

IMPACT OF SCREEN TIME ON DAILY STUDY HABITS

SUDE NIL VARLI-32191



DATASET OVERVIEW

- Duration: 3 months
First Data Entry: March 10, 2025
- Variables Collected:
 - Screen time (educational & non-educational)
 - Studying hours
 - Sleep duration
 - Time spent on social activities
 - Academic responsibilities

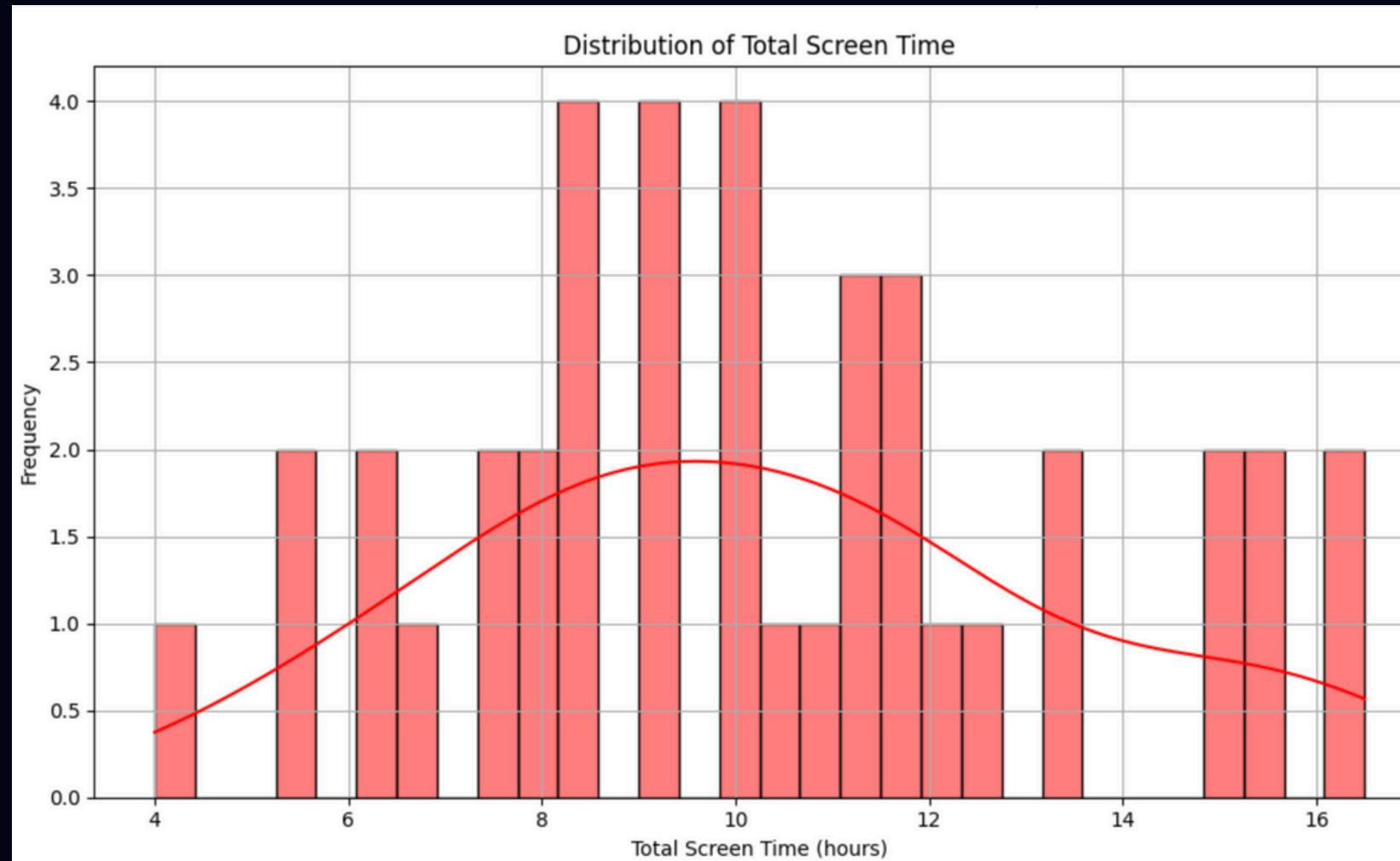


HYPOTHESIS

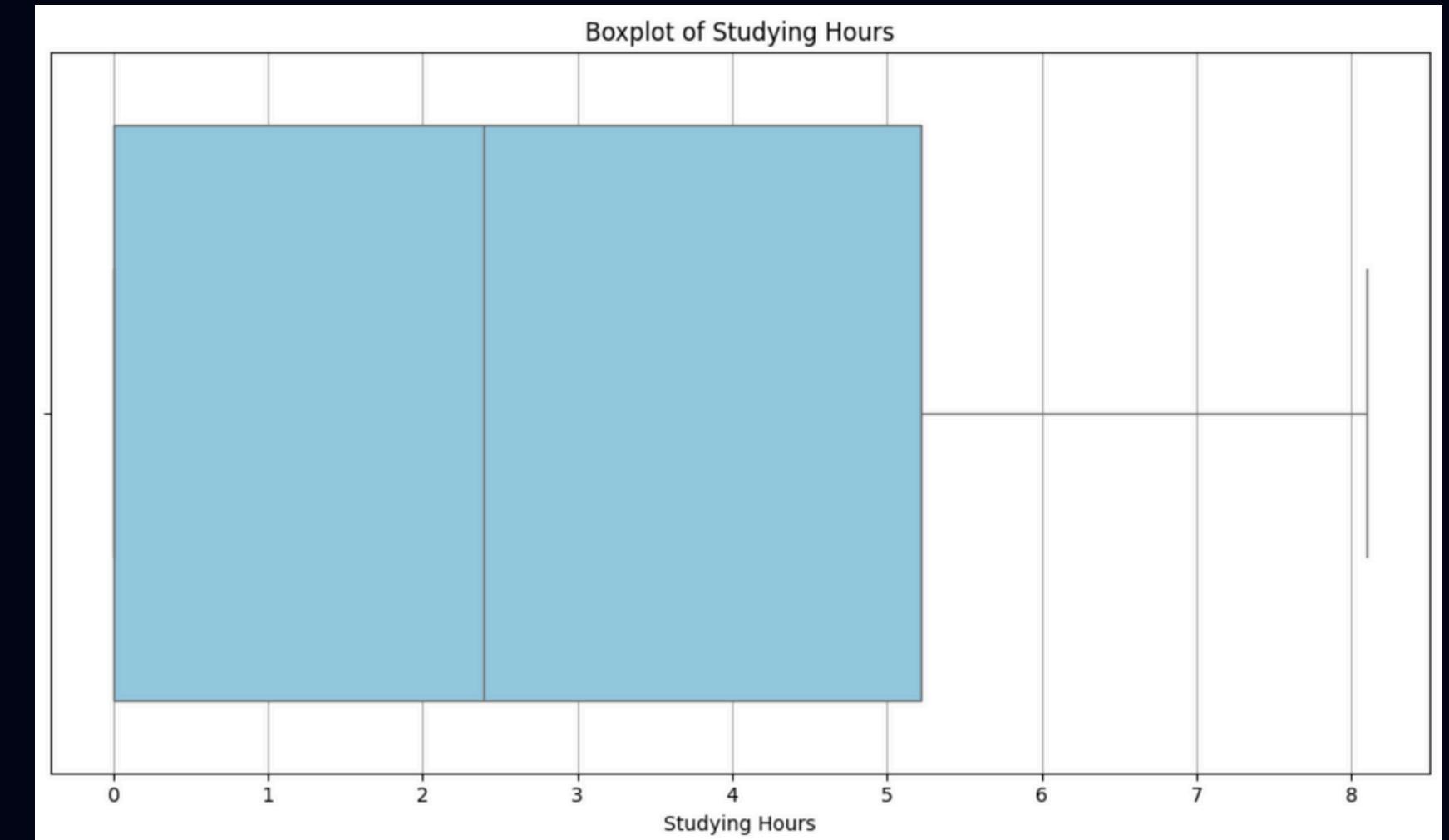
- Null Hypothesis (H_0): There is no significant correlation between total screen time and studying hours.
- Alternative Hypothesis (H_1): There is a significant negative correlation between total screen time and studying hours.

