

## RASCH LIKELIHOOD RATIO TEST OF DIFFERENTIAL ITEM FUNCTIONING

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Differential item functioning (DIF) analysis has been a major issue in test development. DIF analyses with item response theory are usually based on differences in item parameters between two groups. This approach assumes that accurate estimates of the covariance matrix are available. However, it has been shown that they are extremely difficult to compute. In addition, this approach does not directly estimate DIF, which makes the evaluation of DIF difficult. In this paper, we elaborate the work proposed by Thissen, Steinberg, and Gerrard (1986) and directly estimate DIF parameters. This approach is made possible by the multidimensional random coefficients multinomial logit model (Adams, Wilson, & Wang, 1997). Results of the simulation study show that all the parameters, including DIF parameters, were recovered very well. A real data set of a verbal subscale from an aptitude test was analyzed in three ways: item parameter difference, DIF parameter  $z$  test, and likelihood-ratio. The likelihood-ratio approach gives best results in terms of both theoretical and practical advantages.

**Keywords:** Differential item functioning, Rasch model, Likelihood-ratio test, Item response theory, Item bias.