

UNIVERSITY OF POTSDAM

Master/Ph.D. Program “Cognitive Science – Embodied Cognition”

Potsdam Embodied Cognition Group (PECoG)

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Guidelines for the preparation of a Master thesis with PECoG

This guide is intended to provide assistance in the preparation of Master's theses and to inform about the criteria used for their evaluation. The successful Master's thesis (including the disputation) will be awarded 30 credit points. Here you will find information on the following topics:

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The thesis should demonstrate that the Master student is able to work fairly independently on current problems in the field of cognitive science by using scientific methods, and to present the results appropriately. A graded oral defense (disputation) is mandatory. The grade achieved during the disputation constitutes one third of the overall mark of the Master's thesis.

As a rule, empirical studies are expected. A Master's thesis does not represent a completely independent research project of the Master student, but is prepared under the guidance of two researchers who already own at least a Master degree. At least one supervisor must be from the PECoG group. After consultation with the supervisor, one of the following options can be selected:

- (1) Collection of new data,
- (2) Participation in an ongoing research project with subsequent use of (part of) the new data,
- (3) Use of an already existing data set; in this case, more advanced investigations are expected compared to projects involving new data collection.

1. Selection of the topic and preparation of the proposal

Offers of possible topics for Master's theses with the Potsdam Embodied Cognition Group are at: www.uni-potsdam.de/en/pecog/possible-basmas-thesis-topics. Other topics are possible, and other groups in the department also offer project supervision. The exact topic and timing of a project are defined in discussion with the main supervisor. Afterwards a short proposal should be delivered (approx. 2-5 pages) which contains the following information:

- (1) Preliminary thesis title, student's name and matriculation number
- (2) State of research: Which research inspired the proposal and why? Here it makes sense to refer to a recent review paper or other central work in the subject area
- (3) Research questions (possibly already stated as hypotheses): Each research question should be derived from the state of published research. It should be clear and concrete: what is to be examined and what results are expected?
- (4) Method: Short description of the experimental design, including the targeted participant sample (type and number of test persons), the measuring instruments, the planned implementation (where and how are the test persons to be examined?), independent and dependent variables, and planned statistical analyses.
- (5) Expected schedule of the overall process from literature research and pilot testing/analyses to full data collection and analyses to writing and handing in the finished thesis. Consider for this a GANTT chart.

A proposal that has been accepted by the supervisor is a prerequisite for further work on the Master thesis. Based on it, the exact work on the thesis is planned together with the supervisor. Note that this proposal is not identical with the form to be submitted to the examination office ("Prüfungsamt"), which usually only happens after data collection is advanced (to prevent time pressure).

2. Preparation of the written thesis

Although deviations are possible in special cases, each Master's thesis should correspond as much as possible to the structure below. Questions are listed for each of the individual points in the outline, which the Master students can use to check the extent to which they have completed each part.

The theoretical part (introduction, literature review and discussion) and the empirical part (methods and results) of the thesis should be of approximately the same size. The total volume (including literature, but without Appendices) should range between 50 and 70 pages (no smaller than 11 points font with 1.5 inter-line separation). Exceeding the limit can result in down-marking. In any case quality comes before quantity. The thesis can be printed either single- or double-sided and must be bound (hard or soft cover). The thesis should be written in English. Relevant APA Style Guidelines should be strictly followed.

Front page

- Title of the thesis, author (name and matriculation number), institute, place, submission date, supervisor(s) and reviewer(s)

(Optional: Foreword/Thanks)

Table of contents

(Optional: Table of tables and figures)

Summary

- The summary should not exceed 1 page and should be structured as follows: research question, methodology, results and conclusions.

(1) Introduction

The work begins with a concise introduction (1-2 pages). Here, for example, a rough outline of the topic should be given with its connections to other topics, the relationship of the topic to current problems in cognitive science, everyday practice or important aspects of social life. The relevant questions should be presented and an overview of the following chapters should be given.

Self-check questions:

- *Is the topic presented in the introduction so that even readers who are not familiar with the subject area can categorize the work?*

(2) Theory

In order to be able to write the theory part properly, you should conduct a detailed literature research. In the theoretical part, the essential developments in the field must be presented in a way that shows how the master thesis contributes to solving the problems in the current literature.

Thus, it is not a listing of all the research work related to the own topic, but a selection of the relevant works concerning concrete questions. All terms central for the work must be introduced and exactly defined in the theory part. The literature review serves not only to summarize the current state of research, but also to make clear the student's assessments of methodological problems or open questions.

It should be ensured that the current state of the literature (e.g., published within the last 5 years) on the topic is covered. Of course, trend-setting and methodologically relevant older works on the topic can also be included in the presentation of the theory.

