Advanced Quantitative Research Methods

Semester: 2 (16/02/26-22/05/2026: Monday 2-4 PM)

Credits: 6

Course instructors: Barbara Briers, Kris Hardies

1. Prerequisites

The course requires an intermediate understanding of research methodology — that is, having completed a research methodology course at the PhD level. The current course builds on the foundations established by the two existing introductory methodology courses currently offered at the PhD level at FBE, expanding students' knowledge and skills to more advanced and specialized topics in quantitative research design and analysis.

Students should have good knowledge of basic research concepts relating to the design and analysis of quantitative research. For instance, students should be familiar with the basic tenets of experimental and observational research (e.g., internal and external validity, systematic and random variance), models and relations (dependent, independent, moderator, mediator, and control variables), and statistical analysis (e.g., linear regression).

2. Learning outcomes

This course will develop students' knowledge and abilities to conduct, evaluate, and contribute to rigorous quantitative research in the social sciences. Throughout the course, students will be encouraged to engage critically with the literature, assess methodological debates, and contribute to scholarly discourse on quantitative research methods in the social sciences.

Foundations of Scientific Inquiry: Students will develop a comprehensive understanding of the aims and methods of science, including the role of theory, experimental design, and empirical validation, with attention to the unique challenges of conducting rigorous research in the social sciences.

Critical Evaluation of Research Practices: Students will learn to critically assess the design, implementation, and execution of scientific research. They will engage in debates on methodological rigor, the validity of findings, and the interplay between theory and empirical evidence.

Advanced Quantitative Methods and Analysis: Students will improve their understanding of advanced topics in quantitative research design and analysis (e.g., mediation analysis, statistical power, sample size planning).

Open Science and Replicability: Students will explore contemporary practices in open science, such as preregistration and replication, and their role in enhancing research credibility. They will assess the challenges and opportunities of advancing transparency and reproducibility in scientific inquiry.

3. Course content

Topis / mandatory readings per week:

3.1. General introduction: The aims and methods of science

3.2. Experimental design

Hertwig & Ortmann (2001) Experimental practices in economics: A methodological challenge for psychologists? [With commentary] Behavioral and Brain Sciences 24: 383-451.

Mize & Manago (2022) The past, present, and future of experimental methods in the social sciences. Social Science Research 108: 102799.

3.3. We're scientists, not astrologists – On the perils of vaguery

*Bringmann LF, Elm*er T, Eronen MI. 2022. Back to Basics: The Importance of Conceptual Clarification in Psychological Science. *Current Directions in Psychological Science*. 31(4): 340-346.

von Nordenflycht, A. 2023. Clean up Your Theory! Invest in Theoretical Clarity and Consistency for Higher-Impact Research. *Organization Science* 34(5): 1651-996.

3.4. Measurement Schmeasurement

Chester & Laski (2021) Construct Validation of Experimental Manipulations in Social Psychology: Current Practices and Recommendations for the Future. Perspectives on Psychological Science 16(2): 377-395.

Flake & Fried (2020) Measurement Schmeasurement: Questionable Measurement Practices and How to Avoid Them. Advances in Methods and Practices in Psychological Science 3(4): 456-465.

Bringman & Eronen (2016) Heating up the measurement debate: What psychologists can learn from the history of physics. Theory & Psychology 26(1): 27-43.

Elson et al. (2023) Psychological measures aren't toothbrushes, Communications Psychology 1: 25.

3.5 There is more to experimentation than randomization

Brutger et al. (2023) Abstraction and Detail in Experimental Design. American Journal of Political Science 67(4): 979-995.

Morales et al. (2017) Keeping It Real in Experimental Research— Understanding When, Where, and How to Enhance Realism and Measure Consumer Behavior. Journal of Consumer Research 44(2): 465-476.

Zizzo (2010) Experimenter demand effects in economic experiments. Experimental Economics 13: 75-98.

Mummolo & Peterson (2018) Demand Effects in Survey Experiments: An Empirical Assessment. American Political Science Review 113(2): 517-529.

3.6. Manipulation checks

Fayant, M.-P. et al. (2017). On the Limitations of Manipulation Checks: An Obstacle Toward Cumulative Science. International Review of Social Psychology 30(1): 125–130.

Hauser, Ellsworth & Gonzalez (2018) Are Manipulation Checks Necessary? Frontiers in Psychology 9: 998.

Gruijters (2022) Making inferential leaps: Manipulation checks and the road towards strong inference. Journal of Experimental Social Psychology 98: 104251.

Varaine (2023) How Dropping Subjects Who Failed Manipulation Checks Can Bias Your Results: An Illustrative Case. Journal of Experimental Political Science 10: 299-305.

3.7. Regressions running out of control

Cinelli, C., Forney, A., & Pearl, J. (2024). A Crash Course in Good and Bad Controls. Sociological Methods & Research, 53(3), 1071-1104.

