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**Given name(s) Surname (including academic titles)**

**Title**

**(Subtitle)**

**Bachelor Thesis/Master Thesis**

in partial fulfilment of the requirements of the degree

(insert academic degree)

**Supervisor (s):**

Given name(s) Surname (including titles)

**University of Graz**

**Institute of Biology**

 **Year**

# Acknowledgements

The acknowledgements section is an optional part of your thesis.

This section is used to thank and acknowledge the people who have contributed to the successful completion of your thesis: your supervisor(s), the head of the Institute and/or the working group you worked with, cooperation partners, provider(s) of project funding, technical staff in the lab or field, colleagues, family, friends, partner, etc. – the list of people/institutions addressed in the acknowledgements depends on various factors and is highly individual, particularly when it comes to the personal aspects.

The wording of the acknowledgements section is very much a matter of personal taste. Read the acknowledgements in other students’ theses to get an idea of how this part of your thesis could be written.

# Abstract

The abstract of a scientific work provides an overview of the work’s content. Based on the abstract, the reader decides whether or not the work is relevant to their own work. Thus, the abstract is a major determinant for the number of full-text reads and, potentially, for the number of times it will be cited by other authors

The abstract of a scientific work provides the reader with the work’s content in a nutshell: background, objectives, research question(s), methods, most important results, and conclusion(s). This means that, in the abstract, you are summarising the full story of your thesis as a whole – but reducing the key message of this story to a few sentences (or the allowed word count/page limit). Your research question has to be at the heart of the story – in the abstract as well as in your thesis. Usually, there are no references in the abstract.

The abstract is a continuous text without any subheadings or paragraphs. The abstract is typically composed as follows:

* Summary of the Introduction:

What is the background of your work?

Why is the topic of your research of interest?

What is the objective of your work?

What is/are the specific research question(s) of your work?

* Summary of Material and Methods**:**

**What were the central methods you used for your work?**

* Summary of the Results:

What were the most important results of your work?

* Summary of the Discussion:

Which conclusion(s) did you draw from the results of your work?

If applicable: What are the potential implications of your work (for future research in your field; for future research beyond your field; for practical application/commercial purposes)?

If a German version of the abstract (Kurzfassung) is also required, start a new page and translate your abstract into German.

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# Abbreviations

Make a list of all the abbreviations you use in your thesis. Even with this list, you still need to introduce every abbreviation in your text when you first use it (i.e., spell out the full term in combination and introduce the abbreviation in brackets). In academic works, common abbreviations – e.g., for units and the respective prefixes indicating the order of magnitude – are often used without an explanation. Ask your supervisor which abbreviations (not) to include in your list of abbreviations. Note – if you do not use any abbreviations, or only use a small number, in your thesis, it may be acceptable to skip this section.

Usually exempted from the list of abbreviations:

Linear measures (metre) – m, cm, mm, µm, nm, etc.

Volumes (litre) – L, mL, µL, etc.

Mass (gramme) – kg, g, mg, µg, etc.

Substance concentration (mol/liter) – M, m, µM, nM, etc.

Time (day, hour, minute, second) – d, h, min, s, ms, µs, etc.

Temperature (degrees Celsius, Kelvin) – °C, K

Chemical elements and molecules – C, N, K, CO2, etc.

Abbreviations for common technical terms: for example, DNA, cDNA, RNA, mRNA, tRNA, rRNA, ATP, ADP, UTP, UDP, dNTPs, bp, abbreviations for amino acids, etc. – strongly depends on the field of research!

# Introduction

The Introduction provides the general context for your research topic and leads the way to the specific research question(s) you worked on. At the end of the introduction, you describe the objectives of your work, define your specific research question(s), and introduce your hypothesis/hypotheses.

The Introduction contains a large number of references (multiple references per paragraph, and sometimes even several per sentence, is not at all unusual). Objective(s), research question(s), and hypothesis/hypotheses are usually free from references, as these are the parts you worked out yourself (in cooperation with your supervisor). However, if your hypotheses or research questions build on other, already published work (which is usually the case), then you should both explain this point and cite the source somewhere in your introduction.

* Introduce the topic of your work and provide the general context.

What is the field of research you worked in?

What is the relevance of your work to this field of research?

* Summarise the current state of research in your specific field.

Start with the general aspects and get more and more specific.

Concentrate on the aspects that are of immediate relevance to your specific research question(s).

* Based on the current literature, point out the knowledge gaps/problems in your specific field.
* Describe the objectives of your work.
* Define your specific research question(s).
* Based on your research question(s), introduce your hypothesis/hypotheses.

The Introduction is written in the **present tense.** When referring to specific results from other studies, you may also use the simple past or present perfect tense. Like in the research articles in scientific journals, the introduction is a continuous text without any subchapters. In some cases, however, it makes sense to split the introduction into sub-chapters (e.g., when your work is very extensive or contains two independent parts).

