LBP-TBQ:
Supplementary digital content 6

Multi-group analyses for measurement invariance – parameter estimates and model fit (ML)

Manual therapy data

Multi-group CFA analyses were performed with the 16-item LBP-TBQ to examine measurement invariance (MI) for manual therapy data between:

- Participants with nerve compression likely or not
- Participants with sciatica diagnosis reported or not
- Participants with pain duration less than 3 years versus more than 3 years
- Treatment-experienced versus treatment-naïve participants
- Across time (wave 1 versus wave 2)

Results are presented below and include model fit summaries, nested models comparisons, and graphical representation of the most appropriate models. For these analyses, multivariate outliers were first excluded from the sample to exclude this source of model misspecification; sensitivity analyses were performed selectively with the total samples, with similar results. Models reported here were estimated using maximum likelihood (ML).

A. Nerve compression likely (N= 144 cases -14 outliers=130) or not (N=170 cases -18 outliers=152)

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Unconstrained	116	354.195	188	.000	1.884
Measurement weights	100	369.801	204	.000	1.813
Measurement intercepts	84	399.797	220	.000	1.817
Structural covariances	78	415.615	226	.000	1.839
Measurement residuals	58	508.517	246	.000	2.067
Saturated model	304	.000	0		
Independence model	64	4894.075	240	.000	20.392

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unconstrained	.928	.908	.965	.954	.964
Measurement weights	.924	.911	.965	.958	.964
Measurement intercepts	.918	.911	.962	.958	.961
Structural covariances	.915	.910	.959	.957	.959
Measurement residuals	.896	.899	.944	.945	.944
Saturated model	1.000		1.000		1.000

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Unconstrained	.056	.047	.065	.126
Measurement weights	.054	.045	.063	.227
Measurement intercepts	.054	.046	.062	.211
Structural covariances	.055	.046	.063	.169
Measurement residuals	.062	.054	.069	.006
Independence model	.263	.257	.270	.000

AIC

Model	AIC	BCC	BIC	CAIC
Unconstrained	586.195	618.531		
Measurement weights	569.801	597.677		
Measurement intercepts	567.797	591.213		
Structural covariances	571.615	593.358		
Measurement residuals	624.517	640.685		
Saturated model	608.000	692.745		
Independence model	5022.075	5039.916		

Nested Model Comparisons

Assuming model Unconstrained to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	16	15.606	.481	.003	.003	-.003	-.004
Measurement intercepts	32	45.602	.056	.009	.010	-.003	-.003
Structural covariances	38	61.420	.009	.013	.013	-.002	-.002
Measurement residuals	58	154.322	.000	.032	.033	.009	.009

Assuming model Measurement weights to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement intercepts	16	29.996	.018	.006	.006	.000	.000
Structural covariances	22	45.814	.002	.009	.010	.001	.001
Measurement residuals	42	138.716	.000	.028	.030	.012	.013

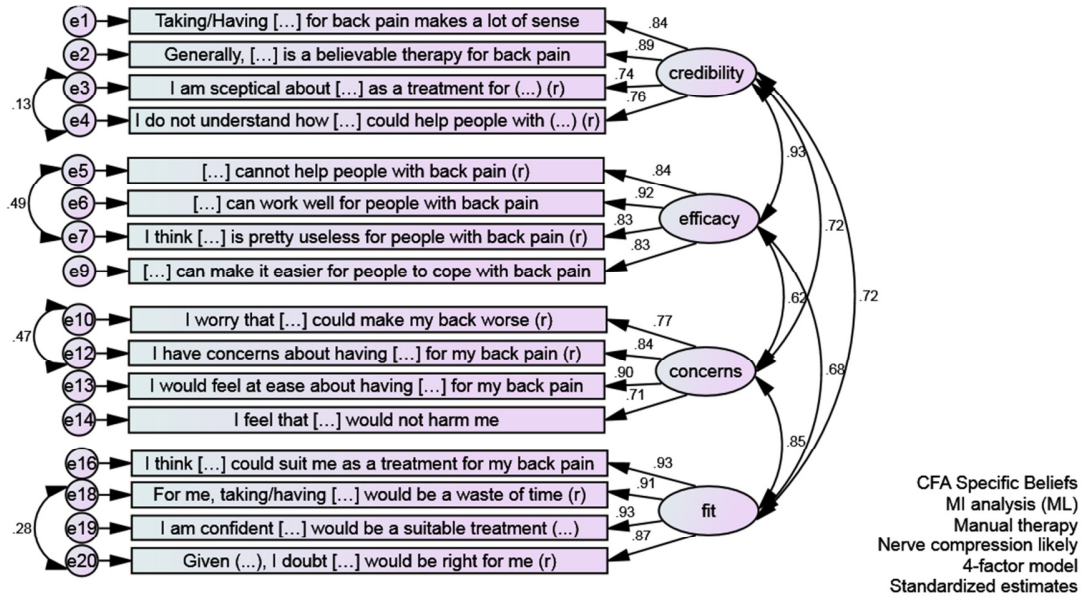
Assuming model Measurement intercepts to be correct:

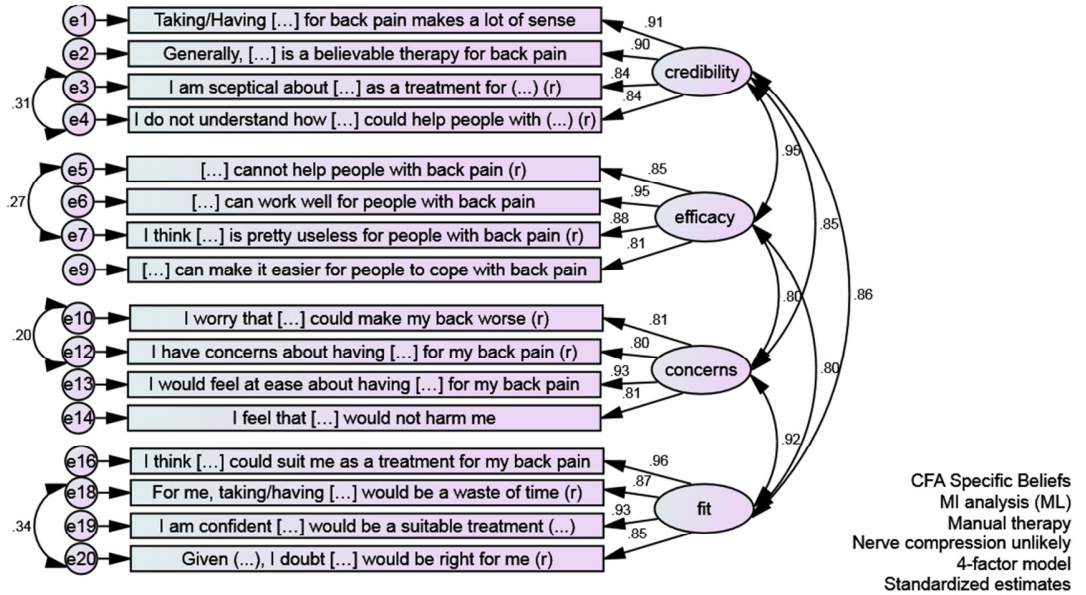
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural covariances	6	15.818	.015	.003	.003	.001	.001
Measurement residuals	26	108.720	.000	.022	.023	.012	.013

Assuming model Structural covariances to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement residuals	20	92.902	.000	.019	.020	.011	.012

Measurement weights models:





B. ***Sciatica diagnosis reported (N=192 cases -17outliers=175) or not (N=237 cases – 28 outliers=209)***

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Unconstrained	116	524.200	188	.000	2.788
Measurement weights	100	549.118	204	.000	2.692
Measurement intercepts	84	576.933	220	.000	2.622
Structural covariances	78	609.118	226	.000	2.695
Measurement residuals	58	710.551	246	.000	2.888
Saturated model	304	.000	0		
Independence model	64	7037.159	240	.000	29.321

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unconstrained	.926	.905	.951	.937	.951
Measurement weights	.922	.908	.949	.940	.949
Measurement intercepts	.918	.911	.948	.943	.947
Structural covariances	.913	.908	.944	.940	.944
Measurement residuals	.899	.901	.932	.933	.932
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Unconstrained	.068	.062	.075	.000
Measurement weights	.067	.060	.073	.000
Measurement intercepts	.065	.059	.072	.000
Structural covariances	.067	.060	.073	.000
Measurement residuals	.070	.064	.076	.000
Independence model	.272	.267	.278	.000

AIC

Model	AIC	BCC	BIC	CAIC
Unconstrained	756.200	779.097		
Measurement weights	749.118	768.857		
Measurement intercepts	744.933	761.514		
Structural covariances	765.118	780.515		
Measurement residuals	826.551	838.000		
Saturated model	608.000	668.005		
Independence model	7165.159	7177.791		

