Online Gaming Engagement and Adolescent Social Withdrawal: The Mediating Role of Family Cohesion

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Article Info

A B S T R A C T

Objective: This study aimed to investigate the relationship between online gaming engagement and adolescent social withdrawal, with family cohesion examined as a mediating factor.

Methods and Materials: A descriptive correlational design was employed with a sample of 388 adolescents in Greece, selected based on the Morgan and Krejcie sample size determination table. Standardized instruments measured online gaming engagement, social withdrawal, and family cohesion. Data analysis included Pearson correlation analysis using SPSS-27 to examine bivariate associations and Structural Equation Modeling (SEM) with AMOS-21 to test the hypothesized mediation model. Model fit was evaluated using χ^2, df, χ^2/df, GFI, AGFI, CFI, TLI, and RMSEA indices.

Findings: Pearson correlation results revealed that social withdrawal was positively correlated with online gaming engagement ($r = .42$, $p < .001$) and negatively correlated with family cohesion ($r = -.36$, $p < .001$). Online gaming engagement was also negatively correlated with family cohesion ($r = -.28$, $p < .001$). SEM demonstrated adequate model fit ($\chi^2 = 218.73$, df = 94, χ^2/df = 2.33, GFI = 0.93, AGFI = 0.90, CFI = 0.96, TLI = 0.95, RMSEA = 0.057). Path analysis showed that online gaming directly predicted higher social withdrawal ($b = 0.41$, $\beta = 0.36$, $p < .001$) and lower family cohesion ($b = -0.29$, $\beta = -0.27$, $p < .001$). Family cohesion negatively predicted social withdrawal ($b = -0.39$, $\beta = -0.32$, $p < .001$). Indirect effects confirmed partial mediation ($b = 0.11$, $\beta = 0.09$, $p = .008$), with a significant total effect of gaming on withdrawal ($b = 0.52$, $\beta = 0.45$, $p < .001$).

Conclusion: The findings suggest that online gaming engagement contributes to adolescent social withdrawal both directly and indirectly through reduced family cohesion. Strengthening family cohesion may serve as a protective factor, mitigating the adverse psychosocial effects of excessive gaming.

Keywords: Online gaming engagement; family cohesion; adolescent social withdrawal; structural equation modeling; Greece

1. Introduction

Adolescence is a crucial developmental stage marked by psychological, social, and emotional transitions. During this period, adolescents seek autonomy, expand peer relationships, and begin to form a stronger sense of identity. However, contemporary youth face new challenges brought about by the widespread use of digital technologies, particularly online gaming. While online gaming provides entertainment, cognitive stimulation, and opportunities for social interaction, increasing evidence suggests that excessive engagement may contribute to problematic outcomes such as gaming addiction, reduced family interaction, psychological distress, and ultimately, social withdrawal (Shrestha et al., 2025; Xiao, 2025). The concept of social withdrawal, often manifested as avoidance of social interactions, reduced participation in peer networks, and preference for solitary activities, is closely linked to maladaptive gaming patterns. Investigating the relationship between online gaming engagement, family cohesion, and adolescent social withdrawal is thus critical in understanding the psychosocial implications of digital entertainment in youth populations.

The relationship between gaming engagement and adolescent wellbeing has become a growing research priority worldwide. Scholars highlight that online gaming, when excessive, may cross into addictive behavior, leading to a spectrum of adverse consequences, including sleep disruption, academic decline, depression, and anxiety (Adekunle, 2025; Yue, 2024). Studies show that problematic gaming can parallel substance-related disorders, affecting the brain's reward system and fostering compulsive use (Nagata, 2025). These effects are not uniform across contexts; for instance, research in Nigeria identified gaming addiction as strongly correlated with depression and anxiety among urban youth (Adekunle, 2025), while evidence from Saudi Arabia linked high gaming addiction prevalence to attention deficit hyperactivity disorder (ADHD), depression, and anxiety (Alrahili et al., 2023).

