



The Interplay of Rumination, Positive Emotions, Negative Emotions, and Effect on Quality of Sleep

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Abstract

The widely prevalent and complex sleep problem known as insomnia, that is characterised by persistent trouble falling asleep or staying asleep, continues to have a negative impact on one's physical, emotional, and cognitive well-being. By examining the connections between rumination, positive emotions, negative emotions, and their combined impact on sleep quality, this study paper dives into the complex nature of insomnia. The goal of the study is to improve our comprehension of the psychological mechanisms that underlie sleep disturbances and to provide information for prospective intervention options. The current research employs a quantitative method with three scales namely Rumination Responses Scale (Treynor, Gonzalez, Hoeksema 2003), Positive and Negative Affect Schedule (PANAS-SF) (Watson, D., Clark, L. A., & Tellegen, A. 1988), and Sleep Quality Scale (Yi, H., Shin, K., & Shin, C. 2006) to comprehensively evaluate the function of rumination and emotional states in influencing sleep patterns, drawing on a variety of theoretical frameworks from psychology and sleep medicine. This research accentuates the advantages of treating insomnia holistically, considering the interconnected roles of cognitive functions and emotional states in sleep disorders. The research offers opportunities for clinicians, researchers, and practitioners to improve therapeutic strategies that consider both cognitive and emotional aspects, providing people who struggle with insomnia with a more thorough path towards better sleep quality and general well-being.

Keywords: Insomnia · Negative Affect · Positive Affect · Rumination · Sleep Quality.

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Sleeping is a basic human need, like eating, drinking, and breathing. Like these other needs, sleeping is vital for good health and well-being throughout your lifetime.

Sleep deprivation is when a person does not get enough sleep. This can be a short-term issue, affecting one or a few nights, or it can be a chronic concern that lasts weeks or even months. Sleep deprivation can happen for countless reasons, many of them harmless, but

it is also a key symptom of certain health conditions.

Sleep is something that everyone needs, and most people need a similar amount, depending on their age. That amount also changes with age. The symptoms of sleep deficiency may differ between children and adults. Children who are sleep deficient might be overly active and have problems paying attention. They also might misbehave, and their school performance can suffer (*What are sleep deprivation and deficiency?*, n.d.). However, some people need more sleep to feel well-rested, while others need less, but these exceptions are not common.

Sleep is as important to the human body as food and water, but many of us do not get enough sleep. Insufficient sleep, inadequate quality of sleep or disruptions to the sleep-wake cycle (such as those that occur with shift work or travelling to a different time zone) have consequences for how we function in the daytime, causing sleepiness and fatigue (*Sleep deprivation*, n.d.).

A sleepy fatigued person is accident prone, judgement impaired and more likely to make mistakes and bad decisions. Staying awake for 24 hours leads to a reduced hand-to-eye coordination that is like having a blood alcohol content of 0.1 (Pelegriano, 2021). This is why sleep deprivation contributes to road accidents and work injuries. Lack of sleep can also affect a child's school performance and could be linked to an increased risk of emotional problems such as depression (*Sleep deprivation may be undermining teen health*, n.d.).

Sleep deficiency is linked to many chronic health problems, including heart disease, kidney disease, high blood pressure, diabetes, stroke, obesity, and depression (*What are sleep deprivation and deficiency?*, n.d.).

Causes of Sleep Deprivation

On a larger scale, sleep deprivation is thought to be brought on by a hyperarousal state that interferes with going to sleep or remaining asleep. Both mental and physical hyperarousal are possible, and it can be brought on by a variety of external factors and medical conditions.

- **Sleep Deprivation and Stress:** Stress can provoke a profound reaction in the body that poses a challenge to quality sleep. This stress response can come from work, school, and social relationships. Exposure to traumatic situations can create chronic stress, including Posttraumatic Stress Disorder (PTSD). The body's physical response to stress contributes to hyperarousal, and mental stress can have the same effect. The inability to sleep may itself become a source of stress, making it increasingly harder to break the cycle of stress and insomnia (Suni, 2018).
- **Sleep Deprivation And Mental Health Disorders:** Mental health conditions like anxiety, depression, and bipolar disorder frequently give rise to serious sleeping problems. These conditions can incite pervasive negative thoughts and mental hyperarousal that disturbs sleep. In addition, studies indicate that sleep deprivation can exacerbate mood and anxiety disorders, making symptoms worse and even increasing the risk of suicide in people with depression (Suni, 2020).
- **Sleep Deprivation And Neurological Problems:** Problems affecting the brain, including neurodegenerative and neurodevelopmental disorders, have been found to be associated with an elevated risk of sleep deprivation. Neurodegenerative disorders, such as dementia and

