Reviews in Quantitative Biology

Writing a review

Purpose of a review

- “[To] carefully identify and synthesize relevant literature to evaluate a specific research question, substantive domain, theoretical approach, or methodology and thereby provide readers with a state-of-the-art understanding of the research topic.”

Palmatier et al. Review articles: purpose, process, and structure. https://doi.org/10.1007/s11747-017-0563-4

Purpose of a review

- Synthesize current state of knowledge
- Identify inconsistencies in results
- Evaluate methodology
- “Develop conceptual frameworks to reconcile and extend past research”
- Resolve definition ambiguities
- Identify gaps in knowledge
- Point to future research directions

**Not every review paper does ALL of these things*

Palmatier et al. Review articles: purpose, process, and structure. https://doi.org/10.1007/s11747-017-0563-4

Standards of a review

- Enough past research in the domain exists to make having a review paper worthwhile
- Review must be well done
  - Good coverage of literature (collection, breadth, depth)
  - Compelling writing style
- Review must offer significant new insights
  - Not a “book report” that describes past research!

Palmatier et al. Review articles: purpose, process, and structure. https://doi.org/10.1007/s11747-017-0563-4

Difference between research article and review article

	Research article	Review article
Viewpoint	Presents the viewpoint of the author	Critiques the viewpoint of other authors on a particular topic
Content	New content	Assessing already published content
Length	Depends on the word limit provided by the journal you submit to	Tends to be shorter than a research article, but will still need to adhere to words limit

https://authorservices.taylorandfrancis.com/publishing-your-research/writing-your-paper/how-to-write-review-article/

