

The Moderating Role of Well-Being in the Relationship Between Gaming Motivation and Problematic Gaming

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ABSTRACT

The aim of this study was to explore the moderating role of psychosocial well-being in the relationship between gaming motivation and problematic gaming among problematic and recreational online gamers. Data from 511 online video game players ($M = 24.89$, $SD = 6.39$) were analyzed. Problematic online gaming was positively correlated with social anxiety, loneliness, and stress, as well as with social escape, competition, coping, skill development, and fantasy motives for playing online video games. Negative correlation was found between problematic gaming and life satisfaction. The results showed significant interaction terms between loneliness and social motive, life satisfaction and recreation and coping motive, and stress and fantasy motive among problematic gamers. Furthermore, results showed a significant interaction term between stress and skill development motive among recreational gamers. The results are discussed in the framework of the compensatory internet use model (Kardefelt-Winther, 2014a).

KEYWORDS

Life Satisfaction, Loneliness, Online Gaming, Online Gaming Motivation, Psychological Well-Being, Stress

INTRODUCTION

Playing video games has become a very popular habitual leisure activity. For many individuals, it is mainly a benign source of entertainment that has potential to produce benefits in several areas including cognitive, social, educational, and therapeutic (Colder Carras et al., 2018; Granic, Lobel, & Engels, 2014). However, there is a growing scientific concern that a minority of gamers, who play excessively, meet criteria for addictive gaming, such as loss of control and functional impairment with impacts on psychological well-being (Billieux et al., 2017; Jo et al., 2019; Király, Nagygyörgy, Griffiths, & Demetrovics, 2014).

Considering significant importance to public health, Internet gaming disorder (IGD) has been recently included in the 11th revision of the International Classification of Diseases (WHO, 2019). ICD-11

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defines internet gaming disorder as a pattern of gaming behavior (“digital-gaming” or “video-gaming”) characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences. Moreover, Internet Gaming Disorder (IGD) has been included in Section III of DMS-5-TR by the American Psychiatric Association (2022) as a result of research on problematic gaming and its significance for public health, which has provoked abundant criticism and a continuing debate among scholars concerning conceptualization and clinical significance of problematic gaming as a formal psychiatric diagnosis (Aarseth et al., 2017; Schimmenti & Starcevic, 2019). A focal point of disagreements involves a tendency to apply the biomedical approach to the concept of IGD, using criteria similar to those of substance-use disorders and addiction, without considering alternative etiological models (Billieux et al., 2015; Van Rooij et al., 2018). In line with the view of the Internet as a social environment, problematic gaming should not be considered apart from its psychosocial context (Musetti & Corsano, 2018) and psychological needs that individuals aim to meet (Kardefelt-Winther, 2014a). As proposed by the model of compensatory internet use (CIU) (Kardefelt-Winther, 2014b), problematic gaming could be intended as a maladaptive coping strategy to compensate for psychosocial problems with the underlying motivation to restore psychological well-being. Given that socially anxious or lonely people may engage in video gaming for socializing (motive) or stressed people to escape (motive) from reality, in this compensatory view problematic gaming may occur when individuals are motivated to use video games as a mean to cope with their life problems. Individuals with high psychological maladjustment could be more motivated to use video games to alleviate or compensate for their negative feelings occurring from unfavorable life situation, potentially starting a vicious circle ending with problematic use. Consequently, the aim of this study is to test the CIU model by exploring the relationship between motivation, psychological well-being and problematic gaming.

Previous studies have confirmed a relation between problematic gaming and a wide range of psychological factors. Studies on excessive forms of gaming have shown a direct positive association between problematic gaming and psychosocial factors such as loneliness, lack of social skills, life dissatisfaction, and low self-esteem (Festl, Scharkow & Quandt, 2013; Kim & Kim, 2010; Lemmens, Valkenburg, & Peter, 2011a). When investigating the relationship between psychological characteristics and problematic gaming, it was found that players’ unstable self-esteem and/or hypersensitivity to success or failure increase likelihood of problematic gaming (Beard & Wickham, 2016), depending on their perceptions of self-efficacy and a sense of achievement experienced during online gaming (Calado, Alexandre & Griffiths, 2014). Exploring psychological well-being and motivation for play simultaneously may have some merit in understanding problematic gaming.

According to the studies examining the role of gaming motives as mediating factors in the development of problematic gaming (Király et al., 2015; Ballabio et al., 2017), psychiatric distress has both direct and indirect effects on problematic online gaming, via escape motive for playing (but also via competition and fantasy motives, respectively). Li, Liao and Khoo (2011) have found that depression mediates the relationship between actual-ideal discrepancies and escapism, and escapism in turn mediates the relationship between depression and pathological gaming, suggesting that pathological gaming may be an over-regulated coping strategy for approaching the ideal self and avoiding the actual self. Likewise, Kardefelt-Winther (2014b) demonstrated that escapism and achievement motives mediate the relationship between stress and excessive online gaming.

In the present study gaming refers to playing all types of online games, excluding those that include gambling. To determine when and why video gaming, a generally healthy leisure activity, becomes problematic, and to gain deeper understanding of the relation between video gaming and psychological functioning (Von Der Heiden, Braun, Müller, & Egloff, 2019) we need to concentrate on the minority of problematic gamers. By analyzing problematic gamers separately, a better explanation of IGD may be obtained, which would otherwise be omitted when examining the full sample of gamers. In line with the CIU model, the present study starts from the assumption that a major motivational drive to excessive gaming is to relieve psychosocial problems (e.g., loneliness, social anxiety, stress). This

can be tested by exploring whether the association between motivations to play and problematic gaming vary depending on the level of psychosocial well-being. Hence, the aim of this study is to explore moderating role of psychosocial well-being in the relationship between motivations to play and problematic gaming among problematic and recreational gamers, classified based on their IGD scores. It is hypothesized that motives for playing online games are more strongly associated with problematic gaming in individuals who report lower levels of psychosocial well-being, compared to those who report higher levels of psychosocial well-being. The interactions between psychological well-being and motives to play are expected to be significant only among problematic gamers.

