Cochran's Q Test

COCHRAN'S Q test is used to verify if k treatments have the same effect between three or more related groups. In essence, the Cochran's Q test is an extension of the McNemar test [SDN]. While the results of Cochran's Q test are informative, one should also measure the degree of agreement among the tests.

How To

✓ Run: **STATISTICS->NONPARAMETRIC STATISTICS -> COCHRAN'S Q TEST.**

✓ Select variables with a two-way randomized block design (rows are subjects, columns are treatments).

✓ **LISTWISE** deletion is used for missing values removal.

Results

The report includes Cochran's Q test results and the table with proportions statistics for each variable.

Cochran's Q Test			
Sample size	12	Degrees of Freedom	3
Test Statistics Q	13.28571	p-level	0.00406

Statistics			
VAR	Sum	Proportions: 0	Proportions: 1
α	4	66.66667%	33.33333%
β	3	75.%	25.%
γ	2	83.33333%	16.66667%
δ	10	16.66667%	83.33333%

The Cochran's Q test statistic is defined as following:

$$T = k(k-1) \frac{\sum_{j=1}^{k}(x_j - \frac{N}{k})^2}{\sum_{i=1}^{b} x_i(k - x_i)}$$

where k is the number of treatments, x_j is the column total for the jth treatment, x_i is the row total for the ith block, b is the number of blocks, N is the total number of observations. The null hypothesis is accepted if Q is less than critical X^2, and rejected if $Q > X^2$.

If **P-LEVEL** is less than α (default value – 0.05) then the H_0 (the treatments are equally effective) is rejected and it is concluded that the significant difference among treatments exists.

Assumptions

The Cochran's Q test is based on the following assumptions:

      a) The sample of n subjects has been randomly selected from the population it represents;

      b) The scores of subjects are in the form of a dichotomous categorical variable (i.e., a "0" or "1").

References

 [SDN] Sheksin, David (2000) Handbook of Parametric and Nonparametric Statistical Procedures. SECOND EDITION Chapman & Hall/CRC