



The relative contribution of motives and maladaptive cognitions to levels of Internet Gaming Disorder

Socayna Moudiab, Marcantonio M. Spada*

Division of Psychology, School of Applied Sciences, London South Bank University, London, UK

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ABSTRACT

This study aimed at determining whether motives and/or maladaptive cognitions would predict levels of Internet Gaming Disorder independently of negative affect and problematic Internet use. Seventy-nine Internet gamers completed the following questionnaires: Ten-Item Internet Gaming Disorder Test, Problematic Internet Use Questionnaire Short Form, Depression Anxiety and Stress Scale 21, Motives for Online Gaming Questionnaire, and Maladaptive Gaming-Related Cognitions Scale. Results showed that all variables were positively and significantly correlated with levels of Internet Gaming Disorder with the exception of motives relating to recreation. Furthermore, a hierarchical linear regression analysis showed that motives relating to coping and skills development and maladaptive cognitions relating to overvaluing of game rewards were the only significant predictors of levels of Internet Gaming Disorder when controlling for negative affect and problematic Internet use. The implications of these findings are discussed.

1. Introduction

1.1. Internet Gaming Disorder

Internet gaming has become commonplace however there is growing concern that when it becomes excessive and prolonged it may lead to a host of negative outcomes including poor academic performance, compromised real-life relationships, family difficulties and physical problems (Kuss, 2013). The inclusion of “Internet Gaming Disorder (IGD)” in the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders ([APA], 2013) indicates its emergence as an important mental health issue. Prevalence rates for IGD, based on representative samples, have been estimated to be between 1.2% and 8.5% in adolescents and young adults (e.g. Fam, 2018; Griffiths, Király, Pontes, & Demetrovics, 2015; Rehbein, Kliem, Baier, Mößle, & Petry, 2015; Wartberg, Kriston, & Thomasius, 2017).

The diagnostic criteria for IGD were first outlined by Petry et al. (2014). IGD is defined as the combination of the propensity to spend excessive time using Internet games and the display of pathological behaviours (Billieux et al., 2011). Petry et al. (2014) agreed on nine criteria for the classification of IGD: preoccupation with Internet games; withdrawal symptoms when Internet gaming is taken away; the need to spend increasing amounts of time engaged in Internet gaming (more than 3 h a day); unsuccessful attempts to control participation in

Internet gaming; loss of interest in hobbies and entertainment as a result of, and with the exception of, Internet gaming; continued excessive use of Internet games despite knowledge of psychosocial problems; deception of family members or others regarding the amount of internet gaming; use of Internet gaming to escape a negative mood; and loss of significant relationship, job, or educational opportunity because of participation in Internet games.

To date, several scholars have investigated and shed light on the importance of both motives and maladaptive cognitions in predicting Internet gaming however no research has explored the relative contribution of these constructs in predicting levels of IGD. We now turn to briefly reviewing the evidence on both motives and maladaptive cognitions as predictors of Internet gaming and IGD.

1.2. Motives in internet gaming and IGD

Motivation-focused models propose that IGD is linked to mis-directed motives, in which greater attention is given to virtual reality than the real world (Dong & Potenza, 2014). Nick Yee (2006) put forward a model of gamer motives to understand and assess individual differences and collective patterns of motivation in Internet gaming. Using a 40-item questionnaire based on Bartle's Player Types (Bartle, 1996), three core motives for Internet gaming were identified: achievement, social connection, and immersion. The achievement is

* Corresponding author.

E-mail address: spadam@lsbu.ac.uk (M.M. Spada).

defined as the desire to gain power, progression, accumulation of in-game wealth/status, and competition. The social connection motive is defined as the production of long-term meaningful relationships and teamwork. The immersion motive is defined by in-game skills advancement, role-playing, production of self-serving fictional characters, and escapism/avoidance from real-life issues. Results from the study indicated that Internet gamers chose to play in relation to different motives, highlighting that Internet gaming may have contrasting meanings and consequences for different gamers (Yee, 2006). Wan and Chiou (2006) explored the conscious and unconscious motives of gamers. In their research, participants were found to use Internet gaming as a coping mechanism to feel and gain a sense of control in the virtual world.

