New Concepts, Old Known Issues - The DSM-5 and Internet Gaming Disorder and its Assessment[1]

Chapter Subtitle:

Internet Gaming Disorder Psychometric Assessment

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ABSTRACT

Background: Following the growing concern about 'gaming addiction', the American Psychiatric Association (APA) and numerous scholars have suggested the need for unification and consensus for the assessment of gaming addiction, which is now possible given the recent formal recognition of 'internet gaming disorder' (IGD) by the APA since its inclusion in the DSM-5. **Aims**: In light of this, the aim of this chapter is to present the main findings concerning the development of the Internet Gaming Disorder Test (IGD-20) and the Internet Gaming Disorder Scale – Short-Form (IGDS9-SF), two newly developed psychometric tools aimed to measure the extent of gaming disorder in online and/or offline players. **Conclusions**: The present findings support the viability of the two newly developed measures as adequate standardized psychometrically robust tools for assessing internet gaming disorder. Consequently, the new instruments represent the first step towards unification and consensus in the field of gaming studies.

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Introduction

According to the Entertainment Software Association (2014) [ESA], 59% of the entire American population plays video games, with an average of two gamers in each game-playing household. Additionally, among US households 68% play video games on consoles, 53% play on smartphones, and 41% play on wireless devices (ESA, 2014). During 2012, playing video games via smartphones and wireless devices increased by 22% and 37%, respectively while the average video game player is 31 years old, with 52% being male and 48% female (ESA, 2014).

Given the pervasiveness of gaming across several countries and different segments of the population, the study of its associated effects on general human behavior, physical and mental health has become an important topic for dedicated research agendas from various scientific domains in addition to psychology and psychiatry (e.g., Blocher, 2015; Dreier, Wölfling & Müller, 2013; Johnston, Boyle, MacArthur & Manion, 2013). Taken together, findings in this developing field suggest both favorable and unfavorable effects of gaming, outcomes that could inform decisions made by health care professionals, parents, policymakers, (Przybylski, 2014) and other stakeholders such as researchers and the video game industry (Yousafzai, Hussain & Griffiths, 2013).

Background

A relatively large body of research suggests that playing video games has been associated with several positive outcomes when performed in a healthy and balanced way. In a recent study using a nationally representative sample of 4,899 British children and young adolescents gamers and non-gamers (Przybylski, 2014), it was found that low levels of gaming (i.e., < 1 hour of gameplay/day) was associated with

higher levels of prosocial behaviors, augmented life satisfaction, and lower levels of internalizing and externalizing problems in comparison to non-gamers. Furthermore, low levels of game engagement accounted for between .5% and .9% of variability in positive psychosocial indicators and between .5% and 1.3% of variability in negative indicators of adjustment. In another recent study (Jackson et al., 2012), using a small-sized sample (N = 491) of children with mean age of 12 years from the US, it was found that irrespective of the type of videogame played, videogame playing was able to predict creativity. Furthermore, Jackson et al. (2012) concluded that regardless of gender or race, greater videogame playing was linked to greater levels of creativity on different levels.

A study conducted by Ewoldsen et al. (2012) aimed to explore the effects of violent gameplay when played cooperatively and competitively in eliciting subsequent cooperative behaviors in a sample of 119 undergraduate students. In this study, four between-subject conditions were used: (i) direct competition, (ii) indirect competition, (iii) cooperation, and the (iv) control to assess subsequent levels of a behavioral measure of cooperation between participants. Based on the study's results, it was demonstrated that participants in the cooperation condition showed significantly more use of tit-for-tat strategies than participants pertaining to the other two competition conditions, which led the researchers to conclude that playing violent games cooperatively increased the use of tit-for-tat strategies, therefore leading to a possible increase in the likelihood of subsequent cooperative behaviors.

