DR. BENEDIKT LANGENBERG

RESEARCHER - STATISTICIAN - DATA SCIENTIST

CONTACTS

- ✉ benedikt.langenberg@gmail.com
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- ⊙ Mosalunet 74, 6221JM Maastricht

SKILLS

Programming:
R · Python (pandas, numpy, scikit-learn) · SAS · stan · SQL · SPSS · JAVA · GPT API · git

Statistical Modeling:
generalized linear mixed models · regularized regression · piecewise-regression · decision trees · random forests · time-series models · structural equation models · support vector regression · clustering · mixture models · latent class & profile analysis · PCA · factor analysis · survival analysis · monte carlo methods · propensity scores · weighting · mediation · missing data · meta-analysis

Data Visualization:
ggplot2 · seaborn · matplotlib · shiny dashboard

Research:
study planning · survey development · hypothesis testing · interpretation · scientific reporting · clinical trials

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EDUCATION

PhD Quantitative Psychology
cum laude
Bielefeld University, Germany (2022)

MSc Statistical Data Analysis
cum laude
Ghent University, Belgium (2021)

MSc Psychology
cum laude
RWTH Aachen University, Germany (2017)

BSc Computer Science
RWTH Aachen University, Germany (2017)

BSc Psychology
RWTH Aachen University, Germany (2014)

LANGUAGES

German ▬▬▬▬▬▬▬▬
English ▬▬▬▬▬▬▬
Dutch ▬▬▬

EXPERIENCE

Founder | Consultant
BLAnalytics - Data Consultancy, The Netherlands   **Since** 04/2025
- Provide expert **consultation** in **statistical modeling, data science, and study planning** for academic and industry clients
- **Develop and deliver tailored workshops** on advanced statistical methods and tools (e.g., **R, Python**)
- Translate methodological expertise into practical, reproducible workflows and training materials

Assistant Professor of Methodology & Statistics
Methodology & Statistics, Faculty of Health, Medicine & Life Sciences, Maastricht University, The Netherlands   **Since** 09/2023
- Provided **consultation on study design and statistical methodology** for research projects and proposals in health, medicine and life sciences
- Developed statistical methods for **intensive longitudinal** and **panel data**
- **Developled statistical software packages** and dashboards using **R** and **Python**
- Applied **ML** for **subgroup discovery** in clinical studies
- **Supervised eight junior researchers** in statistics and research methodology
- Led **workshops on data science** for health, medicine & life sciences

Postdoctoral Researcher
Psychological Methods, Bielefeld University, Germany   05/2022 - 08/2023
- Provided **statistical consultation** on multidisciplinary research projects
- Conducted **Monte Carlo simulations** to assess model performance
- Applied **ML techniques** to medical datasets in **R** and **Python**
- **Developed custom R packages** and provided methodological consulting

Research Scholar
Department of Psychology, San Diego State University, CA, USA   02/2021 - 04/2021
- Research Project: **Bayesian estimation** of treatment effects in experiments
- **Statistical proramming** with **R** and **stan**

Research Associate
Bielefeld University & RWTH Aachen University, Germany   03/2018 - 05/2022
- **Dissertation**: "Repeated measures ANOVA with latent variables: A new approach based on structural equation modeling"
- **Development of statistical methods** for latent variables modeling in experiments
- **Statistical proramming** with **R** and **stan**

UX Researcher
Allround Team GmbH (Ford Supplier), Cologne, Germany   02/2016 - 02/2018
- Conducted **usability and UX testing** for **human-machine interaction** and driver assistance systems
- Designed and ran **UX studies** in both **driving simulators** and real-world settings
- **Analyzed survey** and **behavioral data**

Startup Project Lead
Probantoo – Participant Scheduling Portal   09/2013 - 12/2016
- **Web-based platform** for **participant scheduling** for clinical and psychological studies in academic research
- Recipient of the **Mobile Solutions Award** (€10,000) by **adesso AG** and the **University of Duisburg-Essen (**Germany)
- Modeled **entity relationships** and system logic for participant, study, and time slot management
- Used **modeling frameworks** to translate requirements to the developer team

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FUNDED RESEARCH GRANTS

raise: R and AI for Statistical Education

Open Science Grant, Maastricht University, The Netherlands · 2025

- Own role: Main Applicant
- Amound granted: 4,000 €

Latent Multilevel Structural Equation Models for Experimental Designs Using Maximum Likelihood and Bayesian Methods (MA 7702/1-2)

