Construct the MLM file from MDM file

Once the MDM file is constructed, it can be used as input to construct a MLM command file. Model specifications are to be conducted after opening an MDM file. The established model then can be saved by the following steps:

1. Open the **File** menu from the **WHLM** main window, choose **Save As** to open a **Save command file** dialog box.
2. Enter a command file name (for example, **hsb1.mlm**).

Steps of model specification for the five modules

HLM2

In HLM2, model specification via the Windows mode has three steps:

1. Specify the level-1 model, which defines a set of level-1 coefficients to be computed for each level-2 unit.
2. Specify a level-2 structural model to predict each of the level-1 coefficients.
3. Specify the level-1 coefficients to be viewed as random or non-random.

See HSB data example 1: Constructing the command file for a detailed illustration of the procedure.

HLM3

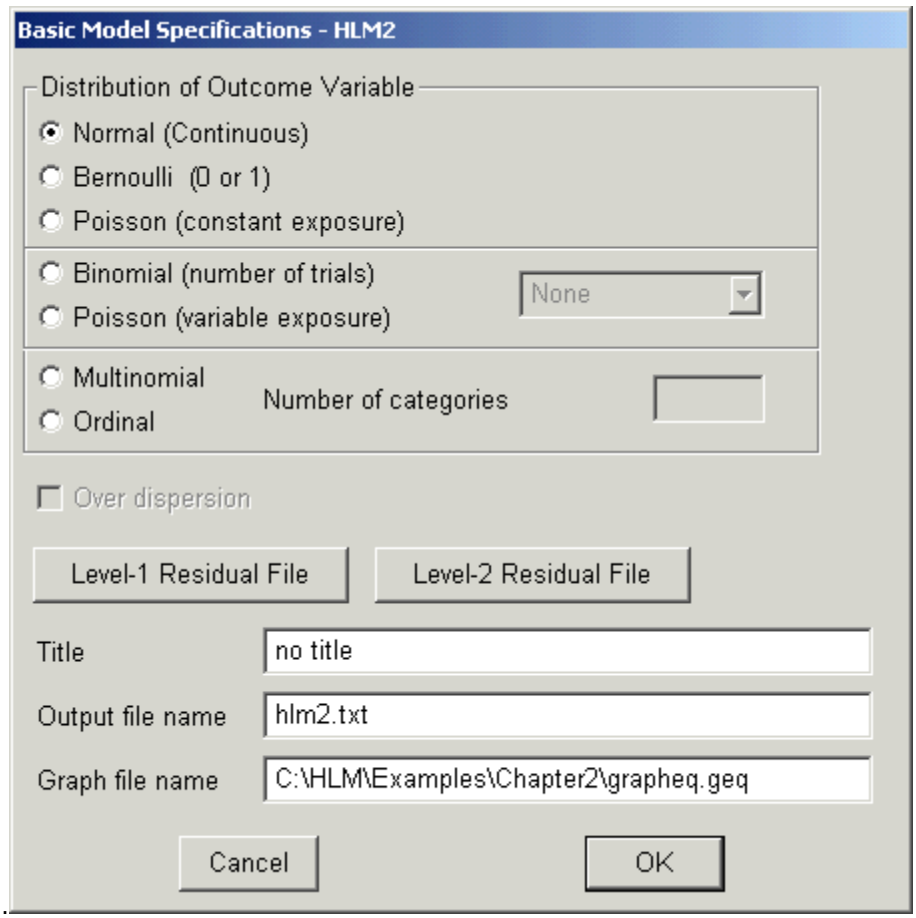
In HLM3, Model specification via the Windows mode has five steps:

1. Specification of the level-1 model, which defines a set of level-1 coefficients to be computed for each level-2 unit.
2. Specification of the level-2 prediction model. Each level-1 coefficient – the intercept and/or the slope(s) – becomes an outcome variable.
3. Specification of level-1 coefficients as random or non-random across level-two units.
4. Specification of the level-3 prediction model. Each level-2 coefficient becomes an outcome, and we can select level-3 variables to predict variation among level-2 units.
5. Specification of the level-2 coefficients as random or non-random across level-3 units.

