

How do I calculate Cramer's V in Excel?

Authored by
stats writer

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Cramer's V is a statistical measure used to determine the strength of association between two categorical variables. It is commonly used in social and behavioral sciences to analyze the relationship between two variables. To calculate Cramer's V in Excel, you will need to first organize your data into a contingency table. Then, use the CHISQ.TEST function to obtain the chi-square value. Finally, use the formula ($V = \sqrt{\chi^2/n(k-1)}$) to calculate Cramer's V, where χ^2 is the chi-square value, n is the sample size, and k is the number of categories for each variable. This formula can be easily applied in Excel to obtain an accurate measure of association between the variables.

Calculate Cramer's V in Excel

Cramer's V is a measure of the strength of association between two .

It ranges from 0 to 1 where:

0 indicates no association between the two variables. 1 indicates a strong association between the two variables.

It is calculated as:

Cramer's V = $\sqrt{(X^2/n) / \min(c-1, r-1)}$

where:

**X²: The Chi-square statistic: Total sample size:
Number of rows: Number of columns**

This tutorial provides two examples of how to calculate

Cramer's V for a contingency table in Excel.

Example: Calculating Cramer's V in Excel

Suppose we would like to understand if there is an association between two exam prep methods and the passing rate of students.

The following table shows the number of students who passed and failed the exam, based on the exam prep method they used:

| | A | B | C | D | E | F |
|----|----------|------|------|-------|---|---|
| 1 | | Pass | Fail | Total | | |
| 2 | Method 1 | 7 | 12 | 19 | | |
| 3 | Method 2 | 9 | 8 | 17 | | |
| 4 | Total | 16 | 20 | 36 | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | | | | | | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | | | | | | |
| 22 | | | | | | |
| 23 | | | | | | |

The following screenshot shows the exact formulas we

can use to calculate Cramer's V for a 2x2 table that contains data for 36 students:

| | A | B | C | D | E | F | G |
|----|------------------------------|-------------|-------------|--------------|--------------------------------------|---------------|---|
| 1 | | Pass | Fail | Total | | | |
| 2 | Method 1 | 7 | 12 | 19 | | | |
| 3 | Method 2 | 9 | 8 | 17 | | | |
| 4 | Total | 16 | 20 | 36 | | | |
| 5 | | | | | | | |
| 6 | Expected | | | | FORMULAS | | |
| 7 | | 8.44 | 10.56 | | =B4*D2/D4 | =C4*D2/D4 | |
| 8 | | 7.56 | 9.44 | | =B4*D3/D4 | =C4*D3/D4 | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | (O-E)² / E | | | | | | |
| 12 | | 0.25 | 0.20 | | =(B2-B7)^2/B7 | =(C2-C7)^2/C7 | |
| 13 | | 0.28 | 0.22 | | =(B3-B8)^2/B8 | =(C3-C8)^2/C8 | |
| 14 | | | | | | | |
| 15 | χ² | 0.9418 | | | =SUM(B12:C13) | | |
| 16 | min(c-1, r-1) | 1 | | | =MIN(COUNT(B2:B3)-1, COUNT(C2:C3)-1) | | |
| 17 | n | 36 | | | =SUM(B2:C3) | | |
| 18 | Cramer's V | 0.1617 | | | =SQRT((B15/B17)/B16) | | |
| 19 | | | | | | | |
| 20 | | | | | | | |
| 21 | | | | | | | |
| 22 | | | | | | | |
| 23 | | | | | | | |
| 24 | | | | | | | |
| 25 | | | | | | | |

Cramer's V turns out to be 0.1617.

We can use the following table to determine whether a Cramer's V should be considered a small, medium, or large effect size based on the degrees of freedom used:

| df | small | medium | large |
|----|-------|--------|-------|
| 1 | 0.1 | 0.3 | 0.5 |
| 2 | 0.07 | 0.21 | 0.35 |
| 3 | 0.06 | 0.17 | 0.29 |
| 4 | 0.05 | 0.15 | 0.25 |
| 5 | 0.04 | 0.13 | 0.22 |

In other words, there's a fairly weak association between the exam prep method used and the passing rate of students.