Does Mplus automatically correlate the independent variables in a latent variable model?

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Mplus is a statistical software program that is commonly used for latent variable modeling. In a latent variable model, the relationship between observed variables is explained by underlying latent variables. One question that may arise when using Mplus is whether the program automatically correlates the independent variables in a latent variable model. The answer to this question is yes. Mplus automatically calculates the correlations between all independent variables in a latent variable model. This is done to account for potential relationships between the independent variables that may affect the interpretation of the model. Therefore, users of Mplus can be assured that the program will account for potential correlations between independent variables in their latent variable models.

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In this simple example we have an observed dependent variable (y), predicted by latent variables (x1, x2 and x3). Each of the three latent variables is associated with a set of observed variables. Assume that all of the variables are continuous. To fit this model we use the Mplus input file below. The Model section of the input file contains the commands for estimating the latent variables (e.g., x1 by a1 a2 a3). The Model section of the input also contains the command y on x1 x2 x3, which specifies that y should be regressed on the three x variables. Note that we have not specified correlations between the x variables. We have included tech1 under Output, this will allow us to see a listing of all parameters estimated in the model. The dataset can be downloaded here.

Data:
File is D:datamydata.dat ;
Variable:
Names are a1 a2 a3 b1 b2 b3 c1 c2 c3 y female;
Analysis:
Type = general ;
Model:
x1 by a1 a2 a3;
x2 by b1 b2 b3 b4;
x3 by c1 c2 c3;
y on x1 x2 x3;
Output:
tech1;

Below is the output for this model. Some of the output has been omitted, the entire output can be viewed by clicking here. Looking at the output below, under MODEL RESULTS we see the path loadings for the latent variables X1, X2, and X3 (indicated with the BY). Next the coefficients for the regression of y on the three latent variables (X1, X2 and X3). Next we see the correlations between the three latent variables, first X1 with X2 and X3, and then X2 with X3 (indicated by WITH). Mplus included the correlations between the

latent independent (predictor) variables, without us having to specifically request them (i.e., by default). It is worth noting that had we run just the measurement portion of the model, i.e., omitting the y on x1 x2 x3 but leaving the model otherwise the same, Mplus would have correlated the three latent variables by default.

MODEL RESULTS

Two-Tailed
Estimate S.E. Est./S.E. P-Value

X1 BY
A1 1.000 0.000 999.000 999.000
A2 0.937 0.023 40.581 0.000
A3 0.773 0.027 29.137 0.000

X2 BY
B1 1.000 0.000 999.000 999.000
B2 1.182 0.109 10.859 0.000
B3 0.070 0.020 3.415 0.001
B4 0.026 0.010 2.631 0.009

X3 BY
C1 1.000 0.000 999.000 999.000

C2 2.192 0.316 6.933 0.000

C3 1.814 0.250 7.249 0.000

Y ON

X1 0.019 0.008 2.376 0.018

X2 0.041 0.011 3.646 0.000

X3 1.377 0.228 6.033 0.000

X2 WITH

X1 0.018 0.096 0.190 0.850

X3 WITH

X1 -0.003 0.009 -0.386 0.699

X2 0.012 0.007 1.809 0.070