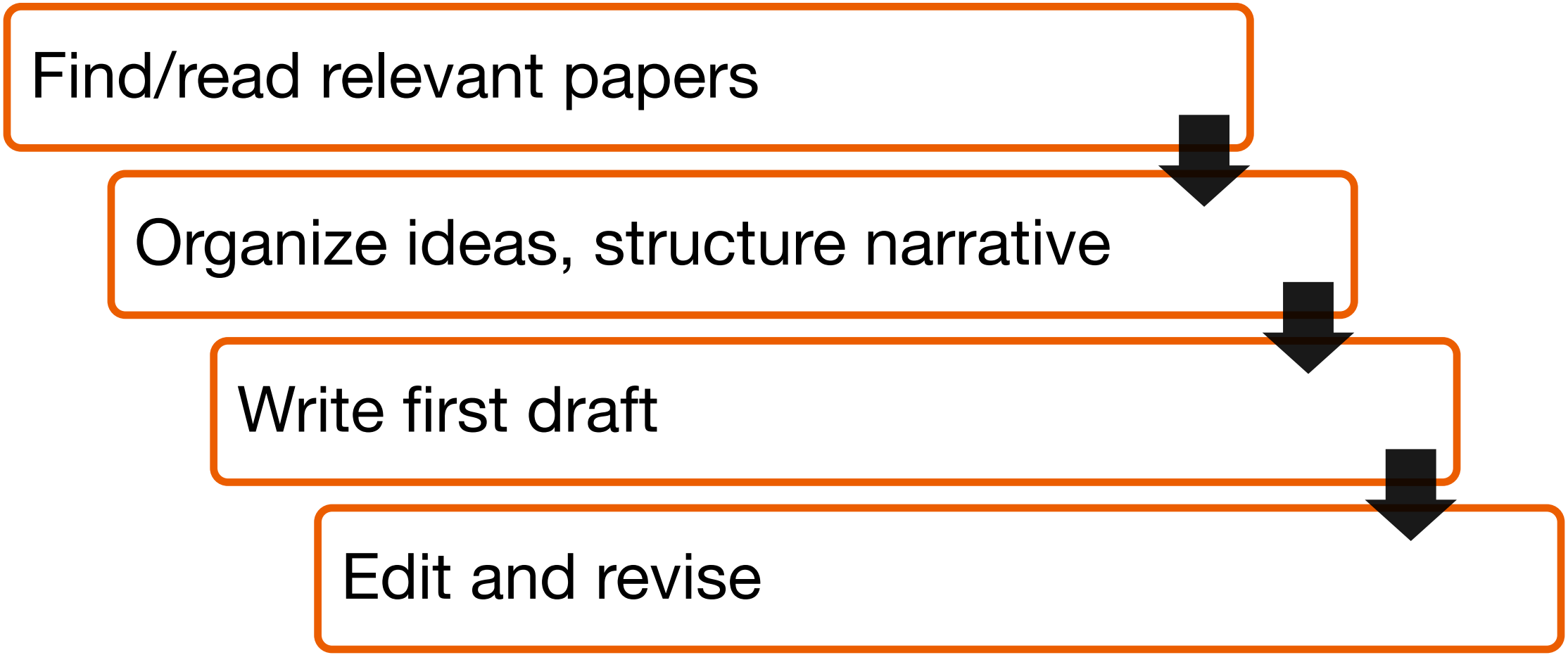
Purpose of a review

- “A literature review …is generally considered a secondary source since it may analyze and discuss the method and conclusions in previously published studies.”

