

ERSH 8320, Fall 2007

Homework #1

Due: Tuesday 9/18/2007 at 12:00pm

Homework format: all homework answers must be provided electronically. Please answer each question with as much detail as you can provide. Do not provide direct SPSS (or other package) output for any question (the exception being figures/graphs).

The following data gives rat body weights (in grams) and latency to seizure (in minutes), following injection of 40mg/kg of body weight of metrazol.

LATENCY	WGT
2.30	348
1.95	372
2.90	378
2.30	390
1.10	392
2.50	395
1.30	400
2.00	409
1.70	413
2.00	415
2.95	423
1.25	428
2.05	464
3.70	468

1. Create a scatter plot of the data, with latency as a function of weight (plot latency on the Y axis and weight on the X axis).
  - a. Comment on the graph: does there appear to be any relationship between the two variables?
2. Find the least-square regression line.
  - a. Report the estimated values for the slope, intercept, and variance of error.
3. Test whether the slope is equal to 0. Use a Type I error rate of 0.1.
  - a. Report the null and alternative hypotheses.
  - b. Report the test statistic and p-value.
  - c. Report your decision: do you reject or fail to reject the null hypothesis?
  - d. Interpret your result as you would for a non-statistical audience (put into words you found by the hypothesis test and what that means for predicting Y from X).
4. Test whether the intercept is equal to 0. Use a Type I error rate of 0.1.
  - a. Report the null and alternative hypotheses.
  - b. Report the test statistic and p-value.
  - c. Report your decision: do you reject or fail to reject the null hypothesis?
  - d. Interpret your result as you would for a non-statistical audience (put into words you found by the hypothesis test and what that means for predicting Y from X).
5. Comment on the fit of the line to the data.
  - a. How much variance in Y can be explained by X (report the value of the statistic you used for this answer)?
  - b. Does it appear that knowing X provides much information about what Y should be? Describe why or why not.