



# Introduction to CSS

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# What is Computational Social Science?

INSIGHTS

## POLICY FORUM

SOCIAL SCIENCE

### Computational social science: Obstacles and opportunities

Data sharing, research ethics, and incentives must improve

By David M. J. Lazer<sup>1,2</sup>, Alex Pentland<sup>3</sup>, Duncan J. Watts<sup>4</sup>, Sinan Aral<sup>3</sup>, Susan Athey<sup>5</sup>, Noshir Contractor<sup>6</sup>, Deen Freelon<sup>7</sup>, Sandra Gonzalez-Bailon<sup>4</sup>, Gary King<sup>2</sup>, Helen Margetts<sup>8,9</sup>, Alondra Nelson<sup>10,11</sup>, Matthew J. Salganik<sup>12</sup>, Markus Strohmaier<sup>13,14</sup>, Alessandro Vespignani<sup>1</sup>, Claudia Wagner<sup>14,15</sup>

**T**he field of computational social science (CSS) has exploded in prominence over the past decade, with thousands of papers published using observational data, experimental

dependencies within data. A loosely connected intellectual community of social scientists, computer scientists, statistical physicists, and others has coalesced under this umbrella phrase.

#### MISALIGNMENT OF UNIVERSITIES

Generally, incentives and structures at most universities are poorly aligned for this kind of multidisciplinary endeavor. Training tends to be siloed. Integrating computational training directly into social science (e.g., teaching social scientists how to code) and

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- “[CSS is] **the development and application of computational methods** to complex, typically large-scale, human (sometimes simulated) behavioral data.”  
... to understand society

# Big Data

- We are all data sources!
- Internet => Data Sharing
  - Public datasets, archives
- Smart Phones => Behavioral Data
  - Online shopping, phone calls, trading
- Social Media => News & Public Opinion



Announcement of Pope



# Big Data is Cheap

- Internet data is up for grabs!
- Limitations
  - May not be exactly what you are looking for
- Ethical & Legal Risks
  - Often no explicit consent



# Caveat: Big Data is Big!

- Reddit: 11 billion comments, 2TB compressed
- First ChatGPT (GPT 3.5) Training Set: 50TB compressed text
  - 25 Reddits!
  - Only text :o
- More Data => More Reliable Results
  - (usually)
- Requires computational methods
  - Cheap & Fast!



Small data



**BIG DATA**

# Common Characteristic of CSS Studies

## Large-Scale Behavioral Data “Big Data”

- Cheap & Fast => Efficient
- Repurposed Data => Limited
- Often no consent 🚧 => Ethical Risks!



