Chapter 7
Honing Your Academic Writing Skills

Abstract This chapter on academic writing serves as a reference for a number of topics discussed throughout the textbook. Instructors can decide to teach this topic before talking about the literature review. This chapter is subdivided into the following topics: structuring writing, finding your voice, tips for non-native English speakers, and tips for productive academic writing. The first topic, on structuring writing, deals with the main questions you need to ask yourself before starting. The next topic, on finding your voice in writing, deals with writing styles, scholarly identity, and how different writing styles relate to different types of articles. Since the majority of scientific publications nowadays are in English, and many PhD candidates are non-native English speakers, we focus on the typical pitfalls for non-native speakers. We also discuss how, as a non-native speaker, you can work on improving your English, and how you can find your writing voice and scholarly identity in a language that is not your own. Finally, this chapter contains a series of tips for productive academic writing. Best practices are shared, and anecdotes from researchers worldwide illustrate how they manage to fit academic writing into their busy schedules.

Keywords Academic writing · Productive writing · Authority · Academic voice · Productivity · Writing

7.1 Introduction and Learning Goals

This chapter on academic writing serves as a reference for a number of topics discussed throughout the textbook. Writing is often considered as your most important academic skill. Honing your academic writing skills, and eventually writing your dissertation is a crucial part of your PhD trajectory, and is intrinsically related to your research and finding your scholarly identity. As such, it is a very personal process. This chapter aims at giving you food for thought about writing, and offering you tools to try out – but keep in mind that this is your unique PhD trajectory.

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7.2 Structuring Writing

7.2.1 Determining What You Need to Convey

Before you start to write anything at all, you need to ask yourself a number of questions [1]. There's not a single approach to writing for every possible written document out there. Imagine a world in which a newspaper article would be written in the exact same way as a technical paper… Can you see that this wouldn't really work? To set the tone of your writing, you need to ask yourself a number of questions:

- **What's the goal of this work?** Why am I writing this document in the first place? What do I want to tell people? Do I want my readers to learn about a new methodology, about theoretical developments, about a new experimental observation,…?
- **Who is my audience?** Who will read this document? Where is this report or article going to be published? What information are the readers of this type of publication looking for? Do my readers want to get a general idea of what I have done so far and where my research is taking me (for example, for a conference paper)? Do my readers want to learn about the background and evidence for a new theory I developed (for example, in a journal paper)? Do my readers want to know all the details of my experiments, so that they can continue my work, perhaps with a benchmark test to calibrate their results with mine (for example, in a detailed technical report)?
- **What writing style do I need?** Do I want to convince people of something (such as funding my research), or do I want to inform peers about my findings? Your writing style will be different depending on your audience: you can use a different voice for a conference paper as compared to an industry publication that will be read by industry partners instead of by researchers. For such an industry publication, highlight the practical importance of your work, give clear recommendations, and avoid jargon.
- **What is the main message I want to convey?** If someone reads my paper, what is the main message that I want him/her to remember? Identify the core message of your article or other type of document, and use this as a red thread throughout your writing. Think about how you need to provide a proof or support for this main message, in such a way that it will be loud and clear for the reader. If you can't put it on paper right away, try practicing your elevator pitch of the article verbally. A similar approach that you can use is to "talk it out": grab a friend, colleague, or, if all else fails, talk to your computer screen, and say the following: "The article that I am preparing is about XXX and I show how YYY works based on results from ZZZ" (as an example). For a larger piece of writing, such as a book or dissertation, a mindmap or diagram of the contents can be helpful, to understand how the different chapters are related, and how you link evidence and proof of hypothesis together.

7.2.2 *Outlining Your Writing*

Once you have answered the previous questions and have a better grasp of what you want to tell, it's time to delve into the nitty-gritty: the outline of your document, and then your planning for writing (which we'll discuss in the next section). Outlines in the traditional sense are experienced as too static and unmanipulable by many writers [2]. Since writing is an act of creativity, it's important to keep in mind that your outline is not a rigid scheme, but a first idea to bring structure and planning to your writing endeavor. For some writers, outlining does not work at all. Learn to understand yourself and your optimal way of working.

If outlines of some kind are helpful for you, this paragraph is for you. Before you start writing, ask yourself how you will structure your writing. The outline of your article is an extended table of contents. First, of course, you need to set up the table of contents. There are different outlines that are possible, depending on the type of document. If you are writing a paper based on experimental work, you can use the following typical outline:

1. **Introduction**: In this section, you address the background of the problem. What are the practical implications of the topic you analyze theoretically or experimentally in this paper? Why do we even care about the problem you are studying?
2. **Literature review**: How is your work related to the literature? In this section, you need to review the existing literature in a limited number of paragraphs, so return to the red thread, and see which references really matter. Don't cite everything you've ever read on the topic, but stick to making your point by framing your work inside the relevant state-of-the-art.
3. **Experiments**: If you've used experiments to study the problem you outlined in the introduction and framed inside the literature in your literature review, then the description of the experiments goes here. If you did laboratory experiments, describe the test setup and all properties of the specimens. If you did computer simulations, describe the assumptions used in the program, and your input. If you used qualitative experiments such as questionnaires, describe how you determined your sample population and questions.
4. **Results**: First, you need to report on the measured results: the tested values in the laboratory, or an overview of the data you collected from a questionnaire. In a second step, you can analyze these results, show graphs with the relation between your results and a parameter that was varied, or show other forms of post-processing your data.
5. **Discussion**: Here, you can link back your results to your introduction. Which practical applications follow from your results? Did you find something odd that needs further research? How do your results fit into the broader scope and the literature?
6. **Summary and conclusions**: No new information goes here. You can only summarize what you have shown in your previous paragraphs.

If you are writing a paper for a mathematical proof, or a paper in which you show support for a certain hypothesis, you can use the following outline:

1. **Introduction**: As before, this section allows you to frame your work within the broader scope of things. If you are providing a mathematical proof, then you can mention in which fields this part of mathematics is applied (for example: medicine, aerospace applications…).
2. **Theorem**: What is the theorem you are going to prove? Here, you simply introduce the theorem, and, if needed, you can add a discussion of where in the literature attempts were made to solve it.
3. **Proof**: Here, you outline your proof for the theorem introduced before. The proof can be purely analytical, or, if you are proving a hypothesis instead of a theorem, it can be based on experiments or numerical work.
4. **Discussion**: How does the work you presented fit in the broader scope of things? It is unlikely that you will have been able to suddenly come up with the proof to a mathematical theorem that nobody has been able to solve before, but you might have done a step in the right direction and advanced your field.
5. **Summary and conclusions**: This section simply restates and summarizes the contents you have shown in the paper. No new information goes here.

Depending on the goal of your document, or the requirements from the institution where you will submit your work, other elements might be required. Additional elements can be:

- **Research significance**: Some journals require you to describe in one paragraph why your work is significant and original, and how it will impact your field.
- **Acknowledgement**: Here you can thank your funders, but also anybody who helped you with your research. You can thank colleagues who came to help you a hand in the lab, or maybe senior colleagues who revised your work and gave their input.
- **List of notations**: Many journals require you to give an overview of all notations and abbreviations you used. Typically, this list is organized as Latin lowercase, Latin uppercase, Greek lowercase, Greek uppercase. Within each list, organize your notations alphabetically. If necessary, revise your Greek alphabet.
- **References**: References are not optional, but are also not a part of the general structure of a paper. At the end of your paper, list the works cited in the text. Make sure, again, that you know and understand the formatting rules for the references of the institution where you are submitting your work. More and more, with the formatting guidelines you will receive a file to use in combination with a digital paper management system (Endnote, Zotero, Mendeley, …), to facilitate citing and compiling the list of references.

A next step to outlining your writing is finding a suitable title for your work. Take into account the following tips:

- **Check the guidelines**: Many journals have a limit to the maximum number of characters or words that you can use for the title. This requirement ensures that

your title is short and impactful. A number of journals also ask you not to start your title with "On..." or "Towards a …"

- **Say what you did:** Is your work mostly experimental, then have "experimental study" or "experiments" or something similar in the title. Is your work a literature review, then add "review", "survey", or "state-of-the-art" to the title. Did you come up with practical recommendations, then mention the word "recommendations" in the title.
- **Check other titles**: If you are stuck in finding a good title, browse the journal or previous editions of the conference you are submitting your work to. Briefly skim the article, and see how the title and the article are related. Try to apply the same relation to your outline to draft a title.

