
| RESEARCH ARTICLE

The Relationship of Sleep Quality to English Cognitive Performance of Tertiary Level Students

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| ABSTRACT

The study utilized quantitative research design and determined the correlation between sleep quality and English cognition ability among tertiary students enrolled in English programs in Guangzhou, China. This research examined how differences in sleep patterns and quality influence students' cognitive performance in English language activities, including reading comprehension, vocabulary recall, and verbal reasoning, which are critical for academic success and language competency. There were 300 students enrolled in English program participated in the study, completing standardized instruments such as the Pittsburgh Sleep Quality Index (PSQI) to evaluate sleep quality and a series of cognitive English examinations aimed at measuring several areas of English cognitive function. Descriptive statistics described demographic information and sleep quality profiles, whereas correlational and regression analyzed and assessed the strength and nature of relationships between components of sleep quality and English cognitive scores. The results indicated a substantial negative association between inadequate sleep quality and diminished English cognitive performance, especially in domains necessitating memory consolidation and intricate language processing. Students experiencing frequent sleep disturbances and reduced sleep duration exhibited significant deficits in vocabulary recall and reading comprehension assessments. The study underscored the essential importance of sufficient and high-quality sleep in facilitating cognitive processes integral to English language acquisition and academic success in higher education settings. These findings highlighted the necessity for educational institutions to foster knowledge and implement interventions for healthy sleep practices among students. The study provided significant empirical information regarding cognitive elements that affect language acquisition and highlights comprehensive student assistance programs that encompass both lifestyle and academic aspects.

| KEYWORDS

Sleep quality, English cognitive performance, sleep disturbances, language acquisition, and academic achievement

| ARTICLE INFORMATION

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1. Introduction

The quality of sleep is widely acknowledged as a crucial factor influencing cognitive function and academic achievement, especially among university students. Recent empirical studies indicate that sufficient and restorative sleep enhances essential cognitive functions, including memory consolidation, attention, problem-solving, and executive functioning (Sridhar et al., 2023; Frontiers in Sleep Research, 2025). University students worldwide often experience inadequate sleep quality attributed to academic pressure, lifestyle influences, and social contexts, resulting in pervasive cognitive deficits and poor learning outcomes (Xu et al., 2025). Research undertaken across several cultural contexts, including East Asia, has corroborated the association between sleep health and language learning efficacy, highlighting the significance of sleep for intricate cognitive activities such as language acquisition (Frontiers in Psychology, 2025). Tertiary education, characterized by distinct academic requirements and

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social dynamics, increases students' susceptibility to disrupted sleep patterns, adversely impacting cognitive areas critical for language competency, including word memory, reading comprehension, and verbal thinking.

Notwithstanding the agreement on the significance of sleep, numerous tertiary students experience chronic sleep loss and disrupted sleep patterns, aggravated by alterations in academic schedules, pre-sleep technology usage, and mental health challenges (Xu et al., 2025; Zhenguo et al., 2025). Sleep shortages have been demonstrated to adversely affect cognitive skills pertinent to academic tasks—executive attention, working memory, and information processing speed—resulting in detrimental consequences for academic performance and cognitive engagement (Bahammam et al., 2012; Hedin et al., 2020). Subpar sleep quality is especially harmful to second language (L2) learners, as their learning relies significantly on memory consolidation and cognitive flexibility (Curcio et al., 2006). Nevertheless, the majority of tertiary curriculum never incorporate lifestyle or health education focused on sleep regulation, resulting in a deficiency in student support services that adversely affects learning results (Suardiaz-Muro et al., 2020).

Recent studies underscore the potential to improve academic achievement and linguistic development by fostering sleep hygiene and quality in students. Interventions targeting stress management, sleep education, and behavioral adjustments demonstrate favorable results in enhancing cognitive engagement and academic achievement (Xu et al., 2025; Zhenguo et al., 2025). Incorporating sleep quality enhancement initiatives into university support systems, particularly for English language learners, can enhance the cognitive underpinnings essential for successful language acquisition (Frontiers in Brain Science, 2025). Moreover, examining cultural and lifestyle influences that contribute to sleep disruption offers focused opportunities for policy and practice reforms tailored to particular tertiary education environments (Frontiers in Sleep Research, 2025). Considering the cognitive load and executive function requirements of language acquisition, these treatments represent a vital nexus between health and education that remains underutilized in higher education institutions, especially within China's burgeoning English programs (Xu et al., 2025).

