

Bayesian SEM:
A more flexible representation of substantive theory
Web tables

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April 14, 2011

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Table 1: Bayesian analysis, non-informative cross-loading priors, 0.0 and 0.1 cross-loadings

Parameter	Estimates			S.E.	M.S.E.	95%	% Sig
	Population	Average	Std. Dev.	Average		Cover	Coeff
Cross-loading = 0.0, n=100, 5% reject proportion for the PPP = 0.036							
Major loading	0.800	0.8192	0.1034	0.1005	0.0110	0.928	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.0475	0.2447	0.2365	0.0620	0.938	1.000
Factor correlation	0.500	0.5026	0.0872	0.0886	0.0076	0.952	0.996
Cross-loading = 0.0, n=200, 5% reject proportion for the PPP = 0.032							
Major loading	0.800	0.8114	0.0680	0.0677	0.0047	0.948	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.0114	0.1635	0.1564	0.0268	0.922	1.000
Factor correlation	0.500	0.4999	0.0602	0.0621	0.0036	0.954	1.000
Cross-loading = 0.0, n=500, 5% reject proportion for the PPP = 0.024							
Major loading	0.800	0.8049	0.0412	0.0415	0.0017	0.946	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.0024	0.0974	0.0960	0.0095	0.940	1.000
Factor correlation	0.500	0.4999	0.0379	0.0390	0.0014	0.954	1.000
Cross-loading = 0.1, n=100, 5% reject proportion for the PPP = 0.056							
Major loading	0.800	0.7605	0.0934	0.0905	0.0103	0.902	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.2063	0.2713	0.2631	0.1160	0.832	1.000
Factor correlation	0.500	0.5278	0.0843	0.0859	0.0079	0.940	0.996
Cross-loading = 0.1, n=200, 5% reject proportion for the PPP = 0.080							
Major loading	0.800	0.7537	0.0615	0.0612	0.0059	0.860	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.1645	0.1796	0.1731	0.0592	0.806	1.000
Factor correlation	0.500	0.5256	0.0584	0.0600	0.0041	0.932	1.000
Cross-loading = 0.1, n=500, 5% reject proportion for the PPP = 0.262							
Major loading	0.800	0.7496	0.0386	0.0374	0.0040	0.700	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.1498	0.1092	0.1062	0.0343	0.684	1.000
Factor correlation	0.500	0.5264	0.0365	0.0376	0.0020	0.906	1.000

Table 2: ML: cross-loadings 0.0 and 0.1

Parameter	Estimates			S.E.	M.S.E.	95%	% Sig
	Population	Average	Std. Dev.	Average		Cover	Coeff
Cross-loading = 0.0, n=100, 5% reject proportion for the LRT χ^2 test = 0.172							
Major loading	0.800	0.8066	0.0984	0.0945	0.0097	0.944	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	0.9842	0.2079	0.2091	0.0435	0.932	1.000
Factor correlation	0.500	0.4926	0.0886	0.0867	0.0079	0.936	0.996
Cross-loading = 0.0, n=200, 5% reject proportion for the LRT χ^2 test = 0.090							
Major loading	0.800	0.8007	0.0667	0.0659	0.0044	0.954	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	0.9870	0.1476	0.1495	0.0219	0.952	1.000
Factor correlation	0.500	0.4949	0.0632	0.0613	0.0040	0.940	1.000
Cross-loading = 0.0, n=500, 5% reject proportion for the LRT χ^2 test = 0.060							
Major loading	0.800	0.8017	0.0420	0.0413	0.0018	0.942	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	0.9970	0.0948	0.0954	0.0090	0.950	1.000
Factor correlation	0.500	0.4978	0.0373	0.0387	0.0014	0.958	1.000
Cross-loading = 0.1, n=100, 5% reject proportion for the LRT χ^2 test = 0.226							
Major loading	0.800	0.7510	0.0894	0.0852	0.0104	0.884	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.1281	0.2373	0.2318	0.0726	0.944	1.000
Factor correlation	0.500	0.5192	0.0863	0.0839	0.0078	0.926	0.996
Cross-loading = 0.1, n=200, 5% reject proportion for the LRT χ^2 test = 0.228							
Major loading	0.800	0.7458	0.0606	0.0595	0.0066	0.834	1.000
Cross-loading	0.100	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.1316	0.1638	0.1649	0.0441	0.906	1.000
Factor correlation	0.500	0.5213	0.0616	0.0593	0.0042	0.922	1.000
Cross-loading = 0.1, n=500, 5% reject proportion for the LRT χ^2 test = 0.460							
Major loading	0.800	0.7470	0.0381	0.0373	0.0043	0.662	1.000
Cross-loading	0.000	0.0000	0.0000	0.0000	0.0000	1.000	0.000
Factor variance	1.000	1.1430	0.1049	0.1052	0.0314	0.744	1.000
Factor correlation	0.500	0.5242	0.0362	0.0375	0.0019	0.892	1.000