The global nature of gaming addiction is further reinforced by findings in Asia, Europe, and the Middle East. In Hong Kong, problematic gaming intensified during COVID-19 lockdowns when children and adolescents were confined at home, increasing both screen time and solitary leisure (Zhu et al., 2020, 2021). Similarly, studies in Tunisia and Turkey demonstrated that online gaming addiction can contribute to significant psychological strain and even impair physical health (Omri et al., 2021; Özkan & Özkan, 2023). Furthermore, systematic reviews and scoping studies confirm that problematic gaming is not limited to clinical populations but is increasingly visible in general adolescent cohorts (Joseph, 2022; Purwaningsih & Nurmala, 2021). Collectively, these findings suggest that online gaming engagement, while not inherently harmful, poses considerable risks when excessive or unregulated.

Adolescents' vulnerability to excessive gaming is also shaped by their family environment. Family cohesion, defined as the emotional bonding and supportive connections among family members, plays a central role in moderating the effects of digital media use. Research indicates that weak family cohesion is associated with heightened risk of problematic gaming, while cohesive families provide protective mechanisms against maladaptive patterns (Deniz et al., 2024; Rosales-Navarro & Pérez, 2025). Parents' monitoring behaviors, communication styles, and emotional support can buffer adolescents from the negative psychological consequences of gaming. For example, a systematic review found that parental behaviors—such as inconsistent monitoring or permissive attitudes—significantly increased the likelihood of gaming addiction in adolescents (Rosales-Navarro & Pérez, 2025).

The interplay between family cohesion and gaming addiction has also been empirically validated in diverse contexts. In Nepal, structured intervention modules aimed at reducing gaming addiction were found more effective when parents and family members actively participated (Giree & Das, 2024). In Saudi Arabia and Egypt, cross-sectional studies demonstrated that high levels of family dysfunction were correlated with more severe psychiatric impacts of gaming addiction (Alrahili et al., 2023; El-Rasas et al., 2022). Likewise, in Indonesia and the Philippines, findings highlighted that poor family interaction worsens the negative outcomes of gaming, including depression and withdrawal (Fithria et al., 2022; Labana et al., 2020).

Social withdrawal is a multifaceted construct encompassing behaviors such as avoidance, reticence, and preference for solitude. In adolescence, social withdrawal can limit peer relationships, reduce social learning opportunities, and foster feelings of loneliness. Prior studies underscore the relationship between excessive gaming and withdrawal behaviors, suggesting that problematic gaming fosters a cycle of isolation and diminished face-to-face social interaction (Shrestha et al., 2025; Yang, 2023). For example, research in Nepal and the United States showed that gaming addiction and problematic screen use are linked to loneliness and maladaptive coping strategies (Raney et al., 2023;

Shrestha et al., 2025). Similarly, studies in China and Singapore found that adolescents exposed to intensive gaming patterns often displayed reduced offline social engagement and increased risk of isolation (Hu, 2023; Sim et al., 2020).

Moreover, cross-cultural evidence suggests that social withdrawal is not simply an individual preference but a developmental risk factor with broad implications for mental health. In Tunisia, for instance, gaming-addicted adolescents reported higher levels of loneliness and avoidance behaviors (Ouertani et al., 2022). Research in Pakistan and Indonesia similarly demonstrated that gaming addiction compromises both mental and physical wellbeing, leading to fatigue, social anxiety, and social retreat (Shabih et al., 2022; Syam et al., 2022). These findings position social withdrawal as both an outcome and perpetuating factor of problematic gaming engagement.

Emerging research highlights that gaming-related behaviors are not only influenced by environmental and familial conditions but also by biological predispositions. For example, polymorphic variants of the dopamine receptor gene DRD2 have been associated with adolescents' susceptibility to problematic gaming (Tereshchenko et al., 2024). Cultural context also matters; in the Philippines and Tunisia, different cultural attitudes toward gaming shaped the expression of addiction symptoms (Labana et al., 2020; Omri et al., 2021). Similarly, in Turkey and Spain, studies revealed that adolescents' school belongingness and peer norms influence both gaming behaviors and mental health outcomes (Deniz et al., 2024; García-Gil et al., 2022).

Educational systems and policy interventions have also been identified as crucial. In Singapore, family-focused interventions to address gaming addiction were more successful when supported by schools (Sim et al., 2020). In Indonesia, school-based self-regulation programs reduced problematic gaming behaviors by encouraging adolescents to engage in structured reflection and behavioral control (Syam et al., 2022). Reviews further confirm that school and community-based interventions targeting digital literacy and self-regulation are effective in reducing gaming-related harm (Kumari & Dhiksha, 2022).

