

Development of an interactive tool for the exploration of the effects of measurement error

Bachelor Thesis

Supervision: Helmut Küchenhoff, Veronika Deffner

Background:

Measurement error and misclassification of variables may distort the statistical analysis of observational data. Previous literature surveys revealed that methods to correct for measurement error and misclassification are often only rarely or even not at all applied. Frequently, the size and structure of the error are insufficiently described and the analysts seem to be not aware of the impact of the errors on their results. Currently, a guidance document on measurement error and misclassification of variables in observational epidemiology is developed outlining different types of errors, their impact on the analysis, methods to correct the errors and giving practical advice. This guidance document is part of the work of TG4 of the STRATOS initiative¹, in which Helmut Küchenhoff and Veronika Deffner participate. The initiative aims at providing accessible and accurate guidance in the design and analysis of observational studies.

Aim:

The objective of the Bachelor thesis is to develop an interactive tool for the exploration of the effects of measurement error and misclassification in the linear model. Based on the examples included in the draft of the guidance document, an interactive tool should be implemented, which could be further used as supplementary material for the guidance paper. Classical measurement error, linear measurement error, Berkson error and misclassification in the explanatory variables as well as in the outcome variable should be considered for simple and multiple linear and logistic regression models. The user of the tool should be able to easily gain an overview about the used data and to interactively explore the effects of measurement error for various situations.

Requirements:

- R programming
- Preferably experience with Shiny

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¹<http://www.stratos-initiative.org/>