Table 3: Rejection rates for ML CFA and Bayes CFA with non-informative priors for residual covariances

Cross-loading	Sample size	ML LRT rejection rate	Bayes PPP rejection rate
0.0	200	0.048	0.024
	500	0.070	0.024
0.1	200	0.750	0.510
	500	1.000	0.984
0.3	200	1.000	1.000
	500	1.000	1.000

Table 4: Residual correlations =0.1, Method 1

Parameter	Estimates			S.E.	M.S.E.	95%	% Sig
	Population	Average	Std. Dev.	Average		Cover	Coeff
Residual covariance = 0.1, df=30, n=200, 5% reject proportion for the PPP = 0.024							
Factor loading	0.800	0.8074	0.0690	0.0688	0.0048	0.942	1.000
Residual covariance	0.100	0.0154	0.0106	0.0159	0.0073	0.044	0.076
Factor variance	1.000	1.0257	0.1602	0.1595	0.0263	0.934	1.000
Factor correlation	0.500	0.5141	0.0599	0.0608	0.0038	0.950	1.000
Residual covariance = 0.1, df=30, n=500, 5% reject proportion for the PPP = 0.002							
Factor loading	0.800	0.8035	0.0425	0.0449	0.0018	0.958	1.000
Residual covariance	0.100	0.0399	0.0151	0.0178	0.0038	0.162	0.860
Factor variance	1.000	1.0296	0.1010	0.1016	0.0111	0.946	1.000
Factor correlation	0.500	0.5126	0.0374	0.0382	0.0016	0.940	1.000
Residual covariance = 0.1, df=14, n=200, 5% reject proportion for the PPP = 0.000							
Factor loading	0.800	0.8103	0.0694	0.0792	0.0049	0.970	1.000
Residual covariance	0.100	0.0534	0.0252	0.0376	0.0028	0.846	0.338
Factor variance	1.000	1.0139	0.1596	0.1717	0.0256	0.952	1.000
Factor correlation	0.500	0.5162	0.0605	0.0644	0.0039	0.952	1.000
Residual covariance = 0.1, df=14, n=500, 5% reject proportion for the PPP = 0.000							
Factor loading	0.800	0.8056	0.0447	0.0552	0.0020	0.976	1.000
Residual covariance	0.100	0.0665	0.0201	0.0309	0.0015	0.894	0.880
Factor variance	1.000	1.0142	0.1015	0.1148	0.0105	0.968	1.000
Factor correlation	0.500	0.5130	0.0380	0.0413	0.0016	0.952	1.000

