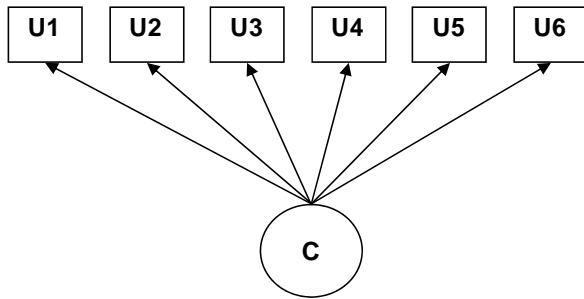


Figures and Mplus Scripts for:

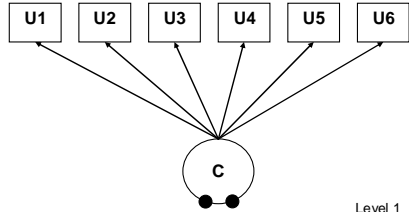
Henry, K.L. & Muthén, B. (2010). Multilevel Latent Class Analysis: An Application of Adolescent Smoking Typologies with Individual and Contextual Predictors. *Structural Equation Modeling: A Multidisciplinary Journal*, 17(2), 193-215.

Latent Class Model with Three Latent Classes (Model 1 in Table 1)

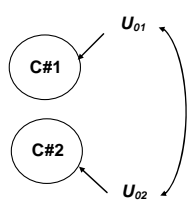


```
USEVARIABLES = EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;  
CLASSES=C(3);  
CATEGORICAL ARE EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;  
ANALYSIS: TYPE = MIXTURE;  
STARTS = 60 30;
```

Multilevel Latent Class Model with Three Level 1 Latent Classes—Parametric Approach (Model 2 in Table 1)



Level 1
Within Community

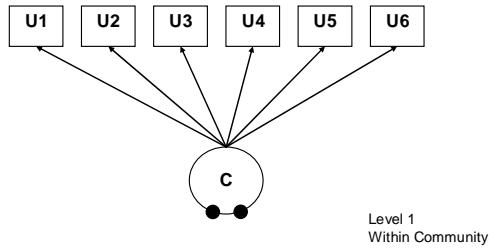


Level 2
Between Community

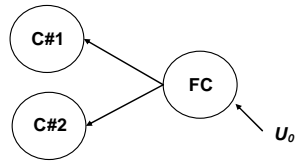
```

USEVARIABLES = EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLASSES=C(3);
CATEGORICAL ARE EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLUSTER=LEAID;
WITHIN=EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
ANALYSIS: TYPE = MIXTURE TWOLEVEL;
STARTS = 20 10;
MODEL:
%WITHIN%
%OVERALL%
%BETWEEN%
%OVERALL%
C#1; C#2; C#1 WITH C#2;
    
```

Multilevel Latent Class Model with Three Level 1 Latent Classes—Parametric approach with Level 2 Factor on Random Latent Class Intercepts (Model 3 in Table 1)



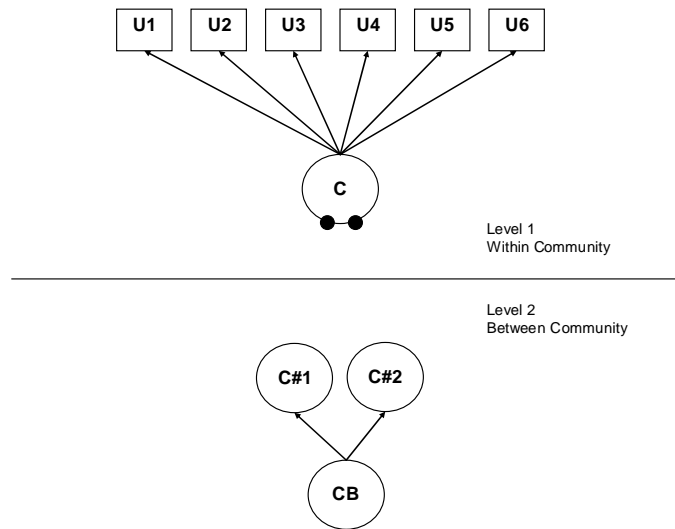
Level 2
Between Community



```

USEVARIABLES = EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLASSES=C(3);
CATEGORICAL ARE EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLUSTER=LEAID;
WITHIN=EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
ANALYSIS: TYPE = MIXTURE TWOLEVEL;
STARTS = 20 10;
MODEL:
%WITHIN%
%OVERALL%
%BETWEEN%
%OVERALL%
FC BY C#1 C#2;
    
```

