

# Guide to Writing the Results and Discussion Sections of a Scientific Article

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## CATEGORIES

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A good research paper has both qualities of *good studies* and *good writing* ([Bordage, 2001](#)). In addition, a research paper must be clear, short, and effective when presenting the information in an organized structure with a logical manner ([Sandercock, 2013](#)).



The results section is a section containing a description about the main findings of a research, whereas the discussion section interprets the results for readers and provides the significance of the findings. This section should not repeat the results section.

Some of the common reasons the results and discussion sections might cause reviewers to reject a manuscript are (Bordage, 2001)

- confusing tables or figures
- inconsistent or inaccurate data
- potential variables that are not reported
- over interpretation/under interpretation of the results

To avoid these problems, you can use an organized structure, such as outlines, points or subheadings, to write the results and discussion section. For the results, figures and tables must be clear so the readers understand the message (Hofmann, 2013).

In the discussion section, outline your thoughts to defend your research and to emphasize the significance of your research. Use good writing, clear argumentations, and logical explanations in this section to support your conclusion (Hofmann, 2013).

In this article, we provide tips and directions to construct a succinct and deeply informative results and discussion section.

## How to Organize the Results Section

Since your results follow your method section, you'll provide information about *what you found* from the methods you used, such as your research data. You may also include information about the measurement of your data, variables, treatments, and statistical analyses.

materials when submitting to the journal.

The next step is to prioritize your research data based on importance – focusing heavily on the information that directly relates to your research questions using the subheadings. The organization of the subheadings (subheading organization information below) for the results section usually mirrors the methods section. It should follow a logical and chronological order.

## Subheading organization

Subheadings within your results section are primarily going to detail major findings within each important experiment. And the first paragraph of your results section should be dedicated to your major findings (findings that answer your overall research question and lead to your conclusion) (Hofmann, 2013).

In the book “Writing in the Biological Sciences,” author Angelika Hofmann recommends you to structure your results subsection paragraphs as follows:

- Experimental purpose
- Approach
- Result
- Interpretation

Each subheading may contain a combination of ([Bahadoran, 2019](#); Hofmann, 2013, pg. 62):

- texts: to explain about the research data
- figures: to display the research data and to show trends or relationships, for examples using graphs or gel pictures.
- tables: to represent a large data and exact value

Decide on the best way to present your data — in the form of text, figures or tables (Hofmann, 2013).

## Data or Results?

Sometimes we get confused about how to differentiate between *data* and *results*. Data are information that you collected from your research (Bahadoran, 2019).



Whereas, results are the texts presenting the meaning of your research data (Bahadoran, 2019).



One mistake that some authors often make is to use text to direct the reader to find a specific table or figure without further explanation. This can confuse the readers when they interpret the meaning of the data completely different from what the authors had in mind. So, you should briefly explain your results to make your information clear for the readers.

