A Guide To The Abstract

What is an Abstract?

An abstract is a brief summary which condenses in itself the argument and all the essential information of a paper.

An abstract allows the reader to survey the contents of a document quickly and decide whether to continue reading. It needs to be dense with information but also readable, well-organized, brief, and self-contained.

Abstracts are generally 100-250 words, though a thesis or conference abstract may be up to 400 words. There are no rules for the exact format of an abstract. This Guide provides samples, below, of the commonly used formats: paragraph style, headings style, and mixed style.

A conference paper may have an audience of a few dozen; the audience for a journal paper may be hundreds to thousands. An abstract, though, has a life of its own in electronic databases around the world. Like a title, it is used by abstracting and information services to index and retrieve articles. Thus, for every person who hears or reads a paper, hundreds will read the abstract.

An abstract competes for attention in a global ocean of literature—it's worth spending some quality time on writing it.

What Goes into an Abstract?

For a **research paper**, an abstract typically answers these questions:

Purpose:	What is the nature of your topic/study and why did you do it?
Methods:	What did you do, and how?
Results:	What were your most important findings?
Conclusions:	What can you logically conclude through analysis of your data?
Relevance:	How do your findings relate to the theory or practice of your field, or to future research? Do you have any recommendations?

For a **methods paper**, an abstract typically answers these questions:

Name:	What is the name or category of the method, apparatus, or material? If this is an improved version of an existing method, say so.
Purpose:	What is the major reason for developing this method? State the purpose in the form "for doing X" or "to do X."
Features:	What are its key features, how does it work, or both?
Relevance:	Why is this method needed?
Tests:	How was it tested?
Evaluation:	How well did it work?

Tips on Writing an Abstract

1. Write the abstract last
2. Follow any guidelines you've been given
3. Be accurate
4. Be self-contained
5. Be clear, concise and specific
6. Use signals
7. Emphasize points in proportion to the emphasis they receive in the paper
8. Select key indexing terms

Tip No.1: Write the abstract last

An abstract should be written as the final stage of an otherwise complete paper. Otherwise it will tend to be vague and/or incomplete. You'll hesitate to be too specific, because you don't know yet what your conclusions will be. You'll start writing uninformative sentences like these:

- Preliminary results are presented.
- Policy implications are discussed.

When you are writing for a course deadline or for publication, it's easy to follow this advice. What happens, though, when you want to present a paper at a conference in six or eight months? You are asked to submit an abstract for consideration by the conference committee. Your acceptance depends on the quality of the abstract, which is also going to be published in the conference program. Meanwhile, you're still collecting data for your experiment or interviewing stakeholders for your policy analysis. How do you write a precisely detailed abstract?

Although you may not have the results or conclusions that will ultimately be presented in the paper, you do know your problem, theoretical framework, research problem or questions, and methods. These can form the bulk of the abstract, with your expectations, appropriately qualified, coming next, and a concluding sentence saying to whom your work will be useful, and why. For a sample, see Case C below.

Tip No.2: Follow any guidelines you've been given

There are no rules for the exact format of an abstract. However, if the abstract is being submitted to a conference, journal, grant agency, or is part of a thesis or dissertation, the organization or department may issue guidelines for abstracts.

If so, be sure to follow them precisely. Do not try to "improve" on their format, or think it doesn't matter if you make minor changes (or even major ones!). Differences from an expected format interrupt the reader's ability to concentrate on the text. When your reader has dozens (or hundreds) of abstracts to choose from, this sort of negative attention does not help your case for acceptance.

Tip No.3: Be accurate

Make sure the abstract does the following:

- it uses the same language as the paper, especially key words and concepts; don't try for variety
- it includes only information that actually appears in the paper
- it correctly reflects the purpose and content of your paper
- for a research report, it states if the study extends or replicates previous research
- it reports what it is in the body of the paper but doesn't comment on it or make claims (e.g., *This important new theory…; Our study is essential in characterizing the function of this receptor…*).

