

## A Brief Overview of Internet Gaming Disorder and its Treatment

Mark D. Griffiths, Daria J. Kuss and Halley M. Pontes

*International Gaming Research Unit, Psychology Division  
Nottingham Trent University, United Kingdom*

**Abstract:** *In the latest (fifth) edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), Internet Gaming Disorder (IGD) was included in Section 3 ('Emerging Measures and Models') as a promising area that needed future research before being formally included in the DSM. This paper provides a brief overview of IGD and its treatment. There are now over 20 different screens for assessing problematic gaming although very few studies have used nationally representative samples. The prevalence rates in these studies have ranged from 1.2% to 8.5% depending upon country and screening instrument used. Although IGD is not yet an officially recognized disorder, there have been a number of treatment studies although many of these do not distinguish between Internet Use Disorder and IGD. In terms of psychological treatments for IGD, cognitive-behavioural therapy appears to be the most widely used. It is concluded that standardized and comprehensive methods of diagnosis are at present lacking, and that further research into IGD is needed from clinical, epidemiological, and neurobiological aspects of IGD.*

**Keywords:** *internet gaming disorder, addiction, internet addiction*

### Internet Gaming Disorder: Background

Research into online addictions has grown considerably over the last two decades (Kuss, Griffiths, Karila & Billieux, 2014), and much of it has concentrated on problematic gaming. In the latest (fifth) edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), *Internet gaming disorder* (IGD) (also commonly referred in the literature as problematic gaming and gaming addiction) was included in Section 3 ('Emerging Measures and Models') as a promising area that needed future research before being formally included in the DSM.

The DSM-5 proposed nine criteria for IGD (of which five or more need to be endorsed over a period of 12 months and result in clinically significant impairment to be diagnosed as experiencing IGD). More specifically the criteria include (1) preoccupation with games; (2) withdrawal symptoms when gaming is taken away; (3) the need to spend increasing amounts of time engaged in gaming, (4) unsuccessful attempts to control participation in gaming; (5) loss of interest in hobbies and entertainment as a result of, and with the exception of, gaming; (6) continued excessive use of games despite knowledge of psychosocial problems; (7) deception of family members, therapists, or others regarding the amount of gaming; (8) use of gaming to escape or relieve a negative mood; and (9) loss of a significant relationship, job, or educational or career opportunity because of participation in games.

### **Prevalence of internet gaming disorder.**

There is no agreement on the prevalence of IGD as the vast majority of studies have used self-selected samples (King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013; Pontes & Griffiths, 2015a). A review of problematic gaming prevalence studies by Griffiths, Király, Pontes, and Demetrovics (2015) reported a large variation in the prevalence rates (from 0.2% up to 34%; 5% among Australian students [Thomas & Martin, 2010]). However, the authors noted that there were many factors that could have accounted for the wide variation in prevalence rates, including the type of gaming examined (i.e., some studies just examined online gaming, whereas others examined console gaming or a mixture of both), sample size, participants' age range, participant type (i.e., some surveyed the general population while others assessed gamers only), and instruments used to assess gaming.

There have been a handful of studies that have reported the prevalence of IGD using nationally representative samples. The prevalence rates reported were 8.5% of American youth aged 8–18 years (Gentile, 2009), 1.2% of German adolescents aged 13-18 years (Rehbein, Kliem, Baier, Mößle, & Petry, 2015), 5.5% among Dutch adolescents aged 13-20, and 5.4% among Dutch adults (Lemmens, Valkenburg & Gentile, 2015), 4.3% of Hungarian adolescents aged 15-16 years (Király, Griffiths, Urbán et al., 2014), 1.4% of Norwegian gamers (Wittek, et al., 2015), and 1.6% of European youth from seven countries aged 14-17 years (Müller, et al., 2015).

There are now over 20 different screening instruments including a number of new ones specifically incorporating the IGD criteria (e.g., Király, Slecza, et al., 2016; Lemmens, et al., 2015; Pontes & Griffiths, 2015b; van Rooij, Schoenmakers & van de Mheen, 2015). A comprehensive review by King et al. (2013) examined the criteria of 18 problematic gaming screens. The 18 screens had been utilized in 63 quantitative studies ( $N=58,415$  participants). The main weaknesses identified were (i) inconsistency of core addiction indicators across studies, (ii) a general lack of any temporal dimension, (iii) inconsistent cutoff scores relating to clinical status, (iv) poor and/or inadequate inter-rater reliability and predictive validity, and (v) inconsistent and/or untested dimensionality. King et al. (2013) also questioned the appropriateness of certain screens for certain settings, because those used in clinical practice may require a different emphasis than those used in epidemiological, experimental, or neurobiological research settings (King et al., 2013; Koronczai et al., 2011;).

