



The Relationship Between Early Maladaptive Schemas, Depression, Anxiety and Problematic Video Gaming Among Female and Male Gamers

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Abstract

The present study investigated the relationship between problematic video gaming (PVG) and early maladaptive schemas (EMSs) among male and female gamers. Additionally, the present study investigated depression and anxiety as mediators in the relationship between EMSs and PVG. The study comprised 673 videogame players (391 female gamers) aged from 18 to 38 years. PVG was assessed using the nine-item Internet Gaming Disorder Scale–Short-Form (IGDS9-SF). Depression and anxiety symptoms were assessed using the Hospital Anxiety and Depression Scale (HADS). EMS dimensions were assessed using the Young Schema Questionnaire (YSQ–S3). Results suggested that EMSs such as practical incompetence/dependence were positively related to PVG. The findings showed gender differences in these relationships. The vulnerability to harm or illness, enmeshment and subjugation schemas were positively related to PVG among male gamers. However, depression and anxiety did not mediate the relationship between EMSs and PVG. These findings may contribute to a better understanding of mechanisms related to PVG development, which are associated with maladaptive schemas.

Keywords Problematic video gaming · Depression · Anxiety · Early maladaptive schemas · Gamers

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Problematic video gaming (PVG) has been reported in many countries worldwide and is increasingly common among a small minority of adolescents as well as emerging adults (Fam, 2018; Feng et al., 2017). PVG is included in the appendix of the latest (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) as ‘internet gaming disorder’ (IGD; American Psychiatric Association, 2013). For IGD to be diagnosed, five or more of the following criteria have to be met over the past 12 months: (i) compulsive or obsessive engagement or preoccupation with internet gaming; (ii) users experience withdrawal symptoms when internet gameplay ceases; (iii) tolerance is identified through increased internet gaming engagement; (iv) attempts to stop or reduce engagement with internet gaming have failed; (v) loss of interest in non-internet gaming activities or hobbies; (vi) continued use or excessive use of internet gaming despite negative consequences; (vii) lying to others about internet gaming use; (viii) engaging in internet-based gaming as a way to escape; and (ix) relationship difficulties or loss as a result of playing internet games (American Psychiatric Association, 2013). Gaming disorder (GD) has also been included in the latest 11th revision of the *International Classification of Diseases* (ICD-11; WHO, 2019). Further to this, Griffiths (1996, 2005, 2019) has posited the following behavioural addiction symptoms in relation to videogames: salience, mood modification, tolerance, withdrawal, conflict and relapse. Griffiths (2019) asserts that all six listed consequences must occur to recognise such behaviours as addictions. However, Griffiths (2019) noted that problematic behaviour may still be present even when some of these specific consequences are absent. More specifically, problematic behaviour may occur when an individual manifests some but not necessarily all specific consequences associated with addiction (e.g., tolerance, conflict, salience and mood modification).

The PVG prevalence rates among nationally representative samples have ranged from 1.2% to 8.5% (Griffiths et al., 2016). Stevens et al. (2021) considered 53 GD prevalence studies conducted between 2009 and 2019 across 17 different countries among adolescents and adults, and estimated worldwide GD prevalence as 3.05% (confidence interval: 2.38%–3.91%). Previous studies (Cudo et al., 2020a; Fam, 2018; Feng et al., 2017; Stevens et al., 2021) reported that PVG prevalence was higher for male gamers than female gamers. For example, based on a meta-analysis, Stevens et al. (2021) indicated that PVG rates were approximately 2.5:1 in favour of males compared to females. Additionally, PVG prevalence was higher for adolescents and individuals from Asian countries than adults and individuals from other regions (André et al., 2020; Chia et al., 2020; Stevens et al., 2021). For example, Stevens et al. (2021) reported that individuals from Asian countries had higher GD prevalence estimates (5.08% [3.29%, 7.78%]) than individuals from European countries (2.72% [1.96%, 3.75%]). Additionally, Stevens et al. (2021) pointed to the rise in PVG prevalence rate in recent decades, particularly among female gamers. Consequently, it is important to understand the mechanisms involved in PVG development to most effectively prevent the number of individuals addicted to gaming from increasing.

Considering the Interaction of Person-Affect-Cognition-Execution (I-PACE) model for internet addiction (Brand et al., 2016, 2019), which developed out of the cognitive-behavioural model of problematic internet use (PIU) (Davis, 2001), PVG may be treated as a subtype of addictive behaviour. According to the I-PACE model, specific types of problematic behaviour may arise by the interaction between general predisposing variables (i.e. genetics, early childhood experiences, psychopathology, temperamental features and general coping style) and behaviour-specific predisposing variables (i.e., specific needs, specific motives and specific values). This interaction may condition perception of external and internal triggers associated with specific addictive behaviour subtypes (e.g., addictive social media, gaming and pornography use). Additionally, internal and external triggers

may be related to experiencing gratification at the beginning of media use. However, as the addiction process progresses, gratification associated with media use decreases and compensation increases. Moreover, according to the I-PACE model, Brand et al. (2016, 2019) also pointed out that negative early childhood experiences such as early trauma, emotional or physical abuse and social isolation may make individuals more vulnerable to respond intensively to stressful situations in later developmental stages. Additionally, negative early childhood experiences may be associated with developing mental disorders (Carr et al., 2013; Maschi et al., 2013) and addictive behaviours (Schimmenti et al., 2017; Shi et al., 2020). Brand et al. (2016, 2019) suggested that the development of addictive behaviours may be associated with a combination of early childhood experiences, parental styles, familial atmospheres and parents' own media use (see Alvarez-Monjaras et al., 2019). Consequently, according to the I-PACE model, it can be assumed that negative early childhood experiences can have an important contributory role in the development of PVG. In this context, it should be noted that negative early childhood experiences may lead to developing persistent maladaptive behaviour patterns (Simard et al., 2011), which may contribute to increased risk of PVG. Consequently, it is important to understand the relationship between early maladaptive schemas (EMSs) and PVG.

Early Maladaptive Schemas

EMSs are defined as "broad, pervasive themes ... regarding oneself and one's relationships with others, which are developed during childhood or adolescence, elaborated throughout one's lifetime, and dysfunctional to a significant degree" (Young et al., 2003, p.7). These schemas develop based on a combination of a child's inherited temperament with a dysfunctional experience with their parents, siblings and peers. They are a cognitive-emotional representation of the knowledge about ourselves and the world, and regulate how individuals view themselves as well as their interpersonal relationships with others (Young, 2014). A child develops coping styles as a reaction to the painful and overwhelming emotions experienced as a result of a specific schema. There are three general coping styles: (i) surrender, when individuals accept a schema and give in to it; (ii) avoidance, when individuals find ways to escape or block out their schemas; and (iii) overcompensation, when individuals do the opposite of what their schemas make them feel (Young, 2014). It should be noted that an avoidance coping style may contribute to individuals being more prone to substance use, risky or compulsive behaviour and other behaviours associated with social and psychological withdrawal. The schemas in conjunction with coping styles that made it possible to function in childhood may interfere with an individual's ability to function and develop healthy relationships in adulthood (Young, 2014). For example, a child criticised by parents may try harder to meet their parents' wishes to get acceptance from them. However, in adulthood, this behaviour pattern related to seeking acceptance from others may hinder normal social functioning and developing intimate relationships. Additionally, individuals trying to cope with this schema using avoidance coping may be more likely to develop avoidance behaviours such as addictions and compulsive behaviours. Young (2005) postulated that there are 18 EMSs, which may be classified into five domains reflecting childhood tasks. These are (i) disconnection and rejection, (ii) impaired autonomy and performance, (iii) impaired limits, (iv) other-directedness, and (v) over-vigilance and inhibition. Bach et al. (2018) modified the classification and postulated four domains (see Table 1).

