

(Continued)

2. What is the critical value in this analysis?

A: Given our between-groups degrees of freedom (3) and within-groups degrees of freedom (44), and an alpha level of .05, we consult Appendix C and see that our critical value is 2.82.

3. Do you reject or fail to reject the null hypothesis in this example?

A: Given that our F ratio test statistic is greater than the critical value, we reject the null hypothesis.

4. Calculate the effect size

A:

$$\begin{aligned}\eta_p^2 &= \frac{SS_{\text{between-groups}}}{SS_{\text{between-groups}} + SS_{\text{within-groups}}} \\ &= \frac{25}{75} \\ &= .33\end{aligned}$$

5. Regarding post hoc tests, calculate the HSD for this example. Assume each group had 12 people in it. Explain in plain English what this HSD number means in relation to our example.

A:

$$\begin{aligned}\text{HSD} &= Q \times \sqrt{\frac{MS_{\text{within-groups}}}{\text{number of participants in each group}}} \\ &= 4.20 \times \sqrt{\frac{1.14}{12}} \\ &= 4.20 \times .308 \\ &= 1.29\end{aligned}$$

This number of 1.29 indicates that for a mean difference between any two groups to be statistically significant, that mean difference must be at least 1.29. In this example, all mean differences are greater than 1.29; therefore, we conclude that each group was statistically significantly different from every other group.