8th GESIS Summer School in Survey Methodology
Cologne, August 2019

Syllabus for Short Course B: "Research Designs and Causal Inference"

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Date: 01.-02. August 2019
Time: 09:00-13:00, 14:00-16:00
Course starts Thursday morning at 09:00

About the Instructors:

Stefanie Eifler is a professor of Sociology and Empirical Social Research at the Catholic University of Eichstätt-Ingolstadt, Germany. Her research interests cover the implementation of experimental techniques into survey research and the interplay of rational choice and norms in the explanation of prosocial and criminal behaviour.

Heinz Leitgöb is a research associate at the Catholic University of Eichstätt-Ingolstadt, Germany. His main areas of research include design issues in self-report surveys of crime and victimization, interaction effects in nonlinear models, the explanation of criminal behaviour as well as the causes and consequences of educational inequalities.

Selected Publications:

- Eifler, S. & Petzold K. (in press): Validity Aspects of Vignette Experiments. Expected 'What-If' Differences between Reported and Actual Behavior. In P.J. Lavrakas et al. (eds.), Experimental Methods in Survey Research. Techniques that Combine Random Sampling with Random Assignment. Hoboken: John Wiley & Sons.
- Eifler, S. & Menold, N. (2018): Linearity, symmetry, and equidistance in semantic differential scales for measuring images of self and images of others. Mathematical Population Studies, 25(2): 82-98.
- Eifler, S. (2016): Social Mechanisms in Norm-relevant Situations: Explanations for Theft by Finding in High-cost and Low-cost Situations. Analyse & Kritik 38: 91-120.
- Seddig, D. & Leitgöb, H. (2018): Exact and Bayesian approximate measurement invariance. In E. Davidov, P. Schmidt, J. Billiet & B. Meuleman (eds.), Cross Cultural Analysis: Methods and Applications. Taylor & Francis: New York (2. Edition): 553–570.
- Seddig, D. & Leitgöb, H. (2018): Approximate measurement invariance and longitudinal confirmatory factor analysis: Concept and application with panel data. Survey Research Methods 12: 29–41.
- Bacher, J., Koblbauer, C., Leitgöb, H. & Tamesberger, D. (2017): Small differences matter: How regional distinctions in educational and labour market policy account for heterogeneity in NEET rates. Journal for Labour Market Research 51: 4.

Short Course Description:

Social scientists are frequently interested in the analysis of change and its causes. For this reason, typical research interests refer not only to the observation of change but first and foremost to the analysis of its causes – the question why change occurs is at the core of many empirical studies in social science research. The extent to what change can be traced back to a specific cause unambiguously – the so-called internal validity – depends on the order and the course of the empirical study, in other words, the research designs. For this reason, decisions concerning the research design are crucial to the success of any causal analysis. Against the background of these considerations, different ways to classify research designs are introduced, and the relations between research questions and designs are introduced and discussed with regard to the strengths and weaknesses of different kinds of research designs.

Keywords:

Research designs, foundations of causality, causal inference, potential outcome model, counterfactuals

Course Prerequisites:

Participants should have graduate-level knowledge about
- main types of research and sampling designs;
- survey methodology;
- main techniques of cross-sectional and longitudinal data analysis.

Target Group:

Participants will find the course useful if:
- they are considering to collect experimental or observational data to answer causal research questions and need advanced knowledge about potential research designs and their appropriate implementation;
- they want to gain insight into the prerequisites of causal inference from a design perspective.

Course and Learning Objectives:

By the end of the course participants will:
- have obtained an extensive overview over various types of quantitative research designs;
- be familiar with the concept of causality from different perspectives;
- be able to select the appropriate research design to answer causal research questions.

The course does not cover how to investigate or model causal effects using statistical software!

Organizational Structure of the Course:

Both days will consist of three teaching blocks, each one and a half hours long. The rest of the time will be dedicated to assignments and individual consultations. More information about the topics covered in each of the teaching blocks is provided in the detailed description below. The instructors will give joint lectures supported by slides. Course participants are highly encouraged to engage actively and to contribute to the lectures in order to establish lively discussions.

Course participants who want to profit from discussions of their own scientific work are asked to submit a one-page summary of their current or planned research to Stefanie Eifler and Heinz Leitgöb by July 15th.
Each day after the teaching blocks, the course participants will have the opportunity for individual consultation.

Software and Hardware Requirements:

None.

Long Course Description:

Day 1 (August 1, 2019)

1. **General Introduction to Research Designs**

Decisions concerning the research design are crucial to the success of causal analyses. Against the background of these considerations, different ways to classify research designs are introduced, and the relations between research questions and designs are highlighted and discussed with regard to the strengths and weaknesses of different kinds of research designs.

2. **Correlation and Causality**

A substantial portion of research questions within the field of quantitative social sciences aims at identifying causal links between social phenomena. Selecting between research designs that allow causal questions to be answered validly presupposes a sophisticated knowledge of causality and its differentiation from pure statistical correlation. Consequently, a theoretical and analytical introduction to the most prominent concepts of causality (robust dependence, consequent manipulation, mechanism based) will be provided in order to enable the course's participants to critically reflect on the potential of the research designs under discussion from a causal perspective.

