

Text S1. Mplus output file: males

c:\users\pstin4\onedrive - loughborough un...\4cubic_7off_males_autoreg_no_integr_r3.out

Mplus VERSION 8.5
MUTHEN & MUTHEN
03/04/2021 9:48 PM

INPUT INSTRUCTIONS

TITLE: 4 cubic_males;
DATA: FILE IS "mplusdata_males_7off_v2.txt";
VARIABLE:
NAMES ARE
sid sid_v21 sid_v22 sid_v23 id sex bmi1 bmi2 bmi3 bmi4 bmi5
wtself1 wtself2 wtself3 wtself4 wtself5
cage1 cage2 cage3 cage4 cage5;

USEVARIABLES ARE
bmi1 bmi2 bmi3 bmi4 bmi5;

IDVARIABLE IS id;

MISSING are ALL(-9999);
CLASSES = c(4);
AUXILIARY (R3STEP) sid_v22 sid_v23 ;

ANALYSIS:
ESTIMATOR = MLR;
TYPE IS MIXTURE;
STARTS = 1000 200;

MODEL:

%OVERALL%
i s q cubic | bmi1@-12.60 bmi2@-7.8 bmi3@0 bmi4@10.29 bmi5@18.55;

cubic@0;
q@0;
s WITH q @0;
i WITH q @0;

bmi5 ON bmi4;
bmi4 ON bmi3;
bmi3 ON bmi2;
bmi2 ON bmi1;

%c#1%
[i] (c1p1);
[s] (c1p2);
[q] (c1p3);
[cubic] (c1p4);

bmi1-bmi5 (c1r1-c1r5);

%c#2%
[i] (c2p1);
[s] (c2p2);
[q] (c2p3);
[cubic] (c2p4);

bmi1-bmi5 (c2r1-c2r5);

bmi5 ON bmi4;
bmi4 ON bmi3;
bmi3 ON bmi2;
bmi2 ON bmi1;

%c#3%

```
[i] (c3p1);
[s] (c3p2);
[q] (c3p3);
[cubic] (c3p4);
```

```
bmi1-bmi5 (c3r1-c3r5);
```

```
bmi5 ON bmi4;
bmi4 ON bmi3;
bmi3 ON bmi2;
bmi2 ON bmi1;
```

```
%c#4%
```

```
[i] (c4p1);
[s] (c4p2);
[q] (c4p3);
[cubic] (c4p4);
```

```
bmi1-bmi5 (c4r1-c4r5);
```

```
bmi5 ON bmi4;
bmi4 ON bmi3;
bmi3 ON bmi2;
bmi2 ON bmi1;
```

MODEL CONSTRAINT:

```
PLOT(class1 class2 class3 class4);
LOOP(time,11.04,42.19,0.001);
class1 = c1p1 + c1p2*(time-23.64) + c1p3*(time-23.64)^2 + c1p4*(time-23.64)^3;
class2 = c2p1 + c2p2*(time-23.64) + c2p3*(time-23.64)^2 + c2p4*(time-23.64)^3;
class3 = c3p1 + c3p2*(time-23.64) + c3p3*(time-23.64)^2 + c3p4*(time-23.64)^3;
class4 = c4p1 + c4p2*(time-23.64) + c4p3*(time-23.64)^2 + c4p4*(time-23.64)^3;
```

PLOT:

```
TYPE = PLOT1;
TYPE = PLOT2;
TYPE = PLOT3;
SERIES = bmi1(11.04) bmi2(15.84) bmi3(23.64) bmi4(33.93) bmi5(42.19);
```

SAVEDATA:

```
FILE IS "four_males_auto_no_integr.dat";
SAVE = CPROB;
```

OUTPUT:

```
TECH4 sampstat cinterval;
```

*** WARNING in MODEL command

All continuous latent variable covariances involving Q have been fixed to 0 because the variance of Q is fixed at 0.

*** WARNING in MODEL command

All continuous latent variable covariances involving CUBIC have been fixed to 0 because the variance of CUBIC is fixed at 0.

2 WARNING(S) FOUND IN THE INPUT INSTRUCTIONS

4 cubic_males;

SUMMARY OF ANALYSIS

Number of groups	1
Number of observations	12465

Number of dependent variables	5
Number of independent variables	0
Number of continuous latent variables	4
Number of categorical latent variables	1

Observed dependent variables

Continuous				
BMI1	BMI2	BMI3	BMI4	BMI5

Observed auxiliary variables

SID_V22	SID_V23
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Continuous latent variables

I	S	Q	CUBIC
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Categorical latent variables

C

Variables with special functions

ID variable	ID
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Estimator	MLR
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Information matrix	OBSERVED
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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
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Convergence criterion for H1	0.100D-03
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Optimization algorithm	EMA
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Random Starts Specifications

Number of initial stage random starts	1000
Number of final stage optimizations	200
Number of initial stage iterations	10
Initial stage convergence criterion	0.100D+01
Random starts scale	0.500D+01
Random seed for generating random starts	0

Input data file(s)

mplusdata_males_7off_v2.txt

Input data format	FREE
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SUMMARY OF DATA

Number of missing data patterns	16
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Number of y missing data patterns	16
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				
	BMI1	BMI2	BMI3	BMI4	BMI5
BMI1	0.859				
BMI2	0.647	0.744			
BMI3	0.630	0.560	0.749		
BMI4	0.700	0.594	0.611	0.830	
BMI5	0.687	0.584	0.597	0.711	0.816

SAMPLE STATISTICS

ESTIMATED SAMPLE STATISTICS

	Means				
	BMI1	BMI2	BMI3	BMI4	BMI5
	17.108	20.347	23.511	25.771	26.702
	Covariances				
	BMI1	BMI2	BMI3	BMI4	BMI5
BMI1	5.000				
BMI2	4.153	7.589			
BMI3	3.243	5.253	9.434		
BMI4	3.946	6.041	9.093	15.066	
BMI5	3.816	5.918	9.227	13.660	17.262
	Correlations				
	BMI1	BMI2	BMI3	BMI4	BMI5
BMI1	1.000				
BMI2	0.674	1.000			
BMI3	0.472	0.621	1.000		
BMI4	0.455	0.565	0.763	1.000	
BMI5	0.411	0.517	0.723	0.847	1.000

MAXIMUM LOG-LIKELIHOOD VALUE FOR THE UNRESTRICTED (H1) MODEL IS -113257.178

UNIVARIATE SAMPLE STATISTICS

UNIVARIATE HIGHER-ORDER MOMENT DESCRIPTIVE STATISTICS

iles	Variable/	Mean/	Skewness/	Minimum/	% with	Percent	
0%	Sample Size	Variance	Kurtosis	Maximum	Min/Max	20%/60%	40%/8
	Median						
	BMI1	17.098	1.555	10.273	0.01%	15.444	16.28

9	16.690						
	10707.000	4.946	4.451	32.881	0.01%	17.143	18.41
0							
	BMI2	20.335	1.402	10.759	0.01%	18.215	19.39
4	19.935						
	9279.000	7.608	4.487	43.948	0.01%	20.523	22.12
8							
	BMI3	23.434	1.173	13.812	0.01%	21.092	22.36
4	23.093						
	9341.000	9.194	3.621	48.976	0.01%	23.738	25.54
4							
	BMI4	25.763	1.012	11.576	0.01%	22.742	24.46
2	25.256						
	10350.000	14.801	2.560	50.219	0.01%	26.126	28.43
3							
	BMI5	26.673	1.146	13.918	0.01%	23.424	25.25
2	26.114						
	10174.000	16.995	3.026	56.491	0.01%	27.050	29.48
1							

RANDOM STARTS RESULTS RANKED FROM THE BEST TO THE WORST LOGLIKELIHOOD VALUES

1 perturbed starting value run(s) did not converge in the initial stage optimizations.

