

8 Rules to write a PhD Thesis

A PhD Thesis Rulebook

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Preface

Why read this book

So I was a PhD student once! As you may already know, to obtain a doctorate degree and finally be called a Doctor¹, you need to submit a dissertation towards the end of your studies. During my efforts to produce a respectable, well-written, paper-based PhD thesis, I followed *a personal list of rules*. It is these rules, and the principles behind them, that I present in this rulebook. They are the direct result of my personal travel through the PhD thesis writing ordeal and the lessons I learned from that experience. I cannot really say if these guidelines are also applicable to a monograph-based thesis or a thesis about a subject in a research field entirely different from my own (my PhD was in Computational Biology), but I would expect some of them to be. You can find several sources on the internet nowadays, providing advice on how to write a PhD thesis. Two excellent books exist on the subject ([Eco 2015](#); [Murray 2017](#)), as well as several online blogs and presentations. I admit that I haven't thoroughly read all of these sources but I have noticed similarities between the guidelines presented in some of these works and my rules. All in all, it might be wise to check them out as well if you are interested in good advice on thesis writing. Getting expert opinion never hurts, or so they say.

How can I write more efficiently? How can I organize the work that needs to be done in a manner that will increase my productivity? How to better prepare myself psychologically for the task ahead? How to regulate external factors to my advantage? If you are struggling with similar questions, then keep reading. In the end, I found some answers to the above questions - at least ones that seemed to work for me, and helped me get the job done. I formulated these answers into a list of guidelines. I also tried to extract the essence or central idea behind each rule. This allowed me to analyze in depth the *underlying principles* that are key to understanding why these rules actually

¹As in “Dr. John,” a title with a nice ring to it! You can check my PhD thesis here: <https://bblodfon.github.io/my-phd-thesis/>

work (or I think that they do). Therefore, every rule has its own theoretical background, in case you want to know more details about *why* each one was included in the first place.

Who is this book for

Who is the intended reader? To answer this question, let me start by saying that **a PhD thesis is not a paper or an essay**. You can not finish a PhD thesis in five days of intense writing and use the weekend to do some refinements, all while having pizza every day to boost your psychological well-being. But a scientific paper can be written this way actually (and surely without the pizza). Numerous guidelines exist for writing a paper, and an excellent advice is to structure it in the Introduction-Methods-Results-Discussion format to facilitate your writing in an efficient manner. Nonetheless, if you are a person that thinks you can write a scientific thesis in one week, then the following text is not meant for you (and I wish you good luck!). The presented rules are aimed towards the *strugglers*, the good-working people who may turn lazy and procrastinate when they even think of the prospect of having to write scientific prose. These people usually think “*I am better at the lab or when writing code,*” “*too much effort to produce almost nothing,*” “*extremely boring*” and “*who is going to read it anyway?*” The sad fact is that such thoughts are true most of the time. You will need to overcome such tricks of the mind in order to finish your thesis. It is clearly a **psychological battle**. Moreover, the process of writing a PhD thesis is similar to writing a book, so it is really **hard work**, apart from being mentally and psychologically draining. Given its serious nature (it’s a doctoral degree after all), it makes sense to be properly prepared for it. The presented rules are a step towards this direction and may thus be of help to you.

Structure of the book

A few words about the layout of the rules are in order. The first five rules relate to things that need to be in place and figured out before you even start writing. The next three rules explain **what to do everyday** during the writing period. That’s why I have split this collection of rules to [Before](#) and [During writing](#). The [Epilogue](#) provides some general advice and states the final take-home messages (so no rules in there). I sincerely hope you enjoy reading this text and that it proves useful to your goals.

About the author

John Zobolas is an engineer. He likes to write software and play with data to solve problems. He has a PhD in Computational Biology from NTNU (Trondheim, Norway), where his research was focused on cancer modeling and biological knowledge management. He enjoys playing the [piano](#), [juggling](#) and reading books. You can find him on [GitHub](#) most of the time.

Before writing

Rule 1: Read the damn papers

What exactly is a PhD thesis? I believe that the answer is simple: *the thesis is the story of your PhD journey, written by the main character* (that's you). So how to shape such a story? Let's start from the beginning. You are about to write a scientific thesis and for the sake of the argument let's say that you already have some results to write about or even better, papers published.² You have to have some background knowledge as well. **Your work has to fit in a larger picture, be part of a larger story.** To write your PhD story you need to know the basic constituents of a thesis. In a nutshell, the PhD thesis incorporates three components. First, it lays out the contextual framework of the scientific subject you are writing about (background). Second, it presents the problems that you as a scientist faced, along with what you did to solve them (results). Lastly, it includes some discussion points and potential future work. To formulate such a story and embellish it with the details of your own PhD journey, the knowledge you've acquired over the course of your PhD will play a significant role. The most prominent source of such knowledge is scientific literature.

Most people think that the PhD thesis is a strict, formal writing work. These people are wrong. You see, scientific writing does not necessarily mean the absence of creative writing. **To write a story, you need to have a certain degree of imagination.** But to integrate your scientific results into such a story and create a coherent narrative, you need to know about the subject you will be writing about. This means that you need to have a certain level of background knowledge as well, the main source of which is scientific papers. That's also where you are going to find the citations you need for your thesis. Of course the papers are not the only source of knowledge

²If you have no results, in any form that satisfy the criteria set by your academic institution, well, that's another problem entirely, one that I honestly hope that you find a solution for. Either way, my assumption here is that you have some results to write about, which will be integrated into the story of your PhD thesis.

you will have access to during your PhD. Taking advantage of other forms of knowledge dissemination, such as courses, workshops and conferences is your own responsibility. Use every possible means necessary to learn as much as possible about the subject you will be writing about. The discussions you have with your supervisors and colleagues are also going to be decisive in shaping your knowledge.

