Kendall's Coefficient of Concordance

It is not uncommon that a group of people are asked to judge a group of persons or objects by rank ordering them from highest to lowest. It is then desirable to have some index of the degree to which the various judges agreed, that is, ranked the objects in the same order. The Coefficient of Concordance is a measure varying between 0 and 1 that indicates the degree of agreement among judges. It is defined as:

W = Variance of rank sums / maximum variance of rank sums.

The coefficient W may also be used to obtain the average rank correlation among the judges by the formula:

$$Mr = (mW - 1) / (m - 1)$$

where Mr is the average (Spearman) rank correlation, m is the number of judges and W is the Coefficient of Concordance.
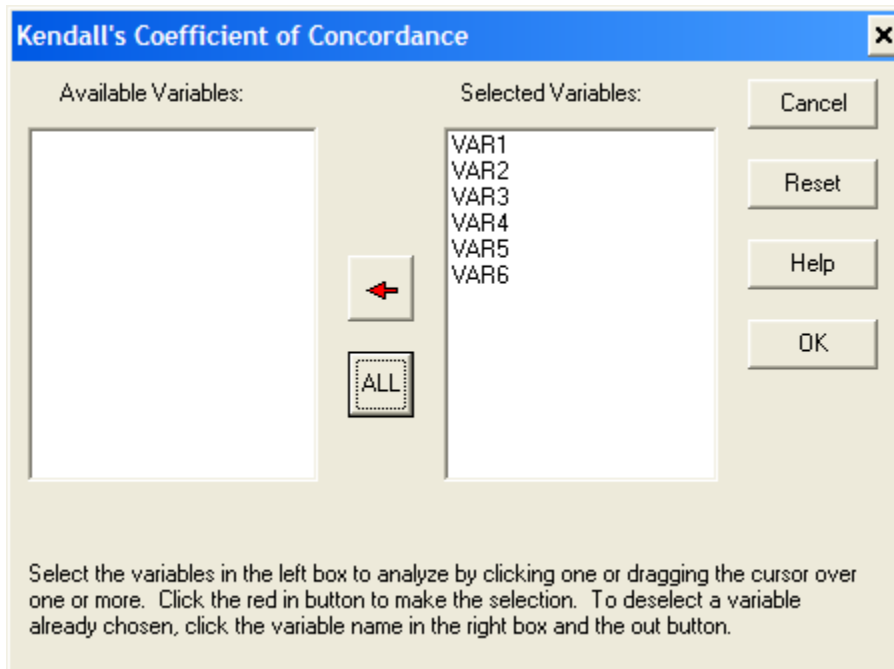The file sucsintv.LAZ is used to demonstrate the LazStats procedure for this analysis:

Figure 1.   Coefficient of Concordance Form

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Kendall's Coefficient of Concordance Analysis

Ranks Assigned to Judge's Ratings of Objects

Judge    1                Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
   5.5000   4.0000   3.0000   2.0000   1.0000   7.0000

Judge    2                Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
   6.0000   4.5000   3.0000   2.0000   1.0000   6.0000
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Judge   3            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   3.5000   5.5000   2.0000   1.0000   5.0000


Judge   4            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   5.0000   3.5000   2.0000   1.0000   4.0000


Judge   5            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   4.0000   4.0000   2.0000   1.0000   3.0000


Judge   6            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   5.0000   4.0000   2.5000   1.0000   2.0000


Judge   7            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   5.0000   4.0000   3.0000   2.0000   1.0000


Judge   8            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   4.5000   3.0000   2.0000   1.0000   6.0000


Judge   9            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   4.5000   3.0000   2.0000   1.0000   5.0000


Judge  10            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   5.0000   3.5000   2.0000   1.0000   4.0000


Judge  11            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   4.5000   2.5000   4.0000   1.0000   3.0000


Judge  12            Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
  6.0000   5.0000   4.0000   2.5000   1.0000   2.0000



Sum of Ranks for Each Object Judged
          Objects
    VAR1     VAR2     VAR3     VAR4     VAR5     VAR6
 71.5000 54.5000 43.0000 28.0000 13.0000 48.0000

Coefficient of concordance =      0.864
Average Spearman Rank Correlation =      0.852
Chi-Square Statistic =   51.844
Probability of a larger Chi-Square = 0.0000
Warning - Above Chi-Square is very approximate with only 7 variables!
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