Cochran Q Test

The Cochran Q test is used to test whether or not two or more matched sets of frequencies or proportions, measured on a nominal or ordinal scale, differ significantly among themselves. Typically, observations are dichotomous, that is, scored as 0 or 1 depending on whether or not the subject falls into one or the other criterion group. An example of research for which the Q test may be applied might be the agreement or disagreement to the question "Should abortions be legal?". The research design might call for a sample of n subjects answering the question prior to a debate and following a debate on the topic and subsequently six months later. The Q test applied to these data would test whether or not the proportion agreeing was the same under these three time periods. The Q statistic is obtained as

$$Q = \frac{(K-1)\left[K\sum_{j=1} Gj2 - \left(\sum_{j=1}^{K} Gj\right)2\right]}{K\sum_{i=1}^{n} Li - \sum_{i=1}^{n} Li2}$$

where K is the number of treatments (groups of scores, Gj is the sum with the jth treatment group, and Li is the sum within case i (across groups). The Q statistic is distributed approximately as Chi-squared with degrees of freedom K-1. If Q exceeds the Chi-Squared value corresponding to the cumulative probability value, the hypothesis of equal proportions for the K groups is rejected. ItemData.TAB is the file used to demonstrate this procedure.

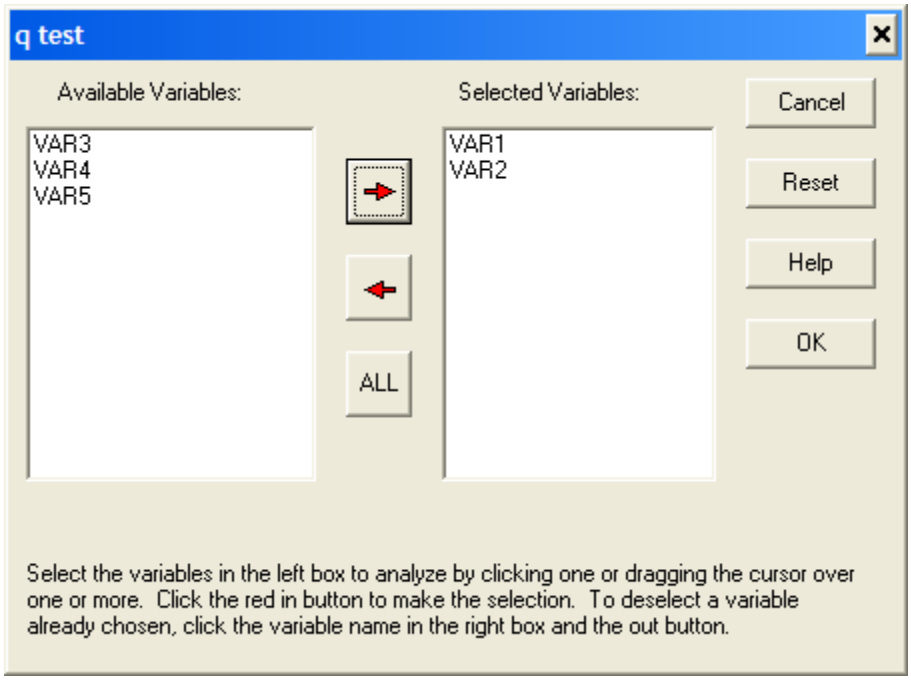

Figure 1. The Q Test Form

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Cochran Q Test for Related Samples
See pages 161-166 in S. Siegel's Nonparametric Statistics for the
Behavioral Sciences
McGraw-Hill Book Company, New York, 1956

Cochran Q Statistic =  3.000
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which is distributed as chi-square with 1 D.F. and probability = 0.0833