While online gaming remains a central focus, new digital forms such as short video applications and social media have expanded the landscape of adolescent screen use. These platforms share addictive design features, such as reward loops and social comparison mechanisms, which parallel gaming addiction. For example, adolescents' overuse of short video applications has been linked to compulsive patterns, mirroring the psychological effects of gaming disorder (Lu et al., 2022). Similarly, the rise of social media addiction illustrates overlapping vulnerabilities, where adolescents display compulsive use and withdrawal symptoms (Yang, 2023). These findings suggest that gaming must be understood as part of a broader spectrum of addictive digital behaviors (Nagata, 2025; Xiao, 2025).

Although prior research has established strong associations between gaming engagement, family dynamics, and mental health, the mediating role of family cohesion in the relationship between gaming and social withdrawal has not been adequately explored. Evidence consistently demonstrates that problematic gaming undermines mental health (Adekunle, 2025; Hu, 2023; Yue, 2024), while family cohesion acts as a protective factor (Deniz et al., 2024; Rosales-Navarro & Pérez, 2025). However, most studies either focus on direct relationships between gaming and wellbeing (Joseph, 2022; Purwaningsih & Nurmala, 2021) or on family cohesion and adolescent adjustment (Fithria et al., 2022; Giree & Das, 2024), without considering the mediating mechanisms that connect these domains. Furthermore, cross-national comparative studies remain limited, and little research has examined these interactions specifically within European contexts such as Greece.

The present study aims to fill this gap by examining the mediating role of family cohesion in the relationship between online gaming engagement and adolescent social withdrawal.

2. Methods

2.1. Study Design and Participants

This study employed a descriptive correlational design to examine the relationships among online gaming engagement, family cohesion, and adolescent social withdrawal. The target population consisted of adolescents from Greece enrolled in secondary schools. A total of 388 participants were recruited, with the sample size determined according to the Morgan and Krejcie sample size determination table, ensuring adequate statistical power for correlational and structural analyses. Participants were selected through a stratified random sampling method to represent both genders and diverse socioeconomic backgrounds. Prior to data collection, informed consent was obtained from all participants and their guardians, and the study was conducted in line with ethical standards for research involving human participants.

2.2. Measures

Social withdrawal was measured using the Children's Social Withdrawal Scale developed by Coplan, Prakash, O'Neil, and Armer (2004). This widely used instrument assesses different aspects of social reticence and withdrawal in adolescents. The scale consists of 27 items grouped into three subscales: shyness, unsociability, and avoidance. Items are rated on a 5-point Likert scale ranging from 1 ("not at all true of me") to 5 ("very true of me"), with higher scores indicating higher levels of social withdrawal. The scale has been validated across multiple cultural contexts, with studies confirming its strong internal consistency (Cronbach's alpha values typically above 0.80) and test–retest reliability, as well as convergent validity with related constructs such as peer difficulties and anxiety.

Online gaming engagement was assessed using the Game Engagement Questionnaire (GEQ) developed by Brockmyer et al. (2009). The GEQ is a standard tool for measuring the psychological involvement and immersion of individuals in video gaming activities. It comprises 19 items divided into four subscales: absorption, flow, presence, and immersion. Responses are provided on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), with higher scores representing greater engagement in online gaming. Reliability and validity have been consistently supported in prior research, with Cronbach's alpha coefficients above 0.85 for the overall scale and evidence of factorial validity across diverse gaming populations.

Family cohesion was measured using the Family Adaptability and Cohesion Evaluation Scales IV (FACES IV) developed by Olson, Gorall, and Tiesel (2006). This instrument assesses the emotional bonding, connectedness, and supportive climate among family members. The cohesion subscale of FACES IV includes 7 items rated on a 5-point Likert scale ranging from 1 ("almost never") to 5 ("almost always"). Higher scores indicate greater family cohesion. The scale has been shown to have high internal consistency (Cronbach's alpha typically above 0.85), good construct validity, and strong correlations with family functioning outcomes in various studies, making it a reliable tool for family relationship research.