Research into IGD is needed from clinical, epidemiological, and neurobiological aspects of IGD. There has been an increasing number of neurobiological studies on IGD. A recent meta-analysis (Meng, Deng, Wang, Guo, & Li, 2014) of 10 neuroimaging studies investigated the functional brain response to cognitive tasks from IGD, using quantitative effect size signed differential mapping meta-analytic methods. The meta-analysis found reliable clusters of abnormal activation in IGD within the regions comprising the bilateral medial frontal gyrus/cingulate gyrus, the left middle temporal gyrus and fusiform gyrus as compared to healthy controls. Moreover, Meng and colleagues (2014) also found that greater amounts of time spent per week playing was associated with hyper-activity in the left medial frontal gyrus and the right cingulate gyrus. However, one of the major limitations of this meta-analysis, was that 90% of the studies reviewed were conducted in Asian countries or regions, which might be problematic since prevalence rates of IGD in these populations are usually inflated, compared to prevalence rates reported in Western countries (Pontes & Griffiths, 2015a).

## **Aetiology of Internet Gaming Disorder**

Over the last decade, a number of studies have investigated the association between IGD (and its derivatives) and various personality and comorbidity factors. A recent review by Griffiths et al. (2015) summarised the research examining the relationship between personality traits and IGD. Empirical studies have shown IGD to be associated with (i) neuroticism, (ii) aggression and hostility, (iii) avoidant and schizoid tendencies, loneliness and introversion, (iv) social inhibition, (v) boredom inclination, (vi) sensation-seeking, (vii) diminished agreeableness, (viii) diminished self-control and narcissistic personality traits, (ix) low self-esteem, (x) state and trait anxiety, and (xi) low emotional intelligence. However, Griffiths and colleagues (2015) noted that it was difficult to assess the aetiological significance of such associations because these personality factors are not unique to problematic gaming. The same review also reported that IGD had been associated with various comorbid disorders, including (i) attention deficit hyperactivity disorder, (ii) symptoms of generalized anxiety disorder, panic disorder, depression and social phobia, as well as (iii) various psychosomatic symptoms (Griffiths et al., 2015).

## **Internet Gaming Disorder versus Internet Addiction**

Before IGD appeared in Section 3 of the DSM-5, there was debate about whether Internet addiction (IA) or its derivatives (e.g., Internet use disorder, Internet addiction disorder) should have also been included as a separate disorder (Block, 2008; Christakis, 2010; Griffiths, King, & Demetrovics, 2014; Petry & O'Brien, 2013; Pies, 2009). This mirrored debates among scholars, as to whether excessive problematic Internet use can be considered a genuine addiction. Some scholars differentiate between generalised IA (i.e., the totality of all online activities) and specific addictions on the Internet, such as Internet gambling, Internet gaming and Internet sex (Davis, 2001; Griffiths, 2000; Griffiths & Pontes, 2014; Griffiths & Szabo, 2014; Pontes & Patrão, 2014; Pontes, Szabo & Griffiths, 2015). Since the late 1990s, Griffiths (1999, 2000) has constantly argued that there is a fundamental difference between addictions *on* the Internet, and addictions *to* the Internet. Griffiths argued that the overwhelming majority of individuals that were allegedly addicted to the Internet were not Internet addicts, but were individuals that used the medium of the Internet as a vehicle for other addictions. More specifically, he argued that Internet gaming addicts were not Internet addicts but were gaming addicts using the convenience and ubiquity of the Internet to play video games (Griffiths, 2000).

A recent empirical survey, using a nationally representative population of adolescents, clearly showed that IA and Internet gaming addiction are not the same. More specifically, Király et al. (2014) examined the interrelationship and the overlap between IA and IGD in terms of (amongst other variables) gender, and time spent using the Internet and/or online gaming, and preferred online activities. They collected their data from a nationally representative sample of over 2,000 adolescents. They found that IGD was much more strongly associated with being male, and that IA was positively associated with online chatting, online gaming, and social networking, while IGD was only associated with online gaming. Similar to previous studies (Griffiths & Pontes, 2014; Montag, et al., 2014; Rehbein & Mößle, 2013), the authors argued that IGD was a conceptually different behaviour than IA and that their data supported the notion that IA and IGD are separate nosological entities.