Alzheimer's dementia, can throw off a person's circadian rhythm and perception of daily cues that drive the sleep-wake cycle. Night-time confusion can further worsen sleep quality (Fifel & Videnovic, 2021). Hyperarousal brought on by neurodevelopmental disorders like attention-deficit/hyperactivity disorder (ADHD) can make it difficult for people to obtain the rest they require at night (). Children with Autism Spectrum Disorder (ASD) frequently have trouble sleeping, and these issues might last throughout adulthood (Singh & Zimmerman, 2015).

- **Sleep Deprivation and Anxiety:** The more trouble you have with sleep, the more it starts to invade your thoughts. You may dread going to sleep because you just know that you are going to toss and turn for hours or wake up at 2 a.m. again. Or maybe you are worried because you have a big day tomorrow, and if you do not get a solid 8 hours, you are sure you will blow it. Often the qualities of a person's sleep deprivation and their other symptoms can be helpful in determining the role of mental illness in a person's inability to sleep. Early morning wakefulness can be a sign of depression, along with low energy, inability to concentrate, sadness and a change in appetite or weight. On the other hand, a sudden dramatic decrease in sleep which is accompanied by increase in energy, or the lack of need for sleep may be a sign of mania (Krystal, 2012). Many anxiety disorders are associated with difficulties sleeping. Obsessive-compulsive disorder (OCD) is frequently associated with poor sleep. Panic attacks during sleep may suggest a panic disorder. Poor sleep resulting from nightmares may be associated with PTSD (Staner, 2003).

Psychological Impact of Intense Emotions on Sleep Deprivation

To understand the connection between sleep and mood, look no further than your brain. Deep inside the brain, the region known as the amygdala is probably best known as the control centre for our emotions. But it also plays a role in sleep.

Some research suggests that when you are sleep-deprived, there is more activity in this part of the brain in response to negative emotions like fear. There may also be fewer connections between the amygdala and certain other parts of the brain, which can worsen your mood. The amygdala oversees our emotional responses. But to do its job correctly it needs us to sleep, because that is the time it is allocated to process emotion. When we miss out on sleep, the amygdala goes into overdrive, causing our immediate emotional reactions to intensify (Saghir et al., 2018).

But that is not all. The amygdala is not the only area of the brain that gets hit with the consequences of sleep deprivation. Another area involved in emotional regulation, the prefrontal cortex, does as well. The prefrontal cortex does a lot of impressive things. One of which is being "the voice of reason" to our emotions (or putting the brakes on our amygdala when it is being a diva). The prefrontal cortex helps control our impulses.

However, like the amygdala, the prefrontal cortex cannot do its job properly when we do not sleep well. Much of this has to do with a disruption in communication between the amygdala and prefrontal cortex, who work closely with one another. This makes us more impulsive and less likely to think through our emotional reactions, which is a dangerous place to be.

Also, when you are sleep deprived, you may miss out on critical phases of sleep. While you sleep, activity in your brain cycles goes through different stages. Your brain is very active during the REM (rapid eye movement) stage. It is when you dream, and when you process new information into your long-term memory.

REM sleep also affects your emotional and mental health. When you do not get enough of it, your brain cannot properly process information linked to your emotions. This can affect your mood, and is sometimes even linked to mental health disorders. Sufficient sleep, especially REM sleep, facilitates the brain's processing of emotional information. During sleep, the brain works to evaluate and remember thoughts and memories, and it appears that a lack of sleep is especially harmful to the consolidation of positive emotional content. This can influence mood and emotional reactivity and is tied to mental health disorders and their severity, including the risk of suicidal ideas or behaviours (Suni, 2020).

As a result, the traditional view, which held that sleep problems were a symptom of mental health disorders, is increasingly being called into question. Instead, it is becoming clear that there is a bidirectional relationship between sleep and mental health in which sleeping problems may be both a cause and consequence of mental health problems.