2.3. Data Analysis

Data were analyzed using both descriptive and inferential statistics. Descriptive statistics included means, standard deviations, frequencies, and percentages to provide a demographic and variable overview. Pearson correlation analysis was conducted in SPSS-27 to assess the bivariate relationships between the dependent variable (social withdrawal) and each independent variable (online gaming engagement and family cohesion). Furthermore, Structural Equation Modeling (SEM) was performed using AMOS-21 to test the hypothesized mediating role of family cohesion in the relationship between online gaming engagement and adolescent social withdrawal. Model fit indices such as CFI, TLI, RMSEA, and χ^2/df were used to evaluate the adequacy of the structural model.

3. Findings and Results

The demographic distribution of the participants indicated that 192 adolescents (49.48%) were male and 196 (50.52%) were female. The majority of participants were between 14 and 16 years old, with 128 students (32.99%) aged 14, 145 (37.37%) aged 15, and 115 (29.64%) aged 16. Regarding parental education, 87 fathers (22.42%) and 102 mothers (26.29%) held a university degree, while 143 fathers (36.86%) and 151 mothers (38.92%) had completed secondary education. The remaining participants reported parents with either primary education or postgraduate qualifications. These distributions suggest that the sample is fairly balanced in terms of gender and includes diverse educational backgrounds.

Table 1

Descriptive Statistics for Research Variables (N = 388)

Variable	M	SD
Social Withdrawal	52.37	9.46
Online Gaming Engagement	61.84	10.72
Family Cohesion	44.29	8.31

As shown in Table 1, the mean score for social withdrawal among adolescents was 52.37 (SD = 9.46), suggesting a moderately high level of withdrawal behaviors in the sample. Online gaming engagement presented a higher mean of 61.84 (SD = 10.72), reflecting notable involvement in digital gaming activities. Family cohesion scores

averaged 44.29 (SD = 8.31), indicating moderate bonding and emotional connection within families. These distributions provide initial insights into the tendencies of adolescents in terms of social adjustment, gaming, and family functioning.

Prior to conducting correlation and SEM analyses, the statistical assumptions were examined. The Kolmogorov–Smirnov test indicated that the distribution of scores for all three variables did not significantly deviate from normality (social withdrawal: D(388) = 0.042, p = .076; online gaming engagement: D(388) = 0.037, p = .089; family cohesion:

D(388) = 0.041, p = .064). Homoscedasticity was confirmed by Levene's test, which showed non-significant results across variables (all p > .05). Additionally, multicollinearity diagnostics revealed tolerance values above 0.72 and variance inflation factor (VIF) values below 1.38, well within the acceptable range. Box's M test of equality of covariance matrices was also non-significant (M = 12.47, F = 1.02, p = .326), confirming homogeneity of covariance. These results suggest that the assumptions for Pearson correlation and SEM were met, justifying the application of the chosen analyses.

Table 2

Pearson Correlations Between Study Variables (N = 388)

Variable	1	2	3
1. Social Withdrawal	—		
2. Gaming Engagement	.42** (p < .001)	—	
3. Family Cohesion	-.36** (p < .001)	-.28** (p < .001)	—

The correlation matrix in Table 2 indicates that social withdrawal was positively correlated with online gaming engagement (r = .42, p < .001), supporting the hypothesis that higher gaming involvement is associated with increased withdrawal. Conversely, family cohesion was negatively correlated with both social withdrawal (r = -.36, p < .001) and gaming engagement (r = -.28, p < .001). These findings suggest that cohesive family environments are associated with lower levels of withdrawal and reduced excessive gaming.

Table 3

Model Fit Indices for Structural Equation Model

Fit Index	Value	Criterion for Acceptability
χ^2	218.73	—
df	94	—
χ^2/df	2.33	< 3.00
GFI	0.93	≥ 0.90
AGFI	0.90	≥ 0.90
CFI	0.96	≥ 0.95
TLI	0.95	≥ 0.95
RMSEA	0.057	≤ 0.08

As displayed in Table 3, the structural equation model demonstrated good fit to the data. The χ^2/df ratio was 2.33, below the recommended threshold of 3.0, while the GFI and AGFI values (0.93 and 0.90, respectively) indicated adequate fit. Comparative fit indices (CFI = 0.96; TLI =

0.95) further confirmed model robustness, and the RMSEA value of 0.057 fell within the acceptable range of ≤ 0.08. Collectively, these indices validate the structural model as appropriate for examining the mediating role of family cohesion.

