

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.”

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*

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!

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

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

Organize ideas, structure narrative

Write first draft

Edit and revise



**Find/read
relevant papers**



Finding papers

- Google Scholar
- Pubmed
- [How to access the literature for free](#)

The screenshot shows the Google Scholar interface with the search term "gene duplication" entered in the search bar. The results page displays a list of articles with filters on the left side. The filters include "Articles" (About 203'000 results (0.07 sec)), "Any time" (Since 2022, Since 2021, Since 2018, Custom range...), "Sort by relevance" (Sort by date), "Any type", "Review articles", and "Create alert".

The first article is titled "[HTML] Evolution by **gene duplication**: an update" by J Zhang, published in Trends in ecology & evolution, 2003 - Elsevier. The abstract snippet reads: "... **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 ...". It has 2277 citations and is available on sciencedirect.com.

The second article is titled "[HTML] **Gene duplication** as a major force in evolution" by S Magadum, U Banerjee, P Murugan, D Gangapur, published in Journal of genetics, 2013 - Springer. The abstract snippet reads: "... **Gene duplication** is an important mechanism for acquiring new ... new **gene** functions have evolved through **gene duplication** and ... **Gene duplication** can result from unequal crossing over, ...". It has 336 citations and is available on springer.com.

The third article is titled "**Gene duplication**: past, present and future" by PWH Holland, published in Seminars in cell & developmental biology, 1999 - Elsevier. The abstract snippet reads: "... **Gene duplication** is of ... **gene** duplications and for widespread **gene duplication** in vertebrate evolution. I also outline the major unresolved questions in the study of **gene duplication**, and ...". It has 207 citations.

The fourth article is titled "Evolution of **gene duplication** in plants" by N Panchy, M Lehti-Shiu, SH Shiu, published in Plant physiology, 2016 - academic.oup.com. The abstract snippet reads: "... **gene duplication**, including **gene duplication** mechanisms, the potential fates of duplicate genes, models explaining duplicate **gene** ... , and the evolutionary impact of **gene duplication**. ...". It has 760 citations and is available on oup.com.

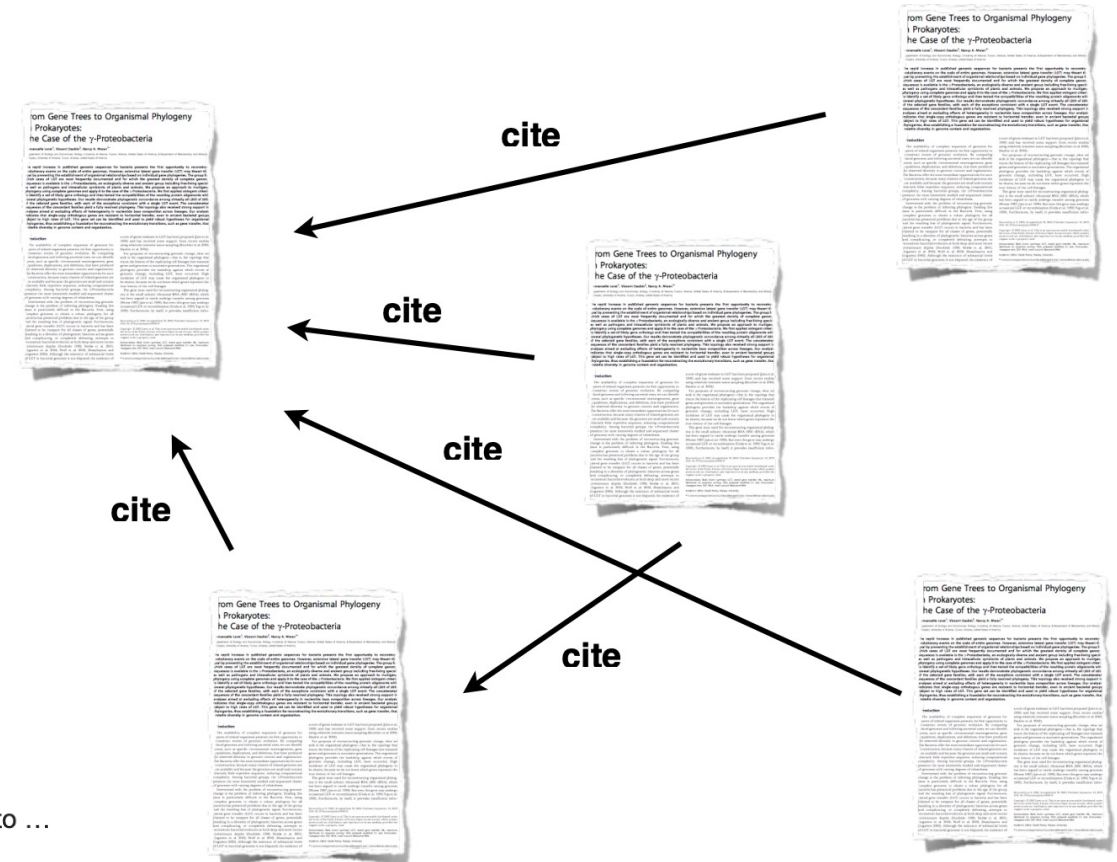


Shiny new
research
topic



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  

... **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  Cite [Cited by 2277](#) [Related articles](#) [All 13 versions](#) [Import into BibTeX](#)

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!**



Dr. Lisa Munro @llmunro · Sep 27

Making a "how to skim an academic article" guide for students because I spent years assuming that everyone was reading every word.

