

Resilience and Depressivity among Czech Adolescents in Relation to Internet Gaming Disorder: Representative Sample

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INTRODUCTION: Existing research highlights current issues in youth mental health that are often related to the overuse of modern technology, the experience of depression, or reduced resilience to mental stress. The main aim of this study is to analyse the relationships between Internet Gaming Disorder, depression, and resilience, with a focus on gender differences among Czech adolescents.

METHODS: A quantitative research design was chosen for the study. Three assessment instruments were utilized – the Internet Gaming Disorder Scale-Short Form (IGDS9-SF), the Depression Anxiety Stress Scales-21 (DASS-21), and the Child and Youth Resilience Measure-Revised (CYRM-R). The sample consisted of a representative group of 7th grade pupils comprising 1240 individuals from 45 schools in all regions of the Czech Republic, aged 12–16 years. **RESULTS:** Multiple linear regression analyses revealed that gender, resilience, and depression significantly predicted Internet Gaming Disorder

symptoms and explained 26% variance in these symptoms. With male gender being the strongest predictor and reduced resilience the weakest.

CONCLUSIONS: These findings can be used to plan effective preventive measures and appropriate interventions for high-risk gaming, depression, and the use of protective factors such as individual resilience.

Keywords | Internet Gaming Disorder – Depression – Resilience – Adolescence – Risk factors – Protective factors

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1 INTRODUCTION

Nowadays, when modern technology is penetrating all spheres of our lives, digital games are becoming an integral part of many lives, especially for adolescents (Brand et al., 2017). The period of adolescence can be characterised by an intense physical, psychological and social development of the individual, with the formation of the individual's thinking, values and opinions, the acquisition of new social roles and a greater degree of autonomy (Lerner & Steinberg, 2009). Adolescence can be defined as a transitional stage of life between childhood and adulthood, characterised by a complex transformation of the personality on physical, psychological, social and spiritual levels. The complex process of transition is influenced by individual differences, previous experiences, emotional and social maturity, as well as the individual's inner resources (Noack, 2011). Social relationships in peer groups play an important role in the process of identity formation and emancipation from the family. These provide the individual with feelings of security and safety and influence his or her resilience. In the process of becoming independent, adolescents become more prone to loneliness and the development of negative psychological symptoms (Chipuer, 2000). These processes can be influenced by a number of factors, including various forms of modern technology which can carry risks, including disordered gaming. Therefore, investigating this age group is crucial in understanding the significance psychological burden they face, notably those associated with Internet Gaming Disorder, depression, and diminished resilience.

Gaming is increasingly popular due to the continuous development of technology and the increased availability of computers, smartphones, and video games. Playing games can bring many benefits (Granic et al., 2014; Kowert et al., 2014; Kowert & Oldmeadow, 2014). However, in response to its global popularity, reports of problematic gaming are appearing in many countries around the world and with increasing frequency American Psychiatric Association (2013) reacted to this situation by establishing a new diagnosis Internet Gaming Disorder [IGD], which has been defined as a behavioural addiction and has been included in the Appendix of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a preliminary disorder requiring further research. Internet Gaming Disorder is characterised by persistent and repeated use of the internet for gaming, often with other gamers, resulting in clinically significant functional impairment or distress and characterised by the presence of five or more of the nine criteria within the last 12 months.

The potential risk of developing addictive tendencies, with the prevalence of gaming disorder being set between 1.96% and 6.4% according to various studies (Feng et al., 2017; Kim et al., 2021, Meng et al., 2022). In a Czech representative study of 11–19-year-old adolescents, the prevalence of Internet Gaming Disorder was 3.7% (Suchá et al., 2018). Men are more prone to problematic digital gaming (Rafiemanesh et al., 2022). Results from a Canadian study showed that boys spent significantly more time online than girls. These results also show that girls used social networking sites more, while boys intensively played multiplayer online role-playing games (MMORPG), on-

line games and visited pornographic sites. Both genders had similar proportions of adolescents at risk of internet addiction (Dufour et al., 2016). However, male gender has been identified as one of the potential risk factors for developing Internet Gaming Disorder (Cudo et al., 2022; Estévez et al., 2017; Idris et al., 2023; Suchá et al., 2019). These gender-based differences may be developmental and attributed to the fact that among children and adolescents, boys spend significantly more time playing games than girls (Rehbein et al., 2015). Moreover, large European studies have shown that approximately twice as many men as women play online games daily, and have suggested that online gaming is the most gender-specific online activity (Smahel et al., 2020).

Digital games are frequently used by adolescents, e.g., to cope with stressful situations, to escape from difficulties, to socialize and gain social status in virtual environments, to have fun, to relax, or to immerse themselves in the game (flow) (Olson, 2010). It is important to mention that the individual, through the process of the maturation of brain structures during adolescence, is particularly susceptible to the development of addictive behaviours (Spear, 2000). Many of the symptoms associated with disordered digital gaming can also be likened to those of addiction, typically exhibiting excessive rumination on games, withdrawal symptoms, lying or hiding gaming activity, social withdrawal, irritability, or consistent gaming despite negative consequences (APA, 2013). Higher levels of self-esteem, self-control, emotional regulation, social competence, quality family relationships, and a positive school climate are protective against the development of gaming disorder (Ji et al., 2022; Liao et al., 2015, Warburton et al., 2022). Risk factors include e.g. narcissism, impulsivity, aggression, poor family relationships, and social isolation (Liao et al., 2020, Warburton et al., 2022). Furthermore, the impact of gaming-specific elements, such as the mode of internet connection, genre of the game, and its internet game characteristics, should also be considered (King & Delfabbro, 2018). Some authors propose that games within the shooter and MMORPG genre pose a higher risk for the development of gaming disorders (Na et al., 2017; Rehbein et al., 2010). At the same time, online games correlate more strongly with disorder than offline games (Lemmens & Hendriks, 2016).

