Structural Equation Models

Models Info

Estimation Method	DWLS
Optimization Method	NLMINB
Number of observations	281
Free parameters	103
Standard errors	Robust
Scaled test	Mean adjusted scaled and shifted
Converged	TRUE
Iterations	70
Model	AR=~AR1+AR2+AR3+AR4
	CB=~CB1+CB2+CB3+CB4
	CE=~CE1+CE2+CE3+CE4
	MRP=~MRP1+MRP2+MRP3+MRP4
	MRQ=~MMRQ1+MMRQ2+MMRQ3+MMRQ4
	MRP~AR+CB+CE
	MRQ~AR+CB+CE

Note. Variable (AR1,AR2,AR3,AR4,CB1,CB2,CB3,CB4,CE1,CE2,CE3,CE4,MRP1,MRP2,MRP3,MRP4,MMRQ1,MMRQ2,MMRQ3,MMRQ4) has been coerced to ordered type.

Note. lavaan WARNING: The variance-covariance matrix of the estimated parameters (vcov) does not appear to be positive definite! The smallest eigenvalue (= -1.181659e-18) is smaller than zero. This may be a symptom that the model is not identified.

Note. lavaan WARNING: Covariance matrix of latent variables is not positive definite. variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate.

Overall Tests

Model tests

Label	X^2	df	p
User Model	506	160	< .001
Baseline Model	13483	190	< .001
Scaled User	525	160	< .001
Scaled Baseline	5111	190	< .001

Fit indices

			95% Confidence Intervals		
Type	SRMR	RMSEA	Lower	Upper	RMSEA p
Classical	0.077	0.088	0.079	0.097	< .001
Robust	0.074				
Scaled	0.074	0.090	0.082	0.099	< .001

User model versus baseline model

	Model	Scaled
Comparative Fit Index (CFI)	0.974	0.926
Tucker-Lewis Index (TLI)	0.969	0.912
Bentler-Bonett Non-normed Fit Index (NNFI)	0.969	0.912
Relative Noncentrality Index (RNI)	0.974	0.926
Bentler-Bonett Normed Fit Index (NFI)	0.962	0.897
Bollen's Relative Fit Index (RFI)	0.955	0.878
Bollen's Incremental Fit Index (IFI)	0.974	0.926
Parsimony Normed Fit Index (PNFI)	0.810	

Additional fit indices

	Model
Hoelter Critical N (CN), a=0.05	106.350
Hoelter Critical N (CN), a=0.01	114.099
Goodness of Fit Index (GFI)	0.976
Adjusted Goodness of Fit Index (AGFI)	0.960
Parsimony Goodness of Fit Index (PGFI)	0.594
McDonald Fit Index (MFI)	0.539
Expected Cross-Validation Index (ECVI)	.
Loglikelihood user model (H0)	.
Loglikelihood unrestricted model (H1)	.
Akaike (AIC)	.
Bayesian (BIC)	.
Sample-size adjusted Bayesian (SABIC)	.

R^2

Variable	R^2
MRP	0.824
MRQ	0.911

Estimates

Parameters estimates

				95% Confidence Intervals				
Dep	Pred	Estimate	SE	Lower	Upper	β	z	p
MRP	AR	0.4389	0.385	-0.315	1.1927	0.3323	1.141	0.254
MRP	CB	-0.2759	0.227	-0.721	0.1693	-0.2939	-1.215	0.225
MRP	CE	0.7786	0.133	0.518	1.0393	0.8786	5.853	< .001
MRQ	AR	-0.7890	0.381	-1.536	-0.0421	-0.4791	-2.071	0.038
MRQ	CB	-0.0651	0.282	-0.618	0.4880	-0.0556	-0.231	0.818
MRQ	CE	1.5289	0.182	1.173	1.8852	1.3834	8.411	< .001