Once you have a title and outline, you can choose to use your momentum and write your abstract. You can find tips for writing abstracts in Chap. 10. The benefit of going ahead and writing the abstract right away, is that you can use the sentences of the abstract, and copy-paste them into the different sections of your outline. Once you add the contents of the different parts of your outline, having a brief reminder from your abstract in place will help you to get started and to know exactly what to discuss. If you are limited to a word count or maximum number of pages, add your estimated word count or size of the section to your outline. This practice will help you avoid writing an epic length introduction and literature review, only then to see that you have very limited space left for the core of your work: your experiments and results, for example. If figures and tables add up to the total word count, note down which figures and tables you absolutely need in your outline. Examples of such essential figures and tables are for example a sketch of your test setup, an overview of your test results, and the main graphs showing your results.[1]

7.2.3 Planning Your Writing

Once you have your outline ready, you know what to write. The next step then is to know when to write it. Planning is essential in getting work done. If you want to revise the elements of planning, please check out Chap. 3. Don't get started without a plan. If you are a few hours away from a submission deadline, and still have to write an entire article, then something is wrong with your overall planning. Always start on time - a good paper needs time to rest.

When you start planning your writing, two elements are key:

1. you need to know how much time per day you can spend on writing, and
2. you need to know all the elements you need to plan time for.

The first question can be directly linked to your weekly template. If you are well ahead of a deadline, you can simply decide to spend two hours every day to move

[1] I invite you to try this method out, but it may not work for you, just like writing in MS Word does not work for everybody and many academics sing the praises of Scrivener.

your writing project forward. If your only task at the moment is to finish your dissertation, then you may want to carve out four hours for writing, and perhaps some additional time for revising older work, or for making drawings. Remember that if you force yourself to write for long periods of time, you'll see diminishing returns as the invested time increases. It's better to start on time, get enough time to work through your project and digest everything well, and have enough time for proofreading. The next part you need to consider is the list of all the elements you need to plan time for. These elements can include, but are not limited to:

- **Writing the first draft:** Often, students tend to think that only this part requires time in your planning. To know how many time slots you need to reserve in your calendar for this step, estimate the amount of time you need to write a certain amount of words. Now, consider your target word count, and calculate the focused hours of writing you need. Take into account disturbances by dividing these hours by 0.75 to give you a first estimate of the number of hours you need to write your first draft. If you track your time and work, you can have a starting point for this estimate. Another approach you can follow is to estimate the number of hours you will need for each section, and to plan your time accordingly. Keep in mind that you can keep your introduction and summary sections for last.
- **Making drawings and tables**: If you don't have all drawings and tables ready, you need to plan time for working on your drawings and tables. Even when you think your drawings and tables are ready to plug straight into a manuscript, check if they fulfill all the formatting requirements of the institution where you are submitting your work. Even changing the font in all your drawings and tables, or adding dual units can be time-consuming.
- **Formatting your reference list**: Make sure you understand the formatting guidelines of the institution you are submitting to. Even when you have all the tools for citing and compiling a list of references, you still need to go through your reference list and check if all references are in the right format. If that's not the case, you need to make some changes manually.
- **Thoroughly revising your draft:** A first draft often looks quite different from the version you will eventually submit. If you are writing your first article, you will rewrite your article a few times to learn how to do this. Always pay due attention to your main idea when you revise your draft. Omit sections that take you too far from your main idea, rearrange the order of paragraphs, and critically revise to see that your story flows naturally.
- **Proofreading your final draft:** In a final round of revising, after going through different versions of the paper, you need to check for typing errors, check if you followed all the formatting guidelines, check if your list of notations is complete, and verify if all references to figures and tables and citations have been done correctly.
- **Giving your coauthors time to revise:** If you send an article to your coauthors for feedback or approval, or for them to write sections of the manuscript, you

need to give them sufficient time to react. A reasonable stretch of time would be two to three weeks for feedback, and longer if they need to draft sections.

- **Implement the comments of your coauthors**: If your coauthors mostly provide feedback, plan time to implement their comments. If your coauthors write entire sections of the manuscript, you might want to revise their work, see if it aligns correctly with what you wrote before, and perhaps send it back to them with comments or clarification requests. If that's the case, you need to, again, give them sufficient time to work on this, and you might need to go back and forth a few times, in the same way you went back and forth with yourself and your writing until you got to your final draft.
- **Submit your manuscript:** Sometimes, submission simply means sending a file as an attachment to an e-mail, and you are ready. However, for many journals, you need to swim through an entire system for submission, which takes time as well. Perhaps you need to write a cover letter. You might need to register yourself and your coauthors in the system of the journal. The actual uploading of your work can take time. Plan sufficient time for submission, especially if you will be using an online submission system of a journal for the first time and you need to register all your information.

If you are in the first year of your PhD, you should be working on your writing, to learn the skill and to start wrestling with your scholarly identity. You can practice this skill by writing reports as we discussed in Chaps. 4, 5, and 6. If you are in the next years of your PhD, work towards conference papers, and perhaps journal papers (especially if a given number of journal papers is a requirement for graduation). If you are in the final year(s) of your PhD, work on your dissertation. If you are an early career researcher, you should be getting your journal papers out. If you are a senior professor, you write your own work, as well as supervise the writing of your students. Remember that getting a lot of publications, and getting citations from these, are the most important factors for a successful academic career [3]. In short: writing is your most important academic skill.

Academic writing is not a talent you are born with (or not): it is a skill that you can (and should) learn, and that must be practiced. It is part of your PhD trajectory, and of finding your identity as a researcher. Start practicing early during your PhD, schedule time for writing in your weekly template (see Chap. 3), and honor this time. Don't drop a writing project because you don't have time – if you can, drop something else instead from your work load, or see if you can work more efficiently and effectively. Plan time for your writing projects ahead of time. Make writing your priority. Work on improving your writing constantly. Show your writing to others and ask for feedback. Check with senior researchers in your field to see if you are writing the "right" things: does your work fulfil a research need? Then, when all is said and done, get writing again.

As you progress through your career, you can start to juggle different writing projects – as long as you can plan for them and keep a good overview of how your work is progressing at all times. You can find an overview on how to structure, outline, and plan your writing in Fig. 7.1.

