## Appendix A – Formal specification of the Latent Growth Mixture Model

In this Appendix we formally introduce the statistical model used in our paper.

The first part of the model can be described as 

 (1)

for *i =* 1…*n* individuals, where is a  random vector for *t* = 1…*T* occasions. Furthermore,  is a  random vector containing *q* continuous latent variables (i.e., the latent growth factors). Then, is a  matrix of factor loadings, and  is a  vector of residuals assumed to be multivariate normally distributed with. The growth trajectory of the LGM is determined by y and **.** If we assume quadratic growth with a random intercept , a random slope parameter , and a random quadratic parameter denoting deviance from linearity , which are estimated for individuals *i*, then  and . To identify the LGM, in our paper we specifieda  matrix with 1s in the first column, in the second column, and  in the third column. We assume

 (2)

with  being the fixed effects and  being a  random vector . Furthermore we assume  and  are independent.

The first part of the model can be extended with a mixture component, namely that  follows a mixture of normal distributions, where each mixture component represents a latent class with its own growth trajectory. The parametric finite mixture model can be expressed as

 (3)

where , where , are component LGM densities forlatent classes,are the unknown class probabilities with  and. Furthermore, vary across latent class, but in our examples we set and  equal across classes; this is also the default setting in the software we used in our paper, M*plus* (L. K. Muthén & Muthén, 2012). Note that we assume . For individual *i* class membership can be expressed by class *ci*= *k* with *k*=1,…,*K*. When the most likely latent class membership is used instead of *ci*, a *K*-dimensional component label can be used with  where the *k*th element is defined 0 or 1 according to whether ***y*i** comes from the *k*th class, which follows a multinominal distribution with the density function of vector being

. (4)

The unknown parameters in our model are class sizes, denoted by  for *k* number of classes, and

. (5)

Furthermore, and  is specified as

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