Rumination and Quality of Sleep

Rumination increases the likelihood of depression, disrupts sleep, and emotional regulation. The relationship between rumination and sleep as well as the ruminative behaviour of light sleepers was examined. Research findings showed that ruminative behaviour was more common in self-described poor sleepers than in self-described good

sleepers, and that the ruminative content was symptom-focused (poor sleepers, for example, ruminated on reasons of dysphoria, concentration, and fatigue symptoms) (Carney et al., 2006).

The present study aims to understand the impact of rumination, positive emotions, and negative emotions on the quality of sleep among the adults.

Review of Literature

Metacognition refers to the ability to review one's mental state that governs thoughts and beliefs. The genesis and maintenance of insomnia have to do with metacognition dysfunction which is typical of numerous psychopathological conditions. In the light of understanding insomnia, metacognition highlights the way individuals respond and react to their sleep-related thoughts and beliefs, increasing the hyperarousal state experienced by them. A study stated that patients who presented metacognitive impairment even after treatment received significant beneficial effects by Cognitive Behavioural Therapy for Insomnia (CBT-I) on both insomnia symptoms and dysfunctional beliefs, but not on metacognition, suggesting that this dimension needs to be carefully assessed in insomnia patients because it might have a prognostic valence. Therefore, high levels of dysfunctional sleep-related metacognition do not decrease the beneficial effect of CBT-I, and might provide a risk factor for relapses in the long term (Galbiati et al., 2021).

Sleep disturbances have been associated with several negative occupational responses such as absenteeism, decreased productivity, accidents and injuries, and lastly increased healthcare costs. To understand the relationship between employees' trouble sleeping and absenteeism, work performance, and healthcare

expenditures over two years using a large Kansas State EWP participants' Health Risk Assessment data showcases intriguing findings that trouble sleeping was related to a greater likelihood of missed work days, lower work performance (either subjective or relative), and higher overall healthcare expenditure. Longitudinal analysis of data over two years showed that each unit of worsening sleep difficulty over time resulted in increased absenteeism at work, reduced productivity, and exorbitant healthcare expenditures. These results point towards sleep improvement intervention that would result in greater work productivity and which will promote health and longevity (Hui & Grandner, 2015).

Disturbances in sleep can have an impact on our affect. Mood disturbances are looked at as the symptoms of several psychopathological ailments including depression and anxiety. The symptoms of these mental health conditions contain elements of sleep disturbances or trouble falling asleep which are considered the sufferers as distressing and sometimes pave the way for suicidal ideation and suicide attempts. To investigate the relationship between self-reported daily mood and sleep quality, a total of 208 adult participants were selected to report mood and sleep patterns following each day through their mobile phones for 6 consecutive weeks. Participants recruited fell into equal groups consisting of 4 roughly equal groups such as depressed and anxious, depressed only, anxious only, and controls. The impact of sleep quality on next-day mood was found to be much larger than the effect of previous-day mood on sleep quality. Hence the study stated that sleep quality and mood are related with affect impacting sleep quality more than the reverse (Triantafillou et al., 2019).

The well-being of adolescents is predicted via positive and negative emotions. The structural

equation modelling to examine the associations between self-reported sleep duration and quality with positive affect, negative affect, and happiness, controlling for age and sex among 4582 adolescents. The findings stated that shorter sleep was associated with lower positive emotion and poorer sleep is associated with more negative affect. Maintaining adequate sleep duration facilitates positive emotion and improving one's sleep quality may reduce mood disturbances (Shen et al., 2018).

Emotional regulation can be defined as the ability to manage one's emotional outflow including increasing, maintaining, or decreasing the intensity, duration, and pathway of positive and negative emotional expression. Poor sleep is considered the precipitator of grave emotional dysregulation. Young adults, aged between 18–24 years (N = 101), completed 7 days of ecological momentary assessments on a smartphone application. The duration and quality of the previous night's sleep were reported each morning. The finding of the study highlighted that multilevel modeling showcased the fact that higher self-reported sleep quality led to increased duration of positive emotion, and decreased intensity of negative emotion (Parsons et al., 2022).

