Comparing Regression and ANOVA

Recall the cubic model that you fit to the **mydata.paper** data set. When a linear regression model is fit to the data, you are assuming that the mean of the dependent variable (**Strength**) at each value of the independent variable (**Amount**) follows a mathematical relationship. This relationship is estimated and presented as a line on the graph. You are interested in estimating the nature of the relationship (the slopes), whether this relationship is significant (slopes not equal to zero), and to what extent the variations in the data are explained by your model. Analysis of variance, or ANOVA, is a statistical technique that is used to compare the means of two or more groups of observations or treatments. You should have a continuous dependent variable and one or more discrete independent variables (also called predictor or explanatory variables). They separate your data into several groups.

You want to evaluate the effects of these categorical variables to see whether they explain the variations in the response variable. You can perform a one-way ANOVA or an *n*-way ANOVA. The *n* can be replaced with the number of categorical predictor variables in your model. When you fit an ANOVA model to the paper strength example, the mean of the dependent variable (**Strength**) at each value of the independent variable (**Amount**) is also computed. However, no mathematical relationship is defined between these average values and the values of the independent variable. As a matter of fact, the independent variable might not be on an interval scale. The independent variables can be numeric and character variables, and they can be on a nominal or ordinal scale. When this is the case, a regression model might not be appropriate because the mathematical relationship between the mean of the dependent variable and the independent variables might not be defined. The independent variables group your data into different groups. The question of interest is whether the group means are equal to each other.