Key questions:

- *Have all central terms been introduced and clearly defined?*
- *Are the described studies considered representative and relevant to the topic?*
- *Are the contents well-structured and presented in a comprehensible way?*
- *Is the considered literature critically reviewed or merely described?*

(3) Questions and hypotheses

Here the overarching questions and the precise hypotheses can be presented, resulting from and referring to the theory section. It is important to provide reasons why you find exactly these questions to be important and why you consider certain hypotheses regarding the possible results (with reference to the corresponding sources from the theory section). Directed hypotheses (about a specific order of condition means or sign of a correlation) can only be presented if this can be clearly deduced from the current state of research – in all other cases, two-sided hypotheses must be formulated. For experimental work, independent and dependent variables must be identified.

Key questions

- *Is the question logically derived and comprehensibly justified?*
- *Are the hypotheses logical and formally sound?*

(4) Methods

The procedures for data collection and measurement of the constructs must be presented in such a way that they are comprehensible to readers who are not familiar with the subject. The choice of procedures should be justified.

Guiding questions:

- *Plan of investigation*
 - *Is the research plan appropriate for the research question?*
 - *Are the variables correctly, completely and clearly operationalized? (When using experimental methods: Are all methods and procedures sufficiently explained? Is information on the objectivity, reliability and validity of the measuring instruments provided?)*
 - *Are possible complications discussed in advance, taken into account during planning and described appropriately?*
- *Research implementation*
 - *Is the procedure described in such a way that replication of the study is possible?*
 - *Is the sample described in sufficient detail (inclusion criteria; excluded participants: number and reasons; age, gender, education etc.)?*
 - *Is the data set appropriate for the research question (power calculation)?*
- *Evaluation*
 - *Adequacy of statistical methods with regard to the question?*
 - *Adequacy of statistical methods with regard to data quality?*
 - *Are the prerequisites of the statistical methods discussed and are alternatives to data analysis seen if the prerequisites are violated?*

(5) Results

Here the results are presented in detail. The structure of the results section is defined by questions and hypotheses. It is recommended to re-state each hypothesis that is being tested. For each of the original hypotheses it must be stated whether it is supported or rejected by the results.

There should not only be a table with statistics, but the results must always be described in the text in such a way that they can be understood by professionals. It is important that directions of correlations or differences in the text part are explicitly formulated (e. g., "There is a statistically significant negative correlation. This means that higher values in A are accompanied by lower results in B." or "Group A achieves significantly better results than group B"). Full statistics (frequentist/Bayesian) include a report of the test parameter and the degrees of freedom, the resulting parameter value and its significance level.

Tables and figures for main results can facilitate the presentation by providing overviews. Each table or illustration should be comprehensible on its own, even for those who do not read the text. This requires complete and legible labels, visually distinct graph elements and a proper legend. However, the continuous text must explicitly refer to each individual table or figure before it is inserted, and

must explain the important information that can be taken from the table or figure. The key statistical information reported via tables and figures (e.g. F-values, t-values, significance levels) should not be presented again in detail in the main body of text; such repetitions are excessive. However, it is necessary to explain them, e.g., to specify which groups differ in which direction or which variables are related in which way.

Key questions

- *Is the relevance of a reported result to the question clear?*
- *Is the presentation of results complete, i.e. have all questions been answered and are all results described in the text?*
- *Were limitations in case of a violation of statistical requirements considered?*
- *Are the tables/graphics understandable and a real help for the reader?*

(6) Discussion

Here, an overall interpretation of methods and results with further considerations is made.

At first a summary of the most important results and an evaluation is provided, with a view to the issues at hand, reflecting on the strengths of one's own work. Thereby the considerations presented in the introduction, the theory and the question should be integrated and thus continuity can be achieved. In general, it is favorable to use the structure of hypotheses or research questions to summarize and interpret results related to each question. Guiding questions: Do your own results deviate from the expectations based on the literature and if yes, what could be the reason for this (e.g. methods of survey or evaluation, specifics of the sample etc.)? Do other authors come to similar or different results?

The limits and limitations of your own investigation should also be presented under a separate heading. In addition, further questions in the light of your own findings should be formulated. This can also include tips for methodologically better approaches.

Key questions

- *Are results and their interpretations consistent?*
- *Are the results integrated, i.e.:*
 - *Are individual results related to each other?*
 - *Are the results related to the literature and the research question?*
- *Is the own research approach critically reflected?*
- *Are the own results appropriately generalized?*
- *Are approaches to follow-up studies discussed?*

(7) Bibliography

All references cited in the text (and only these) are listed alphabetically in the bibliography. The form of the references should follow the current APA guidelines for manuscript design.

