

## HLM is unable to estimate covariance components for the model specified

### Description

HLM is unable to estimate covariance components for the model specified.

It is likely that either

1. one or more of the variance components is very close to zero and the reliability of the associated random effect is also close to zero, or
2. there is a collinearity or multicollinearity among the random effects. In this case, the estimated correlations among the random effects would be close to 1.0, or
3. one or more of the OLS level-1 regressions produced extreme values.

### Solution

- To check option (1), the tau-matrix printed in the output file must be examined. Small values on the diagonal of this matrix indicate the variable causing this problem.
- The information needed to check option (2) follows directly after the tau-matrix, where the tau-matrix is given in the form of a correlation matrix.
- Review the OLS estimates for all groups to find problems associated with option (3). If this is the source of the problem, use the option to manually reset the tau(0) matrix on the **Iteration Settings** dialog box accessed via the **Other Settings** menu.

Deciding which level-1 effect to keep random and which to change to non-randomly varying should be based on theory and research purposes.