Within Subjects ANOVA

REPEATED MEASURES (Within Subjects) ANOVA is used to determine whether three or more group means are different where the test subjects are the same in each group. It is similar to the one-way ANOVA, but for related groups. In comparison with the between subjects ANOVA, the within subjects ANOVA reduces the unexplained error variance further, by removing the individual subject variability as well as it is more sensitive to changes in treatment effect. The null hypothesis H_0 states that there is no difference between related population means. Within subjects ANOVA is commonly used in pretest-posttest designs and longitudinal studies.

How To

- ✓ **RUN: STATISTICS-> ANOVA -> REPEATED MEASURES (WITHIN SUBJECTS) ANOVA...**
- ✓ Select variables with repeated measures (*unstacked data*). Use the **DATA->UNSTACK COLUMN** command if you have single-column observations and group variable.
- ✓ **Casewise** deletion method is used for missing values removal.

Assumptions

Except for the standard assumptions for a simple ANOVA the repeated measures ANOVA requires *sphericity*. Sphericity requires the homogeneity of variance and covariance for the repeated measures or, in other words, that covariance matrices between each pair of repeated measures must be similar.

Results

A report includes analysis of variance summary table, descriptive statistics for the treatments and Box's test for homogeneity of variance–covariance matrices.

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 number of observations for the corresponding model term.

MS (MEAN SQUARE) - an estimate of the variation accounted for the term.

$MS = SS/DF$

F - F-test statistic. Under the null hypothesis is distributed as $F_{df\ treatment, df\ error}$.

P-VALUE - p-value for a F-test. If p-value is less than the significance level α - the null hypothesis is rejected, and we can conclude that not all of the group means are equal.

BOX'S TEST FOR HOMOGENEITY

Box's M test is used to test for equality two or more covariance matrices. Box's test is considered to be robust from the point of view of error rates, but it is sensitive to deviations from multivariate normality and can be non-significant for similar matrices if the assumption of normality is not met.

References

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