Measurement model

				95% Confidence Intervals				
Latent	**Observed**	**Estimate**	**SE**	**Lower**	**Upper**	**β**	**z**	**p**
AR	AR1	1.000	0.0000	1.000	1.000	0.481		
	AR2	1.299	0.1481	1.009	1.589	0.625	8.77	< .001
	AR3	1.324	0.1368	1.056	1.592	0.637	9.68	< .001
	AR4	1.538	0.1609	1.222	1.853	0.739	9.56	< .001
CB	CB1	1.000	0.0000	1.000	1.000	0.677		
	CB2	0.934	0.0783	0.780	1.087	0.632	11.93	< .001
	CB3	0.689	0.0911	0.510	0.868	0.466	7.56	< .001
	CB4	0.414	0.0791	0.259	0.570	0.280	5.24	< .001
CE	CE1	1.000	0.0000	1.000	1.000	0.717		
	CE2	1.194	0.0593	1.077	1.310	0.856	20.12	< .001
	CE3	1.057	0.0582	0.943	1.171	0.757	18.15	< .001
	CE4	0.920	0.0692	0.784	1.055	0.659	13.28	< .001
MRP	MRP1	1.000	0.0000	1.000	1.000	0.635		
	MRP2	0.489	0.0933	0.306	0.672	0.310	5.24	< .001
	MRP3	1.039	0.0747	0.893	1.185	0.660	13.90	< .001
	MRP4	1.203	0.0697	1.067	1.340	0.764	17.27	< .001
MRQ	MMRQ1	1.000	0.0000	1.000	1.000	0.792		
	MMRQ2	0.911	0.0551	0.803	1.019	0.722	16.55	< .001
	MMRQ3	0.919	0.0422	0.837	1.002	0.728	21.81	< .001
	MMRQ4	0.914	0.0500	0.816	1.012	0.724	18.26	< .001

Variances and Covariances

				95% Confidence Intervals				
Variable 1	**Variable 2**	**Estimate**	**SE**	**Lower**	**Upper**	**β**	**z**	**p**
AR1	AR1	0.7687	0.0000	0.76870	0.7687	0.7687		
AR2	AR2	0.6097	0.0000	0.60975	0.6097	0.6097		
AR3	AR3	0.5945	0.0000	0.59449	0.5945	0.5945		
AR4	AR4	0.4532	0.0000	0.45319	0.4532	0.4532		
CB1	CB1	0.5422	0.0000	0.54219	0.5422	0.5422		
CB2	CB2	0.6009	0.0000	0.60086	0.6009	0.6009		
CB3	CB3	0.7827	0.0000	0.78265	0.7827	0.7827		
CB4	CB4	0.9213	0.0000	0.92135	0.9213	0.9213		
CE1	CE1	0.4863	0.0000	0.48628	0.4863	0.4863		
CE2	CE2	0.2680	0.0000	0.26803	0.2680	0.2680		
CE3	CE3	0.4262	0.0000	0.42620	0.4262	0.4262		
CE4	CE4	0.5655	0.0000	0.56553	0.5655	0.5655		
MRP1	MRP1	0.5966	0.0000	0.59659	0.5966	0.5966		
MRP2	MRP2	0.9036	0.0000	0.90362	0.9036	0.9036		
MRP3	MRP3	0.5646	0.0000	0.56455	0.5646	0.5646		
MRP4	MRP4	0.4160	0.0000	0.41604	0.4160	0.4160		
MMRQ1	MMRQ1	0.3725	0.0000	0.37253	0.3725	0.3725		
MMRQ2	MMRQ2	0.4794	0.0000	0.47942	0.4794	0.4794		
MMRQ3	MMRQ3	0.4696	0.0000	0.46959	0.4696	0.4696		
MMRQ4	MMRQ4	0.4758	0.0000	0.47577	0.4758	0.4758		
AR	AR	0.2313	0.0472	0.13873	0.3239	1.0000	4.90	< .001
CB	CB	0.4578	0.0636	0.33315	0.5825	1.0000	7.20	< .001
CE	CE	0.5137	0.0470	0.42163	0.6058	1.0000	10.93	< .001
MRP	MRP	0.0711	0.0342	0.00412	0.1380	0.1762	2.08	0.037
MRQ	MRQ	0.0561	0.0415	-0.02530	0.1376	0.0895	1.35	0.177
AR	CB	0.3604	0.0424	0.27724	0.4435	1.1075	8.50	< .001
AR	CE	0.3026	0.0367	0.23070	0.3744	0.8777	8.25	< .001
CB	CE	0.4143	0.0348	0.34612	0.4825	0.8543	11.91	< .001
MRP	MRQ	0.0311	0.0229	-0.01377	0.0760	0.4928	1.36	0.174