Sleep is considered a pivotal phenomenon for restoring our daily functioning and aids in our ability to cope with emotional stress in everyday life. When everyday stress is not regulated optimally, it results in several psychopathological problems and sleep disturbances. Emotions impact our sleep duration and quality of sleep but the reverse is also true as sleep quality in turn aids in effective emotional regulation. Emotional events during waking hours impact our ability to react to the stimuli and our general well-being. How an individual copes up with the emotional stressors dictate the overall sleep quality and

satisfaction from sleep (Vandekerckhove & Wang, 2017).

Relationship satisfaction and sleep problems among college students were studied encompassing relationship mindfulness and negative emotional symptoms working as a mediator between relationship satisfaction and sleep problems. A total of 242 college students who were in a romantic relationship were recruited from Southeastern University. Serial mediation analyses were administered, covering age and attachment orientations. The results stated that the students who reported higher relationship satisfaction had lower sleep problems. The study further showed that the degree to which one is mindful about their interaction with their romantic partners facilitates relationship satisfaction and negative emotional symptoms that are associated with sleep quality (Jaurequi et al., 2022).

The recovery of physical strength and mental exhaustion requires proper sleep. Emotion and attitude influence the quality of sleep. The impact of job satisfaction and sleep quality of female shift working nurses from teaching hospitals in northern Taiwan was investigated in the Minnesota Satisfaction Questionnaire (MSQ) short form and the Pittsburgh Sleep Quality Index (PSQI). The results demonstrated that the job satisfaction of shift-working nurses indeed impacted their sleep quality. The more miserable nurses are at their job, the less they can achieve good quality sleep. Obstacles in work are related to lower job satisfaction which in turn results in several physiological symptoms such as headaches and insomnia (Chang & Chang, 2019).

Prolonged wakefulness is a phenomenon common because our lifestyles have taken an abrupt turn. Prolonged wakefulness can be the reason for consistent and constant sleep

deprivation or chronic partial sleep restriction. The latter is more persistent in our daily hassle-filled livelihood. Sleep deprivation and chronic partial sleep restriction can result in the decline of adequate cognitive performance. Sleep deprivation causes impairment in attention and working memory as well as long-term memory and decision-making. Partial sleep deprivation influences vigilance. Aging influences a person's ability to cope with sleep deprivation. In terms of cognitive performance, women than men endure prolonged wakefulness however they recover slower (Alhola & Polo-Kantola, 2007).

The effect of experimentally induced chronic sleep restriction on adolescents' mood and mood regulation was studied on fifty healthy adolescents, aged between 14–17 years. The participants completed a 3-week sleep manipulation protocol involving a baseline week, followed by a sleep restriction (SR) condition (6.5 hr in bed per night for five nights) and healthy sleep duration (HS) condition (10 hr in bed per night for five nights). At the end of each condition, participants and their parents completed questionnaires of mood and mood regulation. To assess for expectancy effects, we also analysed parent and teen ratings of hyperactivity/impulsivity, which prior research suggests is not sensitive to SR in adolescents. Wilcoxon Signed Rank tests compared questionnaire outcomes across the two conditions and found that after only a few days of shortened sleep, at a level of severity that is experienced regularly by millions of adolescents on school nights, adolescents have worsened mood and decreased ability to regulate negative emotions (Baum et al., 2014).

The effect of sleep deprivation compared to sleep, immediately after experimental trauma stimuli on the development of intrusive

memories to that trauma stimuli was examined. Participants were exposed to a film with traumatic content (trauma film). The immediate response to the trauma film was assessed, followed by either total sleep deprivation (sleep deprived group, N = 20) or sleep as usual (sleep group, N = 22). Twelve hours after the film viewing the initial psychological effect of the trauma film was measured and for the subsequent 6 days intrusive emotional memories related to the trauma film were recorded in daily life. The results showed on the first day after the trauma film, the psychological effect as assessed by the Impact of Event Scale – Revised was lower in the sleep deprived group compared to the sleep group. In addition, the sleep deprived group reported fewer intrusive emotional memories compared to the sleep group (Porcheret et al., 2015).