# What Makes Persuasion Effective?

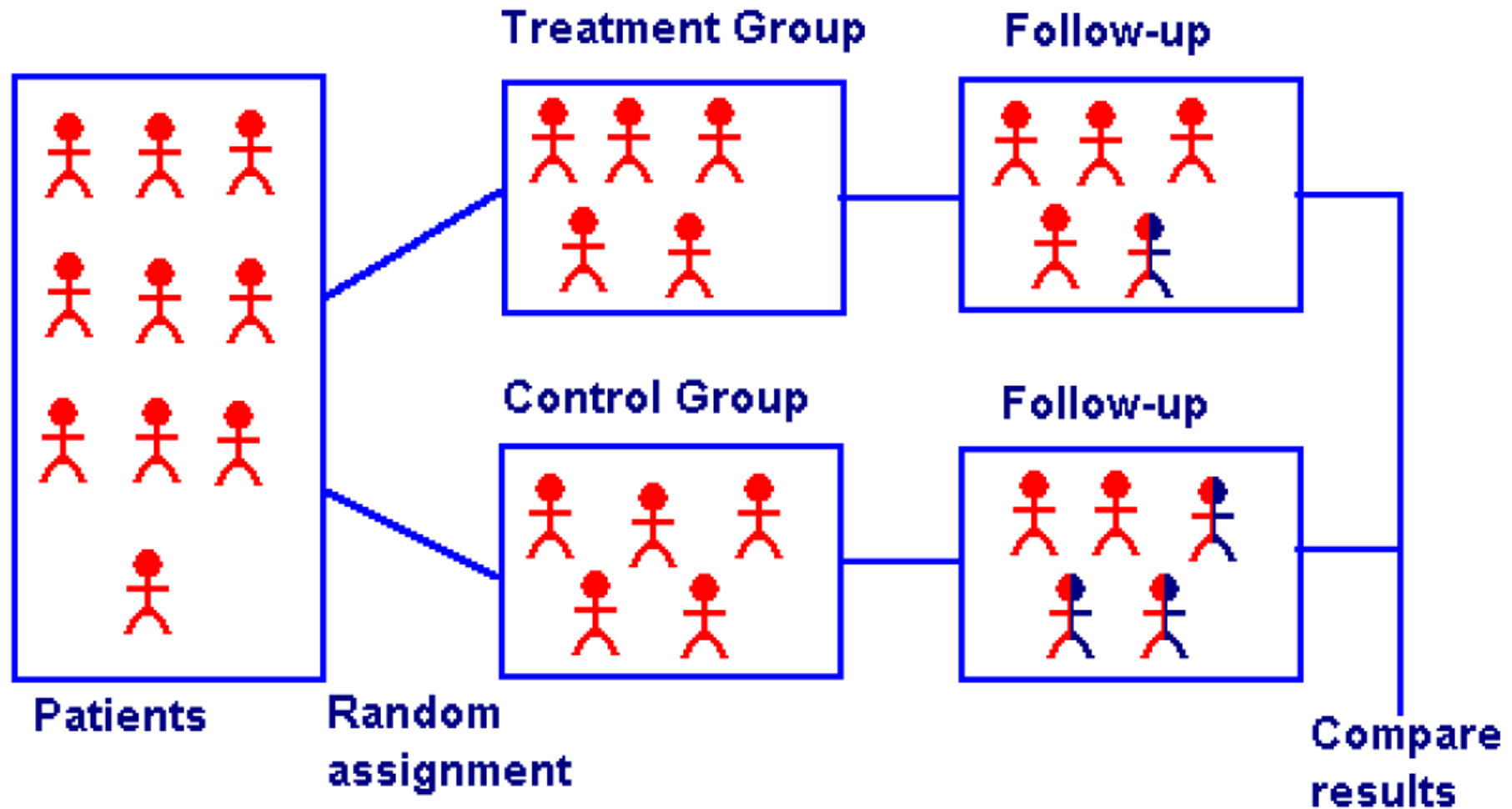


# What Makes Persuasion Effective?



- Research Question: What makes persuasion effective? To what extent?
- **Hypothesis:** Evidence makes persuasion more effective (compared to no evidence)
- We predict AI will be more persuasive than humans
- AI/Evidence => Persuasion  
(compared with the absence of AI/Evidence)

# Traditional Way



# EPFL Study (2025)

nature human behaviour



Article

<https://doi.org/10.1038/s41562-025-02194-6>

## On the conversational persuasiveness of GPT-4

Received: 16 May 2024

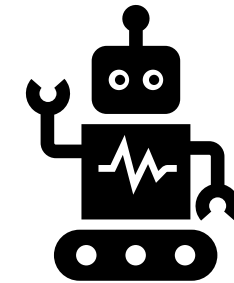
Accepted: 28 March 2025

Published online: 19 May 2025

Check for updates

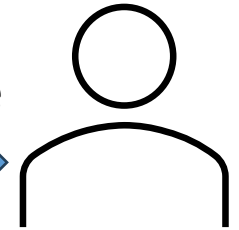
Francesco Salvi <sup>1,2</sup>✉, Manoel Horta Ribeiro <sup>3</sup>, Riccardo Gallotti <sup>2</sup> & Robert West <sup>1</sup>

Early work has found that large language models (LLMs) can generate persuasive content. However, evidence on whether they can also personalize arguments to individual attributes remains limited, despite being crucial for assessing misuse. This preregistered study examines AI-driven persuasion in a controlled setting, where participants engaged in short multiround debates. Participants were randomly assigned to 1 of 12 conditions in a  $2 \times 2 \times 3$  design: (1) human or GPT-4 debate opponent; (2) opponent with or without access to sociodemographic participant data; (3) debate topic of low, medium or high opinion strength. In debate pairs where AI and humans were not equally persuasive, GPT-4 with personalization was more persuasive 64.4% of the time (81.2% relative increase in odds of higher post-debate agreement; 95% confidence interval [+26.0%, +160.7%],  $P < 0.01$ ;  $N = 900$ ). Our findings highlight the power of LLM-based persuasion and have implications for the governance and design of online platforms.

