



جامعة مصر للمعلوماتية
EGYPT UNIVERSITY
OF INFORMATICS

Egypt University of Informatics
Computer and Information Systems
Data Analysis Course

Sleep pattern Vs Academic performance Analysis

19/03/2025

Introduction

Sleep is a vital part of our daily lives, yet many students sacrifice it to meet academic demands. But could better sleep be the key to higher grades? This report explores the connection between sleep patterns and academic performance among undergraduate students. By analysing survey data, we uncover whether more sleep leads to better GPAs and what factors disrupt students' rest. Whether you're a student, educator, or simply curious, this report offers insights into how sleep impacts success—and why it matters.

Research Question

Does Sleep Patterns affect Academic performance?

Hypothesis

Students who get adequate and consistent sleep will have better academic performance, as measured by GPA, compared to those who experience poor or inconsistent sleep patterns

Population of Interest:

Undergraduate students at EUI

Sampling Method:

Convenience sampling as it is much efficient to gather data from limited population with easier access

Bias Identification:

In designing this survey, we have taken steps to identify and minimize potential sources of bias.

Bias: To minimize bias, we ensured the survey was anonymous and encouraged honest responses.

Survey Questions:

[What is your current academic year?]

[On a scale of 1 to 5, how would you rate your overall academic performance this semester? (1 = Very Poor, 5 = Excellent)]

[On average, how many hours of sleep do you get per night?]

[What factors disrupt your sleep? (Select all that apply)]

[How many hours per week do you spend on academic work outside of class?]

[What was your GPA for the last semester?]

[Do you feel that your sleep habits impact your academic performance?
(Yes/No/Not Sure)]

Online survey :

<https://docs.google.com/forms/d/e/1FAIpQLSeDM9jTI3V8Gywk5Ekb5VASpROKoSUcEWDyDTbnnJirCOZ1DQ/viewform?usp=sharing>

Number of samples collected: 51

Analysis:

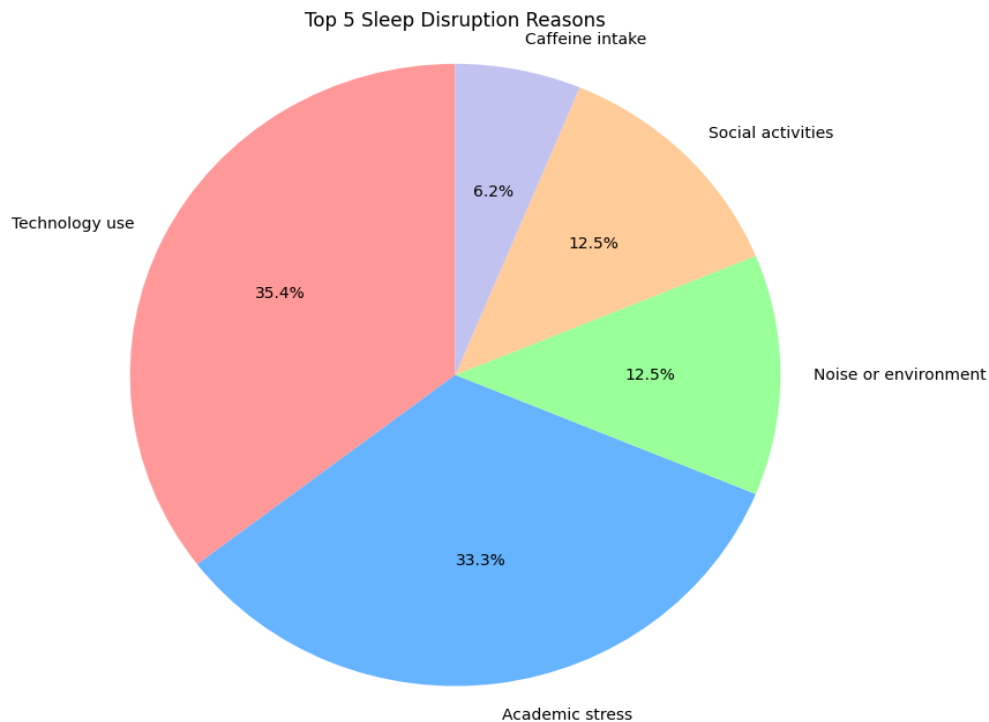
To analyse the data collected from this survey, we will calculate basic descriptive statistics such as the mean, median, and mode.

