

A meta-analytic investigation
of the factor structure of the

PANAS

Nadine Kasten, Tanja Burgard, Oliver Wedderhoff, Michael Bosnjak, & Timo Gnambs

The Positive and Negative Affect Schedule (PANAS)

Watson, Clark, & Tellegen, 1988

Indicate to what extent you feel this way right now

i01 interested

i02 distressed

i03 excited

i04 upset

i05 strong

i06 guilty

i07 scared

i08 hostile

i09 enthusiastic

i10 proud

i11 irritable

i12 alert

i13 ashamed

i14 inspired

i15 nervous

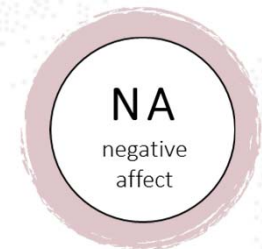
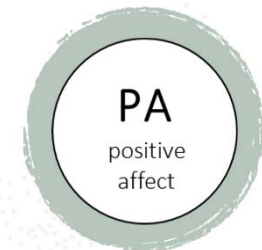
i16 determined

i17 attentive

i18 jittery

i19 active

i20 afraid



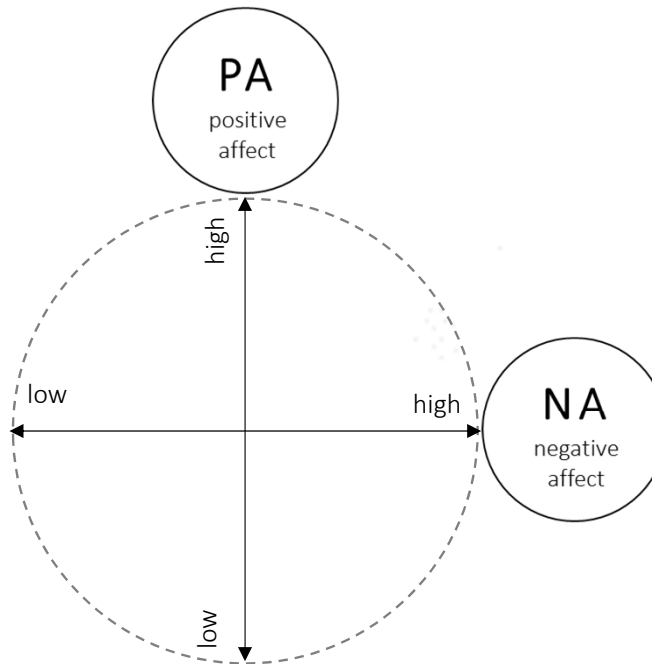
The internal structure of the PANAS

PA and NA on two opposite ends of a bipolar scale



