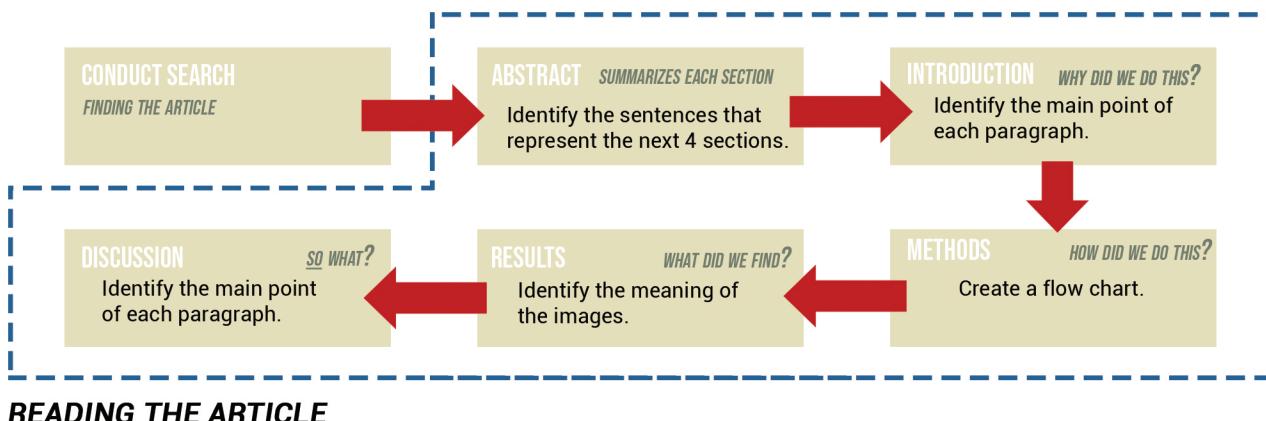


READING SCIENTIFIC JOURNAL ARTICLES

Journal articles can be intimidating to approach at first, and often are filled with unfamiliar vocabulary and long complex ideas. This handout will teach you how to break scientific research down efficiently and effectively.

Despite the level of depth and detail that journal articles have, they all follow an identical format that once mastered, can be applied to practically any experimental article in any field!



READING THE ARTICLE

LITERATURE SEARCH

1. Get an overview of your topic first and narrow down your subtopic

- ▶ Nowadays scientific papers tend to cover particularly niche areas of research, the more specific, the easier your search will be

Suggestions: Wikipedia, library, teachers/professors

2. Finding the right database

- ▶ Key for ensuring that the correct articles show up
- ▶ Determines the trustworthiness of your sources – often certain databases provide peer reviewed articles and/or articles from well-known journals

Suggestions: Google scholar (general), Scopus, Web of Science, Plos One (general science), ACM Digital Library, IEEE Explore (engineering & computer science)

Note: Databases that provide open access include Google Scholar and Plos One.

3. Defining your topic

- ▶ Brain storm – generate a list of key words related to your topic
- ▶ Broaden your search to contain alternative spellings of words, acronyms, short forms etc.

4. Doing the search

- ▶ Boolean Logic – This is a key part of most search engines. Using the connectives **AND**, **OR** and **NOT** can help refine your search
- ▶ Special characters * and ?
 - * searches all words that start with a certain root (i.e. dys* would bring up dysfunction, dyslexia etc.)
 - ? searches words with a variation in a single letter (i.e. globali?ation brings up globalisation and globalization)
- ▶ Follow citations from papers you've found – especially reviews or meta-analyses

THE ABSTRACT

An abstract summarizes the next four parts of a paper. Parse abstracts by identifying which sentences correspond to which section.

INTRODUCTION

The introduction consists of a description of the context of the experiment, what they are studying and why.

METHODS

The methods is a description of "how" and describes the details of the experiment. Attempt to identify the types of variables.

- *Independent variable is the one being manipulated*
- *Dependent variable is the one that is being measured*

RESULTS

The results describe the "what" of the experiment and states direct measures of data.