Intercepts

			95% Confidence Intervals			
Variable	**Intercept**	**SE**	**Lower**	**Upper**	**z**	**p**
AR1	0.000	0.000	0.000	0.000		
AR2	0.000	0.000	0.000	0.000		
AR3	0.000	0.000	0.000	0.000		
AR4	0.000	0.000	0.000	0.000		
CB1	0.000	0.000	0.000	0.000		
CB2	0.000	0.000	0.000	0.000		
CB3	0.000	0.000	0.000	0.000		
CB4	0.000	0.000	0.000	0.000		
CE1	0.000	0.000	0.000	0.000		
CE2	0.000	0.000	0.000	0.000		
CE3	0.000	0.000	0.000	0.000		
CE4	0.000	0.000	0.000	0.000		
MRP1	0.000	0.000	0.000	0.000		
MRP2	0.000	0.000	0.000	0.000		
MRP3	0.000	0.000	0.000	0.000		
MRP4	0.000	0.000	0.000	0.000		
MMRQ1	0.000	0.000	0.000	0.000		
MMRQ2	0.000	0.000	0.000	0.000		
MMRQ3	0.000	0.000	0.000	0.000		
MMRQ4	0.000	0.000	0.000	0.000		
AR	0.000	0.000	0.000	0.000		
CB	0.000	0.000	0.000	0.000		
CE	0.000	0.000	0.000	0.000		
MRP	0.000	0.000	0.000	0.000		
MRQ	0.000	0.000	0.000	0.000		

Thresholds

				95% Confidence Intervals			
Variable	**Step**	**Thresholds**	**SE**	**Lower**	**Upper**	**z**	**p**
AR1	t1	-1.225	0.099	-1.420	-1.030	-12.327	< .001
AR1	t2	-0.655	0.081	-0.814	-0.496	-8.082	< .001
AR1	t3	-0.427	0.077	-0.579	-0.276	-5.520	< .001
AR1	t4	0.689	0.082	0.528	0.849	8.425	< .001
AR2	t1	-2.302	0.218	-2.728	-1.875	-10.574	< .001
AR2	t2	-2.102	0.180	-2.455	-1.748	-11.661	< .001
AR2	t3	-0.049	0.075	-0.196	0.098	-0.655	0.512
AR3	t1	-2.451	0.254	-2.949	-1.953	-9.649	< .001
AR3	t2	-1.904	0.153	-2.203	-1.605	-12.479	< .001
AR3	t3	-1.581	0.121	-1.818	-1.344	-13.052	< .001
AR3	t4	0.202	0.075	0.054	0.350	2.678	0.007
AR4	t1	-2.102	0.180	-2.455	-1.748	-11.661	< .001
AR4	t2	-1.804	0.141	-2.081	-1.527	-12.766	< .001
AR4	t3	-1.325	0.104	-1.530	-1.121	-12.686	< .001
AR4	t4	0.379	0.077	0.228	0.530	4.930	< .001
CB1	t1	-2.302	0.218	-2.728	-1.875	-10.574	< .001
CB1	t2	-2.102	0.180	-2.455	-1.748	-11.661	< .001
CB1	t3	0.121	0.075	-0.026	0.268	1.607	0.108
CB2	t1	-2.302	0.218	-2.728	-1.875	-10.574	< .001
CB2	t2	-1.225	0.099	-1.420	-1.030	-12.327	< .001
CB2	t3	0.085	0.075	-0.062	0.232	1.131	0.258
CB3	t1	-1.961	0.160	-2.275	-1.648	-12.271	< .001
CB3	t2	0.457	0.078	0.304	0.609	5.873	< .001
CB4	t1	-1.761	0.137	-2.029	-1.492	-12.863	< .001
CB4	t2	-0.341	0.077	-0.491	-0.191	-4.457	< .001
CB4	t3	0.266	0.076	0.118	0.415	3.509	< .001
CB4	t4	1.325	0.104	1.121	1.530	12.686	< .001
CE1	t1	-1.647	0.126	-1.894	-1.399	-13.023	< .001
CE1	t2	-1.188	0.098	-1.379	-0.996	-12.164	< .001
CE1	t3	-0.677	0.081	-0.837	-0.518	-8.311	< .001
CE1	t4	0.782	0.084	0.618	0.946	9.327	< .001
CE2	t1	-2.102	0.180	-2.455	-1.748	-11.661	< .001
CE2	t2	-1.494	0.115	-1.719	-1.269	-13.014	< .001
CE2	t3	-0.994	0.090	-1.170	-0.817	-11.040	< .001
CE2	t4	0.507	0.079	0.353	0.661	6.459	< .001
CE3	t1	-2.102	0.180	-2.455	-1.748	-11.661	< .001
CE3	t2	-1.551	0.119	-1.784	-1.318	-13.049	< .001
CE3	t3	-0.794	0.084	-0.959	-0.629	-9.438	< .001
CE3	t4	0.831	0.085	0.665	0.998	9.769	< .001
CE4	t1	-1.904	0.153	-2.203	-1.605	-12.479	< .001
CE4	t2	-1.682	0.130	-1.936	-1.428	-12.988	< .001
CE4	t3	-1.347	0.106	-1.554	-1.140	-12.748	< .001
CE4	t4	0.303	0.076	0.154	0.453	3.984	< .001
MRP1	t1	-2.451	0.254	-2.949	-1.953	-9.649	< .001
MRP1	t2	-1.284	0.102	-1.484	-1.083	-12.552	< .001
MRP1	t3	-0.538	0.079	-0.693	-0.383	-6.809	< .001
MRP1	t4	0.758	0.083	0.595	0.921	9.104	< .001
MRP2	t1	-1.551	0.119	-1.784	-1.318	-13.049	< .001
MRP2	t2	-0.644	0.081	-0.802	-0.486	-7.968	< .001
MRP2	t3	-0.379	0.077	-0.530	-0.228	-4.930	< .001
MRP2	t4	1.170	0.097	0.980	1.360	12.079	< .001

