

Using AI tools for searching, classifying, extracting and synthesizing research

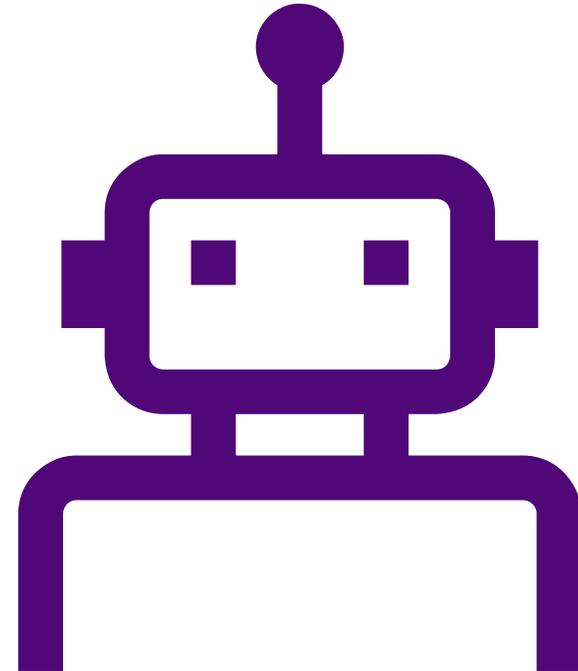
James Thomas



EPPI Centre
Evidence for
Policy & Practice

In this session

- Thinking about how AI tools work & what this means for their strengths & weaknesses for specific tasks
- Searching
- Classifying and extracting data
- Synthesis

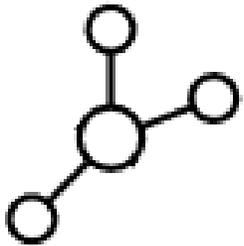




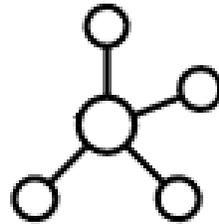
- How a GenAI chatbot works (simplified)
- Searching
 - Search technologies
 - 'Agentic' search
- Extract and classify
 - Retrieval Augmented Generation (RAG)
- Synthesise
 - Explainable AI

Building a GenAI chatbot

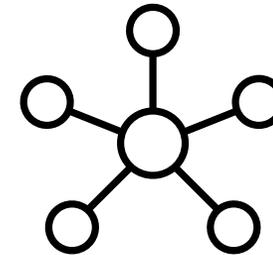
Pretraining
(unsupervised ML))



Fine-tuning
(supervised ML)



RLHF
(supervised ML)