Mean GPA: 2.88843137254902

Median GPA: 3.0

Mode GPA: 2.4

1.Sleep Disruption

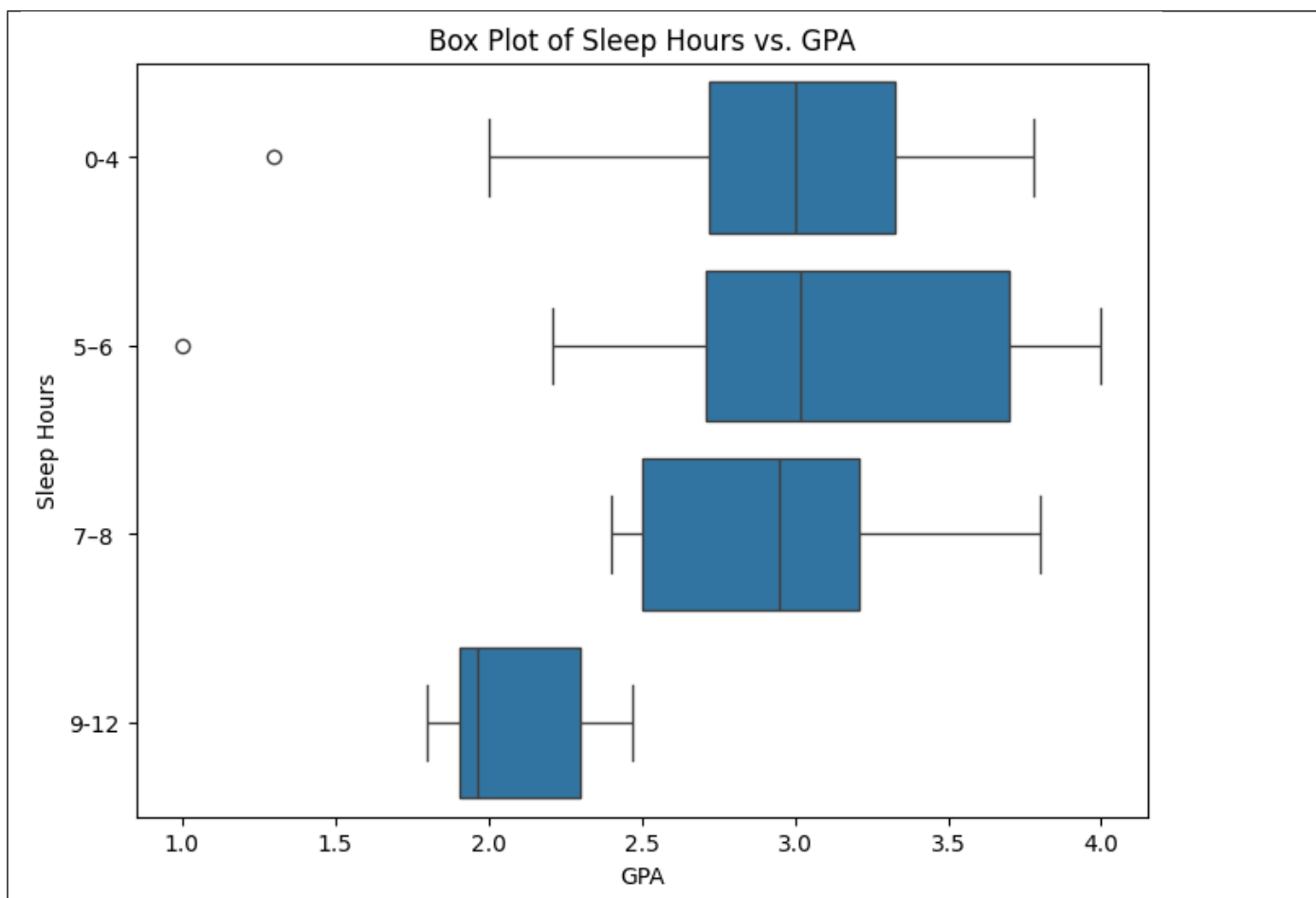


The pie chart illustrates the top five reasons for sleep disruption among individuals, with each segment representing the percentage contribution of each reason.

