



## The model should be respecified...

For some models, the message

“The model should be respecified. One (or more) of the random effects must be either deleted from the model or treated as fixed.”

This happens when the iteration process forms an unusable (not positive-definite) tau (*i.e.*, variance-covariance matrix ) where usually one of the diagonal elements has gone to effectively 0, or one or more of the correlations of tau falls outside  $-1 \leq x \leq 1$ . In practice, the latter is more likely.

If this happens, the output should give one some indication which variables are causing the trouble, and one of them should be fixed, or removed from the analysis entirely.

Check the elements of the Tau matrices at all levels of the hierarchy. Small diagonal elements in these matrices indicate that negative variances may have been found, and that attempts by the program to fix this (specified on the **Iteration Settings** dialog box accessed via the **Other Settings** menu) may have been unsuccessful. Intervention by the program in such cases is due to the use of the EM algorithm for estimation in HLM2/HLM3, and the unrestricted sections of HMLM/ HMLM2. In the case of special models fitted using HMLM/ HMLM2, (homogenous etc.), the Fisher accelerator is used and, if a negative variance is encountered, the program will exit with a message concerning the problem encountered during estimation.

If this is the cause of the problem, you may want to fix the slope associated with the problem element of tau, in other words to assume that a common, fixed slope over units is adequate. To do this, remove the random coefficient from the slope in question.