

Confidence Intervals

WHAT IS A CONFIDENCE INTERVAL?

A confidence interval defines a range of values that we're fairly sure our true value lies in. Confidence intervals enable us to mitigate the impact of sampling error (where the sample mean is not equal to the true mean and each sample mean is different).

For example, if we measure the height of 100 men, we get a mean height of 179CM.

We also know that the standard deviation of men's height is 20CM.

HOW DO WE DO IT?


In order to work out our confidence intervals we need to:

1. Calculate the number of observations
2. Calculate the mean of your observations
3. Calculate the standard deviation of your observations

In this example, we have:

1. 100 observations
2. A mean of 179CM
3. A standard deviation of 20.

If we want 95% confidence, we will have a z value of 1.960



Confidence Interval	Z
80%	1.282
85%	1.440
90%	1.645
95%	1.960
99%	2.576
99.5%	2.807
99.9%	3.291

LET'S WORK IT OUT

$$X \pm Z (s / \sqrt{n})$$

X = 179CM (mean)

Z = 1.960 (z score from table)

S = 20 (standard deviation)

N = 100 (number of observations)

$$179 \pm 1.960 (20 / \sqrt{100})$$

LET'S WORK IT OUT

$$179 \pm 1.960 (20 / \sqrt{100})$$

$$179 \pm 1.960 (20 / 10)$$

$$179 \pm 1.960 (2)$$

$$179 \pm 3.92$$

← Known as margin of error

So, heights should be between
175.08 and 182.92