

This is an example of a Regression Auxiliary Model with basic psychological need satisfactions of competence, autonomy and relatedness and moderate-to-vigorous physical activity (MVPA) over four time points (STEP 2).

Mplus VERSION 8.4
MUTHEN & MUTHEN
01/16/2022 10:52 AM

INPUT INSTRUCTIONS

TITLE: Auxliary model Step 2

Data: File is
C:\MVPA data_NEW.dat;

VARIABLE:
NAMES ARE
COM1 COM2 COM3 COM4
AUT1 AUT2 AUT3 AUT4
REL1 REL2 REL3 REL4
MVPA1 MVPA2 MVPA3 MVPA4
W1-W4;

Missing are all (-999);

Usevar=
MVPA1 MVPA2 MVPA3 MVPA4
W1-W4;

Classes = C(4);

Training= W1-W4(bch);

Analysis:

Type = Mixture;
Starts=0;
Estimator=mlr;
PROCESSORS = 10;

Model:
%overall%

iz sz | MVPA1@0 MVPA2@1 MVPA3@2 MVPA4@3; !latent growth curve

%C#1%

iz sz | MVPA1@0 MVPA2@1 MVPA3@2 MVPA4@3;

```

%C#2%

iz sz | MVPA1@0 MVPA2@1 MVPA3@2 MVPA4@3;

%C#3%

iz sz | MVPA1@0 MVPA2@1 MVPA3@2 MVPA4@3;

%C#4%

iz sz | MVPA1@0 MVPA2@1 MVPA3@2 MVPA4@3;

PLOT: TYPE IS PLOT2 PLOT3;
SERIES IS
MVPA1  MVPA2 MVPA3 MVPA4      (iz)|
MVPA1  MVPA2 MVPA3 MVPA4      (sz);

```

```

*** WARNING
Data set contains cases with missing on all variables.
These cases were not included in the analysis.
Number of cases with missing on all variables:  1
1 WARNING(S) FOUND IN THE INPUT INSTRUCTIONS

```

Auxliary model Step 2

SUMMARY OF ANALYSIS

Number of groups	1
Number of observations	444
Number of dependent variables	4
Number of independent variables	0
Number of continuous latent variables	2
Number of categorical latent variables	1

Observed dependent variables

Continuous			
MVPA1	MVPA2	MVPA3	MVPA4

Continuous latent variables	
IZ	SZ

Categorical latent variables
C

Variables with special functions

Training variables (BCH)

W1

W2

W3

W4

Estimator	MLR
Information matrix	OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for Continuous Outcomes	
Maximum number of iterations	100
Convergence criterion	0.100D-05
Optimization Specifications for the EM Algorithm	
Maximum number of iterations	500
Convergence criteria	
Loglikelihood change	0.100D-06
Relative loglikelihood change	0.100D-06
Derivative	0.100D-05
Optimization Specifications for the M step of the EM Algorithm for Categorical Latent variables	
Number of M step iterations	1
M step convergence criterion	0.100D-05
Basis for M step termination	ITERATION
Optimization Specifications for the M step of the EM Algorithm for Censored, Binary or Ordered Categorical (Ordinal), Unordered Categorical (Nominal) and Count Outcomes	
Number of M step iterations	1
M step convergence criterion	0.100D-05
Basis for M step termination	ITERATION
Maximum value for logit thresholds	15
Minimum value for logit thresholds	-15
Minimum expected cell size for chi-square	0.100D-01
Maximum number of iterations for H1	2000
Convergence criterion for H1	0.100D-03
Optimization algorithm	EMA
Input data file(s)	
C:\MVPA data_NEW.dat	
Input data format	FREE

SUMMARY OF DATA

Number of missing data patterns	8
Number of y missing data patterns	8
Number of u missing data patterns	0

COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value 0.100

PROPORTION OF DATA PRESENT FOR Y

	Covariance Coverage			
	MVPA1	MVPA2	MVPA3	MVPA4
MVPA1	1.000			
MVPA2	0.545	0.545		
MVPA3	0.403	0.279	0.403	
MVPA4	0.257	0.182	0.178	0.257

UNIVARIATE SAMPLE STATISTICS

UNIVARIATE HIGHER-ORDER MOMENT DESCRIPTIVE STATISTICS

Variable/ Percentiles		Mean/ Variance	Skewness/ Kurtosis	Minimum/ Maximum	% with Min/Max	20%/60%
Sample Size 40%/80% Median						
MVPA1		58.642	0.573	11.369	0.23%	39.119
51.107	56.288					
	444.000	505.911	0.213	133.357	0.23%	61.625
76.357						
MVPA2		55.367	0.536	17.464	0.41%	36.929
48.125	53.067					
	242.000	413.571	0.060	119.071	0.41%	58.188
72.393						
MVPA3		52.992	0.560	9.940	0.56%	33.536
44.786	50.000					
	179.000	460.790	-0.053	113.250	0.56%	55.714
69.634						
MVPA4		55.966	0.845	19.652	0.88%	36.643
46.143	51.312					
	114.000	578.922	0.397	128.310	0.88%	55.714
74.964						

THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters 18

Loglikelihood

H0 Value -4873.987
H0 Scaling Correction Factor 1.2793
for MLR

Information Criteria

Akaike (AIC)	9783.974
Bayesian (BIC)	9857.699
Sample-Size Adjusted BIC	9800.575
(n* = (n + 2) / 24)	

FINAL CLASS COUNTS AND PROPORTIONS FOR THE LATENT CLASSES
BASED ON THE ESTIMATED MODEL

Latent Classes		
1	47.74793	0.10754
2	147.79313	0.33287
3	124.56379	0.28055
4	123.89515	0.27904

FINAL CLASS COUNTS AND PROPORTIONS FOR THE LATENT CLASSES
BASED ON ESTIMATED POSTERIOR PROBABILITIES

Latent Classes		
1	47.74793	0.10754
2	147.79313	0.33287
3	124.56379	0.28055
4	123.89515	0.27904

FINAL CLASS COUNTS AND PROPORTIONS FOR THE LATENT CLASSES
BASED ON THEIR MOST LIKELY LATENT CLASS MEMBERSHIP

Class Counts and Proportions

Latent Classes		
1	46	0.10360
2	150	0.33784
3	121	0.27252
4	127	0.28604

Classification Probabilities for the Most Likely Latent Class Membership
(Column)
by Latent Class (Row)

	1	2	3	4
1	1.086	-.072	0.008	-.021
2	-.028	1.135	-.074	-.032
3	-.004	-.059	1.148	-.085

4 -.009 -.056 -.092 1.156

Logits for the Classification Probabilities for the Most Likely Latent Class
Membership (Column)
by Latent Class (Row)

	1	2	3	4
1	13.898	0.000	8.935	0.000
2	0.000	13.942	0.000	0.000
3	0.000	0.000	13.954	0.000
4	-13.961	-13.961	-13.961	0.000

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Latent Class 1				
IZ				
MVPA1	1.000	0.000	999.000	999.000
MVPA2	1.000	0.000	999.000	999.000
MVPA3	1.000	0.000	999.000	999.000
MVPA4	1.000	0.000	999.000	999.000
SZ				
MVPA1	0.000	0.000	999.000	999.000
MVPA2	1.000	0.000	999.000	999.000
MVPA3	2.000	0.000	999.000	999.000
MVPA4	3.000	0.000	999.000	999.000
SZ WITH				
IZ	2.138	19.348	0.111	0.912

Means

IZ	64.876	3.686	17.602	0.000
SZ	-3.873	1.562	-2.480	0.013

Intercepts

MVPA1	0.000	0.000	999.000	999.000
MVPA2	0.000	0.000	999.000	999.000
MVPA3	0.000	0.000	999.000	999.000
MVPA4	0.000	0.000	999.000	999.000

Variances

IZ	226.556	42.014	5.392	0.000
SZ	4.130	11.480	0.360	0.719

Residual Variances

MVPA1	257.671	41.259	6.245	0.000
MVPA2	152.139	20.749	7.332	0.000

MVPA3	189.830	34.757	5.462	0.000
MVPA4	287.053	91.332	3.143	0.002

Latent Class 2

IZ					
MVPA1		1.000	0.000	999.000	999.000
MVPA2		1.000	0.000	999.000	999.000
MVPA3		1.000	0.000	999.000	999.000
MVPA4		1.000	0.000	999.000	999.000

SZ					
MVPA1		0.000	0.000	999.000	999.000
MVPA2		1.000	0.000	999.000	999.000
MVPA3		2.000	0.000	999.000	999.000
MVPA4		3.000	0.000	999.000	999.000

SZ	WITH				
IZ		2.138	19.348	0.111	0.912

Means

IZ	59.113	1.934	30.559	0.000
SZ	-0.556	1.134	-0.490	0.624

Intercepts

MVPA1	0.000	0.000	999.000	999.000
MVPA2	0.000	0.000	999.000	999.000
MVPA3	0.000	0.000	999.000	999.000
MVPA4	0.000	0.000	999.000	999.000

Variances

IZ	226.556	42.014	5.392	0.000
SZ	4.130	11.480	0.360	0.719

Residual Variances

MVPA1	257.671	41.259	6.245	0.000
MVPA2	152.139	20.749	7.332	0.000
MVPA3	189.830	34.757	5.462	0.000
MVPA4	287.053	91.332	3.143	0.002