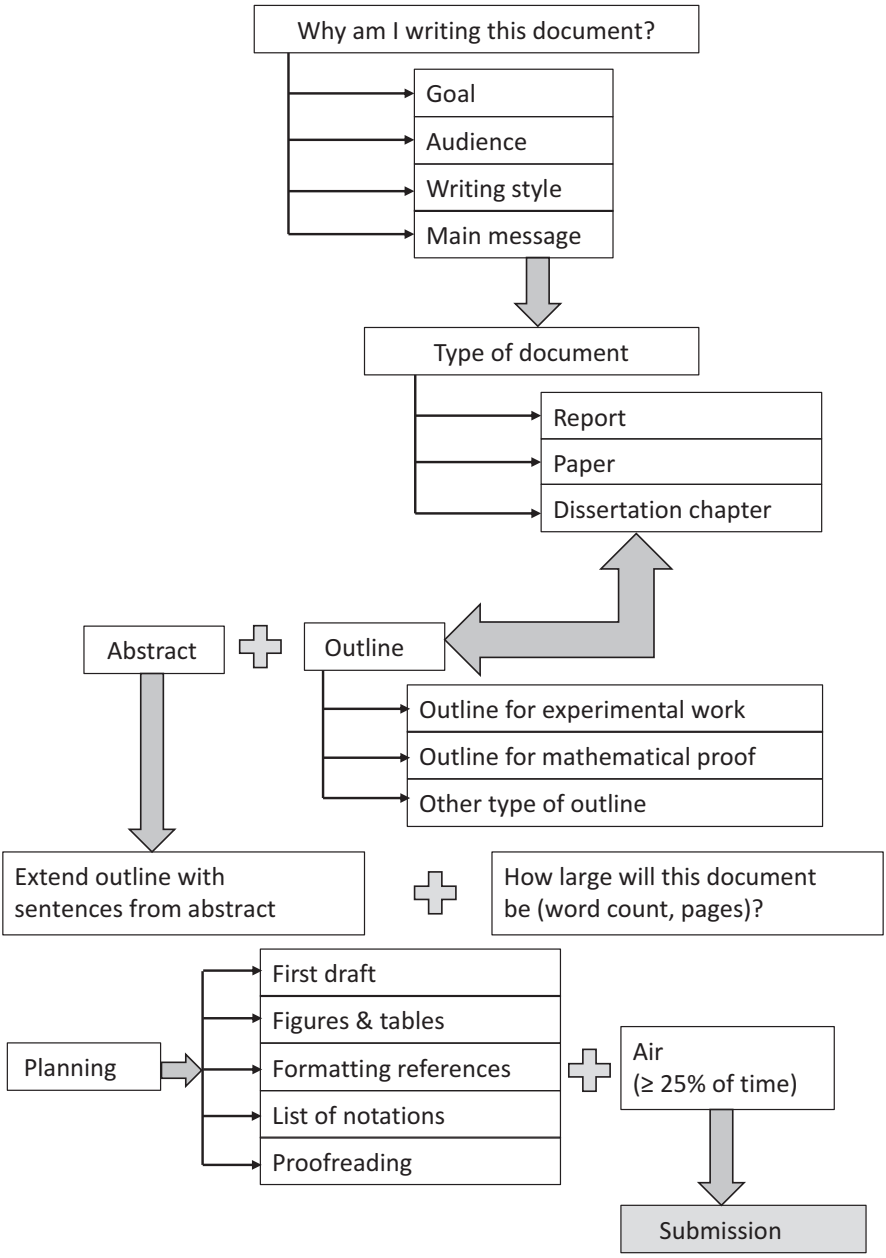

Fig. 7.1 Steps to be taken to outline and plan your writing. If outlining does not work for you, you can replace this step with any other method to start organizing your writing

7.3 Finding Your Voice

7.3.1 Writing Styles and Document Types

There is no such thing as a single voice that you will use for all your writing projects. Part of your writing practice and PhD trajectory is finding your voice across different writing styles, and to find authority in your writing. In this part, we focus on two different writing styles: writing persuasive content, and writing informative content. Keep in mind that a typical journal article is a combination of both: you want to inform your reader about the work you did, and then persuade the reader of the conclusions that you draw from the work you did.

Let's start by looking at writing persuasive content [4]. In persuasive writing, you want to convince the reader, and make sure the reader does something with your ideas. This activity can range from applying your recommendations, to trying out a new planning tool, to further explore your experimental results. You want your reader not just to archive your paper, but to take action. For example, if I write a blog post with tips on achieving better concentration [5], my goal for the readers is that they will read the post, try out the tips, and ultimately be more concentrated. If I write a paper about my experimental work [6], my goal for the reader is that he/she will look at my data, test my results against their theories, find something, and get back to me to discuss. For all writers, the process from reading towards implementing ideas is interesting. Typically, this content is discussed within the more narrow scope of using persuasive content in sales and marketing, but the basic ideas hold true across disciplines.

When you write a journal paper, your sole focus could be on getting another publication. But in order to advance your field of research, and even to score citations to increase your h-index,[2] the most important goal of publishing becomes sharing ideas and data, and enticing other researcher to look at your results from their perspective. Your field only advances through the interaction that follows from a publication.

To understand the process from reading your work to acting upon it, let's have a look at the five basic steps a reader goes through during this process:

1. **Content:** This first step is the most basic and obvious step in the process. As a writer, you are responsible for reporting all your data and required content in your publication. This content should be presented in a clear and understandable way, the reader should be able to find the important information right away. The reader simply needs to distill the necessary information from the writing – this step requires no direct action from the reader.
2. **Context:** Context is about showing the relevance of your results. Your job as a writer is to discuss the larger impact of your work. You can discuss this in the introduction or discussion section of your document, or use a research significance paragraph. You need to point the reader to the further possibilities of your

[2] I don't think we should be publishing for the sole reason of getting citations and improving our metrics.

work, for example in a discussion section. The reader can now hear a little bell ringing in his/her mind, and may get interested in the work. This step is the "call to action" from the writer to the reader. The reader goes from a passive to an active stance.

3. **Acceptance:** In the stage of acceptance, the reader understands that the material of the writer presents an opportunity to the reader. The writer makes acceptance possible by placing emphasis on context, and to present clear results. In this step, the reader accepts the idea that he/she should do something with the paper he/she just read. In this stage, the reader decides to take a piece of paper and sharpen his/her pencil to get going. The action has now fully shifted from the writer to the reader.
4. **Action:** In the stage of action, the reader implements the ideas from the writer. The reader uses the published data and explores their possibilities. The writer is now passive, and this step lies within the expected outcomes of the writer. The active role is now for the reader. The reader can carry out a parameter analysis based on the published data, test a theory, or explore the boundaries and assumptions of the work presented by the writer.
5. **Final goal:** In sales, the final goal is the step when the reader "buys into the contents" of the writer. In an academic context, the final goal is an advancement, modest as it may be, of your field of research. This step involves the interaction between the writer, who published his/her results, and the reader, who might have found something odd or interesting when further analyzing the results. When experts in a research field find something odd, research moves forward: we get to sharpen our assumptions and discover the boundaries of our theories.

Let's now look at informative content. Essentially, in terms of academic writing, we have discussed this as the first part of the previously described five-step process. Informative content is the step of providing clear and transparent information to your readers. If you report results in an experimental report, see Chap. 6, you provide only informative content. The discussion and analysis can then be placed in a separate analysis report. An overview of activities as a report to a funding organization or your supervisor is another example of only informative content.

7.3.2 Finding Your Voice Through Blogging

We've discussed the typical scholarly document types in the previous section, and in this section we will focus on how you can use blogging as a practice for developing your writing style and voice [7]. Blogging can be a way to gain confidence and experience in writing about your scholarly work [8]. Popular writing can make us better academic writers: being able to write about your work in an accessible way, leaving out the jargon, is excellent practice to develop a more transparent writing style. If you train popular writing by researching for an article and bringing material from different sources together, you are prepared to write about multidisciplinary research by combining material from two different fields of study, with each their own vocabulary.

Blogging and popular writing also teach us to look widely and broadly for information, which links to the act of reading like a mongrel from Chap. 4. This observa-

tion also confirms my hypothesis that reading sparks creativity [9]. Grazing around in the literature, and wandering off onto roads less traveled might lead us to unexpected goldmines for our research. Crossing over the borders of different fields is what a blogger does on a frequent basis. In her piece about why graduate students should blog, Maria Konnikova proposes [7] to incentivize students to blog and write for a popular audience on topics beyond their immediate area of interest. This activity encourages the students to explore research fields beyond their own, and to find a useful voice and vocabulary for this work. We will discuss blogging further in Chap. 9.

One step further is to recommend multidisciplinary research teams to write posts on a group blog, and to practice writing in a style and language that is accessible to researchers from different backgrounds involved in the project. This exercise invites groups to learn how to speak each other's language, by building a narrative on a shared platform.

7.3.3 Practicing Writing to Develop Your Voice

Once you've understood that writing is the single most important skill to learn during your PhD trajectory, you can start to think about additional types of writing you can practice to hone your writing skills, and to find a writing voice that is suitable for each different occasion. When I understood I had to work hard on my writing, I decided to come up with a plan to improve my writing. I was going to practice as much as I could, as often as I could, and in as many different ways as I could. In short, I decided to put myself on a writing diet [10]. And this diet would not be about restriction and cutting, but instead about bulking. You can't lean back and assume that one glorious spring morning, you will open a new file, and start typing your dissertation as if you've never done anything else. You can't get a decent journal article published without practicing your writing. If you are not a native English speaker, you need to go the extra mile to get to the level of a native speaker. Reading a few papers in English is not enough. A Netflix marathon does not count as practice for your English writing. One of the best decisions I took for my academic career, was to take my writing very seriously. Remember that your dissertation (and thus your graduation) will depend on your writing, as well as your publications.

I had been an enthusiastic reader (reading a little less than 700 papers during my PhD), and I vowed to become an even more enthusiastic writer. One action I took, was to set up the Writers' Lab on my blog PhD Talk, in which I'd host guest authors to talk about their writing practices, as well as share my own experiences and reflections on the topic of writing. For my personal practice, I decided to write as much as I could, about as many different things as I could, including:

1. **Test reports:** I reported everything I did in a very detailed way about every single experiment I did, and reported on the material properties as well.
2. **Background reports:** A common practice in my research group, is to keep our doctoral theses limited in length, but to provide all the details in additional background reports.
3. **Paper summaries:** As I mentioned in Chap. 4, you can write short reports with summaries, critiques, and comparisons between papers. I also developed docu-

ments in which I added all information about a certain parameter that I varied in my experiments.

