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The Impact of Pre-Sleep Social Media Use on Sleep Quality Among College Students: The Mediating Effect of Revenge Bedtime Procrastination

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Abstract:

Based on the contemporary context of generally poor sleep quality among college students and the increasing influence of social media on their daily lives, this study examines the college student population using a mixed methods approach to explore the underlying psychological mechanisms through which pre-sleep social media use affects individual sleep quality, with revenge bedtime procrastination as a mediating variable. The research employed questionnaire surveys (N = 137) combined with social media data mining (639 comments from platforms including Douyin, Bilibili, Weibo, and Xiaohongshu) for triangulation purposes. Data analysis revealed that, compared to frequency, the duration of pre-sleep social media use more significantly predicted revenge bedtime procrastination ($\tau\_b = 0.390$, $p < 0.001$). Revenge bedtime procrastination directly contributed to decreased sleep quality ($\beta = 0.199$). Structural equation modeling further confirmed the mediating role of revenge bedtime procrastination in the social media use to sleep quality pathway (indirect effect = 15.76, $p < 0.05$). Simultaneously, text sentiment analysis identified a widespread psychological motivation among students to compensate for perceived daytime freedom loss by extending nighttime social media use. However, this behavior induced a sense of time loss and control, ultimately forming a vicious cycle of compensation and loss of control that exacerbates sleep quality issues. The study reveals the deep psychological pathway through which social media affects sleep quality at the behavioral mechanism level.

Keywords: Pre-sleep social media use; revenge bedtime procrastination; sleep quality; mediating effect; college students.

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1. Introduction

According to the *2024 White Paper on Sleep Health of Chinese Residents*, the prevalence of late-night sleep among university students is notably severe, with only 29% of students falling asleep before midnight, while a significant 52% go to bed between midnight and 2:00 AM [1]. Concurrently, a 2024 survey conducted by *China Youth Daily* and the *China University Media Center* on social media usage among university students revealed that 86.6% of respondents utilize social media platforms to share diverse aspects of their lives [2].

This study focuses on the prevalent phenomenon of exacerbated sleep quality decline among college students due to pre-sleep social media use, examining it through the lens of psychological and behavioral mechanisms. It specifically investigates the mediating role of "*Revenge Bedtime Procrastination*" in the relationship between these two factors. Revenge Bedtime Procrastination is defined as the behavior of deliberately delaying bedtime at night as a form of psychological compensation for the perceived loss of personal free time caused by daytime commitments to study, work, or other obligations.

In the current digital era, smartphones have become an indispensable tool for college students, permeating and influencing virtually every aspect of their lives. Social media usage, as a core smartphone function, profoundly impacts students' learning, social interactions, and even their sleep duration [3]. Notably, high-frequency nighttime social media use has emerged as a significant trigger for sleep disturbances among students. While existing research has established direct physiological pathways - such as blue light emission suppressing melatonin secretion and information overload inducing cognitive arousal - less attention has been paid to the underlying psychological factors driving this behavior [4]. Consequently, this study holds significant value for understanding the psychological mechanisms and behavioral paradoxes of the adolescent sleep health crisis in the digital age. It not only bridges the gap concerning psychological factors behind major sleep disturbance triggers but also provides a theoretical foundation for comprehending the complex behavior of "deliberate bedtime delay despite awareness of its consequences". This research specifically focuses on social media due to its fragmented content, algorithmic recommendations, and its function in compensating for Fear of Missing Out (FOMO) or fulfilling unmet emotional needs from reduced face-to-face interactions, making it the primary nighttime conduit [5-8].

This study employed a literature analysis method to systematically search and review relevant materials and publications. This approach offers the advantage of effectively analyzing and summarizing the current state of research, providing a logical foundation for the mixed methods design, and facilitating the subsequent formulation of hypotheses and the execution of the survey investigation. Current research consistently indicates that social media plays a central role in inducing sleep problems among college students: it triggers Fear of Missing Out (FOMO), prompting individuals to excessively use platforms at night as compensation for unmet psychological needs during the day [7]. This compensatory behavior manifests directly as the highly prevalent phenomenon of revenge bedtime procrastination - 79.5% of students, experiencing deprivation of daytime free time, actively choose to delay sleep in exchange for a sense of nocturnal autonomy [9]. More significantly, this behavior has become deeply embedded in the sleep context: 93.5% of adolescents use smartphones before sleep, with 76.7% primarily engaging with social media platforms, resulting in a high degree of overlap between platform usage and the sleep space [9, 10]. Empirical studies further reveal that Problematic Social Media Use (PSU) is directly and negatively correlated with declining sleep quality, while revenge bedtime procrastination, as a key mediating variable, indirectly amplifies sleep impairment - manifested as decreased sleep quality and related physiological dysfunctions - through exacerbating pre-sleep procrastination [7, 10]. Consequently, the associations between nighttime social media use, revenge bedtime procrastination, and sleep deterioration have been partially established, yet independent hypotheses are still required to validate the logical chain of their direct interrelationships.

