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The Metacognitions about Online Gaming Scale: Development and psychometric properties

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HIGHLIGHTS

- The MOGS possesses good predictive and divergent validity.
- Metacognitions predict frequency of online gaming and possible problematic engagement.
- Assessing metacognitions using the MOGS may aid treatment.

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ABSTRACT

Objectives: Recent research has suggested that metacognitions may play a role across the spectrum of addictive behaviours. The goal of our studies was to develop the first self-report scale of metacognitions about online gaming.
Method: We conducted two studies with samples of online gamers (n = 225, n = 348) to test the structure and psychometric properties of the Metacognitions about Online Gaming Scale and examined its capacity to predict weekly online gaming hours and Internet addiction.
Results: Exploratory and confirmatory factor analyses supported a three-factor solution: positive metacognitions about online gaming, negative metacognitions about the uncontrollability of online gaming, and negative metacognitions about the dangers of online gaming. Internal consistency, predictive and divergent validity were acceptable. All the factors of the Metacognitions about Online Gaming Scale correlated positively with weekly online gaming hours and Internet addiction. Regression analyses showed that negative metacognitions about the uncontrollability of online gaming and levels of Internet addiction were the only significant predictors of weekly online gaming hours, and that positive metacognitions about online gaming and negative metacognitions about the uncontrollability of online gaming were the only significant predictors of Internet addiction.
Conclusions: The Metacognitions about Online Gaming Scale was shown to possess good psychometric properties, as well as predictive and divergent validity within the populations that were tested.

1. Introduction

Over the last 25 years online gaming has become highly accessible and popular (Kiraly, Nagygyorgy, Griffiths, & Demetrovics, 2014). However, this growth in accessibility and popularity has been paralleled by increasing concerns regarding the emergence of problematic online gaming (POG; Demetrovics & Griffiths, 2012; Kuss & Griffiths, 2012). There is broad agreement that POG is characterised by: (1) frequency of gaming that is higher than intended, leading to neglect important day to day activities; (2) negative impact on personal performance and social relationships; and (3) withdrawal symptoms (Cole & Griffiths, 2007; Ng & Wiemer-Hastings, 2005; Peters & Malesky, 2008). The prevalence of POG ranges from 3 to 10% (Deleuze et al., 2015; Gentile, 2009; Gentile et al., 2011; Kuss, Griffiths, Karila, & Billieux, 2014) with high levels of comorbidity observed in relation to attention deficit disorder (e.g. Batthyany, Muller, Benker, & Wolfling, 2009; Bioulac, Arfi, & Bouvard, 2008; Chan & Rabinowitz, 2006), depression and social anxiety (Gentile et al., 2011; Peng & Liu, 2010).

It has been argued that POG shares common characteristics with behavioural addictions (Billieux et al., 2015; Demetrovics & Griffiths, 2012; Grant, Potenza, Weinstein & Gorelick, 2010) sustaining the assumption that it could be conceptualised as a coping strategy for regulating negative cognition and affect as, for example, alcohol and nicotine use are (Billieux et al., 2015; Kirby, Jones, & Copello, 2014). If this were the case, broadening our metacognitive understanding of the self-regulation mechanisms involved in the frequency of online gaming and its relationship with Internet addiction may be of value.

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Metacognition can be defined as "stable knowledge or beliefs about one's own cognitive system, and knowledge about factors that affect the functioning of the system; the regulation and awareness of the current state of cognition, and appraisal of the significance of thought and memories" (p.302; Wells, 1995). Theorists in the field (e.g. Flavell, 1979; Wells, 2000) are in broad agreement in terms of distinguishing between two fundamental dimensions of metacognition: (1) knowledge about cognition – that which is knowable and reportable; and (2) the regulation of cognition – the planning, evaluating, monitoring and regulation of activities that affect cognitive processes.

Knowledge about cognition (or metacognitions) has become a central construct in the metacognitive model of psychopathology (Wells & Matthews, 1994, 1996). In this model, metacognitions are thought to play a crucial role in the activation and persistence of coping strategies (e.g. perseverative thinking, threat monitoring, thought suppression and potentially POG), which cause negative thoughts and emotions to persist. In support of this view, metacognitions have been found to be associated with a wide array of psychological and behavioural problems (for a full review, see Wells, 2013) in the anxiety and mood disorders. Within the field of addictive behaviours early studies have linked metacognitions to alcohol use (Spada & Wells, 2005, 2006, 2008, 2010; Spada, Caselli & Wells, 2009) with subsequent work demonstrating that metacognitions are also linked to gambling and nicotine use (for a review see Spada, Caselli, Nikčević, & Wells, 2015) and, of most relevance to the current research endeavour, levels of problematic Internet use (Spada, 2014; Spada, Langston, Nikčević, & Moneta, 2008).