https://en.wikipedia.org/wiki/Literature_review

https://en.wikipedia.org/wiki/Review_article

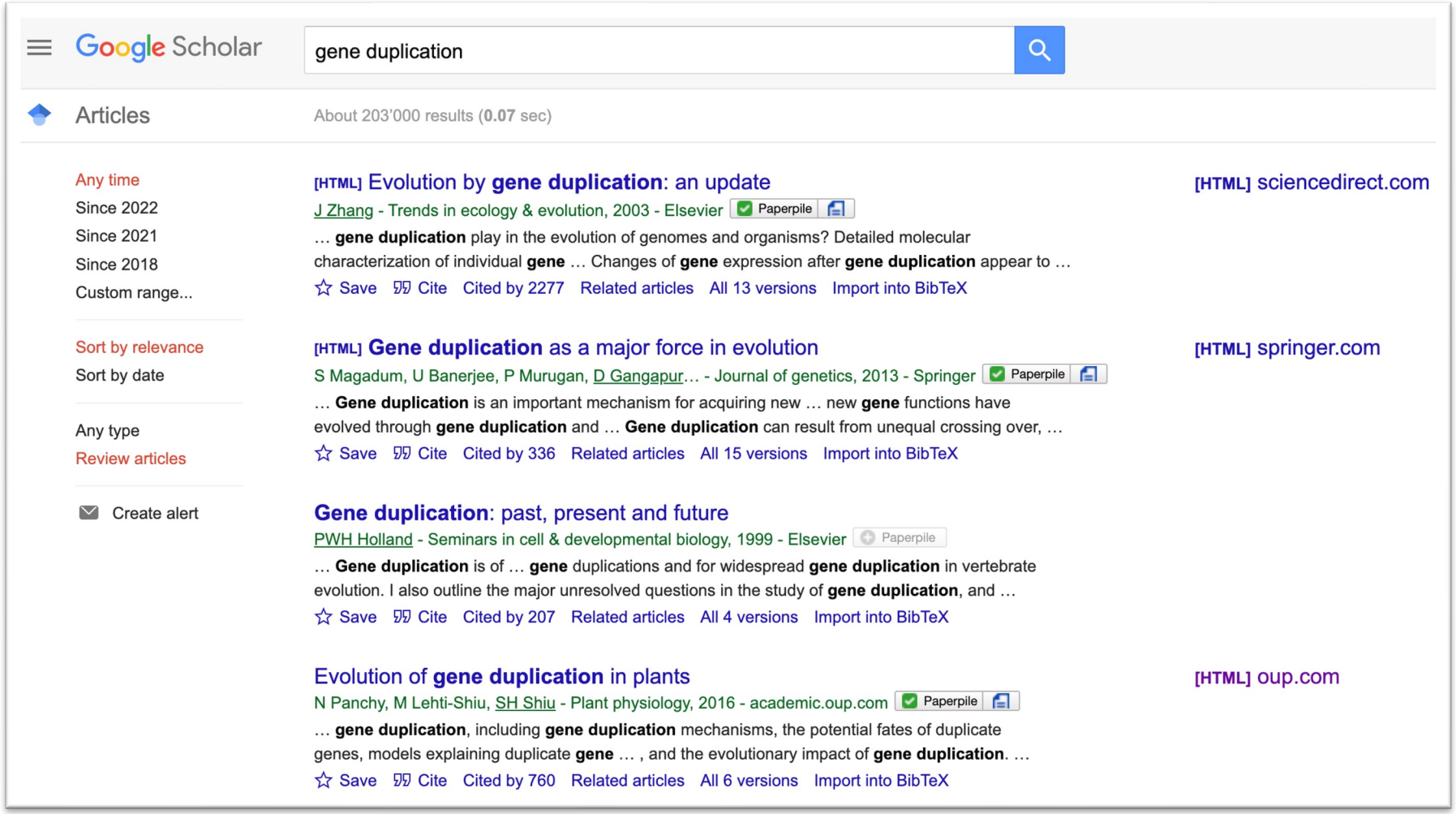
The writing process



Find/read relevant papers

Finding papers

- Google Scholar
- Pubmed
- How to access the literature for free



Shiny new
research
topic

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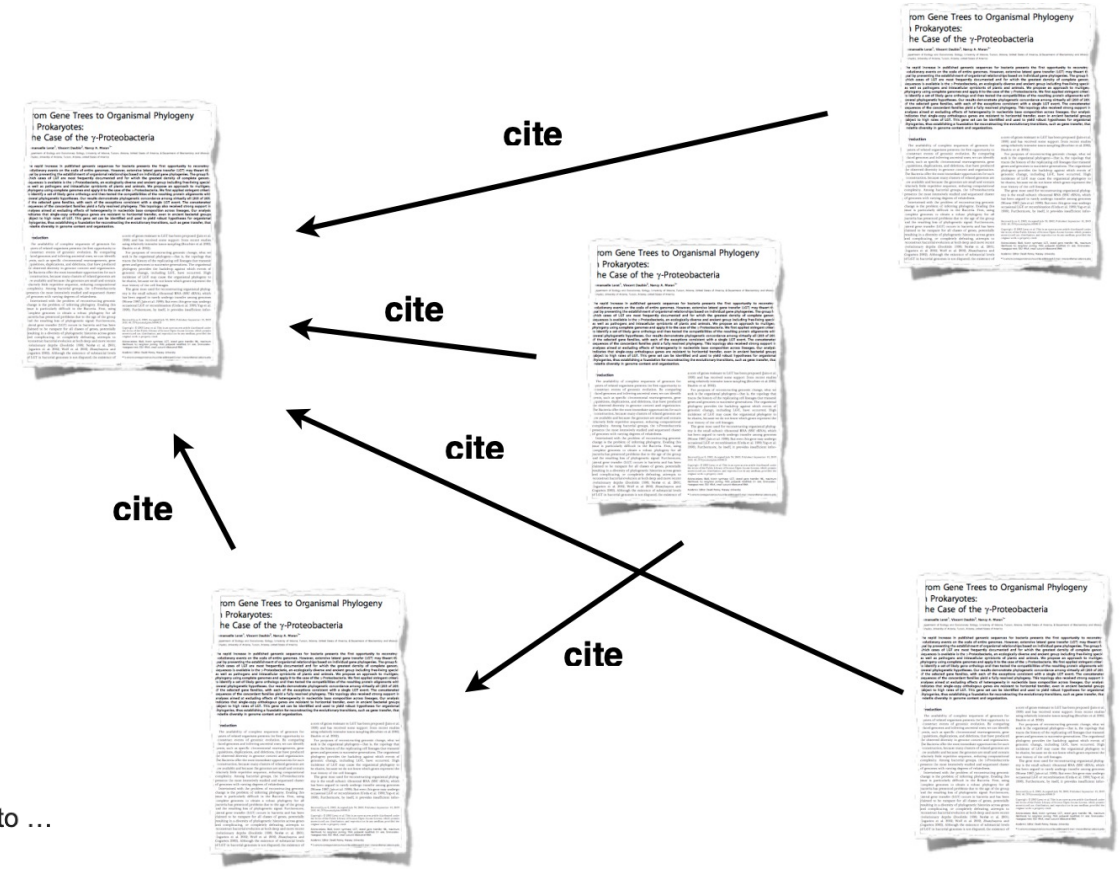
Paper hopping

- Find original idea or result, evidence, influential papers
- Find dependent work, follow-up, criticism, falsification
- Google scholar cited by, related articles