METHOD

Participants and Procedure

The study was conducted among online video game players aged ³18 years, using an online questionnaire and the snowball sampling method. Links to the survey were placed on various online video game forums in the Croatian language (HCL.hr Gaming Forum, Bug Online Forum and Forum.hr), Facebook Groups and Pages and Discord gaming groups. All Croatian-language questionnaires were administered in accordance with the Croatian Psychological Chamber's Code of Ethics. Anonymity of the participants was guaranteed, and they had not received any form of compensation. From the total of 582 online video game players who completed the survey, the analysis included 511 participants who met the age-related inclusion criteria (³18 years) and provided complete, non-stereotyped answers. The sample was predominantly male (77.7%, $n = 397$), aged 18 – 57 years ($M = 24.89$, $SD = 6.39$), mostly from Croatia (86.8%, $n = 444$) followed by Serbia (6.3%, $n = 32$), Bosnia and Herzegovina (3.7%, $n = 19$) and Germany, Austria, Ireland, Czech Republic, Denmark, Sweden (3.1%, $n = 16$).

Measures

- *Motives for Online Gaming Questionnaire* (MOGQ) (Demetrovics et al., 2011) is a 27-item self-report measure used to assess the full range of motives for online gaming. The items are measured on a 5-point Likert scale from “never” to “almost always/always”, with higher scores indicating higher frequency of respective motivational dimension. Cronbach's alpha reliability coefficients of 7 motivational dimensions assessed by MOGQ subscales were high: Social ($\alpha = .86$), Escape ($\alpha = .88$), Competition ($\alpha = .91$), Coping ($\alpha = .74$), Skill Development ($\alpha = .92$), Fantasy ($\alpha = .86$), and Recreation ($\alpha = .81$).
- *Internet Gaming Disorder Scale* (IGDS-SF9) (Pontes & Griffiths, 2015) is a 9-item scale used to assess IGD based on DSM-V diagnostic criteria for IGD (APA, 2013). The measure is based on gaming over the past 12 months, and each item represents one of the criteria included in DSM-V. The questions are answered using a 5-point Likert scale ranging from “never” to “very often”. A participant's score is calculated as a composite score of answers, ranging from 9 to 45. Higher scores indicate more severe cases of IGD (APA, 2013). In this study the IGDS-SF9 had a high reliability score, Cronbach's alpha $\alpha = .85$.
- *UCLA Loneliness Scale* (USC-8) (Hays & DiMatteo, 1987) is an 8-item short-form UCLA Loneliness Scale. The questions are answered using a 4-point Likert scale ranging from “never” to “always”. Higher scores indicate greater degrees of loneliness. In this study Cronbach's alpha was high, $\alpha = .89$.
- *Social Interaction Anxiety Scale* (SIAS) (Fergus, Valentiner, McGrath, Gier-Lonsway, & Kim, 2012) is a 6-item short-form self-report measure used to assess generalized social interactional anxiety. Participants were asked to rate the extent to which they feel each of six statements is true for them using a 4-point Likert scale ranging from “not at all” to “extremely”. The present study determined high internal reliability of Cronbach's alpha $\alpha = .86$.
- *Perceived Stress Scale* (PSS) (Cohen, Kamarck & Mermelstein, 1983) is a self-report measure that evaluates the level of perceived stress. The short form used in this study consisted of 4-items answered

on a 5-point Likert scale, ranging from “never” to “very frequently”. Higher scores indicate higher perceived stress. Internal reliability of the present study was acceptable, with Cronbach’s alpha $\alpha = .66$.

- *Satisfaction with Life Scale* (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985) is a self-report measure that assesses respondent’s satisfaction with life as a whole. SWLS consists of 5 items, answered using a 5-point Likert scale ranging from “strongly disagree” to “strongly agree”. Higher score indicates higher life satisfaction. In this study, Cronbach’s alpha was high, $\alpha = .81$.

RESULTS

On average, the participants reported to play video games for 20.4 (SD = 19.24) hours per week and their motivation for online gaming was above average in all of the motive dimensions. The most prominent motive was Recreation (M = 4.17; SD = 0.71) and Fantasy (M = 2.37; SD = 1.18) was the least prominent. On the IGDS-SF9 scale, the average score obtained by participants was 18.08 (SD = 6.46), which indicates that, on average, our gamers had few or none IGD symptoms or problems with gaming (Table 1).

For research purposes, our gamers were classified into a group of problematic gamers (22.5%, N = 115), consisting of those who answered “sometimes”, “often” or “very often” to 5 or more IGDS-SF9 questions (DMS-V cut-off point of 5 or more criteria), and a group of recreational gamers (77.5%, N = 396) with none, few or less than 5 IGD symptoms. On the psychological well-being scales, a shift of the average scores toward lower values on social anxiety and higher values on loneliness, stress and life satisfaction scales, implies that the participants were on average less socially anxious but lonelier, more stressed and more satisfied with life.

IGD was significantly positively correlated with social anxiety, loneliness, stress, and all motivational dimensions except recreation, with the highest correlation for escape motive (Table 2). A significant negative correlation was found between IGD and life satisfaction.

The moderating effect of psychosocial well-being on the relationship between motivations to play and problematic gaming was tested using multiple regressions with multigroup path analysis for each

Table 1.
Descriptive statistics in measures of IGD, social anxiety, life satisfaction, loneliness, stress, motives for online gaming, and weekly gaming time

	M	SD	TR	α
IGD	18.08	6.46	9-45	.85
Social Anxiety	11.58	5.22	6-30	.86
Life Satisfaction	17.04	4.18	5-25	.81
Loneliness	14.22	5.46	8-32	.89
Stress	9.56	3.15	4-20	.66
Social Motive	2.77	1.10	1-5	.86
Escape Motive	2.65	1.16	1-5	.88
Competition Motive	3.20	1.18	1-5	.91
Coping Motive	3.26	0.91	1-5	.74
Skill Development Motive	3.26	1.15	1-5	.92
Fantasy Motive	2.37	1.18	1-5	.86
Recreation Motive	4.17	0.71	1-5	.81
Weekly Gaming Time (h)	20.4	19.24	-	-
Age	24.89	6.39	18-57	-

moderator: loneliness, life satisfaction, social anxiety and stress. In each path model, motivations to play, moderator and control variables (weekly gaming time and age) were entered as predictors. Additionally, interactions between motivations to play and moderators were included to test for moderation effects.

The first multigroup path analysis model with loneliness as a moderator, indicated a good fit to the data (Table 3).

Results of loneliness model for problematic and recreational gamers are presented in Table 4. Among problematic gamers, a significant interaction term was found between loneliness and social motive ($\beta = .134, p < .05$). In those with high loneliness score, higher levels of social motives result in more IGD symptoms (Figure 1) which demonstrates that loneliness moderates the relationship between social motives and IGD. The loneliness model did not show any significant interaction between loneliness and motives to play among recreational gamers. The loneliness model explained 35.4% of variance of IGD symptoms for problematic gamers and 16.0% of variance for recreational gamers.