Motives have been a key construct in the understanding of Internet gaming, providing a framework to differentiate between gamers, in terms of usage patterns and behaviours. It has been argued that motives can mediate behaviours by regulating cognitive processing, thus influencing patterns of schema formation, use and recall (Eagly & Chaiken, 1993). In addition, gamers may use gaming for personality maintenance purposes; for example, individuals with low self-esteem in the real world might utilize the virtual world and its achievements/social experience as a coping mechanism. In turn, if motives are reinforced by positive outcomes, cognitive schemas will be too. This idea is supported by Williams, Yee, and Caplan (2008), who found that sociability, achievement, and immersion (motives factors) accounted for 60% of the overall variance in Internet gaming. Their results were strengthened by the inclusion of a mental health criterion, observing that regular gamers reported lower mental health wellness and higher levels of depression than non-gamers.

1.3. Maladaptive cognitions in internet gaming and IGD

Although the importance of motives in predicting Internet gaming has been substantiated by research evidence, an early study conducted by Billieux et al. (2011) showed that high urgency was an important factor, beyond motives, in predicting problematic Internet gaming. The construct of urgency relates to the tendency to impulsively respond to negative feelings/situations, and, therefore, can be a determinant in the development of problematic Internet gaming, as individuals might employ gaming to avoid negative real-life situations. This viewpoint aligns itself with the rationale that the more favourable an attitude is, for example playing Internet games, the more individuals will engage in that activity (Haagsma, King, Pieterse, & Peters, 2013).

King and Delfabbro (2014) reviewed 36 studies on maladaptive cognitions related to IGD. As the authors explain, these cognitions are not pathological per se, but they can be related to the development of problematic Internet gaming behaviours depending on their strength and frequency of activation. The authors identified four broad categories of maladaptive cognitions related to IGD: (1) Cognitions regarding game reward value and tangibility (including cognitions relating to reward regulation and obsession); (2) Cognitions regarding maladaptive and inflexible rules about Internet gaming (including cognitions relating to sunk cost bias and procrastination); (3) Cognitions regarding over-reliance on gaming to meet self-esteem needs (including cognitions relating to control and gaming self-esteem); and (4) Cognitions regarding social acceptance in the gaming community rather than the real-world (including cognitions relating to social avoidance and sense of belonging). The findings and observations of King and Delfabbro were broadly supported by recent reviews of the literature (e.g. Marino & Spada, 2017).

1.4. Anxiety, depression and stress, and problematic Internet use

As a result of the modernisation of videogames through the inclusion of the Internet as delivery pathway, gaming has evolved from a computer-based analogue to a high-definition Internet gaming

ecosystem. Indeed, Internet gaming has now spread to social media platforms (e.g. Facebook and Twitter) and can be accessed from all technological devices (e.g. iPhones, tablets, or laptops). For this reason, the study includes problematic Internet use (PIU) as a variable of intrinsic importance to IGD. PIU is defined as Internet use that causes psychological, emotional or social adversities in an individual's personal life, leading to clinical impairment (Spada, 2014). Some of the markers of PIU are obsessive thoughts about using the Internet, decrease in impulse control, overuse the Internet, and the isolation from others to be online (Davis, 2001).

A large study investigated the relationship between PIU and Internet gaming, with over 4000 Internet gamers sampled (Caplan, Williams, & Yee, 2009). The authors found that the immersion motives in Internet gaming were the strongest predictor of PIU, in addition to the use of voice technology (being able to communicate with other players), and the number of hours spent playing online. Thus, these findings support the tenet that individuals who display IGD symptoms, especially those with escapism and immersion motives, are also likely to display PIU symptoms.

Additionally, anxiety, depression and stress have been identified to be important contributors to both PIU and IGD. For example, Akin and Iskender (2011), employing a sample of 300 participants, identified PIU as positive predictors of anxiety, depression and stress. According to the researchers, levels and frequency of depression increased with overuse of the Internet, alongside anxiety and stress, especially because of misplaced attention towards the Internet rather than real-life social circles. Likewise, a study that examined the relationship between IGD and symptoms of anxiety, depression and stress in 576 Internet gamers found a positive correlation between these variables (Loton, Borkoles, Lubman, & Polman, 2016). Hence, poorer mental health may be strongly associated to IGD (Mentzoni et al., 2011; Spada & Caselli, 2017).