Nested Model Comparisons

Assuming model Unconstrained to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	16	24.918	.071	.004	.004	-.003	-.003
Measurement intercepts	32	52.733	.012	.007	.008	-.006	-.006
Structural covariances	38	84.918	.000	.012	.012	-.003	-.003
Measurement residuals	58	186.351	.000	.026	.027	.003	.004

Assuming model Measurement weights to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement intercepts	16	27.816	.033	.004	.004	-.002	-.002
Structural covariances	22	60.001	.000	.009	.009	.000	.000
Measurement residuals	42	161.434	.000	.023	.024	.007	.007

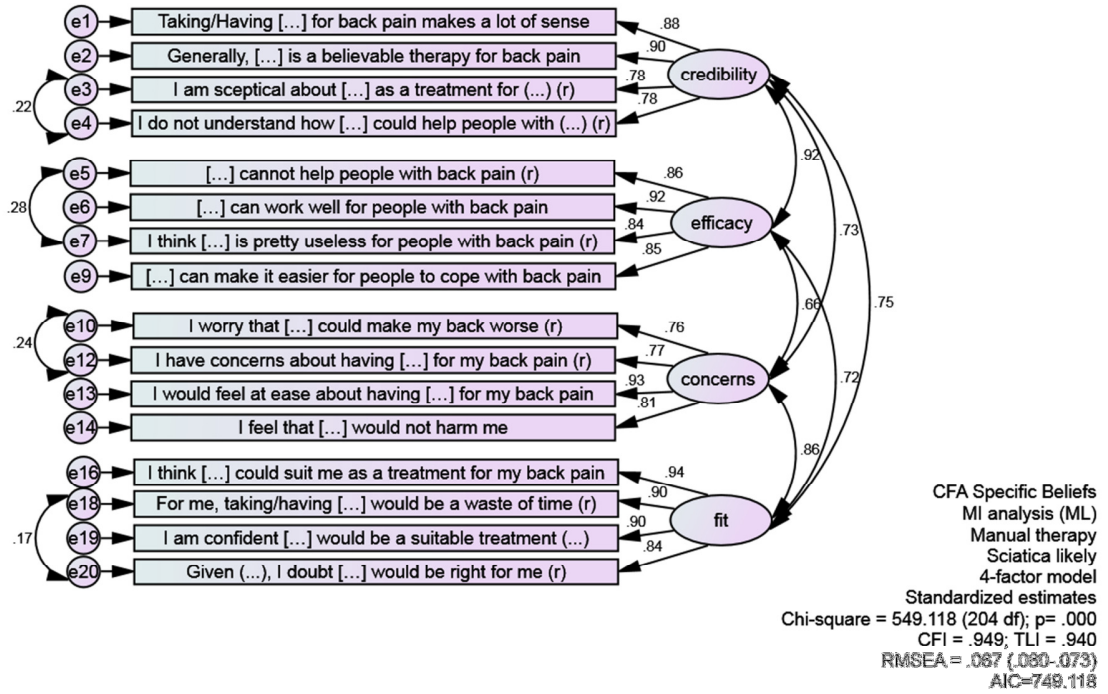
Assuming model Measurement intercepts to be correct:

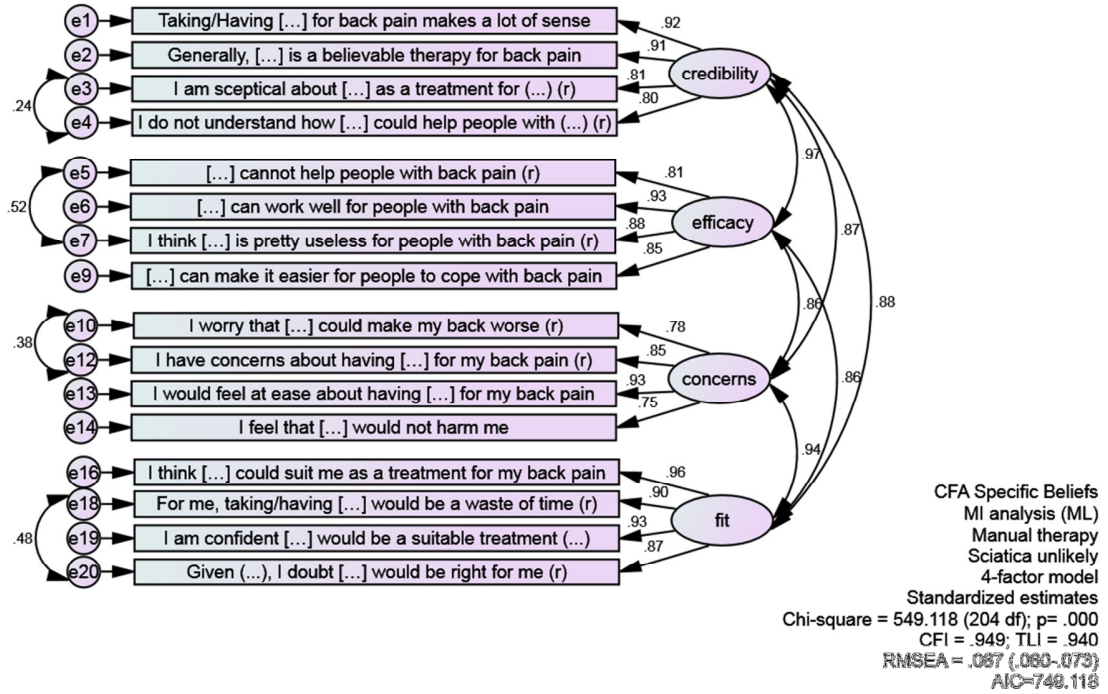
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural covariances	6	32.185	.000	.005	.005	.002	.003
Measurement residuals	26	133.618	.000	.019	.020	.009	.009

Assuming model Structural covariances to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement residuals	20	101.433	.000	.014	.015	.007	.007

Measurement weights models:





C. Pain duration less than 3 years (N = 151cases – 15 outliers=136) vs more than 3 years (N = 278 cases - 27outliers=251)

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Unconstrained	116	487.314	188	.000	2.592
Measurement weights	100	507.990	204	.000	2.490
Measurement intercepts	84	527.555	220	.000	2.398
Structural covariances	78	545.007	226	.000	2.412
Measurement residuals	58	621.078	246	.000	2.525
Saturated model	304	.000	0		
Independence model	64	6954.705	240	.000	28.978

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unconstrained	.930	.911	.956	.943	.955
Measurement weights	.927	.914	.955	.947	.955
Measurement intercepts	.924	.917	.954	.950	.954
Structural covariances	.922	.917	.953	.950	.952
Measurement residuals	.911	.913	.944	.946	.944
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Unconstrained	.064	.057	.071	.000
Measurement weights	.062	.055	.069	.002
Measurement intercepts	.060	.054	.067	.006
Structural covariances	.061	.054	.067	.004
Measurement residuals	.063	.057	.069	.000
Independence model	.270	.264	.275	.000

AIC

Model	AIC	BCC	BIC	CAIC
Unconstrained	719.314	744.634		
Measurement weights	707.990	729.817		
Measurement intercepts	695.555	713.890		
Structural covariances	701.007	718.032		
Measurement residuals	737.078	749.738		
Saturated model	608.000	674.355		
Independence model	7082.705	7096.674		

Nested Model Comparisons

Assuming model Unconstrained to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	16	20.676	.191	.003	.003	-.004	-.004
Measurement intercepts	32	40.241	.150	.006	.006	-.007	-.007
Structural covariances	38	57.692	.021	.008	.009	-.006	-.006
Measurement residuals	58	133.764	.000	.019	.020	-.002	-.002

Assuming model Measurement weights to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement intercepts	16	19.565	.240	.003	.003	-.003	-.003
Structural covariances	22	37.017	.024	.005	.005	-.003	-.003
Measurement residuals	42	113.088	.000	.016	.017	.001	.001