Final stage loglikelihood values at local maxima, seeds, and initial stage start number s:

-108600.343	109946	771
-108600.343	637095	207
-108600.343	534193	689
-108600.343	608460	244
-108600.343	621542	375
-108600.343	420910	928
-108600.343	980970	894
-108600.343	535303	923
-108600.343	150531	154
-108600.343	79212	517
-108600.343	987560	985
-108600.343	153053	378
-108600.343	407168	44
-108600.343	395754	388
-108600.343	94573	983
-108600.343	512403	719
-108600.343	345974	622
-108600.343	76451	211
-108600.343	92091	649
-108600.343	91231	727
-108600.343	847088	750
-108600.343	43523	297
-108600.343	843555	952
-108600.343	425929	508
-108600.343	954354	840
-108600.343	966603	919
-108600.343	486646	586
-108600.343	650371	14
-108600.343	548673	732
-108600.343	237332	661
-108656.386	484116	915
-108656.386	970689	266
-113404.345	945065	255
-113404.345	76974	16
-113404.345	496881	192
-113404.345	710154	831
-113404.345	322790	636
-113404.345	982520	737
-113404.345	717754	180
-113404.345	830529	279

-113404.345	155622	507
-113404.345	78862	529
-113404.345	701525	239
-113404.345	800454	751
-113404.345	814975	129
-113404.345	520177	262
-113404.345	93468	3
-113404.345	922596	456
-113404.345	92689	304
-113404.345	107446	12
-113404.345	546943	865
-113404.345	700846	867
-113404.345	276102	599
-113404.345	723775	97
-113404.345	674171	195
-113404.345	350608	334
-113404.345	391368	802
-113404.345	208620	965
-113404.345	358488	264
-113404.345	488125	368
-113404.345	73576	213
-113404.345	677062	680
-113404.345	791678	974
-113404.345	55115	408
-113404.345	68850	462
-113404.345	695155	150
-113404.345	193569	440
-113404.345	802682	419
-113404.345	387701	275
-113404.345	928287	197
-113404.345	499150	216
-113404.345	939709	112
-113404.345	689529	516
-113404.345	939870	655
-113404.345	462821	745
-113404.345	105656	909
-113404.345	860772	174
-113404.345	900921	984
-113404.345	781489	627
-113404.345	727176	861
-113404.345	213532	503
-113404.345	127362	757
-113404.345	910224	580
-113404.345	645664	39
-113404.345	298553	773
-113404.345	972430	491
-113404.345	567165	319
-113404.345	626087	314
-113404.345	580181	691
-113404.345	260601	36
-113404.345	572637	989
-113404.345	618760	489
-113404.345	831410	567
-113404.345	821011	161
-113404.345	97300	640
-113404.345	232226	235
-113404.345	816765	959
-113404.345	248742	556
-113404.345	607072	717
-113404.345	265218	924
-113404.345	810705	626
-113404.345	608849	224
-113404.345	130541	896
-113404.345	376411	473
-113404.345	165853	105
-113404.345	370466	41
-113404.345	317868	740
-113488.134	772131	407

-113488.134 167409 772

91 perturbed starting value run(s) did not converge or were rejected in the third stage
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THE BEST LOGLIKELIHOOD VALUE HAS BEEN REPLICATED. RERUN WITH AT LEAST TWICE THE
RANDOM STARTS TO CHECK THAT THE BEST LOGLIKELIHOOD IS STILL OBTAINED AND REPLICATED.

THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters 58

Loglikelihood

H0 Value	-108600.343
H0 Scaling Correction Factor for MLR	1.2133

Information Criteria

Akaike (AIC)	217316.686
Bayesian (BIC)	217747.666
Sample-Size Adjusted BIC ($n^* = (n + 2) / 24$)	217563.348

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

Latent Classes

1	905.41341	0.07264
2	3003.59832	0.24096
3	2614.82674	0.20977
4	5941.16153	0.47663

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

Latent Classes

1	905.41341	0.07264
2	3003.59832	0.24096
3	2614.82674	0.20977
4	5941.16153	0.47663

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

Class Counts and Proportions

Latent Classes

1	718	0.05760
2	2561	0.20546

3	2032	0.16302
4	7154	0.57393

CLASSIFICATION QUALITY

Entropy	0.505
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Average Latent Class Probabilities for Most Likely Latent Class Membership (Row)
by Latent Class (Column)

	1	2	3	4
1	0.836	0.083	0.081	0.000
2	0.061	0.679	0.128	0.133
3	0.065	0.129	0.688	0.119
4	0.003	0.132	0.116	0.749

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

	1	2	3	4
1	0.663	0.171	0.145	0.021
2	0.020	0.579	0.087	0.314
3	0.022	0.125	0.534	0.318
4	0.000	0.057	0.041	0.902

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

	1	2	3	4
1	3.469	2.116	1.952	0.000
2	-2.757	0.612	-1.282	0.000
3	-2.663	-0.936	0.518	0.000
4	-11.408	-2.756	-3.102	0.000

MODEL RESULTS

		Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Latent Class 1					
I					
BMI1		1.000	0.000	999.000	999.000
BMI2		1.000	0.000	999.000	999.000
BMI3		1.000	0.000	999.000	999.000
BMI4		1.000	0.000	999.000	999.000
BMI5		1.000	0.000	999.000	999.000
S					
BMI1		-12.600	0.000	999.000	999.000
BMI2		-7.800	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		10.290	0.000	999.000	999.000
BMI5		18.550	0.000	999.000	999.000
Q					
BMI1		158.760	0.000	999.000	999.000
BMI2		60.840	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000