## Treatment of Internet Gaming Disorder

Although IGD is not yet an officially recognised disorder, there have been a number of treatment studies published recently (Graham Jr., 2014; Han, Kim & Renshaw, 2015; Jiménez-Murcia, et al., 2015; Pallesen, Lorvik, & Molde, 2015; Poddar, Sayeed & Mitra, 2015; Sachdeva & Verma, 2015; Torres-Rodríguez & Carbonell, 2015). However, many of the treatment studies do not distinguish between Internet use disorder (IUD; sometimes referred to as IA) and IGD. For instance, a recent meta-analysis by Winkler and colleagues (2013) evaluated the short-term and long-term efficacy of both pharmacological and psychological treatments for IUD in 16 studies ( $N=670$  patients) that also included treatment of IGD. The authors concluded that both types of treatment were effective in treating and reducing symptoms of IUD, time spent online, anxiety, and depression. For psychological treatments, the short-term efficacy was reported as large and robust (and maintained over follow-up).

Przepiórka, Blachnio, Miziak, and Czuczwar (2014) recommended that clinicians should combine both cognitive-behavioural therapy (CBT) and pharmacological treatments including opioid receptor antagonists (e.g., naltrexone combined with sertraline), antidepressants (e.g., escitalopram, bupropion), antipsychotics (e.g., olanzapine, quetiapine) and psychostimulants (e.g., methylphenidate). On the other hand, recent reviews have suggested that multi-modal treatments were most effective in combatting online addictions (Pontes, Kuss & Griffiths, 2015).

In terms of psychological treatments for IGD, CBT therapy appears to be the most widely used. A number of review papers have noted that this model has been used to treat IGD (King, Delfabbro, Griffiths & Gradisar, 2011; Pontes, et al., 2015; Winkler et al., 2013). The first stage of treatment is typically focused on the behavioural aspects of the gaming addict, so that at subsequent stages the focus of treatment is gradually shifted towards the development of positive cognitive assumptions. During therapy, gaming addicts identify false beliefs and learn how to modify them into more adaptive ones. Additionally, the cognitive-behavioural approach also advocates that the addict should monitor their thoughts in order to identify affective and situational triggers associated with their addictive gaming behaviour.

In addition to this, a recent systematic review of clinical research included 46 studies with clinical samples (Kuss & Lopez-Fernandez, 2016). Studies were selected based on the following inclusion criteria. Studies had to (i) contain quantitative empirical data; (ii) have been published after 2000; (iii) include clinical samples and/or clinical interventions for Internet and/or gaming addiction; (iv) provide a full text paper (rather than a conference abstract); and (v) be published in English, German, Polish, Spanish, Portuguese, or French as the authors spoke these languages. The included studies used clinical samples, and outlined characteristics of individuals seeking treatment and the different treatment approaches used. Four main types of clinical research studies were identified, namely research involving (i) treatment seeker characteristics; (ii) psychopharmacotherapy; (iii) psychological therapy; and (iv) combined treatment. Regarding the treatment, both psychological as well as psychopharmacological treatments appear efficacious in treating Internet and gaming addiction. Psychopharmacological treatment often included prescribing selective serotonin reuptake inhibitors (SSRIs), such as escitalopram, anxiolytics, often used to treat anxiety disorders, including obsessive compulsive disorder (OCD), stimulants often used for attention deficit hyperactivity disorder (ADHD), and atypical antipsychotics often administered for schizophrenia spectrum disorders (such as psychosis and schizotypal personality disorder). Overall, the studies using

psychopharmacological therapy to treat Internet and gaming addiction lead to decreasing Internet addiction symptoms and the time spent on the Internet and gaming. Antidepressants were used most often, indicating that mood disorders have a relatively high comorbidity with Internet and gaming addiction. In addition to this, Kuss and Lopez-Fernandez (2016) suggested that if other (primary or secondary) disorders are comorbid conditions (such as OCD and ADHD), pharmaceutical medication often used for these conditions may be useful in decreasing problems associated with Internet addiction.

Furthermore, Kuss and Lopez-Fernandez (2016) reported that ten studies used individual and group therapy in order to treat Internet and gaming addiction and associated symptoms. Based on their analysis, CBT was the type of psychological therapy most often used to treat Internet and gaming addiction. Often CBT included eighty to twenty-eight sessions that had the following elements: psychoeducation, problem identification, teaching healthy communication, increasing Internet awareness, and teaching cessation techniques. Moreover, a comparable short-term treatment for Internet and videogame addiction was applied, as well as group therapy, including systemic therapy with parents/teachers/peer support and/or multilevel interventions, that incorporated motivational interviewing, often used to treat substance-related addictions.