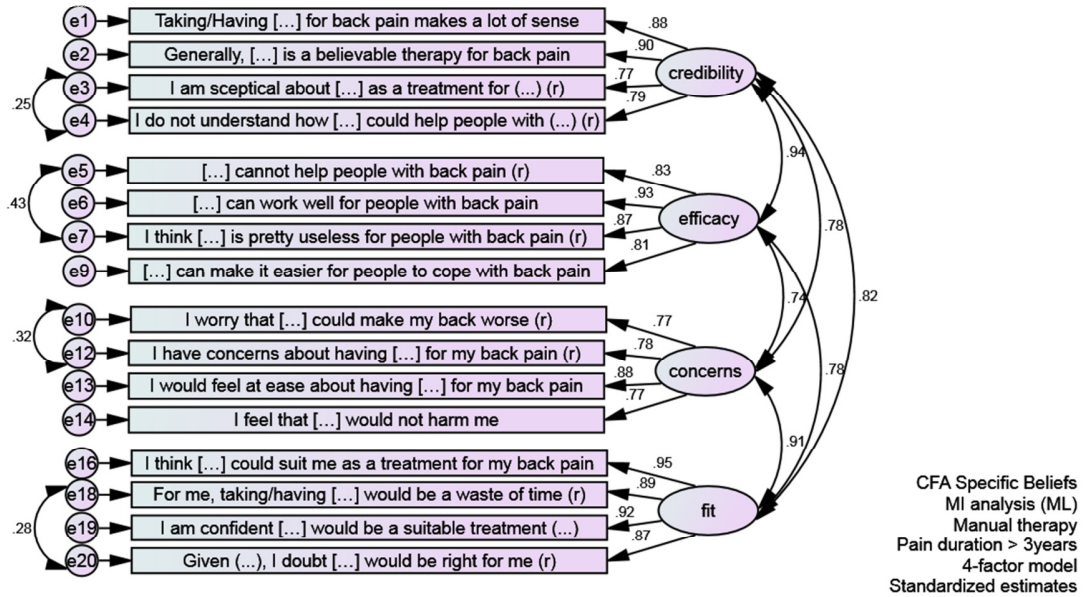
Assuming model Measurement intercepts to be correct:

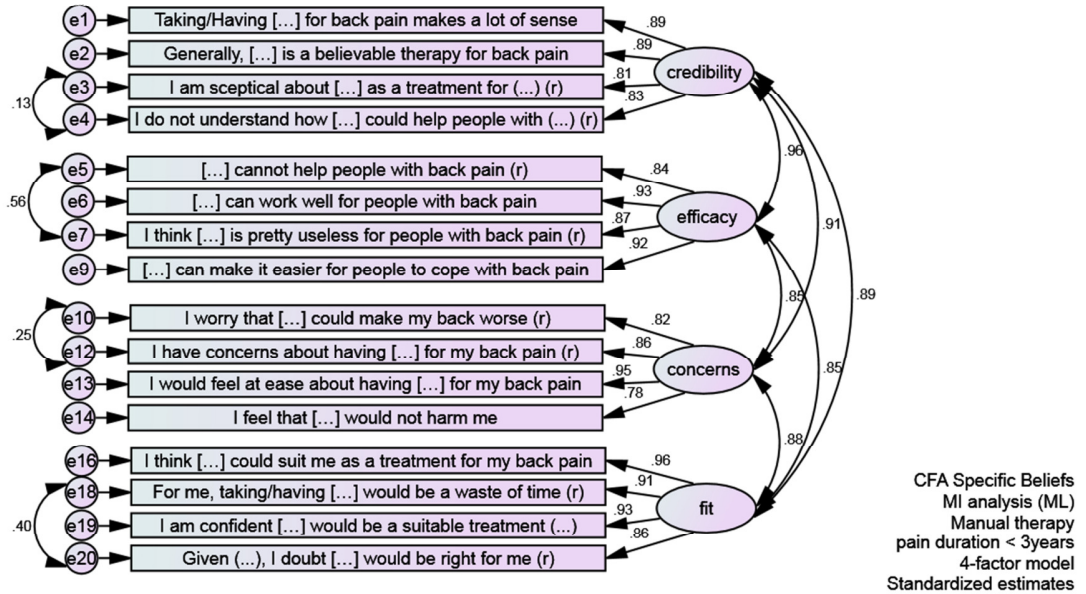
Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural covariances	6	17.451	.008	.003	.003	.000	.000
Measurement residuals	26	93.523	.000	.013	.014	.004	.005

Assuming model Structural covariances to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement residuals	20	76.071	.000	.011	.011	.004	.004

