

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

OBJECTIVES

In this lecture, you will learn the following items:

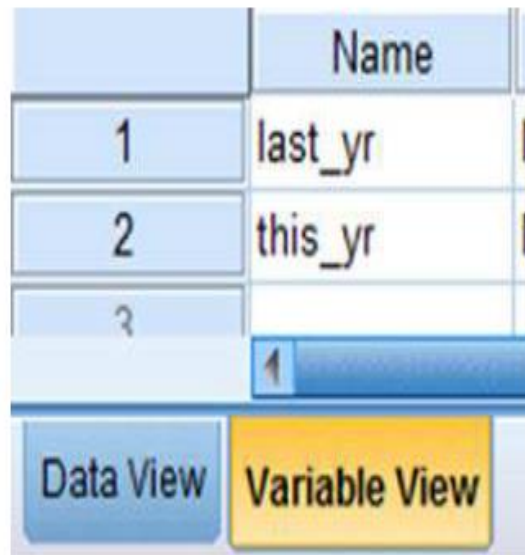
- **How to perform the Wilcoxon signed rank test using SPSS.**
- **How to perform the sign test using SPSS.**

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.”



The image shows a screenshot of a software interface. At the top, there is a table with three rows. The first row has a blue header cell with the text "Name". The second row has a blue cell with the number "1" and a white cell with the text "last_yr". The third row has a blue cell with the number "2" and a white cell with the text "this_yr". Below the table, there are two tabs: "Data View" and "Variable View". The "Variable View" tab is highlighted in yellow. A small blue box with the number "1" is positioned above the "Variable View" tab.

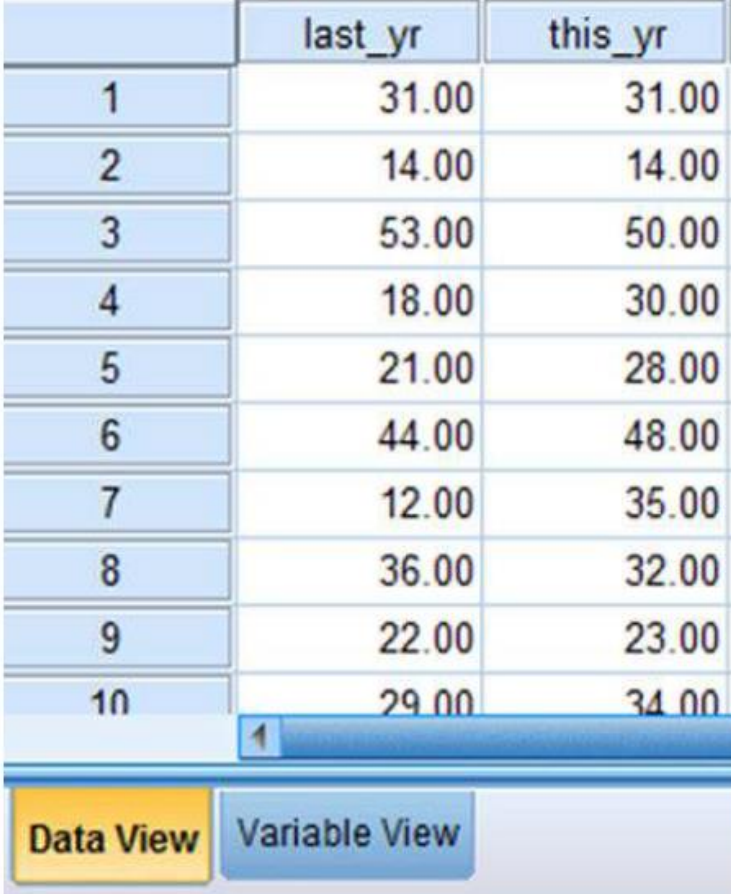
	Name
1	last_yr
2	this_yr
3	

Data View Variable View

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

1

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 “2 Related Samples . . .”