'Naïve' model
Cannot 'chat'; next-
word prediction only

Model can now
'chat' and answer
questions

Model produces
'better' and less
toxic answers

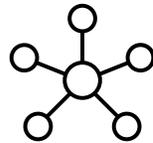
Generative LLM operation

Input

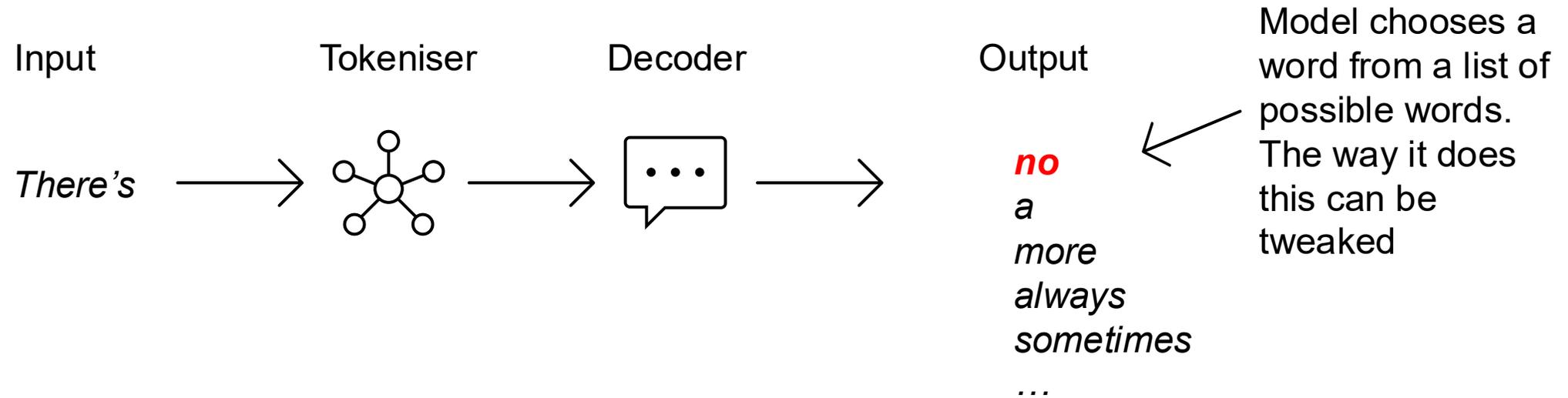
Tokeniser

Decoder

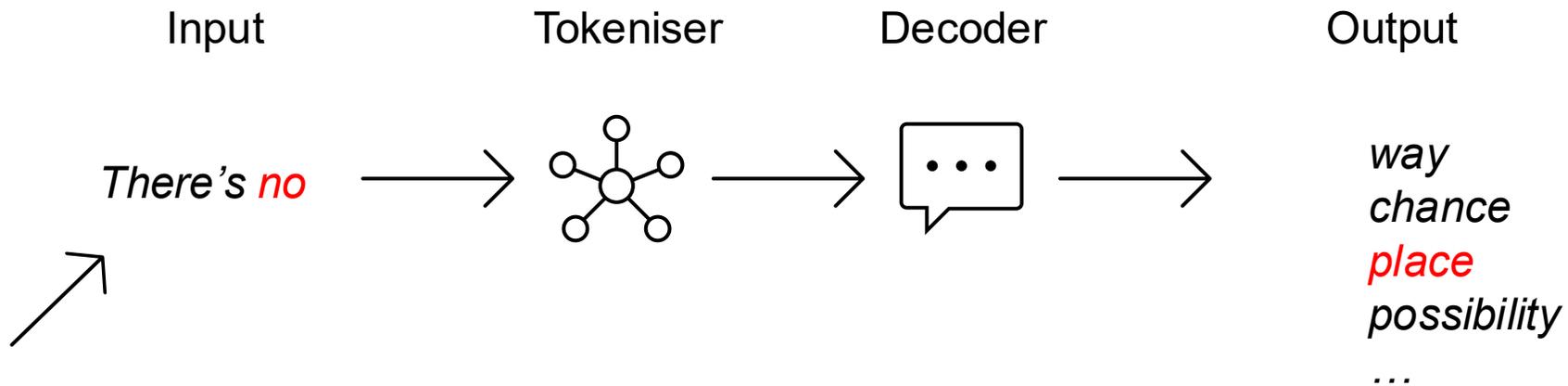
Output



Generative LLM operation

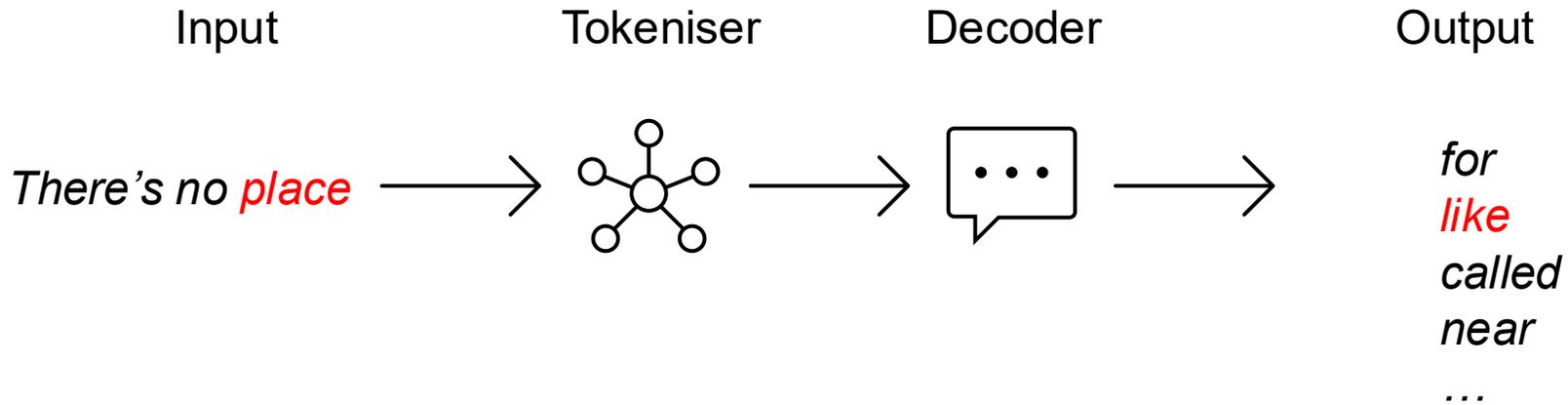


Generative LLM operation

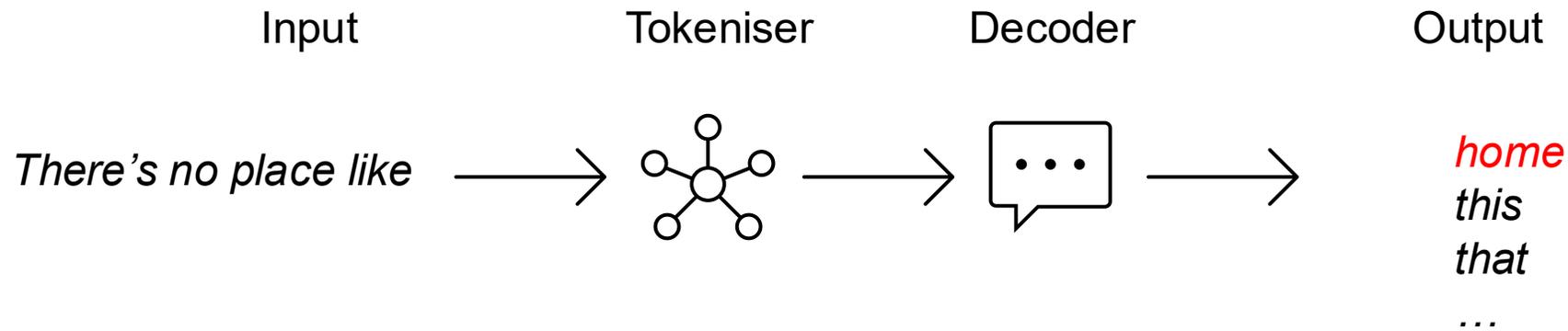


The selected word
is added to the
input

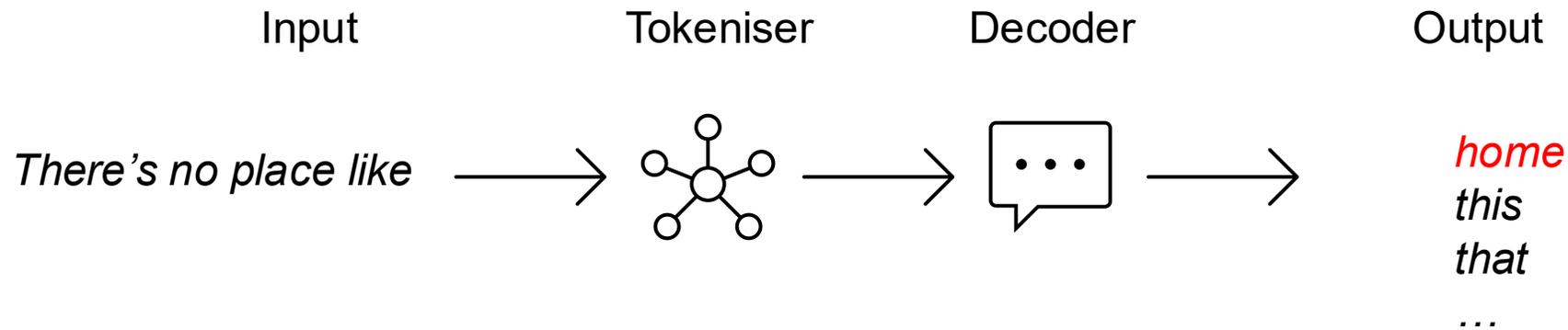
Generative LLM operation



Generative LLM operation

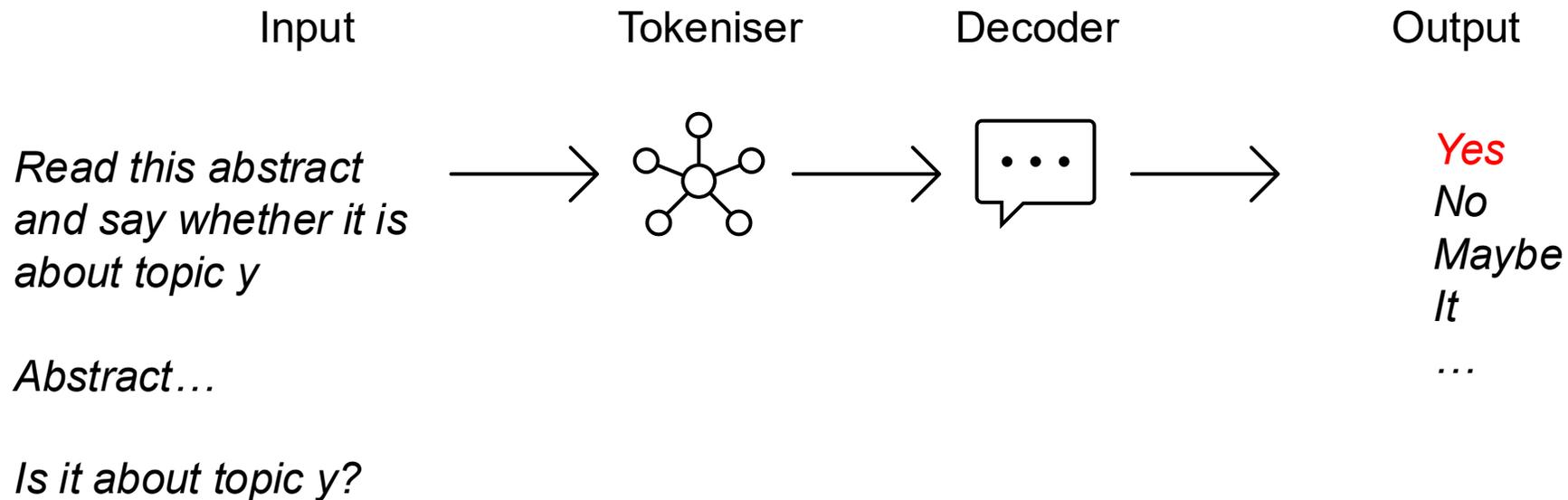


Generative LLM operation



*Important to bear in mind that the system does not plan ahead
...and at no point does it check the accuracy of what is 'said'*

Generative LLM operation



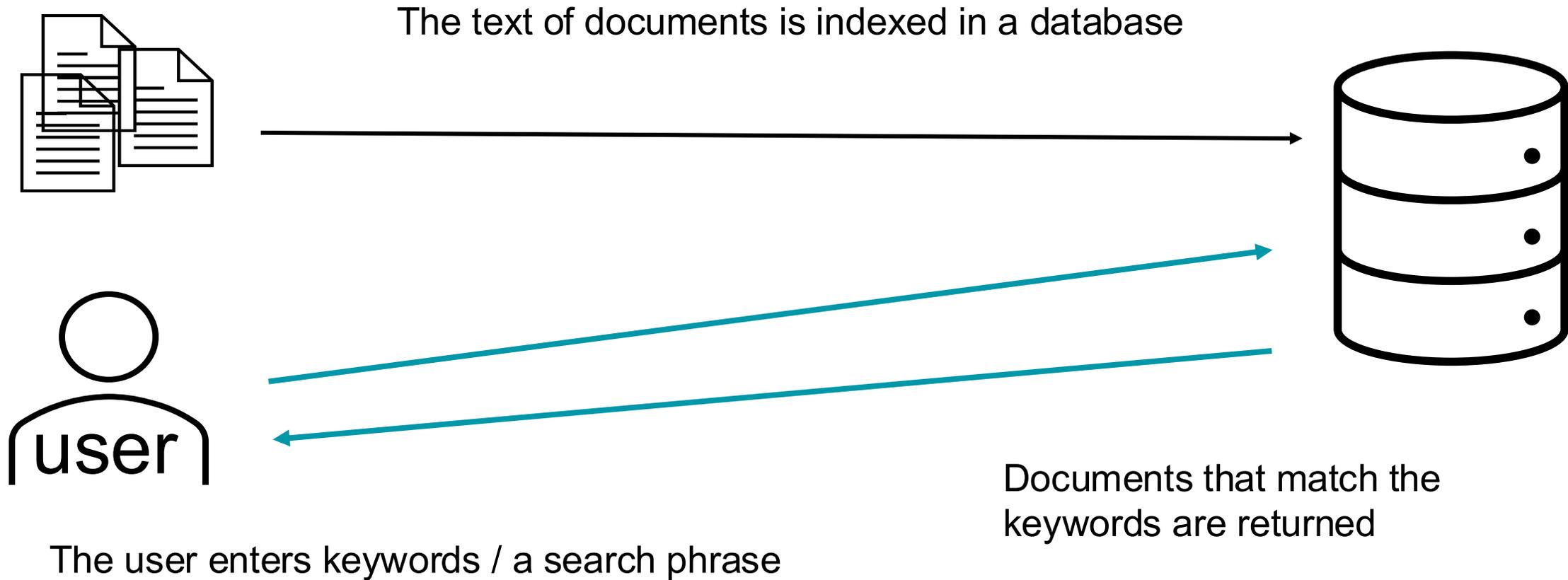
Instead of the prompt containing "There's no place like..." it could contain a question about a passage of text that is also in the prompt

Searching for research

Conventional tools & those that use open data

- E.g. Google Scholar, PubMed, ...
- Usually work using keyword / phrase matching
- Tools that utilise open data
 - Sadly, not all abstracts are open
- Offer ability to find ‘related documents’
 - Based on machine learning
 - Based on citation networks

Keyword search



**Is mindfulness an
effective intervention for
smoking cessation
among adults?**

Example of conventional search: OpenAlex

The screenshot displays the OpenAlex search results page for the query "Mindfulness for smoking cessation". The interface includes a search bar at the top, a list of works on the left, and a summary panel on the right.

Search Query: Mindfulness for smoking cessation

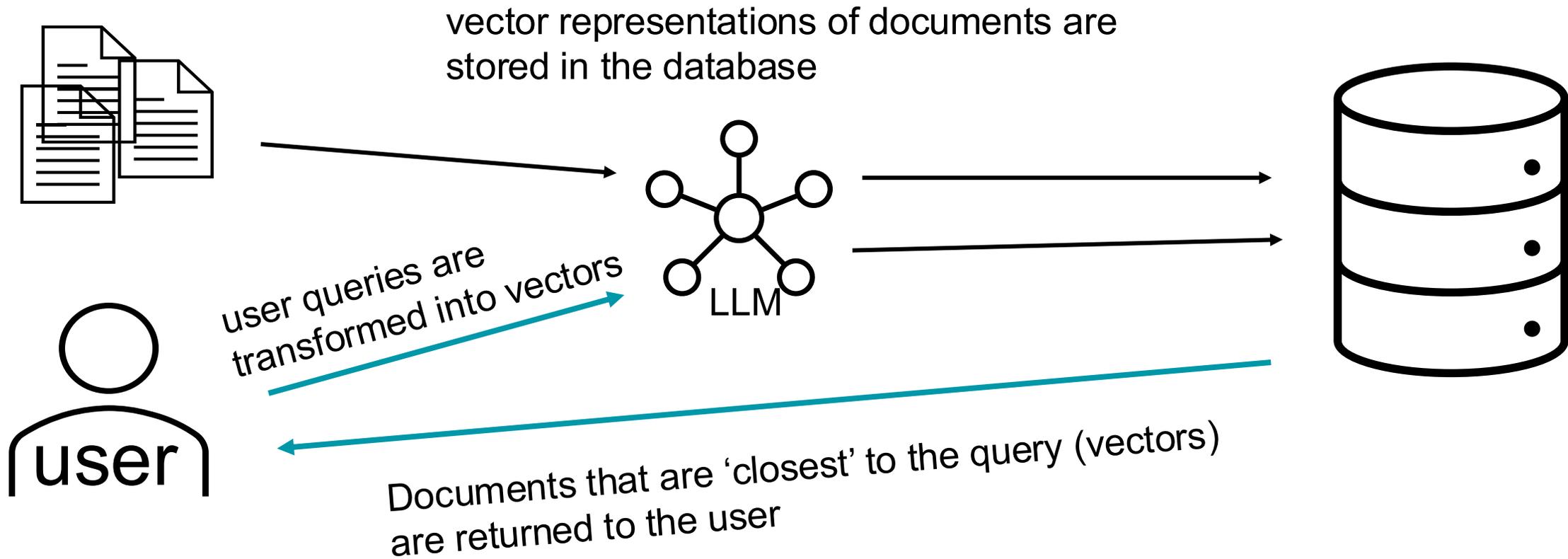
Works:

- Both Smoking Reduction With Nicotine Replacement Therapy and Motivational Advice Increase Future Cessation Among Smokers Unmotivated to Quit. 2004 · Matthew J. Carpenter, John R. Hughes, et al. · *Journal of Consulting and Clinical Psychology* Cited by 234
- Smoking cessation therapy during pregnancy. 2012 · Alex Cressman, Anna Pupco, et al. · *PubMed* Cited by 18
- Exercise in Addition to Nicotine Replacement Therapy Improves Success Rates in Smoking Cessation 2006 · Ralf Harun Zwick, Phillip Mutzbacher, et al. · *CHEST Journal* Cited by 6 PDF
- Awareness of Nicotine Replacement Therapy Among South African Smokers and Their interest in Using It for Smoking Cessation When Provided for Free 2013 · Israel T. Agaku, Olalekan Ayo-Yusuf · *Nicotine & Tobacco Research* Cited by 3
- Pharmacology of drugs used to treat smoking cessation and obesity 2008 · Kevin Johns, Jiri Frohlich, et al. · *Canadian Journal of Cardiology* Cited by 1

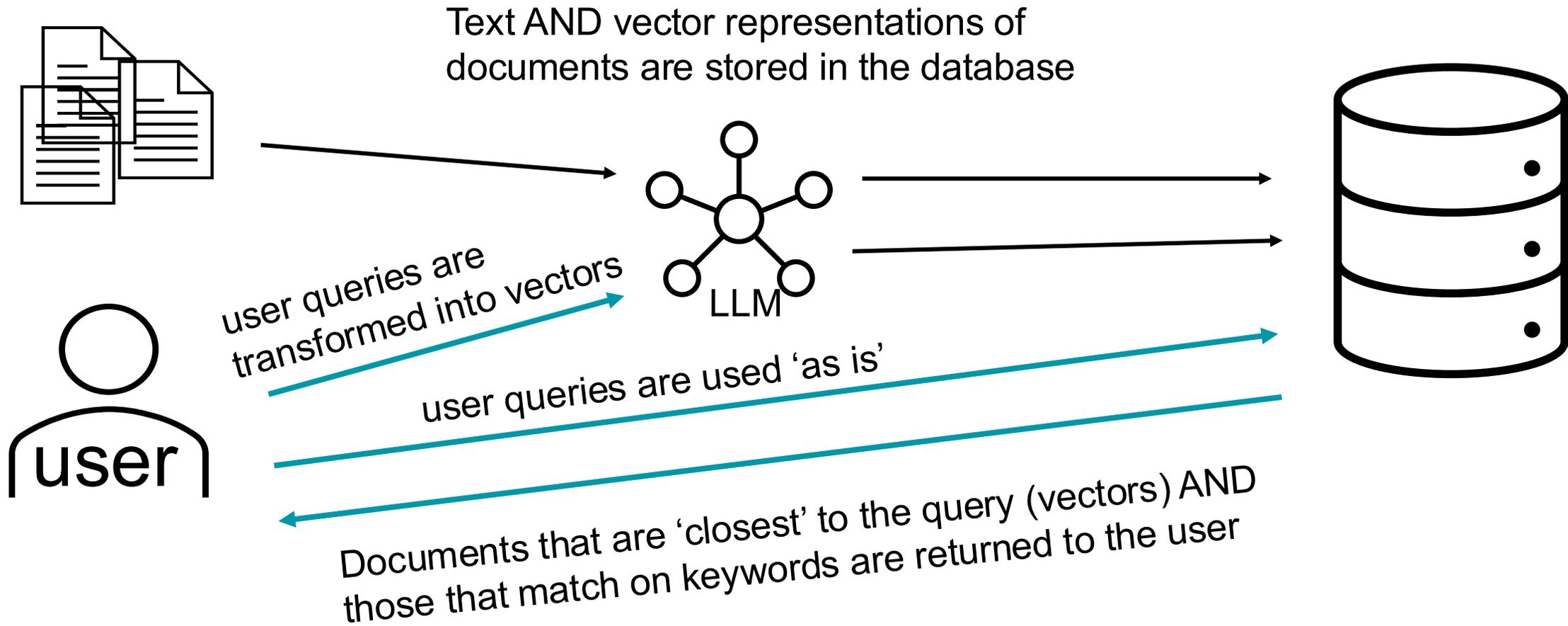
Stats:

- 9 results**
- Open Access:** 33.3% (3 items)
- Year:** A bar chart showing the distribution of results over time.
- Topic:**
 - Smoking Behavior and Cessation: 6
 - Fatty Acid Research and Health: 1
 - Pharmacology and Obesity Treatment: 1
 - Health and Lifestyle Studies: 1
- Institution:**
 - University of Vermont: 1
 - The University of Queensland: 1
 - St. Paul's Hospital: 1
 - Auckland City Hospital: 1
 - Princess Alexandra Hospital: 1

Semantic search



Hybrid search



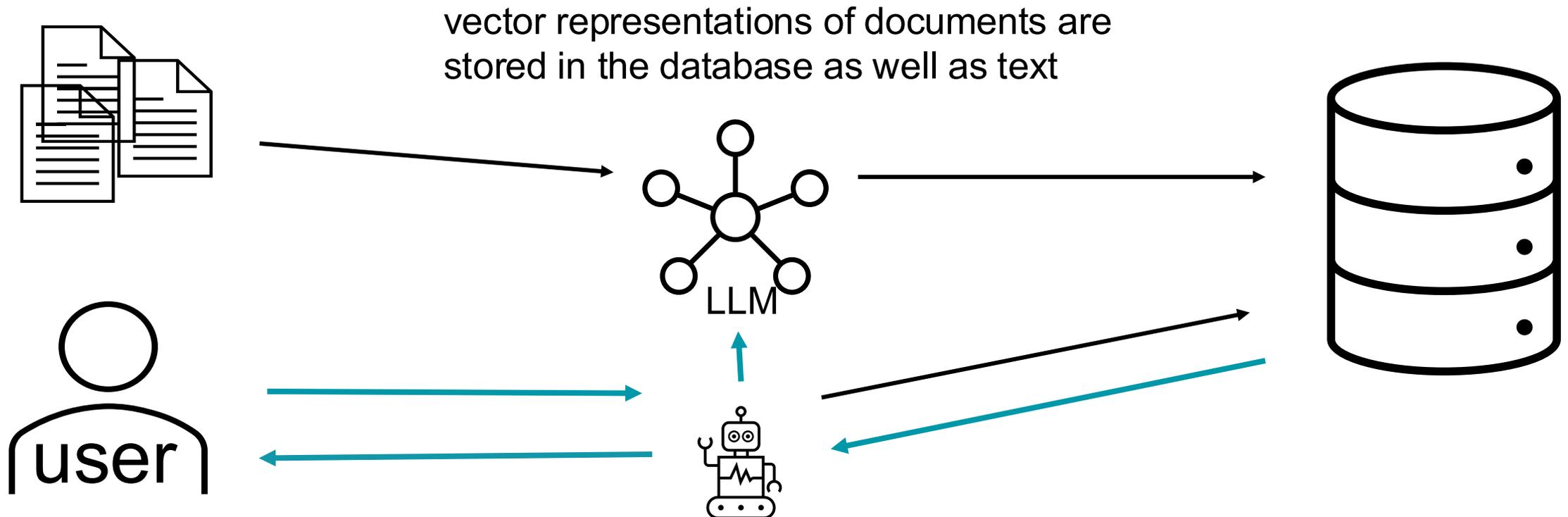
Example of hybrid search: Elicit

Elicit
Recent
Library

<input type="checkbox"/> Paper	Abstract summary
<input type="checkbox"/> Mindfulness for smoking cessation S. Jackson +5 Cochrane Database of Systematic Reviews 2020 · 16 citations DOI 	Mindfulness-based smoking cessation interventions do not show a clear benefit for increasing quit rates or improving mental health outcomes compared to other treatments.
<input type="checkbox"/> Efficacy of mindfulness meditation for smoking cessation: A systematic review and meta-analysis. M. Maglione +8 Addictive Behaviours 2017 · 74 citations DOI 	Mindfulness meditation did not show significant effects on smoking cessation compared to other interventions, indicating low efficacy.
<input type="checkbox"/> Feasibility and Efficacy of a Brief Mindfulness-Based Smoking Intervention Delivered via the Internet: A Randomized Controlled Trial Michael Br Schmidt +2 Substance Use & Misuse 2023 · 1 citation DOI 	A brief, online mindfulness-based intervention effectively reduces craving but does not significantly change smoking quantity among adults.
<input type="checkbox"/> Mindfulness training for smoking cessation: results from a randomized controlled trial. J. Brewer +11 Drug and Alcohol Dependence 2011 · 375 citations Source DOI 	Mindfulness training shows greater effectiveness than standard treatments for smoking cessation, with higher rates of abstinence and reduced cigarette use.
<input type="checkbox"/> Mindfulness training for smoking cessation: moderation of the relationship between craving	Mindfulness training may be effective for smoking cessation by reducing the correlation between craving

Load more

'Agentic search'



user queries are transformed by the agent into text and vector searches; the database is searched; the agent then screens results, identifies related records and (often) undertakes multiple 'rounds' of searching before returning results to the user

PaperFinder from Ai2

<https://paperfinder.allen.ai/>

An agentic, iterative search that analyses your query before constructing and carrying out a search using standard free text terms as well as vector indexes

Uses LLMs to help develop the search at multiple points

✦ Ai2 Paper Finder

U **User** Today, 6:09 p.m.
Is mindfulness an effective intervention for smoking cessation among adults?

