

Hi everyone! I am your librarian, my name is Jingjing Li.

As you start to read scientific articles, you might find it can be challenging with language written, complex figures, and all those statistics! But don't worry, in this video, I am going to show you how to decode scientific articles and make them more accessible.

Reading a research article is not like reading a book or a magazine. Given the dense nature of scientific papers, they require a more strategic approach.

This step-by-step guide designed to help you comprehensively navigating a research article. This guide will not only assist you with your current literature review assignment but will also be beneficial for all your study-related readings moving forward.

First, let's begin with the title and abstract. Starting with the title and abstract is a good approach when diving into a research article. The title gives away the research's main topic, letting you know what to expect. Next, the abstract offers a concise overview of the whole study, from its aims right through to its conclusions. By reviewing the abstract, you can easily gauge if the article aligns with your interests and determine whether it's worth a more thorough read.

Now, let's look at an example. These are the title and the abstract of an article, usually the abstract is between 200-250 words. The length is regulated by the journal.

Now let's take a closer look. In this abstract, the author first summarized the background of the study. As highlighted here, the author emphasized the importance of understanding trophic dynamics' impact on biodiversity, especially for coralline algae.

Right after, the authors stated the aim of the research which was to examine and compare the variety and makeup of algae communities at various locations that had different number and influence of sea urchins and sea otters. In this very concise sentence, it also tells the method used were DNA barcoding.

In the next sentence, the authors give you a clear cue by saying that “we show”, which means, this is where authors started summarizing their research findings.

At the end, the author quickly discussed how their research finding contributed to the research field.

As you just learned, the abstract contains rich information, and it provides a bird view for the whole paper. However, it is important to remember that only reading abstract does not give you a full understanding of the research, as the abstract is only summary of each part of the paper. In your literature review assignment, it is crucial that you read the whole paper carefully to have a better understanding of the study.

When you start reading a research article, it's a good idea to skim the introduction first. Think of this section as a mini literature review specific to the research topic at hand. Usually, in the introduction section, the author explains what's already known in the field and what gaps still exist. The introduction lays out background information, helping you to get the foundation upon which the research is built. As you are near the end of this section, you'll find the research question or

hypothesis being stated, this is the part you should read carefully as it gives you a clear idea of what the study aims to address. Additionally, it might emphasize why this particular study is important or why there was a need to explore this topic at the first place. Overall, the purpose of the introduction is to set the stage.

In this introduction authors started with introducing the background, then authors talked about the situation or problem exists in the field. As the introduction progresses, the author continued to establish the context and repeatedly highlights specific issues that must be addressed, making this an integral part of setting the stage. Perhaps, you will be writing your introduction later in your study, it is important that you tell the readers what is being found and what issue is still existing and that would bring in your research question naturally.

The aim or the objective of the research is usually at the end of the introduction.

Now let's jump to the conclusion. Taking a look at the conclusion before delving into the rest might seem a bit unusual, but there's a method to the madness. The conclusion typically wraps up the study by summarizing its pivotal findings, highlighting on the importance of those results, and sometimes pointing towards future research area. Dipping into this section early gives you a snapshot of the paper's key takeaway. This way, you can get the essence of the research without getting entangled in the nitty-gritty details.

It's important to be aware that some papers have both conclusion and discussion sections, while others, like the one I'm presenting, only have one, which may be labeled as either discussion or as conclusion. Here, the author started by challenging the oversimplified idea that coralline algae are the winners, they also stress that putting all species under one single category doesn't capture the full picture. Right after, the authors presented their research findings revealing that without sea otter control, high urchin numbers and grazing pressure reduce coralline algal diversity.

After you get the key takeaway of the study, let's go to the results. The figures, tables and statistics in this section capture the study's most crucial pieces of data. When you come across these, don't just skim over them. Instead, pay special attention to the figure and figure captions. These text provide valuable context; help you understand the data presented. By focusing on these elements early in your reading, you can get a handle on the main outcome of the research without immediately diving deep into the technicalities. As you become more comfortable with this approach, you'll also find that the result section in scientific papers becomes less daunting. It's about deciphering the key findings first and then, when you're ready, digging into the finer details to understand the research fully.

