

Guidelines for writing a scientific article

A good design of a scientific manuscript and a lucid writing style are of extreme importance for getting one's work published in a scientific journal. Many graduate students (and many "mature" scientists as well) have a hard time writing their manuscripts, and even after having invested immense efforts the end result is often disappointing. If you encounter similar problems, you may find the following guidelines useful. They can be found on the website www.sfeddit.net of San Francisco Edit, a company that is specialized in editing and proofreading scientific manuscripts (of course for a fee). There are also lots of books available on this and similar topics, which can easily be found on www.amazon.com (together with a description and reader comments). Here is a short and incomplete list:

M. Alley (1998): *The Craft of Scientific Writing*. pbk \$34.95

V. Booth (1993): *Communicating in Science: Writing a Scientific Paper and Speaking at Scientific Meetings*. pbk \$24.99

R.A. Day & B. Gastel (2006): *How to Write and Publish a Scientific Paper* (6th Edition). pbk \$29.95

P.J. Feibelman (1994): *A Ph.D. Is Not Enough: A Guide to Survival in Science*. pbk \$10.73

A.J. Friedland & C.L. Folt (2000): *Writing Successful Science Proposals*. pbk \$16.00

J.R. Matthews, J.M. Bowen & R.W. Matthews (2001): *Successful Scientific Writing: A Step-by-step Guide for Biomedical Scientists*. Spiral bound \$29.99



Focusing on your Central Message

San Francisco Edit

www.sfededit.net

This is one of the most important parts of writing your paper, and one that is often overlooked. Think carefully about what it is that you want your readers to understand about your work. Remember, we are all busy and we need to absorb your message quickly and clearly. Try these exercises:

1. Write down the three central points of your paper.
2. Summarize your paper in one sentence.
3. Describe your work to a colleague in one minute.

These might sound easy, but try them and you'll find out they aren't!

Don't rush this part of your planning. It is worth spending time getting it right. Once you have mastered these exercises you will feel more confident about the whole writing process that follows.

A common problem with summarizing your work is that there are usually several major findings. This exercise is meant to focus your thinking on the central issues. It is not going to form the published abstract. So, if you really can't squeeze your key message into one sentence don't worry. Try to do it in two. If you can't do that then you need to take a careful look at the reasons. Remember, this is a very important part of the process for writing papers so work at it. Talk to your colleagues and see if between you it is possible to highlight the central message of your work.

A number of studies have indicated that a badly written manuscript with poor use of English, even with good science, has less chance of being accepted and published

Ten Steps to Writing an Effective Abstract

<http://www.sfeddit.net>

An abstract is a condensed version of the manuscript, which highlights the major points covered, concisely describes its content and scope, and reviews its material in abbreviated form. It is usually the first section read and sets the tone of the paper for the reviewer. It must be concise and easy to read and must cover the important points of the paper.

Many publications have a required style for abstracts; the "Guidelines for Authors" provided by the publisher will provide specific instructions. Stay within the publisher's guidelines, or your manuscript might be rejected.

Writing an abstract involves summarizing a whole manuscript and providing as much new information as possible. The best way to write an effective abstract is to start with a draft of the complete manuscript and follow these 10 steps:

1. Identify the major objectives and conclusions.
2. Identify phrases with keywords in the methods section.
3. Identify the major results from the discussion or results section.
4. Assemble the above information into a single paragraph.
5. State your hypothesis or method used in the first sentence.
6. Omit background information, literature review, and detailed description of methods.
7. Remove extra words and phrases.
8. Revise the paragraph so that the abstract conveys only the essential information.
9. Check to see if it meets the guidelines of the targeted journal.
10. Give the abstract to a colleague (preferably one who is not familiar with your work) and ask him/her whether it makes sense.

Writing an effective abstract will improve the chances of your manuscript being accepted, encourage people to read it, and increase its impact.

A number of studies have indicated that a badly written manuscript with poor use of English, even with good science, has less chance of being accepted and published.



San Francisco Edit
Scientific, Medical and Technical Proofreading and Editing

Eight Steps to Developing an Effective Outline

San Francisco Edit

www.sfeddit.net

Preparing an outline is the most important step in the process of producing a manuscript for publication in a journal. The outline bears roughly the same relation to the final manuscript as an architectural blueprint does to a finished house.

Its purpose of an outline is to divide the writing of the entire paper into a number of smaller tasks.

A good outline will organize the various topics and arguments in logical form. By ordering the topics you will identify, before writing the manuscript, any gaps that might exist.

There is no single best way to prepare a scientific manuscript, except as determined by the individual writer and the circumstances. You should know your own style of writing best. Whatever you decide to do, you should follow at least these steps before beginning to write your manuscript.

Remember, at this stage, you are only constructing an outline. You are not writing; you just need to put down some notes to guide your thinking.