4. **Analysis reports:** Another good practice of my research group in Delft, is that we deliver the experimental results in one report, without any interpretation, and then do all interpretation, analysis, and discussions in a separate report. These reports also contain parameter studies and comparisons to code predictions.
5. **Meeting preparations:** You can use the template from Chap. 2 to help you have effective meetings with your supervisor, and you can also write small progress reports to keep your supervisor up-to-date with your progress.
6. **Conference papers:** I wrote a fair share of conference papers during my PhD, and they were an excellent preparation for writing journal papers and my dissertation.
7. **Journal papers:** I did not publish many journal papers during my PhD, but left the publication of journal papers to after my defense. My main focus was on writing my dissertation. If you have to publish a certain number of journal papers to graduate, you need to focus more on these papers. I turned the material from my dissertation into a number of journal papers after my graduation.
8. **The dissertation:** I wanted to graduate before my funding ended, so I had to move forward. I started halfway during my third year, submitted the first draft to my supervisor at the beginning of my fourth year, and defended and graduated 2.5 months before my funding ended. Mission accomplished.
9. **Blog posts:** I started blogging for real at the beginning of the second year of my PhD. I had been blogging here and there before, but never managed to get my momentum going. Things changed when I started PhD Talk, and I have still not ran out of topics to write about.
10. **Guest posts:** During my PhD, I wrote for other websites regularly. Nowadays, I do much less guest blogging, as I have other writing projects to vie for my attention. However, at the height of my writing diet, I tried to write a guest post every week.
11. **CD reviews:** Something totally different, but I was a staff writer for Grave Concerns from 2012 to 2014 and I've been a writer for Darkview.be since 2015. Music journalism is a different skill, and I noticed a learning curve in finding my voice in writing reviews.
12. **Journaling:** I switched between 750words and a pretty Moleskine during my PhD, just to let off some thoughts and steams. Journaling is a private practice – nobody will "review" your work. But being able to bleed your thoughts onto paper can be immensely healing and liberating, especially in moments of writer's block or when you grapple with your identity as a scholar.

As with every diet, you can't start without a plan. So I got my writing plan as a meal plan, and made sure I could set aside time on a weekly basis for the following:

- two hours of writing for research every workday
- daily journaling

- two CD reviews per week
- three posts for PhD Talk per week
- one guest post per week

While the details of my daily and weekly planning have changed since the days of my PhD, I still make sure I reserve time for research writing every weekday, and I still schedule time for blogging and writing reviews in the evening hours.[3]

As I mentioned in Chap. 2, it is good practice to start writing from the beginning of your PhD trajectory [11]. Haters of writing from the beginning of your PhD say that it is a waste of time, because none of your initial writing will end up in your dissertation. On the other hand, we can't ignore the fact that you need to practice writing before you are ready to tackle the task of writing your dissertation (or writing your first journal paper, if your degree is by publication). So instead of focusing on whether writing from day one is the right thing to do, I discussed in Chap. 2 how you can practice your writing from the very beginning. Remember that even though what you write in those first months typically won't end up in your dissertation, it can be useful material to discuss during meetings with your supervisor, to start shaping the direction of your research. In Chap. 2, I've given a list of ideas of reports and documents that you can start to develop at the beginning of your PhD, to train your writing. Revise this list, check if you are already implementing some of these recommendations, and if not, decide which type of report you'd like to develop before your next meeting with your supervisor.

While you start writing your first documents, you can practice a few technical elements. Become aware of where you use passive voice, and see if you can rewrite the sentence into active voice. Try to vary sentence length [12]. Good academic writing is easy to read and understand. This implies avoiding jargon, and avoiding sentences that are an entire paragraph long (unless you are Julius Caesar). One thing you can do, is identify, among the papers you read for your literature review, which ones you consider written in the most accessible way. One of the things you might notice, is that these texts typically vary sentence length. They're not a sequence of short bullet-like sentences. A paragraph full of short sentences will give you the impression that the narrative is not flowing, but instead is cut short by the accumulation of short sentences, creating a stop-and-go feeling in the reading. To practice variable sentence length, you can do the following:

1. Write your paragraph using sentences that are as short as possible.
2. Revise, and vary sentence length by combining some of the shorter sentences.
3. Reread your paragraph to check if all sentences follow in a logical manner. In a flowing narrative, a sentence links to the one before and after the considered sentence.
4. Finally, verify if your entire paragraph forms one integrated text. Is it jumping on two ideas? Rewrite into two paragraphs. Does it feel too short? Combine paragraphs on the same topic.
5. Repeat this method for every single paragraph in a section.

[3] Even with a baby in the mix.

6. Now, revise the section to check if you have variation in paragraph length, and to check if each paragraph is connected to what comes before and after.

This section aims by no means to work as a cookbook. I recommend that you read these suggestions, use what resonates with you, and happily ignore what feels irrelevant for you and your writing practice. Learn to become your own master through self-reflection.

If you have a background in creative writing, you might think that academic writing is just the same old, same old. You'd be surprised to learn that academic writing is a different skill, and that you need different practice from what you are used to. If you want to improve your academic writing on a daily basis, pay attention to the following [13]:

- **Brevity and clarity:** Communicating research and writing non-fiction require a style that is in stark contrast to the hyperboles and metaphors used in creative writing. For academic writing, you need to practice the opposite. Learning to describe a (physical) process in a succinct manner can be a learning experience.
- **Practice makes perfect**: The key to successful writing (which leads to a successful academic career) is enough practice to master the skill of writing. As discussed before, all writing practice, including blogging, journaling, creative writing, and academic writing helps you develop the broad skill of writing.
- **Structure:** Scientific publications follow a logical structure that functions as the clothing hanger on which you dress your piece of writing. If you have difficulties structuring your writing, use targeted approaches to developing your outline and identify the key idea of each paragraph. If the ideas don't follow logically, and don't fit within the structure revise and rework. Practice identifying if an idea belongs to the introduction, literature review, methods, results, or discussion section of a document. This practice will teach you to think deeper about the relationship between text structure and the clarity of a message, a skill that will help you across writing disciplines.
- **Summarize:** For most conference papers, the abstract is written and reviewed before the paper. Often authors go back to tweak and improve their abstract after writing the paper. This circle of going from summary to full text to summary is interesting for all writers: fiction writers, academic writers, bloggers, and others. Revising your abstract after writing the full paper helps you analyze if you held on to the main idea of your paper, or if your ideas have started to wander and your message became more blurred. Remember the red thread we've talked about a number of times. If you lose this red thread, you need to jump into the swamp, get dirty, and save your writing.
- **Take the reader by the hand:** When we identified the five steps a reader goes through from reading an article to taking action and working on the results, we learned the importance of presenting the main idea in such a way that it almost jumps out of the page to the reader. Take the reader by the hand, and guide him/her through the development of a new idea. Show him/her over and over again your main idea, and the support for this idea, and why this idea matters (thus, why the reader should take action). If you as a writer fail to keep your red thread

clear, or miss steps in the development of the proof or experimental evidence for your idea, the reader might fall behind, and the author loses the opportunity to convey a novel idea.

- **Review process**: All the Reviewer 2 memes aside, the review process is an inherent part of academic writing. Submitting a paper for review can feel the same as sending in poems to a contest, or pitching a guest post idea to editors of webpages – you don't really know who is sitting on the other side, enjoying or quietly ripping apart your work. At times, you will be met with complete incomprehension, and find a reviewer who simply talks about another topic. Sometimes, a reviewer will consider your work complete utter nonsense, and convey that message clearly, so that you'll want to go home and stay in bed for the next two weeks. A good review, on the other hand, will be fair, point at the strengths and weaknesses of your work, and will help you grow as a writer.
- **Coauthors**: Almost all papers are a joint effort of authors. At the beginning of your PhD trajectory, your supervisor will coauthor with you, and -ideally- teach you the ropes of writing. As you gain more confidence and practice, the coauthoring role of your supervisor(s) becomes smaller. For a thoroughly coauthored piece, where different authors write different sections, you as a writer will learn how to write with others, discuss your ideas, merge writing styles, and plan to deliver the joint effort on time.