Tip No.4: Be self-contained

You can't ask your reader to go elsewhere for an understanding of what you say in your abstract. Therefore,

- define all acronyms and abbreviations (except standard units of measurement)
- spell out names of tests and drugs (use generic names for drugs)
- define unique terms
- do not include references. An exception is made for sources whose theory, method or measure is being used. For example,

✔ **All athletes completed the Movement Imagery Questionnaire (MIQ; Hall, 1983).**

Tip No.5: Be clear, concise and specific

- make each sentence as informative as possible, especially the lead sentence
- include in the abstract only the most important concepts, findings, or implications
- the question and what was done can often be written in one sentence:

To examine the effect of an imagery intervention **on imagery use of elite figure skaters,** ***we required athletes (n=30) to listen*** **to a guided imagery session of a skating element during warm up for six consecutive practices.**

- avoid sentences that contain no real information (*Policy implications are discussed*).
- short sentences are preferable but not required. Avoid clusters of nouns and adjectives—they make your sentence shorter but compromise clarity:

✘ **Our study found significant bipolar disorder interepisodic phase functional morbidity.**

✔ **Our study found significant functional morbidity in the interepisodic phase of bipolar disorder.**

- if you give a *P* value, also give data (e.g., mean ± SD) and the sample size (*n*).
- use active voice and personal pronouns for study objectives:

✘ **First, new clinical criteria were attempted to be defined.**

✔ **We first sought to define new clinical criteria.**

- conserve characters:
  - use digits for numbers unless the number begins a sentence
  - abbreviate whenever possible (e.g., *vs.* for *versus*)
  - give percent change rather than exact data when possible
- don't waste space by repeating the title
- don't waste space with promises—an abstract should deliver:

⊗ **This study will examine pain control at Hospital X.**

✓ **Of the caregivers at Hospital X, 53% actively encouraged epidurals for patients who were "hostile or extremely resistant" to artificial pain control.**

Tip No.6: Emphasize points in proportion to the emphasis they receive in the paper

- If your paper is a proposal, and you have devoted fairly equal sections to background, literature review, and your proposed method, those should be the proportions in the abstract.
- If you are reporting on research, the amount of space devoted to results should reflect their importance and level of complexity.

Tip No.7: Use signals

a) Signal the parts of your abstract with conventional phrases such as these:

Your question:	*We asked whether X inhibits Y…*
	We hypothesized that X inhibits Y …
Your method:	*To answer this question, we used …*
	To test the hypothesis that…, we conducted two trials …
Your results:	*We found that…*
Your analysis:	*Descriptive statistics were used to analyze…*
Your answer:	*We conclude that X inhibits Y…*
	Therefore,…
Your implications:	*We suggest that X may play a role…*
Your recommendations:	*We recommend that X be administered …*

b) Choose verbs that signal the parts of the abstract:

- use present tense for the topic/problem/question
- use past tense to describe your method, results and analysis
- use a cautious present tense for implications *(may mediate, can improve*) and recommendations (*should be administered)*
- use simple future tense in a proposal (*I will measure…; This exploratory study will investigate…)*

c) Use transitional words and phrases that signal logical relationships:

Addition:	*In addition, also, moreover, as well as*
Contrast:	*However, nonetheless, although, but, unlike*
Comparison:	*Similarly, compared with, equally*
Causality:	*Therefore, thus, consequently, as a result, in conclusion*

Tip No.8: Select key indexing terms

- Choose key words and phrases that will make your paper readily and accurately searchable in databases
- Select terms you would use to find your own paper
- Select current terms, such as medical subject headings (MeSH), that name important topics in your paper
- If necessary, include an indexing term even if the term does not appear in the paper.

Sources

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: Author.

Hewitt, J. L. (2001). *Abstract checklist.* Unpublished instructional material prepared for use at Rice University.

Landes, K. K. (1991). A scrutiny of the abstract, II. In W. R. Hansen, *Suggestions to authors of the reports of the United States Geological Survey* (7th ed.). U. S. Government Printing Office.

Silyn-Roberts, H. (2000). *Writing for science and engineering: Papers, presentations and Reports.* Oxford: Butterworth-Heinemann.

Zeiger, M. (2000). *Essentials of writing biomedical research papers* (2nd ed.). New York: McGraw-Hill.

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Samples of Abstracts, with Notes

Case A: What not to do

The purpose of this paper was to [A] critique and contrast [B] four research articles which explored adaptive functioning in the interepisodic phase of bipolar disorder. [C] Having discussed why this is an important topic in Adult Occupational Therapy and having given [D] a brief overview of each article, [E] the writer critiqued each study with respect to the following headings: [F] theoretical background, research design, sampling, measurement, data analysis, conclusions, and contribution to OT knowledge base. [G] In conclusion, it was found that despite methodological limitations, the studies' findings generally supported previous research which suggests that people with bipolar disorder experience significant interepisodic functional morbidity. [H] Implications for Occupational Therapy practice were then briefly discussed.

