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Mediation models of the interaction between Internet gaming disorder and psychological pain and symptoms of anxiety, depression, and borderline personality disorder[1]

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Abstract: *Introduction:* The prevalence of Internet gaming disorder (IGD) ranges from approximately 2% to 27.5% in the world population and 5.5% in the Polish population. Research findings indicate that IGD may be associated with depression, ADHD, anxiety, autism spectrum, and aggressive behaviours. However, there is a lack of research on the relationship between IGD and borderline personality disorder and psychological pain (psychache). The aim of this study is to examine the relationships between IGD and symptoms of anxiety, depression, psychological pain, borderline personality disorder and determining the role of psychological pain as a mediator of the above-mentioned links.; *Methods:* A sample of Polish gamers (n=201) was assessed using clinical scales (HADS, IGD-20, BPD Checklist) to evaluate the severity of depression, anxiety, IGD, and borderline personality symptoms. Additionally, the psychological pain scale was administered to assess relationship with IGD *via* mediation models. *Results:* Regression analysis in a mediation model revealed that IGD significantly predicted anxiety and depression, while borderline personality disorder was a significant predictor of IGD. Moreover, a bidirectional relationship between IGD and psychological pain had been demonstrated–IGD was a significant predictor of psychological pain and vice versa. Psychological pain also mediated the relationship between IGD and anxiety and depression, as well as the relationship between borderline personality symptoms and IGD. *Conclusions:* In the diagnostic and therapeutic process of people suffering from IGD, the co-occurrence of IGD with psychological pain, depression, anxiety and borderline personality disorder should be considered. Further scientific exploration is required to assess the associations between IGD and clinical variables and psychological pain.

Keywords: anxiety, depression, borderline personality disorder, Internet gaming disorder, psychological pain

Introduction

With the phenomenon of the dynamic digitization of the entertainment industry, the number of video game players is increasing at an alarming rate, reaching 2.7 billion people worldwide in 2023 (Patterson, 2020; Turner, 2024, Number of Gamers in the World section) and 20 million in Poland, of which at least 80% are adults (Marszałkowski, Biedermann, Rutkowski, 2023). Among the global population, 55% of gamers are from Asian countries (Turner, 2024, section Regional Distribution of Video Gamers), 36% are adults aged 18-34, 52% are male (Turner, 2024, section Editors Picks, point 7). Symptoms of problematic video game use may be manifested by approximately 2% to 27.5% of the global population (Mihara, Higuchi, 2017; Stevens, Dorstyn, Delfabbro, King, 2021) and 5.51% of the Polish gamer population, 7.15% of males, 8.70% of people of different gender, 8.06% of people aged 17-24, approximately 3.6% of people being young adults (PredictWatch, PAN, 2022).

Gaming disorder (GD) has been included as a new diagnostic entity (code: 6C51) in the *Disorders due to addictive behaviours* group of the ICD-11 (*International Statistical Classification of*

1 Article in polish language: https://www.stowarzyszeniefidesetratio.pl/fer/59P_Fele.pdf

Diseases and Related Health Problems, 11th Edition). The ICD-11 classification also describes a category of hazardous gaming (QE22), a condition of increased risk of addiction that precedes GD but does not yet meet the diagnostic criteria for GD (World Health Organization, 2023). Gaming disorder according to the ICD-11 classification is described as a continuous or episodic, recurrent pattern of behaviour associated with playing digital or video games (online or offline), characterised by: (1) loss of control over gaming, (2) prioritisation of gaming in life, (3) continuation or intensification of this behaviour, despite its negative consequences (e.g. social, professional). The American Psychiatric Association's DSM-5 classification (*Diagnostic and Statistical Manual of Mental Disorders, 5th Edition*), on the other hand, proposes nine diagnostic criteria for Internet gaming disorder (IGD) (a minimum of five criteria must have been met in the last 12 months), such as: (1) preoccupation with gaming, (2) withdrawal symptoms in the event of an inability to play, such as irritability, annoyance, anxiety or sadness, (3) tolerance, defined as the need to engage in more and more gaming to achieve the same effect, (4) unsuccessful attempts to take control of gaming, i.e. to stop or cut down on it, (5) loss of previous interests/hobbies, (6) continuation of disturbed gaming pattern despite its negative consequences, (7) underestimation of time spent gaming, (8) gaming as a way of coping with problems and as a method of regulating emotions, (9) difficulties in interpersonal relationships leading to social withdrawal/isolation, problems at work and at school due to excessive gaming (American Psychiatric Association, 2013).