7.3.4 On Expertise and Authority

When you want to improve your writing, and find a voice that speaks with authority, ask yourself: "What am I doing that does not contribute to my writing, and how can I eliminate it?" [14]. For me, during my PhD, it was the passive attitude I took towards my writing. I used to write a draft paper in a few full days. Then, I would leave a printed draft paper on my desk for about a week, after which I'd thoroughly revise the draft. This revision typically meant considerable changes, especially to the structure and organization of the paper. After that, I'd submit my work to my supervisors, and wait for their input. At that time, I didn't feel confident about my scientific writing, and craved feedback from my supervisors. However, their time was limited, and they typically only caught a few typing errors, smaller lacks in the text, and minor problems with the figures. I missed receiving feedback on how to actually structure a paper, or what I should focus on in the discussion section. When I realized this type of feedback was not going to come, I decided to teach myself. I'd look through the papers I read for my literature review, and identified papers that I found particularly well-written. I sat down with the paper, and tried to learn from the writing style of the author by implementing elements into my own style. By paying attention to the work of others and their writing style, I suddenly felt as if I had a whole number of senior scientists showing me (silently) how to write.

When doubting our authority, we sometimes get stuck and wrestle with our scholarly identity. The voices in our head saying that it's not good enough become

so loud that they drown out our own thinking necessary to write a paper. We feel utterly stuck – it's the well-known writer's block problem. When you face writer's block, you need to have a conversation with yourself. Why are you not enjoying your writing? What is limiting you? Which fears and doubts do you need to address? You can use your research diary to assess what is happening. If these fears and doubts are structural, tell your supervisor.

Remember that there are a lot of people out there who write in their evening hours as a hobby – writing is actually fun, and being able to write, mastering the skill of writing, is a blessing. For me, acknowledging that writing is fun was one of the first steps in overcoming my fear of an empty white screen.

Another element that can help you overcome writer's block is to simply write without feeling pressure. Just develop documents for discussion with your supervisor – these documents won't go into your dissertation, so there's no pressure on them to be "good enough". Writing these little documents, as insignificant as they may seem, has an important psychological benefit: you'll never have to start from an empty sheet once you want to write a (conference) paper. You'll have something to pull contents from. You might still need to develop large parts of the paper, but you have a starting point. And once you get started and get rolling, it's much easier to gain momentum than when you need to start from scratch. You can also track your writing, set goals for a certain output in terms of a word count for the day, and then reward yourself once you meet your goal. As always, it helps to have your time well-planned, so that you don't have to do last-minute work, which can induce a whole new level of anxiety.

Exercises

1. Practice your academic writing as compared to creative writing. Start by writing a short story, in your personal (creative) writing style. Then, write a revised version, in which you replace all metaphors by factual descriptions. Finally, write a version in which you replace all descriptions, movements, and objects in a creative new way. This exercise helps you develop different writing styles, as well as your creativity.
2. Coauthor. If you usually write the entire paper by yourself, and get only an "OK" back from your supervisor because he/she is too busy to pay a lot of attention to your writing, look for a collaboration with another PhD student in your research group or outside to really coauthor a piece. You will learn from their writing practice, and you will be faced with the blind spots in your writing practice.
3. Take your research journal, and ask yourself the question: "What am I doing that does not contribute to my writing, and how can I eliminate it?" Simply let your ideas flow on paper to identify the weak spots in your writing.

7.4 Tips for Non-native Speakers of English

7.4.1 Typical Pitfalls for Non-native Speakers

Writing is an essential skill for academic success. If you are not a native speaker of English, you are faced with the added challenge of writing in a language that is not yours. In this section, we will first look at some common pitfalls for non-native speakers. This list is never complete, as the typical mistakes depend on your native language. A great reference work that deals with all aspects of scholarly publishing in English from the perspective of different European researchers is available [15] as well as a guidebook [16].

Depending on your native language, you will make typical mistakes in English, and have different deflections here and there in your pronunciation. Since setting up a list of common errors for each and every language is not the goal of this book, I recommend you to take an active stance. If you feel like your grammar is poor, take a course on improving your English grammar. Most universities offer English courses. You can look for MOOCs or other online learning platforms to support your learning. If you have a good basic understanding of English grammar, you can start to analyze the common mistakes that are typical for your native language. You can start to compile your personal list of the most common errors you find in your own writing when you proofread your work [17]. Actively looking for your own errors gives you insight in your writing, helps you identify areas of improvement, and is a first step towards eliminating these errors. Some typical errors can include, but are not limited to:

- **Tenses**: When you read through your own work, make sure you don't shift back and forth between present and past tense. Select one and stick to your tense of choice.
- **Singular versus plural**: When the subject of a sentence becomes relatively long, you can lose sight of the actual subject, and make mistakes against the proper use of singular or plural. When proofreading your work, identify the verb and subject and check if these correspond.
- **Typing errors:** Besides errors in grammar, you can also make typical typing errors that result from tripping over your fingers. For me, a classic mistake is "strenght", but there are also the more obscure errors that make you wonder what you were trying to type in the first place. If you are in the proofreading stage, and really can't make sense of a completely misspelled word, try to see which letters on the keyboard are close to the ones you typed – your hand can have drifted slightly to one side while you were typing. If that's the case, you can often find out which word you wanted to type by looking at the letters on the keyboard.
- **Prepositions:** Selecting the right preposition can be a challenge for non-native writers. When in doubt, look it up in the dictionary or online.
- **Passive versus active voice:** Boring academic texts are chockfull of passive voice. If you want to make your writing more engaging, try to focus on the active

voice. If you find a sentence with passive voice during proofreading, ask yourself if you can rewrite it using active voice.

7.4.2 *Improving Your (Technical) English*

A next tip especially for non-native writers relates to how you can improve your English on your own [18]. Suppose you just had your first abstract accepted, and you need to write your first conference paper in good, academic English. You might have already prepared some documents for discussion with your supervisor, but you've never sent anything out to peer review. What should you do to improve your technical English? If you're not a native English speaker, and perhaps your institution or funding body require documents in another language, how do you advance your technical English? You can't simply "opt out". As a grown researcher, ready to graduate and receive your doctoral degree, you'll need to have mastered the skill of publishing in English. Here are a few steps you can take to actively work towards this goal:

- **Take a course**: As mentioned before, most universities offer courses that can help you brush up your English skills, as universities realize that the majority of high-impact journals are English-only. If you have the opportunity to take such a course, don't doubt for a moment and enroll as soon as possible. You'll be glad you took this course when a paper deadline is approaching quickly.[4] If taking a course is not an option, you can look for a MOOC. You can also find great information and exercises on the website of the University of Warwick [19]. If you consider you are already getting more than enough screen time, learn from a book. Just remember that when you pick up a book, your goal is to learn; not to sit back and relax and read a book. Actively study the book, and immediately practice the insights you gained while reading. Don't wait until you finish reading, start working while you read this book. Treat the book like a course, and spend time and effort on improving your writing.
- **Master the technical vocabulary**: Learn the correct English terms for all technical concepts in your field. If you have all your lecture notes in your native language, you may not be fully aware of the subtleties in technical terms in English in your field. If that's the case, look for an English textbook and review the technical terms. Study the terms used in technical papers. Don't directly translate terms from your native language to English without checking if this term even exists in English.
- **Know the pitfalls**: As discussed in the previous section, become aware of your own mistakes. Check Copyblogger's list of grammar goofs [20] to find the errors you should never make. Subscribe to the blog of Grammar Girl [21] to improve

[4] Which of course won't happen, because you've learned in this book to plan so that you can always finish your drafts on time.

your writing, and to Doctoral Writing SIG [22] for all discussions on academic writing. Look for a list of false friends between your language and English.