In their review, Kuss and Lopez-Fernandez (2016) identified six studies that combined psychological treatment (primarily CBT) with other psychological therapies, such as motivational enhancement therapy, a lifestyle training programme, psychopharmacotherapy (such as antidepressants and anxiolytics), or with electroacupuncture therapy. Poddar and colleagues (2015) used motivational enhancement therapy together with CBT (METCBT). METCBT included various stages: (i) a contemplation stage (i.e., initial sessions of rapport building including a detailed interview and case formulation; (ii) a preparation stage (i.e., sessions delivered in an empathetic atmosphere to emphasise psychoeducation, including managing physiological and emotional arousal through relaxation techniques, and a cost-benefit analysis of gaming addiction); and (iii) a contract stage with the patient, a parent, and the therapist (i.e., behaviour modification of gaming, reducing time spent online and promoting healthy activities). Using METCBT resulted in symptom decrease, and the young patients improved their school performance (Poddar et al., 2015). Electroacupuncture was also used as an adjunct to CBT by Zhu and colleagues (2008), and was applied at acupoints Baihui (GV20), Sishencong (EX-HN1), Hegu (LI4), Neiguan (PC6), Taichong (LR3), and Sanyinjiao (SP6), and retained for 30 minutes every other day (Kuss & Lopez-Fernandez, 2016).

Taken together, therapy that combined different approaches was beneficial for all groups because Internet addiction symptomatology decreased at all measurement time points. For instance, applying electroacupuncture in combination with a psychological treatment enhanced treatment outcomes for Internet addiction above CBT alone, providing evidence for the effectiveness of this approach. In addition to this, psychopharmacological therapy is not always as efficacious for co-occurring conditions, such as major depressive disorder, relative to its effectiveness for Internet and gaming addiction. This is noteworthy because it appears that Internet addiction commonly co-occurs with other psychological disorders.

This review also indicated that psychopharmacotherapy added to psychological treatment may not always be beneficial in alleviating problems of comorbidity (such as depressive symptoms which often accompany Internet and gaming addiction), and therefore the appropriate treatment should be chosen based on the individual client's needs (Kuss & Lopez-Fernandez, 2016).

A recent systematic review (Pontes & Griffiths, 2015c) of 17 empirical studies that analysed the types of cognitions and cognitive-related impairments associated with IGD found that cognitive impairments were more frequently reported by most studies than the general cognitions associated with IGD. More specifically, the set of cognitive-related variables associated with IGD were the following: deficient self-regulation; preference for a virtual life; cognitive bias; impaired cognitive control ability; cognitive deficits; poor cognitive error processing; decision-making deficits; maladaptive cognitions; and cognitive distortions. Given the prominence of the cognitive-related variables in IGD, Pontes and Griffiths (2015c) noted that the cognitive-behavioural therapy approach could benefit from taking into account the different sets of cognitions present in disordered gamers.

Early intervention approaches by Young (1999) proposed strategies for treatment of online addiction (including gaming), including: (i) practicing the opposite (i.e., identifying patients' patterns of gaming use and then helping them disrupt their normal routine of gaming usage and re-adapting new time patterns of use to break the online gaming habits), (ii) using external stoppers (i.e., real events or activities that prompt addicts to disconnect from their gaming), (iii) setting goals with regard to the amount of time spent gaming online, (iv) using reminder cards that serve as cues to remind addicts of the costs of excessive gaming and benefits of breaking free from it, (v) developing a personal inventory of activities the addicts can engage in instead of engaging in excessive gaming, (vi) entering a support group to compensate for the lack of social support (if applicable), and (vii) engaging in family therapy to address relational problems between addicts and their family. Although the cognitive-behavioural therapy model for treating IGD appears to be effective, there do not appear to be significant differences between CBT and other psychological treatments that treat IGD (Winkler et al., 2013). For this reason, other treatment approaches might be useful to treat this condition, such as multi-family group therapy (Liu, et al., 2015).

A systematic review of online addiction treatment studies using the Consolidating Standards of Reporting Trials (CONSORT) guidelines by King et al. (2011) noted that almost all of them had severe methodological problems and several key limitations. The review found that there was a lack of adequate controls or other comparison groups; randomization and blinding techniques; information concerning recruitment dates, sample characteristics, and treatment effect sizes.

For assessing clients with IGD (but not necessarily intending to diagnose), King, Delfabbro and Griffiths (2012) noted that clinicians could use Beard's (2005) assessment protocol (which was designed for Internet-related problems but can be used for IGD). The protocol (see Table 1) was originally designed to be used as a structured clinical interview, but may be of practical utility for clinicians. The screening protocol may be particularly useful in cases where the clinician is aware of concurrent issues of IGD, but is unsure of its relevance to the overall clinical conceptualization (King, Delfabbro & Griffiths, 2012). The clinical assessment tool (C-VAT 2.0) developed by van Rooij, et al. (2015) has been developed using a clinical sample of 32 Dutch adolescents (aged 13-23 years) and may be a potentially useful tool to be used by clinicians and practitioners in the future since it is based on the DSM-5 framework. However, more robust testing and cross-cultural studies supporting the initial findings is warranted before definite conclusions can be made regarding the general validity of this tool. Finally, a recent study (Ko, et al., 2014) has found that using the nine IGD criteria as in the DSM-5 (i.e., endorsement of five or more out of the nine criteria) may be also a valid procedure for clinical diagnosis of IGD.

