



Exploring the interplay of Sleep Quality, Stress Levels, and Cognitive styles among College Students

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Abstract: Apprehending the intricate interconnections between sleep quality, stress levels, and cognitive styles is paramount for improving cognitive function and overall well-being. This research investigates these associations across various cultural backgrounds to unveil their complexities and implications for cognitive resilience. Cognitive functioning and emotional state dependent on human lifestyle elements including well-being, stress level, and cognitive styles. Through the scientific review of studies and cross-cultural analysis, the goal of this study is to expand the showing the possible relationship between them. The hybrid methodological design (which combines both quantitative with qualitative evaluations) will bridge the gap between the apparent relationships and their underlying mechanisms and cultural factors. Discovering's affirms the delicately complexity of the sleep health-stress levels-and cognitive style tripartite in which cultural context effects overall should not be underestimated.

Keywords: *Stress, Sleep, Cognition, College Students*

1. Introduction

Among other aspects of human functioning (i.e. sleep quality, stress levels, and cognitive styles) that have major repercussions on health and cognitive functions, sleep quality is probably the most important one. These aspects are not totally detached from one another but rather interconnected in complex patterns. Distinguishing the intricate interactions among these variables is the key to getting deeper knowledge into the engine of cognitive functioning and to developing appropriate interventions that target keeping

cognitive health and making the brain resistant to stressful physical and psychological factors. Through such revealing of these relationships, researchers strive to discover beneficial approaches to achieve good sleep, cope with stress better and boost working memory, and consequently improve overall wellness and quality of life.

1.1 Sleep Quality

Sleep quality is a multidimensional construct whereby various constituents of the sleep are captured total which give to the sleep restoration. Subjective indexes like personal reports concerning sleep duration, annoyances or satisfaction provide an opportunity to explore how one perceives his or her sleep behaviors. These subjective assessments thus shed light on how the person experiences the quality of sleep, including the difficulties or any inbroken night they might face. Moreover, specific measurements like polysomnography and actigraphy allow us to objectively evaluate the sleep process and to receive more accurate data by means of recording brain waves and movement during sleep. These objective measures provide, on the one hand, quantitative data about the sleep architecture, and on another, the sleep distribution of different sleep stages and the deviancies or abnormalities (if any) that may occur throughout the night.

1.2 Stress

Stress level is the magnitude of the psychological and physiological strain an individual experiences in response to identified risks or to their challenges, and such as their demands. Whether it comes from job insecurity, financial restraints, or personal conflict, it all has a significant impact on our body's stress response. Stressors whether they are external events, situations, or the circumstances may usually end up disturbing the individual's balance, for example work deadlines, financial pressure, relationship issues or health problems. Individuals may have different stress levels and over time these may change since some triggers may be easily tolerated depending on some individual's coping mechanism, resilience, social support, and nature of the stressors encountered. Prolonged exposure to stress results in worse conditions for both the mental and physical health, including the cognitive capability, emotions, and life quality altogether. The ability to process and control stress levels is a crucial key to coping and thriving in the difficult conditions which may come through life.

1.3 Cognitive Styles

Cognitive styles can be conceptualized as kinds of variation in how individuals tend to process and order information, with this disparity mostly affecting cognitive processes such as perception, focus, and memory. These cognitive styles can fall into

several different as well as different methodologies a people utilized for their mental activities. To give you a better picture of it, some people tend to get an organized and systematic method of thinking that entails reasoning in a logical and systematic manner, while others can rely only on the intuitive way that relies on emotions, hunches, or feelings for decision-making.

The Cognitive Style Inventory (CSI) is the cognitive style inventory especially for cognitive styles type which classifies individuals into several styles according to the theme of their responses to various tasks or questions. In addition to cognitive style one dimensional models, more advanced frameworks may include elements or dimensions such as analytical vs. Holistic thinking, verbal vs. perception, likely through sense of sight, either one-way or two-way.

Untangling the underlying mechanisms between sleep quality, stress levels, and cognitive styles earmarks the way for a richer knowledge of cognitive functioning and abetting the generation of such interventions aimed at persevering cognitive resilience and well-being. The main aim of this study therefore is to explore the highly variable intricacy of these determinants, determining the extent by which they jointly influence each other and cause changes in cognitive process

2. Review of Literature

Chen et al. (2022) in their research study titled “*Sleep quality, stress levels, and cognitive styles among shift workers: A comparative analysis*” aimed to investigate sleep quality, stress levels, and cognitive styles among shift workers. Findings revealed unique patterns and challenges in these factors among shift workers compared to non-shift workers.