The effects of sleep continuity disruption on positive mood and sleep architecture in healthy adults was studied. Participants were randomised to receive 3 consecutive nights of sleep continuity disruption via forced nocturnal awakenings (FA, n = 21), or one of two control conditions: restricted sleep opportunity (RSO, n = 17) or uninterrupted sleep (US, n = 24). Polysomnography was used to measure sleep architecture, and mood was assessed via self-report each day. Findings suggested that sleep continuity disruption reduces positive mood via disruption of SWS, and adds texture to an emerging body of literature that highlights the ramifications of insomnia on the regulation of positive emotions (Finan et al., 2015).

The impact of an emotionally distressing experience on the EEG correlates of sleep was assessed. In addition, the association between sleep physiological parameters and the extent of emotional attenuation over sleep was determined. The experimental set up involved presentation of an emotionally neutral or

distressing film fragment in the evening, followed by polysomnographic registration of undisturbed, whole-night sleep and assessment of emotional reactivity to film cues on the next evening. They found that emotional distress induced mild sleep deterioration, but also an increase in the proportion of slow wave sleep (SWS) and altered patterning of rapid eye movement (REM) sleep. The combined results provide strong evidence for an intimate reciprocal relation between sleep physiology and emotional processing (Talamini et al., 2013).

The effects of one night of total sleep deprivation on subjective stress and mood in response to low-stress and high-stress cognitive testing conditions in healthy adult volunteers in two separate experiments (total N = 53) was investigated. Sleep was manipulated in a controlled, laboratory setting and stressor intensity was manipulated by changing difficulty of cognitive tasks, time pressure, and feedback about performance. Sleep-deprived participants reported greater subjective stress, anxiety, and anger than rested controls following exposure to the low-stressor condition, but not in response to the high-stressor condition, which elevated negative mood and stress about equally for both sleep conditions. These results suggest that sleep deprivation lowers the psychological threshold for the perception of stress from cognitive demands but does not selectively increase the magnitude of negative affect in response to high-stress performance demands (Minkel et al., 2012).

Case Studies on the Treatments of Insomnia

Pharmacotherapy, which is now a common form of treatment for insomnia, can be useful for short-term insomnia, but more research is needed to determine how effective and safe it is

for long-term use. Therefore, non-pharmacologic therapeutic approaches (such as CBT) are employed to supplement the shortcomings of pharmacotherapy in the treatment of individuals with insomnia. However, CBT for insomnia seems to be more expensive and time-consuming than medication, and clinical practise in the field can be challenging to implement. In order to counteract the drawbacks of CBT, we chose the structure of group treatment rather than individual therapy. Now that we have reported on how effective group CBT is for insomnia, we would want to reflect on the meaning of this choice. Patients were sought out at the St. Vincent's Hospital Sleep Centre; a group of four patients was led by two males and three women. In order to address the variables that contribute to and maintain insomnia, CBT uses several strategies, including cognitive therapy, relaxation, sleep restriction, sensory management, and teaching about good sleep hygiene. From February to March 2012, a series of treatments were carried out once a week, lasting around one hour and thirty minutes per session. Results showed that despite lowering the dosage of the medicine, all patients' subjective sleep quality and sleep efficiency improved, and both the Pittsburgh Sleep Quality Index and the Beck Depression Inventory reduced (Yi et al., 2012).

There are several positive studies supporting the efficacy of paradoxical intention therapy as a treatment for sleep onset insomnia in the relatively scant behavioural research that is currently available. Six additional case studies of chronic insomniacs were randomly assigned to receive paradoxical intention as part of a large treatment comparison research. The normal length of therapy was eight weeks, divided into two periods of four weeks each. The first phase of therapy often comprised a counterdemand manipulation to help manage

demand and expectancy elements. Significant variation in treatment response was seen, with 3 patients experiencing a quick decrease in sleep start latency while the sleep patterns of the other 3 participants were noticeably aggravated. The other 2 participants were finally successfully treated with progressive relaxation training after failing to persist with paradoxical intention, even though 1 participant from the latter group did improve after several weeks of treatment (Espie & Lindsay, 1985).

