PERFORMING THE THE KRUSKAL–WALLIS H-TEST USING SPSS

OBJECTIVE

In this lecture, you will learn the following items:

- How to perform the THE KRUSKAL–WALLIS H-TESTUsing SPSS

We will analyze the data from the example earlier using SPSS.

1 Define Your Variables

First, click the "Variable View" tab at the bottom of your screen. Then, type the names of your variables in the "Name" column. Unlike the Friedman's ANOVA described in Chapter 5, you cannot simply enter each sample into a separate column to execute the Kruskal–Wallis H-test. You must use a grouping variable.

In Figure 1, the first variable is the grouping variable that we called "Group." The second variable that we called "Score" will have our actual values.

FIGURE   1

When establishing a grouping variable, it is often easiest to assign each group a whole number value. In our example, our groups are "High," "Medium," and "Low." Therefore, we must set our grouping variables for the variable "Group." First, we selected the "Values" column and clicked the gray square as shown in Figure 2.

Then, we set a value of 1 to equal "High," a value of 2 to equal "Medium," and a value of 3 equal to "Low." Each value label is established and moved to the list when we click the "Add" button. Once we click the "OK" button, we are returned to the SPSS Variable View.

	Name	Type	Width	Decimals	Label	Values	Missi
1	Group	Numeric	8	2		None ...	None
2	Score	Numeric	8	2		None	None
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

Value Labels

Value Labels

Value: 3

Label: Low

Spelling...

1.00 = "High"
2.00 = "Medium"

Add
Change
Remove

OK   Cancel   Help

FIGURE   2

2. Type in Your Values

Click the "Data View" tab at the bottom of your screen as shown in Figure 3. Type in the values for all three samples in the "Score" column. As you do so, type in the corresponding grouping variable in the "Group" column. For example, all of the values for "High" are signified by a value of 1 in the grouping variable column that we called "Group."

	Group	Score	
1	1.00	21.00	
2	1.00	23.00	
3	1.00	18.00	
4	1.00	12.00	
5	1.00	19.00	
6	1.00	20.00	
7	2.00	19.00	
8	2.00	5.00	
9	2.00	10.00	
10	2.00	11.00	
11	2.00	9.00	
12	3.00	7.00	
13	3.00	8.00	

Data View | Variable View

FIGURE   3

3 Analyze Your Data

As shown in Figure 4, use the pull-down menus to choose "Analyze," "Nonparametric Tests," "Legacy Dialogs," and "K Independent Samples. . . ."
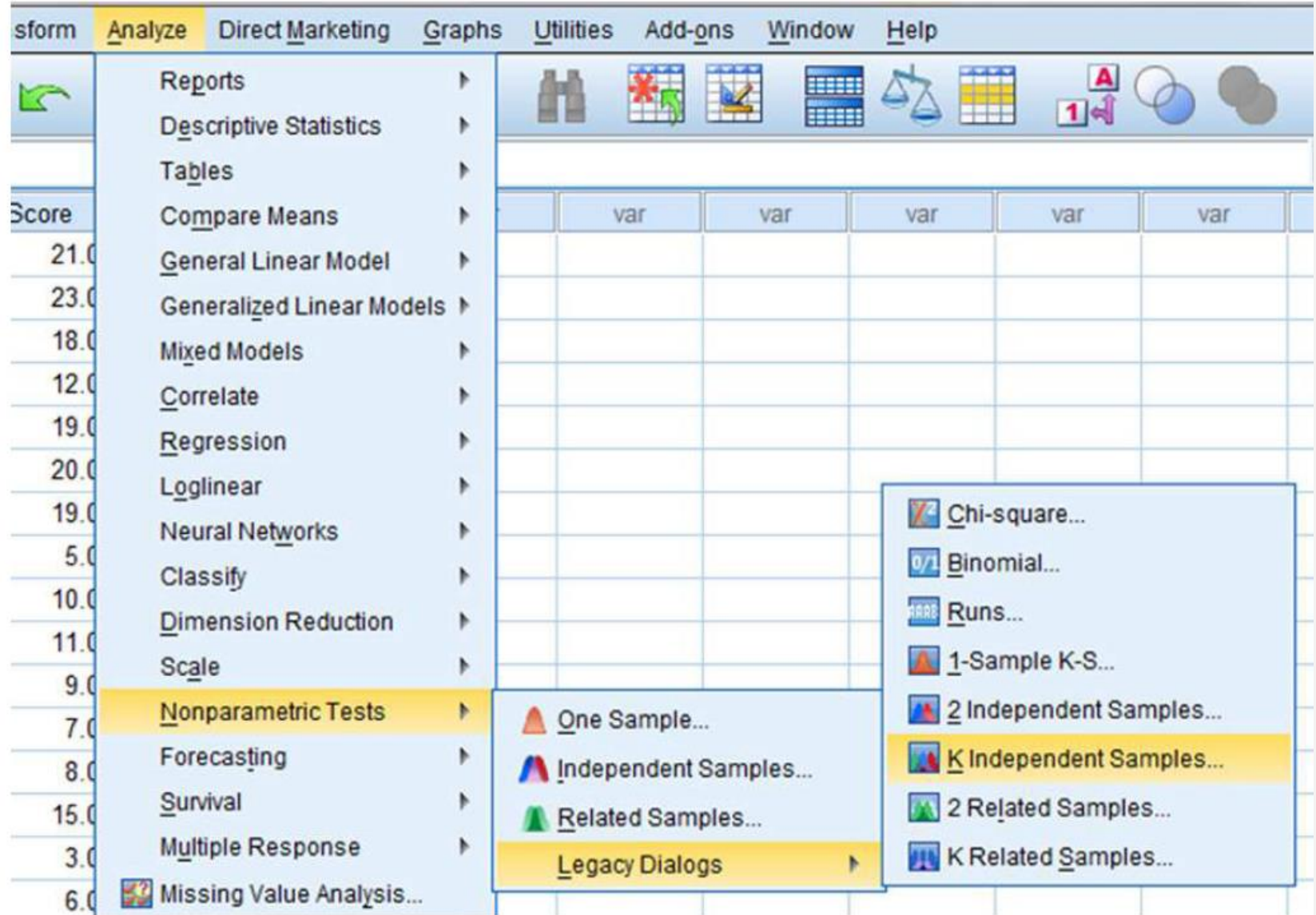
FIGURE 4

