Psychology 1305 Experimental Child Psychology: Language
Stats: Regression, Part 2

1. Open the SPSS data set Stats_RegressionHW2a_data_2184.

2. Find the correlation between X and Y. From the menu, use
   Analyze>Correlate>Bivariate. Select X and Y as variables and click OK. Paste
   the result below. (You will need to use "copy special" and copy the table as a
   jpeg in order to paste it in Word.)

   What is the correlation (r)? Is this the same number you got on your own (in the
   previous homework)?
   ANSWER:

3. Now run a simple linear regression with the same data. Use
   Analyze>Regression>Linear. Select Y as the dependent variable and X as the
   independent variable. Click the Save button on the right. Check the boxes for
   unstandardized predicted values and unstandardized residuals (the top box in each
   column). Click Continue, then OK to run the regression.

   From the output, paste the second table (Model Summary) below.

   Explain what R^2 means.
   ANSWER:

4. From the same output, paste the third table, Coefficients, below.

   Write the linear equation from this regression ($Y = AX + B$ from the previous
   homework) below. Where did you find A and B?
   ANSWER:

5. What does B (coefficient of X) mean in terms of the relationship between X and Y?
    ANSWER:

6. What does β (standardized coefficient of X) mean in terms of the relationship between X and Y?
    ANSWER:

7. Is B/β statistically significant? How do you know?
    ANSWER:

8. Go back to the data window. Note that two new columns have appeared, the predicted values (PRE_1) and the residuals (RES_1). Within a given row, how do the Y values, predicted values, and residual values relate to each other?

    ANSWER:

9. How can we interpret the residuals?

ANSWER:

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10. Now do a second one. Open the SPSS dataset
Stats_RegressionHW2b_data_2184.sav. The variables are
  - Mother's education (4 levels)
  - Grammar (a test of passive voice comprehension)
  - Verbal Memory (a test involving immediate repetition of words,
    sentences, and a narrative passage)
  - Tapping (involves imitating sequences on a 4-key xylophone)
  - Birthweight

Run a linear regression with Grammar as the dependent variable and Verbal
Memory as the independent variable.

11. From the output, paste the second table (Model Summary) below.

Explain what R^2 means.
ANSWER:

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12. From the same output, paste the third table, Coefficients, below.

Write the linear equation from this regression ($Y = AX + B$) below. Where did
you find A and B?
ANSWER:

[ ]

13. What does B (coefficient of Verbal Memory) mean in terms of the relationship between Verbal Memory and Grammar?
ANSWER:

14. What does β (standardized coefficient of X) mean in terms of the relationship between Verbal Memory and Grammar?
ANSWER:

15. Is B/β statistically significant? How do you know?
ANSWER:

16. Create a scatter plot of GRAMMAR versus VERBAL MEMORY (Graphs > Chart Builder > Scatter/Dot > (first graph option). Drag VERBALMEM onto the X axis, drag GRAMMAR onto the Y axis. Click OK. Copy and paste the graph below.
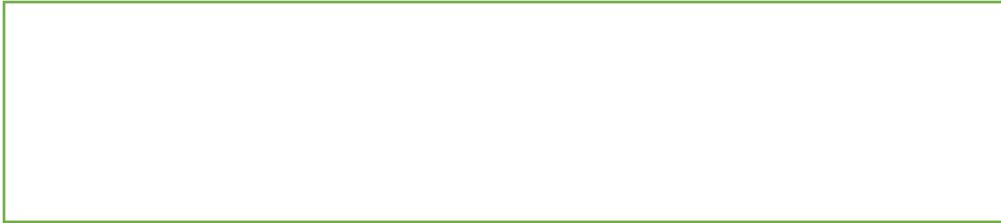
17. Draw a line over your scatter plot above (using Insert > Shapes in Word to get a line). Use the approximate y-intercept and slope from your linear equation.

18. Here is a formal way to write the equation:

$$\hat{Y} = b_0 + b_1 X$$

$\hat{Y}$, spoken as "Y-hat", represents _____. Where can these be found in your graph above?

ANSWER:

19. Any scatterplot can be fit by a line. The question is, how good is the fit? In other words, how far are the *predicted* values from the actual or *observed* values? What are these differences called? How could you show these on your graph above?

ANSWER: