessive video game use, there are positives to video games. Before delving into the literature on Internet Gaming disorder, some of the studies describing the benefits of will be briefly reviewed. As mentioned earlier, most people

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use video games for entertainment or to have fun with friends. However, there are more benefits to video games than just entertainment use. For example, previous research has found that people with anxiety may use video games to overcome their social anxiety (Reinecke, 2009). In some instances, video games have been linked to prosocial behavior. Kovess-masfety and colleagues (2016) examined the association between video games, mental health, and social skills in children 6 to 11-year-old. Data was collected through surveys and self-reports completed by the child, teacher, and mother. According to their findings, prosocial video games were likely to increase prosocial behaviors.

Another benefit of video games is that they can increase some cognitive skills. Research by Basak and colleagues (2008) explored training cognitive abilities through a real-time strategy game. Through two conditions, 40 older adults took part in training sessions where they played the strategy game *Rise of Nations: Gold Edition*. They found that subjects in the training condition performed significantly better on executive control tasks than the no-training group.

Additionally, previous research has found that video games are used by some people to cope with stress and calm down anxious feelings. Ferguson and Rueda (2010) investigated the effects violent video games have on aggressive behavior, hostile feelings, and depression. Using paced auditory serial addition tasks and a 45-minute playing period, they found that video games can be used as a mood management activity to reduce stress. In another study, Reinecke (2009) investigated recovery methods through video games. In this study, participants took an online survey that asked about video game use, recovery methods, and everyday problems. Reinecke found there was a positive relationship between recovery and video games play.

Furthermore, video game technology, like virtual reality, has been used as a form of treatment. Past research has examined the advantages of exposure therapy used in a virtual

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environment. Anderson and colleagues (2013) examined the comparisons between virtual reality exposure and exposure group therapy. Participants were randomly assigned to one of the three groups and had to complete all assessments and 8 treatment sessions. Anderson and colleagues found there was no difference between virtual reality exposure treatment and exposure group therapy. Additionally, Reger and colleagues (2016) examine the comparison between virtual reality exposure (VRE) to general treatment. In their study, participants were randomly assigned to one of the three groups. Participants in the treatment conditions were given 90-120-minute treatment sessions over 5 weeks. According to the results, there were no significant differences between the two treatment groups. These are just some of the current benefits of video games.

The main goal of this literature review is to examine the research on epidemiology, etiology, proposed symptoms, and course of Internet gaming disorder in the USA and internationally. In addition, this literature review will explore the existing research pertaining to treatment of Internet gaming disorder. Finally, recommendations will be for future research in psychology, and for public policy.

Internet Gaming Disorder

The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) is the most widely accepted nomenclature used by practitioners and researchers for the classification of mental disorders in the United States. Video game addiction has been included in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM V*) as a condition that is not yet classified but warrants additional research. Despite being listed in the *DSM-V*, Internet gaming disorder is not an official disorder, rather it is a disorder under investigation. According to the *DSM-V*, Internet gaming disorder is defined as excessive use of the Internet for gaming purposes leading to impairment in five or more of the listed criteria for at

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least a 12-month period, accompanied by five or more of the following symptoms: 1) preoccupation with Internet games, 2) withdrawal symptoms when the game is taken away or not possible (sadness, anxiety, irritability), 3) tolerance (the need to spend more time gaming to satisfy the urge), 4) unsuccessful attempts to curb Internet playing, 5) loss of interest in other life activities (such as hobbies), 6) continued use despite the negative consequences, 7) lying to others about his or her Internet gaming usage, 8) use of Internet gaming to relieve negative moods (such as anxiety or guilt), 9) having jeopardized or lost a job or relationship due to gaming.