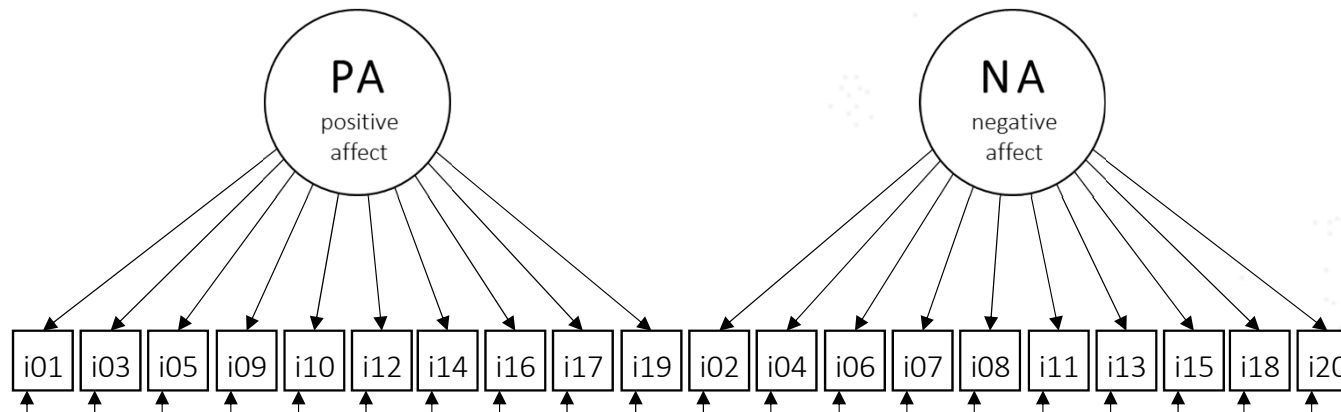
The internal structure of the PANAS

The originally proposed structure by Watson, Clark, & Tellegen, 1988



The internal structure of the PANAS

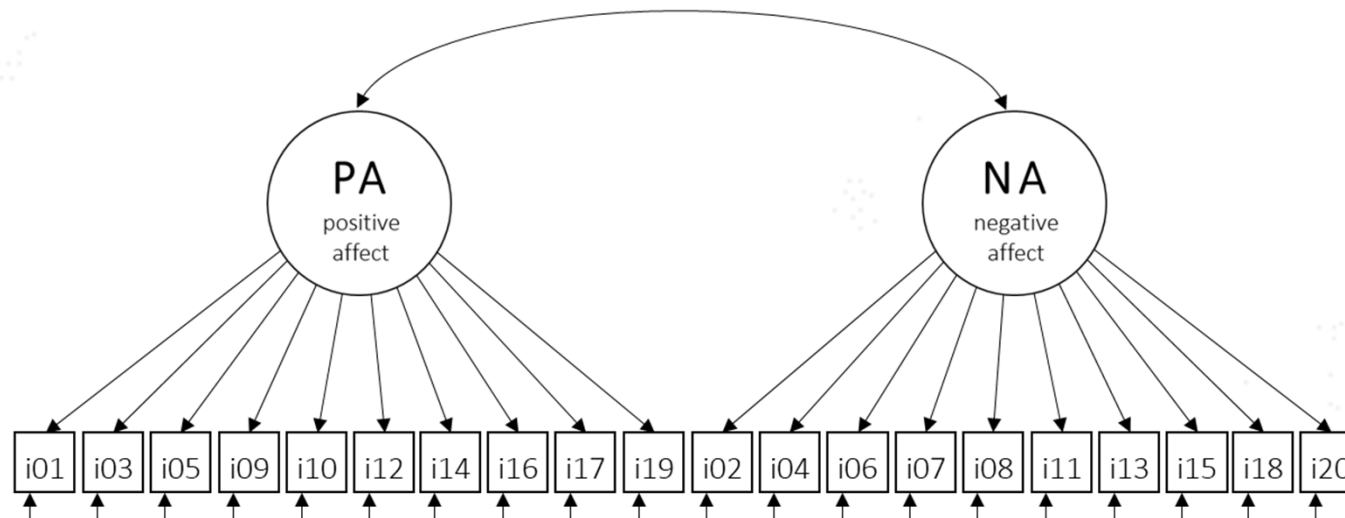
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Model 1a
Orthogonal factors

The internal structure of the PANAS

The correlated two-factor model



Model 1b
Correlated factors

The internal structure of the PANAS

Literature review on the structure of the PANAS

Two-factor models

Model 1a
Orthogonal factors

Model 1b
Correlated factors

Second-order models

Model 3a
Mihic et al. (2013)

Model 3b
Mehrabian (1997)

Three-factor models

Model 2a
Killgore et al. (2000)

Model 2b
Beck et al. (2003)