1.5. Aims and objectives

The aim of this study was to examine whether motives or maladaptive cognitions (or a combination of both) would predict levels of IGD independently of negative affect (anxiety, depression and stress) and PIU.

2. Method

2.1. Participants and procedure

In total, 79 participants attending a London (UK) University were recruited by advertisement on Facebook and University research platforms. Inclusion criteria were: (1) being 18 years of age or above; (2) consenting to the study; (3) understanding spoken and written English; and (4) engaging in Internet gaming regularly (for at least 4 h a week). Sixty-four participants were entered for analysis. The mean age of the final sample was 21.3 years (SD = 3.2 years), with 39 females and 25 males participating.

Upon ethics approval, an Internet-based questionnaire was set up for the study. Participants were provided with a brief of the study. Those who agreed to take part in the research were directed to a consent form, in which they were also asked to provide demographic details and details of hours spent gaming on the Internet. Once consent and demographics were obtained, participants were directed to complete the five questionnaires. On completion of the study, participants were debriefed.

2.2. Questionnaires

2.2.1. Ten-Item Internet Gaming Disorder Test (IGDT-10; Lemmens, Valkenburg, & Gentile, 2015)

The IGDT-10 measures levels of IGD based on the DSM-5 definition

Table 1
Correlation matrix of study variables with means, SDs, and ranges.

Measures	Mean	SD	Range	2	3	4	5	6	7	8	9	10	11	12	13	14	
1. IGDT-10	1.53	1.99	0–8	0.53**	0.46**	0.52**	0.54**	0.43**	0.64**	0.36**	0.56**	0.15*	0.68**	0.66**	0.60**	0.57**	
2. PIUQ-SF-6	16.38	5.64	6–28		0.55**	0.67**	0.65**	0.62**	0.65**	0.54**	0.59**	0.16	0.50**	0.51**	0.49**	0.52**	
3. DASS-21	21.54	13.87	0–51			0.59**	0.53**	0.33**	0.44**	0.35**	0.52**	0.13	0.56**	0.61**	0.62**	0.53**	
4. MOGQ-Soc	8.64	4.23	4–20				0.60**	0.62**	0.70**	0.63**	0.76**	0.24	0.61**	0.50**	0.58**	0.72**	
5. MOGQ-Esc	11.09	4.40	4–20					0.53**	0.80**	0.52**	0.70**	0.51**	0.60**	0.47**	0.43**	0.47**	
6. MOGQ-Com	10.78	3.91	4–18						0.59**	0.75**	0.54**	0.41**	0.59**	0.51**	0.37**	0.52**	
7. MOGQ-Cop	10.96	4.23	4–20							0.67**	0.70**	0.38**	0.65**	0.49**	0.51**	0.62**	
8. MOGQ-Skl	10.48	4.24	4–20								0.66**	0.39**	0.56**	0.43**	0.41**	0.48**	
9. MOGQ-Fan	9.57	4.48	4–20									0.33**	0.67**	0.49**	0.54**	0.60**	
10. MOGQ-Rec	10.71	3.19	3–15										0.37**	0.15	–0.00	0.22	
11. MGCS-Over	2.78	1.94	0–7											0.73**	0.67**	0.73**	
12. MGCS-Mal	4.07	2.51	0–10												0.72**	0.62**	
13. MGCS-Self	3.04	2.28	0–8													0.64**	
14. MGCS-Soc	2.94	2.46	0–8														–

Note. *n* = 64. IGDT-10 = Ten-Item Internet Gaming Disorder Test; PIUQ-SF-6 = Problematic Internet Use Questionnaire Short Form 6; DASS-21 = Depression Anxiety and Stress Scale 21; MOGQ-Soc = Motives for Online Gaming Questionnaire-Social; MOGQ-Esc = Motives for Online Gaming Questionnaire-Escape; MOGQ-Com = Motives for Online Gaming Questionnaire-Competition; MOGQ-Cop = Motives for Online Gaming Questionnaire-Coping; MOGQ-Skl = Motives for Online Gaming Questionnaire-Skill Development; MOGQ-Fan = Motives for Online Gaming Questionnaire-Fantasy; MOGQ-Rec = Motives for Online Gaming Questionnaire-Recreation; MGCS-Over = Maladaptive Gaming-Related Cognitions Scale-Overvaluing of Game Rewards; MGCS-Mal = Maladaptive Gaming-Related Cognitions Scale-Maladaptive and Inflexible Rules; MGCS-Self = Maladaptive Gaming-Related Cognitions Scale-Gaming-based Self-Esteem; MGCS-Soc = Maladaptive Gaming-Related Cognitions Scale-Gaming to get Social Acceptance.