Table 4

Direct, Indirect, and Total Effects in the Structural Model

| Path	b	S.E.	Beta	p
Gaming → Social Withdrawal (Direct)	0.41	0.08	0.36	< .001
Family Cohesion → Social Withdrawal	-0.39	0.07	-0.32	< .001
Gaming → Family Cohesion	-0.29	0.06	-0.27	< .001
Gaming → Social Withdrawal (Indirect via Family Cohesion)	0.11	0.04	0.09	.008
Gaming → Social Withdrawal (Total)	0.52	0.09	0.45	< .001

Table 4 presents the path coefficients in the structural model. The direct effect of online gaming on social withdrawal was positive and significant (b = 0.41, β = 0.36, p < .001). Family cohesion negatively predicted social withdrawal (b = -0.39, β = -0.32, p < .001), supporting its protective role. Gaming engagement also significantly predicted lower family cohesion (b = -0.29, β = -0.27, p < .001). Importantly, the indirect effect of gaming on social withdrawal via family cohesion was significant (b = 0.11, β = 0.09, p = .008), indicating partial mediation. The total effect of gaming on social withdrawal (b = 0.52, β = 0.45, p < .001) highlights the strong predictive influence of gaming behaviors on adolescents' withdrawal tendencies, both directly and through family processes.

Figure 1

Model with Beta Coefficients

Structural Model: Online Gaming Engagement, Family Cohesion, and Social Withdrawal
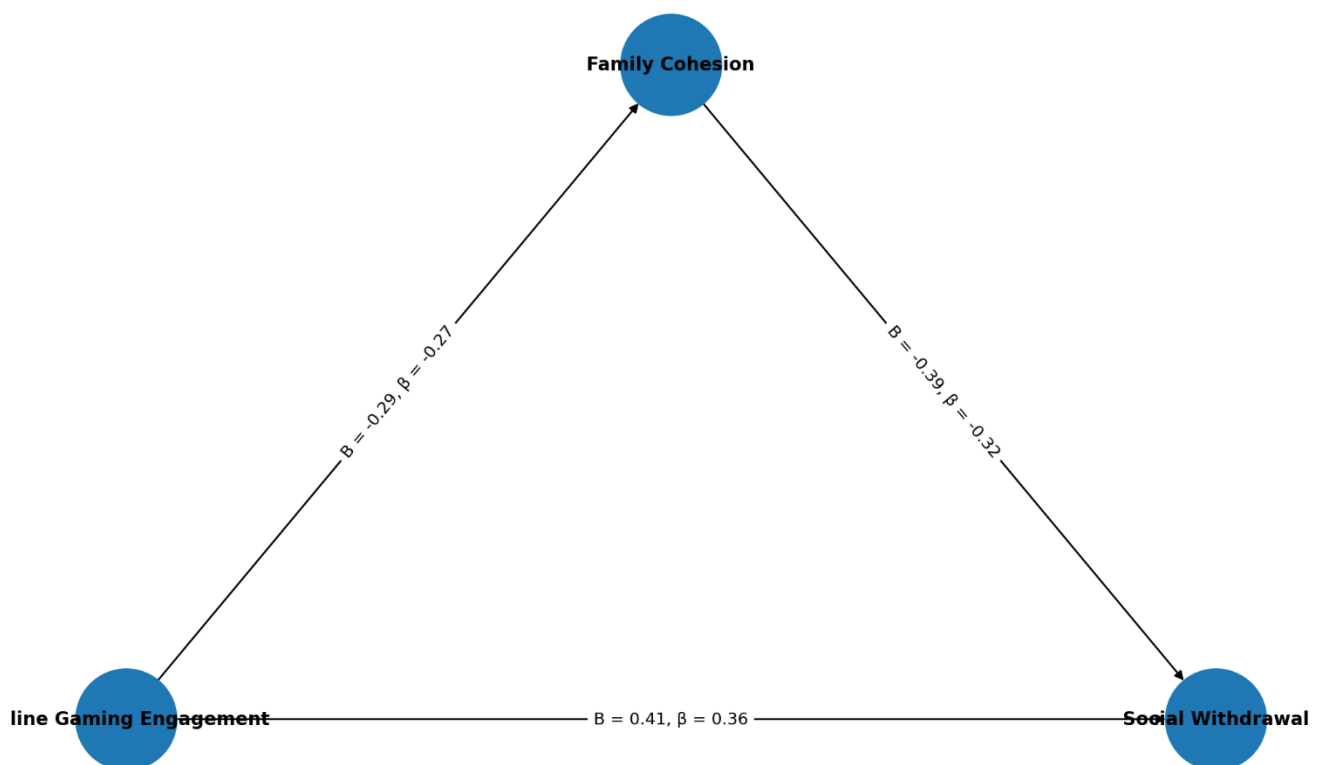
4. Discussion and Conclusion

