

Reviews in Quantitative Biology

Introduction



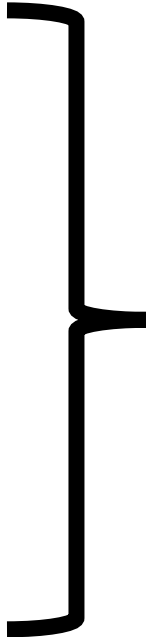
Time	Topic
11:00-11:20	Introduction
11:20-11:45	How to write a review
11:45-12:00	Break
12:00-12:45	Guest presentation
12:45-13:00	Q&A

How many people...

- Know what is a review?
- Have read a review?
- Have written a review?
- Have published a review?

Course in a nutshell

Hear a
Write a
Evaluate a



Review

Why review the literature?

- Discover and learn new topics
- Identify relevant research questions
- Build upon existing work

Why write a review?

- Introduce proposals, research plans, theses, papers...
- Improve your writing skills
- Improve your science communication skills
- Think/understand through writing

Why peer review?

- Be a good citizen
- Stay at the forefront of research
- Sharpen your critical thinking skills
- Impress the editor

Learning outcomes

- Recognize current QB topics
- Identify relevant papers
- Organize and summarize relevant work in a clear, coherent, concise, and correct review
- Provide critical and constructive peer reviews
- Improve your work from peer reviews

Organization

- Main tutorial (11am – 1pm)
 - 1 hr on specifics of the writing and reviewing process
 - 1 hr review on a special topic by an invited speaker
 - Presence mandatory!

Assignments

Write 1 review and do 2 peer reviews

	1st Friday	2nd Friday	3rd Friday	4th Friday	5th Friday	6th Friday	7th Friday	8th Friday
	Nov.04	Nov.11	Nov.18	Nov.25	Dec.02	Dec.09	Dec.16	Dec.24
Group 1	Topic presented in class (Daron)		Your paper due	Get peer review for your paper	Revision for your paper due			
				Your peer review due		Your peer review due		
Group 2		Topic presented in class (van Leeuwen)		Your paper due	Get peer review for your paper	Revision for your paper due		
					Your peer review due		Your peer review due	
Group 3			Topic presented in class (Majidian)		Your paper due	Get peer review for your paper	Revision for your paper due	
				Your peer review due				
Group 4				Topic presented in class (Soyk)		Your paper due	Get peer review for your paper	Revision for your paper due
				Your peer review due	Your peer review due			
Independent	Topic decided by you		Your paper due	Get peer review for your paper	Revision for your paper due			
				Your peer review due		Your peer review due		

RQB 2022 Friday Schedule

Location: see table below (or <https://unil.zoom.us/my/natashaglover>)

Week	Date	Location	11:00-12:00	12:00-13:00
1st	04 Nov	Génopode C	Introduction & How to write a review	Dr. Josquin Daron (Université de Montpellier): Transposable elements and population genetics in mosquitos
2nd	11 Nov	Génopode A	Writing science in plain English	Prof. Jolanda van Leeuwen (CIG): Conservation of genetic interaction properties
3rd	18 Nov	Cubotron III	Editing & Peer review	Dr. Sina Majidian (DBC): Applications of k-mer analysis in quantitative biology
4th	25 Nov	Génopode A	How to get published	Prof. Sebastian Soyk (CIG): Dissecting quantitative variation by genome editing

Participants not assigned to one topic plan to write their own review.

Writing and Independent review

- You **must** get your advisor to agree to review your paper
- Paper is due **2 weeks** from today!

Co-authoring reviews

- Reviews are written in **groups**
- Include a statement of author contribution at the end, e.g.:

JS wrote most of the introduction and section on PPI network and produced Table 1. CD wrote most of the section on regulatory network and produced the figures.

Manuscript

- Quality matters more than quantity, but ~2000 words is a typical length.
- Write with Google Docs + Paperpile (*recommended*)
- Initially submit as a PDF only with a References section and any images and tables.
- Submit revised version as a PDF with a cover letter addressing the referees' criticisms.