“To write, you need to read” as many people have said. If you have reached the final stage of your PhD and haven’t read a single paper (which I think is almost impossible), you are like a soldier standing on the front line with no weapons. Your chances are better if you stand prepared for the battle ahead. So, arm yourself with knowledge. **Start reading early in your PhD.** You will still have a pile of papers to read during the writing phase of your PhD (see [Rule 2](#)). The main point here is that the core of the reading material should be read before that phase starts. Performing your usual PhD duties can be extremely rewarding, but focusing only on working and not on reading can have a detrimental effect on your thesis writing. Don’t fall under the wrong impression. **Reading is of paramount importance to a successful PhD.**

Read the damn papers before you start writing.

Rule 2: Read abstracts and reviews

Here’s another piece of advice if you are close to the end of your PhD (let’s say around half to one year before submission) and you have a lot of papers in your to-read list: **focus on abstracts and review papers.** The assumption here is that you don’t need all the details from a paper, just the main take-home messages. Abstracts were created exactly for that reason. Some papers nowadays also include a Highlights section, facilitating a quick overview of the key results. Don’t spend your time reading the Methods section of a paper, though a quick look at the figures and the Discussion section can only be beneficial. Don’t waste your time on technical papers at this point, you will rarely need them if at all. Reviews will point you to other important papers that you may have missed. A good review paper is one where you have the possibility of reading about the work from other papers, in a way that is embedded in a larger story, similar to what you will be doing in your thesis writing. So you might want to spend a considerate amount of time reading reviews rather than any other type of scientific paper at this point of your PhD period.

By reading abstracts and reviews, you most probably will obtain pieces of information that may seem unconnected to what you already know. What is important

to remember is that *you have to make the connections* and make that knowledge your own. **Reading by itself is not enough.** So, what is the best way to assimilate knowledge? To answer that, let's assume that you have an internal knowledge representation structure, which I like to think of as a tree (let's call it your own *tree of knowledge*). That tree is going to be the main source for your PhD story (see [Rule 1](#)) and that is why it is extremely important to take good care of it. *You have to help that tree grow.* The knowledge you've acquired from reading scientific papers needs to be a part of that tree. One technique to accomplish exactly that, i.e. integrate new information into your internal tree of knowledge, is **force remembering**. This means that you have to force yourself to think about what you have been reading at times when you are doing something else (walking, cooking, e.g. take your pick). The simplest way to start remembering is by repeating in your mind words and sentences that you've read (or your own variations of them) and enter a process of internal dialogue with yourself. You start asking questions and you try to find answers to them. During this cognitive exercise, you subject the information you have started remembering to analysis, visualization and interpretation. The goal of this process is to gain a deeper understanding of what you've read, and incorporate that into your own knowledge tree. It might be of help to think of this whole mental activity in a visual manner: refining pieces of information and attaching them at appropriate branches in your knowledge tree!

Using the aforementioned remembering technique along with your reading practice, will help you **build your own personalized tree of knowledge**, fine-tuned to the subject you will be writing about in your PhD thesis. Moreover, the tree's size as well as depth will be considerably increased. Note that any other mnemonic or knowledge assimilation technique might work as well. The key point is to be active in your reading and efficiently absorb knowledge. As Confucius once said, "*Learning without thought is labor lost; thought without learning is perilous.*" So nourish your tree with knowledge, give it the water and sunlight that it deserves!

Read mainly abstracts and reviews during the last months of your PhD.

Rule 3: Organize your story into chapters

Before the actual process of writing begins, you need to create the basic structure of your thesis. **Structure** is the key concept here. You don't need to worry about the actual content of the thesis at this point. What is important is to *build the necessary foundation*, upon which you will be adding content at a later stage. But which are the

main factors that can assist you in constructing such a foundation? First, the structure of your thesis will be shaped to a large degree by your knowledge tree (see [Rule 2](#)). So with no reading, there is no knowledge tree, and thus the creation of such structure becomes almost impossible. Second, it is your creative ability and imagination that will help you shape a coherent story about your PhD work. The integration of these two factors deserves a bit of clarification. The crucial question here is this: *how can someone write a PhD story?*

Here is a way to construct your PhD story: first, find the central idea of your work. This idea should be directly related to the problem you are trying to solve. Next, expand this idea by elaborately formulating it as a sequence of *sub-ideas* with backup storylines (largely influenced by your accomplishments, i.e. your papers). Think and refine these sub-ideas, until you reach a point where you can write down single sentences, each capturing a different sub-idea in the most clear possible manner. Then, **use these sentences to write your chapter titles**. These sentences should be enough to create the outline of your thesis abstract as well (so two birds with one stone!). If you do that, in a way, you will have managed to create a map of your knowledge tree with the chapters corresponding to the different, possibly intersecting areas of that map. You can think of this mapping process like adding a certain level of *semantics* to your knowledge tree. And that's the whole point of doing this! You see, without semantics, how will you be able to reason with the knowledge you possess, connect the results you have and write your PhD story?

On the practical side, you should **aim for a structured draft document with proper chapter titles**. Each chapter should include some rough notes and comments, representing your ideas of what you should write there in the future. The notes can of course be incomplete or miss contextual detail at this stage. The process to generate these comments and ideas in each chapter is similar to *brainstorming*. That's where your creative side needs to shine. And yes, you are not writing a novel, but a certain amount of *vision* is required to create the framework of your PhD thesis story. It personally took me around one week to think and write down the ideas that constituted the structure of my PhD story, so my advice to you is to plan accordingly for this. Obviously, without structure and order in your initial thesis draft, you will only make your future writing work way more harder than it could be. In conclusion, the proposed modular way of creating the story of your thesis will be extremely beneficial for the ensuing long-term writing work.

