1. Describe the similarities between an F-ratio and a T statistic.

2. A research study comparing three treatment conditions produced means of M1 = 2, M2 = 4, M3 = 6.

a. the variance for the set of three means. (Treat the means as a sample of n = 3 values

and compute the sample variance)

b. Now we will change the third mean from M3 = 6 to M3 = 15. Notice that we have

substantially increased the differences among the three means. Compute the variance for the new set of n=3 means. You should find that the variance is much larger than the value obtained in apart a. Note: The variance provides a measure of the size of the mean differences.

3. In the preceding problem, the three sample means are close together and there are no significant mean differences. To construct the following data, we started with the scores in Problem 9, then increased the size of the mean differences. Specifically, we lowered the smallest mean by subtracting 2 points from each score in treatment 1, and we increased the largest mea n by adding 2 points to each score in treatment III. As a result, the three sample means are now much more spread out.

a. Use an ANOVA with *a* = .05 to determine whether there are any significant differences among the three treatments. Compare the outcome with the results in Problem 9.

b. Compute a = .05for these data. Compare the outcome with the result from Problem 9.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Treatment |  |  |
| I | II | III |  |
| 0 | 3 | 9 | N=12 |
| 4 | 7 | 7 | G=60 |
| 0 | 6 | 6 | EX2 = **408** |
| 4 | 4 | 10 |  |
| M=2 | M=5 | M=8 |  |
| SS=16 | SS=10 | SS=10 |  |

The answer to Problem 9 (found in the back of the book) to compare with is:

 a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | SS | df | MS |  |
| Between treatments | 8 | 2 | 4 | F(2,9)=1.00 |
| Within treatments | 36 | 9 | 4 |  |
| Total | 44 | 11 |  |  |

With *a* = .05, the critical value is F=4.26. Fail to reject the null hypothesis and conclude there are no significant differences among the three treatments.

b. For these data, eta squared is 8/44 = 0.18 or 18%.

4. The repeated-measures analysis of variance can be viewed as a two-stageprocess. What is the purpose for the second stage?

5. A researcher reports an F-ration with df = 1, 10 for a repeated-measures ANOVA.

1. How many treatment conditions were compared in the study?
2. How many individuals participated in the study?

6. A behavior analyst would like to evaluate the effectiveness of a new technique for controlling classroom outbursts of unruly children. For a sample of n= 4children, the number of outbursts is recorded 1 day before treatment, and again 1 week, 1 month, and 6 months after treatment. Use a repeated-measures ANOVA with x = .05 to determine whether there are significant changes in behavior over time. The data are as follows:

Child Before 1- Week 1- Month 6-Months Ptotals

A 8 2 1 1 12

B 4 1 1 0 6

C 6 2 0 2 10

D 8 3 4 1 16

N = 16

G = 44

Xsquare = 222

T = 26 T = 8 T=6 T=4

SS= 11 SS=2 SS=9 SS= 2