
Scientific writing:
Style;
Structure;
Format.

Style Considerations

Be clear and concise:

Write briefly and to the point. Say what you mean clearly and avoid embellishment with unnecessary words or phrases. Brevity is very important. Use of the active voice alone shortens sentence length considerably.

Style Considerations

Precise word use is critical:

Scientific terminology carries specific meaning - learn to use it appropriately and use it consistently. A critical function of technical terminology is to say a lot with a few words, i.e., economy. This applies as well to appropriate acronyms (e.g., PCR) and abbreviations. Direct your paper toward the average reader in your intended audience. If writing for a highly technical journal, you will necessarily use the technical jargon. If writing for a general science audience you would limit the jargon.

Some things to avoid:

- You do not have to try to impress people by using words most people have never heard of.
- Do not use colloquial speech, slang, or "childish" words or phrases.
- Do not use contractions: for example, "don't" must be "do not" and "isn't" must be "is not" etc.

Style Considerations

Abbreviations:

Do not use abbreviations in the text except for units of measure. Always abbreviate these when using them with data (2 mm; 10 min.). Except for temperature units (F,C, K) never abbreviate units of measure when using them in a non-data context (e.g., "we measured length in millimeters"; "time was recorded in minutes"; "temperature was measured in F (or C)"; "100 years have passed since Mendel did...").

Style Considerations

Use Past Tense:

Research papers reflect work that has been completed, therefore use the past tense throughout your paper (including the Introduction) when referring to the actual work that you did, including statements about your expectations or hypotheses. Use the past tense, as well, when referring to the work of others that you may cite.

Style Considerations

References:

References to the research findings of others are an integral component of any research paper. The usual practice is to summarize the finding or other information in your own words and then cite the source. Any ideas or other information that are not your own must be substantiated by a reference that is cited in the text. As a rule, in research papers, direct quotation and footnoting are not practiced - simply restate the author's ideas or findings in your own words and provide a citation.

Guide to Footnotes & Example in APA

Example of text in a research paper[1]— the footnotes are located at the bottom of the page below the line.[2]

Superscript numbers in the research paper match the footnote numbers

Footnotes placed below line at the bottom of the page

[1] Firstname Lastname, Title of Book (Place of publication: Publisher, Year of publication), page number.

[2] Antony Grafton, The Footnote: A Curious History (Cambridge, MA: Harvard University Press, 1999), 221.

Footnote tips:

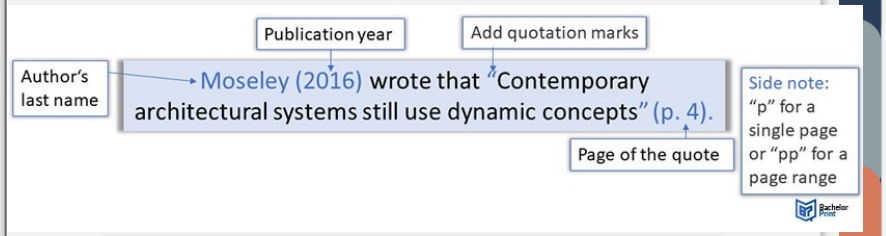
- Double-space
- Indent first line of footnote
- Superscript number corresponds to footnote number in body copy
- Add a space between the superscript number and note

Example:

Journalists examined –over several years[1]— the ancient tools used in photojournalism.[2]

[1] See Burquest (2010), especially chapter 5, for more information on this journalist's theory.

[2] From the chapter "Theories of Photojournalism" W. Jones and R. Smith, 2010, Photojournalism, 21, p. 122. Copyright 2007 by Copyright Holder. Reprinted with permission.



Choo and Nash state that this new piece of legislation 'led to the creation by the courts of a *prima facie* rule of exclusion of evidence obtained in breach of the Act'.[1] A recent case in the Supreme Court relates to this point of law.[2] It has been noted that after the new Act came into force, the courts adopted a *prima facie* rule that evidence obtained in breach of the legislation was to be excluded, except in certain restricted circumstances.[3] Hart asserts this is a significant change.[4]

[1] Andrew L-T Choo and Susan Nash, 'Improperly Obtained Evidence in the Commonwealth: Lessons for England and Wales?' (2007) 11 E&P 75.

[2] Lucasfilm Ltd v Ainsworth [2011] UKSC 39, [2012] 1 AC 208.

[3] Choo and Nash (n 1) 100.

[4] Chris Hart, Doing a Literature Review (Sage 1998).

Format

Introduction

- Define the scope of the study
- Define the problem
- State the objective
- Identify gaps in the knowledge about the subject
- State the purpose of the experiment
- Summarise the background to the research (sufficiently but not too widely!)
- State the question that you asked
- Provide a context for your investigation
- Briefly explain the theory involved
- Present an hypothesis or an expectation.

1. **Demonstration of Worth:** The Introduction must convince readers of the study's value and relevance, framing the research within the context of existing knowledge and current questions.
2. **Beyond Literature Review:** While introducing relevant literature is essential, a good Introduction should logically lead to the hypothesis, explaining the purpose, expectations, and rationale of the study.
3. **Focus on Hypothesis:** The core of the Introduction is a well-justified hypothesis, providing a concise summary of the expected outcomes and the basis for the research.
4. **Logical Justification:** The Introduction should lay out a logical argument supporting the hypothesis, making the paper's purpose clear and setting the stage for the ensuing sections.
5. **Engagement and Orientation:** Through a compelling narrative, the Introduction should transition the reader from a passive recipient to an active seeker of the paper's findings.
6. **Efficiency and Precision:** Despite the temptation to broadly cover background material, the Introduction should be concise and focused directly on supporting the hypothesis.
7. **Addressing Non-Experimental Research:** Even in studies not designed around a traditional hypothesis-testing model, a logical expectation or predictive statement provides focus and direction.
8. **Clarity over Length:** An effective Introduction is not measured by its length but by its ability to clearly present the research's objective, context, and expected contributions to knowledge.
9. **Contextual Relevance:** Any background information included should directly support the hypothesis or the rationale for the study, avoiding unnecessary broad statements that do not enhance understanding.
10. **Scientific Discipline:** The Introduction should reflect disciplined, logical thinking, steering clear of presenting the research as an unfocused exploration.

