

A Serial Mediation Model of Short-Form Video Addiction and High School Students' Academic Burnout: The Role of Sleep Quality and Anxiety

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Abstract: This study examined the mechanism linking short-form video addiction to academic burnout among high school students, with a specific focus on the serial mediating effects of sleep quality and anxiety. A total of 800 high school students were administered the Short-Form Video Addiction Scale, the Pittsburgh Sleep Quality Index, the Generalized Anxiety Disorder Scale, and the Adolescent Student Burnout Inventory, yielding 587 valid responses. Results showed that short-form video addiction, poor sleep quality, anxiety, and academic burnout were all significantly and positively correlated. Short-form video addiction had a direct impact on academic burnout ($\beta = 0.196$, $p < 0.001$). Sleep quality and anxiety mediated the link between short-form video addiction and academic burnout. The total indirect effect accounted for 45.56% of the total association, while the serial indirect pathway accounted for 8.89%. These findings indicate that short-form video addiction may increase academic burnout not only directly but also indirectly by impairing sleep quality and increasing anxiety. The results provide theoretical and empirical support for interventions targeting digital media use, sleep hygiene, and anxiety management among adolescents.

1. Introduction

Short videos refer to online videos that are released and shared through social media platforms, video sharing websites, mobile applications, etc., with a duration ranging from a few seconds to a few minutes^[1]. Because of their diverse content, effective human-computer interaction, convenient access, and short viewing duration, short-form videos have become widely popular. Short-form video addiction is a type of specific internet addiction, referring to a chronic or periodic state of obsession characterized by the repeated use of short-form video apps (e.g., TikTok, Kwai), accompanied by an intense and persistent craving and dependence^[2,3]. Studies have found that short-form video addiction exacerbates negative effects on students' academic performance and physical and mental health, such as reducing learning motivation and increasing the incidence of depression^[2,4,5].

Academic burnout is a persistent, negative, and learning-related psychological state that occurs in healthy individuals. This state is characterized by depletion of energy and physical and mental exhaustion; a gradual loss of enthusiasm for learning-related activities and a negative attitude toward academic work; and a lack of a sense of accomplishment or efficacy in academic studies^[6]. Existing studies have shown that academic burnout may lead to broad adverse consequences such as depression, low self-esteem, physical symptoms, reduced academic engagement and dropout^[7,8]. With the high penetration of short-form videos among adolescents, short-form video addiction has been identified as an important predictor of academic burnout. Short-form video addiction is significantly and positively associated with academic burnout^[9]. The Conservation of Resources (COR) theory holds that individuals continuously strive to acquire, maintain, and protect valued resources. When resources are depleted, threatened, or insufficient to meet individual needs and expectations, negative psychological outcomes such as burnout may emerge^[10,11]. Within this framework, short-form video addiction serves as a source of resource depletion: algorithm-driven immersive viewing continuously erodes time and attentional resources, shortens sleep duration, and crowds out space for rest and study. Based on this evidence, Hypothesis 1 is proposed: short-form video addiction positively predicts academic burnout.

Sleep is a fundamental physiological process for maintaining health and functioning. Insufficient or poor-quality sleep can significantly impair cognitive and psychological processes such as memory consolidation, executive function, and emotion regulation^[12-15]. A large body of research has demonstrated a stable positive association between short-form video addiction and poor sleep quality. Wu and Yao (2026) found that short-form video addiction was positively correlated with poor sleep quality in a sample of 553 Chinese college students^[16]; Zhao and Kou (2024) indicated that short-form video addiction can indirectly impair sleep quality by reducing physical activity and increasing procrastination behavior^[17]. Individuals who are excessively immersed in short-form videos divert time at night that should be used for rest to watching videos, thereby shortening sleep duration and reducing sleep quality^[18]; meanwhile, the high-intensity sensory stimulation of short-form videos and the continuous algorithmic recommendation induce pre-sleep cognitive arousal, making it difficult for individuals to fall asleep^[19]. Sleep quality is likewise regarded as a key predictor of academic burnout^[20,21]. From the perspective of COR theory, sleep serves as the physiological basis for the restoration of attention, memory, and emotion regulation^[12-15]. Good sleep quality helps to restore physical and psychological resources, and its decline triggers a continuous loss of an individual's available resources, thereby promoting the formation of burnout^[10]. Therefore, Hypothesis 2 is proposed: sleep quality mediates the relationship between short-form video addiction and academic burnout.