The *International Classification of Diseases for Mortality and Morbidity Statistics* (11th ed.; *ICD-11*; World Health Organization, 2018) is the system of classification that is used to identify health trends globally, and is the international standard for reporting diseases, disorders, and health conditions. According to the ICD-11, gaming disorder is classified under disorders due to addictive behaviors and is defined as a pattern of constant gaming, which may be online or offline behavior over a period of at least 12 months, accompanied by the following symptoms: 1) impaired control over gaming, 2) increasing priority to gaming that gaming takes over other interests and daily activities, 3) continuation or escalation of gaming despite the occurrence of negative consequences.

Some researchers examined the validity of these systems of classification (DSM-V and ICD-11) others have come up with their own methods for assessing addiction to video games. Przybylski and colleagues (2016) have examined the effectiveness of the DSM-V Internet gaming disorder criteria. In four studies across the U.S, U.K, Canada, and Germany, they gave participants surveys that relate to the nine symptoms of Internet gaming disorder that are described in the DSM-V (diagnosis under investigation). Przybylski and colleagues found that

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the number of indicators endorsed, positively correlated with distress criterion across all four studies, meaning that all the criteria were relevant to potential diagnoses. Furthermore, Ferguson and Colwell (2019) investigated the opinions of scholars about whether to officially add Internet gaming disorder to the DSM-V. In their study, they had scholars take a survey about their opinions on pathological gaming as a diagnosis. According to the results, more scholars supported the possibility of pathological gaming as a diagnosis than were skeptical of it. Scholars were evenly split concerning whether the diagnosis could do harm. Although these authors presented their own methods to evaluate for Internet gaming disorder, the DSM-V is known to be the main unofficial method of diagnosing Internet gaming disorder.

Additionally, Bean and colleagues (2017) wrote a review on pathologizing video games. In their review, they discussed the history of Internet gaming disorder from the DSM-V and gaming disorder from the ICD-11. Bean and colleagues reviewed the reasons the disorder was added and/or considered and addressed the current concerns about classifying the disorder as an official diagnosis. The first concern they mentioned is whether it can be identified as a mental condition with its current criteria. Another concern derives from the current studies on the disorder. The authors raised concerns that some current research studies may categorize people as having video game addiction without the benefit of enough research that would warrant this, thereby ‘pathologizing’ normal behavior. For example, not enough studies have identified the course of Internet gaming disorder. The unknowingness about how to classify the disorder is a growing concern and needs to be further reflected on. These are just some of the concerns Bean and colleagues focus in in their review.

Furthermore, researchers have mentioned their concerns and reasons behind adding gaming addiction to the ICD. For instance, Király, & Demetrovics (2017) discuss the debate on

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the inclusion of gaming disorder in the ICD-11. This debate mentions that establishing a formal diagnosis based upon a few studies of problematic video gaming is premature. However, Király, & Demetrovics argue in their paper that the studies on problematic video gaming are improving and should be seen through a cross-cultural view.

The Current Study

The goal of this literature review is to discuss Internet gaming disorder and excessive gaming. The research on the epidemiology, proposed symptoms, and course of Internet gaming disorder will be described and critically appraised. Additionally, the paper will examine the risk factors that lead to the development of addiction, and currently available treatments for Internet gaming disorder. Finally, recommendations will be made for future research in psychology, and for public policy.

The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) is the most widely accepted nomenclature used by practitioners and researchers for the classification of mental disorders in the United States. Video game addiction has been included in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM V*) as a condition that is not yet classified but warrants additional research. Despite being listed in the *DSM-V*, Internet gaming disorder is not an official disorder, rather it is a disorder under investigation. Through using the *DSM-V* and the *ICD-11* as guidelines, this paper will examine the epidemiology, proposed symptoms, and course of Internet gaming disorder, as well as currently available treatments for Internet gaming disorder. Moving forward, relating titles are referring to Internet gaming disorder.

