

One-Way ANOVA and Multiple Comparisons

ACTIVITY 1 One-Way ANOVA

A 60-item knowledge test was administered to a random sample of 15 human performance majors from each class (freshmen, sophomores, juniors, and seniors). The researcher is interested in testing whether a significant difference exists among the mean scores for the classes. The results are given in Table 9.10. Enter the data into SPSS and answer the questions that follow.

TABLE	9.10	Data set.									
	Class	ClassNum	TestScore		Class	ClassNum	TestScore		Class	ClassNum	TestScore
1	F	1	13	22	H	2	19	43	J	3	27
2	F	1	18	23	H	2	18	44	J	3	29
3	F	1	15	24	H	2	19	45	J	3	31
4	F	1	15	25	H	2	19	46	S	4	43
5	F	1	17	26	H	2	20	47	S	4	47
6	F	1	12	27	H	2	20	48	S	4	41
7	F	1	20	28	H	2	18	49	S	4	49
8	F	1	18	29	H	2	15	50	S	4	48
9	F	1	13	30	H	2	17	51	S	4	42
10	F	1	14	31	J	3	28	52	S	4	41
11	F	1	14	32	J	3	26	53	S	4	40
12	F	1	18	33	J	3	31	54	S	4	46
13	F	1	19	34	J	3	23	55	S	4	49
14	F	1	15	35	J	3	26	56	S	4	48
15	F	1	15	36	J	3	29	57	S	4	41
16	H	2	16	37	J	3	28	58	S	4	42
17	H	2	18	38	J	3	27	59	S	4	40
18	H	2	18	39	J	3	32	60	S	4	43
19	H	2	17	40	J	3	30				
20	H	2	16	41	J	3	29				
21	H	2	14	42	J	3	25				

Procedures and Questions

- Q 1. What is the null hypothesis for this study?
- 2. What is the research hypothesis for this study?

In SPSS, go to **Analyze→Compare Means→Means**. In the Means box, use the arrow button to put TestScore in the Dependent List box and Class in the Independent List box. Click on **Options** and check the box next to “ANOVA table and eta.” Click **Continue** and then **OK**.

- Q 3. What are the mean and standard deviation for all 60 scores?
- 4. What are SS_B , SS_W , and SS_T ?
- 5. Why are the degrees of freedom 3 and 56?
- 6. What is the value of the F -ratio?
- 7. What is the significance value for this F -ratio?
- 8. Why is the MS_W so relatively small?
- 9. What is your conclusion regarding the null hypothesis?
- 10. If this written test is designed to measure human performance knowledge, does the pattern of the means make sense? (*Hint*: Think about the typical human performance curriculum.)
- 11. Why weren't the sophomores labeled S?

ACTIVITY 2 Multiple Comparisons following One-Way ANOVA

Procedures and Questions

- Q 12. Is it appropriate to conduct multiple comparison tests for this study?
- 13. Which multiple comparison tests might be most appropriate? Answer the three questions given in the chapter to guide the selection of a multiple comparison test. Compare your selection with a classmate's selection. Discuss why you made the selection that you did.

Rerun an SPSS ANOVA procedure as follows: Go to **Analyze→Compare Means→One-Way ANOVA**. Put ClassNum in the Factor box and put TestScore in the Dependent list box. Click on **Post Hoc**. When the Post Hoc Multiple Comparison window opens, click on **S-N-K**. Click **Continue** and then **OK**.

- Q 14. Is your ANOVA Source Table the same as what you obtained when you ran the first procedure?
- 15. Describe what you see in the multiple comparison output.
- 16. Why do you think the mean values are significantly different in the pattern that you observe?
- 17. Rerun the ANOVA, this time choosing Scheffé as the post hoc procedure. Compare the Scheffé results with the SNK results.