Notes:

The most serious problem with this abstract is that it lists what is covered in the paper, but does not describe why the topic (adaptive functioning and bipolar disorder) is important, or what this paper found when it reviewed four studies on the topic.

The abstract is an outline, with each item in the outline expanded into a sentence. It tells the reader what the paper is about, but not what it contributes. It is a meta-description – that is, a description of a description, not the description itself.

Here are some other lessons to learn from this inadequate abstract:

[A] There's no need to say "critique and contrast." By definition, when we critique studies, we compare and contrast them.

[B] Researchers report their studies in the form of journal articles, but it is the research studies that we critique, not the articles. The distinction is subtle but important.

[C] Don't promise to tell us why the topic is important, just tell us. Also, it's difficult to imagine a more awkward way to construct this sentence, with its clumsy verbs (*having discussed, having given*).

[D] No need to tell us that the studies will be summarized—this is always a part of the critique process. Better to use this space to tell us why the topic is important.

[E] Say "I" or "we," not "the writer."

[F] This list simply replicates the headings that were specified in the course assignment—it outlines the paper without describing it. It would be better to choose the most significant of the "methodological limitations" mentioned in the next sentence and identify them for the reader.

[G] This is the best sentence in the abstract, because it describes the conclusion reached, instead of providing a meta-description such as "Conclusions are discussed."

[H] It would be better to specify one or two major implications. Also, use present tense (are, not "were") to describe conclusions, implications, or recommendations.

Case B: What not to do

Silenced Partners: Epistemological and Rhetorical Barriers to Interdisciplinary Health Care Practice.

Recent educational initiatives to encourage interdisciplinary practice in the health care system fail to address hierarchical and curricular barriers that have historically divided the disciplines, and by failing to address them serve ultimately to reinforce them. Drawing on the work of Foucault and Liaschenko, this paper argues that the discourse of scientific medicine gives visible representation and voice overwhelmingly to knowledge that can be quantified, rendering other, qualitative knowledges invisible and silenced, and denying them the power that would make them equal players on the health care field. A key feature of this paper is a comparative analysis of the rhetorical moves in two studies of quality-of-life, one quantitative and one qualitative methodology.

Notes:

The author of this Guide is embarrassed to confess that she once submitted this abstract as a proposal for a conference paper. Surprisingly, the conference committee accepted it. The problem here is that the sentences are so long, the abstract becomes unreadable. There are only three sentences and they are crammed with ideas. The middle sentence is a whopping 52 words. Even the "short" sentences are 36 and 25 words. Notice how much easier to follow this revised version is, because each idea gets its own sentence. The new word counts are given in brackets:

Recent educational initiatives to encourage interdisciplinary practice in the health care system fail to address hierarchical and curricular barriers that have historically divided the disciplines.[25] The failure to address interdisciplinary barriers serves ultimately to reinforce them.[11] Drawing on the work of Foucault and Liaschenko, this paper argues that the discourse of scientific medicine gives visible representation and voice overwhelmingly to knowledge that can be quantified.[29] Medical discourse renders other, qualitative knowledges invisible and silenced.[9] Further, it denies them the power that would make them equal players on the health care field.[17] A key feature of this paper is a comparative analysis of the rhetorical moves in two studies of quality-of-life, one quantitative and one qualitative methodology.[25]

Case C: Headings style, study in preliminary stages

Enabling compulsory licensing of ARVs: Case studies from three developing countries.
Kinsley Wilson, Thomas Einarson, Arial Katz, Paul Williams, Peri Ballantyne, and Jillian Cohen. Department of Pharmaceutical Sciences, Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Canada.

A Statement of the Problem: With the adoption of the World Trade Organization's agreement on the B Trade Related Aspects of Intellectual Property (TRIPs), developing countries (DCs) have been utilizing various strategies to procure patented antiretrovirals for the treatment of C HIV/AIDS, such as voluntary licensing, compulsory licensing (CL), and price negotiations. Recently, attention has been drawn to CL, a TRIPs safeguard enabling DCs to grant a license to make and sell a drug without the patent holder's permission. As CL is new in DCs, understanding the process behind this strategy is an important area of interest.