Univariate Analysis

- Histogram: Total Screen Time per day
Average total screen time: 10.27 hours



- Boxplot: Daily Studying Hours
Average studying hours: 2.86

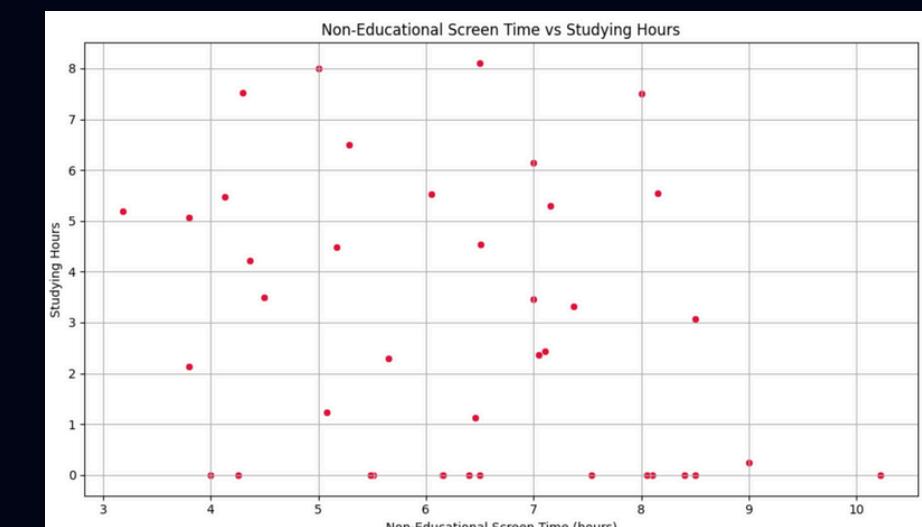
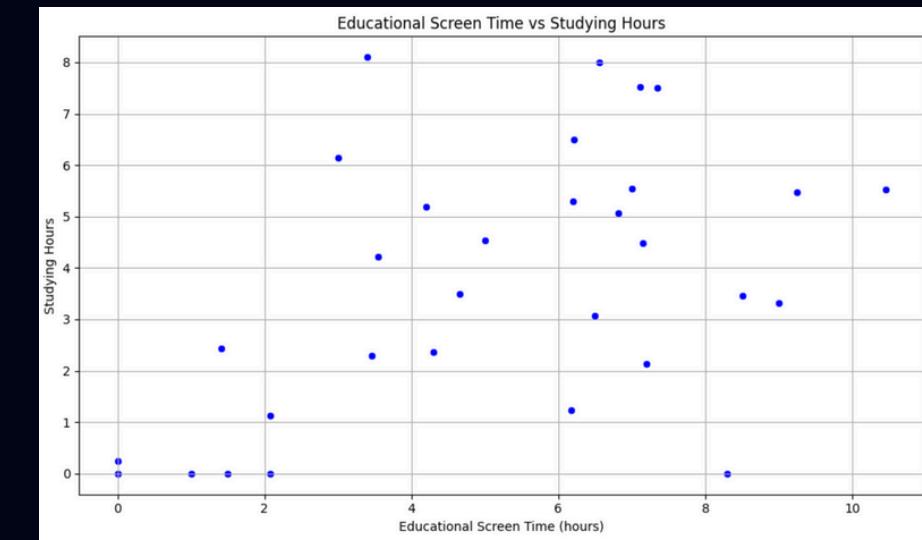
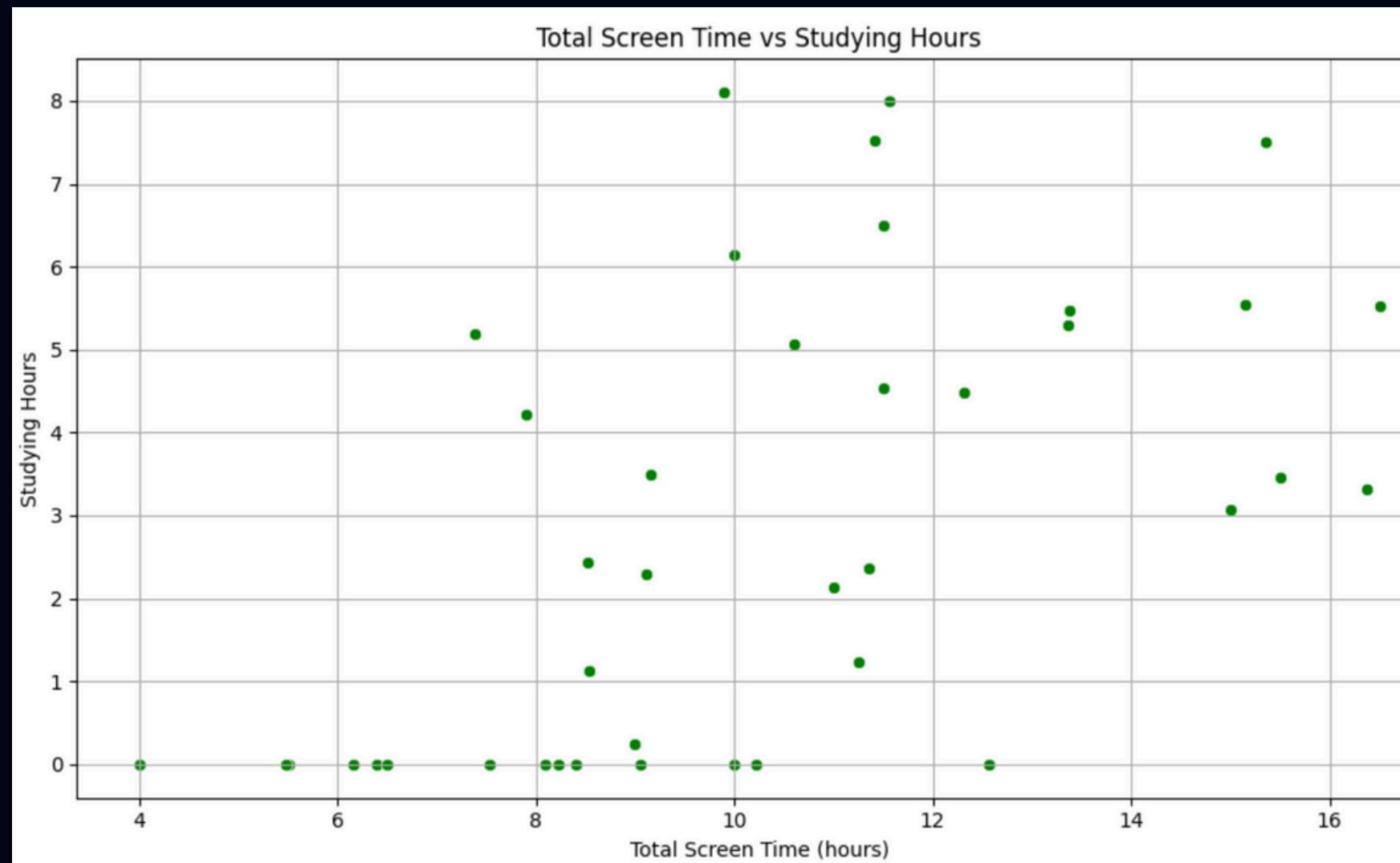