801

11.5K

150.2K



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

Citation managers



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- Access your PDFs from anywhere
- Add citations and bibliographies to Google Docs

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EndNote™

The Zotero logo features the word 'zotero' in a lowercase, sans-serif font. The letter 'z' is colored red, while the remaining letters 'otero' are black.

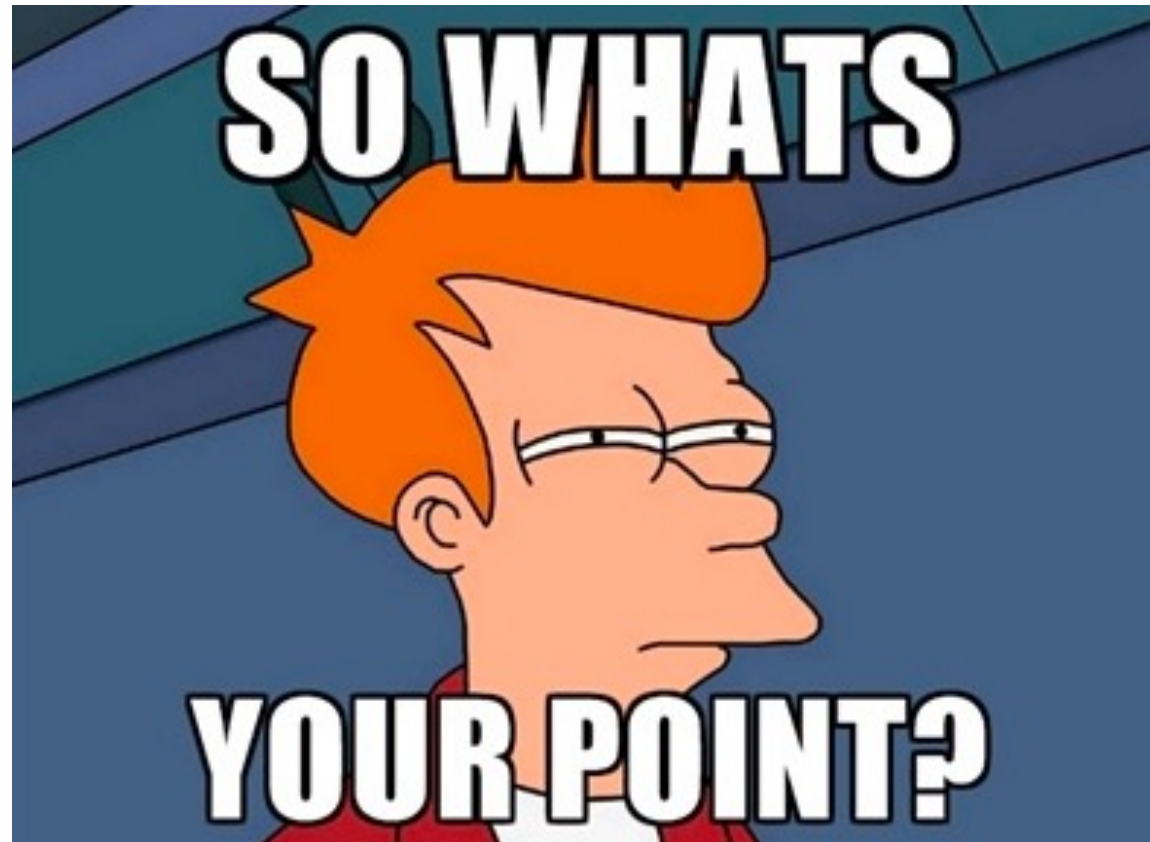
**Organize ideas,
structure
narrative**



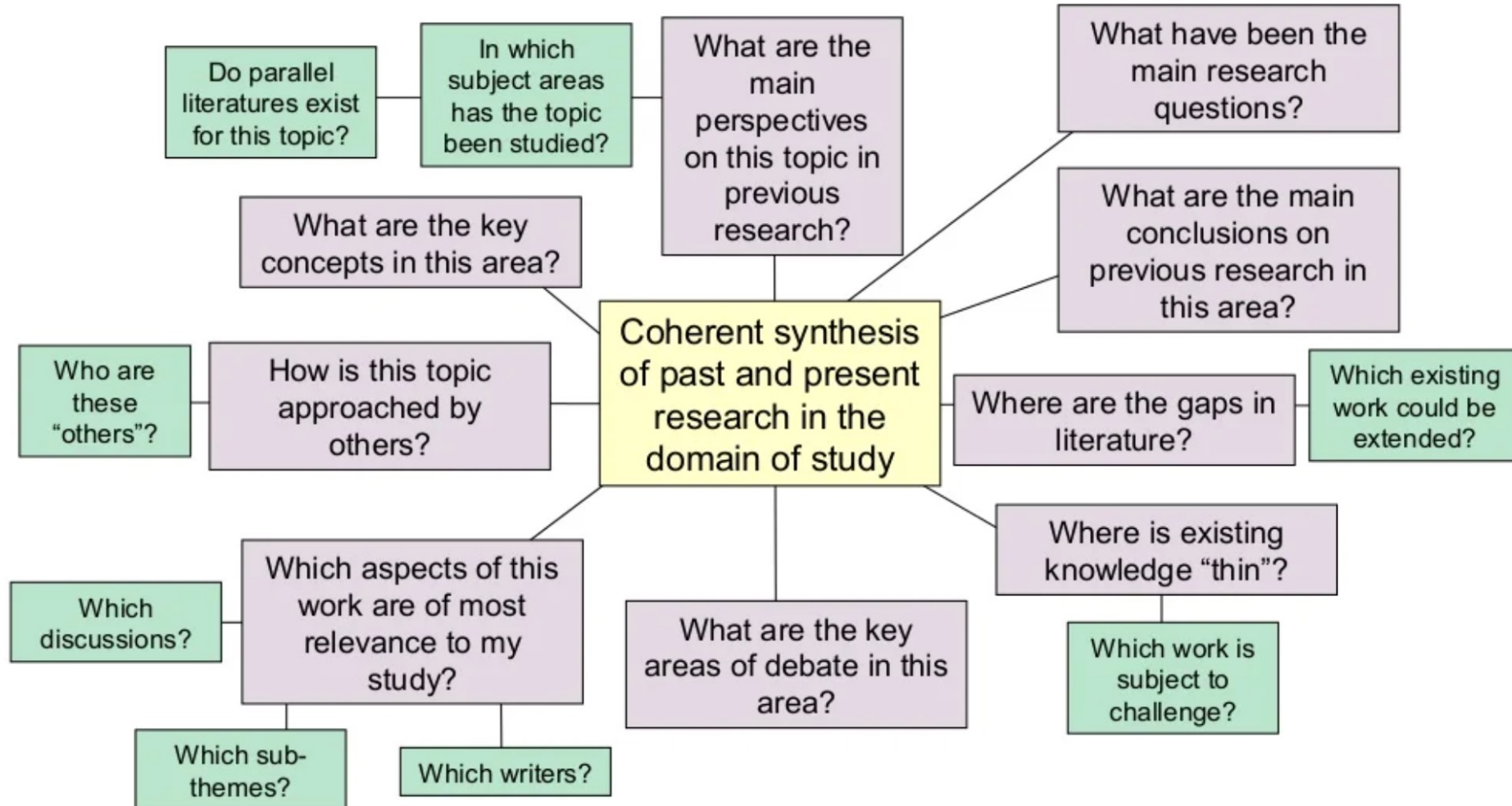
Key Questions

