

In some Bayesian analyses, Mplus prints a message that a random walk algorithm is needed using the option GIBBS(RW). This, however, is frequently due to a model mis-specification of a covariance matrix so that it isn't block diagonal as required. You can use TECH1 to check this. Here is an example of a covariance matrix that is not block diagonal, in this case the Psi factor covariance matrix:

$$\text{Psi} = \begin{matrix} & & X \\ X & X & \\ & X & 0 & X \end{matrix}$$

The 3 rows of Psi correspond to factor 1, factor 2, and factor 3 where X means that the element is free to be estimated and 0 means that the element is fixed. To make Psi block diagonal, the last row should either have the first X removed or the 0 changed to an X. This means that factor 3 should either be uncorrelated with factor 1 or correlated with factor 2.

More generally, the block diagonal concept can be visualized with the help of triangles. In the above example, the first 2 rows form a triangle consisting of 3 Xs and no 0s. This means that the first 2 factors form a block-diagonal covariance matrix part. If the first X in row 3 is removed, a second triangle can be considered formed by the X itself in the 3rd position of row 3. This means that there are 2 triangles that together form a block-diagonal covariance matrix. If the 0 in row 3 is changed to an X, a single triangle consisting of all Xs is formed by all 3 rows consisting of 6 Xs. This means that the whole covariance matrix is block-diagonal.

The following is a useful trick to be able to view TECH1 despite the Fatal error that stops the analysis. Before the running, use the Mplus menu to click on the setting: Get diagram without analysis (data). Then run. Don't forget to reset to the usual setting Do analysis with diagram.

As an aside, Mplus doesn't allow an IW prior for a covariance matrix with the random walk (RW) specification. But you can switch to normal priors.