The findings of this study highlight that online gaming engagement is positively associated with adolescent social withdrawal, while family cohesion serves as a significant mediating factor in this relationship. Adolescents with high levels of gaming engagement reported greater withdrawal behaviors, but the presence of strong family cohesion mitigated this effect. These results provide important

empirical evidence that aligns with the growing literature on digital media addiction and its psychosocial implications.

The positive association between gaming engagement and social withdrawal is consistent with studies across diverse cultural and regional contexts. Research from Nigeria demonstrated that excessive gaming was linked to poorer mental health, including depression and anxiety, which are often accompanied by withdrawal from peers (Adekunle, 2025). Similarly, a Saudi Arabian study reported that gaming addiction among adolescents was significantly correlated with psychiatric symptoms such as ADHD, depression, and anxiety, all of which are commonly associated with social isolation (Alrahili et al., 2023). Evidence from Hong Kong during COVID-19 lockdowns further confirmed that prolonged gaming coincided with reduced real-world interaction and heightened social withdrawal behaviors (Zhu et al., 2020, 2021).

Comparable findings have emerged in other parts of Asia, where gaming addiction is strongly linked to loneliness and maladaptive coping. For instance, a Nepalese study found that adolescents with higher levels of gaming disorder experienced more intense feelings of loneliness and detachment from their social environment (Shrestha et al., 2025). Research from China revealed that extensive exposure to video games among adolescents undermined face-to-face peer interactions and promoted avoidant behaviors (Hu, 2023). Likewise, qualitative studies in France underscored how adolescents perceive pathological gaming as a driver of social withdrawal, further reinforcing the universality of this phenomenon (Cisamolo et al., 2020).

These results also align with earlier studies from the Philippines and Tunisia, which found that adolescents who reported gaming addiction often presented symptoms of depression and withdrawal (Labana et al., 2020; Omri et al., 2021). In Turkey, the health impacts of gaming addiction were found to extend beyond mental health into physical consequences, further intensifying the likelihood of isolation (Özkan & Özkan, 2023). Taken together, the present findings contribute to a large body of evidence confirming that online gaming, while providing entertainment and skill development, carries significant risks for social withdrawal when overused.

One of the most important contributions of this study is its demonstration that family cohesion mediates the relationship between online gaming engagement and social withdrawal. Adolescents reporting higher family cohesion exhibited lower levels of withdrawal despite being engaged in gaming. This highlights the protective role of family

dynamics and underscores the importance of parental involvement.

Previous research has already established that family cohesion serves as a buffer against gaming addiction. A systematic review concluded that parental behaviors, including consistent monitoring and supportive communication, significantly reduce the risk of gaming-related harm (Rosales-Navarro & Pérez, 2025). Deniz and colleagues further demonstrated that family communication was directly associated with adolescent mental health and indirectly influenced outcomes through gaming addiction (Deniz et al., 2024). In Nepal, intervention programs that incorporated parental involvement were more effective in reducing gaming-related harm (Giree & Das, 2024).

Cross-cultural findings also reinforce this point. In Indonesia and Egypt, weak family structures were associated with more severe psychiatric outcomes of gaming addiction (El-Rasas et al., 2022; Fithria et al., 2022). A study from Tunisia revealed that family dysfunction amplified the risk of problematic gaming behaviors among adolescents (Ouertani et al., 2022). The present study's findings extend this literature by empirically showing that family cohesion not only correlates with adolescent wellbeing but also directly mediates the link between gaming engagement and withdrawal.

