

Effects of College Students' Self-efficacy on Sleep Problems: Chain Mediating Role of Self-esteem and Social Adaptation

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Abstract: Background: Sleep problems have increasingly become a public health problem. How to improve sleep problems has become the focus of many people's concerns. Meanwhile, sleep problems are more common in children and adolescents, with prevalence ranging from 11% to 47%. Therefore, how to help college students improve sleep problems has become a problem worth studying. Objective: The present study focused on intrinsic psychological factors to explore how college students' self-efficacy, self-esteem, and social adaptations all work together to influence sleep problems and analyze the chain mediating effect of self-esteem and social adaptation in the influence of self-efficacy on sleep problems of college students. Methods: Eighty-seven college students were conveniently chosen to engage in a survey about self-efficacy, sleep problems, self-esteem and social adaptation. Results: (1) Correlation analysis showed that, the relationships between each pair of self-efficacy, self-esteem and social adaptation were significantly positive. Self-esteem and social adaptation were all negatively related to sleep problems. (2) Chain mediating effect analysis showed that, the chain mediating effect of self-esteem and social adaptation between self-efficacy and sleep problems was significant. Conclusion: The results significantly revealed that self-efficacy affected sleep problems not only directly but through the chain mediating roles of self-esteem and social adaptation, which enriched the understanding of the factors that influence sleep problems and provided important guidance and suggestions for improving college students' sleep problems through the enhancement of self-efficacy, self-esteem and social adaptation.

Keywords: Sleep Problems, Self-efficacy, Self-esteem, Social Adaptation

1. Introduction

Sleep can be defined as an active, repetitive, reversible state in which perception is detached from and unresponsive to the environment [1]. Studies have shown an association between sleep and the consolidation of cognitive abilities that are necessary to perform functions, including abstract reasoning, goal-directed behavior, and creative processes [2]. For college students, sleep is associated with the academic performance, memory processes, emotional regulation, and daily behavior. Sleep problems such as lack of sleep, increased sleep fragmentation, late sleep time and early awakening seriously affect the learning ability, academic performance, social function and neurobehavioral function of college students, which can have serious psychological and

physical health effects [3, 4]. In fact, sleep problems are more common in children and adolescents, with prevalence ranging from 11% to 47% supported by different studies [5, 6]. Therefore, how to help college students improve sleep problems has become a problem worth studying.

The present study will study the effects of college students' self-efficacy on their sleep problems and analyze the role of self-esteem and social adaptation. Self-efficacy refers to the belief that an individual is able to perform the actions needed to achieve the desired outcome [7]. Studies have shown a significant negative correlation between self-efficacy and sleep problems [4]. Self-esteem is an individual's attitude towards one's own worth and abilities [8]. Self-esteem is the result of an individual's self-evaluation of the social role, which is one of the

important protective factors for an individual's social adaptation [9]. Studies have confirmed a significant negative correlation between self-esteem and sleep problems in adolescents [10]. Social adaptation refers to the ability of individuals to perform professional and social roles, reflecting the interaction of individuals and environment [11]. Studies have found that college students who lack interpersonal interaction may feel inner scarcity and gradually distance themselves from their social environment [12], namely, social adaptation of college students is significantly negatively correlated with the sleep problems [8].

In summary, self-efficacy, self-esteem, and social adaptation have an impact on sleep problems, respectively. However, there is currently a lack of studies to directly study the relationship between the four. Since self-esteem is the self's defense system, helping individuals adapt to the socio-cultural environment, the negative emotions of the individual's self-competence after setbacks can act as a buffer [13]. The present study speculated that self-esteem plays a bridging role between self-efficacy and social adaptation. Therefore, the present study hypothesized that the self-efficacy of college students on their sleep problems has a chain mediating role in self-esteem and social adaptation.

2. Method

The present study used the scales to measure self-efficacy, sleep problems, self-esteem, and social adaptation. Finally, the bootstrap was used to analyze how self-esteem and social adaptation affect the relationship between self-efficacy and sleep problems.

2.1. Participants

A total of 87 college students were recruited to participate in the experiment (61 males, 26 females, $M_{age}=18.62$, $SD=1.09$). Using G*Power 3.1 [14], we determined that the current sample size was sufficient to obtain: double-tailed, number of predictors=4, $\alpha=0.05$, $1-\beta=0.8$, $H_0 \rho^2=0$, $H_1 \rho^2=0.15$.

2.2. Tools

2.2.1. Measurement of Self-efficacy

The self-efficacy was measured using the General Self-Efficacy Scale (GSES) [15]. The scale consisted of 10 items, each of which has a score of 1 to 4: 1 means "completely incorrect", 2 means "somewhat correct", 3 means "mostly correct", and 4 means "completely correct". The total score was used as the participant's self-efficacy level.

2.2.2. Measurement of Self-esteem

Self-esteem was measured using the Self-Esteem Scale (SES) [8]. The scale consists of 10 items, each of which has a score of 1 to 4: 1 means "very inconsistent", 2 means "consistent", 3 means "consistent", 4 means "very consistent". The 3rd, 5th, 8th, 9th, 10th items were scored in reverse, and the total score was used as the participant's self-esteem level.

