CAUSAL PATHWAYS

VIRTUAL SYMPOSIUM 2023

DISCOVERING HOW, WHY, AND WHEN OUR STRATEGIES MATTER

CAUSAL PATHWAYS VIRTUAL SYMPOSIUM 2023

Causal mapping:

understanding causal pathways at scale

Presented by Steve Powell, Causal Map Ltd.

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We need to understand causal pathways
… gather information from our stakeholders about how they think the world “works”, what leads to what,
… then synthesise all that information.
That sounds like 6 PhDs!
And we should do it regularly!
And there are so many different stakeholders …

Causal mapping, you mean?

This session

- What is causal mapping in evaluation? An example.
- How to do it?
- Two surprises: 🔥Harnessing AI for causal mapping.

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Declaration of interest

- We are a (very small) for-profit organization
- We have a small income from subscriptions to Causal Map app (mainly we do causal mapping consultancy work)
- You don't need the Causal Map app to do causal mapping!
- The app is free for small projects

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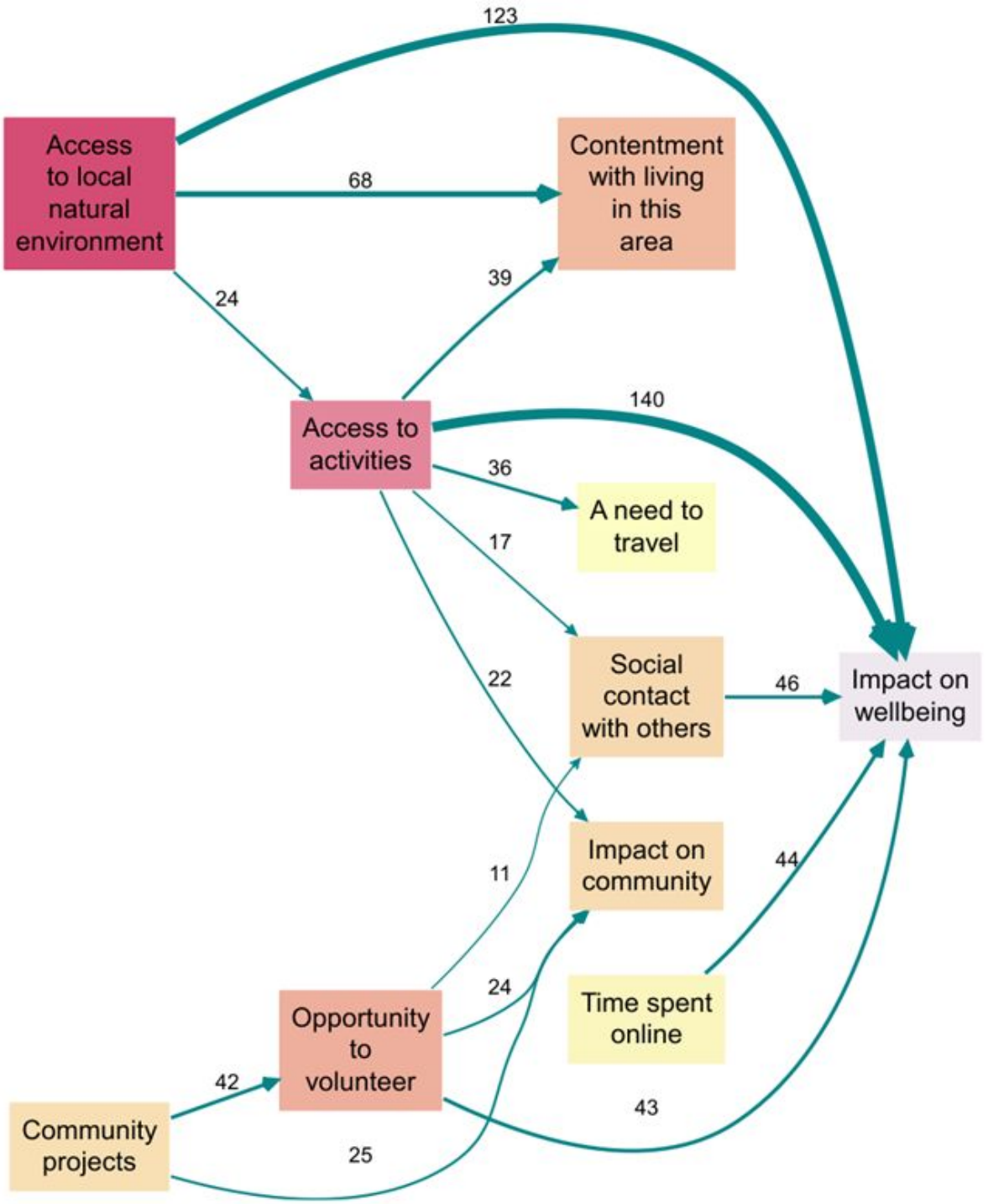
A causal map

