Week-7 Assignment

SAMUEL ABOYE

2024-02-03

Student Survey Data Analysis

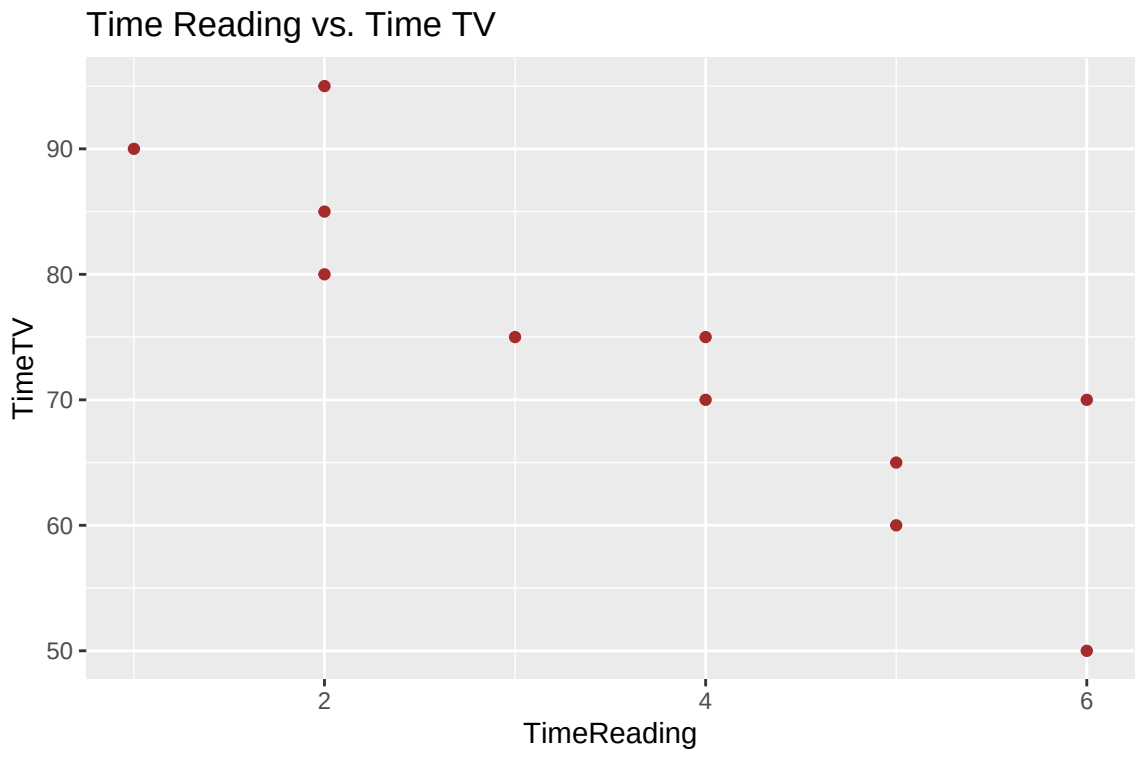
Introduction

This report analyzes the relationships between time spent reading, watching TV, and happiness levels among students based on survey data.