Table 1 Description of early maladaptive schemas

| Dimension (Bach et al., 2018) | Dimension description | Schemas | Schemas description |
|-------------------------------|---|-----------------------------|---|
| Disconnection and rejection | The schema in this group is about an upbringing devoid of emotion and not satisfying the need for closeness, security or understanding. This concerns unpredictable and impulsive environments such as an incomplete family, a dysfunctional family or a family with an alcohol problem | Emotional deprivation | The conviction of the invalidity of one's own emotional needs, as well as the inability of other people to satisfy them. These needs may include being loved, being close and feeling attached (care); being listened to and understood (empathy); and support (protection). It occurs when parents do not meet the child's basic needs |
| | | Defectiveness/unlovability | The belief that 'there's something wrong with me', that you have some observable flaw. It occurs when a child is ridiculed or strongly criticised by parents, siblings or other people |
| | | Mistrust | The belief that other people are hurting and exploiting, threatening. It arises when a child experiences injustice, insult or mockery from others |
| | | Social isolation/alienation | The conviction that you are completely different from other people, not fit for society. It arises when a child is brought up in a family that is very different from those around him or her or experiences a feeling of being different from other children |
| | | Emotional inhibition | The belief that it is necessary to suppress one's own emotions and that throwing them away is bad. It develops when parents punish a child for expressing feelings, spontaneity, playing and discourage it |
| | | Pessimism/worry | Excessive focus on the negative aspects of life, while underestimating the positive. It arises in families where parents experience strong fear and anxiety |

Table 1 (continued)

| Dimension (Bach et al., 2018) | Dimension description | Schemas | Schemas description |
|-----------------------------------|--|--|---|
| Impaired autonomy and performance | <p>The schema in this group refers to an upbringing in which the child was not motivated to make decisions on their own, and their decisions were challenged, criticised or ridiculed. The family environment reduced self-confidence and a sense of doing things, which created an uncertain and weak image of self</p> | <p>Practical incompetence/dependence</p> <p>Vulnerability to harm or illness</p> | <p>The conviction that one is not able to cope with everyday difficulties, make the right decision or make a good choice, and therefore relies on others. It occurs when parents do not allow their child to be independent and self-reliant, and criticise or challenge their decisions</p> <p>The constant fear that something terrible could happen at any time. It is most often created by anxious parents, who present the world as dangerous and threatening</p> |
| | | Abandonment | <p>The belief that loved ones will sooner or later leave. It occurs when a child experiences a physical or mental separation from their parent, e.g. when one parent works and lives in another country, is emotionally absent and shows no interest</p> |
| | | Enmeshment | <p>Arises under the influence of too much emotional involvement of a close person (parent or partner), such as excessive control or overprotection. It causes difficulties in becoming aware of one's own opinions or needs</p> |
| | | Failure to achieve | <p>The conviction that it is not possible to achieve as much as others due to poorer competence/ability. It occurs when a child experiences severe criticism with a lack of support from their loved ones (i.e. parents and/or siblings)</p> |
| | | Subjugation | <p>The conviction of being forced to submit to others to avoid negative consequences. It arises when parents force their opinions and are in strong control of their child</p> |

Table 1 (continued)

| Dimension (Bach et al., 2018) | Dimension description | Schemas | Schemas description |
|--|--|---|---|
| Excessive accountability and standards | This group of schemas is concerned with upbringing, which was dominated by high expectations of the child often impossible to meet and a perfectionist approach to achievements. They concern family environments, where punishment for offenses was predominant while undervaluing successes, as well as an increased sense of responsibility | Self-sacrifice Unrelenting standards | The tendency to help others too much at the expense of one's own needs. It occurs when a child is overburdened with responsibility, e.g. feels responsible for the good mood of their parents The belief that whatever you do, it is never good enough. It is created under the influence of high demands, parents' pressure for achievements and love for success |
| Impaired limits | This group of schemas refers to an overprotective educational attitude, in which handicap, lack of limitations, rules or boundaries prevailed. Parents also display narcissistic behaviour, and create themselves as an 'exemplary family' | Self-punitiveness Entitlement/supertority Insufficient self-control/self-discipline Admiration/recognition seeking | The conviction that everyone deserves severe punishment for their misconduct. It occurs when a child experiences a lack of forbearance, compassion and austerity on the part of the parents The conviction that you are someone special, privileged and better, therefore disregarding the needs or opinions of others. It occurs when parents do not set boundaries or spoil the child excessively A reduced level of impulse braking, frustration tolerance and poor self-discipline. It occurs when parents do not maintain rules and discipline in raising their children A strong need for social approval, often at the expense of one's own needs; a need to adapt. It arises when parents impose their own opinion on a child, and give them only conditional love |

EMSs are associated with psychological problems, including substance use (Khosravani et al., 2017; Shorey et al., 2013); eating disorders (Unoka et al., 2010); post-traumatic stress disorder (Ahmadian et al., 2015); depression (Davoodi et al., 2018; Maçik, 2017; Maçik & Shchelhelska, 2015); anxiety (Carr & Francis, 2010); obsessive–compulsive disorder (Kim et al., 2014; Kwak & Lee, 2015); behavioural addictions (Aloi et al., 2019); and personality disorders, such as borderline personality disorder, dependent personality disorder and antisocial personality disorder (Bach et al., 2017; Barazandeh et al., 2016; Maçik, 2018). It should be noted that EMSs often act beyond cognitive awareness as vulnerability factors to the different aforementioned psychological conditions. Additionally, EMSs can be activated by unpleasant, negative internal and external triggers relevant to a particular schema. For example, a negative comment from a supervisor at work may contribute to activating the defectiveness/unlovability schema and the strong negative thoughts and feelings associated with that schema (Young, 2014). Consequently, EMSs may lead to negative emotional states, such as depression and anxiety, dysfunctional reactions and interpersonal difficulties (Maçik, 2019; Young, 2014).

Considering the mechanism of EMS development and maintenance (Young, 2014) and the crucial role of negative early childhood experiences in the development of PVG (Brand et al., 2016, 2019), it is logical to assume that EMSs may be related to PVG. However, there are only a few studies that have investigated the relationship between behavioural addictions and these schemas (e.g., Aloi et al., 2019; Ostovar et al., 2021; Shajari et al., 2016) even though cognitive-behavioural therapy (e.g. schema therapy; Young et al., 2003) is one of the important ways to treat behavioural addictions (King et al., 2017; Zajac et al., 2017). The aim of the present study was therefore to examine the relationship between PVG and EMSs among female and male gamers. Additionally, considering the relationship between EMSs and negative emotional states (Nicol et al., 2020) and the relationship between depression, anxiety, and PVG (Männikkö et al., 2020), another aim of the study was to test whether depression and anxiety mediate the relationship between EMSs and PVG. Consequently, understanding the associations between EMSs and behavioural addictions such as PVG may improve the efficacy of therapeutic interventions.

Early Maladaptive Schemas and Behavioural Addiction

Previous research has reported a relationship between EMSs and a variety of behavioural addictions including food addiction (Aloi et al., 2019; Imperatori et al., 2017), problematic gambling (Aloi et al., 2019; Shorey et al., 2012), PIU (Aloi et al., 2019; Ostovar et al., 2021; Shajari et al., 2016), problematic Facebook use (Cudo et al., 2020b) and compulsive sexual behaviour (Efrati et al., 2019). A meta-analysis also showed that all EMSs except approval/recognition seeking, unrelenting standards and punitiveness were found to have small to moderate positive associations with interpersonal problems (Janovsky et al., 2020). Additionally, Marengo et al. (2019) reported that EMSs were positively associated with risky behaviours, such as sexual risk behaviours, illicit drug use, heavy drinking, and aggressive/illegal behaviours. Additionally, the research reported gender differences between EMSs and heavy drinking behaviours. More specifically, there was a positive relationship between all EMS dimensions and these risky behaviours among females, whereas there was no similar relationship among males.

For problematic gambling, Shorey et al. (2012) showed that this problematic behaviour was positively related to all EMSs except defectiveness/unlovability, enmeshment, failure

to achieve, self-sacrifice, subjugation and unrelenting standards. Additionally, problematic gambling was associated with male gender and the impaired autonomy and performance domain (Aloi et al., 2019). For PIU, Shajari et al., (2016) using simple correlation analysis reported that PIU was associated with all EMSs. Additionally, Aloi et al. (2019) reported that PIU was associated with younger people and almost all EMS domains (with the exception of impaired autonomy and performance). Ostovar et al. (2021) showed that all EMSs included in the disconnection and rejection dimension and impaired autonomy and performance dimension were positively associated with all four PIU dimensions (i.e., lack of control, social withdrawal and emotional conflict, time management problems, and concealing problematic behaviour). Additionally, Cudo et al. (2020b) reported that the admiration/recognition seeking schema was positively related to problematic Facebook use, whereas the self-sacrifice and social isolation/alienation schema was negatively associated with this type of problematic behaviour among the non-gamers group. Taken together, it can be assumed that EMSs appear to be important contributors to behavioural addictions. It should be carefully noted that most of the studies on the relationship between EMSs and behavioural addiction indicated that the schemas included in the disconnection and rejection dimension and impaired autonomy and performance dimension were related to this type of addiction.

Depression and Anxiety as Mediators Between EMSs and PVG

PVG is associated with mental health problems (e.g., depression, anxiety, insomnia, and stress) and difficulties in interpersonal relations (Cudo et al., 2019; Kuss & Griffiths, 2012). A recent meta-analysis of research on the relationship between PVG and health-related outcomes (Männikkö et al., 2020) showed that depression and anxiety were most commonly associated with PVG. According to the I-PACE model (Brand et al., 2016, 2019), depression and anxiety were identified as risk factors for behavioural addiction. Brand et al. (2016, 2019) indicated that a depressive or anxious state might influence coping strategy and cognitive processes associated with focusing on triggers and risky decision-making. In this context, Teng et al. (2021) showed that pre-pandemic depressive and anxiety symptoms predicted PVG severity during the COVID-19 pandemic, which may support the hypothesis that poorer psychological health may predispose to PVG. Additionally, Cudo et al. (2020c) showed that depression mediated the relationship between self-esteem and PVG among young adult gamers. Ryu et al. (2018) showed that interpersonal relationships and depression mediated the relationship between impulsivity and PVG.