[HTML] Evolution by **gene duplication**: an update

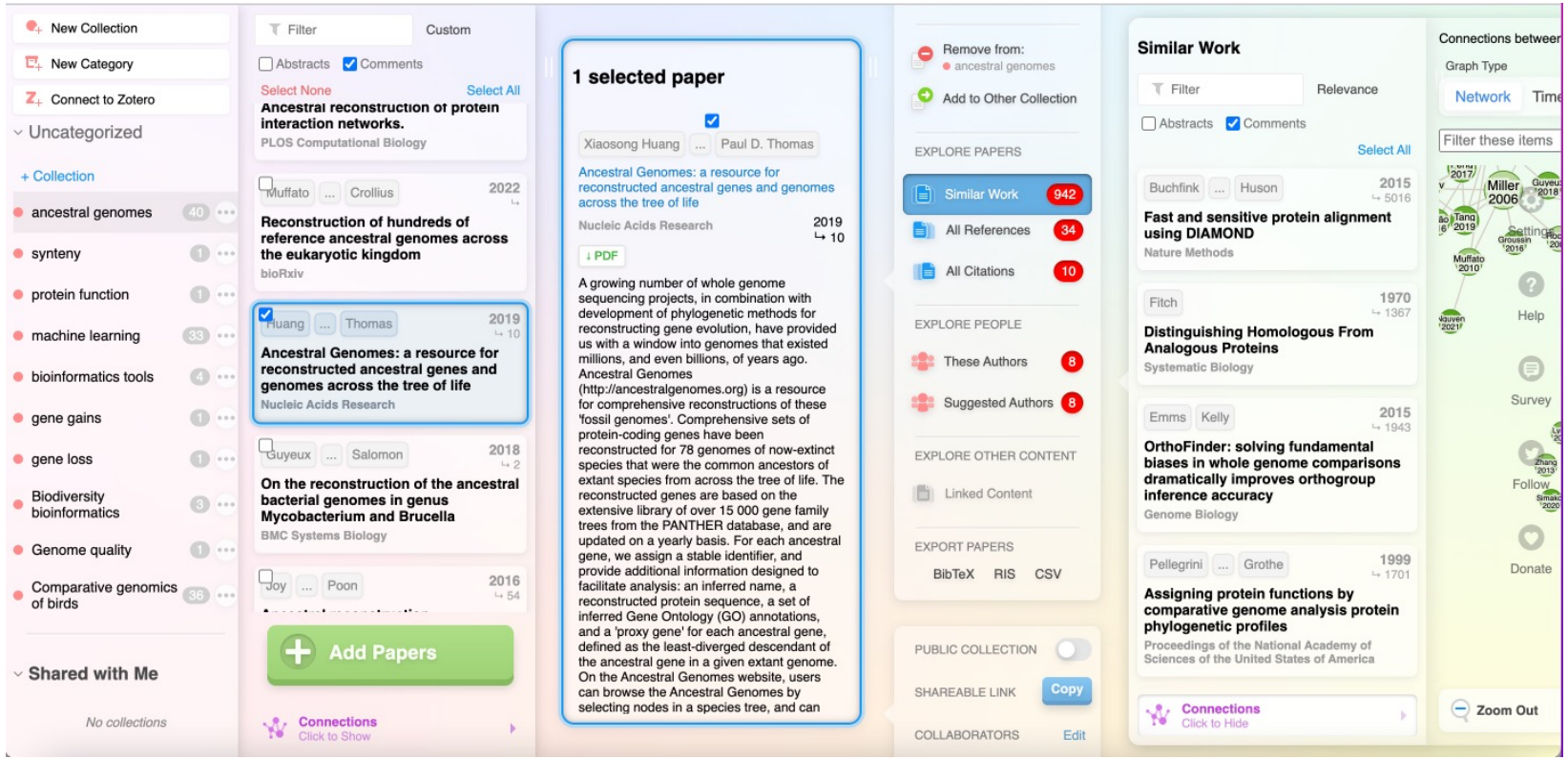
J Zhang - Trends in ecology & evolution, 2003 - Elsevier Paperpile

… **gene duplication** play in the evolution of genomes and organisms? Detailed molecular characterization of individual **gene** … Changes of **gene** expression after **gene duplication** appear to …

☆ Save 99 Cite Cited by 2277 Related articles All 13 versions Import into BibTeX

AI tool: Research Rabbit

- https://researchrabbitapp.com/home



How to read a paper?

