

ASSIGNMENT #1

EPsy 8252

This assignment is intended to review some of the skills you obtained in a regression course. The questions are adapted from Exercise #2, Exercise #3, and Exercise #5 from Section 3.9 of (Gelman & Hill, 2007). Please submit your responses to each of the questions below in a printed document. Only provide your responses to the question asked. You do not need to include any R syntax and output unless it is specifically required in the question.

Any graphics you include should be resized so that they do not take up more room than necessary and all should have an appropriate caption. Any equations should be appropriately typeset within the document. There are 11 points possible for the assignment (each question is worth one point unless otherwise noted).

Adapted from Exercise #2

Suppose that, for a certain population, we can predict log earnings from log height as follows:

- A person who is 66 inches tall is predicted to have earnings of \$40,000.
- Every increase of 1% in height corresponds to a predicted increase of 0.8% in earnings.
- The earnings of approximately 95% of people fall within a factor of 1.1 of predicted values.

1. Give the equation of the regression line.
2. Give the value of the residual standard deviation of the regression.
3. Suppose the standard deviation of log heights is 5% in the population. What, then, is the value of R^2 for the regression model?

Adapted from Exercise #5

Download the contents of the folder beauty from <http://www.stat.columbia.edu/~gelman/arm/examples/>. This folder contains data from (Hamermesh & Parker, 2005) on student evaluations of instructors' beauty and teaching quality for several courses at the University of Texas. The teaching evaluations were conducted at the end of the semester, and the beauty judgments were made later, by six students who had not attended the classes and were not aware of the course evaluations.

4. Fit a main effects regression model using beauty (the variable `btystdave`) to predict course evaluations (`courseevaluation`), controlling for at least two other inputs. Write the regression equation.
5. Interpret the effect of beauty from the model.
6. Display the fitted model graphically. **(2pts.)**
7. Fit another regression model to examine the interaction between beauty and at least one of your control predictors to predict course evaluations. Control for any of the inputs not included in the interaction. Write the regression equation.
8. Interpret the interaction from the model.
9. Display the fitted interaction model graphically. **(2pts.)**

References

- Gelman, A., & Hill, J. (2007). *Data analysis using regression and multilevel/hierarchical models*. New York: Cambridge University Press.
- Hamermesh, D. S., & Parker, A. M. (2005). Beauty in the classroom: Instructors' pulchritude and putative pedagogical productivity. *Economics of Education Review*, 24, 369–376.