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Writing Manuscripts: The Alternative 'Guide to Authors'

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- If the reviewer doesn't get it, you haven't explained it clearly enough! ©Chelm261

"If the reviewer doesn't get it, you haven't explained it clearly enough!" This is one quote from my PhD supervisor that I haven't forgotten. Getting research funded and published depends to a very large extent on our ability to **get the point across**. Although scientific texts appear to differ wildly from other forms of writing, a good research paper actually follows the same basic principles of effective communication as a newspaper article or advertising text.

There are some fairly simple guidelines on presenting and structuring written information to get the point across and highlight the key messages that are very useful for manuscripts, thesis chapters, proposals, basically any kind of academic writing. At [Functional Ecology](#), we've collected [tips and tricks from various sources to help authors effectively communicate](#) their research and ideas. Here are our key points:

1) Know Your Audience



- A research paper is about communicating your research in a way that makes sense to others. © Vinch

The central principle for any type of communication is: **know your audience**. A research paper isn't just about presenting information – it's about communicating your research to others. When you start preparing a manuscript, you need to think about who will read it. In the first instance, this is probably a busy editor or reviewer, so you should make sure that you get your key messages across without making your readers work too hard. Good science writing isn't about using clever-sounding words and sentences, it's about getting the point across in such a way that readers can understand the research and reach the right conclusion (i.e. the one you want them to reach).

There are some general principles of how to get a message across and to make it stick in people's minds. These can be adapted to science writing and remembered with the acronym **SUCCESS**:

- **Simple** — keep it simple by finding the main message and sticking to it
- **Unexpected** — use the unexpected to grab the reader's attention (eg. a knowledge gap, unforeseen consequences, an unusual feedback...)
- **Concrete** — make the central concept easily grasped and remembered
- **Credible** — support your interpretation and discussion with evidence
- **Emotional** — stimulate interest and highlight the relevance of the study to make people *care* about the research
- **Story** — people enjoy and remember stories, so a good manuscript is a narrative about your research, with a logical train of thought

Although you're constrained by scientific convention and the fixed format of most journals, you can still tell a simple, concrete and credible 'story' (non-fiction) about your research. You can use

elements of the unexpected to show the novelty of the research and help the reader remember your paper by tapping into emotion (eg. curiosity, amazement).

2) A Different Take on Manuscript Structure

The title gets people reading the paper, so it should be brief and clear, summarising the main finding of the paper (think of a newspaper or magazine headline). It's wise to avoid questions, convoluted sentences and too much detail. The title should be simple and concrete, and it can also incorporate something unexpected. The most important part of the title should come first because the second half may not appear in a list of search results. (See also [Fox & Burns 2015](#))

The abstract determines whether they read on, so it should get the main messages across without drowning the reader in detail. It can be the hardest section to write because it needs to contain the key information in an easily digestible form within a very strict word limit. The BES journal convention of numbered paragraphs is useful to ensure that your abstract includes a brief justification, a broad description of the approach, key findings and a final statement about the relevance of the study. (For information on optimising your title and abstract for search engines see [Maximising the Exposure of your Research](#)).



— Use your introduction to set the scene. © Michael Theony

The introduction sets the scene by presenting the background for your research. A logical train of thought should lead the reader to the conclusion that the study is novel, exciting and worthwhile. It should be simple and concrete, including only the information relevant to the immediate study subject and the reasons you're doing the research; the section usually concludes with clear research aims or hypotheses to be addressed in the paper. By the end of the introduction, the reader should *want* to know more about your study.

Methods: it's all about the detail and it can be hard to get the level of detail right. You should provide enough information for the reader to understand how the study is designed to address the research aims and judge whether the methodology/ data analyses are appropriate. Details such as the number of plots, experimental treatments, frequency of data collection etc. are crucial, but you can usually omit details that have no influence on the measurements, results, or the way the data is collected. You may need to include more detail if you're writing a methods paper, so it's

important to check the aims of the journal you want to submit to (although even *Methods in Ecology and Evolution* doesn't need to know whether your data points were collected on a Tuesday or a Wednesday).

Results: logical vs. interesting. Determining the order in which to report findings is tricky. The 'logical order' gives basic results first, whereas the 'interesting order' highlights the novelty of the study by reporting the most exciting results first. The solution usually lies somewhere between the two. You need to show how the results address the aims or hypotheses, so a good way of thinking about this section is to decide which results are the 'key results' you want to discuss, and which ones are 'supporting results' that are less interesting but useful for interpreting the main findings.