Table 2.
Correlations between measures of IGD, social anxiety, life satisfaction, loneliness, stress, motives for online gaming and weekly gaming time

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. IGD	1	.333**	-.302**	.407**	.376**	.216**	.459**	.243**	.245**	.116**	.304**	.274**	.062	.354**	-.178**
2. Social Anxiety		1	-.439**	.721**	.442*	-.004	.402**	-.046	.133**	-.024	.322**	.125**	-.018	.050	-.222**
3. Life Satisfaction			1	-.528**	-.526**	.014	-.339**	-.010	-.069	.142**	-.186**	.055	.095*	-.015	.132**
4. Loneliness				1	.556**	-.022	.438**	-.005	.081	-.125**	.306**	.072	-.082	.111**	-.237**
5. Stress					1	.028	.081	.023	.062	.075	.107*	-.015	.078	-.008	.025
6. Social						1	.214**	.329**	.288**	.395**	.196**	.214**	.219**	.328**	-.188**
7. Escape							1	.096*	.536**	.189**	.541**	.228**	.105*	.193**	-.196**
8. Competition								1	.201**	.277**	.117**	.302**	.155**	.205**	-.218**
9. Coping									1	.428**	.420**	.254**	.349**	.092*	-.014
10. Skill Development										1	.268**	.225*	.345**	.347**	-.096*
11. Fantasy											1	.309**	.249*	.095*	-.114**
12. Achievement												1	.206**	.194**	-.155**
13. Recreation													1	.091*	-.021
14. Weekly Gaming Time														1	-.224**
15. Age															1

*p < 0.05; **p < 0.01

Table 3.
Summary of fit indices for social anxiety, life satisfaction, loneliness, and stress moderation model

	χ^2/df	RMSEA	SRMR	CFI	GFI
Social Anxiety	1.374	.027	.0341	.996	.992
Life Satisfaction	1.338	.026	.0322	.996	.992
Loneliness	1.859	.041	.0398	.988	.989
Stress	1.628	.035	.0372	.993	.991

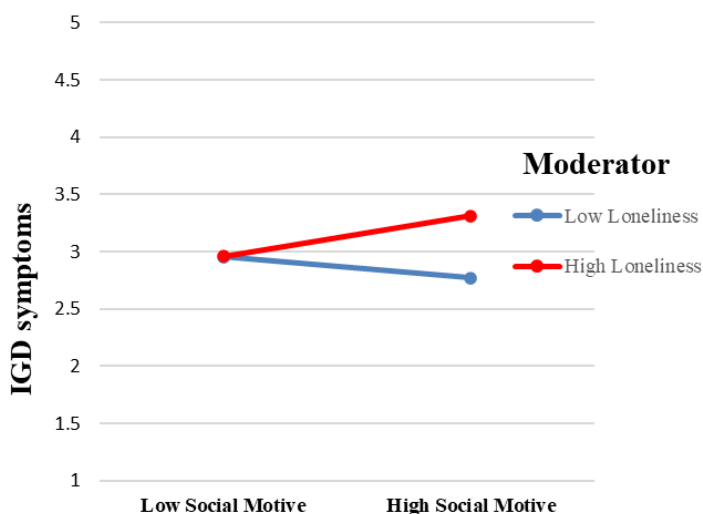
Note: χ^2 = Chi-square, df = degrees of freedom, χ^2/df = ratio of χ^2 to df, CFI = Comparative Fit Index, GFI = Goodness of Fit Index, SRMR = Standardized Root Mean Square Residual, RMSEA=Root Mean Square Error of Approximation

Table 4.
Coefficient estimates in models of gaming motives and moderators in predicting the IGD symptoms and interactions between gaming motives and moderators for problematic and recreational group of gamers

<i>Motives</i>	Problematic			Recreational			Problematic			Recreational			Problematic			Recreational		
	Est.	C.R.	p	Est.	C.R.	p	Est.	C.R.	p	Est.	C.R.	p	Est.	C.R.	p	Est.	C.R.	p
Recreation	-.062	-.45	.65	.021	.538	.59	.035	.308	.758	.025	.633	.53	-.160	-1.54	.13	.018	.479	.63
Coping	-.127	-1.04	.30	.015	.338	.74	-.299	-2.69	.01	.002	.036	.97	-.179	-1.80	.07	.002	.037	.97
Escape	.266	2.03	.04	.055	1.02	.31	.403	3.06	.00	.051	.958	.34	.260	1.99	.05	.058	1.08	.28
Social	.041	.50	.62	.039	1.11	.26	.132	1.63	.104	.039	1.07	.28	.080	.985	.33	.051	1.47	.14
Fantasy	-.060	-.60	.55	.030	.691	.49	-.069	-.74	.461	.064	1.50	.13	.028	.280	.78	.034	.797	.43
Competition	.050	.64	.52	.104	3.12	.00	-.050	-.62	.537	.102	3.04	.00	-.010	-.131	.90	.106	3.21	.00
Skill Development	-.175	-1.74	.08	-.065	-1.65	.01	-.200	-2.05	.041	-.084	-2.16	.03	-.186	-2.05	.04	-.078	-2.02	.04
<i>Controls</i>																		
Time	.009	2.84	.01	.009	4.93	.00	.007	2.43	.02	.009	4.89	.00	.007	2.33	.02	.009	4.99	.00
Age	.016	1.19	.24	.000	.004	.99	.017	1.28	.20	-.001	-.308	.76	.009	.679	.50	.000	-.042	.97
<i>Moderators</i>																		
Loneliness	.136	1.21	.23	.135	2.62	.01												
Life Satisfaction							-.020	-.206	.84	-.044	-1.05	.30						
Social Anxiety													-.026	-.257	.80	.094	2.20	.03
Stress																.063	.633	.53
<i>Interactions</i>																		
<i>Motives X</i>																		
<i>Moderators</i>																		
Recreation X	-.081	-.857	.39	.000	-.003	1.0	.243	2.72	.01	.043	1.21	.23	.021	.229	.82	.006	.168	.87
Coping X	-.047	-.712	.47	-.005	-.133	.89	-.131	-1.98	.05	-.028	-.708	.48	-.011	-.170	.87	-.014	-.353	.72
Escape X	-.041	-.564	.57	-.005	-.117	.91	.072	.835	.40	.067	1.65	.10	-.093	-1.13	.27	-.002	-.051	.96
Social X	.134	2.19	.03	-.001	-.037	.97	-.029	-.532	.59	-.001	-.021	.98	.115	1.81	.07	.019	.595	.55
Fantasy X	.072	1.14	.26	.005	.130	.90	-.093	-1.47	.14	-.031	-.720	.47	.076	1.15	.25	.003	.076	.94
Competition X	.000	-.008	.99	-.003	-.087	.93	-.048	-.922	.36	.011	.328	.74	.033	.565	.57	-.014	-.437	.66
Skill Development X	-.029	-.467	.64	.053	1.29	.20	.054	.920	.36	-.023	-.568	.57	-.089	-1.36	.18	.052	1.33	.19

Figure 1.