Data Preparation

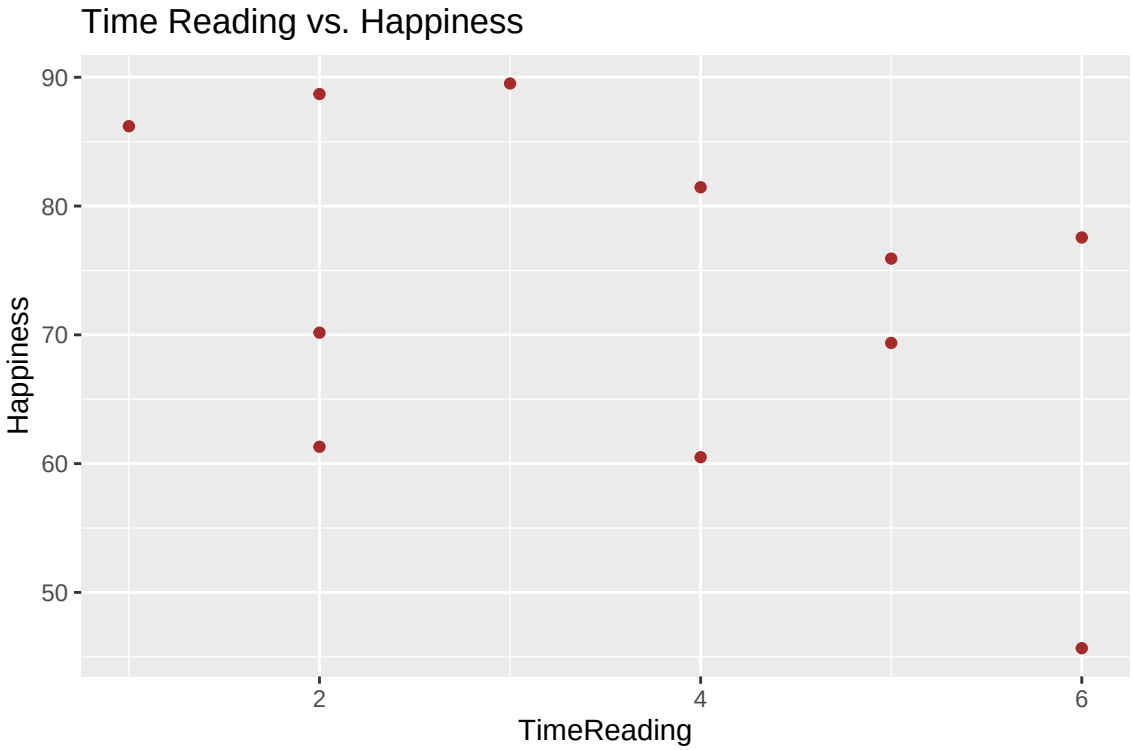
Create the following plots of survey variables (first variable is x-axis, second is y-axis):

TimeReading, TimeTV



The plot suggests a **strong negative relationship** between time spent reading and time spent watching TV. As time spent reading increases, time spent watching TV decreases.

