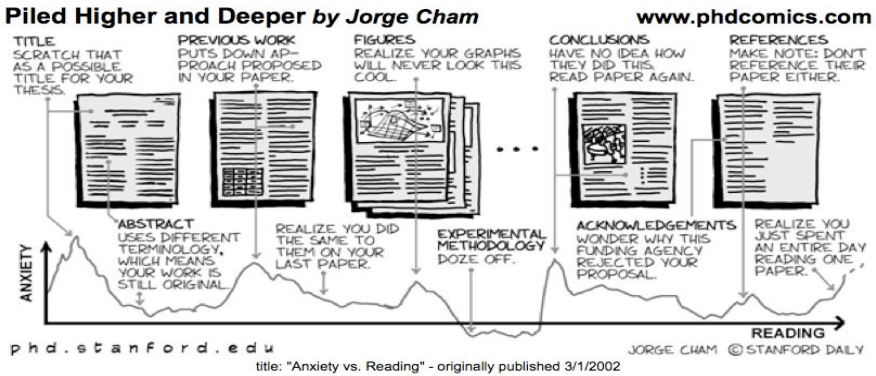
# How to Read a Scientific Paper

By: Kaia Atzberger

ASTR 8500, 28 April 2026

# General Layout



title: "Anxiety vs. Reading" - originally published 3/1/2002

1 Abstract

2 Introduction

3 Data: Observations/Simulations

4 Methods

5+ Results

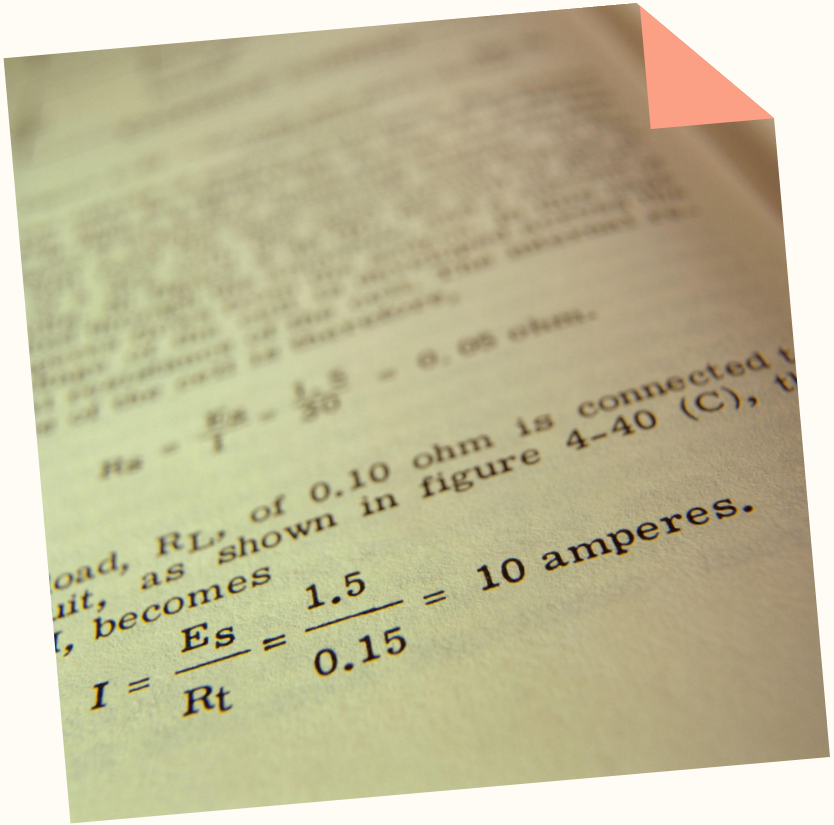
6 Discussion

7 Conclusion

8 Acknowledgments

9+ References (Appendix)

Exceptions: Nature [1]/Science [2]/etc.




