

Chapter 6 Project

Linear Quantitative Relationships

Online Class Directions: *This will be an individual project. Each student is required to analyze a pair of quantitative data sets from the following topic list. You can find your two columns of data in the “Math 075 Project Data Correlation Regression”. You can find this data in Canvas or at www.matt-teachout.org. Put your two columns of data into StatKey to calculate, create a poster summarizing their findings, and email a picture of your poster to your instructor.*

Topics: *IQ/Brain Volume , MLB Runs Scored/Attendance , MLB Runs Allowed/Wins , Price Item/Customer Satisfaction , Meat/illness , CEO Golf Score/Stock Price , Swim time/Pulse , Boats/Manatee Deaths , Cost of Living/Aviation Pay , Poverty/BMI , Alcohol/Tobacco in England*

- Pick one of the pairs of quantitative variables and pick which should be X and which should be Y. The poster should give the explanatory variable (x) and response variables (y) and the units for x and y.
- Why this topic was important or interesting to your group.
- Go to www.lock5stat.com. Click on “Two quantitative variables” under the “descriptive statistics and graphs” menu. Click on “edit data” button in StatKey. Copy and paste the two columns together into StatKey. If your two columns have titles, click the box that says “data has a header row”. Push OK. Click the box that says “Show Regression Line”.
- Look at the scatterplot carefully. Make sure the x variable you picked is on the horizontal axis and the response variable (y) is on the vertical axis. If they are not push the “Switch Variables” button.
- Draw a rough sketch of the scatterplot on your poster. Label your axes and draw the regression line also.
- What is the correlation coefficient (r) for your data? You will find this where it says “Correlation” under “Summary Statistics”.
- Use the r-value to classify the linear relationship as one of the following: strong positive correlation, strong negative correlation, moderate positive correlation, moderate negative correlation, weak positive correlation, weak negative correlation, or no correlation.
- Square your r-value to multiply $r \times r$ in order to calculate the coefficient of determination (r-squared). Put r-squared on your poster.
- Write a sentence describing its meaning of r-square in context.
- What is the slope of the regression line? You will find this where it says “Slope” under “Summary Statistics” in StatKey. Put the slope on your poster.
- Write a sentence describing the meaning of the slope in context.
- What is the Y-intercept of the regression line? You will find this where it says “Intercept” under “Summary Statistics” in StatKey. Put the Y-intercept on your poster.
- Write a sentence describing the meaning of the y-intercept in context.
- Put in the slope and Y-intercept into the regression line equation $\hat{y} = (Y - intercept) + (Slope)X$. Put the regression equation on your poster.
- Find the scope of the x-values? (Estimate two numbers on the X-axis that the points on the scatterplot are in between.)
- Pick any x-value in the scope. Plug in that x value into the regression line equation and predict the y value.
- Decorate your poster to spark interest.

Now take a picture of your poster project and submit the picture to your instructor in Canvas.

After submitting the picture of the poster to your instructor, go to the discussion menu in Canvas and complete the “Chapter 6 Project Discussion”. You will be discussing your findings with other students in the class.



Face to face Class Directions: *The class will be separated into groups. Each group is required to pick a “team name” for their group and analyze a pair of quantitative data sets from the following topic list. You can find your two columns of data in the “Math 075 Project Data Correlation Regression”. You can find this data in Canvas or at www.matt-teachout.org. Put your two columns of data into StatKey to calculate, create a poster summarizing their findings, and present the poster to other students in the class.*

Topics: *IQ/Brain Volume , MLB Runs Scored/Attendance , MLB Runs Allowed/Wins , Price Item/Customer Satisfaction , Meat/illness , CEO Golf Score/Stock Price , Swim time/Pulse , Boats/Manatee Deaths , Cost of Living/Aviation Pay , Poverty/BMI , Alcohol/Tobacco in England*

- Pick one of the pairs of quantitative variables and pick which should be X and which should be Y. The poster should give the explanatory variable (x) and response variables (y) and the units for x and y.
- Why this topic was important or interesting to your group.
- Go to www.lock5stat.com. Click on “Two quantitative variables” under the “descriptive statistics and graphs” menu. Click on “edit data” button in StatKey. Copy and paste the two columns together into StatKey. If your two columns have titles, click the box that says “data has a header row”. Push OK. Click the box that says “Show Regression Line”.
- Look at the scatterplot carefully. Make sure the x variable you picked is on the horizontal axis and the response variable (y) is on the vertical axis. If they are not push the “Switch Variables” button.
- Draw a rough sketch of the scatterplot on your poster. Label your axes and draw the regression line also.
- What is the correlation coefficient (r) for your data? You will find this where it says “Correlation” under “Summary Statistics”.
- Use the r-value to classify the linear relationship as one of the following: strong positive correlation, strong negative correlation, moderate positive correlation, moderate negative correlation, weak positive correlation, weak negative correlation, or no correlation.
- Square your r-value (or multiply r x r) in order to calculate the coefficient of determination (r-squared). Put r-squared on your poster.
- Write a sentence describing its meaning of r-square in context.
- What is the slope of the regression line? You will find this where it says “Slope” under “Summary Statistics” in StatKey. Put the slope on your poster.
- Write a sentence describing the meaning of the slope in context.
- What is the Y-intercept of the regression line? You will find this where it says “Intercept” under “Summary Statistics” in StatKey. Put the Y-intercept on your poster.
- Write a sentence describing the meaning of the y-intercept in context.
- Put in the slope and Y-intercept into the regression line equation $\hat{y} = (Y - intercept) + (Slope)X$. Put the regression equation on your poster.
- Find the scope of the x-values? (Estimate two numbers on the X-axis that the points on the scatterplot are in between.)
- Pick any x-value in the scope. Plug in that x value into the regression line equation and predict the y value.
- Decorate your poster to spark interest.

Presentation

Make sure each person on the team understands the poster and can present your findings. Bring your poster to a designated presentation area in the classroom and hang or tape your poster to a wall. One person at a time will present the poster. We will then rotate so that each member of the team gets to present. Everyone else will listen to presentations and give feedback.