## Common Elements in Figures and Tables

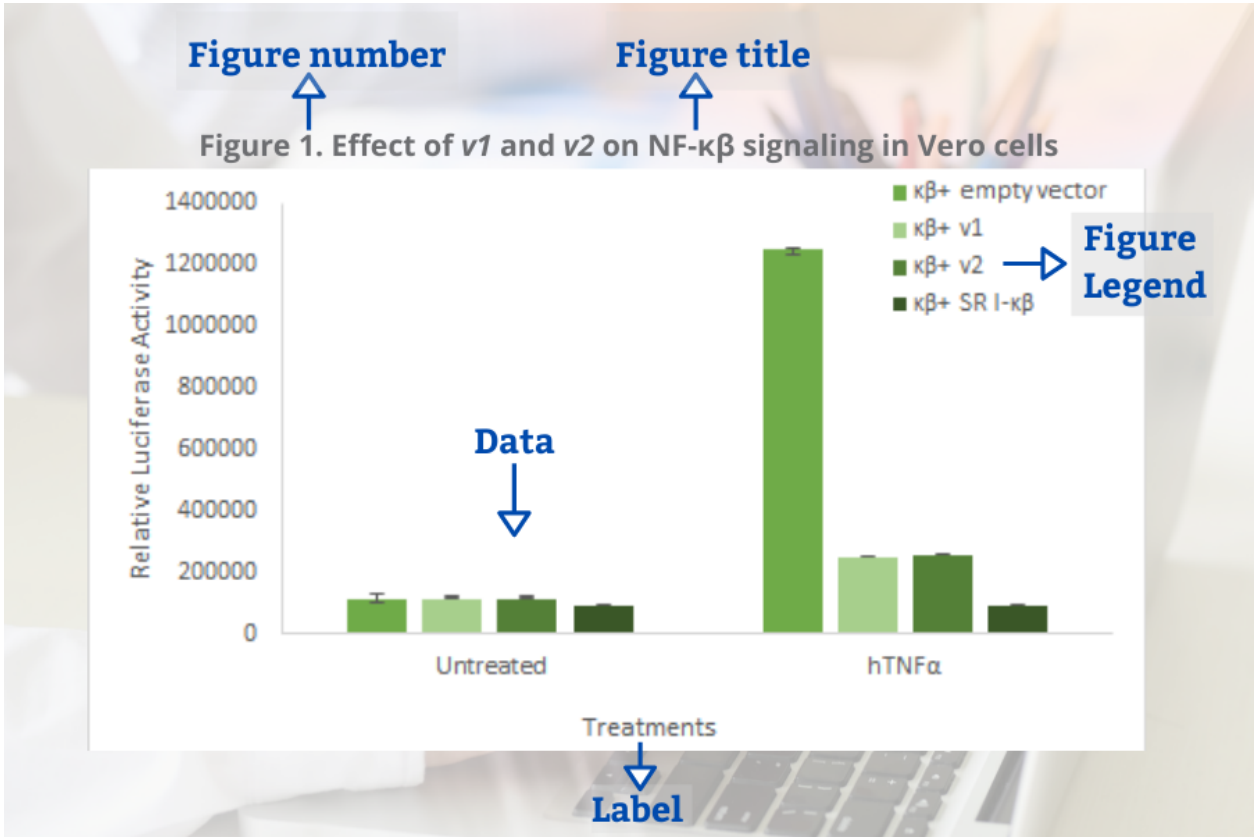
Whereas, tables are ideal to present large quantities of data and exact values.

Several elements are needed to create your figures and tables. These elements are important to sort your data based on groups (or treatments). It will be easier for the readers to see the similarities and differences among the groups.

When presenting your research data in the form of figures and tables, organize your data based on the steps of the research leading you into a conclusion.

**Common elements of the figures (Bahadoran, 2019):**

- Figure number
- Figure title
- Figure legend (for example a brief title, experimental/statistical information, or definition of symbols).
- Data
- Labels



**Tables in the result section may contain several elements (Bahadoran, 2019):**

- Table number
- Table title
- Row headings (for example groups)
- Column headings
- Data
- Row subheadings (for example categories or groups)
- Column subheadings (for example categories or variables)
- Footnotes (for example statistical analyses)

Table 1. Level of  $\alpha$  gene expression after immune challenges.

Column Heading

Row Heading

Row Subheading

Column Subheading

Data

Hours Post Treatment	Mean Value				
Types of treatments	0 hours	6 hours	12 hours	18 hours	24 hours
LPS	0.7	3.2	12	8	3
Laminarin	0.6	1.5	3	2	1
Parasite	0.7	0.7	0.8	0.6	0.65
PBS	0.5	0.5	0.3	0.2	0.4
No treatment	0.3	0.3	0.4	0.3	0.4

### Tips to Write the Result Section

- Direct the reader to the research data and explain the meaning of the data.
- Avoid using a repetitive sentence structure to explain a new set of data.
- Write and highlight your important findings in your results.
- Use the same order as the subheadings of the methods section.
- Match the results with the research questions from the introduction. Your results should answer your research questions.
- Make sure there is no mismatch of the table number or the figure number in text and in figure/tables.
- Only present data that support the significance of your study. You can provide additional data in tables and figures as supplementary material.

### How to Organize the Discussion Section

It's not enough to use figures and tables in your result section to convince your readers about the importance of your findings. You need to support your result section by providing more explanation in the discussion section about what you found.

The discussion section is probably the most creative section of your paper in terms of telling a story about your research ([Ghasemi, 2019](#); [Moore, 2016](#)). In this section, based on your findings, you defend the answers to your research questions and create arguments to support your conclusions.