Previous research findings indicate that excessive self-destructive gaming may be associated with increased depressive symptoms, ADHD, anxiety, autism spectrum disorder, aggressive behaviours, and psychoactive substance use (Buiza-Aguado, Alonso-Canovas, Conde-Mateos, Buiza-Navarrete, Gentile, 2018; Burkauskas et al., 2022; Murray, Mannion, Chen, Leader, 2022; T'ng, Ho, Sim, Yu, Wong, 2020; Wojtczak, Walenda, Kucharska, 2023). Coyne et al. (2020), in a longitudinal study of 385 adolescents over a six-year period, revealed that in a group of 10% of players with moderate levels of gaming at the beginning of the study, there is a worrying dynamic of increased pathological gaming over time along with increased symptoms of depression, anxiety and aggression. In contrast, Han, Yoo, Renshaw, and Petry (2018) showed that higher initial levels of depression and attentional problems are predictors of longer treatment time and lower likelihood of recovery for people with IGD. A study by Sepede et al. (2016) confirmed the association of IGD severity with depression, reduced quality of life or increased suicidal behaviour. A study by Burkauskas et al. (2022) found that IGD symptoms were associated with depressive symptoms, anxiety and substance use, regardless of time spent online, psychiatric diagnosis, cultural norms or sociodemographic characteristics. The aforementioned work suggests that the severity of IGD symptoms correlates with the severity of depression in gamers. However, the number of longitudinal studies to identify the direction of the causal relationship of IGD psychopathology remains limited.

People suffering from IGD often face the experience of psychological pain (psychache), in addition to depression, anxiety and feelings of loneliness in the real world. The concept of psychological pain was explained in Shneidman's model (1993) and has gained increasing popularity in suicidological research. The author of the concept, having read the content of suicide notes, described the concept as an inner feeling of anxiety, guilt, hopelessness, mourning, loss, anger or deep sadness, and identified the deprivation of important needs, including the need for love, belonging, affiliation, achievement, dominance and aggression, as the primary source of psychological pain (Shneidman, 1996). For a better understanding of the experience of psychological pain, it is worth referring to a review of research conducted by Morales, Barros (2022), in which the authors described states of people experiencing such pain as emptiness, abandonment, guilt, helplessness, loneliness, hopelessness, despair, unbearable suffering, and overwhelming thoughts. A study by Mills, Green, Reddon (2005) found correlations of psychological pain with depression, feelings of hopelessness or symptoms of a psychiatric nature.

However, to the authors' current knowledge, there are no scientific reports about associations between psychological pain and severity of IGD and clinical variables. Research reports indicate a bidirectional relationship between diagnoses of IGD and borderline personality disorder (Lu et al. 2017; Torres-Rodríguez, Griffiths, Carbonell, Oberst, 2018). The clinical picture of at least hazardous gamers includes a high risk of behavioural and substance addictions and problems with emotion regulation, identity, aggression, self-aggression, impulsivity, relational difficulties, or emotional lability. Playing computer games often becomes a way of coping with psychological pain that is a source of suffering and self-destructive acts, fear of rejection or a way of regulating emotional states and internal tensions. In a systematic review, Gervasi et al. (2017) point to personality traits such as neuroticism, impulsivity and aggression as predictors of the occurrence of GD.

The aim of this study was to assess (1) the associations between IGD, psychological pain, anxiety, depression and borderline personality disorder symptomatology, and (2) the mediating effect of psychological pain on the associations between IGD and anxiety, depression and borderline personality disorder symptoms.

1. Material and methods

Due to limited number of studies conducted in this research domain, an exploratory study was carried out posing the following research questions:

1. Is there a link between IGD and anxiety and depression?
2. Is there a link between IGD and psychological pain?
3. Is there a link between borderline personality disorder and IGD?
4. Does psychological pain mediate the relationship between IGD and anxiety and depression?
5. Does psychological pain mediate the relationship between borderline personality disorder and IGD?