Organize your PhD story into coherent interconnected ideas, and write them

down as chapter titles with additional comments and notes.

Rule 4: Make a PhD timetable

A PhD thesis can not be written in one week. Get this through your head. It is hard, maybe even the hardest thing you have to do during your PhD. It is going to be a painful task for most of you (it was for me). So schedule it in a proper time-wise manner. Do not wait until it's just two weeks before the deadline to start writing. Here is a proposal: **make a document with your PhD plan**. Write down in that document the important things that need to be done in the last six months of your PhD, preferably in some chronological order.³ Examples of things to write can be submission of papers, finishing data analyses or other leftover work, writing the thesis, preparing for the defence, sending some important emails, etc. **Allocate at least two months of your time for the writing of the thesis**. That's a minimum proposed time frame and it might be far from ideal for you. Time equals money as they say, and that's definitively the case for the PhD. So you might not want to spend too much of your time in thesis writing. On the other hand, you surely don't want to underestimate the time that is required for such a colossal task. Therefore, you need to make a well-balanced estimate and plan your thesis writing accordingly. *How can then someone derive such an estimate?*

For starters, you need to understand that the exact amount of time that is necessary to finish the thesis writing is hard to predict. The reason for this is that during such a large time period, your life is going to be influenced by a lot of factors. Some of these factors are uncontrollable and there is no way to prepare for them (the phenomenon also simply known as "*life happens*"). Some other factors are directly related to the practical task at hand and can thus be more easily predicted and regulated to your advantage. Using this knowledge, you can make a rough calculation of how much time it will take to write your PhD thesis. I personally think three factors are of significant importance to derive such an estimate. First, the **format of the thesis**, i.e. a paper-based thesis or a monograph, the latter of which will surely require more time to finish. Second, your **personal writing speed**, measured in the amount of chapters that you will be able to write on average in a specified time period (usually a week). Third, the **number of chapters** you need to write. Choosing the format of the

³Of course you can make such a plan document from the start of your PhD. I just want to stress here the importance of including in this document what needs to be done during the last stages of your PhD.

thesis should be fairly obvious, based on common practices in your research field, the regulations of your academic institution and the existence or not of published PhD work (papers). Moreover, you should already have a pretty good estimate on the amount of total chapters, based on the modular way of constructing your PhD story as was explained in [Rule 3](#). Then all that is left, is for you to make an educated guess of your writing speed. The combination of the aforementioned three factors will then help you make a realistic estimation of how long the PhD thesis writing will take.

Let me share with you my personal experience on this matter. My thesis was paper-based. Following the rules in the section [During writing](#), I was writing one to two thesis chapters per week. These were chapter drafts, so definitely not polished material. Therefore, my minimum writing speed was around *one chapter per week*. Continuing, I had a total of eight chapters to write + the abstract (derived from my initial story structure), which let's say was equivalent to approximately nine chapters. Worst case scenario, I write one chapter per week, so a total of nine weeks are required. Best case scenario, I write two chapters per week, so a total of five weeks are required (rounding it up). Chapter size plays a huge role as you can probably guess. The proposed estimate of two months time is somewhere between five and nine weeks and closer to the second (the maximum of the two). So, eight weeks, equal to two months, sounded like a good deadline for my writing project. In the end, I finished the thesis writing in seven weeks, which was one week before the deadline. That included also reviewing the edits and comments from my supervisor and several rewrites. The important thing to remember here is that the calculation of your thesis time frame is going to be a **personal rough estimate**. Therefore, *using an average writing speed of one chapter per week without further thought is justifiable* (see [Rule 7](#) on how to have more control over this). To summarize, my advice is to 1) calculate the number of chapters you are going to write 2) directly translate that number to weeks and 3) round it up to months.⁴

Responsibly follow the time schedule you set up for yourself and be aware to not procrastinate on your thesis writing. This has also been stated more empirically as the notion that “*work expands to fill the time available for its completion*” (Parkinson’s Law). Procrastination can lead to unpleasant and stressful days before the thesis submission, that anyone would gladly dispense with. I have seen people doing rewrites, last minute additions, or otherwise work that could have been done a week or so ago, if properly

⁴Remember to **round up** the resulting number to months! A basic arithmetic example is appropriate here. If you have a total of 11 chapters, the time required to write them down would be calculated as follows: $\frac{11 \text{ chapters}}{1 \text{ chapter/week}} = 11 \text{ weeks} \approx 12 \text{ weeks}$ (closest multiple of 4), which is equal to 3 months, assuming that 1 month is equal to 4 weeks.

scheduled. I have heard of people literally running to submit a printed copy in their respective department one hour before the deadline. Doesn't sound too good to me. It's a million times better to **be prepared and follow your time plan religiously**. Try to schedule your thesis writing in an anticipatory manner. This will happen when unfortunate scenarios that you can personally deal with, are managed to a satisfying degree. See also related discussion in the [Epilogue](#).

Make a PhD timetable and allocate a realistic time frame for your thesis writing.

Rule 5: Select several diverse workplaces

Continuing from the previous rules, now you know what to do to have the proper background knowledge (read papers) and how to be more reading-efficient (focus on abstracts and reviews mostly). You also know that you need to lay out your upcoming writing work in a document (the skeleton of the story) and make a plan with regard to when you are going to start and finish the writing. Another factor that will influence your writing is the environment where you will be working from. This is one of the most important rules of this collection. My advice here is two-fold: first, **make sure you have your working environment ready for the task ahead** and second, **have at your disposal several options for places that you could go and do some writing**.