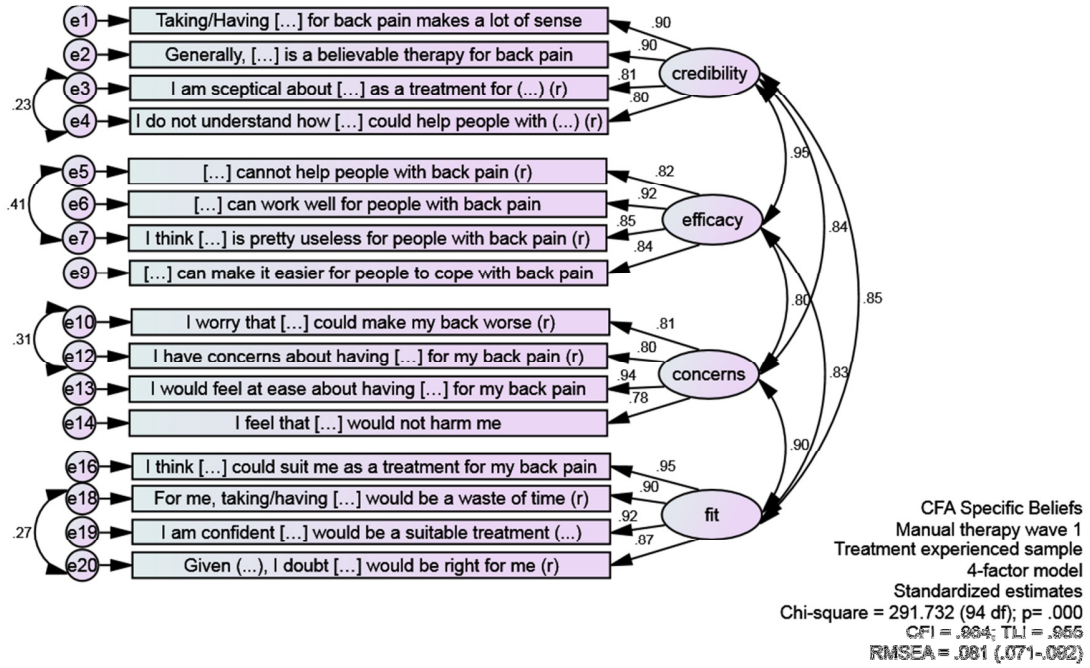
Measurement intercepts models:





D. Treatment-experienced (N = 355– 35 outliers=320) or not (N = 73 cases– 8 outliers = 65)

Sample size for no treatment experience too low - Model presented only for treatment experienced:



E. Measurement invariance across time: wave 1 (N= 429 cases -46 outliers=383) versus wave 2 (N=115 cases -11 outliers=104)

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Unconstrained	116	564.827	188	.000	3.004
Measurement weights	100	579.090	204	.000	2.839
Measurement intercepts	84	596.452	220	.000	2.711
Structural covariances	78	604.980	226	.000	2.677
Measurement residuals	58	649.768	246	.000	2.641
Saturated model	304	.000	0		
Independence model	64	8719.056	240	.000	36.329

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unconstrained	.935	.917	.956	.943	.956
Measurement weights	.934	.922	.956	.948	.956
Measurement intercepts	.932	.925	.956	.952	.956
Structural covariances	.931	.926	.955	.953	.955

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Measurement residuals	.925	.927	.952	.954	.952
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Unconstrained	.064	.058	.070	.000
Measurement weights	.062	.056	.068	.001
Measurement intercepts	.059	.054	.065	.004
Structural covariances	.059	.053	.064	.006
Measurement residuals	.058	.053	.064	.007
Independence model	.270	.265	.275	.000

AIC

Model	AIC	BCC	BIC	CAIC
Unconstrained	796.827	825.750		
Measurement weights	779.090	804.024		
Measurement intercepts	764.452	785.396		
Structural covariances	760.980	780.428		
Measurement residuals	765.768	780.230		
Saturated model	608.000	683.800		
Independence model	8847.056	8863.014		

Nested Model Comparisons

Assuming model Unconstrained to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	16	14.263	.579	.002	.002	-.005	-.005
Measurement intercepts	32	31.625	.485	.004	.004	-.008	-.008
Structural covariances	38	40.153	.375	.005	.005	-.009	-.009
Measurement residuals	58	84.941	.012	.010	.010	-.010	-.010

Assuming model Measurement weights to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement intercepts	16	17.362	.363	.002	.002	-.004	-.004
Structural covariances	22	25.890	.256	.003	.003	-.004	-.005
Measurement residuals	42	70.678	.004	.008	.008	-.005	-.006