# Material and Methods

The Material and Methods section provides a transparent (i.e., reproducible!) description of the methods you used for your work. The content strongly depends on the field of research – for example, the Material and Methods section for a thesis on ecological work performed in the field is completely different from the Material and Methods section for a thesis on molecular physiological work performed in the laboratory.

* Provide information on the material you worked with (e.g., plant material, laboratory animals, experimental plots in the field, etc.)
* Describe the experimental design (e.g., number of biological and technical replicates in a laboratory experiment) and the experimental conditions (e.g., growth conditions for plant material, keeping of laboratory animals, etc.).
* Present the individual methods in a logical order – i.e., always present connected methods in the order that you need to carry them out to efficiently reproduce your work.
* Always provide the references for the methods you used – independent of the level of detail in your description of the methods.
* In Bachelor/Master theses, the Material and Methods are usually presented with a higher level of detail than in an article in a scientific journal. Carefully evaluate where details have to be provided and where a brief description and the respective reference will suffice. It is of particular importance to provide details when you present a newly developed method or a method that you refined/developed further based on the available literature.
* Explain all the changes made to a method you adapted from a reference.
* Computational methods (e.g., statistical tests) and the software you used to perform them also have to be addressed (and probably also cited) in the Material and Methods section.

In some fields, the method descriptions are supplemented with a list of the chemicals, machines, consumables, etc. that were used for the work (including the manufacturer/supplier). Ask your supervisor if you have to provide such a list and where to place it in your thesis (in the Material and Methods section or the Appendix).

The Material and Methods section is written in the **past tense**. It consists of a series of subchapters (one subchapter per method). Every method has to be described in a continuous text. Do not use bulleted/numbered lists.

# Results

In the Results section, you present the results of your work. Make sure that you neutrally describe your results and do not interpret them yet (this is what the Discussion section is for). The Results section is the only section of your thesis that does not require referencing (unless you are presenting the results of a meta-analysis of literature or something along these lines).

Prepare your results in a suitable way to present them as clearly as possible. You may use tables and/or figures (photographs, schematic representations, diagrams). Avoid duplicate data representation (i.e., do not use a diagram and a table showing the same data). The best way to present your data depends on the type of work you are doing and the type of data you have – certain types of data presentation may be more appropriate for your data set than others. When in doubt, ask your supervisor about the most common ways of data presentation in your field.

**HINT:** You may want to try out different ways of data presentation and compare them directly. Which form of data presentation shows the result most clearly? It may also help to ask other people for feedback. Often, it can be helpful to choose the figures and tables that you want to use to present your results before you start writing the rest of your paper, as this can help you “storyboard” your thesis.

* Large sets of raw data are usually not shown in the results section but placed in the appendix of the thesis. In this case, refer to the respective data set in the appendix when writing the text and the figure/table legends.
* Describe your results in a continuous text. Focus on summarising the overall message of the results and refer to the figures and tables for details where you present the data. You do not need to refer to every single result in the text itself, as long as the result is easily interpretable from your figures, tables, and legends. If you want to automatically keep track of the numbering of your figures and tables, you can use “References” – “Cross-references”. The tables/figures and the text must be understandable on their own and must complement each other. Always place the tables/figures as close to the respective parts of the text as possible.
* Arrange your results in a logical order. For the order to make sense, the results must build on each other.
* Abide by the rules of Good Scientific Practice (GSP) when presenting your results. Under the following link, you can find the current version of the GSP guidelines provided by the Austrian Agency for Research Integrity (ÖAWI): https://oeawi.at/richtlinien/.

The Results section is written in the **past tense**. It normally consists of a series of sub-chapters (e.g., for the results obtained from different methods or different experiments). Each sub-chapter is written as a continuous text, as you would see in a scientific article. Do not use bulleted/numbered lists.

**CAUTION:** In some cases, it may be useful to combine the results and discussion in one chapter – for example, when you need to interpret the results of an experiment immediately to plan the follow-up experiment(s). Ask your supervisor what makes more sense in your specific case – separate Results and Discussion sections, or a combination of both in one chapter.

