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Research Article

The Mediating Role of Resilience in The Relationship between Game Addiction and Sleep Disorders in College Students

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ABSTRACT

Gaming addiction has attracted the attention of researchers and clinicians as a current and growing problem. Increased gaming addiction can lead to problems such as sleep disorders. The present study aimed to examine the mediating effect of resilience on the relationship between game addiction and sleep disorders in college students. The study was conducted on 320 college students aged between 20 and 27 years. The Internet Gaming Disorder Scale, Brief Resilience Scale, and DSM-5 Sleep Disorders Scale were used as data collection tools. In the analysis of the data, the SPSS package program and the PROCESS macro were used. The results revealed that gaming addiction significantly predicted resilience in a negative direction and sleep disorders in a positive direction. Resilience, in turn, significantly predicted sleep disorders in a negative direction, and it mediated the relationship between gaming addiction and sleep disorders. The findings demonstrated that resilience emerged as a significant process variable linking gaming addiction and sleep-related outcomes, suggesting that lower resilience may partially account for the pathway through which gaming behaviors affect sleep quality.

Keywords: game addiction, sleep disorders, resilience, mediating variable

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Introduction

With the new opportunities it has created, Internet technology is one of the most innovative developments that attracts people from all demographic groups (age, education, economic status, etc.). Its rapid evolution has had profound effects on various aspects of human life, particularly in the realm of entertainment. One significant change brought about by technological advancements is in how people meet their entertainment needs, which has shifted dramatically with the advent of Internet technology. Entertainment, a basic human need (Glasser, 2003), has transitioned from traditional formats to digital games, making these games increasingly appealing. The attractiveness of games has led individuals to spend more time in virtual environments, and as time spent gaming increases, so does the likelihood of developing game addiction (Rideout et al., 2010).

Game addiction, classified as a behavioral addiction, shares characteristics with substance addiction but does not involve the use or abuse of substances (APA, 2013a). These shared characteristics include impaired control, compulsive engagement, and the experience of withdrawal symptoms. Behavioral addictions have garnered substantial research interest due to their significant implications for mental and physical health. Game addiction, as a contemporary issue emerging from technological advancements, has particularly drawn the attention of researchers and clinicians.

One of the pioneering studies on the diagnostic criteria for game addiction was conducted by Griffiths (2005), who proposed six criteria, including the prioritization of gaming over other activities, using gaming as an escape from negative emotions, playing in increasing amounts, experiencing withdrawal symptoms when gaming is reduced or stopped, conflicts arising from excessive gaming, and relapsing after attempting to quit. Subsequently, the American Psychiatric Association (APA, 2013a) expanded these criteria in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* to include nine criteria for diagnosing gaming disorder. Similarly, the World Health Organization (2018) outlined three main criteria: loss of control over gaming, prioritization of gaming over other life activities, and continued gaming despite negative consequences. These overlapping criteria

emphasize the pervasive and detrimental impact of gaming addiction on individuals' lives.

Given the rising prevalence of gaming addiction, researchers have sought to understand its correlates and consequences. Studies have demonstrated that game addiction is more prevalent among men compared to women (Kurt et al., 2018; Tejeiro Salguero & Moran, 2002), and is negatively associated with family life satisfaction (Taş et al., 2022) and life satisfaction (Baysak et al., 2020). Conversely, it is positively associated with alexithymia and social anxiety (Taş & Güneş, 2019), aggression and emotional eating (Caner & Evgin, 2021), and narcissistic personality traits and cognitive distortions (Zandi Payam & Mirzaeidoostan, 2019). These findings indicate that game addiction is associated with broader effects on emotional, social, and psychological well-being.

One significant consequence of excessive gaming is its impact on sleep quality. Problematic gaming is associated with adverse sleep status (Kristensen et al., 2021). Sleep disorders, defined as negative changes in sleep duration, quality, and patterns, are a growing concern in relation to game addiction (Kharisma et al., 2020; Tereshchenko et al., 2021). Sleep problems, such as insufficient sleep, sleep apnea, narcolepsy, and sleepwalking, adversely affect psychological and physiological health, as well as quality of life (Fusar-Poli et al., 2021). Mayda et al. (2012) emphasized that while sleep patterns can vary among healthy individuals, an average of 7–8 hours of sleep is necessary for optimal functioning. The disruption of this balance can impair social life, work, and family relationships, compounding the negative effects of sleep disorders.