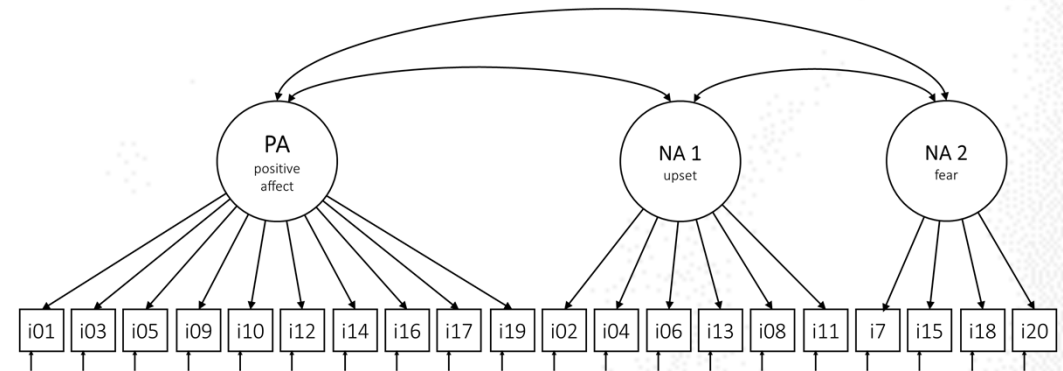
Model 2c
Gaudreau et al. (2006)

Model 2d
Seib-Pfeifer (2017)

Bifactor models

Model 4a
Leue et al. (2011)

Model 4b
Ebesutani (2011)



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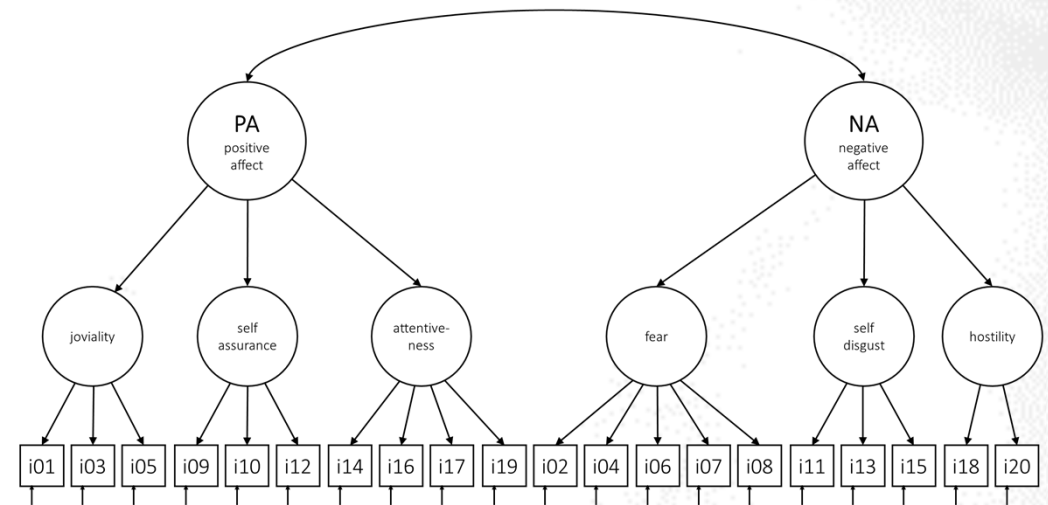
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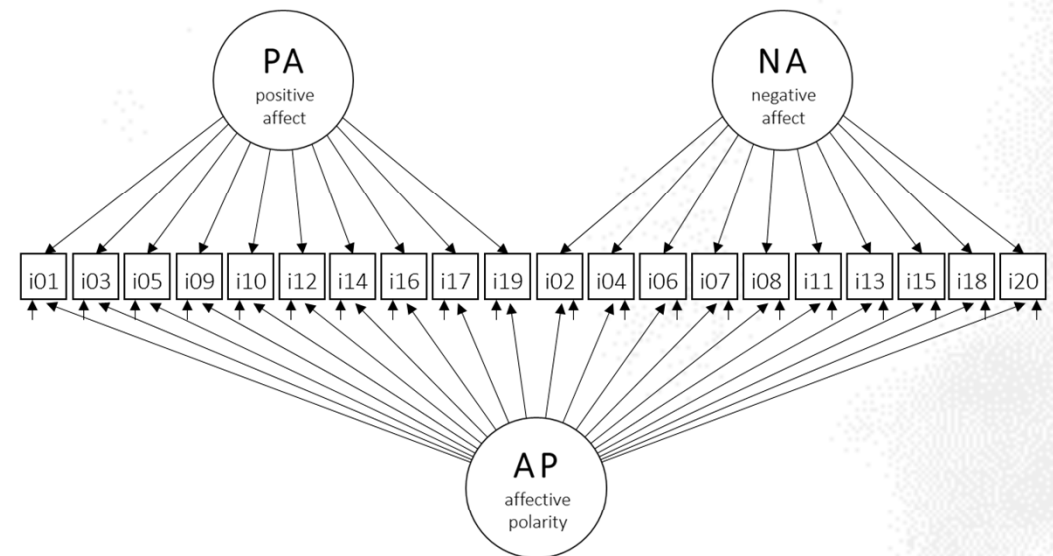
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Bifactor models

