

Demo: Selecting Variables Using Effect Summary

In this video, we see how to use the Effect Summary table for variable selection using the Impurity data.

We'll start by fitting a full model, with interactions, using Fit Model.

First, we'll select Impurity as the Y.

Then, we'll select Temp through Shift, and select Macros, and then Factorial to Degree. This adds all main effects and two-way interactions as model effects.

We'll use the default personality and click Run.

The Effect Summary table shows the terms in the model, in ascending order of p-value.

We can use the Effect Summary table to slowly remove nonsignificant terms from the model, one at a time, starting from the bottom.

We can't remove Reaction Time because it is involved in two-way interactions that are still in the model.

As we slowly remove terms, the p-values for the terms in the model all update, along with all the statistical output. We'll use a p-value threshold of 0.05. Our final reduced model has all five main effects and three interactions.

Catalyst Conc and Temp are the most significant, followed by the interaction between Catalyst Conc and Reaction Time.

Reactor is significant, indicating that there is a difference in impurity between the three reactors. There is also a significant interaction between Reactor and Shift, indicating that the reactors perform differently, relative to Impurity, on the different shifts.

Let's explore this model using the Prediction Profiler. Ignoring the other factors, lower values of Temp and Catalyst Conc have lower impurity. At these values, if we change Reaction Time, we don't see much of a change in Impurity. And Shift 1 has the lowest value of Impurity on Reactor 2, and Shift 2 has the lowest value of Impurity on Reactor 1.

We explore the implications of these findings in the next "Think About It" exercise.