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The Effect of Negative Emotions on Sleep Procrastination Behaviours: Chain Mediation of Self-control and Time Management Tendencies

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Abstract: This study aims to research the effects of negative emotions on bedtime procrastination behaviors, with self-control and time management as chain mediating variables. Using relevant scales, a questionnaire survey was conducted among 300 participants. The results showed significant negative correlations between bedtime procrastination and negative emotional bias, self-control, and time management tendency. Mediation analysis indicated that, Controlling for gender and age., negative emotions significantly positively predict bedtime procrastination. The significant mediating role of time management tendency, and Interlocking mediating effects of self-control and time management tendencies is significant. In essence, individuals with high levels of negative emotions are more likely to engage in bedtime procrastination behaviors and negative emotions can lead to bedtime procrastination behaviors by affecting self-control and time management tendencies.

Keywords: Bedtime Procrastination, Negative Emotions, Self-Control, Time Management Tendency

1. Introduction

Bedtime procrastination is a newly introduced concept in the field of procrastination in recent years. Just like general procrastination, bedtime procrastination involves the willingness to delay an anticipated action plan, despite the expectation that continued procrastination will lead to worse outcomes. Therefore, bedtime procrastination is characterized as the difficulty of adhering to the intended bedtime without external disruptions. [1] For instance, instances such as continuing to scroll through social media even when extremely tired, or consistently going to bed later than intended despite regretting it every morning, are all manifestations of bedtime procrastination.

According to the "China Sleep Index Report", 75.8% of people still go to bed after 11pm, and 27.2% even go to bed after 1am, resulting in serious sleep deprivation due to chronic late-night sleep. Adequate sleep, as one of the most critical behaviors promoting human health, is key to maintaining physical and mental health and preventing diseases. Research has found that the general decrease in sleep duration mainly stems from the delay in bedtime. [2] Therefore, procrastination is likely to play a vital role in the execution of healthy sleep behaviors. Drawing from this foundation, the primary objective of this research is to explore the internal mechanisms and influencing factors of bedtime

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procrastination behaviors by building a research model among variables and integrating current empirical research, providing a reference basis for improving bedtime procrastination behaviors.

According to the self-control theory of procrastination, individuals may possess the capability to plan but struggle with self-control when it comes to executing those plans. Bedtime procrastination, similar to general procrastination, is considered a consequence of weakened self-control. Researchers have found a strong association between bedtime procrastination and self-regulation failure, indicating that poor self-control leads to bedtime procrastination. [3] This, in turn, results in sleep deprivation. Empirical psychological research has demonstrated a negative correlation between self-regulation ability and sleep deprivation. Individuals with lower self-regulation abilities are more susceptible to engaging in bedtime procrastination, which subsequently leads to sleep deprivation Therefore, self-control, as a relatively stable personal trait, directly impacts sleep and contributes to sleep deprivation through bedtime procrastination.

Recent studies have demonstrated a significant link between negative emotions and bedtime procrastination. Negative emotions have a detrimental impact on sleep quality, hindering individuals' ability to manage stress and increasing the probability of engaging in bedtime procrastination. Moreover, there is a positive correlation between bedtime procrastination and symptoms of clinical depression, indicating a link between bedtime procrastination and negative emotions.[4]The bedtime procrastination behavior can be seen as a short-term emotional fix.[5]Specifically, individuals with bedtime procrastination delay going to bed as a way to alleviate negative feelings However, this behavior often leads to sleep deprivation, perpetuating the cycle of bedtime procrastination. Consequently, we propose that negative emotions impact sleep patterns, and procrastinating before bedtime serves as an insufficient strategy for emotional regulation, resulting in bedtime procrastination behavior.

At the same time, there is a close relationship between emotions and Control of the self. Research has revealed that individuals exhibiting elevated levels of positive emotions are cautious in considering all kinds of details before taking action and make impulsive decisions less frequently. [6] On the contrary, negative emotions are often associated with impulsive consumption [7], substance addiction [8], and other self-defeating behaviors. Compared with positive emotions, negative emotions trigger more intense emotional experiences and are more likely to lead to self-control failure [9]. Therefore, negative emotions can have a negative effect on self-control. Meanwhile, self-control can negatively predict bedtime procrastination [10]. From this, the first hypothesis can be made that negative emotions can indirectly lead to bedtime procrastination behavior by affecting an individual's self-control.

Time management, as a personality trait, represents the psychological and behavioral characteristics that an individual demonstrates in their utilization of time. Huang and Qin's study found that the better the time management skills of university students, particularly in terms of time efficacy and time monitoring, the higher their sleep quality [11]. Further studies have found that time management disposition plays a mediating role in Negative emotions, encompassing feelings like anxiety and depression, and their influence on procrastination behavior. There is a significant negative relationship between time management and levels of depression and anxiety Based on this, a second hypothesis can be proposed that mediators of time management tendencies play a role in the relationship between an individual's negative emotions and bedtime procrastination.

