Identifiability in General Attribute Structure Models

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Abstract

In cognitive diagnostic assessment a property of the Q-matrix, usually referred to as completeness, warrants that the cognitive attributes underlying the observed behavior can be assessed uniquely. Characterizations of completeness were first derived under the assumption of independent attributes, and are currently under investigation for interdependent attributes. The dominant approach considers so-called attribute hierarchies, which are conceptualized through a partial order on the set of attributes. The presented paper corrects and extends previously published results on this issue obtained for conjunctive attribute hierarchy models. Drawing upon results from knowledge structure theory it provides novel sufficient and necessary conditions for completeness of the Q-matrix, not only for conjunctive models on attribute hierarchies, but also on more general attribute structures.

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