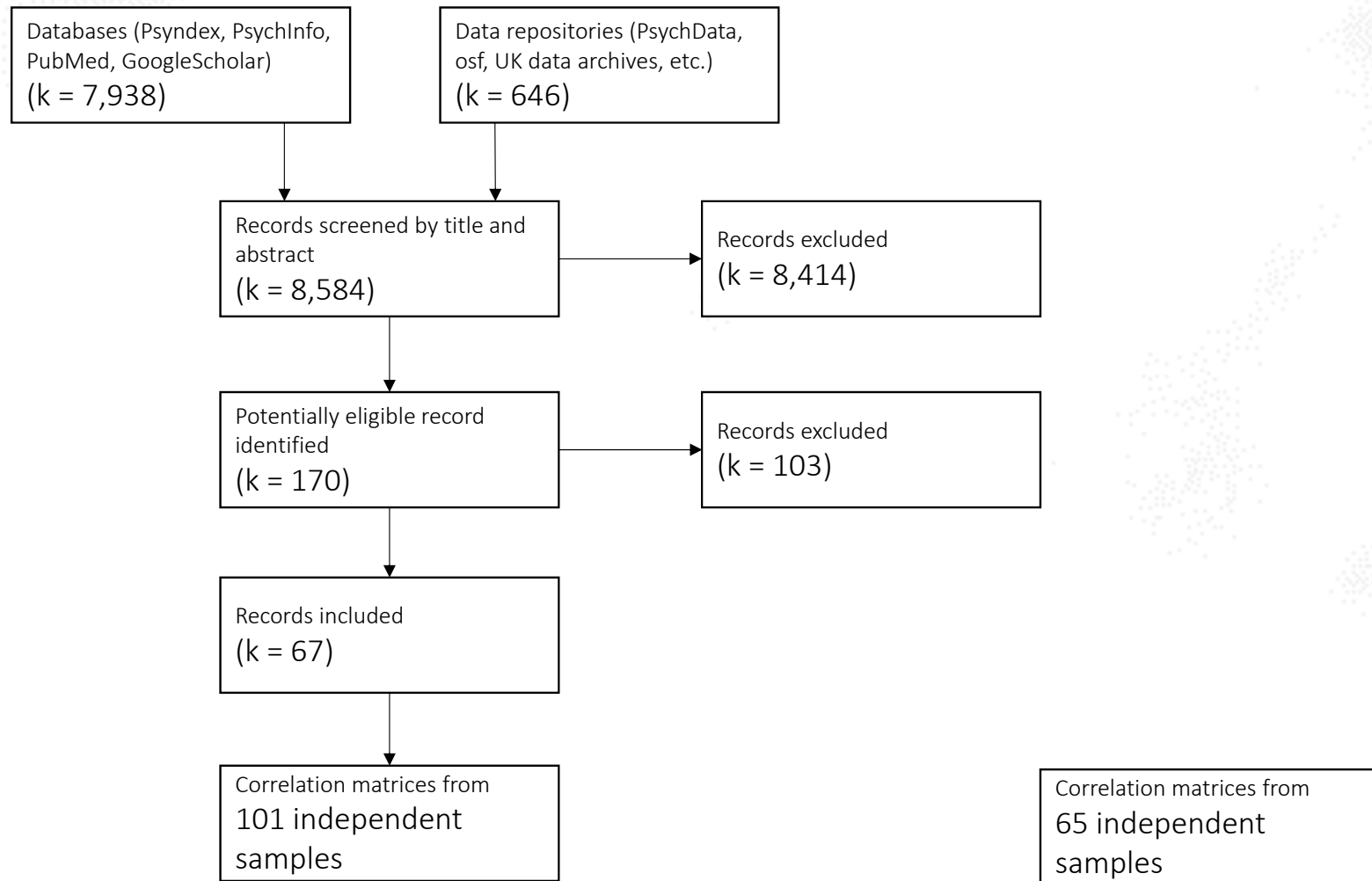
Model 4a
Leue et al. (2011)