In addition to the aforementioned potential positive outcomes, videogame playing has also been linked with increased selective attention in action video game players (Bavelier, Achtman, Mani & Föcker, 2012), attenuation of cognitive decline in older adults (Basak, Boot, Voss & Kramer, 2008), enhancement of mental rotation skills

in children (De Lisi & Wolford, 2002) and adolescents (Okagaki & Frensch, 1994), alongside general overall improvement of spatial cognition in adolescents and adults (Feng, Spence & Pratt, 2007). There is also a large literature on the use of video games for educational, medical, and therapeutic purposes (Griffiths, 2010; Griffiths, Kuss & Ortiz de Gortari, 2013).

Despite the extant reports of positive outcomes associated with gaming, most of these studies present with a different set of limitations that undermine their potential to be generalized to the broader population of gamers and other cultural contexts since most of these studies (i) used cross-sectional research designs, (ii) recruited self-selected samples of university students and therefore, (iii) lacked representative samples, (iv) had low sample sizes, (v) used male predominantly samples, and (v) lacked longitudinal research designs. On the other hand, research on the possible negative effects of gaming due to addiction has also been prolific as noted from several scholars (e.g., Griffiths, Kuss & King, 2012; King, Delfabbro & Zajac, 2011; Kuss & Griffiths, 2012). In fact, irrespective of whether excessive or problematic video game play can be classed as an addiction, there is now a relatively large number of studies indicating that problematic gaming and/or gaming addiction can lead to a wide variety of negative psychosocial consequences for a minority of affected individuals (Griffiths et al., 2012).

More recently, Van Rooij et al. (2014) attempted to investigate the type of game, gaming addiction, and its associated mental health and substance use problems in a sample of 8,478 Dutch adolescents using a large-scale survey with a cross-sectional design. Drawing from the authors' results, compelling empirical evidence was found supporting (i) gaming addiction to multiplayer online games as a common issue amongst adolescent gamers, (ii) higher levels of gaming addiction among male adolescents with substance use problems (i.e., nicotine, alcohol, and cannabis), and (iii)

significant decrease of psychosocial wellbeing (i.e., depressive mood, social anxiety, self-esteem, loneliness) and school performance for both genders. Nevertheless, there is now a relatively large amount of evidence from different empirical studies suggesting that this minority of players may share similar neurobiological abnormalities with other substance-related disorders as both types of addiction may activate the reward system in a similar fashion (Brand, Young & Laier, 2014; Feng et al., 2013; Han et al., 2011; Ko et al., 2013).

Several negative outcomes associated with gaming addiction have been widely reported. These may include sacrificing work, education, hobbies, socializing, time with partner/family, and sleep (Griffiths, Davies & Chappell, 2004), increased stress (Snodgrass et al., 2014), social anxiety and loneliness (Kardefelt-Winther, 2014), depression (Brunborg, Mentzoni & Frøyland, 2014; Wei, Chen, Huang & Bai, 2012), low sociability, self-efficacy and satisfaction with life (Festl, Scharkow & Quandt, 2013), decreased academic performance (Brunborg et al., 2014; Faulkner, Irving, Adlaf & Turner, 2014; Jiang, 2014; Ko et al., 2014), attention deficit hyperactivity disorder (Weinstein & Weizman, 2012), and poor emotional and behavioral functioning (Baer, Saran & Green, 2012).

Having briefly presented some of the positive and negative aspects of gaming, the remainder of this chapter will focus on Internet Gaming Disorder (IGD) and the challenges surrounding its assessment in research and clinical setting. The issue of assessment is of utmost importance to any field of studies because it not only determines how a construct is defined and measured, but also the direction research will likely follow.

Internet Gaming Disorder: Conceptualization and Assessment Issues

According to recent reviews (e.g., Griffiths, Király, Pontes & Demetrovics, 2014; Griffiths et al., 2012; Pontes & Griffiths, 2014a), research on problematic and/or addictive gaming – even though it was mainly observational, anecdotal or case studies – dates back to the 1970s, with one of the first empirical studies being published in the mid-1980s (i.e., Egli & Meyers, 1984).