The ultimate research objective of this study is to empirically validate the mediating model of "social media use → revenge bedtime procrastination → sleep quality," thereby illuminating the paradox between the short-term gratification derived from psychological compensation and its long-term health costs. To achieve this objective, we conducted a cross-sectional survey to measure variable correlations, employed structural equation modeling to test the mediating effect, and performed text mining on social media comments to unravel the behavioral loop of "psychological compensation leading to loss of control and subsequent deterioration." Collectively, these approaches definitively identified revenge bedtime procrastination as the critical psychological nexus connecting pre-sleep digital behaviors with the sleep health crisis.

2. Theoretical Framework & Hypothesis

2.1 Theoretical Framework

The construction of the theoretical framework and path-

ways is grounded in "*Psychological Compensation Theory*" and "*Autonomy Need Compensation Theory*."

Psychological Compensation Theory, proposed by Alfred Adler, posits that individuals develop compensatory behaviors when certain psychological needs are frustrated [11]. Social media use is frequently linked to unmet needs in an individual's real life, serving as a channel for such psychological compensation. Over time, this usage pattern readily contributes to the emergence of revenge bedtime procrastination. The sense of gratification derived from immersion in social media can also lead to cognitive dissonance - manifested as the awareness of the detrimental effects of sleep deprivation while simultaneously persisting in late-night use to fulfill psychological needs, thereby further rationalizing revenge bedtime procrastination [12]. Consequently, individuals sacrifice sleep time at night to satisfy their psychological needs, ultimately exerting an adverse effect on sleep quality.

Autonomy Need Compensation Theory originates from Self-Determination Theory, proposed by Deci and Ryan. This theory emphasizes the fundamental importance of an individual's need for autonomy [13]. When autonomy is thwarted in daily life, individuals seek alternative ways to compensate for this deficiency. Social media provides a compensatory space for autonomous choice and self-expression.

Thus, from the perspective of Psychological Compensation Theory and Autonomy Need Compensation Theory, a complex interplay exists between social media use, revenge bedtime procrastination, and sleep quality, leading to the construction of the mediating model (see Figure 1 and Figure 2).

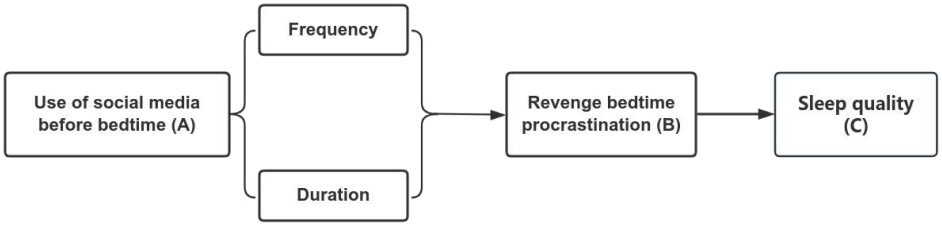

Fig. 1 The mediating model: social media use→revenge bedtime procrastination→sleep quality

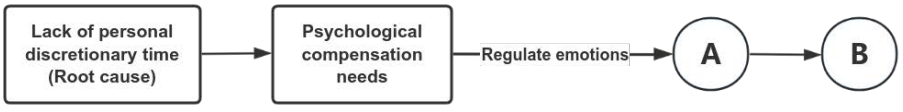

Fig. 2 Additional detailed steps regarding section A→B (including prerequisite factors)