Articles were identified by using the *DSM-V* online database, *ICD-11* online database, and SUNY Purchase database system for students (i.e. Psych-ARTICLES, PsycINFO, PubMed

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[Medline], Psychology and Behavioral Science Collection, and ScienceDirect from 2009 to present). Articles and journals were included if the research was on gaming addiction, Internet gaming disorder, problematic gaming, addiction, extensive video game playing, video game overuse, extensive gaming, cross-cultural comparison, international samples, adolescents, video gaming, cognition, pathological gaming, prevalence, treatment, virtual reality, technology, anxiety, coping, and mental illness. Articles were excluded if they were not translated into English, mainly focused on video games and aggression, or did not mention video games or video game technology.

Epidemiology and Risk Factors

Prevalence

Przybylski and colleagues (2016) study on etiological risk factors and video game addiction found that the current lifetime prevalence of Internet gaming disorder in the DSM-V is 3.1%. Additionally, Rehbein and colleagues (2010) examined the prevalence and risk factors of video game dependency. By using a German sample, they wanted to get a nationwide prevalence estimate of video game dependency. In their study, they administered a 31-page standardized inventory which asked about video game use and video game dependency using the classification of dependency of the ICD-10. For prevalence, they found that 2.8% of the adolescents surveyed were at risk, while 1.7% were classified as being dependent on video games.

Age and Gender

The DSM-V notes that male adolescents between the ages of 12 to 20 are more likely to develop Internet gaming disorder (American Psychiatric Association, 2013). Most research has found that Internet gaming disorder mainly affects male adolescents. Przybylski and colleagues

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researched Internet gaming disorder across an even sample of males and females. They found there was no significant difference in rates of Internet gaming according to gender. On the other hand, Rehbein and colleagues (2010) using the ICD-10 found that 4.7% of the males were at risk and 3% were dependent, while 0.5% of the females were at risk and 0.3% were dependent.

Despite the findings described in the DSM-V, there is a possibility that other age groups can be affected. However, this issue needs to be further researched.

Socioeconomic Status

In terms of socioeconomic status, it appears that people with families that have a stable income are more likely to develop Internet gaming disorder than families that financially struggle because they can afford video games or can financially support family members (Reinecke, 2009). However, there is not much research focusing on socioeconomic status.

Cross-Cultural Comparisons

Video games are played across the world and have become more than just a hobby and entertainment. Half of the Korean teenage population are affected by Internet addiction (Shea M. [VICE], 2015). Additionally, in South Korea, video games have become more than just a hobby. Esports are professional competitive video games, where professional gamers compete one another in a competitive league.

Even in the USA, according to the DSM-V, being an adolescent male and being in an Asian environment or from an Asian genetic background is associated with an increased risk of developing Internet gaming disorder. However, it is unclear why these demographic characteristics are related to the development of Internet gaming disorder. The genetic and physiological risk factors are still unclear and need to be researched.

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A study by Kiraly and colleagues (2019) investigated the psychometric properties of the Internet Gaming Disorder Test (IGDT-10) across seven language samples. In their study, participants took a survey about video game use, motivation to play video games, problematic gaming, and Internet gaming criteria. They found that the IDGT-10 showed good psychometric properties in each of the language samples. Additionally, Przybylski and colleagues looked at an international sample that includes the US, UK, Canada, and Germany. They found that the rates of Internet gaming disorder were assessed similarly across the four countries. Additionally, they found that participants who endorsed five or more of the indicators reported to be more in distress than those who did not across each of the samples, implying that those who dedicate themselves to gaming are more prone to Internet gaming disorder.

Furthermore, Rehbein and colleagues (2010) examined the prevalence of video game dependency within a German sample, and studied the factors associated with this dependency. Through an administered 31-page standardized inventory, risk factors were measured through questions that asked about participant's usage time on nine different video game genres, other activities, social interactions, and impulsivity. They found that out of the games played, players of online games like World of Warcraft, Counterstrike, Battlefield, Call of Duty, and Guild Wars had an increased chance of video game dependency. Additionally, they analyzed the participants who played games regularly from the collected sample and found other risk factors that contribute to video game dependency. These risk factors include: the use of three game genres, lower education, repetition of school year(s), having no other leisure time activities, a history of physical abuse in the family, and the presence of other psychological disorders.