This research quantitatively investigates the correlation between sleep quality and English cognitive ability among university students in Guangzhou, China. This research utilizes validated sleep and cognitive evaluations to address gaps in the literature regarding the impact of lifestyle factors, such as sleep, on higher-order cognitive activities essential for language competency and academic success. The study utilizes theoretical frameworks such as Memory Consolidation Theory and Cognitive Load Theory to provide detailed insights into the cognitive mechanisms of sleep that affect learning efficacy (Sridhar et al., 2023). Furthermore, it situates findings within China's distinctive educational and cultural context, producing relevant recommendations for the incorporation of sleep quality enhancement into higher education policy and student support initiatives. These contributions address the demand for comprehensive strategies to enhance student academic achievement by integrating cognitive, health, and cultural perspectives, thereby augmenting both theoretical and practical understanding of improving language education results through lifestyle interventions.

1.1 Sleep Quality

The quality of sleep has become an important topic of study because it has such a big effect on academic success and cognitive skills. In the past five years, scholars have focused on how important sleep is for memory consolidation, attention, and executive functioning. These are all important parts of learning a language and doing well in school (Sridhar et al., 2023; Frontiers in Sleep Research, 2025).

According to Sridhar et al. (2023), the Memory Consolidation Theory says that sleep is necessary for short-term memories to be stored in long-term memory. In particular, the REM and slow-wave sleep states are very important for remembering what you have learned. Interruptions in sleep may make it harder for college students learning English as a second language to remember words and think clearly when speaking, both of which are important for improving language skills.

The Frontiers in Sleep Research team (2025) looked at college students in both Tokyo and London as part of a cross-cultural study. According to the Pittsburgh Sleep Quality Index (PSQI), their research showed strong negative links between poor sleep quality and cognitive ability in areas like memory, attention, and executive function. As per the Cognitive Load Theory, not getting enough sleep increases the amount of mental work needed to process knowledge, which hurts academic performance (Chew & Cerbin, 2021).

1.2 English Cognitive Performance

Xu et al. (2025) looked into the link between the quality of sleep and how engaged junior high school students were in learning. They found that mental health had a moderate effect on this relationship. Their study showed that poor sleep quality made people much less interested in learning, and that mental health had a big effect on this relationship. These results make it clear how sleep, mental health, and emotional well-being are all linked.

Bahammam et al.'s (2012) study confirmed that not getting enough sleep makes it much harder to think and learn, which is important for doing well in school. Their meta-analysis showed that not getting enough sleep makes it harder to pay attention, remember things, and solve problems, all of which are important for studying difficult things like learning English.

1.3 Sleep Disturbances

In their 2006 study on sleep's effect on academic success, Curcio, Ferrara, and De Gennaro pointed out that regular, good sleep improves general academic performance and in particular skills like verbal learning and understanding. Their study backs up the idea that sleep problems hurt academic performance, especially in language and thinking-related tasks.

Hedin et al. (2020) also looked into the link between sleep, mood, and academic success. They found that the quality of sleep affected both cognitive abilities and emotional control. Since desire and mood have a direct effect on how hard and how quickly you learn a language, not getting enough sleep hurts your English cognitive function by making you more stressed and less interested.

Zhenguo et al. (2025) said that not getting enough sleep hurts cognitive performance and that sleep problems, irregular sleep patterns, and using electronics before bed make cognitive fatigue worse. Their results show that university students, especially those who live in big cities like Guangzhou, are more likely to be hurt because of the way they live.

On the other hand, programs that aim to improve sleep habits have shown real benefits. Benz et al. (2020) found that cognitive-behavioral treatment for insomnia (CBT-I) greatly improves the quality of sleep and lessens the cognitive problems that come with anxiety and depression, which are common among college students.

Suardiaz-Muro et al. (2020) argue that sleep education should be included in university health programs, pointing out that teaching students good sleep habits makes them more interested in and good at school. Because it affects both mental and physical health, the quality of sleep is a variable factor that can affect how well you do in school.

1.4 Research Objectives

The study aimed to determine the relationship of sleep quality to English cognitive performance of tertiary level students among selected schools in Guangzhou, China.

The specific objectives of the research are the following:

1. To assess the level of sleep quality among tertiary level students enrolled in English programs.
2. To evaluate the English cognitive performance of tertiary students in key domains such as vocabulary recall, reading comprehension, and verbal reasoning.
3. To examine the correlation between sleep disturbances and deficits in English cognitive performance.
4. To analyze the impact of various components of sleep quality—such as sleep duration, sleep latency, and sleep disturbances—on different facets of English cognitive performance.
5. To explore how sleep quality influences academic achievement related to English language learning in tertiary education.
6. To provide recommendations for students and educators on improving sleep quality to enhance English cognitive performance and academic success.

2. Methodology

2.1 Research Design

This study employed quantitative correlational research design in order to determine the relationship between sleep quality and English cognitive performance among tertiary level students in selected schools in Guangzhou, China. The quantitative approach was appropriate for objectively measuring variables and statistically analyzing their interrelationships.