Methods and materials

- Context and setting of the study
- Specify the study design
- Population (patients, etc. if applicable)
- Sampling strategy
- Intervention (if applicable)
- Identify the main study variables
- Data collection instruments and procedures
- Outline analysis methods

1. **Objective Clarity:** The Materials and Methods section should describe the experimental process clearly enough that a knowledgeable colleague could replicate the experiment.
2. **Balanced Detail:** While detailing procedures, the writer must discern what essential information to include and what to omit to avoid overcomplicating the section.
3. **Seek External Review:** It's beneficial to have someone not involved in the study review this section to ensure that the experiment could be repeated based on the provided information.
4. **Understandable Subheadings:** Use subheadings that summarize the main features of the experiment to guide readers who may skim through this section.
5. **Sequence of Information:** Present information in a logical sequence, starting with a description of the experimental design, followed by materials and methods in an order that makes sense.
6. **Proper Referencing:** When established techniques are used, reference the original descriptions rather than recent papers that also utilized them, unless the technique has been modified.
7. **Include Necessary Details:** Mention details relevant to replicating the experimental conditions, like location and climate for field experiments, but omit irrelevant details.
8. **Validation of New Techniques:** If new methods are introduced, their validation may be included in the Results section if the paper focuses on the methodology.
9. **Statistical Methods:** Generally, common statistical methods don't need extensive explanation; a simple mention or reference is sufficient unless the method is novel or complex.

Results

- Report on data collection and/or recruitment
- Participants (demographic, clinical condition, etc.)
- Present key findings with respect to the central research question
- Secondary findings (secondary outcomes, subgroup analyses, etc.)

1. **Exclusive Results Placement:** The Results section should exclusively contain the results, with no discussion or summary elements mixed in.
2. **Clear Presentation:** Results should be presented clearly, allowing the reader to form their own judgements before reaching the Discussion section where the author's interpretation is provided.
3. **Results-Discussion Separation:** Keeping the Results and Discussion sections separate is advised to maintain objectivity and to avoid confusion.
4. **Order of Presentation:** Results should be presented logically and, preferably, in a sequence that reflects their relevance to the hypothesis tested.
5. **Relevance and Importance:** The author should decide which results are most important to present based on their relevance to the hypothesis.
6. **Data Prioritization:** Results should be categorized based on their significance to the hypothesis, with less important or irrelevant data being omitted.
7. **Use of Tables and Figures:** Tables and figures should be self-explanatory and should not duplicate data. They are used for precise presentation of results, while the text should focus on clarity.
8. **Statistical Clarity:** Statistical significance should be indicated clearly. Terms like "significant" should be used with care to refer specifically to statistical significance.
9. **Visual Data Presentation:** Good tables highlight patterns and critical data points, and should include all necessary explanatory notes.
10. **Avoiding Data Overload:** The Results section should avoid overwhelming the reader with too much detail that could dilute the focus on important findings.

Discusssion

- Main findings of the study
- Discuss the main results with reference to previous research
- Policy and practice implications of the results
- Strengths and limitations of the study

1. **Focus on Your Results:** The Discussion should primarily explore your findings, not a broad review of others' work. Any references to literature should directly relate to your results.
2. **Connection to the Introduction:** Start the Discussion by relating your results to the hypothesis or questions raised in the Introduction.
3. **Conclusive Arguments:** Every argument within the Discussion should lead to a clear conclusion that contributes to the overarching narrative of the paper.
4. **Structure and Clarity:** Discussions should be logically organized with topic sentences that signal what follows and conclusions that underscore the main message.
5. **Speculation with Care:** Speculation is acceptable when it is well-founded and could lead to testable hypotheses, but it must be based on the results presented.
6. **Prioritize Key Arguments:** The most critical findings should be discussed first to engage the reader and ensure that they grasp the central messages early on.
7. **Brevity and Relevance:** Avoid extraneous information and ensure that all discussion points are directly relevant to your study's results.
8. **Visual Presentation:** Similar to newspapers, the visual layout of a Discussion can imply the importance of arguments, with critical points receiving more prominence.
9. **Consistency with Results:** Ensure that the Results section and the Discussion are aligned, with the latter reinforcing and interpreting the former without redundancy.
10. **Proper Citation:** References should be accurate and relevant, providing support for the discussion points without overshadowing your own findings.
11. **Editing for Coherence:** Revisit the Introduction and Results sections after drafting the Discussion to ensure coherence across the entire paper and to adjust any inconsistencies.

VII. Conclusions: [occasionally optional or not required]. Do not reiterate the data or discussion. Can state hunches, inferences or speculations. Offer perspectives for future work.

VIII. Acknowledgements: Names people who contributed to the work, but did not contribute sufficiently to earn authorship. You must have permission from any individuals mentioned in the acknowledgements sections.

IX. References: Complete citations for any articles or other materials referenced in the text of the article.

- **VII. Conclusions:** [occasionally optional or not required]. Do not reiterate the data or discussion. Can state hunches, inferences or speculations. Offer perspectives for future work.
- **VIII. Acknowledgements:** Names people who contributed to the work, but did not contribute sufficiently to earn authorship. You must have permission from any individuals mentioned in the acknowledgements sections.
- **IX. References:** Complete citations for any articles or other materials referenced in the text of the article.

Thank you for your attention!