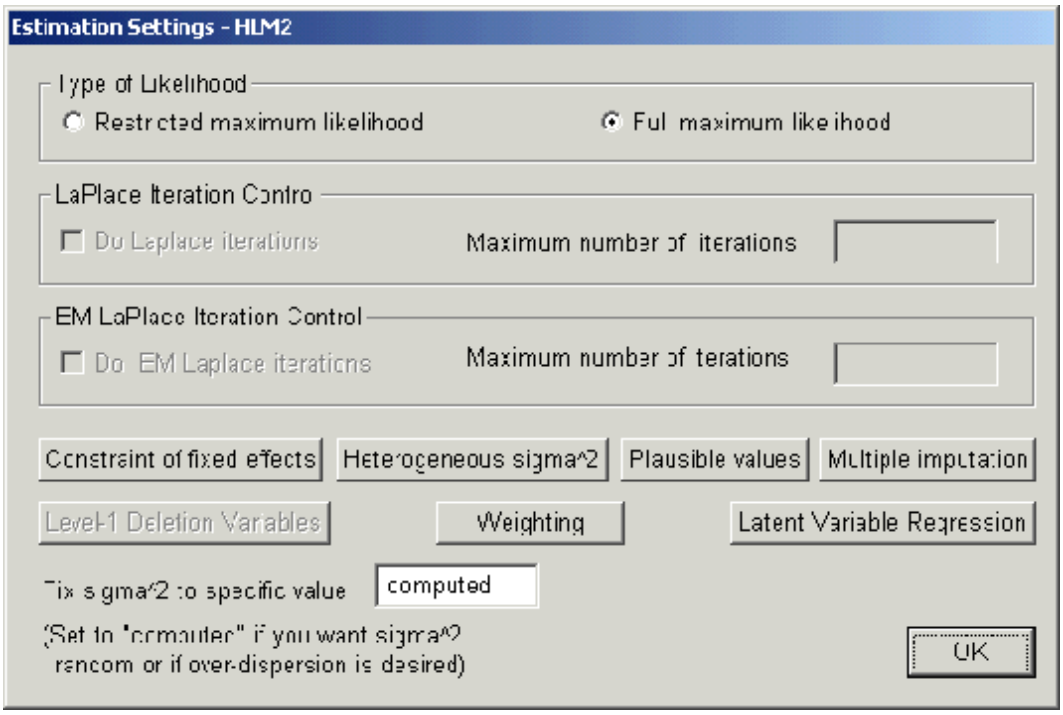
See EG data example 1: Constructing the command file for a detailed illustration of the procedure.

HGLM

The mechanics of model specification for HGLM models are generally the same as in linear analyses with the following differences: Six types of nonlinear analysis are available. With Windows execution, these options are displayed in the **Basic Model Specifications – HLM2** dialog box as shown below. This dialog box is accessed by clicking the **Outcome** button at the top of the variable list box to the left of the main HLM window. There are two choices for dichotomous outcomes, two for count outcomes, one for multinomial outcomes, and one for ordinal outcomes.

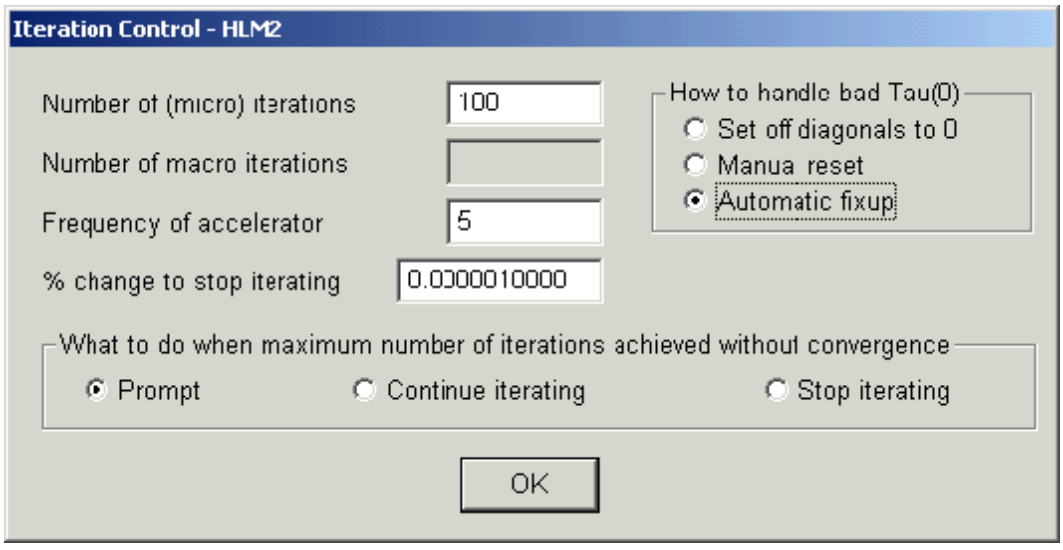


Highly accurate Laplace approximation to maximum likelihood option is available for 2-level Bernoulli models through the **Estimation Settings – HLM2** dialog box as shown below.



