



Good Night, Great Mood? Tracking Sleep and Emotional States

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Introduction

Research Question: How does more or less hours of sleep affect student mood the next day
This study investigates how sleep duration affects mood among students.

Data was collected over the fall 2024 term through weekly surveys on Tuesdays and Thursdays, with responses on mood (categorical) and hours of sleep.

Hypothesis : more sleep leads to more positive moods, while less sleep

Data Wrangling

- **Dataset:** Uploaded a class survey dataset ("*Daily Survey Dec 3.csv*") containing responses on mood and sleep.
- **Subset Selection:** Focused on key variables:
survey_date (date of survey),
ID (participant ID),
mood (self-reported emotional state),
hours_of_sleep (self-reported sleep hours).
- **Renamed Variables:** Simplified column names for clarity.
- **Mood Levels:** Converted numeric mood responses into descriptive categories (e.g., "*extremely negative*" to "*extremely positive*").
- **Sleep Hours Cleaning:**
Removed invalid entries.
Converted textual or time-based sleep data into numeric hours.
Excluded rows with missing values.

How do sleep hours and mood vary across individuals?

- Outcome variable: mood
- Predictor variables: hours of sleep
- Time Variant: survey date
- Random effect: Individual ID (accounting for repeated measures)
- Total observations: 243 from 18 individuals

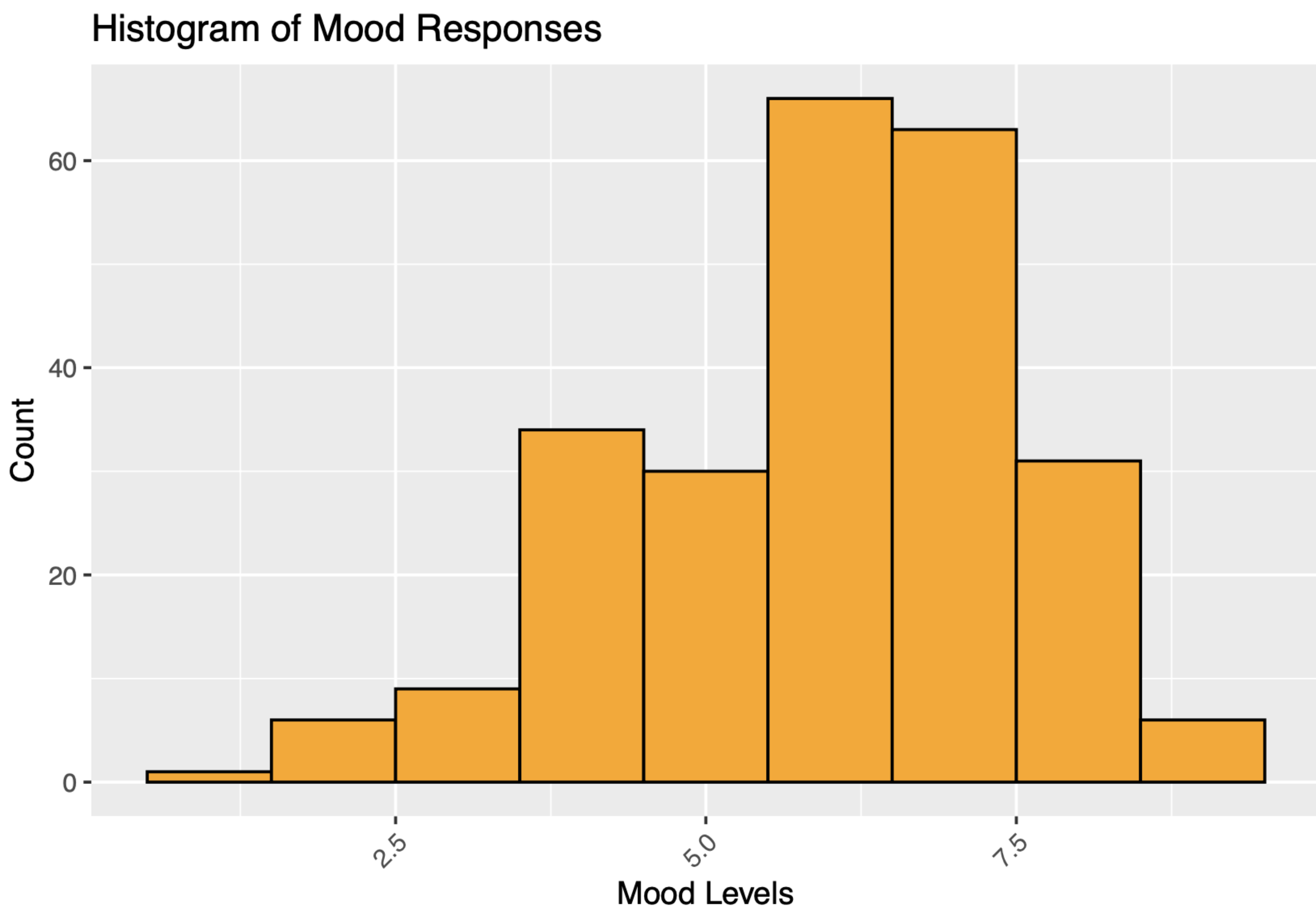
Visualizations



References

Class slides and workshops, Google search
<https://www.betterhealth.vic.gov.au/health/healthyliving/Mood-and-sleep#sleep-and-moods>
<https://sleep.hms.harvard.edu/education-training/public-education/sleep-and-health-education-program/sleep-health-education-87>

Visualizations



How does mood change over time? - Analysis

Fixed Effects (Key Findings):

- Hours of Sleep:
 - * Statistically significant effect ($p = 0.03$)
 - * Positive relationship ($\beta = 0.133$)
 - * For each additional hour of sleep, mood increases by 0.133 units
 - * This is the most important predictor in the model
- Survey Date:
 - * Not statistically significant ($p = 0.49$)
 - * Negligible effect on mood ($\beta = 0.003$)

Model Fit:

- AIC: 885.0 (lower is better)
- BIC: 902.5
- Pseudo- R^2 (fixed effects): 0.02 (very low explanatory power)
- Pseudo- R^2 (total): 0.24 (moderate explanatory power with random effects)

Random Effects:

- Individual variation (ID intercept variance): 0.56
- Residual variance: 1.91
- Intraclass Correlation (ICC): 0.23, suggesting 23% of mood variation is due to individual differences

Residuals:

- Relatively symmetric distribution (-3.03 to 2.13)
 - Median close to zero, suggesting reasonable model fit
- Key Takeaway: Hours of sleep has a small but statistically significant positive effect on mood, accounting for individual differences.

Overall Conclusions

In this study examining mood across 243 observations from 18 individuals, the key finding is that sleep duration significantly impacts mood. Specifically, each additional hour of sleep is associated with a modest but statistically significant increase in mood ($\beta = 0.133$, $p = 0.03$). While hours of sleep emerged as a meaningful predictor, the survey date showed no significant effect. The model suggests that approximately 23% of mood variation can be attributed to individual differences, highlighting the importance of personal variability in mood. Overall, the results underscore the potential importance of sleep duration in maintaining psychological well-being, though the relationship is relatively small.

Visualizations