Considering the results of a systematic review (Nicol et al., 2020), depressive symptoms were primarily associated with EMSs, such as emotional deprivation, abandonment, mistrust, defectiveness/unlovability, social isolation/alienation, failure to achieve and self-sacrifice. Additionally, anxiety symptoms were primarily associated with EMSs, such as abandonment, vulnerability to harm or illness and emotional inhibition (Nicol et al., 2020). In this context, previous longitudinal research (Calvete et al., 2015) reported that disconnection/rejection, impaired autonomy, and other-directedness domains were associated with higher depression and social anxiety symptoms, and predicted higher stability of depressive symptoms over time. Consequently, it can be assumed that depression and anxiety are associated with EMSs included in the disconnection and rejection and impaired autonomy and performance dimension.

Taken together, considering schema theory (Young et al., 2003) and the I-PACE model (Brand et al., 2016, 2019), it can be presumed that dysfunctional schemas developed in childhood may contribute to negative emotional states, such as depression and anxiety. Additionally, these states may modify the behaviour associated with gaming (Brand et al., 2016, 2019) and consequently lead to PVG. Moreover, individuals with depressive and anxiety symptoms may treat playing videogames as a coping method and therefore be more susceptible to PVG (see Kardefelt-Winther, 2014). Consequently, it can be assumed that depression and anxiety can be mediators between EMSs and PVG.

The Present Study

The present study investigated the relationship between PVG and EMSs, and depression and anxiety as mediators of this relationship among female and male gamers. The current study was based on schema theory (Young et al., 2003) and the I-PACE model (Brand et al., 2016, 2019). To the best of the present authors' knowledge, no previous research has investigated the relationships between EMSs and PVG. However, according to the I-PACE model (Brand et al., 2016, 2019), PVG may be considered a subtype of addictive behaviour. Consequently, based on previous research concerning the relationship between EMSs and behavioural addictions (Ostovar et al., 2021; Shajari et al., 2016) and between these schemas and interpersonal problems (Janovsky et al., 2020), it is hypothesised that PVG will be positively associated with EMSs included in the impaired autonomy and performance dimension (H1) and disconnection and rejection dimension (H2). More specifically, gamers with the schemas from the impaired autonomy and performance dimension (associated with dependence on others, feeling insecure and suffering from a lack of self-determination) may perceive the game as a place where they can make social contacts and where they can be accepted by the social group (see Bhagat et al., 2020; Blinka & Mikuška, 2014). Therefore, it may be that the gamers become increasingly absorbed by the group with which they are gaming and this may lead to increasingly longer gaming sessions and the development of PVG. Moreover, gamers with the schemas from the disconnection and rejection dimension (connected to the general belief that the needs for security, stability, care, and acceptance will never be met) may perceive the game as a safe environment in which they can control their behaviour and their self-presentation. In this context, gaming can be a way to escape from the real world, where unfulfilled needs can be realised (see Hussain & Griffiths, 2009). Therefore, it may be that gamers increasingly abandon the offline world for the gaming world and become more and more absorbed by gaming. The details of hypotheses H1 and H2 are presented in Table 2. Considering the relationship between depression, anxiety, and PVG (Cudo et al., 2020c; Männikkö et al., 2020) and the relationship between depression, anxiety, EMSs, and PVG (Calvete et al., 2015; Nicol et al., 2020), it is hypothesised that depression (H3) and anxiety (H4) will mediate the relationship between EMSs and PVG. Additionally, previous studies showed gender differences in PVG prevalence (Cudo et al., 2020a; Fam, 2018; Feng et al., 2017; Stevens et al., 2021) and the relationship between psychological outcomes and PVG (Cudo et al., 2020d, e). Moreover, gender differences between EMSs and risky behaviours (Marengo et al., 2019) were found in previous studies. Consequently, it was hypothesised that the relationship between EMSs and PVG will be different between male and female gamers (H5).

Table 2 Hypotheses regarding the relationship between early maladaptive schemas and problematic video gaming

| |
|---|
| H1: PVG will be positively associated with the EMSs included in the impaired autonomy and performance dimension |
| H1a: PVG will be positively associated with practical incompetence/dependence |
| H1b: PVG will be positively associated with vulnerability to harm and illness |
| H1c: PVG will be positively associated with abandonment |
| H1d: PVG will be positively associated with enmeshment |
| H1e: PVG will be positively associated with failure to achieve |
| H1f: PVG will be positively associated with subjugation |
| H2: PVG will be positively associated with the EMSs included in the disconnection and rejection dimension |
| H2a: PVG will be positively associated with emotional deprivation |
| H2b: PVG will be positively associated with defectiveness/unviability |
| H2c: PVG will be positively associated with mistrust |
| H2d: PVG will be positively associated with social isolation/alienation |
| H2e: PVG will be positively associated with emotional inhibition |
| H2f: PVG will be positively associated with pessimism/worry |

Method

Participants

The sample comprised 673 (391 females; 58.1%) participants who had played videogames in the past year. The participants were selected from 1365 individuals who completed an offline survey. Considering differences between gamers and non-gamers in cognitive functioning (Bediou et al., 2018), the selection criterion was based on being an active player, which was defined as playing computer games regularly over the last year (minimum 0.5 h per week, maximum 150 h per week, $M = 12.04$, $SD = 16.72$). The participants' ages ranged from 17 to 38 years ($M = 21.25$, $SD = 2.67$, 5th percentile = 18 years, 95th percentile = 25 years). Participants were from six voivodships (administrative regions) of Poland (Małopolskie, Mazowieckie, Kujawsko-Pomorskie, Lubelskie, Lubuskie and Wielkopolskie). The study was conducted in accordance with the Declaration of Helsinki. Participants were informed that their responses would be anonymous and confidential, and oral informed consent was obtained. All participants were volunteers, and received no monetary reward for participation. The study was approved by the Institute of Psychology's ethics committee (John Paul II Catholic University of Lublin). The study was conducted between April and August 2019. The presented findings were a part of a larger research project on psychological aspects of videogame and Facebook use among Polish young adults. This project had two main, extensive parts: multidimensional aspects of impulsivity and early maladaptive schemas. Consequently, considering the issues' breadth and consistency, only the variables concerning EMSs among Polish young adult gamers are examined in the present study. The results concerning the relationship between the multidimensional aspects of impulsivity and problematic behaviours are available in another paper (Cudo et al., 2020d). Results regarding the relationship between EMSs and PFU among non-gamers were published in another paper (Cudo et al., 2020b). Consequently, the present paper focuses on the relationship between EMS and PVG among active gamers and the possible effect of depression and anxiety mediating this relationship. The dataset from the present

study is available from the institutional repository database (access link: <http://hdl.handle.net/20.500.12153/1644>).

Measures

Problematic Videogame Playing The nine-item Internet Gaming Disorder Scale–Short-Form (IGDS9-SF; Pontes and Griffiths, 2015; Polish version: Schivinski et al., 2018) was used to assess PVG. Items (e.g. ‘*Do you play in order to temporarily escape or relieve a negative mood [e.g., helplessness, guilt, anxiety]?’*’) are responded to on a five-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores reflect a greater PVG. The scale has very good psychometric properties, with a Cronbach’s alpha of 0.85 in the present study.

Depression and Anxiety The Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983; Polish version: Watrowski & Rohde, 2014) was used to assess depression and anxiety. Items were responded to on a four-point scale, ranging from 0 to 3. However, the description of the response was dependent on the content of the item. Higher scores reflect more symptoms of depression or anxiety. The scale has very good psychometric properties, with a Cronbach’s alpha of 0.86 for the anxiety scale and 0.77 for the depression scale in the present study.

Early Maladaptive Schema The 90-item Young Schema Questionnaire (YSQ–S3; Young, 2005; Polish version: Oettingen et al., 2018) was used to assess 18 EMSs. Items are responded to on a six-point scale, ranging from 1 (*completely untrue of me*) to 6 (*describes me perfectly*). The scores for each of the 18 EMSs subscales range from 5 to 30. Higher scores reflect a greater intensity of the schema. In the present study, the subscales’ Cronbach’s alphas ranged from 0.58 to 0.89 (see Supplementary Materials 1).

Demographic Variables and Frequency of Use Participants also provided information concerning socio-demographic factors (i.e., age and gender), time spent playing videogames per week, and playing action videogames (yes/no).

Statistical Analysis

The simple relationship between the analysed variables was tested using Spearman’s correlation coefficients. To assess the differences between male and female gamers in EMSs, anxiety, depression, PVG and the number of gaming hours per week, a Mann–Whitney two-sample test (Mann & Whitney, 1947) was performed because some variables had a non-normal distribution. In this context, η^2 was used to assess effect size (Fritz et al., 2012). To verify differences between analysed groups in playing action videogames, the χ^2 test was used. In this context, ϕ was used to assess effect size (Fritz et al., 2012).