1.1. Participants

The online study included 215 gamers, regardless of the amount of time spent playing and the game genre. Exclusion criteria for the study were: substance dependence, schizophrenia, bipolar affective disorder, organic damage to the central nervous system. Finally, data of 201 respondents (35.82% female, 63.18% male, 1.00% people identifying as a different gender) ages between 18 and 52 years old (M = 27.72; SD = 6.80) was eligible for analyses. Respondents had most often secondary education (47.76%) and tertiary education (45.76%), less often primary/middle-secondary education (4.48%) and vocational education (2.49%). Duration of their education varied from 9 to 18 years (M = 15.09; SD = 2.80).

74.63% of participants were professionally active, 25.37% inactive. The preferred game genre was RPG (*Role-Playing Game* – 74.75%), survival games (58.08%), FPS (*First-Person Shooter* – 59.09%), RTS (*Real-Time Strategy* – 48.48%), racing games (28.28%), sports games (21.21%).

The study received approval from local University Ethics Committee No. 9/2023.

1.2. Methods

Participants were requested to fill online a sociodemographic questionnaire and five standardised measures.

The *Internet gaming disorder-20* Test (*IGD-20*, Pontes, Griffiths (2014); Polish adaptation: Grajewski, Dragan (2021)) consists of 20 items to measure the prevalence of symptoms of IGD over the past twelve months according to the DSM-V (APA, 2013). It measures an overall score and six subscales: Salience, Mood Modification, Tolerance, Withdrawal Symptoms, Conflict, Relapse. The Cronbach's α reliability coefficient was 0.93 for the total score and 0.76 (Conflict) to 0.85 (Withdrawal Symptoms) for the subscales (Grajewski, Dragan, 2021).

The Hospital Anxiety and Depression Scale (*HADS*, Zigmond, Snaith (1983); Polish adaptation: Czerwiński, Mackiewicz, Mytlewska, Atroszko (2020)) consists of 14 items and measures two subscales: Anxiety and Depression. The Cronbach's

α reliability coefficient was 0.74 for the Depression subscale and 0.85 for the Anxiety subscale (Czerwiński et al., 2020).

The Psychache Scale (*The Scale of Psychache*, *PAS*, Holden, Mehta, Cunningham, McLeod (2001); Polish adaptation: Chodkiewicz, Miniszewska, Strzelczyk, Gąsior (2017)) consists of 13 items and is used to measure the level of psychological pain. The Cronbach's α reliability coefficient was 0.93 (Chodkiewicz et al., 2017).

The Alcohol Use Disorders Identification Test (*AUDIT*, Saunders, Aasland, Babor, De la Fuente, Grant (1993); Polish adaptation: Klimkiewicz et al., (2021)) consists of 10 items and measures the intensity of an alcohol problem, assigning respondents to one of four drinking patterns: low-risk drinking, risky drinking, harmful drinking, suspected alcohol dependence. The high reliability and validity of the tool has been confirmed (strong correlation with the MAST and CAGE scales, ρ = 0,76; Klimkiewicz et al., 2021).

The Borderline Personality Disorder Checklist (*BPD Checklist*, Bloo, Arntz, Schouten (2017)) scale consists of 47 items and is used to measure the intensity of symptoms associated with borderline personality disorder experienced in the past month according to the DSM-IV (APA, 1994). It measures the total score and nine subscales not included in the study: Abandonment Avoidance, Unstable Relationships, Identity Disturbance, Self-Destructive Impulsivity, Recurrent Suicidal Behaviour, Affective Instability, Lack of Anger Control, Dissociation, Paranoid Ideation. The Cronbach's α reliability coefficient was 0.97 for the total score and for subscales ranging from 0.72 (Self-Destructive Impulsivity) to 0.93 (Affective Instability) (Bloo et al., 2017).

2. Results

Statistical analyses were performed using SPSS Statistics 28.0. The means and standard deviations were presented, and the Pearson's correlation coefficient and regression analysis in a mediation model using the PROCESS macro (Hayes, 2013) were applied.

