

HOWEVER, the formulae we use for a sample and a population are different!

Most researchers almost never work with population data.

We use samples to infer the population's variance.

	<i>Population</i>	<i>Estimate Based on a Sample</i>
Variance	$\sigma^2 = \frac{\Sigma(X - \mu)^2}{N}$ <p>where Σ = to sum X = a score in the distribution μ = the population mean N = the number of cases in the population</p>	$s^2 = \frac{\Sigma(X - \bar{X})^2}{n-1}$ <p>where Σ = to sum X = a score in the distribution \bar{X} = the sample mean n = the number of cases in the sample</p>
Standard Deviation	$\sigma = \sqrt{\frac{\Sigma(X - \mu)^2}{N}}$ <p>where Σ = to sum X = a score in the distribution μ = the population mean N = the number of cases in the Population</p>	$s = \sqrt{\frac{\Sigma(X - \bar{X})^2}{n-1}}$ <p>where Σ = to sum X = a score in the distribution \bar{X} = the sample mean n = the number of cases in the sample</p>

HOWEVER, the formulae we use for a sample and a population are different!

Sample variance tends to be lower than the **population variance** that is purportedly estimates (i.e., undervalues the penalty).

Thus, we divide by **$n-1$** (**n** is the data in sample) instead of **n** .

A smaller number in the denominator yields a higher variance.

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