* *p* < .05.

** *p* < .01.

of IGD. It consists of 10 items. Examples of questions include “Have you risked or lost a significant relationship because of gaming?” and “Have you played to relieve a negative mood (for instance helplessness, guilt, or anxiety)?” Higher scores indicate greater levels of IGD. The IGDT-10 has an appropriate level of internal consistency and good validity and reliability (Király et al., 2017).

Problematic Internet Use Questionnaire Short Form (PIUQ-SF-6; Demetrovics et al., 2016)

The PIUQ-SF-6 measures PIU. It consists of 6 items, with three subscales of 2-items each measuring obsession (e.g. “How often do you feel tense, irritated, or stressed if you cannot use the Internet for as long as you want to?”), neglect (e.g. “How often do people in your life complain about spending too much time online?”), and control disorder (e.g. “How often does it happen to you that you wish to decrease the amount of time spent online but you do not succeed?”). Higher scores indicate greater levels of PIU. The PIUQ-SF-6 has an appropriate level of internal consistency and good psychometric properties (Demetrovics et al., 2016).

2.2.2. Depression, Anxiety, and Stress Scales (DASS-21; Henry & Crawford, 2003)

The DASS-21 measures states of depression, anxiety and stress. It consists of a total of 21 items, with three subscales of 7-items each measuring depression (e.g. “I couldn't seem to experience any positive feelings at all”), anxiety (e.g. “I felt scare without any good reason”), and stress (e.g. “I found it difficult to relax”). Higher scores indicate greater levels of distress. The DASS-21 has an appropriate level of internal consistency and possesses good reliability and validity, especially when used as a measure of general psychological distress (Henry & Crawford, 2005).

2.2.3. Motives for Online Gaming Questionnaire (MOGQ; Demetrovics et al., 2011)

The MOGQ measures motives for online gaming. It consists of 27 items, with 6 subscales of 4-items each and one subscale of 3-items measuring social motives (e.g. “I play online games because I can get to know people”), escape motives (e.g. “I play online games because gaming helps me to forget about daily hassles”), competition motives (e.g. “I play online games because I like to win”), coping motives (e.g. “I play online games because it helps me get rid of stress”), skill

development motives (e.g. “I play online games because gaming sharpens my sense”), fantasy motives (e.g. “I play online games to feel as if I was somebody else”), and recreation motives (e.g. “I play online games because it is entertaining”). Higher scores indicate greater levels of motives. The MOGQ has a good level of internal consistency and good psychometric properties (Demetrovics et al., 2012).

2.2.4. Maladaptive Gaming-Related Cognitions Scale (MGCS; Forrest, King, & Delfabbro, 2017)

The MGCS measures maladaptive cognitions related to Internet gaming. It consists of 17 items, with 4 subscales of 4-items each measuring overvaluing of game rewards (reward value and tangibility; avatar identification; obsession; e.g. “Game rewards are as meaningful to me as anything else in life”), maladaptive and inflexible gaming rules (sunk cost bias; cognitive regret; behaviour completion; procrastination; e.g. “When I make mistakes or fail in a game, I must retry until I succeed”), gaming-based self-esteem (gaming self-esteem; lack of real-life control; vulnerability; e.g. “I am more in control when I'm playing the game”), gaming to gain social acceptance (achievement belief; competition; social avoidance; sense of belonging/acceptance; e.g. “Gaming protects me from people that make me uncomfortable”). Higher scores indicate greater levels of maladaptive cognitions. The MGCS has a good level of internal consistency and good psychometric properties (Forrest et al., 2017).

3. Results

3.1. Inter-correlations of variables

Skewness and kurtosis scores for all questionnaires were found to be within acceptable range. Therefore, a Pearson Product Moment Correlation was undertaken. Table 1 represents the descriptive statistics and inter-correlations of the study variables. The results show that all predictor variables were positively and significantly correlated with levels of IGD with the exception of motives relating to recreation.