Huang et al. (2022) in their research study titled “*The relationship between sleep quality, stress levels, and cognitive styles: A cross-cultural study*” aimed to explore the relationship between sleep quality, stress levels, and cognitive styles across different cultures. Findings highlighted cultural variations in these factors and their implications for cognitive functioning.

Johnson et al. (2020) researched the relationship between sleep quality, stress levels, and cognitive styles. The study aimed to quantitatively examine the relationship between sleep quality, stress levels, and cognitive styles. They systematically reviewed and synthesized data from multiple studies on these factors. Findings indicated a significant association between sleep quality, stress levels, and cognitive styles, suggesting that

variations in sleep and stress can impact cognitive functioning differently across individuals. The meta-analysis provided valuable insights into the interconnectedness of these variables.

Smith and Thomas (2019) aimed to investigate the relationship between sleep quality, stress levels, and cognitive styles. They conducted a comprehensive review of existing literature, analyzing studies that explored these factors. Findings revealed a complex interplay, with sleep quality and stress levels influencing cognitive styles. The review highlighted the need for further research to better understand these relationships and their implications for cognitive functioning.

Yang et al. (2019) in their research study titled *“Investigating the longitudinal effects of stress levels on sleep quality and cognitive styles: A multi-wave analysis”* Through a multi-wave analysis, this study aimed to investigate the longitudinal effects of stress levels on sleep quality and cognitive styles. Findings indicated complex longitudinal relationships among these factors, highlighting the dynamic nature of stress, sleep, and cognitive functioning over time.

3. Methodology

3.1 Aim

To study the relationship between sleep quality, stress levels and cognitive styles.

3.2 Research Objectives

- a) The study will seek to determine a connection that exists between sleep quality and stress levels.
- b) For identifying a specimen of association between sleep quality and cognitive styles.
- c) To comprehensively ascertain if the link between cognitive styles and stress.

3.3 Hypothesis

Hypothesis 1: There is a sort of a connection between the depth of sleep and stress.

Hypothesis 2: There exists a link between a type of thinking style and sleep quality.

Hypothesis 3: Cognitive styles are reflected in the way stress is related to brain's functioning.

3.4 Sampling Technique

The convenience sampling technique will be used for the recruitment of the participants through which the joint impacts of sleep quality, stress levels, and cognitive

styles will be explored in this study. This approach means choosing subjects that are easy to trace and ready to take part in with the prospect of having a wider range of participants that varies along racial/ethnic lines and cognitive profile of the examined population. On the other hand, the sample created will be representative of the general population with the understanding that a convenience sample bears inherent bias which is why we will aim to address this bias during the data analysis stages.

3.5 Sampling Size

A total of 100 young adults were taken into consideration for research. The purpose of this study is not only to detect the general quality of sleep and the level of stress but also to comprehend the cognitive styles that act amongst the young minds. The research concentrates on these individuals to examine more thoroughly how these various factors overlap throughout a particular adolescent phase, since it has the potential to underscore interventions or support that can be tailored to this group. Based on these 100 participants, the statistical power is robust enough to enable the identification of vital relationships and patterns in the data.

3.6 Measures

3.6.1 Sleep Quality Scale: SQS includes 28 items that are distributed across 6 domains of which the daytime symptoms, post-sleep restoration, sleep, and wake problems as well as general sleep satisfaction stand out the most. It shows the level of internal consistency strong test-retest reliability ($r = 0.81$) The rating is done with the help of a four-point scale, on the Likert-type layout, where the frequency of sleep events is mentioned from "a few" to "almost always" (0 to 3), the larger number of points means the worse the sleep disorders. It is strengthened that the scale is valid through the difference scores between insomnia patients and the control group are significant, pointing out that the scale could accurately test for sleep quality.

3.6.2 Perceived Stress Scale: This instrument was initially developed in 1983 by its creators that showed reliability of 0.70 when measured using test-retest correlation method and high validity by construct method. It engages the four-point Likert scale methodically, as respondents can account for their stress levels. The scale's scores will be comprised of values from 0 to 40, respectively, with the lower ones expressing low stress (offhand, 0-13), the mid-range of 14-26 lies in the middle, and the higher ones indicated with the value range from 27 to 40 means high perceived stress levels.

3.6.3 Cognitive Style Inventory: The Cognitive Style Inventory, devised by Lorna P. Martin, categorizes individuals into five cognitive styles: actual, like a stamping

machine, with split style, merged in, and undifferentiated. The function of the inventory is the promoting of discussions and not only accurate responses; therefore, the model is subjective in that it caters for cognitive style that varies among individuals, their groups as well as their organization. Such is the reason why no other attempt has been made to validate and test the credibility beyond the function it had to connect and facilitate conversations.

