

Reading Scientific Papers

You are going to read three short scientific articles in this class:

1. [Mayberry, Lock, Kazmi \(2002\) Linguistic Ability and Early Language Exposure. Nature](#)
2. [Saffran, Aslin, Newport \(1996\) Statistical Learning by 8-Month-Old Infants. Science](#)
3. [Perrachione, Del Tufo, Gabrieli \(2011\): Human Voice Recognition Depends on Language Ability. Science](#)

For one of them, you will write 5 questions related to the content of the article (Question Formation), for one you will summarize the argument of the paper in less than a paragraph (Argument Summarization), and for another you visualize the argument of the paper using boxes and lines (Argument Visualization). You can find out which one of these techniques you are doing with which paper by clicking on [this link to the assignment spreadsheet](#).

The details of how to do each technique is explained below using the following 1-page scientific article as an example. It's super short so take a few minutes to read it first:

- [Weikum, Vouloumanos, Navarra, Soto-Faraco, Sebastián-Gallés, & Werker \(2009\) Visual Language Discrimination in Infancy. Science](#)

Please do not try to copy or create your homework close to the example explained here in every aspect. This is just one example. Try to understand the goal and the principles and apply them to your paper.

Question Formation

- Come up with 5 questions about the content of the paper, especially the main components like the claims, the data provided to support the claims, and the authors' interpretation of data
- Make sure the questions are relevant to the article
- Make sure the questions are specific to the content of the paper and cannot just be asked about any article
- Make sure the questions do not assume false information according to the article

Example for Weikum et al (2009):

1. Is visual information redundant for vocal language processing according to this article?
2. To test visual language discrimination in infancy, which age range of infants is used for the study and what is the sample size?
3. Why does the study compare monolingual infants with bilingual infants?
4. What does the study conclude for bilingual children's language development?
5. How does the study measure infants' language discrimination?

But avoid vague and general questions like:

- What is the article about?
- What did the scientists test?
- How did they test their hypothesis?

If you can ask a question for any scientific paper, then it is too general.

Avoid asking questions that assume false information according to the article:

- Why are adults incapable of discriminating languages solely based on visual information?

This question assumes adults are not capable of visual discrimination even though the article says the opposite.

Argument Summarization

- Summarize the paper in one paragraph
- Make sure you cover the following components:
 - The main conclusion(s) of the paper (Conclusion)
 - What data and evidence the paper has considered (Findings)
 - How the data and evidence was collected (Methods)
- If the paper has an abstract, your summary should not simply repeat what the abstract says

Example for Weikum et al (2009):

“Weikum et al (2009) suggest that “visual speech information alone is sufficient for language discrimination in infancy” [Conclusion 1]. They examined 72 English monolingual 4, 6, and 8-month-old infants using silent videos from their native language (English) and an unfamiliar language (French). 36 infants watched one language and midway the language was switched (test condition) and for 36 other infants the language was kept the same (control condition). Longer looking time at the video by

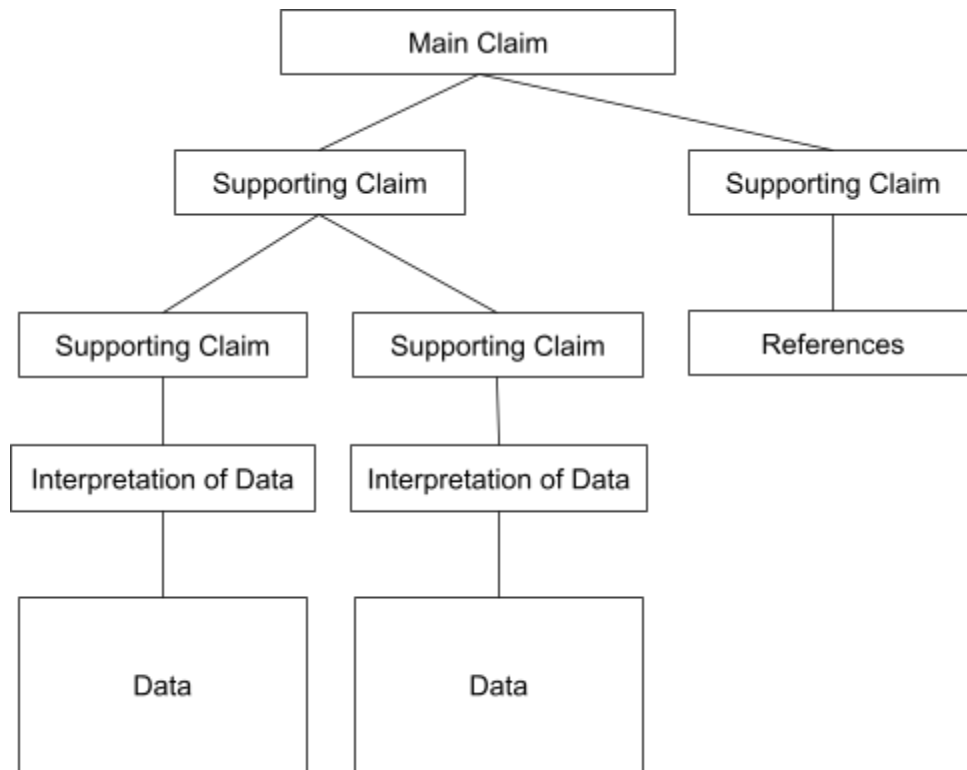
infants was interpreted as noticing the change in language [Methods 1]. 4 and 6-month-old Infants looked significantly longer when the language switched but not 8-month-old infants [Finding 1]. They similarly compared English monolingual 6 and 8-month-olds with 24 French-English bilingual 6- and 8-month-old infants [Methods 2]. They found that while at 6-months both monolingual and bilingual infants looked longer at the change of language, at 8 months only the bilingual infants looked significantly longer and not monolingual infants [Finding 2]. They concluded that bilingual infants maintain the discrimination abilities needed for separating and learning multiple languages. [Conclusion 2]”