D Research Question: This study will answer the following question: What conditions are present which enable a country to issue a CL?

Theoretical Framework: With the complexity of health and pharmaceutical policy in DCs, two theoretical approaches will be consolidated. From industrial organization, a structure-conduct-performance paradigm modified to include the role of government policy will be integrated with the theory of transaction costs from the school of new institution economics.

Methods: A comparative case study will be performed on three DCs which illustrate varying antiretrovirals procurement measures. Both an industry and policy analysis will be performed using primary and secondary sources. Document analysis of policy and industry related materials will be conducted. Key-informant interviews with policy makers, industry leaders, and stakeholders will be performed using a snowball sampling technique. Analysis of qualititative data will be performed with the assistance of the software NVivo to identify key patterns and themes that will allow cross-case analysis.

Significance of the Study: Few studies exist on CL in DCs, particularly in view of the recent Doha accord; therefore, by determining the enabling factors that lead to or deter

CL, these case studies could be generalizable to other DCs facing similar situations and develop propositions for future research in the field.

[E]*Supported by: Social Sciences and Humanities Research Council of Canada (SSHRC) through a doctoral fellowship as well as a grant from the Ontario Training Centre in Health Services and Policy Research.*

Notes:
[A] The division of the abstract reflects the preliminary status of the study: half the space is given to the problem, question and framework; half is given to proposed methods and significance.
[B] Note that abbreviations are defined the first time they are used. Also, note that abbreviations are pluralized by adding a lowercase "s" (TRIPs, DCs).
[C] HIV/AIDS does not need to be defined because its meaning is general knowledge.
[D] Note the dominant use of future verb tense in the question, framework and methods. The signficance section uses a cautious present tense (*exist, could be*)
[E] Funding sources are acknowledged.

Case D: Paragraph style, from a Social Work thesis

The Experience of Being the Adopted Child/Adolescent of Same-Sex Parents

[A]Lesbians and gay men, whether seeking child custody or adoption, continue to be marginalized by the general public and legal system. [B]Advised by their lawyer, the majority of same-sex couples seeking to become adoptive parents do not openly acknowledge their sexual orientation for fear of rejection of their application. [C]Presently, however, there is a growing trend for lesbians and gay men to openly state their sexual orientation in child custody and adoption procedures. [D]A large body of research demonstrates that same-sex couples are as affective parents as are straight couples. [E]Nonetheless, the judicial system still disapproves of same-sex couples in relation to adoption and custody of children. [F]In order to add to the evidence supporting same-sex couples as adoptive parents, [G]this exploratory study [H]will conduct semi-structured interviews [I]to reveal how adopted children/adolescents feel about being raised by lesbian and gay men couples.

Notes:
[A] Statement of the social problem
[B] Consequence of the problem
[C] Recent social trend
[D] Support from the literature for social change

E Aspect of the problem the study focuses on
F Purpose of the study
G Design of the study
H Method of the study
I Anticipated results of the study

Case E: Mixed style, abstract of a review article

McDonagh MS. Whiting PF. Wilson PM. Sutton AJ. Chestnutt I.Cooper J. Misso K. Bradley M. Treasure E. Kleijnen J. **Systematic review of water fluoridation.**
Source: BMJ. Vol 321(7265) (pp 855-859), 2000.

Objective: To review the safety and efficacy of fluoridation of drinking water. Design: Search of 25 electronic databases and world wide web. Relevant journals hand searched; further information requested from authors. Inclusion criteria were a predefined hierarchy of evidence and objectives. Study validity was assessed with checklists. Two reviewers independently screened sources, extracted data, and assessed validity. Main outcome measures: Decayed, missing, and filled primary/ permanent teeth. Proportion of children without caries. Measure of effect was the difference in change in prevalence of caries from baseline to final examination in fluoridated compared with control areas. For potential adverse effects, all outcomes reported were used. Results: 214 studies were included. The quality of studies was low to moderate. Water fluoridation was associated with an increased proportion of children without caries and a reduction in the number of teeth affected by caries. The range (median) of mean differences in the proportion of children without caries was -5.0% to 64% (14.6%). The range (median) of mean change in decayed, missing, and filled primary/permanent teeth was 0.5 to 4.4 (2.25) teeth. A dose-dependent increase in dental fluorosis was found. At a fluoride level of 1 ppm an estimated 12.5% (95% confidence interval 7.0% to 21.5%) of exposed people would have fluorosis that they would find aesthetically concerning. Conclusions: The evidence of a beneficial reduction in caries should be considered together with the increased prevalence of dental fluorosis. There was no clear evidence of other potential adverse effects.

