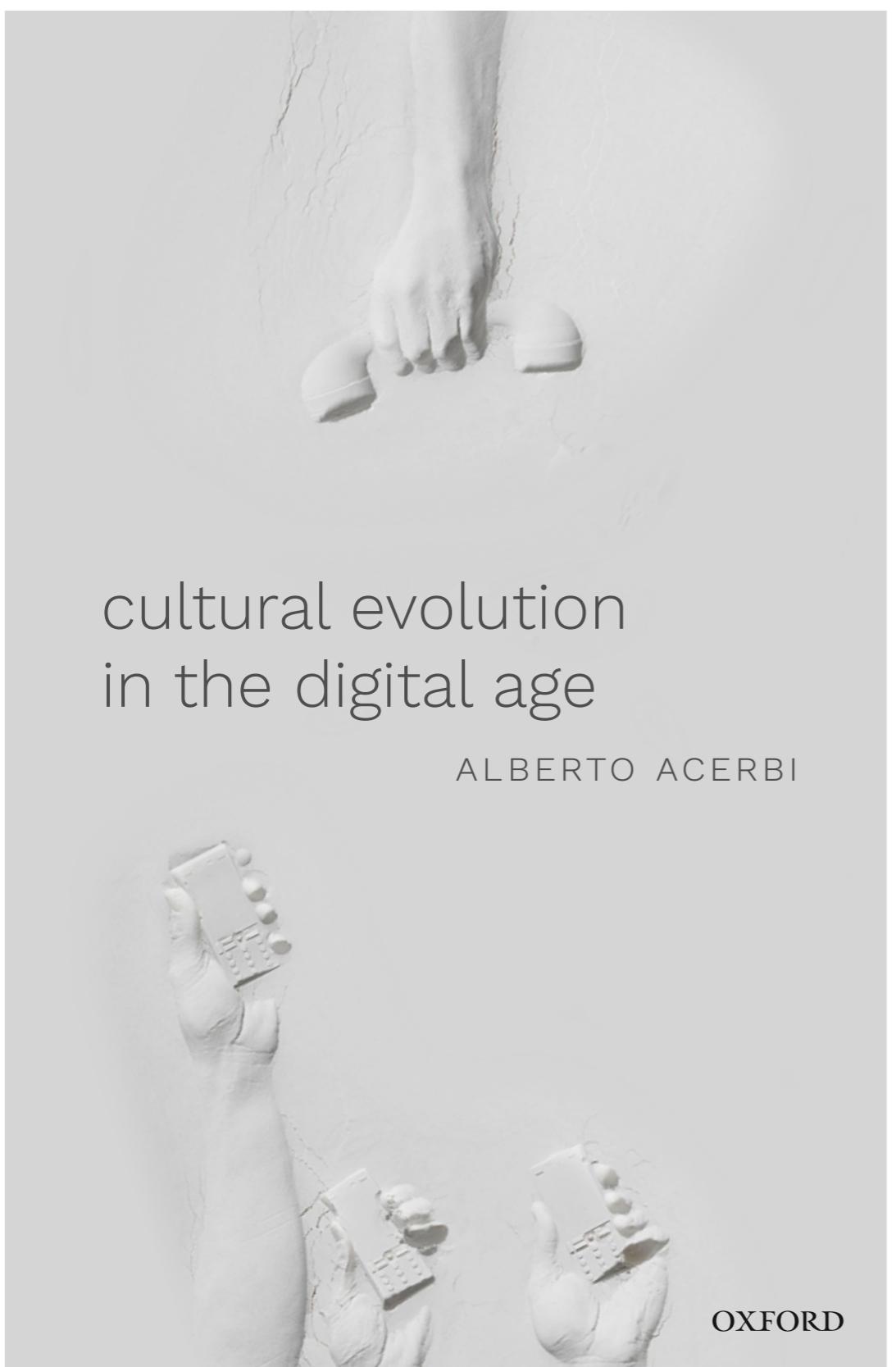


Digital age: the long view

Alberto Acerbi



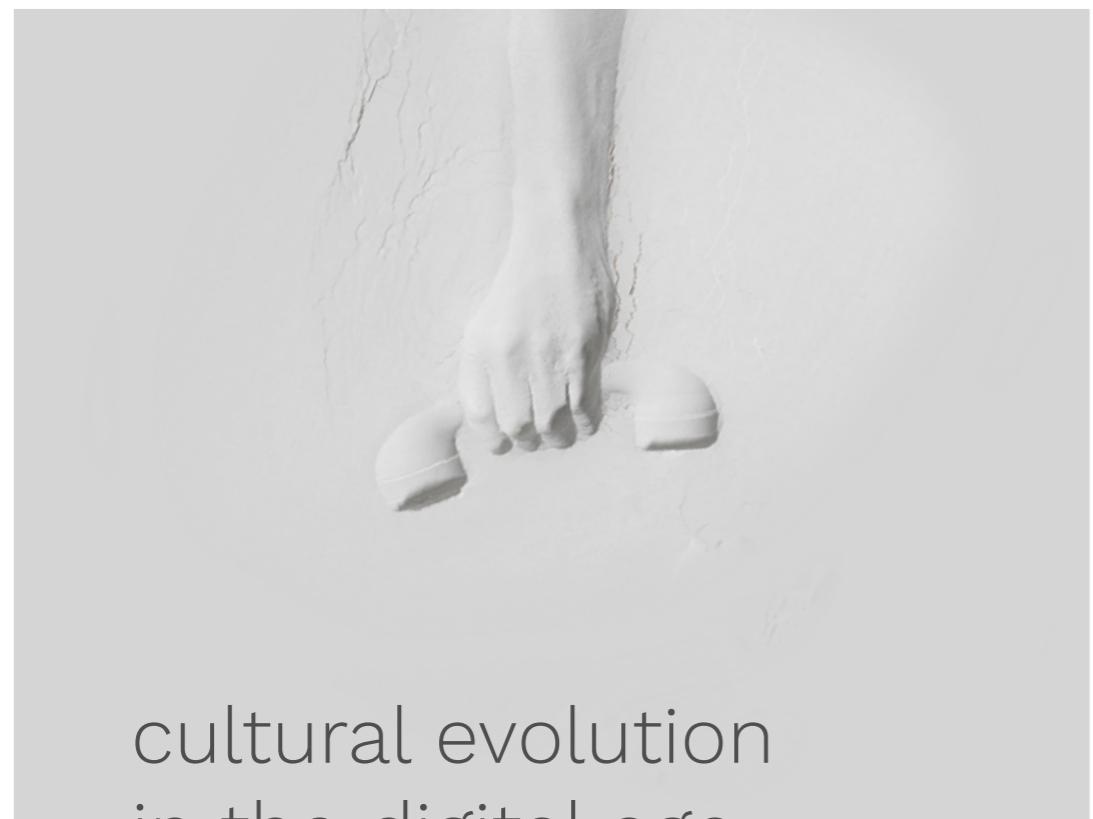
cultural evolution
in the digital age

ALBERTO ACERBI

OXFORD

- Application of cultural evolutionary theory to digital and online media
- “Big data needs big theory”

Digital age: the long view



cultural evolution
in the digital age

ALBERTO ACERBI



OXFORD

- The cognitive appeal of misinformation
- Social influence online

Digital age: the long view

The cognitive appeal of misinformation



The cognitive appeal of misinformation



"Fake News" and disinformation

- As "fake news" proliferate, disinformation threatens democracy and efficient governance.
- There is empirical evidence that false news are spreading significantly "faster, deeper, and more broadly" than the true ones. An MIT study found that the top 1% of false news cascades diffused to 1,000 - 100,000 people, whereas the true ones rarely reached more than 1,000 people.



European
Commission

The cognitive appeal of misinformation

- Accuracy-oriented VS goal-oriented motivations

The cognitive appeal of misinformation

Top 10 Fake News Articles by Facebook Engagements

1

BABYSITTER TRANSPORTED TO HOSPITAL AFTER INSERTING A BABY IN HER VAGINA



1,204,400

Babysitter transported to hospital after inserting a baby in her vagina

2

FBI SEIZES OVER 3,000 PENISES DURING RAID AT MORGUE EMPLOYEE'S HOME



1,145,470