Assembled from a large quantity of undifferentiated causal claims eg from documents, interview transcripts etc, often mixed.
Numbers = number of sources or number of citations aka claims (not strengths!)
"Causation" means only “causal influence / contribution”



An example of causal mapping

An example of causal mapping

Part of a simple evaluation for a health care agency

Effectiveness of a programme for staff to improve their engagement with patients/ "consumers"

Transcripts from 39 short semi-structured online interviews

Questions were not directly causal, e.g.

- **How would you describe your experience of the Programme?**
- **What was it in particular about the Programme that had the most immediate impact on you?**
- **What did you like about the Programme?**
- **What did you not like about the Programme?**

Client did their own qualitative analysis

Additional causal mapping using the interview transcripts

Getting causal claims from these transcripts: causal QDA

… after that it was different because Covid meant that we spent more time at home …

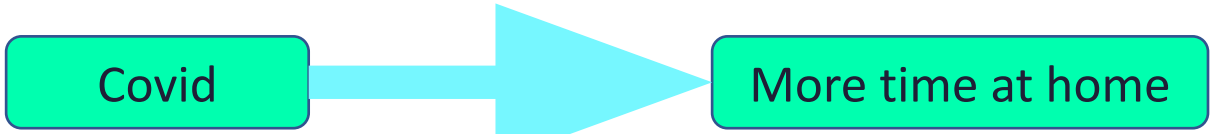
Traditional QDA: make connections between non-causal themes

Text and quote	Theme / tag
… after that it was different because Covid meant that we spent more time at home …	Covid
… after that it was different because Covid meant that we spent more time at home …	More time at home