Bivariate Analysis

- Scatterplot: Total Screen Time vs Studying Hours

A negative trend between total screen time and studying hours.
While educational screen time shows a weak or neutral effect, non-
educational screen time is more strongly associated with reduced study time.

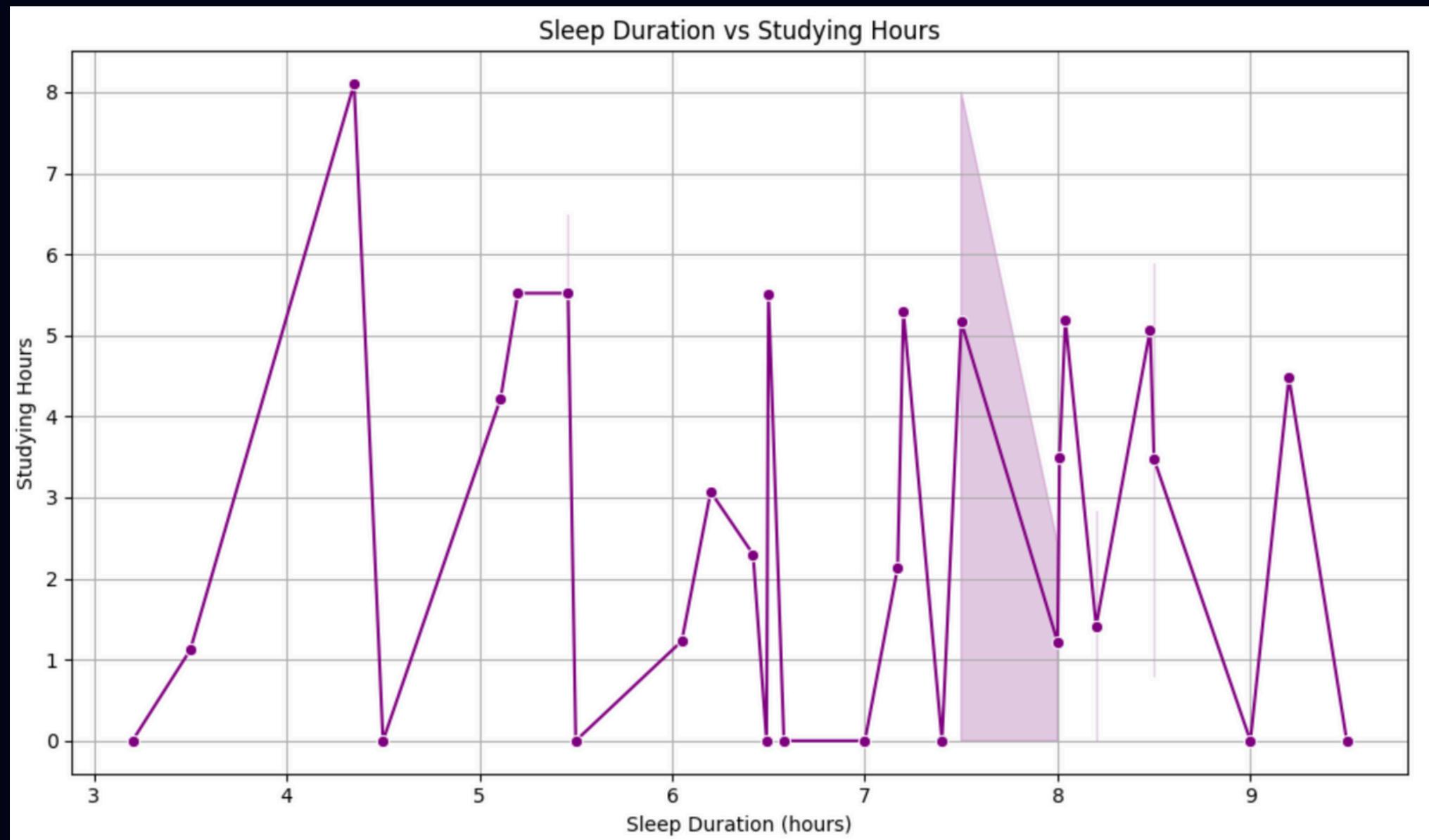
These patterns visually support the hypothesis of a negative relationship.



