The correlation coefficient has no units since it is calculated from standard units (z-scores) and is not affected by a change of scale:

- *Adding a constant to all X or Y values does NOT change r.*
- *Multiplying all X or Y values by a positive constant does NOT change r. What does multiplying by a negative constant do?*

- *Interchanging all X and Y values does not change r. (The correlation between height and weight is the same as the correlation between weight and height).*
- *Changing units does NOT change r. (So the correlation between height in inches and weight in pounds is the same as between height in meters and weight in kilograms.)*

Correlation is NOT Causation

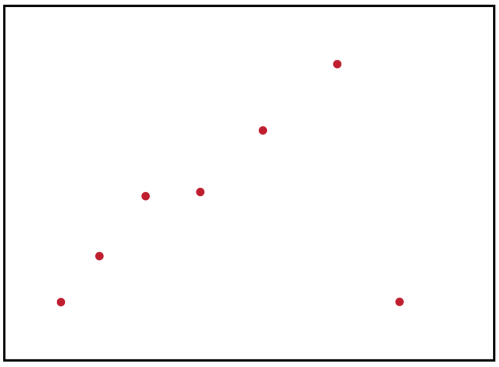
Correlation only measures the association between two variables. Correlation does not imply causation. Though the correlation between the weight and the math ability of children in a school district may be positive, that does not mean that doing math makes children heavier or that putting on weight improves the children's math skills. Age is a confounding variable: older children are both heavier and better at math than younger children, on average.

Outliers can have a strong effect on the correlation coefficient, r.

Outliers should only be excluded for good reason. The correlation coefficient should be used with caution when there are outliers. Outliers can be typos, lies, real data, etc.

Puzzle: For which plot below does the outlier raise the correlation coefficient and for which plot does it lower the correlation coefficient?

Plot A



Plot B