Anxiety is one of the common emotional problems among adolescents, manifested as excessive worry about future uncertainty, tension, and physiological vigilance^[22]. Short-form video addiction is significantly and positively correlated with anxiety. Excessive immersion in short-form videos may exacerbate upward social comparison, information overload, and failure of time control, thereby elevating anxiety levels^[23-26]. From the perspective of COR theory, anxiety is a psychological response when resources are threatened^[10]. Elevated anxiety levels may make it more difficult for individuals to maintain concentration and persistence on academic tasks, thereby promoting the formation of academic burnout^[27]. Based on the above evidence, Hypothesis 3 is proposed: anxiety mediates the relationship between short-form video addiction and academic burnout.

Sleep deprivation can disrupt a wide range of emotional processes, from basic emotional functions (e.g., emotion recognition, emotional reactivity, and emotional expression) to higher-order and complex social emotional functions (e.g., loneliness, helping behavior, abusive behavior)^[28]. A meta-analysis showed that poor sleep quality could predict subsequent anxiety and that sleep

interventions could reduce anxiety^[29]. We infer that, in the process through which short-form video addiction affects academic burnout, sleep quality and anxiety may not only act as separate mediators but may also form a serial mediating pathway. Therefore, Hypothesis 4 is proposed: sleep quality and anxiety play a serial mediating role between short-form video addiction and academic burnout.

Previous research has generally examined sleep problems and anxiety as separate correlates of short-form video addiction. Less is known about whether they jointly account for the association between short-form video addiction and academic burnout, particularly among high school students. Furthermore, the potential serial pathway from impaired sleep-related recovery to elevated anxiety has rarely been tested in this context. Integrating COR theory, this study focuses on the mechanisms by which sleep quality and anxiety operate in the process through which short-form video addiction leads to academic burnout, thereby providing empirical evidence and theoretical guidance for the prevention and intervention of academic burnout among high school students.

2. Methods

2.1. Participants

Participants were selected through convenience sampling from a senior high school in Guangdong Province. A total of 800 questionnaires were distributed. After excluding blank questionnaires and responses that failed the embedded validity-check items, 587 valid questionnaires were retained, resulting in a valid response rate of 73.4%. The sample comprised 248 males and 339 females. Participants ranged in age from 15 to 20 years ($M = 16.42$, $SD = 0.73$). Before answering the questionnaire in this study, the participants were informed that this survey was only for academic research and no personal information would be disclosed. All the participants were informed and answered voluntarily.

2.2. Measures

2.2.1. Short-Form Video Addiction Scale

This study used the Short Video-dominated Social Media Dependence Scale adapted by Hu et al.^[30] The scale consists of 6 items rated on a 5-point scale, with higher scores indicating more severe short-form video addiction. Items are scored from 1 (completely disagree) to 5 (completely agree). In this study, the Cronbach's α coefficient of the scale was 0.80.

2.2.2. Pittsburgh Sleep Quality Index (PSQI)

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), which was developed by Buysse et al.^[31] and then translated into Chinese by Liu et al.^[32] The scale contains 19 self-report items, 18 of which are grouped into seven factors: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications and daytime dysfunction. Factor scores range from 0 to 3 and are summed to produce a total PSQI score ranging from 0 to 21. Higher scores indicate poorer sleep quality. In this study, the Cronbach's α coefficient of the scale was 0.85.