Resilience is a complex phenomenon that is defined as an individual's ability to face, adapt and recover quickly from adverse situations (Šolcová, 2009). According to Masten (2013), resilience can be considered a dynamic process that is influenced by interactions between risk and protective factors and may also vary depending on cultural context. Protective factors of resilience include e.g. internal locus of control, optimism, self-esteem or a secure family environment (Herrman et al., 2011). Risk factors include e.g. low intelligence, problematic family relationships, and hereditary burden (Jenkins, 2008). During adolescence, when the complex transformation and development of the individual occurs, resilience becomes even more significant. It is during this period that an individual is highly susceptible to developing risky behaviours and negative mental health behaviours. It is important to provide the adolescent with the appropriate attributes to aid in healthy development and satisfaction (Ostaszewski, 2020).

In general terms, depression can be defined as feelings of sadness, dissatisfaction, loneliness, and exhaustion (Zuckerbrot & Jensen, 2006). Shorey et al. (2022) report a prevalence of depression at a specific time in adolescents (10–19 years) of approximately 8%, with more than one-third of adolescents experiencing depressive symptoms. The Covid-19 pandemic has contributed significantly to the prevalence of depressive and anxiety disorders, as reduced social interactions have impacted the mental health of the population (Santomauro et al., 2021). Symptomatology of depression in adolescents is often similar to that of adults, but somatic syndrome is more commonly encountered (Soleimani et al. 2019). Specific symptoms include low self-esteem, feelings of hopelessness, loss of meaning in life, feelings of guilt, anhedonia, and chronic feelings of boredom that can lead to overuse of electronics (Goetz, 2005). However, depression can be considered a predictor of risky behaviours, including substance abuse and the related development of addictions (Spear, 2000), including gaming disorders (Stavropoulos et al., 2022; Tejeiro et al., 2012; Tsui & Cheng, 2021; Yen et al., 2019).

Except depressive and anxiety symptoms (Teng et al., 2021) resilience (Canale et al., 2019; Wu et al., 2018; Yen et al., 2019) may also play a significant role in the development of gaming disorder. Adolescents showing lower levels of resilience are up to 3.5 times more likely to develop a gaming disorder (Yen et al., 2019). Similarly, adolescents with higher levels of depressive symptoms have lower levels of resilience (Canale et al., 2019; Teng et al., 2021). An association between higher scores on the gaming disorder scale and depression is also described, with individuals exhibiting addictive symptoms to digital games also showing higher levels of depressive symptoms (Wu et al., 2018). In the context of these challenges, it is crucial to explore the role of resilience as a possible protective factor that may help adolescents better cope with the potential negative effects of digital gaming in a very homogeneous group of adolescents. At the same time, it is important to understand the relationship between depression and gaming disorder to identify targeted intervention strategies to promote mental health and well-being.

The aim of this paper is to provide a more comprehensive view of digital gaming in adolescents in 7th grade from primary schools and grammar schools. The principal objective of the research component is to examine the relationships between the Internet Gaming Disorder, depression and resilience, together with the aspect of gender differences. Thus, the overarching goal of this work is to present evidence that can serve as a basis for the development of prevention programs and interventions aimed at promoting resilience and mental health in adolescents, which may be one effective strategy to minimize the risk of gaming disorder and related negative consequences.

2 METHODS

2.1 Procedure

Throughout the research, the data and all personal data were handled according to ethical rules of Palacký University and in accordance with Act No. 101/2000 Coll., on the Protection of Personal Data and on the amendment of certain acts. The

research plan was approved by the Ethics Panel of Faculty of Arts of Palacký University for Research on 6 October 2021. A signed informed consent from the respondents' legal guardian was required to participate in the research as we were working with people under 15. When administering the questionnaire batteries, respondents were adequately informed of their rights as well.

2.2 Instruments

Due to the nature of the research objectives, we have chosen a quantitative research approach. The relationships between the selected variables were analysed using several selected test methods: the Internet Gaming Disorder Scale-Short-Form (IGDS9-SF) (Pontes & Griffiths 2016), the Child and Youth Resilience Measure (CYRM-R), (Resilience Research Centre, 2018), and the Depression Anxiety Stress Scales-21 (DASS-21) (Lovibond & Lovibond, 1995), within which we only used the Depression scale.

Internet Gaming Disorder Scale-Short-Form (IGDS9-SF)

To measure problematic gaming, we used the Internet Gaming Disorder Scale-Short-Form (IGDS9-SF) (Pontes & Griffiths, 2015) based on the core nine DSM-V criteria for diagnosing Internet Gaming Disorder (IGD) (APA, 2013). The method focuses on the assessment of negative symptoms associated with addictive digital gaming, both online and offline, over the past 12 months. The questionnaire contains a total of 9 items to which the respondent answers using five-point Likert scale. The respondent can score a minimum of 9 and a maximum of 45 points, with higher scores associated with higher levels of gaming disorder (Pontes & Griffiths, 2015).

In this research project, we worked with the translation of the original version into Czech language according to Suchá et al., (2024). In this standardization study for the Czech adolescent sample, the psychometric properties of the Czech IGDS9-SF were examined in terms of factor structure, reliability, and distribution of the raw scores. In the mentioned study, a unidimensional factor structure for the IGDS9-SF was verified through confirmatory factor analysis [CFA] to further provide evidence of the scale's construct validity using the WLSMV method, which yielded an acceptable fit for the model ($\chi^2[27] = 110.976$, CFI = 0.991, TLI = 0.989, RMSEA = 0.039 [0.035; 0.042], SRMR = 0.046). The Czech version of the IGDS9-SF based on polychoric correlation demonstrated adequate reliability (Cronbach's $\alpha = 0.93$; McDonald's $\omega = 0.95$) (Suchá et al., 2024). The reason for choosing polychoric correlation coefficients was to avoid underestimating reliability, as mentioned by Gadermann et al. (2007).

Child and Youth Resilience Measure for Youth (CYRM-R)

To measure resilience, we chose the Child and Youth Resilience Measure for Youth (CYRM-R) self-assessment questionnaire, which is a shortened version of the original 58-item CYRM questionnaire (Jefferies et al., 2019). The version of the method translated in 2020 by Sobotková and Suchá was used for test-

ing in the Czech school environment. The questionnaire consists of 17 items in which the respondent rates the validity of the statements on a five-point Likert scale. The minimum score is 17 and the maximum is 85, with higher scores associated with higher levels of resilience. In this paper, we are concerned with the overall resilience score, but the method can be divided into two subscales, namely personal resilience and relational resilience, if necessary by summing specific items (Resilience Research Centre, 2018).

