Scientific papers: Writing the discussion section

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Main purpose of the discussion

To answer the research question expressed (implicitly or explicitly) in the introduction, and **to summarize** the findings from your study that support the answer.

Structuring the discussion

The format of the discussion is much looser than the other parts of the paper, which can make writing it a challenge. A **good place to start** is with a one-paragraph summary of your major findings: State the answer to the question (posed in the introduction) and then follow with "a concise, broad-brush version of the supporting evidence" (Wells, 2004).

You can then expand from there by **answering the following questions:**

- What specific evidence from your study supports or validates your answer to the question posed in the introduction? (Start with the most solid/important evidence and follow with evidence of lesser and lesser importance)
- How do your results fit into the larger context of what is already known about your subject? Which published studies support or contradict your findings? How do you explain unexpected or contradictory results?
- What are the advantages and limitations of your study? Could these limitations have biased your results in any way?
- What are the key theoretical and/or practical implications of your study? How are your findings an advance over what others have shown?
- What future directions does the research suggest?

Note: Keep in mind the inverted pyramid style. That is, it's generally a good idea to lead with the most important points you want to make and follow with points of lesser and lesser importance.

Discussion structure in a nutshell*

*Whereas the Introduction goes from **Background to Question**, the Discussion goes from **Answer to Implications**. In the discussion, don't repeat background information or justification already mentioned in the Introduction, or keep it to a minimum.*

The statement of the Answer should use the same keywords as the statement of the Question, and the Implications should echo the Introduction's Background/Big picture themes. The implications can also point to new research directions.

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Common pitfalls to avoid

Overstating the significance of the work. Many articles on scientific writing will caution you against this, and with good reason. However, an even bigger pitfall may be the one directly below.

Understating the significance of the work. While it's true you should take care not to oversell things, it's also true that young scientists tend to downplay the importance of their research. So, do think about the larger theoretical and practical implications of what you've found and then don't be afraid to say them. As Wells (2004) writes, "there probably was a bigger idea behind your work than the possibility of protein X and Y binding to one other, so make sure you convey that reason and that excitement." In other words, readers should not come away from your discussion thinking, "so what?"

Being vague. Related to the point above, if you make general statements such as, "We believe our model can help experimental biologists understand their own systems better," or "Our findings are valuable for the future design of bacteria that can do X and Y" be sure to explain what you mean. What *specific* insights will your model offer biologists? What *exactly* will your models contribute to the future design of microorganisms? If you're hazy about this, reviewers are likely to ask you to provide some explanation and evidence.

Failing to address the question or problem posed in the introduction. "The Introduction and Discussion should function as a pair," say Day and Gastel (2006). "Be sure the Discussion answers what the Introduction asked."

References

- Cetin, SA and DJ Hackam (2005) An approach to writing a scientific manuscript. *J. Surgical Research* 128: 165-167.
- Day, RA and B Gastel (2006) *How to Write and Publish a Scientific Paper*. Greenwood Press, Westport, CT.
- Ness, R. (2007) Writing science: The story's the thing. Science Careers: http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2007_04_06/caredit.a0700047
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