Two-way ANOVA

The **TWO-WAY ANOVA**, also called two-factor ANOVA, determines how a response is affected by two factors. A two-way ANOVA may be done with replication (more than one observation for each combination of the factors) or without replication (only one observation for each combination of the factors).

Assumptions

The results can be considered reliable as long as the following assumptions are met: response variable must be normally distributed, samples are independent, variances of populations are equal, and responses for a given group are independent and identically distributed normal random variables.

How To

- ✓ Run**: STATISTICS->ANALYSIS OF VARIANCE (ANOVA)->TWO-WAY ANOVA...**
- ✓ Select a **RESPONSE** variable and two **FACTOR** variables (nominal variables)**.**
- ✓ Factor can be one of two types: fixed or random.
  - Fixed factors: For a particular factor, we assume that the levels of the factor that we have represented in our experiment compose all possible levels of the factor in the population. That is, we have presented all possible levels (e.g., types of teaching method) in our experiment.
  - Random factors: We assume that the levels of a factor in our experiment have been randomly assigned from all possible levels of the factor that exist in the real world.
- ✓ The two-way ANOVA is done with replication by default. To run the analysis without replication (if you have only one observation for each combination of the factors) in the **ADVANCED OPTIONS** check the **NO INTERACTIONS / RANDOMIZED BLOCK DESIGN** option.
- ✓ **Casewise** deletion is used for missing values removal.

Data Layout

(v6) Two-way ANOVA requires data to be arranged so that there is one **RESPONSE** variable that contains the dependent variable and two **FACTOR** variables with level values. If you have data arranged in a table – please use the **DATA->STACK COLUMNS** command to change data layout.

Results

Analysis of variance summary table and results of post-hoc analysis are produced. Detailed description of post-hoc comparison tests and ANOVA is available in the "**ONE-WAY ANOVA**" chapter.

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION - the source of variation (term in the model).
SS (SUM OF SQUARES) - the sum of squares for the term.
DF (DEGREES OF FREEDOM) - the degrees of freedom for the corresponding model term.
MS (MEAN SQUARE) - the estimate of the variation accounted for by this term.
$MS = SS/DF$
F - the F-test statistic.
P-VALUE - p-value for a F-test.