Lit review, research questions, and Zotero

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about me!

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general thoughts on consuming science

different ways to get updates about science

- social media
  - often highly-biased and can be hard to find the original source so you can fact check
- news media
  - should observe journalistic standards (e.g., fact checking), but also can be subject to bias
- scientific journals
  - these are usually the primary sources for the posts that you see in other media outlets
  - these should be peer-reviewed by other experts in the field
  - should be the least biased (but there are still biases like what data is more likely to get published, who has an easier time getting published, impact of publications, etc.)
- the source of information can both eliminate *and introduce* sources of bias

why are you reading the piece?

- you may have different goals when you're reading for different reasons
  - e.g., trying to replicate a study -> focus on methods
  - trying to fact-check -> skim results (and need many different sources!)
  - other motivations?

some science journalists

The Atlantic

Ed Yong

THE WALL STREET JOURNAL.

Daniela Hernandez*
(*PhD in neurobiology from Columbia)

The New York Times

Nicholas St. Fleur

Medium

BROAD INSTITUTE

Anahita Vieira

literature reviews

what is a literature review?

- a broad search to get an overview of what is already known (and not known) about a topic
- usually the first step in evaluating an existing research question or in helping to generate a new one
- should include both theoretical/reviews as well as empirical research

literature review key elements

- unless you are doing this for a class where you have formatting guidelines, format is up to you
- popular approaches:
  - annotated bibliography
  - mind maps
  - bulleted lists (sometimes with subsections)

an example from my own notes

- **Temporal context models**
  - (Estes, 1955; Howard & Kahana, 2002), (Howard et al., 2014; Howard & Kahana, 2002; Manning, 2019; Norman et al., 2008; Polyn et al., 2009; Ranganath, 2019; Sederberg et al., 2008; Shankar & Howard, 2010, 2012)
  - Abrupt changes in cognitive state disrupt temporal context: (Lohnas et al., 2015; Polyn et al., 2009).
  - Context is important for recall: (Clewett & Davachi, 2017; Davachi & DuBrow, 2015; Zacks & Swallow, 2007)
  - Shifting vs. drifting: (DuBrow et al., 2017)

- **Context congruency**
  - MORRIS, D., BRANSFORD, J. D., & FRANKS, J. J. (1977). Levels of processing versus transfer appropriate processing. Journal of Verbal Learning & Verbal Behavior, 16,519-533.

  - TuLVING, E., & THOMSON, D. M. (I 973}. Encoding specificity and retrieval processes in episodic memory. Psychological Review, 80, 359-380.

- **Potentials for data scoring options:**
  - These plots that incorporate confidence w/ old/new judgments: https://www.tandfonline.com/doi/full/10.1080/09658211.2021.1901937?af=R

Models of cognitive & latent contexts
- (Park et al., 2020)

Sustained RT tasks:
- (Heideman et al., 2018)

RT effects depend on condition order:
- (Kóbor et al., 2020)

Detecting boundaries (more for eyetracking extension work):
- (Lawlor et al., 2021)

Full references:

Barakat, B. K., Seitz, A. R., & Shams, L. (2013). The effect of statistical learning on internal stimulus representations: Predictable items are enhanced even when not predicted. *Cognition*, *129*(2), 205–211. https://doi.org/10.1016/j.cognition.2013.07.003

