McKibben_DSC520_Ex_7.2

Makayla McKibben

2024-07-28

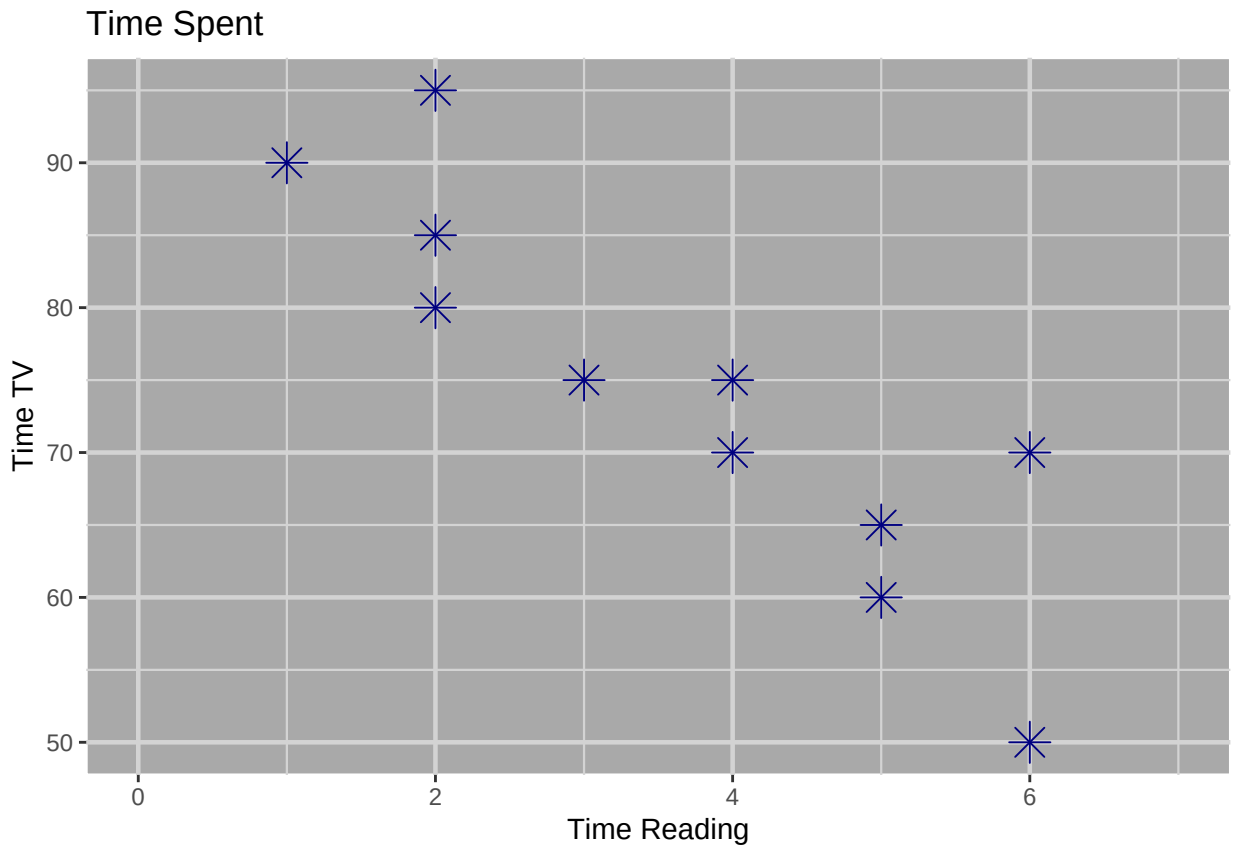
```
# Install appropriate packages
# install.packages("tidyverse")

# Importing the data set
survey <- read.csv(file = 'student-survey.csv', header = TRUE, sep =",", stringsAsFactors = FALSE)

# Looking at a section of the data set to understand the structure
head(survey)
```

```
##   TimeReading TimeTV Happiness Gender
## 1           1     90     86.20      1
## 2           2     95     88.70      0
## 3           2     85     70.17      0
## 4           2     80     61.31      1
## 5           3     75     89.52      1
## 6           4     70     60.50      1
```