But first things first. When the prospect of writing a PhD thesis is on the horizon, we usually resort to a familiar place to complete such a task: our home. The reasons are multiple. Quiet, which makes it easy to focus. No disturbances, no interactions either.⁵ Easy to regulate and make it fit to your needs and standards. Not to mention, access to kitchen and toilet without too much of a trouble. Despite these conveniences, there might still be things that require your careful attention to transform your home environment to a workplace suitable for the ensuing writing work. For example, do you have a proper screen (if that's what is best for you), comfortable chair and desk? Access to some nice view (nature if possible)? I can not advise you on what is the perfect writing home environment since this is entirely a matter of personal taste. I can insist though that you **spend the time required to make your workplace as ideal for**

⁵Homes are not always the quiet places I portray them to be. Having a family or living in a shared apartment for example can be valid reasons to use your university office or some other place as first option for your writing sessions. In either case, it seems to me that the more daunting the writing task, the more people tend to seek out quiet environments to increase their work efficiency, no matter where these are located.

you as possible. So make sure that the basic preconditions are there to efficiently work from home. If you have already lived one or more quarantines due to COVID-19, then you know exactly what I am talking about!

So your home might be one place where you will be doing some writing. Another option? Your work office seems like a possible candidate. Since you want to write a PhD thesis, I assume that you are a PhD candidate and therefore you should have an office space at a university. Apply the same reasoning as described above and think: “*How can I improve my office space and make it a welcome environment for my thesis writing?*” You could add some family pictures for example. Is the surface of your desk clean, with no coffee cups or papers scattered around? If not, then how do you expect to write something of order in such a chaotic environment? Maybe you can start by cleaning your desk, a certain level of tidiness can surely be of some help. Or maybe you can forget all about working from the office, since it is a cubicle workspace with lots of other students and it can get too much noisy for your taste. Then how about the university’s library? Or some other cozy place in the university that you may know of? An on-campus café perhaps? A nice suggestion is to **book a study room for some hours once every week**, motivating you to go in that place and do some writing. Overall, a university campus can be the host of several writing spots which you should know about beforehand, so make sure you do your spatial research!

Having a provision of different places (and backup places) suitable for writing sessions, is a central element to this rule. The keyword here is **diversity**. It is one of the principles that you can apply to *break the monotony of writing*. So you have all your standard workplaces (home and office) figured out. Sometimes we need the absolute quiet of our home, sometimes we get inspired by having a conversation in our office and seeing some of our colleagues. Great. Now extend this concept a bit further. How about working from a café for a change? Cafés can be fairly quiet places during regular working days and hours. I like to view them as libraries with a bit more noise than usual and constant music in the background, a combination that acts as an alternative working environment. Coordinating also with a friend and having some company might actually be a good idea. Being voluntarily exposed to social environments might trigger thoughts in your brain that sitting alone in your home or office just won’t do. Your regulated working environments may lack the certain level of *randomness* that could be the key ingredient of a productive writing session. Just walking to the café might be beneficial to your unconscious mind, providing you with the essential stimulus and inspiration. Maybe you meet someone you haven’t seen for a while. Maybe your favorite song from

your high school years suddenly plays inside the café, inspiring you to find the missing word you were searching for. And you get the chance to drink some quality coffee (hopefully). The aforementioned experiences are all directly related to **the notion of reward**. You can think of reward as a way to boost your psyche at times when writing scientific prose just doesn't seem to be the best thing in the world. Or as I like to say, "*more espresso, less depresso*."

Reward is a very powerful motive. You can use it to persuade yourself to do things you don't feel like doing. Days will come when your motivation levels will be extremely low and you won't feel like writing at all. **Don't spend time thinking about it. Act.** Any type of reward would be welcome at moments such as these. Go out to the nearest café and get a cup of coffee. I believe that is the simplest reward you can give to yourself and which will encourage you to do some writing work. It is at least *something*. Having some coffee is a million times better than staying inside and trying to fight against your inner rebelling self that wants to procrastinate and do anything other than write. **So pay for the damn coffee and get that cookie as well!** Note that caffeine is one of the most used psychoactive substances in the world. Be also aware of the fact that the beneficial effects of caffeine (*concentration* and *mental focus* are the most important for us here) decrease over time with regular consumption, resulting in the manifestation of caffeine tolerance. In other words, you need ever-increasing amounts of caffeine to reap its benefits. Therefore, I advise you to properly regulate your caffeine intake in your everyday life, with some days having a bit more and other days a bit less. Cutting down your caffeine consumption for a couple of days can be very rewarding. After some time, drinking a regular cup of coffee will result in a very pleasant experience and will significantly enhance your mental performance.

I used the example of working from cafés to demonstrate the importance of a reward system and of how such a system can positively influence your writing progress. Reward here was having some coffee and being exposed to a different environment. But you don't have to restrict yourself to the rewards or workplaces that I mentioned. They just happened to be the most accessible to me. It could very well be the case that some other types of rewards or work environments are more fitting for you. So take advantage of them when you deem appropriate to do so. The argument of having several working environments (and the potential rewards they offer) is of crucial importance to the PhD thesis writing. Only if you have several options available, you can make a choice of a working environment that is better for you at a specific time. Remember that you have to **be in the right place, at the right time**. If you have only one standard

workplace though, then you don't allow yourself the benefit of a choice. You constrain yourself. It's better to have a few places to work from. So have them figured out, before you start writing. Thus you may alleviate some of the suffering that is associated with the writing ordeal that is the PhD thesis.

Select several diverse workplaces, and if applicable, make the corresponding environments suitable for the upcoming writing task.

