

MANN-WHITNEY U TEST

Tutorial SPSS

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The Mann-Whitney U test or Mann-Whitney-Wilcoxon evaluates whether the medians on a test variable differ significantly between two groups.

To conduct the Mann-Whitney U test, each case must have scores on two variables, the grouping variable (independent or categorical variable) and the test variable (dependent or quantitative variable). The grouping variable divides cases into two groups or categories, and the test variable assesses individuals on a variable with at least an ordinal scale.

Unlike its parametric counterpart, the t test for 2 samples, this method does not assume that the difference between the samples have normality distributed, or that the variances of the two population are equal.

UNDERSTANDING THE MANN-WHITNEY U TEST

We have two sales groups. Each group consisted of 10 sales. Manager wants to evaluate the effect of training on sales performance. He take 2 group, 1 group without training, and else with training

To help understand how the Mann-Whitney U test evaluates differences in medians, we will look at an example data sheet :

ID	Group	Unit Sold	Training
1	0	19	No
2	0	16	No
3	0	27	No
4	0	14	No
5	0	39	No
6	0	28	No
7	0	15	No
8	0	29	No
9	0	10	No
10	0	27	No
11	1	37	Yes

12	1	32	Yes
13	1	44	Yes
14	1	39	Yes
15	1	28	Yes
16	1	48	Yes
17	1	48	Yes
18	1	35	Yes
19	1	24	Yes
20	1	48	Yes

Display in the SPSS

18 :					
	ID	grup	sales	var	var
1	1.00	.00	19		
2	2.00	.00	16		
3	3.00	.00	27		
4	4.00	.00	14		
5	5.00	.00	39		
6	6.00	.00	28		
7	7.00	.00	15		
8	8.00	.00	29		
9	9.00	.00	10		
10	10.00	.00	27		
11	11.00	1.00	37		
12	12.00	1.00	32		
13	13.00	1.00	44		
14	14.00	1.00	39		
15	15.00	1.00	28		
16	16.00	1.00	48		
17	17.00	1.00	48		
18	18.00	1.00	35		
19	19.00	1.00	24		
20	20.00	1.00	48		
21					
22					

The Mann-Whitney U test then evaluates whether the mean ranks for the two groups differ significantly from each other. For this example, we will be evaluating whether the

mean rank for the no training group (0) differs significantly from the mean rank for the training group (code 1).

CONDUCTING THE MANN-WHITNEY U TEST IN SPSS

To conduct the Mann-Whitney U test in SPSS, use the following steps:

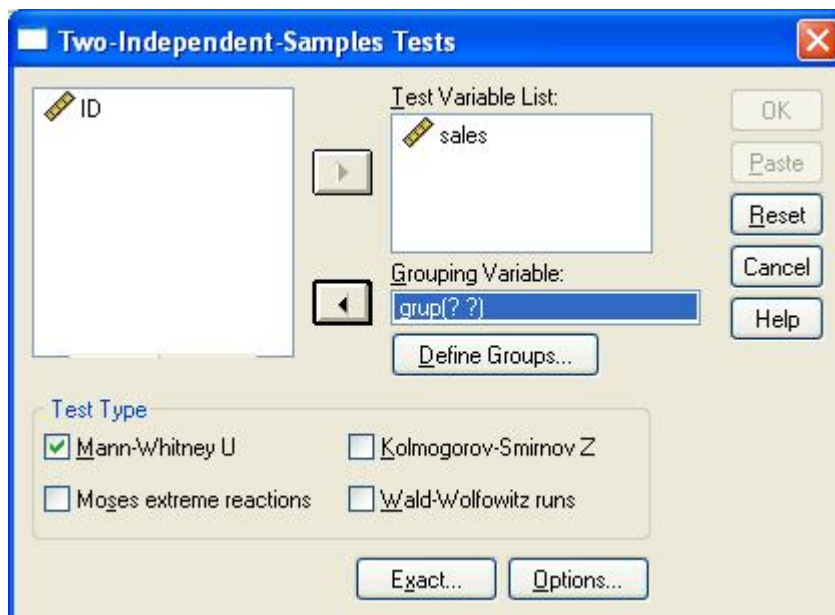
Step 1

Click **Analyze**, click (mouse over) **Nonparametric Tests**, and then click **2 Independent-Samples**

You should now be in the Two-Independent Samples Tests dialog box

Click on your (*Test Variable*), and click > to move it to the Test Variable List: box

Click *Grouping Variable*, and click > to move it to the Grouping Variable: box

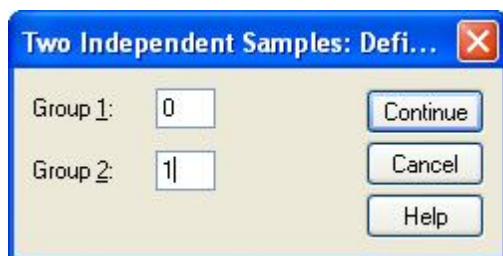


Step 2

Click **Define Groups**

Type 0 in the Group 1 box to indicate that Group 0 is the first level of your grouping variable.

Type 1 in the Group 2 box indicating that Group 1 is the second level of your grouping variable.

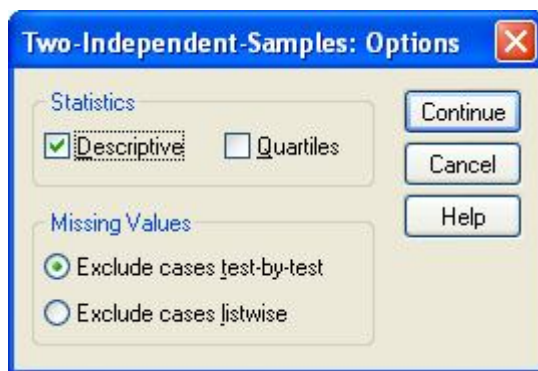


Click **Continue**

Step 3

Click **Options**

Under Statistics, Select "**Descriptive**"



Click **Continue**

Be sure **Mann-Whitney U** is checked in the Test Type area.

Click **OK**

Now we ready to analyze the output data...

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
sales	20	30.35	11.847	10	48
grup	20	.5000	.51299	.00	1.00

Mann-Whitney Test

Ranks

grup	N	Mean Rank	Sum of Ranks
sales notraining	10	6.60	66.00
sales training	10	14.40	144.00
Total	20		

Test Statistics^b

	sales
Mann-Whitney U	11.000
Wilcoxon W	66.000
Z	-2.956
Asymp. Sig. (2-tailed)	.003
Exact Sig. [2*(1-tailed Sig.)]	.002 ^a

a. Not corrected for ties.

b. Grouping Variable: grup

A Mann-Whitney U test was conducted to evaluate the hypothesis that group with training would higher on sales, on the average, than group without training on a sales performance.

The results of the test were in the expected direction and significant, $z = -2.911$, $p < .05$. sales with training had an average rank of 14.40, while salesmen without traning had average rank of 6.60.

References :