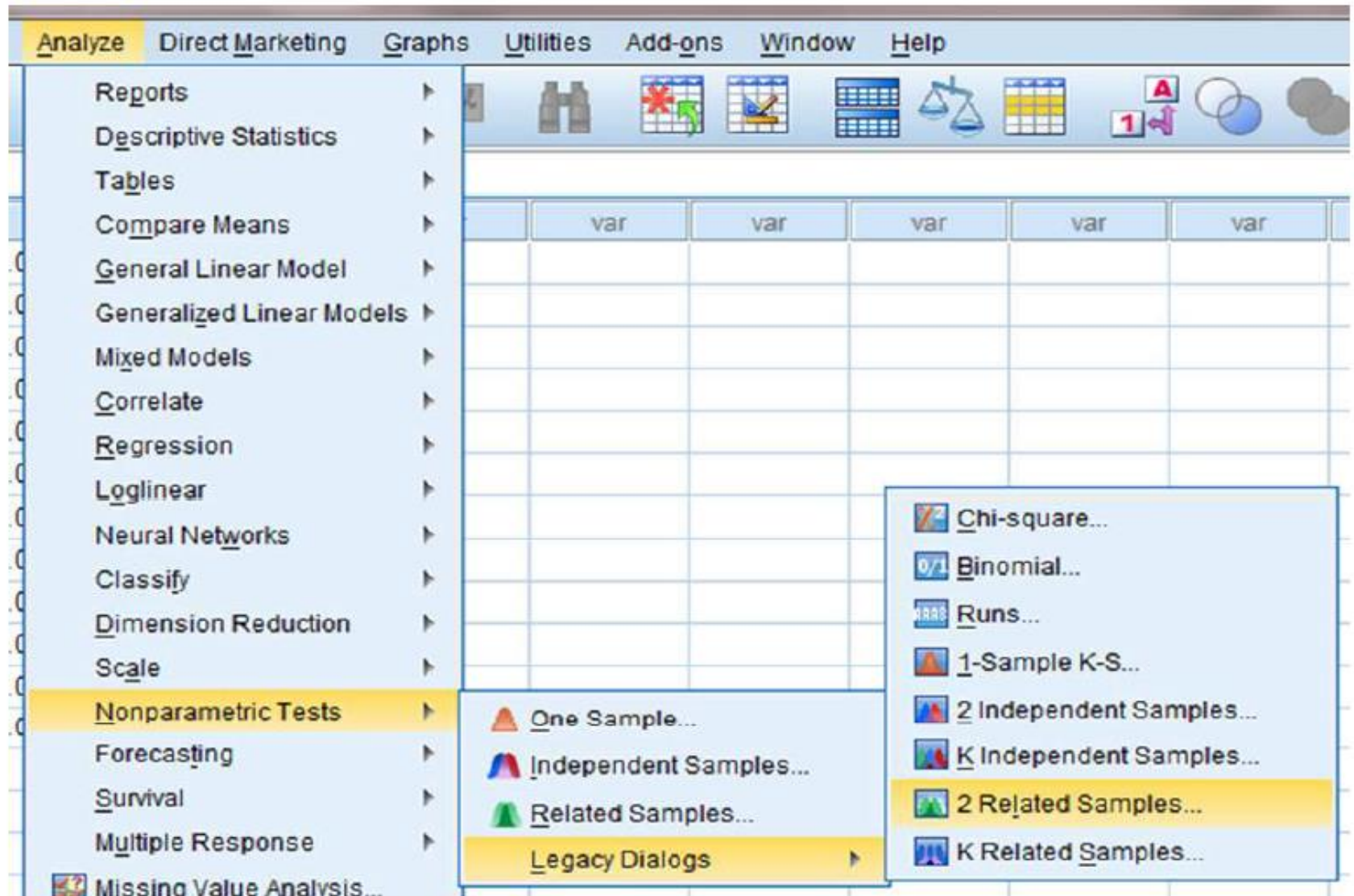


FIGURE 4

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

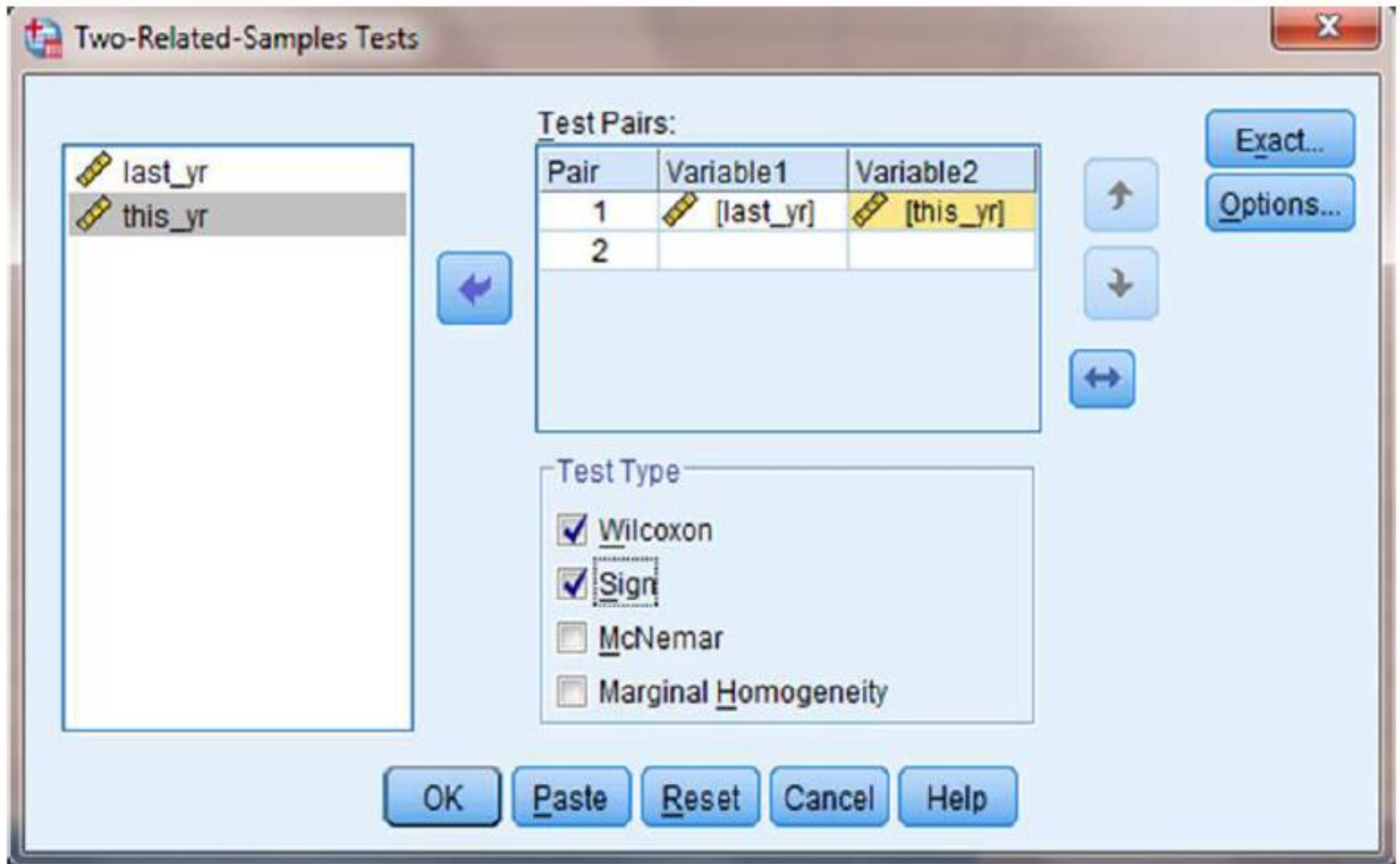


FIGURE 5

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 ($\sum R_+ = 47.5$) was larger than the sum of the negative difference ranks ($\sum R_- = 7.5$), demonstrating a positive impact from the program.

Wilcoxon Signed Ranks Test

Ranks

		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 ^c		
	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.

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 ($0.109 > 0.05$).

Sign Test

Frequencies

		N
this_yr - last_yr	Negative Differences ^a	2
	Positive Differences ^b	8
	Ties ^c	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
Exact Sig. (2-tailed)	.109 ^b

a. Sign Test

b. Binomial distribution used.

SUMMARY

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