Thresholds

				95% Confidence Intervals			
Variable	**Step**	**Thresholds**	**SE**	**Lower**	**Upper**	**z**	**p**
MRP3	t1	-1.225	0.099	-1.420	-1.030	-12.327	< .001
MRP3	t2	-0.487	0.078	-0.640	-0.334	-6.225	< .001
MRP3	t3	0.770	0.084	0.606	0.934	9.216	< .001
MRP4	t1	-0.794	0.084	-0.959	-0.629	-9.438	< .001
MRP4	t2	-0.350	0.077	-0.501	-0.200	-4.576	< .001
MRP4	t3	1.054	0.092	0.873	1.235	11.437	< .001
MMRQ1	t1	-2.302	0.218	-2.728	-1.875	-10.574	< .001
MMRQ1	t2	-0.979	0.090	-1.155	-0.804	-10.938	< .001
MMRQ1	t3	-0.313	0.076	-0.462	-0.163	-4.102	< .001
MMRQ1	t4	1.039	0.092	0.859	1.218	11.339	< .001
MMRQ2	t1	-2.451	0.254	-2.949	-1.953	-9.649	< .001
MMRQ2	t2	-1.417	0.110	-1.632	-1.202	-12.906	< .001
MMRQ2	t3	-1.206	0.098	-1.399	-1.013	-12.247	< .001
MMRQ2	t4	0.770	0.084	0.606	0.934	9.216	< .001
MMRQ3	t1	-1.961	0.160	-2.275	-1.648	-12.271	< .001
MMRQ3	t2	-1.119	0.095	-1.304	-0.933	-11.813	< .001
MMRQ3	t3	-0.644	0.081	-0.802	-0.486	-7.968	< .001
MMRQ3	t4	0.883	0.087	0.713	1.053	10.203	< .001
MMRQ4	t1	-2.191	0.196	-2.574	-1.807	-11.203	< .001
MMRQ4	t2	-1.494	0.115	-1.719	-1.269	-13.014	< .001
MMRQ4	t3	-0.870	0.086	-1.039	-0.701	-10.096	< .001
MMRQ4	t4	0.700	0.082	0.539	0.861	8.539	< .001