- 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**



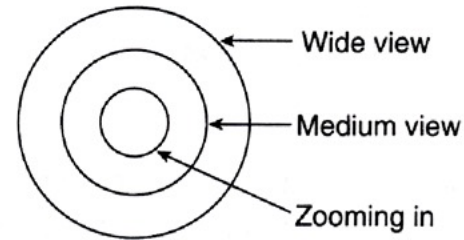
More questions



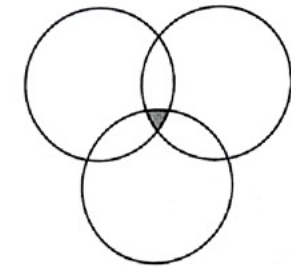
Typical structures

- Chronological
- Conceptual (e.g. pro/contra)
- Experimental/
Methodological
- Centered on Implications

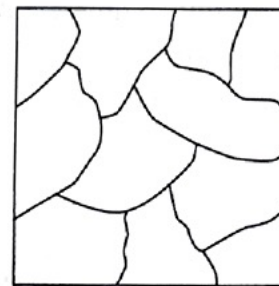
But: remember your point!



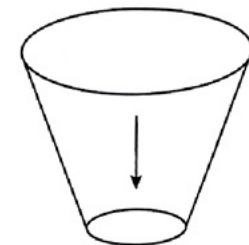
(a) Zooming



(b) Finding intersections



(c) Patch working



(d) Funelling

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

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

Resources