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Review

The measurement of Internet addiction: A critical review of existing scales and their psychometric properties

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ABSTRACT

Internet addiction is a recently recognized disorder which has received increasing attention worldwide over the past two decades. This focus has led to the development of several screening tools measuring different aspects of Internet use, and more particularly Internet addiction. However, a synthesis of the information regarding the validity and usefulness of these different scales is lacking and would help inform researchers and clinicians in their choice of measures when assessing for Internet addiction. The main goal of this study was therefore to identify all the existing measures of Internet addiction and to review the psychometric properties of the most frequently used ones. Five electronic databases were searched using the key words: internet use disorder, Internet addiction, problematic internet use, pathologic internet use, cyber dependence, and scale, test, questionnaire, tool, assessment and inventory. Forty-five tools assessing Internet addiction were identified, of which only seventeen had been evaluated more than once in terms of their psychometric properties. Most of the existing scales for Internet addiction require further validation work but some of them already demonstrate promising psychometric properties. Given the interest in this phenomenon, it seems important for the field to promote the use of validated and well-established measures.

Contents

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1. Introduction

Internet addiction, otherwise called pathological or problematic Internet use is a recent and increasingly recognized disorder (Block, 2008; Lopez-Fernandez, Freixa-Blanxart, & Honrubia-Serrano, 2013) which has received growing attention worldwide over the past two decades. It also has been the subject of numerous debates, particularly concerning its terminology, definition and theoretical basis (Fu, Chan, Wong, & Yip, 2010; Lortie & Guitton, 2013; Meerkerk, Van Den Eijnden, Vermulst, & Garretsen, 2009; Pezoa-Jares, Espinoza-Luna, & Vasquez-Medina, 2012). The still controversial term "Internet addiction", appears to be the most frequently used in the literature (Frangos, Frangos, & Kiohos, 2010; Lai et al., 2013; Zhang & Xin, 2013). In our present review, this term will be considered to be synonymous with compulsive, pathological or problematic Internet use (Lai et al., 2013; Lee et al., 2013; Osada, 2013; Widyanto, Griffiths, Brunsden, & McMuran, 2008).

Furthermore, a standard and consensual definition of Internet addiction is still lacking (Spada, 2014). It is mainly defined as a maladaptive pattern of Internet use, generally time-consuming, that leads to clinically significant impairment or distress (Goldberg, 1995; Shaw & Black, 2008; Weinstein & Lejoyeux, 2010). For many authors, Internet addiction implies at least an inability or a difficulty to control the time spent online (Beard, 2005; Cash, Rae, Steel, & Winkler, 2012; Lopez-Fernandez et al., 2013), associated with negative, behavioral, psychosocial or physical consequences (Wallace & Masiak, 2011; Zhang & Xin, 2013). Furthermore, Internet addiction has been compared to a non-substance-related or behavioral addiction (Lopez-Fernandez et al., 2013), to an impulse control disorder (Pezoa-Jares et al., 2012) or to a combination of both (Aboudjaoude, Koran, Gamel, Large, & Serpe, 2006; Kim, Park, Ryu, Yu, & Ha, 2013). Among other debates, the usefulness of Internet addiction as a concept, as opposed to the existence of Internet-facilitated addictions that would exist offline has been questioned (Spada, 2014).

The increasing research interest in Internet addiction has led to the development of numerous scales assessing this disorder. Literature reviews focused on Internet addiction (Atwal, Klaus, & Daily, 2012; Beard, 2005; Cash et al., 2012; Chou, Condron, & Belland, 2005; Jia & Jia, 2009; Ko, Yen, Yen, Chen, & Chen, 2012; Lopez-Fernandez et al., 2013; Moreno, Jelenchik, Cox, Young, & Christakis, 2011; Pezoa-Jares et al., 2012; Shaw & Black, 2008; Widyanto & Griffiths, 2006; Özcan & Gokcearslan, 2013) and meta-analyses (Byun et al., 2009; Weinstein & Lejoyeux, 2010) have included between 3 and 13 scales. Other authors have suggested even greater numbers, quoting "at least 13 instruments" for evaluating Internet addiction (Moreno et al., 2011) or 14 in a recent study (Lortie & Guitton, 2013).