Bivariate Analysis

Sleep Duration vs Studying Hours

Although no strong linear trend is observed, moderate sleep durations (around 6–7 hours) seem to align with higher studying hours, suggesting a potential sweet spot for academic productivity.

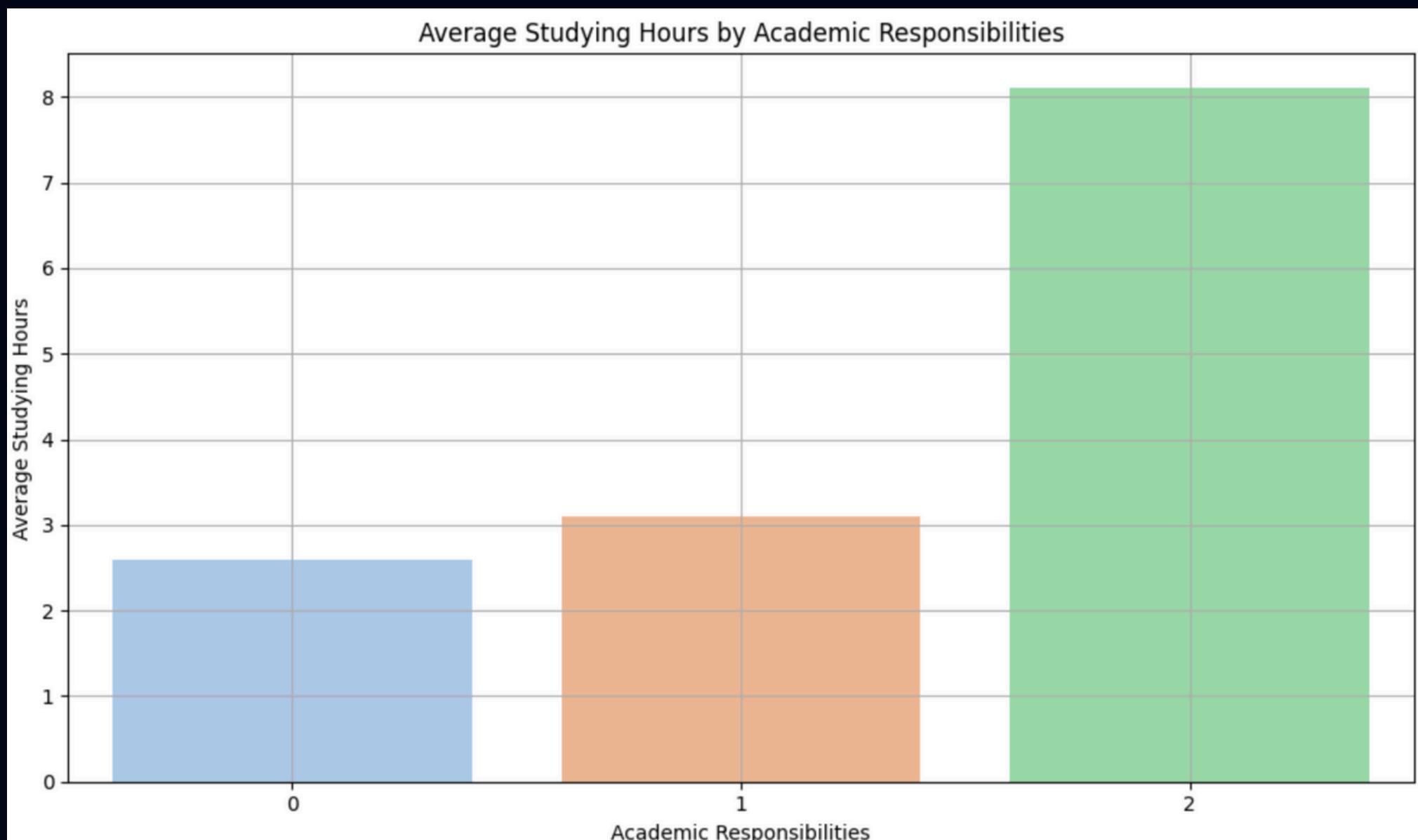


