

Modelling of Interindividual and Intraindividual differences by Multilevel Simultaneous Component Analysis

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Abstract

An approach to analysing multisubject multivariate time series is the use of a series of P-technique Analyses for each of the subjects. To overcome the problem of assessing the differences between subjects in intraindividual variability, Timmerman and Kiers (in press) proposed the use of Simultaneous Component Analysis (SCA) as an alternative to a series of P-technique analyses. In SCA, the multivariate time series of each subject are decomposed into a common loading matrix, and series of subject specific component scores. Four variants of SCA are distinguished, which differ in their degree of interindividual differences in intraindividual variability. A drawback of SCA is that variability in level between subjects is ignored. Therefore, Multilevel SCA (MSCA) is proposed, of which SCA is a special case. MSCA reveals a model of intraindividual variation, just as SCA, and of interindividual variation in level. Thus, a model of both within and between subjects variation is provided, as will be illustrated by means of an empirical example. Properties and estimation procedures of MSCA will be discussed. Special attention will be devoted to the relationships between MSCA and competitive models, which are mainly found in the context of Structural Equation Modelling.

Reference

Timmerman, M.E. & Kiers, H.A.L. (in press). Four Simultaneous Component Models of multivariate time series from more than one subject to model intraindividual and interindividual differences. *Psychometrika*, xx, xxx-xxx.