Depression Anxiety Stress Scales (DASS-21)

To measure depression, we used the Depression Anxiety Stress Scales (DASS-21), a self-assessment questionnaire, which is a shortened version of the original 42-item DASS (Lovibond & Lovibond, 1995). The DASS-21 contains 21 items divided into three subscales measuring negative emotional states, namely depression, anxiety, and stress, with each subscale consisting of seven items. In order to examine the depression variable in more detail, we used only the depression subscale in this paper. For our purposes, we used the translation of the original version of the DASS-21, according to Suchá et al. from 2021. Respondents were asked to select the most appropriate statement related to the past week on a four-point scale, which provides a capture of depressive symptoms at the current time (Lovibond & Lovibond, 1995).

2.3 Participants

The sample consisted of a representative group of 7th grade pupils of primary schools and the equivalent year of grammar schools. The sample contains a total of 1240 individuals, 583 of which are males (the average age 12.87, $SD \pm 0.56$) and 657 are females (the average age 12.83, $SD \pm 0.51$). This corresponds to 1.15% of the total study population. The average age of the respondents is 12.85 years ($SD \pm 0.54$). We focused on these pupils because the highest scores on the Internet Gaming Disorder scale are observed in Czech adolescents in this group, according to Suchá et al. (2019).

The study population consisted of individuals from 45 schools in all regions of the Czech Republic, aged 12–16 years. Understandably, the most represented groups were 13-year-old and 12-year-old adolescents. The smallest group was 15- and 16-year-olds. However, since the sample population aged 15–16 consists of only 6 respondents, we do not exclude these individuals, as they are also a natural part of some 7th grade classes in the Czech Republic (see *Table 1*).

2.4 Hypotheses

The research hypotheses fall into two main categories. The first category is the gender dimension, where we examine whether there is a statistically significant difference in scores on each variable between females and males. The second category focuses on whether the independent variables identified are predictors of Internet Gaming Disorder (i.e. IGD symptoms).

Gender dimension hypotheses

H1: On average, males score higher than females on the resilience variable.

H2: Males on average score lower than females on the depression variable.

H3: Males on average score higher than females on the internet gaming disorder variable.

Predictors of the risk of the Internet Gaming Disorder

H4: Male gender is a significant predictor of IGD symptoms.

H5: Low resilience is a significant predictor of IGD symptoms.

H6: High depression is a significant predictor of IGD symptoms.

2.5 Statistical analysis

The normality test was performed using the Shapiro-Wilk test. As the first of the possible approaches to analyse the dependence between the variables, we used correlation, specifically Spearman's rank correlation. Hierarchical multiple linear regression models were performed to understand the effect of resilience, and depression on the risk of Internet Gaming Disorder taking into account the control variable (gender). The risk of Internet Gaming Disorder was a dependent variable.

3 RESULTS

3.1 Descriptive statistics

Data on gender, level of resilience, depression, and Internet Gaming Disorder are summarized in *Table 2*.

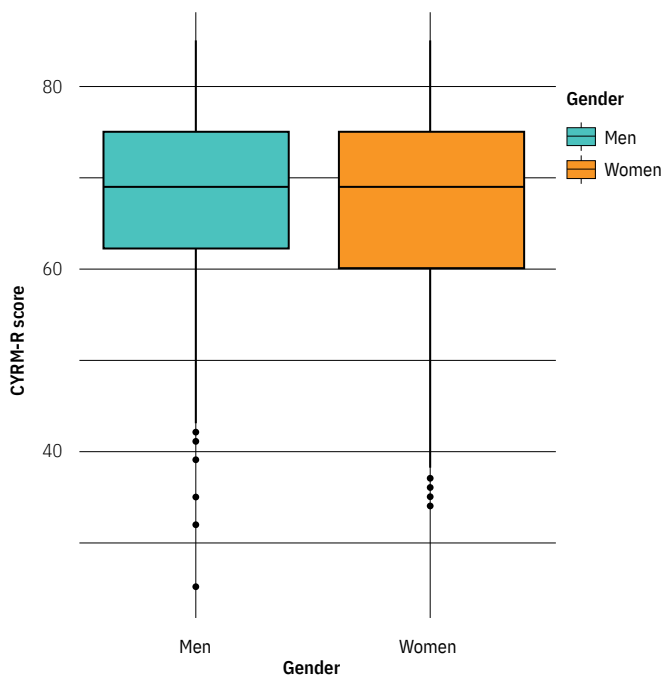
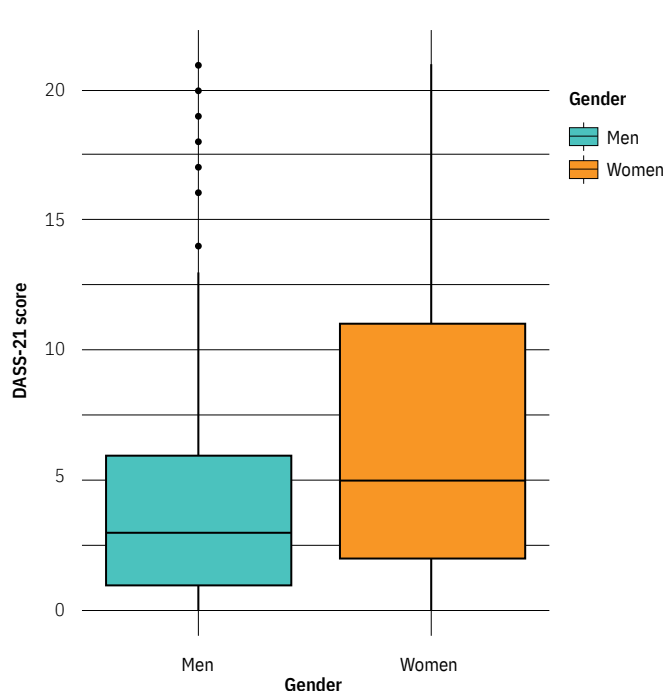
Table 1 | Frequency distribution of respondents by age and gender variables

Sex	N	(%)
Males	583	47
Females	657	53
Age		
12	277	22.3
13	879	70.9
14	78	6.3
15	5	0.4
16	1	0.1

Table 2 | Descriptive characteristics of the variables

Gender	Minimum	Maximum	Median	Average	Q1	Q3	Cohen's d
Resilience							
Males	25	85	69	67.72	62	75	0.11
Females	34	85	69	66.54	60	75	
Depression							
Males	0	21	3	4.03	1	6	0.55
Females	0	21	5	6.95	2	11	
Internet Gaming Disorder							
Males	9	42	16	16.72	12	20	0.64
Females	9	41	11	13.16	9	15	

Note: N = 1240.

