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## Multiple regression

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### Description

Multiple regression is used to explore the connection between multiple independent variables that act on a single dependent variable. It can be used to predict someone's score on one variable based on their scores on several other variables.

The number of measurements made must be significantly more than the number of independent variables. This should be at least 5:1 and should be more like 10:1 and preferably 40:1.

Interval or ratio data is required for the independent variable. The independent variable can be ratio, interval, ordinal or nominal dichotomous (eg. male/female).

### Interpretation

The R value is a measure of correlation between the predicted and observed values of the independent variable. R-square indicates the proportion of the variance in the dependent variable which is accounted for by the model. An adjusted R-square figure allows a percentage claim, for example if it is 0.45, then it can be said that 45% of the variance is explained by the model.

The beta variable is a measure of how strongly the independent variable influences the dependent variable. It is measured in 'standard deviation' units. A beta of 3 means that a change in one standard deviation in the independent variable leads to a 3 standard deviation change in the dependent variable. Thus the higher the beta, the greater the impact of the dependent variable on the independent variable.

When there is only one independent variable, then beta is equivalent to a correlation coefficient. When there are multiple dependent variables, beta shows the contribution of each.

### Discussion

The great value of multiple regression is in the ability to predict one score based on multiple other scores. In multiple regression, an independent variable is often called a predictor and the dependent variable is called the criterion.

Ideally, the independent variables are independent of one another, although this is seldom completely true. When independent variables correlate, it is said that there is multicollinearity, or just collinearity.

'Logistic regression' can be used for dichotomous independent variables.

Multiple regression is different from [ANOVA](#) as it studies natural values rather than deliberately manipulating the independent variables. As such is it more observational than classically experimental.

See also:  
[ANOVA](#), [Factor Analysis](#)

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