

Introduction to Quantitative Methods
Homework 7 (for Weeks 8 and 9)
Due: Friday 2 April 2010

1. Answer the following question, and also describe whether you think this an appropriate use of the correlation coefficient.

Do reading and TV viewing compete for leisure time? To find out, a communication specialist interviewed a sample of 10 children regarding the number of books they had read during the last year and the number of hours they had spent watching TV on a daily basis. Her results are as follows:

<i>Number of Books</i>	<i>Hours of TV Viewing</i>
0	3
7	1
2	2
1	2
5	0
4	1
3	3
3	2
0	7
1	4

What is the strength and direction of the correlation between number of books read and hours of TV viewing daily? Is the correlation significant?

2. LF&F p413, Question 16. Use R to answer the questions (when appropriate).
3. Suppose that a researcher collected the following set of data on years of education (X) and number of children (Y) for a sample of 10 married adults:

X	Y
11	2
15	1
16	0
9	3
7	5
10	3
11	4
13	2
16	0
15	2

- a. Use R to produce a scatter plot of the data.
- b. Use R to draw the regression line on the scatterplot.
- c. Use R to calculate the regression slope and intercept.
- d. Predict the number of children for an adult with 11 years of education.
- e. Report the R² and interpret it.

- f. In a few sentences, provide a substantive interpretation of the calculated slope and intercept.

4. Answer this question using R. Item (4) is optional extra-credit for 2 points.

A psychiatrist wondered how much a night's sleep could affect a person's alertness and reaction time. She collected a random sample of people and asked them (X) how many hours of sleep they got the night before and then used a simple test to determine (Y) their reaction time in seconds. The following results were obtained:

X	Y
5.0	13
10.5	8
4.0	15
6.0	12
7.5	11
6.5	13
2.5	21
6.0	10
4.5	17

- Draw a scatter plot of the data.
 - Calculate the regression slope and Y -intercept.
 - Draw the regression line on the scatter plot.
 - Predict the number of seconds it would take for someone who got 8.5 hours of sleep to react.
 - Find the coefficients of determination and nondetermination. What do they mean?
 - Construct an analysis of variance table and perform an F test on the significance of the regression.
5. Load in the Benoit and Marsh (2008) `dail2002.Rdata` dataset we have been using.
- What is the correlation coefficient between `spend_total` and `votes1st`? Briefly interpret the figure you compute.
 - Create a scatterplot of `spend_total` by `votes1st`.
 - Using the R `lm()` command, regress `votes1st` on `spend_total`. Briefly interpret the regression coefficient and the y -intercept.
 - From c, report and interpret the R^2 .