3. **Cross-Sectional and Ex-Post-Facto-Designs**

Starting from the distinction between correlation and causality, the problems and prospects of observational designs are introduced. The pitfalls of these designs are mainly their limited potential to rule out possible alternative explanations for observed outcomes. We will introduce cross-sectional-designs and ex-post-facto-designs in particular, in order to elaborate on threats to the internal validity that arise from an application of these research designs. Course participants will learn to identify research questions and research situations in which observational designs are appropriate.

Day 2 (August 2, 2019)

4. **Experimental Designs**

This section of the course provides an overview of the idea and the principles of experimentation in the social sciences. The distinctive feature of experiments consists in the possibility to manipulate the independent variable and to analyze their effects upon the dependent variable. Various experimental designs have been proposed that differ with regard to their internal and external validity. The course will provide knowledge concerning the reasons that guide decisions for a special type of experimental design. Experimental designs have become more important in the field of social sciences. In particular, they were implemented into survey research which required some modifications of the classical experimental approaches referring to laboratory and field experiments. Experimental techniques in survey research - like vignette experiments or factorial surveys - allow for an analysis of the influences of situational features upon attitudes and decisions in general population samples. They are frequently related to concrete situations or events and are assumed to provide more valid measures of attitudes and decisions.

5. **Panel Designs**

Panel designs are generally characterized by the repeated interviewing of the same (usually large and representative) sample of individuals with the same survey instrument. Data based on panel designs enables the disentanglement of reciprocal causal relationships, the separation of age and cohort effects, the study of intra- and inter-individual change, the identification of "typical" developmental trajectories and the time-lag between the emergence of cause and effect to be taken into account. However, panel designs may be associated with a number of problems that have to be addressed in order to avoid the substantive interpretation of methodological artifacts (e.g. panel attrition, lack of measurement invariance across time, panel effects). Thus, the course will provide insights into the various forms of panel designs (e.g. rotating designs, single and multiple cohort designs, prospective and retrospective designs), their analytical potential as well as their methodological problems and possibly occurring pitfalls.

6. **Trend Designs**

In contrast to panel designs, trend designs represent repeated cross-sectional surveys with the same survey instrument being given to different samples of individuals at numerous time points. Therefore, it is possible to study change only at the aggregate level. An introduction to the specific characteristics of this type of longitudinal research design is intended to evaluate its potential in revealing social change and causal effects.

Day-to-day Schedule and Literature:

Day	Topic(s)
1	**General Introduction to Research Designs**
	Compulsory reading (have to be read before the session): ▪ Smith, H. L. (2013). Research design. Towards a realistic role for causal analysis. In S. L. Morgan (Ed.), Handbook of causal analysis for social research (pp. 45–73). Dordrecht: Springer. Suggested reading (suggested, yet do not have to be read before the session): ▪ Krosnick, Jon A./Presser, Stanley (2010): Question and Questionnaire Design (pp. 263-313). In: Peter V. Marsden/Wright, James D. (Eds.), Handbook of Survey Research. West Yorkshire: Emerald Group.
	Correlation and Causality
	Compulsory reading: ▪ Goldthorpe, J. (2001): Causation, statistics, and sociology. European Sociological Review 17, 1–20. Suggested reading: ▪ Pearl, Judea (2009): Causality. Models, Reasoning, and Inference (Chapter 8: pp. 259-281). Cambridge: Cambridge University Press.
	Cross-Sectional and Ex-Post-Facto-Designs
	Compulsory reading: ▪ Vogt, W. Paul/Gardner, D. C./ Haeffele, L. M. (2012): When to use what research design. New York: Guilford. Suggested reading: ▪ Morgan, S. L. & Winship, C. (2007). Counterfactuals and causal inference. Methods and principles for social research (Part I: pp. 3–57). Cambridge: Cambridge University Press.
2	**Experimental Designs**
	Compulsory reading: ▪ Shadish, William R./Cook, Thomas D./Campbell, Donald T. (2002): Experimental and Quasi-Experimental Designs for Generalized Causal Inference (Chapter 1: pp. 1-32). Boston: Houghton Mifflin Company. Suggested reading: ▪ Mutz, Diana C. (2011): Population-Based Survey Experiments (Chapter 4: pp. 54-67). Princeton and Oxford: Princeton University Press. ▪ Krosnick, Jon A. (2011): Experiments for Evaluating Survey Questions (Chapter 14: pp. 215-238). In: Madans, Jennifer/Miller, Kirsten/Maitland, Aaron/Willis, Gordon (Eds.), Question Evaluation Methods. Contributing to the Science of Data Quality. New York, NY: Wiley.
	Panel Designs
	Compulsory reading: ▪ Menard, S. (2002). Longitudinal research (pp. 24-48). Thousand Oaks: Sage. Suggested reading: ▪ Stafford, F. P. (2010). Panel surveys: Conducting surveys over time. In P. W. Marsden, J. D. Wright (Ed.), Handbook of survey research (pp. 765–793). Howard House: Emerald Group Publishing Limited.
	Trend Designs
	Compulsory reading: ▪ Menard, S. (2002). Longitudinal research (pp. 24-32). Thousand Oaks: Sage. Suggested reading: ▪ Firebaugh, G. (2010). Analyzing data from repeated surveys. In P. W. Marsden, J. D. Wright (Ed.), Handbook of survey research (pp. 795–812). Howard House: Emerald Group Publishing Limited.

Preparatory Reading:

Gorard, Stephen (2013): Research Designs. Creating Robust Approaches for the Social Sciences. London: Sage.

Additional Recommended Literature:

Additional recommended literature will be provided during the course.