2.1. Correlational analyses between study variables

Table 1 shows the means, standard deviations and *r-Pearson* correlation matrix between the study variables. Significant positive correlations were found between the total score and most of the subscales of IGD (IGD-20) and anxiety (*r* = from 0.15-salience to 0.33-mood modification), depression (*r* = from

Table 1. Means, standard deviations and Pearson's r correlation matrix between the studied variables (N = 201)

	M	SD	1	2	3	4	5	6	7	8	9	10	11
IGD-20: Total score	41.25	12.83	-										
IGD-20: Salience	6.15	2.89	0.85***	-									
IGD-20: Mood modification	9.57	3.32	0.65***	0.46***	-								
IGD-20: Tolerance	6.39	3.07	0.79***	0.72***	0.44***	-							
IGD-20: Withdrawal symptoms	4.91	2.24	0.75**	0.60***	0.40***	0.47***	-						
IGD-20: Conflict	7.26	2.97	0.61***	0.39***	0.14	0.35***	0.38***	-					
IGD-20: Relapse	5.26	2.38	0.73***	0.54***	0.35***	0.44***	0.55***	0.39***	-				
HADS: Anxiety	7.55	4.34	0.26***	0.15*	0.33***	0.19**	0.24***	0.12	0.10	-			
HADS: Depression	5.25	3.86	0.37***	0.23***	0.30***	0.31***	0.28***	0.29***	0.17*	0.61***	-		
ZOB: Total score	89.95	31.06	0.47***	0.32***	0.39***	0.36***	0.37***	0.30***	0.30**	0.72***	0.62***	-	
PAS: Total score	31.37	15.31	0.30***	0.22**	0.35***	0.25***	0.23***	0.14*	0.12	0.76***	0.60***	0.81***	-

Note. M – mean; SD – standard deviations.
*** p < 0,001; ** p < 0,01; * p < 0,05.

0.17-relapse to 0.37-total score), psychological pain (r = from 0.14-conflict to 0.35-mood modification) and the strongest correlations with borderline personality disorder (r = from 0.30-conflict and relapse to 0.47-IGD total score). Psychological pain correlated significantly, positively with anxiety (r = 0.76), depression (r = 0.60) and IGD total score (r = 0.81). borderline personality disorder correlated significantly, positively with anxiety (r = 0.72) and depression (r = 0.62).

2.2. Psychological pain as a mediator of the relationship between borderline personality disorder and IGDr

The relationship between the variables discussed (see Table 1) formed the basis for testing a mediation model considering the role of psychological pain as a mediator of the relationship between borderline personality disorder and IGD.

A suppression effect of psychological pain was found on the relationship between borderline personality disorder and IGD (IGD-20: total score): β = -0,18; 95% C.I. (-0,38; -0,01). The suppression effect was described, when the mediator was included in the model, the role of borderline increased and was stronger in explaining IGD (β = 0,64; p < 0,001) than in the model without the mediator (β = 0,47; p < 0,001; Figure 1).

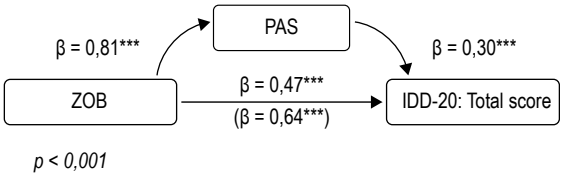

Figure 1. The suppression effect of psychological pain on the relationship between borderline personality disorder and IGD (N = 201)

2.3. Psychological pain as a mediator of the relationship between IGD and anxiety and depression

A mediation model that considers the role of psychological pain as a mediator of the relationship between IGD and depression and anxiety was also tested.

A mediating effect of psychological pain was found on the relationship between IGD (IGD-20: WO) and depression: β = 0,16; 95% C.I. (0,09; 0,23) and anxiety: β = 0,22; 95% C.I. (0,13; 0,32). The mediating effect was noticed when the mediator was included in the model, the role of IGD decreased and was weaker in explaining levels of depression (β = 0,37; p < 0,001 vs. β = 0,21; p < 0,001) and insignificant in explaining levels of anxiety (β = 0,26; p < 0,001 vs. β = 0,04; p > 0,05) than in the model without the mediator (Figure 2).