Below is a list of questions to guide you when organizing the structure of your discussion section ([Viera et al., 2018](#)):

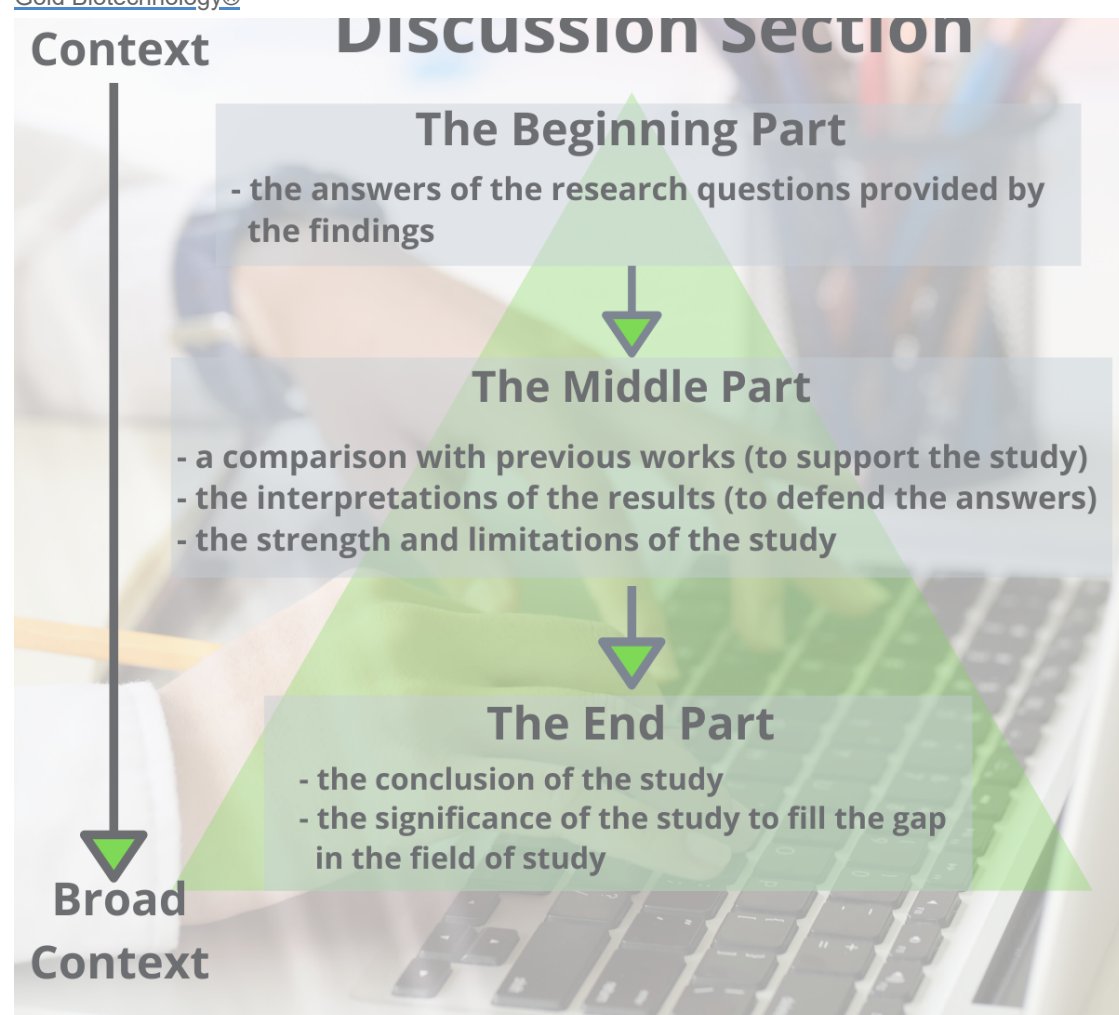
- What experiments did you conduct and what were the results?
- What do the results mean?
- What were the important results from your study?
- How did the results answer your research questions?
- Did your results support your hypothesis or reject your hypothesis?
- What are the variables or factors that might affect your results?
- What were the strengths and limitations of your study?
- What other published works support your findings?
- What other published works contradict your findings?
- What possible factors might cause your findings different from other findings?
- What is the significance of your research?
- What are new research questions to explore based on your findings?

### Organizing the Discussion Section

The structure of the discussion section may be different from one paper to another, but it commonly has a beginning, middle-, and end-to the section.

Present the contents of your section from narrow context (your study) to broader context (your field of study) (Ghasemi, 2019).





One way to organize the structure of the discussion section is by dividing it into three parts (Ghasemi, 2019):

- **The beginning part:** The first sentence of the first paragraph should state the importance and the new findings of your research. The first paragraph may also include answers to your research questions mentioned in your introduction section.
- **The middle part:** The middle should contain the interpretations of the results to defend your answers, the strength of the study, the limitations of the study, and an update literature review that validates your findings.
- **The end part:** The end concludes the study and the significance of your research.