To investigate the relationship between EMSs, depression, anxiety, and PVG between male and female gamers, path analysis was used. Considering previous studies (Ostovar et al., 2021; Shajari et al., 2016), a model with EMSs as predictors of PVG was developed. Additionally, the model included depression and anxiety as mediators between the EMSs–PVG relationship (see Cudo et al., 2020b; Männikkö et al., 2020; Nicol et al., 2020). Playing action videogames and the time spent gaming were included as predictors of PVG (see Cudo et al., 2018; Cudo et al., 2020a). Additionally, in the path model, the covariance

between EMSs, playing action videogames and time spent gaming as well as between depression and anxiety residuals was considered. However, for clarity in presenting the results, the covariance values are presented in Supplementary Material 2. Considering the violation of multivariate normal distribution, the path model was based on the maximum likelihood method with Satorra-Bentler adjustment (Satorra & Bentler, 1994). The χ^2 , χ^2/df , confirmatory fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) and standardised root mean squared residual (SRMR) statistics were applied as measures of the model fit. A value of χ^2/df ratio lower than 2 may suggest a good fit to the dataset. Statistically non-significant ($p > 0.05$) χ^2 values suggest that the proposed model fits the dataset well. RMSEA values lower than 0.05 and SRMR values lower than 0.08 indicate a good fit of the model. CFI and TLI values higher than 0.90 indicate that the model fits the dataset well (Hu & Bentler, 1999; Kline, 2011).

Additionally, to analyse the mediation effects between EMSs and PVG via depression as well as anxiety, the approach used by Zhao et al. (2010) was applied. This approach comprises the Monte Carlo method to estimate standardised indirect effects with 95% confidence interval using 5000 samples (Mehmetoglu, 2018). Finally, to test differences between male and female gamers in paths, the Wald test (Wald, 1943) was conducted (Acock, 2013). Statistical calculations were conducted using the statistical software IBM SPSS 23 for descriptive statistics and correlation analyses and Stata 14 with the `medsem` ado package (Mehmetoglu, 2018) for path analysis.

Results

The correlation analysis showed that PVG was positively associated with the number of hours spent playing videogames per week, playing action videogames, anxiety, depression, and almost all EMS except self-sacrifice, entitlement/superiority, and admiration/recognition seeking among female gamers. For male gamers, there was also a positive association between the number of hours spent playing videogames per week, playing action videogames and PVG. Additionally, PVG was positively associated with almost all EMSs except the self-sacrifice schema. Complete results are shown in Table 3. However, the correlation between EMS dimensions is presented in Supplementary Materials 3.

Based on gender difference analysis, the results showed that female gamers had lower levels of PVG and spent fewer hours playing videogames per week than male gamers. The female gamers had a higher level of anxiety compared to male gamers. Additionally, male gamers presented greater EMSs associated with emotional/deprivation and defectiveness/unlovability than female gamers, whereas male gamers showed lower EMSs associated with abandonment, vulnerability to harm or illness, self-sacrifice, unrelenting standards, admiration/recognition seeking, and pessimism/worry. However, the effect sizes of gender differences in EMSs were small. Complete results are shown in Table 4. Additionally, there was a difference between the female and male gamers in playing action videogames ($\chi^2_{(df=1)} = 95.32$; $p < 0.001$; $\phi = 0.38$). The male gamers played action videogames more often ($N = 220$; 78.0%) than female gamers ($N = 157$; 40.2%). The effect sizes of this difference were medium.

According to a path analysis, the model represented a good fit to the data: $\chi^2_{(df=8)} = 12.32$, $p = 0.138$, $\chi^2/df = 1.54$, CFI = 0.996, TLI = 0.937, RMSEA = 0.040 and SRMR = 0.005. For female gamers, practical incompetence/dependence was positively related to PVG. Additionally, the number of hours spent playing videogames per week and playing action games

Table 3 Correlation coefficients between gaming characteristics, PVG, anxiety, depression and early maladaptive schemas among female ($n = 391$) and male gamers ($n = 282$)

| Variables | Female gamers ($n = 391$) | | | | | Male gamers ($n = 282$) | | | | |
|---|-----------------------------|---------------------------------|--------------|---------|------------|---------------------------|---------------------------------|--------------|---------|------------|
| | Problematic video gaming | Number of gaming hours per week | Action games | Anxiety | Depression | Problematic video gaming | Number of gaming hours per week | Action games | Anxiety | Depression |
| Number of gaming hours per week | 0.49*** | 0.39*** | | | | 0.43*** | | | | |
| Action games (0=no; 1=yes) | 0.35*** | -0.01 | -0.03 | | | 0.30*** | 0.34*** | 0.01 | | |
| Anxiety | 0.15** | 0.06 | -0.01 | 0.56*** | | 0.22*** | -0.04 | 0.08 | 0.61*** | |
| Depression | 0.21*** | 0.09 | 0.05 | 0.36*** | 0.46*** | 0.19** | 0.04 | 0.12* | 0.34*** | 0.46*** |
| Early maladaptive schemas | 0.26*** | 0.07 | 0.04 | 0.46*** | 0.56*** | 0.25*** | 0.01 | 0.06 | 0.46*** | 0.48*** |
| DR | 0.15** | 0.02 | 0.01 | 0.58*** | 0.47*** | 0.31*** | 0.07 | 0.18* | 0.54*** | 0.42*** |
| Defectiveness/lovability | 0.29*** | 0.07 | 0.10* | 0.50*** | 0.50*** | 0.24*** | 0.04 | 0.11 | 0.52*** | 0.47*** |
| Mistrust | 0.18*** | 0.05 | 0.04 | 0.34*** | 0.39*** | 0.20*** | 0.06 | 0.06 | 0.45*** | 0.48*** |
| Social isolation/alienation | 0.16** | 0.02 | 0.01 | 0.66*** | 0.53*** | 0.29*** | 0.03 | 0.13* | 0.68*** | 0.49*** |
| Emotional inhibition | 0.30*** | -0.01 | -0.01 | 0.45*** | 0.49*** | 0.32*** | 0.07 | 0.10 | 0.44*** | 0.46*** |
| Pessimism/worry | 0.13* | -0.04 | -0.02 | 0.60*** | 0.45*** | 0.34*** | 0.03 | 0.08 | 0.62*** | 0.48*** |
| Practical incompetence/dependence | 0.14** | 0.00 | -0.06 | 0.50*** | 0.41*** | 0.24*** | 0.04 | 0.04 | 0.57*** | 0.38*** |
| Vulnerability to harm or illness | 0.18*** | 0.04 | 0.01 | 0.31*** | 0.30*** | 0.33*** | -0.04 | 0.02 | 0.27*** | 0.29*** |
| Abandonment | 0.30*** | 0.07 | 0.05 | 0.46*** | 0.58*** | 0.33*** | 0.09 | 0.09 | 0.48*** | 0.47*** |
| Enmeshment | 0.29*** | 0.10* | 0.07 | 0.46*** | 0.51*** | 0.40*** | 0.07 | 0.14* | 0.49*** | 0.46*** |
| Failure to achieve | 0.05 | 0.09 | -0.01 | 0.20*** | 0.21*** | 0.11 | 0.01 | 0.09 | 0.33*** | 0.20** |
| Subjugation | 0.05 | 0.02 | 0.06 | 0.36*** | 0.26*** | 0.12* | -0.07 | 0.04 | 0.38*** | 0.23*** |
| Self-sacrifice | 0.13** | 0.05 | 0.03 | 0.47*** | 0.44*** | 0.20*** | 0.04 | 0.12 | 0.37*** | 0.30*** |
| Unrelenting standards | 0.21*** | -0.08 | 0.03 | 0.15** | 0.11* | 0.20** | -0.05 | 0.05 | 0.31*** | 0.21*** |
| Self-punitive ness | 0.08 | 0.01 | 0.01 | 0.31*** | 0.36*** | 0.34*** | 0.03 | 0.13* | 0.43*** | 0.52*** |
| IL | 0.19*** | | | | | | | | | |
| Insufficient self-control/self-discipline | 0.09 | -0.11* | 0.00 | 0.29*** | 0.20*** | 0.24*** | -0.04 | 0.01 | 0.33*** | 0.17** |
| Administration/recognition seeking | | | | | | | | | | |

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

DR, disconnection and rejection dimension; IAP, impaired autonomy and performance dimension; EAS, excessive accountability and standards dimension; IL, impaired limits dimension

were associated with PVG. There was a positive association between failure to achieve, social isolation/alienation, emotional/deprivation and depression. Additionally, anxiety was positively associated with social isolation/alienation, mistrust, pessimism/worry and vulnerability to harm or illness. However, there was a negative relationship between anxiety and entitlement/superiority. Additionally, anxiety was negatively associated with PVG. Other paths were statistically non-significant (see Table 5 and Supplementary Materials 2). Statistically significant paths are shown in Fig. 1.