Robert L. Whited, Quinn T. Swanquist, Jonathan E. Shipman, James R. Moon; Out of Control: The (Over) Use of Controls in Accounting Research. The Accounting Review 1 May 2022; 97 (3): 395–413.

Hünermund, P., & Louw, B. (2023). On the Nuisance of Control Variables in Causal Regression Analysis. Organizational Research Methods, 0(0).

3.8. But what's the "mechanism"?

Green et al. (2010) Enough Already about "Black Box" Experiments: Studying Mediation Is More Difficult than Most Scholars Suppose. The ANNALS of the American Academy of Political and Social Science 628(1): 200-208.

Celli (2022) Causal mediation analysis in economics: Objectives, assumptions, models. Journal of Economic Surveys 36: 214-234.

Spencer et al. (2005) Establishing a Causal Chain: Why Experiments Are Often More Effective Than Mediational Analyses in Examining Psychological Processes. Journal of Personality and Social Psychology 89(6): 845-851.

Ge (2023) Experimentally manipulating mediating processes: Why and how to examine mediation using statistical moderation analyses. Journal of Experimental Social Psychology 109: 104507.

Yzerbyt et al. (2018) New recommendations for testing indirect effects in mediational models: The need to report and test component paths. Journal of Personality and Social Psychology 115(6): 929-943.

3.9. Preregistration and other Open Science practices

Kathawalla, U.-K., Silverstein, P., & Syed, M. (2021) Easing Into Open Science: A Guide for Graduate Students and Their Advisors. Collabra: Psychology 7(1).

Krishna (2020) The Need for Synergy in Academic Policies: An Introduction to the Dialogue on Pre-registration. Journal of Consumer Psychology 31(1): 146-150.

Simmons & Nelson (2020) Pre-registration: Why and How. Journal of Consumer Psychology 31(1): 151-162.

Pham & Oh (2020) Preregistration Is Neither Sufficient nor Necessary for Good Science. Journal of Consumer Psychology 31(1): 163-176.

Simmons & Nelson (2020) Pre-registration is a Game Changer. But, Like Random Assignment, it isNeither Necessary Nor Sufficient for Credible Science. Journal of Consumer Psychology 31(1): 177-180.

Pham & Oh (2020) On Not Confusing the Tree of Trustworthy Statistics with the Greater Forest of Good Science: A Comment on Simmons et al.'s Perspective on Pre-registration. Journal of Consumer Psychology 31(1): 181-185.

3.10. Statistical power – Power to the test

Giner-Sorolla, R., Montoya, A. K., Reifman, A., Carpenter, T., Lewis, N. A., Aberson, C. L., Bostyn, D. H., Conrique, B. G., Ng, B. W., Schoemann, A. M., & Soderberg, C. (2024). Power to Detect What? Considerations for Planning and Evaluating Sample Size. Personality and Social Psychology Review, 28(3), 276-301.

Wang & Rhemtulla (2021) Power Analysis for Parameter Estimation in Structural Equation Modeling: A Discussion and Tutorial. Advances in Methods and Practices in Psychological Science 4(1): 1-17.

Bentley (2021) Improving the Statistical Power and Reliability of Research Using Amazon Mechanical Turk. Accounting Horizons 35(4): 45-62.

3.11. Replication: The hallmark of science, is it really?

Camerer et al. (2016) Evaluating replicability of laboratory experiments in economics. Science 315(6280): 1433-1436.

Menkveld et al. (2024) Nonstandard errors. The Journal of Finance. 79(3): 2339-2390.

Buzbas et al. (2023) The logical structure of experiments lays the foundation for a theory of reproducibility. Royal Society Open Science 10(3): 221042.

4. International dimension

This course offers a unique international perspective on quantitative research methods, drawing from a diverse range of research practices and challenges across the social sciences including material from economics, psychology, accountancy, finance, organizational behavior, marketing, political and social sciences, .. . By engaging with studies from different global scholars and examining different designs, statistical techniques, and open science practices, students will gain insights into the varied methodological approaches and cultural contexts that shape research in different countries. The course fosters a collaborative learning environment, encouraging cross-cultural exchange of ideas on the ethical, theoretical, and practical aspects of scientific inquiry. In addition, students will have the opportunity to explore how international research standards, such as replication efforts and open science practices, contribute to the credibility and generalizability of scientific knowledge. This global approach prepares PhD students to navigate the increasingly

interconnected and diverse landscape of international academic and professional environments.

5. Teaching method and planned learning activities

This course uses interactive classroom lectures/discussions. Students are expected to prepare each class thoroughly, attend class, and actively participate in each session.

Group presentations: students are divided into groups to present a summary of the assigned papers for one session before the open discussion starts.

6. Assessment method and criteria

- 40% Participation in classroom activities

- 60% group presentation

7. Study material

Scientific papers (see course content).

8. Contact information

Barbara Briers

Kris Hardies