MIS Quarterly

RESEARCH COMMENTARY

INCORPORATING FORMATIVE MEASURES INTO COVARIANCE-BASED STRUCTURAL EQUATION MODELS

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Appendix A

MIMIC Model Specification

```
! Baseline MIMIC Model
Observed Variables: x1 x2 x3 x4 y1 y2 y3 y4
Correlation Matrix:
1.000
0.666   1.000
0.465   0.599   1.000
0.483   0.520   0.351   1.000
0.407   0.353   0.273   0.488   1.000
0.473   0.406   0.298   0.536   0.681   1.000
0.391   0.390   0.361   0.421   0.705   0.653   1.000
0.422   0.464   0.418   0.553   0.678   0.737   0.647   1.000

Standard Deviations:
1.110
1.013
1.485
1.196
1.454
1.444
1.400
1.371
Sample Size:  261
Latent Variables:  ETA
Relationships:
ETA = x1 x2 x3 x4
y1 = 1*ETA
y2 = ETA
Options:  ND=3 SC
Path Diagram
End of Program
```

Note: ! means a comment and is ignored by the program.

Appendix B

Two-Construct Model Specification

```
! Two-Construct Model
Observed Variables: x1 x2 x3 x4 y1 y2 y3 y4
Correlation Matrix:
1.000
0.666   1.000
0.465   0.599   1.000
0.483   0.520   0.351   1.000
0.407   0.353   0.273   0.488   1.000
0.473   0.406   0.298   0.536   0.681   1.000
0.391   0.390   0.361   0.421   0.705   0.653   1.000
0.422   0.464   0.418   0.553   0.678   0.737   0.647   1.000

Standard Deviations:
1.110
1.013
1.485
1.196
1.454
1.444
1.400
1.371
Sample Size:  261
Latent Variables:  ETA1   ETA2
Relationships:
ETA1 = 1*x1
ETA1 = x2 x3 x4
y1 = 1*ETA2
y2 y3 y4 = ETA2
ETA2 = ETA 1
Set the Error Variance of ETA1 to 0
Options:  ND=3 SO SC
Path Diagram
End of Program
```

Appendix C

Three-Construct Model Specification

```
! Three-Construct Model:  gamma11 fixed to 1
Observed Variables:  x1 x2 x3 x4 y1 y2 y3 y4 y5 y6 y7
Covariance Matrix from File example.cov
Sample Size:  261
Latent Variables:  ETA1 ETA2 ETA3
Relationships:
ETA1 = 1*x1
ETA1 = x2 x3 x4
y1 = 1*ETA2
y2 y3 y4 = ETA2
y5 = 1*ETA3
y6 y7 = ETA3
ETA2 = ETA1
ETA3 = ETA1
Options:  ND=3 SO SC
Path Diagram
End of Program
```

```
! Three-Construct Model: beta21 fixed to 1
Observed Variables:  x1 x2 x3 x4 y1 y2 y3 y4 y5 y6 y7
Covariance Matrix from File example.cov
Sample Size:  261
Latent Variables:  ETA1 ETA2 ETA3
Relationships:
ETA1 = x1 x2 x3 x4
y1 = 1*ETA2
y2 y3 y4 = ETA2
y5 = 1*ETA3
y6 y7 = ETA3
ETA2 = 1*ETA1
ETA3 = ETA1
Options:  ND=3 SC
Path Diagram
End of Program
```

Note: The covariance matrix (example.cov) is shown in Appendix E.

Appendix D

Four-Construct Model Specification

```
! Four-Construct Model
Observed Variables:  x1 x2 x3 x4 y1 y2 y3 y4 y5 y6 y7 y8 y9 y10
Covariance Matrix from File example.cov
Sample Size:  261
Latent Variables:  ETA1 ETA2 ETA3 ETA4
Relationships:
ETA1 = x1 x2 x3 x4
y1 = 1*ETA2
y2 y3 y4 = ETA2
y5 = 1*ETA3
y6 y7 = ETA3
y8 = 1*ETA4
y9 y10 = ETA4
ETA2 = ETA1
ETA4 = 1*ETA1
ETA3 = ETA2
Options: ND=3 SC
Path Diagram
End of Program
```

Note: The covariance matrix (example.cov) is shown in Appendix E.

Appendix E

Covariance Matrix for Three- and Four-Construct Models

	x1	x2	x3	x4	y1	y2	y3	y4	y5	y6	y7	y8	y9	y10
x1	1.232													
x2	0.749	1.026												
x3	0.766	0.901	2.205											
x4	0.641	0.630	0.623	1.430										
y1	0.657	0.520	0.589	0.849	2.114									
y2	0.758	0.594	0.639	0.926	1.430	2.085								
y3	0.608	0.553	0.751	0.705	1.435	1.320	1.960							
y4	0.642	0.644	0.851	0.907	1.352	1.459	1.242	1.880						
y5	-0.499	-0.497	-0.659	-0.740	-1.208	-1.088	-1.019	-0.903	2.582					
y6	-0.252	-0.179	-0.150	-0.497	-0.765	-0.552	-0.627	-0.549	1.423	2.199				
y7	-0.176	-0.317	-0.215	-0.542	-0.782	-0.702	-0.590	-0.542	1.272	0.728	2.280			
y8	0.485	0.254	0.388	0.734	1.055	0.934	0.886	0.920	-0.907	-0.732	-0.696	2.958		
y9	0.559	0.435	0.571	0.966	1.350	1.322	0.932	1.261	-1.163	-0.747	-1.028	2.377	3.478	
y10	0.549	0.356	0.369	0.627	0.910	0.969	0.803	0.804	-0.656	-0.691	-0.786	1.584	1.760	3.534