Table 1

*Clinical Interview Screening Questions for the Assessment of Problematic Video Game Use*

Area of assessment	Screening questions
Presenting problem	<ol style="list-style-type: none"> <li>1. When did you begin to notice problems with your gaming?</li> <li>2. How long have you been gaming?</li> <li>3. How much time do you spend on gaming each day? Week? Month?</li> <li>4. What was going on in your life when you began gaming?</li> <li>5. What was going on in your life when you began to have difficulties with your gaming?</li> </ol>
Biological areas	<ol style="list-style-type: none"> <li>1. Are you experiencing or previously experienced any health concerns? If so, please describe.</li> <li>2. How have these health concerns been impacted by your gaming?</li> <li>3. What treatment you have received for these health concerns?</li> <li>4. Does your gaming interfere with your sleep/meal schedule?</li> <li>5. What exercise patterns do you engage in?</li> <li>6. What drugs and/or medications do you take? How much? How often? In the past?</li> </ol>
Psychological areas	<ol style="list-style-type: none"> <li>1. What types of gaming do you engage in?</li> <li>2. What do you like/dislike about gaming?</li> <li>3. How do you feel before, during, and after gaming?</li> <li>4. What are your thoughts before, during, and after gaming?</li> <li>5. Have you ever used gaming to help improve your mood or change your thoughts?</li> <li>6. In what places at home or elsewhere do you usually engage in gaming?</li> <li>7. Have you ever felt anxious, depressed or isolated when not gaming?</li> </ol>
Social areas	<ol style="list-style-type: none"> <li>1. Has your gaming caused concerns with your family?</li> <li>2. Has your gaming caused concerns with your significant other?</li> <li>3. Has gaming caused concerns with your social activities and friendships?</li> <li>4. Has gaming interfered with your performance at school or work?</li> <li>5. What are your social/leisure/hobby activities?</li> </ol>
Relapse prevention areas	<ol style="list-style-type: none"> <li>1. Do you believe that you have a problem with your level of gaming?</li> <li>2. What do you see as the benefits and costs of continued gaming?</li> <li>3. What is your level of commitment to change your current gaming patterns?</li> <li>4. What plans have you implemented in the past to deal with your level of gaming?</li> <li>5. Have these plans worked?</li> </ol>

*Adapted from Beard (2005) and King, Delfabbro and Griffiths (2012)*

**Concluding Comments**

According to Petry and O'Brien (2013), IGD will not be included as a separate mental disorder in future editions of the DSM until the (i) defining features of IGD have been identified, (ii) reliability

and validity of specific IGD criteria have been obtained cross-culturally, (iii) prevalence rates have been determined in representative epidemiological samples across the world, and (iv) aetiology and associated biological features have been evaluated.

At present, standardised and comprehensive methods of diagnosis are lacking. As noted above, almost all IGD treatment studies have methodological shortcomings and none have assessed long-term efficacy of the interventions. To determine post-treatment outcomes, diagnostic assessment should include gaming frequency, IGD symptoms (e.g., tolerance, withdrawal, relapse, etc.), functioning at work, school or college, participation in leisure time activities and hobbies, and quality of interpersonal relationships (Király, Griffiths & Demetrovics, 2015). Additionally, factors that prevent relapse should also be investigated. Previous research (Kuss & Griffiths, 2015) has also investigated perceptions and experiences of psychotherapists who are treating individuals presenting with the problem of Internet and gaming addiction, yielding relevant results with regards to diagnosis, problem experience, and risk factors. This research should be extended by specifically addressing issues of relapse risk and prevention from the perspective of both the clients seeking help as well as the trained experts providing it.