3.2. Simultaneous linear regression analyses

A first simultaneous linear regression analysis was run in order to establish which motives would predict levels of IGD. In the analysis, we

Table 2
Simultaneous linear regression statistics with IGDT-10 as outcome variable and all correlated motives as predictor variables.

Measures	IGDT-10			
	β	t	p	Beta
MOGQ-Soc	-0.01	-0.15	.89	-0.02
MOGQ-Esc	-0.04	-0.49	.62	-0.09
MOGQ-Com	0.13	1.61	.11	0.24
MOGQ-Cop	0.29	3.20	.00	0.61
MOGQ-Skl	-0.20	-2.48	.02	-0.43
MOGQ-Fan	0.16	2.08	.04	0.37
R ² = 0.47	0.00			

Note. *n* = 64. IGDT-10 = Ten-Item Internet Gaming Disorder Test; MOGQ-Soc = Motives for Online Gaming Questionnaire-Social; MOGQ-Esc = Motives for Online Gaming Questionnaire-Escape; MOGQ-Com = Motives for Online Gaming Questionnaire-Competition; MOGQ-Cop = Motives for Online Gaming Questionnaire-Coping; MOGQ-Skl = Motives for Online Gaming Questionnaire-Skill Development; MOGQ-Fan = Motives for Online Gaming Questionnaire-Fantasy.

entered all motives that were found to be positively and significantly correlated with IGD. Table 2 presents the model summary and coefficients for this analysis. Motives relating to coping, skills development and fantasy were found to be the only significant predictors of IGD.

A second simultaneous linear regression analysis was run in order to establish which maladaptive cognitions would predict levels of IGD. In the analysis, we entered all maladaptive cognitions that were found to be positively and significantly correlated with IGD. Table 3 presents the model summary and coefficients for this analysis. Maladaptive cognitions relating to overvaluing of game rewards were found to be the only significant predictor of IGD.

3.3. Hierarchical linear regression analysis

A hierarchical linear regression analysis was run in order to establish whether motives and/or maladaptive cognitions identified to be significant in the previous simultaneous linear regression analyses would predict levels of IGD independently of negative affect (anxiety, depression and stress) and PIU. In the analysis, we entered negative affect on Step 1, PIU on Step 2, motives relating to coping, skills development and fantasy on Step 3, and maladaptive cognitions relating to overvaluing of game rewards on Step 4. Table 4 presents the model summary and coefficients for the hierarchical linear regression analysis. Results indicated that motives relating to coping and skills development and maladaptive cognitions relating to overvaluing of game rewards were the only significant predictors of levels of IGD when controlling for all other variables. The model as a whole accounted for 59% of the

Table 3
Simultaneous linear regression statistics with IGDT-10 as outcome variable and all correlated maladaptive cognitions as predictor variables.

Measures	IGDT-10			
	β	t	p	Beta
MGCS-Over	0.38	2.43	.02	0.38
MGCS-Mal	0.20	1.74	.09	0.26
MGCS-Self	0.18	0.95	.34	0.13
MGCS-Soc	0.04	0.35	.73	0.05
R ² = 0.53	0.00			

Note. *n* = 64. IGDT-10 = Ten-Item Internet Gaming Disorder Test; MGCS-Over = Maladaptive Gaming-Related Cognitions Scale-Overvaluing of Game Rewards; MGCS-Mal = Maladaptive Gaming-Related Cognitions Scale-Maladaptive and Inflexible Rules; MGCS-Self = Maladaptive Gaming-Related Cognitions Scale-Gaming-based Self-Esteem; MGCS-Soc = Maladaptive Gaming-Related Cognitions Scale-Gaming to get Social Acceptance.

Table 4
Hierarchical linear regression statistics with IGDT-10 as outcome variable and motives and maladaptive cognitions found to be significant in previous linear regression analyses as predictors.