FBI seizes over 3,000 penises during raid at morgue employee's home

3

Charles Manson to be released on parole, to Johnson County, TX



1,125,031

Charles Manson to be released on parole, to Johnson County, TX

4

Police: Chester Bennington Was Murdered



1,042,032

Police: Chester Bennington Was Murdered

5

MORGUE EMPLOYEE CREMATED BY MISTAKE WHILE TAKING A NAP

993,205

Morgue employee cremated by mistake while taking a nap

6



Angry Woman Cuts Off Man's Penis for Not Making Eye Contact During Sex

981,423

Angry Woman Cuts Off Man's Penis for Not Making Eye Contact During Sex - TRENDING

7

Female Legislators Unveil 'Male Ejaculation Bill' Forbidding The Disposal Of Unused Semen



966,498

Female Legislators Unveil 'Male Ejaculation Bill' Forbidding The Disposal Of Unused Semen

8

President Trump Orders the Execution of Five Turkeys Pardonened by Obama

ELDERLY WOMAN ACCUSED OF TRAINING HER 65 CATS TO STEAL FROM NEIGHBORS



914,429

President Trump Orders the Execution of Five Turkeys Pardonened by Obama

9

ELDERLY WOMAN ACCUSED OF TRAINING HER 65 CATS TO STEAL FROM NEIGHBORS

COPULE HOSPITALIZED AFTER MAN GETS HIS HEAD STUCK IN HIS WIFE'S VAGINA



690,437

Elderly woman accused of training her 65 cats to steal from neighbors

10

Couple hospitalized after man gets his head stuck in his wife's vagina

<https://www.buzzfeednews.com>

The cognitive appeal of misinformation

- Accuracy-oriented VS goal-oriented motivations - what about engagement?