Within the area of addictive behaviours metacognitions can be usefully divided into two broad sets (Spada, Caselli, & Wells, 2013; Spada & Wells, 2009; Spada et al., 2015): (1) positive metacognitions about the benefits of engaging in addictive behaviour as a means of cognitive and affective regulation such as "Using alcohol will help me get things sorted out in my mind" or "If I smoke I will achieve greater levels of concentration"; and (2) negative metacognitions concerning the uncontrollability and dangers of thoughts about addictive behaviour and engagement in addictive behaviour such as "I cannot stop thinking about gambling" or "using the Internet will damage my mind". Positive metacognitions have been found to play a central role in motivating individuals to engage in addictive behaviour whilst negative metacognitions are thought to play a crucial role in the perpetuation of addictive behaviour by becoming activated during and following engagement, and triggering negative emotional states that compel a person to remain engaged (Spada et al., 2015).

The current study builds on these findings by presenting the development and preliminary validation of a self-report scale designed to assess metacognitions in online gaming. We hypothesized that scores on this newly developed scale would have a significant association with both weekly online gaming hours and Internet addiction, and that this relationship would be maintained when controlling for negative affect. We chose weekly online gaming hours and Internet addiction as outcome variables because they have been found to be associated with POG (e.g. e.g. Billieux et al., 2011; Gentile, 2009; Hussain & Griffiths, 2009; Wang & Chu, 2007; Whang, Heo, & Hur, 2004; Young, 1998, 1999). We hope that with the development of this self-report scale further quantitative research investigating the role of metacognitions in online gaming will be facilitated. We also envisage that the scale may provide a preliminary tool to identify individuals with maladaptive metacognitive profiles related to online gaming.

2. Study 1: construction of the Metacognitions about Online Gaming Scale (MOGS)

2.1. Method

2.1.1. Participants

A sample of 225 individuals (12 female) agreed to participate in the study which was approved by the ethics committee of Studi Cognitivi, Italy. For purposes of inclusion participants were required to: (1) be 18 years of age or above; (2) consent to participate; (3) understand spoken and written Italian; and (4) report online gaming of at least 1 h per week (with the exclusion of online gambling). The mean age of the sample was 26.7 years (SD = 6.8 years) and the age range was 18 to 44 years. The majority of the sample (98.0%) was Caucasian. Participants reported mean online gaming of 20.6 h per week (SD = 12.1 h), mean engagement with online gaming of 9.5 years (SD = 4.8 years), and mean scores on the Internet Addiction Test (IAT, Young, 1998) of 42.9 (SD = 9.7; range = 24–80).

2.1.2. Materials

Items representing positive and negative metacognitions about online gaming were derived from previous research on metacognition in addictive behaviours (see Spada et al., 2015), from the authors' clinical experience, and from deductions based on the metacognitive model of psychopathology (Wells, 2009). The items selected as positive metacognitions about online gaming concerned the usefulness of online gaming in: (1) controlling cognition ("online gaming stops my worry"); and (2) controlling emotion ("online gaming reduces my anxious feelings"). The items selected as negative metacognitions about online gaming concerned: (1) the uncontrollability of online gaming ("I cannot control my online gaming"); and (2) the dangers of online gaming ("thoughts about online gaming interfere with my functioning"). A total of 20 items were framed in terms of statements to which participants reported the extent of their agreement on a 4-point Likert-type scale ("Do not agree", "Agree slightly", "Agree moderately", "Agree very much").

2.1.3. Procedure

Participants were recruited from a number of work places (universities and schools) using e-mail lists and advertisements such as through online sharing in social network groups and thematic forums. A web link directed the participants to the study website. The first page of the study website explained the purpose of the study as: "To develop a self-report scale to assess beliefs people hold about online gaming". Participants were then directed, if consenting to participate in the study, to a second page containing basic demographic questions and the self-report scale. On completion participants were asked to click on the "Submit" button. Once participants had clicked on "Submit", their data was forwarded to a generic postmaster account. This ensured that participants' responses were anonymous. A second submission from the same IP address was not allowed so as to avoid multiple submissions from the same participant.

2.2. Results

A principal components method of factor extraction was performed on the scores of the original 20 items. The Scree test suggested a two factor solution (eigenvalues of 4.5 and 2.8). Items were assessed as indicators of the latent variables using Varimax rotation. The two factors together accounted for 51.9% of variance. Items which loaded less than 0.4 on any factor were discarded, as were items that loaded on two or more factors. If an item loaded more than 0.4 on one factor, and failed to load onto the other factors, but was within approximately 0.2 of the loading on the first factor, it was also discarded. This procedure was followed in order to exclude items that influenced more than one factor. Only the six items that loaded on each factor were selected to define a brief final version of the self-report scale. The revised self-report scale consisted of 12 items. The factor loadings and communalities of the individual items are presented in Table 1. Internal consistencies (homogeneity) were determined by computing Cronbach's alpha. This coefficient was 0.87 for factor 1 and 0.81 for factor 2. All items showed correlations above 0.6 on their own factor and above 0.4 with the scale. Intercorrelation between factors was 0.23.

The first factor referred to the uncontrollability and dangers of online gaming and online gaming related thoughts. We termed this factor 'negative metacognitions about online gaming' (N-MOG). The second

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