Section 2A Lab Discussion

Dec 1st, 2009

We started with a review of the plots at the end of this document. Then we reviewed the quiz 1 questions below. The last 10 minutes of class was for evaluations.

Which of the following is NOT a property of the Least Squares Regression Line?

(a) The sum of squared residuals is minimized.
(b) The sum of the distances between each point and the LSR Line is minimized.
(c) The sum of the residuals = 0.
(d) The average x value and the average y value lie on the LSR

Interpretation of correlation coefficient (causal?)

A friend claims that when the correlation coefficient is close to 1, a change in the explanatory variables causes a strong positive change in the response variable and when the correlation coefficient is close to -1, the independent variable causes a strong negative change in the dependent variable. **True or False?**

Interpreting slope

A study on the effects of a restricted calorie diet on overweight, healthy adults fit the following regression line:

$$\text{predicted weight change} = 3 - 0.232(\text{adherence})$$

Weight was measured in kilograms. "Adherence" measures how well the dieter stuck to the diet: a high score (100) means they followed the diet perfectly. A score of 0 means they did not follow the diet at all. A scatterplot shows a linear association.

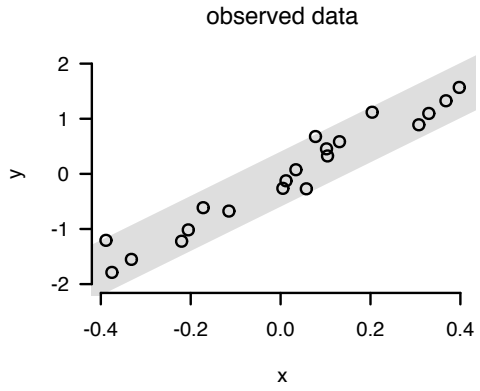
Which of the following is the best interpretation of the slope?

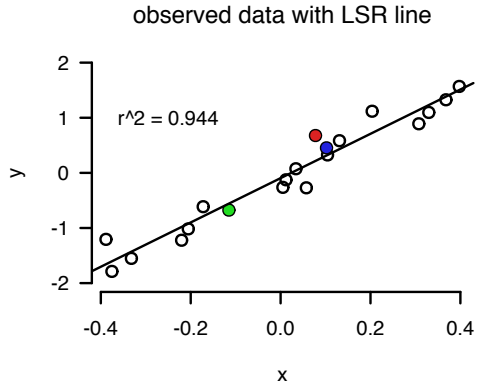
(a) Dieters whose adherence score was 10 points higher, lost, on average, 2.32 kilograms more than those with the lower adherence.

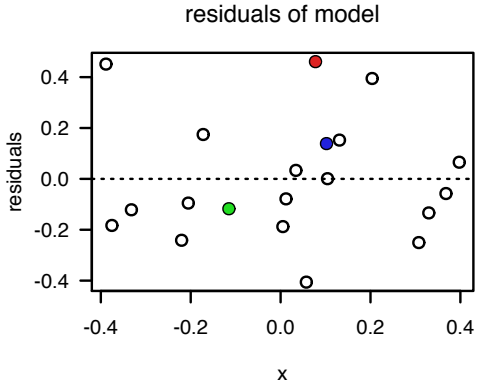
(b) If a dieter can increase his adherence by 10 points, he will lose an additional 2.32 kilograms.

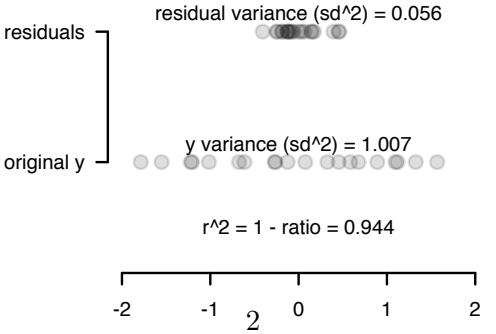
(c) The low value for the slope means that the correlation coefficient was close to 0, and that this is therefore not a strong association.

