

# Author Pack

## A guide to publishing in scholarly journals

### How to write a scientific article

#### Introduction

The task of writing a research article can be daunting. You may have completed groundbreaking research, but unless the article is correctly written, at best publication will be delayed and at worst will never be published.

The purpose of this article is to try and give the reader an overview of how to write a well-structured research article for publication. It is principally aimed at new authors and is generic enough to encompass all disciplines.

#### Do I need to write a research article?

This might seem like an obvious question, but it is one worth asking yourself. Editors and reviewers are looking for original and innovative research that will add to the field of study. Ensure that you have enough numbers to justify sound statistical conclusions. If the research you are going to report relates to a larger study, perhaps it is better to produce one important research article, rather than a number of average incremental articles.

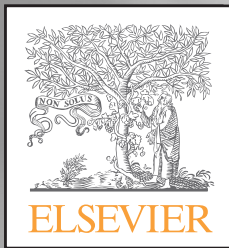
In deciding where to send your article, consider the reader. Does your article address a question of international or mainly local interest? If the latter is true, it may be better placed in a national journal than in an international one.

#### The structure of an article

Scientific writing follows a rigid structure. A format developed over hundreds of years and considered to be the most efficient means for communicating scientific findings to the broader research community. Moreover, the format has the advantage that it allows the article to be read at several levels. Some people will refer to just the title, others may read only the title and abstract, while those who want a deeper understanding will read most, if not all, of the article.

Most disciplines use the format of title, authors, abstract, keywords, introduction, methods, results, discussion, acknowledgments, references and supplementary material. Though the headings are standard for most journals, there is some variation, so it is essential to read the guide for authors of the journal you intend to submit your article to prior to writing.

Section	Purpose
Title	Clearly describes contents
Authors	Ensures recognition for the writer/s
Abstract	Describes succinctly what was done
Keywords	Ensures the article is correctly identified in abstracting and indexing services
<b>Main text</b>	
Introduction	Explains the hypothesis
Methods	Explains how the data were collected
Results	Describes what was discovered
Discussion	Discusses the implications of the findings
Acknowledgments	Ensures those who helped in the research are recognized
References	Ensures previously published work is recognized
Supplementary material	Provides supplementary data for the expert reader



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### Style and language

It is important to refer to the journal's guide for authors' notes on style. Some authors write their article with a specific journal in mind, while others write the article and then adapt it to fit the style of a journal they subsequently choose. Regardless of your preference, some fundamentals remain true throughout the process of writing a scientific article. The object is to report your findings and conclusions clearly, and as concisely as possible; try to avoid embellishment with unnecessary words or phrases. The use of the active voice will shorten sentence length. For example, *carbon dioxide was consumed by the plant...* is in the passive voice. By changing to the active voice it can be shortened to *the plant consumed carbon dioxide...* The following shows how tenses are most often used in science writing:

For known facts and hypotheses, the present tense should be used.

The average life expectancy of a honey bee is 6 weeks.

When you refer to experiments you have conducted, the past tense should be used.

All the honey bees were maintained in an environment with a consistent temperature of 23 °C.

When you describe the results of an experiment, the past tense should be used.

The average life span of bees in our contained environment was 8 weeks.

If English is not your first language it is recommended that you ask a native English speaker to review the article before you submit it for publication. Alternatively you could use a language editing agency. Visit

<http://www.elsevier.com/languagepolishing>

### Authors

The listing of authors should only include those who have made an intellectual contribution to the research, who will publicly defend the data and conclusions, and who have approved the final version. The order in which the names of the authors appear can vary from discipline to discipline. In some fields the corresponding author's name appears first.

### Title

A title should describe the article's content clearly and precisely, and allow the reader to decide whether it would be appropriate to consult the article further. The title is the advertisement for the article – a poorly titled article may never reach its target audience, so be specific. Omit unnecessary words such as 'A study of', 'Investigations of', 'Observations on', etc. Do not use abbreviations and jargon. Indexing and abstracting services depend on the accuracy of the title, extracting keywords from it that are used in cross-referencing.

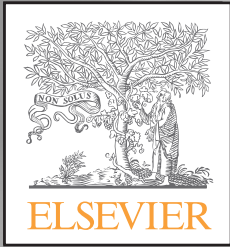
### Keyword list

Some journals request a keyword list; this list provides the inclusion of important words, in addition to those already present in the title. Appropriate choice of keywords will increase the likelihood of your article being located by other researchers. These words are used by the indexing and abstracting services.

Many Elsevier journals will also require authors to choose a subject classification during the online submission process. This classification helps editors to select appropriate reviewers.

