

# **A Likelihood-Based Item Fit Statistic for the Generalized Graded Unfolding Model**

James Roberts

University of Maryland

"Dept. of Measurement, Statistics & Evaluation

1230F Benjamin Building

University of Maryland

College Park, Maryland 20742, USA"

The generalized graded unfolding model is a unidimensional, polytomous item response theory (IRT) model that implements single-peaked, nonmonotonic item characteristic curves. It is a proximity-based model that suggests respondents are more likely to receive higher item scores to the extent that they are located close to an item on the latent continuum. The utility of the GGUM is dependent on the degree to which it fits data in social science applications. However, methods to test for item/model fit have not previously been generalized to the GGUM in a systematic manner.

In this paper, a likelihood-based item fit statistic is generalized to the GGUM. This statistic, denoted as  $S-X^2$ , was originally developed for cumulative, binary IRT models (Orlando & Thissen, 2000).  $S-X^2$  is extended here in two respects. Specifically, it is generalized to an unfolding (rather than cumulative) model that involves polytomous (rather than binary) responses. The effectiveness of the  $S-X^2$  generalization is assessed using standard simulation techniques that investigate Type I error rate and power under realistic alternative hypotheses. The results are also compared to those produced with the more traditional likelihood ratio  $\chi^2$  statistic used in PARSCALE.