

## Covariates – bringing them into the model:

In regression, the model is estimated conditioned on the covariates. Their means, variances, and covariances are not model parameters and no distributional assumptions are made about them. You can find their means, variances, and covariances in the descriptive statistics for the data set. Any observation that has a missing value on one or more observed exogenous covariates is eliminated from the analysis. To avoid this, the covariates can be brought into the model by mentioning their means, variances, and/or covariances in the MODEL command. This can be done for maximum likelihood estimation and Bayes. It should not be done for weighted least squares estimation. When this is done, the means, variances, and covariances of the covariates become model parameters and distributional assumptions are made about them. This is not innocuous, however, especially when there are binary covariates. Pros and cons of this approach are discussed in Chapter 10 of our book *Regression and Mediation Analysis using Mplus* as well as at the end of our Short Course Topic 11 video and handout on our website.