2.2 Hypothesis

Building upon the research background presented in the introduction and the constructed mediating model, the following four hypotheses are proposed: H1 (Direct Effect) posits that the duration/frequency of pre-sleep social media use positively predicts a decline in sleep quality, i.e., pre-sleep social media use (A) negatively predicts sleep quality (C); H2 (Mediating Path a) posits that the duration/frequency of pre-sleep social media use positively predicts the intensity/frequency of revenge bedtime procrastination behavior, i.e., social media use (A) positively predicts revenge bedtime procrastination (B); H3 (Mediating Path b) posits that the intensity/frequency of revenge bedtime procrastination behavior positively predicts a decline in sleep quality, i.e., revenge bedtime procrastination (B) negatively predicts sleep quality (C); H4 (Mediating Effect) posits that revenge bedtime procrastination behavior plays a significant mediating role between pre-sleep social media use and the decline in sleep quality.

3. Research Methods

This study employed a mixed-methods approach, building upon established practices in related research that commonly utilize cross-sectional surveys and text analysis. The design incorporated both questionnaire surveys and the collection of social media comments to gather and analyze data. The questionnaire method quantitatively verified the statistical pathway of "A→B→C," providing foundational data for the study. While quantitative methods alone are limited, the collection of social media comment data captures students' actual feelings, perceptions, emotions, and experiences during platform usage; it also facilitates the elucidation of dynamic changes with

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temporal context and supplements the nuanced emotional states and authentic scenarios often missed by questionnaires. Consequently, the strength of this methodological approach lies in enhancing data richness and diversity; it increases the study's credibility and validity, as the mutual complementarity of the two methods yields findings that more closely reflect reality.

3.1 Questionnaire Design

Beyond surveying participants' basic information and environmental variables affecting sleep (specifically academic stress), this questionnaire was specifically designed to measure the three key variables outlined in the hypotheses. Basic information included gender, academic year, level of academic stress, and wake-up time. For Variable A (pre-sleep social media use), questions targeted two dimensions: usage frequency (A1) and usage duration (A2). It also gathered more detailed insights into specific social media usage patterns, including commonly used platforms and purposes of use. The measurement items for the mediating Variable B (revenge bedtime procrastination behavior) were adapted from the Bedtime Procrastination Scale, employing a self-developed 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". For the measurement of Variable C (sleep quality), core items from the Pittsburgh Sleep Quality Index (PSQI) were utilized: sleep duration (C1), sleep latency (time taken to fall asleep) (C2), level of daytime dysfunction (insufficient energy the next day) (C3), and subjective sleep quality (C4).

3.2 Data Collection

The questionnaire was completed by 137 college students, and all were valid (100% validity rate). Male and female participants accounted for 37.23% and 62.77% respectively, covering all academic years from freshman, sophomore, junior, and senior undergraduates to graduate students. Social media comment data was sourced from Douyin, Bilibili, Weibo, and Xiaohongshu, totaling 4,009 entries collected (see Table 1). Questionnaire data analysis utilized SPSS 26.0 for Spearman and Kendall's tau_b correlation analyses, and AMOS 24.0 was employed to test the mediating effect within the structural equation model. For social media text analysis, the primary methods employed were word frequency analysis based on WordCloud and an AI tool (deepseek) leveraging one of the latest NLP engines, Transformer, as its base model, further optimized for this research.

Table 1. Overview of 4 platforms

Platform	Content Theme	Comments/Posts Count
Bilibili	Mechanisms and Current Prevalence of Revenge-Addiction Sleep Delay	2,988
Douyin	#RevengeBedtimeProcrastination High-engagement Videos	639
Weibo	#RevengeBedtimeProcrastination Real-Time Posts	142

4. Findings

4.1 Questionnaire Data Analysis

Questionnaire analysis will proceed along two dimensions: one focused on extracting key characteristics for descriptive profiling, and the other dedicated to verifying causal mechanisms underlying the hypotheses. Regarding social media usage characteristics, the survey revealed that WeChat dominates the pre-sleep scenario (78.83%), followed by short-video platforms (Xiaohongshu: 70.07%, Douyin: 51.09%, Bilibili: 39.42%). The primary motivations for use were social chatting (77.37%) and fragmented entertainment consumption (72.99%). As illustrated in Figure 3, in the analysis of academic stress characteristics, the survey found that self-rated stress scores≥3 points were prevalent at approximately 80% across all academic years.