Model 4b
Ebesutani (2011)



Intention: Analyse the internal structure of the PANAS using a meta-analytic structural equation modeling (MASEM) approach (effect sizes: correlations between the 20 items)

Literature Search



Descriptives

of the 65 included samples

- Published/surveyed between 2008 and 2019 ($Mdn = 2016$)
- $N = 21,504$ ($M = 330$, $SD = 592$)
- $M = 51$ % women
- $M = 32.39$ years ($SD = 12.14$)
- Country: Netherlands (38 %), United States (30 %)
- Language: English (45 %), Dutch (38 %)

Statistical approach

Meta-analytic structural equation modeling (MASEM; Cheung & Chan, 2005)

Step 1:
Pool matrices across
samples

Step 2:
Fit CFA models to the
pooled matrix

	I01	I02	I03	I04	I05	I06	I07	I08	I09	I10	I11	I12	I13	I14	I15	I16	I17	I18	I19	I20
I01	1																			
I02	.036	1																		
I03	.247	.327	1																	
I04	-.074	.549	.340	1																
I05	.385	-.071	.259	-.099	1															
I06	-.071	.409	.255	.529	-.081	1														
I07	-.082	.464	.281	.638	-.122	.622	1													
I08	-.095	.369	.254	.543	-.057	.522	.603	1												
I09	.465	-.007	.384	-.046	.510	-.024	-.035	-.005	1											
I10	.350	-.005	.317	-.042	.522	-.040	-.047	-.006	.590	1										
I11	-.108	.442	.240	.533	-.107	.447	.501	.510	-.047	-.011	1									
I12	.333	.061	.182	.017	.366	.004	.017	.020	.384	.342	.044	1								
I13	-.057	.398	.270	.512	-.082	.583	.561	.494	.017	-.010	.472	.052	1							
I14	.380	.041	.319	.029	.405	.048	.039	.041	.535	.443	-.017	.407	.091	1						
I15	-.047	.483	.302	.559	-.116	.476	.627	.474	-.001	-.012	.539	.039	.522	.070	1					
I16	.365	.010	.224	-.031	.453	-.042	-.044	-.010	.476	.447	-.015	.452	-.017	.514	.005	1				
I17	.379	.006	.156	-.045	.381	-.053	-.045	-.039	.409	.366	-.042	.594	-.004	.410	-.003	.556	1			
I18	-.046	.464	.370	.545	-.103	.462	.598	.461	-.003	-.012	.523	.038	.496	.049	.755	-.007	.004	1		
I19	.384	.002	.241	-.046	.458	-.044	-.051	-.023	.500	.405	-.072	.436	-.009	.475	-.014	.487	.487	-.001	1	
I20	-.081	.465	.233	.569	-.141	.505	.696	.502	-.045	-.056	.483	.022	.534	.028	.633	-.039	-.030	.632	-.040	1