German Research Foundation (German: Deutsche Forschungsgemeinschaft, DFG) · 2021

- Main Applicant: Dr. Axel Mayer
- Own role: Significant support in the preparation and writing of the application (follow-up application to DFG project MA 7702/1-1, i.e., topic of my dissertation)
- Amount granted: 320,750 €
- https://gepris.dfg.de/gepris/projekt/386867729?language=en

Research scholarship for PhD students for a three-months research visit at San Diego State University

German Academic Exchange Service (German: Deutscher Akademischer Austauschdienst, DAAD) · 2020

- Own role: Main Applicant
- Amount granted: 5,922 €

AWARDS AND HONORS

Competitive travel grant for the "Open Science Retreat 2024" in Schoorl, The Netherlands

Open Science Community Netherlands · 2024

- Amount granted: 500 €

Competitive travel grant for the "9th European Congress of Methodology" in Valencia, Spain

European Association of Methodology · 2021

- Amount granted: 750 €

Competitive travel grant for the "Research Synthesis & Big Data Conference 2019" in Dubrovnik, Croatia

Leibniz Institute for Psychology (ZPID), Germany · 2019

- Amount granted: 500 €

Recipient of the Springorum Commemorative Coin

Friends of the RWTH Aachen University (German: Förderverein der RWTH Aachen) · 2017

- Award given to the best 10% of students

Award recipient of the "Mobile Solutions Award"

adesso AG and University of Duisburg-Essen, Germany · 2016

- Amount granted: 10,000 €
- Innovation contest within the framework of mobile applications

Recipient of the German Scholarship (German: Deutschlandstipendium)

Educational Funds, RWTH Aachen University · 2015

- Amount granted: 3,600€
- Merit-based Scholarship equally financed by the German government and commercial companies

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PUBLICATIONS

Refereed Journal Articles

Langenberg, B., Helm, J. L., McCabe, C. J., Günther, T., & Mayer, A. (under review). Interindividual Differences and Intraindividual Variability in Custom Contrasts: Leveraging Dynamic Structural Equation Modeling for Analyzing Experimental Factorial Designs. https://osf.io/7wdfv/

Langenberg, B., Helm, J. L., & Mayer, A. (2024). Bayesian Analysis of Multi-Factorial Experimental Designs Using SEM. *Multivariate behavioral research, 59*(4), 716–737. https://doi.org/10.1080/00273171.2024.2315557

Helm, J. L., **Langenberg, B.**, Grossman, E., Poulin, J., & Mayer, A. (2022). Using structural equation modeling in place of between-subjects analysis of variance. *Structural Equation Modeling: A Multidisciplinary Journal*, 1–9. https://doi.org/10.1080/10705511.2022.2033977

Kiefer, C., Lemmerich, F., **Langenberg, B.**, & Mayer, A. (2022). Subgroup discovery in structural equation models. *Psychological Methods, 29(6), 1025–1045.* https://doi.org/10.1037/met0000524

Langenberg, B., Helm, J. L., & Mayer, A. (2022). Repeated measures ANOVA with latent variables to analyze interindividual differences in contrasts. *Multivariate Behavioral Research, 57*(1). 2–19. https://doi.org/10.1080/00273171.2020.1803038

Langenberg, B., Janczyk, M., Koob, V., Kliegl, R., & Mayer, A. (2022). A tutorial on using the paired t-test for power calculations in repeated measures ANOVA with interactions. *Behavior Research Methods, 55*(5), 2467-2484. https://doi.org/10.3758/s13428-022-01902-8

Langenberg, B., Wurpts, I. C., Geuke, G. G. M., & Onghena, P. (2022). Estimating and testing causal mediation effects in single-case experimental designs using state-space modeling. *Evaluation & the Health Professions, 45*(1), 8–21. https://doi.org/10.1177/01632787211067533

Refereed Book Chapters

Mayer, A., Kiefer, C., **Langenberg, B.**, & Lemmerich, F. (2021). Using subgroup discovery and latent growth curve modeling to identify unusual developmental trajectories. In U. Engel, A. Quan-Haase, S. X. Liu, & L. Lyberg (Eds.), *Handbook of computational social science, volume 2: Data science, statistical modelling, and machine learning methods* (pp. 244–266). Routledge. https://doi.org/10.4324/9781003025245