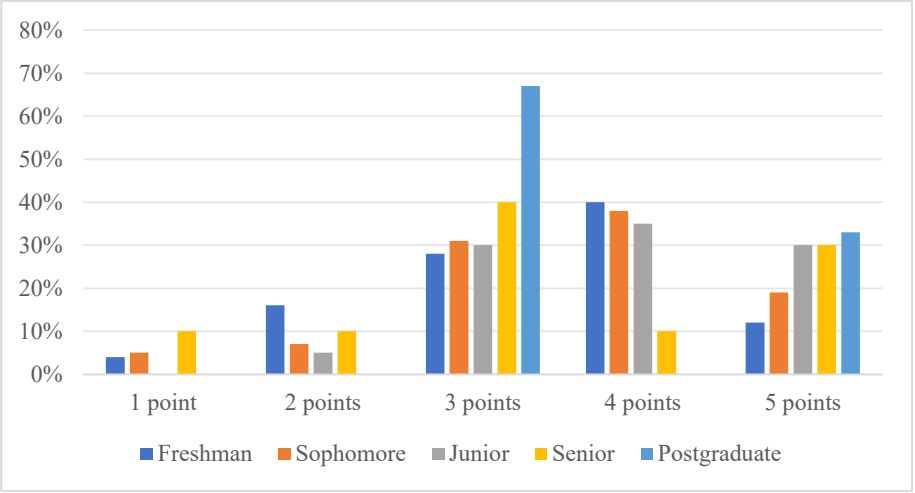

Fig. 3 Grade-stress score relationship

This study encompasses four hypotheses. Accordingly, the hypothesis verification section employs multiple appropriate analytical methods for separate validation. To test H1 (that the duration/frequency of pre-sleep social media use positively predicts a decline in sleep quality), Spearman's rank correlation coefficient (ρ) was utilized. Indicators for predicting changes in sleep quality referenced the outcomes of daytime dysfunction (insufficient energy the next day) (C3) and subjective sleep quality (C4).

Table 2. Using SPSS to analyze correlation between A and C

			A1	A2	C3	C4
Spearman's rho	A1	Correlation Coefficient	1.000	200*	0.063	0.117
		Sig. (2-tailed)		0.019	0.465	0.172
		N	137	137	137	137
	A2	Correlation Coefficient	200*	1.000	194*	0.081
		Sig. (2-tailed)	0.019		0.023	0.349
		N	137	137	137	137
	C3	Correlation Coefficient	0.063	194*	1.000	0.162
		Sig. (2-tailed)	0.465	0.023		0.059
		N	137	137	137	137
	C4	Correlation Coefficient	0.117	0.081	0.162	1.000
		Sig. (2-tailed)	0.172	0.349	0.059	
		N	137	137	137	137

*. Correlation is significant at the 0.05 level (2-tailed).

As shown in Table 2, at the 0.05 significance level, social media usage duration (A2) exhibited a weak positive correlation with daytime dysfunction (insufficient energy the next day) (C3) (ρ = 0.194); other correlations were not significant.

To test H2 (that the duration/frequency of pre-sleep social media use positively predicts the intensity/frequency of revenge bedtime procrastination behavior), Kendall's tau_b correlation coefficient (τ_b) was employed.

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Table 3. Using SPSS to Analyze Correlation Between A and B

			A1	A2	B
Kendall's tau_b	A1	Correlation Coefficient	1.000	179*	162*
		Sig. (2-tailed)		0.020	0.033
		N	137	137	137
	A2	Correlation Coefficient	179*	1.000	390**
		Sig. (2-tailed)	0.020		0.000
		N	137	137	137
	B	Correlation Coefficient	162*	390**	1.000
		Sig. (2-tailed)	0.033	0.000	
		N	137	137	137
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

As indicated in Table 3, at the 0.01 significance level, social media usage duration (A2) significantly predicted revenge bedtime procrastination (B) ($\tau\_b = 0.390$). At the 0.05 significance level, the correlation coefficient between social media usage frequency (A1) and revenge bedtime procrastination (B) was relatively small, indicating a correlation of moderate strength; however, this correlation was highly significant ($\tau\_b = 0.162$).

To test H3 (that the intensity/frequency of revenge bedtime procrastination behavior positively predicts a decline in sleep quality), Kendall's tau_b correlation coefficient (τ_b) was applied.