For male gamers, vulnerability to harm or illness was positively related to PVG. Additionally, there was a positive association between subjugation and PVG as well as between enmeshment and PVG. The number of hours spent playing videogames per week and playing action games were associated with PVG. Depression was positively associated with emotional/deprivation, emotional inhibition, and insufficient self-control/self-discipline. However, there was a negative relationship between depression and entitlement/superiority. Anxiety was positively associated with social isolation/alienation, pessimism/worry, vulnerability to harm or illness, abandonment, and unrelenting standards. However, there was a negative relationship between anxiety and self-punitiveness. Other paths were statistically non-significant (see Table 6 and Supplementary Materials 2). Statistically significant paths are shown in Fig. 2.

According to the Zhao et al.'s (2010) approach to mediation used in the present analysis, there were no statistically significant indirect effects. More specifically, indirect effects between EMSs and PVG via depression were not demonstrated in either the female or male gamers group. Similarly, there were no statistically significant indirect effects between EMSs and PVG via anxiety among the female and male gamers group (see Table 7).

The gender difference analyses using the Wald test showed differences in paths between female and male gamers regarding the association between practical incompetence/dependence, vulnerability to harm or illness, enmeshment, and PVG. Additionally, there was a gender difference in the relationship between anxiety and PVG. The findings showed differences in paths between female and male gamers in the association between failure to achieve, insufficient self-control/self-discipline, and depression. Additionally, there was a gender difference in the relationship between mistrust and anxiety and between self-punitiveness and anxiety. The other differences between female and male gamers in terms of analysed paths were statistically non-significant. Detailed findings are shown in Table 8.

Discussion

The present study investigated the relationships between EMSs and PVG as well as depression and anxiety as mediators of this relationship among female and male gamers. As hypothesised (H1), problematic behaviours were associated with EMSs including those in the impaired autonomy and performance domain (Bach et al., 2018). This domain refers to an upbringing in which the child was not motivated to make decisions independently, and their decisions were challenged, criticised or ridiculed. The family environment reduced self-confidence and a sense of doing things, which created an uncertain and weak self-image. However, it should be noted that not all schemas from an impaired autonomy and performance dimension were associated with PVG. More specifically, practical incompetence/dependence was related to PVG among female gamers (H1a). For male gamers, there was a positive relationship between vulnerability to harm or illness (H1b), enmeshment

Table 4 Differences between female ($n = 391$) and male ($n = 282$) gamers

| Variables | Male gamers ($n = 282$) | | | | Female gamers ($n = 391$) | | | | U | z | p | η^2 |
|---|---------------------------|-------|-------|-------|-----------------------------|-------|-------|------|-----------|--------|-------|----------|
| | M | SD | Me | Q | M | SD | Me | Q | | | | |
| Problematic video gaming | 17.94 | 6.07 | 17.00 | 4.50 | 13.49 | 5.10 | 12.00 | 3.00 | 29,489.00 | -10.35 | 0.001 | 0.16 |
| Number of gaming hours per week | 18.82 | 18.72 | 14.00 | 10.00 | 7.15 | 13.12 | 3.00 | 3.00 | 27,396.00 | -11.17 | 0.001 | 0.19 |
| Anxiety | 7.50 | 4.35 | 7.00 | 3.50 | 9.12 | 4.29 | 9.00 | 3.00 | 43,635.50 | -4.63 | 0.001 | 0.03 |
| Depression | 5.52 | 3.90 | 5.00 | 3.00 | 5.60 | 3.64 | 5.00 | 2.50 | 53,547.50 | -0.64 | 0.523 | - |
| Early maladaptive schemas | 10.67 | 5.40 | 10.00 | 4.00 | 10.05 | 5.61 | 8.00 | 4.00 | 49,582.50 | -2.25 | 0.024 | 0.01 |
| DR | 10.93 | 5.57 | 10.00 | 3.50 | 10.23 | 6.00 | 9.00 | 3.50 | 48,389.50 | -2.73 | 0.006 | 0.01 |
| Emotional/deprivation | 13.97 | 6.04 | 13.00 | 4.50 | 13.73 | 6.02 | 13.00 | 4.50 | 53,972.50 | -0.47 | 0.641 | - |
| Defectiveness/unlovability | 14.22 | 6.54 | 13.00 | 4.50 | 14.20 | 6.47 | 14.00 | 4.50 | 54,918.50 | -0.09 | 0.932 | - |
| Mistrust | 13.62 | 5.68 | 13.00 | 4.00 | 13.32 | 5.69 | 13.00 | 4.00 | 53,590.50 | -0.62 | 0.535 | - |
| Social isolation/alienation | 14.20 | 5.92 | 13.00 | 4.00 | 15.39 | 6.11 | 15.00 | 5.00 | 48,478.00 | -2.68 | 0.007 | 0.01 |
| Emotional inhibition | 11.06 | 4.62 | 10.00 | 3.50 | 10.79 | 4.62 | 10.00 | 3.00 | 52,977.50 | -0.87 | 0.385 | - |
| Pessimism/worry | 11.81 | 5.14 | 11.00 | 4.00 | 12.79 | 5.45 | 12.00 | 4.50 | 49,432.00 | -2.29 | 0.022 | 0.01 |
| IAP | 14.02 | 5.65 | 13.50 | 4.50 | 16.07 | 6.27 | 15.00 | 4.50 | 45,107.00 | -4.03 | 0.001 | 0.02 |
| Practical incompetence/dependence | 9.82 | 4.16 | 9.00 | 2.63 | 9.89 | 4.44 | 9.00 | 3.00 | 54,769.50 | -0.15 | 0.884 | - |
| Vulnerability to harm or illness | 12.44 | 6.01 | 11.00 | 4.00 | 13.08 | 6.42 | 12.00 | 4.50 | 52,355.50 | -1.12 | 0.264 | - |
| Abandonment | 11.35 | 4.49 | 11.00 | 3.00 | 11.56 | 4.78 | 11.00 | 3.50 | 54,316.00 | -0.33 | 0.743 | - |
| Enmeshment | 14.45 | 4.69 | 14.00 | 3.13 | 16.51 | 5.11 | 16.00 | 3.50 | 42,528.50 | -5.07 | 0.001 | 0.04 |
| Failure to achieve | 14.79 | 4.51 | 15.00 | 3.50 | 16.14 | 5.30 | 16.00 | 3.50 | 47,610.00 | -3.03 | 0.002 | 0.01 |
| EAS | 13.32 | 4.81 | 13.00 | 4.00 | 12.96 | 5.41 | 12.00 | 3.50 | 51,629.00 | -1.41 | 0.159 | - |
| Subjugation | 14.50 | 4.63 | 14.00 | 3.00 | 14.57 | 4.12 | 14.00 | 3.00 | 54,356.00 | -0.31 | 0.755 | - |
| Self-sacrifice | 14.29 | 5.03 | 14.00 | 3.50 | 14.51 | 4.87 | 14.00 | 3.50 | 53,621.00 | -0.61 | 0.543 | - |
| Unrelenting standards | 15.51 | 5.66 | 15.00 | 4.00 | 17.66 | 5.32 | 18.00 | 3.50 | 42,502.50 | -5.08 | 0.001 | 0.04 |
| Self-punitiveness | | | | | | | | | | | | |
| IL | | | | | | | | | | | | |
| Entitlement/superiority | | | | | | | | | | | | |
| Insufficient self-control/self-discipline | | | | | | | | | | | | |
| Admission/recognition seeking | | | | | | | | | | | | |

DR, disconnection and rejection dimension; IAP, impaired autonomy and performance dimension; EAS, excessive accountability and standards dimension; IL, impaired limits dimension

Table 5 Standardised path coefficients between EMSs, depression, anxiety, action videogames, number of gaming hours per week and problematic video gaming, EMSs and depression and EMSs and anxiety among female gamers

