Multilevel modelling and analysis

Time: 10am-2pm (with breaks) on 29 Oct 2021, 12 Nov 2021, and 19 Nov 2021

Place: https://uni-due.zoom.us/j/69287845211?pwd=K0hVWThYVCtVUWJuOFZQKy9kWHBuUT09

Instructor: PD Dr. Conrad Ziller

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Materials: https://github.com/conrad-ziller/ml-course

Description:

This seminar teaches the statistical foundations and practical application of multilevel modelling techniques. Multilevel models have become a standard analytic tool for data based on non-independent observations, which are also known as clustered or nested data structures. Such data structures may refer to spatial clustering (e.g., survey data from multiple countries), temporal clustering (e.g., repeated observations in panel data), as well as design-based clustering (e.g., respondents answering multiple vignettes in a survey experiment).

In addition to the statistical foundations, participants will learn how to conduct multilevel regression analysis with real data using Stata and R. Participants will also have the possibility to discuss their own research projects.

To successfully participate in the course, participants are required to conduct their own multilevel regression analysis and to describe their methodological approach and results (similar to the sections from typical journal articles). That is, a handed-in document of about 3-4 pages.

Learning goals:

- Acquiring knowledge of the foundations of multilevel modeling
- Acquiring knowledge of the advanced multilevel modeling techniques for complex hierarchical data such as panel data or cross-classified data
- Hands-on experience in fitting multilevel models using Stata and R
- Being able to conduct own studies using multilevel modeling

Requirements:

Basic knowledge of statistics and data analysis at the level of an introductory statistics course. Students need their own laptop on which to do exercises and assignments.

Exam:

Conducting a multilevel analysis. Description of the results in form of a Data & Methods, as well as Results section from journal articles using multilevel models.

E.g., see https://doi.org/10.1093/sf/sou088 (although a bit complex)

Hand in until **17 Dec 2021**.

Schedule

Day	Date	Topics
1.	29. Oct	Introduction Fundamentals Random Intercept and Random Intercept Random Slope models Cross-level interactions Centering Assumptions and diagnostics Exercise using cross-national comparative data
2.	12. Nov	Recap Fixed Effects models 3-Level models (and more) Cross-classified models Logit and other link functions Exercise using complex hierarchical data (incl. panel data structures)
3.	19. Nov	Recap Growth curve models and multilevel SEM Merits and pitfalls of multilevel models Exercise using data from a factorial survey experiment Discussion of your projects