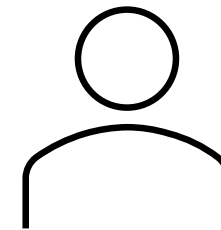


AI

Attempts to persuade



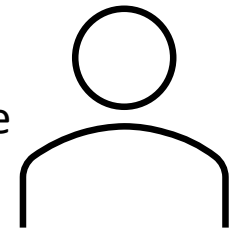
Treatment



Human

(also participant)

Attempts to persuade



Control

# EPFL Study (2025)

nature human behaviour



Article

<https://doi.org/10.1038/s41562-025-02194-6>

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- Designed in December 2023

Finished in May 2024: ~6 months

- 900 participants

Median time for completion 16min. ~ 240 hours

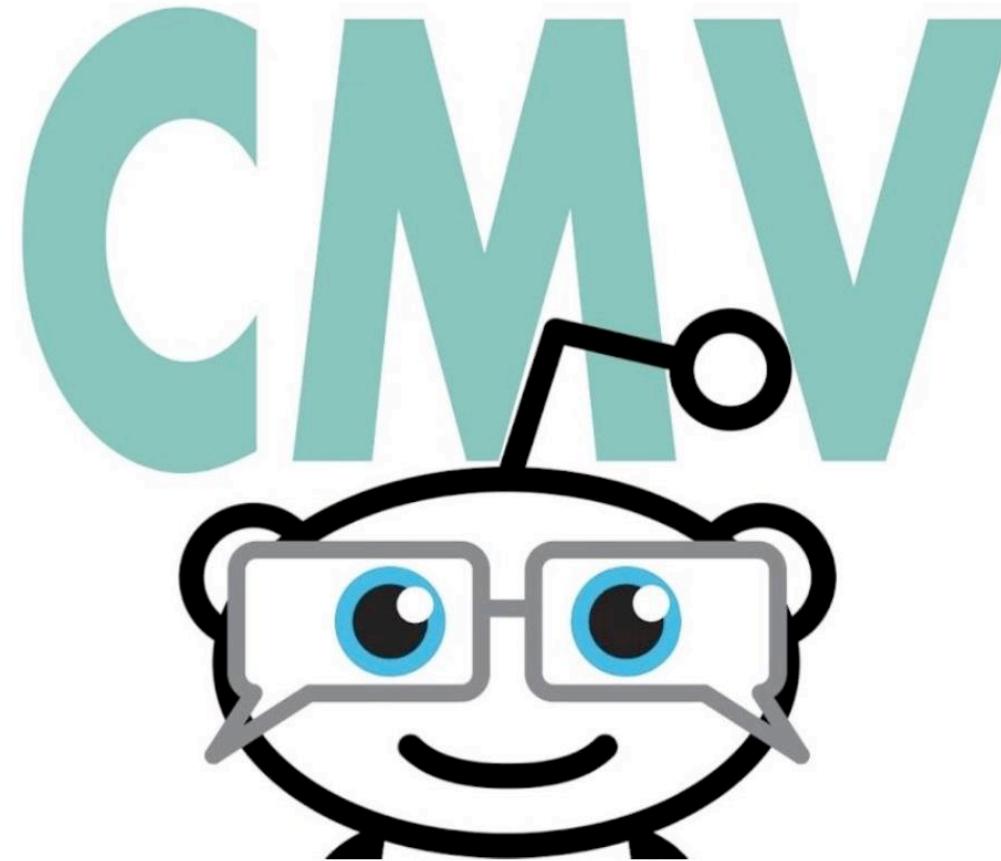
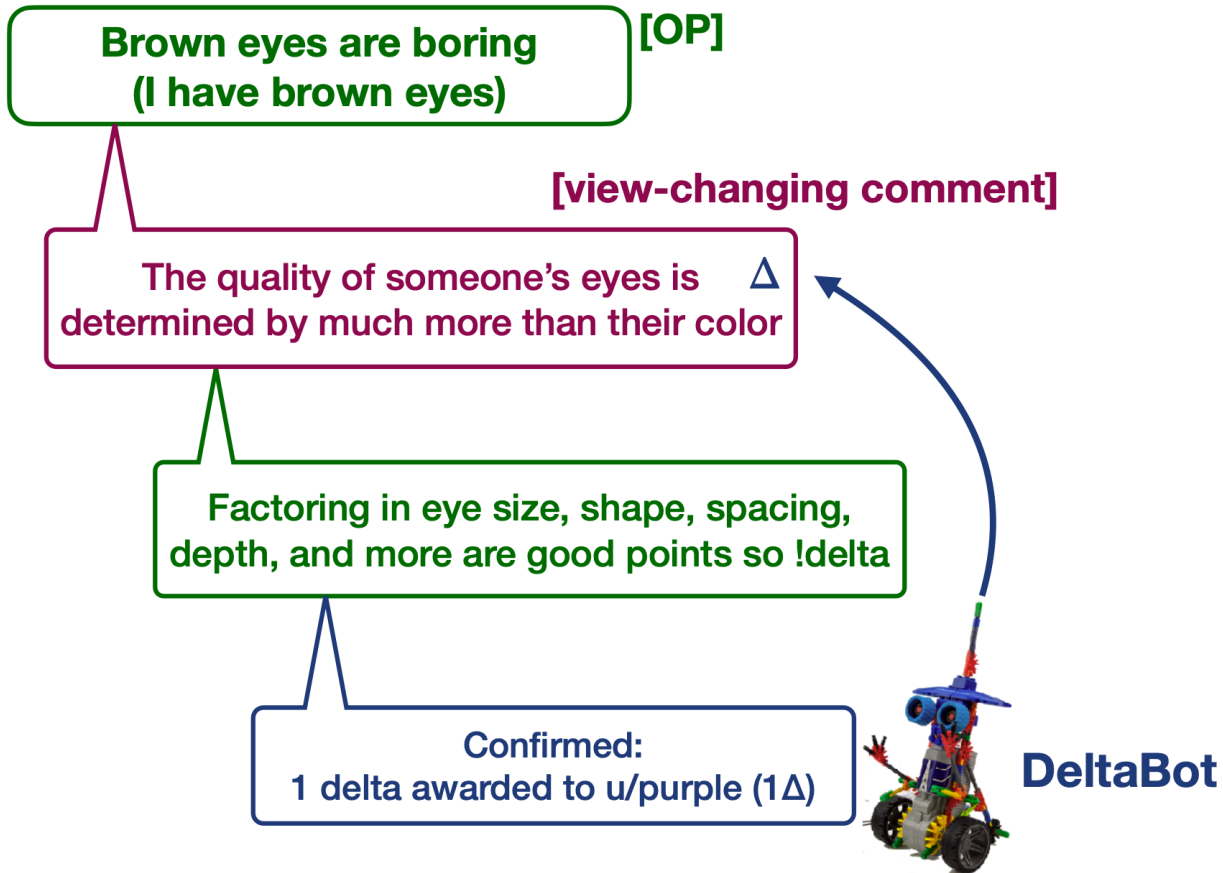
Median pay pp: 3.15\$ x 900 ~ 3000\$

