Appendix: OLS Regression values summed up

Hypothesis	HAT Rigorifeeth (NJ	Marrethe Apprhesis (4)		Coefficient	p-villar	Sprftart1
Street Impacts Steep Quality	Street has no officerior sings quality	higher clean is executed with lower place quality	1106	4680	0.007	• (marginal)
(NR offsets Sings Coeffs	Bellina in affect on sleep quality	tigher (Mris-associated with some deep-quality	0.406	-00402	0.000	•
14647 Rate release to Street Souths	Mattrig Next title had no whether street quality	region testing heart total is associated with varies charp spathy	0.408	-0.000	0.000	
Cally Brayes affects Sixopriseality	Delly steps have no effect on silvey quality	More disportant to better disea quality	0.408	-0000000	0.000	
Age of Essential Enteraction	his interaction offers between against election on obeing quality	Earning Improves sileny quality trans for sider and relations	0.001	0.0001	0.000	
Screen Time of California Interaction	to part affect of scenarions and offere or steep quality	migrowers of soft head to write steep quality	0.000	0.000075	0.000	•
Steep Southly affects ideaed South	Street quality-down not affect mosel soom	box sky nysses nod	0.000	0.000	0.079	
Steep Southly affects Productivity Source	Deep quality-does not affect productivity	Better cheep triproven productivity	0.000	-0001	OKH	•





THANKS for your attention!

Questions?

Conclusion

Sleep Quality Analysis

Investigation on the effects on and of sleep quality



Data Overview

Sources
- Sleep Health and Lifestyle Dataset
- Sleep Cycle and Productivity Dataset

Key variables

- Lifestyle: Stress Level, Exercise, Screen Time, Caffeine Intake

Physiological: Age, BMI, Heart Rate, Daily Steps
Outcome: Sleep Quality, Mood and Productivity Score



Methodolgy Overview



Hypotheses



On the first view, only one clear linear relation ...



Challenges

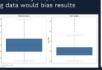
Missing values

- Merging of multiple data sources led to missing values in several variables
- Especially affected: Heart Rate, Daily Steps, BMI
 High proportion of missing data would bias results

Outliers

- · Cleaned dataset by removing rows with missing values
 Result: Reduced
- sample size → 374 complete cases used in regression models











Sleep Quality Analysis

Investigation on the effects on and of sleep quality

AGENDA

Data Overview	Step 1	
Methodology Overview	Step 2	
Hypotheses	Step 3	
Conclusion	Step 4	

Data Overview

Sources

- Sleep Health and Lifestyle Dataset
- Sleep Cycle and Productivity Dataset

Key variables

- Lifestyle: Stress Level, Exercise, Screen Time, Caffeine Intake
- Physiological: Age, BMI, Heart Rate, Daily Steps
- Outcome: Sleep Quality, Mood and Productivity Score

Methodolgy Overview

Data Cleaning

- Removed missing and implausible values
- Handled outliers
- Encoded categorical variables