Figure 1 | Distribution of resilience scores according to gender**Figure 2** | Distribution of depression scores by gender

3.2 Validation of statistical hypotheses in the gender dimension

The mean and median in the CYRM-R method reach similar values for both males and females, as can be observed in *Figure 1*. The results of the Shapiro-Wilk test for both males ($W = 0.96829$, $p \leq 0.001$) and females ($W = 0.96211$, $p \leq 0.001$) confirm the assumption that the sets do not have a normal distribution, so we use the Wilcoxon test ($W = 199858$, $p = 0.0924$). At the five percent significance level, we could not show that males score higher than females on the resilience scale, so we cannot reject the null hypothesis and do not accept H1. The distribution of scores on the resilience scale between genders, including outlier measures, can be observed in *Figure 1*.

For the Depression scale of DASS-21 method, females score higher on average (6.95) than males (4.03), as can be seen in *Table 2*. At the same time, females have a significantly larger variance of values, see *Figure 2*. According to the results of the Shapiro-Wilk test for both males ($W = 0.82513$, $p \leq 0.001$) and females ($W = 0.89993$, $p \leq 0.001$), we can confirm that the values do not follow a normal distribution. For this reason, we use the Wilcoxon test ($W = 132897$, $p \leq 0.001$). At the 5% significance level, we accept the alternative hypothesis, i.e. that males score lower on the depression scale than females. We reject the null hypothesis and accept H2.

For the IGDS9-SF method, males have a higher mean score (16.72) than females (13.16), see *Table 2*. At the same time,

males also have a higher variance of scores, see *Figure 3*. The results of the Shapiro-Wilk test for both males ($W = 0.93303$, $p \leq 0.001$) and females ($W = 0.7888$, $p \leq 0.001$) indicate that the data are not normally distributed. According to the results of the Wilcoxon test ($W = 273998$, $p \leq 0.001$) at the five percent significance level, we accept the hypothesis that males score higher than females on the IGDS9-SF Scale. We reject the null hypothesis and accept H_3 .

3.3 Testing the validity of statistical hypotheses in the dimensions of resilience, depression and Internet Gaming Disorder

There is a low negative association between Internet Gaming Disorder and resilience ($r = -0.33$, $p \leq 0.001$). There is a low positive association between digital Internet Gaming Disorder and depression ($r = 0.27$, $p \leq 0.001$). There is a moderate significant negative relationship between depression and resilience ($r = -0.58$, $p \leq 0.001$). The correlations between the variables analysed based on Spearman's correlations can be found in *Table 3*.

3.4 Predictors of the risk of the Internet Gaming Disorder

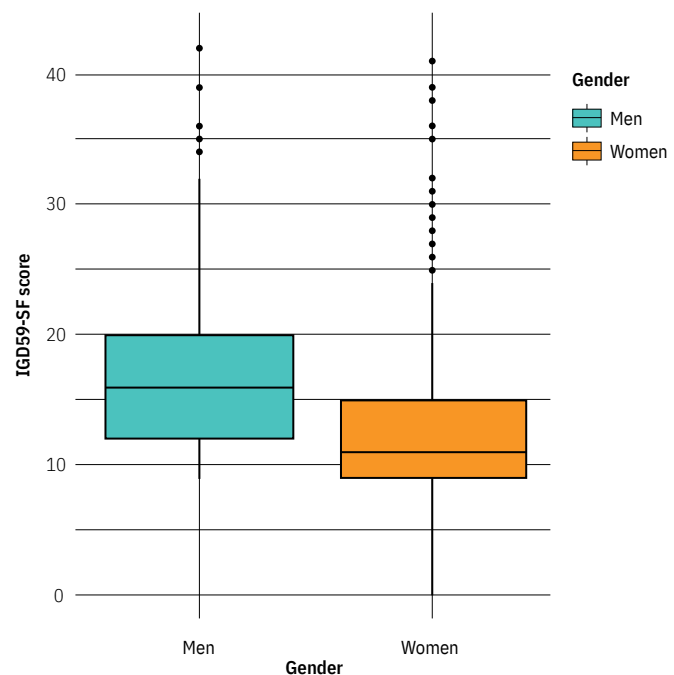
Multiple linear regression analyses were conducted to examine the relationships between personality characteristics (resilience, depression) and IGD symptoms (see *Table 4*). Since

Table 3 | Correlation matrix of Internet Gaming Disorder, resilience, and depression

	1	2	3	4
Gender	1			
Internet Gaming Disorder	-0.37***	1		
Resilience	-0.037	-0.31***	1	
Depression	0.27***	0.23***	-0.55***	1

Note: $N = 1240$; *** $p < 0.001$.

Figure 3 | Distribution of IGDS9-SF scores according to gender



gender was correlated with the level of IGD symptoms, this variable was controlled in these models. There was no evidence of multicollinearity, as in checking multicollinearity among 3 independent variables, the range of tolerance value was from 0.610 to 0.914 and the range of variance inflation factor [VIF] was from 1.094 to 1.638.

In the first step a gender variable was added to the first model (Model 1). In the second step, resilience variable was added into the second model (Model 2). In the third step, depression was added into the third model (Model 3).