2.2.3. Generalized Anxiety Disorder Scale (GAD-7)

Anxiety levels were assessed using the Chinese version of the Generalized Anxiety Disorder Scale, originally developed by Spitzer et al.^[22] and validated in Chinese populations by He et al.^[33]

The scale consists of 7 items rated on a 4-point Likert scale (0 = “not at all”, 3 = “almost every day”), with total scores ranging from 0 to 21, and higher scores indicating more severe anxiety symptoms. In this study, the Cronbach’s α coefficient of the scale was 0.92.

2.2.4. Adolescent Student Burnout Inventory

This study adopted the Adolescent Student Burnout Inventory revised by Wu et al.^[6] The scale contains 16 items and includes three dimensions: exhaustion, learning cynicism, and reduced efficacy. Items are scored on a 5-point Likert scale from 1 (“completely inconsistent”) to 5 (“completely consistent”). The cumulative score is derived from the aggregation of individual item scores. Higher total scores indicate higher levels of academic burnout. In this study, the Cronbach’s α coefficient for the total scale was 0.84.

2.3. Data Analysis

Data analysis was conducted using SPSS 27.0 and Hayes’ (2022) process macro^[34]. First, Harman’s single-factor test was used to evaluate potential common method bias. Second, Pearson’s correlation analyses were conducted to examine associations among the core variables. Finally, Model 6 was used to investigate a serial mediation model where short-form video addiction served as the predictor, sleep quality and anxiety acted as sequential mediators, and academic burnout was the outcome variable. The significance level of the mediating effect was tested by using the Bootstrap method with 5,000 repeated samplings to determine the 95% confidence interval for parameter estimation. Mediation effects were deemed significant when the 95% confidence interval for indirect effects did not contain zero.

3. Results

3.1. Common Method Bias Test

Harman’s single-factor test was used to assess common method bias. The results showed that the variance explained by the first factor was 24.50%, which is below the critical threshold of 40%, indicating that there was no serious common method bias in this study^[35].

3.2. Descriptive Statistics and Correlation Analysis

Table 1: Descriptive Statistics for Each Variable and Correlation Matrix among Variables.

Variable	M	SD	1	2	3	4
1 short-form video addiction	14.239	4.113	1	-	-	-
2 sleep quality	6.468	3.030	0.266***	1	-	-
3 anxiety	5.579	4.810	0.295***	0.512***	1	-
4 academic burnout	48.141	7.052	0.361***	0.517***	0.483***	1

Note: *** $p < 0.001$.

The means, standard deviations, and correlation coefficients of the variables are shown in Table 1. The findings showed a significant correlation among short-form video addiction, sleep quality, anxiety, and academic burnout. Short-form video addiction was significantly and positively correlated with poor sleep quality ($r = 0.266$, $p < 0.001$). Anxiety was significantly and positively correlated with both short-form video addiction ($r = 0.295$, $p < 0.001$) and poor sleep quality ($r = 0.512$, $p < 0.001$). Academic burnout showed a significant positive correlation with short-form video addiction ($r = 0.361$, $p < 0.001$), poor sleep quality ($r = 0.517$, $p < 0.001$), and anxiety ($r = 0.483$, $p < 0.001$).

3.3. Analysis of the Mediating Effect

The data were analyzed using SPSS 27.0 and Hayes' (2022) process macro. The utilization of Model 6 within the process macro was used to conduct a serial mediation test, with short-form video addiction as the independent variable, academic burnout as the dependent variable, and sleep quality and anxiety as serial mediators. The regression results are shown in Table 2. The analysis revealed that short-form video addiction significantly and positively predicted academic burnout ($\beta = 0.360$, $p < 0.001$), poor sleep quality ($\beta = 0.266$, $p < 0.001$) and anxiety ($\beta = 0.173$, $p < 0.001$). When both sleep quality and anxiety were entered into the regression equation, poor sleep quality significantly and positively predicted academic burnout ($\beta = 0.334$, $p < 0.001$), anxiety significantly and positively predicted academic burnout ($\beta = 0.254$, $p < 0.001$), and short-form video addiction ($\beta = 0.196$, $p < 0.001$) remained significantly positive.