BMI4		105.884	0.000	999.000	999.000
BMI5		344.102	0.000	999.000	999.000
CUBIC					
BMI1		-2000.376	0.000	999.000	999.000
BMI2		-474.552	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		1089.547	0.000	999.000	999.000
BMI5		6383.101	0.000	999.000	999.000
BMI5	ON				
BMI4		0.618	0.040	15.340	0.000
BMI4	ON				
BMI3		0.581	0.058	9.991	0.000
BMI3	ON				
BMI2		0.437	0.041	10.757	0.000
BMI2	ON				
BMI1		0.324	0.056	5.799	0.000
S	WITH				
Q		0.000	0.000	999.000	999.000
I		0.058	0.009	6.717	0.000
I	WITH				
Q		0.000	0.000	999.000	999.000
Means					
I		16.914	1.025	16.506	0.000
S		-0.163	0.207	-0.788	0.431
Q		0.006	0.008	0.733	0.464
CUBIC		0.000	0.001	-0.438	0.662
Intercepts					
BMI1		0.000	0.000	999.000	999.000
BMI2		0.000	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		0.000	0.000	999.000	999.000
BMI5		0.000	0.000	999.000	999.000
Variances					
I		1.760	0.132	13.367	0.000
S		0.005	0.001	8.259	0.000
Q		0.000	0.000	999.000	999.000
CUBIC		0.000	0.000	999.000	999.000
Residual Variances					
BMI1		12.009	0.864	13.893	0.000
BMI2		14.756	1.430	10.322	0.000
BMI3		15.172	1.810	8.383	0.000
BMI4		19.805	2.470	8.020	0.000
BMI5		12.570	1.646	7.637	0.000
Latent Class 2					
I					
BMI1		1.000	0.000	999.000	999.000
BMI2		1.000	0.000	999.000	999.000
BMI3		1.000	0.000	999.000	999.000
BMI4		1.000	0.000	999.000	999.000
BMI5		1.000	0.000	999.000	999.000
S					
BMI1		-12.600	0.000	999.000	999.000
BMI2		-7.800	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000

BMI4	10.290	0.000	999.000	999.000
BMI5	18.550	0.000	999.000	999.000
Q				
BMI1	158.760	0.000	999.000	999.000
BMI2	60.840	0.000	999.000	999.000
BMI3	0.000	0.000	999.000	999.000
BMI4	105.884	0.000	999.000	999.000
BMI5	344.102	0.000	999.000	999.000
CUBIC				
BMI1	-2000.376	0.000	999.000	999.000
BMI2	-474.552	0.000	999.000	999.000
BMI3	0.000	0.000	999.000	999.000
BMI4	1089.547	0.000	999.000	999.000
BMI5	6383.101	0.000	999.000	999.000
BMI5	ON			
BMI4	0.285	0.050	5.708	0.000
BMI4	ON			
BMI3	0.322	0.041	7.898	0.000
BMI3	ON			
BMI2	0.468	0.038	12.368	0.000
BMI2	ON			
BMI1	0.328	0.037	8.774	0.000
S	WITH			
Q	0.000	0.000	999.000	999.000
I	0.058	0.009	6.717	0.000
I	WITH			
Q	0.000	0.000	999.000	999.000
Means				
I	15.395	0.749	20.565	0.000
S	0.314	0.092	3.398	0.001
Q	0.020	0.005	4.308	0.000
CUBIC	-0.001	0.000	-2.826	0.005
Intercepts				
BMI1	0.000	0.000	999.000	999.000
BMI2	0.000	0.000	999.000	999.000
BMI3	0.000	0.000	999.000	999.000
BMI4	0.000	0.000	999.000	999.000
BMI5	0.000	0.000	999.000	999.000
Variances				
I	1.760	0.132	13.367	0.000
S	0.005	0.001	8.259	0.000
Q	0.000	0.000	999.000	999.000
CUBIC	0.000	0.000	999.000	999.000
Residual Variances				
BMI1	1.165	0.241	4.826	0.000
BMI2	2.241	0.291	7.695	0.000
BMI3	5.141	0.296	17.369	0.000
BMI4	5.952	0.658	9.041	0.000
BMI5	4.099	0.489	8.389	0.000
Latent Class 3				
I				
BMI1	1.000	0.000	999.000	999.000
BMI2	1.000	0.000	999.000	999.000
BMI3	1.000	0.000	999.000	999.000

BMI4		1.000	0.000	999.000	999.000
BMI5		1.000	0.000	999.000	999.000
S					
BMI1		-12.600	0.000	999.000	999.000
BMI2		-7.800	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		10.290	0.000	999.000	999.000
BMI5		18.550	0.000	999.000	999.000
Q					
BMI1		158.760	0.000	999.000	999.000
BMI2		60.840	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		105.884	0.000	999.000	999.000
BMI5		344.102	0.000	999.000	999.000
CUBIC					
BMI1		-2000.376	0.000	999.000	999.000
BMI2		-474.552	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		1089.547	0.000	999.000	999.000
BMI5		6383.101	0.000	999.000	999.000
BMI5	ON				
BMI4		0.268	0.065	4.128	0.000
BMI4	ON				
BMI3		0.289	0.060	4.834	0.000
BMI3	ON				
BMI2		0.212	0.035	6.112	0.000
BMI2	ON				
BMI1		0.158	0.030	5.286	0.000
S	WITH				
Q		0.000	0.000	999.000	999.000
I		0.058	0.009	6.717	0.000
I	WITH				
Q		0.000	0.000	999.000	999.000
Means					
I		19.000	0.691	27.490	0.000
S		0.019	0.106	0.179	0.858
Q		-0.001	0.004	-0.248	0.804
CUBIC		0.000	0.000	0.346	0.729
Intercepts					
BMI1		0.000	0.000	999.000	999.000
BMI2		0.000	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		0.000	0.000	999.000	999.000
BMI5		0.000	0.000	999.000	999.000
Variances					
I		1.760	0.132	13.367	0.000
S		0.005	0.001	8.259	0.000
Q		0.000	0.000	999.000	999.000
CUBIC		0.000	0.000	999.000	999.000
Residual Variances					
BMI1		4.344	0.495	8.774	0.000
BMI2		3.361	0.359	9.357	0.000
BMI3		2.012	0.277	7.255	0.000
BMI4		2.490	0.394	6.325	0.000
BMI5		1.066	0.222	4.812	0.000

Latent Class 4

I					
BMI1		1.000	0.000	999.000	999.000
BMI2		1.000	0.000	999.000	999.000
BMI3		1.000	0.000	999.000	999.000
BMI4		1.000	0.000	999.000	999.000
BMI5		1.000	0.000	999.000	999.000
S					
BMI1		-12.600	0.000	999.000	999.000
BMI2		-7.800	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		10.290	0.000	999.000	999.000
BMI5		18.550	0.000	999.000	999.000
Q					
BMI1		158.760	0.000	999.000	999.000
BMI2		60.840	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		105.884	0.000	999.000	999.000
BMI5		344.102	0.000	999.000	999.000
CUBIC					
BMI1		-2000.376	0.000	999.000	999.000
BMI2		-474.552	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		1089.547	0.000	999.000	999.000
BMI5		6383.101	0.000	999.000	999.000
BMI5	ON				
BMI4		0.027	0.070	0.377	0.706
BMI4	ON				
BMI3		0.203	0.046	4.423	0.000
BMI3	ON				
BMI2		0.183	0.027	6.876	0.000
BMI2	ON				
BMI1		0.071	0.020	3.469	0.001
S	WITH				
Q		0.000	0.000	999.000	999.000
I		0.058	0.009	6.717	0.000
I	WITH				
Q		0.000	0.000	999.000	999.000
Means					
I		18.596	0.505	36.808	0.000
S		-0.002	0.058	-0.028	0.978
Q		-0.003	0.002	-1.115	0.265
CUBIC		0.001	0.000	5.502	0.000
Intercepts					
BMI1		0.000	0.000	999.000	999.000
BMI2		0.000	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		0.000	0.000	999.000	999.000
BMI5		0.000	0.000	999.000	999.000
Variances					
I		1.760	0.132	13.367	0.000
S		0.005	0.001	8.259	0.000
Q		0.000	0.000	999.000	999.000
CUBIC		0.000	0.000	999.000	999.000