Statistical approach

10 different structural models were fitted to the pooled correlation matrix

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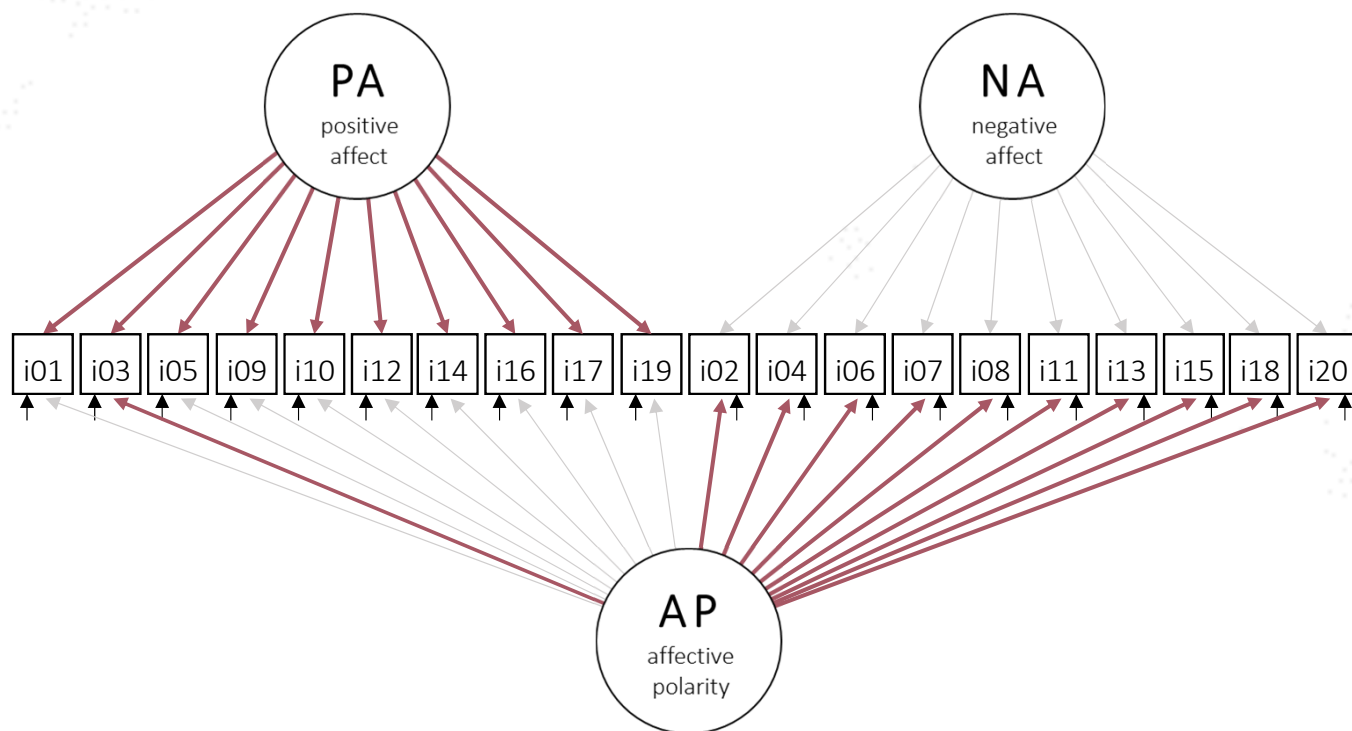
CFI = .95 RMSEA = .05 SRMR = .06

Standards (cf. Schermelleh-Engel et al. 2003)