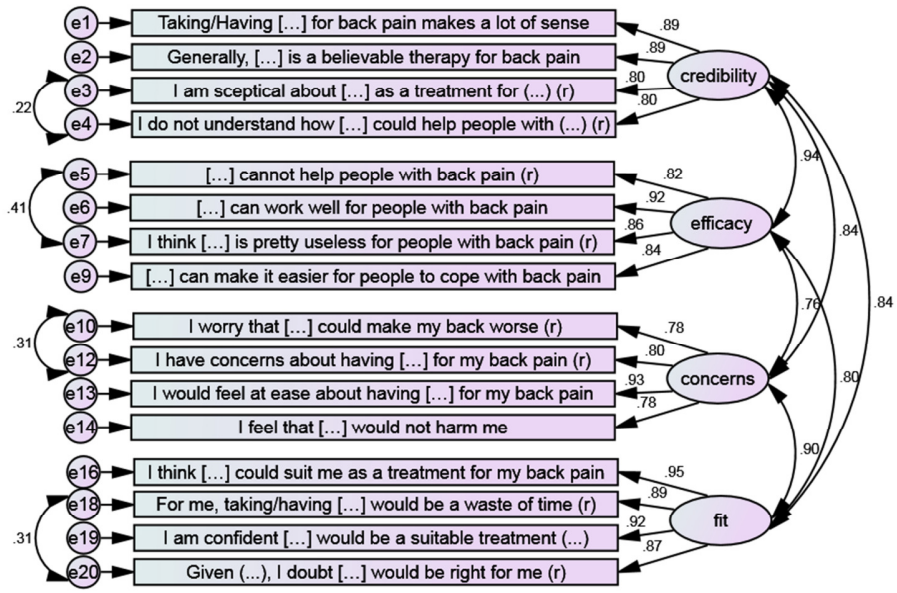
Assuming model Measurement intercepts to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural covariances	6	8.528	.202	.001	.001	-.001	-.001
Measurement residuals	26	53.316	.001	.006	.006	-.002	-.002

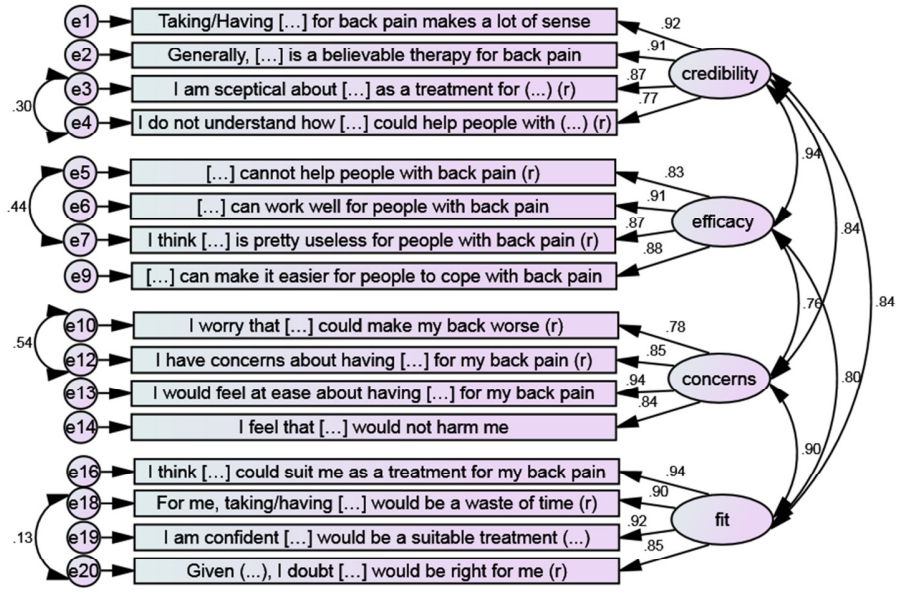
Assuming model Structural covariances to be correct:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement residuals	20	44.788	.001	.005	.005	-.001	-.001

Structural covariances models:



CFA Specific Beliefs
MI analysis (ML)
Manual therapy
wave 1
4-factor model
Standardized estimates
Chi-square = 604.980 (226 df); p= .000
CFI = .955; TLI = .953
RMSEA = .059 (.053-.064)
AIC=760.980



CFA Specific Beliefs
MI analysis (ML)
Manual therapy
wave 2
4-factor model
Standardized estimates
Chi-square = 604.980 (226 df); p= .000
CFI = .955; TLI = .953
RMSEA = .059 (.053-.064)
AIC=760.980