There is an inseparable connection between time management disposition and self-control. According to the self-control model created by Wan, the demonstration of self-control ability is based on cognitive monitoring. As a specific facet of cognitive monitoring, time management disposition can be positively predicted by self-control. Individuals with low self-control ability find it difficult to regulate and restrain their psychological and behavioral tendencies, which leads to a poorer time management disposition and subsequently to the occurrence of procrastination behavior [12].

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In summary, a third hypothesis can be proposed that self-control and time management tendencies have a knock-on mediating effect on the effect of negative tendencies on procrastination behavior at bedtime.

2. Methodology

2.1. Participants

Considering the screening criteria, 300 subjects were recruited from areas such as Zhejiang and Jiangsu through questionnaires. Thirty-three of them were excluded because they failed the detection test. The final sample comprised 267 subjects (Mage = 26 years, SD = 0.43 years), 52.90% of whom were male.

2.2. Research instruments

2.2.1. Negative subscale of the Positive and Negative Affect Scale (PANAS)

The negative mood subscale of the PANAS developed by Watson et al. The negative mood subscale consists of 18 items, with each subscale containing 9 items. The scale is scored on a 5-point scale, with 1 indicating "hardly ever" and 5 indicating "very much". A higher score on the subscale indicates a higher level of the corresponding emotional experience. The Cronbach's alpha coefficient for the negative emotion subscale was 0.90[13]

2.2.2. Self-Control Scale(SCS)

SCS was revised by Shu-Hua Tan and Yong-Y consists of 19 items divided into five dimensions: Well-being Practices, Resisting Temptation, Concentrating on Tasks, Restraining Entertainment, and Impulse Control. The scale is scored on a 5-point scale, where 1 is "strongly disagree" and 5 is "strongly agree. The Cronbach's alpha coefficient for this scale was calculated to be 0.84 [14].

2.2.3. Bedtime Procrastination Scale(BPS)

The BPS developed by Kroese et al. was used in this study. This one-factor structured scale consists of nine items, each associated with a different bedtime procrastination scenario. The scale uses a 5-point Likert scale to assess the frequency of each scenario, with higher scores indicating greater bedtime procrastination. Internal consistency coefficients ranged from 0.87 to 0.94. [1]

2.2.4. Time Management Tendency Scale (TMTS)

The TMTS developed by Huang Xiting et al. The scale consists of three subscales assessing the value of time (10 items), time monitoring (24 items), and time effectiveness (10 items), for a total of 44 items. The scale utilizes a 5-point scoring system, where respondents can indicate their agreement level on a continuum from "strongly disagree" (scored as 1) to "strongly agree" (scored as 5). Items 9, 17, 27, 30, and 41 were reverse scored. The Cronbach's alpha coefficients for the three subscales in this study were 0.78, 0.88, and 0.80, respectively.2.4 Statistical Analysis [11].

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3. Results

3.1. Common Method Bias

Harman's single-factor test was employed to assess the presence of common method bias with SPSS 26.0. The results showed that the first component accounted for 38.217% of variance, which is less than 50%. This suggests that common method variance was not a problem in this study.

3.2. Correlation Analysis and Descriptive Statistics

The Pearson correlation analysis showed significant correlations among the variables: Bedtime procrastination had a positive correlation with negative emotions, and it had negative correlations with both self-control and time management disposition. Similarly, negative emotions were negatively correlated with self-control and time management disposition. Additionally, the results revealed a significant positive correlation between self-control and time management disposition.

Table 1: Descriptive Statistics and Correlation Analysis of Variables

	M	SD	Bedtime Procrastination	Time Management Disposition	Negative Emotion	Self-Control
Bedtime Procrastination	2.31	0.756	1			
Time Management Disposition	3.33	0.717	-0.652*	1		
Negative Emotion	3.00	0.374	0.117*	-0.229**	1	
Self-Control	2.54	0.461	0.563*	-0.800**	0.165**	1

* p<0.05 ** p<0.01

Table 2: Linear Regression Analysis Results (n=267)

	Unstandardized Coefficients		Standardized Coefficients	t	p	Collinearity Diagnostics	
	B	SE	Beta			VIF	Tolerance
Constant	2.489	0.646	-	3.854	0.00**	-	-
Negative Emotion	0.363	0.094	0.180	3.861	0.00**	1.056	0.947
Time Management Disposition	-0.538	0.081	-0.510	-6.658	0.00**	2.856	0.350
Self-Control	0.206	0.124	0.126	1.662	0.098	2.783	0.359
R 2	0.460						
Adjusted R 2	0.454						
F	F (3,263)=74.673,p=0.000						
D-W	2.119						

Dependent Variable: Bedtime Procrastination. * p<0.05 ** p<0.01

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Table 3: Mediation Analysis Results

Mediation Pathway	Effect	SE	95% Confidence Interval	Relative Mediation Effect
Direct Effect	0.363	0.094	[0.179 0.547]	
Total Indirect Effect	0.640	0.118	[0.410 0.871]	
Negative Emotion → Time Management Disposition → Bedtime Procrastination	0.102	0.021	[0.012 0.094]	16%
Negative Emotion → Self-Control → Bedtime Procrastination	-0.042	0.014	[-0.004 0.052]	6.5%
Negative Emotion → Time Management Disposition → Self-Control → Bedtime Procrastination	0.180	0.025	[0.004 0.054]	28%