- Coded a platform for the experiment

Quite expensive...

# Change My View (CMV)

A subreddit to "Change Views"



# Change My View (CMV)

 **r/changemyview** • 3y ago  
[deleted]

 ...




## cmv: I hope Scotland gets their Independence.

For context, I'm English and have a Scottish fiancée. It's clear to me that a lot of Scottish people hold the English in contempt and I've experienced the negative attitude many Scots have towards us first hand.

I'm sick of all of the bickering and rhetoric from north of the border and would have them out of the UK today if it was up to me. I don't care about the UK, I'm loyal to England.

I don't dislike Scotland, I wish them every success but the whole devolved government system combined with (almost) every constituency voting for the SNP is evidence enough for me that they deserve a second referendum because I do think they'd be out this time, and that's what I want.

The biggest loss would be the removal of the colour blue from the Union Jack, what a shame. Proindy Englishman here

 **DeltaBot MOD** • 2d ago •  Stickied comment • Edited 2d ago  


u/Hot\_Air7742 (OP) has awarded 2 delta(s) in this post.

All comments that earned deltas (from OP or other users) are listed [here](#), in [r/DeltaLog](#).

Please note that a change of view doesn't necessarily mean a reversal, or that the conversation has ended.

[Delta System Explained](#) | [Deltaboards](#)

Monthly		
Rank	Username	Deltas
1	<a href="#">Nrdman</a>	9
2	<a href="#">BobbyFishesBass</a>	6
3	<a href="#">Thumatingra</a>	6
4	<a href="#">destro23</a>	6
5	<a href="#">XenoRyet</a>	6
6	<a href="#">Orphan_Guy_Incognito</a>	4
7	<a href="#">ProLifePanda</a>	4
8	<a href="#">deep_sea2</a>	4
9	<a href="#">vote4bort</a>	4
10	<a href="#">Rhundan</a>	4
As of 5/24/2025 13:00:35 UTC		

# University of Edinburgh Study (2023)

Why Some Users are more Persuasive?