During writing

Rule 6: Short focused daily sessions

Every day, organize your writing work in short focused sessions, and carry out each session in a different place. I believe that this strategy is most effective in helping you achieve your PhD writing goals. Before laying out my arguments why I think that to be the case, I would like to share my observation about the process of writing and its impact on our psychological being. This observation is based on my personal writing experience and you may find it familiar. Simply put, **writing does not induce the same level of accomplishment or achievement as normal PhD work does** (lab experiments, executing simulations, writing software, performing data analyses, conducting qualitative research, etc.). Writing (and subsequently thinking) is great, but getting your hands “dirty” trying to fix things, working out problems and discussing them with your colleagues, simply feels better in the short term. You “*get a better kick*” when you see the world change due to your actions. Writing is equivalent to *inaction* in that sense, since typing some words and phrases in your computer will not directly affect the physical world in any way. Compare four hours of writing with the same amount of time spent doing some of your normal PhD work (and consider an average performance on both fronts). Doesn’t feel the same. Comparatively speaking, **writing feels like too much effort for little reward**. Or as some people say, “*the juice is not worth the squeeze!*”

Nonetheless, you are bravely entering a period of writing, which you know will feel less satisfactory in every possible dimension compared to your normal, everyday PhD work. How can you motivate yourself to go through that and achieve your end goal? Some people would say “*Well, I will just do my normal 8 hours + some overtime, rest on the weekends (or not) and all will be fine.*” So to write the PhD thesis, they will follow their standard routine and perhaps push for more hours. Sorry, but this strategy might not be optimal. One reason for this is that **you can not exceed 3-4 hours of**

productive writing per day on average. This means that by following the standard eight-hour routine for writing, some of your precious PhD time will go to waste. Several online sources advise on two up to six hours of combined reading and writing on a daily basis. The actual amount of hours isn't what is important here. What matters is that any such amount should be far less than the standard eight-hour working day. What you should be really aiming for is small bursts of concentrated writing activity. So to be more productive in your writing, the general advice is to **work less and smarter, not more and harder.** So, what should you do exactly?

Most people use the same workplace to write for 8+ hours and finish their PhD thesis. My personal opinion is that this is the *worst possible choice you can make from a psychological point of view.* You are going to face writing blocks all the time, characterized by the lack of stimulus needed to produce new text. Practically, if you find yourself looking at your computer screen for ~20 minutes without having written a single word, then that's exactly the problem I am referring to. With long hours of writing ahead, you become susceptible to demotivation. Your concentration levels might be far from optimal most of the time. You risk falling into patterns where *you read what you think you've written and not what actually is written.* So writing quality will also suffer in the long term. To avoid falling prey to such tricks of the mind, you have to give your brain some time to relax and let the thoughts "sink in." **Pauses are important for this to happen.** It is a million times better to stop writing and resume it later, when you will be fresh again. Multiple writing sessions are therefore essential. Distribute them throughout the day to make each individual session more productive. In addition, using the same place for writing work, might turn out to be counterproductive in the long term. That's where the diverse working environments fit in (see [Rule 5](#)). Go to a place, do a session, leave. Later in the day, you will do the next session someplace else. The duration of each session can be 45 minutes to 2-3 hours. The exact time span is not important here, it's up to you to decide how long each session will last. **Aim for at least two writing sessions every day.** Follow this rule diligently. A good advice is to have the first session early in the morning, when your cognitive power is at its peak. Preferably with some breakfast and coffee as well!

Now you know what you need to do: be a constantly moving writer! There is an adventurous element to this that you should definitely exploit. The last and most important piece of the puzzle that makes the strategy of small and focused writing sessions work, is **consistency.** This is the only answer I could find to the *variation* in which the production of writing work manifests itself every day. Variation here means

that there are going to be bad days, good days and so-so days in terms of writing output for your PhD thesis. And the distribution is probably going to be skewed towards the bad days. This is true for everybody. This is life. So you can't base your hopes for the writing of your thesis only on the good days! You need an element of order and stability to counterbalance the chaotic elements such as the writer's productivity variation and the constant change of the work environment. And that comes with a sacrifice. **You have to write every day.** The most successful writers are people who write every day. Make no excuses. Isn't the PhD thesis the most important work-related task during the last stages of your PhD? Take it seriously then, commit yourself to it. It might be that one day you are more productive than usual and successfully complete in one session the equivalent writing output of two "normal" days. This does not mean that you can take a break the next day. You see, **writing a PhD thesis is more like running a marathon, not a 100m sprint.** *You need to maintain a steady rhythm.* Your will to keep doing every day what you set out to do, is what is going to make a difference in the long run. The work from each session will be insignificant. The work from a week of everyday sessions will be at least *something*. Stopping for the weekend or for some days to relax, will only produce a gap, an irregularity. Would you stop a marathon race to take a nap? Or would you just stop for a while, replenish your power levels by drinking an energy drink and keep moving forward? Reflect on what this writing project means for you and once you start, do it wholeheartedly.

Write every day, from different places, in short dedicated writing sessions.

Rule 7: Write one new paragraph

In the previous rule I explained why daily distributed sessions might do the trick and increase your overall writing productivity. To finish the PhD thesis in a timely manner, you also need to set a writing goal for your everyday work. This rule will provide you with an indication on when you can stop your session(s) and call it a day, without feeling afterwards that you haven't done enough. The question of "*What is the daily goal?*" has to do with the choice of a particular *threshold*. This threshold is exactly the minimum required amount of writing that concludes a day's work (short-term goal) and which at the same time, is enough for the completion of the PhD thesis if kept on a constant, daily basis (long-term goal). In other words, **you have to define what good enough is for you.** I will provide my own empirical daily goal, but first I have to introduce a new principle. I call this principle "*basic cable*," and I view it as equally

important as the principle of diversity is with regard to the choice of work environments (see [Rule 5](#)). The inspiration for its name came from the comedy special titled “Oh My God,” performed by the renowned American comedian Louis C.K. ([Louis 2013](#)). In particular, there is a scene in the show in which Louis talks about what do you get with living a normal, basic life. He mentions examples of things that we take for granted and never seriously think of as important in our lives. These things are an essential part of our existence, but we don’t give them attention. I think there is a lesson to take from this.

