**Abstract**

A central component of most cognitive diagnosis models (CDMs) is the Q-matrix, which specifies the attributes required by each item. A complete Q-matrix is said to be necessary for all the attribute profiles to be identified. However, the completeness, or lack thereof, of a particular Q-matrix may vary from one CDM to another. A method that has been proposed to assess Q-matrix completeness is to compare the success probabilities across the items of the different attribute profiles. However, this method presupposes that the underlying CDMs are known, a condition that is difficult to satisfy in practice. The current work proposes a simulation-based approach to assess Q-matrix completeness. The proposed method involves determining the simplest CDMs empirically, and disentangling completeness from test reliability. A simulation study is conducted to evaluate the viability of the proposed method. Results show that the simulation-based method performs well under most conditions, but needs to be used with caution when the sample size is small and items are of inadequate quality. A set of real data is also analyzed to examine the viability of the proposed procedure.