Another possible way to organize the discussion section is by using this structure (Viera *et al.*, 2018; [Docherty, 1999](#)):

- Discussion of important findings
- Comparison of your results with other published works
- Strength and limitations of the study
- Conclusion and possible implications of your study (including the significance of your study)
- Future research questions based on your findings

Finally, a last option is structuring your discussion this way (Hofmann, 2013, pg. 104):

- **First Paragraph:** Provide an interpretation based on your key findings. Then support your interpretation with evidence.
- **Middle Paragraphs:** The middle paragraphs should include the following
  - Secondary results
  - Limitations
  - Unexpected findings
  - Comparisons to previous publications
- **Last Paragraph:** The last paragraph should provide a summarization (conclusion) along with detailing the significance, implications and potential next steps.

Remember, at the heart of the discussion section is presenting an interpretation of your major findings.

### Tips to Write the Discussion Section

- Highlight the significance of your findings
- Mention how the study will fill the gap of knowledge.
- Indicate the implication of your research.
- Avoid generalizing, misinterpreting your results, drawing a conclusion with no supportive findings from your results.



## References

- Aggarwal, R., & Sahni, P. (2018). The Results Section. In *Reporting and Publishing Research in the Biomedical Sciences* (pp. 21-38): Springer.
- Bahadoran, Z., Mirmiran, P., Zadeh-Vakili, A., Hosseinpanah, F., & Ghasemi, A. (2019). The principles of biomedical scientific writing: Results. *International journal of endocrinology and metabolism*, 17(2).
- Bordage, G. (2001). Reasons reviewers reject and accept manuscripts: the strengths and weaknesses in medical education reports. *Academic medicine*, 76(9), 889-896.
- Cals, J. W., & Kotz, D. (2013). Effective writing and publishing scientific papers, part VI: discussion. *Journal of clinical epidemiology*, 66(10), 1064.
- Docherty, M., & Smith, R. (1999). The case for structuring the discussion of scientific papers: Much the same as that for structuring abstracts. In: *British Medical Journal Publishing Group*.
- Faber, J. (2017). Writing scientific manuscripts: most common mistakes. *Dental press journal of orthodontics*, 22(5), 113-117.
- Fletcher, R. H., & Fletcher, S. W. (2018). The discussion section. In *Reporting and Publishing Research in the Biomedical Sciences* (pp. 39-48): Springer.
- Ghasemi, A., Bahadoran, Z., Mirmiran, P., Hosseinpanah, F., Shiva, N., & Zadeh-Vakili, A. (2019). The Principles of Biomedical Scientific Writing: Discussion. *International journal of endocrinology and metabolism*, 17(3).
- Hofmann, A. H. (2013). *Writing in the biological sciences: a comprehensive resource for scientific communication*. New York: Oxford University Press.
- Kotz, D., & Cals, J. W. (2013). Effective writing and publishing scientific papers, part V: results. *Journal of clinical epidemiology*, 66(9), 945.
- Mack, C. (2014). How to Write a Good Scientific Paper: Structure and Organization. *Journal of Micro/ Nanolithography, MEMS, and MOEMS*, 13. doi:10.1117/1.JMM.13.4.040101
- Moore, A. (2016). What's in a Discussion section? Exploiting 2-dimensionality in the online world.... *Bioessays*, 38(12), 1185-1185.
- Peat, J., Elliott, E., Baur, L., & Keena, V. (2013). *Scientific writing: easy when you know how*: John Wiley & Sons.
- Sandercock, P. M. L. (2012). How to write and publish a scientific article. *Canadian Society of Forensic Science Journal*, 45(1), 1-5.
- Teo, E. K. (2016). Effective Medical Writing: The Write Way to Get Published. *Singapore Medical Journal*, 57(9), 523-523. doi:10.11622/smedj.2016156
- Van Way III, C. W. (2007). Writing a scientific paper. *Nutrition in Clinical Practice*, 22(6), 636-640.
- Vieira, R. F., Lima, R. C. d., & Mizubuti, E. S. G. (2019). How to write the discussion section of a scientific article. *Acta Scientiarum. Agronomy*, 41.

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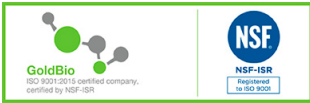
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