

BAYESIAN ANALYSIS OF HIERARCHICAL IRT MODELS:  
COMPARING AND COMBINING THE UNIDIMENSIONAL &  
MULTI-UNIDIMENSIONAL IRT MODELS

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ABSTRACT

As item response theory models gain increased popularity in large scale educational and measurement testing situations, many studies have been conducted on the development and applications of unidimensional and multidimensional models. However, to date, no study has yet looked at models in the IRT framework with an overall ability dimension underlying all test items and several ability dimensions specific for each subtest. This study is to propose such a model and compare it with the conventional IRT models using Bayesian methodology. The results suggest that the proposed model offers a better way to represent the test situations not realized in existing models. The model specifications for the proposed model also give rise to implications for test developers on test designing. In addition, the proposed IRT model can be applied in other areas, such as intelligence or psychology, among others.