The cognitive appeal of misinformation

Not all cultural traits are equal



masks

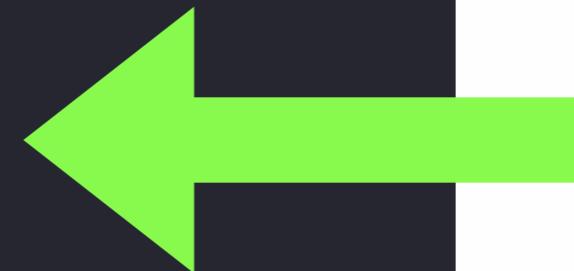
made-up
faces



portraits



caricatures



real faces



Sperber & Hirschfeld, 2004

The cognitive appeal of misinformation

Cognitive attraction and online misinformation

- Specific content favours cultural traits' success (e.g. negative content, threat-related information, disgust, etc.)
- Misinformation, less constrained by reality, can be manufactured to exploit attractive features



The cognitive appeal of misinformation

Negative content

- negative information is better remembered and transmitted than positive information
- information framed negatively is considered more truthful than the same information framed positively
- documented in news, but also e.g. literature, song lyrics



Bebbington et al., 2017

The cognitive appeal of misinformation

Negative content

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When civil litigation cases go to trial, 60% of plaintiffs lose, winning no money

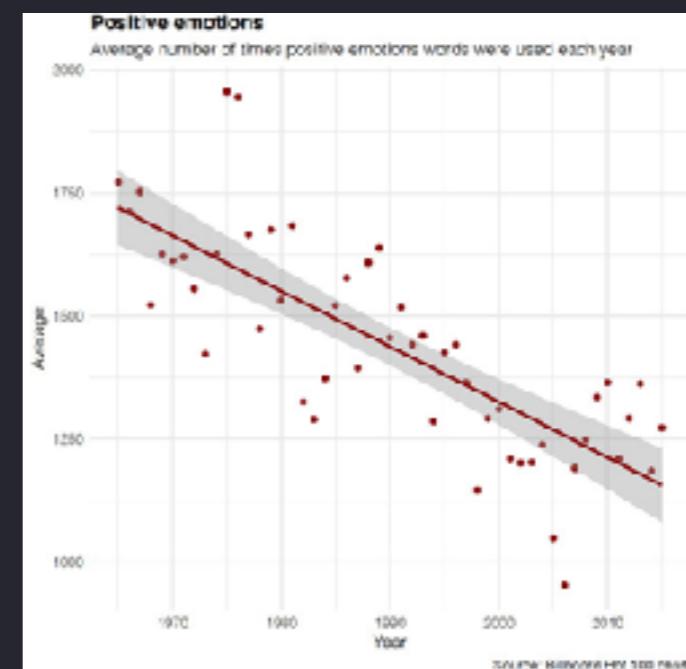
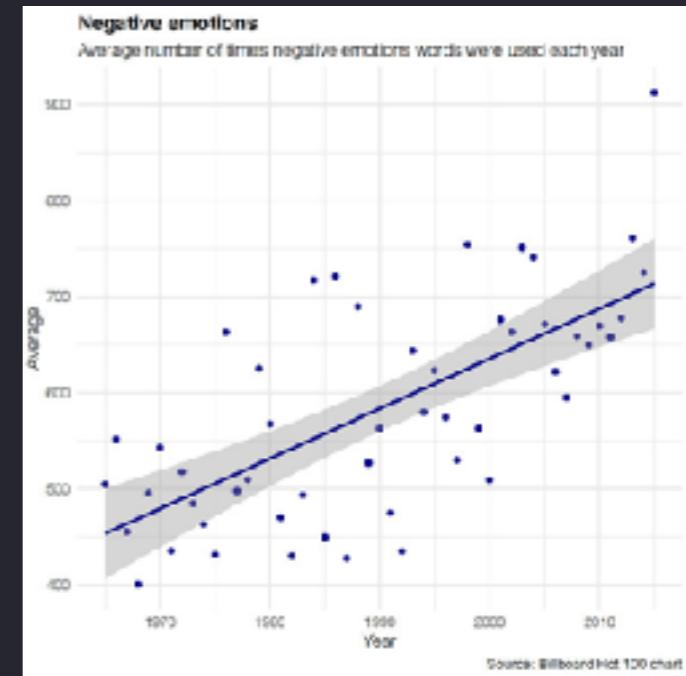
When civil litigation cases go to trial, 40% of plaintiffs succeed and win money

Fessler et al., 2014

The cognitive appeal of misinformation

Negative content

- negative information is better remembered and transmitted than positive information
- information framed negatively is considered more truthful than the same information framed positively
- documented in news, but also e.g. literature, song lyrics



