

Björn Gustavii

How to Prepare
a Scientific
Doctoral Dissertation
Based on
Research Articles

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HOW TO PREPARE A SCIENTIFIC DOCTORAL DISSERTATION BASED ON RESEARCH ARTICLES

The article-based thesis is becoming increasingly common, especially in the “hard” sciences such as biology, medicine, and technology, and is beginning to replace the traditional monograph. Format guidelines vary among universities. This is the first book to summarize the main features, showing the PhD student how to prepare a thesis in such a format.

The suggestions are highly practical; both the good and bad examples from published theses support the author’s wise advice on all aspects of such theses. Poor figures are not only scrutinized in detail, but are also redrawn for comparison. Guidance also covers the issues of reprint permissions and copyright.

This informative and accessible book, by the author of *How to Write and Illustrate a Scientific Paper*, has developed through the author’s extensive teaching experience in scientific writing and also through his experience as a journal editor. It is an indispensable guide to article-based thesis success.

BJÖRN GUSTAVII has been teaching courses in scientific writing for doctoral students for over 30 years. He brings his personal experience to this book, both from his work as a journal editor and from producing more than 100 of his own research papers. He is the author of the highly successful *How to Write and Illustrate a Scientific Paper* (2nd edition, Cambridge, 2008).

How to
Prepare a

Scientific Doctoral Dissertation Based on Research Articles

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Preface

Before writing this book, I looked into a couple of thousand theses¹ based on published (and ready-for-publication) papers. Most of them I viewed on the Internet, but several I surveyed while on location in various university libraries. Merely seeing an image of a thesis on the Internet is not the same as having a paper version in your hands; to smell and feel the paper – I love it!

Although the examples shown are real (if not otherwise stated), bad ones are given without revealing the source. When I wanted to include a figure, I sought permission from the author. If the example was bad, the author was informed of the changes suggested and of the form the credit line would take, for example: *Reproduced from a thesis published in 2008, with permission*. All the authors asked gave me permission. I am grateful for your generosity, which has provided the readers with authentic examples from which to learn. Thank you!

This book is about the overall summary of a thesis (also called the *overview*²). It is thus *not* about the research papers which were

¹ The terms *thesis* and *dissertation* are used differently in different parts of the world. For example, in the USA, master's students write *theses* whereas in Britain, they write *dissertations*. At the PhD level, however, these terms are reversed. In this book the terms *thesis* and *dissertation* are used interchangeably.

² *Overview*: To mention a few variants, this is also called *contextual statement*, *explanatory essay*, *linking narrative*, *summarizing report*, *integrating paper*, *cover story*, *frame* and *synthesis*.

dealt with in my book *How to Write and Illustrate a Scientific Paper* (2nd edition, Cambridge University Press, 2008). Such research papers authored by the degree candidate have passed editorial scrutiny; the overview has not. As a former editor of a scientific journal, I had the experience of giving this overview a closer look.

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Finally – my thanks to Katrina Halliday, senior commissioning editor, Cambridge University Press, for her thorough revision of the manuscript.

1

Introduction

This book is about the overview of the article-based thesis. It is written for graduate students mainly in the “hard” sciences, such as biology, medicine, and technology. The best time to read this book would be when you are finishing your individual papers.

However, you must find out at an early stage whether your university allows you to use the article-based format. If not, you have to write a traditional monograph thesis. Then, the contents of this book would be helpful to you as well. Listed below are those parts that are also valid for the traditional monograph.

- Front cover picture
- Title
- Abstract
- Quotations
- Abbreviations
- Acknowledgment
- General introduction
- Aims

General discussion

Copyright

To a certain extent, the content of the methods and results sections could also prove beneficial.

2

Compilation – the article-based thesis

This chapter is a review of the article-based thesis, also called *compilation* thesis. The compilation is increasingly encouraged, especially in the hard sciences such as biology, medicine, and technology.

Compilations

Compilations are of two types. In one, the reprinted articles are appended to an overall summary of their content, here called the *Scandinavian model*. In the other, the reprinted articles are sandwiched between introductory and concluding chapters, here called the *sandwich format*.¹

Scandinavian model

Common to theses of the Scandinavian model is that an overall summary (overview) is followed by research papers – bound together in a single volume. Published articles are reproduced as

¹ A *sandwich* refers to two slices of bread with a layer of food between them, named after the inventor, the fourth Earl of Sandwich (1718–1792).

exact copies of the articles as they appear in the publishing journal (including title pages with original letterheads, logotypes, typefaces, and so on) – in short, as reprints; papers *in press* are reproduced as preprints.

In contrast with the research papers, which are highly structured, the overview of the Scandinavian type of compilation has no formula for arranging its various parts, not even regarding which parts to include.

A basis for discussion

In this book I suggest a scheme (see *Contents*) based on real examples gathered from a large number of compilations of the Scandinavian model. This layout can serve as a basis for the discussion. I emphasize, however, that the sections could be rearranged, for example, *Acknowledgments*, the part most read, could be placed first, and some parts could be excluded, such as *Thesis at a glance* and *Contributors*, as appropriate locally.