## References

- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders (5<sup>th</sup> ed.)*. Washington, D.C.: The author.
- Beard, K. W. (2005). Internet addiction: A review of current assessment techniques and potential assessment questions. *CyberPsychology & Behavior, 8*(1), 7-14. doi: 10.1089/cpb.2005.8.7
- Block, J. (2008). Issues for DSM-V: Internet addiction. *American Journal of Psychiatry, 165*(3), 306-307. doi: 10.1176/appi.ajp.2007.07101556
- Christakis, D. (2010). Internet addiction: A 21<sup>st</sup> century epidemic? *BMC Medicine, 8*(1), 61. doi: 10.1186/1741-7015-8-61
- Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior, 17*(2), 187-195. doi: 10.1016/S0747-5632(00)00041-8
- Gentile, D. (2009). Pathological video-game use among youth ages 8–18: A national study. *Psychological Science, 20*(5), 594-602. doi: 10.1111/j.1467-9280.2009.02340.x
- Graham Jr., J. M. (2014). Narrative therapy for treating video game addiction. *International Journal of Mental Health and Addiction, 12*, 701-707. doi: 10.1007/s11469-014-9491-4
- Griffiths, M. D. (1999). Internet addiction: Internet fuels other addictions. *Student British Medical Journal, 7*, 428-429.
- Griffiths, M. D. (2000). Internet addiction: Time to be taken seriously? *Addiction Research, 8*(5), 413-418. doi: 10.3109/16066350009005587
- Griffiths, M. D., King, D. L., & Demetrovics, Z. (2014). DSM-5 Internet Gaming Disorder needs a unified approach to assessment. *Neuropsychiatry, 4*(1), 1-4. doi: 10.2217/npv.13.82
- Griffiths, M. D., Király, O., Pontes, H. M., & Demetrovics, Z. (2015). An overview of problematic gaming. In E. Aboujaoude & V. Starcevic (Eds.), *Mental health in the digital age: Grave*

- dangers, great promise* (pp. 27-45). Oxford: Oxford University Press. doi: 10.1093/med/9780199380183.003.0002
- Griffiths, M. D., & Pontes, H. M. (2014). Internet addiction disorder and Internet gaming disorder are not the same. *Journal of Addiction Research and Therapy*, 5(4), e124. doi: 10.4172/2155-6105.1000e124
- Griffiths, M. D., & Szabo, A. (2014). Is excessive online usage a function of medium or activity? An empirical pilot study. *Journal of Behavioral Addictions*, 3(1), 74-77. doi: 10.1556/JBA.2.2013.016
- Han, D. H., Kim, S. M., & Renshaw, P. F. (2015). Functional brain changes in response to treatment of Internet gaming disorder. In C. Montag & M. Reuter (Eds.), *Internet Addiction* (pp. 77-91): Springer International Publishing. doi: 10.1007/978-3-319-07242-5\_5
- Jiménez-Murcia, S., Fernández-Aranda, F., Granero, R., Tárrega, S., Aymamí, N., Gómez-Peña, M., Giner-Bartolomé, C., Santamaría, J. J., Forcano, L., Moragas, L., Pino-Gutiérrez, A., Baño, M., & Menchón, J. M. (2015). Nuevas tecnologías como estrategia terapéutica complementaria para el Transtorno de Juego [New technologies as a complimentary therapeutic strategy for the treatment of Internet Gaming Disorder]. *Aloma: Revista de Psicología, Ciències de l'Educació i de l'Esport*, 33(2), 59-66.
- King, D. L., Delfabbro, P. H., Griffiths, M. D., & Gradisar, M. (2011). Assessing clinical trials of Internet addiction treatment: A systematic review and CONSORT evaluation. *Clinical Psychology Review*, 31(7), 1110-1116. doi: 10.1016/j.cpr.2011.06.009
- King, D. L., Delfabbro, P. H., & Griffiths, M. D. (2012). Clinical interventions for technology-based problems: Excessive Internet and video game use. *Journal of Cognitive Psychotherapy: An International Quarterly*, 26(1), 43-56. doi: 10.1891/0889-8391.26.1.43
- King, D. L., Haagsma, M. C., Delfabbro, P. H., Gradisar, M. S. & Griffiths, M. D. (2013). Toward a consensus definition of pathological video-gaming: A systematic review of psychometric assessment tools. *Clinical Psychology Review*, 33(3), 331-342. doi: 10.1016/j.cpr.2013.01.002
- Király, O., Griffiths, M. D., & Demetrovics, Z. (2015). Internet Gaming Disorder and the DSM-5: Conceptualization, debates, and controversies. *Current Addiction Reports*, 2(3), 254-262. doi: 10.1007/s40429-015-0066-7
- Király, O., Griffiths, M. D., Urbán, R., Farkas, J., Kökönyei, G., Elekes, Z., Tamás, D., & Demetrovics, Z. (2014). Problematic internet use and problematic online gaming are not the same: Findings from a large nationally representative adolescent sample. *Cyberpsychology, Behavior, and Social Networking*, 17(12), 749-754. doi: 10.1089/cyber.2014.0475
- Király, O., Slezcka, P., Pontes, H. M., Urbán, R., Griffiths, M. D., & Demetrovics, Z. (2016). Validation of the ten-item Internet Gaming Disorder Test (IGDT-10) and evaluation of the nine DSM-5 Internet Gaming Disorder criteria. *Addictive Behaviors*. doi: 10.1016/j.addbeh.2015.11.005
- Ko, C. H., Yen, J. Y., Chen, S. H., Wang, P. W., Chen, C. S., & Yen, C. F. (2014). Evaluation of the diagnostic criteria of Internet Gaming Disorder in the DSM-5 among young adults in Taiwan. *Journal of Psychiatric Research*, 53(6), 103-110. doi: 10.1016/j.jpsychires.2014.02.008

