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Difference Between ANOVA and ANCOVA

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ANOVA vs ANCOVA

ANOVA and ANCOVA [are](#) both statistical models that have different features:

ANOVA

Analysis of variance (ANOVA) is a collection of statistical models and their procedures which are used to observe differences between the means of three or more [variables](#) in a population basing on the sample presented. It is very useful in comparing three or more means.

It is a statistical tool that has been used in several sectors such as agriculture, psychology, and different industries. It assumes that each observation is independent, that the measurement level intervals between the DV and CV, and that the underlying populations must be distributed normally and must have the same variance.

ANOVA models:

1. Fixed-effects models which assume that [data](#) from normal populations that differ in their means allows the estimation of the range of response that any treatments [towards](#) them will generate.
2. Random-effects models which assume that data from a constrained hierarchy of different populations are sampled with different factor levels.
3. Mixed-effects models which describe the situations where both fixed and random effects are present.

Although a nonlinear model [can](#) [also](#) be used, all approaches to the analysis of variance use a linear model to create the assumption of the responseï¿½s probable distribution.
It assumes that the case is independent and that the model simplifies the statistical analysis. It also assumes the normal distribution of the residuals and the equality of variances and that the variance must always be constant.

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Types of ANOVA:

ï¿½ One-way ANOVA, is used to test for differences among two or more independent groups.
ï¿½ Factorial ANOVA, is used in the study of the interaction effects among treatments.
ï¿½ Repeated measures ANOVA, is used when the same subject is used for each treatment.
ï¿½ Multivariate analysis of variance (MANOVA), is used when there is more than one response variable

ANCOVA

ANCOVA is an ANOVA model that has a general linear model with a continuous outcome variable (quantitative, scaled) and two or more predictor variables, where at least one is continuous and at least one is categorical (nominal, non-scaled).

It is a merger of ANOVA and regressions for continuous variables and has a covariate. Its interpretation depends on certain assumptions about the data entered into the model.

The relationship between the dependent and independent variables must be linear in parameters. It evaluates whether population means that has been adjusted for differences on covariates differ on the levels of dependent variables.

The effects of a third variable are statistically controlled out in ANCOVA and any number of independent variables and CVs can be used to create one-way, two-way, and multivariate ANCOVA designs.

ANCOVA assumes that covariates must be linearly related to the dependent variables and that they must have homogeneity of regression effect. It assumes that the covariates should be unrelated to the independent variables and they should not be overly correlated with one another.

Summary

1. ANOVA are statistical models and techniques used to observe the difference between variables while ANCOVA is an ANOVA model.
2. ANOVA uses both linear and non linear models while ANCOVA uses a general linear model.
3. ANCOVA has a covariate while ANOVA does not.

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