

# Detection and Diagnosis of Misfitting Item-Score Vectors

Wilco H.M. Emons

Department of Methodology and Statistics, Tilburg University, P.O. Box 90153, 5000 LE Tilburg,  
The Netherlands. E-mail: [W.H.M.Emons@uvt.nl](mailto:W.H.M.Emons@uvt.nl)

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## **Abstract:**

The validity of an individual test score may be threatened when the person's response behavior is governed by other factors than the latent trait of interest. For example, a respondent may suffer from extreme test anxiety and, as a result, obtain a lower test score than expected on the basis of his/her ability. Respondents whose response behavior is affected by such unwanted factors typically produce an inconsistent item-score vector; that is, they give incorrect answers to easy items and correct answers to difficult items. Person-fit methods detect item-score vectors that are unlikely given the hypothesized item response theory model or unlikely given the majority of item-score vectors in a the sample. Most person-fit statistics can be used to identify misfitting item-score vectors, but they do not give diagnostic information about the type of misfit. In this paper, a person-fit approach is presented that can be used to diagnose possible explanations for the observed misfit of an item-score vector. This approach uses the person response function (PRF), which describes for an individual testee the probability of giving a correct answer as a function of the item difficulty. For each person, the PRF is estimated using nonparametric regression. Unexpected trends in the estimated PRF may be indicative for certain types of aberrant response behavior. The interpretability of the person-fit results may be further improved using auxiliary information, such as ability-level estimates from previous testing occasions. In this presentation, the diagnostic approach to person-fit assessment is explained and illustrated in the context of child intelligence assessment.