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On the Way to State Specific Response Errors: A Generalized Local Independence Model

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Knowledge structure theory is a psychometric approach for representing the knowledge of participants in a precise, non-numerical way. The most prominent probabilistic model in knowledge structure theory is the basic local independence model. One of its fundamental assumptions is the constancy of the response error probabilities (guessing and slipping) across all participants. However, it seems to be implausible that a student with no knowledge in a domain guesses the correct answer of an item with the same probability as an experienced student, who is ready to learn the item. Therefore, it would be desirable to let an item's error probabilities depend on a person's knowledge state and, in particular, on how close the item is to the knowledge state in some proper sense. Different options of capturing the discrepancy between an item and a knowledge state are discussed, and first results of simulation studies based on a generalized local independence model with state-dependent error probabilities are presented.

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