- Koronczai, B., Urbán, R., Kökönyei, G., Paksi, B., Papp, K., Kun, B., Arnold, P., Kállai, J., & Demetrovics, Z. (2011). Confirmation of the three-factor model of problematic internet use on off-line adolescent and adult samples. *Cyberpsychology, Behavior, and Social Networking*, *14*(11), 657-664. doi: 10.1089/cyber.2010.0345
- Kuss, D. J., & Griffiths, M. D. (2015). *Internet addiction in psychotherapy*. London: Palgrave.
- Kuss, D. J., & Lopez-Fernandez, O. (2016). Internet addiction and problematic Internet use: A systematic review of clinical research. *World Journal of Psychiatry*, *6*(1), 143-176.
- Kuss, D. J., Griffiths, M. D., Karila, L., & Billieux, J. (2014). Internet addiction: A systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design*, *20*(25), 4026-4052. doi: 10.2174/13816128113199990617
- Lemmens, J. S., Valkenburg, P. M., & Gentile, D.A. (2015). The Internet Gaming Disorder Scale. *Psychological Assessment*, *27*(2), 567-582. doi: 10.1037/pas0000062
- Liu, Q-X., Fang, X-Y., Yan, N., Zhou, Z-K., Yuan, X-J., Lan, J., & Chao-Ying Liu, C-Y. (2015). Multi-family group therapy for adolescent Internet addiction: Exploring the underlying mechanisms. *Addictive Behaviors*, *42*, 1-8. doi: 10.1016/j.addbeh.2014.10.021
- Meng, Y., Deng, W., Wang, H., Guo, W., & Li, T. (2014). The prefrontal dysfunction in individuals with Internet Gaming Disorder: A meta-analysis of functional magnetic resonance imaging studies. *Addiction Biology*, *20*(4), 799-808. doi: 10.1111/adb.12154
- Montag, C., Bey, K., Sha, P., Li, M., Chen, Y. F., Liu, W. Y., Zhu, Y. K., Li, C. B., Markett, S., & Keiper, J. (2014). Is it meaningful to distinguish between generalized and specific internet addiction? Evidence from a cross-cultural study from Germany, Sweden, Taiwan and China. *Asia-Pacific Psychiatry*, *7*(1), 20-26. doi: 10.1111/appy.12122
- Müller, K. W., Janikian, M., Dreier, M., Wölfling, K., Beutel, M. E., Tzavara, C., Richardson, C., & Tsitsika, A. (2015). Regular gaming behavior and internet gaming disorder in European adolescents: results from a cross-national representative survey of prevalence, predictors, and psychopathological correlates. *European Child and Adolescent Psychiatry*, *24*(5), 565-574. doi: 10.1007/s00787-014-0611-2
- Pallesen, S., Lørvik, I. M., Bu, E. H., & Molde, H. (2015). An exploratory study investigating the effects of a treatment manual for video game addiction. *Psychological Reports*, *117*(2), 490-495. doi: 10.2466/02.PRO.117c14z9
- Pies, R. (2009). Should DSM-V Designate "Internet Addiction" a Mental Disorder? *Psychiatry (Edgmont)*, *6*(2), 31-37.
- Petry, N. M., & O'Brien, C. P. (2013). Internet gaming disorder and the DSM-5. *Addiction* *108*(7), 1186–1187. doi: 10.1111/add.12162
- Poddar, S., Sayeed, N., & Mitra, S. (2015). Internet Gaming Disorder: Application of motivational enhancement therapy principles in treatment. *Indian Journal of Psychiatry*, *57*(1), 100-101. doi: 10.4103/0019-5545.148540
- Pontes, H. M., & Griffiths, M. D. (2015a). New concepts, old known issues: The DSM-5 and Internet gaming disorder and its assessment. In J. Bishop (Ed.), *Psychological and Social Implications*

