

## 12.1: Introduction to the Lesson

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In module 5, you learned that an effect of multicollinearity in your regression model is that the estimated coefficients of the model have high variability. This fact means that the removal or addition of a single observation to your data set could drastically change the estimated model and the predictions from the model. In the guided question set in module 5, that outcome happened when you were trying to predict the seat position of a driver based on measurements on various body parts of the driver. Because the measurements on various body parts are typically highly correlated, this change in the data set led to the regression model being unstable.

One way to deal with this instability in your regression model is to use shrinkage methods. In this lesson, you will learn about two shrinkage methods, ridge regression and lasso. These methods differ from least-squares regression in that the assumption of unbiased estimators is no longer needed. The estimators in ridge regression and lasso are biased, but typically reduce the variance of the estimators so that ridge estimators may perform better than least-squares estimators when predictors are linearly dependent.

PCA is a method of finding linear combinations of predictors that are able to explain most of the variance in the data, as well as being orthogonal to each other. PCA seeks to reduce the number of predictors needed by using a smaller number of linear combinations. Improvement in the predictive ability of the model may be achieved.