✦ Analyzing request. ✓
This is how I interpreted your request:
Look for a set of papers.
Content criteria: Search for "whether mindfulness is an effective intervention for smoking cessation among adults"
To be considered relevant, the paper's content must satisfy:

- **Mindfulness Intervention:** The paper discusses mindfulness-based interventions, practices, or techniques. This includes meditation, mindful breathing, body scan, or other related approaches.
- **Smoking Cessation:** The paper focuses on smoking cessation, quitting smoking, or reducing cigarette consumption. It should address methods, strategies, or interventions aimed at helping individuals stop smoking. ✓
- **Adult Population:** The study population consists of adults (typically 18 years or older). The paper should explicitly mention or imply that the

✦ Ai2 Paper Finder

helping individuals stop smoking.

- **Adult Population:** The study population consists of adults (typically 18 years or older). The paper should explicitly mention or imply that the participants are adults.
- **Effectiveness Evaluation:** The paper evaluates the effectiveness of mindfulness interventions for smoking cessation. It should present data, results, or analyses that assess whether mindfulness helps adults quit or reduce smoking. This includes studies that compare mindfulness to other interventions or control groups.

Processing request: "Find academic papers about whether mindfulness is an effective intervention for smoking cessation among adults." ✓

Searching for papers. ✓

Running keyword and semantic searches for "whether mindfulness is an effective intervention for smoking cessation among adults". ✓

Following citations that were mentioned in relevant passages. ✓

Reranking candidate documents. ✓

Judging relevance of top documents. ✓

Found 34 relevant papers. ✓

Found 30 perfectly relevant papers. ✓

Sorting result set. ✓

Found 2 relevant papers. ✓

Found 3 perfectly relevant papers. ✓

Finalizing response. ✓

Strengths and limitations: agentic search



- Can provide more semantically powerful searches
- Less 'fragile' than a Boolean search (and not necessary to know all relevant terms in advance)
- BUT
- Dependent on the right documents being available for indexing
- Dependent on the query being translated effectively by the agent
- Little in the way of an evidence base to support their use in evidence synthesis

Searching...

Conventional tools

- <https://scholar.google.com>

Using open data for identifying related papers

- <https://www.connectedpapers.com/> (only two networks for free!)
- <https://openalex.org/>

‘Semantic search’

- <https://elicit.com/> (select ‘find papers’)

‘Agentic search’

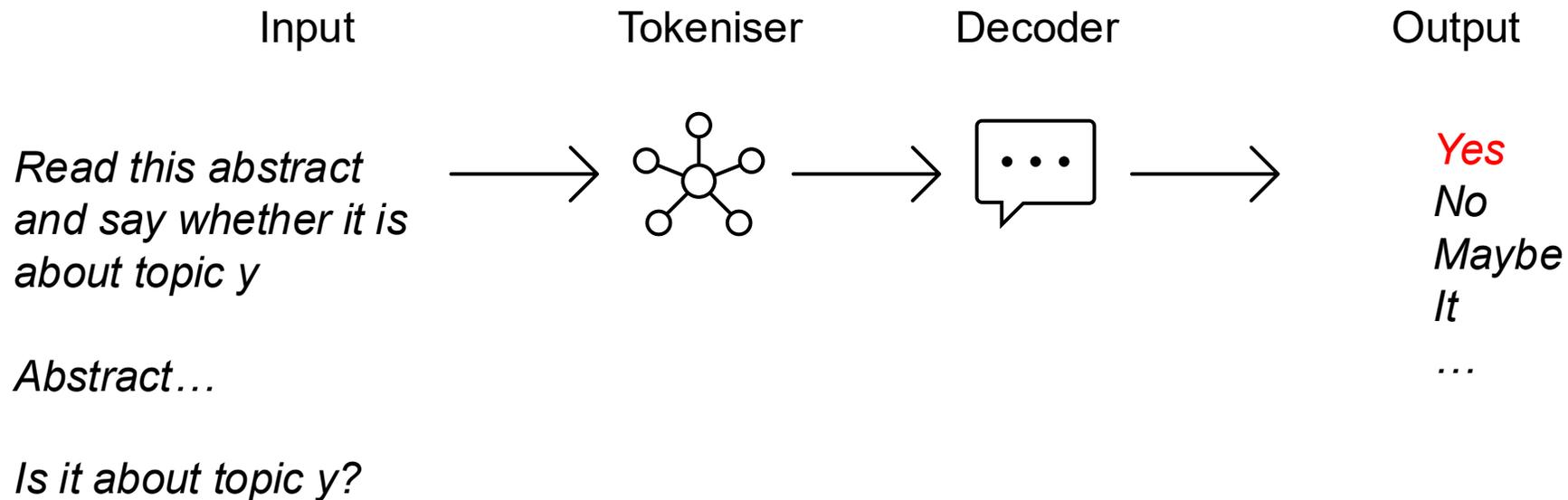
- <http://paperfinder.allen.ai>

Your turn...

- Pick a on a topic you know well, or are currently working on
- Search for papers on:
 - [Google Scholar](#)
 - [ConnectedPapers](#) or [OpenAlex](#)
 - [Elicit](#)
 - [Ai2 Paper Finder](#)
- For each search, what do you think of the:
 - Relevance of results
 - Comprehensiveness of results
 - Signal : noise ratio?

Extract & classify

Generative LLM operation (recap)



Instead of the prompt containing “There’s no place like...” it could contain a question about a passage of text that is also in the prompt

It's all in the prompt

- Everything used in a data extraction or classification task is in the prompt: the user inputs no training data
- E.g. uploading a document and extracting information about the intervention
 - ‘in-context’ learning
- E.g. uploading a document and asking the LLM to classify it in terms of its behaviour change technique
 - ‘zero shot’ learning

Data (information) extraction

- Earlier language models lacked precision & limited context 'window'
- Newer models have larger windows and offer impressive early results
- E.g. Claude2, published by Anthropic

The screenshot shows the Anthropic website homepage. At the top left is the 'ANTHROPIC' logo. To the right is a navigation menu with links for 'Product', 'Research', 'Company', 'News', and 'Careers'. The main heading reads 'AI research and products that put safety at the frontier'. Below this are two main content blocks. The left block is titled 'NEW' and 'Claude in Beta, now available!', with a subtext 'Your friendly assistant. Fast, capable, and truly conversational.' and a 'Talk to Claude' button. The right block is titled 'ENTERPRISE' and 'Build with Claude', with a subtext 'Start using Claude and unlock business value with AI.' and a 'Submit business interest' button.

ANTHROPIC

Product Research Company News Careers

AI research and products that put safety at the frontier

NEW

Claude in Beta, now available!

Your friendly assistant. Fast, capable, and truly conversational.

Talk to Claude

ENTERPRISE

Build with Claude

Start using Claude and unlock business value with AI.

Submit business interest

Here is a report of a randomized trial. State: the population recruited; the intervention(s) evaluated; the main outcome(s) measured; and the statistical results of the primary outcome

JT

According to the paper, this randomized controlled trial had the following key details:

Population:

- 4613 participants aged 18+ years who smoked daily and were willing to make a serious quit attempt in the UK.
- Recruited online, mainly via the English Department of Health website.
- Stratified into low socioeconomic status (n=2142) and high socioeconomic status (n=2471) based on occupation.

Interventions:

- Interactive internet-based smoking cessation website called StopAdvisor.
- Control group received a 1-page static website with brief standard smoking cessation advice.

Main outcome:

- Primary outcome was biochemically verified 6-month sustained abstinence from smoking (self-report of smoking ≤ 5 cigarettes in the past 6 months plus saliva cotinine < 15 ng/mL).

Results:

- No overall difference between groups in 6-month abstinence (StopAdvisor 10% vs control 10%, RR 1.06, 95% CI 0.89-1.27, $p=0.49$).
- In the low SES subgroup, 6-month abstinence was higher in StopAdvisor vs control (8% vs 6%, RR 1.36, 95% CI 1.00-1.86, $p=0.0499$).
- No difference between groups in the high SES subgroup (StopAdvisor 12% vs control 13%, RR 0.95, 95% CI 0.77-1.17, $p=0.61$).

Internet-based intervention for smoking cessation (StopAdvisor) in people with low and high socioeconomic status: a randomised controlled trial

Jamie Brown, Susan Michie, Adam WA Geraghty, Lucy Yardley, Benjamin Gardner, Lion Shahab, John A Stapleton, Robert West

Summary

Background Internet-based interventions for smoking cessation could help millions of people stop smoking at very low unit costs; however, long-term biochemically verified evidence is scarce and such interventions might be less effective for smokers with low socioeconomic status than for those with high status because of lower online literacy to engage with websites. We aimed to assess a new interactive internet-based intervention (StopAdvisor) for smoking cessation that was designed with particular attention directed to people with low socioeconomic status.

Methods We did this online randomised controlled trial between Dec 6, 2011, and Oct 11, 2013, in the UK. Participants aged 18 years and older who smoked every day were randomly assigned (1:1) to receive treatment with StopAdvisor or an information-only website. Randomisation was automated with an unseen random number function embedded in the website to establish which treatment was revealed after the online baseline assessment. Recruitment continued until the required sample size had been achieved from both high and low socioeconomic status subpopulations. Participants, and researchers who obtained data and did laboratory analyses, were masked to treatment allocation. The primary outcome was 6 month sustained, biochemically verified abstinence. The main secondary outcome was 6 month, 7 day biochemically verified point prevalence. Analysis was by intention to treat. Homogeneity of intervention effect across the socioeconomic subsamples was first assessed to establish whether overall or separate subsample analyses were appropriate. The study is registered as an International Standard Randomised Controlled Trial, number ISRCTN99820519.