Bivariate Analysis

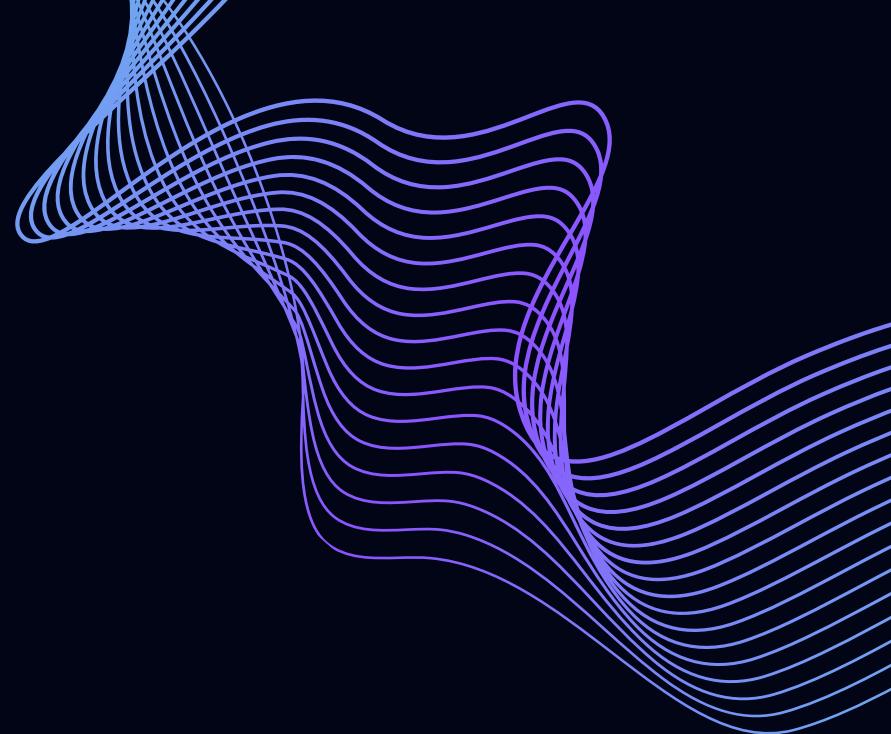


- Barplot: Academic Responsibilities vs Studying Hours

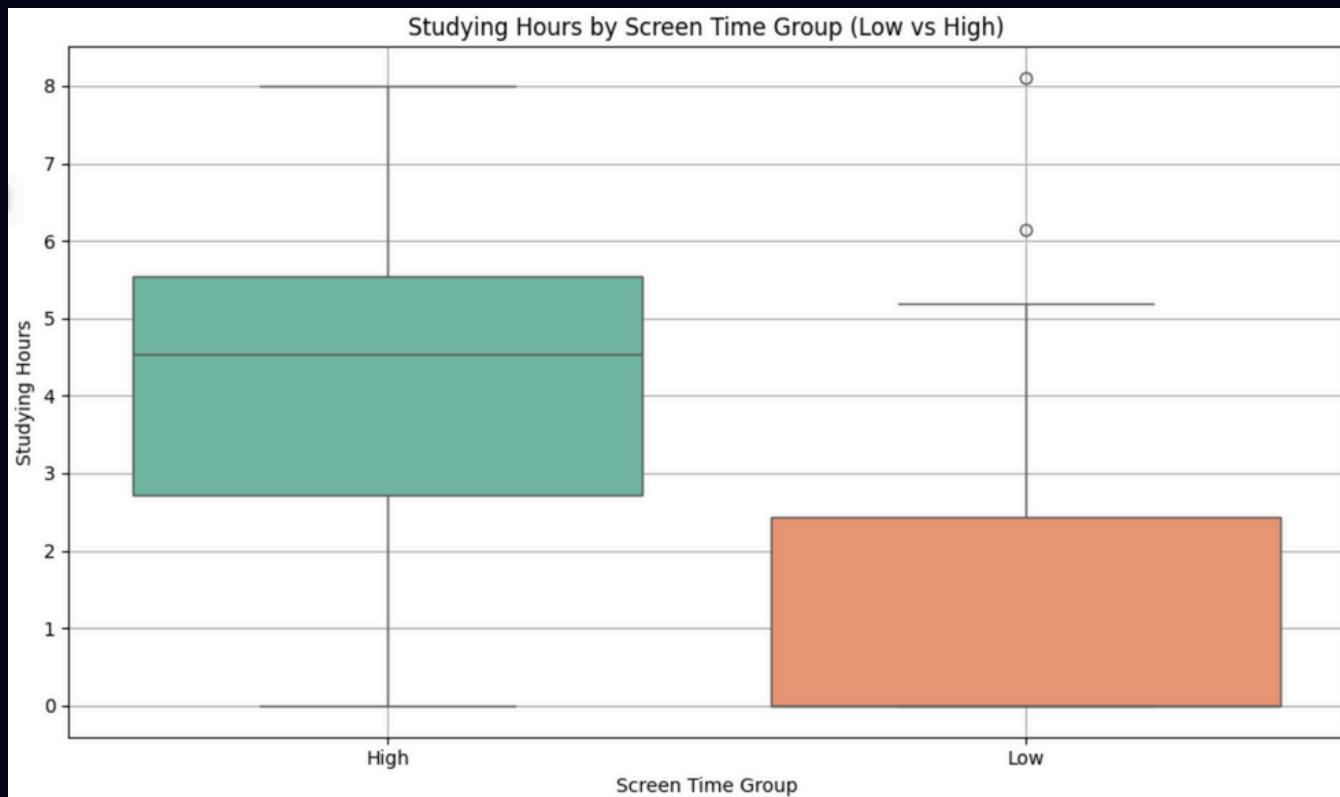
Higher academic responsibilities tend to study more, indicating a positive association between workload and studying hours.