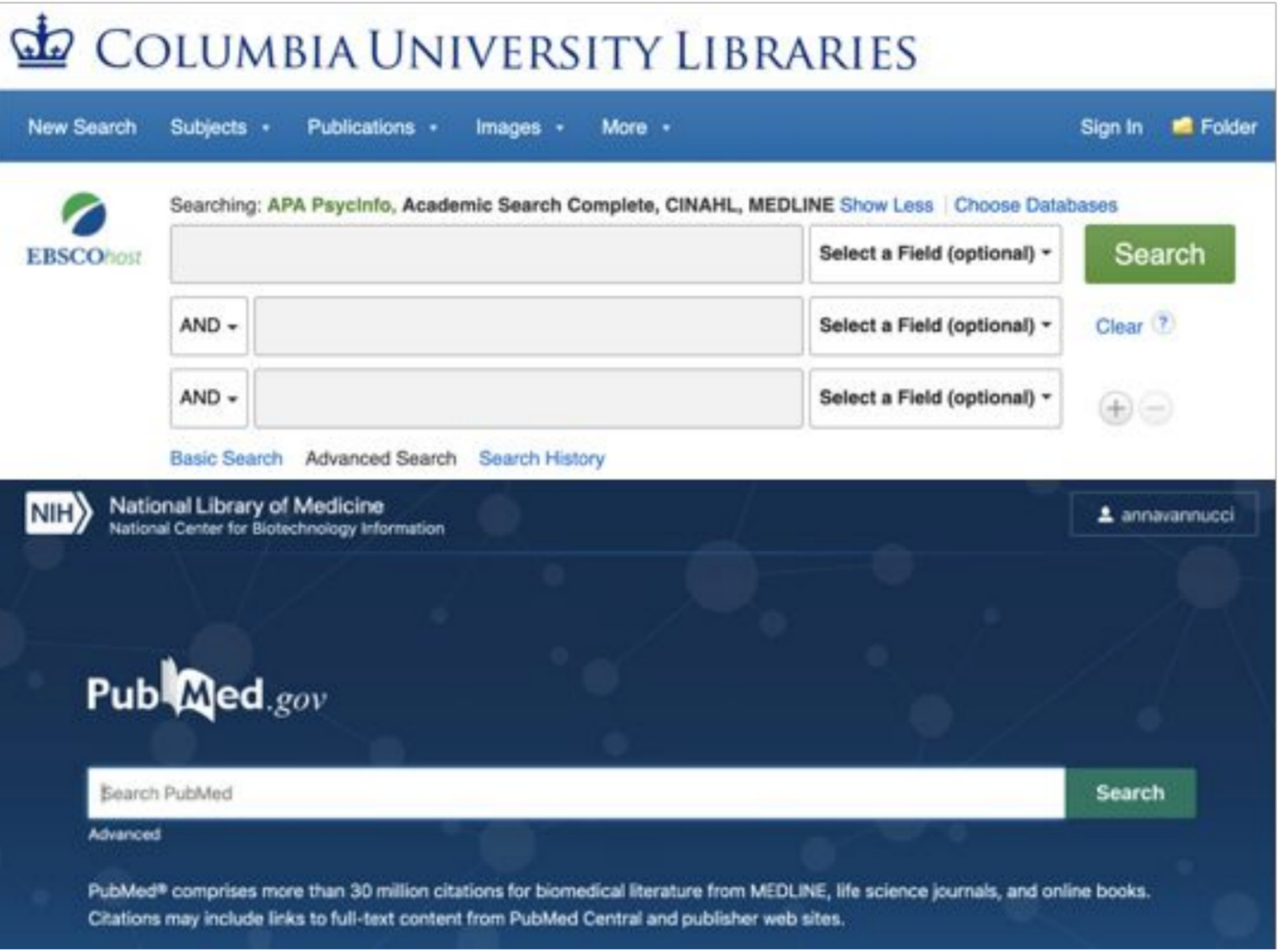
Damsma, A., Schlichting, N., & Rijn, H. van. (2021). Temporal context actively shapes EEG signatures of time

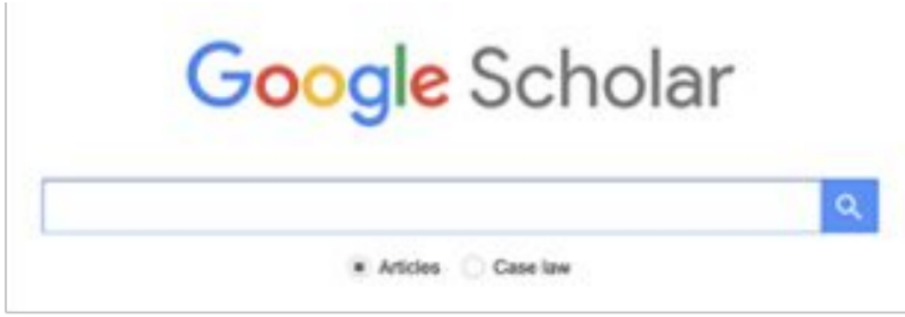
key elements, cont.

- should be able to **describe** and **compare** what is known about the topic already
- ideally, should have a sense of the **gaps** or **outstanding questions** in the area
- have a clear sense of what your study will (and will not) be able to address
  - if you discover that your research question has already been answered, time to go back to the drawing board
- should understand typical methodological approaches (and, therefore, the rational for how you plan to tackle the question)
- should have a clear answer to **why** your question is important to study, and how it will **advance understanding** of the topic

how to find scientific journal articles

- scholar.google.com
- https://pubmed.ncbi.nlm.nih.gov/
- https://www.apa.org/pubs/databases/psycinfo/





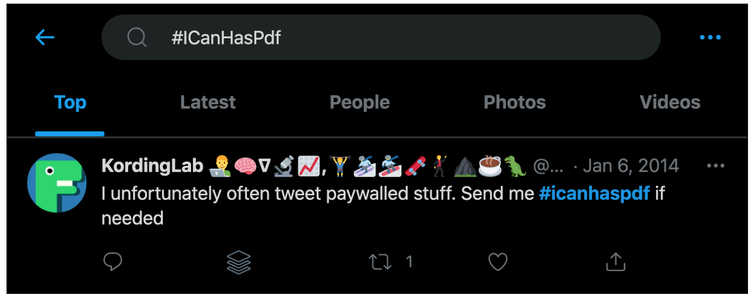
slide courtesy of Anna Vannucci, SIPPS 2021

