pairfam

Panel Analysis of Intimate Relationships and Family Dynamics

Measurement Invariance of the Pairfam Scales

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Measurement Invariance

Longitudinal studies often aim at modelling or comparing time trajectories of latent variables. Therefore, latent variables of different measurement occasions must be comparable over time, that is, the psychometric properties of the repeatedly applied instruments (i.e., indicators) must not change (Geiser, 2010), and measurement invariance (over time) needs to be established. This is done by constraining certain parameters of the measurement model to be equal (i.e., invariant).

Strong factorial invariance is needed for certain applications, such as comparing latent means. Strong factorial invariance implies that (a) the number of factors and the pattern of loadings, (b) the factor loadings and (c) the item's intercepts are invariant (Meredith, 1993).

Pairfam Scales

In order to investigate measurement invariance of the pairfam scales, we tested for strong factorial invariance. Several fit indices of the corresponding measurement models can be found in table 1. According to Hu and Bentler (1999), a cutoff value close to .06 for RMSEA and close to .95 for CFI is desirable.

The descriptions of the scales are adapted from *Scales Manual Release 5* (generated from the anchor data set). Due to methodological limitations, scales consisting of at least three items were analyzed. Nearly all measurement models fit very well (RMSEA < .06, CFI > .95), indicating strong measurement invariance for most pairfam scales. Importantly, calculated parameters are sample-specific. For further (i.e., own) analyses, these parameters need to be re-established using respective data.

Table 1

Fit indices for strong factorial invariance

Name of scale	Variable (Items)	χ^2	df	χ^2/df	RMSEA	CFI
Expectations towards partnership						
VOP: Negative expectations	vopneg2 (5)	269.92	37	7.30	.033	.986
Single Module						
Broad exploration	siexplbr (3)	18.17	9	2.02	.023	.997
Broad exploration[e]	siexplbr2 (3)	18.93	9	2.10	.031	.994
In-depth exploration	siexplde (4)	279.25	168	1.66	.039	.967
Current partnership (status quo)						
Ambivalence about moving in together[f]	ambcoh (3)	13.27	9	1.47	.074	.986
Ambivalence regarding marriage[f]	ambmarr (3)	33.20	26	1.28	.050	.988

Name of scale	Variable (Items)	χ^2	*df*	χ^2/df	RMSEA	CFI
Quality of relationship indicators (CASI)						
Fear of love withdrawal	lovewitanx_apd (3)	72.51	51	1.42	.020	.994
Autonomy	indep_apd (4)	262.92	104	2.53	.026	.988
Feelings of self-efficacy/competence in the ps.	comppart2 (3)	42.02	26	1.62	.016	.997
Subjective instability of partnership[f]	instab_apd (3)	319.44	84	3.80	.038	.985
Hostile attribution	hostattr_aps (3)	5.59	26	1.95	.019	.996
Areas of conflicts and frequency of manifest c.	confldom_apd (6)	208.98	57	3.67	.040	.974
Dyadic coping – respondent	dycop_aps (3)	73.50	26	2.83	.026	.993
Dyadic coping – respondent's partner	dycop_apo (3)	71.96	26	2.77	.025	.996
Personality (CASI)						
Explosiveness and tendency to anger	explosive (3)	68.75	9	7.64	.033	.996
Shyness	shyness (3)	134.94	9	14.99	.048	.989
Shyness (adjusted)[a]	- (3)	93.09	9	1.34	.039	.992
Emotional autonomy	emotautn (3)	11.19	9	1.24	.006	1.000
Emotional autonomy (adjusted)[a]	- (3)	28.49	9	3.17	.019	.997
Well-being (CASI)						
Self-esteem	selfworth (3)	1131.09	84	13.46	.049	.971
Self-esteem (adjusted)[a]	- (3)	1312.42	84	15.62	.053	.966
Depressiveness (STDS-T)	depressive (10)	13182.89	758	17.39	.058	.876
Depressiveness (STDS-T) (3 parcels)[b]	- (3)	162.20	51	3.18	.021	.998
Activity (stress during past 4 weeks)	activ2 (3)	47.43	9	5.27	.025	.997
Overload (stress during past 4 weeks)	stress (3)	36.27	9	4.03	.021	.999
Children Modules						
Temperament of child 1 (new born)[c]	temperc1 (4)	156.27	104	1.50	.076	.782
Parental self-efficacy / competence	comperz (4)	36.68	21	1.75	.019	.996
Coparenting with current partner	coparent (3)	39.06	9	4.34	.042	.993
Coparenting with other partner of CAPI child	coparent_opk1 (3)	17.99	9	2.00	.109	.978
Overprotectiveness	overprotect (3)	21.86	9	2.43	.027	.997
Readiness to make sacrifices[d]	sacrif_pacs (3)	219.26	26	8.43	.095	.912
Readiness to make sacrifices (without wave 2)	sacrif_pacs (3)	29.90	9	3.32	.029	.996

Note. [a] Present method effect has been corrected (cf. Sonntag, Mund, Schubach, & Neyer, 2014).

[b] The measurement model did not comprise 10 single indicators but three parcels. Parcels were constructed using the item-to-construct method (Little, Cunningham, Shahar, & Widaman, 2002).

[c] The corresponding items were presented to a slightly different sample in wave two.

[d] A change in the interview method took place after wave two. Thus, the possibility of a method effect similar to constructs labeled with [a] cannot be excluded. Furthermore, the number of cases in wave two is fairly small due to low participation in parenting questionnaire.

[e] Due to a change in number of items, we could not include all measurement occasions (only wave three and four were included).

[f] The tested model leads to Heywood cases (i.e., some negative variances). If the error persists when using the data for own purposes, the applied model requires further investigation.

χ^2 = chi-square; *df* = degrees of freedom; RMSEA = root-mean-square error of approximation; CFI = comparative fit index.

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