

Statistics. Simplified.

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How to Calculate Cohen's Kappa in R

In statistics, **Cohen's Kappa** is used to measure the level of agreement between two raters or judges who each classify items into mutually exclusive categories.

The formula for Cohen's kappa is calculated as:

$$k = (p_o - p_e) / (1 - p_e)$$

where:

- p_o : Relative observed agreement among raters
- p_e : Hypothetical probability of chance agreement

Rather than just calculating the percentage of items that the raters agree on, Cohen's Kappa attempts to account for the fact that the raters may happen to agree on some items purely by chance.

The value for Cohen's Kappa always ranges between 0 and 1 where:

- **0** indicates no agreement between the two raters
- **1** indicates perfect agreement between the two raters

The following table summarizes how to interpret different values for Cohen's Kappa:

Cohen's Kappa	Interpretation
0	No agreement
0.10 - 0.20	Slight agreement
0.21 - 0.40	Fair agreement
0.41 - 0.60	Moderate agreement
0.61 - 0.80	Substantial agreement
0.81 - 0.99	Near perfect agreement
1	Perfect agreement

The easiest way to calculate Cohen's Kappa in R is by using the **cohen.kappa()** function from the **psych** package.

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

Example: Calculating Cohen's Kappa in R

Suppose two art museum curators are asked to rate 15 paintings on whether they're good enough to be shown in a new exhibit.

The following code shows how to use the **cohen.kappa()** function from the **psych** package to calculate Cohen's Kappa for the two raters:

```
library(psych)

#define vector of ratings for both raters
rater1 = [0, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0, 1, 0]
rater2 = [0, 0, 1, 1, 0, 1, 0, 0, 1, 1, 0, 1, 0, 1, 0]

#calculate Cohen's Kappa
cohen.kappa(x=cbind(rater1,rater2))
```

Cohen Kappa and Weighted Kappa correlation coefficients and confidence			
	lower	estimate	upper
unweighted kappa	-0.14	0.34	0.81
weighted kappa	-0.14	0.34	0.81

Number of subjects = 15

The **estimate** column displays the value for Cohen's Kappa.

From the output we can see that Cohen's Kappa turns out to be **0.34**.

Based on the table from earlier, we would say that the two raters only had a “fair” level of agreement.

If you want to calculate the level of agreement between three or more raters, it’s recommended to use Fleiss’ Kappa instead.

Additional Resources

The following tutorials offer additional resources on Cohen's Kappa:

[Introduction to Cohen's Kappa](#)

[Online Cohen's Kappa Calculator](#)

[How to Calculate Cohen's Kappa in Excel](#)

[How to Calculate Cohen's Kappa in Python](#)



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