Use the top arrow button to place your variable with your data values, or dependent variable (DV), in the box labeled "Test Variable List:." Then, use the lower arrow button to place your grouping variable, or independent variable (IV), in the box labeled "Grouping Variable." As shown in Figure 5, we have placed the "Score" variable in the "Test Variable List" and the "Group" variable in the "Grouping Variable" box.

Click on the "Define Range . . ." button to assign a reference value to your independent variable (i.e., "Grouping Variable").
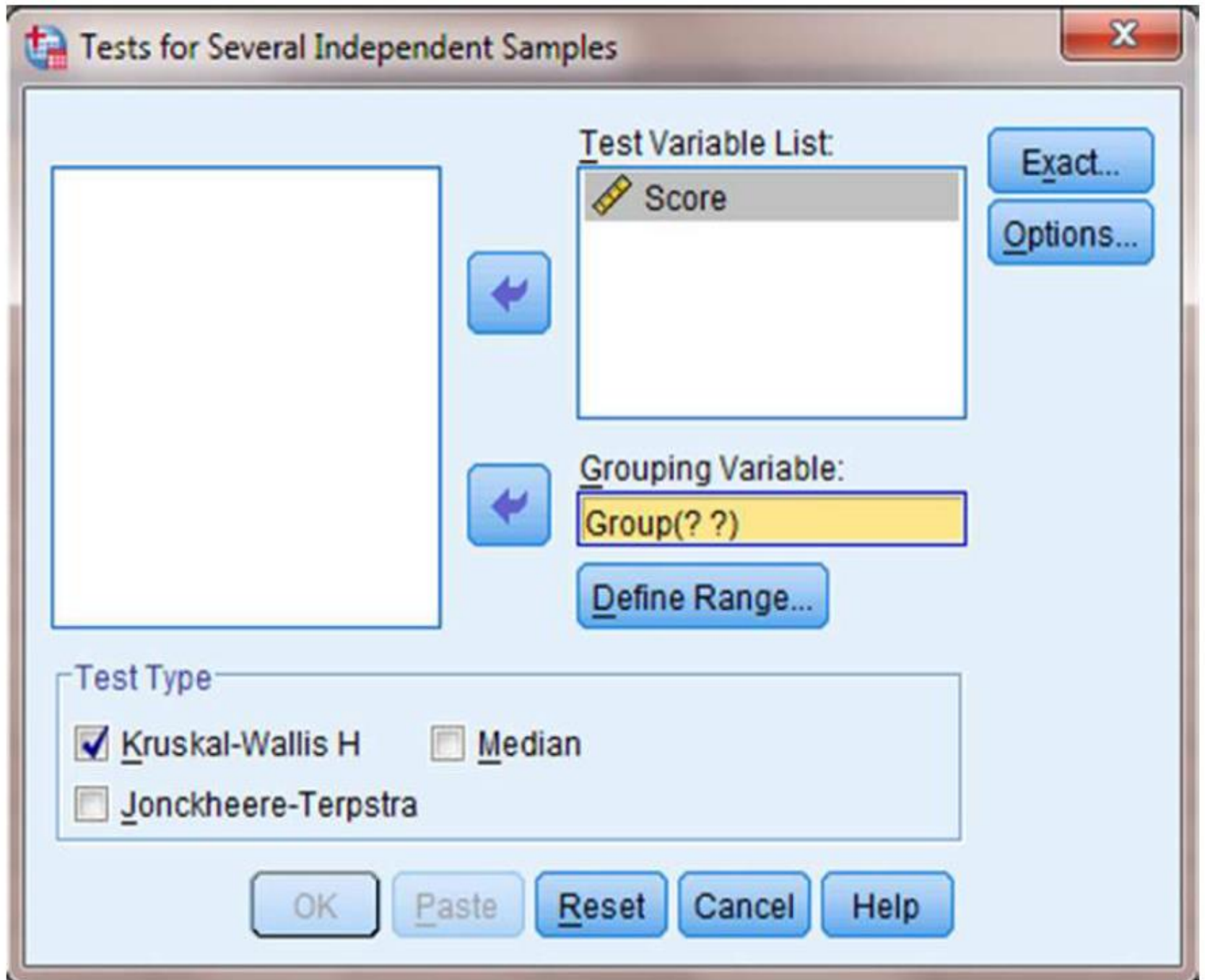
FIGURE   5

