

# Guidelines for Master Theses

## Chair of Biological Psychology and Neuroergonomics

### Requirements

- A) Empirical vs. Methodical thesis:** Two different types of theses are possible. Empirical theses contain the process of experiment planning, data collection, and practical lab work, and receive assistance for data processing and feature extraction. Methodical theses work with already collected data and the independent creation of the data processing pipelines is the core of the thesis. All students have to create plots and statistics themselves and discuss the scientific background, data collection, data processing, statistics and results in their thesis work.
- B)** All master students have to submit a **written exposé** about their work to the department's secretariat and/or the supervisor. This should be max. 2 pages and contain the following points:  
**General:** The exposé should contain the following information: Name, address, telephone number and email address, provisional title of the thesis, date of writing of the exposé, and planned date of handing in the thesis.  
**Background:** This should be a brief outline of the relevant research context and most important publications leading to this project, including the gap that should be filled by the project in general.  
**Research Questions:** This should contain a clear statement of the central issue to be solved in the thesis work. In addition, the specific research questions that are asked should be presented in more detail, and if applicable, your hypothesis on their answer.  
**Time plan:** Schedule for the preparation, implementation, evaluation and writing the work, including the final deadline and whether or not this deadline is mandatory or extendable.
- C)** For master students, regular **participation in the colloquium** (usually in English) is invited. Each Master student is recommended to **present their own work to get feedback:**  
A good time point is either after the study design was developed and before data is collected or when presenting the results. The first allows for improving the design plan, research questions, hypotheses, and



methodology before the study is conducted/before the data analysis is started. The latter allows for constructive input for result discussion.

The presentation time should not exceed 45 min to make enough time for discussion. For the purpose of illustration, you are asked to prepare a slide presentation. The presentation will take place in the conference room of the BPN chair and the required equipment will be provided by the department.

Intermediate quick presentations and discussions in the weekly meetings are possible in addition.

### **Study implementation**

Before implementing any experiment, each Master's student should study the ethical principles of human research and take the online ethics course of the Canadian Panel on Research Ethics (<http://tcps2core.ca/welcome>). With this in mind, you are asked to closely examine your own study design again. If not already in place, a review of every experiment by the ethics committee is desirable, and obligatory for a scientific publication.

During the experimental phase, students are asked to keep a test protocol, which notes all special features (e.g. loss of test subjects, date of questionnaires returned, disturbances of the test procedure, etc.). Completed questionnaires and other tests are to be labeled (subject number, date, test section, etc.) and filed.

### **Important! All files must be stored on the BPN data storage server!**

For laboratory tests: The student is required to attend a lab introduction by the Lab manager. The use of the test rooms, equipment and consumable materials has to be done with the requisite care and listed in the digital BeMoBIL lab book. After each single test, the collected data must be saved separate from the experimental control computers.

After completing the experiment, all documents must be removed from the test room. Unused questionnaires and other reusable materials should be handed to the secretariat. Data on test control computers and recording computers has to be deleted by the investigator (after storing it on the BPN server!).

### **Data preparation and analysis**

All collected data must be transferred to an SPSS file (or alternatively to R / MATLAB). Variable names, codes, sequence of data, etc. are to be discussed with the supervisors. You are asked to create a backup of this file. All scripts, syntax, and output used for further processing and analysis have to be saved on the BPN server; files with flawed data or incorrect analyzes should be deleted.

### **Writing the thesis**

The written work should correspond to the standards of scientific texts. For formal design, the guidelines for manuscript design of the American Psychological Association (APA) should be consulted. A 1.2-line spacing should be selected.

The thesis should follow the general structure as follows:

### **Eidesstattliche Erklärung**

The declaration of honor (Eidesstattliche Erklärung) that the thesis is an independent and original piece of work has to be included according to the guidelines from the examination office (Prüfungsamt). This should also include a statement whether large language models/AI were used.