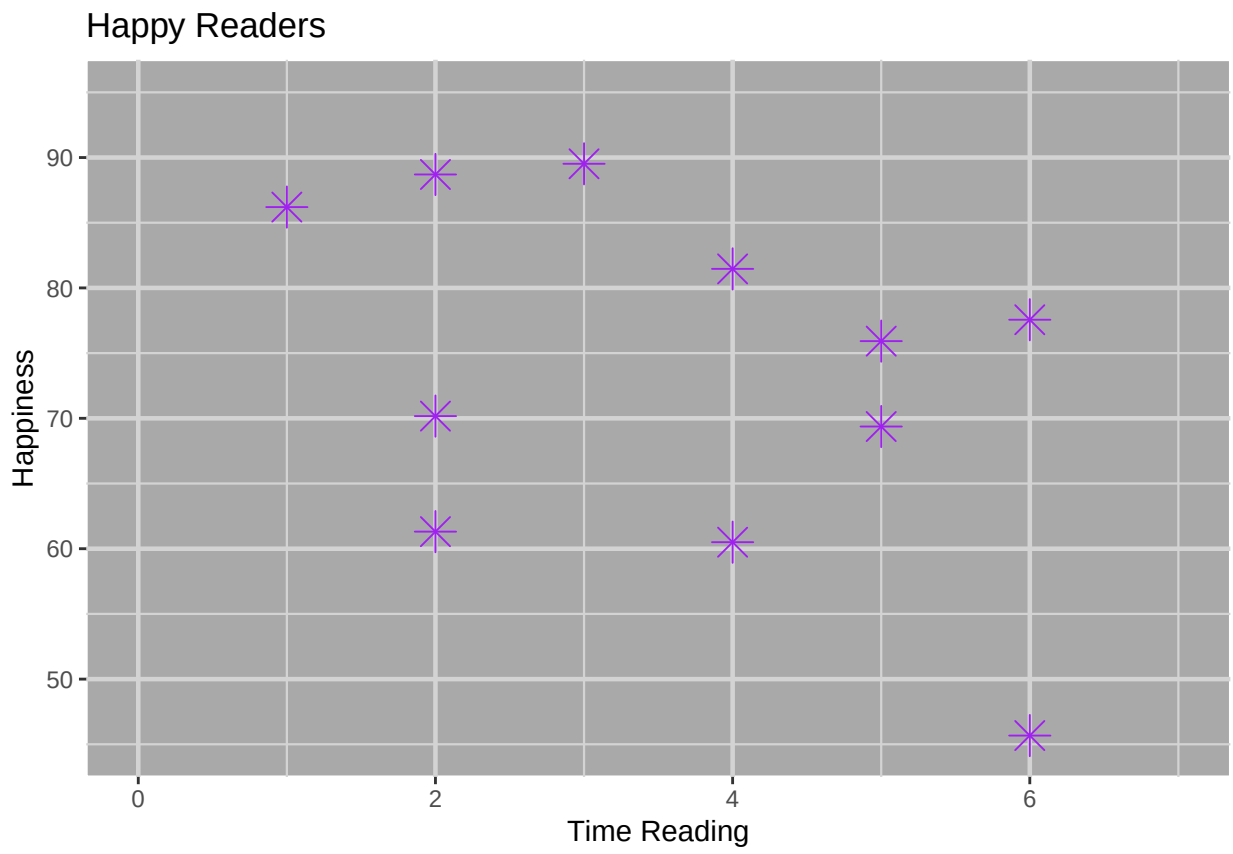
```
# Calling relevant library
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.4.1
```