Hypothesis Testing

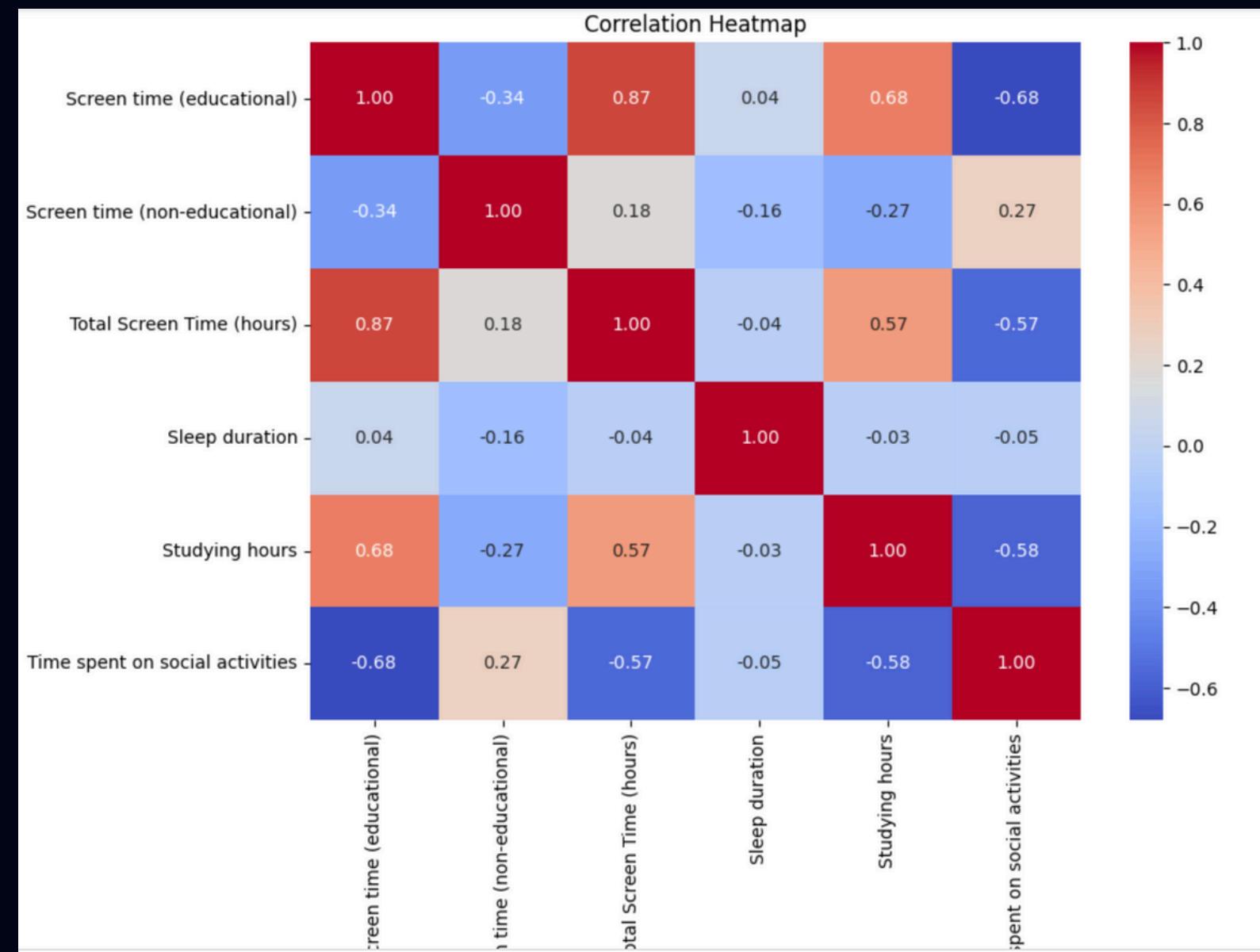


- T-Test result:
 $t\text{-statistic} = -3.492$,
 $p = 0.0012 < 0.05 \rightarrow$ Reject null hypothesis.
- Pearson Correlation: $r = 0.566$, $p = 0.0001 < 0.05$.
- Conclusion: Statistically significant negative correlation between screen time and studying hours



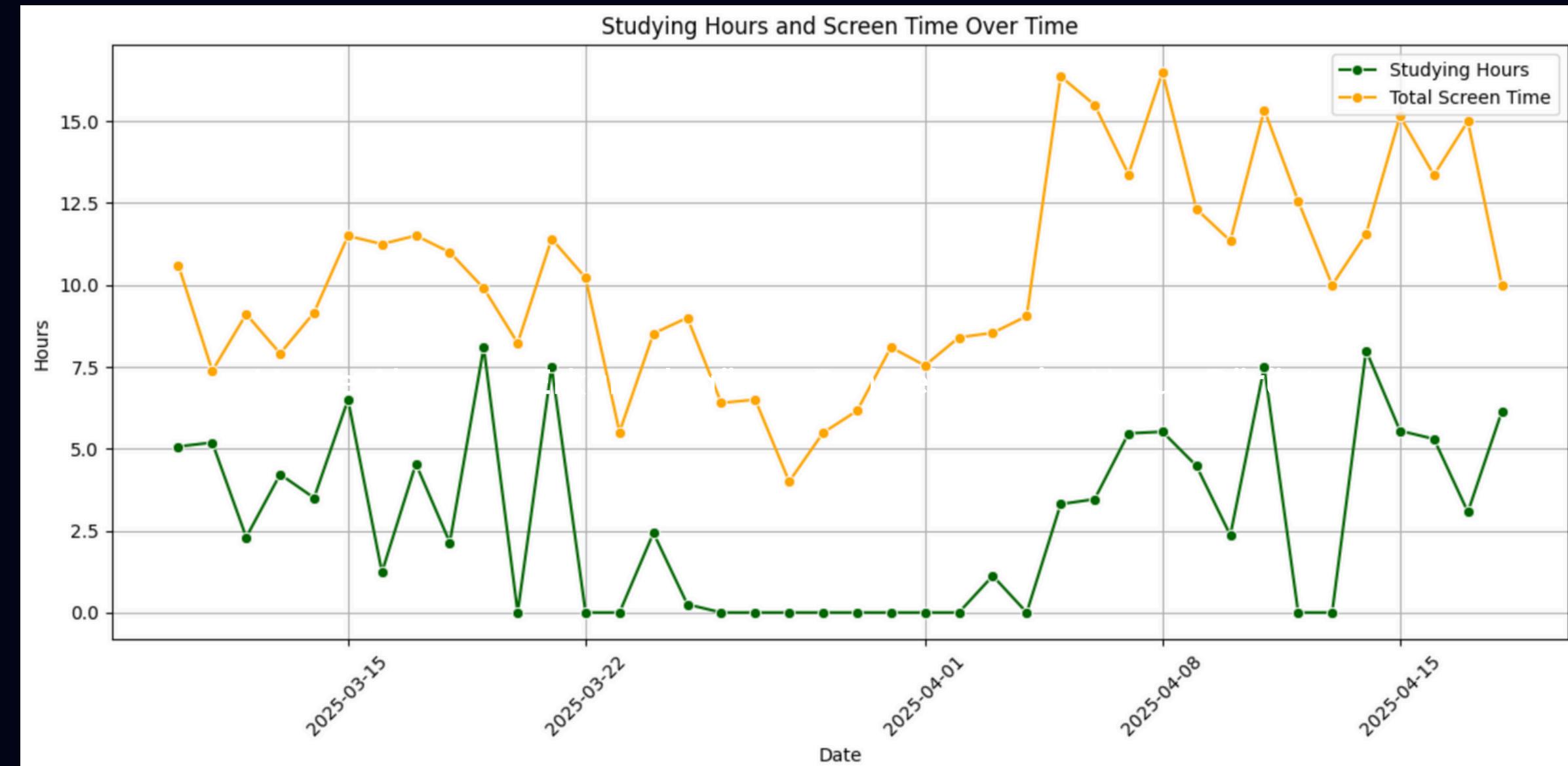
Multivariate Analysis

- Heatmap: Correlation Matrix
 - Studying hours show a moderate negative correlation with both total screen time ($r = -0.57$) and non-educational screen time ($r = -0.60$).
 - They have a weak to moderate positive correlation with educational screen time ($r = 0.27$) and sleep duration ($r = 0.35$).