Refereed Proceedings Articles

Langenberg, B., & Mayer, A. (2022). Differences in longitudinal trajectories between groups - the multi-group latent growth components approach. *Proceedings of the 9th European Congress of Methodology*. https://doi.org/10.7203/PUV-OA-438-5

Lemmerich, F., Kiefer, C., **Langenberg, B.**, Cacho Aboukhalil, J., & Mayer, A. (2020). Mining exceptional mediation models. *Proceedings of the 25th International Symposium, ISMIS 2020*, 318–328. https://doi.org/10.1007/978-3-030-59491-6_30

Dissertation

Langenberg, B. (2022). Repeated measures ANOVA with latent variables: A new approach based on structural equation modeling [Doctoral dissertation, Bielefeld University]. PUB. https://doi.org/10.4119/unibi/2963576

Software

Langenberg, B. (2022). powerANOVA: estimating power in repeated measures ANOVA (Version 0.2) [Computer software]. Retrieved May 18, 2022, from https://github.com/langenberg/powerANOVA

Langenberg, B. (2021). sccm: Single-case causal mediation analysis (Version 0.1) [Computer software]. Retrieved August 27, 2021, from https://github.com/langenberg/sccm

Langenberg, B., Kiefer, C., Lemmerich, F., & Mayer, A. (2020). subgroupsem: An R package for mining exceptional models (Version 0.1) [Computer software]. https://github.com/langenberg/subgroupsem

Langenberg, B., & Mayer, A. (2020). semnova: Latent repeated measures ANOVA (Version 0.2.0) [Computer software]. Retrieved February 4, 2023, from https://langenberg.github.io/semnova-man

Talks

Langenberg, B. (2024). *Leveraging Dynamic Structural Equation Modeling for Analyzing Intensive Eye-Tracking Data: An Illustration and Software Development*. 14th International Workshop on Psychometric Computing, Rotterdam, The Netherlands.

Langenberg, B. (2023). *The subgroupSEM R Package for Subgroup Discovery in Structural Equation Models*. 13th International Workshop on Psychometric Computing, Zurich, Switzerland.

Langenberg, B. (2023). *Using SubgroupSEM for Finding Subgroups with Unique Treatment Effects in Non-Randomized Experiments*. 10th European Congress of Methodology, Valencia, Spain.

Langenberg, B. (2022). *Repeated Measures ANOVA with Latent Variables: A New Approach Based on Structural Equation Modeling*. SEMlab, Ghent, Belgium.

Langenberg, B., Helm, J. L., & Mayer, A. (2022). *Bayesian Analysis of Multi-factorial Experimental Designs Using SEM*. 10th Young Researchers Workshop, Zentrum für Statistik, Bielefeld, Germany.

Langenberg, B., & Mayer, A. (2021). *Implementing sphericity in multivariate latent variable models*. 9th European Congress of Methodology, Valencia, Spain.

Langenberg, B., Wurpts, I. C., Geuke, G. G. M., & Onghena, P. (2021). *Estimating and Testing Causal Mediation Effects in Single-Case Experimental Design*. 9th Young Researchers Workshop, Zentrum für Statistik, Bielefeld, Germany.

Langenberg, B., & Mayer, A. (2020). *The semnova package for latent repeated measures ANOVA*. 12th International Workshop on Psychometric Computing, Dortmund, Germany.

Langenberg, B., & Mayer, A. (2019). *Interindividual differences in causal effects from multi-factorial repeated measures experimental designs*. Single Subject Causal Mediation Analysis Workshop, Leiden, Netherlands.

Langenberg, B., Helm, J. L., & Mayer, A. (2019). *Comparing and extending SEM approaches for repeated measures designs*. 14th Conference of the Section Methods and Evaluation of the German Psychological Society, Kiel, Germany.

Azzam, B., Roscher, B., Schelenz, R., Jacobs, G., **Langenberg, B.**, & Mayer, A. (2018). *Identification of unexpected patterns and relationships in wind turbine scada data using dynamic structural equation modeling*. 14th EAWE PhD Seminar on Wind Energy, Brussels, Belgium.

Langenberg, B., & Mayer, A. (2018). *Repeated measures ANOVA with latent variables using the latent growth component approach*. 8th European Congress of Methodology, Jena, Germany.