



Correlation vs. Regression

A solid blue circle with a white 'X' centered inside. The 'X' is composed of two thick, white diagonal strokes that intersect in the middle. The circle has a slight drop shadow, giving it a 3D appearance as if it's floating above the white background.

**X**

A large, solid purple circle is centered on a white background. In the middle of the purple circle is a white, bold, sans-serif capital letter 'Y'. The 'Y' is perfectly centered both horizontally and vertically within the circle.

Y

$$r_{xy} = \frac{\sum_{i=1}^N (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^N (x_i - \bar{x})^2 \sum_{i=1}^N (y_i - \bar{y})^2}}$$



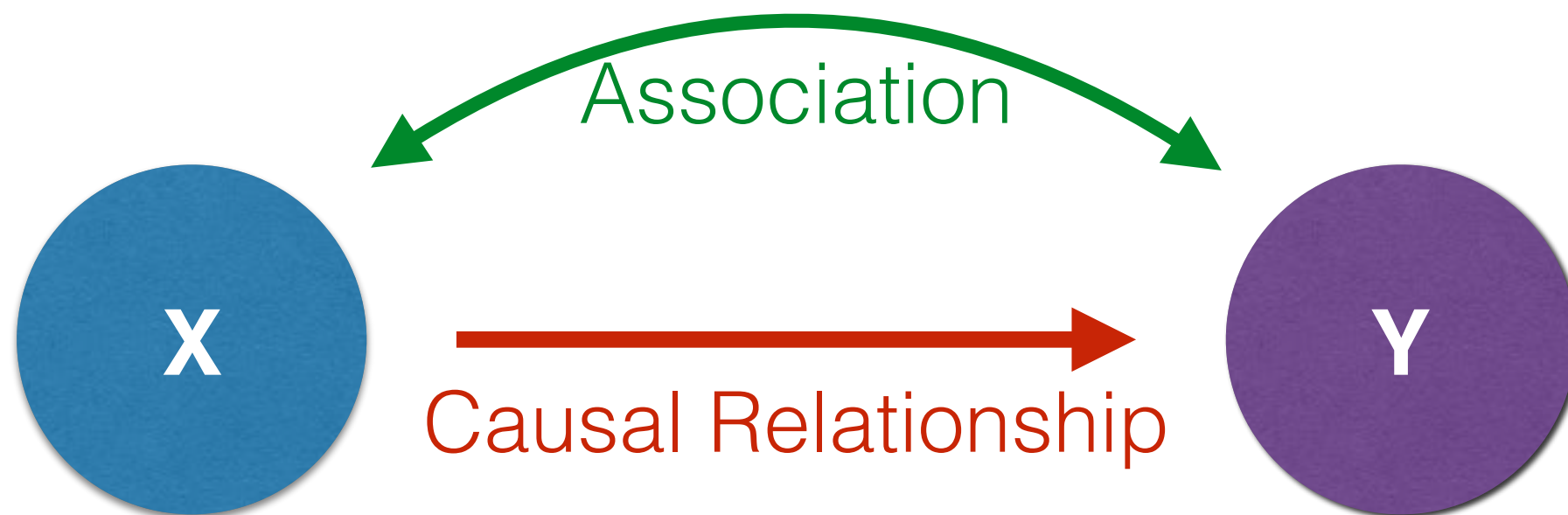


# Causal Relationship

$$R^2 = \frac{\sum_{i=1}^N (\hat{y}_i - \bar{y})^2}{\sum_{i=1}^N (y_i - \bar{y})^2}$$

# Correlation vs. Regression

$$r_{xy} = \frac{\sum_{i=1}^N (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^N (x_i - \bar{x})^2 \sum_{i=1}^N (y_i - \bar{y})^2}}$$



$$R^2 = \frac{\sum_{i=1}^N (\hat{y}_i - \bar{y})^2}{\sum_{i=1}^N (y_i - \bar{y})^2}$$

# the Mantel Test

Estimates correspondence between values in two or more distance matrices.

