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A Scientific Approach to Scientific Writing

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Chapter 1
Maximizing Chances of Publication

In the modern world, every scientist who wants to publish findings in an international, peer-reviewed journal must write in English. This can be very challenging for people who are not native speakers of English. Indeed, it can be challenging for people who *are* native speakers. However, whether you are writing papers in your first or any other language, the process can be greatly facilitated by approaching it in a logical, systematic manner.

The authors of this guide have written, re-written or edited more than 4,000 texts of diverse kinds and (together with numerous friends, colleagues and clients who have commented on various drafts) have substantial experience of both writing papers and the problems encountered by people who are learning to write them, in either their first or other languages. This brief guide is intended to help people tackle these problems, using four increasingly complex hypothetical case studies. The book focuses on writing research papers because they are key outputs for scientists seeking a high-profile career and the main elements of the primary literature. However, as discussed in Chapter 7, the outlined systematic approach can be applied when writing other kinds of presentations (e.g., reports, reviews and oral presentations).

It is impossible to describe how to write anything without considering some linguistic aspects. Here, we address aspects we believe to be critical for structuring a paper, but it is assumed that readers will have had many years of English education; hence attempting to add significantly to your knowledge of the language would be pointless. Furthermore, there are many good books on English grammar, for people of all ages. We are not intending to add to their number. Instead, the main aim is *to show you ways to arrange, compose and present a study*, starting from brief, simple statements, in order to *maximize the chances of publication*.

There are several ways to do this. The most effective way of all is to buy the company that owns the target journal. Then you can publish all of your papers, and those of your friends and colleagues, in it. The problems with this strategy are that it is very expensive and there is a risk that the quality, and hence the impact rating, of the journal will decline. The second strategy is to discover an embarrassing secret about the journal's editor and apply blackmail. The problems with this approach are that it is difficult and immoral. The third option is to describe the problems/phenomena

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you have addressed, your results and their implications clearly and concisely. This is the approach that can be most easily adopted by the majority of readers and the one that will be considered here.

As discussed in Chapter 6, however brilliant or innovative your study may be, there is no guarantee that it will be accepted by the target journal. However, presenting your study clearly and coherently greatly improves the chances of acceptance. Furthermore, *writing papers is simple*. Essentially, all that you need to do is this: Describe what you have done and why you have done it, outline the results and limitations (or *focus*) of the study, discuss the implications of the findings and highlight their importance.

The problem is that this has to be done:

- clearly and concisely
- while covering all the key points and showing that your study is very important
- and in a foreign language, if you are writing in English and you are not a native English speaker.

As noted before, currently, if one wants to publish papers in international, peer-reviewed journals, they must be written in English. *This is clearly unfair* and may change in the future. Indeed, as China's economic power grows, it is quite possible that in a few decades everyone will have to write in Chinese. However, at the moment all scientists who want a successful career have to write in English. Thus, the objective of this book is to present a coherent, systematic strategy that can help both native and non-native English speakers to construct, write and publish papers, and other kinds of scientific communications, in English.

Chapter 2
Essential Steps Before Writing a Paper

Having completed a study and acquired all the data required to present it, you are ready to begin preparing a paper. However, before beginning to write, you have to take several critical preliminary steps: Your notes must be gathered, a suitable place for writing must be found, a selective literature review may be helpful, a target journal must be identified, linguistic limitations must be recognized, the study must be defined and delimited, and the information must be arranged. Failure to take these steps will make writing more difficult and seriously compromise the chances of publication. Therefore, this chapter outlines what needs to be done in each of these steps.

2.1 Gather Your Notes

Writing a paper can be greatly facilitated by keeping good notes during the study phase. A comprehensive laboratory or field notebook (either electronic or handwritten) is a valuable resource when you finally sit down to write your paper. It is easy, during data collection, to assume that you will be able to remember why or how you did things. Unfortunately, when you begin to write up your work, several months or even years later, you are likely to find it difficult to recall details. Keeping thorough notes as you proceed, supported by other sources of information such as sketches or photographs, can alleviate a great deal of stress in the latter stages of your study. Of course, it is not only essential to keep good notes, it is also essential to use them. Thus, before sitting down to write, all the relevant notes must be gathered.

2.2 Find Somewhere Quiet

Having gathered your notes, it is essential to find somewhere peaceful to write, or at least somewhere where disturbances are minimal, because writing well requires intense concentration. Ideally, one should find a quiet room and pin a 'Do not disturb' note on the door while arranging the material and writing. Supervisors can help by refraining from demanding to see how the work is progressing every few

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minutes. Supervisors have many ways to make students' and post-doctoral workers' lives miserable if they wish, but constantly disturbing them when they are writing is particularly unhelpful; it reduces the quality of the output, thus impairing the chances of publication. On the other hand, an inexperienced writer will need help. Hence, setting a good balance between providing helpful advice and interfering too much is an important 'soft skill'.

2.3 *Selectively* Review the Literature

It is vital to review the relevant literature, to ensure that no important observations that either support your findings or contradict them have been missed. Failure to mention such references will create a poor impression and may seriously impair the chances of publication (especially if you miss publications by one or more of the referees). Thus, it is essential to search all of the relevant databases, such as CAB Abstracts (http://cababstracts.edina.ac.uk) and ISI Web of Knowledge^{SM} (http://apps.isiknowledge.com), using all of the potentially relevant keywords. The websites of these databases themselves, and a number of books and other web sources (e.g., Harvard College Library's site; http://hcl.harvard.edu/research/guides/citationindex/ accessed September 5, 2010), describe ways to search these databases.

However, you can only tell what fields of literature you need to scan when you know precisely what each section of a planned paper is going to cover, and thus the *kinds* of references you need to cite. Otherwise much time could be wasted reading material that is only tangentially related to your study. For instance, if you tried to read every report that has ever been written on over-fertilization of every type of soil, supporting every crop, and all the associated problems, you would never stop reading.

Furthermore, a detailed review of the literature before drafting a paper can be counter-productive, since nearly all of the papers that *could* be read will have some sections that are relevant to your study, but also many sections that have little relevance. Reading such papers can be seriously distracting because they will present many ideas that you may start to think should perhaps be mentioned, complicating rather than helping attempts to draft a clear, coherent framework. In addition, you are likely to be an expert in the subject (otherwise you would not have been able to plan and execute the work) and you should already have good knowledge of the pertinent literature. Therefore, it is generally better to draft your paper first, and *then* identify the aspects of the literature that you can *selectively* focus on. Hence, we recommend restricting any literature survey, at this stage, to at most a couple of recent reviews to refresh your memory about key aspects of the subject that may need to be covered, jotting down brief details of references that *could* be cited. However, even this is optional until the framework of the paper has been drafted.

Ways of identifying references that *need* to be cited while drafting the framework are described in detail later, but here we will mention that key steps in writing