Course homepage

- <https://lab.dessimoz.org/teaching/rqb/>
 - Course details
 - Schedule
 - Slides
- Article management webpage (EasyChair):
<https://easychair.org/my/conference?conf=rqb22>

Authorship according to Genome Biology

To qualify as an author one should:

- 1) Have made substantial contributions to **conception and design**, or acquisition of **data**, or **analysis** and **interpretation** of data;
- 2) Have been involved in drafting the manuscript or revising it critically for important intellectual content; and
- 3) Have given final approval of the version to be published.
- 4) Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship.

Share credit with lecturer

- Reviews written in this course heavily draw from the presentation.
- Thus, the speaker is typically listed as **last author** on your submission.
- Note that if this was a *real* submission, the other two requirements would also need to be fulfilled.

My expectations

- Demanding tutorial
- Presence and participation on Fridays
- Strong commitment to both review and peer-review
- Intellectual honesty: no plagiarism nor fabrication!

Your expectations

- What do you expect from this course?
- What topics do you want to learn about in the paper-writing process?
- Questions, concerns?

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'. The search results are displayed in a list format. On the left side, there are filters for '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 search results are as follows:

- [HTML] Evolution by gene duplication: an update** [HTML] sciencedirect.com
J Zhang - Trends in ecology & evolution, 2003 - Elsevier [Paperpile] [Share]
... **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
- [HTML] Gene duplication as a major force in evolution** [HTML] springer.com
S Magadum, U Banerjee, P Murugan, D Gangapur... - Journal of genetics, 2013 - Springer [Paperpile] [Share]
... **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, ...
☆ Save 📄 Cite Cited by 336 Related articles All 15 versions Import into BibTeX
- Gene duplication: past, present and future**
PWH Holland - Seminars in cell & developmental biology, 1999 - Elsevier [Paperpile]
... **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 ...
☆ Save 📄 Cite Cited by 207 Related articles All 4 versions Import into BibTeX
- Evolution of gene duplication in plants** [HTML] oup.com
N Panchy, M Lehti-Shiu, SH Shiu - Plant physiology, 2016 - academic.oup.com [Paperpile] [Share]
... **gene duplication**, including **gene duplication** mechanisms, the potential fates of duplicate genes, models explaining duplicate **gene** ... , and the evolutionary impact of **gene duplication**. ...
☆ Save 📄 Cite Cited by 760 Related articles All 6 versions Import into BibTeX

