One-way independent sample ANOVA test

- is a F-test where the test statistic follows an F-distribution with $k-1$ and $n-k$ degrees of freedom.
- is always a right-tailed test. So we reject H_0 if $F_{obs} > F_{\alpha,k-1,n-k}$.
- the test statistic is calculated as:

$$F_{obs} = \frac{s_0^2}{s_p^2} = \frac{MST}{MSE} = \frac{SST/(k-1)}{SSE/(n-k)}$$

where

$$SST = \sum_{j=1}^{k} n_j(\bar{x}_j - \bar{x})^2; \quad SSE = \sum_{j=1}^{k}\sum_{i=1}^{n_j}(x_{ij} - \bar{x}_j)^2; \quad SS = \sum_{j=1}^{k}\sum_{i=1}^{n_j}(x_{ij} - \bar{x})^2; \quad SS = SST + SSE$$

where k is the number of groups, n is the total number of observations, n_j is the number of observations in group j, $\bar{x}_j$ is the mean of group j, and $\bar{x}$ is the overall mean.