Findings We randomly assigned 4613 participants to the StopAdvisor group (n=2321) or the control group (n=2292); 2142 participants were of low socioeconomic status and 2471 participants were of high status. The overall rate of smoking cessation was similar between participants in the StopAdvisor and control groups for the primary (237 [10%] vs 220 [10%] participants; relative risk [RR] 1.06, 95% CI 0.89-1.27; $p=0.49$) and the secondary (358 [15%] vs 332 [15%] participants; 1.06, 0.93-1.22; $p=0.37$) outcomes; however, the intervention effect differed across socioeconomic status subsamples (1.44, 0.99-2.09; $p=0.0562$ and 1.37, 1.02-1.84; $p=0.0360$, respectively). StopAdvisor helped participants with low socioeconomic status stop smoking compared with the information-only website (primary outcome: 90 [8%] of 1088 vs 64 [6%] of 1054 participants; RR 1.36, 95% CI 1.00-1.86; $p=0.0499$; secondary outcome: 136 [13%] vs 100 [10%] participants; 1.32, 1.03-1.68, $p=0.0267$), but did not improve cessation rates in those with high socioeconomic status (147 [12%] of 1233 vs 156 [13%] of 1238 participants; 0.95, 0.77-1.17; $p=0.61$ and 222 [18%] vs 232 [19%] participants; 0.96, 0.81-1.13, $p=0.64$, respectively).



Lancet Respir Med 2014

Published Online
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[http://dx.doi.org/10.1016/S2213-2600\(14\)70195-X](http://dx.doi.org/10.1016/S2213-2600(14)70195-X)

See Online/Comment
[http://dx.doi.org/10.1016/S2213-2600\(14\)70214-0](http://dx.doi.org/10.1016/S2213-2600(14)70214-0)

Cancer Research UK Health Behaviour Research Centre, Department of Epidemiology and Public Health (J Brown PhD, B Gardner DPhil, L Shahab PhD, Prof R West PhD) and Department of Clinical, Educational, and Health Psychology (Prof S Michie, Prof R West); University College London, London, UK; National Centre for Smoking Cessation and Training, London, UK (Prof S Michie, Prof R West); Primary Care and Population Sciences (A W A Geraghty PhD) and School of Psychology (Prof L Yardley PhD), University of Southampton, Southampton, UK; Addictions Department, Institute of Psychiatry, Kings College London, London, UK (J A Stapleton MSc)
Correspondence to: Dr Jamie Brown, Health

The overall rate of smoking cessation was similar between participants in the StopAdvisor and control groups for both the primary (237 [10%] vs 220 [10%] participants; relative risk [RR] 1.06, 95% CI 0.89-1.27; p=0.49) and the secondary (358 [15%] vs 332 [15%] participants; 1.06, 0.93-1.22; p=0.37) outcomes. However, analysis of the interaction between intervention and socioeconomic status showed clear evidence of non-ignorable heterogeneity of intervention effect by both primary (RR 1.44, 95% CI 0.99-2.09; p=0.0562) and secondary (1.37, 1.02-1.84; p=0.0360) cessation measures. This finding was evident before and after adjustment for all other baseline characteristics (adjusted data not shown). Consequently, the analysis of outcome was done separately within each of the two socioeconomic status subsamples.

In the subsample of participants with low socioeconomic status, a benefit of StopAdvisor was evident for both primary and secondary measures compared with the information-only website, whereas in those with high socioeconomic status, no evidence of a difference was shown (table 2). Adjustment for all baseline characteristics had a negligible effect on these comparisons (table 2). In a post-hoc sensitivity analysis, we re-examined the effect of StopAdvisor on biochemically verified smoking cessation in participants with low socioeconomic status, after exclusion of those in full-time education from the classification (n=237). The benefit of StopAdvisor compared with the information-only website remained in both unadjusted (primary outcome 87 [9%] of 967 vs 60 [6%] of 938 participants; RR 1.41, 95% CI 1.03-1.93; p=0.0346; secondary

who did not have post-16 education. In this smaller subsample (n=1687), the results were consistent with the primary analyses for StopAdvisor versus information only, but were non-significant in both the unadjusted (primary outcome 818 participants; RR 1.21, 0.93-1.58; p=1.27, 0.92-1.75; secondary outcome 1092 participants; RR 0.92-1.58; p=0.17) analysis, we re-examined the effect of StopAdvisor on self-reported rather than biochemically verified smoking cessation on the basis of similar verification criteria. New analyses showed a benefit of StopAdvisor reported in table 2 (primary outcome 141 [13%] of 1088 participants compared with information-only website; unadjusted RR 1.20, 95% CI 0.97-1.49; p=0.07). That study failed to reach significance in participants with low socioeconomic status, but decreased power between the two groups.

State, in tabular form, the outcomes of the study

Here is a table summarizing the key outcomes of the study:

	StopAdvisor	Control	Relative Risk (95% CI)	p-value
Overall				
6-month abstinence	10%	10%	1.06 (0.89-1.27)	0.49
Low SES				
6-month abstinence	8%	6%	1.36 (1.00-1.86)	0.0499
High SES				
6-month abstinence	12%	13%	0.95 (0.77-1.17)	0.61

Copy

	StopAdvisor	Control	Relative risk (95% CI)	Odds ratio (95% CI)*	Percentage-point difference (95% CI)	p value†
Primary outcome (abstinence for 6 months)						
High SES	147/1233 (12%)	156/1238 (13%)	0.95 (0.77 to 1.17)	0.94 (0.74 to 1.19)	-0.68 (-3.27 to 1.91)	0.61
Adjusted	0.97 (0.78 to 1.19)‡	0.95 (0.75 to 1.22)‡	..	0.75
Low SES	90/1088 (8%)	64/1054 (6%)	1.36 (1.00 to 1.86)	1.39 (1.00 to 1.94)	2.20 (0.02 to 4.38)	0.0499
Adjusted	1.43 (1.05 to 1.96)‡	1.46 (1.04 to 2.05)‡	..	0.0238
Secondary outcome (point prevalence of abstinence)						

The study authors did not report a risk of bias assessment using the Cochrane RoB tool. However, here are some observations about potential risks of bias based on the details provided in the paper:

- Random sequence generation: Participants were randomized using an automated unseen random number function, so this should have been adequate.
- Allocation concealment: The randomization was automated with no experimenter involvement, so allocation was likely adequately concealed.
- Blinding of participants/personnel: Not reported, but blinding of participants may not have been feasible given the difference in intervention. Personnel were likely not blinded.
- Blinding of outcome assessment: Outcome assessors were reported to be blinded to treatment allocation.
- Incomplete outcome data: Follow-up rates were 77% overall and similar between groups, with missing data treated as smoking, so the risk appears low.
- Selective reporting: The outcomes specified in the protocol appear to be reported, suggesting low risk of bias.
- Other biases: The study appears to have been adequately powered and analyzed as pre-specified, with low risks of other biases.

So in summary, the lack of blinding of participants and personnel, as well as the lack of formal risk of bias assessment by the authors, suggest some uncertainties but overall the study seems reasonably well conducted.



- As an experiment, we mapped the literature on AI and equity – using AI
- 36,546 records identified through conventional searches
- 11,467 records included in the map
- GPT4o used for screening and mapping
- Took a few days to screen & code
- Cost about £100 in OpenAI API fees (less than it used to!) to do >50 days of human work
- Evaluation found:
 - Sensitivity 100%; specificity 93% (screening)
 - Classification of records: 90% no errors; 6% minor errors; 4% major errors



Adding columns in Elicit

Elicit Recent Library

Sort: Most relevant Filters Export as UPGRADE 32

	Abstract summary	Methodology	Study population
<p>Effectiveness of mindfulness for smoking cessation</p> <p>Jackson +5</p> <p>Cochrane Database of Systematic Reviews</p> <p>16 citations DOI</p>	<p>Mindfulness-based smoking cessation interventions do not show a clear benefit for increasing quit rates or improving mental health outcomes compared to other treatments.</p>	<ul style="list-style-type: none"> - Comprehensive search of databases and registries. - Inclusion of RCTs and cluster-RCTs. - Data analysis following standard Cochrane methods. - Calculation of risk ratios and confidence intervals. - Grouping of studies by intervention and comparator types. - Use of Mantel-Haenszel random-effects models for meta-analyses. - Narrative summary of mental health outcomes. 	<p>Adults from the community, primarily in the USA, excluding studies that solely recruited pregnant women.</p>
<p>Effectiveness of mindfulness meditation for smoking cessation: A systematic review and meta-analysis.</p> <p>Di Maglione +8</p> <p>Addictive Behaviours</p> <p>14 citations DOI</p>	<p>Mindfulness meditation did not show significant effects on smoking cessation compared to other interventions, indicating low efficacy.</p>	<ul style="list-style-type: none"> - The study is a systematic review and meta-analysis of RCTs on mindfulness meditation for smoking cessation. - Five electronic databases were searched for English-language RCTs. - Two independent reviewers screened literature and assessed study quality. - Meta-analyses used the Hartung-Knapp-Sidik-Jonkman method for random-effects models. - The quality of evidence was assessed using the GRADE approach. 	<p>Smokers seeking alternative interventions for smoking cessation or reduction</p>
<p>Reliability and Efficacy of a Brief Mindfulness-Smoking Intervention Delivered via the Internet: A Randomized Controlled Trial</p> <p>Michael Br Schmidt +2</p> <p>Substance Use & Misuse</p> <p>1 citation DOI</p>	<p>A brief, online mindfulness-based intervention effectively reduces craving but does not significantly change smoking quantity among adults.</p>	<ul style="list-style-type: none"> - Single session, web-based mindfulness intervention for smoking cessation. - Fully online cue exposure exercise with brief instructions on coping with cravings. - Random assignment to mindfulness-based or coping as usual instructions. - Outcomes: participant satisfaction, self-reported craving, and cigarette use 30 days post-intervention. 	<p>The study population consisted of 80 participants who were smokers or had smoking-related issues, as they were involved in a cue exposure exercise and reported on cigarette use and cravings.</p>
<p>Effectiveness of mindfulness training for smoking cessation:</p>	<p>Mindfulness training shows greater effectiveness than</p>	<ul style="list-style-type: none"> - Randomized controlled trial with 88 participants. 	<p>The study population consisted of 88 treatment-seeking</p>