1. Develop a central message of the manuscript

Prepare a central message sentence (20-25 words). If you were asked to summarize your paper in one sentence, what would you say? Everything in the manuscript will be written to support this central message.

2. Define the materials and methods

Briefly state the **population** in which you worked, the **sampling method** you employed, the **materials** you used, and most importantly, the **methods** you used to carry out the study

3. Summarize the question(s) and problem(s)

What was known before you started the study? What answers were needed to address the problem(s)? List the key points pertaining to the question(s) and problem(s). What did you do to answer the question(s)?

4. Define the principal findings and results

Your central message sentence probably encapsulates the most important findings. There may be others that you feel ought to be included. List these in note form. Don't worry about the order or about how many you put down.

5. Describe the conclusions and implications

Make brief notes on each of the implications that arise from your study. What are the principal conclusions of your findings? What is new in your work and why does it matter? What are the limitations and the implications of your results? Are there any changes in practice, approaches or techniques that you would recommend?

6. Organize and group related ideas together

List each key point separately. Key points can be arranged chronologically, by order of importance or by some other pattern. The organizing scheme should be clear and well structured. You can use a cluster map, an issue tree, numbering, or some other organizational structure.

Identify the important details, describe the principal findings, and provide your analysis and conclusions that contribute to each key point.

7. Identify the references that pertain to each key point

8. Develop the introduction

Before beginning on the introduction, read through the notes you have made so far in your outline. Read them through and see whether there is a coherent and cohesive story and a unifying theme that runs through the outline.

Your introduction outline should start with the main message, describe what the purpose or objective of your study was, how you went about doing the study, what you found and what are the implications of what you found.



Twelve Steps to Developing an Effective First Draft of your Manuscript

San Francisco Edit

www.sfedit.net

You should now have detailed notes you can use to write your draft paper. If you don't have one already, it may help to prepare an outline for each section which includes a number of major headings, sub-headings and paragraphs covering different points. If you need help in preparing an outline see our article *Eight Steps to Developing an Effective Manuscript Outline* at www.sfedit.net/newsletters.html. At this point you will need to convert your notes and outline into narrative form.

Some people recommend that you begin with the Introduction and continue in order through each section of the paper to help ensure flow. Others suggest that you begin with the easiest sections, which are usually the Methods and Results, followed by the Discussion, Conclusion, Introduction, References and Title, leaving the Abstract until the end. The main thing is to begin writing and begin filling up the blank screen or piece of paper.

- 1. Consolidate all the information.** Ensure you have everything you need to write efficiently, i.e., all data, references, drafts of tables and figures, etc.
- 2. Target a journal.** Determine the journal to which you plan to submit your manuscript and write your manuscript according to the focus of the targeted journal. The focus may be clearly stated within the journal or may be determined by examining several recent issues of the targeted journal.
- 3. Start writing.** When writing the first draft, the goal is to put something down on paper, so it does not matter if sentences are incomplete and the grammar incorrect, provided that the main points and ideas have been captured. Write when your energy is high, not when you are tired. Try to find a time and place where you can think and write without distractions.

4. Write quickly. Don't worry about words, spelling or punctuation at all at this stage, just ideas. Keep going. Leave gaps if necessary. Try to write quickly, to keep the flow going. Use abbreviations and leave space for words that do not come to mind immediately.

5. Write in your own voice. Expressing yourself in your own way will help you to say what you mean more precisely. It will be easier for your reader if they can "hear" your voice.

6. Write without editing. Don't try to get it right the first time. Resist the temptation to edit as you go. Otherwise, you will tend to get stuck and waste time. If you try to write and edit at the same time, you will do neither well.

7. Keep to the plan of your outline. Use the headings from your outline to focus what you want to say. If you find yourself wandering from the point, stop and move on to the next topic in the outline.

8. Write the paper in parts. Don't attempt to write the whole manuscript at once, instead, treat each section as a mini essay. Look at your notes, think about the goal of that particular section and what you want to accomplish and say.

9. Put the first draft aside. Put aside your first draft for at least one day. The idea of waiting a day or more is to allow you to "be" another person. It is difficult to proofread and edit your own work; a day or more between creation and critique helps.

10. Revise it. Revise it and be prepared to do this several times until you feel it is not possible to improve it further. The objective is to look at your work not as its author, but as a respectful but stern critic. Does each sentence make sense? In your longer sentences, can you keep track of the subject at hand? Do your longer paragraphs follow a single idea, or can they be broken into smaller paragraphs? These are some of the questions you should ask yourself.

11. Revise for clarity and brevity. Revise sentences and paragraphs with special attention to clearness. For maximum readability, most sentences should be about 15-20 words. For a scientific article, paragraphs of about 150 words in length are considered optimal. Avoid using unnecessary words.

12. Be consistent. Often a manuscript has more than one author and therefore the writing may be shared. However, the style needs to be consistent throughout. The first author must go through the entire manuscript and make any necessary editorial changes before submitting the manuscript to the journal.