This aligns with the theoretical perspective that cohesive families provide emotional support, regulate adolescent behaviors, and foster resilience. Such families likely compensate for the social deficits that arise from excessive gaming, helping adolescents maintain interpersonal relationships even when engaged in digital activities. By contrast, in families with poor cohesion, adolescents may turn to gaming as a substitute for emotional fulfillment, exacerbating withdrawal tendencies.

Our results also resonate with studies investigating other forms of addictive screen use. The rise of short video applications and social media platforms illustrates similar behavioral mechanisms, where compulsive engagement leads to social retreat (Lu et al., 2022; Yang, 2023). Addictive screen use trajectories have been linked to suicidal behaviors and poor mental health in U.S. adolescents, demonstrating that the risks are not confined to gaming but extend across digital platforms (Nagata, 2025; Xiao, 2025). These findings emphasize the importance of conceptualizing gaming engagement within a broader ecosystem of addictive media consumption.

Moreover, genetic research highlights the biological underpinnings of problematic gaming. Polymorphic variants

in dopamine receptor genes have been associated with susceptibility to gaming addiction (Tereshchenko et al., 2024). This suggests that while family cohesion is an important mediator, biological predispositions may also interact with environmental and familial factors in shaping outcomes. For example, adolescents with certain genetic vulnerabilities may be more reliant on family cohesion to regulate their engagement with gaming.

The consistency between our findings and prior research across diverse contexts highlights the robustness of the observed relationships. However, this study extends the literature by focusing on family cohesion as a mediating mechanism, rather than examining gaming addiction and social withdrawal in isolation. Previous reviews and systematic analyses confirmed that problematic gaming compromises mental health (Joseph, 2022; Purwaningsih & Nurmala, 2021), while family cohesion protects against adolescent maladjustment (Deniz et al., 2024; Rosales-Navarro & Pérez, 2025). Yet few studies have directly tested these constructs in a single model.

Furthermore, by examining adolescents in Greece, this study contributes to a European perspective that has been underrepresented in the literature. Most prior research has focused on Asia, the Middle East, and Africa (Adekunle, 2025; Alrahili et al., 2023; Giree & Das, 2024). Findings from the present study therefore add cultural diversity to the growing understanding of how gaming engagement and family dynamics interact to influence social withdrawal.

5.   Suggestions and Limitations

Despite its contributions, this study has several limitations. First, the use of a cross-sectional design limits the ability to infer causality. While the findings suggest that family cohesion mediates the relationship between gaming engagement and social withdrawal, longitudinal data would be needed to confirm causal pathways. Second, data were based on self-reports, which may be subject to response bias or social desirability effects. Adolescents may have underreported their gaming behaviors or withdrawal tendencies, and parents' perspectives were not directly included. Third, the study focused exclusively on adolescents in Greece, which may limit the generalizability of findings to other cultural contexts. Although gaming addiction is a global issue, cultural norms and family structures vary widely across societies. Finally, while family cohesion was examined as a mediator, other potential factors such as peer support, school belongingness, or personality traits were not included in the model.

Future research should adopt longitudinal and mixed-methods designs to establish causal relationships and capture the dynamic nature of gaming behaviors. Including both adolescent and parental perspectives would enrich the understanding of family dynamics in relation to gaming and withdrawal. Additionally, expanding the research to diverse cultural settings would provide insights into how different family structures and cultural norms influence the observed relationships. Future studies should also explore other mediators and moderators, such as school climate, peer networks, or genetic predispositions, to build a more comprehensive model of adolescent adjustment in the digital era. Experimental interventions designed to enhance family cohesion could be tested for their effectiveness in reducing gaming-related harm and preventing social withdrawal.

The findings have practical implications for educators, parents, and policymakers. Interventions aimed at reducing adolescent social withdrawal should incorporate family-based strategies that strengthen cohesion, communication, and support. Schools can play a role by integrating digital literacy programs that address healthy gaming behaviors, while community organizations can provide family counseling services tailored to digital addiction. Policymakers should also recognize the importance of family cohesion in adolescent development and design public health campaigns that emphasize family involvement in regulating digital use. Finally, mental health practitioners should consider family dynamics when developing treatment plans for adolescents presenting with problematic gaming and withdrawal symptoms.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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