

Q-Matrix Validation with Factor Retention Methods in Cognitive Diagnosis Modeling

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Oral presentation

Q-Matrix Validation with Factor Retention Methods

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Abstract

In Cognitive Diagnosis Modeling (CDM), validating the Q-matrix is crucial to classify attribute profiles accurately. Several empirical and statistical methods have been developed to validate Q-matrix. However, most of these methods need a number of attributes to perform and begin the Q-matrix validation process. Yet, the studies which Q-matrix validation techniques to use estimate number of attributes are limited. With the aim of filling this gap, the current study evaluates factor retention methods to determine the number of attributes in CDMs by several Monte Carlo simulations. Data will be generated by varying sample size, number of attributes, test length, generating model and item quality. The evaluated factor retention methods will be three variants of parallel analysis (PCA, PAF, MRFA) with 95th eigenvalue criteria, Empirical Kaiser Criterion, Comparison Data Forest, Factor Forest, Next Eigenvalue Sufficiency Test and exploratory graph analysis. Results will be assessed by accuracy and absolute bias, also doublet combinations of factor retention methods will be assessed by agreement hit rate to reveal “winner” combination instead of if there is not a “winner” single method.

Keywords

CDM, factor retention, Q-matrix

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