Extensive research highlights the association of sleep disorders with various mental health problems, including depression (Lotfi Saeedabad & Basharpoor, 2022; Nutt et al., 2008; Zhang et al., 2022), attention deficit (Rodrigues & Shigaeff, 2022), sexual dysfunction (Agrawal et al., 2022; Lew-Starowicz, 2022), suicide risk (Yiyue et al., 2023), anxiety (Wang et al., 2022), stress (Susanti et al., 2022), quality of life (Nowowiejska et al., 2021), and aggression (Chervin et al., 2003). Sleep problems negatively affect individuals across all life stages, from infancy to old age (Schmitt, 1991; Guénolé, 2020). These findings underscore the importance of addressing sleep disorders as a pervasive health issue.

Technology use further compounds the impact of sleep disorders, with studies indicating that technological addictions, such as social media and gaming addiction, are strongly associated with poor sleep quality (Dinç, 2015; Moattari et al., 2017). Adolescents with high social media addiction scores report more problematic sleep habits (Güneş et al., 2018). Similarly, technology addiction correlates negatively with sleep quality (Shahbal et al., 2022). Specific to gaming addiction, studies have found significant associations with sleep problems, suggesting that excessive gaming may coincide with reduced sleep quality and duration (Birol, 2021; Lam, 2014; Tuncay & Göger, 2022; Zaman et al., 2022). Studies have identified associations between excessive gaming and sleep problems, such as reduced sleep duration and increased odds of poor sleep quality (Kristensen et al., 2021). While most evidence comes from cross-sectional studies, which cannot confirm causality, experimental research shows that prolonged gaming (e.g., 150 minutes of violent gameplay) increases physiological arousal and delays sleep onset (King et al., 2013).

On the other hand, research has found that resilience, defined as the ability to adapt positively to stress and adversity, is negatively associated with game addiction (Kim, 2016; Turan, 2021) and sleep disorders (Liu et al., 2021). Resilience encompasses coping skills, self-regulation, and positive thinking, which enable individuals to maintain mental well-being despite challenges (Joyce et al., 2018; Reivich & Shatte, 2002). Masten (2001) identified two key components of resilience: encountering difficulties and adapting positively to them. This capacity seems vital in mitigating the effects of addictive behaviors and sleep disturbances.

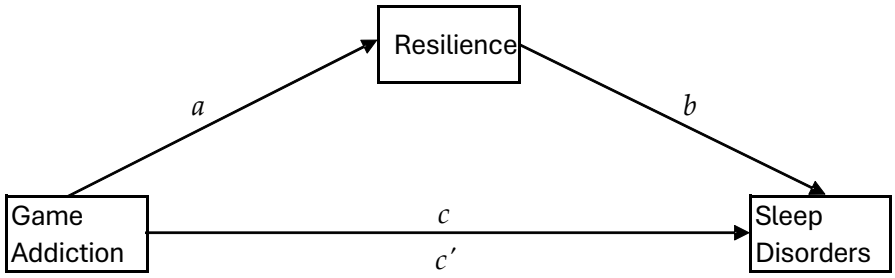
Studies show that resilience is inversely related to psychological problems, including depression (Edward, 2005), anxiety (Dolan et al., 2022), and emotional distress (Zheng et al., 2022). Moreover, resilience has been found to mediate the relationship between gaming addiction and empathy (Turan, 2021), highlighting its potential role in addressing complex mental health issues. However, there is limited research examining the mediating role of resilience in the relationship between game addiction and sleep disorders. This gap underscores the need for further investigation. While resilience has often been studied as a moderator, its inclusion here as a mediator is conceptually in line with “process-oriented” models focusing on

adaptation mechanisms. This perspective complements previous research by pointing to resilience not as a moderator, but as a part of a mechanism connecting behavioral and physiological outcomes.

