

## **Algorithm for Bayesian Inference about an Information Index of Fit for Categorical Data Analysis**

Thomas A. Mazzuchi,  
Ehsan Soofi (School of Business Administration, University of Wisconsin-Milwaukee),  
soofi@csd.uwm.edu,  
Refik Soyer, and Joseph J. Retzer

### **Abstract**

Akaike information criteria and its descendants serve the purpose of model comparison only, and do not provide diagnostic about the fit of the model to data. We will present the algorithm for a new approach to inference about the fit of a model in categorical data analysis. This approach combines ideas that are well known in information theoretic statistics (maximum entropy characterization of the model) and Bayesian statistics (Dirichlet prior) and is referred to as Maximum Entropy Dirichlet (MED). The procedure assumes that the data generating distribution is unknown, uses moments to derive a tentative model, and incorporates uncertainty about the model. The MED generates prior and posterior distributions of an information index for assessing the model fit. As byproducts, MED also produces priors and posteriors that map uncertainty about the model parameters and the moments. Applications will be presented.