Model 1 predicted 9% of the variance in IGD symptoms. Gender was a significant predictor ($b = -3.56$; $\beta = -.31$, $SE = .31$, $t = -11.31$, $p < 0.001$) and indicated that for males in comparison with females increased 3.56 in IGD symptoms. Model 2 predicted 22%

Table 4 | Hierarchical multiple regression predicting the Internet gaming disorder from gender, resilience, and depression

	Model 1		Model 2		Model 3	
	b	β	b	β	b	β
Constant	16.72***		29.83***		23.31***	
Gender (Female)	-3.56***	-.31	-3.78***	-.33	-4.48***	-.39
Resilience			-.19***	-.35	-.12***	-.20
Depression					.27***	.26
F		127.95***		169.19***		140.67***
R Square		.09		.22		.26

Note: $N = 1240$; *** $p < 0.001$.

of the variance in IGD symptoms. Gender ($b = -3.78$; $\beta = -.33$, $SE = .29$, $t = -12.90$, $p < 0.001$) and lower resilience ($b = -.19$; $\beta = -.35$, $SE = .01$, $t = -13.81$, $p < 0.001$) were significant predictors. The results indicated that for every unit of lower resilience, there was a 0.19 increase in IGD symptoms. Model 3 predicted 26% of the variance in IGD symptoms. Gender ($b = -4.48$; $\beta = -.39$, $SE = .30$, $t = -15.01$, $p < 0.001$), lower resilience ($b = -.12$; $\beta = -.20$, $SE = .02$, $t = -6.74$, $p < 0.001$), and higher depression ($b = .27$; $\beta = -.26$, $SE = .03$, $t = 8.12$, $p < 0.001$) were significant predictors. The results indicate that, in comparison to females, males showed an increase of 4.48 IGD symptoms. For every unit decrease in the resilience, there was a 0.12 increase in IGD symptoms. For every unit increase in the depression, there was a 0.27 increase in IGD symptoms. Based on this Model 3, hypotheses H4, H5, H6 are accepted.

4 DISCUSSION

The research part of this thesis examined the relationship between Internet Gaming Disorder, depression, and resilience along with gender differences in Czech adolescents. In this investigation, a representative sample of students from the 7th grade of primary schools and equivalent grades in grammar schools was selected. This age group was specifically chosen due to its critical developmental stage, which is susceptible to the onset of gaming disorder. Another important aspect of the choice of the topic is also the low level of research on the topic in the Czech Republic and the currently growing issue of online addictions and mental health of Czech adolescents.

The research findings suggest that gender does not have a significant effect on the level of resilience, and the mean values were very similar between genders (males = 67.72; females = 66.54). On the other hand, a significant relationship was found between gender and depression, with females achieving higher mean scores compared to males. The study further established a link between gender and Internet Gaming Disorder, revealing that males reported higher average scores in comparison to females. These conclusions can be supported by the research study of Macur and Pontes (2021), which focuses on impaired digital gaming among Slovenian adolescents, according to which risk factors include, together with low self-control, also male gender. Other research confirming the increased prevalence of disordered gaming in males are e.g. studies by Dong et al. (2018), Buono et al. (2020) or Rehbein and Baier (2013).

Increased depression appears to be a significant predictor of IGD symptoms. Higher values on the depression scale were associated with significantly higher values on the digital game addiction scale. Similar results were also obtained in a study by Lin et al. (2021) examining coping strategies, resilience, stress and depression in individuals originating from Taiwan and suffering from digital game addictions. According to the authors, individuals suffering from gaming disorder not only showed higher levels of depressive symptoms and lower levels of resilience but also a greater number of dysfunctional coping strategies and increased levels of perceived stress. The association between disordered digital gaming and depression has also

been confirmed in research studies by several other authors, including Stavropoulos et al. (2022), Tsui and Cheng (2021), Yen et al. (2019).

According to the results of our statistical research, we found a low negative dependence between resilience and digital game addiction. The more the resilience decreases, the more severe the manifestations of the gaming disorder an individual has. In this case, we can refer to a research study by Yen et al. (2019), according to which adolescents possessing low levels of resilience scored higher on the gaming disorder scale than adolescents exhibiting high levels of resilience. The same conclusion was also reached in a study by Tsui and Cheng (2021) examining Chinese adolescents with an average age of 13.5 years.

Third model of hierarchical linear regression, which included gender, resilience, and depression, explained 26% of the variance, indicating that lower resilience and higher depression were associated with increased IGD symptoms. Concurrently, depression proved to be a stronger predictor of IGD symptoms than resilience. Correspondence of our results with the results of the aforementioned studies suggests that higher resilience and lower depression serve as a protective factors in relation to Internet Gaming Disorder.

Furthermore, we found a moderate (significant) negative relationship between resilience and depression. The higher the score on the resilience scale, the lower the values we observed on the depression scale. This finding is supported by a study by Yen et al. (2019) describing increased rates of depressive symptoms in individuals reporting lower resilience scores. These results suggest a possible protective function of resilience against depression as well. However, this relationship needs to be explored in more detail in future.

We devote the following section of the discussion to the limitations and contributions of the research. The first limitation of the research may be the small age range (12–16) of the study population, which cannot be used to generalize the findings to the entire population of Czech adolescents, while other demographic aspects that may potentially affect the outcome data of the paper were not included. We consider representativeness only for a narrow age range as a limit. Although the study sample ranges in age from 12 to 16, we consider the results to be representative only of Czech adolescents attending primary schools and grammar schools who are aged 12–14. The other two cohorts (15-year-olds, and 16-year-olds) were only minimally represented in the research, but we have nevertheless did not remove them from the analysis because they reflect the reality of the Czech school environment. The reasons for integrating these older pupils may be health problems, repeating a year, etc. Furthermore, we have to take into account the limitations of self-assessment questionnaires, whose outputs may not be completely objective in all respects. We cannot confidently assess other multifactorial relationships affecting the variables, which may cause hidden causality in the outcomes. Bias may also arise due to social desirability.