Residual Variances

BMI1	0.381	0.058	6.604	0.000
BMI2	1.258	0.063	20.097	0.000
BMI3	1.704	0.120	14.152	0.000
BMI4	1.161	0.170	6.831	0.000
BMI5	0.826	0.105	7.878	0.000

Categorical Latent Variables

Means

C#1	-1.881	0.186	-10.102	0.000
C#2	-0.682	0.131	-5.197	0.000
C#3	-0.821	0.153	-5.373	0.000

QUALITY OF NUMERICAL RESULTS

Condition Number for the Information Matrix 0.608E-08
(ratio of smallest to largest eigenvalue)

TESTS OF CATEGORICAL LATENT VARIABLE MULTINOMIAL LOGISTIC REGRESSIONS USING THE 3-STEP PROCEDURE

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
C#1 ON				
SID_V22	0.801	0.192	4.165	0.000
SID_V23	1.300	0.196	6.646	0.000
C#2 ON				
SID_V22	-0.011	0.133	-0.082	0.935
SID_V23	1.024	0.131	7.794	0.000
C#3 ON				
SID_V22	0.197	0.120	1.644	0.100
SID_V23	0.147	0.138	1.065	0.287
Intercepts				
C#1	-2.761	0.181	-15.283	0.000
C#2	-1.079	0.115	-9.401	0.000
C#3	-0.971	0.106	-9.182	0.000

Parameterization using Reference Class 1

C#2 ON				
SID_V22	-0.812	0.235	-3.454	0.001
SID_V23	-0.277	0.233	-1.190	0.234
C#3 ON				
SID_V22	-0.604	0.227	-2.655	0.008
SID_V23	-1.154	0.238	-4.857	0.000
C#4 ON				
SID_V22	-0.801	0.192	-4.165	0.000
SID_V23	-1.300	0.196	-6.646	0.000
Intercepts				
C#2	1.681	0.216	7.784	0.000
C#3	1.789	0.212	8.458	0.000
C#4	2.761	0.181	15.283	0.000

Parameterization using Reference Class 2

C#1 ON				
SID_V22	0.812	0.235	3.454	0.001

SID_V23	0.277	0.233	1.190	0.234
C#3 ON				
SID_V22	0.208	0.169	1.232	0.218
SID_V23	-0.877	0.174	-5.052	0.000
C#4 ON				
SID_V22	0.011	0.133	0.082	0.935
SID_V23	-1.024	0.131	-7.794	0.000
Intercepts				
C#1	-1.681	0.216	-7.784	0.000
C#3	0.108	0.147	0.733	0.464
C#4	1.079	0.115	9.401	0.000

Parameterization using Reference Class 3

C#1 ON				
SID_V22	0.604	0.227	2.655	0.008
SID_V23	1.154	0.238	4.857	0.000
C#2 ON				
SID_V22	-0.208	0.169	-1.232	0.218
SID_V23	0.877	0.174	5.052	0.000
C#4 ON				
SID_V22	-0.197	0.120	-1.644	0.100
SID_V23	-0.147	0.138	-1.065	0.287
Intercepts				
C#1	-1.789	0.212	-8.458	0.000
C#2	-0.108	0.147	-0.733	0.464
C#4	0.971	0.106	9.182	0.000

ODDS RATIOS FOR TESTS OF CATEGORICAL LATENT VARIABLE MULTINOMIAL LOGISTIC REGRESSIONS
USING THE 3-STEP PROCEDURE

	Estimate	S.E.	95% C.I.	
			Lower 2.5%	Upper 2.5%
C#1 ON				
SID_V22	2.227	0.428	1.528	3.246
SID_V23	3.671	0.718	2.502	5.387
C#2 ON				
SID_V22	0.989	0.132	0.761	1.285
SID_V23	2.784	0.366	2.152	3.601
C#3 ON				
SID_V22	1.218	0.146	0.963	1.540
SID_V23	1.158	0.160	0.884	1.517

Parameterization using Reference Class 1

C#2 ON				
SID_V22	0.444	0.104	0.280	0.704
SID_V23	0.758	0.176	0.481	1.196
C#3 ON				
SID_V22	0.547	0.124	0.350	0.854
SID_V23	0.315	0.075	0.198	0.503
C#4 ON				
SID_V22	0.449	0.086	0.308	0.655
SID_V23	0.272	0.053	0.186	0.400

Parameterization using Reference Class 2

C#1	ON				
SID_V22		2.251	0.529	1.421	3.568
SID_V23		1.319	0.307	0.836	2.081
C#3	ON				
SID_V22		1.231	0.208	0.885	1.713
SID_V23		0.416	0.072	0.296	0.585
C#4	ON				
SID_V22		1.011	0.135	0.778	1.313
SID_V23		0.359	0.047	0.278	0.465

Parameterization using Reference Class 3

C#1	ON				
SID_V22		1.829	0.416	1.171	2.856
SID_V23		3.170	0.753	1.990	5.049
C#2	ON				
SID_V22		0.812	0.137	0.584	1.131
SID_V23		2.403	0.417	1.710	3.377
C#4	ON				
SID_V22		0.821	0.098	0.649	1.039
SID_V23		0.863	0.119	0.659	1.131

CONFIDENCE INTERVALS OF MODEL RESULTS

		Lower .5%	Lower 2.5%	Lower 5%	Estimate	Upper 5%	Upper 2.5%
Upper .5%							
Latent Class 1							
I							
BMI1		1.000	1.000	1.000	1.000	1.000	1.000
1.000							
BMI2		1.000	1.000	1.000	1.000	1.000	1.000
1.000							
BMI3		1.000	1.000	1.000	1.000	1.000	1.000
1.000							
BMI4		1.000	1.000	1.000	1.000	1.000	1.000
1.000							
BMI5		1.000	1.000	1.000	1.000	1.000	1.000
1.000							
S							
BMI1		-12.600	-12.600	-12.600	-12.600	-12.600	-12.600
-12.600							
BMI2		-7.800	-7.800	-7.800	-7.800	-7.800	-7.800
-7.800							
BMI3		0.000	0.000	0.000	0.000	0.000	0.000
0.000							
BMI4		10.290	10.290	10.290	10.290	10.290	10.290
10.290							
BMI5		18.550	18.550	18.550	18.550	18.550	18.550
18.550							
Q							
BMI1		158.760	158.760	158.760	158.760	158.760	158.760
158.760							
BMI2		60.840	60.840	60.840	60.840	60.840	60.840
60.840							
BMI3		0.000	0.000	0.000	0.000	0.000	0.000
0.000							
BMI4		105.884	105.884	105.884	105.884	105.884	105.884