- Surrounding Internet and Gaming Addiction* (pp. 16-30). Hershey, PA: Information Science Reference. doi: 10.4018/978-1-4666-8595-6.ch002
- Pontes, H. & Griffiths, M.D. (2015b). Measuring DSM-5 Internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior*, 45, 137-143. doi: 10.1016/j.chb.2014.12.006
- Pontes, H. M., & Griffiths, M. D. (2015c). Internet gaming disorder and its associated cognitions and cognitive-related impairments: A systematic review using PRISMA guidelines. *Revista Argentina de Ciencias del Comportamiento*, 7(3), 102-118.
- Pontes, H. M., & Patrão, I. M. (2014). Estudo exploratório sobre as motivações percebidas no uso excessivo da Internet em adolescentes e jovens adultos [An exploratory study on the perceived motivations underpinning excessive Internet use among adolescents and young adults]. *Psychology, Community & Health*, 3(2), 90-102. doi: 10.5964/pch.v3i2.93
- Pontes, H. M., Szabo, A., & Griffiths, M. D. (2015). The impact of Internet-based specific activities on the perceptions of Internet Addiction, Quality of Life, and excessive usage: A cross-sectional study. *Addictive Behaviors Reports*, 1, 19-25. doi: 10.1016/j.abrep.2015.03.002
- Pontes, H. M., Kuss, D. J., & Griffiths, M. D. (2015). Clinical psychology of Internet addiction: a review of its conceptualization, prevalence, neuronal processes, and implications for treatment. *Neuroscience and Neuroeconomics*, 4, 11-23. doi: 10.2147/NAN.S60982
- Przepiórka, A. M., Blachnio, A., Miziak, B., & Czuczwar, S. J. (2014). Clinical approaches to treatment of Internet addiction. *Pharmacological Reports*, 66(2), 187-191. doi: 10.1016/j.pharep.2013.10.001
- Rehbein, F., Kliem, S., Baier, D., Mößle, T. & Petry, N. M. (2015). Prevalence of Internet Gaming Disorder in German adolescents: Diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. *Addiction*, 110(5), 842–851. doi: 10.1111/add.12849
- Rehbein, F. & Mößle, T. (2013). Video game and internet addiction: Is there a need for differentiation? *SUCHT-Zeitschrift für Wissenschaft und Praxis/Journal of Addiction Research and Practice*, 59(3), 129-142. doi: 10.1024/0939-5911.a000245
- Sachdeva, A. & Verma, R. (2015). Internet gaming addiction: A technological hazard. *International Journal of High Risk Behaviors and Addiction*, 4(4), e26359. doi: 10.5812/ijhrba.26359
- Torres-Rodríguez, A. & Carbonell, X. (2015). Adicción a los videojuegos en línea: tratamiento mediante el programa PIPATIC [Online Gaming Addiction: The PIPATIC treatment program]. *Aloma: Revista de Psicologia, Ciències de l'Educació i de l'Esport*, 33(2), 67-75.
- Thomas, N. & Martin, F. (2010). Video-arcade game, computer game and Internet activities of Australian students: Participation habits and prevalence of addiction. *Australian Journal of Psychology*. 62(2), 59-66. doi: 10.1080/00049530902748283
- van Rooij, A. J., Schoenmakers, T. M. & van de Mheen, D. (2015). Clinical validation of the C-VAT 2.0 assessment tool for gaming disorder: A sensitivity analysis of the proposed DSM-5 criteria and the clinical characteristics of young patients with 'video game addiction'. *Addictive Behaviors*. doi: 10.1016/j.addbeh.2015.10.018

- Winkler, A., Dörsing, B., Rief, W., Shen, Y., & Glombiewski, J. A. (2013). Treatment of Internet addiction: a meta-analysis. *Clinical Psychology Review, 33*(2), 317-329. doi: 10.1016/j.cpr.2012.12.005
- Wittek, C. T., Finserås, T. R., Pallesen, S., Mentzoni, R. A., Hanss, D., Griffiths, M. D., & Molde, H. (2015). Prevalence and predictors of video game addiction: A study based on a national representative sample of gamers. *International Journal of Mental Health and Addiction, 1*-15. doi: 10.1007/s11469-015-9592-8
- Young, K.S. (1999). Internet addiction: Symptoms, evaluation and treatment. *Innovations in clinical practice: A source book*, (Vol. 17; pp. 19-31). Sarasota, FL: Professional Resource Press.
- Zhu T-M, Jin R-J, Zhong X-M, Chen J, Li H. (2008). Paper in Chinese [Effects of electroacupuncture combined with psychologic interference on anxiety state and serum NE content in the patient of internet addiction disorder]. *Zhongguo Zhen Jiu, 28*(8), 561-4.

---

**Financial and Competing Interests Disclosure**

---

*The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties. No writing assistance was utilized in the production of this manuscript.*

---