# Why do we read papers?

According to a computer science professor at the University of Waterloo [3]:

- Learn material for a conference or class
- Follow current research in your field
- Study literature from a new field

# The Three-Pass Approach [3]

## First Pass

Get a general idea of the paper

## Second Pass

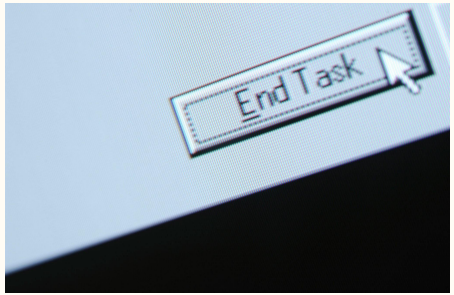
Understand the paper's context

## Third Pass

Learn the details

# The First Pass (~5-10 mins)

- Read the title, abstract, and introduction
- Read the section and sub-section headings
- Read the conclusions
- Check the references for papers you recognize




Wait! Do you want to keep going?

You should be able to answer:

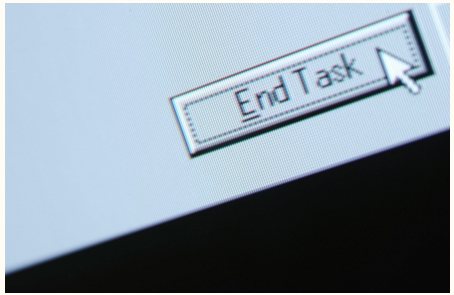
1. *Category*: What type of paper is this? A measurement paper? An analysis of an existing system? A description of a research prototype?
2. *Context*: Which other papers is it related to? Which theoretical bases were used to analyze the problem?
3. *Correctness*: Do the assumptions appear to be valid?
4. *Contributions*: What are the paper's main contributions?
5. *Clarity*: Is the paper well written?

# The Second Pass (~1 hour)

- Read the full paper
- Look at the figures and captions
- Note any references you want to read next
- Write down key points and make comments in the margins

You should be able to answer:

- What is the content?
- Summarize the paper with evidence

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tired. You can now choose to: (a) set the paper aside, hoping you don't need to understand the material to be successful in your career, (b) return to the paper later, perhaps after reading background material or (c) persevere and go on to the third pass.

# The Third Pass (~4-5 hours)

- Re-create the work
- Compare your results with the paper
- Write down ideas for future work

You should be able to answer:

- What assumptions do they make?
- How would you present this idea?
- What are the strengths and weaknesses of this paper?

Done! You are now an expert on this paper

# Let's Practice! [4]

## Are All Apples Red?

*by*
*Ida Cortland*

**Abstract:**

We examined several apples' color. Although most are red, some are not.

**Introduction:**

An age-old question is: are all apples red? Macintosh (1993) thought so. G. Smith (1999) begs to differ. We hope to resolve this issue once and for all.

**Methods:**

**Results:**

**Discussion:**

Since we found one yellow apple and two green apples, it must be true that all apples are not red. We concur with G. Smith's findings.

**References:**

Macintosh (1993) *Journal of Fruit Science.* 4(3): 121-135.

Smith, G. (1999) *Apple Technology Today.* 7(3): 4-8.

*Pomes and You, Volume 3, Issue 4 (2003) p.8*

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**Methods:**

We went to the local grocery store and bought one of every apple they had. We took them home and looked at them.

**Results:**

We found four red apples, one green apple, and two yellow apples. See Figure 1.


**Figure 1**

**Discussion:**

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What apples have you bought recently?

# References

[1] https://www.nature.com/nature/for-authors/formatting-guide

[2] https://www.science.org/content/page/instructions-preparing-initial-manuscript

[3] https://web.stanford.edu/class/ee384m/Handouts/HowtoReadPaper.pdf

[4] https://lib.purdue.edu/wp-content/uploads/2024/06/Newest-Scientific-Paper.pdf

# Questions?