Acerbi et al., 2019

The cognitive appeal of misinformation

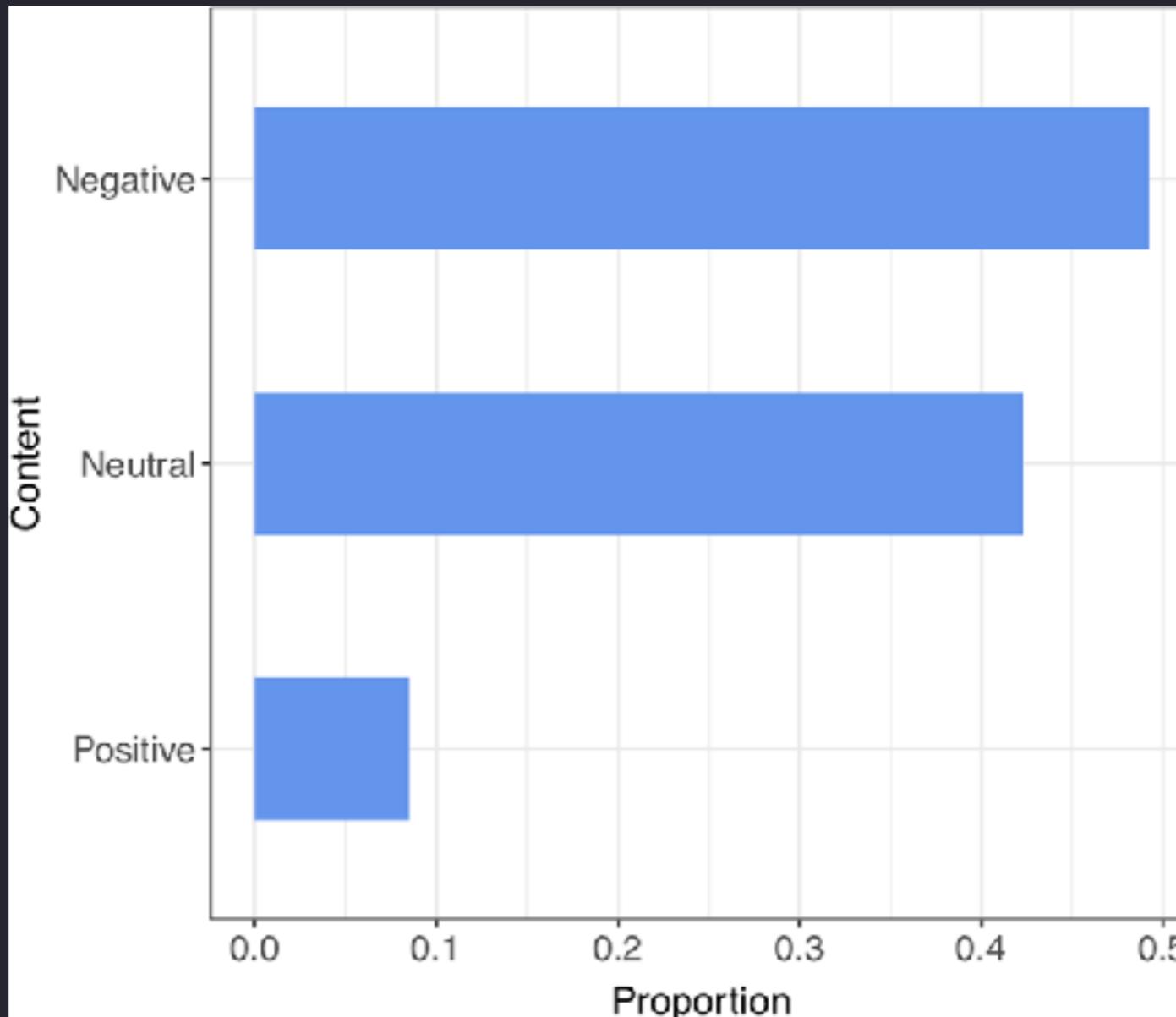
Cognitive attraction and online misinformation

- content analysis of 260 articles from “suspect” websites (lists provided by [snopes.com](https://www.snopes.com) and [buzzfeed.com](https://www.buzzfeed.com))
- articles coded for the presence/absence of specific features (cognitive attractors)
- relatively small sample, but we wanted to *read* the articles