5 CONCLUSION

The main contribution of this research is to deepen the knowledge in the field of the studied issue in the Czech Republic, which may help to identify risk and protective factors that play a key role in the complex interactions between resilience, depression and the development of Internet Gaming Disorder. Furthermore, it was demonstrated that females score higher on the depression scale than males, while males score higher on the Internet Gaming Disorder scale than females. It was not possible to demonstrate that males achieve higher scores on the resilience scale (CYRM-R) than females. These findings can be used to plan effective preventive measures and appropriate interventions for adolescents.

Authors' contributions: VP collected the data, wrote the main parts of text and provided the statistical analysis. ŠK collected the data, organised a research project, cooperated on preparation and writing of the article, corresponding author, has drafted the work and revised it. JS collected the data, supervised data collection and research project, provided the main parts of statistical analysis. MD data collection, cleaned the collected data and calculated the resulting scores of individual methods.

Declaration of interest: The authors declare that they have no conflict of interest.

REFERENCES

- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed). American Psychiatric Association.
- Brand, J. E., Todhunter, S., & Jervis, J. (2017). *Digital Australia Report 2018*. Interactive Games and Entertainment Association (IGEA). <http://www.igea.net/wp-content/uploads/2017/07/Digital-Australia-2018-DA18-Final-1.pdf>
- Buono, F. D., Paul, E., Sprong, M. E., Smith, E. C., Garakani, A., & Griffiths, M. D. (2020). Gaming and Gaming Disorder: A Mediation Model Gender, Salience, Age of Gaming Onset, and Time Spent Gaming. *Cyberpsychology, Behavior, and Social Networking*, 23(9), 647–651. <https://doi.org/10.1089/cyber.2019>
- Canale, N., Marino, C., Griffiths, M. D., Scacchi, L., Monaci, M. G., & Vieno, A. (2019). The association between problematic online gaming and perceived stress: The moderating effect of psychological resilience. *Journal of Behavioral Addictions*, 8(1), 174–180. <https://doi.org/10.1556/2006.8.2019.01>
- Chang, C.-W., Huang, R.-Y., Strong, C., Lin, Y.-C., Tsai, M.-C., Chen, I.-H., Lin, C.-Y., Pakpour, A. H. H., & Griffiths, M. D. D. (2022). Reciprocal relationships between problematic social media use, problematic gaming, and psychological distress among university students: A 9-month longitudinal study. *Frontiers in Public Health*, 10, Article 858482. <https://doi.org/10.3389/fpubh.2022.858482>
- Chipuer, H. M., & G. H. Pretty. (2000). Facets of adolescents' loneliness: A study of rural and urban Australian youth. *Australian Psychologist*, 35(3), 233–237. <https://doi.org/10.1080/00050060008257484>
- Cudo, A., Montag, C., & Pontes, H. M. (2022). Psychometric assessment and gender invariance of the Polish version of the Gaming Disorder Test. *International Journal of Mental Health and Addiction*, Article 0123456789. <https://doi.org/10.1007/s11469-022-00929-4>
- Czech Ministry of Education, Youth and Sports (2022). Statistical yearbook of education - performance indicators for the school year 2021/2022. <https://statis.msmt.cz/rocnka/rocnka.asp>
- Dong, G., Wang, L., Du, X., & Potenza, M. N. (2018). Gender-related differences in neural responses to gaming cues before and after gaming: implications for gender-specific vulnerabilities to Internet Gaming Disorder. *Social Cognitive and Affective Neuroscience*, 13(11), 1203–1214. <https://doi.org/10.1093/scan/nsy084>
- Dufour, M., Brunelle, N., Tremblay, J., Leclerc, D., Cousineau, M. M., Khazaal, Y., Légaré, A. A., Rousseau, M., & Berbiche, D. (2016). Gender difference in internet use and internet problems among Quebec high school students. *Canadian Journal of Psychiatry*, 61(10), 663–668. <https://doi.org/10.1177/0706743716640755>
- Entertainment Association (IGEA). <https://www.igea.net/wp-content/uploads/2017/07/Digital-Australia-2018-DA18-Final-1.pdf>
- Estévez, A., Jáuregui, P., Sánchez-Marcos, I., López-González, H., & Griffiths, M. D. (2017). Attachment and emotion regulation in substance addictions and behavioral addictions. *Journal of Behavioural Addictions*, 6(4), 534–544. <https://doi.org/10.1556/2006.6.2017.086>