| Variables | | To problematic video gaming | | | To depression | | | To anxiety | | |
|---------------------------------|---|-----------------------------|--------------|--------------|---------------|-------------|--------------|-------------|-------------|--------------|
| | | β | SE | <i>p</i> | β | SE | <i>p</i> | β | SE | <i>p</i> |
| | | | | | | | | | | |
| Early maladaptive schemas | DR | 0.03 | 0.06 | 0.581 | 0.13 | 0.06 | 0.030 | -0.03 | 0.05 | 0.591 |
| | | -0.10 | 0.07 | 0.151 | 0.05 | 0.07 | 0.504 | 0.01 | 0.06 | 0.815 |
| | | -0.05 | 0.06 | 0.451 | 0.01 | 0.07 | 0.965 | 0.17 | 0.07 | 0.009 |
| | | 0.09 | 0.06 | 0.101 | 0.17 | 0.06 | 0.006 | 0.18 | 0.06 | 0.001 |
| | | -0.04 | 0.06 | 0.439 | -0.01 | 0.05 | 0.808 | -0.03 | 0.05 | 0.478 |
| IAP | Emotional deprivation | 0.07 | 0.08 | 0.338 | 0.13 | 0.08 | 0.111 | 0.28 | 0.07 | 0.001 |
| | Defectiveness/unlovability | 0.25 | 0.07 | 0.001 | 0.04 | 0.07 | 0.557 | 0.08 | 0.06 | 0.208 |
| | Mistrust | -0.08 | 0.06 | 0.202 | 0.08 | 0.08 | 0.315 | 0.14 | 0.06 | 0.021 |
| | Social isolation/alienation | 0.05 | 0.06 | 0.365 | 0.01 | 0.06 | 0.838 | 0.10 | 0.05 | 0.055 |
| | Emotional inhibition | 0.01 | 0.05 | 0.938 | -0.05 | 0.05 | 0.320 | -0.03 | 0.05 | 0.460 |
| | Pessimism/worry | 0.09 | 0.07 | 0.207 | 0.15 | 0.07 | 0.034 | -0.03 | 0.07 | 0.597 |
| EAS | Practical incompetence/dependence | 0.06 | 0.07 | 0.432 | 0.09 | 0.06 | 0.156 | 0.01 | 0.06 | 0.966 |
| | Vulnerability to harm or illness | -0.05 | 0.04 | 0.282 | -0.02 | 0.05 | 0.704 | -0.07 | 0.04 | 0.089 |
| | Abandonment | 0.04 | 0.06 | 0.494 | 0.02 | 0.06 | 0.737 | 0.06 | 0.05 | 0.189 |
| | Enmeshment | 0.03 | 0.06 | 0.588 | 0.06 | 0.06 | 0.339 | 0.04 | 0.05 | 0.395 |
| | Failure to achieve | 0.01 | 0.06 | 0.965 | -0.09 | 0.05 | 0.069 | -0.09 | 0.04 | 0.029 |
| IL | Insufficient self-control/self-discipline | 0.04 | 0.05 | 0.408 | 0.04 | 0.05 | 0.409 | -0.01 | 0.05 | 0.846 |
| | Admiration/recognition seeking | -0.03 | 0.06 | 0.561 | -0.01 | 0.05 | 0.867 | 0.06 | 0.05 | 0.225 |
| | | 0.32 | 0.04 | 0.001 | | | | | | |
| Number of gaming hours per week | 0.22 | 0.05 | 0.001 | | | | | | | |
| Action games (0—no; 1—yes) | -0.15 | 0.07 | 0.032 | | | | | | | |
| Anxiety | 0.06 | 0.06 | 0.344 | | | | | | | |
| Depression | | | | | | | | | | |

DR, disconnection and rejection dimension; IAP, impaired autonomy and performance dimension; EAS, excessive accountability and standards dimension; IL, impaired limits dimension; statistically significant results ($p < 0.05$) are bolded

(H1d), subjugation (H1f) and PVG. Consequently, hypotheses H1c and H1e were not supported by the results obtained.

In the present study, practical incompetence/dependence was related to PVG among female gamers. This finding may indicate that the belief associated with being unable to handle daily tasks without help from others (e.g., taking care of oneself, solving daily problems, exercising good judgment, tackling new tasks and making good decisions; Young, 2014) may contribute to increased problems with playing videogames among females. Additionally, among male gamers only, the present study’s findings may also indicate that emotional over-involvement and constant search for support from close others (enmeshment; see Young, 2014) and beliefs that various, unstoppable, and unavoidable bad things will happen (vulnerability to harm or illness; see Young, 2014) may contribute to increased PVG. There was also a positive association between subjugation and PVG among male gamers. Consequently, this result may indicate that excessive surrendering of control to others because individuals feel coerced, and typically individuals want to avoid anger, retaliation, or abandonment (Young, 2014), may contribute to increased problems with video gaming.

The results showed no relationship between PVG and any EMSs included in the disconnection and rejection dimension, and therefore did not confirm H2 or H2a–H2f. Additionally, the present findings did not support H1c and H1e. This difference from previous studies (Shajari et al., 2016; Ostovar et al., 2021) regarding the relationship between EMSs and behavioural addiction may be due to the inclusion of inter-correlations between the schemas. More specifically, previous research was based on analyses treating schemas as variables independently of each other. Consequently, the probability of obtaining statistically significant results increased. In this context, almost all simple, independent correlations between EMSs and PVG were significant (see Table 3). However, after considering the inter-correlation between schemas in the path model, only some schemas were statistically significantly associated with PVG (see Table 5 and Table 6). The analogous situation was

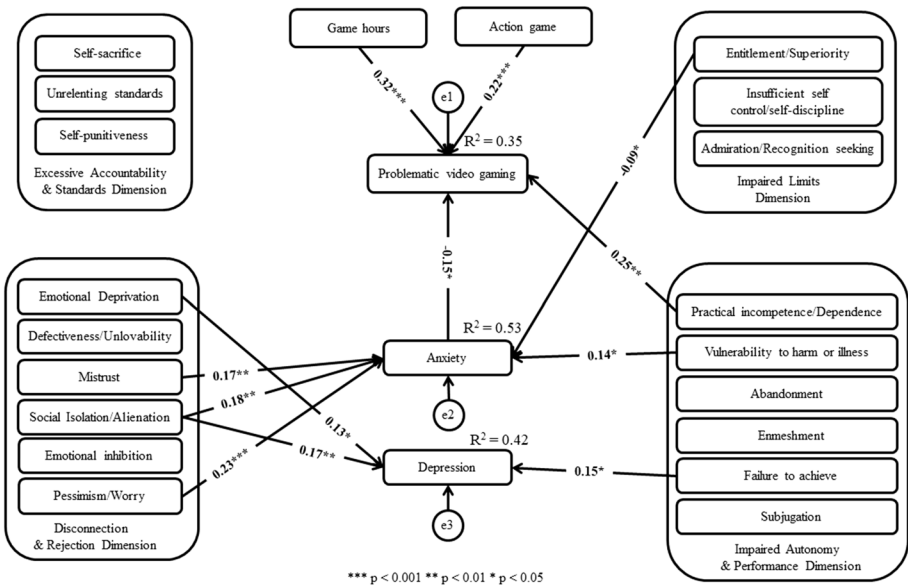


Fig. 1 Statistically significant paths between analysed variables among female gamers

Table 6 Standardised path coefficients between EMSs, depression, anxiety, action videogames, number of gaming hours and problematic video gaming, EMSs and depression and EMSs and anxiety among male gamers

| Variables | | To problematic video gaming | | | To depression | | | to anxiety | | | |
|---------------------------------|-----|---|-------------|-------------|---------------|-------------|-------------|--------------|-------------|-------------|--------------|
| | | β | SE | <i>p</i> | β | SE | <i>p</i> | β | SE | <i>p</i> | |
| | | | | | | | | | | | |
| Early maladaptive schemas | DR | Emotional/deprivation | 0.06 | 0.07 | 0.427 | 0.23 | 0.06 | 0.001 | 0.04 | 0.05 | 0.431 |
| | | Defectiveness/unlovability | -0.12 | 0.10 | 0.243 | 0.06 | 0.08 | 0.497 | -0.04 | 0.08 | 0.603 |
| | | Mistrust | 0.13 | 0.09 | 0.126 | -0.01 | 0.08 | 0.851 | -0.10 | 0.07 | 0.112 |
| | | Social isolation/alienation | -0.02 | 0.07 | 0.813 | 0.12 | 0.07 | 0.078 | 0.26 | 0.07 | 0.001 |
| | | Emotional inhibition | -0.07 | 0.08 | 0.362 | 0.13 | 0.06 | 0.034 | 0.01 | 0.06 | 0.969 |
| | | Pessimism/worry | -0.15 | 0.11 | 0.147 | 0.18 | 0.10 | 0.069 | 0.43 | 0.09 | 0.001 |
| | IAP | Practical incompetence/dependence | -0.11 | 0.09 | 0.222 | -0.01 | 0.09 | 0.880 | -0.09 | 0.08 | 0.248 |
| | | Vulnerability to harm or illness | 0.18 | 0.08 | 0.026 | 0.11 | 0.08 | 0.155 | 0.23 | 0.07 | 0.001 |
| | | Abandonment | -0.04 | 0.08 | 0.573 | -0.02 | 0.08 | 0.859 | 0.19 | 0.07 | 0.006 |
| | | Enmeshment | 0.23 | 0.07 | 0.001 | 0.02 | 0.06 | 0.785 | -0.02 | 0.05 | 0.668 |
| EAS | | Failure to achieve | 0.12 | 0.09 | 0.222 | -0.09 | 0.09 | 0.350 | -0.05 | 0.08 | 0.521 |
| | | Subjugation | 0.22 | 0.09 | 0.022 | -0.03 | 0.09 | 0.693 | 0.01 | 0.07 | 0.898 |
| | | Self-sacrifice | -0.10 | 0.06 | 0.079 | -0.01 | 0.06 | 0.814 | -0.02 | 0.05 | 0.680 |
| | | Unrelenting standards | 0.02 | 0.05 | 0.695 | 0.10 | 0.05 | 0.051 | 0.10 | 0.05 | 0.029 |
| | | Self-punitiveness | -0.03 | 0.06 | 0.685 | -0.06 | 0.06 | 0.322 | -0.11 | 0.05 | 0.020 |
| IL | | Entitlement/superiority | 0.07 | 0.07 | 0.321 | -0.16 | 0.06 | 0.011 | -0.07 | 0.06 | 0.248 |
| | | Insufficient self-control/self-discipline | 0.13 | 0.08 | 0.102 | 0.33 | 0.07 | 0.001 | 0.10 | 0.06 | 0.117 |
| | | Admiration/recognition seeking | 0.07 | 0.07 | 0.317 | -0.11 | 0.07 | 0.098 | -0.01 | 0.05 | 0.884 |
| Number of gaming hours per week | | | 0.32 | 0.05 | 0.001 | | | | | | |
| Action games (0=no; 1=yes) | | | 0.17 | 0.05 | 0.001 | | | | | | |
| Anxiety | | | 0.06 | 0.07 | 0.377 | | | | | | |
| Depression | | | -0.11 | 0.07 | 0.114 | | | | | | |

DR, disconnection and rejection dimension; IAP, impaired autonomy and performance dimension; EAS, excessive accountability and standards dimension; IL, impaired limits dimension; statistically significant results ($p < 0.05$) are bolded

also observed in the study on the relationship between EMSs and problematic Facebook use (Cudo et al., 2020b).