Moderation effect of loneliness on association between IGD and social motive in problematic gamers group



The second multigroup path analysis model with life satisfaction as a moderator showed a good fit to the data (Table 3). Results of life satisfaction model for problematic and recreational gamers are presented in Table 4. Two significant interaction terms were found: between life satisfaction and recreation motive ($\beta = .243$, $p < .05$) and between life satisfaction and coping motive ($\beta = -.131$, $p < .05$). In problematic gamers with low life satisfaction score, higher levels of both recreation motive (Figure 2) and coping motive (Figure 3) result in less IGD symptoms.

This demonstrates that life satisfaction moderates the relationship between motives to play (recreation and coping) and IGD. The life satisfaction model did not show any significant interaction between life satisfaction and motives to play among recreational gamers. Variables in life satisfaction

Figure 2.

Moderation effect of life satisfaction on association between IGD and recreation motive in problematic gamers group

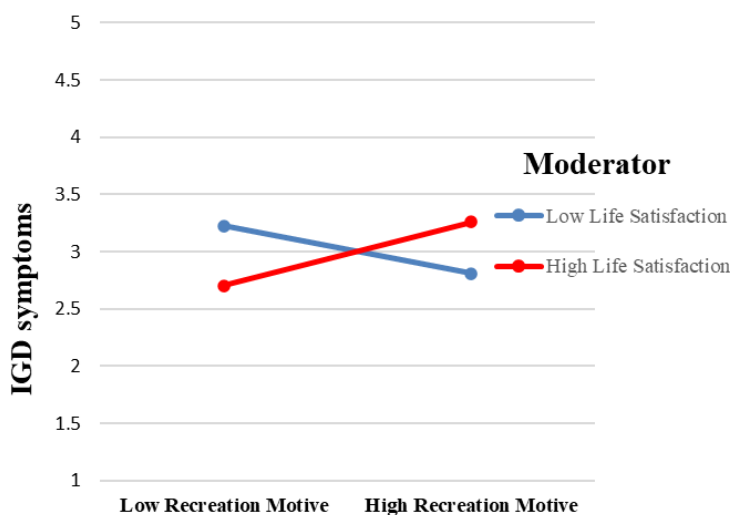
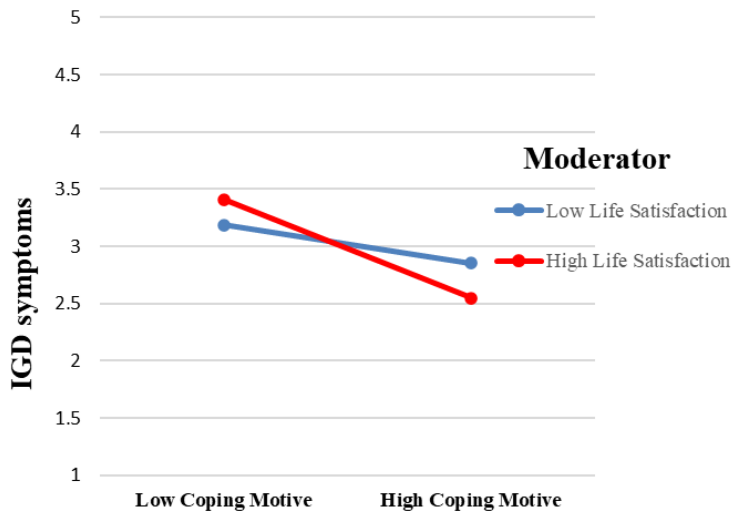


Figure 3.
Moderation effect of life satisfaction on association between IGD and coping motive in problematic gamers group



model explained 35.8% of variance of IGD symptoms for problematic gamers and 14.8% of variance for recreational gamers.

In the third multigroup path analysis model with social anxiety as a moderator, a good fit to the data was obtained (Table 3). Results of social anxiety model for problematic and recreational gamers are presented in Table 4. Social anxiety model did not show any interaction between social anxiety and any other motive to play among either problematic or recreational gamers. Social anxiety model explained 33.1% of variance of IGD symptoms for problematic gamers and 15.9% of variance for recreational gamers.

The fourth multigroup path analysis model with stress as a moderator showed a good fit to the data (Table 3). Results of stress model for problematic and recreational gamers are presented in Table 4. Among problematic gamers, two significant interaction terms were found: between stress and recreation motive ($\beta = -.267, p < .05$), and between stress and fantasy motive ($\beta = -.149, p < .05$). In those with high stress scores, less IGD symptoms were associated with higher levels of recreation motive (Figure 4), whereas in those with low stress scores, less IGD symptoms were associated with higher levels of fantasy motive (Figure 5).

This demonstrates that stress moderates the relationship between motives to play (recreation and fantasy) and IGD. The stress model displays significant interaction between stress and skill development motive ($\beta = .076, p < .05$) among recreational gamers (Table 4).

As shown in Figure 6, in recreational gamers with low stress scores, higher levels of skill development result in less IGD symptoms. Variables in the stress model explained 37.1% of variance of IGD symptoms for problematic gamers and 17.0% of variance for recreational gamers.

DISCUSSION

A hypothesis that motives for playing online games are more strongly associated with problematic gaming for individuals who report lower levels of psychosocial well-being, compared to individuals who report higher levels of psychosocial well-being was partially supported. Findings of the loneliness and life satisfaction models revealed a significant interaction effect in problematic gamers with no interaction effects in recreational gamers. Stress model findings identified significant interaction

Figure 4.
Moderation effect of stress on association between IGD and recreation motive in problematic gamers group