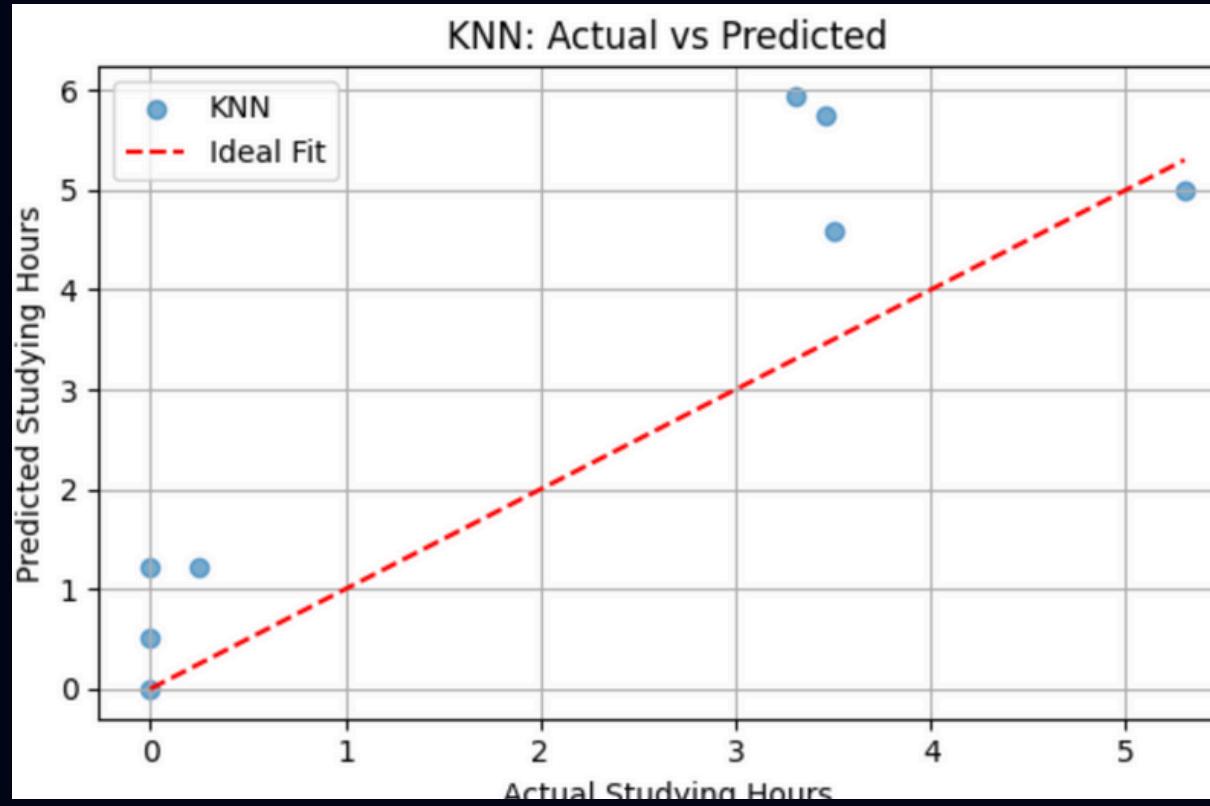


Multivariate Analysis

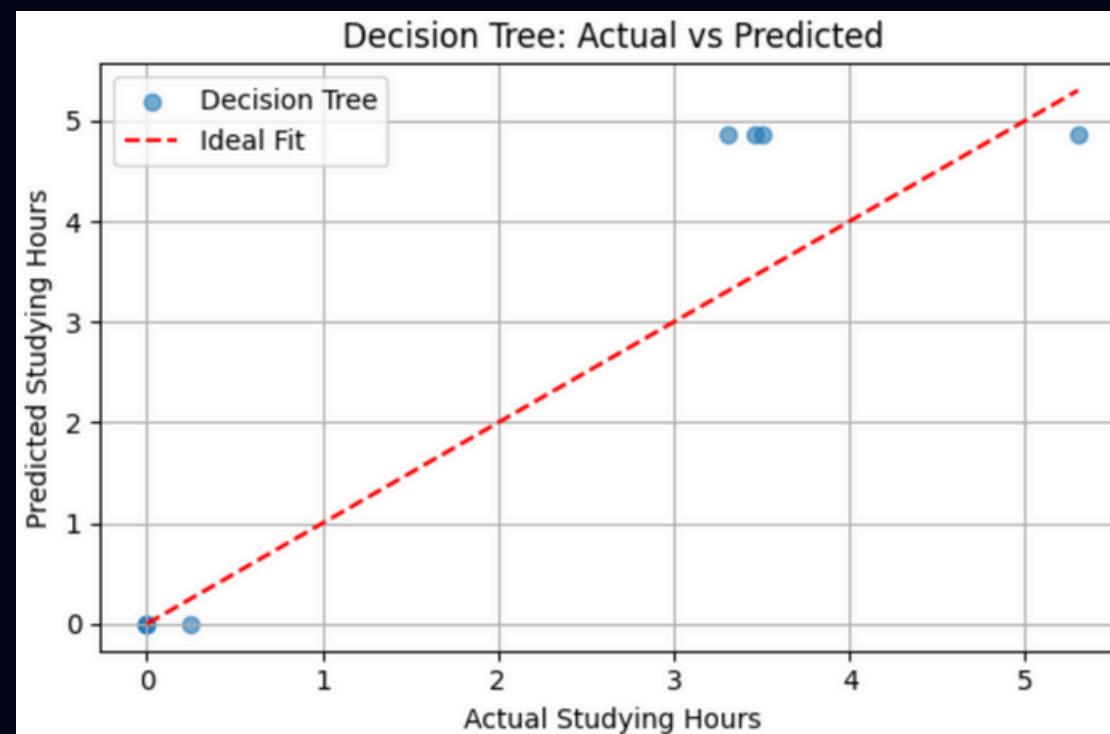
Studying hours tend to drop on days when total screen time increases, indicating an inverse relationship over time



