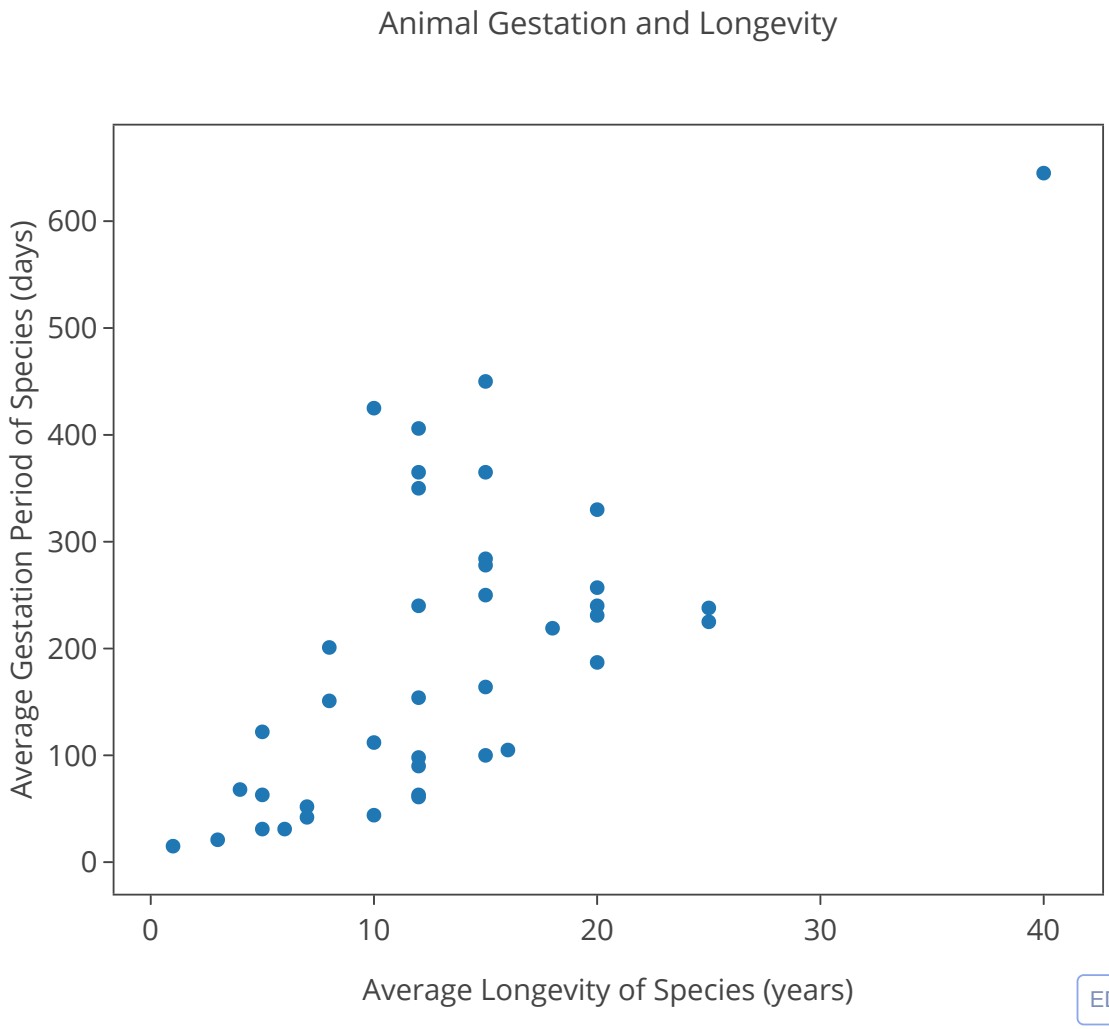
Learn By Doing Activity

Scenario: Animal Gestation and Longevity

The average gestation period, or time of pregnancy, of an animal is closely related to its longevity —the length of its lifespan. Data on the average gestation period and longevity (in captivity) of 40 different species of animals have been recorded.

We first produce a scatterplot to verify that gestation and longevity are nearly linear in their relationship.



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1/1 point (graded)

We compute the correlation between gestation period and longevity and find that r = 0.663.

Based on these findings, what is the strength of the relationship between gestation period and longevity?

- ○ Weak and positive
- ◉ Moderate and positive ✔
- ○ Strong and positive
- ○ Weak and negative
- ○ Moderate and negative

Strong and negative

Answer
Correct:
The relationship between gestation period and longevity is positive indicating that as gestation increases so does longevity, and an r value of 0.633 is considered moderate.

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Looking at the scatterplot you can see that there is an outlier in both longevity (40 years) and gestation (645 days). Note: This outlier corresponds to the longevity and gestation period of the elephant.

What do you think will happen to the correlation (0.663) if we remove this outlier?

Increase

Decrease ✔

Answer
Correct:
After removing the outlier, the correlation decreases from 0.663 to 0.519. The elephant is an outlier, however, it is consistent with the linear form of the relationship between longevity and gestation period. In this case, it would be most informative to report both correlations.

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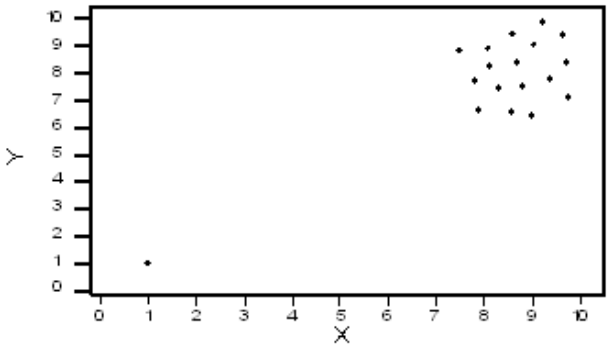
Comment

In the last activity, we saw an example where there was a positive linear relationship between the two variables, and including the outlier just "strengthened" it. Consider the hypothetical data displayed by the following scatterplot:



In this case, the low outlier gives an "illusion" of a positive linear relationship, whereas in reality, there is no linear relationship between X and Y.