Optional post-hoc connection

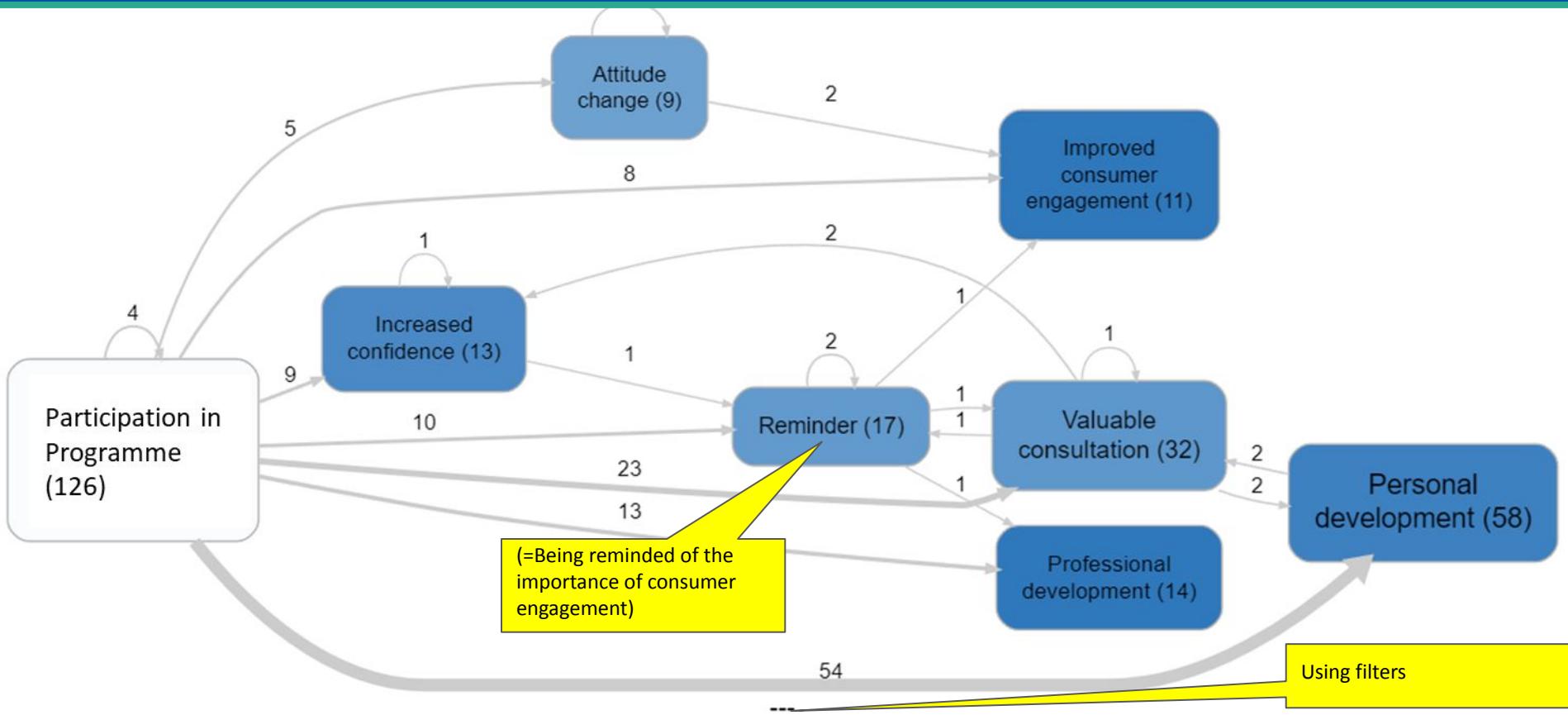
Causal QDA: natively causal

Text and quote	influence	consequence
… after that it was different because Covid meant that we spent more time at home …	Covid	More time at home



CAUSAL MAP

An overview causal map



Filename: partner-ring. Citation coverage 50%: 145 of 314 total citations are shown here.
Numbers on factors show citation count, sizes show citation count, colours show outcomeness.
Numbers on links show citation count.
Zooming out to level 1 of the hierarchy. Auto clustering factors with strictness of 56% at level 1. Top 8 factors by citation count.

Simple conclusions from the map

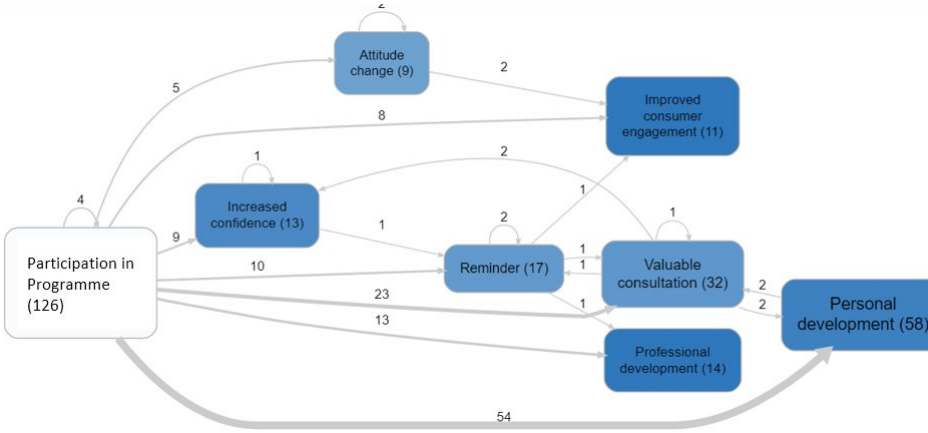
What is the causal landscape like for these respondents?

Preparing the evidence for (but not conducting) causal inference.

Most frequently cited link:

participation in programme → personal development

Impact on work with consumers was mentioned but less often: sometimes directly, occasionally as an indirect consequence of attitude change - is this something we want to address?