Types of Games

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There are many types of video games. There are also several different genres including action, adventure, role-playing, and others. Additionally, there are different ways that people can play games such as online, offline, or both. Lemmens and Hendriks (2016) examined the relations between Internet gaming disorder and game genres (i.e. offline, online, action, adventure, and others). In their study, they used two online IGD surveys (Internet gaming disorder surveys) to examine the difference between online gaming and offline gaming. Participants were given questions that asked about the amount of time spent on games, questions relating to Internet gaming disorder, video game genre, and whether the games they played were online or offline. They found that online games were more strongly correlated with Internet gaming disorder than offline games. Additionally, they found that time spent on shooter and role-playing games (RPGs) were positively correlated with Internet gaming disorder. This shows that there are certain games that are more likely to put you at risk for Internet gaming disorder than others. However, more research needs to be done about the impact of different game genres on video game addiction.

Video Games as a Coping Strategy

Previous studies have mentioned that people use video games to cope with anxiety and other disorders. However, overreliance on video games can lead to video game addiction. Plante and colleagues (2018) examined the relationship between some etiological risk factors and video game addiction. One of these risk factors was whether video games were used as a coping method. The participants completed surveys on their media habits and usage and were given a coping strategies checklist. Plante and colleagues found a positive relationship between the use of video games as a coping method and video game addiction. Their findings help contribute to understanding the potential harm of using video games as a coping method.

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A study by Bender and Gentile (2019) investigated Internet gaming disorder. More specifically, the authors investigated the relationship between in-game and real-life satisfaction. They wanted to investigate if satisfaction with life is related to symptoms of Internet gaming disorder. Additionally, they wanted to test if satisfaction with life would moderate the relation between in-game satisfaction and symptoms of Internet gaming disorder. They administered questionnaires that asked about the frequency of video games played and video game addiction. Then they administered two scales to measure “need satisfaction” in-game and “need satisfaction” in life. Bender and Gentile found that higher levels of need for in-game satisfaction was related to higher levels of Internet gaming disorder symptoms, while higher levels of need for satisfaction in life was related to lower levels of Internet gaming disorder symptoms. This indicates that players who tend to pay more attention to their in-game “need satisfaction” tend to play more and focus less on satisfying their needs in life. This imbalance could imply that they are avoiding their in-life needs by turning to video games.

King and Delfabbro (2016) investigated cognitive factors that influence those with symptoms of Internet gaming disorder. They found four cognitive factors that are associated with addicts' behavior. These factors include the person's belief about the value of the game's rewards, maladaptive rules about game behavior, over-reliance on games for self-esteem, and using games for social acceptance.

Personality

Video games allow people to try different actions, experiences and identities. Behavioral simulation and identity simulation emphasize the influence that video games have on a person's sense of self. Behavioral simulation is the opportunity to try out different actions and experiences associated with thoughts and feelings, while identity simulation is the perspective that

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emphasizes the influence of video games on one's sense of self. Character-based video games allow a person to see through a different perspective. Hull and colleagues (2014) examined these concepts through studying the relationship between playing mature-rated, risk glorifying video games (MRRG) and behavioral deviance (alcohol use, cigarette smoking, aggression, delinquency, and risky sexual behavior.) In their study, they gave US adolescents surveys that assessed media exposure and risk behaviors. Surveys were given to participants in four waves. Wave 0 and Wave 1 were separated by 8 months, Wave 1 and Wave 2 were separated by one and one-half years, and Wave 2 and Wave 3 were separated by two years. Hull and colleagues created a direct effects model and a mediational model for alcohol, smoking, aggression, and delinquent behavior and sexual behavior. They found that the mediation model was a better fit compared to the direct effects model. Through these findings, they were able to support their hypothesis that MRRG video games can change a person's self-perception, and lead individuals to identify with characters. This identification with deviant characters influences the behavior of individuals who watch violent video games, and this influence extends beyond the specific behaviors that are viewed and executed online. For example, those who play violent video games consume more alcohol, smoke more, are more likely to be aggressive and to engage in delinquent behavior and sexual behavior compared to their demographically similar peers. This is true despite the fact that many of these behaviors do not appear in violent video games, but rather, reflect an overall identification with the actions that are involved in video game play.

