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Measuring the dynamic structure of affect using a stepwise exploratory structural equational approach

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The proliferation of experience sampling methodology (ESM) has advanced the study of affect dynamics. In ESM, participants respond to multiple questions about the presence and intensity of positive an negative emotions at random moments throughout the day for many consecutive days or weeks. These items are commonly thought to represent two latent constructs, positive affect (PA) and negative affect(NA), and the dynamics of the summarized PA and NA scores are subsequently modelled using vector autoregressive modelling (VAR). In a VAR model, momentary PA and NA are predicted based on the preceding PA and NA scores. The computation of PA and NA implicitly relies on a so-called measurement model (MM) that specifies how observed items relate to latent constructs. However, in ESM this MM is unlikely to hold over time and the misspecification can lead to incorrect VAR parameter estimates. Therefore, the MM must be explicitly studied before fitting the VAR. The recently proposed three step latent vector autoregressive modelling (3S-LVAR) is a stepwise approach for estimating VAR models for latent constructs. In this approach, the MM is estimated, then factor scores are computed, and finally the auto- and cross-regressive relations are estimated while accounting for the uncertainty in the factor scores. Up to now, an important limitation of 3S-LVAR is that prior specification of the MM is required, which is notoriously difficult with ESM, as the commonly assumed PA-NA distinction is not systematically found. To address this, we extend 3S-LVAR by incorporating exploratory factor analysis to infer the MM from the data in the first step. One challenge of this exploratory approach is the choice of rotation, as different rotation criteria can lead to differences in the MM and in the dynamics of the latent variables, potentially altering conclusions regarding the auto- and cross-regressive parameters. I will present on the impact of different rotation criteria on the interpretation of the auto- and cross regressive relations for existing ESM data.

Keywords

structural-equational-modelling, exploratory-factor-analysis, vector- autoregressive-modelling, longitudinal-data-analysis,

Primary authors: CEULEMANS, Eva (KU Leuven); DE ROOVER, Kim (KU Leuven); DICKSON, Shannon (KU Leuven)

Presenters: CEULEMANS, Eva (KU Leuven); DE ROOVER, Kim (KU Leuven); DICKSON, Shannon (KU Leuven)

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