Despite over 30 years of research into the phenomenon of gaming addiction, it was not until May 2013 that the American Psychiatric Association decided to formally recognize and include the term Internet Gaming Disorder in the Section III of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) (American Psychiatric Association, 2013). Put simply, at the present moment the term IGD remains as an area that requires further research before being fully included in future editions of the DSM (Petry & O'Brien, 2013).

As noted in the DSM-5 (APA, 2013), IGD may be defined by nine criteria, including: (i) pre-occupation with internet games; (ii) withdrawal symptoms when internet gaming is discontinued; (iii) tolerance: the need to spend increasing amounts of time engaged in internet gaming; (iv) unsuccessful attempts to control participation in internet gaming; (v) loss of interest in hobbies and entertainment as a result of, and with the exception of, internet gaming; (vi) continued excessive use of internet games, despite knowledge of psychosocial problems; (vii) deception of family members, therapists, or others regarding the amount of internet gaming; (viii) use of internet gaming to escape or relieve a negative mood; and (ix) loss of a significant relationship, job, or educational or career opportunity because of participation in internet games (APA, 2013). Despite the inclusion of the word “internet” in the IGD term, the APA (2013) posits that IGD may also be involved in non-internet computerized games, although these have been less researched. As suggested by Pontes and Griffiths (2014a),

the word “internet” in the term IGD may be misleading since it encompasses both online and/or offline gaming.

Nevertheless, the fact that IGD has recently received nomenclatural recognition from official medical bodies as a potential mental health disorder, represents a milestone for the field since researchers now have the opportunity to overcome the issue of standardization of the construct in terms of its conceptualization and assessment. Studies such as those by King, Haagsma, Delfabbro, Gradisar and Griffiths (2013) helped highlight some of the most challenging issues regarding the variability and inconsistency in the core conceptualization and psychometric assessment of the phenomenon. In their review, King et al. (2013) reviewed 63 empirical studies that used 18 different gaming addiction instruments used to investigate gaming addiction. After reviewing the studies, the authors concluded that the instruments reviewed could broadly be characterized as inconsistent since no two measures were alike in their conceptualization and ability to identify specific diagnostic features. Accordingly, the key limitations of extant psychometric tools included: (i) inconsistent coverage of core addiction indicators, (ii) varying cut-off scores to indicate clinical status, (iii) a lack of a temporal dimension, (iv) untested or inconsistent dimensionality, and (v) inadequate data on predictive validity and inter-rater reliability.

Arguably, one of the corollaries of these inconsistencies in the assessment of IGD may be evidenced by the relatively large amount of studies directly assessing IGD with generalized internet addiction measures or other non-standardized tools which has become common practice (Pontes & Griffiths, 2014a). Accordingly, Király, Nagygyörgy, Koronczai, Griffiths and Demetrovics (2014) reviewed a total of 12 gaming addictions assessment tools applying strict criteria. The inclusion criteria adopted by the researchers were that the assessment instrument had to have (i) been

used in two or more empirical studies, (ii) used considerable sample sizes in their development, and (iii) shown good psychometric properties. According to the authors' findings, it was observed that a relatively large amount of studies on gaming addiction (e.g., Han, Hwang & Renshaw, 2010; Lee et al., 2007; Meerkerk, Van den Eijnden, Franken & Garretsen, 2010; Meerkerk, Van den Eijnden & Garretsen, 2006; Van Rooij, Schoenmakers, Van de Eijnden & Van de Mheen, 2010; Van Rooij, Schoenmakers, Vermulst, Van Den Eijnden & Van De Mheen, 2011) measured the construct with psychometric tools designed for measuring generalized internet addiction and/or the criterion of time spent on online gaming.

