

Mann Whitney U Test

This is a non-parametric test of location for two populations based on independent samples; there is no need for the samples to be of the same size (ie. they can be non-paired). It is also known as the Wilcoxon rank-sum test. The test requires no assumptions about the form of the underlying distributions, ie they are not assumed to be normally distributed. It is based on the ranks of the observations in each data sample obtained when all data is combined.

Method: The underlying hypotheses are:

H₀: there is no difference between the two populations

H₁: there is a difference between the two populations; with H₁ either one or two sided. If m and n ($m \leq n$) are the sizes (counts) of the two samples, then the test uses the fact that when H₀ is true, the probability that any of the ranks 1, 2, ..., $m+n$ is associated with a particular population depends only on the values of m and n . The observations in the combined data set are ranked from smallest to largest (taking account of signs) with ties being assigned the average of the tied ranks. The test statistic, W , is the sum of the ranks of the smaller sample (ie. the one of size m), or of either sample if $m=n$. To determine whether or not to reject H₀, the value of W is compared with the appropriate table of critical values or, if the sample sizes are sufficiently large, a normal approximation to the distribution of W can be used to determine the p-value.

See the **Statistics** topic for instructions on selecting this test.