DISCUSSION

The discussion describes the importance of a journal article – look for key words like "suggests", "interpret", "demonstrate" and "show".

EXAMPLE: DECOMPOSING AN ABSTRACT

Kawaii (a Japanese word meaning "cute") things are popular because they produce positive feelings. However, their effect on behavior remains unclear. In this study, three experiments were conducted to examine the effects of viewing cute images on subsequent task performance. In the first experiment, university students performed a fine motor dexterity task before and after viewing images of baby or adult animals. Performance indexed by the number of successful trials increased after viewing cute images (puppies and kittens; $M \pm SE = 43.9 \pm 10.3\%$ improvement) more than after viewing images that were less cute (dogs and cats; $11.9 \pm 5.5\%$ improvement). In the second experiment, this finding was replicated by using a non-motor visual search task. Performance improved more after viewing cute images ($15.7 \pm 2.2\%$ improvement) than after viewing less cute images ($1.4 \pm 2.1\%$ improvement). Viewing images of pleasant foods was ineffective in improving performance ($1.2 \pm 2.1\%$). In the third experiment, participants performed a global-local letter task after viewing images of baby animals, adult animals, and neutral objects. In general, global features were processed faster than local features. However, this global precedence effect was reduced after viewing cute images. Results show that participants performed tasks requiring focused attention more carefully after viewing cute images. This is interpreted as the result of a narrowed attentional focus induced by the cuteness-triggered positive emotion that is associated with approach motivation and the tendency toward systematic processing. For future applications, cute objects may be used as an emotion elicitor to induce careful behavioral tendencies in specific situations, such as driving and office work.



EXERCISE: Attempt to identify the 4 sections in the exercise article and label them with a pen.

THE INTRODUCTION

Introductions are difficult because they are long and meandering; often referencing concepts and methods you may not understand. The tip to stay on track is to focus on each paragraph at a time.

STRUCTURAL BREAKDOWN



1. Summarize each paragraph into one or two sentences and WRITE them down
 - With practice, you'll be able to do this in your head
2. Note down key jargon and acronyms here, they will be used in the rest of the paper

EXERCISE: Skim through the introduction paragraphs of the exercise article and identify the research questions and hypotheses.



EXAMPLE: SUMMARIZING AN INTRODUCTION

- P1. Cute is an affective feeling characterized by wanting to take care of something.
- P2. Cute objects often resemble babies, and elicit favourable care giving behaviour. However little is known about how the feeling affects the behaviour of the caregiver afterwards.
- P3. Previous studies suggest that cuteness improves motor behaviour, yet the mechanism behind this improvement remains unclear. Using a variety of perceptual-cognitive tasks can elucidate whether cuteness promotes care giving, motivation for social interaction or some other cognitive process.
- P4. Three experiments are done to clarify the questions above, the first examines the mechanism of improvement by timing the completion of a task, the second attempts to test whether social interaction is the basis behind improved performance and the last experiment examines whether attention plays a role.

EXERCISE: In your head, summarize the last paragraph of the example article 'The Power of Kawaii' into one sentence. 

THE METHODS

Methods can be simplified with a flow chart or diagram that depicts the chronological order of events and the different groups in the experiment.

- Your diagram should include the number of participants, all the experimental and control groups, the number of people in them (if applicable), and the different tests being done.
- It is also helpful to indicate what data is being collected and where.