Moreover, alongside the aforementioned issues surrounding the measurement of IGD, researchers have traditionally adopted a broad range of terminologies to define and conceptualize the same phenomenon, including computer game dependence (Griffiths & Hunt, 1998), computer addiction (Young, Pistner, O'Mara & Buchanan, 1999), problem videogame playing (Salguero & Morán, 2002), video game addiction (Griffiths & Davies, 2005), internet gaming addiction (Kuss & Griffiths, 2012), pathological video-game use (Gentile, 2009), problem videogame play (King & Delfabbro, 2009), game addiction (Lemmens, Valkenburg & Peter, 2009), online gaming addiction (Mehroof & Griffiths, 2010), problematic online game use (Kim & Kim, 2010), video game dependency (Rehbein, Psych, Kleimann, Mediasci & Mößle, 2010), pathological gaming (Lemmens, Valkenburg & Peter, 2011a), online video game addiction (Van Rooij et al., 2011), and problematic online gaming (Demetrovics et al., 2012). Given the current limitations of extant assessment tools and the use of non-standardized criteria for assessing IGD, it is no surprise that scholars have now called for unification in the assessment of gaming addiction (Griffiths, King & Demetrovics, 2014; King et al., 2013; Petry & O'Brien, 2013; Petry et al., 2014).

The call for a consensually agreed assessment criteria or standardized instrument to assess gaming addiction partly results from the need to enhance reliability and validity across studies (Kuss, 2013; Pontes & Griffiths, 2014a). On the other hand, this in turn may help to advocate more adequate and effective treatments for the condition (Kuss, 2013). Additionally, a unified view is of utmost importance if gaming addiction is to be fully recognized as a separate clinical disorder (Pontes & Griffiths, 2014a).

Following this brief introduction to some of the issues related to the assessment of IGD, the remainder of this chapter will now focus on two newly developed psychometric tools aimed to assess this phenomenon using officially recognized and updated diagnostic criteria as proposed by the American Psychiatric Association (2013). To help understanding how these two measures were developed, two studies will be summarized.

Internet Gaming Disorder: A Step Forward Toward Unification

Due to the diversity of instruments used in research to assess the phenomenon of gaming addiction alongside the previous criticism made to them (e.g., inconsistent conceptualization; adoption of non-standardized criteria; use of *ad hoc* cut-off points) (see King et al., 2013; Pontes & Griffiths, 2014a) and in line with the latest advancements in the field, two standardized instruments were developed by the present authors as an attempt to lay the foundations for a more unified approach in the assessment of gaming addiction. By using the officially recognized nine criteria for IGD as in the DSM-5 (APA, 2013), the Internet Gaming Disorder Test (IGD-20 Test) (Pontes, Király, Demetrovics & Griffiths, 2014) and the Internet Gaming Disorder Scale – Short-Form (IGDS9-SF) (Pontes & Griffiths, 2014b) were both derived from two empirical studies.

Accordingly, the IGD-20 Test was devised using a large sample of 1,003 English-speaking gamers from 58 different countries. The IGD-20 Test measures the severity of gaming disorder using 20 items that are rated on a 5-point Likert scale (1'Strongly disagree' to 5'Strongly agree') (see Table 1) based on the original nine IGD criteria embedded in the components model of addiction framework (Griffiths, 2005). Additionally, the IGD-20 Test can be used to examine both online and/or offline gaming activities occurring over a 12-month period just as suggested by the original conceptualization of IGD as outlined in the DSM-5 (APA, 2013).

Table 1. The Internet Gaming Disorder Test, Dimensionality and Instructions

Internet Gaming Disorder Test (IGD Test)*
1. I often lose sleep because of long gaming sessions.
2R**. I never play games in order to feel better.
3. I have significantly increased the amount of time I play games over last year.
4. When I am not gaming I feel more irritable.
5. I have lost interest in other hobbies because of my gaming.
6. I would like to cut down my gaming time but it's difficult to do.
7. I usually think about my next gaming session when I am not playing.
8. I play games to help me cope with any bad feelings I might have.
9. I need to spend increasing amounts of time engaged in playing games.
10. I feel sad if I am not able to play games.
11. I have lied to my family members because the amount of gaming I do.
12. I do not think I could stop gaming.
13. I think gaming has become the most time consuming activity in my life.
14. I play games to forget about whatever's bothering me.
15. I often think that a whole day is not enough to do everything I need to do in-game.
16. I tend to get anxious if I can't play games for any reason.
17. I think my gaming has jeopardised the relationship with my partner.
18. I often try to play games less but find I cannot.
19R**. I know my main daily activity (i.e., occupation, education, homemaker, etc.) has not been negatively affected by my gaming.
20. I believe my gaming is negatively impacting on important areas of my life.
Dimensions
Salience: 1, 7, 13
Mood Modification: 2R, 8, 14
Tolerance: 3, 9, 15
Withdrawal Symptoms: 4, 10, 16