Mplus VERSION 8.5
MUTHEN & MUTHEN
03/04/2021 10:18 PM

INPUT INSTRUCTIONS

```
TITLE: 4 cubic females;
DATA: FILE IS "mplusdata_females_7off_v2.txt";
VARIABLE:
  NAMES ARE
    sid sid_v21 sid_v22 sid_v23 id sex bmi1 bmi2 bmi3 bmi4 bmi5
    wtself1 wtself2 wtself3 wtself4 wtself5
    cage1 cage2 cage3 cage4 cage5;

  USEVARIABLES ARE
    bmi1 bmi2 bmi3 bmi4 bmi5;

  IDVARIABLE IS id;

  MISSING are ALL(-9999);
  CLASSES = c(4);
  AUXILIARY (R3STEP) sid_v22 sid_v23 ;

ANALYSIS:
  ESTIMATOR = MLR;
  TYPE IS MIXTURE;
  STARTS = 1000 200;

MODEL:
  %OVERALL%
    i s q cubic | bmi1@-15.08 bmi2@-10.12 bmi3@0 bmi4@7.94 bmi5@16.19;

    cubic@0;
    q@0;
    s WITH q @0;
    i WITH q @0;

    bmi5 ON bmi4;
    bmi4 ON bmi3;
    bmi3 ON bmi2;
    bmi2 ON bmi1;

  %c#1%
    [i] (c1p1);
    [s] (c1p2);
    [q] (c1p3);
    [cubic] (c1p4);

    bmi1-bmi5 (c1r1-c1r5);

  %c#2%
    [i] (c2p1);
    [s] (c2p2);
    [q] (c2p3);
    [cubic] (c2p4);

    bmi1-bmi5 (c2r1-c2r5);

    bmi5 ON bmi4;
    bmi4 ON bmi3;
    bmi3 ON bmi2;
    bmi2 ON bmi1;

  %c#3%
    [i] (c3p1);
```

```
[s] (c3p2);
[q] (c3p3);
[cubic] (c3p4);
```

```
bmi1-bmi5 (c3r1-c3r5);
```

```
bmi5 ON bmi4;
bmi4 ON bmi3;
bmi3 ON bmi2;
bmi2 ON bmi1;
```

```
%c#4%
```

```
[i] (c4p1);
[s] (c4p2);
[q] (c4p3);
[cubic] (c4p4);
```

```
bmi1-bmi5 (c4r1-c4r5);
```

```
bmi5 ON bmi4;
bmi4 ON bmi3;
bmi3 ON bmi2;
bmi2 ON bmi1;
```

MODEL CONSTRAINT:

```
PLOT(class1 class2 class3 class4);
LOOP(time,10.92,42.19,0.001);
class1 = c1p1 + c1p2*(time-26.00) + c1p3*(time-26.00)^2 + c1p4*(time-26.00)^3;
class2 = c2p1 + c2p2*(time-26.00) + c2p3*(time-26.00)^2 + c2p4*(time-26.00)^3;
class3 = c3p1 + c3p2*(time-26.00) + c3p3*(time-26.00)^2 + c3p4*(time-26.00)^3;
class4 = c4p1 + c4p2*(time-26.00) + c4p3*(time-26.00)^2 + c4p4*(time-26.00)^3;
```

PLOT:

```
TYPE = PLOT1;
TYPE = PLOT2;
TYPE = PLOT3;
SERIES = bmi1(10.92) bmi2(15.88) bmi3(26.00) bmi4(33.94) bmi5(42.19);
```

SAVEDATA:

```
FILE IS "four_females_auto_no_integr.dat";
SAVE = CPROB;
```

OUTPUT:

```
TECH4 sampstat cinterval;
```

*** WARNING in MODEL command

All continuous latent variable covariances involving Q have been fixed to 0 because the variance of Q is fixed at 0.

*** WARNING in MODEL command

All continuous latent variable covariances involving CUBIC have been fixed to 0 because the variance of CUBIC is fixed at 0.

2 WARNING(S) FOUND IN THE INPUT INSTRUCTIONS

4 cubic females;

SUMMARY OF ANALYSIS

Number of groups	1
Number of observations	13190
Number of dependent variables	5
Number of independent variables	0
Number of continuous latent variables	4
Number of categorical latent variables	1

Observed dependent variables

Continuous				
BMI1	BMI2	BMI3	BMI4	BMI5

Observed auxiliary variables

SID_V22	SID_V23
---------	---------

Continuous latent variables

I	S	Q	CUBIC
---	---	---	-------

Categorical latent variables

C

Variables with special functions

ID variable	ID
-------------	----

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
Random Starts Specifications	
Number of initial stage random starts	1000
Number of final stage optimizations	200
Number of initial stage iterations	10
Initial stage convergence criterion	0.100D+01
Random starts scale	0.500D+01
Random seed for generating random starts	0

Input data file(s)

mplusdata females 7off_v2.txt

Input data format FREE

SUMMARY OF DATA

Number of missing data patterns	16
Number of y missing data patterns	16
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				
	BMI1	BMI2	BMI3	BMI4	BMI5
BMI1	0.853				
BMI2	0.651	0.749			
BMI3	0.728	0.646	0.864		
BMI4	0.689	0.599	0.709	0.825	
BMI5	0.675	0.586	0.691	0.700	0.809

SAMPLE STATISTICS

ESTIMATED SAMPLE STATISTICS

	Means				
	BMI1	BMI2	BMI3	BMI4	BMI5
	17.369	21.083	22.593	24.599	25.695
	Covariances				
	BMI1	BMI2	BMI3	BMI4	BMI5
BMI1	6.457				
BMI2	5.224	9.247			
BMI3	4.463	6.952	12.660		
BMI4	5.785	8.609	13.551	23.743	
BMI5	5.472	8.298	13.885	21.788	27.559
	Correlations				
	BMI1	BMI2	BMI3	BMI4	BMI5
BMI1	1.000				
BMI2	0.676	1.000			
BMI3	0.494	0.643	1.000		
BMI4	0.467	0.581	0.782	1.000	
BMI5	0.410	0.520	0.743	0.852	1.000

MAXIMUM LOG-LIKELIHOOD VALUE FOR THE UNRESTRICTED (H1) MODEL IS -130804.853

UNIVARIATE SAMPLE STATISTICS

UNIVARIATE HIGHER-ORDER MOMENT DESCRIPTIVE STATISTICS

iles	Variable/	Mean/	Skewness/	Minimum/	% with	Percent	
0%	Sample Size	Variance	Kurtosis	Maximum	Min/Max	20%/60%	40%/8
	Median						
9	BMI1	17.367	1.271	10.195	0.01%	15.348	16.38
5	16.884						
	11248.000	6.436	2.775	37.749	0.01%	17.449	19.09
	BMI2	21.067	1.355	9.881	0.01%	18.678	20.01

0	20.638						
	9877.000	9.141	5.006	53.698	0.01%	21.326	23.11
4							
	BMI3	22.536	1.647	13.978	0.01%	19.850	21.21
1	21.873						
	11399.000	12.321	4.846	52.338	0.01%	22.596	24.62
8							
	BMI4	24.610	1.547	11.173	0.01%	20.974	22.60
0	23.456						
	10887.000	23.526	3.769	64.684	0.01%	24.462	27.61
8							
	BMI5	25.606	1.469	11.277	0.01%	21.628	23.41
5	24.412						
	10667.000	26.811	3.265	58.195	0.01%	25.544	29.01
0							

RANDOM STARTS RESULTS RANKED FROM THE BEST TO THE WORST LOGLIKELIHOOD VALUES

1 perturbed starting value run(s) did not converge in the initial stage optimizations.

