Demo: Fitting Multiple Linear Regression Models

In this example, we use the Cleaning data and fit a multiple linear regression model for Removal with three predictors, OD, ID, and Width.

Recall that when we fit a linear model with one response and one predictor, we use either the Graph Builder or the Fit Y by X platform. Graph Builder is used more for exploratory purposes, whereas Fit Y by X provides more comprehensive and formal analysis options.

To fit a model with more than one predictor at a time, we use Fit Model from the Analyze menu.

We'll select Removal as the Y variable.

Then we'll select OD, ID, and Width, and click Add to add the terms as model effects.

The default personality, or analysis type, is standard least squares. JMP will use the method of least squares to fit the regression model.

Note that Fit Model is a very flexible modeling platform, with many different analysis options. These include stepwise and logistic regression, which we'll discuss later in this module, and generalized regression, which we'll introduce in the Predictive Modeling module.

You can use the Emphasis option to specify the type of output that JMP provides when the model is run. The default emphasis for regression models with three predictors is Effect Leverage.

We select Run to fit the regression model.

The Actual by Predicted plot provides a summary of our analysis. This is a plot of our actual response values against the values predicted by our model.

The horizontal line is the overall mean, and the diagonal line is our predicted mean. The bands are confidence bands for the predicted mean.

The coefficients in our model are reported in the Parameter Estimates table.

Recall that JMP provides many options under the top red triangle. We'll select Show Prediction Expression from the Estimates menu. This displays the equation for our fitted regression model, making it easier to understand the model coefficients.

Let's look at the model fit statistics we introduced in the previous video. Root mean square error, RSquare, and RSquare Adjusted are reported in the Summary of Fit table.

Recall that our initial model, with only OD, had a root mean square error of 1.12 and an RSquare of 0.84. The fit statistics for our multiple linear regression model with OD, ID, and Width are nearly identical.

So, the model with all three predictors doesn't explain any additional variation in Removal than our simple model with just OD.

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