Experimental Methods

Period. 2025/26 –1 sem.

Class times: Thursdays 08:30-11:50

Room: TBA

Instructor:

Prof. **Joachim Vosgeraau**
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Course description

This course focuses on the fundamental principles of behavioral experimental research, including statistical tests, causal inference, empirical adequacy, and replicability. Experimental data are often analyzed with ANOVA, a special case of regression analysis. We will cover ANOVA in detail, its differences to regression, and non-parametric tests. We will read/discuss methodological papers related to causal inference, replicability, p-hacking, sample size requirements, effect sizes and power issues, and estimation of non-linear effects.

Course Material

Textbook

Navarro, D., & Foxcroft, D. (2022). Learning Statistics with JAMOVI (free download: https://www.learnstatswithjamovi.com)

Required Skills/Knowledge/Software

- Statistical analysis: Regression
- Software: SPSS, SAS, JMP, STATA, R, Jamovi, Python, ChatGPT
- Download freeware GPower from http://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower.html

Online Resources used in the Course

- Uri Simonsohn, Joe Simmons, and Leif Nelson: Data Colada (http://datacolada.org/)
- Uri Simonsohn, Joe Simmons, and Leif Nelson: p-curve (http://www.p-curve.com/)
- Uri Simonsohn: Two-lines test for testing u-shapes: http://webstimate.org/twolines/
- Ron Dotsch: Tutorial on Degrees of Freedom (https://medium.com/@rondotsch/degrees-of-freedom-tutorial-8d8e5c7be6ec)
- Pre-registration of experiments, hypotheses, and analyses: AsPredicted

(https://aspredicted.org/)
- Depository for experimental research: Researchbox (https://researchbox.org/)
- Andrew Gelman: Statistical Modeling, Causal Inference, and Social Science (http://andrewgelman.com/)

Assessment Methods

Weekly Assignments

In most sessions, you are given a dataset from an experiment that you are asked to analyze. Write-up your analyses and results in journal-style format (like in the results-section in an academic journal, together with figures/tables). Together with your write-up also submit your code to analyze the data. Assignments will be discussed in subsequent sessions.

Final Assignment

Analyze the data of study 2 in Xu, L., Zhao, S., Cotte, J., & Cui, N. (2023). Cyclical Time Is Greener: The Impact of Temporal Perspective on Pro-Environmental Behavior. *Journal of Consumer Research*. Can you reproduce the results reported in the paper? If you had analyzed that data, would you have reported the same analyses/results? What would you conclude from your analysis? Prepare a couple of PowerPoint slides to present your analyses and results in class.

Class participation:	20 points
Weekly assignments:	40 points
Final assignment:	40 points

Papers to read

André, Q. (2022). Outlier exclusion procedures must be blind to the researcher's hypothesis. *Journal of Experimental Psychology: General*, *151*(1), 213.

Montealegre, Andres and Simonsohn, Uri (2025). Johnson-Neyman 2.0: More Flexible, More Robust, and More Interpretable Probing of Interactions. Working paper available at SSRN: https://ssrn.com/abstract=4861381

Nelson, L. D., Simmons, J., & Simonsohn, U. (2018). Psychology's renaissance. *Annual Review of Psychology*, 69, 511-534.

Simmons, J P, Nelson, L D and Simonsohn, U (2011). False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant. *Psychological Science* 22(11): 1359–1366

Simonsohn, U., Nelson, L. D., & Simmons, J. P. (2014). P-curve: a key to the file-drawer. *Journal of Experimental Psychology: General*, 143(2), 534-547.

Simonsohn, U. (2015). Small telescopes: Detectability and the evaluation of replication results. *Psychological Science*, 26(5), 559-569.

Simmons, J. P., Nelson, L., & Simonsohn, U. (2021). Pre-registration: Why and how. *Journal of Consumer Psychology*, 31(1), 151-162.

Vosgerau, J., Simonsohn, U., Nelson, L. D., & Simmons, J. P. (2019). 99% impossible: A valid, or falsifiable, internal meta-analysis. *Journal of Experimental Psychology: General*, *148*(9), 1628-1639.

Tentative schedule

Class	Date Time	Room	Topic	Homework/Readings
1	Oct 30th 8:30 – 12:00		The logic of experimentation, hypothesis testing, ANOVA, simple and contrast effects	we will do assignment 1 in class
2	Nov 6th 8:30 – 12:00		Factorial designs, interactions, ANOVA and regression, ANCOVA	Assignments 2 & 3 due
3	Nov 13th 8:30 – 12:00		Within-subject manipulations and mixed designs	Read Assignment 4 (we will do it in class) Assignment 5 due
4	Nov 20th 8:30 – 12:00		Effect size, power, and non-parametric tests	Assignment 6 due Read the following papers: Montealegre and Simonsohn (2025)
5	Nov 27th 8:30 – 12:00		Thinking about Data Analysis, p-hacking	Assignment 7 due Read the following papers: Nelson et al. (2018) Simmons, Nelson, and Simonsohn (2011) Simonsohn et al. (2014 *JEPG*) Andrè (2022)
6	Dec 4th 8:30 – 12:00		Preregistration, replications, meta-analysis	Final Assignment due Read the following papers: Simonsohn (2015) Simmons et al. (2021) Vosgerau et al. (2019)

Faculty Bio

Joachim earned his Diplom in Psychology from University of Konstanz, Germany, and my Ph.D. in Marketing from INSEAD, France. From 2005 to 2013 he served on the marketing faculty at the Tepper School of Business at Carnegie Mellon University, where he was also co-director of the Center for Behavioral and Decision Research (CBDR). From 2013 to 2015, Joachim was on the faculty of the Marketing Department at Tilburg University's School of Economics and Management, Netherlands. Since 2015, he is on the marketing faculty of Bocconi University in Milan, and served from 2015-24 as director of Bocconi's Experimental Laboratory for the Social Sciences (BELSS). Joachim's research interests are in the realm of consumer behavior, with a specific interest in decision making and preferences under uncertainty, and research methodology.