Exploratory Data Analysis

- distribution histograms
- correlation matrices
- pairplots

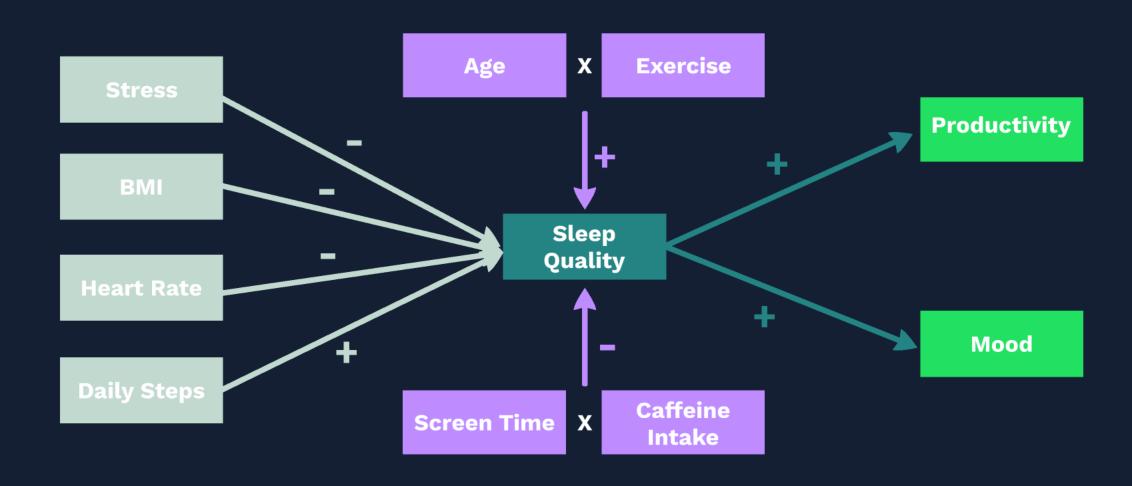
Modeling

- Applied Ordinary Least Squares (OLS) regression
- Included interaction terms for combined variable effects

Evaluation

- Interpreted R², p-values, and coefficients
- Visualized model fits using seaborn regplot

Hypotheses



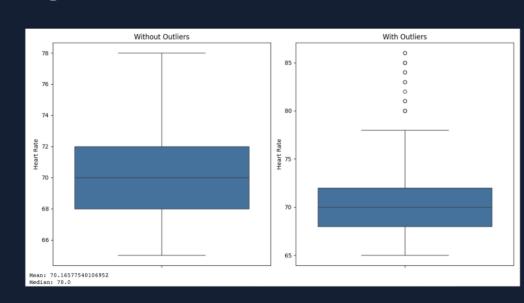
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	0
Gender	0
Age	0
Total Sleep Hours	0
Sleep Quality	0
Exercise (mins/day)	0
Stress Level	0
BMI Category	5000
Heart Rate	5000
Daily Steps	5000
Age Category	0
BMI Category Code	5000
Caffeine Intake (mg)	374
Screen Time Before Bed (mins)	374
Work Hours (hrs/day)	374
Productivity Score	374
Mood Score	374

On the first view, only one clear linear relation ...



Conclusion

· Statistically significant effects?

- effect of heart rate on sleep quality was found statistical significant
- BMI, Daily Steps, and Stress Level showed no significant impact on sleep quality
- Interaction effects (Exercise × Age, Caffeine × Screen Time) were **not statistically significant**
- No evidence found for an effect of sleep quality on mood or productivity scores

Sample size limitations

- The reduced sample size for key variables (n = 374) may have limited statistical power to detect significant relationships, especially for subtle effects
- Potential multicollinearity
 - Some independent variables may be correlated (e.g., Heart Rate and BMI, Stress Level and Heart Rate, Age and Exercise etc) which could affect the stability and interpretation of regression coefficients

Model fit (R² values)

- R-squared values were consistently low (mostly < 0.01), indicating that the models explained very little variance in sleep quality, mood, or productivity
- Implication: Other unobserved variables likely play a larger role in determining sleep quality and its outcomes

Appendix: OLS Regression values summed up

Hypothesis	Null Hypothesis (H₀)	Alternative Hypothesis (H ₁)	R ²	Coefficient	p-value	Significant?
Stress impacts Sleep Quality	Stress has no effect on sleep quality	Higher stress is associated with lower sleep quality	0.006	-0.0250	0.067	x (marginal)
BMI affects Sleep Quality	BMI has no effect on sleep quality	Higher BMI is associated with worse sleep quality	0.436	-0.0422	0.665	*
Heart Rate relates to Sleep Quality	Resting heart rate has no effect on sleep quality	Higher resting heart rate is associated with worse sleep quality	0.436	-0.1884	0.000	•
Daily Steps affect Sleep Quality	Daily steps have no effect on sleep quality	More steps lead to better sleep quality	0.436	-0.0000042	0.885	*
Age × Exercise Interaction	No interaction effect between age and exercise on sleep quality	Exercise improves sleep quality more for older individuals	0.001	0.0001	0.236	*
Screen Time × Caffeine Interaction	No joint effect of screen time and caffeine on sleep quality	High levels of both lead to worse sleep quality	0.000	0.0000015	0.866	*
Sleep Quality affects Mood Score	Sleep quality does not affect mood score	Better sleep improves mood	0.000	0.0055	0.676	*
Sleep Quality affects Productivity Score	Sleep quality does not affect productivity	Better sleep improves productivity	0.000	-0.0011	0.934	*