ANOVA : Analysis of variance

Parametric test: requires nominal (groups) independent variables and ratio or interval dependent variables.

1. Find $\bar{X}$, s^2, n for each group

2. Compute the grand mean: $\bar{\bar{X}}$

$$\bar{\bar{X}} = \frac{(n_1 * \bar{X}_1) + (n_2 * \bar{X}_2) + (n_3 * \bar{X}_3)}{n_1 + n_2 + n_3}$$

3. Compute the between groups variance:
   - a. subtract the grand mean from each group mean
   - b. square the difference
   - c. multiply by n for that mean
   - d. sum the totals
   - e. divide by df (number of groups -1)

$$\frac{n_i(\bar{X}_i - \bar{\bar{X}})^2}{df}$$

4. Compute within groups variance (s_p^2):
   - a. Multiply the variance for each group by n-1 for that group
   - b. Sum these totals and divide by df
   - c. df = $(n_1 - 1) + (n_2 - 1) + (n_3 - 1)$

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2 + (n_3 - 1)s_3^2}{df}$$

5. Divide $\dfrac{\text{between groups variance}}{\text{within groups variance}}$ by

6. Compare to critical value in F table with between groups df (top of the chart) and within groups df (side of the chart)