Conflict: 5, 11, 17, 19R, 20
Relapse: 6, 12, 18

Notes: Items answered in a 5-poin scale: 1 “strongly disagree”, 2 “disagree”, 3 “neither agree or disagree”, 4 “agree”, 5 “strongly agree”; Suggested empirical cut-off for the test: 71 points; Cronbach’s alpha for the 20 items = .88.
*Instructions: These questions relate to your gaming activity during the past year (i.e., 12 months). By gaming activity we mean any gaming-related activity that was played on either a computer/laptop, gaming console and/or any other kind of device online and/or offline.
** Reversely score items.

The IGD-20 Test was found to be a reliable and valid psychometric tool containing six dimensions: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. Moreover, other sources of validity have also been obtained during the validation process, including criterion-related validity and concurrent validity. Additionally, Pontes and Griffiths (2014a) highlighted the fact that having an empirical cut-off point established beforehand throughout rigorous psychometric analyses may constitute an advantage in comparison to existing measures. Therefore, an optimal empirical cut-off points for the IGD-20 Test of 71 out of 100 points was provided based on the results of a latent profile analysis, sensitivity and specificity analyses.

In line with the IGD-20 Test and using the same framework underpinning its development, Pontes and Griffiths (2014b) conducted another study using sample of 1,397 English-speaking gamers from 58 different countries where the IGDS9-SF was developed. Moreover, the IGDS9-SF is a brief and shorter standardized test that was derived from the nine core criteria defining IGD according to the DSM-5 (APA, 2013). Similar to the IGD-20 Test, this instrument may be used evaluate the severity of IGD and its accompanying harmful effects by examining both online and/or offline gaming activities occurring during a period of 12 months. The nine questions can be responded to using a 5-point Likert scale (1‘Never’ to 5‘Very often’) (see Table 2).

Table 2. Internet Gaming Disorder nine criteria, instructions and reliability

Modified Internet Gaming Disorder nine criteria (DSM-5) (APA, 2013)*

1. Do you feel preoccupied with your gaming behaviour? (Some examples: Do you think about previous gaming activity or anticipate the next gaming session? Do you think gaming has become the dominant activity in your daily life?)
2. Do you feel more irritability, anxiety or even sadness when you try to either reduce or stop your gaming activity?
3. Do you feel the need to spend increasing amount of time engaged gaming in order to achieve satisfaction or pleasure?
4. Do you systematically fail when trying to control or cease your gaming activity?
5. Have you lost interests in previous hobbies and other entertainment activities as a result of your engagement with the game?
6. Have you continued your gaming activity despite knowing it was causing problems between you and other people?
7. Have you deceived any of your family members, therapists or others because the amount of your gaming activity?
8. Do you play in order to temporarily escape or relieve a negative mood (e.g., helplessness, guilt, anxiety)?
9. Have you jeopardised or lost an important relationship, job or an educational or career opportunity because of your gaming activity?

Notes: Items answered in a 5-poin scale: 1 "never", 2 "rarely", 3 "sometimes", 4 "often", 5 "very often"; Cronbach's alpha for the nine items = .87.
*Instructions: These questions will ask you about your gaming activity during the past year (i.e., last 12 months). By gaming activity we understand any gaming-related activity that has been played either from a computer/laptop or from a gaming console or any other kind of device (e.g., mobile phone, tablet, etc.) both online and/or offline.