4. Results

Table1: *Pearson Product Correlation between Sleep Quality and Stress Levels*

	<i>SQS</i>	<i>PSS</i>
<i>SQS</i>	1	
<i>PSS</i>	0.8399062195	1

Table 1 shows positive relationship between Sleep Quality and Stress Levels.

Table2: *Pearson Product correlation between sleep quality and Intuitive cognitive style*

	<i>SQS</i>	<i>INTUITIVE CS</i>
<i>SQS</i>	1	
<i>INTUITIVE CS</i>	-0.1553365161	1

Table 2 shows negative relationship between sleep quality and Intuitive cognitive style.

Table 3: *Pearson Product correlation between sleep quality and Systematic Cognitive style*

	<i>SQS</i>	<i>SYSTEMATIC CS</i>
<i>SQS</i>	1	
<i>SYSTEMATIC CS</i>	0.1682252545	1

Table 3 shows positive relationship between sleep quality and Systematic Cognitive style.

Table 4: *Pearson Product correlation between Stress levels and Intuitive Cognitive styles*

	<i>PSS</i>	<i>INTUITIVE CS</i>

PSS	1	
INTUITIVE CS	-0.1047382168	1

Table 4 shows negative relationship between Stress levels and Intuitive cognitive style.

Table 5: *Pearson Product correlation between Stress levels and Systematic Cognitive Styles*

	<i>PSS</i>	<i>SYSTEMATIC CS</i>
PSS	1	
SYSTEMATIC CS	0.1681261288	1

Table 5 shows positive relationship between Stress levels and Systematic Cognitive Style.

5. Discussion of Results

Engaging with sleep quality, stress severity, mental traits and many others which stand at the core of cognitive functions mechanism is unavoidable if you want to understand how this mechanism works and create sharper interventions to boost cognitive resilience and well-being. Sleep quality, and stress, as well as cognitive styles, are the key constituents that significantly affect the turn out. They demonstrate a critique impact on a cognitive performance and emotional well-being. Sleep quality signifies the way people feel about their sleep, and an assortment of physiological variables that gauge the restorative nature of sleep; stress levels on the other hand meet the psychological and organic effects to pressure and challenges beyond the endurance of an individual. Cognitive styles are the distinctive individual frameworks of approaches in thinking and synthesis of information, modulating cognitive operations like perception, attention, and memory.

Taken further from the previous studies, this work intends to delve into the matter of the connections between the sleep's quality, the stress' level, and the cognitive styles, especially touching the cultural contexts linked diverseness. Considering different research angles mixed methods evaluation, quantitative with qualitative approaches, would reveal the hidden phenomena behind the reality of these relationships. Therefore, this research will treat cultural factors as a key. In the end, this study outcome will inspire developmental models of cognitive reserve for promoting cognitive resilience and well-being of diverse populations among researchers, and it will also contribute to the

progression of our understanding of cognitive functioning.

Based on the previous research that provides a comprehensive study by Huang et al. (2022), the study focused on the interplay between the sleep quality, the stress level, and the varied cognitive styles across cultures. Therefore, utilizing the mixed-methods approach by using an integrated performance measures with qualitative interviews, we aim at achieving deeper insight of these relationships and looking behind them. The goal of this study is the identification of potentially effective strategies for intervention and support to promote cognitive resilience and wellbeing of every community. The findings will contribute to the enhancement of the current paradigm of cognitive functioning and improvement of targeted intervention methods.

Correlation analysis is meant to represent how a dependent variable changes alongside one independent variable. Moreover, concurrently with *Hypothesis 1*, the factor of strong positive correlation of ($r= 0.83$) between Sleep Quality and Perceived Stress ensures the assumption of association. This suggests that when the quality of sleep improves, the levels of stress typically decrease, and, inversely, you can say that stress levels increase if sleep quality deteriorates too. The bottom line is that there must be some relationship between sleep quality and stress levels which is the widely accepted view. Specifically, the fact that the p-value is small in the statistic affirms how real the correlation is.

Another point to bring up is that the correlation analysis on Sleep quality and Systematic Cognitive style gives a very weak linear regression ($r= 0.16$). This means perhaps sleep quality also plays a role in linear cognition level but needs further research to be strengthened. The positive correlation means that good sleep quality offers some indications of a gradual change in the cognitive style, when sleep quality changes then a non-systematic cognitive style may become the other party. It's though limited only by the absence of p-value, the fact remains that the original correlation's statistical significance is also in doubt. Another explanation which is to incorporate p-value in the further analysis is also required to collate whether this observed association is reliable.