EXAMPLE: UNDERSTANDING METHODS

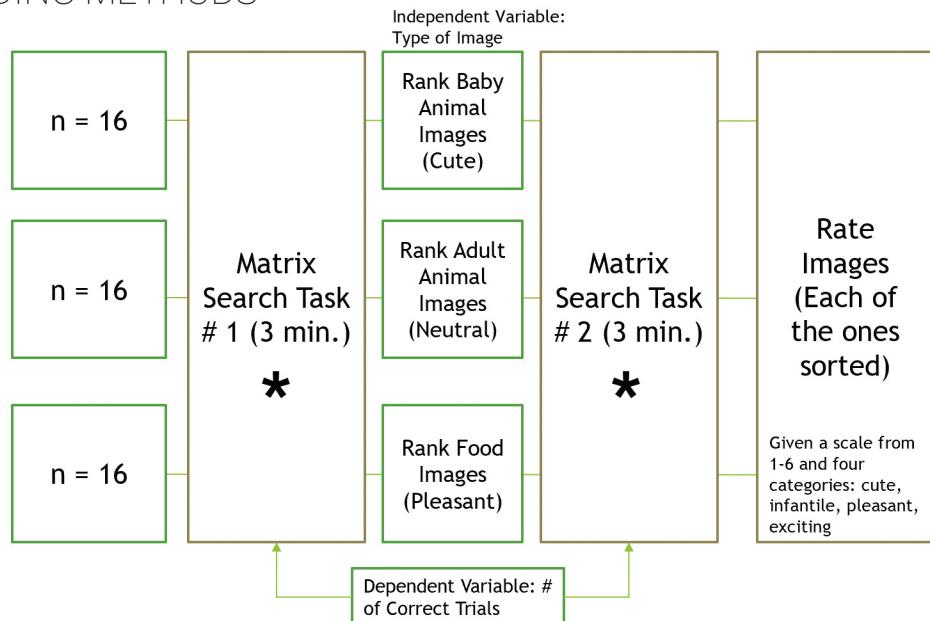
Experiment # 2 in Example Article:

* Find 8

7449622731
4576307356
8924072992
1891911645

EXERCISE: In the space below draw a flowchart for the experiment done in the exercise article. 

ARTICLE TITLE:



THE RESULTS

It may be tempting to read the results right away...BUT

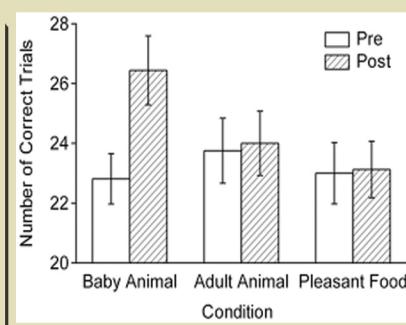
Understanding the methods is key to interpreting the data produced by the experiment. Reading the results first biases you towards author views.

Look at the figures and come up with your own interpretations first:

1. Graphs, brain scan images and visualizations all represent raw data – take the time to understand these first and read the captions
2. After you've made your own predictions, the author's text can be read with a critical eye, and examined to see if they match up with your own

EXAMPLE: INTERPRETING THE RESULTS

Experiment 2 in Example Article



From looking at this image, we can see that the control condition (pre) is only significantly different from the experimental condition (post) in the baby animal trial.



This implies that cute animals improve the performance of participants on a visual search task.

* Note how this was concluded without even referencing the text in the result section.

EXERCISE: Using a graph from the exercise article, state the results in one sentence, and whether or not the data seems to support or reject the original hypothesis.

THE DISCUSSION

Often this section provides the most valuable information for generating ideas for your own research, and/or further topics to look at in your literature search.

- Approach this section in a similar manner to the introduction, one paragraph at the time.
Attempt to summarize each portion in one to two sentences.
- Includes information that is described in the results section in the context of the larger theory that the author is investigating, and the limitations of the study in that context as well.

EXERCISE: Using the example under the introduction section as a template, attempt to summarize the first two paragraphs of the discussion in the exercise article.

P1:

P2:

CITATIONS:

All credit for journal example paragraphs and images go to the authors. Images, quotations and interpretations were taken from Plos One.

Nittono, H., Fukushima, M., Yano, A., & Moriya, H. (2012). The Power of Kawaii: Viewing Cute Images Promotes a Careful Behavior and Narrows Attentional Focus. *PLoS ONE*, 7(9). doi:10.1371/journal.pone.0046362