Could also look in more detail at:

- direct consequences of participation, or direct antecedents of “Improved engagement” (“path tracing”)
- differences between maps for men and women, etc.
- differences between source count and citation count
- whether the people who said B → C are the same people who said C → D (“thread tracing / transitivity trap”)

Software for causal mapping

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

Kumu.io

Cauzality[1]

Decision Explorer[4]

Participatory System Mapper[17]

System Effects[20]

CMAP 3

Causal Map (causalmap.app)

… and more …

🔥Using AI for causal coding of texts: brief overview

Automated causal coding with Causal Map (using OpenAI API: GPT 4.0)

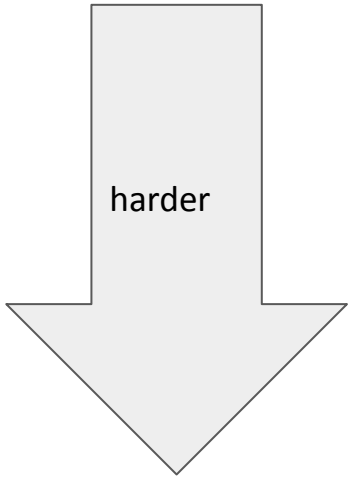
Providing explicit instructions for how to code, as for a human assistant.

Not asking for a summary or the AI's "opinion" but for an exhaustive list of causal claims

Possible approaches

- Zero-shot ("list the causal claims")
- ✅ Almost zero-shot

  ("list the causal claims, especially chains leading to valuable outcomes …")
- Suggesting factor labels
- Suggesting factor labels with examples
- ✅ Zero-shot followed by suggested labels
- Fine-tuning the model
- 😔Iterative coding



🔥 Tips for prompts

Ask the AI to identify chains as well as individual links

Ask it to provide results in a standard format like X >> Y >> Z which you can parse

Our prompts (even without giving any examples) are *long*

We give *short* texts to code (otherwise the AI cherrypicks)

Our prompts are often longer than the texts!

Don’t iterate!

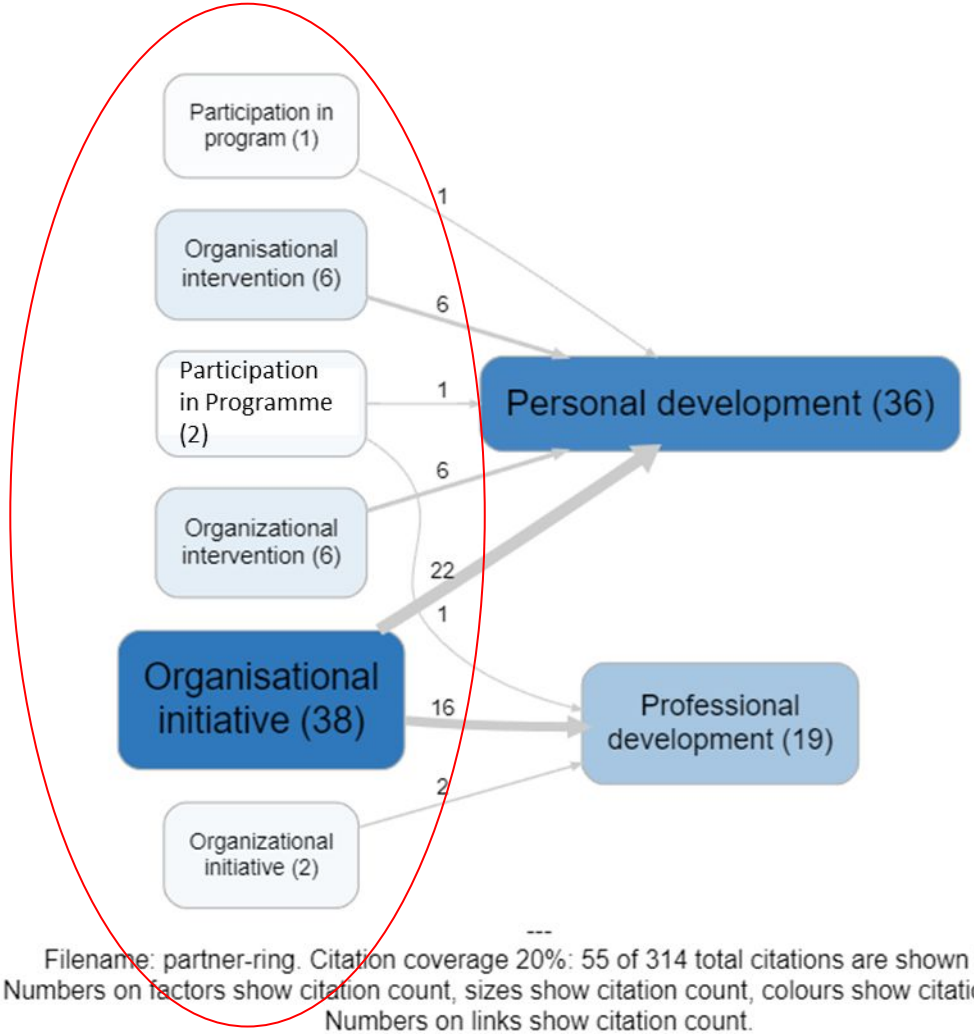
There’s a lot of housekeeping! (The private beta of Causal Map 3 does this for us)