Final stage loglikelihood values at local maxima, seeds, and initial stage start number s:

-123744.396	490123	995
-123744.396	318177	748
-123744.396	unperturbed	0
-123744.396	587946	120
-123744.396	479273	156
-123744.396	850112	922
-123744.396	971693	470
-123744.396	506886	576
-123744.396	549244	756
-123744.396	964570	701
-123744.396	954354	840
-123744.396	299977	956
-123744.396	420910	928
-123744.396	323588	826
-123744.396	496710	386
-123744.396	817298	967
-123744.396	341041	34
-123744.396	161421	519
-123744.396	622290	880
-123744.396	848331	137
-123744.396	668003	647
-123744.396	588699	828
-123744.396	354208	196
-123744.396	876943	650
-123744.396	345974	622
-123744.396	118421	139
-123853.217	252346	528
-123853.217	618000	190
-123853.217	118958	994
-123853.217	831410	567
-123853.217	982520	737
-123853.217	865906	641
-130906.355	188498	258
-130906.355	629320	222
-130906.355	691234	250
-130906.355	112586	494
-130906.355	494209	904
-130906.355	521575	313
-130906.355	760531	550
-130906.355	319144	176
-130906.355	529455	268
-130906.355	399508	415
-130906.355	387701	275
-130906.355	928624	981

-130906.355	370466	41
-130906.355	567165	319
-130906.355	168888	817
-130906.355	237332	661
-130906.355	556929	734
-130906.355	473343	844
-130906.355	945065	255
-130906.355	157351	579
-130906.355	910224	580
-130906.355	647617	725
-130906.355	366706	29
-130906.355	891347	504
-130906.355	254551	996
-130906.355	82200	830
-130906.355	298275	418
-130906.355	327927	908
-130906.355	941975	816
-130906.355	685268	596
-130906.355	484501	163
-130906.355	268217	83
-130906.355	163110	584
-130906.355	814975	129
-130906.355	495366	964
-130906.355	76451	211
-130906.355	798821	423
-130906.355	130541	896
-130906.355	114433	708
-130906.355	699810	571
-130906.355	203508	806
-130906.355	710154	831
-130906.355	193569	440
-130906.355	700846	867
-130906.355	350608	334
-130906.355	395754	388
-130906.355	802682	419
-130906.355	700270	855
-130906.355	89970	223
-130906.355	265218	924
-130906.355	7959	256
-130906.355	127362	757
-130906.355	94573	983
-130906.355	153942	31
-130906.355	879338	309
-130906.355	462821	745
-130906.355	780698	337
-130906.355	286735	175
-130906.355	79212	517
-130906.355	121425	511
-130906.355	972430	491
-130906.355	301717	823
-130938.060	35191	703
-130938.060	164305	128
-130938.060	303834	798
-130938.060	137305	379
-130938.060	628143	854
-130938.060	552272	654
-130938.060	147440	514
-130938.060	411615	171
-130938.060	765586	709
-130938.060	355254	796
-130938.060	105656	909
-130938.060	794236	127
-130938.060	810705	626
-130938.060	80438	246
-130938.060	211281	292
-130938.060	264081	186
-130938.060	926283	269
-130938.060	891531	206

-130938.060	595759	997
-130938.060	210870	383
-130938.060	232226	235
-130938.060	702492	718
-130938.060	72662	729
-130938.060	724087	925
-130938.060	455410	999
-130938.060	991329	182
-130938.060	848163	47
-130938.060	461687	833
-130938.060	576783	866
-130938.060	188640	451
-130938.060	791285	416
-130938.060	506113	895
-130938.060	985387	381
-130938.060	465160	862
-130938.060	316165	299
-130938.060	710445	792
-130938.060	373505	88
-130938.060	140442	500
-130938.060	821011	161
-130938.060	646573	741
-130938.060	987560	985
-130938.060	344422	296
-130938.060	671390	814
-130938.060	871438	561
-130938.060	343926	624
-130938.060	23012	352
-130938.060	491970	563

59 perturbed starting value run(s) did not converge or were rejected in the third stage
.

THE BEST LOGLIKELIHOOD VALUE HAS BEEN REPLICATED. RERUN WITH AT LEAST TWICE THE
RANDOM STARTS TO CHECK THAT THE BEST LOGLIKELIHOOD IS STILL OBTAINED AND REPLICATED.

THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters 58

Loglikelihood

H0 Value	-123744.396
H0 Scaling Correction Factor for MLR	1.2564

Information Criteria

Akaike (AIC)	247604.791
Bayesian (BIC)	248039.050
Sample-Size Adjusted BIC (n* = (n + 2) / 24)	247854.731

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

Latent
Classes

1	1427.39212	0.10822
2	2473.88445	0.18756
3	3921.13290	0.29728
4	5367.59054	0.40694

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

Latent
Classes

1	1427.39212	0.10822
2	2473.88445	0.18756
3	3921.13290	0.29728
4	5367.59054	0.40694

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

Class Counts and Proportions

Latent
Classes

1	1227	0.09303
2	1942	0.14723
3	3771	0.28590
4	6250	0.47384

CLASSIFICATION QUALITY

Entropy	0.565
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Average Latent Class Probabilities for Most Likely Latent Class Membership (Row)
by Latent Class (Column)

	1	2	3	4
1	0.862	0.031	0.107	0.000
2	0.043	0.695	0.156	0.106
3	0.073	0.107	0.741	0.078
4	0.002	0.109	0.110	0.779

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

	1	2	3	4
1	0.741	0.058	0.193	0.008
2	0.015	0.546	0.164	0.275
3	0.033	0.077	0.713	0.176
4	0.000	0.038	0.055	0.907

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

	1	2	3	4
1	4.579	2.037	3.232	0.000
2	-2.896	0.683	-0.521	0.000
3	-1.662	-0.821	1.399	0.000

4	-9.427	-3.166	-2.804	0.000
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MODEL RESULTS

		Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Latent Class 1					
I					
BMI1		1.000	0.000	999.000	999.000
BMI2		1.000	0.000	999.000	999.000
BMI3		1.000	0.000	999.000	999.000
BMI4		1.000	0.000	999.000	999.000
BMI5		1.000	0.000	999.000	999.000
S					
BMI1		-15.080	0.000	999.000	999.000
BMI2		-10.120	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		7.940	0.000	999.000	999.000
BMI5		16.190	0.000	999.000	999.000
Q					
BMI1		227.406	0.000	999.000	999.000
BMI2		102.414	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		63.044	0.000	999.000	999.000
BMI5		262.116	0.000	999.000	999.000
CUBIC					
BMI1		-3429.289	0.000	999.000	999.000
BMI2		-1036.434	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		500.566	0.000	999.000	999.000
BMI5		4243.660	0.000	999.000	999.000
BMI5	ON				
BMI4		0.708	0.032	22.062	0.000
BMI4	ON				
BMI3		0.503	0.053	9.581	0.000
BMI3	ON				
BMI2		0.451	0.033	13.497	0.000
BMI2	ON				
BMI1		0.477	0.050	9.465	0.000
S	WITH				
Q		0.000	0.000	999.000	999.000
I		0.026	0.004	6.363	0.000
I	WITH				
Q		0.000	0.000	999.000	999.000
Means					
I		17.089	0.929	18.403	0.000
S		0.438	0.199	2.202	0.028
Q		-0.002	0.004	-0.387	0.699
CUBIC		-0.003	0.001	-3.829	0.000
Intercepts					
BMI1		0.000	0.000	999.000	999.000
BMI2		0.000	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		0.000	0.000	999.000	999.000

BMI5		0.000	0.000	999.000	999.000
Variances					
I		1.327	0.081	16.405	0.000
S		0.003	0.000	12.769	0.000
Q		0.000	0.000	999.000	999.000
CUBIC		0.000	0.000	999.000	999.000
Residual Variances					
BMI1		10.790	0.681	15.844	0.000
BMI2		12.762	1.479	8.628	0.000
BMI3		19.835	1.455	13.631	0.000
BMI4		26.087	1.895	13.766	0.000
BMI5		20.327	1.743	11.660	0.000
Latent Class 2					
I					
BMI1		1.000	0.000	999.000	999.000
BMI2		1.000	0.000	999.000	999.000
BMI3		1.000	0.000	999.000	999.000
BMI4		1.000	0.000	999.000	999.000
BMI5		1.000	0.000	999.000	999.000
S					
BMI1		-15.080	0.000	999.000	999.000
BMI2		-10.120	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		7.940	0.000	999.000	999.000
BMI5		16.190	0.000	999.000	999.000
Q					
BMI1		227.406	0.000	999.000	999.000
BMI2		102.414	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		63.044	0.000	999.000	999.000
BMI5		262.116	0.000	999.000	999.000
CUBIC					
BMI1		-3429.289	0.000	999.000	999.000
BMI2		-1036.434	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		500.566	0.000	999.000	999.000
BMI5		4243.660	0.000	999.000	999.000
BMI5	ON				
BMI4		0.344	0.058	5.918	0.000
BMI4	ON				
BMI3		0.374	0.048	7.754	0.000
BMI3	ON				
BMI2		0.186	0.027	6.936	0.000
BMI2	ON				
BMI1		0.106	0.036	2.968	0.003
S	WITH				
Q		0.000	0.000	999.000	999.000
I		0.026	0.004	6.363	0.000
I	WITH				
Q		0.000	0.000	999.000	999.000
Means					
I		17.995	0.567	31.745	0.000
S		-0.363	0.120	-3.029	0.002
Q		-0.003	0.003	-1.272	0.203

CUBIC	0.001	0.000	2.467	0.014
Intercepts				
BMI1	0.000	0.000	999.000	999.000
BMI2	0.000	0.000	999.000	999.000
BMI3	0.000	0.000	999.000	999.000
BMI4	0.000	0.000	999.000	999.000
BMI5	0.000	0.000	999.000	999.000
Variances				
I	1.327	0.081	16.405	0.000
S	0.003	0.000	12.769	0.000
Q	0.000	0.000	999.000	999.000
CUBIC	0.000	0.000	999.000	999.000
Residual Variances				
BMI1	5.090	0.432	11.788	0.000
BMI2	4.471	0.379	11.788	0.000
BMI3	1.870	0.195	9.584	0.000
BMI4	2.480	0.424	5.852	0.000
BMI5	1.652	0.366	4.511	0.000
Latent Class 3				
I				
BMI1	1.000	0.000	999.000	999.000
BMI2	1.000	0.000	999.000	999.000
BMI3	1.000	0.000	999.000	999.000
BMI4	1.000	0.000	999.000	999.000
BMI5	1.000	0.000	999.000	999.000
S				
BMI1	-15.080	0.000	999.000	999.000
BMI2	-10.120	0.000	999.000	999.000
BMI3	0.000	0.000	999.000	999.000
BMI4	7.940	0.000	999.000	999.000
BMI5	16.190	0.000	999.000	999.000
Q				
BMI1	227.406	0.000	999.000	999.000
BMI2	102.414	0.000	999.000	999.000
BMI3	0.000	0.000	999.000	999.000
BMI4	63.044	0.000	999.000	999.000
BMI5	262.116	0.000	999.000	999.000
CUBIC				
BMI1	-3429.289	0.000	999.000	999.000
BMI2	-1036.434	0.000	999.000	999.000
BMI3	0.000	0.000	999.000	999.000
BMI4	500.566	0.000	999.000	999.000
BMI5	4243.660	0.000	999.000	999.000
BMI5	ON			
BMI4	0.452	0.026	17.264	0.000
BMI4	ON			
BMI3	0.438	0.041	10.581	0.000
BMI3	ON			
BMI2	0.379	0.035	10.923	0.000
BMI2	ON			
BMI1	0.293	0.030	9.757	0.000
S	WITH			
Q	0.000	0.000	999.000	999.000
I	0.026	0.004	6.363	0.000

I	WITH				
Q		0.000	0.000	999.000	999.000
Means					
I		15.451	0.662	23.341	0.000
S		0.005	0.093	0.058	0.954
Q		0.005	0.003	1.901	0.057
CUBIC		0.000	0.000	-0.509	0.611
Intercepts					
BMI1		0.000	0.000	999.000	999.000
BMI2		0.000	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		0.000	0.000	999.000	999.000
BMI5		0.000	0.000	999.000	999.000
Variances					
I		1.327	0.081	16.405	0.000
S		0.003	0.000	12.769	0.000
Q		0.000	0.000	999.000	999.000
CUBIC		0.000	0.000	999.000	999.000
Residual Variances					
BMI1		1.902	0.220	8.660	0.000
BMI2		2.702	0.207	13.069	0.000
BMI3		4.621	0.351	13.176	0.000
BMI4		9.415	0.643	14.646	0.000
BMI5		7.405	0.471	15.715	0.000
Latent Class 4					
I					
BMI1		1.000	0.000	999.000	999.000
BMI2		1.000	0.000	999.000	999.000
BMI3		1.000	0.000	999.000	999.000
BMI4		1.000	0.000	999.000	999.000
BMI5		1.000	0.000	999.000	999.000
S					
BMI1		-15.080	0.000	999.000	999.000
BMI2		-10.120	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		7.940	0.000	999.000	999.000
BMI5		16.190	0.000	999.000	999.000
Q					
BMI1		227.406	0.000	999.000	999.000
BMI2		102.414	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		63.044	0.000	999.000	999.000
BMI5		262.116	0.000	999.000	999.000
CUBIC					
BMI1		-3429.289	0.000	999.000	999.000
BMI2		-1036.434	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		500.566	0.000	999.000	999.000
BMI5		4243.660	0.000	999.000	999.000
BMI5	ON				
BMI4		0.183	0.050	3.620	0.000
BMI4	ON				
BMI3		0.166	0.030	5.543	0.000
BMI3	ON				
BMI2		0.119	0.019	6.218	0.000

