Nomenclature

Populations and samples: N (usually) is number of individuals in population
n is number of individuals in sample
n_i is number of individuals in i^{th} sample

Summation:

$$\sum_{i=1}^{n} X_i = X_1 + X_2 + \cdots + X_n \qquad \text{e.g., } \sum_{i=1}^{4} X_i = X_1 + X_2 + X_3 + X_4$$

$$\sum_{j=1}^{n} X_{i,j} = X_{i,1} + X_{i,2} + \cdots X_{i,n} \qquad \text{e.g., } \sum_{j=1}^{4} X_{ij} = X_{i1} + X_{i2} + X_{i3} + X_{i4}$$

$$\sum_{a}^{A}\sum_{b}^{B} X_{a,b} = \left(X_{1,1} + X_{1,2} + \cdots X_{1,n}\right) + \left(X_{2,1} + \cdots + X_{2,n}\right) + \cdots$$

Means: population mean: $\mu = \frac{\sum_{i=1}^{N} X_i}{N}$ sample mean: $\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n}$

Median: middle measurement in ordered set of data (central data point)
$M = X_{(n+1)/2}$ if N even, average of 2

Geometric mean (GM): $\bar{X}_G = \sqrt[n]{X_1 X_2 X_3 \cdots X_n} = \sqrt[n]{\prod_{i=1}^{n} X_i}$

Variance: population variance: $\sigma^2 = \sum \frac{(X_i - \mu)^2}{N}$

sample variance: $s^2 = \sum \frac{(X_i - \bar{X})^2}{n-1}$

Standard Deviation (SD): population SD: $\sigma = \sqrt{\sigma^2} = \sqrt{\sum \frac{(X_i - \mu)^2}{N}}$

sample SD: $s = \sqrt{s^2} = \sqrt{\sum \frac{(X_i - \bar{X})^2}{n-1}}$

Coefficient of Variation (CV) $CV = 100 \times \frac{s}{\bar{X}}$

Standard Error (SE): SE of the mean: $s_{\bar{X}} = \sqrt{\frac{s^2}{n}}$

Note: different formulae for SE of difference between means $s_{\bar{X}_1 - \bar{X}_2}$, etc

$1-\alpha$ Confidence Interval: $\text{CI} = \bar{X} \pm t_{\alpha,\nu} \times \text{SE}$

Null hypothesis: H_0 Alternative hypothesis: H_A

Significance level: α = probability of (incorrectly) rejecting a true null hypothesis

P-value: Given a true H_0, P-value is the probability of obtaining a test statistic at least as extreme as the one obtained.

Degrees of Freedom: ν