

## Mplus Discussion Question

posted on Wednesday, March 02, 2011 - 10:53 am

Dear Drs. Muthen,

I have a question about the model Mplus estimates when running an LTA with covariates. Based on my reading of the Nylund (2007) dissertation, the coefficients for the multinomial regression that occurs when a covariate is included in the model are for the latent status at a given time point. Stated otherwise, it is the effect of the covariate on latent class/status membership at a given time point. Other programs (e.g., PROC LTA, Collins & Lanza, 2010), provide the effect of the covariate on the transitional probabilities. Thus, in Mplus we get the effect on class membership at a given time point for a covariate, whereas in PROC LCA and others it is the effect of transitioning in to a given class membership at a given time point. Am I correct in the way I am distinguishing these effects and the model I understand Mplus to be running? If so, is there a way to make it so that Mplus runs the model where the effect of the covariate on transitional probabilities is tested?

Thank you in advance for your help.

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Bengt O. Muthen posted on Wednesday, March 02, 2011 - 3:35 pm

Mplus does allow for transition probabilities to vary as a function of a covariate.

Essentially such a phenomenon is an interaction between the latent class variable say  $c_1$  at time 1 and the  $x$  covariate in their influence on the latent class variable  $c_2$  at time 2. As usual, an interaction can be viewed as a moderated effect, either by (1)  $c_1$  moderating the effect of  $x$  on  $c_2$  or (2) by  $x$  moderating the effect of  $c_1$  on  $c_2$ . Estimates from either approach can be used to compute estimates from the other approach. In Mplus, the transformation can be done in Model Constraint.

Approach (1) is shown in UG ex 8.13 with the broken line from  $c_1$  to the arrow from  $x$  to  $c_2$  indicating the interaction through  $c_1$  moderating  $x$ 's influence on  $c_2$ .

Approach (2) is shown in UG ex 8.14, where  $c$  takes the role of  $x$ . The  $c$  variable can be latent as shown in that example (this is not possible in proc lta as far as I understand), or it can be observed-categorical. The observed case is handled by using the Knownclass approach making the observed  $x$  identical to the latent class variable. An example of this approach is given in the Topic 6 handout of 8/17/2009, slides 48-50. That's an example where  $x$  is a binary treatment/control variable in an intervention. Various intervention effects of interest are expressed using new parameters defined in Model Constraint.

Approach (2) is used in proc LTA and does not use a latent  $c$ . An illustration is given in

the Lanza-Collins (2008) article in Dev Psych. Their x is binary, representing past-year drunkenness. This model can also be done in Mplus.

I should add that a more advanced way of doing approach (2) with a continuous covariate x in Mplus is to use the Constraint=x option in the Variable command. This is then applied to the c2 on c1 regression. For an example, look for quantitative trait locus in the index of the UG.