



Measuring DSM-5 internet gaming disorder: Development and validation of a short psychometric scale



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ARTICLE INFO

Article history:

Available online 22 December 2014

Keywords:

Gaming addiction
Video games
Internet gaming disorder
DSM-5
IGD9-SF
Behavioural addictions

ABSTRACT

Despite the large growth on gaming behaviour research, little has been done to overcome the problem stemming from the heterogeneity of gaming addiction nomenclature and the use of non-standardised measurement tools. Following the recent inclusion of Internet Gaming Disorder [IGD] as a condition worthy of future studies in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* [DSM-5], researchers have now an opportunity to reach consensus and unification in the field. The aim of this study was to develop a new nine-item short-form scale to assess Internet Gaming Disorder (IGDS-SF9) and to further explore its psychometric properties. A sample of 1060 gamers (85.1% males, mean age 27 years) recruited via online gaming forums participated. Exploratory factor analysis [EFA], confirmatory factor analysis [CFA], analyses of the criterion-related and concurrent validity, reliability, standard error of measurement [SEM], population cross-validity, and floor and ceiling effects were performed to assess the instrument's psychometric properties. The results from the EFA revealed a single-factor structure for IGD that was also confirmed by the CFA. The nine items of the IGDS-SF9 are valid, reliable, and proved to be highly suitable for measuring IGD. It is envisaged that the IGDS-SF9 will help facilitate unified research in the field.

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1. Introduction

In Section 3 of the latest (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders* [DSM-5], the American Psychiatric Association [APA] included Internet Gaming Disorder [IGD] as a condition worthy of future study (APA, 2013). The inclusion of IGD followed the (i) increasing amount of research published over the last decade and (ii) debates surrounding the legitimacy of IGD as an independent clinical disorder. As suggested by the APA (2013), the clinical diagnosis of IGD comprises a behavioural pattern encompassing persistent and recurrent use of the internet to engage in online games, leading to significant impairment or distress over a period of 12 months as indicated by endorsing five (or more) of nine criteria. More specifically, the nine proposed criteria for IGD include: (1) preoccupation with internet games; (2) withdrawal symptoms when internet gaming is taken away; (3) tolerance, resulting in the need to spend increasing amounts of time engaged in internet games; (4) unsuccessful attempts to control participation in internet games; (5) loss of

interest in previous hobbies and entertainment as a result of, and with the exception of, internet games; (6) continued excessive use of internet games despite knowledge of psychosocial problems; (7) deceiving family members, therapists, or others regarding the amount of internet gaming; (8) use of internet games to escape or relieve negative moods; and (9) jeopardising or losing a significant relationship, job, or education or career opportunity because of participation in internet games. Moreover, IGD may lead to school/college failure, job loss, or marriage failure as the problematic gaming behaviour tends to displace usual and expected social, work and/or educational, relationship, and family activities (APA, 2013).

Research into the psychosocial effects of video games has increased with many studies being published (Kardefelt-Winther, 2014a, 2014b; Kowert, Domahidi, Festl, & Quandt, 2014; Kuss, Griffiths, & Binder, 2013; Kuss, van Rooij, Shorter, Griffiths, & van de Mheen, 2013; Lopez-Fernandez, Honrubia-Serrano, Baguley, & Griffiths, 2014; Lopez-Fernandez, Honrubia-Serrano, Gibson, & Griffiths, 2014; Odrowska & Massar, 2014; Snodgrass et al., 2014). More recently, several scholars (e.g., Griffiths, King, & Demetrovics, 2014; King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013; Petry & O'Brien, 2013; Petry et al., 2014) have noted the need for developing a new psychometric tool for IGD

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capable of integrating the new aspects of the concept. Research on gaming behaviour has increased greatly over the last few years (Griffiths, Kuss, & Daniel, 2012; Kuss & Griffiths, 2012). However, it is argued that the field has been hindered by the use inconsistent non-standardised criteria to assess gaming addiction (Griffiths et al., 2012). Traditionally, researchers have adopted a broad range of nomenclatures (e.g., problematic gaming, video game addiction, online gaming addiction, compulsive internet use) to address the same phenomenon (Demetrovics et al., 2012; Gentile, 2009; Griffiths, 1993; Griffiths & Hunt, 1998; Rehbein, Psych, Kleimann, Mediasci, & Mößle, 2010; Young, 1998). This has resulted in a lack of a widely accepted definition and difficulty in unifying the field. Therefore, the use of a nomenclature that researchers can agree upon (e.g., IGD) and standardised psychometric tool rooted in the IGD concept, may represent an important step in providing a consensual view of the phenomenon from a scientific standpoint, and help unify different approaches into a singular one amongst researchers (Griffiths et al., 2014).

In light of this, the aim of the present study is twofold. Firstly, the main goal is to examine whether the nine adapted IGD criteria from the DSM-5 (APA, 2013) can serve as a basis for developing a new standardised psychometric tool for measuring IGD (namely the nine-item short-form *Internet Gaming Disorder Scale* [IGDS-SF9]). Secondly, to explore its psychometric properties in-depth in order to ascertain if it can be a valid and reliable tool for assessing IGD in accordance with the nine criteria from the DSM-5 (APA, 2013).