### Abstract

The abstract should summarize, in 50 to 300 words, the problem, the method, the results, and the conclusions. The title is the simplest statement about the content of your article. In contrast, the abstract allows you to elaborate on each major section of the article. The abstract should give sufficient detail so that the reader can decide whether or not to read the whole article. Together, the title and the abstract should be able to stand on their own, as they are processed further by abstracting services. For this reason it is advisable not to include references to figures or tables, or citation of the reference in the abstract. Many authors write the abstract last so that it accurately reflects the content of the article.



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### Main text

#### Introduction

The introduction should be brief, ideally one to two paragraphs long. It should clearly state the problem being investigated, the background that explains the problem, and the reasons for conducting the research. You should summarize relevant research to provide context, state how your work differs from published work and importantly what questions you are answering. Explain what findings of others, if any, you are challenging or extending. Briefly describe your experiment, hypothesis(es), research question(s), and general experimental design or method. Lengthy interpretations should be left until the Discussion.

#### Methods

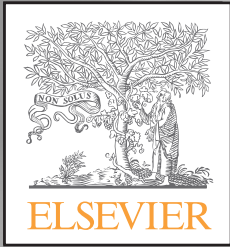
(Materials and Methods or Experimental Methods, etc.) The key purpose of this section is to provide the reader enough details so they can replicate your research. Explain how you studied the problem, identify the procedures you followed, and order these chronologically where possible. If your methods are new, they will need to be explained in detail; otherwise, name the method and cite the previously published work, unless you have modified the method, in which case refer to the original work and include the amendments. Identify the equipment and describe materials used and specify the source if there is variation in quality of materials. Include the frequency of observations, what types of data were recorded. Be precise in describing measurements and include errors of measurement. Name any statistical tests used so that your numerical results can be validated. It is advisable to use the past tense, and avoid using the first person, though this will vary from journal to journal.

#### Results

In this section you objectively present your findings, and explain in words what was found. This is where you show that your new results are contributing to the body of scientific knowledge, so it is important to be clear and lay them out in a logical sequence. Raw data are rarely included in a scientific article; instead the data are analyzed and presented in the form of figures (graphs), tables, and/or descriptions of observations. It is important to clearly identify for the reader any significant trends. The results section should follow a logical sequence based on the table and figures that best presents the findings that answer the question or hypothesis being investigated. Tables and figures are assigned numbers separately, and should be in the sequence that you refer to them in the text. Figures should have a brief description (a legend), providing the reader sufficient information to know how the data were produced. It is important not to interpret your results - this should be done in the Discussion section.

#### Discussion

In this section you describe what your results mean, specifically in the context of what was already known about the subject of the investigation. You should link back to the introduction by way of the question(s) or hypotheses posed. You should indicate how the results relate to expectations and to the literature previously cited, whether they support or contradict previous theories. Most significantly, the discussion should explain how the research has moved the body of scientific knowledge forward. It is important not to extend your conclusions beyond what is directly supported by your results, so avoid undue speculation. It is advisable to suggest practical applications of your results, and outline what would be the next steps in your study.



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### Acknowledgments

This section should be brief and include the names of individuals who have assisted with your study, including, contributors, reviewers, suppliers who may have provided materials free of charge, etc. Authors should also disclose in their article any financial or other substantive conflict of interest that might be construed to influence the results or interpretation of their article.

### References

Whenever you draw upon previously published work, you must acknowledge the source. Any information not from your experiment and not "common knowledge" should be recognized with a citation. How citations are presented varies considerably from discipline to discipline and you should refer to the guide for authors for the specific journal. Quotes that appear in the article, if long, should have their own indented paragraph. Otherwise, if they are in the natural flow of the article they should be within quotation marks. In both cases they should include a reference.

The references section that appears at the end of the article includes all references cited in your article. This section is in contrast to a bibliography, common in books, where works read but not necessarily cited in the text are listed. The manner in which references are presented also varies from journal to journal and you should consult the journal's guide for authors.

### Supplementary material

Typically raw data are not included in a scientific article. However, if you believe the data would be useful, they can be included. Increasingly this is becoming more common as journals move to an online environment and the cost of including supplementary material is lowered. Supplementary material can include raw data tables, video footage, photographs, or complex 3D models. If you have more than one set of materials to include, give each a separate number e.g. Appendix 1, Appendix 2, etc. For full guidelines on supplementary material submission, please visit <http://www.elsevier.com/artwork>

### Further reading

Davis, M. (2005) *Scientific Papers and Presentations*, 2nd Edition, Academic Press

Grossman, M. (2004) *Writing and Presenting Scientific Papers*, 2nd Edition, Nottingham University Press

Clare, J. and Hamilton, H. (2003) *Writing Research Transforming Data into Text*, Churchill Livingstone