

UNIVERSITY OF HAMBURG

MASTER THESIS

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Author:

Lona Frießner

Supervisor:

Prof. Dr. Simon Grund

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Department of Psychology with focus on Quantitative Methods



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Abstract

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by Lona Frießner

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Table of contents

Abstract	iii
1 Introduction	1
2 Theory	3
3 Methods	5
3.1 Data generation	5
3.2 Data-generating model	5
3.3 Missing data generation	5
3.4 Factors and simulation conditions	5
3.5 Methods of missing data handling	6
3.6 Execution of simulation	6
4 Results	7
5 Discussion	9
References	11

List of Figures

List of Tables

Chapter 1

Introduction

Chapter 2

Theory

Chapter 3

Methods

3.1 Data generation

A simulation study was conducted to compare the methods of missing data handling. (erklären, was eine Simulationsstudie ist)

Data was generated from a parametric model with known parameters.

3.2 Data-generating model

The data-generating model was a two-level random intercept model:

$$Y_{ij} = \gamma_{10} (X_{ij} - \bar{X}_{.j}) + \gamma_{01} \bar{X}_{.j} + \gamma_{02} W_j + u_{0j} + e_{ij} \quad (3.1)$$

The random effects are normally distributed with

$$u_{0j} \sim N(0, \psi^2)$$

and

$$e_{ij} \sim N(0, \sigma^2)$$

and independent of each other. Y_{ij} , X_{ij} , W_j are z-standardized variables, which means that they have a mean of zero and a variance of 1. First,

3.3 Missing data generation

3.4 Factors and simulation conditions

3.4.1 Constants

3.4.2 Level-2 sample size

As the small-sample performance of the methods is of interest, three different group sizes are used: - $N_2 = 15$ - $N_2 = 30$ - $N_2 = 60$ These sizes are chosen to reflect McNeish (2017) (2017) summary, that group sizes below 25 almost certainly face issues and below 50 there is a susceptibility to small sample biases. These ranges should therefore cover problematic, likely problematic and not problematic level-2 sample sizes. ### Effect size of the group-level effect { 01} The effect size of the group-level effect of X is varied between 0.0 and 0.30. This is to investigate the performance both with a null effect of the parameter of interest as well as a substantive effect.

3.4.3 ICC of X and residual Y

3.4.4 Missing data mechanism

Missing data mechanism is set to either MCAR or MAR. For MAR, the strength of relationship between W and missing of X is set to 0.4, which corresponds to 0.4^2 % 100% explanation of variance in missingness through W.

3.5 Methods of missing data handling

3.5.1 Estimands

3.5.2 Performance measures

3.6 Execution of simulation

Chapter 4

Results

Chapter 5

Discussion

References

- McNeish, D. (2017). Small Sample Methods for Multilevel Modeling: A Colloquial Elucidation of REML and the Kenward-Roger Correction. *Multivariate Behavioral Research*, 52(5), 661–670. <https://doi.org/10.1080/00273171.2017.1344538>