Extract & classify

- 1. Either using the same search as before, or a new one, use the ‘add columns’ feature in [Elicit](#).
 - Ask it to ‘extract’ information (e.g. participant characteristics)
 - Ask it to ‘classify’ the research (e.g. study design / intervention type)
- 2. Upload a pdf to Gemini
 - <https://gemini.google.com/app>
 - Ask it to extract narrative information (e.g. description of intervention)
 - Create a new ‘chat’ and do the same several times
- 3. Evaluate:
 - How accurate is the extraction and classification (as far as you can tell)?
 - How consistent is the output? (Need to be aware of result caching)

Synthesis

**Is mindfulness an
effective intervention for
smoking cessation
among adults?**

Mindfulness for smoking cessation

✉ Sarah Jackson, Jamie Brown, Emma Norris, Jonathan Livingstone-Banks, Emily Hayes, Nicola Lindson

Authors' declarations of interest

Version published: 14 April 2022 [Version history](#)

<https://doi.org/10.1002/14651858.CD013696.pub2> [↗](#)

Authors' conclusions

We did not detect a clear benefit of mindfulness-based smoking cessation interventions for increasing smoking quit rates or changing mental health and well-being. This was the case when compared with intensity-matched smoking cessation treatment, less intensive smoking cessation treatment, or no treatment. However, the evidence was of low and very low certainty due to risk of bias, inconsistency, and imprecision, meaning future evidence may very likely change our interpretation of the results. Further RCTs of mindfulness-based interventions for smoking cessation compared with active comparators are needed. There is also a need for more consistent reporting of mental health and well-being outcomes in studies of mindfulness-based interventions for smoking cessation.

Yes, **mindfulness-based interventions (MBIs)** have shown **promising effectiveness** as a tool for **smoking cessation among adults**, particularly when integrated with other treatment strategies.

Evidence from Research:

1. Randomized Controlled Trials (RCTs):

- Multiple RCTs have found that mindfulness training can **reduce cigarette use, increase abstinence rates, and decrease relapse rates**.
- A well-cited study by **Brewer et al. (2011)** compared mindfulness training to the American Lung Association's Freedom From Smoking (FFS) program. Results showed that participants in the mindfulness group had significantly higher abstinence rates at 4 and 17 weeks post-quit.

2. Mechanisms of Action:

- Mindfulness helps individuals become more aware of **cravings** and **emotional triggers** without reacting impulsively.
- It reduces **automaticity of smoking behavior**, allowing for more conscious decision-making.
- It may help regulate **stress and negative emotions**, which are common triggers for smoking.

3. Meta-analyses:

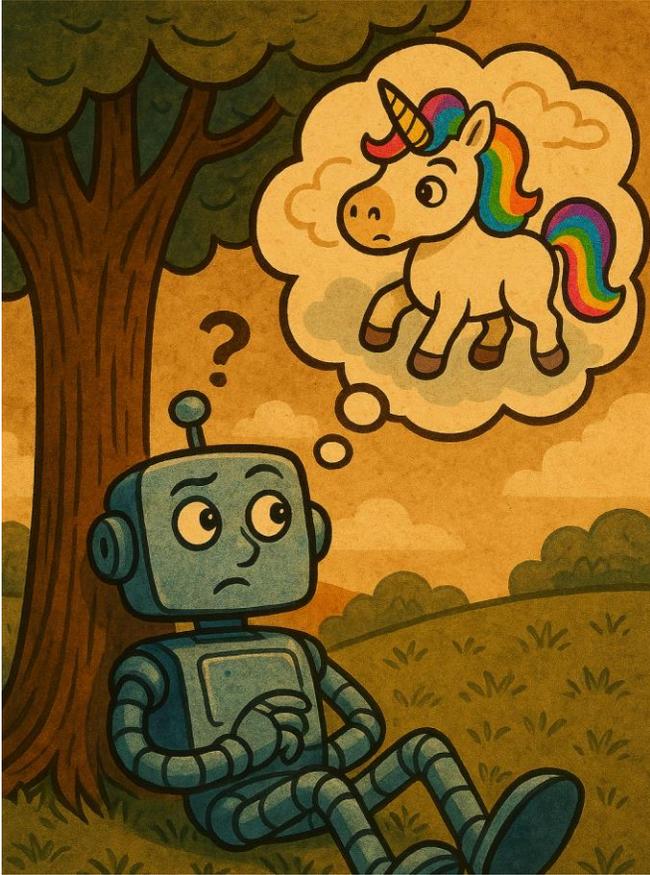
- A 2020 meta-analysis published in *Nicotine & Tobacco Research* concluded that MBIs were significantly more effective than minimal interventions or no treatment, and had comparable efficacy to other active treatments like cognitive behavioral therapy (CBT).

4. Neuroscientific Findings:

- Neuroimaging studies show mindfulness may modulate activity in brain regions involved in **craving, self-control, and reward processing**, such as the **prefrontal cortex** and **insula**.

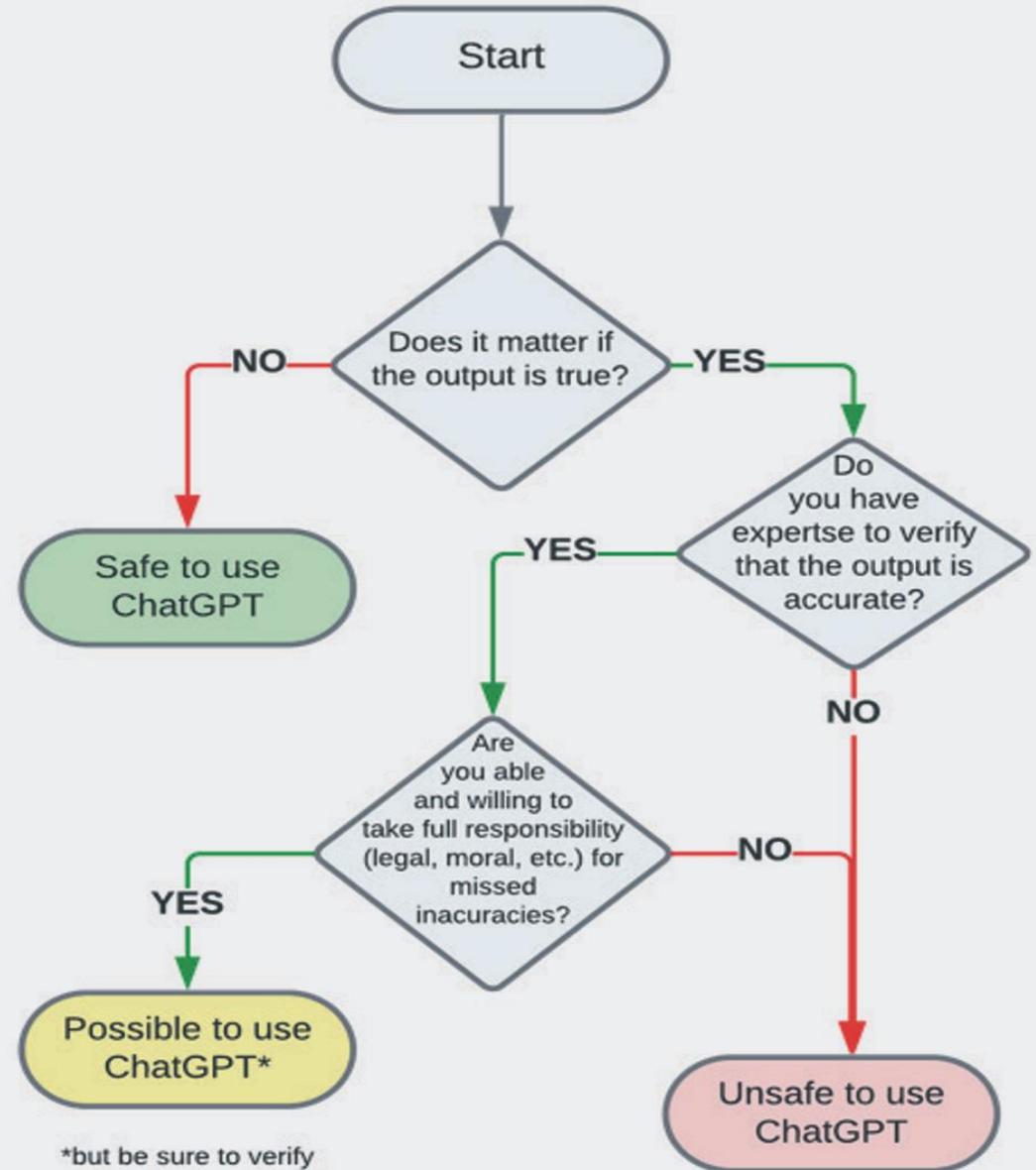


Strengths and limitations: chatbot



- Can be asked questions in standard prose
- Can provide accurate answers quickly
- **But**
- Frequency biased
- ‘Hallucinate’
- Sounds confident, but is often wrong

When can we use chatbots as sources of information?



*but be sure to verify each output word and sentence for accuracy and common sense

Horoscope – Friday 13th June

For the Inquisitive and Evidence-Seeking Soul (Yes, You, Government Social Researchers)

🌟 General Vibe:

Friday the 13th may have a spooky reputation, but today the real magic is in your dataset. Mercury in Gemini blesses your analytical powers — you'll notice patterns others miss (especially in that stubborn cross-tab). Proceed with confidence, but do *triangulate* your sources. The gods of qualitative insight are watching.

📊 Workplace Energy:

Venus aligns with your stakeholder engagement strategy, which means it's a good day to share that long-gestating draft — even if it still has "TBC" in the conclusions. Be bold. Someone senior may finally get the nuance of your findings (or at least pretend convincingly).