(8) Appendix

An Appendix is optional and can document additional work and insights. If used, it should enhance the understanding of the text and can include unpublished questionnaires, larger tables with statistical results, forms etc.

NOTE: A USB-stick with the dataset files/analyses/tables and all other information necessary for verification/following-up on the data analyses presented in the Thesis should be attached to the printed version of the Thesis that is sent to the reviewers.

Declaration of independence

The declaration of independence must be signed personally and should be formulated in the following way:

I hereby officially declare that I have prepared this manuscript independently and without the use of other aids and sources than those that are indicated in the manuscript. All contents, which I have taken from other published or unpublished sources, are marked and listed in the bibliography. This work was not published or produced in another examination procedure.

Potsdam, [date]

[Signature]

3. Data storage obligations and publication conditions

The original materials of the work, i.e. tapes, videos, data sheets, etc., must be stored according to laboratory protocols, so that it can be made available to the Ethical Committee on request.

Publication of the results of the Master's thesis in professional journals is ONLY possible after consultation and in agreement with the supervisor of the thesis. An individual agreement on authorship, as well as on the contents, any additional calculations, research, etc. that may be necessary must be made. If the results are published, the research material must be stored according to the guidelines of the respective journal.

Provided that the original material for the thesis was provided by the institute or collected by using institutional resources, it remains in the possession of the department and can be used by the staff or by other Bachelor or Master students.

The final version of the Master's thesis is to be included in pdf format, together with the print-outs of the results and calculations, including analysis syntaxes (also in pdf format), on a data medium (e.g., CD or USB flash drive) and attached to the printed work.

4. Evaluation criteria

The criteria used to evaluate the master's thesis are listed below. Each of these criteria is evaluated on a scale from 1 (very good, fully given, high) to 5 (insufficient, absent, low).

Grades within each section (A to H) are averaged, then grades across all sections are averaged, which gives the resulting final grade. Grades of all examiners have equal weight. Conflicts are solved according to the General Study Regulations.

(A) General aspects of the thesis

- (1) Structure and coherence
- (2) Clarity and comprehensibility
- (3) Correctness of images and writing (typos)
- (4) Appropriate use of visuals (tables, graphs)

(B) Literature section

- (5) Structure
- (6) Precision of the representation of the literature
- (7) Scope/relevance of the literature considered
- (8) Correctness of citations and bibliography
- (9) Integration of the presented approaches into own research

(C) Concretization of the question

- (10) Justification of the theoretical question
- (11) Formulation of the hypotheses
- (12) Completeness in the consideration of relevant variables

(D) Data collection and evaluation

- (13) Adequacy of the description of the sample
- (14) Adequacy of the study plan and experimental design
- (15) Documentation of the data collection process
- (16) Objectivity and completeness of data evaluation

(E) Statistical processing

- (17) Adequacy of the evaluation procedures
- (18) Correct application of the procedures

(F) Presentation of the Results

- (19) Structure and completeness of presentation
- (20) Precision of presentation
- (21) Adequacy of answering the question

(G) Presentation of the Discussion

- (22) Brief, generally understandable summary of the main results
- (23) Evaluation of results against the background of the theoretical questions and hypotheses
- (24) Discussion of results in the context of existing literature

(25) Adequacy of generalization of results

(26) Critical reflection of the work

(H) General evaluation criteria

(27) Independence and personal initiative

5. Defense of the Master thesis

Examiners:

As a rule, these are both the first (supervisor) and second reviewers of the Master thesis. In exceptional cases, in which an external supervisor was appointed, when the supervisor is required to travel to the location of defense and this is unreasonable, an employee of the Department of Psychology who is authorized to conduct the examination together with the second reviewer can be assigned by individual arrangement.

Duration:

Approx. 30 minutes

Part 1: Presentation of the work by the examinee:

In approx. 15 minutes the master thesis should be presented in its important parts, usually according to the structure of the work (theory, hypotheses, methods, results, discussion). The theory should be presented only when it is absolutely necessary for the understanding of the results (approx. 2-3 slides). The focus of the presentation should be on the own results and the discussion. The available 15 minutes cannot be exceeded.

Part 2: Questions about the work and related areas (content and methodology)

In this part of the exam, which also takes approx. 15 minutes, the examiners present their questions related to the work, for example, on the interpretation of results, on possible further research or on considerations for the selection of certain methodological approaches. In addition, questions that are related to the content or methodology of the master thesis are possible.

Evaluation

The evaluation of the disputation is communicated to the examinee after the defense.