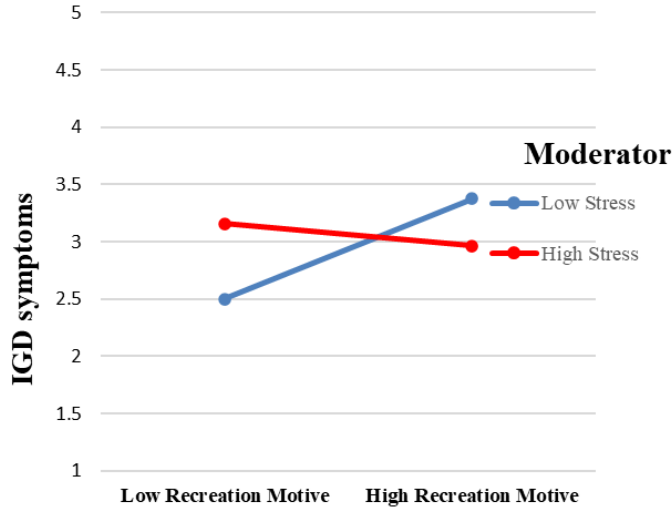
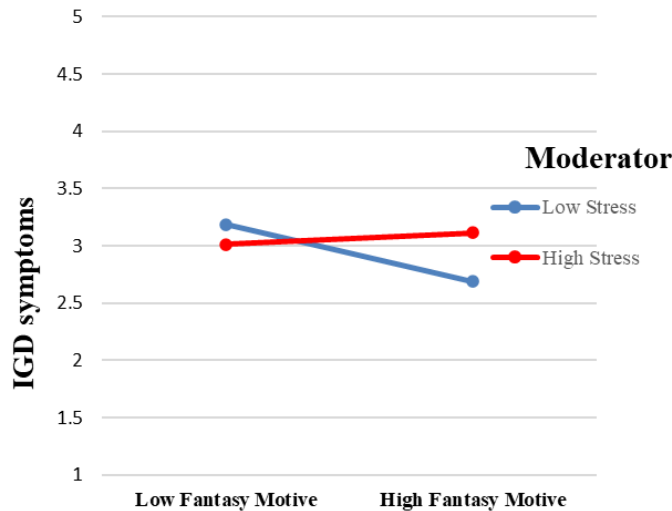


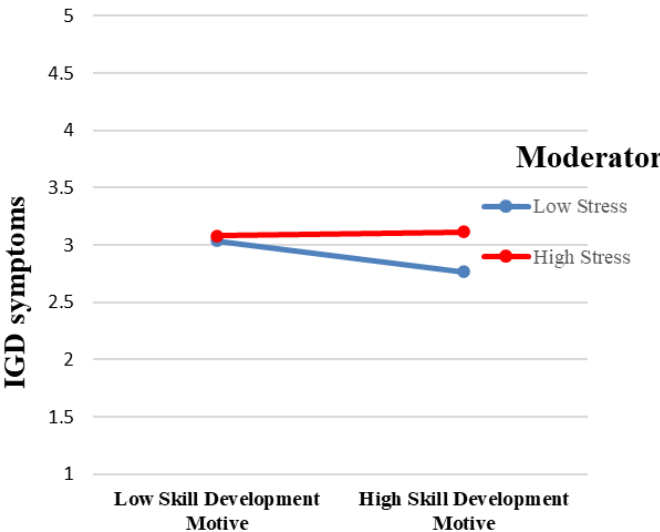
Figure 5.
Moderation effect of stress on association between IGD and fantasy motive in problematic gamers group



effects in both problematic and recreational gamers. There were no significant interaction effects in the social anxiety model among problematic gamers. Aspects of psychosocial well-being (loneliness, life satisfaction, stress and social anxiety) were analyzed as moderators between motivations to play and problematic gaming and discussed separately as a follow up.

Interaction between loneliness and social motive was a significant predictor of disordered gaming among problematic gamers. Several studies show a direct positive association between loneliness and problematic gaming (Caplan, Williams, & Yee, 2009; Shen & Williams, 2011), suggesting that problematic gamers are more likely to be lonely and less socially competent (Khazaal et al., 2016; Lemmens, Valkenburg, & Peter, 2011b). The main idea of these studies, supported by our results, is

Figure 6.
Moderation effect of stress on association between IGD and skill development motive in recreational gamers group



that people when feeling lonely or socially deprived, turn to online gaming as a form of compensation to satisfy their needs (Blais, Craig, Pepler, & Connolly, 2008; Wan & Chiou, 2006). For lonely people, online gaming has socially accommodating characteristics like visual anonymity, greater response time, fewer non-verbal clues and it is an easily accessible way to interact with others. Because of their rare social interactions, some lonely people could be less socially skilled. Therefore, online gaming is very appealing, it can provide a safer way to interact without being really accountable for one's actions and for getting away with fewer repercussions compared to face-to-face interactions. In virtual gaming environments, gamers can partially satisfy their unmet need for sociability, and virtual relationships are perceived as meaningful as real-world relationships (Billieux et al., 2013). Thus, engagement in virtual gaming environments can successfully alleviate the feeling of loneliness, but the root cause of loneliness still remains unresolved. According to Caplan (2003), if gamers rely on online video games only to alleviate their unmet need for sociability, this would easily boost their loneliness and social problems because excessive online playing may substitute activities needed to maintain healthy, or creating new relationships. However, study by Snodgrass et al. (2018) showed that lonely individuals who engage intensively in online video games "signal" greater passion and thus gain social inclusion and support online and offline. In contrast, lonely gamers who do not engage with video games in this intense and socially supportive way may increase rather than alleviate their perceived loneliness. In this study loneliness was significant moderator between social motive and disordered gaming, indicating that for some gamers compensating for loneliness through online gaming may result in problematic habit formation and increase IGD symptoms.

With life satisfaction as a moderator, path analysis showed significant interactions in the group of problematic gamers with no interactions among recreational gamers. Interaction between life satisfaction and coping motive was a significant predictor of disordered gaming among problematic gamers, which is in line with the previous studies. Problematic gamers, according to IGD criteria, tend to report lower life satisfaction (Bargeron & Hormes, 2017; Forrest, King & Delfabbro, 2016; Sarda, Bègue, Bry, & Gentile, 2016) and are more likely to use video games as a mechanism to cope with negative emotions (Bowditch, Chapman, Naweed, 2018; Schneider, King, & Delfabbro 2017). Findings from life satisfaction model suggest that individuals with low life satisfaction tend to use video games as a coping strategy to distract themselves from life problems, resulting with less IGD symptoms.

