Contribution ID: **129** Type: **not specified**

Automated Paths Detection in Composite-Based Structural Equation Modeling

Monday, 16 September 2024 14:10 (20 minutes)

Structural Equation Models (SEMs) are primarily employed as a confirmatory approach to validate research theories. SEMs operate on the premise that a theoretical model, defined by structural relationships among unobserved constructs, can be tested against empirical data by comparing the observed covariance matrix with the implied covariance matrix derived from the model parameters. Traditionally, SEMs assume that each unobserved construct is modeled as a common factor within a measurement theory framework.

Recently, Henseler (2021) proposed the synthesis theory, which allows for the inclusion of composites as proxies for unobserved constructs in SEMs. While automatic search algorithms have been proposed for factor-based SEMs to systematically identify the model that best fit the data based on statistical criteria, such algorithms have not been developed for composite-based SEMs.

This presentation introduces an extension of these approaches to composite-based SEMs using a genetic algorithm to identify the theoretical model that best fits the data. Akaike Information Criterion (AIC) is employed to compare model fits and determine the optimal model. We present a Monte Carlo simulation study that investigates the ability of our approach to accurately identify the true model under various conditions, including different sample sizes and levels of model complexity.

Our methodology can be considered a grounded theory approach, offering novel insights for conceptualizing structural relations among unobserved constructs and potentially advancing new theories.

Type of presentation

Talk

Classification

Mainly methodology

Keywords

SEM, Genetic Algorithms, Grounded theory

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Session Classification: Stochastic modelling

Track Classification: Stochastic Modelling