problems with getting access

- many scientific journals require you to pay to access articles
  - usually university libraries have subscriptions so you don’t have to pay
  - some public libraries may also have subscriptions so you can access articles for free
  - access restrictions are *deliberate* (and an example of inequities in science)
- some journals are “open access” (i.e., everyone can see the articles without paying
  - https://www.eneuro.org/

eNeuro an open-access journal of SfN Society for Neuroscience

- crowdsourcing
  - #ICanHasPDF



my personal process

- do a very general keyword search
  - this will often include non-scientific sources like Wikipedia
- then, use these preliminary findings to do a slightly more refined search on these keywords and any new ones I've uncovered
  - typically, I use Google Scholar
- by now, I should hopefully have a sense of key authors who are working in this sub-area
  - do a more refined search on PubMed, or if I have found a good review paper pull articles that cite that work
- once I feel like I'm "chasing my tail" (that is, I keep finding papers or citations that I've already encountered from other sources), I usually move forward to the next steps of planning

tips for searching

- **start broad** with a variety of keywords
- use **search operators**
  - “quotes” to encompass a multi-word search term
  - **AND** to find ALL search terms
  - **OR** to find one or another of the search terms
  - **NOT** to exclude certain terms
  - **limiters** (e.g., age, gender, methodology, etc.)

finding citing articles (a personal favorite life hack!)

research questions

crafting research questions: reviewing from Ben's workshop

- once you've done a lit review, you should have a better sense of whether or not your question has already been answered
    - note: it's OK if it's been answered, but you are proposing a tweak (often called a **replication and extension**)
- should be a question that's interesting to you (remember you're going to be spending HOURS if not YEARS working on it), as well as the field/others in general
    - one "test" I use for this is whether I can come up with a toy example based on a real-world phenomena
    - sometimes I'll also pitch the idea to both scientists and non-scientists, and see if I can both explain the question and get them excited about what I might find

more on evaluating research questions

- should be **measurable** and **testable** (sometimes we say **falsifiable**)
- ideally, even if your primary hypothesis isn't supported, your results would be interesting/advance knowledge in the field
- should be able to sketch out (yes, I literally mean on paper!) your ideal results as well as at least one alternative
- also, should (at least conceptually) be able to write the introduction to your manuscript
    - in practice, I don't usually do this because I often change the focus based on my findings, but it's a good heuristic

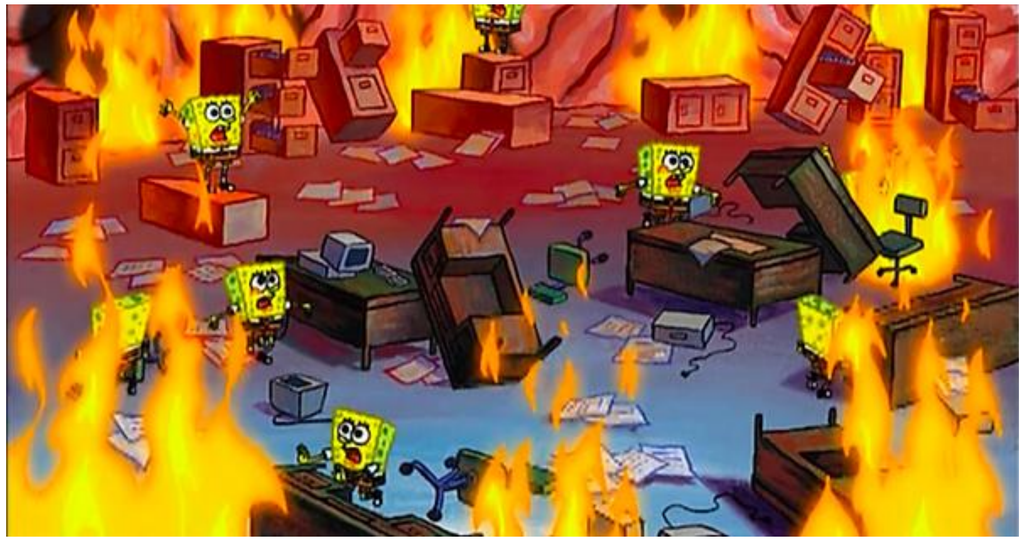
what’s **your** research question???

reference and citation managers

reference managers - options

- Mendeley
- EndNote
- PaperPile
- Zotero
  - (the only one of these that I’ve actually used extensively personally)

live demo: Zotero



end-of-workshop survey

- ugh, Halle, but whyyyyyy do we have to keep doing these???
  - SIPPS is designed by scientists and we love data (and also think it's the only *real* way to quantify if what we're doing is working)
  - one goal is to receive a grant to fund students in future summers, and funding agencies also love to see data of whether (or not) things are working
- https://docs.google.com/forms/d/e/1FAIpQLSfXQYejYNHPafF3AoaTSHLErGzyF62IeBieMzg-cZDMB4Y3vA/viewform