Make Better Predictions With Powerful Regression Procedures

Use SPSS Regression Models' wide range of nonlinear modeling procedures to apply more sophisticated models to your data. For example, you can use SPSS Regression Models for:

- Market research—Study consumer buying habits
- Medical research—Study response to dosages
- Loan assessment—Analyze good and bad credit risks
- Institutional research—Measure academic achievement tests
- And much more

Predict categorical outcomes with more than two categories

With Multinomial logistic regression (MLR), you are free from constraints such as yes/no answers. For example, you can model which factors predict if the customer buys product A, product B, or product C.

Easily classify your data into two groups

Use binary logistic regression to predict dichotomous variables such as buy or not buy and vote or not vote. This procedure offers stepwise methods to select the main and interaction effects that best predict your response variable.

Control your model

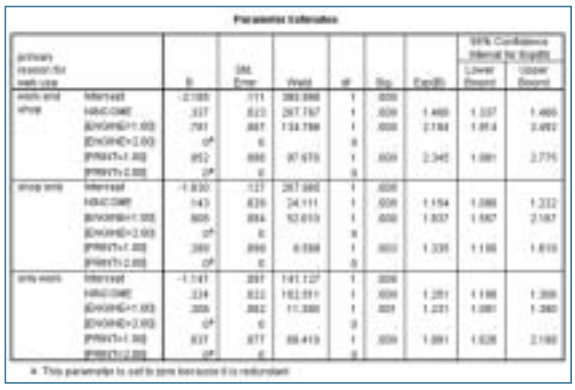
Have more control over your model and your model expression using constrained and unconstrained nonlinear regression procedures. These procedures provide two methods for estimating parameters of nonlinear models. The Levenberg-Marquardt algorithm analyzes unconstrained models. The sequential quadratic programming algorithm enables you to specify constraints on parameter estimates, provide your own loss function, and get bootstrap estimates of standard errors.

Use alternative procedures to meet assumptions

When your data do not meet the statistical requirements for ordinary least squares, use weighted least squares (WLS) and two-stage least squares (2SLS). Give more weight to measurements within a series using WLS. 2SLS helps control for correlations between predictor variables and error terms that often occur with time-based data.

Find the best stimuli

Perform PROBIT and LOGIT response modeling to analyze the potency of responses to stimuli, such as medicine doses, prices, or incentives. PROBIT evaluates the value of the stimuli using a LOGIT or PROBIT transformation of the proportion responding.



The multinomial logistic regression procedure predicts a categorical outcome such as "primary reason for Web use." The categories shown in this example are: a) work only, b) shopping only, c) both working and shopping, and d) neither (reference category). Search engine use was a better predictor of "shopping only" than print media use. Search engine users were 1.837 times more likely to use the Web for "shopping only" purposes than were non-users of search engines.

Features

Procedures

Multinomial logistic regression

Regresses a categorical dependent variable with more than two categories on a set of independent variables

- Control the values of the algorithm-tuning parameters using the CRITERIA subcommand
- Include interaction terms
- Customize hypotheses by directly specifying null hypotheses as linear combinations of parameters by using the TEST subcommand
- Specify the dispersion scaling value by using the SCALE subcommand
- Build equations with or without a constant
- Use a confidence interval for odds ratio
- Save the following statistics: Predicted probability, predicted response category, probability of the predicted response category, and probability of the actual response category
- Run approximately 10 times faster than versions 10.0 and earlier
- Specify the reference category in the dependent variables
- Handle very large problems
- Find the best predictor from dozens of possible predictors using stepwise functionality
  - Find predictors using forward entry, backward elimination, forward stepwise, or backward stepwise
  - Opt to select a rule for effect entry or removal from the analysis
    - Base entry or removal on satisfying the hierarchy requirement for all effects, for factor-only effects, or for satisfying the containment requirement for all effects
    - Optionally, perform entry or removal without satisfying the hierarchy or containment requirement for any effects in the model
- ⊟ Use Score and Wald methods, which help you more quickly reach results if you have a large number of predictors
  - Choose an option for setting the minimum and maximum numbers of terms included in the final model
  - Choose an option for setting the probabilities for variable entry and removal
  - Reach more accurate conclusions using a likelihood ratio-based method
- ▣ Use Akaike information criteria (AIC) and Bayesian information criterion (BIC; also called Schwarz Bayesian Criterion, or SBC) to access model fit

Binary logistic regression

Regresses a dichotomous dependent variable on a set of independent variables

- Use forward/backward stepwise and forced entry modeling
- Transform categorical variables by using deviation contrasts, simple comparison, difference (reverse Helmert) contrasts, Helmert contrasts, polynomial contrasts, comparison of adjacent categories, user-defined contrasts, or indicator variables
- Select criteria for model building: Probability of score statistic for entry, probability of Wald, or likelihood ratio statistic for removal
- Save the following statistics: Predicted probability and group, residuals, deviance values, LOGIT, Studentized and standardized residuals, leverage value, analog of Cook's influence statistic, and difference in Beta
- Export the model using XML

Unconstrained nonlinear regression

- Save predicted values, residuals, and derivatives
- Choose numerical or user-specified derivatives

Constrained nonlinear regression

- Specify loss function options
- Use bootstrap estimates of standard errors

Weighted least squares

- Calculate weights based on source variable and Delta values or apply from existing series
- Select output for calculated weights: Log-likelihood functions for each value of Delta; R, R^2, adjusted R^2, standard errors, analysis of variance, and *t* tests of individual coefficient for Delta value with maximized log-likelihood function

Two-stage least squares

- Use structural equations and instrumental variables
- Set control for correlations between predictor variables and error terms

PROBIT

Dose response analysis and related models, and LOGIT response models

- Transform predictors: Base 10, natural, or user-specified base (including none)
- Allow for natural response rate estimates or specify them yourself
- Use algorithm control parameters: Convergence, iteration limit, and heterogeneity criterion probability
- Select from the following statistics: Frequencies, fiducial confidence intervals, relative median potency, test of parallelism, plots of observed PROBITs, or LOGITs

System requirements

- Software: SPSS Base 13.0
- Minimum free drive space: 1MB
- Other system requirements vary according to platform

Features subject to change based on final product release. ☐ *Symbol indicates a new feature.*