

How do you calculate sxy formula in statistics?

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June 25, 2024

RECOMMENDED CITATION

stats writer (2024). *How do you calculate sxy formula in statistics?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=153000>

Sxy, also known as the covariance, is a statistical measure used to determine the relationship between two variables. It measures how much two variables vary together, and is calculated by multiplying the deviations of corresponding values of the two variables and then finding the average of those products.

For example, if we have two variables X and Y with the following values:

X: 2, 5, 7, 9

Y: 4, 8, 10, 12

To calculate Sxy, we would first find the mean of each variable ($\bar{X} = 5.75$, $\bar{Y} = 8.5$). Then, we would subtract each value from its respective mean to find the deviations:

X deviations: -3.75, -0.75, 1.25, 3.25

Y deviations: -4.5, -0.5, 1.5, 3.5

Next, we multiply the deviations of each corresponding value and find the average of those products:

$$\begin{aligned} S_{xy} &= (-3.75 * -4.5 + -0.75 * -0.5 + 1.25 * 1.5 + 3.25 * 3.5) / 4 \\ &= 4.0625 \end{aligned}$$

Therefore, the covariance (Sxy) of the two variables X and Y is 4.0625. A positive value indicates a positive relationship, while a negative value indicates a negative relationship. A value close to 0 indicates little to no relationship between the variables.

Calculate Sxy in Statistics (With Example)

In statistics, Sxy represents the sum of the product of the differences between x values and the mean of x and the differences between y values and the mean of y.

This value is often calculated when fitting a by hand.

We use the following formula to calculate Sxy:

$$S_{xy} = \sum (x_i - \bar{x})(y_i - \bar{y})$$

where:

Σ : A symbol that means "sum"

x_i : The i th value of x

$\bar{x}$: The mean value of x

y_i : The i th value of y

$\bar{y}$: The mean value of y

The following example shows how to use this formula in practice.

Example: Calculating S_{xy} by Hand

Suppose we would like to fit a simple linear regression model to the following dataset:

x	y
1	8
2	12
2	14
3	19
5	22
8	21

Suppose we would like to calculate S_{xy} for this dataset.

First, we must calculate the mean value of x :

$$x = (1 + 2 + 2 + 3 + 5 + 8) / 6 = 3.5$$

Then, we must calculate the mean value of y:

$$y = (8 + 12 + 14 + 19 + 22 + 21) / 6 = 16$$

Using these values, the following screenshot shows how to calculate the value for Sxy:

x	y	$x - x_{\text{bar}}$	$y - y_{\text{bar}}$	$(x - x_{\text{bar}})(y - y_{\text{bar}})$
1	8	-2.5	-8	20
2	12	-1.5	-4	6
2	14	-1.5	-2	3
3	19	-0.5	3	-1.5
5	22	1.5	6	9
8	21	4.5	5	22.5
Σ				59