

(Continued)

10. For an alpha level of .05, the critical value is 3.89.
11. We fail to reject the null hypothesis because the  $F$  ratio is less than the critical value

$$12. \eta_p^2 = \frac{6.53}{6.53 + 35.20}$$

$$\eta_p^2 = .157$$

$$\begin{aligned} 13. \text{HSD} &= Q \times \sqrt{\frac{MS_{\text{within-groups}}}{\text{number of participants in each group}}} \\ &= 3.78 \times \sqrt{\frac{2.93}{5}} \\ &= 3.78 \times 0.7655 \\ &= 2.89 \end{aligned}$$

This number of 2.89 means that for a mean difference between any two groups to be statistically significant, that mean difference must be at least 2.89.

14. No, none of the mean differences were statistically different from each other.
15. There are no differences in depressive symptomology based on which one of the three drugs that people ingested.
16. A one-way, between-subjects ANOVA on depressive symptomology indicated no effect of type of drug,  $F(2, 12) = 1.12, p > .05, \eta_p^2 = .157$ . A follow-up Tukey's HSD test showed that those who ingested the experimental drug ( $M = 7.0$ ) had similar levels of depressive symptomology as people who ingested the placebo ( $M = 5.60$ ) and who ingested nothing ( $M = 7.0$ ), both having  $p > .05$ . There was also no difference in depressive symptomology for the placebo and no drug groups,  $p > .05$ .

### Problem #3

A researcher wants to compare the means of four groups. After collecting data from 48 people in a between-subjects design, here are summary statistics needed to test this hypothesis that there is no difference among those four group means, using an alpha of .05:

Group A mean = 30; Group B mean = 25; Group C mean = 20; Group D mean = 15

Within-groups sums of squares ( $SS_{\text{within-groups}}$ ) = 50; Between-groups sums of squares ( $SS_{\text{between-groups}}$ ) = 25

### Questions to Answer:

1. Put these data into an ANOVA summary table.

A:

Source of variability	SS	df	MS	F
Between-groups	25	3	8.33	7.31
Within-groups	50	44	1.14	
Total	75	47		