

SPSS Lab 8 - Non-parametric Tests

Demo

In a study, 28 adults with mild periodontal disease are assessed before and 6 months after the implementation of a dental-education program intended to promote better oral hygiene. After 6 months, periodontal status improved in 15 patients, declined in 8, and remained the same in 5.

Change Score	Number of Patients
+3	4
+2	5
+1	6
0	5
-1	4
-2	2
-3	2

- Is this a paired test or an independent samples test? Explain your choice.
- What non-parametric test can be used to determine whether or not a significant change in periodontal status has occurred over time? Write down the hypothesis
- Type in the data from the table. You will have two columns “score” and “no_patients”. Then add a new column (variable) “dummy” with 0’s.
- Go to menu data\weight cases\weight cases by \Frequency variable: “no_patients”
- Go to Analyze\Nonparametric Methods\2 Related Samples.
- Select both variables “score” and “dummy” and then move both to the “Test Pair List” box. Check Wilcoxon and check Sign test. Click on Options and select Descriptives. Click OK.
- Describe the results!

Now let’s analyze the following data:

Table 8.18 Birthweights in a clinical trial to test a drug for preventing low-birthweight deliveries

Patient number	Baby weight (lb)	
	Treatment group	Control group
1	6.9	6.4
2	7.6	6.7
3	7.3	5.4
4	7.6	8.2
5	6.8	5.3
6	7.2	6.6
7	8.0	5.8
8	5.5	5.7
9	5.8	6.2
10	7.3	7.1
11	8.2	7.0
12	6.9	6.9
13	6.8	5.6
14	5.7	4.2
15	8.6	6.8

- You have two groups, one taking a drug (treatment group) the other not (control group). Is this a paired test or an independent samples test? The study wants to determine if the drug prevents low-birthweight deliveries. What test is appropriate here?
- What non-parametric test is appropriate for this data? Write down the hypothesis.
- Type in the data as in table 8.18. You will have to create two columns (variables) “Score” and “Group.” In the second column you will need to type in 1 if it is a score for the “Treatment group”, otherwise 2 for “Control”.
- Go to Analyze\Nonparametric Methods\2 Independent Samples. Choose “Score” as the test variable. Choose Group as the grouping variable. In Define Groups, enter Group 1=1, and Group 2= 2. Check Mann-Whitney U Test, which is the same as the the Wilcoxon Rank-Sum Test. Click on Options and select Descriptives. Click OK.
- Describe the results!

Lab Assignment 8b

1. Download the data file “Data 8a” from the web site. Use the file Tennis_sign.sav to test the hypothesis that the effect of Motrin (drg_ord=1) is stronger during “MAXIMUM ACTIVITY VS BASELINE” (variable painmx_2) than “WITHIN 12 HOURS FOLLOWING MAXIMAL ACTIVITY, COMPARED TO SAME PERIOD AT BASELINE” (variable pain12_2). The description of the data can be found on page 348 in the book under “Sports Medicine.” As you can see the values are always for the same person (same id) which is why this is a paired test. Let’s use the Sign Test to analyze the data.
 - a. Write the null and alternative hypotheses for the difference between painmx_2 and pain12_2 in the email you will send me.
 - b. Go to Analyze\Non-parametric Test\Binomial. Select variable “Sign.” Test proportion=0.5. Click on Options and select Descriptives. Explain in the email why the Binomial sign test is appropriate in this case (check the sample size restriction)
 - c. You will get the following output:

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
sign	20	.4000	.50262	.00	1.00

Binomial Test

	Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
sign	Group 1	8	.40	.50	.503
	Group 2	12	.60		
	Total	20	1.00		

$2 * p(C >= 8) = 0.503$

- d. Describe what the results means by looking at equation 9.1 and 9.2 in the book (Sign Test - Normal Theory Method).

2. Now let's use the Wilcoxon Sign-Rank Test to analyze the same data. With this test we will not only analyze the "sign" of the difference, but also the "magnitude" of the difference.
 - a. Go to Analyze\Nonparametric Methods\2 Related Samples. Explain why you think this is the right SPSS test among all the nonparametric options (For example, why not "Analyze\Nonparametric Methods\2 Independent Samples?")
 - b. Explain in the email why the Wilcoxon Sign-Rank Test is appropriate in this case (check the sample size restriction)
 - c. Select both variables painmx_2 and pain12_2 and then move both to the "Test Pair List" box. Check Wilcoxon and check Sign test. Click on Options and select Descriptives. Click OK.
 - d. What is the p-value? Why is this p-value different to the previously calculated p-value?
3. Download the data file "Data 8b" from the web site. Use the file Tennis2.sav to test the hypothesis that the effect of Motrin (drg_ord=1) is stronger than the placebo effect (drg_ord=2) by analyzing the variable "OVERALL IMPRESSION OF DRUG EFFICACY VS BASELINE" (painov_2)
 - a. Why is the Wilcoxon Rank-Sum Test appropriate for this test?
 - b. What is the Hypothesis?
 - c. Go to Analyze\Nonparametric Methods\2 Independent Samples. Choose painov_2 as the test variable. Choose drg_ord as the grouping variable. In Define Groups, enter Group 1=1, and Group 2= 2. Check Mann-Whitney U Test, which is the same as the the Wilcoxon Rank-Sum Test. Click on Options and select Descriptives. Click OK.
 - d. What is the p-value. What does it mean with regards to our hypothesis.