While several of these studies report on a number of the existing scales designed to assess Internet addition, none of them have attempted to provide an exhaustive overview of them, even the three studies focused on assessment methods (Beard, 2005; Lortie & Guitton, 2013; Wallace & Masiak, 2011). Furthermore, none of these scales has obtained consensus as the gold-standard (Demetrovics, Szeredi, & Rozsa, 2008; Lai et al., 2013; Meerkerk et al., 2009; Pezoa-Jares et al., 2012; Wallace & Masiak, 2011). To date, therefore, a synthesis of the information regarding the validity and usefulness of these different scales is lacking. Such a review would help inform researchers and clinicians in their choice of measures when assessing for Internet addiction and help the field to move towards the adoption of well-established and validated tools. The main goal of the present study was therefore to identify all the existing instruments aiming to assess Internet addiction and to report on their psychometric properties.

2. Materials and methods

2.1. Data-gathering

In this review, we identified published studies focusing on Internet addiction and more specifically the assessment of Internet addiction. Existing scales were identified by searching the academic databases EBSCO (Elton B. Stephens Co.), ScienceDirect, PubMed, ACM DL (Association for Computing Machinery – Digital Library) and IEEE Xplore Digital Library (Institute of Electrical and Electronics Engineers) from July to November 2013. The English keywords used were: internet use disorder, internet addiction, problematic internet use, pathological internet use, and cyber dependence, combined with scale, test, questionnaire, assessment, measure, and inventory. The first search on EBSCO (Medline, PsycInfo) revealed 68 papers focused on Internet addiction measurement. The second search on PubMed revealed 42 papers including 5 not previously identified, the third search on Science Direct yielded 14 publications of which one was a new addition and the final searches on ACM DL and IEEE Xplore yielded 6 publications with no new additions. In a second step, we read all those papers (74) and used Google in order to retrieve other records that we found references for but were not yet included in our review (18). Despite contacting the authors of papers which we did not have access to, we were unable to obtain 17 manuscripts and another 9 were published in Chinese and were therefore excluded because the authors could not accurately interpret Chinese.

2.2. Inclusion and exclusion criteria

We only included manuscripts measuring Internet addiction with scales, interviews or diagnostic criteria (Table 1); those evaluating other aspects of Internet use (attitudes, consequences or motives) were not included given the focus of the present study on Internet "addiction". Assessment scales for which no information about psychometric properties was available (i.e., not reported or published in a language we could not interpret) were included in Table 1 but not described in the results section; only scales with at least two validating studies were included. In Table 1, papers including three or more authors were cited using "the first author et al." for clarity.

2.3. Psychometric properties

Psychometric properties were not always provided or only partially, but when possible we reported the internal consistency, the main theoretical basis and the characteristics of the scales (number of items and response modalities) and of the tested samples (number, mean age and sex ratio) in Table 1, as well as information regarding the validity and reliability in the results section.

The number of citations of the original papers was presented in Table 1 in order to estimate studies using each scale. Harzing's Publish or Perish software, frequently used for citation analyses in various field of study (Hodge, Lacasse, & Benson, 2011), was used to retrieve all academic citations (Google Scholar and Microsoft Academic Search).

Reliability was assessed through test–retest reliability and internal consistency. According to Cicchetti (1994), a test–retest reliability coefficient can be considered "fair" (between .40 and .59), "good" (between .60 and .74) and "excellent" (between .75 and higher); internal consistency coefficients (Cronbach alphas are presented in Table 1) may be considered "fair", between .70 and .79, "good" between .80 and .89, and "excellent" from .90 upwards.