

## A Hybrid Latent Variable Model for Detecting Aberrant Response Patterns

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3:30-4:30pm, New PI 6<sup>th</sup> Floor Multipurpose Room (6602)  
Light refreshments provided

### **Abstract**

Responses to a set of indicators/items/variables are often used in social sciences for measuring unobserved constructs such as attitudes. Latent variable models, also known as factor analysis models, are used for linking the observed responses to the latent constructs. Often, some respondents provide random responses to the items. We distinguish between two response strategies: a primary one that is driven by the latent variable of interest and a secondary one that can be characterized as random. We propose an extended latent variable model for binary responses that models the secondary response mechanism through a latent class model implemented as an unobserved pseudo-item. We allow for the secondary response strategy employed by some respondents to be a function of the latent variable of interest and covariates. Not taking into account the proportion of responses generated by secondary strategies in the data can affect parameter estimates and the goodness-of-fit. Covariates are used to identify the demographic characteristics of those who choose a secondary response strategy and increase the precision of model estimation. We fit our proposed model to two data sets, one from a section of the 1990 Workplace Industrial Relations Survey and one from a section of the 2007 British Social Attitudes survey.

### **Biographical Note**

Irini Moustaki obtained her Ph.D in 1996 from the London School of Economics and Political Science. She has been a Reader in Social Statistics in the Department of Statistics at the LSE since 2007, head of department from 2010-2012, and she was recently promoted to full Professor. Her main research interests are latent variable models, structural equation modelling, analysis of categorical data, composite likelihood estimation, detection of outliers and missing values.

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<sup>1</sup> The PI Biostatistics Seminar Series is held on Tuesdays at New York State Psychiatric Institute. If you are interested in receiving regular announcements for our seminars in the future, or if you need further information, please contact Jina James (jamesji@nyspi.columbia.edu, (212) 543-5589).

She has co-authored two books: *Analysis of Multivariate Social Science Data* (2008) with Bartholomew, Steele and Galbraith, and *Latent Variable Models and Factor Analysis: a unified Approach* (2011) with Bartholomew and Knott. She is associate editor and member of the editorial board for four journals including *Computational Statistics and Data Analysis* and the *Journal of Educational and behavioural Statistics*. Some of her more cited publications are: *Generalised Latent Trait Models*, *Psychometrika*, 2000 with M. Knott. *Factor Analysis for Ordinal Variables: a Comparison of three approaches*, *Multivariate Behavioural Research*, 2001 with K. Joreskog and among the most recent: *The forward search algorithm for detecting aberrant response patterns in factor analysis for binary data*, *Journal of Computational and Graphical Statistic*, 2009 with D. Mavridis. *Composite likelihood inference in latent variable models for ordinal longitudinal responses*, *Psychometrika* (2012) with Vasdekis, V. and Cagnone, S.