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**Current Thesis Topics**

at the Department of Psychology with Focus on Quantitative Methods

*Last updated: 09.08.2024*

**General information**

The list and description of the thesis topics currently offered can be found on the following pages. If you are interested in one of the topics, please write a short exposé (max. 1 page) in which you briefly present your ideas on the research question. Please send the exposé and a current CV to the contact person mentioned in the description. If you are interested in a different topic that focuses on quantitative methods, please contact the head of department with a specific topic proposal (including an exposé).

Since the majority of the research literature is available only in English, theses in our research area are usually written in English. Exceptions are possible by prior agreement. For general inquiries, please contact the secretary office (sekretariat-grund.pb@uni-hamburg.de).

**Notes on master theses**

The master thesis should show the student's ability to work on and present a problem from an area of psychology according to scientific criteria. Master's theses in the field of "Quantitative Methods" mainly deal with the development and evaluation of statistical methods for psychological research, for example in the context of simulation studies or concrete case studies.

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| **Topic** | **Effects of missing data on statistical power and sample size requirements** |
| Type | 1 Master thesis |
| Supervisor | Prof. Dr. Simon Grund (simon.grund@uni-hamburg.de) |
| Description | Missing data are a common problem in psychological research, because they can distort statistical conclusions and reduce the statistical power to detect existing effects. Yet, when researchers conduct power analyses to determine the statistical power and the required sample size of an empirical study, the effects of missing data are largely ignored, and software packages for power analysis often do not provide a way to take missing data into account. The aim of this thesis is to explore the impact of missing data on the estimation of statistical power and required sample sizes under varying conditions using simulation studies that mimic typical applications in psychological research. |
| Literature | Woods, A. D., Gerasimova, D., Van Dusen, B., Nissen, J., Bainter, S., Uzdavines, A., Davis-Kean, P. E., Halvorson, M., King, K. M., Logan, J. A. R., Xu, M., Vasilev, M. R., Clay, J. M., Moreau, D., Joyal-Desmarais, K., Cruz, R. A., Brown, D. M. Y., Schmidt, K., & Elsherif, M. M. (2023). Best practices for addressing missing data through multiple imputation. *Infant and Child Development*, *e2407*, 1–37. https://doi.org/10.1002/icd.2407 <br><br> Davey, A., & Savla, J. (2009). Estimating statistical power with incomplete data. Organizational Research Methods, 12(2), 320–346. https://doi.org/10.1177/1094428107300366 |

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| **Topic** | **Testing indirect effects in mediation analyses with multiply imputed data** |
| Type | 1 Master thesis |
| Supervisor | Prof. Dr. Simon Grund (simon.grund@uni-hamburg.de) |
| Description | Mediation analyses are often used to investigate indirect effects, which are based on the idea that one variables' effect on a second variable might not be due to a direct cause-effect relationship, but is merely transmitted through a third (intermediate) variable. In practice, mediation analyses are often complicated by missing data, and many researchers address this problem with multiple imputation (MI), a statistical technique that creates multiple copies of the data set, each of which is "filled in" with plausible replacements for the missing data. Although MI is extremely effective at handling missing data, it can sometimes complicate statistical decision making, which is especially true for statistical tests of indirect effects. The aim of this thesis is to use simulation studies to compare different strategies for testing indirect effects in combination with MI for handling missing data. |
| Literature | MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, *7*(1), 83–104. https://doi.org/10.1037//1082-989X.7.1.83 |
| | Wu, W., & Jia, F. (2013). A new procedure to test mediation with missing data through nonparametric bootstrapping and multiple imputation. *Multivariate Behavioral Research*, *48*(5), 663–691. https://doi.org/10.1080/00273171.2013.816235 |

| Topic | **Latent curve modelling for experience sampling designs with daily and weekly trends** |
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| Type | 1-2 Master theses (1 THESIS HAS ALREADY BEEN ASSIGNED) |
| Supervisor | Prof. Dr. Simon Grund (simon.grund@uni-hamburg.de) |
| Description | The experience sampling method (ESM) is an increasingly popular data collection technique that often requires participants to respond to multiple prompts per day to describe their current experiences (e.g., mood, feelings, behaviors). Compared with more traditional methods, ESM provides a larger number of measurements, allowing researchers to examine the dynamics of everyday life in more detail. However, this also creates challenges for the statistical analysis of longitudinal data, for example in latent curve modelling (LCM). One particular problem in the LCM is that this method does not distinguish between trends that occur on different time scales (e.g., trends within vs. between days). In this set of theses, the aim is to explore different options for extending the LCM to account for these types of trends and to evaluate them in simulation studies. |
| Literature | Duncan, T. E., & Duncan, S. C. (2004). An introduction to latent growth curve modeling. Behavior Therapy, 35, 333–363. https://doi.org/10.1016/S0005-7894(04)80042-X

Gabriel, A. S., Podsakoff, N. P., Beal, D. J., Scott, B. A., Sonnentag, S., Trougakos, J. P., & Butts, M. M. (2019). Experience sampling methods: A discussion of critical trends and considerations for scholarly advancement. Organizational Research Methods, 22, 969–1006. https://doi.org/10.1177/1094428118802626 |