Let me give you a funny, illustrative example. You are thinking of moving into a new house. The first things to check should not be if there is a super fast WiFi internet connection or if the house has a nice view and heating floors. Your first questions should be something like: “Does the house have the basic stuff required for living? Does it have a roof to keep the weather elements at bay? Is there a kitchen with the essential appliances (e.g. fridge, sink) installed? Does it have a functioning toilet?” You shouldn’t be asking for HDTV but rather if *basic cable* is provided (the standard, least expensive television subscription service). **Start small.** Set your expectations low on what you can have or the things that you can achieve, especially in the short term. When these expectations are satisfied and the smaller tasks completed, only then turn your attention to more complex, long-term attainments. It is good to know about this. People tend to always go for the larger prizes or set too much difficult goals from the beginning, forgetting how nice it feels when we fulfill our minimal needs and accomplish our everyday small tasks (which are not necessarily easy). **Setting small objectives and expectations**, that’s what the principle of basic cable is all about.

A more realistic example, in which the aforementioned principle is directly applied, involves the widely used app *Duolingo*, also termed “*The world’s best way to learn a language*.” Many people want to learn a new language, but they are discouraged due to the seemingly impossible task. To address this, Duolingo suggests that you do one single session every day, which can take up to 15 minutes of your time on average. A small sacrifice for a greater good! This is exactly the application of the basic cable principle along with a promise of its potential impact: **a small task, done repeatedly every single day, can have a remarkable positive effect on a long term goal, no matter how impossible the goal might seem at first.** Of course nobody will fully learn a language using Duolingo, but it is a first step towards achieving a satisfactory level of fluency, enabling communication with other people from different countries.

To write a PhD thesis is a lengthy and laborious task, and as such, it presents an

excellent opportunity to apply the basic cable principle as a strategy for its completion. We have already taken care to split the writing work into multiple sessions. Now we need to define the minimum threshold which will signify a successful writing session (or day). So, per basic cable principle, *we set our goal a bit low, so as to make sure we can achieve or even surpass that goal every day*. **I hereby advise you to set this goal to one new paragraph per day**. This rule provides the guarantee that you might have been looking for. This guarantee is none other than the completion of the PhD thesis, given that the previous rules were also followed (e.g. having a time plan and a story structure) and that no external factors severely influenced your work or personal life. It's miraculous how small achievements add up to bring about the realization of a larger objective. **The progress you will be making by following this rule consistently, is staggering.**

Your daily goal is now set. Write one new paragraph. But how exactly to do that? I need to clarify at this point that I do not advise you to write a finished and super-refined paragraph every day, but more like the *initial draft* from which you will produce the envisioned version in the future. There are two processes at work here. The first relates to the **creation of a new draft paragraph** (your daily goal) and the second relates to **text refinement** (task for another day or session). Creating the first version of a paragraph is associated with the initial PhD story structure that we discussed in [Rule 3](#). You already had laid out some comments and notes in the chapter you are currently writing (or maybe even whole text segments). So the layout, i.e. the ideas that constitute the main argument of the chapter should mostly be there. Your day-to-day job is to formulate these ideas to separate paragraphs and connect the subsequent arguments in a cohesive manner. To expand an idea into a whole paragraph, you will have to use a bit of your imagination and creative ability. Here is what you need to do: let your thoughts about an idea *flow* from mind to pen (or keyboard). The subject-specific knowledge you have accumulated up to this point, relating to a particular idea, will be beneficial to this effort (see [Rule 1](#)). The diverse environments might also help (see [Rule 5](#)). This process of text generation is all about *having a continuous flow*. The most important thing to remember is to lay out the subsequent arguments in a way that the whole paragraph *makes sense*, i.e. it succeeds in the highest possible level of conceptualization. The key point has to be there. Another piece of advice: do not try to make the perfect paragraph from the first draft. **Do not think about correct words and phrases, or proper syntax and grammar at this stage**. The produced result will be “far from done” most of the times. But rejoice, since its existence will denote that the daily goal was achieved, and therefore that's one successful day for you (per

basic cable principle).

By writing a new draft paragraph, you accomplish your daily writing goal. Maybe that's the only thing you are going to do on a bad day. And there are going to be such days, make no mistake about that. By setting your daily goal within grasp, you allow yourself the chance to do a bit more work on an average day. I hypothesize here that you've had enough with writing new scientific prose at this point (but by all means, if you feel like doing more of this type of writing, continue to do so!). The main question now is **what kind of work you should do after you have written your daily new paragraph(s)**. Here are three suggestions: **reading, normal PhD work and rewriting**. How much of each of these you will do in a day (if at all), rests entirely in your hands. Having said that, I believe that you should **prioritize rewriting**. The reason is that your main goal during the thesis writing phase is none other than to finish the PhD thesis. And this can only be accomplished by writing and rewriting. This statement is as crucially important as it is self-evident. It is not the reading of all the papers you had in your to-read list or doing non-essential PhD work that will help you achieve your goal at this point. Nevertheless, reading and normal work also play their respective role, so they deserve a bit of more discussion.