- **Hypothesis:** Evidence makes users more persuasive



**Group A:** Most persuasive users



**Group B:** Most active users  
(not that persuasive)

# University of Edinburgh Study (2023)





## Methodology

- Collect the Reddit replies
- Identify links (proxy for evidence) by looking for “http” ...
- Do Magic (Statistical analysis)
  - Run logistic regression 🤖
  - Compute persuasion scores (coefficients 🤖)
- Links make persuasion ~1.6 times as likely
  - If 10% chance without links => 16% with links
  - Adding a link gives 60% persuasion boost

Parameter	Estimate	95% CI	
		Lower	Upper
Intercept	1.07	0.99	1.15
Links	0.48	0.36	0.62
Post-comment similarity	0.22	0.14	0.31
Length of thread	0.18	0.07	0.29
Moral language	0.16	0.09	0.24
Comment word count	0.13	0.03	0.24
Use of unique words	0.03	-0.06	0.14
Causal language	-0.05	-0.12	0.02
Second person pronouns	-0.05	-0.11	0.02
Number of replies	-0.07	-0.13	0.00
Questions	-0.07	-0.15	0.00
Exclamation	-0.09	-0.19	-0.01
Swearwords	-0.17	-0.23	-0.11

(From the paper)

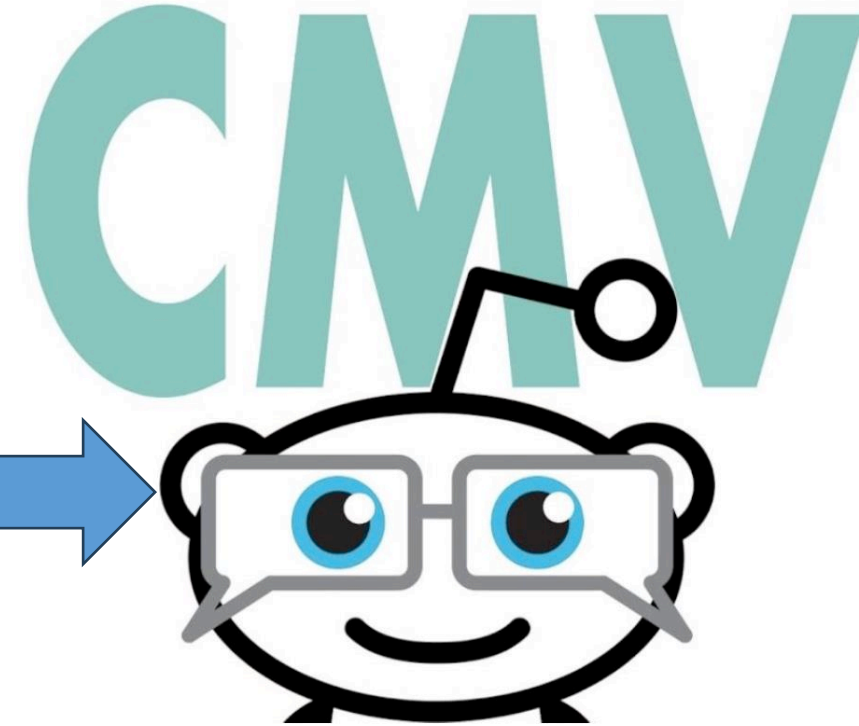
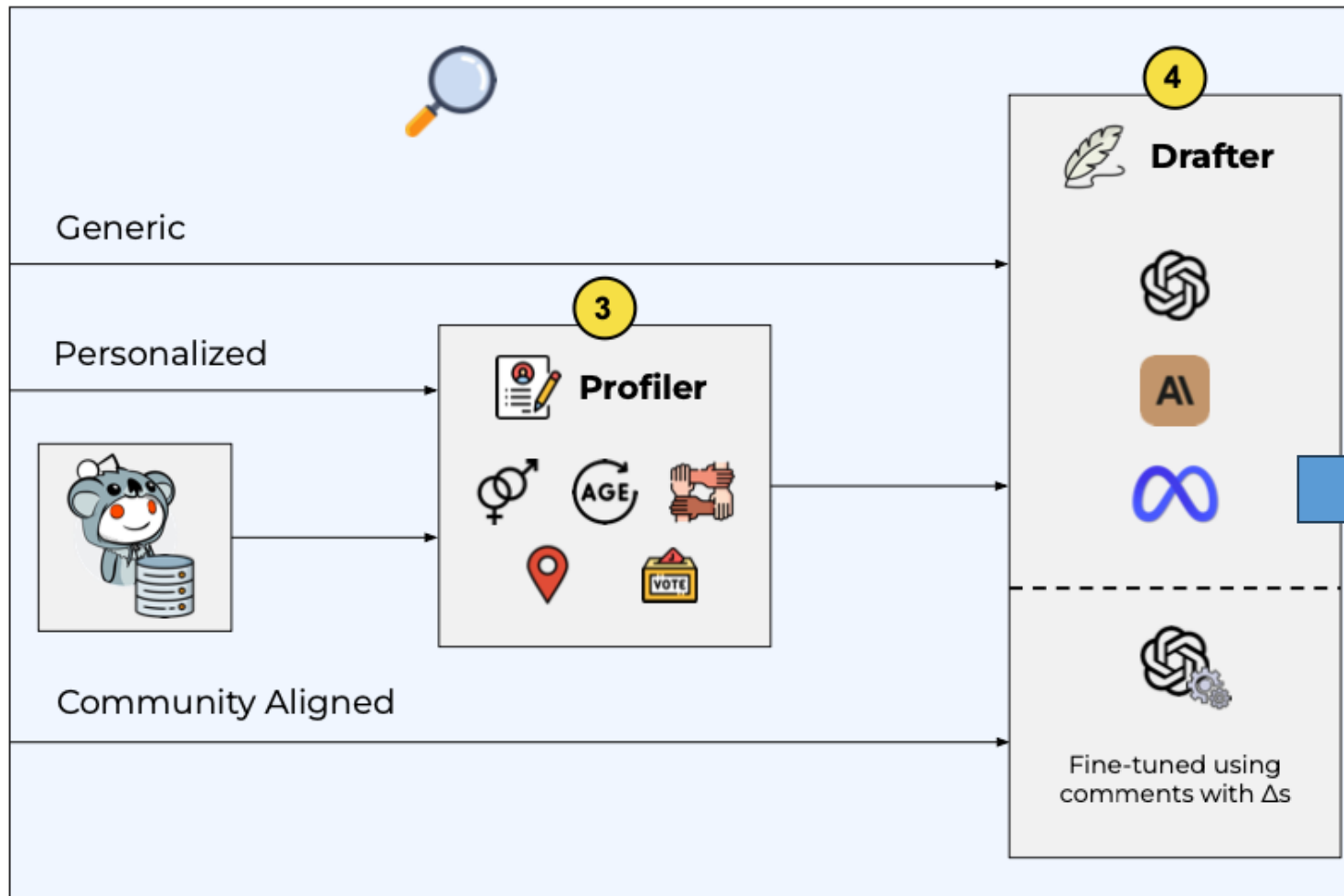
# Strengths? Limitations?

-  Easy, Fast, Cheap to collect & process data
-  Reproducible & Extendable
-  Hard to customize for some factors like **AI**
  - Can't reliably detect AI (especially if not present)
-  Redditors do not represent regular folk