Primary insomnia is a mental health condition that is frequently described as a result of both difficulties falling asleep and difficulty staying asleep. People with primary insomnia are known to experience heightened physiological, cognitive, or emotional arousal along with unfavourable sleep-related conditioning. Due to the person's need to release their tension, progressive relaxation is one of the techniques that is recognised to be useful in minimising primary insomnia. Anxiety and tightness in the muscles are frequently the root of primary insomnia. Due to the paucity of studies demonstrating the effectiveness of interventions for mental health issues, additional research in the field is required to demonstrate the usefulness of progressive relaxation in treating primary insomnia, particularly in Indonesia. The graduate student who was diagnosed with primary insomnia is the subject of a single case study in this essay. Due to academic stress and bad sleeping habits, graduate students are more prone to suffer from sleep deprivation. Participant was identified as having primary insomnia because they consistently reported having trouble falling asleep, had trouble staying asleep for at least a month, and had impaired social and professional performance. It became clear during counselling that the person was distressed, mostly as a result of familial issues.

Due to their family's expectations for them about a variety of topics, including their career, relationships, and academic achievement, the participant felt burdened about the future. The individual felt pressure to meet all of the demands of the family. Due to the participant's negative core belief that prevented them from seeing their own positive features, further intervention, such as the ABC model from CBT, was required. The participant also picked up a mantra to banish pointless negative thoughts that kept them up at night. Across a three-week period, the intervention was conducted across five sessions. Prior to learning about progressive relaxation, the participant claimed she struggled to stay asleep, would wake up five or six times during the night, and could only fall asleep after midnight. The participant claimed that her primary insomnia symptoms had lessened after learning progressive relaxation. She was able to go to sleep peacefully and awaken at 10 o'clock. The participant's worry about living up to her family's expectations also significantly lessened. She claimed to be able to focus on what is important right now and to tell the difference between her needs and those of her family. Even a year following the intervention, the participant continued to employ mantras. She claimed that the most effective approach for her to banish unfavourable thoughts was by repeating a mantra. This one case study demonstrated that a brief intervention could produce positive results for a person with primary insomnia. Progressive relaxation has also been demonstrated to be effective in treating primary insomnia. This one case study demonstrated the necessity of lowering anxiety (Narinda & Musabiq, 2019).

Methodology

Objective-

The aim of the study was to assess the impact of rumination, positive emotions, and negative emotions on the quality of sleep.

Hypotheses-

- H1- There is no significant correlation between rumination and quality of sleep.
- H2- There is no significant correlation between positive affect and quality of sleep.
- H3- There is no significant correlation between negative affect and quality of sleep.

Variables-

Independent Variables-

- **Rumination-** Rumination refers to the act of continuously thinking about or dwelling on a particular thought, idea, or problem, often in a repetitive and unproductive manner.
- **Positive Affect-** Positive affect refers to the experience of positive emotions, such as happiness, joy, contentment, enthusiasm, and excitement.
- **Negative Affect-** Negative affect refers to the experience of negative emotions, such as sadness, anger, fear, guilt, and anxiety. It encompasses the range of unpleasant and distressing emotional states that individuals may encounter.

Dependent Variable-

- **Quality of Sleep-** The efficacy, contentment, and restfulness of a person's sleep are all subjectively experienced and objectively measured as sleep quality.

Sample Description-**Sample Size-**

A sample size of 136 participants in the age-group of 18-71 years were recruited for the study. Participants hailed from major metropolitan cities of India, Dubai, USA and Pakistan.

Sample Inclusion Criterion-

Participants were in the age group of 18-71 years.

Sample Exclusion Criteria-

- No diagnosed psychological disorders such as depression, anxiety, affective disorders, personality disorders, etc.
- No major health complaints and ailments.
- No significant negative life events in the past 6 months.
- No history of addiction involving alcohol or psychoactive substances by the participants.

Sampling Techniques-

Purposive sampling and snowball techniques were utilised to obtain the valuable data from the population.

Research Design-

The present study utilised a descriptive and correlational research design to understand the impact of rumination, positive and negative affect on the quality of sleep.

Tools Used-

- Rumination Responses Scale (Treynor, Gonzalez, Hoeksema 2003)

- Positive and Negative Affect Schedule (PANAS-SF) (Watson, D., Clark, L. A., & Tellegen, A. 1988).
- Sleep Quality Scale (Yi, H., Shin, K., & Shin, C. 2006)

Statistical Analysis-

Descriptive statistics was calculated for the variables. Normality (Shapiro-Wilk Test) was tested and to understand the response distribution across the sample population. Spearman's Rank Correlation was employed to understand the correlation between the variables chosen for the study.

