

How can I calculate the coefficient of variation in R?

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April 23, 2024

RECOMMENDED CITATION

stats writer (2024). *How can I calculate the coefficient of variation in R?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=138591>

The coefficient of variation (CV) is a statistical measure used to determine the level of variability in a dataset relative to its mean. In order to calculate the CV in R, the first step is to calculate the mean and standard deviation of the dataset using appropriate functions such as "mean()" and "sd()". Once these values are obtained, the CV can be calculated by dividing the standard deviation by the mean and multiplying it by 100. This will result in a percentage value, representing the CV of the dataset. It is a useful tool for comparing the level of variability between different datasets and is commonly used in financial and scientific analysis.

Calculate the Coefficient of Variation in R

A coefficient of variation, often abbreviated as CV, is a way to measure how spread out values are in a dataset relative to the mean. It is calculated as:

$$CV = \sigma / \mu$$

where:

σ : The standard deviation of dataset
 μ : The mean of dataset

In plain English, the coefficient of variation is simply the ratio between the standard deviation and the mean.

When to Use the Coefficient of Variation

The coefficient of variation is often used to compare the variation between two different datasets.

In the real world, it's often used in finance to compare the mean expected return of an investment relative to the expected standard deviation of the investment. This allows investors to compare the risk-return trade-off between investments.

For example, suppose an investor is considering investing in the following two mutual funds:

Mutual Fund A: mean = 9%, standard deviation = 12.4%

Mutual Fund B: mean = 5%, standard deviation = 8.2%

Upon calculating the coefficient of variation for each fund, the investor finds:

CV for Mutual Fund A = $12.4\% / 9\% = 1.38$

CV for Mutual Fund B = $8.2\% / 5\% = 1.64$

Since Mutual Fund A has a lower coefficient of variation, it offers a better mean return relative to the standard deviation.

How to Calculate the Coefficient of Variation in R

To calculate the coefficient of variation for a dataset in

R, you can use the following syntax:

```
cv <- sd(data) / mean(data) * 100
```

The following examples show how to use this syntax in practice.

Example 1: Coefficient of Variation for a Single Vector

The following code shows how to calculate CV for a single vector:

```
#create vector of data
```

```
data <- c(88, 85, 82, 97, 67, 77, 74, 86, 81, 95, 77, 88, 85,  
76, 81, 82)
```

```
#calculate CV
```

```
cv <- sd(data) / mean(data) * 100#display CV
```

```
cv
```

```
9.234518
```

The coefficient of variation turns out to be 9.23.

Example 2: Coefficient of Variation for Several Vectors

The following code shows how to calculate the CV for several vectors in a data frame by using the function:

```
#create data frame
```

```
data <- data.frame(a=c(88, 85, 82, 97, 67, 77, 74, 86, 81,  
95),
```

```
b=c(77, 88, 85, 76, 81, 82, 88, 91, 92, 99),
```

```
c=c(67, 68, 68, 74, 74, 76, 76, 77, 78, 84))
```

```
#calculate CV for each column in data frame
```

```
sapply(data, function(x) sd(x) / mean(x) * 100)
```

```
a b c
```

```
11.012892 8.330843 7.154009
```

Be sure to use `na.rm=T` if there happen to be missing values in your data as well. This tells R to simply ignore the missing values when calculating the coefficient of variation:

```
#create data frame
```

```
data <- data.frame(a=c(88, 85, 82, 97, 67, 77, 74, 86, 81,  
95),
```

```
b=c(77, 88, 85, 76, 81, 82, 88, 91, NA, 99),
```

```
c=c(67, 68, 68, 74, 74, 76, 76, 77, 78, NA))
```

#calculate CV for each column in data frame

**sapply(data, function(x) sd(x, na.rm=T) / mean(x,
na.rm=T) * 100)**

a b c

11.012892 8.497612 5.860924

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