There are few things you need to look for in the results section. First, it's the statistic, usually it tells you whether the results are statistically significant or not, and/or how significant it is. Depending on the statistic method the authors use, it may also tell how the factors studied are correlated with each other, or the power of the statistic. The methods, or the statistic method used depend on the type of data authors collected.

Next thing you look for is the figure. Figure gives a direct illustration of the result. From the figure, you can see comparison between groups, the difference is very easy to see comparing to for

example, looking at two groups of numbers. It is important to check the figure captions, which usually tells what information is presented in the figure, for example, what group are there, what does an acronym mean, sometimes it also lists the statistic results.

Don't forget the check figure legend, which is usually next to the graph, it tells you what each colour represents for.

Moving on to the method section. Reading the method section of a scientific paper might be a challenge as this section is written by experts for fellow experts in the same field, as each domain has its unique terminologies and practices. This section is, however, fundamental, acting as the backbone of the entire research. It offers a clear blueprint of how the scientists carried out their experiments, allowing readers to visualize the steps and procedures. By understanding the methods, you're not just passively absorbing information; you're actively assessing the strength and validity of the research. Questions like, "Was their sample size big enough?", "Did they use the right experimental techniques?", or "Was their statistical analysis a good fit for the kind of data they collected?" become easier to answer. And once you get the hang of this, you'll realize the findings presented in the results section are much more meaningful, as you'll know the context in which those results were derived. So, while it might seem intricate at first, understanding the methods section sets the stage for a deeper, more informed reading of the entire paper.

For example, let's read this section together, you can pause the video to read first. And by doing that, you perhaps get the following information, such as where and when the samples were collected, what measurements authors took from samples, how they identified the samples.

Next the statistical analysis tells you what method authors used to analyse the data in order to get their conclusion. As you learn more in your study, you will be able to tell if the statistical method is appropriate for the type of data. At this moment, it's perfectly fine, as a first-year undergraduate student, you don't fully understand the technical details in this method section. For now, your primary goal is to get the idea of what author did in their research.

Now at the end, we circle back to the discussion. In this part, the authors address a few things. First, they interpret what their results really mean. They don't just throw numbers and facts; they explain the significance behind them. Then, they compare and contrast their findings to what has been discovered before, show how their data align within the wider scope of scientific knowledge. They'll also address where their study might have fallen short or where there's room for error. In some papers, there is a section called limitation where authors talk about these issues, but it's not always the case. Sometime, the authors address the limitation within the section called discussion or conclusion section. Last, they often discuss the broader implications of their work and how it could be applied in real-world scenarios or future research. It's a section that brings depth, context, and perspective to the data presented previously.

This is the rest part of the discussion section from the same paper. Starting from here, the author started to compare their study with previous studies.

Then authors also discuss the broader implications of their research in this field.

After getting the paper's main ideas, it's time to circle back to the parts you might have skipped or just skimmed over. For example, don't forget the references. It can guide you towards other influential papers in the field, let you know trajectory of the research topic. Revisiting these sections ensures you're not just skimming the surface but truly understanding the depth of the research presented in the paper.

As you dive into the research paper, it's essential to actively engage with the content. Taking notes and annotating can be your best strategies. Summarizing sections in your own words can also be helpful in solidifying your understanding and retaining key information. And remember, it's okay if everything doesn't click immediately.

At this point, you probably already know that not all scientific papers are structured in the same way. While many follow a general template, there are variations based on the journal, field of study, or authors' preference. You'll need to develop the skill to discern these differences. For example:

The research question might not always be explicitly stated in the introduction. Instead, you might have to infer it from the context or purpose of the study presented.

Sometime, you'll come across papers where the methods section is very short. In such cases, the authors might refer you to previous papers where they've described their methodologies in greater details.

Some papers have supplementary material. That can provide additional information related to methods or offer more results that couldn't be accommodated in the main text of the paper.

Adapting to these nuances is part of becoming proficient in reading and understanding scientific literature. Over time, you'll get better at making these judgments and navigating the scientific papers.

Remember, reading a research article is a skill, and like all skills, it improves with practice. The more articles you read, the more efficient you'll become.

Thank you for watching, I hope the video is helpful, if you have question, please do not hesitate to contact me.