The discussion is your playground because you are less constrained by convention and there is room for interpretation. There are four common types of discussion that really let a paper down:



- Don't make your discussion a whodunnit.
©Rumensz

The Saga, where each result (no matter how trivial) is discussed separately in turn. This can produce a very long and unexciting discussion that buries your most interesting findings.

The Whodunnit, where the reader is presented with various lines of evidence and the conclusion is drawn at the end. This leaves the reader guessing about the important facts while they wade through details.

The Report, where the results are presented only in comparison to other studies, with little or no interpretation. This distracts from your study by highlighting other people's work and misses the opportunity to show the relevance of your research and present new ideas.

The Fairy Tale, where the discussion is sidetracked into lengthy sections about things that could have been important but were not measured, or where interpretation isn't supported by evidence and crosses the line into speculation.

A really interesting discussion brings together different lines of evidence (the results of your study and other published work) to make sound conclusions and/or propose new ideas and hypotheses to be tested in future.

The conclusions section really is about conclusions, it shouldn't just summarise the results. What should the reader remember? Why should anyone care about this study? Are there any unanswered or new questions? *The worst way to end a paper is to leave the reader thinking: "So what?"*

3) Structure Within Structure

When we read, our brain processes information in a certain way. You can use this to your advantage by placing different types of information in 'strategic' locations to emphasize key messages.

'Topical sentences' guide the reader. The first sentence of each paragraph should make it instantly clear what the paragraph is about. Topical sentences are particularly important in the discussion because they highlight the key results before discussing them in context. You can also emphasise the main point(s) in the last sentence of the paragraph, but a topical sentence will stop the paragraph from becoming a 'whodunnit'.

A really good way to check for topical sentences is to copy the first sentence of each paragraph into a separate document and see whether it gives a rough summary of the content.

Use the 'stress position' to emphasize information. Readers naturally emphasize the material at the end of a sentence; this is referred to as a 'stress position'. By placing information at the end of a sentence, it appears at the moment when the reader will naturally give it the greatest reading emphasis. If you place key information at the end of a sentence, the reader is more likely to see it as being important.

The middle of a paragraph or section is the best place for information you need to report but that isn't particularly exciting; these 'supporting results' can also help plug logic gaps (see below).

4) Improving the Flow of Information



Mind the logic gap! You can become so familiar with your research that you omit information that may seem unnecessary to you, but is important for your readers. Following a line of reasoning through to a conclusion is like climbing a ladder: each piece of information is a rung required to reach the next one. So if there's a rung missing, the line of reasoning is broken and the reader could miss the point entirely. It's a good to get feedback from someone who works outside your immediate research area, because they're more likely to spot logic gaps.

Get straight to the point! You're often constrained by word limits, so it's important to omit unnecessary detail or jargon; if there's a lot of repetition in a section of text, then it probably needs restructuring. You should drop anything that isn't relevant to the study and the interpretation of the results – no matter how tangentially interesting or how much hard work it was. It's better to keep the story simple, and there's certainly no need to 'flesh out' a manuscript that is otherwise short and to the point.

Use figures and tables to your advantage. The best figures show your important results at a glance and shouldn't need lengthy explanation. Tables are useful for summary and 'auxiliary' data: as a general rule, if a text section reads like a list with lots of numbers, the information would probably be better off in a table. Unless your paper is actually about statistical methods, tables of statistics are best placed in an appendix.

Use terms consistently and avoid too many abbreviations. It's tempting to use different terms to make the text less repetitive, but this can confuse readers who are less familiar with the study. Non-standard abbreviations should be logical (eg. N+ for nitrogen addition treatments) and you should only use as many different abbreviations as is absolutely necessary.

5) Learn from the Best

Finally, we all read a lot of papers – some are a pleasure to read and others are confusing. It's worth trying to work out why one paper is so much easier to follow or so much more memorable than others. You may think that something sounds good or important because you like a particular phrase or buzzword, but you only notice it because the author wants you to...

For more detail and examples, download the full [Functional Ecology Guide to Science Writing](#). You can also take a look at the sources we used to compile these tips:

1. Heath C & Heath D (2007) [Made to Stick](#). Random House, 336pp. (available in 25 languages!)
2. Fox CW & Burns CS (2015) [The relationship between manuscript title structure and success: editorial decisions and citation performance for an ecological journal](#). *Ecology and Evolution* 5: 1970–1980.
3. Schimel J (2011) [Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded](#). Oxford University Press, 240pp.
4. Gopen G & Swan S (1990) [The Science of Scientific Writing](#). *American Scientist*, Nov-Dec 1990.
5. Some [useful advice on grammar](#)
6. Is your writing flabby or fit? Try the [writer's diet online tool](#)

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