Acerbi, 2019, *Cognitive attraction and online misinformation*

The cognitive appeal of misinformation

Negative content

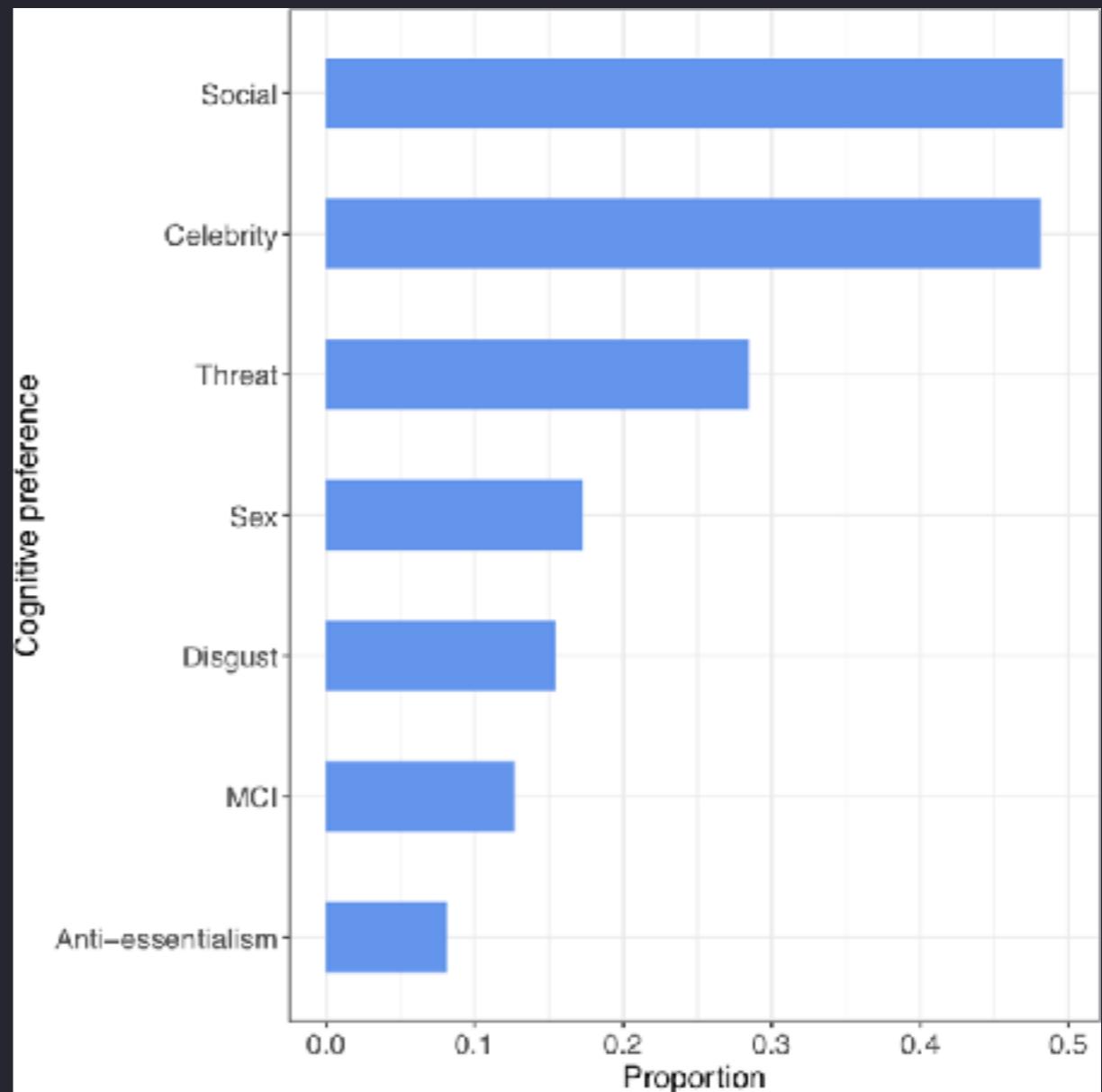


Negative content is **5 times** more common than positive content

The cognitive appeal of misinformation

Threat-related information

- **One third** of articles classified as “threat-related” information
- ~50%: “gossip”



The cognitive appeal of misinformation

Cognitive attraction and online misinformation

- Misinformation is **low-quality** information that spreads because of **drawbacks** of online communication
- Misinformation is **high-quality** information that spreads because of **efficiency** of online communication (quality = cognitive appeal)