In summary, previous research suggested that gaming addiction directly decreases resilience by promoting avoidance behaviors, impairing emotional regulation, and reducing adaptive coping strategies (Eker & Taş, 2022; Loton et al., 2016). This diminished resilience then increases vulnerability to sleep disorders (Kristensen et al., 2021; Peng et al., 2025). Longitudinal evidence shows gaming addiction precedes declines in resilience, which subsequently correlate with poorer mental health outcomes such as depression (Peng et al., 2025). This study aims to examine the mediating role of resilience in the relationship between game addiction and sleep disorders in university students. The proposed model (Figure 1) illustrates the pathways to be examined, with resilience hypothesized to mediate the impact of game addiction on sleep disorders. By framing resilience as a mediator rather than as a moderator, the model emphasizes process-oriented interventions (e.g., rebuilding resilience skills in addicted gamers) rather than merely identifying at-risk subgroups (Wong et al., 2024). This aligns with intervention studies showing resilience training improves both gaming addiction and sleep outcomes (Turan, 2021; Wong et al., 2024). Although resilience may be seen as a moderator variable as well, there are no conceptual obstacles to assume that it is a part of a pathway through which a specific behavioral dependence may influence sleep-related outcomes.

Figure 1

The Proposed Model: The Mediating Role of Resilience in the Relationship Between Game Addiction and Sleep Disorders



Note. The effect of game addiction on resilience is shown by path "a", the effect of resilience on sleep disorders is shown by path "b", and the direct effect of game addiction on sleep disorders is shown by path "c". Path "c^{1}" shows the effect of game addiction on sleep disorders after resilience is included in the model as a mediating variable.

Method

Participants and Procedure

The sample consisted of 320 college students, 220 (68.8%) women and 100 (31.3%) men. The participants' ages varied between 20 and 27, with a mean age of 22.22 years. We aimed to exclude individuals with clinical diagnoses and sleep disorders. By excluding participants with pre-existing sleep disorders, the study aimed to ensure that observed effects on sleep quality were more directly attributable to gaming addiction rather than being compounded by other clinical factors. Similarly, by excluding individuals with psychiatric diagnoses, we aimed to avoid introducing additional variables that could obscure the pathway between gaming addiction and resilience (Abdallat et al., 2024). Thus, the survey form was designed so that individuals who answer "yes" to the questions "Do you have any psychiatric diagnosis?" and "Do you have any sleep disorder diagnosis?" will be directed to the end of the survey. However, no one with any diagnosis was encountered.

The data were collected online, and the participation was voluntary. In the consent form, it was stated that the data obtained would be used only for scientific purposes, that the principle of confidentiality would be followed, and that personal data would not be shared anywhere. This study was conducted in strict accordance with the ethical standards of the Declaration of Helsinki and was approved by the Human Research Ethics Committee of Bülent Ecevit University (Project number: 21.12.2022/251619-436). Written informed consent was obtained from all participants.

Instruments

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

The scale was developed by Pontes and Griffiths (2015) and adapted to Turkish culture by Arıcak, Dinç, Yay, & Griffiths (2018). The measure is unidimensional and consists of nine items with a 5-point Likert-type scale as a response format. The response options range from 1 (Never) to 5 (Very often), with higher scores indicating a higher level of internet gaming disorder (a sample item: *Do you play games to temporarily escape or relax from negative emotions (e.g. helplessness, guilt, anxiety)?*). Within the scope of this study, we performed CFA and the results we obtained show that the construct validity of the scale was re-established (($\chi2$ (25) = 80.99, $p < .001$; $\chi2$/sd = 3.24; RMSEA = .084; GFI = .95; AGFI = .90; NFI = .95; RFI = .93; CFI = .96; SRMR = .031). The Cronbach's Alpha Coefficient of our study was found to be .91.

DSM-5 Sleep Disorder Scale

The *DSM-5* Sleep Disorder Scale was developed by the American Psychiatric Association (2013b) and adapted to Turkish culture by Yüzeren et al. (2017). The scale consists of 8 items and was designed to measure a single dimension. It uses a 5-point Likert scale as a response format, with response options ranging from 1 (Never) to 5 (Always). Higher scores indicate greater sleep disturbance. A sample item illustrating the instrument's scope is: *I get through difficult times with very little trouble?* Within the scope of this study, we performed CFA; the results showed that the construct validity of the scale was re-established (($\chi2(17) = 62.16$, $p < .001$; $\chi2$/sd = 3.66; RMSEA = .091; GFI = .95; AGFI =.90; NFI = .96; RFI = .93; CFI = .97; SRMR = .039).

