Maladaptive cognitions predict changes in problematic gaming in highly-engaged adults: A 12-month longitudinal study

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HIGHLIGHTS

• Longitudinal study of cognitions related to problematic video-game playing
• We use a recently developed measure of gaming-related cognitions.
• Cognitions are perfectionism, cognitive salience, regret, and behavioural salience.
• These cognitions act as both risk and remission factors for problematic behaviour.
• We discuss implications for interventions and clinical trials.

ABSTRACT

Understanding the role of maladaptive gaming-related cognitions may assist in screening and interventions for problematic gaming, including Internet gaming disorder (IGD). Cognitive-behavioural interventions that target specific cognitions related to gaming may be more effective than more general approaches that focus only on preoccupation with games. Although past research has identified cross-sectional associations between maladaptive cognitions and problematic gaming, it is less clear whether these cognitions can predict future changes in problematic gaming behaviour. The present study employed an 18-item measure of gaming cognition, assessing perfectionism, cognitive salience, regret, and behavioural salience, to investigate potential changes in problematic gaming over a 12-month period. The sample included 465 Australian adults (84% male, $M_{age} = 26.2$ years). It was found that individuals who became problematic gamers over 12 months had higher baseline scores on perfectionism ($d = 1.20$), cognitive salience ($d = 0.74$) and regret ($d = 0.69$) than those who remained non-problematic gamers. Problematic gamers who became non-problematic gamers had lower baseline perfectionism scores ($d = 0.62$) than those who remained problematic gamers. Cognitive change accounted for an additional 28% of variance in problematic gaming scores beyond gender, age, and frequency of gaming. These findings suggest that maladaptive gaming-related cognitions could be screened in clinical trials to aid in case formulation and inform decisions on needed interventions to deliver optimal client outcomes.

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1. Introduction

Research interest in problematic gaming (i.e., video gaming) has grown exponentially over the past two decades. A notable development in the field was the inclusion of ‘Internet gaming disorder’ (IGD) in Section III of the DSM-5 as a condition warranting further study (APA, 2013). One aspect of the IGD formulation that has attracted debate is its cognitive dimension. Specifically, it has been argued that ‘preoccupation’ (i.e., constantly thinking about gaming and planning the next gaming activity) may be a useful criterion for screening and diagnosis, but it may not describe the complexity of mental processes that drive problem gaming. Some authors have suggested, for example, that problematic gaming has specific cognitive features such as irrational thinking, expectancy beliefs, or cognitive biases to gaming stimuli (Haagsma, Caplan, Peters & Pieterse 2013; Kim & Davis, 2009; Li & Wang, 2013; Wan & Chiou, 2007). Some research studies have examined this assumption and reported a consistent positive association between the presence of maladaptive gaming cognitions and reporting a greater number of IGD symptoms (Liu et al., 2014; Peng & Liu, 2010; Zhou, Yuan, & Yao, 2012). On this basis, it is often argued that interventions tailored to problem gaming should consider the influence of these...
cognitions to develop more effective treatments (Griffiths & Meredith, 2009; King & Delfabbro, 2014a; Lemos, De Abreu, & Sougey, 2014). However, the literature is currently limited in relation to providing practical guidance on which specific cognitions may be most strongly related to problematic habits, recognising that some gaming-related cognitions may operate only temporarily and fail to distinguish healthy from problematic gamers over time.

A systematic review by King and Delfabbro (2014b) identified four main categories of maladaptive cognitions related to IGD, including: (1) beliefs about game rewards and tangibility, (2) maladaptive and in-flexible rules about video-gaming behaviour, (3) gaming as a source of self-esteem or ego-protection, and (4) gaming as a means of gaining social acceptance. Guided by this framework and other models (e.g., Caplan, 2010; Davis, 2001) a study by Forrest, King, and Delfabbro (2016a) developed a scale of 18 items to measure a range of maladaptive gaming-related cognitions. A factor analysis indicated that the items loaded on four distinct factors: (1) Perfectionism or thoughts about wanting to be 'the best' at a particular game or games, blaming oneself if unable to play as well as expected, and the inability to cease play if close to completing some objective; (2) Cognitive salience or thoughts related to being unable to function without video-games, ruminating about games when not playing, and using play as a means of distraction from work or other activities; (3) Regret or thoughts related to personal responsibility for the negative consequences of play, and the need to reduce one's frequency of play; and (4) Behavioural salience or thoughts related to the need to repeat in-game activities, as well as perceptions of the time investment. The four factors correlated positively with frequency of play, two measures of problematic gaming habits, and symptoms of psychological distress. Additionally, the author reported significant differences between problematic and non-problematic gamers for all four cognition types, and only behavioural salience was a non-significant predictor of problematic gaming status when controlling for all other variables. A similar pattern of results was reported in a similar study of 824 adolescents, which reported that profiles of maladaptive gaming cognitions were distinct between problematic and highly-engaged gamers (King & Delfabbro, 2016). On this preliminary evidence, it seems that maladaptive gaming-related cognitions are a promising research avenue with the potential to inform cognitive-behavioural therapies.