- Joining together short transcripts
- Splitting longer transcripts
- Prepending the standard prompt to each one
- Submitting queries in parallel
- Repeating failed requests …
- Parsing (sometimes incorrectly formatted) output

🔥The causal factor post-hoc codebook

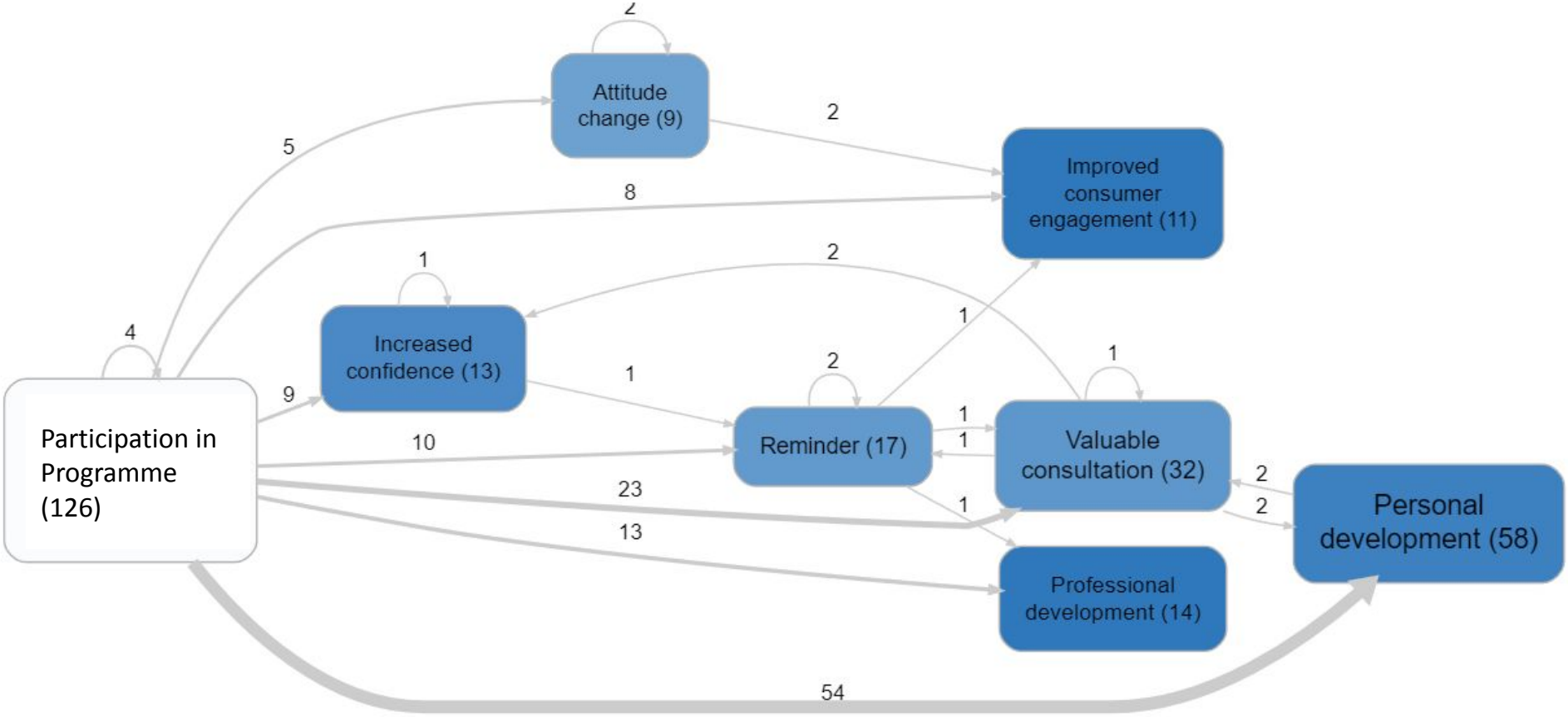
We didn't give the AI a codebook. The AI coded the transcripts separately, so there was a variety of labels with overlapping meanings. This is the original map, top 8 factors.