### **Abstract:**

- A concise summary of your entire thesis, including the purpose, methods, results, and conclusions. This is the first part of the work after the table of content and lists of abbreviations etc. For the thesis both, an English and an German, abstract is required.

## Introduction

- Background Information:  
Provide a broad context of the research area to set the stage for your study. This includes a review of the literature on the topic and key findings from previous studies.
- Rationale:  
Explain the rationale behind your study. Highlight the gaps or unresolved questions in the current literature and how your research aims to address these gaps.
- Significance:  
Discuss the importance or potential impact of your study in advancing knowledge in the field.
- Objectives:  
Outline the specific objectives or aims of your research.
- Research Question/Hypothesis:  
Clearly state the research question(s) or hypothesis(es) your study intends to explore or test.

## Methods

- Participants:  
Describe the demographic and characteristics of your study participants. Include details on how participants were recruited and any inclusion or exclusion criteria.
- Experimental Design:  
Explain the design of your study, such as whether it is observational, experimental, cross-sectional, longitudinal, etc. Mention any control groups or conditions.
- Materials/Instruments:  
List the materials used, including any psychological tests, questionnaires, methods (e.g., EEG, ECG), or other instruments.
- Procedure:  
Detail the step-by-step procedures followed during the study, from recruitment to data collection.
- Data Analysis:  
Describe the statistical methods or other analytical techniques used to analyze the data. Include information on how you processed the data, any software used, and how you addressed potential biases or confounders.

## Results

- Data Presentation:  
Present the findings of your study, usually starting with descriptive statistics followed by the results of the analyses that test your hypotheses.
- Figures and Tables:  
Include graphs, tables, and other visual aids to illustrate your results clearly. Make sure each figure or table is accompanied by a caption and is referenced in the text.
- Statistical Significance:  
Report the statistical tests used and their outcomes, including p-values, effect sizes, and confidence intervals, as applicable.
- Subgroup Analyses:  
If conducted, describe the outcomes of any subgroup analyses or exploratory analyses and their implications.

## Discussion

- Interpretation of Results:  
Discuss the implications of your findings in the context of existing literature. Interpret what your results mean for your hypothesis or research question.
- Limitations:  
Acknowledge any limitations of your study, such as sample size, methodological constraints, or potential biases, and how they might affect the interpretation of your results.
- Future Directions:

Suggest areas for future research based on your findings and any unresolved questions.

- Conclusion:

Summarize the key findings, their relevance to the field, and the potential implications for theory, research, and practice.

**References**

A comprehensive list of all the sources cited in your thesis, formatted according to APA citation style (Line spacing 1.2 points).

**Additional Sections**

- Acknowledgments:

Section to thank those who assisted in your research or contributed to your academic journey. This is usually put after the formal first page but before the table of contents. Sometimes it is placed at the end of the thesis.

- Appendices:

Include any supplementary material that is relevant to your research but not central enough to include in the main text, such as consent forms, additional data, or detailed methodological descriptions. It should include all questionnaires, instructions, recruitment texts and other materials used, as well as any results and statistical analysis not already contained in the text. For the appendix, a separate table of contents has to be provided.

**Submission**

Please see the current official rules from the examination office here:

<https://www.tu.berlin/en/ak/study-and-teaching/final-theses/notes-and-rules-for-theses>

At the examination office, **two** printed copies and a digital copy have to be submitted. Alternatively, an electronic version of the thesis can be submitted when all supervisors approve of an electronic only submission. The submission should include:

- The thesis PDF file
- All created data processing, data visualization, and statistics scripts including documentation on their usage in a README file (DVD or USB stick)
- Final extracted data values that are used for the statistical analysis and plots (DVD or USB stick)

Additionally, it has to be ensured that all digital raw data (e.g. \*.xdf files), stimulus material, programs used for controlling the experiment, files of the used questionnaires, instructions, recruitment texts, and all files of the provided DVD/USB drive except the thesis PDF file are stored on the BPN server in a location that is made known to the supervisors.