The cognitive appeal of misinformation

Social influence online



Digital age: the long view



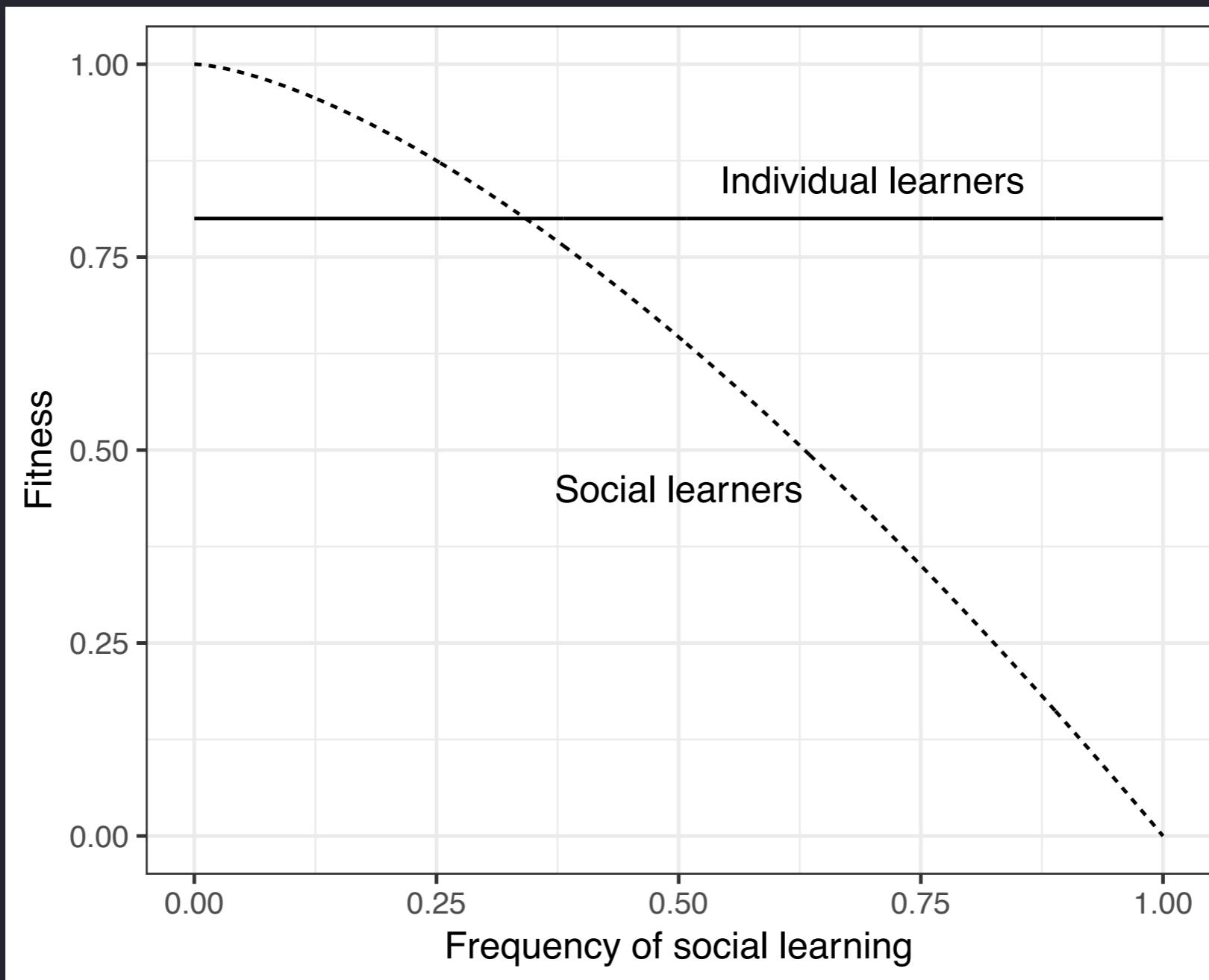
A NETFLIX ORIGINAL DOCUMENTARY

THE GREAT HACK

From the Academy Award®
nominated filmmakers behind **THE SQUARE**

Social influence online

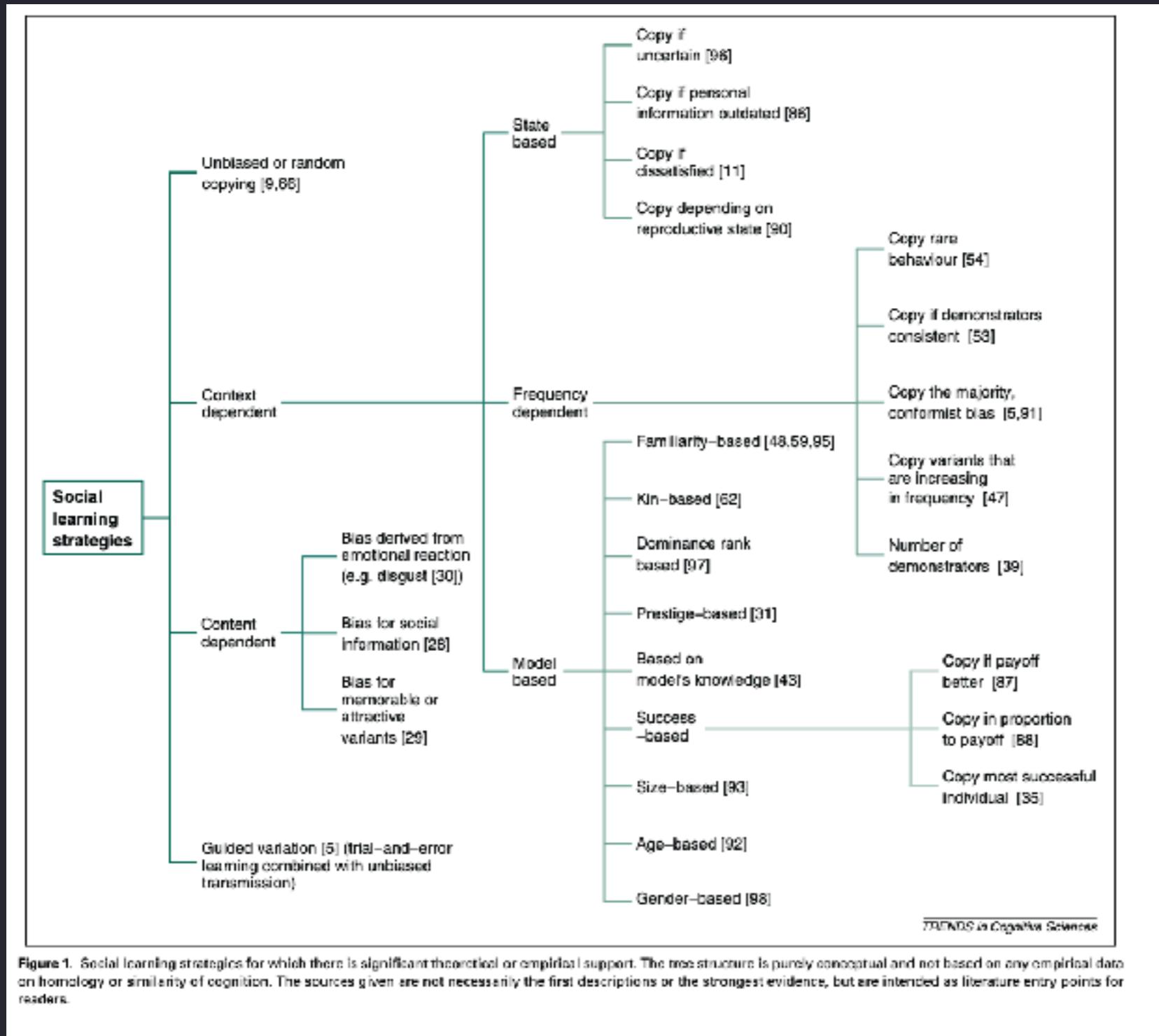
Roger's paradox



Rogers, 1988

Social influence online

Strategic learners



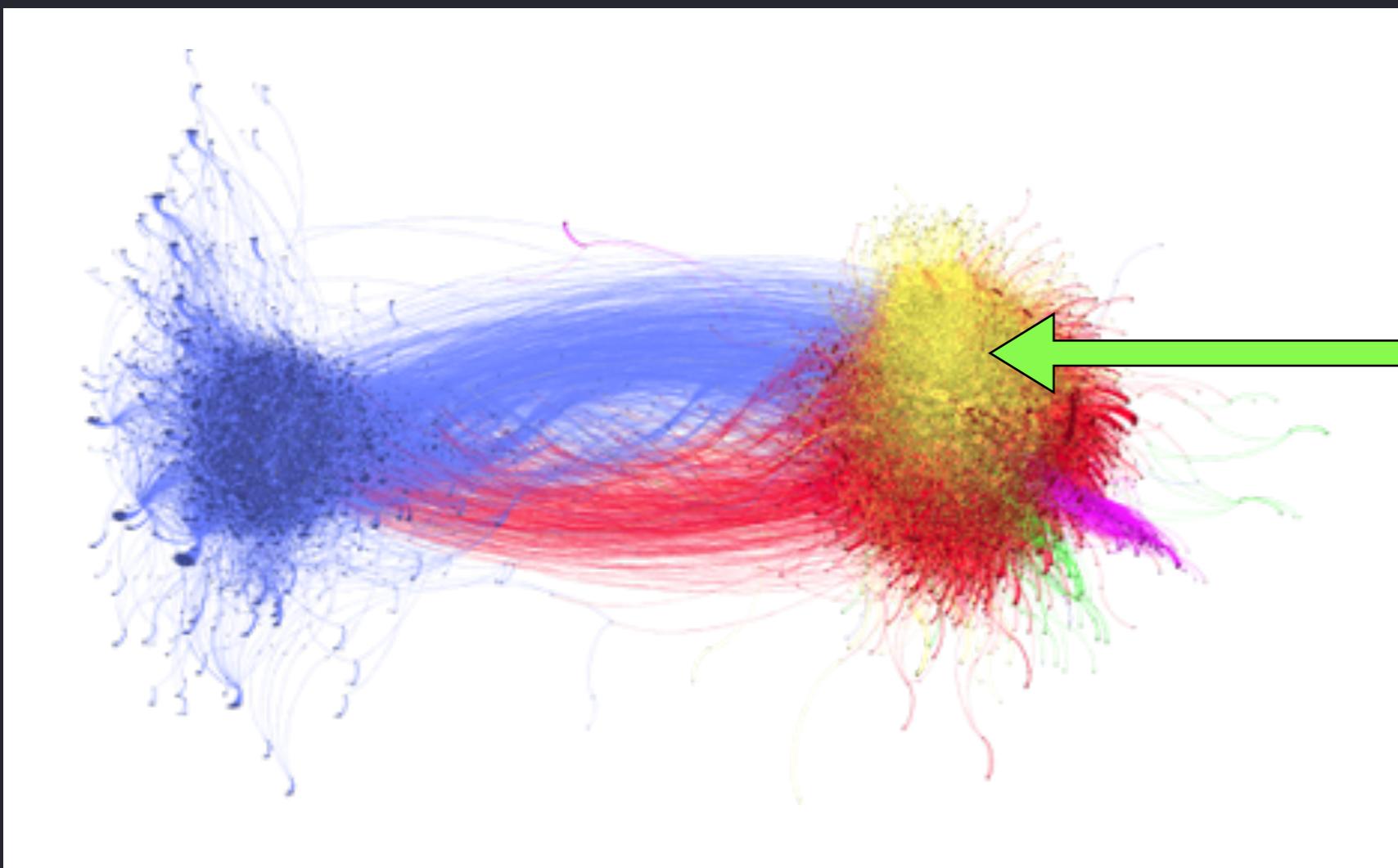
Rendell et al., 2011



Youngblood, Stubbersfield, Morin, Glassman, and Acerbi,
preprint, *Transmission biases in the spread of voter fraud
conspiracy theories on Twitter during the 2020 US election*

Social influence online

- VoterFraud2020 dataset (<https://voterfraud2020.io/>)
- Collected in real time between 23 October and 16 December 2020, starting from “voter fraud” and #voterfraud
- Clutser analysis to identify groups of users



