

Expected Mean Squared for One-Way Fixed Factor Randomized Designs

$$E[SS_M] = \sigma_e^2 + an\mu^2$$

$$E[SS_A] = (a - 1)(\sigma_e^2 + n\theta_A^2)$$

$$E[SS_{S/A}] = a(n - 1) \sigma_e^2$$

Note: θ^2 is used for the variance of fixed factors

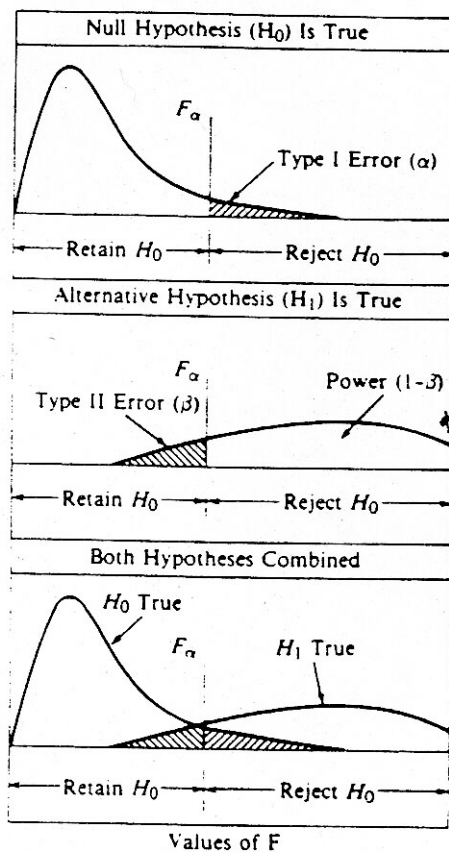
In general: $MS = SS/df$

σ^2 is used for the variance of random factors

$$E[MS_M] = E[SS_M]/1 = \sigma_e^2 + an\mu^2$$

$$E[MS_A] = E[SS_A]/(a-1) = \sigma_e^2 + n\theta_A^2$$

$$E[MS_{S/A}] = E[SS_{S/A}]/a(n-1) = \sigma_e^2$$



Non central
 F

$$F_A = MS_A/MS_{S/A}$$

$$E[F[H_0 \text{ true}]] = df_{error} / df_{error}^{-2} = \frac{a(n-1)}{a(n-1)-2} \sim 1 \text{ as } df_{error} \text{ get large}$$