- **Learn from examples**: We'll repeat this tip from before here as well: select papers from your literature review that you consider good examples of technical writing. Study how the narrative flows, what makes the sentences clear, and how the general concepts in the paper are explained. Study the structure of the sentences, the paragraph transitions, the use of past and present tense, and the use of active and passive voice. You now have a standard in your hands you should try to live up to.
- **Practice makes perfect**: Even if you use your native language to communicate with your supervisor, don't wait until you have to write a paper to write in English. If English is not your native language, you'll have to do an extra effort on mastering technical English. Practice your writing from the first day. Remember you can develop small documents, such as a paper summary, or a preparation report, or even an overview of your goals and planning to practice your writing. Additionally, consider starting your own research blog, or writing guest posts.
- **Surround yourself with English**: Besides the practice of writing, your general language skills will improve if you expose yourself more and more to English. Reach out to the international students for conversations in English. Read technical papers, online news (just stay away from the clickbait), blogs, and fiction… everything you can lay your eyes on. For spoken English, switch to an English channel, listen to YouTube videos, podcasts, TED Talks, MOOCs… presented by native speakers.
- **Ask for advice**: You are not alone in research. When you are writing your first publication, don't be afraid to ask a senior researcher for advice. Check if your university has a service to support your writing by providing feedback. Your research group may rely on a native English speaker that is under contract for checking work developed by your group. Sit together with the senior PhD students for a coffee and listen to their advice on writing. All of us at the beginning of our research journey are faced with the task of learning how to become an independent researcher, which includes learning how to write technical English. Senior researchers are aware of the doubts and challenges of their starting colleagues, and will be happy to give you a helping hand.

7.4.3 Finding Your Voice in a Foreign Language

Finding your voice and writing with expertise is a topic many beginning researchers struggle with. This identity crisis can even be intensified when we need to find our voice in a foreign language. Aside from wondering if you are still you when you think and write in a language outside of your native language, you need to acknowledge the fact that you will always be more limited in a foreign language. Your vocabulary will almost never be as complete in a foreign language as in your own.

One way to develop your voice, as mentioned earlier in this chapter, is by practicing writing (and practicing it a lot!), and possibly by blogging. Don't shy away from these exercises, nor from practicing your writing in English when you are a non-native speaker. If you need to regularly write in more than one language, it can be beneficial to practice in all these languages. Consider the reality of your situation: you will need to publish and present in English at conferences, publish in English in good journals, and perhaps report to your supervisor and funding body in your native language. What are the requirements of your institution with regard to the publication language of your PhD thesis? Almost everywhere, your thesis and defense will need to be in English. Don't think you can escape academic English if you stay in your home country and speak your native language on a day-to-day basis. Take a proactive stance and start improving your technical English right at the start of your PhD trajectory.

Exercises

1. Take a document you recently wrote in English. Carefully proofread this document with extra attention to the grammar. Make a list of your mistakes.
2. What are you going to do to improve your technical English? Select three steps you will take, discuss how your writing will improve based on these steps, and plan for them. How long will this experiment last? Decide when and how you want to evaluate if and how much your writing has improved by implementing these steps.
3. Make an overview of the languages you use. If you navigate the research world in more than one language, think about the steps you can take to improve your academic writing in all languages you need to use.

7.5 Tips for Productive Academic Writing

7.5.1 Best Practices for Productive Academic Writing

In this section you can find some suggestions for increasing your productivity in writing.[5] You might for example find yourself in the flow of your writing, but when you need to generate a table and get input values from another document or program, you start to slow down. The actual activity of switching between programs can be a distraction. You might feel tempted to quickly check something on the internet now that you are out of your writing program anyway. And before you realize, you'll be stuck in the rabbit hole of clicking on pages and not working on your writing [23]. If this happens over and over again, it's time to get a second screen. Sounds weird? Here's the idea: if you use two screens, you can use two programs

[5] This section is a toolbox – use these tools on an as-needed basis.

that are both equally important for your work at the same time, without having to switch. For example, if you want to discuss results in a paper and you have stored these results in a spreadsheet, simply open your word processing software in one screen and the spreadsheet in another screen. No need to switch between views anymore, and you'll be able to easily discuss the results from your spreadsheet in your paper. Try it out, perhaps you find that it makes all the difference. One word of caution: once you are used to working with two screens, you won't ever feel like going back to a single screen.[6]

A second essential tip is to learn how to use keyboard shortcuts to write faster [24]. If you don't want to be browsing the menu of your word processing software all the time to select text that has to be in superscript or that has to be italic, make sure you can do these formatting steps right from your keyboard. If you don't need to use your mouse to select formatting elements, then you can simply keep on typing, without needing to pause and lose your train of thought. For MS Word and MathType, I've compiled a list of common keyboard shortcuts that I use all the time [24]. If you use different software, you can easily find lists of keyboard shortcuts online. Most software also offers you the option to customize the shortcuts to your preferences.

Besides these golden tips of adding a second screen and using keyboard shortcuts, I'd like to share my best practices for productive academic writing with you [25, 26]. If you want more information on the topic, please refer to "Becoming an academic writer" [27]. Here are my best practices for productive academic writing:

- **Schedule time**: Do I start to sound like a broken record to you? Plan your time for writing. Plan the time you need to write the documents, papers, and dissertation chapters you need to write. Make sure that writing is on your daily planning, just like eating your veggies and drinking enough water. Research [28] has shown that academic writers who write steadily for a certain amount of time every day have a larger academic output than those who go for binge-writing. As mentioned before, for PhD students, continuous writing means reporting your work (for yourself, and in short summaries to your supervisor). For an early career researcher, this means setting time aside every day to work on your publications. If you only have a limited amount of time available each day, make it count. Vow to concentrate deeply for the allotted time, say one hour, and go full throttle. Make the time you spend on writing count. Close your mailbox, stow away your phone, put your noise-cancelling headset, and give it your all. If you want to give your focus an extra boost, explore the Pomodoro technique [29], which means working in bursts of 25 minutes.
- **Have a writing planning**: Especially as you reach the second half of your PhD trajectory, you don't only need a planning to finish that conference paper in time. You need to know what you want to be writing from week to week and from

[6] One of my workplaces does not have a second screen. There, I often print out the article I am developing into a literature review section or of which I am analyzing the data.

month to month. Make an overview of the reports, dissertation chapters, conference papers, and journal papers that you need to deliver, and figure out when you will work on this. As a PhD student, you need to know which dissertation chapter you will develop in which months, and have additional space in your planning to write the required background reports, and keep working on your papers. For early career researchers, you need to figure out which journal papers you want to write, and during which months you will be working on these. As a rule of thumb, it takes about two to three months after you have finished the research to write a first version for submission of a journal paper. Once you start publishing and submitting papers, you will need a system to keep track of your papers: which papers are in review, which ones are you working on, and which ones are in press? If you are a starting professor, and you need to suddenly teach three new courses in a semester, life will be tough. But prioritize your writing. Before anything else, write one or two hours a day, so you can keep developing your publications and advance your career.

- **Write a lot**: I described my writing diet previously. Identify the different writing practices you want to develop, and add them to your planning. Work actively on your writing, so that you don't only teach yourself to churn out a lot of words, but also increase your chances of having your work published in high impact journals. Work on your writing style. Improve your technical English if you are a non-native speaker and you feel that your limited English places a barrier between yourself and parts of academia.
- **Learn from examples**: Identify your favorite papers, and learn from the clear writing of your seniors. As mentioned before, analyze these papers for their writing style. How is the sentence length? How much or how little jargon did the author use? How is the structure of the paper? Learn from such examples, and apply these lessons to your own work.
- **Manage your references**: We've discussed the importance of managing your references in Chap. 4. Managing your references in a software package of your choice is important when you need to write and cite these references. You don't want to scramble through an enormous pile of random papers on your desk while you are writing to look up a reference. Have everything at your fingertips, so that your reference management doesn't stand in the way of your writing.
- **Document your work**: Add a "version management" tab to your spreadsheets, in which you write down why and when you made changes. Add comments to your programmed code. It can happen that you write about your calculations years after you made these calculations, and you won't remember what you did. Use your research journal to document how you formed your ideas on certain topics. Compile dry and boring laboratory reports in which you describe step-by-step the procedures you followed in the lab. Make sure you have all your information accessible, so that when you write about your work, you don't have to go back and scratch you head, wondering what you did.
- **Become you own critic:** Another element we discussed previously: at the PhD level, nobody has the time to take out a red pen and correct your writing. Perhaps your supervisor will help you out a bit at the beginning of your PhD trajectory,

but afterwards poor writing will just end up on the "reject" pile of a journal. Learn to become your own critic. Analyze your sentences, the flow of your paragraphs, and the structure of your chapter or paper. Check the visual clarity of your figures. Check if you followed all formatting requirements. Make sure you have enough time when you need to submit something: let your draft rest for a few weeks, and then proofread it with a fresh mind.