As shown in Figure 6, type 1 into the box next to "Minimum" and 3 in the box next to "Maximum." Then, click "Continue." This step references the value labels you defined when you established your grouping variable.
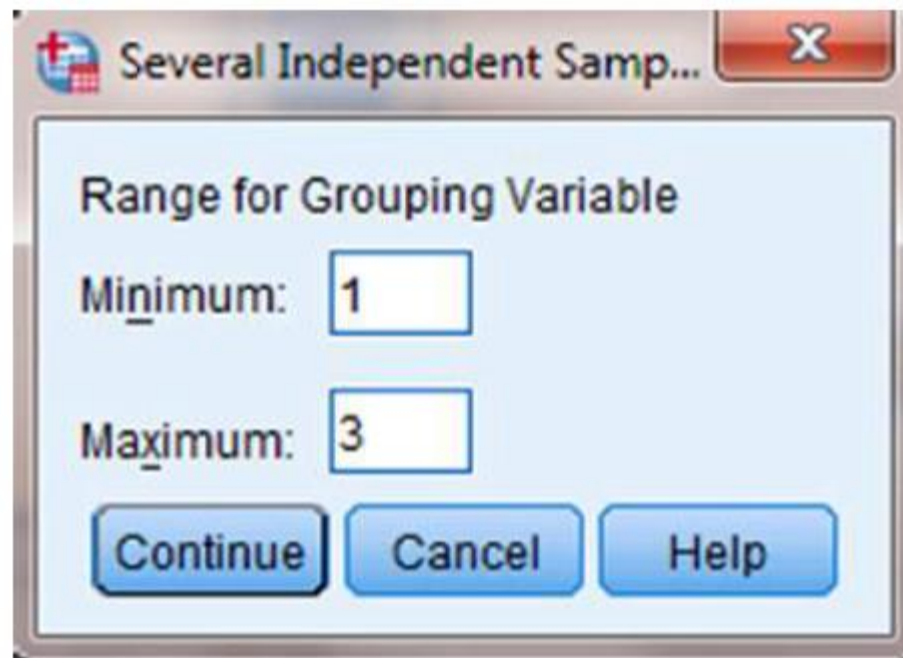

FIGURE 6.