Cronbach's Alpha Coefficient obtained within the scope of our study was found to be .90.

Brief Resilience Scale

This scale, developed by Smith et al. (2008) and adapted to Turkish culture by Doğan (2015), is used to measure the resilience of individuals. The measure consists of 6 items, with a 1 (Not suitable) to 5 (Completely suitable) Likert scale as a response format. Higher scores indicate higher levels of resilience. A sample item illustrating the instrument's scope is: *I get through difficult times with very little trouble?* Within the scope of this study, we performed CFA and the results we obtained show that the construct validity of the scale was re-established (($\chi 2$ (8) = 19.83, $p < .05$; $\chi 2/sd = 3.24$; RMSEA = .068; GFI = .98; AGFI = .95; NFI = .95; RFI = .93; CFI = .99; SRMR = .024). The Cronbach's alpha coefficient found in our study was .86.

Data analysis

The relationship between gaming addiction, resilience, and sleep disorders was tested with a simple mediation model. A simple mediation model refers to any causal system in which at least one causal antecedent variable (X) is proposed to influence an outcome (Y) through a single mediating (M) variable (Hayes, 2018). Mediation tests are tests that fully or partially require the presence of another variable in the relationship between two variables (Şimşek, 2007). A partial mediation occurs when the direct effect (c) remains significant in the model. In social sciences, given that behaviors often have multiple causes, partial mediation is considered a more plausible scenario compared to full mediation (MacKinnon, 2012). Given the cross-sectional nature of the data, the tested model should be interpreted as a process model rather than a strictly causal one. The PROCESS macro (model 4) in SPSS was used for data analysis. The PROCESS macro, an add-on using the nonparametric Bootstrap method, performs the analysis with a 95% confidence interval on a sample size of 5000 people with the resampling method (Hayes, 2018). The effect of the independent variable on the dependent variable was calculated with direct effect, indirect effect, and total effect scores. The effect of the mediating variable is determined based on the bootstrap confidence interval. The lower upper bound of the confidence interval (BootLLCI-BootULCI) should be below or above zero. In

other words, the absence of "0" between both values indicates that the intermediary variable mediates. In addition to the absence of "0" between both values, when the relationship between the dependent variable and the independent variable becomes insignificant, this indicates full mediation and when it decreases, this indicates partial mediation. The Bootstrap method is a powerful method as it reduces the TYPE II error (Preacher & Hayes, 2008).

Results

In the study, descriptive statistics and correlations were computed first. The values of Kurtosis and Skewness (Table 1) suggested that the data were normally distributed (George & Mallery, 2016). Regarding the interrelationships between the variables of interest, we found a significant positive relationship between game addiction and sleep disorders, and a significant negative relationship between game addiction and resilience and between resilience and sleep disorders.

Table 1

Descriptive Statistics and Correlation Coefficients

Variables	*N*	*M/SE*	*SD*	Skewness	Kurtosis	GA	SD	R
GA	320	13.57/.33	5.95	1.53	.1.47	-		
SD	320	19.79/.36	6.45	.377	-.557	.26**	-	
R	320	19.20/.25	4.57	.071	.136	-.17**	-.35**	-

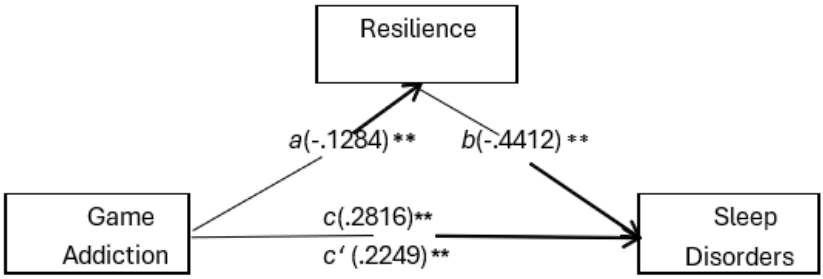
Note. GA - Game Addiction; SD - Sleep Disorder; R - Resilience.

