

THE DEPARTMENT OF EDUCATIONAL PSYCHOLOGY'S RESEARCH METHODS,
MEASUREMENT, & EVALUATION (RMME) PROGRAMS AND THE DEPARTMENT OF
STATISTICS AT THE UNIVERSITY OF CONNECTICUT PRESENT:

SOME NEW DEVELOPMENTS ON PAIRWISE LIKELIHOOD ESTIMATION & TESTING IN LATENT VARIABLE MODELS

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Pairwise likelihood is a limited-information method used to estimate latent variable models, including factor analyses of categorical data. It avoids evaluating high-dimensional integrals and, thus, is computationally more efficient than full information maximum likelihood. This talk will discuss two new developments in the estimation and testing of latent variable models for binary data under the pairwise likelihood framework. The first development is about estimation and limited information goodness-of-fit test statistics under complex sampling. The performance of the estimation and the proposed test statistics under simple random sampling and unequal probability sampling is evaluated using simulated data. The second development focuses on computational aspects of pairwise likelihood. Despite its computational advantages it can still be demanding for large-scale problems that involve many observed variables. We propose an approximation of the pairwise likelihood estimator, derived from an optimization procedure relying on stochastic gradients. The stochastic gradients are constructed by subsampling the pairwise log-likelihood contributions, for which the subsampling scheme controls the per-iteration computational complexity. The stochastic estimator is shown to be asymptotically equivalent to the pairwise likelihood one. However, finite sample performances can be improved by compounding the sampling variability of the data with the uncertainty introduced by the subsampling scheme. We demonstrate the performance of the proposed method using simulation studies and two real data applications.



Dr. Irini Moustaki is a Professor in Social Statistics at the London School of Economics and Political Science. Her research interests include: latent variable models and structural equation models; composite likelihood estimation and testing; detection of outliers; missing values; and applications of these topics in education, psychology and social sciences. She serves as Associate editor of *Psychometrika*; an Editorial board member of *Metrika*, *Structural Equation Modeling: A Multidisciplinary Journal*, and *Educational & Psychological Measurement*; a Technical Advisory Group Member with The Programme for the International Assessment of Adult Competencies, and a Technical Executive Group Member with the International Association for the Evaluation of Educational Achievement (IEA). Dr. Moustaki earned her PhD from the London School of Economics.

Colloquium Access Information:

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