The findings showed no mediation effects between EMSs and PVG via depression or anxiety, and therefore did not confirm H3 and H4. However, it should be noted that the pattern of relationships between EMSs and depression and between EMSs and anxiety was consistent with previous research (see Nicol et al., 2020; Calvete et al., 2015). Additionally, there was a gender difference in the relationship between depression, anxiety, and EMSs (see Table 8). One possible explanation for the present findings may be associated with the difference between EMS dimensions associated with depression and anxiety compared to PVG (see Table 4 and Table 5). More specifically, PVG was only associated with EMSs from the impaired autonomy and performance domain. However, depression and anxiety were related to different EMSs dimensions, particularly the disconnection and rejection dimension, which is connected to the general belief that the needs for stability, acceptance, care, and security will never be fulfilled (Young, 2014). Consequently, different EMS patterns from different EMS dimensions can independently lead to depression, anxiety or PVG. Another explanation may be related to the coping style of the EMS. The avoidance coping style, with which individuals find ways to escape or block out their schemas, may contribute to individuals being more prone to substance use, risky or compulsive behaviours (Young, 2014). However, the surrender coping style is associated with the acceptance of a schema and giving in to it. Consequently, coping with the EMS may lead to specific psychological difficulties. In this context, further research is needed to verify these assumptions.

As hypothesised (H5), the findings showed that gender differences were associated with the relationship between PVG and schemas from the impaired autonomy and performance domain. More specifically, belief associated with being unable to handle daily tasks without help from others (i.e., the practical incompetence/dependence schema) was associated

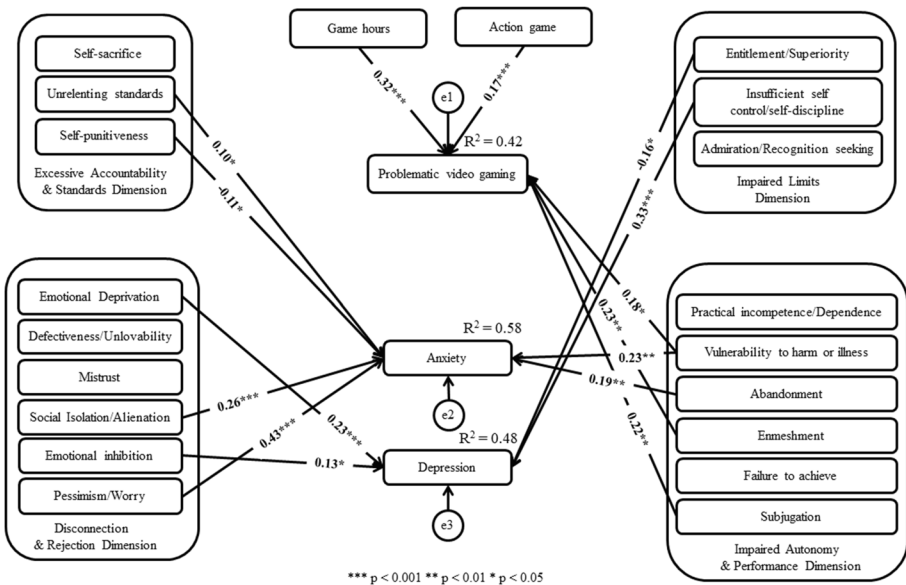


Fig. 2 Statistically significant paths between analysed variables among male gamers

Table 7 Standardised indirect effects with 95% confidence intervals

| Model pathways | Female gamers (n = 391) | | | | | Male gamers (n = 282) | | | | | | |
|--|-------------------------|----------------|--------|--------|-------|-----------------------|-----------------|----------------|--------|-------|-------|-------|
| | Point estimates | Standard error | 95% CI | | z | p | Point estimates | Standard error | 95% CI | | z | p |
| | | | Lower | Upper | | | | | Lower | Upper | | |
| Emotional/Deprivation → Depression → PVG | 0.007 | 0.009 | -0.009 | 0.028 | 0.78 | 0.435 | -0.026 | 0.018 | -0.067 | 0.006 | -1.41 | 0.158 |
| Defectiveness/Unlovability → Depression → PVG | 0.003 | 0.007 | -0.009 | 0.019 | 0.39 | 0.695 | -0.006 | 0.012 | -0.034 | 0.015 | -0.53 | 0.598 |
| Mistrust → Depression → PVG | -0.001 | 0.006 | -0.014 | 0.013 | -0.04 | 0.966 | 0.002 | 0.010 | -0.019 | 0.025 | 0.17 | 0.863 |
| Social Isolation/Alienation → Depression → PVG | 0.010 | 0.012 | -0.011 | 0.035 | 0.83 | 0.406 | -0.014 | 0.013 | -0.045 | 0.005 | -1.07 | 0.285 |
| Emotional Inhibition → Depression → PVG | -0.001 | 0.004 | -0.011 | 0.008 | -0.17 | 0.862 | -0.015 | 0.013 | -0.045 | 0.004 | -1.17 | 0.241 |
| Pessimism/Worry → Depression → PVG | 0.008 | 0.011 | -0.010 | 0.034 | 0.70 | 0.487 | -0.020 | 0.018 | -0.063 | 0.006 | -1.09 | 0.277 |
| Practical Incompetence/Dependence → Depression → PVG | 0.002 | 0.006 | -0.009 | 0.018 | 0.35 | 0.726 | 0.002 | 0.012 | -0.023 | 0.029 | 0.14 | 0.889 |
| Vulnerability to Harm or Illness → Depression → PVG | 0.004 | 0.008 | -0.008 | 0.024 | 0.54 | 0.592 | -0.013 | 0.013 | -0.044 | 0.007 | -0.94 | 0.346 |
| Abandonment → Depression → PVG | 0.001 | 0.005 | -0.010 | 0.012 | 0.12 | 0.902 | 0.002 | 0.011 | -0.021 | 0.027 | 0.16 | 0.871 |
| Enmeshment → Depression → PVG | -0.003 | 0.005 | -0.017 | 0.006 | -0.56 | 0.577 | -0.002 | 0.008 | -0.018 | 0.014 | -0.22 | 0.829 |
| Failure to Achieve → Depression → PVG | 0.009 | 0.011 | -0.011 | 0.035 | 0.78 | 0.438 | 0.010 | 0.014 | -0.012 | 0.045 | 0.72 | 0.469 |
| Subjugation → Depression → PVG | 0.005 | 0.008 | -0.007 | 0.024 | 0.66 | 0.511 | 0.004 | 0.012 | -0.018 | 0.032 | 0.34 | 0.733 |
| Self-sacrifice → Depression → PVG | -0.001 | 0.004 | -0.011 | 0.007 | -0.26 | 0.795 | 0.002 | 0.008 | -0.014 | 0.020 | 0.21 | 0.833 |
| Unrelenting Standards → Depression → PVG | 0.001 | 0.005 | -0.009 | 0.013 | 0.21 | 0.836 | -0.011 | 0.010 | -0.035 | 0.003 | -1.13 | 0.259 |
| Self-Punitiveness → Depression → PVG | 0.003 | 0.007 | -0.007 | 0.020 | 0.52 | 0.605 | 0.007 | 0.010 | -0.008 | 0.030 | 0.76 | 0.449 |
| Entitlement/Superiority → Depression → PVG | -0.005 | 0.007 | -0.021 | 0.006 | -0.76 | 0.449 | 0.019 | 0.014 | -0.004 | 0.052 | 1.29 | 0.198 |
| Insufficient Self-Control/Self-Discipline → Depression → PVG | 0.002 | 0.005 | -0.006 | 0.015 | 0.47 | 0.642 | -0.038 | 0.026 | -0.094 | 0.008 | -1.47 | 0.142 |
| Admiration/Recognition Seeking → Depression → PVG | -0.001 | 0.004 | -0.010 | 0.008 | -0.13 | 0.901 | 0.013 | 0.012 | -0.004 | 0.042 | 1.07 | 0.287 |
| Emotional/Deprivation → Anxiety → PVG | 0.004 | 0.008 | -0.011 | 0.023 | 0.49 | 0.622 | 0.002 | 0.006 | -0.007 | 0.017 | 0.43 | 0.669 |
| Defectiveness/Unlovability → Anxiety → PVG | -0.002 | 0.010 | -0.023 | 0.018 | -0.20 | 0.843 | -0.003 | 0.009 | -0.024 | 0.013 | -0.33 | 0.744 |
| Mistrust → Anxiety → PVG | -0.025 | 0.016 | -0.061 | 0.001 | -1.57 | 0.116 | -0.007 | 0.010 | -0.030 | 0.009 | -0.68 | 0.497 |
| Social Isolation/Alienation → Anxiety → PVG | -0.026 | 0.015 | -0.061 | -0.002 | -1.71 | 0.087 | 0.016 | 0.020 | -0.021 | 0.058 | 0.82 | 0.415 |
| Emotional Inhibition → Anxiety → PVG | 0.005 | 0.008 | -0.009 | 0.024 | 0.64 | 0.526 | 0.001 | 0.006 | -0.013 | 0.013 | 0.01 | 0.990 |

