

# Handling missing data in R

FDZ Herbstakademie / Autumn Academy 2025

- ♦ Dozierende\*r / Prof. Dr. Simon Grund (University of Hamburg, Hamburg, Germany)  
Lecturer:
- ♦ Termin / Dienstag / Tuesday, 16.09.2025, 9:00 – 17:00 h  
Date and Time:

## Abstract

In this workshop, participants will receive an introduction to missing data analysis in R. The workshop begins with a theoretical overview of missing data, before we consider two state-of-the-art methods for handling missing data: maximum likelihood estimation and multiple imputation. Later on, we will also discuss more specific challenges in the treatment of missing data such as multilevel data, questionnaire and longitudinal data, or nonlinear effects. The aim of the workshop is to develop a basic understanding of the problem of missing data and to gain practical experience with modern methods for handling them through a series of examples and hands-on exercises in R.

## Inhalte / Contents

- ♦ Missing Data
- ♦ Maximum Likelihood estimation
- ♦ Multiple imputation
- ♦ Multiple imputation for questionnaire/multilevel data
- ♦ Multiple imputation in applications with nonlinear effects

## Voraussetzungen / Previous knowledge required

To benefit from this workshop, participants should have a basic familiarity with common statistical analyses and their application in R (e.g., multiple regression, multilevel models).

## Literatur / Literature

- Hayes, T., & Enders, C. K. (2023). Maximum likelihood and multiple imputation missing data handling: How they work, and how to make them work in practice. In H. Cooper, M. N. Coutanche, L. M. McMullen, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology: Data analysis and research publication* (Vol. 3) (2nd ed.). (pp. 27–51). American Psychological Association. <https://doi.org/10.1037/0000320-002>
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7, 147–177. <https://doi.org/10.1037//1082-989X.7.2.147>

## Software / Software requirements

For the exercises, the following software packages will be required:

- ♦ R (version 4.4.0 or newer)
- ♦ R packages: `mice`, `miceadds`, `mitml`, `mdmb`, `lavaan`, `semTools`, `lme4`
- ♦ RStudio

Please ensure beforehand that you have an up-to-date version of these packages installed and install or update these packages as needed.