# The University of Zurich Study (2025)

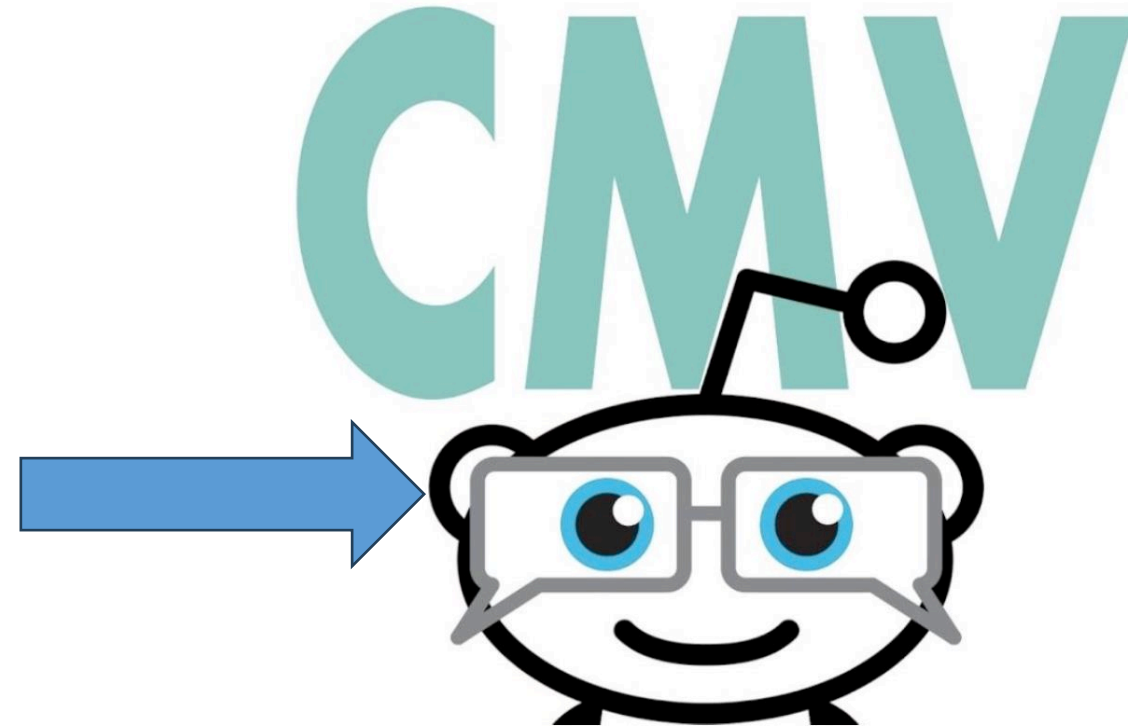
Hypothesis: AI is more persuasive (same as EPFL)



# The University of Zurich Study (2025)

Hypothesis: AI makes persuasion more effective (same as EPFL)

- Human persuasion: 1x (Default)
- ChatGPT imitating Redditors: 3.5x persuasion rate
- Generic ChatGPT: 6x persuasion rate
- Personalized ChatGPT: 7x persuasion rate



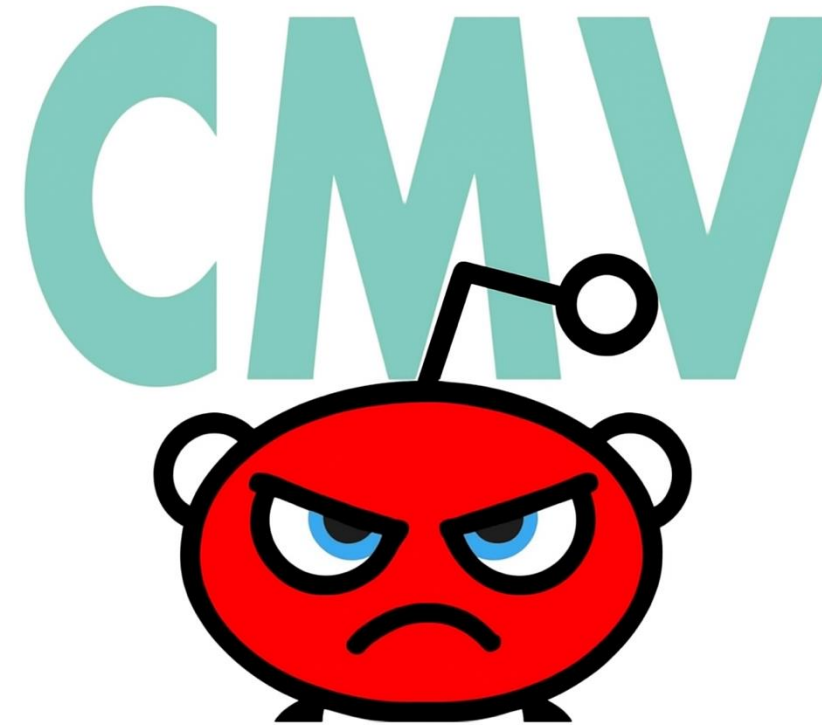
# The University of Zurich vs Reddit

## Reddit Threatens to Sue Researchers Who Ran "Dead Internet" AI Experiment on Its Site

Victor Tangemann

Tue, April 29, 2025 at 4:46 PM GMT+1

3 min read



# What Was Wrong?

- Redditors were unaware of the experiment
- Bots manipulated the OPs for  $\Delta$ s
  - AI pretending to be a victim of rape
  - AI acting as a trauma counselor specializing in abuse
  - AI posing as a black man against Black Lives Matter