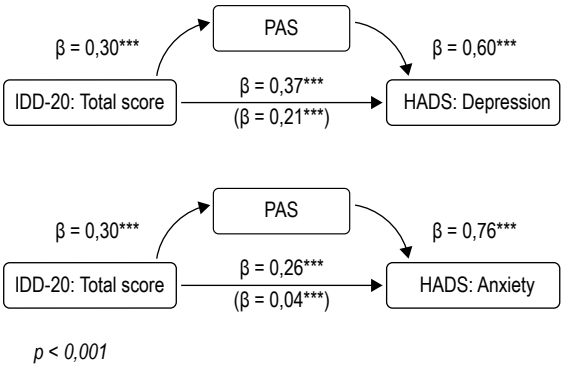

Figure 2. The mediating effect of psychological pain on the relationship between IGD and depression and anxiety (N = 201)

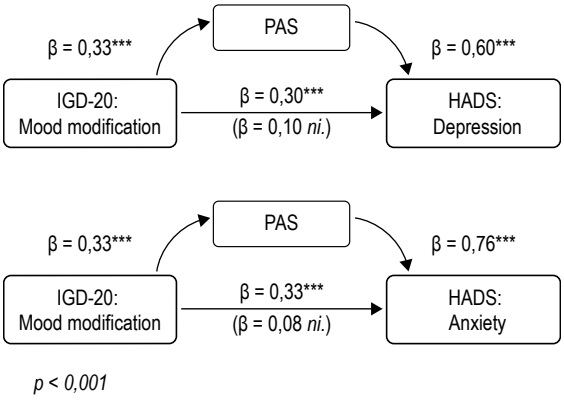

Figure 3. The mediation effect of psychological pain on the relationship between mood modification in IGD and depression and anxiety (N = 201)

There was also a total mediating effect of psychological pain on the relationship between mood modification (IGD-20: Mood Modification) and depression: β = 0,20; 95% C.I. (0,12; 0,28) and anxiety: β = 0,26; 95% C.I. (0,16; 0,35). The mediating effect was noticed when the mediator was included in the model, the role of mood modification in IGD decreased and was non-significant in explaining levels of depression (β = 0,30; $p < 0,001$ vs. β = 0,10; p > 0,05) and anxiety (β = 0,33; $p < 0,001$ vs. β = 0,08; p > 0,05) than in the model without the mediator (Figure 3).

3. Discussion

Research findings to date remain worryingly consistent regarding the negative impacts of problematic gaming and IGD on the mental health and daily functioning of gamers. The present study assessed the associations of IGD with depression, anxiety, psychological pain and borderline personality disorder. Each of these clinical variables showed positive associations with IGD. In addition, these variables were positively and strongly associated with each other.

The results showed that higher severity of IGD appeared to be a significant predictor of depression and anxiety, stronger for depression. The importance of IGD as a predictor of the occurrence of depression has been confirmed by the findings of limited number of papers (Coyne et al., 2020; Sepede et al., 2016). Coyne et al., (2020) showed that the severity of IGD symptoms co-varied with the severity of depressive symptoms in gamers. A similar direction of the relationship between IGD and depression has been confirmed in studies of other authors (Mikuška, Vazsonyi, 2018; Sepede et al., 2016). However, on the other hand, individuals with depressive symptoms show a tendency towards problematic gaming and IGD, which is more often confirmed in the research literature than the direction studied in this paper (Burkauskas et al., 2022; Teng, Pontes, Nie, Griffiths, Guo, 2021). It can thus be hypothesised that depressed individuals seek relief from suffering, escape from loneliness and social anxiety, and therefore engage in behavioural addictions. Depression in gamers is most often undiagnosed and treated late (Ostinelli et al., 2021). It also more often affects the at-risk group – young men, while in the rest of the players, gaming alleviates depressive symptoms (Pallavicini, Pepe, Mantovani, 2022). Also, young men with low self-esteem, experiencing symptoms of generalised anxiety disorder and poor stress tolerance are more likely to play problematically (Lavoie, Dufour, Berbiche, Therriault, Lane, 2023). Players of particular genres of computer games, in this case MOBA (*Multiplayer Online Battle Arena*) and MMORPG (*Massively Multiplayer Online Role Playing Games*), suffer from higher levels of anxiety and depression (Bonnaire, Baptista, 2019). The lack of consistency in the assessment of the relationship between IGD and depression indicates the complexity of this relationship and the likelihood of its bidirectionality.