Reading papers during your thesis writing is very important as it can directly influence the production and quality of your (re-)writing. I therefore formalized it as [Rule 8](#). Next, doing some non-PhD-thesis-writing work can serve as a nice break from the writing routine. Nobody expects you to be done with all the practical work when entering the writing phase of your PhD. Apart from doing leftover work (e.g. related to your papers), tasks such as answering emails will still be a necessary part of your everyday PhD life. The best way to view all of this extra work is as *tasks that exist to break the repetitiveness of writing* rather than blocking points for your writing work. This is exactly the diversity principle we discussed in [Rule 5](#), applied in a different setting (i.e. diverse tasks instead of places). Note that **writing emails can be a good warm-up practice for your thesis writing**. You should aim to write short, concise emails ([Matt 2013](#)). This requires a certain level of rewriting skill as well as the ability to compact meaning (say more with less), both of which are valuable for your thesis writing (and your life in general). My last suggestion to fill in extra work hours (sessions), is to do some rewriting. Your goal here is to make the paragraphs you have already written a little better. Therefore, **your role has to change from a text producer to that of an editor**. Editing your previous writings is mostly a technical task and one that you will get increasingly better the more you do it. Such a text refinement process

might feel similar to normal work, and thus it can serve as a nice break from the more generative type of writing we discussed above.

Let's now discuss in detail how you can do a paragraph rewrite. First, you need to choose a paragraph. This can be either a random one (e.g. from those you've recently written) or one whose context relates to a recent paper reading (see [Rule 8](#)). The goal is to write a better version of the paragraph you chose. But how to do that exactly? Well, apply the principle of basic cable yet again. Start from the basics. A paragraph is a sequence of sentences and each sentence is a sequence of words. Is there any word that could be replaced with a better synonym? Amazing improvements can be made at the single word level, so **make sure you choose the right words**. How about laying out the text in a way that is easier for you to read? This can be accomplished for example by separating each sentence with an empty line. Breaking up a paragraph into its constituents will allow you to check if the respective sentences are correctly ordered, clearly connected and if the paragraph's intended meaning as a whole, is conveyed properly. **Rewrite some of the sentences. Reorder them if necessary. Try to split them into smaller sentences** to achieve a higher level of brevity and clarity. To finish, merge the individual sentences back into a single unit. Now you have a better paragraph.

How much effort should you put into the text refinement process? Well, this question relates to the quality of the produced prose. Speaking of quality, Robert Graves said that "*There is no such thing as good writing, only good rewriting.*" That's a nice quote, arguing that quality can only increase with each subsequent rewrite. But that's just not realistic. **The PhD thesis comes with a deadline**. Time and efficiency are priorities number one and two here. The rewriting process has to stop at some point, so when exactly should someone stop rewriting a paragraph? I believe that it all boils down to *what you consider a good enough paragraph*, i.e. the level of quality that you are satisfied with. As per Grave's quote, remember that **there is no best version of a paragraph**. You can always refine it and re-refine it and so on. This means that you have to define a *threshold* which will tell you when a paragraph is good enough. Personally, I found out that after **~3-5 rewrites of each sentence**, the quality was as good as I could possibly make it. Occasionally, I rewrote a paragraph up to the point where I felt that significant improvement could only be brought by a more experienced author (that responsibility fell into my supervisor's lap). In the end, it was a combination of these two quality assessments that made me declare a paragraph as good enough. To summarize, I stopped editing a paragraph when 1) I rewrote it a

couple of times and 2) it was clear to me that to make it even better, I would need the help of an external human editor.

Aim to write at least one new paragraph every day and if circumstances allow, do some rewriting as well.

Rule 8: Read one paper

Before writing your PhD thesis, you have to read the relevant scientific literature (see [Rule 1](#)). An organized, efficient reader may have already finished reading all that literature, before starting the thesis writing. I think this is the exception rather than the rule. Most likely, your “to-read” list is going to be full of papers when you start writing the thesis. In addition, chances are that you will discover other interesting papers during the writing period. This means that your reading list will probably never be empty. Reading never really ends, right? This is the sign of a *positive attitude towards learning*. On the practical side, reading before writing will help you to focus, acting thus as an excellent *warm-up*. All things considered, you might want to get some reading done while writing your PhD thesis. However, you don’t want to do too much reading at this phase. Time is of considerate value, especially with the thesis submission deadline on the horizon. Therefore, I advise you to set another minimum daily goal for yourself. **Read one paper every day, on top of writing one new paragraph.** That seems like a manageable task. As discussed in [Rule 2](#), the paper’s abstract may be sufficient for this purpose. If the paper turns out to be interesting for you, then keep on reading! Try for example to interpret some of the main figures or focus on the authors’ conclusions. In general, what is important to remember is to get the “*big picture*,” i.e. the paper’s take-home messages. The abstract and a quick (but careful) view of the paper from top to bottom, will be satisfactory to that end.

To better utilize the knowledge you acquire from papers and incorporate it into your writing, I advise you to **force yourself to think about what you have been recently reading** (see [Rule 2](#)). This will be very helpful during the creation process of new text. Moreover, a paper’s particular writing style, as well as the words and phrases used in the subsequent text, are things that you can make use of. For example, while reading a paper you may encounter a word or expression that just happens to be the perfect replacement for a particular word (synonym) or phrase (with a slight variation) you wrote the previous day. So this might facilitate some of the rewriting process discussed in [Rule 7](#). When one thing gets fixed in your writing (e.g. with the

choice of a better word), others might announce themselves as in need of fix. This can easily result in a *cascading effect of rewrites*. To sum up, reading a paper can have a beneficial effect for both the producing and the editing type of writing you will be doing.

As a general advice, I would suggest to **spend no more than 30 minutes reading a paper**, so try to be as efficient and active as possible in your reading practice (Sun 2020). Also, if you are in the mood to read more papers, then by all means do it. We already established that reading one paper was useful enough, so the more the better. Don't forget though that the most important thing is to commit yourself to write one new paragraph every day to progress towards your final goal. You can't focus too much on reading and refrain from your main path. The writing of the PhD thesis comes first. **Priorities are important**. Having said that, if you already wrote one new paragraph, and you are in the mood for reading more than one paper, then by all means, go ahead and read as much as you like!