Results

Table 1 Descriptive Statistics of the Sample

Variable	Mean \pm Standard Deviation
Rumination	45.794 \pm 0.707
Positive Affect	33.779 \pm 12.728
Negative Affect	21.625 \pm 8.485
Quality of Sleep	30.867 \pm 17.677

The mean \pm standard deviation pertaining to responses on Rumination Responses Scale for participants was 45.794 \pm 0.707. The mean \pm standard deviation pertaining to Positive Affect and Negative Affect on Positive and Negative Affect Scale for participants was 33.779 \pm 12.728 and 21.625 \pm 8.485 respectively. The mean \pm standard deviation pertaining to sleep quality Scale for participants was 30.867 \pm 17.677.

Table 2 Test of Normality

Variable	Shapiro- Wilk		
	Statistics	df	Sig
Rumination	.968	1.36	.003
Positive Affect	.973	1.36	.008
Negative Affect	.926	1.36	.000
Quality of Sleep	.947	1.36	.000

It can be seen from the table above that the significance level at 95% of the variables such as rumination, positive emotions, negative emotions, and sleep quality are lesser than 0.05, hence are not normally disturbed across the sample population.

Table 3 Correlation Matrix between Quality of Sleep and Rumination

		Rumination
Quality of Sleep	Spearman's Rank Correlation (r)	.558
	Sig. (2-Tailed)	.000
	N	136

The table shows the Spearman's rank with rumination among participants in the study. There is no significant correlation between quality of sleep and rumination ($r=.558$, $p>0.05$).

Table 4 Correlation Matrix between Quality of Sleep and Positive Affect

		Positive Affect
Quality of Sleep	Spearman's Rank Correlation (r)	-.343
	Sig. (2-Tailed)	.000
	N	136

The table shows the Spearman's rank correlation results between quality of sleep with positive affect among participants in the study. There is no significant correlation between quality of sleep and positive affect ($r=-.343$, $p>0.05$).

Table 5 Correlation Matrix between Quality of Sleep and Negative Affect

		Negative Affect
Quality of Sleep	Spearman's Rank Correlation (r)	.438
	Sig. (2-Tailed)	.000
	N	136

The table shows the Spearman's rank correlation results between quality of sleep with negative affect among participants in the study. There is no significant correlation between quality of sleep and negative affect ($r=.438$, $p>0.05$).

Discussion

The aim of the study was to assess the impact of rumination, positive emotions, and negative emotions on the quality of sleep.

It was hypothesised that there exists no significant correlation between rumination, positive affect, and negative affect on the quality of sleep.

The data was collected from 136 participants in the age group of 18-71 years residing in major metropolitan cities of India such as Mumbai, Goa, Hyderabad, Jharkhand, Kerala, Delhi, Ludhiana, Bhubaneswar, Pune, Ahmedabad, Rohtak, Gujarat, Bhopal, Vijayawada, Guwahati, and Uttar Pradesh. Participants also hailed from Dubai, United Arab Emirates, United States of America, and Lahore, Pakistan. 102 participants are female and 34 participants are male.

Results from the Rumination Responses Scale and Sleep Quality Scale showcases no significant correlation between rumination and quality of sleep among the participants in the study and validating the hypotheses. The findings of the present study stand at the sharp contrast as high-trait ruminators are more likely to have numerous, unhelpful repeating thoughts throughout the day and higher levels of emotional and cognitive arousal at bedtime, which reduces the quality of their sleep (Morin et al., 2003). Rumination, according to research, predicts lower subjective sleep quality even when negative mood is taken into consideration (Thomsen et al., 2003). Therefore, it seems that cognitive arousal linked with rumination threatens subjective sleep quality independently of emotional arousal associated with negative affect. High-trait ruminators have also been found to have lower subjective sleep quality and more pre-sleep intrusive thoughts than low-trait ruminators (Guastella & Moulds, 2007). The relationships between stressful life events and sleep quality were partially mediated by rumination (Li et al., 2019). Rumination has been linked to anxiety, anger, and despair. It is

unknown, nevertheless, whether rumination is separately related to each of these negative feelings given how closely they are associated. According to a study, rumination was associated with both anger and a depressed mood. Significant relationships existed between rumination, unhappy mood, and subjective sleep quality. Even after controlling for negative mood, ruminating was found to be strongly linked with subjective sleep quality (Thomsen et al., 2003).