Table 2: Regression Analysis of Variable Relationships.

Result variable	Predictive variable	R ²	F	β	t	p
academic burnout	short-form video addiction	0.130	87.204	0.360	9.338	< 0.001
sleep quality	short-form video addiction	0.071	44.316	0.266	6.657	< 0.001
anxiety	short-form video addiction	0.290	119.339	0.173	4.792	< 0.001
	sleep quality			0.466	12.887	< 0.001
academic burnout	short-form video addiction	0.366	112.209	0.196	5.620	< 0.001
	sleep quality			0.334	8.614	< 0.001
	anxiety			0.254	6.497	< 0.001

The Bootstrap method (5,000 resamples) was further used to test the significance of the mediating effects. The results are shown in Table 3 and Figure 1. The total mediating effect value was 0.164, which accounted for 45.56% of the overall effect of short video addiction on academic burnout (effect value 0.360). The mediating effects especially included three pathways' indirect impacts: indirect effect 1 from short-form video addiction $\rightarrow$ sleep quality $\rightarrow$ academic burnout pathway (effect value 0.088); indirect effect 2 from short-form video addiction $\rightarrow$ anxiety $\rightarrow$ academic burnout pathway (effect value 0.044); and indirect effect 3 from short-form video addiction $\rightarrow$ sleep quality $\rightarrow$ anxiety $\rightarrow$ academic burnout pathway (effect value 0.032). Indirect effects 1, 2 and 3 accounted for 24.44%, 12.22%, and 8.89% of the total effect, respectively. The 95% confidence intervals for the above indirect effects did not include 0, indicating that all three indirect effects were significant.

Table 3: Mediation Effects Bootstrap Test.

Effect type	Effect value	Boot SE	95% CI lower bound	95% CI upper bound	Effect ratio (%)
Total effect	0.360	-	-	-	-
Direct effect	0.196	-	-	-	54.44
Total indirect effect	0.164	0.022	0.121	0.210	45.56
Indirect effect 1	0.088	0.016	0.059	0.122	24.44
Indirect effect 2	0.044	0.014	0.019	0.075	12.22
Indirect effect 3	0.032	0.008	0.017	0.048	8.89

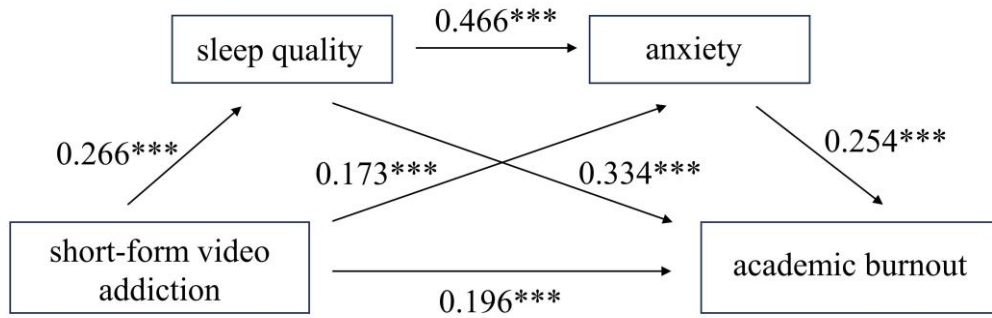


Figure 1: Mediation Model of Sleep Quality and Anxiety between Short-form Video Addiction and Academic Burnout.

4. Discussion

Based on Conservation of Resources theory, this study constructed a serial mediation model to explore the influence of short-form video addiction on academic burnout among high school students and the mechanisms of sleep quality and anxiety. The results indicated that short-form video addiction was directly associated with academic burnout among high school students and was also indirectly associated with academic burnout through sleep quality and anxiety.

