

## WHAT ARE THE DIFFERENT SECTIONS OF A RESEARCH PAPER?

Research papers are written using a specific structure, with each section highlighting an important aspect of the research.

### 1. Abstract:

Provides a snapshot of the paper and summarizes the key points.

*What is it all about?*

### 2. Introduction:

Summarizes important background information and states the problem the paper is trying to solve.

*What is the big question they are trying to answer?*


When making any claims, authors will often include **citations**. This means that they based any statements or claims from other previous research in the field. If you are unsure about any claims, you can look up the citation to check the original study.

### 3. Methods:

Explains the study design and details for how the study was conducted.

*Sort of like a recipe! How were the experiments set up? How was data collected, used and analyzed?*

Methods should mention **sample sizes**, which are the number of participants, animals, or observations in a study.

 Small sample sizes can be a red flag. For the study to be considered significant according to statistics, the larger the sample size, the better. This ensures the results we are seeing are not a coincidence, up to chance, or influenced by other factors.

## 4• Results:

A step-by-step description of the findings, without bias or interpretation.

*For example, to prove x, we did y, and found z.*

## 5• Discussion:

A summary of the results with an explanation of whether the research question was answered and what that means within the current body of research.

*Are the findings unusual or do they support other research in the field?*

*What are the implications of the findings?*

**Significant vs non-significant:** when authors state that the results of an experiment were significant, this is not an arbitrary statement. It means the authors performed statistical tests of significance, to rule out coincidences or random chances to get the same results. Normally, they will state a “P-value” for these results. Usually, the results are significant if the P-value is less (<) than 0.05.



It's a red flag when authors omit the P-value, don't mention that statistics tests were performed at all, or say that results were significant when the P-value is large.

## 6• References:

A list of all the scientific literature referenced and cited in the article.

## WHEN READING A RESEARCH PAPER, KEEP THESE TIPS IN MIND

### Compare and contrast to others in the field

- You can look at other sources mentioned in the introduction and references to compare papers and gain insights into the larger context.
- Ask: what did this study contribute to the field?



### What do other experts say about the article?



- It is helpful to know what other researchers in the field think about the research paper and findings. Is there support or criticism from others in the field? What is the consensus?
- You can find other articles who have cited the article to see what they are saying.

### Try to summarize in a few sentences

- This helps reinforce the key points and reveals points you may not have understood and could revisit.
- Ask: **What is the research investigating and why? What was found? What further questions remain?**



### Mark it up!

- Underline key points and highlight important information.
- Make note of your questions and criticisms.
- Identify the good ideas in the article.
- Be patient - read, digest, ask, repeat! It takes time to build a knowledge base.

# WHEN READING A RESEARCH PAPER, KEEP THESE TIPS IN MIND

## Consider the source

- Every research paper is published in a **Journal**. Each journal has an impact which is given based on the number of citations from their articles.
- High-impact journals are more recognizable in the field, and usually, the article has passed a more rigorous review.
  - 🚩 It is a red flag if an article is published in a very low-ranked or unknown journal, or if it was not published in a journal at all.
- **Peer-reviewed articles** mean there were a group of unbiased researchers who evaluated the study for any technical and scientific inaccuracies. Some journals will only accept peer-reviewed articles.
  - 🚩 It is a red flag if an article did not go through the research process.



## Admit to what you don't know.

- Reread as many times as you need to.
- Look up terms you don't understand. Check out our **Research Glossary** for commonly used terms in ALS research papers. You can use it as a starting base to build your own glossary with specific terms to always go back to.

[als.ca/research/webinars-and-education/](https://als.ca/research/webinars-and-education/)



## Think critically

- **Be wary of hype!**
- **Keep asking questions** – Is this the right way to answer this question? Is the study repeatable? What factors might affect the results, or any confounding variables? How is the work expected to advance the field? Are there other possible interpretations of the findings?
- Do not assume the authors are always right. Consider **any biases** the authors might have and whether this may have influenced the results somehow. **All research should be conducted in an unbiased environment that will not skew the results.**