- **Figures**: We associate writing with producing words and sentences. Academic writing, however, is about more than the actual text. What catches your attention first when you skim through a paper? Typically, that would be the abstract, the introduction, the conclusions, and the illustrations. You can't submit a journal paper without being able to produce figures. Learn how to draw figures. For further information on how to present information visually, check out the books of Edward Tufte [30–33].
- **Revise profoundly**: Writing is an iterative process. Revising your work is something that needs to be scheduled too. Plan time for editing, for letting your work rest, and for discussing with others. Revising can take twice as much time as writing a first draft! When the flow of your writing is not coming along, erase an entire paragraph, and think about the message you want to convey. Talk out loud: "I want this paragraph to describe A and B based on X and Y", and then structure your paragraph so that it delivers this message. Ask yourself if A and B really belong together or if you should describe them in separate paragraphs. Don't be afraid to erase text and start over again – it is part of the process.
- **Seek coauthors**: Break out of your regular group of coauthors, which typically are your supervisors. Talk to people at conferences to see if you can write a paper together. When you are exposed to other writing styles, coming from authors from different institutions, you will not only broaden your horizon, but your own writing will mature as well.
- **Measure your progress**: Set a goal for a certain number of words, and see if you can meet this goal on a daily basis. Use a tracking sheet in which you write down each day how many words you've been writing. Remember that what gets measured gets done [34, 35], so having a sheet in which you report every day how many words you have written can work as a great motivator. If some days are spent on developing figures or proofreading, don't get upset by a low word count. A great tool for counting your words is the PhDometer from PhD2Published [36].
- **Explore tools**: If MS Word does not feel like the right software for your writing, change software. Unless you are limited to submitting your work as a .doc file, there are plenty of software packages you can explore. Many academics love Scrivener. I wrote my first master's thesis in Open Office. Many STEM folks prefer writing in LaTex.
- **Celebrate your successes**: Here's a reminder to party! Don't just keep grinding and grinding all the time. Don't force yourself to work deep into the night without decent food or exercise – your motivation will end up somewhere in the basement. Set realistic goals, such as writing 1000 words a day, and reward yourself when you meet your goal. Go home on time for some well-deserved rest and relaxation.

7.5.2 *Dealing with Writer's Block*

The fear of the blank page and the blinking cursor… who has not been confronted with this devil? Or that phase when you start to write something, and erase the sentence every single time to start over again and produce less than a paragraph in an entire day [37]? If you've been staring at a blank page for too long, close the document and go do something else. Get some fresh air and reorganize your thoughts. Go out and play, and maybe take the rest of the day off if you are feeling particularly down. Get a good night of rest, and then start fresh the next day. Think of it like a bout of insomnia: you are in bed and you can't fall asleep. The best thing to do then is to get out of bed, read something until you feel sleepy, and then try to sleep again. So far for first aid remedies - but what can you do in the long term to be faced less often with writer's block? Here are some tips:

- **Don't postpone writing:** It's all about planning! Don't wait until the last year of your PhD to start writing your thesis. You will only feel increasing pressure from the short amount of remaining time. More pressure and more panic means less space and freedom in your brain to relax and focus on your writing.
- **Get inspired by your examples:** As mentioned before, you can learn a lot by observing the writing of a great paper or a very clear thesis. To get yourself started, you can apply the same outline to your work, as a starting point, and then adapt it as needed. Once you have your structure, you have a good starting point to keep rolling and start adding information to the document you're writing. If you are inspired by another researcher's work, don't feel like you are copying anybody's work: your final product will look very different.
- **Pull from existing material:** Do you have the little summaries of papers and discussions, the preparation documents for meetings, and your research journal? Take some loose ideas from these documents, and paste them into your draft. You are not generating text yet here, but you are focusing your ideas and sharpening your pencil to get ready for productive writing. You can select important citations from papers you read if you will discuss these in your document. And by doing so, the white screen will be gone.
- **Body first:** Do you tend to think about the opening sentence for your paper and dissertation as something that needs to be perfect and ready to grab the attention of the reader? Leave your introduction for later. Start with the body of your document: describe the literature, and then move to your own contributions. Once you have your thoughts on these topics in the paper, you can reread this information, and ask yourself how this information fits into the broader scope of things. The answer to this question will be your introduction.
- **Let your ideas flow:** Don't continuously try to edit your own writing. Let your ideas flow, generate the first draft of your text, and just focus on getting your ideas onto paper. The editing and correcting will come later. If you write without a break, you'll be able to develop your ideas more coherently. If you stop every time to improve your sentence, you are too focused on the details. For a first

draft, you need that helicopter view, that ability to have a story that flows and is logically connected. Focus on getting the flow of the story in your first draft, not a collection of perfectly crafted sentences.

- **Use your research diary:** If you can't seem to get the right words onto paper, use your research diary to tell yourself about what is happening. What do you want to write about? Which topics do you want to discuss? Where are your thoughts going? Why do you feel stuck? If you want to have a private rant in a secluded part of the internet, have a look at 750 words (750words.com), a page where you can have a diary. As an added bonus: 750 words will provide you with stats[7] on how fast you type, and on the emotions you describe.
- **Go to a side project:** If you feel really stuck writing one project, move to a side project for a moment. Don't use this side project to procrastinate, but use it as a creative outlet that you can use that get your writing muscle warmed up. Try to learn how to like writing by exploring different ways of writing – writing can be lots of fun once you've learned to appreciate its beauty.
- **Try getting in the zone [38]:** Once you get into the zone, that focused state of uninterrupted writing, you will enjoy your writing more and accomplish more. You can spend an entire day fidgeting with a paragraph, but when it comes to make a serious push forward, you need to find that zone of concentration. Once you are in the zone, writing becomes effortless. Clear away all distractions, so you can focus on nothing but your writing. Have your goal in mind: what do you need to write first according to your planning? If you need to pull information from other documents, have them within reach, so that you don't lose momentum as you look for them. If you want to keep going, don't get slowed down by the need to add references, figures, or finding the right word when you can't think of it. Just refer to XXX and keep going. Before you revise, you can look for all XXX in your document, and replace these with the right figure reference, or the word you couldn't remember. Look for a quiet spot. If necessary, use earphones or earplugs to block out distractions.

7.5.3 Fitting Writing into Your Schedule

If you find it hard to fit writing into your schedule [39], even after careful planning and scheduling, because of the endless number of more urgent tasks, then look for other options. When I was still spending long days in the laboratory, but really needed to get started on my dissertation, I decided to write in the evenings and on Sundays. I knew that my evening hours are not my best writing hours because of feeling tired after running around the lab an entire day, but anything is better than nothing. I could not free hours in the morning for writing, as I often had to start at 8 am in the laboratory. Know what works for yourself within the limitations of laboratory work and working with other people.

[7] And don't we all love stats in the shape of pretty visuals?

Dr. Amber Davis, a political scientist and PhD coach, [40] recommends you optimize your workday around your writing. She compares writers to top athletes, who never train from nine-to-five. As a mental top athlete, a writer can sustain about four to six hours of intensive work. After that, it is time to rest and relax. She recommends the following: "Choose how many hours you want to devote to working on your thesis today. Be a minimalist: less is more. Do not work continuously. Instead, work in intervals. Work for 30–90 minutes (maximum!), followed by a break. Repeat until your hours are up. That's it. Productivity saved! Now you have time to relax, exercise and meditate."

Dr. William Alexander, a former postdoctoral research associate at the University of Wisconsin-Madison and now senior scientist at Muse Biotechnology in Boulder, CO, [41] found during his postdoc writing in the lab too disturbing, so he preferred to write in the morning from his home office. After lunch, he would go to his university office and laboratory for the afternoon and evening. He stresses that everybody is different, so experiment and figure out what works best for you.

Kristin Haase, a doctoral student in nursing in Canada, [42] had to readjust her schedule after her baby was born. She learned how to be very productive in short chunks of time. She mentions that she had to learn to focus on what needs to be done, and what reasonably can be done.

Dr. William Deyamport, III, an instructional technologist, connected educator, and digital learning consultant, [43] got his PhD through a distance-learning program. Practically, this meant long stretches of time spent working from home. What helped him set boundaries between work and home, even though both were in the same space, was to have a designated work space (a desk in the living room), and to treat his dissertation like a job, which meant reserving seven to eight hours a day for writing.

