

Standardized estimates with random slopes

Standardization with random slopes is discussed in

Schuurman et al. (2016). How to compare cross-lagged associations in a multilevel autoregressive model. *Psychological Methods*, 21, 206-221.

The authors recommend “within-person” standardization.

This is presented in the Mplus Short Course Topic 12, part 1 by Ellen Hamaker. See slide 34 where it says:

“Standardization in multilevel models is a **tricky issue**.

Schuurman, Ferrer, Boer-Sonnenschein and Hamaker (2016)

discuss four forms of **standardization in multilevel models**,

using:

_ total variance (i.e., grand standardization)

_ between-person variance (i.e., between standardization)

_ average within-person variance

_ within-person variance (i.e., within standardization)

Conclusion: last form is most meaningful, as it **parallels standardizing when N=1**.

Standardized fixed effect should be the **average standardized**

within-person effect.”

This is also described in McNeish & Hamaker (2019). A Primer on Two-Level Dynamic Structural Equation Models for Intensive Longitudinal Data in Mplus:

“To interpret the magnitude of the cross-lagged effects, we consider the standardized results that Mplus provides, which are based on standardizing the parameters per person first, and then taking the average of these. This approach was proposed in Schuurman et al. (2016) and takes into account that individuals have different crosslagged parameter values, *and* that they may have different variances. The latter stems from the fact that the variance of a variable in the VAR(1) model is a function of the lagged parameters, which are allowed to differ across individuals.”

Mplus presents within-person standardization when using Estimator=Bayes. Standardization in the context of random slopes is not available in Mplus with ML. It is more difficult to do using ML, even for estimates for fixed effects. Following is a technical note related to Bayes standardization with DSEM:

<http://www.statmodel.com/download/FAQ-DSEMStand.pdf>