**Multilevel Latent Class Model with Three Level 1 Latent Classes—Non-parametric Approach
(Model 4a in Table 1)**

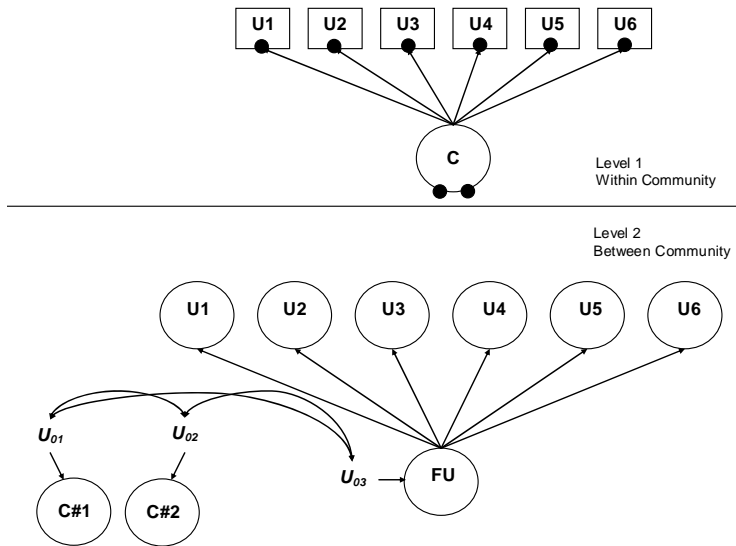


```

USEVARIABLES = EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLASSES=CB(2) C(3);
CATEGORICAL ARE EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLUSTER=LEAID;
BETWEEN=CB;
WITHIN= EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
ANALYSIS: TYPE = MIXTURE TWOLEVEL;
STARTS = 20 10;
MODEL:
%WITHIN%
%OVERALL%
%BETWEEN%
%OVERALL%
C ON CB;
MODEL C:
%WITHIN%
%C#1%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
%C#2%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
%C#3%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];

```

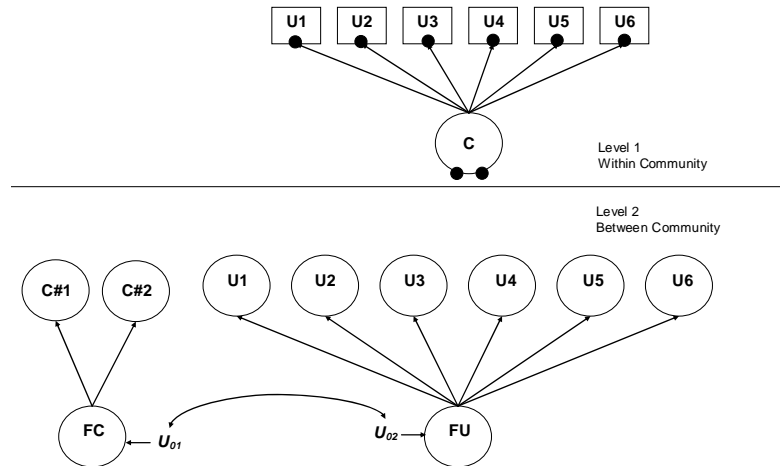
Multilevel Latent Class Model with Three Level 1 Latent Classes—Parametric Approach with Level 2 Factor on Random Latent Class Indicators (Model 5 in Table 1)



```

USEVARIABLES = EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLASSES=C(3);
CLUSTER=LEAID;
CATEGORICAL ARE EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
ANALYSIS: TYPE = MIXTURE TWOLEVEL;
STARTS 20 10;
MODEL:
%WITHIN%
%OVERALL%
%BETWEEN%
%OVERALL%
FU BY EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
[FU@0];
FU WITH C#1 C#2;
C#1; C#2; C#1 WITH C#2;
%C#1%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
%C#2%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
%C#3%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
    
```

Multilevel Latent Class Model with Three Level 1 Latent Classes—Parametric Approach with Level 2 Factor on Random Latent Class Intercepts and Level 2 factor on Random Latent Class Indicators (Model 6 in Table 1)