Furthermore, Wang and colleagues (2015) explored the personality traits related to Internet gaming addiction in Chinese adolescents. They aimed to investigate personality traits that can be associated with excessive Internet gaming. In their study, they administered an anonymous questionnaire which used an Internet Addiction Test, a Gaming Addiction Scale, the

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Bergen Facebook Addiction Scale, and the Big Five Inventory for personality traits. Wang and colleagues found that the most common personality traits associated with Internet gaming were low conscientiousness and low openness. They proposed that these traits may be more common in gamers due to their tendencies to constantly play video games rather than trying new activities. It is also possible, however, that people with these traits are more likely to play video games because they are not risk takers, socially.

Comorbidity

The DSM-V suggests that the diagnosis of Internet gaming disorder is associated with depressive disorders, ADHD, or OCD. King & Delfabbro (2016) examined problematic gaming in adolescence. Participants in their study filled out an Internet gaming disorder checklist, an Internet gaming cognition scale, and a depression anxiety stress scale. They found that adolescents with Internet gaming disorder may have specific maladaptive beliefs about Internet gaming, the self, others, and the world compared to other gaming populations.

Additionally, Plante and colleagues (2018) investigated the relationship between some etiological risk factors and video game addiction. One risk factor they examined was the presence of symptoms of mental illness. Participants were given a survey on media habits and an anxiety inventory. Then they were asked to fill out four surveys that queried them about symptoms of borderline personality disorder, depression, obsessive-compulsive disorder, and attention deficit hyperactivity disorder. Plante and colleagues found a positive correlation between anxiety, symptoms of mental illness, and video game addiction.

Plante and colleagues developed a few models exploring how risk factors may interact and lead to video game addiction. The mediation model focused on the effect of trait anxiety on video game addiction. They found that trait anxiety was significantly positively associated with

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all three proposed mediators (video game frequency, negative coping strategies, and video game use as a coping strategy). However, only the frequency of video gameplay and video game use as a coping strategy were positively associated with video game addiction. Negative coping strategies were not significantly correlated with video game addiction. From these findings, the pathways that included frequency of video gameplay and video game use as a coping strategy were more likely to lead to addiction. Plante and colleagues had a second model to support their existing findings. Plante and colleagues found a significant positive relationship between mental illness symptoms and the two mediators (trait anxiety and video game use were small in magnitude). From these results, the indirect pathway linked mental illness symptoms with video game addiction through the two mediators. The serial mediation model illustrates that mental illness symptoms predict video game addiction through trait anxiety and video game use as a coping method.

Treatment

For more commonly known addictions, such as alcohol and drug addiction, people tend to get help at outpatient treatment facilities, rehabilitation centers, living homes, or support groups. Some people will detox and take certain medications that help them detox. Some researchers have tried investigating the effectiveness of cognitive-behavioral therapy for treating Internet gaming disorder. There are also some rehabilitation centers and camps for people with symptoms of Internet gaming addiction.

Outpatient Psychotherapy

Several types of outpatient psychotherapy have been used to treat Internet gaming disorder, and excessive gaming. These psychotherapies include techniques derived from motivational interviewing, cognitive therapy, client centered counseling, system theory and

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social psychology. Through these strategies, the main goal of the therapist is to motivate clients to change something about themselves (Griffiths & Meredith, 2009). Miller and Rollnick (1991) note that by motivating and encouraging the client, the therapist and client will form a trust and the client will begin to reach a decision to change.