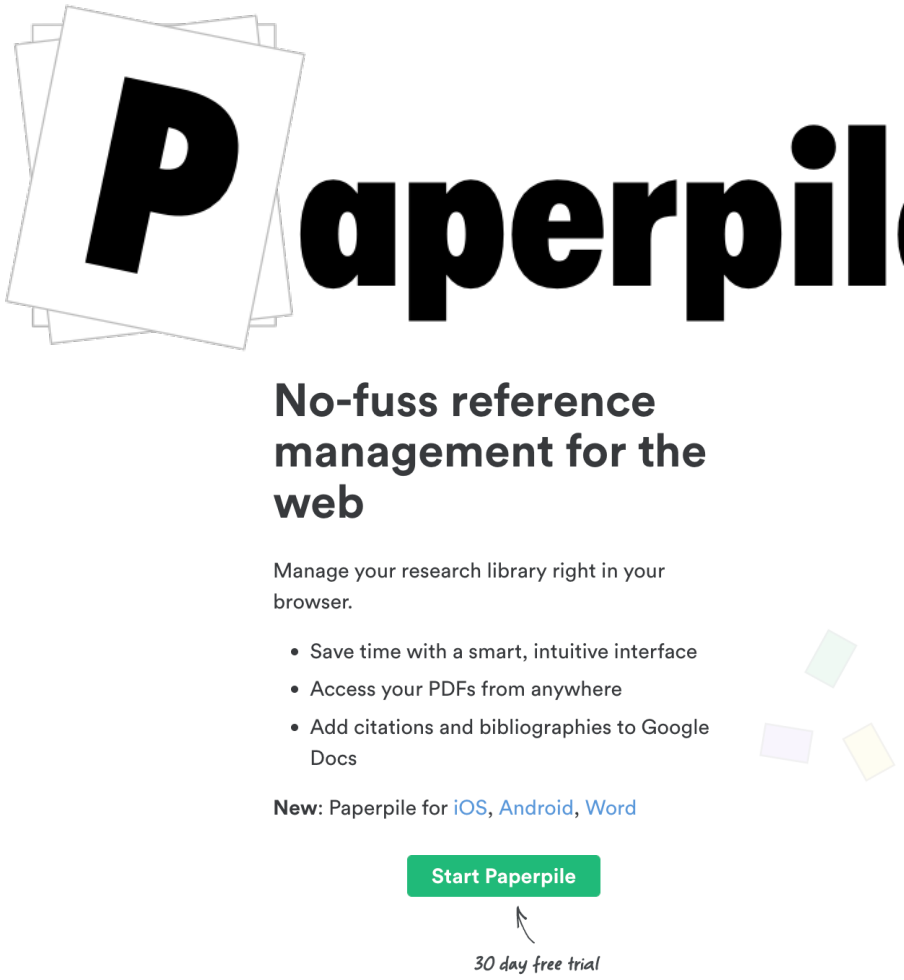
- **Identify (possibly record) key points:**
  - Hypothesis? Approach? Findings? Significance?
- **Order:**
  - Start with Title and Abstract
  - Then, read Introduction
  - Figures and Tables (captions are often self-contained)
  - **If it's not relevant, stop reading!**