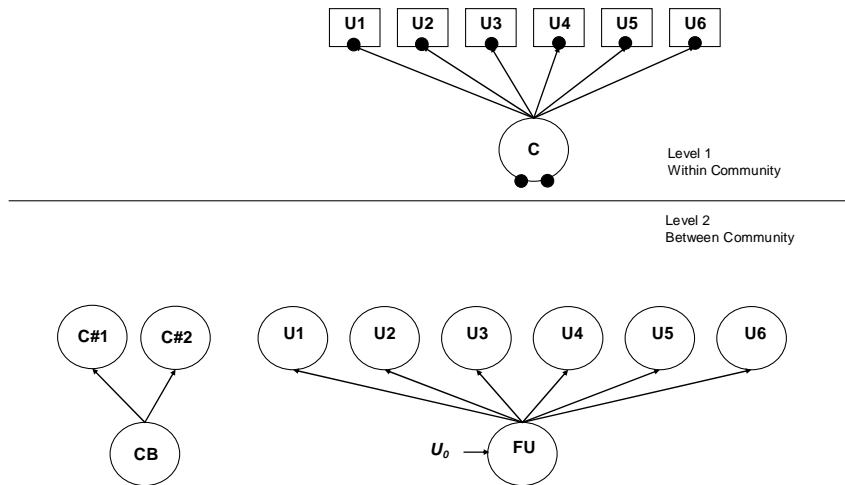


```

USEVARIABLES = EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLASSES=C(3);
CLUSTER=LEAID;
CATEGORICAL ARE EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
ANALYSIS: TYPE = MIXTURE TWOLEVEL;
STARTS 20 10;
MODEL:
%WITHIN%
%OVERALL%
%BETWEEN%
%OVERALL%
FU BY EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
[FU@0];
FC BY C#1 C#2;
FC WITH FU;
%C#1%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
%C#2%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
%C#3%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];

```

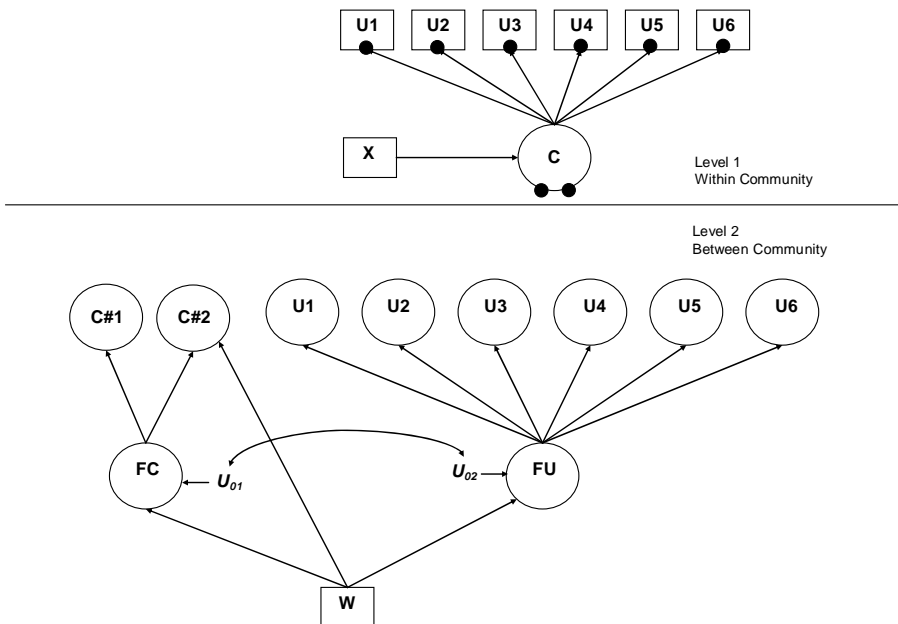
Multilevel Latent Class Model with Three Level 1 Latent Classes —Non-parametric Approach with Level 2 Factor on Random Latent Class Indicators (Model 7a in Table 1)



```

USEVARIABLES = EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLASSES=CB(2) C(3);
CATEGORICAL ARE EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLUSTER=LEAID;
BETWEEN=CB;
ANALYSIS: TYPE = MIXTURE TWOLEVEL;
STARTS = 20 10;
MODEL:
%WITHIN%
%OVERALL%
%BETWEEN%
%OVERALL%
FU BY EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
[FU@0];
C ON CB;
MODEL CB:
%BETWEEN%
%CB#1%
[FU@0];
%CB#2%
[FU];
MODEL C:
%BETWEEN%
%C#1%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
%C#2%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
%C#3%
[EVSMK$1 SMK30TRI$1 SMK30TRI$2 HEAVY$1 HEAVY$2 FRSMK$1 PARSTOP$1 TOBHARM$1];
    
```