Measures	IGDT-10			
	β	t	p	Beta
Step 1				
DASS-21	0.07	4.09	.00	0.46
R ² = 0.21	0.00			
Step 2				
DASS-21	0.04	1.92	.06	0.24
PIUQ-SF-6	0.14	3.18	.00	0.40
R ² = 0.32			.00	
Step 3				
DASS-21	0.02	1.12	.27	0.38
PIUQ-SF-6	0.04	0.82	.42	0.38
MOGQ-Cop	0.24	3.29	.00	0.38
MOGQ-Skl	-0.12	-1.81	.07	0.38
MOGQ-Fan	0.11	1.57	.12	0.38
R ² = 0.49			.00	
Step 4				
DASS-21	0.00	-0.01	.99	-0.00
PIUQ-SF-6	0.06	1.27	.21	0.16
MOGQ-Cop	0.17	2.43	.02	0.35
MOGQ-Skl	-0.15	-2.40	.02	-0.31
MOGQ-Fan	0.05	0.71	.48	0.10
MGCS-Over	0.49	3.71	.00	0.48
R ² = 0.59	0.00			

Note. *n* = 64. IGDT-10 = Ten-Item Internet Gaming Disorder Test; PIUQ-SF-6 = Problematic Internet Use Questionnaire Short Form 6; DASS-21 = Depression Anxiety and Stress Scale 21; MOGQ-Cop = Motives for Online Gaming Questionnaire-Coping; MOGQ-Skl = Motives for Online Gaming Questionnaire-Skill Development; MOGQ-Fan = Motives for Online Gaming Questionnaire-Fantasy; MGCS-Over = Maladaptive Gaming-Related Cognitions Scale-Overvaluing of Game Rewards.

variance in levels of IGD.

4. Discussion

The findings of the current study align themselves to previous research which observed that anxiety, depression and stress are associated with IGD (e.g. Loton et al., 2016; Mentzoni et al., 2011) as are PIU (e.g. Andreassen et al., 2016; Caplan et al., 2009), motives (Chang, Hsieh, & Lin, 2018) and maladaptive cognitions (King & Delfabbro, 2014). In addition, our findings underscore the importance of considering both specific motives and specific maladaptive cognitions in predicting levels of IGD when controlling for both negative affect (anxiety, depression and stress) and PIU.

It appears, from our findings, that motives relating to coping and skills development are key in predicting levels of IGD. It is plausible to assume that levels of IGD are therefore strongly linked, as argued by Wan and Chiou (2006), with believing that Internet gaming can provide a means of coping with, and escaping from, life (coping motives) as well as psychological benefits relating to being immersed in a skilled activity (skills development motives) as argued by Yee (2006). This observation would tally the view of motivation-focused models which propose that IGD is linked to misdirected motives, in which greater attention is given to virtual reality than the 'real' world (Dong & Potenza, 2014). To compound this, it would also appear, from our findings, that maladaptive cognitions relating to overvaluing of game rewards also play an important role in predicting levels of IGD. As argued by King and Delfabbro (2014), these maladaptive cognitions are a 'marker' of the excessive importance placed on the rewards of Internet gaming as well as obsessional-like tendencies associated with excessive Internet gaming.

Our findings suggest that a powerful 'triad' characterised by: (1)

Being motivated to game as a means of coping with life; (2) Being motivated to hone gaming skills; and (3) Overvaluing game rewards, may explain higher levels of IGD. Our study is one of the first to showcase a motives-maladaptive cognitions 'configuration' relevant to predicting levels of IGD. The implications of our findings, if replicated, are that psychological treatment for IGD may need to focus on restructuring this particular configuration rather than targeting other forms of motives and maladaptive cognitions which may be less 'proximally relevant' when the problematic behaviour is more extreme.

The present study has several limitations that need to be noted. Firstly, the sample size was small, so generalization of findings should be considered with caution. Secondly, the study only recruited individuals over the age of 18, so adolescents (who typically engage in Internet gaming) may hold different maladaptive cognitions and motives than adults. Thirdly, our study is based on a self-serving sample and self-report data, which involve the risk of imprecise and dishonest answers. Future studies should employ larger samples which would also allow for a more detailed analysis of the sub-scales' contributions of both motives and maladaptive cognitions towards levels of IGD. Employing longitudinal designs would also allow teasing out the causal elements linking these constructs as well as negative affect and PIU.

In conclusion, the study supports recent findings about the importance of specific motives and maladaptive cognitions in predicting levels of IGD when controlling for both negative affect and PIU.

Conflict of interest

None to disclose.

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