How to Perform a Mann-Whitney U Test in Stata to Compare Two Groups

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The Mann-Whitney U test is a non-parametric statistical test used to compare two independent groups and determine if there is a significant difference between their medians. In Stata, this test can be performed by first importing the data for both groups into the program. Then, the "ranksum" command can be used to calculate the U statistic and p-value. The results can be interpreted to determine if there is a significant difference between the two groups. Additionally, Stata provides options for performing a two-tailed or one-tailed test, as well as calculating confidence intervals for the median difference. Overall, the Mann-Whitney U test can be easily conducted in Stata, making it a valuable tool in analyzing data with non-normally distributed variables.

Perform a Mann-Whitney U Test in Stata

A (sometimes called the Wilcoxon rank-sum test) is used to compare the differences between two samples when the sample distributions are not normally distributed and the sample sizes are small (n <30). It is considered to be the nonparametric equivalent to the .

This tutorial explains how to perform a Mann-Whitney U test in Stata.

Example: Mann-Whitney U Test in Stata

Researchers want to know if a fuel treatment leads to a change in the average mpg of a car. To test this, they conduct an experiment in which they measure the mpg of 12 cars with the fuel treatment and 12 cars without it.

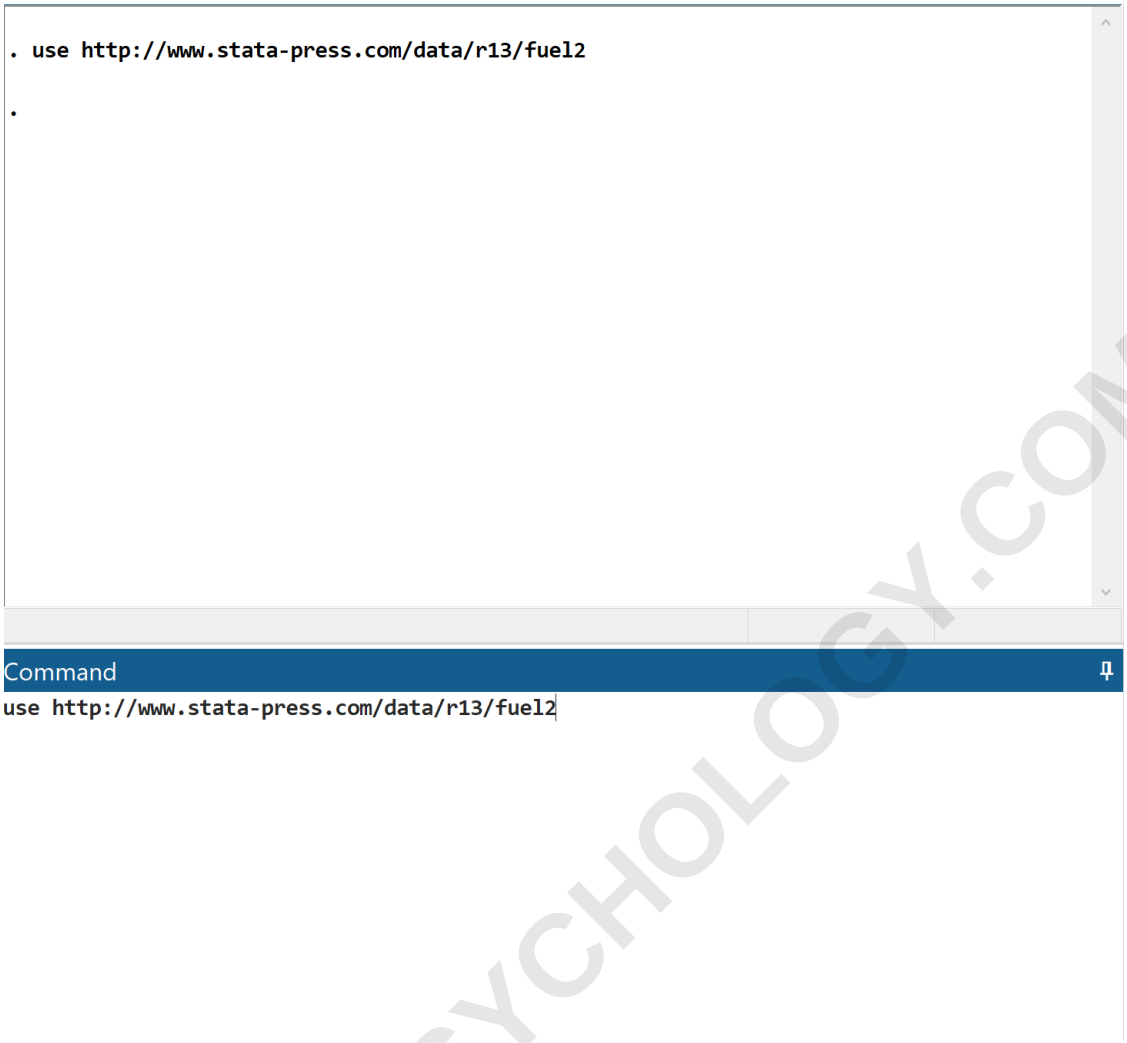
Because the sample sizes are small and they suspect that the sample distributions are not normally

distributed, they decided to perform a Mann-Whitney U test to determine if there is a statistically significant difference in mpg between the two groups.

Perform the following steps to conduct a Mann-Whitney U test in Stata.

