How to write an effective abstract: Tips and conventions to follow

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As researchers, it is critical for us to master how to summarize our work in a clear, concise, and accurate manner. This applies not only to how we describe our research when speaking with others, but also to how we summarize it for readers in research papers and other documents.

We are all very familiar with reading abstracts (also known as summaries, précis, and synopses) to understand what content a research paper, conference presentation, book chapter, grant proposal, or other formal document will cover. We are also all familiar with the consequences of reading abstracts that do not provide effective summaries—we often just stop reading or, at best, we might save them to return to later (if we remember and if we have time).

But what *exactly* do we mean by writing "effective" abstracts?

In this feature article, we discuss tips for writing effective abstracts. We focus on abstracts for research papers that will be submitted to journals or conferences, but these tips also apply to abstracts and summaries of various formal documents that we need to write throughout our careers.

We will cover tips for graphical abstracts, video abstracts, plain language summaries, and lay summaries in a future article about enhanced publications.

Why write abstracts?

The abstract summarizes a research article or other academic work so that readers can (1) quickly understand what information the work covers and (2) decide whether the document is relevant for them to continue reading.

A scientific abstract typically describes the logical steps in your critical thinking that you explain in detail in the main text (e.g., problem statement, aim/hypothesis, methods, results, and implications). Together with a description of the main methods and results, the content helps readers judge the value and robustness of your work. Based on their judgement, readers will decide whether to read your full article (and possibly cite it), potentially expanding the influence of your research.

You want readers to be able to make a quick yet correct choice about whether to continue reading your paper or not. You are trying to target readers who would benefit from knowing about your research. If your abstract clearly, concisely, and accurately summarizes your research and your target reader decides to read on, then you have written an effective abstract. Equally though, if someone who is not one of your target readers discovers your paper and finds the abstract not relevant to them, then you have also written an effective abstract. You are not wasting their time and they can move on.

Some journals may charge readers a fee to access your full paper, but abstracts are freely available. They may be discovered through searches of specific databases of research, such as PubMed, or through general internet searches. Therefore, to expand the potential reach of your research, you need to master writing effective abstracts.

Before you get started

Be sure to check the author guidelines of your target journal or conference because abstracts can differ in the structure, length, content, and formatting required. Writing an abstract that meets the guidelines from the outset can avoid more time-consuming editing later.

- **Structure:** Decide which structure to use based on the author guidelines. Abstracts typically come in two formats: structured, which uses headings such as background/purpose, methods, results, and conclusions, and unstructured, which does not. If you have not yet decided where to submit your paper, then it can be helpful to write a structured abstract with headings that you see often in research papers in your field. This is because it is often easier to change a structured abstract to an unstructured one than vice versa.

- **Word limit:** Make sure you meet any word limit set. Because abstracts are intended to be concise, journals often ask for 150, 250, or 300 words, although some are as short as 50 words (which can be challenging to write).
- **Abbreviations:** Conventionally, abbreviations can be used for terminology that appears at least twice in the abstract, but different journals have different rules. Remember to write out a term in full together with its abbreviation at first mention in the abstract and then use the abbreviation thereafter. Check whether you can use abbreviations and if so, how you should use them. Some journals list very common abbreviations in the field that you can use without writing out the full term at first mention. Other journals ask authors to minimize the use of abbreviations or avoid them altogether to improve readability. If you cannot meet the abstract's word limit despite repeated edits, try using an abbreviation to help you meet it. However, don't use abbreviations just because you can, because too many can be a burden on readers and stop them reading. High readability is a key point to remember when writing abstracts.
- **Statistics:** Check whether your target journal asks you to include specific statistics in abstracts, such as p-values, confidence intervals, and means and standard deviations. These statistics provide information about the reliability and generalizability of the study's findings to help readers judge the value of the work.
- **Citations:** In general, omit citations from abstracts. If they are essential to your scientific argument, give the citation in full because the abstract is considered a stand-alone piece and can appear in databases and conference programs separately from the reference list.
- **Figures and tables:** Some conference abstracts can be accompanied by a table or figure, but be sure to check the conference guidelines to see if they are allowed and how their content contributes to the overall word count allowed.
- **No guidelines:** If there are no particular guidelines for the abstract, then think about the logical steps in your critical thinking that you explain in the main text (e.g., problem statement, aim/hypothesis, methods, results, and implications). Write your abstract to show your critical thinking and help readers understand the value and robustness of your work. Just be sure to keep it short and keep to your key message, because it is a summary only.

Crafting your abstract

Once you know the formatting requirements, you can begin writing your abstract. The following is a typical structure for abstracts of scientific papers. However, not all disciplines structure abstracts in the same way, and some parts may be longer and contain more details than others depending on the focus of your research. It's important to write the abstract in a way that the target readers will expect.