Conditional Multilevel Latent Class Model with Three Level 1 Latent Classes—Parametric Approach with Level 2 Factor on Random Latent Class Intercepts and Level 2 Factor on Random Latent Class Indicators (FINAL MODEL)



```

USEVARIABLES = EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM
AGE SCLBOND PERFORM ASPIR PARSCLEX PARSLIV PEERSCL FRDROP
POPLOG TOBGROW POVLEV;
CLASSES=C(3);
CATEGORICAL ARE EVSMK SMK30TRI HEAVY FRSMK PARSTOP TOBHARM;
CLUSTER=LEAID;
WITHIN=AGE SCLBOND PERFORM ASPIR PARSCLEX PARSLIV PEERSCL FRDROP;
BETWEEN=POPLOG TOBGROW POVLEV;
ANALYSIS: TYPE = MIXTURE TWOLEVEL;
ALGO=INT;
MODEL:
%WITHIN%
%OVERALL%
C#1-C#2 ON AGE SCLBOND PERFORM ASPIR PARSCLEX PARSLIV PEERSCL FRDROP;
%BETWEEN%
%OVERALL%
FU BY EVSMK@1;
FU BY SMK30TRI (FSMK30);
FU BY HEAVY (FHEAVY);
FU BY FRSMK (FFRSMK);
FU BY PARSTOP (FPARSTOP);
FU BY TOBHARM (FTOBHRM);
[FU@0];
FC BY C#1 (FC_C1);
FC BY C#2 (FC_C2);
FU WITH FC;
C#2 ON POPLOG (C2_POP);
C#2 ON TOBGROW (C2_GRW);
C#2 ON POVLEV (C2_POV);
FC ON POPLOG (FC_POP);
FC ON TOBGROW (FC_GRW);
FC ON POVLEV (FC_POV);
FU ON POPLOG (FPOPLOG);
    
```

FU ON TOBGROW (FTOBGROW);
FU ON POVLEV (FPOVLEV);
%C#1%
[EVSMK\$1 SMK30TRI\$1 SMK30TRI\$2 HEAVY\$1 HEAVY\$2 FRSMK\$1 PARSTOP\$1 TOBHARM\$1];
%C#2%
[EVSMK\$1 SMK30TRI\$1 SMK30TRI\$2 HEAVY\$1 HEAVY\$2 FRSMK\$1 PARSTOP\$1 TOBHARM\$1];
%C#3%
[EVSMK\$1 SMK30TRI\$1 SMK30TRI\$2 HEAVY\$1 HEAVY\$2 FRSMK\$1 PARSTOP\$1 TOBHARM\$1];
MODEL CONSTRAINT:
NEW(POPEV POP30 POPHV POPFR POPPAR POPHARM
GRWEV GRW30 GRWHV GRWFR GRWPAR GRWHARM
POVEV POV30 POVHV POVFR POVPAR POVHARM
C2POPLOG C2TOBGRW C2POVLEV);
POPEV=FPOPLOG; POP30=FPOPLOG*FSMK30; POPHV=FPOPLOG*FHEAVY;
POPFR=FPOPLOG*FFRSMK; POPPAR=FPOPLOG*FPARSTOP; POPHARM=FPOPLOG*FTOBHRM;
GRWEV=FTOBGROW; GRW30=FTOBGROW*FSMK30; GRWHV=FTOBGROW*FHEAVY;
GRWFR=FTOBGROW*FFRSMK; GRWPAR=FTOBGROW*FPARSTOP;
GRWHARM=FTOBGROW*FTOBHRM;
POVEV=FPOVLEV; POV30=FPOVLEV*FSMK30; POVHV=FPOVLEV*FHEAVY;
POVFR=FPOVLEV*FFRSMK; POVPAR=FPOVLEV*FPARSTOP; POVHARM=FPOVLEV*FTOBHRM;
C2POPLOG=(FC_POP*FC_C2)+C2_POP;
C2TOBGRW=(FC_GRW*FC_C2)+C2_GRW;
C2POVLEV=(FC_POV*FC_C2)+C2_POV;