Table 4. Using SPSS to Analyze Correlation Between B and C

			C3	C4	B
Kendall's tau_b	C3	Correlation Coefficient	1.000	0.139	199**
		Sig. (2-tailed)		0.058	0.005
		N	137	137	137
	C4	Correlation Coefficient	0.139	1.000	0.136
		Sig. (2-tailed)	0.058		0.060
		N	137	137	137
	B	Correlation Coefficient	199**	0.136	1.000
		Sig. (2-tailed)	0.005	0.060	
		N	137	137	137
**. Correlation is significant at the 0.01 level (2-tailed).					

As presented in Table 4, at the 0.05 significance level, revenge bedtime procrastination (B) exhibited a significant positive correlation with daytime dysfunction (insufficient energy) (C3) ($\tau\_b = 0.199$, $p < 0.05$).

To test H4 (the mediating effect: revenge bedtime procrastination behavior plays a significant mediating role between pre-sleep social media use and the decline in sleep quality), structural equation modeling (SEM) was implemented. The constructed mediation model is depicted in Figure 4, where A1 (frequency), A2 (duration), C1 (sleep duration), C2 (sleep latency), C3 (daytime dysfunction), and C4 (subjective quality) served as observed variables, while A (pre-sleep social media use) and C (sleep quality) were modeled as latent variables.

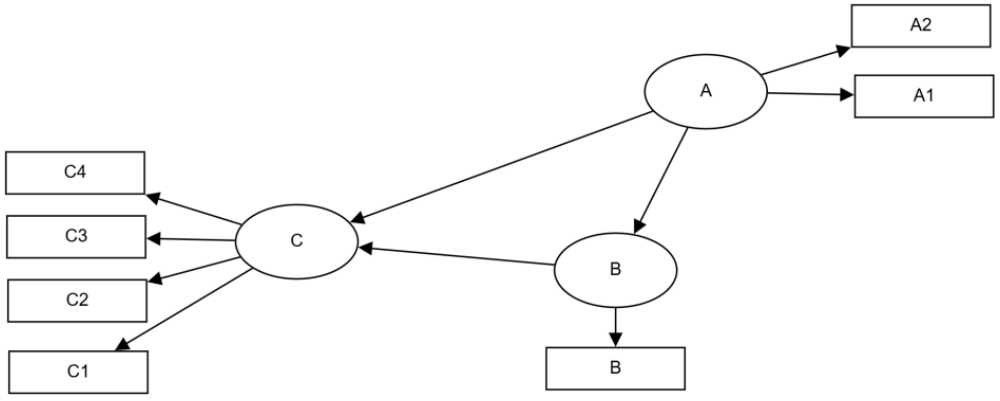

Fig. 4 Model diagram for verifying the mediating effect

Table 5. Use various indicators of SEM to verify mediating effects

X	→	Y	Unstandardized Regression Coefficient	SE	z (CR Value)	p	Standardized Regression Coefficient
A	→	B	6.274	2.855	2.198	0.028	1
A	→	C	-16.567	0.186	-88.991	0	-13.611
B	→	C	2.512	1.168	2.151	0.031	12.951
A	→	A2	129.121	53.962	2.393	0.017	0.685
A	→	A1	1	-	-	-	0.275
C	→	C4	-0.948	0.348	-2.726	0.006	-0.4
C	→	C3	-1.299	0.474	-2.741	0.006	-0.404
C	→	C2	-108.563	34.633	-3.135	0.002	-0.674
C	→	C1	1	-	-	-	0.389
Note: → indicates regression influence relationship or measurement relationship.							
Hyphen '-' indicates that the item is a reference item.							

Assume Results from Table 5 demonstrate that SEM analysis confirmed the significant mediating effect of revenge bedtime procrastination (B) (indirect effect = 15.76, $p < 0.05$), with the model exhibiting good fit ($\chi^2/df = 1.816$, RMSEA = 0.077).

4.2 Social Media Text Analysis

First, sentiment analysis was conducted on platforms with timestamp data (Bilibili and Weibo). This study initiated the investigation by analyzing the correlation between comment timestamps and emotional valence within the comment sections of videos tagged #RevengeBedtime-Procrastination on Bilibili. Comment timestamps were segmented into four distinct six-hour intervals: late night/early morning (00:00-05:59), morning (06:00-11:59), afternoon (12:00-17:59), and evening (18:00-23:59).