Read one paper every day, and force yourself some time later to think about what you have read.

Epilogue

Let me be absolutely clear on one thing, just in case you weren't aware of it already or you have your own theories and ideas about what a PhD thesis really is. I hate to be the one to break it to you, but it's better to know and accept the following simple fact, rather than ignore it. The PhD thesis is a personal achievement and one that you are held 100% ACCOUNTABLE FOR. Don't expect help or a magical hand to write it for you. There is going to be no *Deus ex machina*. You may consider yourself lucky having a willing supervisor or friends who may help you a bit with some text editing, but still, it's ENTIRELY UP TO YOU. The core of the argument is that nobody will blame others except you if something happens and you end up not writing your PhD thesis. You are alone in this. Accept this and move on.

The above fact is applied to the last stage of your PhD, and is meant specifically for the writing of the thesis. So not for the whole PhD term! You should ask and be given proper guidance (if not practical help as well) during the PhD period. The absence of such regulatory guidance and assistance can be detrimental to the achievement of your goal, which is the attainment of the doctoral degree. Of course, there are a million other things that can go wrong during a PhD. If you are dealt a bad hand from the beginning of your PhD, most probably you will drop out at some point (so no thesis writing either). Sadly, the PhD drop out rates are close to 50% and there are many factors that contribute to that effect. We all have heard a story or two about people who suffered because of incompetent and uncaring supervision. Research group disbanded. Payment ceased or funds ended. Motivation levels plummeted. Depression. Loneliness. Uncertainty. Stress. Life is full of uncontrollable, random elements, lurking in the shadows, always ready to lead you astray from your path (the COVID-19 pandemic is the most indicative example of this). On the other hand, dropping out of a PhD can also have a positive effect in your life. The realization that an academic career is not the best choice for you and that your true calling lies in industry, is an example of such a beneficial outcome. All in all, PhD life can be rather complicated.

I would like to share with you two quotes that resonated with me during my PhD. I believe that they speak of valuable things, important to know in general, and of high relevance to the complex PhD life. Or at least I found them to be as such. Firstly, Zig Ziglar’s quote: “*Expect the best but be prepared for the worst.*” Secondly, and largely complementary, is the infamous Murphy’s Law: “*Anything that can go wrong will go wrong.*” Being positive while striving bravely towards your PhD goal, that is the proper attitude. Having the correct mindset is rule number 0. You have to be like a rock, unmoved in your determination to finish the PhD. Envision and aim at the best possible outcome, which also implies that you become the best possible you. Do your job, write the damn thesis. But know that you can’t go into battle without being at least prepared for some of the unpleasanties that might manifest themselves and cause you to deviate from your original goal. That is your responsibility. For example, during the writing of your thesis, delays due to lack of motivation to write or due to other factors (e.g. waiting for people to edit the thesis or deliver some other work) are going to become significantly prominent and irritating. Such distressing scenarios have an amazing tendency to appear when you least expect them to, and in magnitude much larger than originally anticipated. Don’t be discouraged. Make a plan and follow it to the letter. That’s exactly what the rules are for. What we discussed in this rulebook will help you develop some resistance to the aforementioned upsetting situations. Make your own rules if you have to. Unexpected elements cannot always be fought off with careful planning, but having no plan at all is even worse. Remember that being prepared for the worst possible scenarios you can imagine can only be of help, since in real life, it’s usually even worse! Be prepared and serious about this, it’s the importance of the writing task that demands it.

If I were to summarize all the rules into one, the take-home message would be stated like this: write every day for a bit. That’s the only thing that guarantees that the PhD thesis will be eventually completed. But it is not so helpful when simply stated like this. That’s why I felt I had to write about the rules that elaborate on how exactly you can make that happen, i.e. the strategy that you can employ to accomplish the aforementioned goal in a concrete, practical manner. The proposed strategy is similar to the algorithmic divide-and-conquer paradigm for solving computational problems, only applied to a real-world setting. The problem here is the writing of the PhD thesis. The “divide” part has to do with the construction of the story structure. The thesis content is split into several chapters, each with written ideas corresponding to paragraphs that you need to write. Therefore the problem is split into smaller subtasks, the writing and the subsequent rewriting of paragraphs. And to solve the problem, you just need

to write these paragraphs. The “conquer” part relates to the when, where and how exactly to do the writing. When? Every day. Where? Multiple places. How? Produce and edit afterwards. So conquer every day, be CONSISTENT above all. Here is where your mental and psychological state is properly regulated with the help of the basic principle: making the subtasks small so that you can easily finish them in a day’s work. The singularity concept inherent in this idea is fundamental to its success: one paragraph per day, one paper per day, always one thing at a time. Two or three might be too much for some days. And that’s pretty much all the theory behind the rules.

Like all things, the PhD thesis will pass and be part of your life’s history. Try to make it a bit less stressful by employing some of the rules I propose. They worked for me, maybe they will work for you as well. In the end what matters is that you finish your PhD, and I really hope that you do so! No matter the outcome of your PhD adventure, keep in mind that writing can be extremely useful for organizing your thoughts and setting a path for your life. I therefore advise you to continue using the writing skills you gain during your PhD. Making complex decisions is just a part of our lives. Planning the next steps by writing them down, analyzing the whys and hows, the pros and cons, can only be beneficial in understanding what you really want to do. You will also learn more about yourself. This way of helping yourself figure out the next steps in your life sounds like a better alternative than the mere “going with the flow” sort of lifestyle. Think carefully about this.

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