

The Tukey Procedure

Group 1 vs. Group 2

Means: $\bar{x}_1 = 4, \bar{x}_2 = 9$

Mean Sum of Squares Within: $MS_w = 3.4833$

Studentized Range Statistic:

$$q_{\alpha; k, N-k} = q_{.05, 4, 16-4} = 4.199$$

Harmonic Mean for Common Group Size:

$$\tilde{n} = \frac{2(n_1)(n_2)}{n_1 + n_2} = \frac{2(4)(3)}{4 + 3} = 3.43$$

$$\begin{aligned} (\bar{x}_i - \bar{x}_j) \pm q_{\alpha; k, N-k} \sqrt{\frac{MS_w}{n}} \\ = (4 - 9) \pm 4.199 \sqrt{\frac{3.4833}{3.43}} \\ = -5 \pm 4.2135 \end{aligned}$$

$$(-9.232 < \mu_1 - \mu_2 < -.768)$$

μ_2 is significantly higher than μ_1 .

The Scheffe Procedure

Group 1 vs. Group 2

Means: $\bar{x}_1 = 4, \bar{x}_2 = 9$

Mean Sum of Squares Within: $MS_w = 3.4833$

F Statistic: $F_{\alpha; k-1, N-k} = F_{.05; 4-1, 16-4} = 3.49$

Sample Sizes: $n_1 = 4, n_2 = 3,$

$$\begin{aligned} (\bar{x}_i - \bar{x}_j) \pm \sqrt{MS_w \cdot \left(\frac{1}{n_1} + \frac{1}{n_2}\right) \cdot (k-1) \cdot F_{\alpha; k-1, N-k}} \\ = (4 - 9) \pm \sqrt{3.4833 \cdot \left(\frac{1}{4} + \frac{1}{3}\right) \cdot (4-1) \cdot 3.49} \\ = -5 \pm 4.613 \end{aligned}$$

$$(-9.613 < \mu_1 - \mu_2 < -.387)$$

μ_2 is significantly higher than μ_1 .