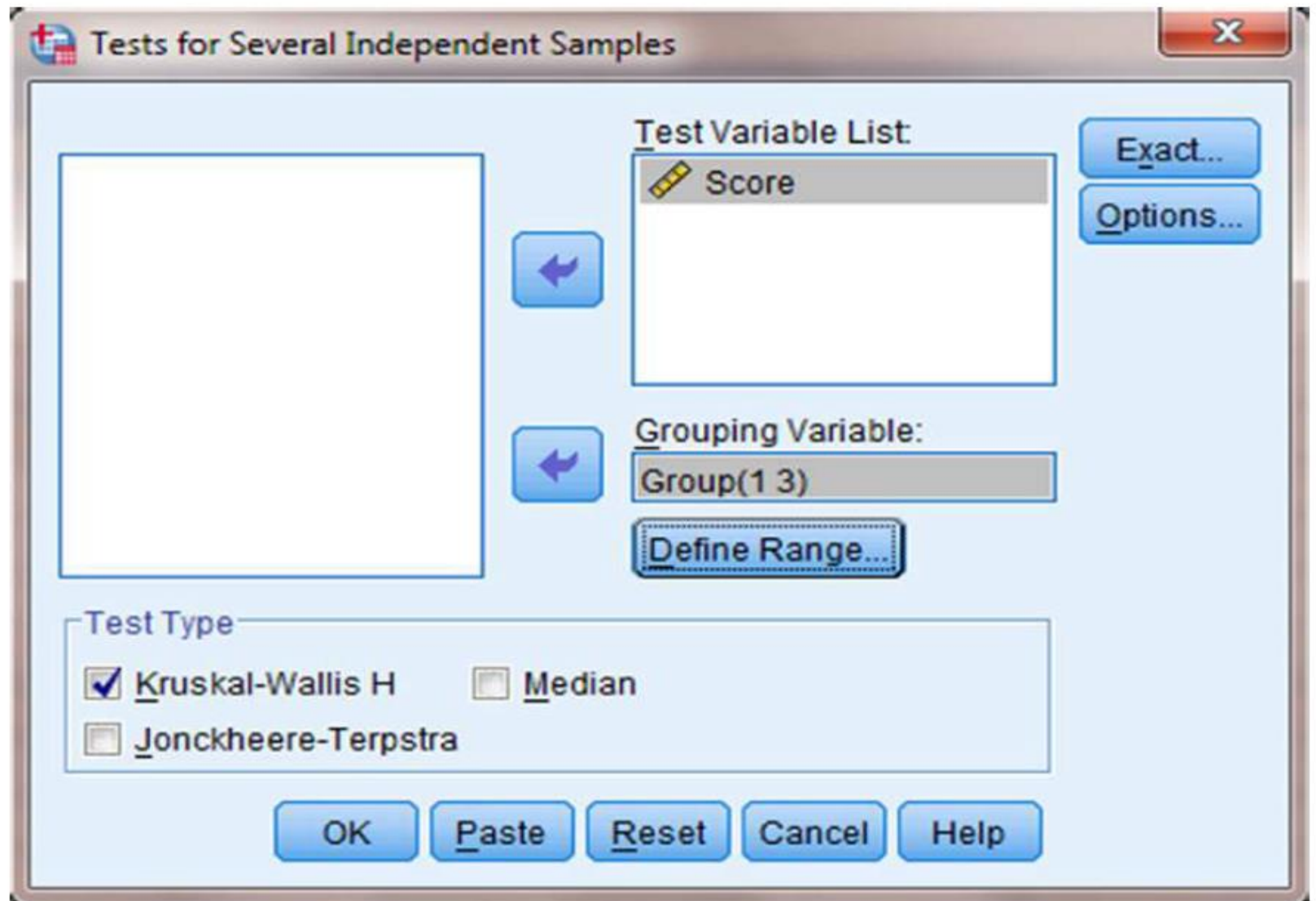Now that the groups have been assigned (see Fig. 7), click "OK" to perform the analysis.

FIGURE 7

4. Interpret the Results from the SPSS Output Window SPSS

Output 1 provides the mean ranks of groups and group sizes. The second output table provides the Kruskal–Wallis H-test statistic (H = 9.944). Since this test uses a $_2$

distribution, SPSS calls the H statistic "Chi-Square." This table also returns the degrees of freedom (df = 2) and the significance (p = 0.007).

Ranks

	Group	N	Mean Rank
Score	High	6	13.92
	Medium	5	8.10
	Low	6	4.83
	Total	17	

Test Statistics[a,b]

	Score
Chi-Square	9.944
df	2
Asymp. Sig.	.007

a. Kruskal Wallis Test

b. Grouping Variable: Group

SPSS OUTPUT 1

Based on the results from SPSS, three social interaction groups were compared:

high ($n_H = 6$), medium ($n_M = 5$), and low ($n_L = 6$). The Kruskal–Wallis H-test was significant ($H(2) = 9.94$, $p < 0.05$). In order to compare individual pairs of samples, contrasts must be used.

Note that to perform Mann–Whitney U-tests for sample contrasts, simply use the grouping values you established when you defined your variables in step 1. Remember to use your corrected level of risk B when examining your significance.

SUMMARY

More than two samples that are not related may be compared using a nonparametric procedure called the Kruskal–Wallis H-test.

The parametric equivalent to this test is known as the one-way analysis of variance (ANOVA). When the Kruskal–Wallis H-test produces significant results, it does not identify which nor how many sample pairs are significantly different.

The Mann–Whitney U-test, with a Bonferroni procedure to avoid type I error rate inflation, is a useful method for comparing individual sample pairs.

In this lecture, explained how to perform the procedures using SPSS.