**Some papers you skim, some important papers you read in depth*

See: How to Read an Academic Article by Holly Walters

Citation managers

Paperpile



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EndNote™

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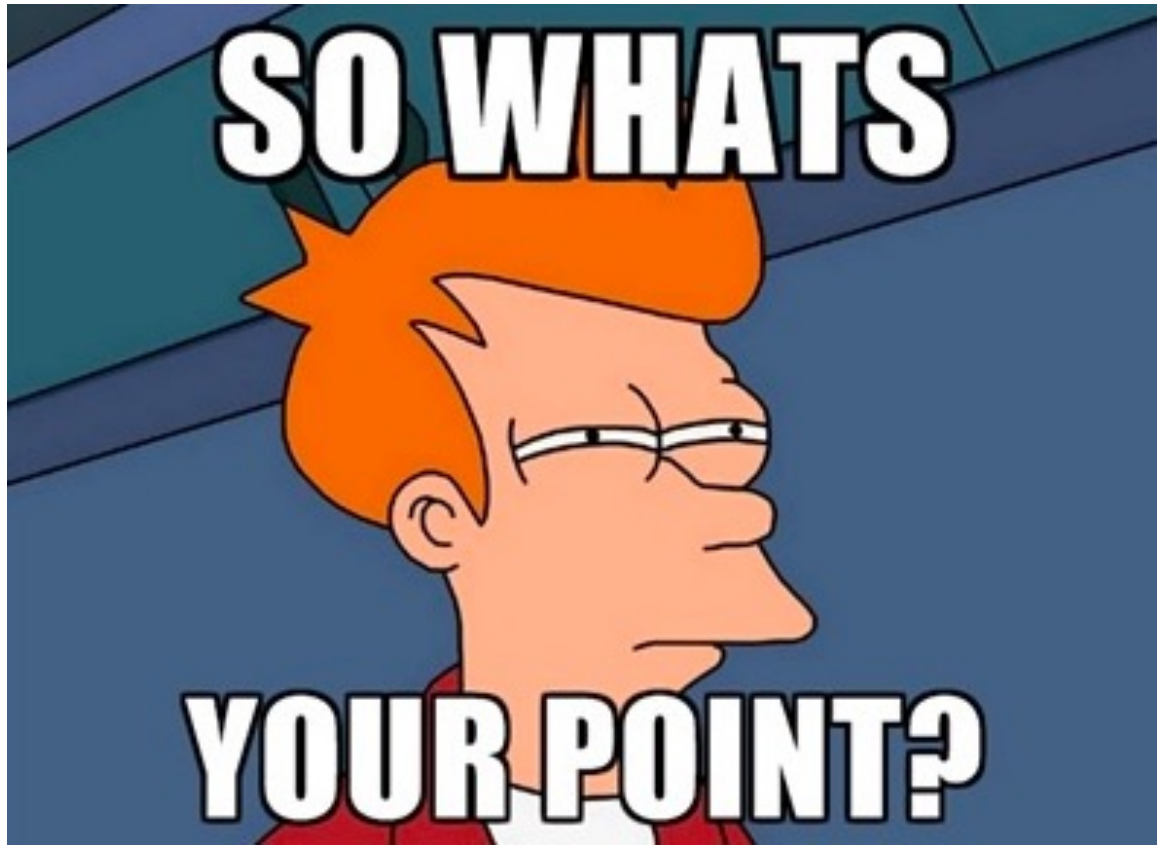
Organize ideas, structure narrative