🧠 Methodological Mood:

Beware confirmation bias today — your instincts may be sharp, but even the best researcher can fall for a shiny p-value. Run that extra check. And no, a sample of 14 is still not "indicative," no matter how persuasive your slide deck font is.

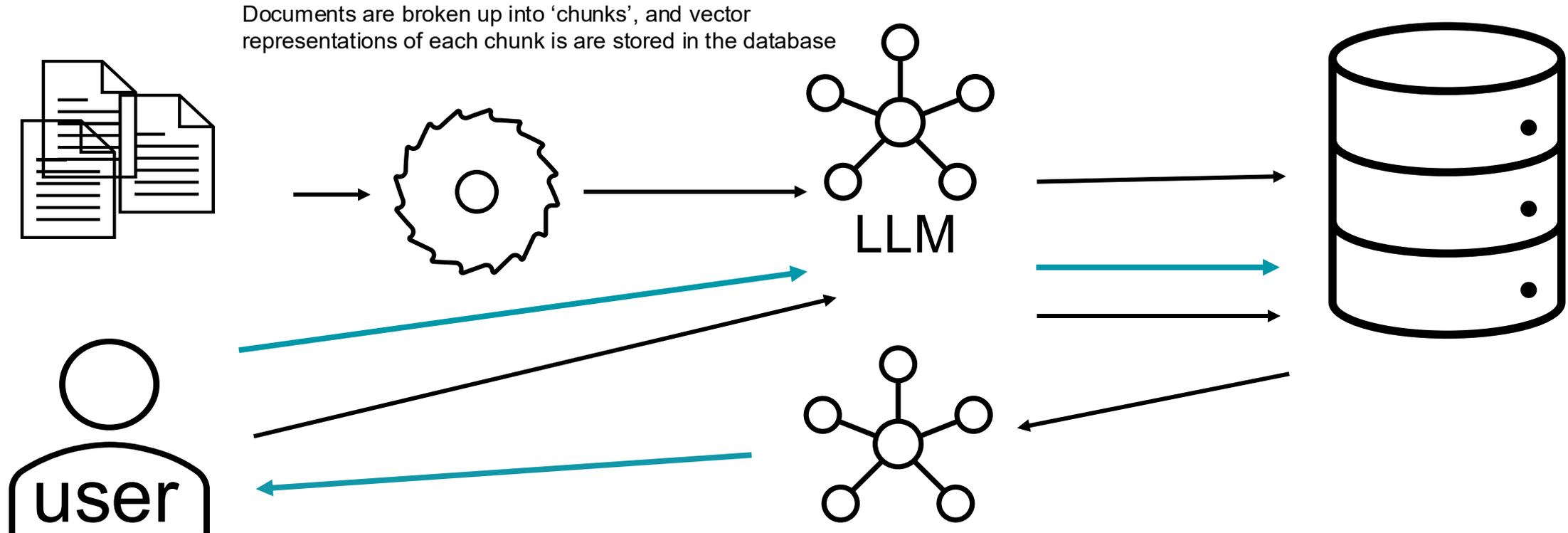
☕ Wellbeing Forecast:

Pluto in retrograde says take a break. You are not your PowerPoint deck. Step away from the screen, grab a coffee, and contemplate life beyond red/amber/green RAG ratings.

🎲 Lucky Insight:

A surprising finding may emerge from the footnotes. Don't ignore the small print today — it could contain the seed of your next big policy brief.

Retrieval Augmented Generation



User queries are translated into vectors; the 'closest' chunks of documents to that query are located; the LLM then generates an answer to the user's query, based on the chunks of text returned

Is mindfulness an effective intervention for smoking cessation among adults

Perplexity Sources · 9

The Cochrane Databas...
Mindfulness for smoking
cessation - PMC - PubMed...

JMIR Research Protoc...
Mindfulness-Based
Smoking Cessation...

oatext
Mindfulness based
treatment for smoking...

cochrane.org
Can mindfulness help
people to stop smoking? - ...

Effectiveness of Mindfulness for Smoking Cessation

Summary of Evidence

- There is mixed evidence on the effectiveness of mindfulness-based interventions (MBIs) for smoking cessation among adults. Some systematic reviews and meta-analyses indicate no clear or conclusive evidence that mindfulness-based treatments are more effective than standard care in helping people quit smoking or improving mental health outcomes ^{1 4}. However, other studies and clinical trials suggest that mindfulness can increase smoking cessation rates and aid in recovery from lapses ^{2 6 8}.

Key Findings from Research

- **Potential Benefits:**
 - Mindfulness interventions teach individuals to observe cravings and negative emotions without reacting, which may help reduce the automatic response to smoke when triggered ^{2 9}.
 - Some studies show that MBIs can increase abstinence rates and reduce cigarette consumption, particularly by improving emotion regulation and self-efficacy ^{3 6 5}.
 - Mindfulness-based relapse prevention has been found to be more effective than traditional relapse prevention in some populations, particularly among racially and

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Perplexity Sources · 9 Tasks

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89% CONVERGED ~27 RELEVANT PAPERS FOUND ?



Export

Share

Research Topic: Randomized trials and meta-analyses of mindfulness-based adult smoking cessation interventions

Full search query: I want to find high-quality evidence (e.g., randomized controlled trials, systematic reviews, or meta-analyses) about the effectiveness of any type of mindfulness-based intervention for smoking cessation among adults

Discuss results with an expert ⓘ

+ New

History

High-quality evidence—including systematic reviews and large randomized controlled trials—indicates that mindfulness-based interventions (including classic mindfulness meditation programs and ACT) produce modest but significant increases in smoking cessation rates versus usual care or minimal intervention, though their efficacy is similar to standard cognitive behavioral therapy and long-term benefit remains uncertain [1 , 2 , 3 , 4 , 6].

You can find the full report and references below, but I can answer your questions about them directly. What do you want to know?

Explain key background information

Create a table comparing the top results

Write a short review article

Identify open questions

Describe the timeline of research

Tell me more about...



Read the full report



MAY 19, 2025

Is mindfulness an effective intervention for smoking cessation among adults?

Meta-analysis and multiple studies show that mindfulness interventions are generally no more effective than standard treatments for smoking cessation, though they may help reduce cigarette consumption and cravings.

ABSTRACT

Mindfulness interventions for adult smoking cessation yield mixed outcomes. * Brewer et al. (2011) observed a 36% abstinence rate at treatment's end and 31% at 17 weeks (versus 15% and 6% with a standard program, respectively; $p = 0.063$ and 0.012). * Davis et al. (2014b) reported 38.7% abstinence at 24 weeks among treatment initiators compared with 20.6% for usual care ($p = 0.05$). * In contrast, Davis et al. (2014a), Spears et al. (2017), Janes et al. (2019), and others found no significant differences between mindfulness and control groups. * A meta-analysis (Jackson et al., 2020) indicated risk ratios near unity when mindfulness interventions were compared with matched or less intensive treatments. * Some studies noted that mindfulness training reduced daily cigarette consumption, alleviated urges, or produced neural changes correlated with smoking reduction. * Mindfulness programs were delivered in varied formats, including in-person groups and smartphone apps, with adherence levels ranging from 67% to 88% in studies that quantified retention. * These findings support the view that mindfulness-based approaches may improve certain aspects of smoking behavior. * However, only a minority of studies reported statistically significant advantages in abstinence outcomes compared with standard interventions. *

Report

Status

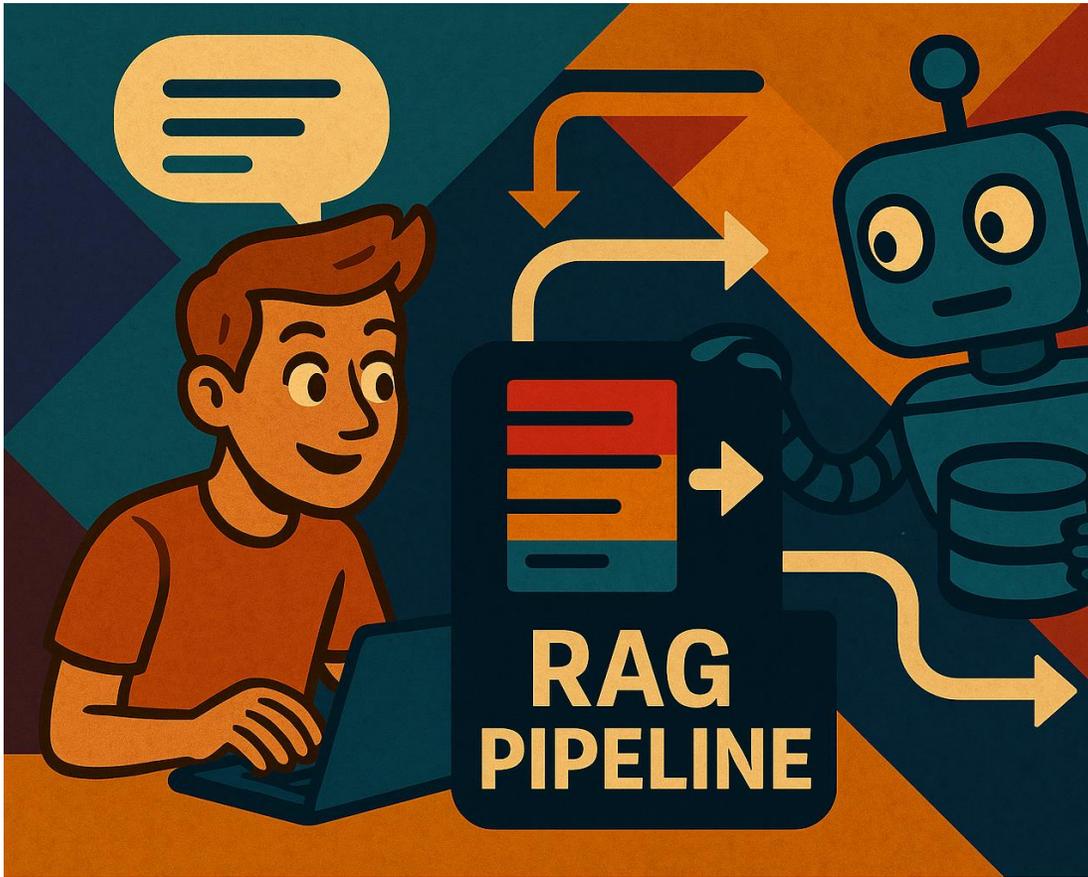
- Gather papers
50 papers found Details ↗
- Screen papers
10 papers included Details ↗
- Extract data
70 data points extracted Details ↗
- Generate report Save PDF

Chat

Ask anything about the report or its underlying data



Strengths and limitations: retrieval augmented generation



- Can provide a powerful interactive experience where users can ‘chat’ to their documents using standard prose
- BUT
- Has many of the limitations of BOTH chatbots and vector indexes:
 - Can hallucinate
 - Requires good translation from query to retrieval AND question to the LLM
 - What if all the relevant documents are not retrieved?
 - What if irrelevant documents *are* retrieved?

