



## There are no degrees of freedom to estimate sigma\_squared

The message

“There are no degrees of freedom to estimate sigma\_squared. Set sigma\_squared to a constant, or delete one or more of the random effects from the model”

indicates that the model as specified implies the estimation of more parameters than is possible to do with the available data. For example, if you have three data points nested within each level-2 unit and you allow two variables to vary randomly at level-2, the level-2 tau matrix will have three non-duplicated elements. The number of random parameters at level-2 is equal to the number of data points/degrees of freedom and no "data remains" for the estimation of the remaining random parameter  $r$  at level-1.

In such a case, only one random effect can be accommodated at level-2. Either no random slope should be requested or, if the random slope is of specific interest, the random parameter associated with the intercept should be removed. Alternatively, comparison of two models, one with a random intercept only and a model with only a random slope should be considered. The model with the lowest deviance statistic would be preferable.