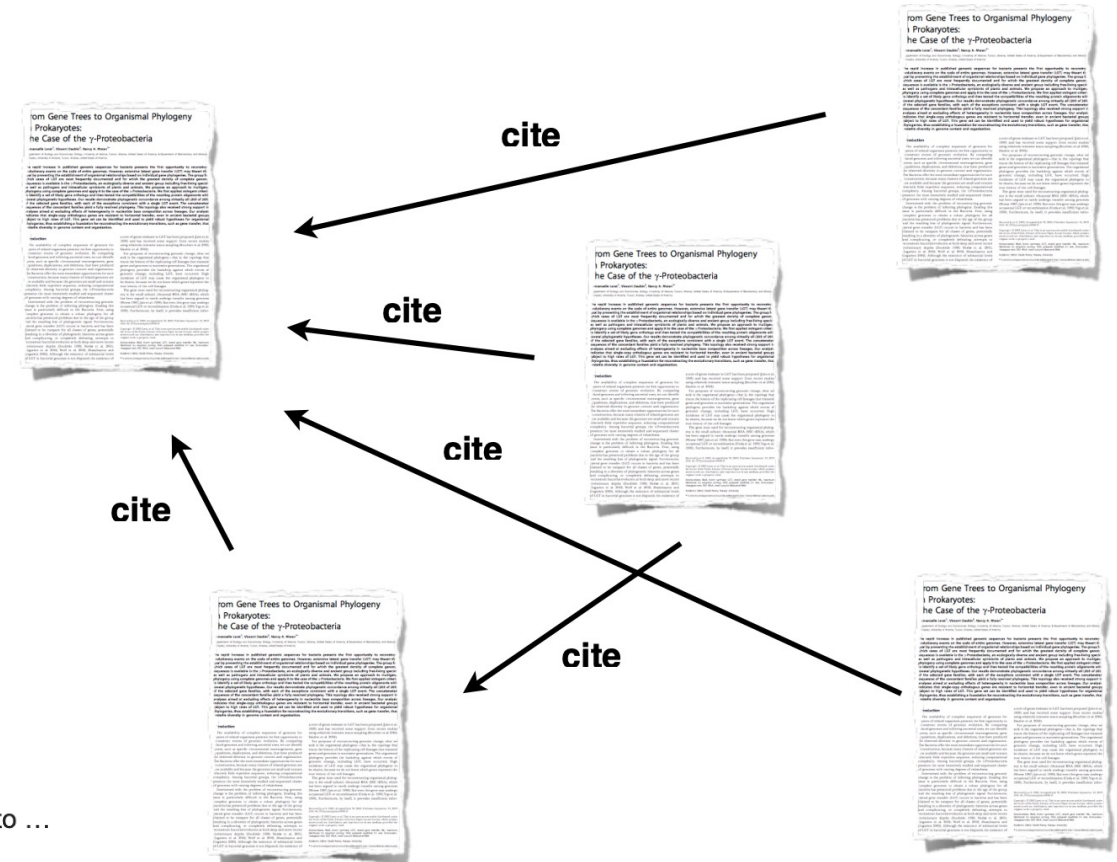


Shiny new
research
topic



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, featuring the word 'zotero' in a lowercase, sans-serif font. The letter 'z' is red, and the remaining letters 'otero' are black.