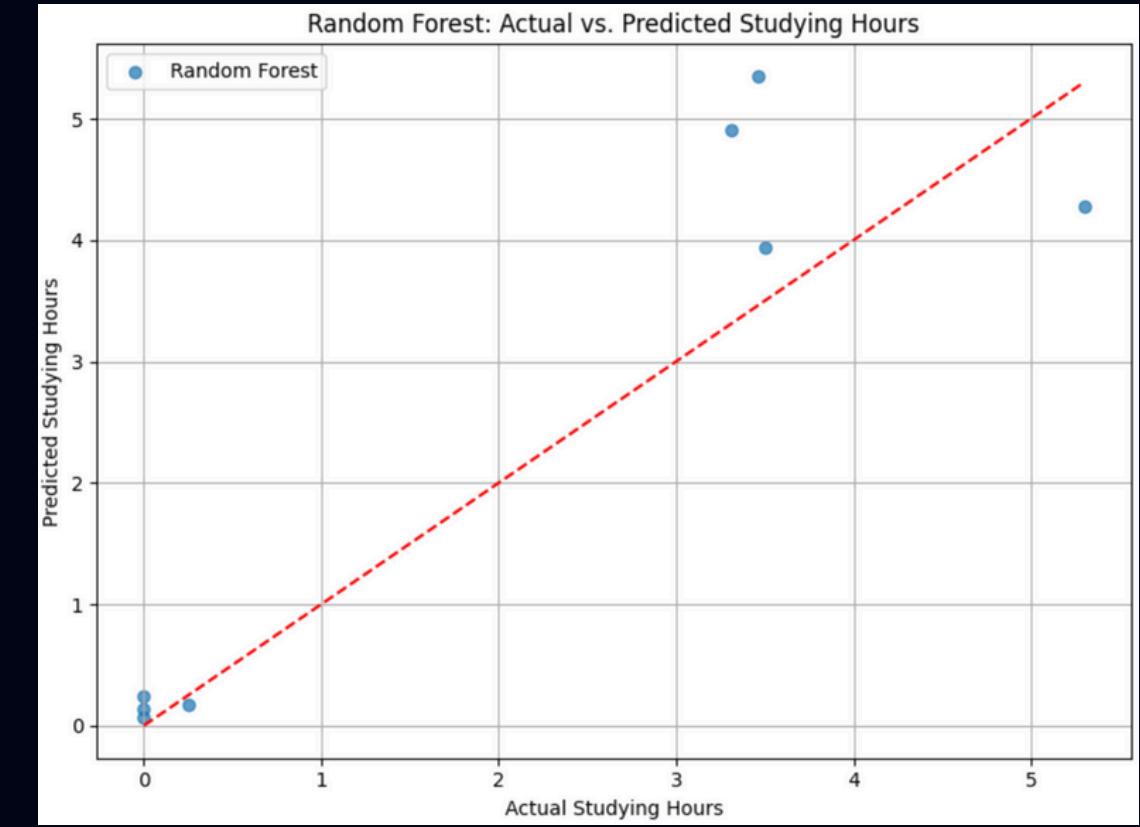
Regression Analysis



Decision Tree Results:
- Mean Squared Error: 5.26
- R^2 Score: -0.31



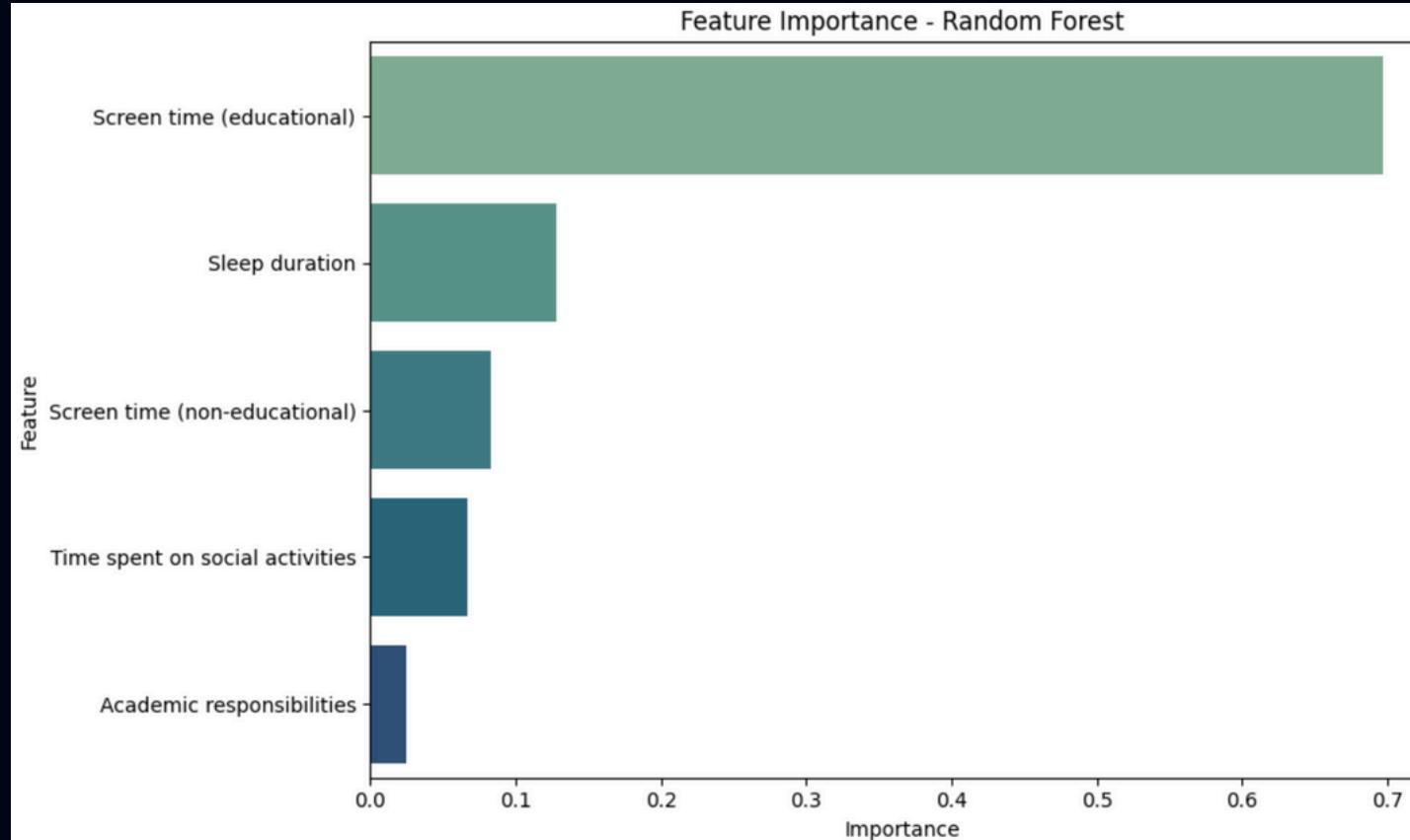
K-Nearest Neighbors:
- Mean Squared Error: 2.01
- R^2 Score: 0.49



Random Forest Results:
- Mean Squared Error: 0.95
- R^2 Score: 0.76

Best Performing Model: Random Forest with $R^2 = 0.77$

Feature Importance & Model Table



The Random Forest model reveals that educational screen time is by far the most influential feature when predicting studying hours.

Among the tested models, the Random Forest Regressor achieved the best overall performance, with the highest R² score and lowest MSE.

This suggests that ensemble methods are more effective in capturing the nonlinear and complex relationships between daily habits and studying hours.

	Model	Mean Squared Error	R ² Score
0	Random Forest	0.950511	0.762715
1	Decision Tree	0.802738	0.799605
2	KNN	2.012113	0.497696

Conclusion

- The null hypothesis is rejected.
- Increased total screen time is significantly associated with decreased studying hours.
 - Effect strongest with non-educational screen time.
- Conclusion: Balance in screen habits is critical for academic productivity.