Table 7 (continued)

| Model pathways | Female gamers (n = 391) | | | | | | Male gamers (n = 282) | | | | | |
|---|-------------------------|----------------|--------|--------|-------|-------|-----------------------|----------------|--------|-------|-------|-------|
| | Point estimates | Standard error | 95% CI | | z | p | Point estimates | Standard error | 95% CI | | z | p |
| | | | Lower | Upper | | | | | Lower | Upper | | |
| Pessimism/Worry → Anxiety → PVG | -0.040 | 0.022 | -0.089 | -0.003 | -1.85 | 0.065 | 0.027 | 0.032 | -0.035 | 0.093 | 0.84 | 0.400 |
| Practical Incompetence/Dependence → Anxiety → PVG | -0.012 | 0.012 | -0.038 | 0.007 | -1.00 | 0.319 | -0.006 | 0.010 | -0.032 | 0.010 | -0.58 | 0.561 |
| Vulnerability to Harm or Illness → Anxiety → PVG | -0.020 | 0.014 | -0.052 | 0.001 | -1.49 | 0.138 | 0.015 | 0.018 | -0.019 | 0.054 | 0.80 | 0.424 |
| Abandonment → Anxiety → PVG | -0.015 | 0.011 | -0.040 | 0.001 | -1.34 | 0.180 | 0.012 | 0.015 | -0.016 | 0.045 | 0.78 | 0.436 |
| Enmeshment → Anxiety → PVG | 0.005 | 0.008 | -0.008 | 0.023 | 0.66 | 0.511 | -0.001 | 0.005 | -0.014 | 0.008 | -0.28 | 0.782 |
| Failure to Achieve → Anxiety → PVG | 0.005 | 0.011 | -0.015 | 0.030 | 0.49 | 0.628 | -0.003 | 0.008 | -0.024 | 0.011 | -0.39 | 0.698 |
| Subjugation → Anxiety → PVG | 0.001 | 0.010 | -0.020 | 0.021 | 0.05 | 0.957 | 0.001 | 0.006 | -0.013 | 0.015 | 0.07 | 0.945 |
| Self-sacrifice → Anxiety → PVG | 0.010 | 0.008 | -0.001 | 0.029 | 1.27 | 0.203 | -0.001 | 0.005 | -0.013 | 0.008 | -0.27 | 0.788 |
| Unrelenting Standards → Anxiety → PVG | -0.009 | 0.009 | -0.029 | 0.005 | -1.03 | 0.304 | 0.006 | 0.008 | -0.009 | 0.026 | 0.74 | 0.462 |
| Self-Punitiveness → Anxiety → PVG | -0.006 | 0.009 | -0.027 | 0.010 | -0.71 | 0.476 | -0.007 | 0.009 | -0.028 | 0.009 | -0.77 | 0.442 |
| Entitlement/Superiority → Anxiety → PVG | 0.013 | 0.009 | -0.001 | 0.035 | 1.48 | 0.140 | -0.004 | 0.008 | -0.024 | 0.008 | -0.58 | 0.561 |
| Insufficient Self-Control/Self-Discipline → Anxiety → PVG | 0.001 | 0.008 | -0.013 | 0.018 | 0.19 | 0.849 | 0.006 | 0.010 | -0.010 | 0.029 | 0.65 | 0.514 |
| Admiration/Recognition Seeking → Anxiety → PVG | -0.008 | 0.009 | -0.028 | 0.005 | -0.97 | 0.334 | -0.001 | 0.005 | -0.011 | 0.009 | -0.11 | 0.915 |

PVG, problematic video gaming

Table 8 Pairwise comparisons of paths between female and male gamers

| Variable 1 | Variable 2 | | Female (N=391) | | Male (N=282) | | Wald test | p |
|--------------------------|------------|-------|----------------|-------|--------------|-------|-----------|---|
| | β | p | β | p | β | p | | |
| Problematic video gaming | 0.22 | 0.001 | -0.11 | ns | 9.83 | 0.002 | | |
| Problematic video gaming | -0.08 | ns | 0.18 | 0.026 | 6.47 | 0.011 | | |
| Problematic video gaming | -0.01 | ns | 0.23 | 0.001 | 7.36 | 0.007 | | |
| Problematic video gaming | -0.15 | 0.032 | 0.06 | ns | 4.52 | 0.034 | | |
| Depression | 0.15 | 0.034 | -0.09 | ns | 4.11 | 0.043 | | |
| Depression | 0.04 | ns | 0.33 | 0.001 | 11.77 | 0.001 | | |
| Anxiety | 0.17 | 0.009 | -0.10 | ns | 8.80 | 0.003 | | |
| Anxiety | -0.11 | 0.020 | 0.05 | ns | 4.81 | 0.028 | | |

Note: ns, not statistically significant ($p > 0.05$)

with PVG only among female gamers. Moreover, there was a positive association between enmeshment, vulnerability to harm or illness, and PVG among male gamers only. These findings may indicate that despite the association between the schemas from the impaired autonomy and performance domain and PVG among both groups, there were different patterns among female and male gamers. Consequently, therapeutic interventions should be tailored to female and male gamers in accordance with these different patterns.

Additionally, the results showed a positive association between the number of hours spent playing videogames per week, playing action videogames, and PVG. These findings are similar to previous research (Cudo et al., 2018; Cudo et al., 2020a, indicating similar relationships between the variables. Moreover, there was a negative relationship between anxiety and PVG among the female gamers group (see Table 5). In this context, it should be noted that female gamers often face online harassment and an over-sexualised representation of female in-game characters (Lopez-Fernandez et al., 2019). Consequently, it can be assumed that female gamers with higher anxiety levels may avoid playing videogames or play games without social interaction, and therefore may be less vulnerable to PVG.

The results presented in this study should be interpreted in light of several limitations. For example, the study group was selected from the Polish population. Consequently, caution should be exercised when generalising the results to other countries and cultural contexts. Methodologically, the study utilised self-report methods and was cross-sectional. Consequently, there are well-known methods biases when participants answer such questions (e.g., social desirability), and only longitudinal studies can provide insights into the causality of the significant associations found among the variables of interest. Additionally, it should be noted that the Cronbach's alpha was 0.58 for the entitlement/superiority schema scale (see Supplementary Materials 1). Consequently, conclusions regarding the results for this schema should be treated with some caution. However, it should also be noted that this schema also had the lowest reliability in the Polish adaptation of the YSQ-S3 where the entitlement/superiority schema scale reliability was 0.62 (see Oettingen et al., 2018).

Conclusion

The present study's findings suggest that PVG is mostly associated with EMSs included in the impaired autonomy and performance domain (Bach et al., 2018). However, the pattern of this relationship is different for male and female gamers. Additionally, the present results showed that depression and anxiety did not mediate the relationship between EMSs and PVG. These results may indicate different patterns of relationships between EMSs, depression, and anxiety compared to PVG. The present study's findings may support the better planning of PVG treatment, including schema therapy (Young, 1994, 2014) for individuals with problems playing videogames. Accordingly, schema therapy (Young et al., 2003) is a treatment approach designed to help individuals break these maladaptive patterns of thinking, feeling, and behaving, and to develop healthier alternatives. Consequently, this model focuses on treating maladaptive patterns underlying the development of PVG, not just treating associated PVG symptoms. Additionally, the results may also indicate the importance of early therapeutic interventions in preventing the development of these problematic behaviours.

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Data Availability The dataset from the present study is available from the institutional repository database (access link: <http://hdl.handle.net/20.500.12153/1644>).

Declarations

Ethics Approval The study was conducted in accordance with the Declaration of Helsinki and approved by the Institute of Psychology's ethics committee (The John Paul II Catholic University of Lublin).

Conflict of Interest The authors declare no competing interests.

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