

## Wilcoxon Matched Pairs Signed Rank Test

This test is similar to a matched (repeated measures) t-test. However, the dependent variable is measured on an **ordinal scale (ranked data)**. This test is used to test for significant differences between **two** conditions of an independent variable in an experiment where the same (or matched) participants are responding in **both** conditions of the study. The dependent variable involves ranked (ordinal) data.

Suppose for example, a department chair wanted to find out whether their department faculty members had a significant preference for one job candidate over another. Each of two job candidates (Dr. Smith and Dr. Jones) came to the department for a job interview. After each candidate gave a one hour guest lecture to the members of the department, and after they were interviewed by the members of the department, the faculty in the department were asked to rank order their preferences for the candidates. The first choice of each department member was given a rank of 1 and their second choice a rank of 2. The department chair then recorded the rankings of each candidate by each department member in the table below:

**Rank Order of Candidates by Faculty**

<u>Faculty Member</u>	<u>Dr. Smith</u>	<u>Dr. Jones</u>
A	1	2
B	1	2
C	1	2
D	1	2
E	2	1
F	1	2
G	1.5	1.5
H	1	2
I	1	2
J	1	2

1. Logon to system
2. **Click Start > Programs > SPSS for Windows > SPSS 10.1 for Windows.** At this point a window will appear asking you what you would like to do. Click on the circle next to Type in Data (2<sup>nd</sup> option in list) and then click **OK** at the bottom of the window.
3. A Data Editor will appear. Look in the lower left corner of the screen. You should see a **Data View** tab and to the right of it a **Variable View** tab. The **Variable View** tab will be used first for the **Data Definition** Phase of creating a data file. The **Data View** tab will be used to actually enter the raw numbers listed above. (See pages 1-3 for a more detailed explanation of creating data files.)

### DATA DEFINITION PHASE

4. Click on the **Variable View** tab in the lower left corner. A new screen will appear with the following words at the top of each column.  
**Name** Type Width Decimals **Label** **Values** Missing Columns Align Measure
5. Click on the white cell in **Row 1** under the word **Name** and type in the word **Smith**
6. Click on the white cell in **Row 1** under the word **Label** and type in **Smith Rank**. (Doing this will provide you with a more expansive label in the results output).
7. Click on the white cell in **Row 2** under the word **Name** and type in the word **Jones**
8. Click on the white cell in **Row 2** under the word **Label** and type in **Jones Rank**. (Doing this will provide you with a more expansive label in the results output).

### DATA ENTRY PHASE

9. Click on the **Data View** tab in the lower left corner. The data **view** screen will now appear with Column 1 named **Smith** and Column 2 named **Jones**.
10. Enter the data for each of the two candidates as follows. Mouse to the top cell under the first column which is Smith and enter the following:

1 tab 2  
 1 tab 2  
 1 tab 2  
 1 tab 2  
 2 tab 1  
 1 tab 2  
 1.5 tab 1.5  
 1 tab 2  
 1 tab 2  
 1 tab 2

## Data Analysis

1. Click on **Analyze** at top of screen then
  - a. Click on **Non-Parametric** Tests then
  - b. Click on **2 Related Samples**
2. Highlight both **Smith and Jones** by clicking on them then
  - a. Click on **arrow >** to transfer both name to the **Test Pair(s)** List box
3. Click on White square next to **Wilcoxon** to place a check mark in the box if one is not already there
4. Click on **Options** button
5. Click on white square next to **Descriptives** to place a check mark in the box
  - a. Click **continue** button
6. Click **OK**. Doing this will result in analysis being conducted. These results are below.

**Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum
Smith Rank	10	1.1500	.33747	1.00	2.00
Jones Rank	10	1.8500	.33747	1.00	2.00

**Ranks**

		N	Mean Rank	Sum of Ranks
Jones Rank - Smith Rank	Negative Ranks	1 <sup>a</sup>	5.00	5.00
	Positive Ranks	8 <sup>b</sup>	5.00	40.00
	Ties	1 <sup>c</sup>		
	Total	10		

- a. Jones Rank < Smith Rank
- b. Jones Rank > Smith Rank
- c. Smith Rank = Jones Rank

**Test Statistics<sup>b</sup>**

	Jones Rank - Smith Rank
Z	-2.333 <sup>a</sup>
Asymp. Sig. (2-tailed)	.020

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

7. For the problem above the null and alternative hypothesis are spelled out below:

$H_{null}$ : There will be no difference in the rankings of Dr. Smith and Dr. Jones by the faculty.

$H_{alt}$ : There will be a difference in the rankings of Dr. Smith and Dr. Jones by the faculty.

8. **Interpretation and APA writing template for Results Above:**

A Wilcoxon matched pairs signed rank test was conducted to determine whether there was a difference in the ranking of two candidates by the faculty. Results of that analysis indicated that there was a significant difference in how the faculty ranked the candidates,  $z = -2.33$ ,  $p < .05$ . The results indicate that Dr. Smith was the preferred candidate and received significantly more favorable rankings than Dr. Jones.