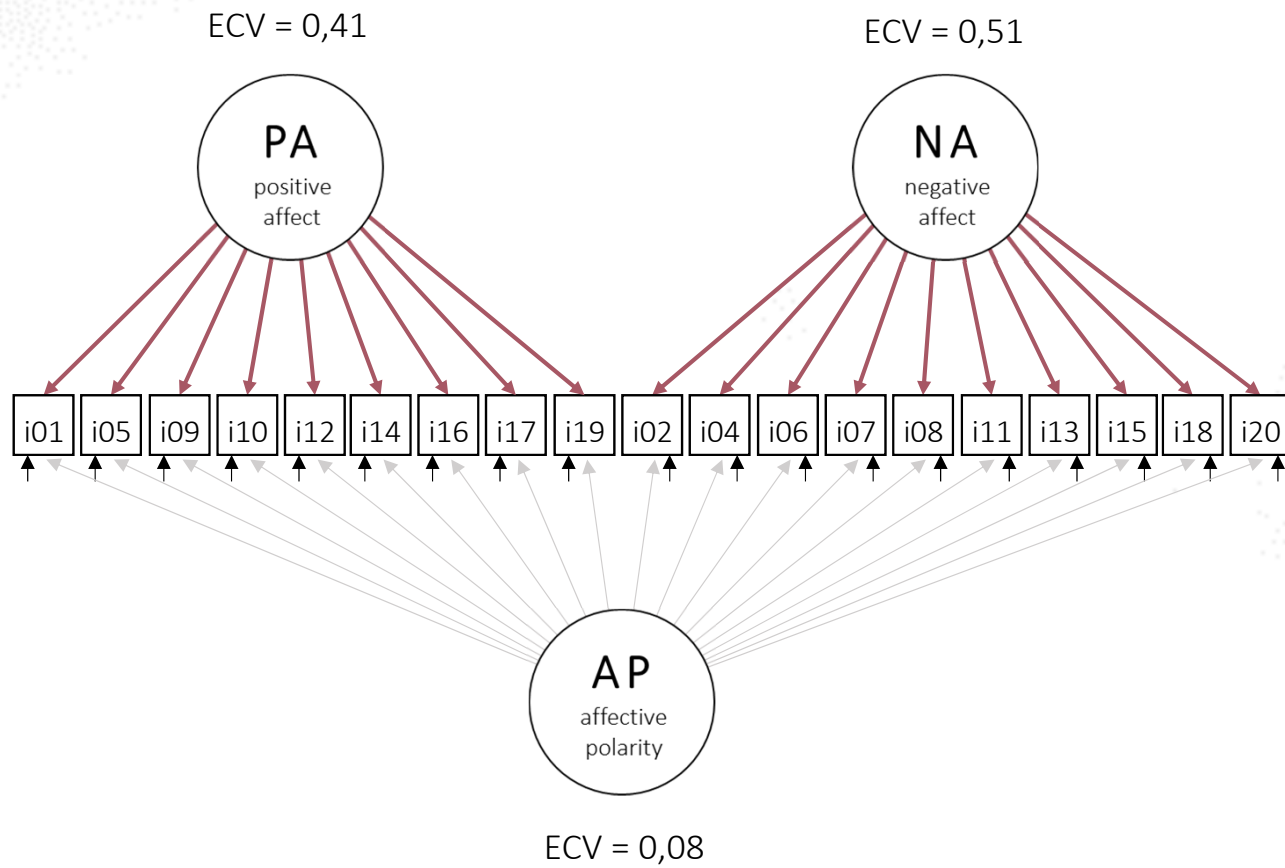
acceptable: CFI \geq .95 RMSEA \leq .08 SRMR \leq .10

good: CFI \geq .97 RMSEA \leq .05 SRMR \leq .05

Model 4a
Leue et al. (2011)



Model 4a (without I03)
Leue et al. (2011)



Future directions

Moderation analyses

Possible explanations of the high factor loadings of I03 on the negative affect factor:

Translation

Sample Characteristics

Thank you for the attention!

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