WISE Regression/Correlation Interactive Lab: Module #2

Module #2, Interactive Exercise #1

For this section you will create relationships. Remember that the statistical tests provided by regression analyses are valid only when relationships are linear. Be sure that all relationships you create follow a straight-line pattern. For this section, we do not provide answers.

For this problem, distribute the data points so that you have a correlation of about +.90. (Place the curson over a point, hold the left mouse button, and slide the point to a desired location.) After getting the correct correlation (or close to the correct value) *place a check mark in the box titled Show mean of Y*. (Note: Y is the dependent variable).

a. What does the plot of scores look like? Answer in terms of general pattern of the scores (Are the points all close to a line? Is there a positive or a negative relationship? Is the relationship strong or weak?).

b. Do the points deviate a lot from the mean on Y? (Check 'Show SS total' to see the deviations, and check 'Show Error as Squares' to see how much the deviation of each data point from the mean contributes to SS Total.)

c. Record the numeric value for SS total here _____ (The SS values are shown in the applet.)

d. Now place a check mark in the box titled Show Regression Line. Do your points seem to deviate a lot from the regression line? (Remove the check from the 'Show SS total' box and check 'Show SS error' to see deviations of observed points from the regression line, shown in red.).

e. Explain what SS error means. What would the plot look like if SS error was even smaller?

f. Record the numeric value for SS error here _____ .

g. Now *click the box marked Show SS predicted and remove the check from the box Show SS error*. The blue lines that appear represent the difference between the mean and predicted scores. How are these scores distributed? Do the predicted scores deviate a lot from the mean?

h. Record the correct numeric value for SS Predicted here _____ .

i. If you were predicting y (y – prime) from X = 10? Would you expect this to be an accurate prediction? Why or why not?

j. Calculate r squared from your SS values.

r squared = [SS predicted/ SS total] = _____/ _____ = _____.

Check: r = _____; r squared = _____

Follow the link at the bottom of the applet to Go to Module #2, Interactive Exercise #2

Module #2, Interactive Exercise #2

Distribute the four data points so that you have a correlation of about +.30.
Move the points around until you have a correlation of about .30. Note: this example works better if you move several of the points a little rather than just moving one to an extreme value on the distribution. After getting the correct correlation (or close to the correct value) *place a check mark in the box titled Show mean of Y*. (Note: Y is the dependent variable).

a. What does the distribution of scores look like now, how does this compare to the data in the previous problem (r = .90)?

b. Do the points deviate a lot from the mean on Y? (Check 'Show SS total' to see the deviations, and check 'Show Error as Squares' to see how much the deviation of each data point from the mean contributes to SS Total.)

c. Record the numeric value for SS total here _____ (The SS values are shown in the applet.)

d. Now *place a check mark in the box titled Show Regression Line*. Do your points seem to deviate a lot from the regression line? (Remove the check from the 'Show SS total' box and check 'Show SS error' to see deviations of observed points from the regression line, shown in red.).

e. Record the SS error here _____

f. Compare the error results to the results from the previous problem (*r* = .90). How do these compare? Compare proportion of error variance for each by taking the SS_{error} / SS_{total}.

g. Now *click the box marked Show SS predicted and remove the check from the box Show SS error*. The blue lines that appear represent the difference between the mean and predicted scores. How are these scores distributed? Do the predicted scores deviate a lot from the mean?

h. Record the correct numeric value for SS Predicted here _____ .

i. How does the difference between predicted scores and the mean differ from the previous problem (*r* = .90)? Focus on the proportion of predicted out of total ($SS_{Predicted}$ / SS_{total}) rather than the SS value itself.

j. Why is the distribution of predicted vs. mean scores so different between the situations where *r* = .90 versus *r* = .30?

Follow the link at the bottom of the applet to Go to Module #2, Interactive Exercise #3

Module #2, Interactive Exercise #3

Now, move the four data points so that you have a correlation of about .00. After getting the correct correlation (or close to the correct value) *place a check mark in the box titled Show mean of Y*. (Note: Y is the dependent variable).

a. What does the distribution of scores look like? Compare to r = .90 and r = .30.

b. Record the numeric value for SS total here _____ (The SS values are shown in the applet.)

c. Now *place a check mark in the box titled Show Regression Line*. Do your points seem to deviate a lot from the regression line? (Remove the check from the 'Show SS total' box and check 'Show SS error' to see deviations of observed points from the regression line, shown in red.).

d. Record the SS error here _____

e. Compare the error results to the results from the previous problems (r = .30 and r = .90). How do these compare? Compare proportion of error variance for each by taking the SS_{error} / SS_{total}.

f. Record SS predicted here _____

g. Compare the predicted variance results to the results from the first problem (r = .90). How do these compare? Compare proportion of predicted variance for each by taking the $SS_{predicted}$ / SS_{total}.

h. If we don't know anything about X for a new case, our best prediction of Y is the mean of Y. Does our regression line provide better predictions of Y?

i. Why, when the correlation is .00, does the predicted score match the mean?

j. Does knowing about the relationship between X and Y help us to predict Y in this case?