According to Pontes and Griffiths (2014b), the IGDS9-SF was devised to examine the severity and accompanying detrimental effects of IGD to the gamers' life in the context of research and not to merely diagnose. However, disordered and non-disordered gamers may be distinguished by a minimum score of 36 out of 45 points in the test (i.e. when a participant answers 'often' and 'very often' to all questions). In case researchers and/or clinicians need to make a clear distinction between a disordered and non-disordered gamer, then the nine IGD criteria from the DSM-5 (APA, 2013) should be given preference over the IGDS9-SF for diagnosing purposes as research suggest that the nine IGD criteria appear to have satisfactory clinical diagnostic validity (Ko et al., 2014).

Similarly to IGD-20 Test, the IGDS9-SF was also subject of intensive psychometric scrutiny which involved exploratory factor analysis, confirmatory factor analysis, analyses of the criterion-related and concurrent validity, reliability, standard error of measurement, and population cross-validity. In addition, the IGDS9-SF was also checked for both floor and ceiling effects. According to the authors' results, the IGDS9-SF revealed a single-factor structure that was tested in two independent samples. Moreover, the IGDS9-SF exhibited satisfactory validity, and reliability, further suggesting its highly adequacy to measure IGD (Pontes & Griffiths, 2014b).

In sum, the IGD-20 Test can be used in large-scale surveys where researchers need to assess the symptoms and clinical features associated with IGD. However, for time-limited surveys, the use of IGDS9-SF is highly recommended over the IGD-20 Test since it also allows for a reliable and brief assessment of IGD by using less items and consequently less time and resources.

Implications and Future Research Directions

Several key issues are worth noting as implications of the present review. First, research should put to test both IGD-20 Test and IGDS9-SF and compare the results and outcomes of disordered gamers against the nine core criteria of IGD as in the DSM-5 (APA, 2013). This approach might be useful to examine the predictive validity of both measures. Secondly, further latent profile analyzes using both tests could be carried in other populations in order to replicate the clusters and patterns of gaming behavior encountered by the authors of the present study. Thirdly, prevalence and epidemiological studies using reliable and previously validated IGD standardized tools based on officially recognized criteria should be conducted across different populations within the western and eastern societies.

Furthermore, neurobiological studies should adopt empirically tested and previously validated assessment tools designed exclusively to measure IGD instead of using inconsistent non-validated criteria originally intended to measure generalized internet addiction. This is an important aspect of IGD research since only after unifying the conceptualization and measurement of the construct more reliable comparison can be drawn from cross-cultural studies.

In terms of clinical implications, there is a clear need for researchers to conduct more randomized controlled trials (RCT) studies using appropriate and valid tools to measure IGD in order to help clinicians develop more efficacious treatment approaches to IGD. In this case, RCT studies may be useful for providing an evidence-based framework to help inform policy makers and official medical bodies about the phenomenon of IGD from a broader perspective, ultimately, helping towards the recognition of IGD as an independent clinical entity. Notwithstanding these issues, future clinical treatments for IGD should rely on evidence-based practices that are freely open and available to researchers and clinicians in non-commercial ways as this is in line with the good scientific practices of transparency.

Discussion

Throughout this chapter it was shown by using recent findings from empirical studies, some of the potential positive and negative aspects and outcomes associated with gaming in general. Gaming is indeed a pervasive and ever-increasing activity that is gradually becoming an integral aspect of society across all segments of population and is here to stay. Despite the potential benefits that healthy gaming can provide to some players, research on the phenomenon of gaming addiction also tells us that to a minority of players gaming can be a harmful activity leading to several detrimental

psychosocial outcomes such as sleeping problems (Lam, 2014), decrease in offline social support (Kaczmarek & Drążkowski, 2014), reduced decision-making ability (Pawlikowski & Brand, 2011), and lower psychosocial wellbeing (Lemmens, Valkenburg & Peter, 2011b).

In a recent two-year longitudinal study conducted by Gentile et al. (2011) using a sample of 3,034 general elementary and secondary Singaporean children, it was found that greater amounts of gaming, lower social competence, and greater impulsivity were distinguished as risk factors for later onset of gaming addiction whereas depression, anxiety, social phobia, and lower school performance were identified as outcomes of gaming addiction. The authors also noted that around 84% of the total sample were still considered gaming addicts two years later, suggesting that gaming addiction is not a simply transient phenomenon.

As noted by King and Delfabbro (2014), inconsistent conceptualization and measurement are arguably one of the greatest methodological weaknesses of existing studies of IGD as most of these studies resulted from the lack of formal criteria for internet-related pathologies and the tendency of researchers to compensate by adapting the criteria of other disorders (e.g., pathological gambling) on grounds of adequate conceptual overlap or similarity. Moreover, the IGD literature features multiple formulations and assessment tools, although many lack justification of their inclusion and use and/or acknowledgement of other approaches (Griffiths, King, et al., 2014; Starcevic, 2013).

Following the publication of the DSM-5 (APA, 2013), an important shift in the paradigm of addiction and how it is conceptualized started to take place. Behavioral addictions are now formally recognized as an independent disorder (e.g., Gambling Disorder) since it is now situated in the diagnostic category of “Substance-Related and

Addictive Disorders" within the DSM-5. Standing alongside the only behavioral addiction at the present moment (i.e., Gambling Disorder), IGD appears as a condition warranting further study before being fully recognized in subsequent publications of the DSM. With this in mind, researchers have recently called for unification in the assessment and conceptualization of the phenomenon (Griffiths, King, et al., 2014; King et al., 2013; Petry & O'Brien, 2013; Petry et al., 2014). Therefore, the concept of IGD may represent a potential common framework to start unifying the field and overcoming some of the major issues the field is currently facing.

Based on the need for unification and taking the opportunity of the recent formal acceptance of IGD as tentative disorder by official medical bodies, the present authors devised two instruments aimed to measure the phenomenon of gaming addiction using the most updated and officially recognized framework (i.e., IGD). Both IGD-20 Test and the IGDS9-SF are expected to help unifying the field at least in terms of the assessment. Even though the two measures presented here may represent an initial effort towards unification, their validity regarding other more heterogeneous samples (e.g., Latin American, non-English speaking) remain to be psychometrically tested. Researchers are now encouraged to put to test the two measures, with studies using clinical samples being of utmost importance since data using these samples is generally sparse. As a concluding note, if the phenomenon of IGD is to be considered an independent clinical entity in the near future, researchers are advised to follow a common framework or at least put to test those based on officially recognized criteria as a starting point.

Note: Some of the material in the latter half of this chapter is taken from: Pontes, H. M., & Griffiths, M. D. (2014a). Assessment of Internet Gaming Disorder in Clinical

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Key Terms and Definitions

Addiction: Addiction is a primary, chronic disease of brain reward, motivation, memory and related circuitry that leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors.

Behavioral Addictions: Any non-chemical behavior (e.g., gambling, work, sex, video game playing, etc.) that contains all following six specific addictive features: salience,

mood modification, tolerance, withdraw, conflict and relapse and causes several significant impairments in various domains of a person's life.

Psychological Assessment: A complex process of testing used by psychologists to test hypotheses about an individual and their behavior, personality and capabilities.

Conceptualization: The logical process of developing and clarifying abstract psychological concepts.

Operationalization: The process used in psychological research to measure indirectly a phenomenon that is not directly observed.

APA: The American Psychiatric Association, founded in 1844, is the world's largest psychiatric organization.

DSM-5: The *Diagnostic and Statistical Manual of Mental Disorders* is the standard classification of mental disorders used by mental health professionals in the United States (and elsewhere) and contains a listing of diagnostic criteria for every psychiatric disorder recognized by the U.S. healthcare system.

IGD-20 Test: Internet Gaming Disorder Test, is a standardized self-report questionnaire that was based on official criteria by the APA and can be used in gaming addiction research.

IGDS9-SF: Internet Gaming Disorder Scale – Short–Form is a brief standardized self-report questionnaire that was based on official criteria by the APA and can be used in gaming addiction research.

Psychometrics: A field within psychology that is concerned with the measurement of behavior and mental processes using reliable and complex statistical modelling while also taking into account the underlying theory of such behaviors and mental processes.