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Full Information Item Factor Analysis of the FCI ERIC HAGEDORN, University of Texas at El Paso — Traditional factor analytical methods, principal factors or principal components analysis, are inappropriate techniques for analyzing dichotomously scored responses to standardized tests or concept inventories because they lead to artifactual factors often referred to as "difficulty factors." Full information item factor analysis (Bock, Gibbons and Muraki, 1988) based on Thurstone's multiple factor model and calculated using marginal maximum likelihood estimation, is an appropriate technique for such analyses. Force Concept Inventory (Hestenes, Wells and Swackhamer, 1992) data from 1582 university students completing an introductory physics course, was analyzed using the full information item factor analysis software TESTFACT v. 4. Analyzing the statistical significance of successive factors added to the model, using chi-squared statistics, led to a six factor model interpretable in terms of the conceptual dimensions of the FCI.

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