Explainable AI?

A rectangular button with a light orange background. On the left is a pink icon of a document with three horizontal lines. To the right of the icon, the text "Show OLMoTrace" is written in a pink, sans-serif font.

- Some tools try to explain the results you see
- In supervised machine learning tools, two models are sometimes used:
 1. to make the prediction
 2. to identify snippets of text that were related to the topic of the prediction
- *Two models* are being used and one does not necessarily explain the other
- Generative ML applications are even more like a ‘black box’
 - Experiment with <https://playground.allenai.org/>
 - Click Show OLMoTrace
 - Are you convinced?

Model:

OLMo 2 32B Instruct



Ai2 Playground is a free scientific and educational tool and by using it you agree to Ai2's [Terms of use](#), [Privacy policy](#), and [Responsible use guidelines](#). This site is protected by reCAPTCHA and the Google [Privacy Policy](#) and [Terms of Service](#) apply.



Is mindfulness an effective intervention for smoking cessation among adults?



Mindfulness has shown potential as an effective intervention for smoking cessation among adults, though results can vary. Here are a few points relevant to this topic:

Research Support: Mindfulness-based interventions (MBIs) have been explored in several studies for their effectiveness in smoking cessation. Studies have shown that mindfulness training can help individuals to become more aware of their smoking habits and triggers, and thereby empower them to make conscious decisions about smoking.

A 2014 Cochrane review found that mindfulness training may be effective in helping people quit smoking. However, the authors noted that more research was needed to confirm these findings.

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OLMo 2 32B Instruct

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Is mindfulness an effective intervention for smoking cessation?



Mindfulness has shown potential as an effective intervention for smoking cessation in adults, though results can vary. Here are a few points to consider:

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OLMoTrace

Documents from the training data that have exact text matches with the model response.

Powered by [infini-gram](#)

[More about how OLMoTrace works](#)

Clear selection ✕

10 documents matching the selected span

MEDIUM RELEVANCE

Pre-training document from:

[olmo-mix-1124](#) > web corpus (DCLM)

"...other treatments.[154] With more complex and chronic forms of depression, a combination of medication and psychotherapy may be used.[155][156] **A 2014 Cochrane review found that** work-directed interventions combined with clinical interventions helped to reduce sick days taken by people with depression. [157] There is moderate-quality evidence that psychological..."

View Document

Locate span

Model:

OLMo 2

Pre-training document from: [olmo-mix-1124](#) > web corpus (DCLM)

URL: https://mdwiki.org/wiki/Major_depressive_disorder

"...appear to decrease depression.[149] Exercise may be recommended to people who are willing, motivated, and physically healthy enough to participate in an exercise program as treatment.[148]

In observational studies, smoking cessation has benefits in depression as large as or larger than those of medications.[151]

Besides exercise, sleep and diet may play a role in depression, and interventions in these areas may be an effective add-on to conventional methods.[152]

Talking therapies

Talking therapy (psychotherapy) can be delivered to individuals, groups, or families by mental health professionals. A 2017 review found that cognitive behavioral therapy appears to be similar to antidepressant medication in terms of effect.[153] A 2012 review found psychotherapy to be better than no treatment but not other treatments.[154] With more complex and chronic forms of depression, a combination of medication and psychotherapy may be used.[155][156] **A 2014 Cochrane review found that** work-directed interventions combined with clinical interventions helped to reduce sick days taken by people with depression.[157] There is moderate-quality evidence that psychological therapies are a useful addition to standard antidepressant treatment of treatment-resistant depression in the short term.[158]

Psychotherapy has been shown to be effective in older people.[159][160] Successful psychotherapy appears to reduce the recurrence of depression even after it has been stopped or replaced by occasional booster sessions.

Cognitive behavioral therapy

Cognitive behavioral therapy (CBT) currently has the most research evidence for the treatment of depression in children and adolescents, and CBT and interpersonal psychotherapy (IPT) are preferred therapies for adolescent depression.[161] In people under 18, according to the National Institute for Health and Clinical Excellence, medication should be offered only in conjunction with a psychological therapy, such as CBT, interpersonal therapy, or family ther..."

Important questions to ask of LLM-based evidence synthesis tools

- For chatbots:
 - Can I verify its accuracy?
 - (Does it matter if not?)
 - Consistency
- For search tools:
 - Are the records I need indexed?
 - How can I check that its retrieved everything it should?
- For ‘RAG’-based approaches:
 - Are the right documents indexed?
 - Are the right documents retrieved?
 - Are incorrect documents avoided?
 - If present, does the summariser check that the research is reliable / that combining them is a valid thing to do?

Try some synthesis using retrieval augmented generation

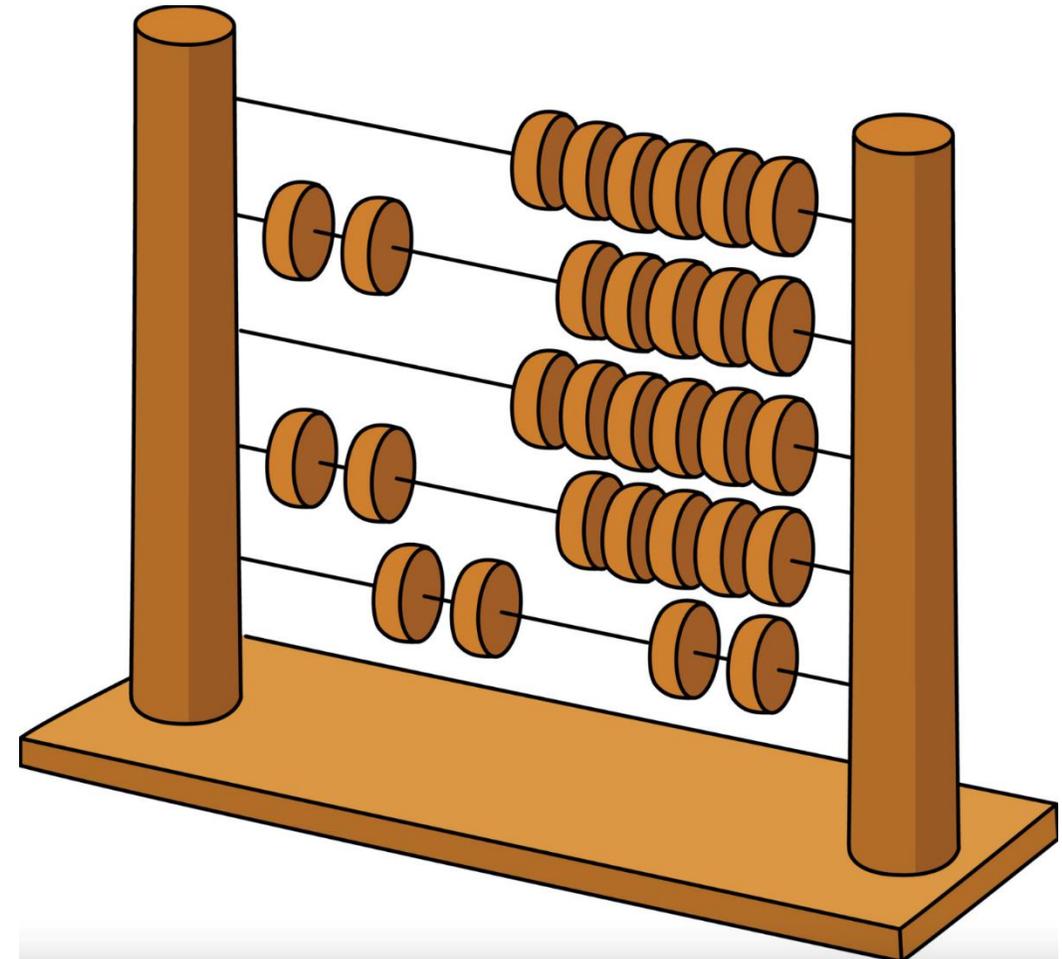
- 1. Try your search on www.google.com (really!)
 - 2. Try your search on <https://playground.allenai.org/>
 - 3. Try your search on one of:
 - <https://www.perplexity.ai/>
 - <https://elicit.com/>
 - <https://qa.allen.ai/>
 - 4. Evaluate your results (see next slide)
-
- If you have time, explore OLMoTrace on the Playground for Explainable AI
 - <https://playground.allenai.org/>
 - (Does it explain what you're seeing convincingly?)

Evaluate

- The retrieval
 - Is the tool using the papers you would expect it to use?
 - Is it using *all* of them?
 - Is it including irrelevant papers?
 - Could you say that it is correctly drawing on the *sum of current knowledge* on the topic?
- The generation
 - Does it appropriately synthesise the findings from the papers?
 - Does it ensure that only reliable research is used?
 - Does it ensure that findings are not ‘double-counted’?
- Consistency
 - Does it give you the same answers each time?

Summing up

- There are some great tools that may soon be ready for use
- Tools for searching, extraction and classification may be useful for some purposes
- Synthesis across documents needs to be carefully checked
- We need to increase our 'AI literacy' across the field to understand when and how to use (and not use) this new generation of tools





EPPI Centre
Evidence for
Policy & Practice



UCL

Thank you

James Thomas

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Email james.thomas@ucl.ac.uk

BlueSky [jm-thomas.bsky.social](https://www.bsky.social/jm-thomas)

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