University of Ottawa

Doctoral Thesis

A doctoral thesis title

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for the degree of Doctor of Philosophy

in the

Informatics Program
Department of Mathematics

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Declaration of Authorship

I, Lona Frießner, declare that this thesis titled, A doctoral thesis titleand the work presented in it are my own. I confirm that:

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- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.

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- I have acknowledged all main sources of help.

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Signed:

_____

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_____

"Thanks to my solid academic training, today I can write hundreds of words on virtually any topic without possessing a shred of information, which is how I got a good job in journalism."

Dave Barry

UNIVERSITY OF OTTAWA

Abstract

Applied Math Group

Department of Mathematics

Doctor of Philosophy

A doctoral thesis title

by Lona Frießner

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Acknowledgements

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List of Abbreviations

LAH	**L**ist **A**bbreviations **H**ere
WSF	**W**hat (it) **S**tands **F**or

List of Symbols

a	distance	m
P	power	W (J s^1)
ω	angular frequency	rad

For Elsa

Chapter 1

Introduction

Chapter 2

Introduction

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:

$$Y_i j = \tag{3.1}$$

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: - N2 = 15 - N2 = 30 - N2 = 60 These sizes are chosen to reflect McNeish´s (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.

Chapter 4

Methods

4.1 Estimands

4.2 Performance measures

4.3 Execution of simulation