Table 5: Residual correlations =0.3, Method 1

Parameter	Estimates			S.E.	M.S.E.	95%	% Sig
	Population	Average	Std. Dev.	Average		Cover	Coeff
Residual covariance = 0.3, df=30, n=200, 5% reject proportion for the PPP = 0.004							
Factor loading	0.800	0.8041	0.0401	0.0437	0.0016	0.970	1.000
Residual covariance	0.300	0.1803	0.0315	0.0399	0.0153	0.210	1.000
Factor variance	1.000	1.1252	0.1425	0.1464	0.0359	0.864	1.000
Factor correlation	0.500	0.5443	0.0570	0.0554	0.0052	0.870	1.000
Residual covariance = 0.3, df=30, n=500, 5% reject proportion for the PPP = 0.000							
Factor loading	0.800	0.8029	0.0264	0.0293	0.0007	0.962	1.000
Residual covariance	0.300	0.2160	0.0291	0.0349	0.0079	0.372	1.000
Factor variance	1.000	1.0855	0.0901	0.0933	0.0154	0.850	1.000
Factor correlation	0.500	0.5335	0.0357	0.0364	0.0024	0.866	1.000
Residual covariance = 0.3, df=14, n=200, 5% reject proportion for the PPP = 0.000							
Factor loading	0.800	0.8058	0.0411	0.0494	0.0017	0.974	1.000
Residual covariance	0.300	0.2307	0.0496	0.0611	0.0073	0.854	1.000
Factor variance	1.000	1.0461	0.1424	0.1554	0.0224	0.948	1.000
Factor correlation	0.500	0.5344	0.0603	0.0629	0.0048	0.900	1.000
Residual covariance = 0.3, df=14, n=500, 5% reject proportion for the PPP = 0.000							
Factor loading	0.800	0.8033	0.0278	0.0347	0.0008	0.986	1.000
Residual covariance	0.300	0.2583	0.0406	0.0483	0.0034	0.890	1.000
Factor variance	1.000	1.0199	0.0930	0.1042	0.0090	0.972	1.000
Factor correlation	0.500	0.5240	0.0386	0.0427	0.0021	0.924	1.000

Table 6: Residual correlations = 0.3, Method 2 and Method 3

Parameter	Estimates			S.E.	M.S.E.	95%	% Sig
	Population	Average	Std. Dev.	Average		Cover	Coeff
Method 2, residual covariance = 0.3, df = 30, n=200							
Factor loading	0.800	0.8041	0.0402	0.0431	0.0016	0.958	1.000
Residual covariance	0.300	0.2364	0.0394	0.0490	0.0056	0.794	1.000
Factor variance	1.000	0.9809	0.1349	0.1429	0.0185	0.946	1.000
Factor correlation	0.500	0.4817	0.0588	0.0594	0.0038	0.950	1.000
Method 2, residual covariance = 0.3, df = 30, n=500							
Factor loading	0.800	0.8029	0.0260	0.0311	0.0007	0.972	1.000
Residual covariance	0.300	0.2809	0.0348	0.0436	0.0016	0.974	1.000
Factor variance	1.000	0.9541	0.0865	0.1016	0.0096	0.952	1.000
Factor correlation	0.500	0.4760	0.0372	0.0401	0.0020	0.938	1.000
Method 3, residual covariance = 0.3, V = 0.001, n=200							
Factor loading	0.800	0.8076	0.0536	0.0587	0.0029	0.970	1.000
Residual covariance	0.300	0.1433	0.0131	0.0212	0.0247	0.000	1.000
Factor variance	1.000	1.0550	0.1482	0.1529	0.0249	0.928	1.000
Factor correlation	0.500	0.5537	0.0585	0.0578	0.0063	0.830	1.000
Method 3, residual covariance = 0.3, V = 0.001, n=500							
Factor loading	0.800	0.8047	0.0379	0.0456	0.0015	0.980	1.000
Residual covariance	0.300	0.1818	0.0119	0.0188	0.0141	0.000	1.000
Factor variance	1.000	1.0390	0.0964	0.1039	0.0108	0.956	1.000
Factor correlation	0.500	0.5499	0.0357	0.0377	0.0038	0.772	1.000

Table 7: Residual correlations = 0.3, Method 3, freeing the two residual correlations

Parameter	Estimates			S.E.	M.S.E.	95%	% Sig
	Population	Average	Std. Dev.	Average		Cover	Coeff
Residual correlations = 0.3, V = 0.001, freeing the two residual correlations, n=200							
Factor loading	0.800	0.8074	0.0463	0.0599	0.0022	0.988	1.000
Residual covariance	0.300	0.3060	0.0394	0.0429	0.0016	0.960	1.000
Factor variance	1.000	0.9959	0.1358	0.1494	0.0184	0.966	1.000
Factor correlation	0.500	0.5016	0.0600	0.0613	0.0036	0.960	1.000
Residual correlations = 0.3, V = 0.001, freeing the two residual correlations, n=500							
Factor loading	0.800	0.8074	0.0462	0.0600	0.0022	0.992	1.000
Residual covariance	0.300	0.3066	0.0395	0.0435	0.0016	0.968	1.000
Factor variance	1.000	0.9965	0.1354	0.1495	0.0183	0.968	1.000
Factor correlation	0.500	0.5017	0.0600	0.0613	0.0036	0.960	1.000