**p <.01

The mediation analysis was then conducted, assessing the mediating effect of resilience in the relationship between game addiction and sleep disorders (Figure 2).

Figure 2

Mediating Effect of Resilience in the Relationship Between Game Addiction and Sleep Disorders



Note. **p < .001

Figure 2 shows the *a,b,c,* and *c'* paths and their unstandardized regression coefficients for the mediating effect of resilience in the relationship between game addiction and sleep disorders. When the model is examined, it can be seen that game addiction significantly predicted resilience in a negative direction (a = -.1284** 95% CI [-.2119, -.0448]); resilience significantly predicted sleep disorders in a negative direction (b = -.4412** 95% CI [-.5858, -.2965]) and game addiction significantly predicted sleep disorders in a positive direction (c = .2816** 95% CI [.1661, .3970]). When resilience, which was a mediating variable, was included in the analysis along with game addiction, the unstandardized regression coefficient between game addiction and sleep disorders (c'= .2249**; 95% CI [.1138, .3361]) decreased. In other words, a significant decrease was found when resilience was included in the mediating model (from c =.2816 to c'= .2249).

The direct effect, indirect effect, total effect, and bootstrap confidence interval were analysed to find out whether the intermediary variable had an effect on the decline that occurred after the intermediary variable was included in the model. The results showed that the total effect of game addiction on sleep disorders was .2816 (p < .000), the direct effect was .2249 (p < .000), the indirect effect was .0566, and the bootstrap

confidence interval (.0173, .1055) did not include zero. Together, our results suggested resilience had a partial mediating effect on the relationship between game addiction and sleep disorders.

Discussion

This study examined the mediating effect of resilience on the relationship between gaming addiction and sleep disorders among college students. Findings revealed that gaming addiction significantly predicted resilience in a negative direction and sleep disorders in a positive direction. Resilience, in turn, significantly predicted sleep disorders in a negative direction, and it mediated the relationship between gaming addiction and sleep disorders. This study positioned resilience as a mediator because it was hypothesized to operate as an internal mechanism through which the adverse effects of gaming addiction on sleep were filtered. This approach aligns with theoretical frameworks suggesting that resilience, as a dynamic process, evolves under the influence of stressors (such as gaming addiction) and subsequently impacts other outcomes, including sleep disorders (Kalisch et al., 2017; Luthar et al., 2000).

The study found that gaming addiction negatively predicts resilience. Such a finding aligns with prior studies (Keskin, 2019; Özmen, 2019; Turan, 2021; Yen et al., 2019), which highlighted that individuals struggling with gaming addiction often turn to games as a coping mechanism to escape from negative emotions and stressors (APA, 2013; Griffiths, 2005). Gaming addiction, characterized by excessive engagement and emotional dependence, depleted psychological resources necessary for adaptive coping (e.g., resilience). Resilience encompasses the ability to manage difficulties, engage in positive thinking, and adapt to adverse circumstances (Park et al., 2004; Reivich & Shatte, 2002).

Resilience negatively predicted sleep disorders, aligning with earlier research (Bilgin & Taş, 2022; Lenzo et al., 2022; Terao et al., 2022). Hughes et al. (2018) identified resilience as a buffer against sleep problems, while Terkeş et al. (2022) reported that individuals with low resilience experienced greater sleep disruptions. Resilience, as a dynamic process of positive adaptation (Luthar et al., 2000), mitigated the impact of stressors by fostering emotional regulation and coping strategies, thereby promoting better sleep.

Conversely, a lack of resilience might amplify the physiological and psychological vulnerabilities that led to sleep problems (Palagini et al., 2018).

The present study also revealed that gaming addiction positively predicts sleep disorders, consistent with previous findings (Cheraghi et al., 2021; Lam, 2014; Nguyen et al., 2021). Other studies, too, have suggested that individuals with gaming addiction often sacrifice sleep for extended gaming sessions (Tuncay & Göger, 2022) and that gaming addiction is linked to sleep issues, including diminished sleep quality and delayed sleep onset (De Rosa et al., 2024). According to APA (2013), gaming addiction itself involves not only prolonged screen time and mental preoccupation but also neglect of basic needs, including sleep. Moreover, sleep quality is intricately linked with mental health variables such as depression, anxiety, and stress (İyigün et al., 2017), which are also associated with gaming addiction (Anli & Taş, 2018; Brunborg et al., 2014). This co-occurrence suggests that gaming addiction and sleep disorders may share overlapping psychological and behavioral processes.

