PERFORMING THE WILCOXON SIGNED RANK EST AND THE SIGN TEST USING SPSS

OBJECTIVES

In this lecture, you will learn the following items:

• How to perform the Wilcoxon signed rank test using SPSS.

• How to perform the sign test using SPSS.

PERFORMING THE WILCOXON SIGNED RANK TEST AND THE SIGN TEST USING SPSS

We will analyze the small sample examples for the Wilcoxon signed rank test and the sign test 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. As shown in Figure 2, we have named our variables "last_yr" and "this_yr."



FIGURE 2

2 Type in Your Values

Click the "Data View" tab at the bottom of your screen and type your data under the variable names. As shown in Figure 3, we are comparing "last_yr" with "this_yr."

	last_yr	this_yr		
1	31.00	31.00		
2	14.00	14.00		
3	53.00	50.00		
4	18.00	30.00		
5	21.00	28.00		
6	44.00	48.00		
7	12.00	35.00		
8	36.00	32.00		
9	22.00	23.00		
10	29.00	34.00		
Data View	Variable View			

3 Analyze Your Data

As shown in Figure 4, use the pull-down menus to choose "Analyze," "Nonparametric Tests," "Legacy Dialogs," and "2 Related Samples . . ."

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FIGURE 4

In the upper left box, select both variables that you want to compare. Then, use the arrow button to place your variable pair in the box labeled "Test Pairs:".

Next, check the "Test Type" you wish to perform. In Figure 5, we have checked "Wilcoxon" and "Sign" to perform both tests. Finally, click "OK" to perform the analysis

Two-Related-Samples Tests

last vr		Test Pa Pair	Variable1	Variable?		Exact
this vr		1	[last_yr]	[this_yr]	†	Options
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FIGURE 5

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Interpret the Results from the SPSS Output Window

SPSS Output 1 begins by reporting the results from the Wilcoxon signed rank test. The first output table (called "Ranks") provides the Wilcoxon *T* or obtained value. From the "Sum of Ranks" column, we select the smaller of the two values. In our example, T = 7.5. The second output table (called "Test Statistics") returns the critical *z*-score for large samples. In addition, SPSS calculates the two-tailed significance (p = 0.041).

Based on the results from SPSS, the number of successful interventions was significantly different (T = 7.5, n = 12, p < 0.05). In addition, the sum of the positive difference ranks ($\Sigma R_+ = 47.5$) was larger than the sum of the negative difference ranks ($\Sigma R_- = 7.5$), demonstrating a positive impact from the program.

Wilcoxon Signed Ranks Test

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		N	Mean Rank	Sum of Ranks
this_yr - last_yr	Negative Ranks	2 ^a	3.75	7.50
	Positive Ranks	8 ^b	5.94	47.50
	Ties	2°		
	Total	12		

- a. this_yr < last_yr
- b. this_yr > last_yr
- c.this_yr = last_yr

Test Statistics^a

	this_yr - last_yr
Z	-2.040 ^b
Asymp. Sig. (2-tailed)	.041

- a. Wilcoxon Signed Ranks Test
- b. Based on negative ranks.

SPSS OUTPUT 1

Next, SPSS Output 2 reports the results from the sign test. The first output table (called "Frequencies") provides the negative differences, positive differences, ties, and total comparisons. The second output table (called "Test Statistics") returns the two-tailed significance (p = 0.109). Based on the results of the sign test using SPSS, the number of successful interventions was not significantly different (0.109 > 0.05).

rrequencies				
		N		
this_yr - last_yr	Negative Differences ^a	2		
	Positive Differences ^b	8		
	Ties ^c	2		
	Total	12		

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Sign Test

a. this_yr < last_yr

b. this_yr > last_yr

c. this_yr = last_yr

Test Statistics^a

	this_yr - last_yr
Exact Sig. (2-tailed)	.109 ⁶

a. Sign Test

b. Binomial distribution used.

SPSS OUTPUT 2

SUMMARY

In this lecture, we described how to perform and interpret a Wilcoxon signed rank test and a sign test, using SPSS.