7.6 Summary

This chapter focused on all aspects of academic writing. We looked at how to organize your writing by laying out the structure of a document, and by planning your writing. A second topic was finding your voice. Finding your voice in academic writing comes with practice and expertise – so the best advice is to practice writing as much as you can. There are particular challenges for non-native speakers of English in terms of writing technical English. We discussed how you can work on improving your technical English and academic writing, so that you increase your chances of having your research published in high-impact journals. Finally, we looked at tips for productive academic writing: how to get a lot of writing done when you have a limited amount of time, and what you can do to avoid writer's block. Finally, I shared some experiences from different (former) PhD candidates on writing. You learned that everybody is different, and that you need to experiment to learn how you can find the right place and time for writing, and how you can make it a habit.

Further Reading and References

1. Lantsoght, E. (2014). Writers' Lab: Five steps to completing your first draft – The Academic Writing Edition. *PhD Talk*. http://phdtalk.blogspot.nl/2014/04/writers-lab-five-steps-to-completing.html
2. Rose, M. (1984). *Writer's block: The cognitive dimension. Studies in writing & rhetoric*. Carbondale, IL: Southern Illinois University Press.
3. Lantsoght, E. (2013). Writers' Lab: Why writing is your single most important skill. *PhD Talk*. http://phdtalk.blogspot.nl/2013/04/writers-lab-why-writing-is-your-single.html
4. Lantsoght, E. (2013). Writers' Lab: Writing more compelling articles and blog posts. *PhD Talk*. http://phdtalk.blogspot.nl/2013/04/writers-lab-writing-more-compelling.html
5. Lantsoght, E. (2012). Towards better concentration in five steps. *PhD Talk*. http://phdtalk.blogspot.nl/2012/10/towards-better-concentration-in-five.html
6. Lantsoght, E. O. L., van der Veen, C., & Walraven, J. C. (2013). Shear in one-way slabs under a concentrated load close to the support. *ACI Structural Journal, 110*(2), 275–284.
7. Konnikova, M. (2013). *Why grad schools should require students to blog*. https://blogs.scientificamerican.com/literally-psyched/why-grad-schools-should-require-students-to-blog/
8. Lantsoght, E. (2013). Writers' Lab: Improving narrative in multidisciplinary projects through blogging. *PhD Talk*. http://phdtalk.blogspot.nl/2013/09/writers-lab-improving-narrative-in.html
9. Lantsoght, E. (2012). The creative process: Reading sparks creativity. *PhD Talk*. http://phdtalk.blogspot.be/2012/11/the-creative-process-reading-sparks.html
10. Lantsoght, E. (2013). Writers' Lab: A writing diet. *PhD Talk*. http://phdtalk.blogspot.nl/2013/03/writers-lab-writing-diet.html
11. Lantsoght, E. (2013). Writers' Lab: How you should start writing from Day 1. *PhD Talk*. http://phdtalk.blogspot.nl/2013/04/writers-lab-how-you-should-start.html
12. Lantsoght, E. (2013). Writer's Lab: Varying sentence length for better writing. *PhD Talk*. http://phdtalk.blogspot.nl/2014/07/writers-lab-varying-sentence-length-for.html
13. Lantsoght, E. (2013). Writer's Lab: Seven lessons from academic writing. *PhD Talk*. http://phdtalk.blogspot.nl/2013/02/writers-lab-seven-lessons-from-academic.html
14. Lantsoght, E. (2010). Reverb10 – Day 2: Writing. *PhD Talk*. http://phdtalk.blogspot.nl/2010/12/reverb10-day-2-writing.html
15. Curry, M. J., & Lillis, T. (2013). *A Scholar's guide to getting published in English: Critical choices and practical strategies*. Bristol: Multilingual Matters.
16. Glasman-Deal, H. (2010). *Science research writing for non-native speakers of English*. London: Imperial College Press.
17. Lantsoght, E. (2013). Writers' Lab: List of common mistakes. *PhD Talk*. http://phdtalk.blogspot.nl/2013/04/writers-lab-list-of-common-mistakes.html
18. Lantsoght, E. (2013). Writers' Lab: Writing Academic English for non-native speakers. *PhD Talk*. http://phdtalk.blogspot.nl/2013/02/writers-lab-writing-academic-english.html
19. Center for Applied Linguistics. (2016). *Academic English skills*. http://www2.warwick.ac.uk/fac/soc/al/globalpad/openhouse/academicenglishskills
20. Clark, B. (2012). *15 Grammar Goofs that make you look silly [infographic]*. http://www.copyblogger.com/grammar-goofs/
21. Fogarty, M. (2016). *Grammar Girl: "Your friendly guide to the world of grammar, punctuation, usage, and fun developments in the English language*." http://www.quickanddirtytips.com/grammar-girl
22. Aitchison, C., Carter, S., & Guerin, C. (2016). *Doctoral Writing SIG*. https://doctoralwriting.wordpress.com/.
23. Lantsoght, E. (2013). Writers' Lab: A quick hack to writing with less disturbances. *PhD Talk*. http://phdtalk.blogspot.nl/2013/05/writers-lab-quick-hack-to-writing-with.html
24. Lantsoght, E. (2011). Using shortcuts to write faster. *PhD Talk*. http://phdtalk.blogspot.com/2011/07/using-shortcuts-to-write-faster.html

25. Lantsoght, E. (2013). PhD Talk for AcademicTransfer: Cultivating the art of writing. *PhD Talk*. http://phdtalk.blogspot.nl/2013/12/phd-talk-for-academictransfer.html
26. Lantsoght, E. (2014). Writers' Lab: 10 Tips for more productive academic writing. *PhD Talk*. http://phdtalk.blogspot.nl/2014/07/writers-lab-10-tips-for-more-productive.html
27. Goodson, P. (2012). *Becoming an academic writer: 50 exercises for paced, productive, and powerful writing* (1st ed.). London: Sage.
28. Jensen, S. (2012). *II. Challenge common assumptions against daily writing*. http://www.academiccoachingandwriting.org/academic-writing/academic-writing-blog/ii-challenge-common-assumptions-against-daily-writing/
29. Cirillo, F. (2013). *The Pomodoro technique*. FC Garage GmbH.
30. Tufte, E. (2006). *Beautiful Evidence*. Cheshire: Graphics Press.
31. Tufte, E. (2001). *The visual display of quantitative information*. Cheshire: Graphics Press.
32. Tufte, E. (1997). *Visual explanations: Images and quantities, Evidence and narrative*. Cheshire: Graphics Press.
33. Tufte, E. (1990). *Envision information*. Cheshire: Graphics Press.
34. Lantsoght, E. (2017). What gets measured gets done. *PhD Talk*. http://phdtalk.blogspot.nl/2017/08/what-gets-measured-gets-done.html
35. Silvia, P. J. (2007). *How to write a lot: A practical guide to productive academic writing* (1st ed.). Washington, DC: American Psychological Association.
36. PhD2Published. (2016). *The PhDometer 3.0*. http://www.phd2published.com/tools/the-phdometer-3-0/
37. Lantsoght, E. (2011). Seven simple steps to tackle writer's block. *PhD Talk*. http://phdtalk.blogspot.com/2011/02/seven-simple-steps-to-tackle-writers.html
38. Lantsoght, E. (2013). Writers' Lab: Five ways of getting in the zone. *PhD Talk*. http://phdtalk.blogspot.nl/2013/04/writers-lab-five-ways-of-getting-in-zone.html
39. Lantsoght, E. (2012). Finding time for writing. *PhD Talk*. http://phdtalk.blogspot.com/2012/03/finding-time-for-writing.html
40. Davis, A. (2014). Happy PhD: Optimizing your workday for writing. *PhD Talk*. http://phdtalk.blogspot.nl/2014/01/happy-phd-optimizing-your-workday-for.html
41. Alexander, W. (2014). Writers' Lab: Writing practices of a postdoc in the sciences. *PhD Talk*. http://phdtalk.blogspot.nl/2014/09/writers-lab-writing-practices-of.html
42. Haase, K. (2014). Writers' Lab: PhD writing with a Baby. *PhD Talk*. http://phdtalk.blogspot.nl/2014/09/writers-lab-phd-writing-with-baby.html
43. Deyamport, W. (2014). Writers' Lab: Experiences from the writing process. *PhD Talk*. http://phdtalk.blogspot.nl/2014/09/writers-lab-experiences-from-writing.html