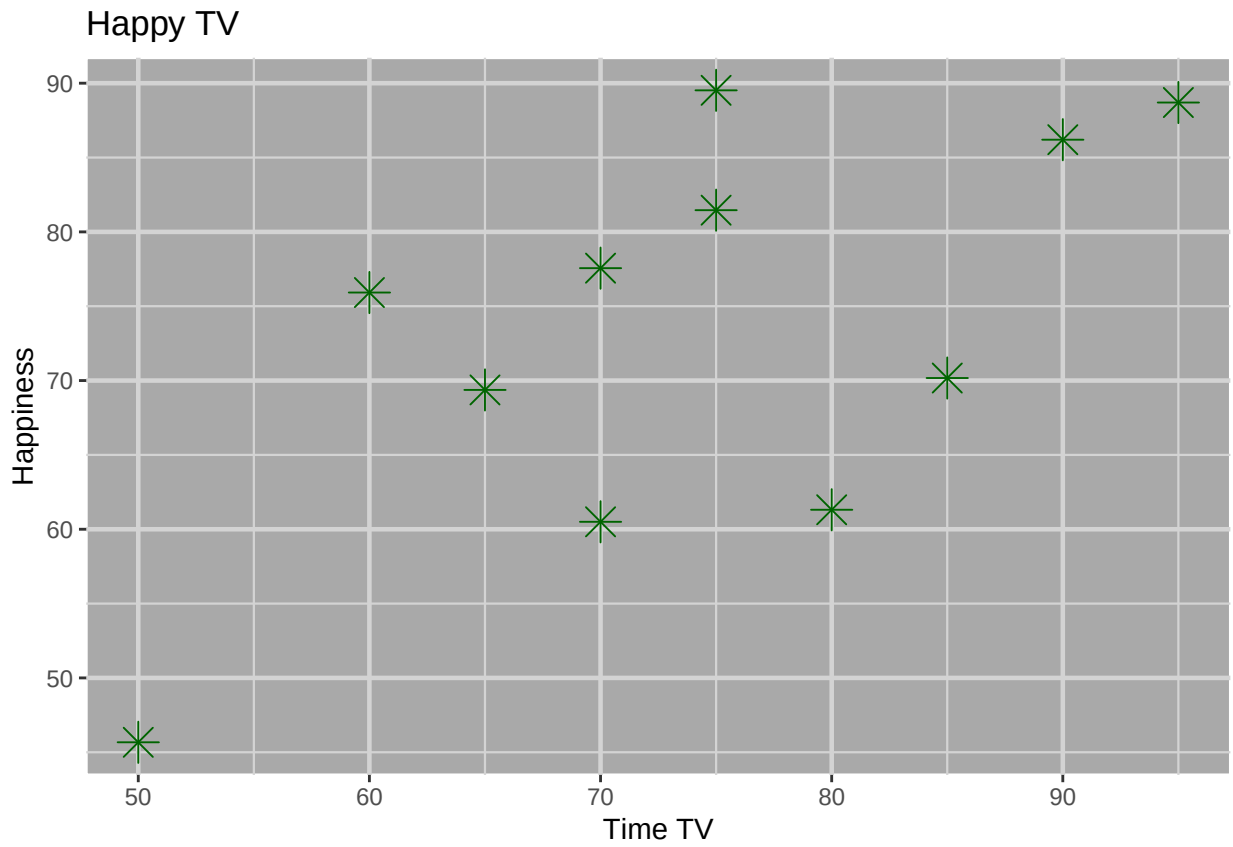
```
# Creating plots
r_v_tv <- ggplot(survey, aes(TimeReading, TimeTV))
r_v_tv + geom_point(color = "navy", shape = 8, size = 4.8) +
  theme(panel.grid = element_line(color = "lightgrey", linewidth = 0.8, linetype = 1),
        panel.background = element_rect(color = "white", fill = "darkgrey")) +
  labs(title = "Time Spent", x ="Time Reading",
       y = "Time TV") + xlim(0,7)
```




```
happy_reader <-ggplot(survey, aes(TimeReading, Happiness))
happy_reader + geom_point(color = "purple", shape = 8, size = 4.8) +
  theme(panel.grid = element_line(color = "lightgrey", linewidth = 0.8, linetype = 1),
        panel.background = element_rect(color = "white", fill = "darkgrey")) +
  labs(title = "Happy Readers", x ="Time Reading",
       y = "Happiness") + xlim(0,7) + ylim(45,95)
```




```
happy_tv <-ggplot(survey, aes(TimeTV, Happiness))
happy_tv + geom_point(color = "darkgreen", shape = 8, size = 4.8) +
  theme(panel.grid = element_line(color = "lightgrey", linewidth = 0.8, linetype = 1),
        panel.background = element_rect(color = "white", fill = "darkgrey")) +
  labs(title = "Happy TV", x ="Time TV",
       y = "Happiness") #+ xlim(0,7) + ylim(45,95)
```



Exercise 7.2 Q3 TimeReading vs. TimeTV shows a strong negative correlation TimeReading vs. Happiness shows a less strong, less negative correlation TimeTV vs. Happiness shows a weak positive correlation

```
# Find the covariance matrix
data_group <- cbind(survey$TimeReading, survey$TimeTV, survey$Happiness)
cov_data <- cov(data_group)
cov_data
```

```
##             [,1]      [,2]      [,3]
## [1,]   3.054545 -20.36364 -10.35009
## [2,] -20.363636 174.09091 114.37727
## [3,] -10.350091 114.37727 185.45142
```

Exercise 7.2 Q4 # TimeReading has a negative covariance with both TimeTV and Happiness. Happiness decreases half as fast as TimeTV as TimeReading increases

As TimeTV increases Happiness increases rapidly as they have a relatively large positive covariance

```
cor_data <- cor(data_group)
cor_data
```

```
##             [,1]       [,2]       [,3]
```

```
## [1,]  1.0000000 -0.8830677 -0.4348663
## [2,] -0.8830677  1.0000000  0.6365560
## [3,] -0.4348663  0.6365560  1.0000000
```

Exercise 7.2 Q5 # TimeReading has a negative correlation with both TimeTV and Happiness. Happiness decreases half as fast as TimeTV as TimeReading increases

As TimeTV increases Happiness increases rapidly as they have a relatively large positive correlation

I think that correlation is better for one primary reason. I believe it's better because there's a reference number other than zero i.e. it's bounded by 1 and -1

```
# Find the corellation between TimeReading and TimeTV
cor_r_tv <- cor(survey$TimeReading, survey$TimeTV)
cor_r_tv
```

```
## [1] -0.8830677
```

Exercise 7.2 Q5

TimeReading has a strong negative correlation with TimeTV.

We cannot assume causation from correlation. We cannot assume causation from correlation. We cannot assume causation from correlation. I would imagine we could still say that if you spend more time reading there's less time to spend watching TV, so it probably does have an effect.