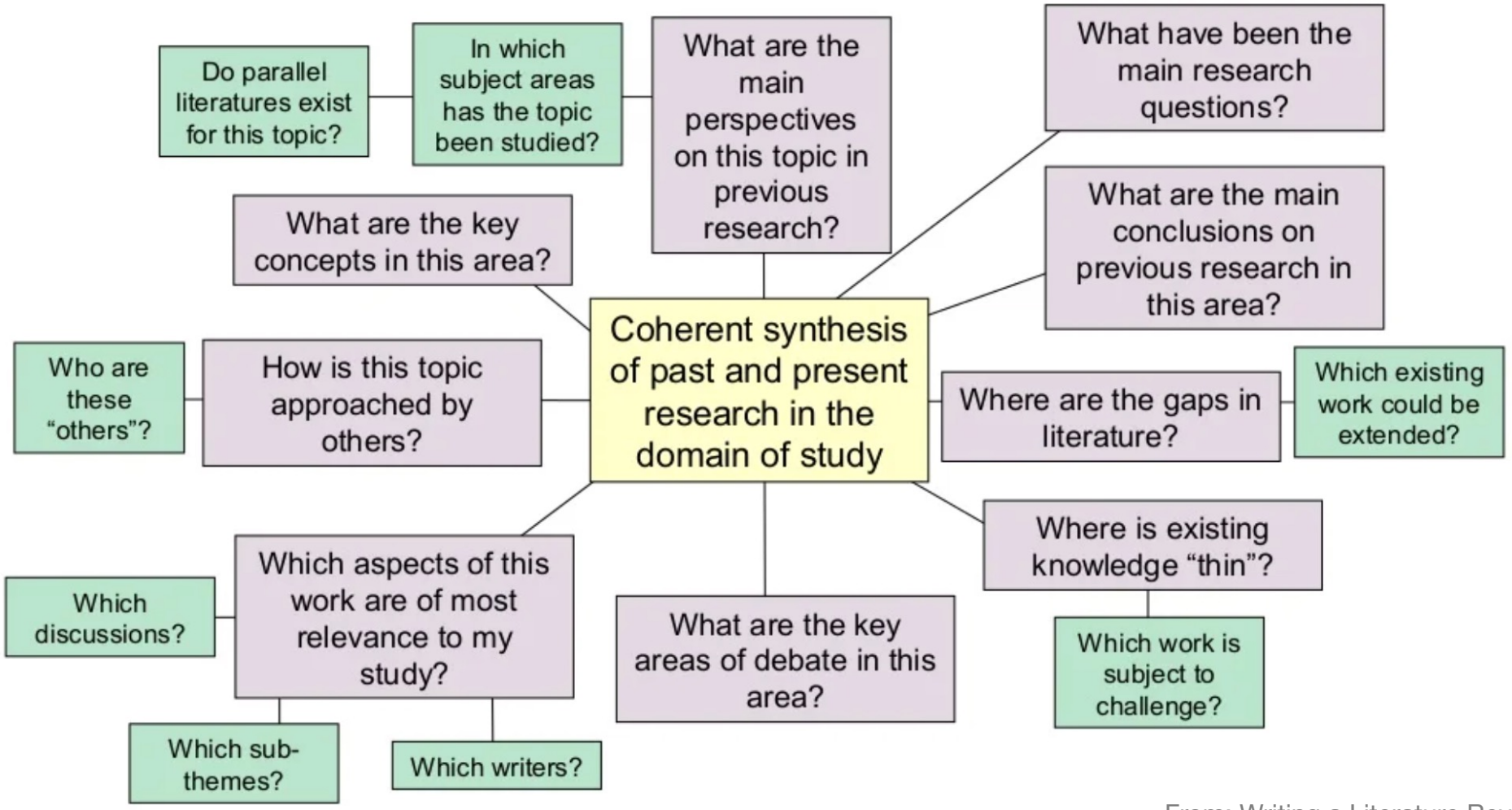
Key Questions

- What is the hypothesis/problem/question?
- Why is it interesting?
- What answers are provided by current literature? How did they do it? Implications?
- Which studies are particularly interesting and why?
- What is unsatisfactory about current literature? What remains unanswered?

Distill the answers into your synthesis



More questions

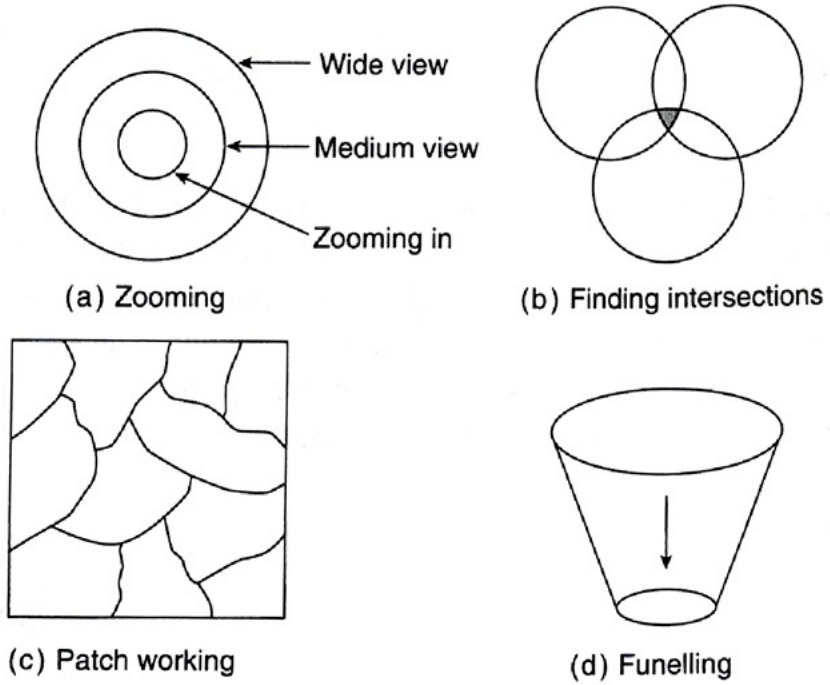


From: Writing a Literature Review,
Hazel Hall Professor at Edinburgh Napier University

Typical structures

- Chronological
- Conceptual (e.g. pro/contra)
- Experimental/ methodological
- Centered on implications

But: remember your point!