Results of this study showed significant interactions between fantasy motive and stress when predicting IGD in the group of problematic gamers. A number of studies have consistently demonstrated a positive significant association between stress and IGD (Canale et al., 2019; Kaess et al., 2017; Yen et al., 2019). This could be explained by a possible function of gaming which allows gamers to use games as a way to relieve perceived life stress (Snodgrass et al., 2014). Likewise, when confronted with life problems and/or stressful situations, online gaming may serve as a way to satisfy one's need for psychological escape (Young & De Abreu, 2011). This is consistent with the CIU model (Kardefelt-Winther, 2014a) as well as with the results of our study. It is interesting to note that in our findings on stress model as a moderator, significant interaction is found between fantasy motive and stress, and not between escape or coping motive and stress, as was expected based on previous research. Fantasy motive refers to stepping out of one's usual identity and trying new identities in the fantasy world, which one cannot do in real life. In this context, fantasy motive can be seen as a form of cognitive diversion, more specifically cognitive diversion or escape from self. Individuals who have problems due to stress, may use online video games as a maladaptive coping strategy to manage stress. Seeking relief from stress in gaming, and not facing the core problems of stress, could lead to progressive increase of gaming overuse potentially ending in IGD behaviors.

Results of this study showed no significant interactions between social anxiety and other motives to play among both recreational and problematic gamers. The review of the existing literature on social anxiety and IGD revealed mixed results, and while some studies show positive association between IGD and social anxiety (Gentile et al., 2011), one study emphasized the lack of this association (Van Rooij et al., 2011). Considering that for socially anxious individuals online video games seem very appealing medium as they prefer indirect interaction (Lee & Stapinski, 2012), further research is needed to give more insight into this topic. Previous research show that socially anxious gamers tend to play highly social game genre, such as MMORPG, more frequently than gamers who are not socially anxious (Cole & Hooley, 2013; Park, Han, Kim, Cheong, & Lee, 2016). The CIU model proposes that underlying psychosocial vulnerability, leading to social anxiety, may predispose individuals to play MMORPG, which could in turn result in problematic gaming. Our results of social anxiety model do not support such compensation, possibly because we analyzed gamers who play all genres. Further research could test proposed models on MMORPG players, as it is possible that such compensation occurs only among these players.

CONCLUSION

In accordance with the hypothesis, moderation of psychosocial well-being (loneliness and life satisfaction) was significant between motivations to play (social and coping motive) and problematic gaming among problematic games group, but not for recreational gamers. For stress and social anxiety, as other aspects of psychosocial well-being, moderation relationship was partially supported by hypothesis. Overall, our findings provide valuable insight into the relationship between psychological well-being and gaming as a maladaptive coping mechanism, and extends the research by Kardefelt-Winther (2014c) that shows empirical support for the CIU model. It allows better understanding of excessive online gaming by contextualizing motivation for gaming in the presence of psychosocial problems. This perspective supports the self-medication hypothesis originating from seminal work on substance-use disorders (Khantzian, 1985; Khantzian, 1997), suggesting that excessive gaming, like any other potentially addictive behavior, may be conceptualized as self-medication behavior which allows addicted individuals to cope with their vulnerabilities and painful states of mind.

Several limitations of this study should be considered. The very nature of self-selecting convenient sample limits the possibility of generalization. There is a potential for less reliable data due to issues with biases when using self-report measures. Furthermore, the cross-sectional design of the study does not allow conclusions on casual relationships. In order to support our results, the relationship between investigated variables should be explored using longitudinal study design. However, despite

its limitation, this study has several strengths. It adds to existing research on compensatory nature of problematic gaming (Di Blasi et al., 2020; Kardefelt-Winther, 2014b; Snodgrass et al., 2018), and by examining seven motivational dimensions using Demetrovics et al. (2012) framework of motivation and four indicators of psychosocial problems, while controlling for participants' weekly gaming time and age, it extends the research by Kardefelt-Winther (2014b) who explored one motivation and two indicators of psychosocial problems. Finally, the study has some relevant clinical implications. Our findings imply that psychosocial health problems, or more specifically loneliness, stress and life dissatisfaction, may play a significant role in developing IGD via maladaptive coping. This could help clinicians to increase understanding and shift focus on underlying psychosocial problems when treating problematic online gaming behavior. From a practical standpoint, this may promote developing of tailored and effective psychological prevention and treatment programs for individuals with problematic gaming.

CONFLICT OF INTEREST

The authors of this publication declare there is no conflict of interest.

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REFERENCES

- Aarseth, E., Bean, A. M., Boonen, H., Colder Carras, M., Coulson, M., Das, D., Deleuze, J., Dunkels, E., Edman, J., Ferguson, C. J., Haagsma, M. C., Helmersson Bergmark, K., Hussain, Z., Jansz, J., Kardefelt-Winther, D., Kutner, L., Markey, P., Nielsen, R. K. L., Prause, N., & Van Rooij, A. J. (2017). Scholars' open debate paper on the World Health Organization ICD-11 Gaming Disorder proposal. *Journal of Behavioral Addictions*, 6(3), 267–270. doi:10.1556/2006.5.2016.088 PMID:28033714
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage. doi:10.1080/10705519909540118
- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). American Psychiatric Association. doi:10.1176/appi.books.9780890425787
- Ballabio, M., Griffiths, M. D., Urbán, R., Quartiroli, A., Demetrovics, Z., & Király, O. (2017). Do gaming motives mediate between psychiatric symptoms and problematic gaming? An empirical survey study. *Addiction Research and Theory*, 25(5), 397–408. doi:10.1080/16066359.2017.1305360
- Bargeron, A. H., & Hormes, J. M. (2017). Psychosocial correlates of internet gaming disorder: Psychopathology, life satisfaction, and impulsivity. *Computers in Human Behavior*, 68, 388–394. doi:10.1016/j.chb.2016.11.029
- Beard, C. L., & Wickham, R. E. (2016). Gaming-contingent self-worth, gaming motivation, and Internet Gaming Disorder. *Computers in Human Behavior*, 61, 507–515. doi:10.1016/j.chb.2016.03.046
- Billieux, J., King, D. L., Higuchi, S., Achab, S., Bowden-Jones, H., Hao, W., Long, J., Lee, H. K., Potenza, M. N., Saunders, J. B., & Poznyak, V. (2017). Functional impairment matters in the screening and diagnosis of gaming disorder. Commentary on: Scholars' open debate paper on the World Health Organization ICD-11 Gaming Disorder proposal (Aarseth et al.). *Journal of Behavioral Addictions*, 6(3), 285–289. doi:10.1556/2006.6.2017.036 PMID:28816514
- Billieux, J., Schimmenti, A., Khazaal, Y., Maurage, P., & Heeren, A. (2015). Are we overpathologizing everyday life? A tenable blueprint for behavioral addiction research. *Journal of Behavioral Addictions*, 4(3), 119–123. doi:10.1556/2006.4.2015.009 PMID:26014667
- Billieux, J., Van der Linden, M., Achab, S., Khazaal, Y., Paraskevopoulos, L., Zullino, D., & Thorens, G. (2013). Why do you play *World of Warcraft*? An in-depth exploration of self-reported motivations to play online and in-game behaviours in the virtual world of Azeroth. *Computers in Human Behavior*, 29(1), 103–109. doi:10.1016/j.chb.2012.07.021
- Blais, J. J., Craig, W. M., Pepler, D., & Connolly, J. (2008). Adolescents online: The importance of Internet activity choices to salient relationships. *Journal of Youth and Adolescence*, 37(5), 522–536. doi:10.1007/s10964-007-9262-7
- Bowditch, L., Chapman, J., & Naweed, A. (2018). Do coping strategies moderate the relationship between escapism and negative gaming outcomes in World of Warcraft (MMORPG) players? *Computers in Human Behavior*, 86, 69–76. doi:10.1016/j.chb.2018.04.030
- Calado, F., Alexandre, J., & Griffiths, M. D. (2014). Mom, Dad it's only a game! Perceived gambling and gaming behaviors among adolescents and young adults: An exploratory study. *International Journal of Mental Health and Addiction*, 12(6), 772–794. doi:10.1007/s11469-014-9509-y
- Canale, N., Marino, C., Griffiths, M. D., Scacchi, L., Monaci, M. G., & Vieno, A. (2019). The association between problematic online gaming and perceived stress: The moderating effect of psychological resilience. *Journal of Behavioral Addictions*, 8(1), 174–180. doi:10.1556/2006.8.2019.01 PMID:30739461
- Caplan, S., Williams, D., & Yee, N. (2009). Problematic Internet use and psychosocial well-being among MMO players. *Computers in Human Behavior*, 25(6), 1312–1319. doi:10.1016/j.chb.2009.06.006
- Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic Internet use and psychosocial well-being. *Communication Research*, 30(6), 625–648. doi:10.1177/0093650203257842
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4), 385–396. doi:10.2307/2136404 PMID:6668417

