

Wilcoxon Matched-Pairs Signed Ranks Test

This test provides an alternative to the student t-test for matched score data where the assumptions for the parametric t-test cannot be met. In using this test, the difference is obtained between each of N pairs of scores observed on matched objects, for example, the difference between pretest and post-test scores for a group of students. The difference scores obtained are then ranked. The ranks of negative score differences are summed and the ranks of positive score differences are summed. The test statistic T is the smaller of these two sums. Difference scores of 0 are eliminated since a rank cannot be assigned. If the null hypothesis of no difference between the groups of scores is true, the sum of positive ranks should not differ from the sum of negative ranks beyond that expected by chance. Given N ranks, there is a finite number of ways of obtaining a given sum T. There are a total of 2^N ways of assigning positive and negative differences to N ranks. In a sample of 5 pairs, for example, there are $2^5 = 32$ ways. Each rank sign would occur with probability of $1/32$. The probability of getting a particular total T is

$$PT = \frac{\text{Ways of getting T}}{2^N}$$

The cumulative probabilities for T, T-1, ..., 0 are obtained for the observed T value and reported. For large samples, a normally distributed z score is approximated and used.

The file labeled wilcoxon.LAZ is used as our example:

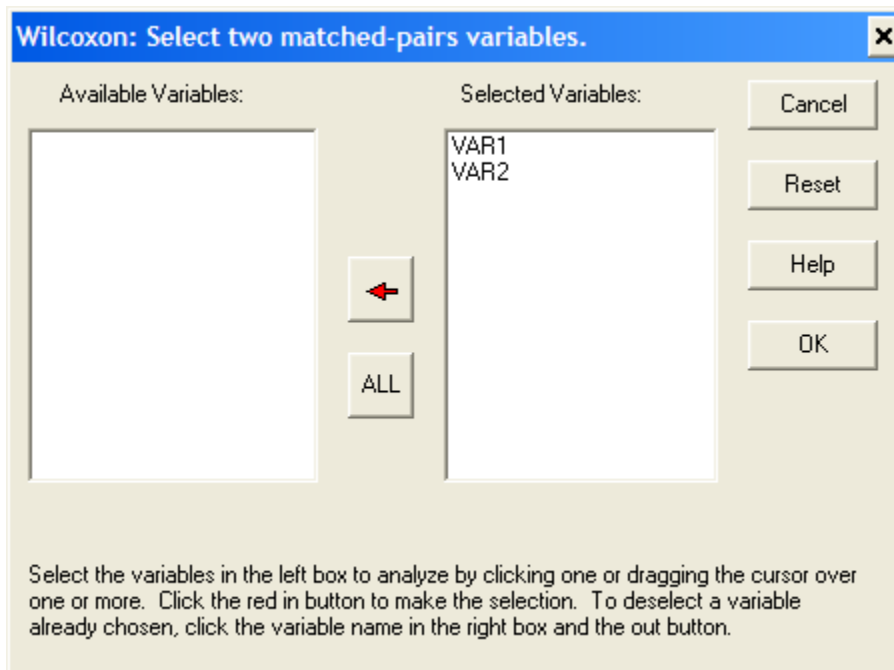


Figure 1. The Wilcoxon Matched Pairs Signed Ranks Test

The Wilcoxon Matched-Pairs Signed-Ranks Test

See pages 75-83 in S. Seigel's Nonparametric Statistics for the Social Sciences

Ordered Cases with cases having 0 differences eliminated:

Number of cases with absolute differences greater than 0 = 8

CASE	VAR1	VAR2	Difference	Signed Rank
3	73.00	74.00	-1.00	-1.00
8	65.00	62.00	3.00	2.00
7	76.00	80.00	-4.00	-3.00
4	43.00	37.00	6.00	4.00
5	58.00	51.00	7.00	5.00
6	56.00	43.00	13.00	6.00
1	82.00	63.00	19.00	7.00
2	69.00	42.00	27.00	8.00

Smaller sum of ranks (T) = 4.00

Approximately normal z for test statistic T = 1.960

Probability (1-tailed) of greater z = 0.0250

NOTE: For N < 25 use tabled values for Wilcoxon Test