

Writing Research Articles

How to Write the Discussion Section

Function of the Discussion:

1. **Answer the question(s) asked at the end of the Introduction.**
2. Validate the answer by summarizing the supporting evidence.
3. Compare the results to the results of others in published literature.
4. Point out the advantages or limitations of the current study.
5. Recommend a course of action/speculate about the implications of the results.

Whereas the Introduction goes from Background to Question (**B→Q**), the Discussion goes from Answer to Implications (**A→I**).

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

The shape of the Discussion is less stereotyped than the shape of the Introduction (funnel shape), but some of the same organizing principles still apply.

A few questions to ask yourself before you start writing your Discussion:

1. **What is your article about?** Go back to the question you asked at the end of your Introduction.
2. What are your **main results**? What are less important results?
3. What are the **published studies that confirm or contradict your results**?
4. Do you have **good arguments to explain unexpected or contradictory results**?
5. What are the **limitations** of your study? What are its **advantages**?
6. What do **YOU** think is the **most interesting implication(s) of your results**?

Making an outline:

1. Make an **outline** starting with your **Answer** and ending with the **Implication/Recommendation**
2. Rank your findings: most important/least important, most relevant (to the question)/least relevant, most solid/least solid
3. Rank/organize your arguments/evidence: literature that supports/contradicts your findings, better/worse/different experimental approaches
4. Summarize the main points you want to make as short statements (one sentence). These will become subheadings, or topic/concluding sentences of your paragraphs.

Writing the Discussion:

1. First **write the Answer** to the main question. If you have several answers, write them in sequence, and **discuss them in the same sequence**. Rank them in a fashion that makes sense scientifically, for instance most interesting to least interesting.
2. Remember that the Discussion format is **A→I**. Do not repeat background information or justification already mentioned in the Introduction, or keep it to a minimum.
3. Then write **the supportive evidence** for each of your answers. Summarize your observations (don't repeat your Results or Methods section). **Do not omit observations that DO NOT SUPPORT your hypothesis!**
4. Compare your observations to other studies.
5. Explain (or speculate about) **discrepancies within your work**, or in the published literature.
6. Discuss the implications of your finding. Make recommendations for the application of your findings.



7. When you mention other published work, indicate clearly how this work relates to yours. One way is to use topic sentences such as:
- “Our observations resolve several contradictions in the published literature. For instance, Smith and Brown (1998) found that ...”

Another way is to describe other work first and mention your finding at the conclusion of the paragraph. In this case, the topic sentence might be

- “Former studies on this topic have led to contradictory hypotheses. Smith and Brown (1998) suggested that... Jones and Suzuki (2001) proposed instead that...”

The concluding sentence will be:

- “Our study resolves this controversy by showing that ...”

A few words on paragraph organization:

1. A topic sentence is like a flag or a title that announces to the reader what the paragraph is about. All sentences in a paragraph should be related to the topic announced by the topic sentence. In some cases they will be illustrations of the principle summarized in the topic sentence. In other cases, they will be steps in a reasoning that began with the topic sentence. Sometimes the paragraph does not start with a topic sentence: the topic sentence ends the paragraph, often as a summary or a conclusion.
2. Even when they start with a topic sentence, some paragraphs might also need a “wrap up” statement, especially if they are long or contain complex information. The wrap up sentence gives the reader the take-home message of the paragraph. It can also serve as a nice springboard for the next paragraph.
“While these studies do not provide an exact mechanism for protein X’s function, they all suggest that X is indispensable for cell proliferation in mammalian cells (*wrap-up sentence*).
By contrast, our study shows that X is not required for the proliferation of skin cells in the mouse embryo (*topic sentence*). The evidence for this conclusion is that ”
3. Whenever possible, link paragraphs with transition words or transition sentences.
4. Some principles for organizing information:
 - c. Known to unknown, familiar to surprising: good principle to set the stage for a question you wish to address. That format is particularly useful in the Introduction, which goes from Background to Question (B->Q).
 - d. The Discussion, which goes from Answer to Implications (A->I), frequently uses the opposite format: **Unknown to known, or Controversy to Resolution.**
 - e. **Most important to least important, pros and cons:** useful to organize arguments within a paragraph or to organize a succession of paragraphs.