- **Rationale/problem statement:** Describe the problem your study addresses. For example, you might start with a sentence such as "Plastic pollution is a growing health concern."
- **Aim/purpose/objective/hypothesis:** Clearly state what you set out to achieve, for example, "This study aimed to develop a biodegradable plastic."
- **Methods:** Explain how you carried out your research. This should include information about the materials and methods used, such as "We tested three plant-based polymers."
- **Results:** Provide a summary of the most important findings. For example, you might say "Compared with samples A and B, sample C showed a significantly higher rate of decomposition." You should include important negative results, especially those that refute your hypothesis. Non-significant results are typically omitted from abstracts unless they are necessary to provide balance with the results presented.
- **Conclusion/implications/originality/contributions:** Provide a concluding statement that summarizes the main findings and places them in the larger context of your field. For example, "This study demonstrated the potential for sample C to contribute to the health and safety of communities worldwide." Unlike the conclusion in the main text, the conclusion in the abstract may not need to discuss potential avenues of future research, but this depends on your research field.

Knowing your audience

When writing an abstract, it is important to keep in mind who your target readers will be and to use clear and concise language accordingly. Although most readers of your abstract will likely be researchers in your own field, researchers in related or non-related fields, and even laypersons, might also be interested in your work.

- **Abstracts for general journals or conferences:** If you are submitting to general journals like *Science* and *Nature*, you should explain technical terms for researchers across a broad range of disciplines to understand. Also, opt for words and phrases that are accessible to a wide audience.

- **Abstracts for enhanced publication:** To help extend the impact of your research paper, you might be encouraged by some journals to create other forms of abstracts, such as graphical abstracts, video abstracts, plain language summaries, and lay summaries. We will offer some tips for preparing these in a separate feature article. In the meantime, please let us know if you have questions about these or if you would like support in preparing them.
- **Avoid copying and pasting from the main text:** It is also important that you don't simply copy and paste sentences from the main text to create the abstract, except perhaps for important statements such as the aim and main conclusion. If you copy any sentences from the main text, you should check that they still make logical sense in the very short abstract, where they are surrounded by different sentences from those in the main text.
- **Avoid simply reusing abstracts presented at academic conferences for journal articles:** The requirements for conference abstracts often differ from those for full journal articles and you should decide whether to adapt the abstract specifically for your target journal and update it with any new work that you have done since your presentation. If only your abstract has been published before, this does not constitute prior publication, but it is good publication practice to tell the journal editor in your cover letter that the research was presented in part or in full at a previous conference. Give the details for that conference and a link to the published abstract.

Final points to consider

- **Originality:** Be sure that your contribution is clearly stated, so readers can understand the originality (novelty) and value of your work.
- **Consistency:** Complete a final check of your manuscript to ensure that the details in your abstract match those in the main text of your paper ~~and vice versa~~. It is especially important to check that any numerals match. Discrepancies between the abstract and main text have the potential to damage your credibility with readers and make you seem less authoritative. Also, make sure that the abstract does not contain any information that is not already stated in the main text.
- **Title:** Check that the title is clear and concise. Also check that it contains the most important keywords (unless the journal guidelines state otherwise). Remove unnecessary phrases such as "a study of" and "an analysis of". Make sure that the title accurately reflects the details given in the abstract (and main text).
- **Spelling and grammar check:** Run these routinely because they may find errors that you haven't spotted yourself.

Abstract alternatives

- **Special formats:** Some journals may request a special format. For example, *Nature* requires a summary paragraph, which serves a similar function to an abstract but is shorter and more concise. It follows a structured format but without headings and it must include citations, which distinguishes it from a traditional abstract. It must also include a phrase like "Here we report..." to introduce the main results of the study. The format required for the Nature summary paragraph is described in detail in the journal's instructions.
- **Extended abstracts:** Another special abstract format you might encounter is the extended abstract for conferences. These abstracts usually have longer word limits, ranging from 600 to 1000 words or more. They may also allow for the inclusion of a figure or table.
- **Other types of summaries:** In addition to the typical abstract, some journals may ask you to write one or more brief summaries for use in the journal's table of contents or for posts on Twitter and other social media to promote your article to a wider audience. In these cases, consider how to convey the impact of your study and its findings in a few sentences by focusing on the key points, such as the aim and main findings (contributions) of your research.
- **Enhanced publication abstracts:** As mentioned above, some journals ask for graphical abstracts, video abstracts, plain language summaries, and/or lay summaries. We'll cover these so-called enhanced publications in an upcoming feature article on enhanced publications in general.

Summary

The abstract is an important part of any academic document and plays an essential role in disseminating the findings of your research. Because it summarizes the main points of your research, it can help other researchers as well as more general audiences quickly grasp the findings of your work and decide whether to read the full article. This is important because your findings might assist other researchers with their own endeavors, which in turn could influence your own future work, lead to collaboration, and advance your field of research. For all these reasons and more, it is worth taking the time to write an effective abstract.

At ThinkSCIENCE, we offer a range of services to ensure that your abstract is clear, concise, and accurately reflects the content of your paper. Our team of native editors and translators can revise or translate your abstract as needed. If you do not have an abstract yet, we can create

one for you based on the content of your paper via our abstracting service. In addition, we can review the guidelines of your target journal and provide science/medical writing assistance if your abstract needs to be substantially shortened or restructured to meet their requirements. We can also create plain language summaries and lay summaries based on your existing abstract. Please ask us if you have any questions about writing abstracts or would like support with preparing an abstract for submission.

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