1. **Academic Stress:** This is the most significant factor, accounting for 35.4% of sleep disruptions. The high percentage suggests that academic pressures are a major cause of sleep issues, likely due to late-night studying or anxiety about academic performance.
2. **Technology Use:** Contributing 33.3%, technology use is another leading cause of sleep disruption. This could be attributed to the use of electronic devices before bedtime, which can interfere with the body's natural sleep cycle due to blue light exposure.
3. **Noise or Environment:** This factor makes up 12.5% of sleep disruptions. Environmental factors such as loud noises or uncomfortable sleeping conditions can significantly affect sleep quality.
4. **Social Activities:** Also at 12.5%, social activities can disrupt sleep patterns, possibly due to late-night socializing or irregular sleep schedules.
5. **Caffeine Intake:** The smallest contributor at 6.2%, caffeine intake, particularly in the evening, can lead to difficulties in falling asleep.

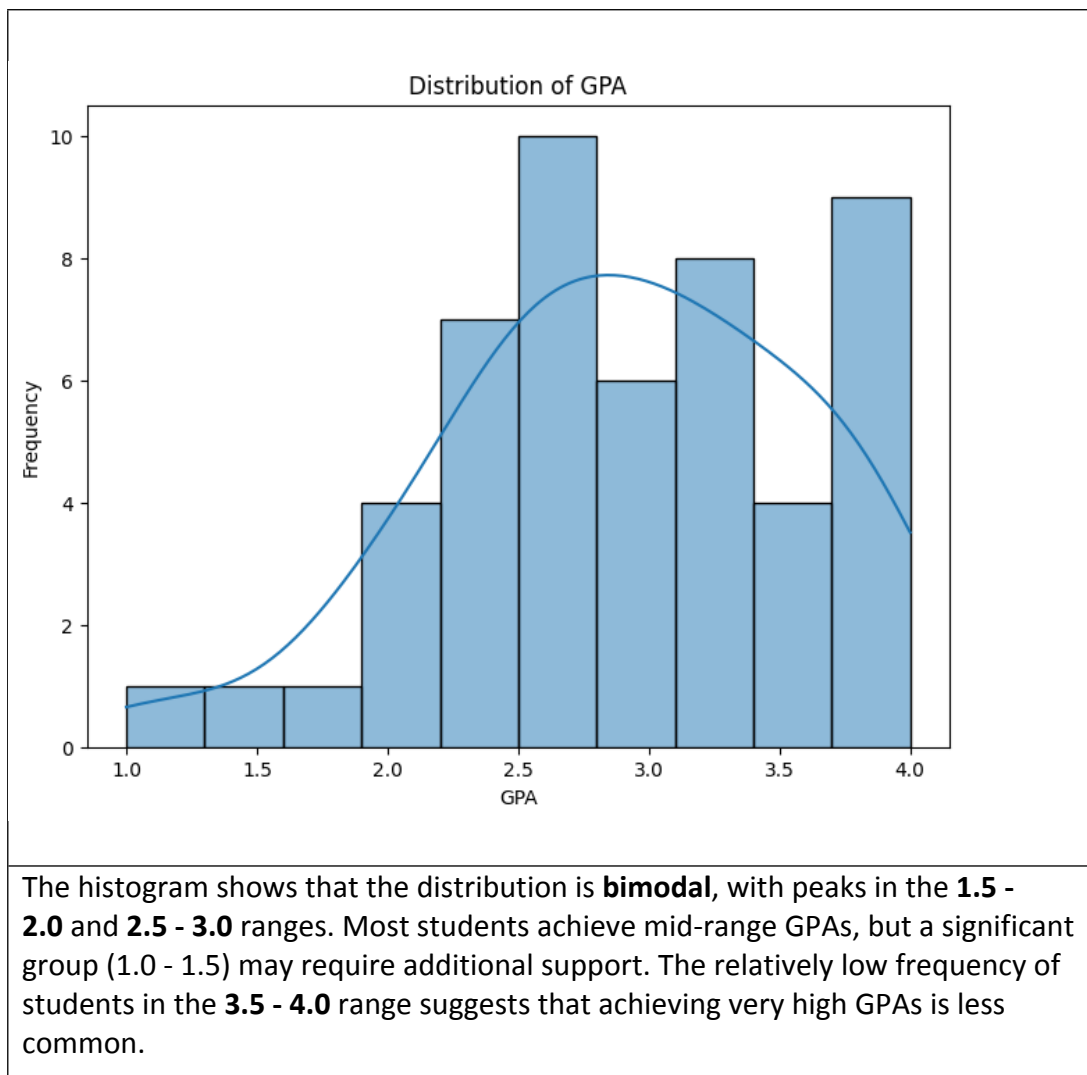
The chart highlights that academic stress and technology use are the predominant reasons for sleep disruptions, emphasizing the need for better stress management and mindful technology use to improve sleep quality.