2.2.3. Measurement of Social Adaptation

Six items in the Social Adaptation of the Student Adaptation to College Questionnaire (SACQ) were selected to measure the social adaptation of participants [16]. Specific items include: (1) I am well integrated into the university environment. (2) I get along well with my college roommates. (3) I am not very accustomed to university dormitory life. (4) I find it difficult to get along with the people around me easily. (5) I made good friends in college. (6) I am satisfied with my social life in college. Each item was scored from 1 to 5, and items 3 and 4 were scored in reverse. The total score was used as the participant's social adaptation level.

2.2.4. Measurement of Sleep Problems

Sleep problems was measured using the Insomnia Severity Index [17], which includes two parts: sleep processes and sleep effects. Sleep process mainly evaluated whether there are the following conditions recently: (1) difficulty of falling asleep, (2) difficulty of persistent sleeping, (3) wake up early, (4) Others. Each item counts 1 point for "Yes" and no points for "No". Sleep Effects mainly evaluated: (1) To what extent do I think sleep problems affect my daily functioning? (E.g., daytime fatigue, ability to handle work/daywork, concentration, memory, mood, etc.). (2) How worried/painful am I about my current sleep problems? Each item was scored from 0 to 4: 0 means "none", 1 means "mild", 2 means "moderate", 3 means "severe" and 4 means "extremely severe". The total score was used as the participant's sleep problems level.

2.3. Experimental Procedure

A professional platform named "Wenjuanxing" was used to program the scales. The participants' electronic informed consents were obtained when collecting the scales. The specific experimental process is: self-efficacy measurement → self-esteem measurement → social adaptation measurement → sleep problem measurement.

2.4. Data Processing

SPSS 20.0 was used for data analysis. First, it was found that the Variance Inflation Factor (VIF) was less than 10, the Condition Index (CI) was less than 30, and the eigenvalue was greater than 0 after using multicollinearity analysis on the data. Therefore, there was no severe multicollinearity in the study data, and further data analysis could be performed. Second, the descriptive statistics and correlation analysis of variables were analyzed. Finally, Hayes's bootstrap method [18] was used to test the chain mediation.

3. Results

3.1. Descriptive Statistics and Correlation Analysis Between Variables

Pearson correlation using SPSS 20.0 was used to test the correlation between the variables. As shown in Table 1, there was a significant positive correlation between self-efficacy,

self-esteem, and social adaptation, while self-efficacy, self-esteem and social adaptation were significantly negatively correlated with sleep problems.

Table 1. Correlation matrix between variables (*r*).

	$\bar{X} \pm S$	1	2	3	4
1 Self-efficacy	23.18±4.73	1			
2 Self-esteem	28.03±4.87	0.631**	1		
3 Social adaptation	22.05±3.40	0.454**	0.539**	1	
4 Sleep problems	4.41±1.91	-0.147	-0.229*	-0.323**	1

Note: * $p < 0.05$, ** $p < 0.01$ (two-tailed).

3.2. Chain Mediation Effect Analysis

Self-esteem and social adaptation were used to test the

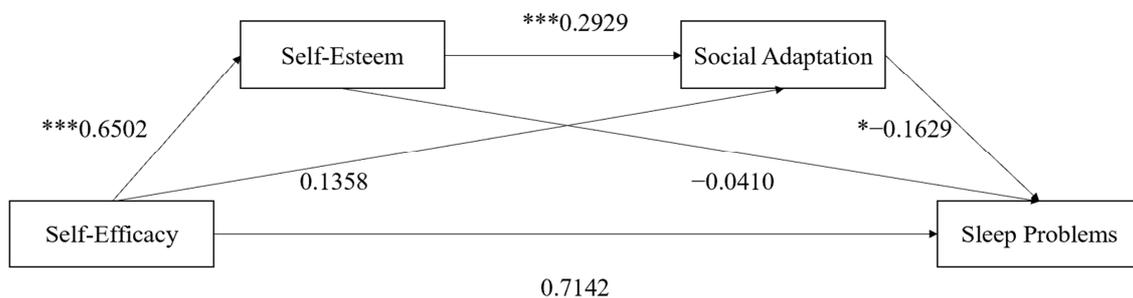
chain mediating effect in the relationship between self-efficacy and sleep problems with the reference of Hayes’s bootstrap method [18]. Model 6 was selected, with a sample size of 5000, and under the 95% confidence interval, self-efficacy was taken as the independent variable X, sleep problems as the dependent variable Y, and self-esteem and social adaptation were the mediating variables M1 and M2, respectively. As Tables 2 and 3 shown, the chain mediation effect of self-esteem and social adaptation was significant, and the mediation effect was generated through a unique intermediary chain: self-efficacy → self-esteem → social adaptation → sleep problems. The exact path was shown in Figure 1.

Table 2. Indirect effect paths.

Indirect effects	Paths
1	self-efficacy → self-esteem → sleep problems
2	self-efficacy → self-esteem → social adaptation → sleep problems
3	self-efficacy → social adaptation → sleep problems

Table 3. Indirect effect values.