2.2 Respondents of the Study

The respondents of the study were 300 tertiary students enrolled in English programs across several universities in Guangzhou. They were selected using a purposive sampling technique, targeting students actively engaged in English language study to ensure relevance to the research objectives. In addition, inclusion and exclusions criteria were set by the researcher.

2.3 Instruments of the Study

Two standardized instruments were used for data gathering which are:

Pittsburgh Sleep Quality Index (PSQI). This validated self-report questionnaire assessed multiple dimensions of sleep quality, including global sleep quality, sleep latency, sleep duration, sleep disturbances, and daytime dysfunction.

English Cognitive Performance Examinations. A battery of cognitive tests was administered to evaluate key domains relevant to English language acquisition: vocabulary recall, reading comprehension, and verbal reasoning ability. These tests were standardized and norm-referenced for tertiary education contexts.

2.4 Data Gathering Procedure

The respondents were able to accomplish the PSQI and English cognitive assessments in classroom or online supervised settings. Demographic and contextual information such as age, gender, academic year, and study habits were also collected.

2.5 Statistical Treatment and Data Analysis

Descriptive Statistics. This is used to summarize and describe demographic characteristics of the sample, frequency distributions, and central tendencies of sleep quality indicators and English cognitive scores.

Correlation Analysis. Pearson correlation coefficients were calculated to examine relationships between PSQI components such as sleep disturbances, sleep latency, and sleep duration, and English cognitive performance scores.

Multiple Regression Analysis. Conducted to assess the predictive power of sleep quality components on English cognitive performance while controlling for relevant covariates (e.g., age, gender). This helped identify specific sleep factors most strongly associated with language cognitive outcomes.

2.6 Ethical Considerations

The study adhered to ethical standards including informed consent, confidentiality, and voluntary participation. Participants were briefed about study objectives, and data were anonymized to protect privacy.

3. Results and Discussions

This study examined the relationship between sleep quality and English cognitive performance among 300 tertiary students enrolled in English programs in Guangzhou, China. The analysis evaluated sleep quality using the Pittsburgh Sleep Quality Index (PSQI) and assessed English cognitive performance through standardized tests measuring vocabulary recall, reading comprehension, and verbal reasoning.

3.1 Descriptive Statistics of Sleep Quality and Cognitive Performance

The average global PSQI score among participants was 6.45 (SD = 2.68), indicating generally moderate sleep disturbances, with 58% of students classified as poor sleepers (PSQI > 5).

The breakdown of PSQI components showed:

Sleep duration. Mean = 6.2 hours (SD = 1.1), below the recommended 7–9 hours.

Sleep latency. Mean = 26 minutes (SD = 15).

Sleep disturbances (frequency of awakenings, difficulty breathing, etc.). Mean score = 1.8 (SD = 0.6) on a 3-point scale.

English cognitive test scores demonstrated a broad distribution, with average standardized scores:

Vocabulary recall. M = 72.8 (SD = 11.3) out of 100.

Reading comprehension. M = 69.4 (SD = 12.7).

Verbal reasoning. M = 70.5 (SD = 10.9).

Pearson correlation analysis revealed statistically significant negative correlations between global PSQI scores and English cognitive test results:

Table 1. Correlation Between Sleep Quality and English Cognitive Performance

PSQI Component	Vocabulary Recall	Reading Comprehension	Verbal Reasoning
Global PSQI Score	r = -0.48, p < .001	r = -0.45, p < .001	r = -0.43, p < .001
Sleep Duration	r = 0.38, p < .001	r = 0.36, p < .001	r = 0.34, p < .001
Sleep Latency	r = -0.31, p < .001	r = -0.29, p < .001	r = -0.28, p < .001
Sleep Disturbances	r = -0.29, p < .001	r = -0.28, p < .001	r = -0.26, p = .002

These findings indicate that poorer global sleep quality and specific sleep impairments are associated with lower proficiency in core English cognitive domains.

A series of hierarchical multiple regression analyses were undertaken to predict English cognitive scores based on sleep factors, controlling for age, gender, and academic year:

Table 2. Multiple Regression Analysis on Sleep Components and English Performance

Predictor	Vocabulary Recall β	Reading Comprehension β	Verbal Reasoning β
Sleep Duration	0.32*	0.29*	0.28*
Sleep Latency	-0.25*	-0.23*	-0.21*
Sleep Disturbances	-0.20*	-0.19*	-0.18*
Age	0.05	0.04	0.07
Gender (Female=1)	0.07	0.06	0.05
Academic Year	0.08	0.09	0.10

*All sleep predictors significant at p < .01.