- Feng, W., Ramo, D. E., Chan, S. M., & Bourgeois, J. A. (2017). Internet Gaming Disorder: Trends in prevalence 1998–2016. *Addictive Behaviors*, 75, 17–24. <https://doi.org/10.1016/j.addbeh.2017.06.010>
- Ferrari, A. J. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet*, 398(10312), 1700–1712. [https://doi.org/10.1016/s0140-6736\(21\)02143-7](https://doi.org/10.1016/s0140-6736(21)02143-7)
- Flynn, M., & Rudolph, K. D. (2011). Depression and depressive disorders. In Brown, B. B., & Prinstein, M. J. (Eds.), *Encyclopedia of Adolescence* (vol. 3, pp. 127–135). Academic press. <https://doi.org/10.1016/b978-0-12-373951-3.00108-3>
- Gadermann, A. M., Zumbo, B. D., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for likert rating scales. *Journal of Modern Applied Statistical Methods*, 6(1), 21–29. <https://doi.org/10.22237/jmasm/1177992180>
- Goetz, M. (2005). Deprese u dětí a adolescentů. *Pediatric Pro Praxi*, 5, 271–274. <https://www.pediatrpropraxi.cz/pdfs/ped/2005/06/03.pdf>
- Granic, I., Lobel, A., & Engels, R. C. M. E. (2014). The benefits of playing video games. *American Psychologist*, 69(1), 66–78. <https://doi.org/10.1037/a0034857>
- Herrman, H., Stewart, D. E., Diaz-Granados, N., Berger, E. L., Jackson, B., & Yuen, T. (2011). What is resilience? *The Canadian Journal of Psychiatry*, 56(5), 258–265. <https://doi.org/10.1177/070674371105600504>
- Idris, M. F., Saini, S. M., Sharip, S., Idris, N. F., & Ab Aziz, N. F. (2023). Association between the internet gaming disorder and anxiety and depression among university students during COVID-19 pandemic. *Healthcare*, 11(8). <https://doi.org/10.3390/healthcare11081103>
- Jenkins, J. (2008). Psychosocial adversity and resilience. In M. Rutter, D. Bishop, D. Pine, S. Scott, J. Stevenson, E. Taylor, & A. Thapar (Eds.), *Rutter's child and adolescent psychiatry* (pp. 377–391). Wiley Blackwell. <https://doi.org/10.1002/9781444300895.ch25>
- Ji, Y., Yin, M. X. C., Zhang, J., & Wong, D. F. K. (2022). Risk and protective factors of Internet Gaming Disorder among Chinese people: A meta-analysis. *Australian and New Zealand Journal of Psychiatry*, 56(4), 332–346. <https://doi.org/10.1177/00048674211025703>
- Kim, H. J., Son, G., Roh, E., Ahn, W., Kim, J., Shin, S., Chey, J., & Choi, K. (2021). Prevalence of gaming disorder: A meta-analysis. *Addictive Behaviors*, 126, Article 107183. <https://doi.org/10.1016/j.addbeh.2021.107183>
- King, D., & Delfabbro, P. (2018). *Internet Gaming Disorder: Theory, assessment, treatment, and prevention*. Academic Press.
- Klimoski, R., & Palmer, S. (1993). The ADA and the hiring process in organizations. *Consulting Psychology Journal: Practice and Research*, 45(2), 10–36. <https://doi.org/10.1037/1061-4087.45.2.10>
- Kowert, R., Festl, R., & Quandt, T. (2014). Unpopular, overweight, and socially inept: Reconsidering the stereotype of online gamers. *Cyberpsychology, Behaviour, and Social Networking*, 17(3), 141–146. <https://doi.org/10.1089/cyber.2013.0118>
- Kowert, R., & Oldmeadow, J. A. (2014). Playing for social comfort: Online video game play as a social accommodator for the insecurely attached. *Computers in Human Behaviour*, 53, 556–566. <https://doi.org/10.1016/j.chb.2014.05.004>
- Lemmens, J. S., & Hendriks, S. (2016). Addictive Online Games: Examining the Relationship Between Game Genres and Internet Gaming Disorder. *Cyberpsychology, Behavior, and Social Networking*, 19(4), 270–276. <https://doi.org/10.1089/cyber.2015.0415>
- Lerner, R. M., & Steinberg, L. (2009). The scientific study of adolescent development: Historical and contemporary perspectives. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology: Individual bases of adolescent development* (3rd ed., pp. 3–14). John Wiley & Sons, Inc. <https://doi.org/10.1002/9780470479193.adlpsy001002>
- Liau, A. K., Choo, H., Li, D., Gentile, D. A., Sim, T., & Khoo, A. (2015). Pathological video gaming among youth: A prospective study examining dynamic protective factors. *Addiction Research & Theory*, 23(4), 301–308. <https://doi.org/10.3109/16066359.2014.987759>
- Lin, P.-C., Yen, J.-Y., Lin, H.-C., Chou, W.-P., Liu, T.-L., & Ko, C.-H. (2021). Coping, resilience, and perceived stress in individuals with internet gaming disorder in Taiwan. *International Journal of Environmental Research and Public Health*, 18(4), 1–11. <https://doi.org/10.3390/ijerph18041771>