This study found that short-form video addiction had a significant positive predictive effect on academic burnout among high school students, supporting Hypothesis 1. This result is highly consistent with the conclusions of prior research^[2,9]. From the perspective of COR theory, short-form video addiction can be understood as a behavioral pattern that continuously consumes time, attention, and self-regulatory resources. High school students are already situated in contexts of heavy academic load and high evaluative pressure. When their limited resources are continually occupied by short-form video use, they are more likely to experience resource depletion, which may manifest as emotional exhaustion, reduced learning efficacy, and academic alienation^[9,10,27].

The present study further showed that sleep quality played a significant mediating role between short-form video addiction and academic burnout, supporting Hypothesis 2. In other words, the higher the level of short-form video addiction, the more likely students were to report poorer sleep quality, and poorer sleep quality further increased academic burnout. This finding is consistent with existing evidence that short-form video use affects sleep and that insufficient sleep impairs academic adaptation^[16,20,36]. For high school students, sleep is not only a physiological recovery process but also an important foundation for maintaining learning, memory, attention, and daytime functioning. A meta-analysis showed that sleep quality, sleep duration, and sleepiness among children and adolescents were all significantly associated with academic performance^[37]. From the perspective of COR theory, sleep quality can be understood as a vital resource for restoring energy and coping with academic stress. When addictive short-form video use continuously disrupts sleep recovery, individuals may become more vulnerable to learning burnout because of insufficient energy and reduced self-control^[17].

The results also indicated that anxiety played a significant mediating role between short-form video addiction and academic burnout, supporting Hypothesis 3. This result suggests that short-form video addiction may affect students' academic status not only by impairing physiological recovery but also by increasing negative emotional experiences. Previous studies have shown a stable association between short-form video addiction and anxiety^[23,24]. Anxiety reflects individuals' subjective perception of resource loss or potential threats to resources. Information overload, failures of time control, and social comparison pressure caused by short-form video

addiction may all increase students' anxiety^[23-26]. Anxiety weakens the efficient operation of the attentional system, leading to negative emotions such as tension and worry, and occupying limited working memory resources^[38]. When resources are continuously consumed by anxiety without replenishment, individuals enter a resource loss spiral, ultimately manifesting as burnout. Therefore, the mediating role of anxiety reveals the emotional channel through which short-form video addiction affects academic burnout.

In addition to the two separate mediation pathways, this study also found that sleep quality and anxiety constituted a significant serial mediating pathway between short-form video addiction and academic burnout. That is, short-form video addiction reduced sleep quality, which gave rise to a higher degree of anxiety, which in turn led to academic burnout, supporting Hypothesis 4. From the perspective of COR theory, short-form video addiction first disrupts sleep as a basic recovery resource, making it difficult for individuals to replenish the energy consumed by learning. Insufficient sleep resources further weaken emotion-regulation resources and raise anxiety levels. Increased anxiety then further consumes cognitive and emotional resources needed for learning, thereby aggravating academic burnout.

Several limitations should be acknowledged. First, this study adopted a cross-sectional design, making it difficult to make strict inferences about the causal relationships among variables. Future studies should use longitudinal tracking or experimental designs to test causal pathways. Second, the sample was drawn from high school students in a single region, and the sampling source and educational stage were relatively limited. Future research should include students from different regions, school types, and educational stages, to improve external validity. Third, this study relied solely on self-report data and may be affected by biases such as social approval. Future research could integrate multiple data sources, such as screen-time records, wearable-device sleep monitoring, and teacher or parent reports, to improve ecological validity.

5. Conclusions

Using a sample of high school students and drawing on COR theory, this study constructed and tested a serial mediation model involving short-form video addiction, sleep quality, anxiety, and academic burnout. The results showed that short-form video addiction not only directly intensified academic burnout among high school students but also exerted an indirect effect through the serial pathway of impaired sleep quality and increased anxiety. These findings suggest that addressing the problem of academic burnout among adolescents in the digital age requires the construction of a multidimensional, coordinated system of prevention and intervention, including reasonably controlling short-form video use, raising awareness of sleep hygiene, and conducting anxiety-management training. This study provides empirical evidence and theoretical guidance for schools, families, and policymakers seeking to respond collaboratively to adolescent short-form video addiction and its academic consequences.

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