**Table 1:** Example for a table. Make sure that all rows and columns are adequately labelled and that the size of the table is adjusted to fit its content. You can repurpose this table by “Copying“ and “Pasting“ and reformat it according to your need.

|  |  |  |  |
| --- | --- | --- | --- |
| **Labelling of column 1**  | **Labelling of column 2** | **Labelling of column 2** | **Labelling of column 2** |
| Labelling of row 2 |  |  |  |
| Labelling of row 3 |  |  |  |
| You may add a footer to the table (created here by joining the cells of the last table row and deleting the outer and lower border lines) for additional information (e.g., to explain the abbreviations used in the table). The content of this table was formatted with the “Table Properties” menu in MS Word. The table caption was created via “References” – “Insert Caption“. Thus, the “Table Contents” style is automatically used, and the numbering of the tables is also done automatically. “Table 1” was subsequently formatted in bold. |

**Figure 1:** Placeholder for a figure. The figure caption was created via “References” – “Insert Caption“. Thus, the “Caption” style is automatically used and the numbering of the figures is done automatically. “Figure 1” was subsequently formatted in bold.

# Discussion

In the Discussion section, you revisit your research question(s) and the state of the research for your topic (from the Introduction). Then you interpret your own data and place it in the research context against the background of your research question(s). Like the Introduction, the Discussion section contains a large number of references. Make sure you use value-neutral, unbiased language in your discussion.

* Start with a summary of your research question(s).
* Were you able to fully answer the question(s)?
* Was/were your hypothesis/hypotheses verified or falsified? In case your hypothesis/hypotheses was/were rejected, question your approach – was/were the hypothesis/hypotheses wrong, were the methods inappropriate etc.
* It is of utmost importance for the quality of your Discussion that you compare your results with the current literature (i.e., state of the research as described in the Introduction). What similarities/contradictions can you find?
* In your conclusions, point out how your findings have advanced the knowledge in your specific field of research.

(The “Conclusions” can be written as a separate chapter if they are more extensive – see next section).

* If you could not fully answer your research question(s), point out the open questions that remain. (This can be part of the Conclusions chapter if you decide to have one.)
* Round up your Discussion with an outlook. Depending on the topic of the work and the findings, the content of the outlook will vary. In the outlook, you could, for example, provide the answers to the following questions: Which approaches will be required to address the open questions that remain? What are the new questions that arose from your work? What are the implications of your findings for other areas of research? Do your findings have potential for future application/commercial use?

(The “Outlook” can be written as a separate chapter it is more extensive – see next section).

The **use of the tenses is more flexible** in the Discussion than in the other chapters. Depending on the content, you may use the present, past, and future tenses. The Discussion can be written either as a continuous text or as a series of sub-chapters. You may consider dividing it into sub-chapters to separately discuss the results from individual methods or experiments or to address higher-level connections between certain aspects.

# Conclusions

(Delete this section if the conclusions are part of your Discussion section.)

In the case of more extensive theses (Master/Ph.D. theses), the outlook and conclusions are often written as a (or multiple) separate chapter(s).

In the Conclusions, point out how your findings have advanced the knowledge in your specific field of research. If you could not fully answer your research question(s), point out the open questions that remain.

# Outlook

(Delete this section if the outlook is part of your Discussion section.)

In the case of more extensive theses (Master/Ph.D. theses), the outlook and conclusions are often written as a (or multiple) separate chapter(s). The content of this final chapter of your thesis will vary depending on the topic of the work and the findings.

In the Outlook, you could, for example, provide the answers to the following questions: Which approaches will be required to address the open questions that remain? What are the new questions that arose from your work? What are the implications of your findings for other areas of research? Do your findings have potential for future application/commercial use?

# References

Provide a reference list according to the citation style you were told to use (or you chose to use). Make sure that the list contains all the references you cited in your thesis, and also check that the list is free from any references you did not cite in the text. The most efficient way of preparing a reference list is by using bibliographic management software. But even when you do so, a thorough final check of the accuracy of the list is essential.

If your citation software does not do so automatically, you can format your finished reference list with the “Literaturliste“ style (if available).

# List of Figures

If required, this is where you can automatically generate a list of all the figures in your thesis. To do this, right-click on the current version of the list and choose “Update Field”.

**Figure 1:** Placeholder for a figure. The table caption was created via “References” – “Insert Caption“. Thus, the “Caption” style is automatically used and the numbering of the figures is done automatically. “Figure 1” was subsequently formatted in bold. 9

# List of Tables

If required, this is where you can automatically generate a list of all the tables in your thesis. To do this, right-click on the current version of the list and choose “Update Field“.

[**Table 1:** Example for a table. Make sure that all rows and columns are adequately labelled and that the size of the table is adjusted to fit its content. You can repurpose this table by “Copying“ and “Pasting“ and reformat it according to your need. 9](#_Toc157516073)

# Appendix

This is where you can add raw data sets, additional figures etc. that would take up too much space in the Results section of your thesis, but may still be of interest to the reader. Refer to the information in the appendix when writing about the respective data.

You can either continue the numbering of the figures/tables in the appendix or start afresh. When starting afresh, extend the figure/table numbers by an “A“ for “Appendix” (for example, the first figure in the Appendix would be labelled as “Figure A1”).