BMI2	ON				
BMI1		0.131	0.023	5.766	0.000
S	WITH				
Q		0.000	0.000	999.000	999.000
I		0.026	0.004	6.363	0.000
I	WITH				
Q		0.000	0.000	999.000	999.000
Means					
I		18.248	0.365	50.031	0.000
S		0.021	0.057	0.373	0.709
Q		-0.005	0.002	-2.434	0.015
CUBIC		0.000	0.000	1.264	0.206
Intercepts					
BMI1		0.000	0.000	999.000	999.000
BMI2		0.000	0.000	999.000	999.000
BMI3		0.000	0.000	999.000	999.000
BMI4		0.000	0.000	999.000	999.000
BMI5		0.000	0.000	999.000	999.000
Variances					
I		1.327	0.081	16.405	0.000
S		0.003	0.000	12.769	0.000
Q		0.000	0.000	999.000	999.000
CUBIC		0.000	0.000	999.000	999.000
Residual Variances					
BMI1		0.507	0.076	6.649	0.000
BMI2		1.486	0.072	20.629	0.000
BMI3		1.320	0.070	18.723	0.000
BMI4		1.196	0.118	10.151	0.000
BMI5		1.175	0.100	11.806	0.000
Categorical Latent Variables					
Means					
C#1		-1.325	0.129	-10.254	0.000
C#2		-0.775	0.122	-6.324	0.000
C#3		-0.314	0.084	-3.745	0.000

QUALITY OF NUMERICAL RESULTS

Condition Number for the Information Matrix 0.317E-08
 (ratio of smallest to largest eigenvalue)

TESTS OF CATEGORICAL LATENT VARIABLE MULTINOMIAL LOGISTIC REGRESSIONS USING THE 3-STEP PROCEDURE

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
C#1 ON				
SID V22	0.454	0.130	3.505	0.000
SID_V23	0.790	0.130	6.061	0.000
C#2 ON				
SID_V22	0.230	0.123	1.867	0.062
SID_V23	-0.071	0.136	-0.526	0.599
C#3 ON				
SID_V22	0.139	0.101	1.369	0.171
SID_V23	0.624	0.101	6.187	0.000

Intercepts				
C#1	-1.857	0.117	-15.806	0.000
C#2	-0.871	0.109	-8.014	0.000
C#3	-0.634	0.088	-7.171	0.000

Parameterization using Reference Class 1

C#2	ON				
	SID_V22	-0.225	0.162	-1.390	0.164
	SID_V23	-0.861	0.170	-5.070	0.000
C#3	ON				
	SID_V22	-0.316	0.160	-1.974	0.048
	SID_V23	-0.166	0.158	-1.047	0.295
C#4	ON				
	SID_V22	-0.454	0.130	-3.505	0.000
	SID_V23	-0.790	0.130	-6.061	0.000

Intercepts				
C#2	0.986	0.146	6.741	0.000
C#3	1.223	0.144	8.482	0.000
C#4	1.857	0.117	15.806	0.000

Parameterization using Reference Class 2

C#1	ON				
	SID_V22	0.225	0.162	1.390	0.164
	SID_V23	0.861	0.170	5.070	0.000
C#3	ON				
	SID_V22	-0.091	0.147	-0.620	0.536
	SID_V23	0.696	0.155	4.483	0.000
C#4	ON				
	SID_V22	-0.230	0.123	-1.867	0.062
	SID_V23	0.071	0.136	0.526	0.599

Intercepts				
C#1	-0.986	0.146	-6.741	0.000
C#3	0.237	0.130	1.820	0.069
C#4	0.871	0.109	8.014	0.000

Parameterization using Reference Class 3

C#1	ON				
	SID_V22	0.316	0.160	1.974	0.048
	SID_V23	0.166	0.158	1.047	0.295
C#2	ON				
	SID_V22	0.091	0.147	0.620	0.536
	SID_V23	-0.696	0.155	-4.483	0.000
C#4	ON				
	SID_V22	-0.139	0.101	-1.369	0.171
	SID_V23	-0.624	0.101	-6.187	0.000

Intercepts				
C#1	-1.223	0.144	-8.482	0.000
C#2	-0.237	0.130	-1.820	0.069
C#4	0.634	0.088	7.171	0.000

ODDS RATIOS FOR TESTS OF CATEGORICAL LATENT VARIABLE MULTINOMIAL LOGISTIC REGRESSIONS
USING THE 3-STEP PROCEDURE

		95% C.I.	
Estimate	S.E.	Lower 2.5%	Upper 2.5%

C#1	ON				
	SID_V22	1.575	0.204	1.222	2.031
	SID_V23	2.204	0.287	1.707	2.845
C#2	ON				
	SID_V22	1.258	0.155	0.989	1.601
	SID_V23	0.931	0.126	0.714	1.215
C#3	ON				
	SID_V22	1.149	0.116	0.942	1.401
	SID_V23	1.867	0.188	1.532	2.275

Parameterization using Reference Class 1

C#2	ON				
	SID_V22	0.799	0.129	0.582	1.097
	SID_V23	0.423	0.072	0.303	0.590
C#3	ON				
	SID_V22	0.729	0.117	0.533	0.998
	SID_V23	0.847	0.134	0.621	1.156
C#4	ON				
	SID_V22	0.635	0.082	0.492	0.818
	SID_V23	0.454	0.059	0.351	0.586

Parameterization using Reference Class 2

C#1	ON				
	SID_V22	1.252	0.202	0.912	1.719
	SID_V23	2.367	0.402	1.696	3.302
C#3	ON				
	SID_V22	0.913	0.134	0.685	1.218
	SID_V23	2.005	0.311	1.479	2.718
C#4	ON				
	SID_V22	0.795	0.098	0.625	1.012
	SID_V23	1.074	0.146	0.823	1.402

Parameterization using Reference Class 3

C#1	ON				
	SID_V22	1.371	0.219	1.002	1.877
	SID_V23	1.180	0.187	0.865	1.610
C#2	ON				
	SID_V22	1.095	0.161	0.821	1.461
	SID_V23	0.499	0.077	0.368	0.676
C#4	ON				
	SID_V22	0.871	0.088	0.714	1.062
	SID_V23	0.536	0.054	0.439	0.653

CONFIDENCE INTERVALS OF MODEL RESULTS

		Lower .5%	Lower 2.5%	Lower 5%	Estimate	Upper 5%	Upper 2.5%
Upper .5%							
Latent Class 1							
I							
	BMI1	1.000	1.000	1.000	1.000	1.000	1.000
	1.000						
	BMI2	1.000	1.000	1.000	1.000	1.000	1.000