- Colder Carras, M., Van Rooij, A. J., Spruijt-Metz, D., Kvedar, J., Griffiths, M. D., Carabas, Y., & Labrique, A. (2018). Commercial video games as therapy: A new research agenda to unlock the potential of a global pastime. *Frontiers in Psychiatry*, 8(300), 300. doi:10.3389/fpsyt.2017.00300 PMID:29403398
- Cole, S. H., & Hooley, J. M. (2013). Clinical and personality correlates of MMO gaming: Anxiety and absorption in problematic internet use. *Social Science Computer Review*, 31(4), 424–436. doi:10.1177/0894439312475280
- Demetrovics, Z., Urbán, R., Nagygyörgy, K., Farkas, J., Griffiths, M. D., Papay, O., Kökönyei, G., Felvinczi, K., & Olah, A. (2012). The development of the Problematic Online Gaming Questionnaire (POGQ). *PLoS One*, 7(5), e36417. doi:10.1371/journal.pone.0036417 PMID:22590541
- Demetrovics, Z., Urbán, R., Nagygyörgy, K., Farkas, J., Zilahy, D., Mervó, B., & Harmath, E. (2011). Why do you play? The development of the Motives for Online Gaming Questionnaire (MOGQ). *Behavior Research Methods*, 43(3), 814–825. doi:10.3758/s13428-011-0091-y PMID:21487899
- Di Blasi, M., Giardina, A., Coco, G. L., Giordano, C., Billieux, J., & Schimmenti, A. (2020). A compensatory model to understand dysfunctional personality traits in problematic gaming: The role of vulnerable narcissism. *Personality and Individual Differences*, 160, 109921. doi:10.1016/j.paid.2020.109921
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71–75. doi:10.1207/s15327752jpa4901_13 PMID:16367493
- Fergus, T. A., Valentiner, D. P., McGrath, P. B., Gier-Lonsway, S. L., & Kim, H. S. (2012). Short forms of the Social Interaction Anxiety Scale and the Social Phobia scale. *Journal of Personality Assessment*, 94(3), 310–320. doi:10.1080/00223891.2012.660291 PMID:22369684
- Festl, R., Scharrow, M., & Quandt, T. (2013). Problematic computer game use among adolescents, younger and older adults. *Addiction (Abingdon, England)*, 108(3), 592–599. doi:10.1111/add.12016 PMID:23078146
- Forrest, C. J., King, D. L., & Delfabbro, P. H. (2016). The measurement of maladaptive cognitions underlying problematic video-game playing among adults. *Computers in Human Behavior*, 55, 399–405. doi:10.1016/j.chb.2015.09.017
- Gentile, D. A., Choo, H., Liau, A., Sim, T., Li, D., Fung, D., & Khoo, A. (2011). Pathological video game use among youths: A two-year longitudinal study. *Pediatrics*, 127(2), e319–e329. doi:10.1542/peds.2010-1353 PMID:21242221
- Granic, I., Lobel, A., & Engels, R. C. (2014). The benefits of playing video games. *The American Psychologist*, 69(1), 66–78. doi:10.1037/a0034857 PMID:24295515
- Hays, R. D., & DiMatteo, M. R. (1987). A short-form measure of loneliness. *Journal of Personality Assessment*, 51(1), 69–81. doi:10.1207/s15327752jpa5101_6 PMID:3572711
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. doi:10.1080/10705519909540118
- Jo, Y. S., Bhang, S. Y., Choi, J. S., Lee, H. K., Lee, S. Y., & Kwon, Y. S. (2019). Clinical characteristics of diagnosis for internet gaming disorder: Comparison of DSM-5 IGD and ICD-11 GD diagnosis. *Journal of Clinical Medicine*, 8(7), 945. doi:10.3390/jcm8070945 PMID:31261841
- Kaess, M., Parzer, P., Mehl, L., Weil, L., Strittmatter, E., Resch, F., & Koenig, J. (2017). Stress vulnerability in male youth with Internet Gaming Disorder. *Psychoneuroendocrinology*, 77, 244–251. doi:10.1016/j.psyneuen.2017.01.008 PMID:28122298
- Kardefelt-Winther, D. (2014a). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior*, 31, 351–354. doi:10.1016/j.chb.2013.10.059
- Kardefelt-Winther, D. (2014b). Problematising excessive online gaming and its psychological predictors. *Computers in Human Behavior*, 31(1), 118–122. doi:10.1016/j.chb.2013.10.017
- Kardefelt-Winther, D. (2014c). The moderating role of psychosocial well-being on the relationship between escapism and excessive online gaming. *Computers in Human Behavior*, 38, 68–74. doi:10.1016/j.chb.2014.05.020
- Khantzian, E. J. (1985). The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *The American Journal of Psychiatry*, 142(11), 1259–1264. doi:10.1176/ajp.142.11.1259 PMID:3904487

- Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry*, 4(5), 231–244. doi:10.3109/10673229709030550 PMID:9385000
- Khazaal, Y., Chatton, A., Rothen, S., Achab, S., Thorens, G., Zullino, D., & Gmel, G. (2016). Psychometric properties of the 7-item game addiction scale among French and German speaking adults. *BMC Psychiatry*, 16(1), 1–10. doi:10.1186/s12888-016-0836-3 PMID:27160387
- Kim, M. G., & Kim, J. (2010). Cross-validation of reliability, convergent and discriminant validity for the problematic online game use scale. *Computers in Human Behavior*, 26(3), 389–398. doi:10.1016/j.chb.2009.11.010
- Király, O., Nagygyörgy, K., Griffiths, M. D., & Demetrovics, Z. (2014). Problematic online gaming. In K. P. Rosenberg & L. Curtiss Feder (Eds.), *Behavioral addictions: Criteria, evidence, and treatment* (pp. 61–97). Elsevier Academic Press. doi:10.1016/B978-0-12-407724-9.00004-5
- Király, O., Urbán, R., Griffiths, M. D., Ágoston, C., Nagygyörgy, K., Kökönyei, G., & Demetrovics, Z. (2015). The mediating effect of gaming motivation between psychiatric symptoms and problematic online gaming: An online survey. *Journal of Medical Internet Research*, 17(4), e88. doi:10.2196/jmir.3515 PMID:25855558
- Lee, B. W., & Stapinski, L. A. (2012). Seeking safety on the internet: Relationship between social anxiety and problematic internet use. *Journal of Anxiety Disorders*, 26(1), 197–205. doi:10.1016/j.janxdis.2011.11.001 PMID:22169053
- Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2011). The effects of pathological gaming on aggressive behavior. *Journal of Youth and Adolescence*, 40(1), 38–47. doi:10.1007/s10964-010-9558-x PMID:20549320
- Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2011b). Psychosocial causes and consequences of pathological gaming. *Computers in Human Behavior*, 27(1), 144–152. doi:10.1016/j.chb.2010.07.015
- Li, D., Liao, A., & Khoo, A. (2011). Examining the influence of actual-ideal self-discrepancies, depression, and escapism, on pathological gaming among massively multiplayer online adolescent gamers. *Cyberpsychology, Behavior, and Social Networking*, 14(9), 535–539. doi:10.1089/cyber.2010.0463 PMID:21332374
- Musetti, A., & Corsano, P. (2018). The internet is not a tool: Reappraising the model for internet-addiction disorder based on the constraints and opportunities of the digital environment. *Frontiers in Psychology*, 9(558), 558. doi:10.3389/fpsyg.2018.00558 PMID:29720954
- Park, J. H., Han, D. H., Kim, B. N., Cheong, J. H., & Lee, Y. S. (2016). Correlations among social anxiety, self-esteem, impulsivity, and game genre in patients with problematic online game playing. *Psychiatry Investigation*, 13(3), 297–304. doi:10.4306/pi.2016.13.3.297 PMID:27247595
- Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 Internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior*, 45, 137–143. doi:10.1016/j.chb.2014.12.006
- Sarda, E., Bègue, L., Bry, C., & Gentile, D. (2016). Internet gaming disorder and well-being: A scale validation. *Cyberpsychology, Behavior, and Social Networking*, 19(11), 674–679. doi:10.1089/cyber.2016.0286 PMID:27831752
- Schimmenti, A., & Starcevic, V. (2019). Logical fallacies in justifying problematic gaming as a mental disorder. *The Australian and New Zealand Journal of Psychiatry*, 53(7), 604–605. doi:10.1177/0004867418821431 PMID:30636433
- Schneider, L. A., King, D. L., & Delfabbro, P. H. (2018). Maladaptive coping styles in adolescents with Internet gaming disorder symptoms. *International Journal of Mental Health and Addiction*, 16(4), 905–916. doi:10.1007/s11469-017-9756-9
- Snodgrass, J. G., Bagwell, A., Patry, J. M., Dengah, H. F. II, Smarr-Foster, C., Van Oostenburg, M., & Lacy, M. G. (2018). The partial truths of compensatory and poor-get-poorer Internet use theories: More highly involved videogame players experience greater psychosocial benefits. *Computers in Human Behavior*, 78, 10–25. doi:10.1016/j.chb.2017.09.020
- Snodgrass, J. G., Lacy, M. G., Dengah, H. F. II, Eisenhauer, S., Batchelder, G., & Cookson, R. J. (2014). A vacation from your mind: Problematic online gaming is a stress response. *Computers in Human Behavior*, 38, 248–260. doi:10.1016/j.chb.2014.06.004
- Van Rooij, A. J., Ferguson, C. J., Colder Carras, M., Kardefelt-Winther, D., Shi, J., Aarseth, E., Bean, A. M., Bergmark, K. H., Brus, A., Coulson, M., Deleuze, J., Dullur, P., Dunkels, E., Edman, J., Elson, M., Etschells, P. J., Fiskaali, A., Granic, I., Jansz, J., & Przybylski, A. K. (2018). A weak scientific basis for gaming disorder: Let us err on the side of caution. *Journal of Behavioral Addictions*, 7(1), 1–9. doi:10.1556/2006.7.2018.19 PMID:29529886

Von Der Heiden, J. M., Braun, B., Müller, K. W., & Egloff, B. (2019). The association between video gaming and psychological functioning. *Frontiers in Psychology, 10*, 1731. doi:10.3389/fpsyg.2019.01731 PMID:31402891

Wan, C. S., & Chiou, W. B. (2006). Why are adolescents addicted to online gaming? An interview study in Taiwan. *Cyberpsychology & Behavior, 9*(6), 762–766. doi:10.1089/cpb.2006.9.762 PMID:17201603

World Health Organization. (2019). *Gaming disorder (6C51)*. WHO. <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/1448597234>

Yen, J. Y., Lin, H. C., Chou, W. P., Liu, T. L., & Ko, C. H. (2019). Associations among resilience, stress, depression, and internet gaming disorder in young adults. *International Journal of Environmental Research and Public Health, 16*(17), 3181. doi:10.3390/ijerph16173181 PMID:31480445

Young, K. S., & De Abreu. (2011). *Internet addiction: A handbook and guide to evaluation*. Hoboken, New Jersey: John Wiley & Sons, Inc.

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