Compare Two Independent Samples

The command compares two independent samples using the Mann-Whitney U test (nonparametric alternative to the *t-test* for independent samples), Kolmogorov-Smirnov test, Wald-Wolfowitz Runs test and Rosenbaum Q criterion.

How To

- ✓ Run: **STATISTICS->NONPARAMETRIC STATISTICS -> COMPARE TWO INDEPENDENT SAMPLES...**
- ✓ Select two variables to compare.

Results

MANN-WHITNEY U TEST is a nonparametric counterpart to the t-test, it is also known as Mann–Whitney–Wilcoxon (MWW) or Wilcoxon rank-sum test. The test assumes that the variables are measured on at least an ordinal scale (rank order).

The test statistics is the smallest of the two *U* values, defined as:

$$U_i = n_1 n_2 - \frac{n_i(n_i+1)}{2} - W_i \text{ (no ties)},$$

where n_i is the size and the W_i is the sum of the ranks for the i^{th} sample.

For small samples the significance level is calculated using the Dineen and Blakesley (1973) algorithm. If the final p-value ≤ 0.05 the decision is to reject the null hypothesis. Null hypothesis for Mann-Whitney U is that there is no difference between the ranks of the two samples

Z, approximately distributed as a standard normal, is defined as:

$$Z = \frac{U\ (n_1 * n_2)/2}{Std.dev}$$

Provided **P-VALUE** is two-tailed.

Mann-Whitney U Test			
U (larger)	44.00000	*U*	5.00000
W1 Sum of Ranks (series 1)	33.00000	*W2 Sum of Ranks (series 2)*	72.00000
W1 Mean	52.50000	*W2 Mean*	52.50000
Standard Deviation W	7.80385	*Multiplicity Factor*	18.00000
Z	2.49162	*p-level*	0.01272

KOLMOGOROV-SMIRNOV TEST is a two-sample test of the null hypothesis that *x* and *y* were drawn from the same continuous distribution is performed.

WALD-WOLFOWITZ RUNS TEST is another alternative of t-test that detects two independent samples from different populations with different cumulative distribution functions. The assumption for the test – samples are mutually independent are there are no, or few, ties between samples. The test can detect differences in averages or spread or any other important aspect between the two populations. It is efficient when each sample size is moderately large.

Null hypothesis H_0 is that there is no statistically significant difference between the two continuous cumulative distribution functions

If **RUNS COUNT R** $\leq R_c$ we reject H0.

References

Black, K. (1994). Business statistics: Contemporary decision making. Minneapolis: West Pub. Chicago.

Dineen, L. C., and B. C. Blakesley. 1973. Algorithm AS 62: Generator for the sampling distribution of the Mann-Whitney U statistic. Applied Statistics, 22, 269-273.

Daniel, Wayne W. (1990). "Kolmogorov–Smirnov one-sample test". Applied Nonparametric Statistics (2nd ed.). Boston: PWS-Kent. pp. 319–330.