Latent Class 3

IZ					
MVPA1		1.000	0.000	999.000	999.000
MVPA2		1.000	0.000	999.000	999.000
MVPA3		1.000	0.000	999.000	999.000
MVPA4		1.000	0.000	999.000	999.000

SZ					
MVPA1		0.000	0.000	999.000	999.000
MVPA2		1.000	0.000	999.000	999.000
MVPA3		2.000	0.000	999.000	999.000
MVPA4		3.000	0.000	999.000	999.000

SZ	WITH				
IZ		2.138	19.348	0.111	0.912

Means

IZ	61.332	2.304	26.618	0.000
SZ	-1.787	1.185	-1.508	0.132

Intercepts

MVPA1	0.000	0.000	999.000	999.000
MVPA2	0.000	0.000	999.000	999.000
MVPA3	0.000	0.000	999.000	999.000
MVPA4	0.000	0.000	999.000	999.000

Variances

IZ	226.556	42.014	5.392	0.000
SZ	4.130	11.480	0.360	0.719

Residual Variances

MVPA1	257.671	41.259	6.245	0.000
MVPA2	152.139	20.749	7.332	0.000
MVPA3	189.830	34.757	5.462	0.000
MVPA4	287.053	91.332	3.143	0.002

Latent Class 4

IZ					
MVPA1		1.000	0.000	999.000	999.000
MVPA2		1.000	0.000	999.000	999.000
MVPA3		1.000	0.000	999.000	999.000
MVPA4		1.000	0.000	999.000	999.000

SZ					
MVPA1		0.000	0.000	999.000	999.000
MVPA2		1.000	0.000	999.000	999.000
MVPA3		2.000	0.000	999.000	999.000
MVPA4		3.000	0.000	999.000	999.000

SZ	WITH				
IZ		2.138	19.348	0.111	0.912

Means

IZ	50.500	2.028	24.900	0.000
SZ	-2.653	1.229	-2.158	0.031

Intercepts

MVPA1	0.000	0.000	999.000	999.000
MVPA2	0.000	0.000	999.000	999.000
MVPA3	0.000	0.000	999.000	999.000
MVPA4	0.000	0.000	999.000	999.000

Variances

IZ	226.556	42.014	5.392	0.000
SZ	4.130	11.480	0.360	0.719

Residual Variances

MVPA1	257.671	41.259	6.245	0.000
MVPA2	152.139	20.749	7.332	0.000
MVPA3	189.830	34.757	5.462	0.000
MVPA4	287.053	91.332	3.143	0.002

Categorical Latent Variables

Means

C#1	-0.953	0.193	-4.953	0.000
C#2	0.176	0.143	1.230	0.219
C#3	0.005	0.158	0.034	0.973

QUALITY OF NUMERICAL RESULTS

Condition Number for the Information Matrix 0.672E-05
 (ratio of smallest to largest eigenvalue)

SAMPLE STATISTICS FOR ESTIMATED FACTOR SCORES

SAMPLE STATISTICS

Means

IZ	SZ	C_IZ	C_SZ
57.948	-1.843	57.922	-1.833

Covariances

	IZ	SZ	C_IZ	C_SZ
IZ	173.705			
SZ	4.181	1.794		
C_IZ	172.059	4.231	170.573	
C_SZ	4.186	1.565	4.222	1.370

Correlations

	IZ	SZ	C_IZ	C_SZ
IZ	1.000			
SZ	0.237	1.000		
C_IZ	1.000	0.242	1.000	
C_SZ	0.271	0.998	0.276	1.000

PLOT INFORMATION

The following plots are available:

Histograms (sample values, estimated factor scores, estimated values, residuals)
 Scatterplots (sample values, estimated factor scores, estimated values, residuals)
 Sample means
 Estimated means, medians, modes, and percentiles
 Sample and estimated means
 Latent variable distribution plots
 Observed individual values
 Estimated individual values
 Estimated means and observed individual values
 Estimated means and estimated individual values
 Estimated overall and class-specific distributions

DIAGRAM INFORMATION

Mplus diagrams are currently not available for Mixture analysis.
 No diagram output was produced.

Beginning Time: 10:52:03
 Ending Time: 10:52:09
 Elapsed Time: 00:00:06

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REPORTING THE RESULTS:

The regression auxiliary model was estimated to examine the MVPA growth curves in the identified need satisfaction classes over time. The first step was to estimate the LCA model and save the BCH weights for each class. In the second step, the class specific latent growth curves were estimated. In case of the random regression model the fit indices were not provided but estimates, standard errors, and p-values were produced. The model indicated that the four-class model was the most reasonable. Latent slopes showed that MVPA (SZ) declined over time in the Latent Class 1 (p = .013).

! Means				
IZ	64.876	3.686	17.602	0.000
SZ	-3.873	1.562	-2.480	0.013