2. Method

2.1. Participants and procedures

A total sample comprising 1397 English-speaking gamers from 58 different countries were recruited to take part in the study by clicking the survey link provided in 52 English-speaking online gaming forums. To advertise the survey link, authorisation from the gaming forum's moderators was sought prior the creation of a thread containing the survey link and specifying its nature on each forum. Every thread was individually checked for a period of 1 month on a daily basis. All important queries addressed by the participants to the research team were given personalised feedback.

The online data collection methodology was chosen because of its benefits regarding ease of access to larger sample pools, opportunity to reach a heterogeneous group of gamers and not only those playing massively multiplayer online role-playing games [MMORPGs], cost-efficiency, and its usefulness and practical advantages for researching behavioural addictions in general (Griffiths, 2012; Wood & Griffiths, 2007), especially in the case of online gamers.

Furthermore, a total of 337 out of 1397 (24%) questionnaires were excluded from the final analyses due to severe incompleteness or other response biases (e.g., acquiescence bias, specifying an unlikely value for age) resulting in an overall heterogeneous self-selected sample comprising 1060 English-speaking gamers. The sample was predominantly male (85.1%; $n = 902$) with ages ranging from 16 to 70 years ($M_{\text{age}} = 27$ years, $SD = 9.02$). All participants were assured of anonymity and confidentiality, and the study was granted approval by the research team's University Ethics Committee.

2.2. Measures

2.2.1. Socio-demographics

The survey included questions relating to gender, age, country of residence, first time of gameplay (online and/or offline),

relationship status, use of psychoactive substances for more than three times a week (i.e., cigarettes and alcohol) in order to map onto excessive substance use behaviours, ownership of mobile device with internet access, and ownership of gaming console and/or other gaming devices were collected.

2.2.2. Internet Gaming Disorder Scale – Short-Form (IGDS9-SF)

The IGDS9-SF is a short psychometric tool adapted from the nine core criteria that define IGD according to the DSM-5 (APA, 2013). The aim of this instrument is to assess the severity of IGD and its detrimental effects by examining both online and/or offline gaming activities occurring over a 12-month period. The nine questions comprising the IGDS9-SF are answered using a 5-point Likert scale: 1 (“Never”), 2 (“Rarely”), 3 (“Sometimes”), 4 (“Often”), and 5 (“Very Often”). The scores are obtained by summing the gamer's answers and total scores can range from 9 to 45, with higher scores being indicative of higher degrees of gaming disorder. It is also worth noting that the main purpose of this instrument is not to diagnose IGD but to assess its severity and accompanying detrimental effects to the gamer's life. However, for research purposes, it may be possible to classify disordered gamers and non-disordered gamers by considering only those gamers that obtain a minimum of 36 out of 45 points in the test (i.e., those who answered ‘often’ and ‘very often’ to all nine questions). For clinical diagnosis purposes, the APA symptom checklist containing the nine IGD criteria in their ‘yes/no’ format should be given preference over the IGDS9-SF for diagnosing IGD since the former appears to have diagnostic validity (Ko et al., 2014).

2.2.3. Weekly gameplay

This variable examined the gamer's weekly time spent playing on computers, consoles, and/or other gaming platforms (e.g., handheld devices) and distinguished between those that played less than 7 h, between 8 and 14 h, between 15 and 20 h, between 21 and 30 h, between 31 and 40 h, and more than 40 h per week respectively. This variable helps to inform APA's definition of IGD since disordered gamers typically devote at least 30 h per week gaming (APA, 2013). Consequently, a significant positive correlation between this variable and the IGDS9-SF measure would be suggestive of the scale's criterion-related validity, and is a common procedure of studies of this nature (see Lemmens, Valkenburg, & Peter, 2009).

2.2.4. Internet Gaming Disorder Test (IGD-20 Test)

The IGD-20 Test (Pontes, Király, Demetrovics, & Griffiths, 2014) comprises 20 items rated on a 5-point Likert scale: 1 (“Strongly disagree”), 2 (“Disagree”), 3 (“Neither agree or disagree”), 4 (“Agree”), and 5 (“Strongly agree”) that reflects the nine criteria of IGD as in the DSM-5 (APA, 2013) and is also embedded in the theoretical framework of the components model of addiction (i.e., salience, mood modification, tolerance, withdrawal symptoms, conflict and relapse) proposed by Griffiths (2005). Moreover, the aim of the IGD-20 is to assess the severity of IGD by examining both online and/or offline gaming activities occurring over a 12-month period. In the present study, the Cronbach's alpha for the IGD-20 Test was .88. Similar to the weekly gameplay variable, this measure was used to examine the IGDS9-SF9 concurrent validity should a significant positive correlation be observed between the two measures.

2.3. Statistical analysis

Statistical analysis comprised of (i) descriptive statistics of the main sample's characteristics and (ii) a psychometric study of the IGDS-SF9. These latter analyses encompassed an exploratory factor analysis (EFA), confirmatory factor analysis (CFA), assessment of

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