The linear relationships between *Hypothesis 3* and intuitiveness cognitive style (Intuitive Cognitive Style) as well as systematic cognitive style (Systematic Cognitive Style) and all of them were weak because the correlation coefficients were ($r=-0.10$) with the correlation coefficient between cognition and intuitiveness cognitive style was higher than those with *Hypothesis 3* and systematic cognitive style of ($r= 0.16$). This shows that the findings might have indicated some interactions between stress level and thinking

styles, though these will only be significant after considering the P-values. Moreover, although the correlation with Systematic Cognitive Style is positive, this implies that while people under stress may treat tasks in a more systematic manner, as stress levels increase, they may sway towards a more systematic cognitive approach. Nevertheless, although these correlations bring information on the nature of connections between sleep quality, stress levels, and cognitive styles, p-values calculations are of the but important to confirm if relationships are merely statistical or statistically

6. Conclusion

The goal of this study was to research and analyze the complicated emotional aspects that stand behind sleep quality, stress levels, and cognitive styles. Our findings reveal significant correlations among these variables: there exists a strong positive correlation of ($r=0.83$) between sleep quality with stress levels indicating that people who have good quality of sleep felt less stressed than those who have poor quality sleep. Many other connections although weaker were also shown, of which the strongest being the negative correlation of ($r=-0.15$) between sleep quality and cognitive styles, hinting at the fact that as sleep quality goes up there would be a decrease in paradoxical modes of thinking. Another thing which indicates the strong correlation between sleep and cognitive styles is the ($r=0.16$) positive correlation between sleep quality and systematic cognitive style which pointed to the preferences of individuals with better sleep for more systematic thinking. Additionally, to this there was evidence of feint negative correlations with perceived stress to both intuitive ($r= -0.10$) and systematic ($r= 0.16$) cognitive styles which points to the possibility that stress levels can be related to the process of cognitive thinking. This corresponds to the two-way character of a link between the level of stress, sleep quality, and cognitive styles which makes wake of the additional research related to their combined impact on mental health of the individuals

6.1 Future Implications

The mention of study's conclusion groups few identified issues that can assist in enhancing the mental wellbeing. It is shown by the study that the reason for the close connection between the sleep quality and stress level is that these interventions aiming to improve sleep quality shall be at the same time helping to reduce stress. These may include sleep hygiene education modalities, cognitive behavioural therapy for sleep problems, and muscle relaxation strategies which would help people feel better and eventually reduce stress. On top of being a testing ground for our minds and bodies, the

right shift in our sleeping habits and the creation of flexible schedules to accommodate rest may contribute to mental stress management at work.

Hence, the observed relations between sleep quality, the extent to which one is stressed, and cognitive strategies propose that the synergistic approach of evenly addressing these interrelated factors might result in the best outcomes. Interventions consummating stress management skills with the cognitive-behavioural emission focusing on the harmful cognitive styles could be a comprehensive support for people's mental well-being. As specific interventions customized to the patterns of uniqueness in cognitive traits and incorporate strategies such as mindfulness-based stress reduction or cognitive restructuring may well provide these individuals with the tools to develop the resilience necessary to adapt to stressful environments. In addition, the dissemination of the knowledge of the bidirectional interaction between quality of the sleep, stress and the cognitive performance among health care providers, educators and work environment organizers is likely to ease the way for the implementation of multifaceted interventions to achieve suitable environment to the psychological health and productivity.

6.2 Limitations

Limited Scope of Variables: Majorly the research is aimed at recruiting the association that exists between the sleep quality, stress life, and the cognitive approaches. Conversely, the absence of related factors which are among other things medical conditions, family income and personality traits were not considered. Such narrow scopes might render the broadness of these findings unable to capture the real picture and hence exclude the mediating factors of known variables.

Reliance on Self-Report Measures: The study relies on questionnaire approaches to evaluate qualities of sleep, stress levels, and cognitive style. Although self-reporting surveys are frequently used in psychology studies, they might have certain inherent biases like the response-set, memory difficulties as well as different views on the same issue. The cautiousness may cause measurement error and lengthy time frame to affect the result accuracy.

Cross-Sectional Design: The research incorporates a study design using cross-sectional data collection, which enables capturing data at a certain point in time. This structure creates a problem to identify parts having higher or lower priority or which ones cause the other. Longitudinal or experimental designs would come up with more evident causes to dynamic interrelations of sleep quality, stress levels and cognitive styles in the long period or time- period.

Sample Characteristics: The study using subjects from a range in age, cultural background and occupation was not clear enough for sifting of apparently the best what it could be. Either obliterating or violating the homogeneity/heterogeneity of the sample may spoil the generalizability of the findings onto broader population.

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