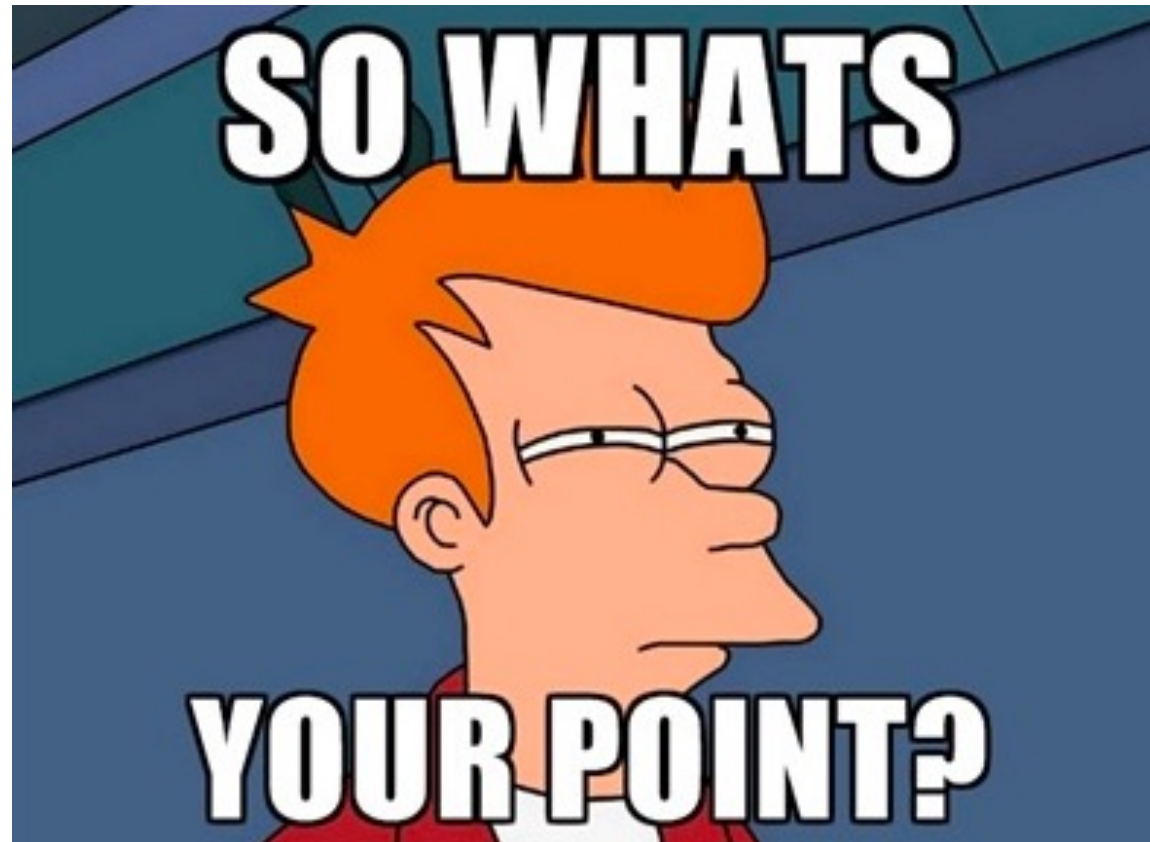
**Organize ideas,
structure
narrative**



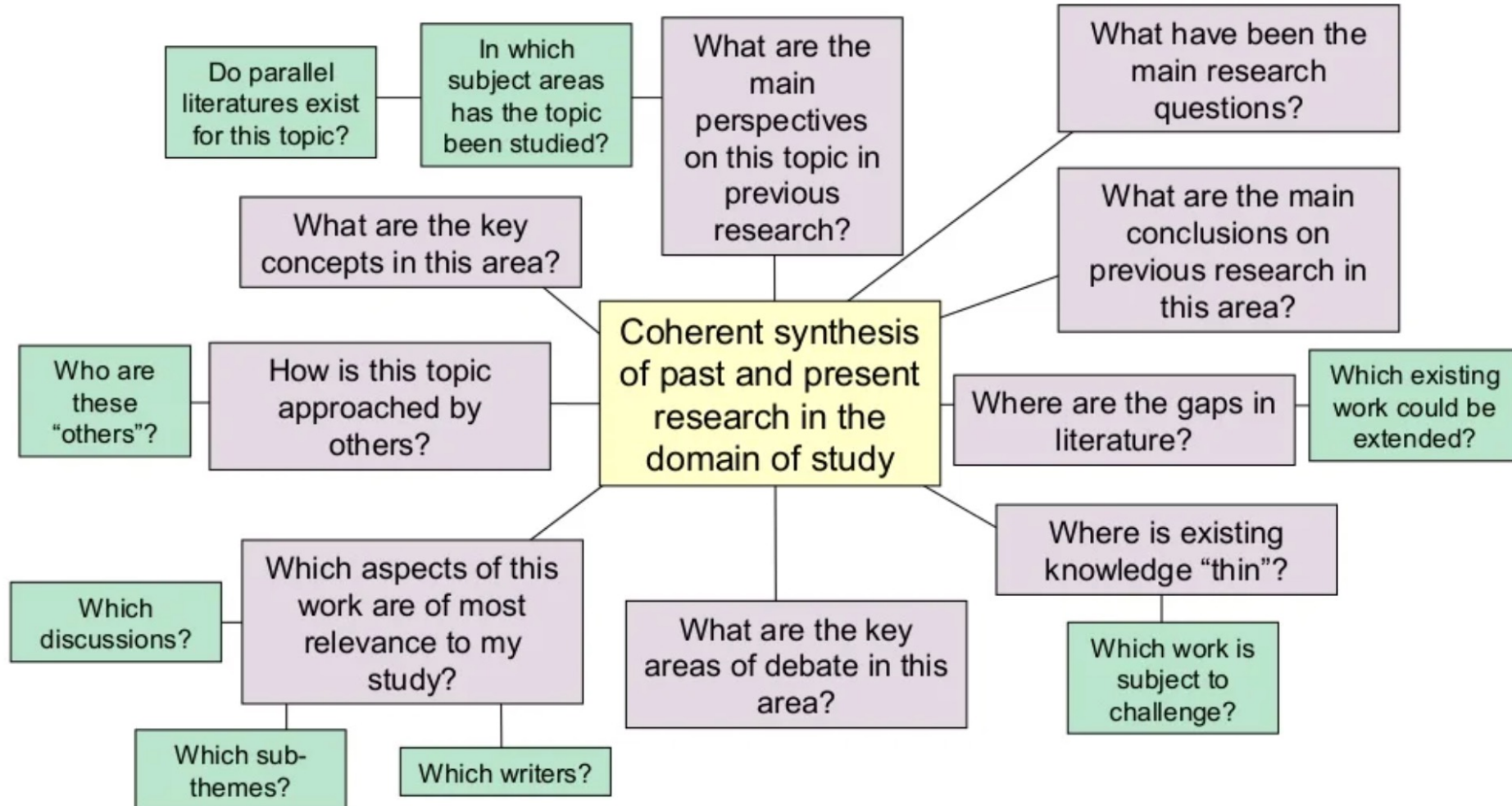
Key Questions

- 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**



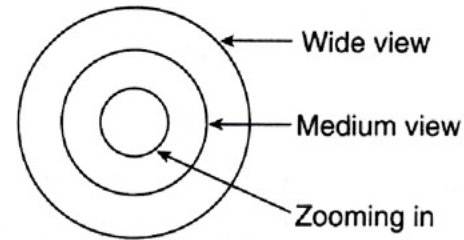
More questions



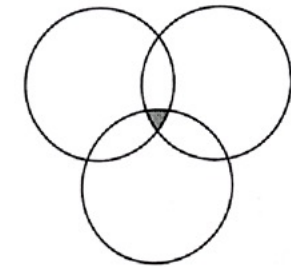
Typical structures