Virtual reality treatment programs have been created to treat Internet gaming disorder. For instance, Park and colleagues (2016) investigated the effectiveness of virtual reality therapy, in comparison to cognitive behavior therapy, for treating 'online gaming addiction.' They predicted that virtual reality therapy would perform similarly to cognitive behavior therapy in reducing online gaming addiction. In their study, participants first completed a 20-item Internet addiction scale, followed by an fMRI scan. Then, they were randomly assigned to one of the two groups: cognitive behavior therapy (CBT), or virtual reality therapy (VRT). First, The CBT group was given eight, two-hour sessions led by a medical expert. In these sessions, the health care professional asked the patients about excessive Internet gaming, and the negative consequences associated with these behaviors. For the VRT group, Park and colleagues developed an eight-session program consisting of three steps. In step one, participants were taught to relax while listening to relaxing sounds and videos. Then, they were stimulated by gaming cues (sounds and noises from familiar video games) that would likely trigger their cravings to play. The last step was a sound-assisted cognitive reconstruction where participants encountered an aversive noise during the most exciting high-risk situation. After the eight sessions, participants completed the same 20-item Internet addiction scale and took another fMRI scan. Results were that both groups evidenced significantly reduced scores on the Internet addiction scale, but there was no significant difference between the CBT group and the VRT group. The VR program that Park and colleagues provided was just as effective as cognitive

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behavioral therapy. Since virtual therapy, and CBT were equally effective, but the effects of CBT lasted longer, future research studies should evaluate the effectiveness of combining both approaches.

Mindfulness-based psychotherapy has been used with people who have Internet gaming disorder or who engage in excessive gaming. This method of treatment helps patients make positive decisions and learn mindfulness. Li and colleagues (2017) examined the effectiveness of mindfulness-oriented recovery enhancement (MORE) on symptoms of Internet gaming disorder. In their study, they randomly split participants into one of the two groups. One group was the MORE group, while the other group was the support group. For the next eight weeks, participants attended treatment sessions according to their assigned treatment. The MORE group attended two-hour group sessions, mindful breathing, mindful awareness, and mindful strategies for coping with negative states. The participants logged their mindful practices. The support group attended group discussions that focused on specific topics revolving around video games and their experiences. Then, a post treatment assessment was administered that included questions about Internet gaming disorder, craving, maladaptive cognitions relating to video games, mental distress, coping, and mindfulness. After three months, participants took a follow up with the same assessment. Results found that both the MORE group and the support group were effective in reducing symptoms of Internet gaming disorder. However, the MORE condition was significantly more effective in reducing Internet gaming disorder symptoms, even after the three months, although Li and colleagues did not describe which symptoms were reduced.

Pharmacological Treatment

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Some medications that have been used to treat substance use disorders have also been studied for their potential use with people who experience Internet gaming disorder or problematic Internet use. Han and colleagues (2010) hypothesized that an antidepressant medication, bupropion (Wellbutrin) would decrease the desire to play video games. In their study, participants were administered an Internet addiction scale to test for problematic Internet use. Then they took an fMRI to test their brain activity before bupropion treatment. For the next six weeks, participants were asked to take 150mg/day of bupropion for the first week and increase the dose to 300mg/day for the following 5 weeks. All participants from both conditions were to play the strategy game, *StarCraft*. At the end of each week, participants and their families recorded the participants' playing time. After six weeks, participants took a follow-up fMRI. Han and colleagues found that there was a significant decrease in craving to play games and total playing time in subjects taking bupropion. Participants improved their daily routines, and some returned to school.