Results from the Positive and Negative Affect Scale and Sleep Quality Scale showcased no significant correlation between the variables therefore validating the hypotheses. The findings are strongly at par differences with other researches on the similar lines. The reported usage of positive emotion control strategies was also related to sleep quality, not sleep duration. Researchers discovered no correlations between the use of negative emotion control strategies and the quantity or quality of sleep. Young adults' experiences with pleasant feeling and their ability to control it may be influenced by naturally occurring variations in their daily sleep quality (Parsons et al., 2022). Compared to sleep duration, sleep quality showed greater relationships with all emotional variables. While poorer sleep exhibited stronger connections with negative affect, shorter sleep was more specifically connected with lower positive emotions (happy, followed by positive affect). Protecting sleep time may encourage happy feelings, and improving sleep quality may lessen mood swings (Shen et al., 2018). The study's findings largely corroborated prior research on the detrimental relationship between negative affect (NA) variability and subsequent sleep quality. Additionally, the positive correlation between daily mean levels and variability of positive affect (PA) was exacerbated by less fulfilling sleep. The outcomes were the same

regardless of clinical state. The study provides brand-new proof that the stability of fluctuating daily levels of PA is influenced by the calibre of the prior night's sleep. It will be easier to understand the mechanisms relating sleep to subsequent affective experiences if we can uncover the patterns of sleep and affect that go beyond mean levels (Song et al., 2023).

Conclusion

Human brain function and affective behaviour continue to be meaningfully connected by cognitive neuroscience. A comparable renaissance in the biological sciences has focused on the function of sleep in various brain functions, most recently on the relationship between sleep and emotional regulation. Sleep has been found to mediate the erasure of human fear memories as well as target the consolidation of components of emotional experiences (Walker & van der Helm, 2009). Sleep appears to be essential for resuming everyday activities, whereas sleep loss makes us more emotionally charged and susceptible to stressful stimuli and situations. Sleep seems to be crucial for our capacity to manage emotional stress in daily life. However, regular stress that is not adequately managed can also lead to sleep disruptions and mental health issues (Vandekerckhove & Wang, 2017). The amount and quality of sleep we get affects how we react to emotional events that occur during the day, which in turn affects how we feel overall. Although we are aware that emotional stress throughout the day has an impact on sleep by changing sleep physiology, dream patterns, dream content, and the emotion experienced during a dream, its precise function is still unknown (Vandekerckhove & Wang, 2017).

The present study shows no significant correlation between rumination and quality of

sleep as well as no significant correlation between positive affect and negative affect and quality of sleep. It can be indicated to several subjective and objective factors such as environmental stimulation, phenomenological aspects of the individuals, appraisal factors, perception of the stressful situations and most importantly the thought processes and the level of emotional regulation.

Present lifestyle being filled with hassle and mentally draining with less physical activity have impacted the sleep schedules and poor sleep schedules impacting poor lifestyle choices have been a quintessential phenomenon that requires immediate attention. Even though the present study findings showcase no correlation between rumination, positive affect and negative affect with quality of sleep, it is crucial to note that getting an optimal amount of sleep is essential for the body to function requisitely and at par. Sleep is influenced by our thought processes and vice-versa.

Limitations of the Study

The major limitation that the study entails is the unequal gender distribution among the sample population. With the population being dominated by the responses from the female participants, the male counterparts did not seem to make a notable distinct impact through their opinion via the responses. The comparative analysis between the genders seems to be an impossibility and therefore constitute the first limitation.

The second limitation of this study is that it did not focus on understanding the link between duration of sleep and the quality of sleep. The third limitation is the level of satisfaction one obtains from a night's sleep and understanding their phenomenological experiences associated

with sleep, rumination patterns, and emotional regulation.

Future Direction for the Study

The study must incorporate a qualitative analysis to understand the phenomenological experiences of the participants associated with the quality of sleep and the patterns of rumination, and emotional regulation. A crisp thematic analysis will be considered beneficial to attain at a better holistic conclusion along with the quantitative analysis.

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Declarations

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