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

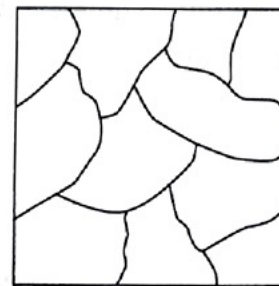
But: remember your point!



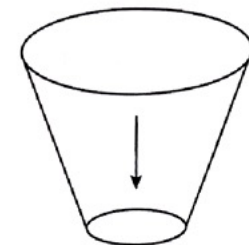
(a) Zooming



(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

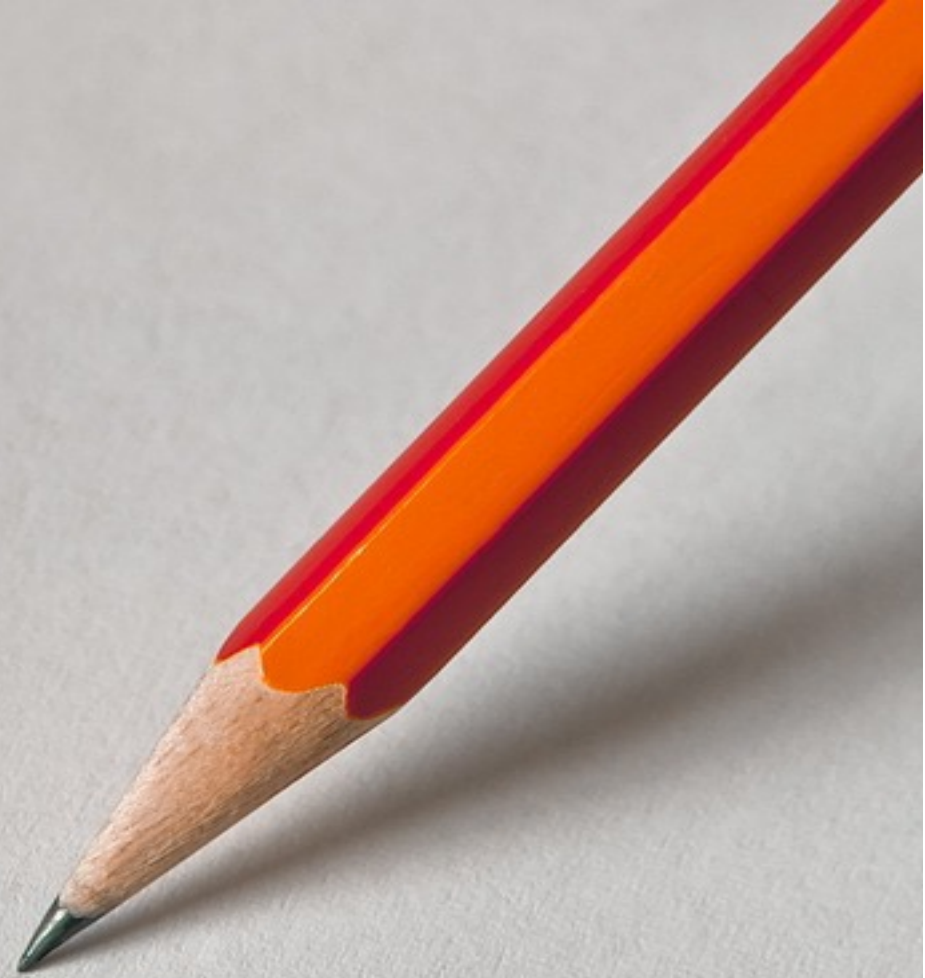
Drafting

- 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