- Lovibond, S.H. & Lovibond, P.F. (1995). *Manual for the depression anxiety stress scales*. (2nd ed.). Psychology Foundation.
- Masten, A. S. (2013). Global perspectives on resilience in children and youth. *Child Development*, 85(1), 6–20. <https://doi.org/10.1111/cdev.12205>
- Mellers, B. A. (2000). Choice and the relative pleasure of consequences. *Psychological Bulletin*, 126(6), 910–924. <https://doi.org/10.1037/0033-2909.126.6.910>
- Meng, S.-Q., Cheng, J.-L., Li, Y.-Y., Yang, X.-Q., Zheng, J.-W., Chang, X.-W., Shi, Y., Chen, Y., Lu, L., Sun, Y., Bao, Y.-P., & Shi, J. (2022). Global prevalence of digital addiction in general population: A systematic review and meta-analysis. *Clinical Psychology Review*, 92. <http://10.03.248/j.cpr.2022.102128>
- Na, E., Choi, I., Lee, T., Lee, H., Rho, M. J., Cho, H., Jung, D. W., & Kim, D. (2017). The influence of game genre on Internet Gaming Disorder. *Journal of Behavioral Addictions*, 6(2), 248–255. <https://doi.org/10.1556/2006.6.2017.033>
- Noack, P. (2011). Socialization. In Brown, B. B., & Prinstein, M. J. (Eds.), *Encyclopedia of Adolescence* (vol. 2, pp. 352–359). Academic press. <https://doi.org/10.1016/B978-0-12-373951-3.00092-2>
- Olson, C. L. (2010). Children's motivations for video game play in the context of normal development. *Review of General Psychology*, 14(2), 180–187. <https://doi.org/10.1037/a0018984>
- Ostaszewski, K. (2020). The importance of resilience in adolescent mental health promotion and risk behaviour prevention. *International Journal of Public Health*. <https://doi.org/10.1007/s00038-020-01508-x>
- Piaget, J., & Inhelder, B. (2010). *The psychology of the child*. Portál.
- Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior*, 45, 137–143. <https://doi.org/10.1016/j.chb.2014.12.006>
- Rafiemaneh, H., Farnam, R., Sangchooli, A., Rahimi, J., Hamzehzadeh, M., Ghani, K., Jobehdar, M. M., Amin-Esmaeili, M., Shadloo, B., Demetrovics, Z., Király, O., & Rahimi-Movaghar, A. (2022). Online gaming and Internet Gaming Disorder in Iran: Patterns, motivations, and correlates. *Current Psychology*, 42(16), 13517–13531. <https://doi.org/10.1007/s12144-021-02490-0>
- Rehbein, F., & Baier, D. (2013). Family-, media-, and school-related risk factors of video game addiction. *Journal of Media Psychology*, 25(3), 118–128. <https://doi.org/10.1027/1864-1105/a000093>
- Rehbein, F., Kliem, S., Baier, D., Mölle, T., & Petry, N. M. (2015). Prevalence of Internet Gaming Disorder in German adolescents: Diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. *Addiction*, 110(5), 842–851. <https://doi.org/10.1111/add.12849>
- Rehbein, F., Psych, G., Kleimann, M., Mediasci, G., & Mölle, T. (2010). Prevalence and risk factors of video game dependency in adolescence: Results of a German nationwide survey. *Cyberpsychology, Behaviour, and Social Networking*, 13(3), 269–277. <https://doi.org/10.1089/cyber.2009.0227>
- Resilience Research Centre. (2018). *CYRM and ARM user manual*. Resilience
- Santomauro, D., Herrera, A. M., Shadid, J., Zheng, P., Ashbaugh, C., Pigott, D. M., Abbafati, C., Adolph, C., Amlag, J. O., Aravkin, A. Y., Bang-Jensen, B., Bertolacci, G. J., Bloom, S., Castellano, R., Castro, E., Chakrabarti, S., Chattopadhyay, J., Cogen, R. M., Collins, J. J.,
- Shorey, S., Ng, E. D., & Wong, C. (2022). Global prevalence of depression and elevated depressive symptoms among adolescents: A systematic review and meta-analysis. *British Journal of Clinical Psychology*, 61(2), 287–305. <https://doi.org/10.1111/bjc.12333>
- Smahel, D., Machackova, H., Mascheroni, G., Dedkova, L., Staksrud, E., Ólafsson, K., Livingstone, S., & Hasebrink, U. (2020). *EU Kids Online 2020: Survey results from 19 countries*. <https://doi.org/10.21953/lse.47fdeqj01of0>
- Sobotková, I., & Suchá, J. (2020). *The Czech version of the Child and Youth Resilience Measure (CYRM-R)* [Unpublished manuscript]. Palacký University Olomouc.
- Šolcová, I. (2009). *The development of resilience in childhood and adulthood*. Grada Publishing
- Soleimani, M. A., Pahlevan Sharif, S., Bahrami, N., Yaghoobzadeh, A., Allen, K. A., & Mohammadi, S. (2017). The relationship between anxiety, depression and risk behaviors in adolescents. *International Journal of Adolescent Medicine and Health*, 31(2). <https://doi.org/10.1515/ijamh-2016-0148>
- Spear, L. (2000). The adolescent brain and age-related behavioral manifestations. *Neuroscience & Biobehavioral Reviews*, 24(4), 417–463. [https://doi.org/10.1016/s0149-7634\(00\)00014-2](https://doi.org/10.1016/s0149-7634(00)00014-2)
- Stavropoulos, V., Vassallo, J., Burleigh, T. L., Gomez, R., & Carras, M. C. (2022). The role of internet gaming in the association between anxiety and depression: A preliminary cross-sectional study. *Asia-Pacific Psychiatry*, 14(2). <https://doi.org/10.1111/appy.12474>
- Suchá, J., Dolejš, M., & Pipová, H. (2019). Hraní digitálních her u českých adolescentů. *Zaostřeno*, 5(4), 1–16. www.drogy-info.cz/data/obj_files/33090/861/Zaostreno_2019-04_Hrani%20digitalnich%20her%20u%20adolescentu.pdf
- Suchá, J., Dolejš, M., Pipová, H., Maierová, E., & Cakirpaloglu, P. (2018). *Digital gaming by Czech adolescents*. Univerzita Palackého v Olomouci. <https://doi.org/10.5507/ff.18.24454245>
- Suchá, J., Kňážek Považanová, B., Kňážek, G., & Dolejš, M. (2024). *The Czech and Slovak version of the Internet Gaming Disorder Scale-Short Form (IGDS9-SF): A cross-cultural Study*. [Unpublished manuscript]. Palacký University Olomouc.
- Suchá, J., Pipová, H., & Babilonová, T. (2021). *The Czech version of Depression Anxiety Stress Scales (DASS-21)*. [Unpublished manuscript]. Palacký University Olomouc.
- Tejreiro, R., Gómez-Vallecillo, J. L., Pelegrina, M., Wallace, A., & Emberley, E. (2012). Risk factors associated with the abuse of video games in adolescents. *Psychology*, 3(4), 310–314. <http://doi.org/10.4236/psych.2012.34044>
- Teng, Z., Pontes, H. M., Nie, Q., Griffiths, M. D., & Guo, C. (2021). Depression and anxiety symptoms associated with Internet Gaming Disorder before and during the COVID-19 pandemic: A longitudinal study. *Journal of Behavioral Addictions*, 10(1), 169–180. <https://doi.org/10.1556/2006.2021.00016>
- Tsui, Y. Y., & Cheng, C. (2021). Internet gaming disorder, risky online behaviour, and mental health in Hong Kong adolescents: The beneficial role of psychological resilience. *Frontiers in Psychiatry*, 12. <https://doi.org/10.3389/fpsy.2021.722353>
- Warburton, W., Parkes, S., & Sweller, N. (2022). Internet gaming disorder: Evidence for a risk and resilience approach. *International Journal of Environmental Research and Public Health*, 19(9), Article 5587. <https://doi.org/10.3390/ijerph19095587>
- Wu A.M.S., Chen J.H., Tong K.-K., Yu S. and Lau J.T.F. (2018). Prevalence and associated factors of Internet Gaming Disorder among community dwelling adults in Macao, China. *Journal of Behavioral Addictions*, 7, 62–69.
- Yen, J. Y., Lin, H. C., Chou, W. P., Liu, T. L., & Ko, C. H. (2019). Associations Among Resilience, Stress, Depression, and Internet Gaming Disorder in Young Adults. *International Journal of Environmental Research and Public Health*, 16(17), Article 3181. <https://doi.org/10.3390/ijerph16173181>
- Zuckerbrot, R. A., & Jensen, P. S. (2006). Improving recognition of adolescent depression in primary care. *Archives of Pediatrics & Adolescent Medicine*, 160(7), Article 694. <https://doi.org/10.1001/archpedi.160.7.694>