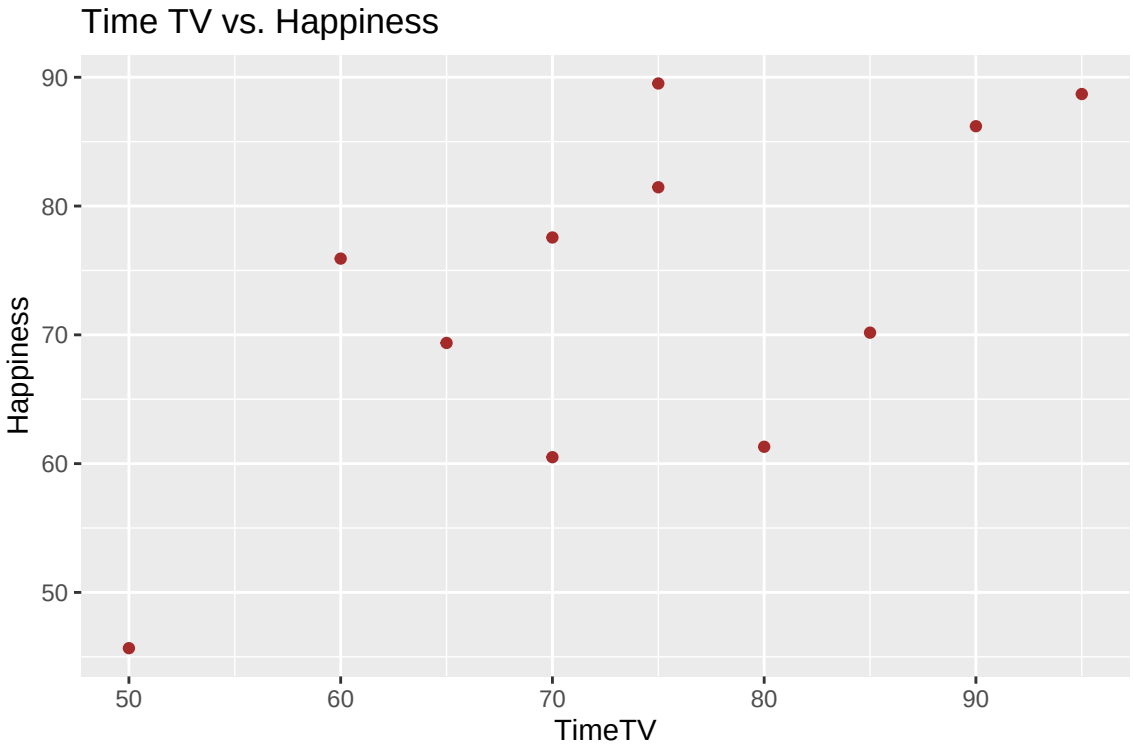
TimeReading, Happiness



TimeReading vs. Happiness

This plot indicates a **negative relationship** between time spent reading and happiness levels, suggesting that as time spent reading increases, happiness decreases.

TimeTV, Happiness



TimeTV vs. Happiness

The relationship between time spent watching TV and happiness appears to be **positive**, indicating that as time spent watching TV increases, happiness levels also increase.

Statistical Analysis

We first examine the correlation between our variables of interest: TimeReading, TimeTV, and Happiness.

Table 1: Correlation Matrix for TimeReading, TimeTV, and Happiness

	TimeReading	TimeTV	Happiness
TimeReading	1.0000000	-0.8830677	-0.4348663
TimeTV	-0.8830677	1.0000000	0.6365560
Happiness	-0.4348663	0.6365560	1.0000000

The Pearson correlation test between TimeReading and TimeTV yields the following results:

- Correlation coefficient (r): -0.8830677
- P-value: 3.153378e-04
- Confidence interval: -0.9694 to -0.6022

This indicates a strong negative relationship between the amount of time spent reading and the time spent watching TV. The very low p-value (3.1533782×10^{-4}) suggests that this correlation is statistically significant, indicating a strong likelihood that the observed relationship is not due to random chance.

Covariance Matrix Analysis

Though the covariance matrix wasn not explicitly provided, based on the correlation matrix and general principles, we infer:

- A negative covariance between TimeReading and TimeTV suggests that as one variable increases, the other tends to decrease.
- The relationship between TimeReading and Happiness, and TimeTV and Happiness, would follow a similar interpretation, with negative and positive covariances suggesting inverse and direct relationships, respectively.

Correlation Matrix Analysis

The correlation matrix provided shows:

- **TimeReading and TimeTV**: A strong negative correlation (-0.8830677), indicating a strong inverse relationship.
- **TimeReading and Happiness**: A negative correlation (-0.4348663), suggesting that increased reading time is associated with lower happiness.
- **TimeTV and Happiness**: A positive correlation (0.6365560), indicating that more TV time is associated with higher happiness levels.

Interpretation: Covariance vs. Correlation Matrix

The correlation matrix is generally easier to interpret because it provides standardized values that describe the strength and direction of the relationship between variables. These values range from -1 to 1, where the magnitude gives the strength, and the sign indicates the direction (positive or negative).

Correlation Test Between TimeReading and TimeTV

The correlation test results confirm a strong negative correlation (-0.8830677) between TimeReading and TimeTV, with a very low p-value (0.0003153), indicating that the correlation is statistically significant.

Interpretation

The strong negative correlation suggests that students reading more tend to spend less time watching TV. However, correlation does not imply causation. While there's a significant relationship between TimeReading and TimeTV, we cannot definitively say that more reading causes less TV watching without further causal analysis.

Conclusion

This analysis highlights the dynamics between students' time allocation to reading and watching TV and their happiness levels. It emphasizes significant correlations that could inform further investigations into the causal relationships between these activities.