Case F: Headings style, from a research report

Novel Small Molecule Chondroitin 4-Sulphate Inhibitors as a Treatment for Maternal Malaria

Aleksandar D. Kostic, Walter Szarek and Ian Crandall, Department of Pharmaceutical Sciences, Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, and Department of Chemistry, Queen's University, Kingston, Ontario, Canada.

Background: [A]**In regions of endemic malaria, protective clinical immunity to *Plasmodium falciparum* is acquired in childhood, limiting the occurrence of severe clinical malaria in adults.** [B]**An exception is primigavid and secundigravid women who are susceptible to malaria resulting from the adherence of *P.falciparum*-parasitized erythrocytes (PEs)**[C] **to chondroitin 4-sulphate (C4S) present on placental syncytiotrophoblasts.** [D]**We performed an *in vitro* evaluation of a series of structurally related synthetic small molecules** [E]**to determine if they could interact with C4S.** [F]**Such molecules may have therapeutic use if they could compete with the ligand found in the *P.falciparum* erythrocyte membrane protein 1 (PfEMP1) antigen of PEs and thereby prevent the adhesion of parasitized erythrocytes to the C4S receptor.**

Methods: Competition assays using a two-fold dilution series of the test compounds and a constant concentration of chondroitin sulfate A (CSA) from bovine trachea were undertaken. Unbound CSA was detected using SYBR® green (SG), a fluorophore commonly used to detect DNA, which was observed to bind CSA. The presence of unbound CSA was measured using a fluorimeter, and the resulting data were fit to a computerized empirical model to calculate the IC_{50} of each novel compound.

Results: The compounds varied greatly in their affinities for CSA. A structure-function relationship was observed in the series with some compounds being active at –1uM.

Conclusions: [G]**These compounds could form the basis of therapeutic agents tailored to prevent the sequestration of PEs in pregnant women, thereby reducing the occurrence of maternal malaria in endemic areas.**

Notes:

[A] Necessary background information
[B] Problem
[C] All abbreviations are defined
[D] Study design
[E] Study objective

[F] Rationale
[G] Answers the question, appropriately qualified with “could”

Case G: Paragraph style, from an ethnic study

Mayhall JT. Saunders SR. **Dimensional and discrete dental trait asymmetry relationships.** Source: American Journal of Physical Anthropology. Vol 69(3) (pp 403-411), 1986.

[A]Inuit (Eskimos) from the Foxe Basin region of the Northwest Territories, Canada, were studied [B]to ascertain the amount of dimensional and morphological asymmetry in their dentitions. [C]The results indicate that dimensional asymmetry does not appear to be greater on either the maxillary or mandibular teeth. [D]Both types of asymmetry show partial conformity to the model of tooth fields with an increasing amount of asymmetry as one goes distally in each tooth group. [E]The morphological asymmetry exception, the mandibular incisors, follows Dahlberg's 'Field Concept'. [F]Rank-order correlations between the amount of dimensional asymmetry and morphological asymmetry reveal no detectable patterns. [G]There appear to be no associations between the presence or absence of morphological asymmetry and the size of the tooth. [H]This lack of association might be explained by differences in developmental timing of tooth dimensions and morphological traits; however, such a hypothesis requires experimental testing. [I]In this population and those for which published results are available, it is practically impossible to overcome the 'noise' level and test recent hypotheses regarding random dental asymmetry

Notes:

Well-designed research does not always come to firm conclusions. Research that raises questions and problems also makes an important contribution. The language of this abstract is appropriately tentative.

[A] Abstract begins with the population studied
[B] Study objective
[C] Study conclusion. Note the qualified language: *indicate, does not appear*
[D] Result 1
[E] Result 2
[F] Result 3
[G] Discussion of results. Again, note the qualified language: *appear to be no*
[H] Explanation. Note points of qualification: *might be explained, however*
[I] Final sentence identifies a major limitation of ethnic studies on this population: *practically impossible to overcome*