→ We used embeddings and bottom-up clustering to automatically group similar labels together and select one of the labels in each cluster as the label for the whole cluster…



Filename: partner-ring. Citation coverage 20%: 55 of 314 total citations are shown here.
Numbers on factors show citation count, sizes show citation count, colours show citation count.
Numbers on links show citation count.
Zooming out to level 1 of the hierarchy. Top 8 factors by citation count.

This is the top 8 factors from the same map after using embeddings and bottom-up clustering (with a “strictness” of 58%) to automatically group similar labels together and select one of the labels in each cluster as the label for the whole cluster.



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Zooming out to level 1 of the hierarchy. Auto clustering factors with strictness of 56% at level 1. Top 8 factors by citation count.

🔥 Highly automated, but human-led

No black box

Reproducible, transparent

“The prompt is the program”

The prompt is exactly the same as the instructions you’d give to a highly intelligent assistant (who is an alien who has read the whole of the internet)

🔥 Second AI surprise

The interviews were AI-led too

.. using StorySurvey.app

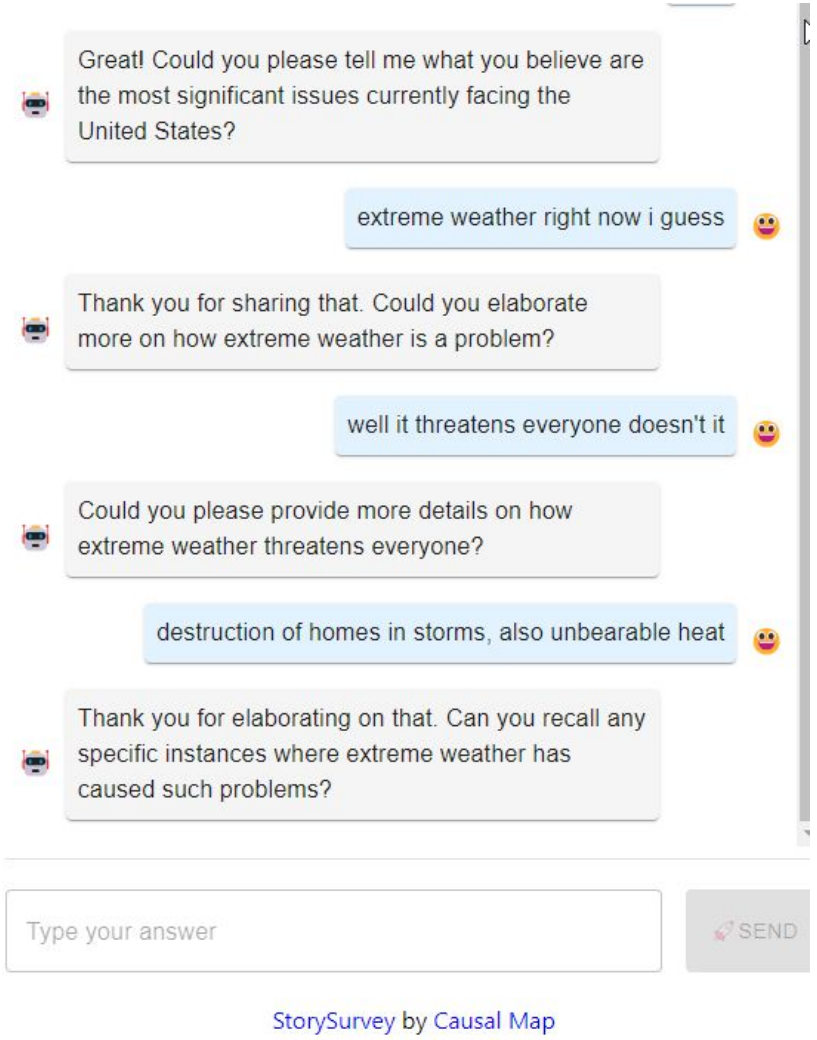
Again, explicit detailed instructions to the AI