Kim and colleagues (2012) were interested in how effective cognitive behavior therapy (CBT) combined with bupropion would be for problematic gameplay. They predicted that CBT combined with bupropion would decrease online game playing time. In their study, participants were randomly assigned to one of the two groups: CBT-Med group (bupropion and CBT) or Med group (bupropion only). Over the next eight weeks, participants were all prescribed 150mg/day of bupropion for the first week and increase the dose to 300mg/day for the following 5 weeks. Participants in the CBT-Med group were also received an eight-session course of CBT, and the medication alone group completed a weekly 10-minute interview with their psychiatrist. At the end of the eight weeks, participants recorded online gameplay, mood and anxiety symptoms, life satisfaction and school adaptation scores. After four weeks, they had a follow up

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where they reported current game use and mood state. Kim and colleagues found that the CBT-Med group had a significant decrease in the severity of their online gameplay after the eight-week treatment period, compared to the medication alone group. These findings show that bupropion plus CBT are viable forms of treatment for people who play games to excess. However, the study does not compare therapy alone to their results. This needs to be further researched to investigate the effectiveness of using both forms of treatment. If patients plan to take this form of treatment, they need to consider the side-effects and medical risks, as well as the benefits of taking bupropion to determine whether this treatment is the right one for them.

Rehabilitation

Since Internet gaming disorder has been compared to other addictive disorders, Internet gaming treatments have investigated rehabilitation centers as a possible treatment option. For instance, South Korea has about 150 counseling centers and 100 hospitals that provide treatment programs (King, Delfabbro, & Griffiths, 2012). This is due to the fact that half of the South Korean teenage population is affected by Internet addiction (Shea M. [VICE], 2015). Sakuma and colleagues (2016) suggested the use of therapeutic residential camps. The goals of these camps are to support awareness of health and wellbeing, communication without technology, and working with others to solve problems. To date, there is not enough of research investigating international rehabilitation centers. But with the increasing concerns of Internet gaming disorder, the effectiveness of international rehabilitation centers to treat Internet Gaming Disorder should be further researched.

Scientific Review Articles that Evaluate Treatment Options

In a review by King and Delfabbro (2014), they present a systematic evaluation of the classification of Internet gaming disorder and treatments. The studies they found came from

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multiple computer databases using search terms such as pathological, addictive, dependent, video games, computer games, and treatment. The eight studies that were selected for their review included treatment studies of Internet gaming disorder or other titles related to Internet gaming. King and Delfabbro found that most of the studies did not include a follow-up, and if they did, the follow-up period was insufficient to determine recovery or relapse. Additionally, posttreatment assessment indicators were limited due to lack of studies on the validity of current Internet gaming measures. King and Delfabbro concluded that current treatments for Internet gaming disorder do not seem to be effective, on the whole, but their evaluation of treatment effectiveness was hampered by a need for Internet gaming measures that have been validated.

Furthermore, Zajac and colleagues (2017) wrote a review discussing the effectiveness of treatments in the current literature. The studies were categorized by author and treatment, then data was collected from each study. Studies were then evaluated by type of treatment using criteria for identification of evidence-based treatments. Zajac and colleagues found that none of the treatments for Internet gaming disorder met the standards for evidence-based treatments. In the end, they mentioned that conclusions about the efficacy of treatments for Internet gaming disorder cannot be made due to the limited methodologies and lack of studies. Overall, there are very few treatment methods for Internet gaming disorder and many of the current treatments need further research and development.

Discussion

Most of the studies discussed in this literature review used the criteria for Internet gaming disorder in the DSM-V or criteria for gaming disorder in the ICD-11. The research found has elaborated on the prevalence of the disorder and the validity of the proposed criteria. Additionally, some studies have described treatments that can be used for excessive Internet

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gaming. As Internet gaming disorder becomes more of a topic of concern, public policy should address how to limit gaming.

Public Policy

In terms of video games, there are not many public policy laws relating to Internet gaming disorder. Currently, the only American public policy laws on video games primarily focus on violent video games. These laws aim to restrict minors from having access to violent video games (Collier & colleagues, 2008). For instance, most violent video games are R rated (for mature audience) and only people who are 18 years or older can purchase these types of games. These legal measures restricting the use of violent video games by minors are based on psychological studies showing that violent video games increase aggressive behaviors (Ferguson and Rueda, 2010).