Sandwich – the format used in the rest of the world

Outside Scandinavia, the most commonly used format for an article-based thesis worldwide is the sandwich. The articles appear as chapters between the general introduction and the general discussion. If the articles are published or accepted for publication, these chapters are usually the final version of the manuscript as sent to the journal (Figure 2.1).

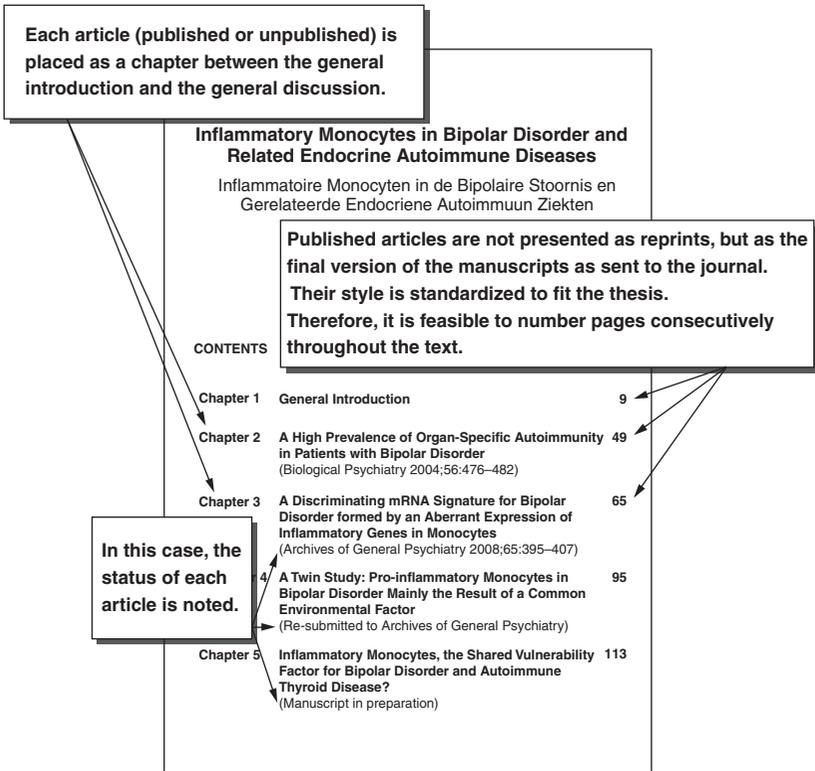


Figure 2.1 Part of the *contents* section of a thesis in the format of a sandwich. (Reproduced with permission from Roos Padmos, 2009, Erasmus University, the Netherlands.)

Illustrations

In the sandwich format, you can use part of the title page of each chapter as an illustration (Figure 2.2). The example is taken from a thesis at National University in Australia, where this format is called *thesis by publication* (Debra L. Saunders, 2008).

**Chapter 3 - Conservation of the swift parrot - management lessons
for a threatened migratory species**

Published in *Pacific Conservation Biology*:

Saunders, D.L., Brereton, R., Tzaros, C., Holdsworth, M. and Price, R. (2007).
Conservation of the swift parrot *Lathamus discolor* - management lessons for a threatened
migratory species. *Pacific Conservation Biology* (2007): 13(2) 111-119



The swift parrot [*Lathamus discolor*] (1928) by E.E. Gostelow
(Source: National Library of Australia)

The swift parrot...appears to be exceedingly rare in New South Wales,
and more common, though by no means now as plentiful as formerly, in
Tasmania (Mathews 1916)

Figure 2.2 Each of six chapters of the thesis begins with a picture of the swift parrot and a pertinent citation, as in this title page. (Reproduced from Debra L. Saunders, 2008, with permission from the author and the painter, E. E. Gostelow.)

Sandwich format vs. Scandinavian model

The sandwich format and the Scandinavian model both have advantages. The sandwich format usually has the following benefits: (a) The articles (chapters) are standardized to fit the thesis, which makes it look like a book. (b) Parts of the title pages can serve as illustrations. In the Scandinavian model, your published

articles appear as reprints, looking exactly as do the articles in the published journal, and giving the author a feeling of being in the midst of the scientific production. That is a great feeling.

Besides these differences, the content of the book itself is mainly applicable to both formats – if not otherwise stated. Well, now, let's begin.

3

Front cover illustration

A journalist from a daily newspaper was one of the teachers at a course on scientific writing. During a break she looked into a thesis overview. (At that time the overview was published separately from the research papers.) She paged through the publication and then said:

Not a single illustration, not even a cover picture.

Still – about forty years later – in technology, a picture on a thesis cover is seldom seen, nor does one occur often in medicine. However, in biology, it has become the norm.

In biology, an animal studied does not need be camouflaged to be portrayed on the cover. In medicine, the need of disguising a patient studied is a problem. On the next page we have one example of how the problem could be solved – by showing the individual in silhouette (Figure 3.1).