

**Latent Moderation with many predictors and simultaneous equation systems:
Comparison and application of Latent Moderated Systems (LMS), Product Indicator
(PI) approaches and Structural after measurement approach (SAM) using the example
of an empirical study.**

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Almost all applications of latent moderation introduce only a single moderation effect into their models. However, in many frequently used theories such as the Reasoned Action Approach/Theory of Planned Behavior (Fishbein/Aizen 2010), many moderation effects are postulated, including those between exogenous and endogenous constructs. In this paper we want to compare three approaches: (1) Latent Moderated Systems (Klein & Moosbrugger, 2000), (2) Product Indicator approaches specifically double-mean-centering approach (Lin et al. 2010) and orthogonalized approach (Little, Bovaird & Widaman 2006) and (3) Structural after measurement approach. The first two methods estimate the free parameters of the model simultaneously. The third approach builds on the (local) structural-after measurement approach that was recently proposed by Rosseel & Loh (in press). One estimates the parameters of the measurement part of the model in stage one. The measurement parameters, together with the sample statistics, are then used to construct an estimate of the variance-covariance matrix of the latent variables: $\text{Var}(\eta)$. This variance-covariance matrix is used in the second stage, where one estimates the relationships among the latent variables including quadratic and interaction terms of the structural part of the model (Rosseel, Y. & Loh, W.W., in press). We apply these three approaches to a study of environmental behavior with a sample size of $N = 404$ and four moderation effects simultaneously including one between an exogenous and an endogenous latent variable. The comparison includes the computation time, whether the model could be estimated at all, point estimates, standard errors and the fit of the model.