In the example above, green square brackets are used to highlight how the conclusion, methods, and findings are covered but you do not need to explicitly mark these components this way.

Argument Visualization

Argument Maps

Argument maps are visual tools that allow us to see how a conclusion is supported by evidence or premises. There are many ways to create argument maps and they have been implemented in many different ways for different purposes. Here we use them to understand the structure of a scientific argument. The following diagram shows an example structure of an argument map.



At the bottom the map presents the data and empirical evidence that supports the main claim or point of the article. As we move to the top of the map, the information becomes more general until we reach the main claim which is the conclusion the researchers have reached after looking at the data and interpreting it.

Basic Components

Data

The most important aspect of the tree structure above is that its branches end in “data” and “evidence”. This is what differentiates a scientific (empirical) argument from other types of arguments. A scientific argument relies on data and empirical evidence for its validity. Sometimes we rely on other researchers who have provided empirical evidence to support a claim. In such cases a claim is supported by a “reference” or citation. You can typically find the data provided in a scientific article by looking at the figures, plots, and tables. However, sometimes data is provided in verbal format and it is harder to find.

Interpretation of Data

Interpretation of data is the author's summary of what they take away or understand from their plots, figures, or tables. You can often see the interpretation of data in figure captions or in the results section of the article. It is sometimes signaled by phrases such as "the results show ..." or "the data suggests that ..."

Main Claim and Supporting Claims

The main claim of a paper is what the authors are trying to show or argue for. It's the main point of the paper. It is why they are providing evidence or data. Typically, the main claim is logically supported by sub-claims or supporting claims. Those supporting claims in turn are supported by the data.

How to Create a Map

1. Start by reading the article and highlight the parts that can end up as components of your map like "claims", "interpretation of data", or "data".
 - For data you can typically scan for plots and figures.
 - Interpretation of data may appear as figure caption or in text when reporting the results.
 - The main claim typically appears in the introduction at the beginning or discussion at the end. It may be signaled by phrases like "we conclude that ..." or "the study shows that ..."
2. Put the data (figures or plots) at the bottom of the map and connect them to the interpretation of data.
 - **IMPORTANT: Feel free to copy paste text from the original article! This is not your essay so copy-pasting is not a problem (i.e. not plagiarism). In fact, staying as close to the wording of the authors as possible is ideal!**
3. Put the main claim at the top of the map.
 - **IMPORTANT: Feel free to copy paste text from the original article! This is not your essay so copy-pasting is not a problem (i.e. not plagiarism). In fact, staying as close to the wording of the authors as possible is ideal!**
4. Connect the main claim to the interpretation of the data using supporting claims in a manner that each claim higher up logically follows from the one supporting it below. For each claim or component lower on the map you should be able to say "this is a reason to believe" the component it is connected to higher up.
 - **IMPORTANT: Feel free to copy paste text from the original article! This is not your essay so copy-pasting is not a problem (i.e. not plagiarism). In fact, staying as close to the wording of the authors as possible is ideal!**

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