

# Structure of early parent-child interactions (PCI) in NEPS-SC1

Is there empirical support for a bi-factor structure of parental interaction behavior?



## Theoretical Background

starting point: „1-factor model“ common  
(general quality, based on attachment theory)

new learning focus: PCI as facet of the  
home learning environment

“SSCO model of learning environments”  
(Bäumer et al., 2019) & models of teaching  
quality (e.g. Klieme et al., 2009)

differentiation proposed:

cognitive stimulation

emotional support

some empirical evidence (e.g. Linberg, 2018)

## Method

- NEPS-SC1<sup>a</sup> PCI observational data, longitudinal:  
waves 1-3 (child age 7, 17, 26 months),  $N = 739$
- semi-structured play situation in the child's  
home, video recorded
- macro-analytic coding (5-pt-scale): interrater  
reliability > 90% (see Linberg, Mann et al., 2019)
- longitudinal cross-lagged SEM in Stata® (FIML for  
missing data)

<sup>a</sup> This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort Newborns, doi:10.5157/NEPS-SC1-7.0.0. From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfE) at the University of Bamberg in cooperation with a nationwide network.



## Longitudinal structure equation modeling of parental interaction behavior

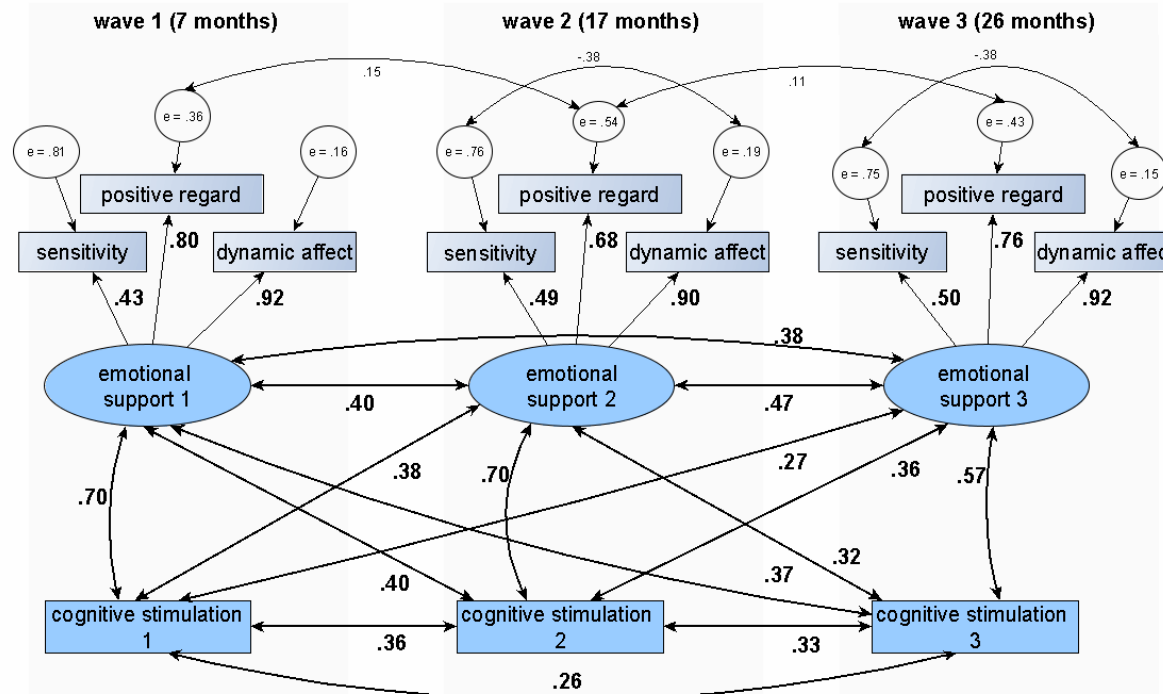


Table: Comparison of model fit – 2-factor vs. general 1-factor model

Mod.	N	$\chi^2$	df	p	CFI	RMSEA	SRMR	AIC	BIC
2f	739	85.41	42	< .001	.985	.041	.030	18513.298	18752.773
g-1f	739	147.07	48	< .001	.970	.053	.045	18554.957	18748.380

note: 2f = 2-factor model, g-1f = general 1-factor model (parental interaction behavior = sensitivity, positive regard, dynamic affect, & cognitive stimulation; some measurement errors correlated).

## Results

- Yes, data supports differentiated 2-factor model (fit comparable to / better than general 1-factor model) → see table
- characteristics of 2-factor model:
  - relative stability: moderate – higher for emotional support, lower for cognitive stimulation
  - cross-lagged paths: high loadings
  - measurement errors correlated

## Discussion

- decreasing, yet high correlation of the 2 factors of parental interaction behavior
- strong cross-lagged paths: interpretation  
→ potential parental adaption? (early emotional support [1] correlates with later cognitive stimulation [3])
- model validity: alternative structures?
- limitations:
  - cognitive stimulation not latent
  - sample composition
  - no covariates: to be included in future
- added value for differential prediction of further child development (e.g. Vallotton et al., 2017)

## References

Bäumer, H., & Linberg, A. (2019). The German National Educational Panel Study (NEPS): Starting Cohort Newborns. In H. Linberg, A. Linberg, & A. Linberg (Eds.), *The German National Educational Panel Study (NEPS): Starting Cohort Newborns* (pp. 1-10). Wiesbaden, Germany: Springer VS.

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Project: NEPS-SC1 Coding Manual, version 1.0