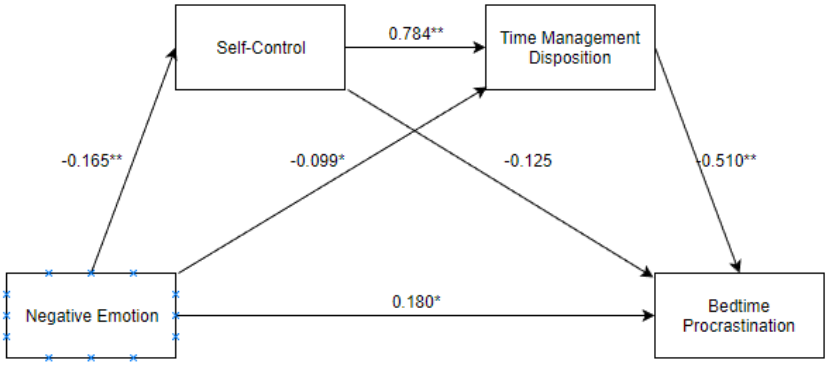

Figure 1: The Mediating Role of Self-Control and Time Management Disposition in the Relationship between Negative Emotion and Bedtime Procrastination

According to Hayes' recommended non-parametric percentile Bootstrap method for testing mediation effects, specific SPSS procedures developed by Hayes were applied. Controlling for gender and age, negative emotion was treated as the predictor variable, bedtime procrastination as the outcome variable, and self-control and time management disposition as the mediator variables. For examining the chain mediation effects, Model 6 in the PROCESS macro was chosen.

The results of the regression analysis showed that overall, negative emotion positively predicted bedtime procrastination ($\beta = 0.18$, $p < 0.001$). The mediation analysis revealed that negative emotion significantly negatively predicted self-control and time management disposition. Self-control had a significant positive impact on time management disposition. Time management disposition had a significant negative impact on bedtime procrastination. However, bedtime procrastination was not significantly affected by the direct effect of self-control.

Therefore, the time management disposition showed a significant independent mediation effect, and the chain mediation effect of self-control and time management disposition between negative emotion and bedtime procrastination was also significant. Please refer to Table 3 for detailed results.

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4. Discussion

This study examined the effects of negative emotions on bedtime procrastination and also explored the mediating effects of self-control and time management tendencies. The findings enhance the understanding of the mechanisms by which negative emotions affect bedtime procrastination and enrich cognitive models of insomnia. In addition, this study provides theoretical support for the prevention and intervention of sleep problems.

Consistent with previous research, results showed that negative emotion positively predicted bedtime procrastination. This is in line with Fu Yiming's study in 2020, which found that immersing oneself in entertainment activities such as using smartphones before bedtime or feeling aversion towards daily tasks before sleep or upon waking can be contributing factors to bedtime procrastination, reflecting inadequate self-control and emotion regulation abilities. Research reveals the important role of negative emotions, self-control and time management tendencies in bedtime procrastination. Specifically, the results of the study showed a negative correlation between time management tendencies, self-control, and bedtime procrastination [15].

In addition, Findings suggest that negative emotions can have a cascading effect on bedtime procrastination through self-control and time management tendencies. Specifically, an increase in negative emotions leads to a decrease in both self-control and time management dispositions. This relationship is supported by Baumeister et al., who found that negative emotions deplete an individual's psychological resources, resulting in reduced self-control in tasks.[16] Additionally, negative emotions can lead to decreased time management tendencies. Moreover, self-control plays a crucial role in time management dispositions, as it positively predicts them. Therefore, effectively understanding and managing negative emotions could be a valuable approach to enhance self-control and time management, ultimately reducing bedtime procrastination

Nonetheless, this study possesses certain limitations. Firstly, it adopts a cross-sectional design was employed, which precludes the establishment of causal relationships between variables. Secondly, due to the limitations of the research methods and measurement tools, this study did not differentiate between different types of negative emotions and only focused on the overall impact of negative emotion on bedtime procrastination. Future research should consider differentiating between specific types of emotions and comprehensively examine their effects on bedtime procrastination.

In conclusion, this study employed a questionnaire survey to investigate and discuss the specific pathways among the variables mentioned above and provided suggestions for the prevention and intervention of bedtime procrastination among university students. This contributes to a deeper theoretical understanding of the mechanisms underlying individuals' bedtime procrastination and offers practical guidance for interventions targeting sleep procrastination.

5. Conclusion

Self-control and time management tendencies as interlocking mediators in the effects of negative emotions on sleep procrastination behavior, significant negative correlations between bedtime procrastination and negative emotional bias, self-control, and time management tendency. Mediation analysis indicated that controlling for gender and age., negative emotions significantly positively predict bedtime procrastination. The significant mediating role of time management tendency and Interlocking mediating effects of self-control and time management tendencies is significant. In essence, individuals with high levels of negative emotions are more likely to engage in bedtime procrastination behaviors and negative emotions can lead to bedtime procrastination behaviors by affecting self-control and time management tendencies.

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