Higher severity of IGD was also found to be a significant predictor of higher levels of psychological pain. Conversely, higher levels of psychological pain were a significant predictor of higher severity of IGD symptoms. Thus, IGD may be a cause of aggravated psychological distress and pain, the treatment of which would include psychotherapeutic, behavioural and pharmacological interventions including treatment of co-occurring mental health disorders, i.e. depression or anxiety disorders. Sadly, the lack of research in this scientific domain does not allow a discussion with the results of other authors.

Higher severity of borderline personality disorder symptomatology has been shown to be a predictor of higher severity of IGD, as evidenced by studies in people addicted to gaming (Torres-Rodríguez et al., 2018) and internet (Lu et al., 2017), as well as a predictor of higher levels of psychological pain. The psychological substrate of this pain may be disturbed emotion dynamics and regulation, which initiates maladaptive emotion regulation strategies, self-destructive and suicidal behaviour (Chen, Fu, Wang, Sun, 2024; Laghaei, Honarmand, Jobson, Ranjbar, Asgarabad, 2023; Olié, Guillaume, Jaussent, Courtet, Jollant, 2010; Paris, 2002; Pompili, Lester, Leenaars, Tatarelli, Girardi, 2008; Troister, Davis, Lowndes, Holden, 2013).

This study also demonstrated a specific role for psychological pain as a mediator in the relationship between borderline personality disorder and IGD and between IGD and both depression and anxiety. The presence of psychological pain makes the role of borderline personality disorder in the prediction of IGD stronger and the role of IGD in the prediction of depression and anxiety weaker. Thus, it can be said that in players experiencing psychological pain, the effect of borderline personality disorder on the severity of IGD symptoms becomes more intense. In contrast, the interaction of IGD on the severity of depression and anxiety symptoms does not occur without players experiencing psychological pain.

The definition of psychological pain by Orbach, Mikulincer, Gilboa-Schechtman, Sirota (2003a, 2003b) as "a subjective experience accompanied by an awareness of negative changes in oneself and one's functioning together with co-occurring unpleasant emotions" allows an understanding of the complex emotional states of the gamer who is trapped in addiction, depression and self-harm. Psychological pain is associated with symptoms of mental health disorders, including depression, and feelings of hopelessness (Mills et al., 2005) and with increased suicide risk – suicidal ideation, plans and acts (Olié et al., 2010; Pompili et al., 2008; Troister et al., 2013). Unfortunately, the number of studies on suicidality among gamers still seems very limited, given the seriousness of the phenomenon. In the research literature, an association has been shown between suicidal ideation, acts and problematic gaming (Erevik et al., 2022), as well as between problematic gaming, suicidal ideation and non-suicidal self-harm in the female population (Leino et al., 2024).

Summary and practical implications

The practical implications of this project are based on the results of the mediation models evaluated, in which IGD was a significant predictor of anxiety, depression and psychological pain, while borderline personality disorder and psychological pain were significant predictors of IGD. The demonstration of the bilateral direction of the relationship between IGD and psychological pain is undoubtedly a novel aspect of this study. On the other hand, the confirmed associations between IGD, depression, anxiety and borderline personality disorder and psychological pain provide an important diagnostic clue. In the process of diagnosing IGD and assessing the suicide risk of players, the variable of psychological pain seems to be very relevant. The gamer's clinical interview should be deepened with questions about psychological pain, motives for playing, as well as social context and functioning, which are stronger predictors of IGD than playing time (Sauter, Braun, Mack, 2021). The co-occurrence of IGD with other mental health disorders should be clinically assessed, and the construct of psychological pain should be thoroughly evaluated in the diagnostic and therapeutic process of gamers to cover suffering and potential suicidal risk.

In the future, the mediation models assessed, in which IGD is a significant predictor of anxiety, depression and psychological pain, should be conducted in large samples of people suffering from hazardous gaming/IGD and in longitudinal studies that allow assessment of the impact of the dynamics of the disorder on the clinical variables assessed.

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