	Effect	SE	95% LLCI	95% ULCI
Total indirect effects	-0.0798	0.0398	-0.1676	-0.0104
Indirect effect 1	-0.0266	0.0323	-0.0915	0.0337
Indirect effect 2	-0.0310	0.0197	-0.0845	-0.0035
Indirect effect 3	-0.0221	0.0198	-0.0801	0.0033



Note: * $p < 0.05$, *** $p < 0.001$

Figure 1. Effect of self-efficacy on sleep problems: the chain-mediating model of self-esteem and social adaptation.

Taking the mediating variables M1 and M2 for social adaptation and self-esteem, respectively, it was found that the 95% confidence interval of the indirect effects of self-efficacy → social adaptation → self-esteem → sleep problem path included 0 ($B = -0.0061$, $SE = 0.0073$, 95% $CI = [-0.0236, 0.0063]$). Therefore, self-efficacy is not shown to affect sleep problems through pathways to social adaptation → self-esteem.

4. Discussion

In the technologically developed society, sleep problems have increasingly become a public health problem. How to improve sleep problems has become the focus of many people’s concerns [19]. Previous generations have studied sleep problems from many fields such as social factors, physiological factors and personality factors, which put

forward suggestions to improve the sleep environment, reduce the use of electronic products, regulate life pressure, enhance cognitive function, reduce alcohol consumption and maintain exercise to solve sleep problems [7, 8, 20]. The present study focused on intrinsic psychological factors to explore how college students’ self-efficacy, self-esteem, and social adaptations all work together to influence sleep problems, and found the only chain-based mediation path: self-efficacy → self-esteem → social adaptation → sleep problems.

College students face many challenges at university including curriculum, exams, social work, family and interpersonal. At this age, sleep is usually not the focus of health-related behaviors, but the amount of sleep needed tends to lead to stress [21], which further affects college students’ ability to learn, social function, and psychology and good health [3, 4]. Studies have found that the assessment of stressors and the lack of a sense of control over stressful

events, rather than the number of stressful events themselves, enhance the susceptibility to insomnia [22]. The theory states that the intensity of self-efficacy affects the effort an individual makes to engage in a particular behavior and how persistently they persist in trying [7]. That said, college students with high self-efficacy are more confident in their ability to cope with stress, which seems to reduce their likelihood of sleep problems.

Further, the present study found that self-efficacy does not directly affect sleep problems, and needs to have an impact on sleep problems by first influencing self-esteem and then influencing social adaptation. This means that self-esteem and social adaptation play an important role in the generation and mitigation of sleep problems. Self-esteem as a defense system of the self, helping individuals adapt to socio-cultural environments and buffering the individual's self-competence negative emotions after setbacks [13]. Attachment theory argues that early interactions with primary caregivers lead to the development of "internal work patterns" that influence an individual's cognition and behavior in subsequent relationships. These patterns also contribute to an individual's sense of self-image, and the ability to regulate physically and psychologically in situations of stress or threat [23]. Studies have confirmed a significant association between attachment insecurity, particularly attachment anxiety, and various dimensions of subjective sleep quality [24]. In fact, higher levels of social support have been associated with fewer sleep problems [25]. Combined with the results of the present study, when college students think they are competent for the pressure they face, and then show a positive evaluation of their self-worth and social role, they subjectively feel that the surrounding environment is safer, their social adaptation is better, and their real experience of sleep problems is less. This result reflects the intrinsic process of self-regulation in college students, and confirms the coordination and balance mechanism between individual stress stimulation, self-state and other people's relationships.

The main contributions of the present study are below. First, the findings of the present study further support previous research on the effects of self-efficacy [4], self-esteem [14], and social adaptation [8] on sleep problems, respectively, which enriches the understanding of the factors that influence sleep problems. Secondly, the present study explored the internal process of college students' self-effects affecting their sleep problems and found the chain mediation of self-esteem and social adaptation, which provides important guidance and suggestions for improving sleep problems through the enhancement of self-efficacy, self-esteem and social adaptation, such as strengthening psychological publicity and education to enhance self-esteem and self-confidence, and promoting campus activities to develop relationships between students.

Future research can be carried out from the following aspects. First, the research sample can be expanded from college students to other groups, so as to explore the robustness of the chain intermediary found in the research, and then reveal the causes of broader sleep problems. Second, the

research methods can be extended from questionnaire correlation analysis to variable experimental manipulation or intervention research, so as to explore the causal relationship between self-efficacy, self-esteem, social adaptation and sleep problems, and then propose the exact intervention methods to solve sleep problems.

5. Conclusion

The present study significantly revealed that self-efficacy affected sleep problems not only directly but through the chain mediating roles of self-esteem and social adaptation, which provided important guidance and suggestions for improving college students' sleep problems through the enhancement of self-efficacy, self-esteem and social adaptation. At the same time, the present study explains the internal performance of the dynamic process that college students interact with the environment to form self-acceptance and social adaptation and finally to form the overall adaptation. The research results can enrich the field of school mental health education and provide empirical evidence for mental health intervention.

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