Multilevel and Longitudinal Modelling

PROGRAMME OUTLINE

LECTURER
Sophia Rabe-Hesketh

PRIOR BACKGROUND
It will be assumed that participants understand multiple regression analysis and have some previous exposure to logistic regression.

Course dates: 21 & 22 June 2012, 10am – 1pm

Course location: G.20, 55-59 Gordon Square, London WC1H 0NU

Course Materials: Participants will receive photocopies of all slides.

1 Aims and objectives

- To provide an introduction to multilevel modeling for continuous and binary responses, with emphasis on model interpretation and assumptions
- To introduce multilevel and other models for analyzing longitudinal data, discussing the advantages and disadvantages of the different approaches

2 Learning outcomes

By the end of the course, participants will

- Understand the structure and scope of multilevel models
- Be able to specify a model for a given application
- Be able to interpret the parameters of multilevel models
- Be aware of the assumptions and limitations of multilevel models
- Understand the modeling challenges of longitudinal models
- Feel encouraged to start exploiting the possibilities of multilevel models in their own analyses

3 Syllabus

- Linear random-intercept models
    - Clustered data, unobserved heterogeneity and dependence
    - Random-intercept models
    - Intraclass correlation
    - Estimation, testing and confidence intervals
    - Empirical Bayes prediction and shrinkage
    - Fixed versus random effects
- Linear random-coefficient models
    - Random-intercept model with covariates
    - Between effects, within effects and endogeneity
    - Random coefficients
- Multilevel logistic regression
    - Introduction to ordinary logistic regression
    - Random intercept logistic regression
    - Conditional and marginal relationships
- Longitudinal data and alternatives to multilevel modelling
    - Longitudinal data
    - Linear growth curve models
    - Nonlinear growth
    - Fixed effects approach
    - Autoregressive or dynamic approaches
    - Three-level models

4 References

- Rabe-Hesketh, S. and Skrondal, A. (2012). *Multilevel and Longitudinal Modeling Using Stata* (*3rd Edition*). Stata Press. ISBN 978-1-59718-108-2
  Volume I: Continuous Responses
  Volume II: Categorical Responses, Counts, and Survival

- Snijders, T.A.B., and Bosker, R.J. (2011). *Multilevel Analysis. An Introduction to Basic and Advanced Multilevel Modelling (2nd Edition)*. London, Sage. ISBN 978-1849202015

- Raudenbush, S.W. and Bryk, A.S. (2002). *Hierarchical Linear Models (2nd Edition)*. Thousand Oaks, CA: Sage. ISBN 0-7619-1904-X

5 Programme

Day 1: 21 June

10:00 – 10:10 Registration, welcome and overview

10:10 – 11:30 Linear random-intercept models

BREAK

11:50 – 13:00 Linear random-coefficient models

Day 2: 22 June

10:00 – 11:30 Multilevel logistic regression

BREAK

11:50 – 13:00 Longitudinal data and alternatives to multilevel modelling