Standardize Normal Distribution

$$Z = \frac{X - \mu}{\sigma}$$

t test for the Mean

$$t_{STAT} = \frac{\overline{X} - \mu}{\frac{S}{\sqrt{n}}}$$

Z test for the Mean

$$Z_{STAT} = \frac{\overline{X} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

Pooled variance

$$S_p^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{(n_1 - 1) + (n_2 - 1)}$$

Test statistic for two independent samples and two unknown population standard deviation assumed equal

$$t_{STAT} = \frac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{S_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

with d.f. = $(n_1 + n_2 - 2)$

Test statistic for two independent samples and two unknown population standard deviation not assumed equal

$$t_{STAT} = \frac{(\overline{X}_1 - \overline{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

With d.f.

$$\nu = \frac{\left(\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}\right)^2}{\frac{\left(\frac{S_1^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{S_2^2}{n_2}\right)^2}{n_2 - 1}}$$

Test statistic for paired difference

$$t_{STAT} = \frac{\overline{D} - \mu_D}{\frac{S_D}{\sqrt{n}}}$$

with d.f. of n -1

One-Way ANOVA Table

Source of Variation	Degrees of Freedom	Sum Of Squares	Mean Square (Variance)	F
Among Groups	c - 1	*SSA*	$MSA = \frac{SSA}{c-1}$	$F_{STAT} = \frac{MSA}{MSW}$
Within Groups	n - c	*SSW*	$MSW = \frac{SSW}{n-c}$	
Total	n – 1	*SST*		

Randomized Block Design

Source of Variation	SS	df	MS	F
Among Blocks	SSBL	r - 1	MSBL	$\frac{MSBL}{MSE}$
Among Groups	SSA	c - 1	MSA	$\frac{MSA}{MSE}$
Error	SSE	(r–1)(c-1)	MSE	
Total	SST	rc - 1		

Two-Way ANOVA table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Factor A	**SSA**	**r – 1**	**MSA** = SSA /(r – 1)	$\frac{\textbf{MSA}}{\textbf{MSE}}$
Factor B	**SSB**	**c – 1**	**MSB** = SSB /(c – 1)	$\frac{\textbf{MSB}}{\textbf{MSE}}$
AB (Interaction)	**SSAB**	**(r – 1)(c – 1)**	**MSAB** = SSAB / (r – 1)(c – 1)	$\frac{\textbf{MSAB}}{\textbf{MSE}}$
Error	**SSE**	**rc(n′ – 1)**	**MSE =** SSE/rc(n’ – 1)	
Total	**SST**	**n – 1**		