Resilience bridged the pathway from gaming addiction to sleep disorders by reflecting an individual's capacity to absorb, process, and respond to the psychological toll of gaming addiction. This conceptualization was grounded in stress-coping theories, which posited that resilience buffers the effects of stressors and determines adaptive versus maladaptive outcomes (Luthar et al., 2000). The results supported the hypothesis that resilience mediated the relationship between gaming addiction and sleep disorders. In other words, gaming addiction influenced sleep disorders indirectly through resilience. Prior studies provided support for these findings. For instance, Liu et al. (2016) demonstrated that resilience had a protective effect against sleep disorders, while Turan (2021) highlighted the mediating role of resilience in the relationship between empathy and video game addiction. The current study added to this body of knowledge by showing that although gaming addiction directly affected sleep disorders, this effect was predominantly channeled through resilience. Individuals with low resilience who were addicted to gaming were more likely to experience sleep disorders. This was consistent with evidence that resilience was negatively associated with both gaming addiction (Kim, 2016; Sert &

Sarıtepeci, 2024) and sleep disorders (Liu et al., 2021). Resilience functioned as a protective factor by enabling individuals to manage stressors and negative emotions effectively, thereby reducing reliance on maladaptive coping strategies such as excessive gaming. Increasing resilience among those at risk for gaming addiction could reduce the likelihood of sleep problems. Moreover, negative emotional states such as depression, anxiety, and stress, which were linked to sleep problems (İyigün et al., 2017), were also associated with gaming addiction (Anli & Taş, 2018; Brunborg et al., 2014). This overlap suggested that individuals with higher resilience were less affected by these risk factors, mitigating both gaming addiction and sleep disorders.

In conclusion, the findings demonstrated that resilience mediated the relationship between gaming addiction and sleep disorders, highlighting its critical role as a protective factor. Strengthening resilience in vulnerable populations could have served as an effective intervention strategy to address both gaming addiction and its associated sleep disturbances.

Limitations and Recommendations

This study had several limitations, which should be acknowledged when interpreting its findings. The first limitation pertains to the data collection tools, as data were obtained through self-report scales. Such tools are subject to limitations, including potential difficulties in item comprehension, tendencies to respond in a socially desirable manner, and influences of participants' momentary emotional states. To mitigate these issues, future researchers could utilize alternative data collection methods, such as interviews, and adopt diverse research approaches and techniques, such as longitudinal designs. Another limitation relates to the generalizability of the findings. Although the study included participants aged 20 to 27, the predominance of young adults in the sample limits the generalizability of the results to other age groups. The sample consists of university students. The high level of education of this group may be a limitation in generalizing the results to the general population.

Another limitation of the study may be the use of a mediation model within a cross-sectional design. In mediation models, collecting data at a

single point in time can be considered a limitation compared to collecting data at multiple time points.

Recommendations were also made for practitioners working in the field. Mental health professionals should consider gaming addiction as a significant factor when addressing sleep problems. Sleep disturbances affect individuals across various domains. Behaviorally, they manifest as lethargy, drowsiness, reduced responsiveness to external stimuli, increased reaction times, elevated arousal thresholds, and impaired cognition (Chokroverty, 2010). Addressing the underlying causes of sleep problems could help mitigate these adverse effects. Furthermore, the negative association of resilience with both gaming addiction and sleep problems highlights the need for professionals to focus on resilience-building interventions when addressing these issues.

The study encompassed a limited age range, and future research could investigate these relationships at different developmental stages, such as adolescence, young adulthood, and old age. Such research could provide valuable insights into how these variables interact across the lifespan. Additionally, educators and school counselors might consider integrating resilience-building modules into psycho-educational activities aimed at preventing gaming addiction. These modules could foster adaptive coping skills and emotional regulation to reduce the likelihood of gaming addiction and its associated negative outcomes.

Conflict of interest

We have no conflicts of interest to disclose.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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