Additional outputs

Reliability indices

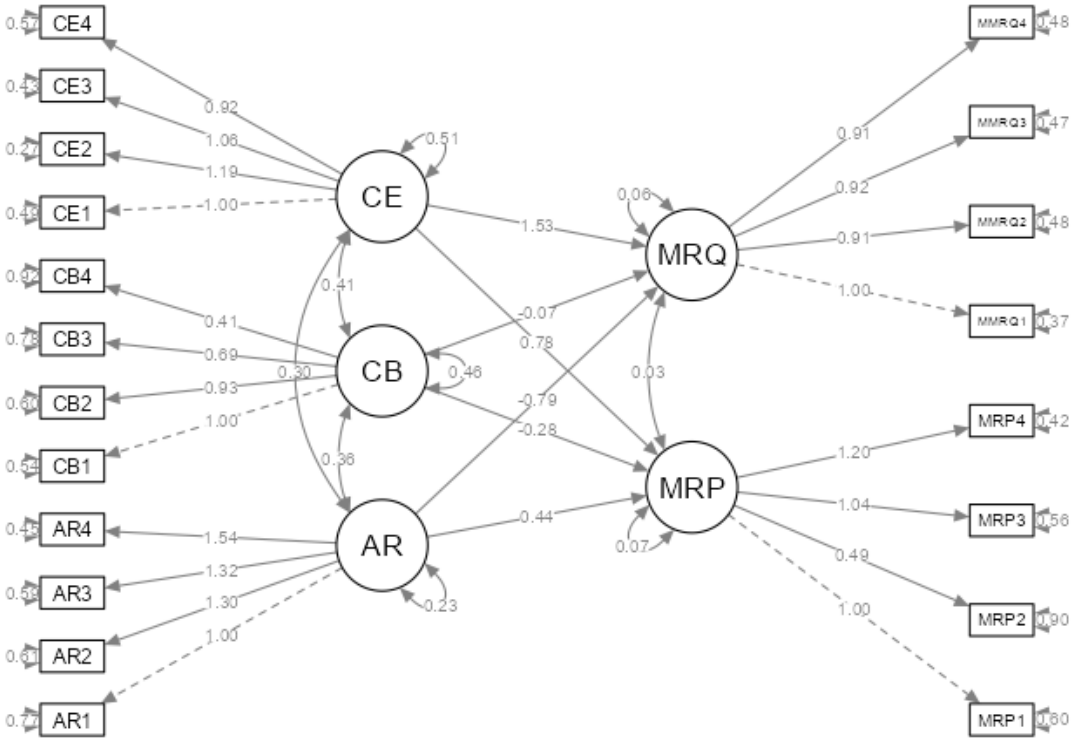
Variable	**α**	**Ordinal α**	**ω_1**	**ω_2**	**ω_3**	**AVE**
AR	0.522	0.717	0.575	0.575	0.566	0.393
CB	0.408	0.565	0.434	0.434	0.447	0.288
CE	0.715	0.818	0.773	0.773	0.792	0.563
MRP	0.620	0.684	0.622	0.622	0.612	0.380
MRQ	0.758	0.822	0.773	0.773	0.779	0.551

Heterotrait-monotrait (HTMT) ratio of correlations

	AR	**CB**	**CE**	**MRP**	**MRQ**
AR	1.000	1.115	0.851	0.757	0.666
CB	1.115	1.000	0.897	0.943	0.629
CE	0.851	0.897	1.000	0.902	0.922
MRP	0.757	0.943	0.902	1.000	0.860
MRQ	0.666	0.629	0.922	0.860	1.000

Path Model

Path diagrams


CE4
CE3
CE2
CE1
CB4
CB3
CB2
CB1
AR4
AR3
AR2
AR1
0.92
1.06
1.19
1.00
0.41
0.69
0.93
1.00
1.54
1.32
1.30
1.00
CE
CB
AR
0.51
0.46
0.23
0.41
0.30
0.36
1.53
-0.07
0.78
-0.79
-0.28
0.44
MRQ
MRP
0.06
0.07
0.03
0.91
0.92
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1.00
1.20
1.04
0.49
1.00
MMRQ4
MMRQ3
MMRQ2
MMRQ1
MRP4
MRP3
MRP2
MRP1
0.48
0.47
0.48
0.37
0.42
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0.90
0.60