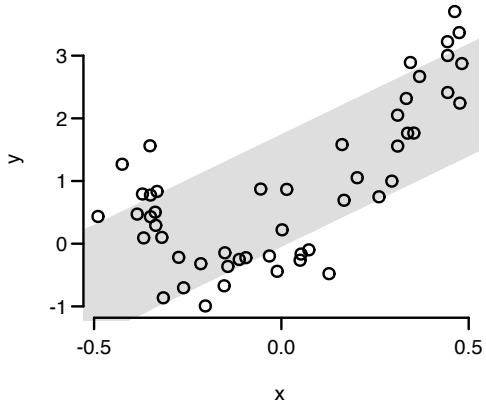
(d) Dieters who lost 10 kilograms more weight had an average adherence of 2.32 more points than the others.

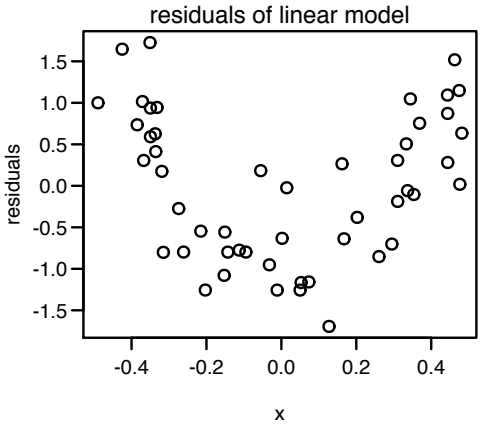

observed data
y
x
2
1
0
-1
-2
-0.4
-0.2
0.0
0.2
0.4

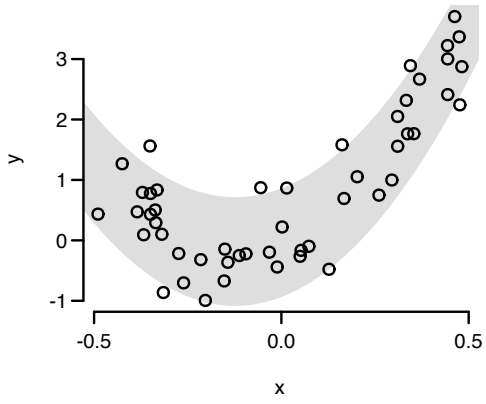

observed data with LSR line
r^2 = 0.944
y
x
2
1
0
-1
-2
-0.4
-0.2
0.0
0.2
0.4

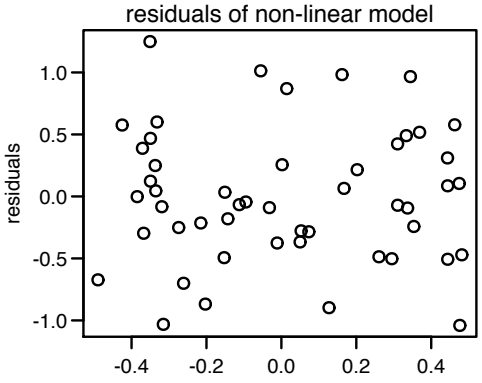

residuals of model
residuals
x
0.4
0.2
0.0
-0.2
-0.4
-0.4
-0.2
0.0
0.2
0.4


residual variance (sd^2) = 0.056
residuals
y variance (sd^2) = 1.007
original y
r^2 = 1 - ratio = 0.944
-2
-1
0
1
2


y
x
3
2
1
0
-1
-0.5
0.0
0.5


residuals of linear model
residuals
x
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-0.4
-0.2
0.0
0.2
0.4


y
x
3
2
1
0
-1
-0.5
0.0
0.5


residuals of non-linear model
residuals
x
1.0
0.5
0.0
-0.5
-1.0
-0.4
-0.2
0.0
0.2
0.4