Table 6. Diurnal Patterns of Sentiment Distribution in Bilibili Platform

Time Period	Total Comments	Positive (%)	Negative (%)	Neutral (%)	Primary Sentiment Characteristics
Late Night (00:00-05:59)	~14%	1 (7%)	8 (57%)	5 (36%)	Predominantly negative; Insomnia/fatigue/regret themes
Morning (06:00-11:59)	~17%	3 (18%)	6 (35%)	8 (47%)	Neutral dominant; Residual negativity; Complex awakening reflections
Afternoon (12:00-17:59)	~20%	2 (10%)	6 (30%)	12 (60%)	Highly neutral; Work-related distractions; Rational state
Evening (18:00-23:59)	~25%	4 (16%)	15 (60%)	6 (24%)	Peak negativity; Anxiety/entertainment loss; Guilt from compensatory behavior

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Analysis of Table 6 reveals that negative sentiment predominates during late-night and evening periods, corresponding to the psychological state of "deliberate bedtime delay despite awareness" characteristic of revenge bedtime procrastination.

For the investigation of emotion-correlation within real-time Weibo posts containing #RevengeBedtimeProcrastination, the study specifically focused on night-to-early morning comments (00:00-05:59), comparing both comment volume and emotional valence against daytime data (as illustrated in Table 7). The comparison demonstrated that nocturnal posts constituted 72% of total data, potentially corresponding to pre-sleep social media engagement patterns. Simultaneously, keyword-associated sentiment exhibited statistically significant diurnal variations.

Table 7. Nocturnal Psychological Themes in Weibo

Keyword	Frequency	% Increase vs. Daytime	Representative Nocturnal Contexts
Loneliness	98	+310%	"Only my phone glows at 3 AM", "Midnight snacks with no one to share"
Loss of Control	87	+290%	"Can't stop scrolling", "Know I shouldn't stay up but can't help it"
Autonomy	76	+180%	"Night is my kingdom", "Reclaiming stolen time"
Somatization	69	+250%	"Heart pounding", "Hand tremors", "Needle-like pain in temples"
Emptiness	54	+200%	"Scrolling into void", "Don't know why I'm staying up"
Regret	48	+170%	"Will be swollen like a pig tomorrow", "Hate my weakness"
Guilty Pleasure	35	Newly emerged	"Secret joy of binge-watching under covers", "Stealth junk food binges"
Death Anxiety	28	+150%	"Sudden death warning", "Liver pain - is this the end?"
Workplace Resentment	26	+120%	"Must see stupid boss at dawn", "Suffocating at thought of work"
Childhood Compensation	18	Newly emerged	"Making up for childhood without late-night snacks"

For Douyin and Xiaohongshu platforms, high-frequency word cloud visualizations were generated (Figure 5), with subsequent analysis of user comments explicitly articulating psychological motivations. Representative examples include: "Only during late-night scrolling do I truly reclaim personal autonomy" and "Despite full awareness of next-day fatigue, the irresistible urge to prolong wakefulness persists".

Fig. 5 Top 16 frequent words in TikTok comments

Comparative analysis revealed significantly amplified negative sentiment keywords during late-night periods versus non-nocturnal intervals. This negativity partially originates from anticipatory awareness of next-day consequences (Figure 6). Building upon textual evidence, this study identified a negative emotional cycle among individuals exhibiting revenge bedtime procrastination: social media provides a transient sense of autonomy → triggers compulsive engagement → delays sleep onset → induces consequent fatigue.

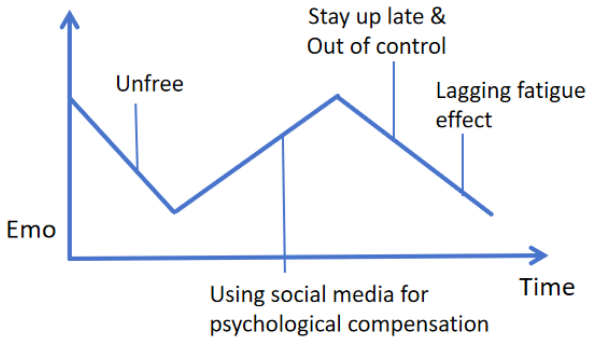

Fig. 6 Simulated nocturnal emotional shifts chart

5. Conclusion

This study elucidates the interconnected pathways linking social media use, revenge bedtime procrastination, and diminished sleep quality, revealing revenge bedtime procrastination's core mediating role between nocturnal social media engagement and sleep deterioration. This demonstrates how social media ultimately impairs sleep through psychological compensation mechanisms. Specifically, while nighttime social media use transiently satisfies compensatory needs, it concurrently induces loss-of-control perceptions, delays sleep onset, and precipitates next-day fatigue - establishing a cyclical "gratification-regret" pattern. Furthermore, psychological compensation exhibits an intrinsic paradox: despite providing ephemeral autonomy fulfillment, it triggers both perceived behavioral dysregulation and negative affect.

Platform-specific analysis indicates WeChat and short-video platforms dominate pre-sleep digital environments by respectively fulfilling core needs for social connection and fragmented entertainment. Academic stress correlates significantly with revenge bedtime procrastination incidence among university students. Collectively, these findings confirm revenge bedtime procrastination's pivotal mediation between social media exposure and sleep impairment, wherein the underlying psychological compensation mechanism functions as a double-edged sword - satisfying immediate psychological demands while generating subsequent emotional distress and sleep dysfunction.

This study offers significant referential value for future research, primarily enhancing the understanding of social media-sleep relationships, elucidating the critical role of psychological compensation mechanisms, and highlighting differential platform impacts on pre-sleep behaviors alongside the academic stress-revenge bedtime procrastination linkage.

Future investigations should first incorporate more objective sleep monitoring to reduce subjective bias, aiming to identify non-significant mediators affecting the impact of revenge bedtime procrastination on self-reported sleep quality; then expand sample diversity by investigating students across different academic levels to strengthen conclusion generalizability; and further conduct in-depth exploration into root causes of RBP and related directions.

References

[1] Chinese Sleep Research Society, Sleemon Sleep Research Institute. 2024 annual report on sleep health of Chinese residents [R/OL]. 2024-03-18. https://www.sohu.com/a/766405048_121757514

[2] Zhong Q., Xiao M. Survey report on social media sharing behavior characteristics of university students [N/OL]. China Youth Daily, 2024-11-04(06) [2025-07-04]. https://zqb.cyol.com/html/2024-11/04/nw.D110000zgqnb_20241104_1-06.htm

[3] Kolhar M., Kazi R. N. A., Alameen A. Effect of social media use on learning, social interactions, and sleep duration among university students. Saudi Journal of Biological Sciences, 2021, 28(4): 2216-2222.

[4] Czeisler C. A., Duffy J. F., Shanahan T. L., et al. Suppression of melatonin secretion by short-wavelength light in humans. Journal of Clinical Endocrinology & Metabolism, 2005, 90(3): 1311-1316.

[5] Bucher T. The algorithmic imaginary: Exploring the ordinary affects of Facebook algorithms. Information, Communication & Society, 2017, 20(1): 30-44.

[6] Alvarado O., Heuer H., Vanden Abeele V., et al. Middle-aged video consumers' beliefs about algorithmic recommendations on YouTube. Proceedings of the ACM on Human-Computer Interaction, 2020, 4(CSCW2): 121.

[7] Almeida F., Marques D. R., Gomes A. A preliminary study on the association between social media at night and sleep quality: The relevance of FOMO, cognitive pre-sleep arousal, and maladaptive cognitive emotion regulation. Scandinavian Journal of Psychology, 2022.

[8] Bond B. J. Parasocial relationships as functional social alternatives during pandemic-induced social distancing. Psychology of Popular Media, 2021, 10(3): 396-406.

[9] Li S. S. Study on retaliatory staying up late of college students and related influencing factors. Pure Mathematics, 2023, 13(6): 1801-1821.

[10] Bozkurt A., Demirdöğen E. Y., Akıncı M. A. The association between bedtime procrastination, sleep quality, and problematic smartphone use in adolescents: A mediation analysis. Eurasian Journal of Medicine, 2024.

[11] Adler A. The neurotic constitution. New York: Greenburg, 1927.

[12] Festinger L. A theory of cognitive dissonance. Stanford: Stanford University Press, 1957.

[13] Deci E. L., Ryan R. M. Intrinsic and extrinsic motivations: Classic definitions and new directions. Contemporary Educational Psychology, 2000, 25(1): 54-67.