Online Appendix

The sample M*plus* syntax illustrates how to estimate a two –class shared parameter mixture model, including how to obtain aggregate point estimates and standard errors for the growth parameters.

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TITLE: Appendix Code
DATA: file=yourdata.dat;
VARIABLE: names are id y0 y1 y2 y3 y4 y5 y6 y7 y8 y9
summary x0 x1; missing=.;
classes=class(2);          !Change if increasing or decreasing number of classes
ANALYSIS:
coverage=0;                !Allows missing data
starts=100 10;             !More random starts lead to more stable estimates (Hipp & Bauer, 2006)
type= mixture;
MODEL:
%OVERALL%
i s | y0@0 y1@1 y2@2 y3@3 y4@4 y5@5 y6@6 y7@7 y8@8 y9@9;
[y0-y9@0];
y0-y9(1)*;                 !Freely estimate homogenous item error variances. They are fixed to equality.
                                        This constraint may be relaxed. It is possible to add
                                        residual correlations if necessary.
i* (wvarint);                           !Save within-class intercept variance.
s* (wvarslp);                           !Save within-class slope variance.
i with s* (wcov);                       !Save within-class covariance.
[s*]; [i*];
[summary*];
i on x0 x1; s on x0 x1;
summary on x0 x1;
summary with i@0;  summary with s @0;   !Conditional independence
[Class#1] (logit1);                     !Add more class intercepts as number of classes
                                        increases. Save information into "logit1" to calculate
                                        class proportions using model constraints.
%Class#1%
[i] (a01);                 !Class-specific fixed intercept. Save for model constraint.
[s] (a11);                 !Class-specific fixed slope. Save for model constraint.
[summary];                 !Missing data pattern varies by class
%Class#2%
[i] (a02);                 !Class-specific fixed intercept. Save for model constraint.
[s] (a12);                 !Class-specific fixed slope. Save for model constraint.
[summary];                 !Missing data pattern varies by class
MODEL CONSTRAINT:
NEW(p1 p2 mba mbb );
p1 = exp(logit1)/(exp(logit1)+1);       !Compute class proportion. Add terms in denominator
                                        +(exp(logit2)... as number of classes increase.
p2 = 1-p1;                              !The last class proportion is 1- all other class
                                        proportions.
mba = (p1*a01 + p2*a02);                !Delta-method standard errors will be computed. Add
                                        more terms as number of classes increases.
mbb = (p1*a11 + p2*a12);                !Delta-method standard errors will be computed. Add
                                        more terms as number of classes increases.
```

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va=wvarint+p1*p2*(a01-a02)**2;          !Computing aggregate intercept variance.  Add all
                                        possible between-class combinations as number of
                                        classes increases.
vb=wvarslp+p1*p2*(a11-a12)**2;          !Computing aggregate slope variance.  Add all possible
                                        between-class combinations as number of classes
                                        increases.
covab=wcov+p1*p2*(a01-a02)*(a11-a12);   !Computing aggregate intercept-slope covariance. Add
                                        terms as number of classes increases.
```