If desired, an over-dispersion option is available for binomial and Poisson models. This option is not available with Laplace (see **Estimation Settings – HLM2** dialog box shown above). To specify over-dispersion, set the σ^2 value to **computed** in the **Estimation Settings – HLM2** dialog box.

The nonlinear analysis is doubly iterative so the maximum number of macro iterations can be specified as well as the maximum number of micro iterations. Similarly, convergence criteria can be reset for macro iterations as well as micro iterations. The number of iterations and method of estimation is set through the **Iteration Control – HLM2** (or HLM3) dialog box.



See Thai data example 1: Creating the command file for a detailed illustration of the procedure.

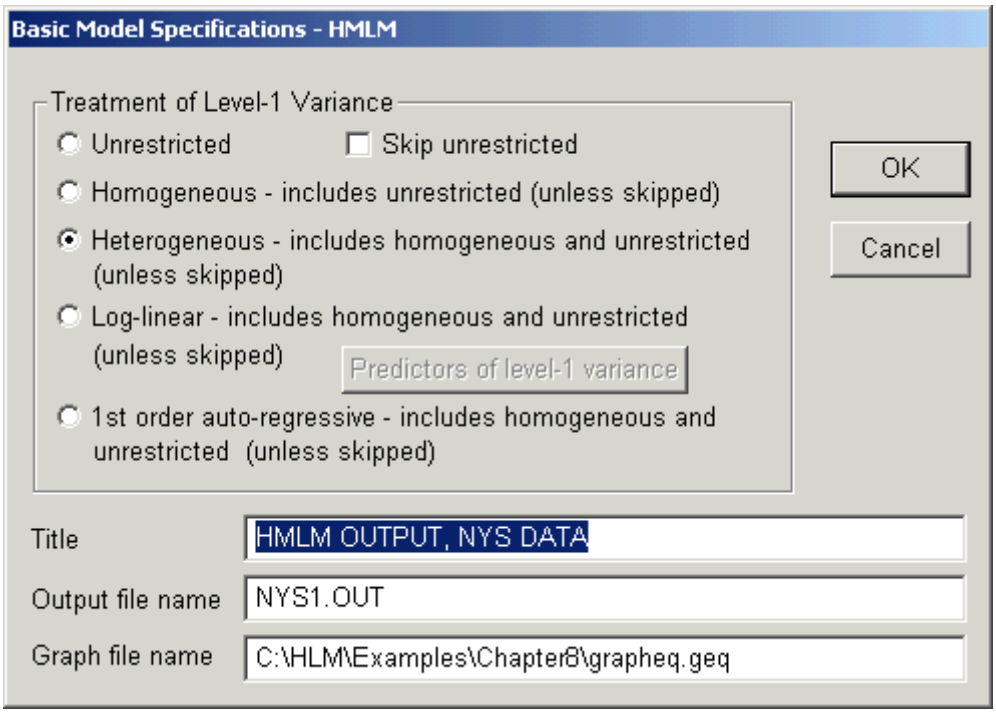
HMLM

The steps involved are similar to the ones for HLM2. It is necessary to specify

1. the level-1 model,
2. the level-2 structural model, and
3. the level-1 coefficients as random or non-random.

See NYS data example 1: Creating the command file for a detailed illustration of the procedure.

Under HMLM, level-1 predictors having random effects must have the same value for all participants at a given occasion. If the user specifies a predictor not fulfilling this condition to have a random effect, such coefficients will be automatically set as non-random by the program. Furthermore, an extra step for selecting the covariance structure for the models to be estimated is needed. The following figure shows the dialog box where the covariance structure for the model can be selected.



HMLM2

The steps involved are similar to the ones for HMLM outlined above and for HLM3 as described previously. The user specifies

1. the level-1 model,
2. the level-2 structural model, and
3. the level-1 coefficients as random or non-random.

In addition, the user selects the covariance structure for the models to be estimated, as the in the case of HMLM.

HCM2

Model specification for a HCM2 model has three steps:

1. Specification of the level-1 or within-cell model.
2. Specification of the row- or column-factor prediction model.
3. Specification of the residual row, column, and cell-specific effects as random or non-random, the effects associated with row-specific predictors as varying randomly or fixed over columns, and the effects associated with column-specific predictors as varying randomly or fixed over rows.

See Scotland data example 1: Constructing the command file for a detailed illustration of the steps.