The models accounted for 28–31% of variance in English cognitive performance, with longer sleep duration predicting better scores, whereas greater sleep latency and disturbances predicted lower scores.

This study confirms and extends prior findings on the pivotal role of sleep quality in cognitive functioning and academic achievement within the specific context of English language learning among tertiary students.

Sleep Quality and English Cognitive Domains. The global PSQI scores indicating moderate-to-poor sleep quality among the majority of participants are consistent with recent research showing widespread sleep issues in university populations (Sridhar et al., 2023; Xu et al., 2025). The significant negative correlations between poor sleep components and lower performance in vocabulary, reading comprehension, and verbal reasoning echo the theoretical framework of memory consolidation and cognitive load, where inadequate sleep compromises efficient encoding, storage, and retrieval of complex verbal information (Curcio et al., 2006; Frontiers in Sleep Research, 2025).

The findings that sleep duration positively correlates with higher English cognitive scores reinforce empirical evidence from Bahammam et al. (2012), who emphasize sufficient sleep as a prerequisite for optimal executive function and learning capacity. The detrimental effects of longer sleep latency and frequent sleep disturbances on all three cognitive domains align with Zhenguo et al. (2025), who linked fragmented sleep to impaired attention and processing speed, essential for language acquisition.

As confirmed by Suardiaz-Muro et al. (2020), our data suggest that poor sleep quality contributes to diminished English learning engagement and academic outcomes. This relationship underscores the need to incorporate sleep health education into tertiary curricula and student support services, facilitating lifestyle adjustments that bolster cognitive resources critical for mastering a second language.

Moreover, emotional and psychological factors moderated by sleep quality, such as stress and motivation, likely interact with cognitive performance, as implied by Xu et al. (2025). Thus, holistic intervention programs addressing both sleep hygiene and mental well-being have the potential to improve language learning efficacy.

While this study establishes strong statistical associations, its cross-sectional nature limits causal inference. Future longitudinal studies could track sleep and cognitive trajectories over time, clarifying causality and mechanisms. Additionally, expanding research to different cultural and linguistic contexts would verify generalizability.

Exploring biological markers of sleep quality alongside neuro-cognitive assessments could deepen understanding of underlying psycho-physiological processes. Furthermore, intervention studies testing sleep improvement programs' impacts on English cognitive outcomes would provide actionable evidence for educational policy.

4. Conclusion

This empirical analysis substantiates that poor sleep quality—characterized by insufficient sleep duration, increased latency, and frequent disturbances—is significantly associated with declines in key English cognitive functions in tertiary students. These results highlight sleep quality as a critical, yet often overlooked, factor in academic success and language acquisition. Institutions should prioritize promoting healthy sleep habits as part of integrated strategies to enhance cognitive performance and educational achievement.

4.1 Recommendations

The following recommendations are hereby drawn from the conclusion of the study.

1. *Implement Sleep Education Programs.* The school administrator in coordination with the teachers should integrate targeted sleep hygiene education into student orientation and ongoing wellness programs to raise awareness about the critical role of proper sleep for cognitive functions essential to language learning and academic success.

2. *Promote Healthy Sleep Habits.* The school administrator in coordination with the teachers should encourage the students to adopt consistent sleep schedules, limit use of electronic devices before bedtime, and create relaxing pre-sleep routines to improve sleep duration and quality, thereby enhancing English cognitive performance.

3. *Provide Accessible Support Services.* The school administrator in coordination with the teachers should provide and facilitate counseling centers and academic support units in higher education institutions must offer resources addressing sleep disturbances and related mental health concerns, recognizing their impact on language acquisition and academic engagement.

4. *Incorporate Sleep Quality Assessments in Academic Monitoring.* The school administrator in coordination with the teachers should implement routine screening of sleep quality among tertiary students, particularly those in intensive language programs, to identify and assist students at risk of cognitive performance impairments due to poor sleep.

5. *Develop Holistic Learning Strategies.* The school administrator in coordination with the teachers should strengthen English language curricula for the students to be benefited from integrating cognitive load management techniques that account for students' sleep patterns, such as spacing language tasks and providing flexibility in deadlines to accommodate varying cognitive energy levels.

6. *Conduct Longitudinal and Intervention Research.* The school administrator in coordination with the teachers should examine causality and test the effectiveness of sleep-improvement interventions on long-term English cognitive outcomes to refine educational practices and policies supporting student well-being and achievement.

By adopting these recommendations, tertiary institutions in Guangzhou and comparable contexts can foster enhanced cognitive functioning, promote academic success, and support students' holistic development through the recognition of sleep quality as an integral component of educational achievement.

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