1.1. Longitudinal studies of video-gaming

Prospective studies of electronic media habits (e.g., Bessiere, Pressman, Kiesler, & Kraut, 2010; Dong, Lu, Zhou, & Zhao, 2011; Dong, Wang, Yang, & Zhou, 2013; Ko et al., 2015; Sun et al., 2012; van den Eijnden, Spijkerman, Vermulst, van Rooij, & Engels, 2010; Yen et al., 2012; Yu & Shek, 2013) have often subsumed video-gaming under broad categories such as 'screen-based behaviour' (including television viewing) or 'Internet addiction', which tends to include other activities such as information browsing, online social networking, online gambling, and viewing online pornographic material. For this reason, there have been relatively few studies that have focussed specifically on longitudinal predictors of problematic gaming. One of the most comprehensive longitudinal studies reported by Gentile et al. (2011) followed 3034 Singaporean school children over two years and reported that the frequency of gaming, impulsivity, and social competence predicted pathological involvement with video-games two years later. Further studies have identified other long-term predictors of problematic gaming, including: parent-child closeness (Choo, Sim, Liu, Gentile, & Khoo, 2015); social competence, self-esteem, and loneliness (Lemmens, Valkenburg, & Peter, 2011); perceived behavioural control (Haagsma, King, Pieterse & Peters, 2013); peer problems, male gender, low academic self-concept, and playing as a response to encountered problems (Möjle & Rehbein, 2013); being in a single parent family, low school well-being, and weaker social interaction (Rehbein & Baier, 2013); attention problems (Ferguson & Ceranoglu, 2014); lower academic achievement, higher than average height, presence of older siblings, and previous victimisation by traditional bullying (Yang et al., 2014); and RSA withdrawal (i.e., a physiological mechanism comparable to sensation-seeking; Coyne et al., 2015). A feature of these studies is their focus on child or adolescent populations, rather than adult gamers. Young populations may be at greater risk of developing gaming problems (Kuss & Griffiths, 2012), however many of these findings may not be generalizable to older age groups (Forrest, King, & Delfabbro, submitted for publication). Adults are also more likely than adolescents to actively seek treatment for problem gaming and therefore it is helpful to understand the gaming-related cognitive profiles of this population.

1.2. The present study

The present study aimed to determine whether maladaptive gaming cognition can predict future changes in problematic video-gaming. If cognitive changes are associated with changes in problematic habits over time, then this might suggest that these cognitions warrant attention and modification in interventions (see King & Delfabbro, 2014c). An effective means of identifying changes is to study both healthy and problematic users using a longitudinal design, given its advantages over retrospective designs that may yield inaccurate data (Scharkow, Festl, & Quandt, 2014). The present study aimed to recruit a sample of highly-engaged and problematic Australian adults, who completed a survey of their habits and gaming-related cognitions over 12 months. It was predicted that participants who became problematic gamers would score significantly higher on the cognition measures than those who did not become problematic gamers. It was also predicted that participants who became non-problematic gamers would score lower on the cognition measures than those who remained problematic gamers. Finally, it was predicted that long-term changes in problematic gaming scores would be positively associated with long-term changes in cognition scores.

2. Method

2.1. Participants and procedure

The study was conducted as part of a broader research project which followed adult video-game players over the course of 12 months. Participants were recruited using flyers distributed throughout the campuses of two South Australian universities supplemented by online advertisements posted on websites frequented primarily by regular Australian video-gamers. All advertisements were addressed to individuals with strong interests in video-gaming. Participants were then directed to an online survey, asked to provide informed consent and an email address enabling the researchers to contact them to participate in subsequent waves of data collection. Data were collected on four occasions at 3-month intervals (i.e., T1 = baseline, T2 = 3 months, T3 = 6 months, T4 = 9 months); in all instances, participants were asked about their gaming experiences during the past three months, and each participant therefore provided data for a 12-month period. Participants were compensated with a $10 voucher for each completed survey.

Fig. 1 presents each stage of the study, summarising drop-out between waves. Inclusion criteria were being aged 18 or older and playing games for at least 7 h per week (i.e., an average of one hour per day) at baseline. Of the 657 initial responses received, 192 were excluded on the basis of these criteria or for providing incomplete or disingenuous responses. Final participation rates were: T1 N = 465, T2 N = 374, T3 N = 329, T4 N = 290. Attrition analysis (see Table 1) revealed that participants who dropped out of the study between T1 and T2 were on average younger, played video-games more frequently, had higher scores on the problem gaming measure and three of the four cognitions measures than those who remained in the study, although effects were small.
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