Ridley, “The Literature Review”,

Write first draft

Know your reader

- What can the reader be assumed to know?
  - Read the journal editorial policy
  - Read similar articles published there
  - Err on side of caution, but avoid condescending or educational tone
- For this course, assume that your reader is a Masters student in Biology
- But keep a formal tone

The Title

- Signals the field and scope
- Includes your main point
- Gets readers interested

The Abstract

- Introduces field in 1-2 sentence(s)
- Motivates your review
- Announces important points (reformulates subheadings and main point)
- Includes relevant keywords (for indexing)

The Introduction

- Set the context from general to specific
  - Show that the research area is important/interesting/ relevant.
- Establish a niche
  - Show need for your work (the review)
- Occupy the niche
  - Announce your main point
  - Indicate structure of article

Heather Murray, “Writing Research Papers for Publication”, 2008

The Main Body

- Use subheadings for each section
  - One sentence summary/conclusion
  - Helps non-linear reading
- If appropriate, use figures and/or tables
  - Review figures are often schema/cartoons
  - Use captions to make them self-descriptive

The Conclusion

- Specific -> general
  - Mini summary
  - Broader implications, future directions

Drafting

- Make an outline
- Every claim needs to be back by some evidence (in reviews, typically a reference)
  - Either report the findings only
  - Or paraphrase their approach and findings
  - Or use quotations (do not distort context)
- Best way to start writing is to start writing

Beware of plagiarism!

- If you include exact wording, use quotation marks and reference
- If you paraphrase, use a reference only

Edit and revise

Improve flow

- Start each paragraph with a topic sentence
  - It signals paragraph content to the reader
- Improve cohesion
  - Connect sentences through conjunctions, parallel structures, repeated keywords, pronouns, “old-new” pattern, etc.
- Remove unneeded/redundant words

Final checks

- Spelling: use automated spell-checker and proofread your text carefully.
- Verify one more time
  - That references are accurate and complete
  - That each claim is backed by citation
  - That your narrative is coherent
  - That the article meets editorial policy (in particular length requirements)
- Ask a colleague for feedback on the draft

Using ChatGPT

Is it ok to use?

- Yes, within reason
- Acknowledge the fact that you used ChatGPT at the end of the paper
  - “ChatGPT-4 was used to assist in writing and editing of this paper.”
- Don’t ever put something in a paper you don’t fully understand or stand by
- You ultimately assume responsibility for anything ChatGPT says
- Always fact check!

Ways to use ChatGPT to help writing

- Give it an detailed outline and ask ChatGPT to turn it into paragraphs
- Reread the paragraphs to check for accuracy and tone
- Re-prompt ChatGPT with modified instructions
- Modify/edit sentences to put it more in your words

Ways to use ChatGPT to help writing

- Write the text (paragraph form) yourself first.
- Then ask ChatGPT to help polish the text.
- The more specific the prompt the better!
  - *Please take this <outline/draft> and generate text (summarize!) It will be a section in <xxx paper/proposal>. Please thoroughly review the text for clarity, conciseness, good flow, proper grammar and punctuation, readability, appropriate sentence length, active voice usage, effective introduction and conclusion sentences, and the use of clear explanations for complex jargon. Feel free to provide specific examples or rephrasing suggestions where necessary. Your goal is to ensure that the text is clear, concise, and easily understandable by both specialists and non-specialists alike. The target output should be <n pages/words>.*

Ways to use ChatGPT to help writing

- Read your originally-written text.
- Then ask ChatGPT to help polish the text.
- For each sentence you don’t like or is unclear in the original text, see how ChatGPT phrases instead.
- Take bits and pieces of the ChatGPT sentences and mix with your own if it improves the writing

Tips

- The key is to use ChatGPT to make your writing sound polished and clear, but without sounding “fake” and like ChatGPT wrote it
- Prompts should be as specific as possible and give the context of the writing
- Use of ChatGPT should be fully transparent