2. Sleeping Hours vs GPA

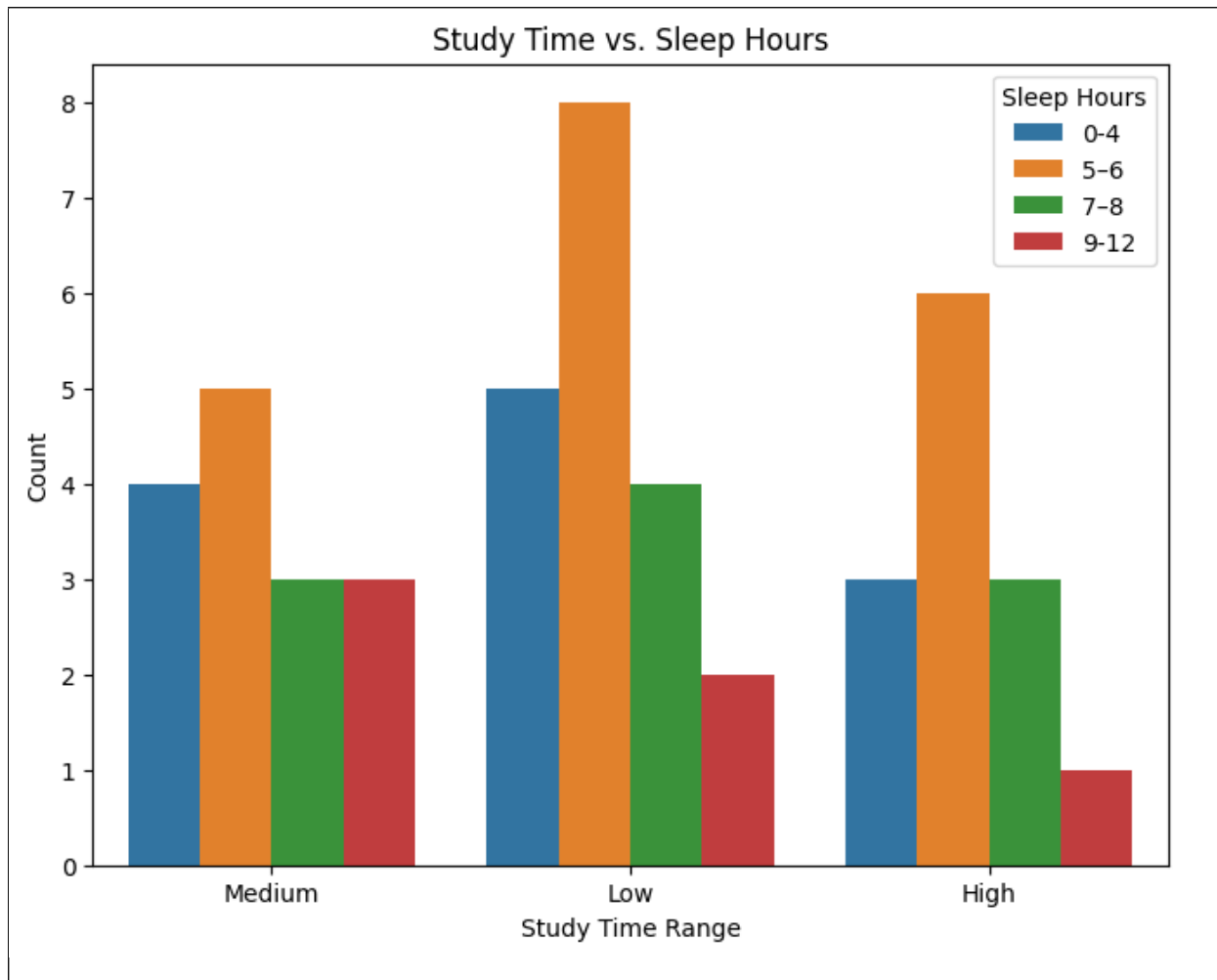


The box plot illustrates the relationship between sleep duration and GPA across four categories: 0-4, 5-6, 7-8, and 9-12 hours. 7-8 hours of sleep correlates with the highest median GPA, indicating optimal sleep for academic performance. The 5-6 hours category has a slightly lower median GPA, while the 0-4 hours group has the lowest, indicating that insufficient sleep negatively impacts GPA. The 9-12 hours category shows a lower median than 7-8 hours, suggesting excessive sleep may also be less beneficial. Outliers in some categories highlight that other factors, like study habits or stress, may influence GPA. Overall, the plot suggests a trend where moderate sleep (7-8 hours) correlates with better academic performance, but the relationship is not strictly linear, indicating additional factors at play.

3.GPA Distribution



4. Study Time vs Sleep Hours



This count plot compares the distribution of students across different study time ranges, grouped by sleep duration categories. The plot shows that students who study 6-10 hours and sleep 7-8 hours are the most common, with a count of 8 for this combination. This indicates a trend where moderate study time and adequate sleep are prevalent among students. Fewer students are found in extreme categories, such as 0-5 hours Study Time or 9-12 hours Sleep Hours, suggesting that these behaviours are less common

Note :

'0-5 ': 'Low',
'6-10': 'Medium',
'11-15': 'High',
'15-20 hours': 'Very High'

Conclusion

The analysis reveals a weak correlation between sleep patterns and academic performance, with students who get more sleep tending to have slightly higher GPAs. However, the relationship is not strongly linear, indicating that other factors like stress, study habits, and time management also play significant roles. Academic stress and technology use were the primary disruptors of sleep, highlighting the need for interventions to improve sleep quality and academic outcomes

Any potential issues

1. **Sample Size:** The survey collected data from only 51 students, which is a relatively small sample size. A larger sample would provide more reliable and generalizable results.
2. **Self-Reported Data:** The data on sleep hours and GPA were self-reported, which may introduce bias. Students may overestimate their sleep hours or GPA, leading to inaccurate results.
3. **Causality:** The analysis shows a correlation between sleep and academic performance but does not establish causality. Other factors, such as stress or study habits, may influence both sleep and GPA.
4. **Bias in Sampling:** The survey used simple random sampling, but it is possible that certain groups of students (e.g., those with higher or lower GPAs) were over- or under-represented in the sample.
5. **Formatting:** Choosing the wrong formatting for Sleep Hours and for study time making it categorical instead of numerical
6. **External Factors:** The survey did not account for external factors such as part-time jobs, family responsibilities, or health issues, which could also impact both sleep and academic performance.