Randomized Item Response Modeling for Sensitive Measurements

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Learning about behaviors and attitudes typically rely on self-reports. The quality of self-report data is based on the cooperation of respondents to provide honest answers. For surveys, specifically about sensitive topics, it is known that people tend to report socially desirable, in the direction of the researcher's expectations and/or what reflects positively on their behavior. To overcome respondents' tendencies to report inaccurately or to refuse to provide any response at all, strategies have been developed to reduce barriers to respond accurately. A general class of data collection methods for sensitive surveys is based on the randomized response technique, where individual responses are masked using a randomizing device. The randomization is performed by the respondent and the outcome is not revealed to the interviewer. The interviewee responds to the question selected by the randomization device, and the interviewer knows only the response to the selected question.

Through the use of a randomization device, each response observation is masked since it cannot be related to the question which was answered. Therefore, the RR technique encourages greater cooperation from respondents and reduces socially desirable response behavior.

Here, an overview is given of item response theory models that are modified in such a way that they are suitable for the analysis of RR data. The general class of such models is referred to as Bayesian randomized item-response (RIRT) theory models (e.g., Fox 2005; Fox and Meijer, 2008) or item randomized-response (IRR) models. Different Bayesian RIRT models are discussed for binary, ordinal, and mixed responses. Furthermore, model extensions are shown to handle non-compliance, where respondents do not follow the RR instructions, and multidimensional scales. Examples are shown to illustrate various models and to make comparisons between data collected under RR and DQ.

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Prior Requirements
Knowledge of statistics and methodology in the field of the behavioral and social sciences

Literature:
Fox, J.-P., and Meijer, R.R. (2008). Using IRT to obtain individual information from randomized response data: An application using cheating data. Applied Psychological Measurement, 32, 595-610.
Fox, J.-P. (2005). Randomized item response theory models. Journal of Educational and Behavioral Statistics, 30, 189-212.
Fox, J.-P. (2010). Bayesian Item Response Modeling: Theory and Applications. Springer, New York.

Short CV: Jean-Paul Fox

Jean-Paul Fox is associate professor, department of research methodology, measurement and data analysis, at the University of Twente, the Netherlands. He is a researcher in the area of Bayesian item response modelling and author of the monograph Bayesian Item Response Modeling published in 2010. He is known for his work on multilevel IRT modelling, where a multilevel survey design is integrated in the psychometric model. He received the 2001 Psychometric Association Dissertation award for his work on multilevel IRT modelling. He received two personal grants from the Netherlands Organisation for Scientific Research to develop psychometric models for large-scale survey research.

He has made novel contributions integrating the randomized response technique in survey methods to obtain accurately sensitive respondent information, which are currently implemented in large-scale survey studies on excessive alcohol consumption (Netherlands) and illegal downloading behaviour (Germany).