just as for a human researcher

(The job of the platform is to *make sure the program = the prompt*).

Many styles are possible

- question by question
- focus on cause and effect
- in-depth, hypothesis-generating



Wrap up

Wrap-up : what questions can causal mapping answer?

- **Assemble evidence for** the evaluator to make a judgement about causal **explanation**
  - "There is a lot of evidence that X influenced Y"
  - "There is evidence that X influenced Y indirectly via Z"
  - "There is more evidence from women than men"
- The **qualitative causal landscape**: *how do people think* the world works? What shape are their causal maps?
  - "Do your stakeholders see the world the same way as you do? Do children see things differently?"
  - "Has the system changed over time, in their view, when we compare the maps with last year?"

💣 Caveats

Causal mapping (they way we do it) does not on its own warrant causal inference.

For specific high-stakes causal questions, you need more than naïve causal mapping.

It's qualitative. Don't think that *the strength of the evidence for a causal connection* is *evidence for the strength of a causal connection*.

Human coding is a creative, subjective/intersubjective process

Automated coding is error-prone / noisy, may have deep biases

🔥Innovations! Beware!

The causal mapping procedures we use are part new, part established, part published

Any use of AI for causal mapping is new?

Using AI to exhaustively code all causal claims in texts is new?

Using embeddings to cluster causal concepts is new?

The AI interviewing is (completely?) new, articles forthcoming.

The public version of Causal Map does (yet) not use AI

➕ Advantages of harnessing AI in causal mapping

Potential to **scale** causal pathways approaches in new ways

- For data gathering
- For synthesis/analysis

Can be used **repeatedly**

Potential to access representative samples, multiple time points

Transparency: the prompt is the program

Multi-language

Takeaways

Use causal mapping to identify and synthesise causal claims within texts, to:

- Assemble evidence for the evaluator to make a judgement about causal explanation
- Visualise the qualitative causal landscape: how do people think the world works? What shape are their causal maps?

There are different softwares for causal mapping

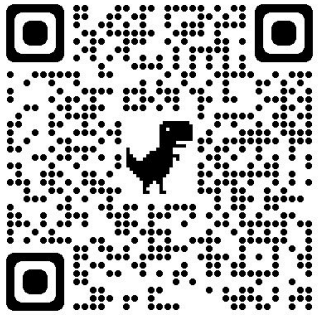
Causal mapping is most useful with large amounts of text data with undifferentiated / non-specialist / lower-stakes causal claims

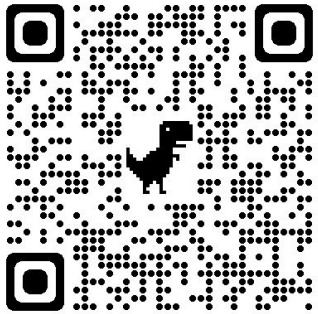
You can use AI, but we recommend to use it as a transparent, low-level coding assistant, not as a guru / black box

You can even use AI to conduct qualitative interviews

Resources

- Zotero library on causal mapping
- causalmap.app/resources2
- Book chapter on using causal mapping to identify an “empirical theory of change”
- New paper on Causal Mapping for evaluators
- The Causal Map app: causalmap.app
- StorySurvey: StorySurvey.app





Get in touch! steve@causalmap.app

🙋 Questions

Have you already used something like causal mapping, maybe informally?

How does causal mapping compare to other causal pathways approaches?

How accurate is AI for causal coding?

Would you like to be interviewed by a robot?

Get in touch! steve@causalmap.app