Internationally, there have been some laws enforced in order to limit gaming, primarily in Asian countries. South Korea passed a law known as the Cinderella Act. Under this law, children under the age of 16 are prevented from playing video games past midnight. Through their national identity numbers, online accounts are shut down at 12 o'clock am (Shea M. [VICE], 2015). Other Asian countries have similar laws to limit gaming.

Some recommendations to improve public policy laws around the world include implementing similar laws like the Cinderella Act to limit gaming. Additionally, if possible, video game companies should be required to provide technology for parents so that they can limit their child's game play through parental controls. This could help ease parents worries and limit children from playing an excessive amount.

Clinical Applications

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Even though Internet gaming disorder is still under investigation, there should be some awareness of the disorder. With treatments for Internet gaming disorder being researched, the clinical field should start paying attention to some of the symptoms. Practitioners should start being aware and noting patients' gaming habits. If still under parental supervision, clinicians should tell parents or guardians to log patients' gaming time. Parents need to be aware of obsessive game playing and the risk factors for Internet gaming disorder. Furthermore, parents and practitioners should begin finding out the types of games patients or children are playing. If parents are opposed to the type of games the child is playing, they need to start consulting them and finding solutions with their children, like identifying different games. Parents and practitioners need to encourage patients and children to play with friends or others on games rather than independently. This could increase the level of awareness that children have of the world around them while they play video games. Additionally, they need to ensure that the patients and children have different activities and hobbies to keep them entertained in their free time (Griffiths & Meredith, 2009). If a child's gaming habits escalate up to the point of being obsessive, parents should start limiting their game use by taking the game consoles and giving them to their children, when appropriate. Or they should be strict on parental controls which can limit the child's game time on the console.

Future research

Although the literature review covers a lot of studies and reviews on Internet gaming disorder, there are still some things that need to be further researched. First, researchers should establish common criterion to use for Internet gaming disorder. Many studies use the DSM-V, but there are still some researchers who use other types of criteria like the IDC-11. By using the

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same criteria for diagnosing Internet gaming disorder, it will be easier to compare studies, and more information could be made available for the next edition of the DSM.

A lot of the current studies on Internet gaming disorder primarily use questionnaires and surveys to gather data. This is a good approach to studying Internet gaming disorder, but there are limitations to just using questionnaires and surveys. For example, participants could lie about their answers because of social desirability, or under-report their use because of difficulties with recall. Future research should try to implement the use of surveys while people play video games. This strategy could be used in longitudinal studies, which are needed in this area of research. The use of concurrent surveys administered during video game play and longitudinal studies could provide further information on the long-term impairment associated with the disorder.

Additionally, future research on Internet gaming disorder treatments need to include follow-ups. In this literature review, a few studies performed follow-ups (Li & colleagues, 2017; Han & colleagues, 2010; Kim & colleagues, 2012), however, these follow-ups were for a short period of time. Long-term follow-ups need to be employed to know if the treatments have long term effects.

Furthermore, future research should examine the gaps in existing research. For instance, only one study could be found for this literature review that examined the effects using video games as a coping method (Plante and colleagues, 2018). This topic is important since many people tend to use video games as a coping method, especially when they encounter with stress and anxiety (Ferguson & Rueda, 2010; Reinecke, 2009).

Additionally, future research should further examine the effects of video game genres on Internet gaming disorder. As mentioned in this literature review, the type of video game is a

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potential risk factor (Lemmens & Hendriks, 2016; Rehbein & colleagues, 2010), but there is a lack of research investigating the video game genres. Another topic that should be researched is whether there are any biological factors related to Internet gaming disorder. Furthermore, a lot of the research analyzes gender differences in the rates of Internet gaming disorder, but not many studies elaborate on what factors are associated with gender differences in Internet gaming disorder.

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