Step 1: Load the data.

First, load the data by typing use http://www.stata-press.com/data/r13/fuel2 in the command box and clicking Enter.



Step 2: View the raw data.

Before we perform the Mann Whitney U test, let's first view the raw data. Along the top menu bar, go to Data > Data Editor > Data Editor (Browse). The first column, *mpg*, shows the mpg for a given car while the second column, *treat*, shows whether or not the car received fuel treatment.

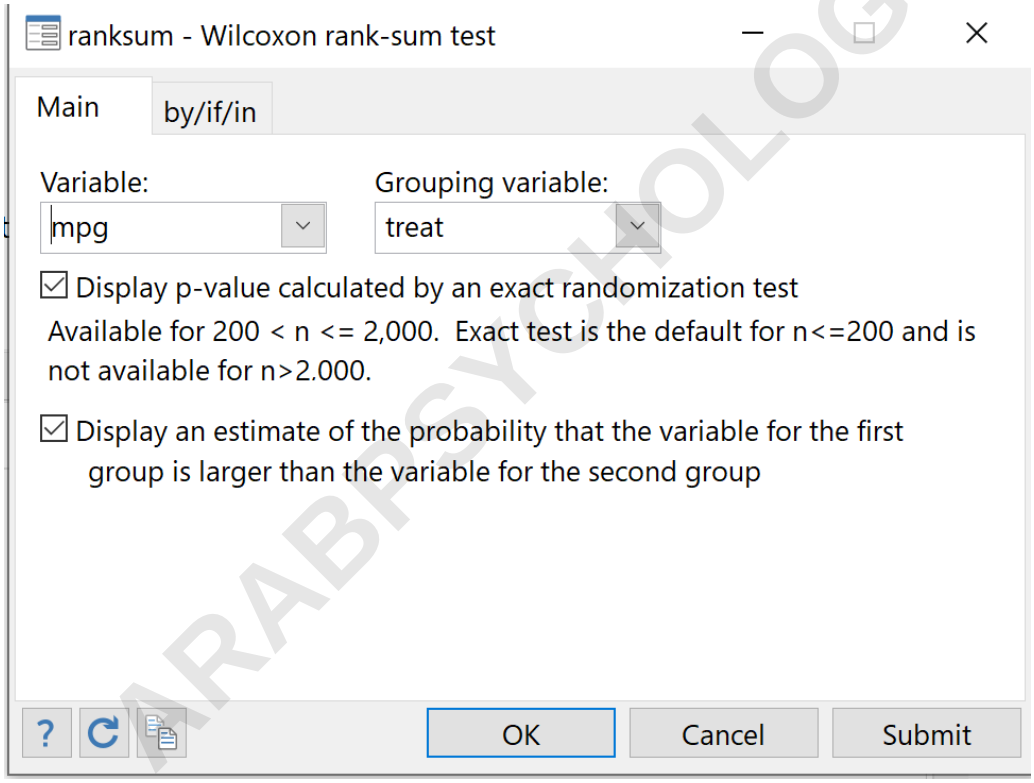
	mpg	treat
1	20	untreated
2	23	untreated
3	21	untreated
4	25	untreated
5	18	untreated
6	17	untreated
7	18	untreated
8	24	untreated
9	20	untreated
10	24	untreated
11	23	untreated
12	19	untreated
13	24	treated
14	25	treated
15	21	treated
16	22	treated
17	23	treated
18	18	treated
19	17	treated
20	28	treated
21	24	treated
22	27	treated
23	21	treated
24	23	treated

Step 3: Perform a Mann-Whitney U test.

Along the top menu bar, go to Statistics > Summaries, tables, and tests > Nonparametric tests of hypotheses >

Wilcoxon rank-sum test.

For Variable, choose *mpg*. For Grouping variable, choose *treat*. Check both of the boxes below to display a p-value for an exact test and display an estimate of the probability that the variable for the first group is larger than the variable for the second group. Lastly, click *OK*.



The results of the test will be displayed:

```
. ranksum mpg, by(treat) porder exact

Two-sample Wilcoxon rank-sum (Mann-Whitney) test

      treat |       obs    rank sum    expected
------------+---------------------------------
  untreated |        12         128         150
    treated |        12         172         150
------------+---------------------------------
   combined |        24         300         300

unadjusted variance        300.00
adjustment for ties         -4.04
                        ----------
adjusted variance          295.96

Ho: mpg(treat==untreated) = mpg(treat==treated)
             z =  -1.279
    Prob > |z| =   0.2010
    Exact Prob =   0.2117

P{mpg(treat==untreated) > mpg(treat==treated)} = 0.347
```

The values that we are primarily interested in are z = -1.279 and Prob > |z| = 0.2010.

Since the p-value of the test (0.2010) is not smaller than our significance level of 0.05, we fail to reject the null hypothesis. We do not have sufficient evidence to say that the true mean mpg is different between the two groups.

Step 5: Report the results.

Lastly, we will report the results of our Mann-Whitney U test. Here is an example of how to do so:

A Mann-Whitney U test was conducted on 24 cars to determine if a new fuel treatment lead to a difference in mean miles per gallon. Each group had 12 cars.

Results showed that the mean mpg was not statistically significantly different between the two groups (z = -1.279, p = .2010) at a significance level of 0.05.

Based on these results, the new fuel treatment does not have a significant impact on the miles per gallon of cars.