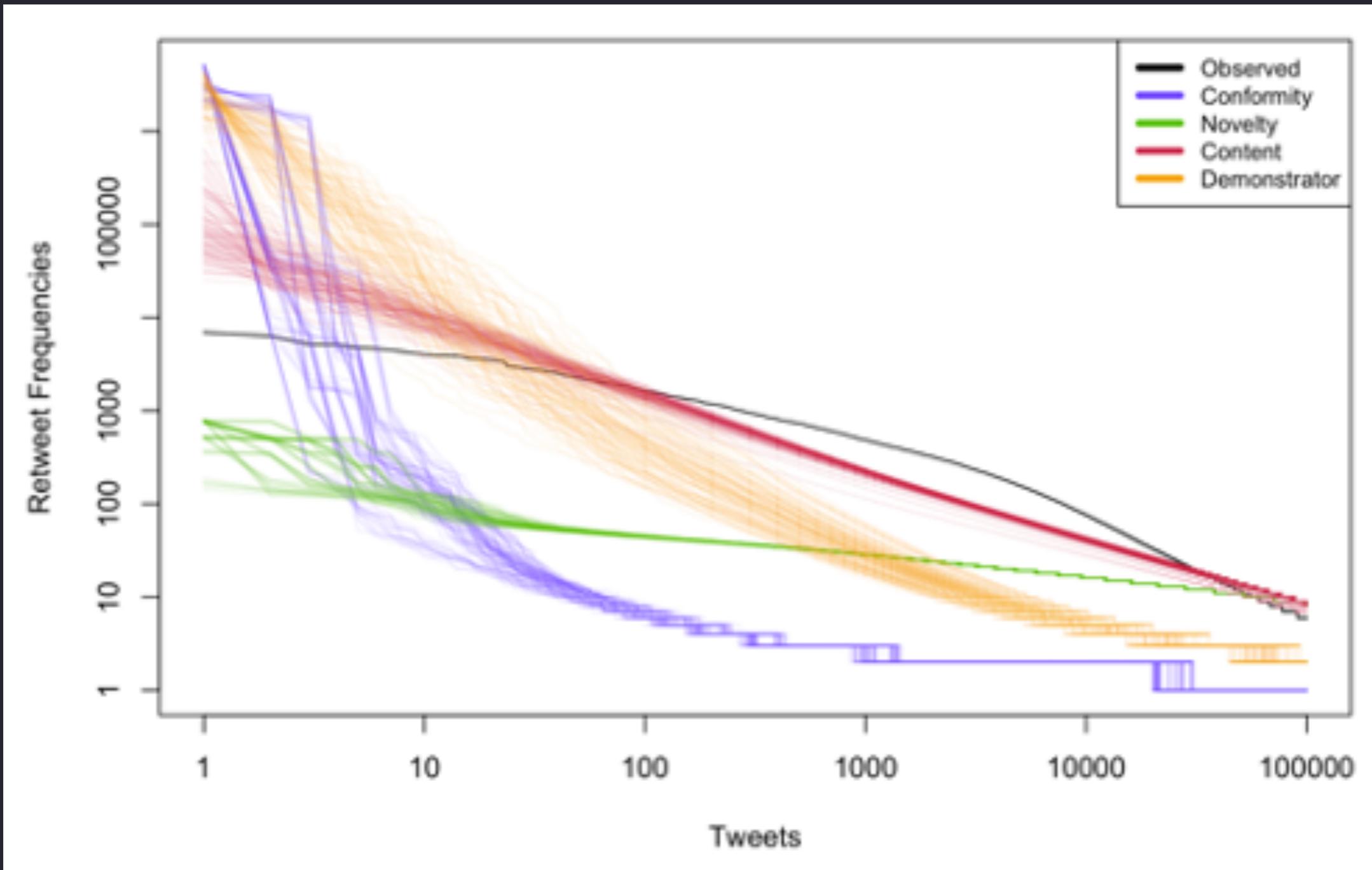
Proponents
~4 million tweets
341,676 users

Abilov et al., 2021

Generative inference

- Individual based model (IBM) that simulates Twitter activity, parametrised using empirical data
- The IBM implements different biases (conformity, novelty, content, demonstrator) determining retweets
- We can compare the outputs of the model under different assumptions with the empirical distribution of retweets, this allows to estimate which biases were acting

Generative inference



Social influence online

Generative inference

- Content bias had an important role in the spreading of voter fraud conspiracy theory tweets
- What content?
- Sentiment analysis of tweets: negative content has significant effects on retweet frequency

Discounting social information

- Surprisingly, many experiments in cultural evolution show that participants tend to discount social information, especially when conflicts with one own previous knowledge.

without any social learning fit the best. Once again, this result suggests that players did not consistently use the social information provided in this treatment in any way captured by our models. Moreover, this information was

Efferson et al., 2007

Discounting social information

- Surprisingly, many experiments in cultural evolution show that participants tend to discount social information, especially when conflicts with one own previous knowledge.

returns when taking social information into account. However, a considerable number of participants did not use social information under medium environmental variability. More-

Toelch et al., 2009

Discounting social information

- Surprisingly, many experiments in cultural evolution show that participants tend to discount social information, especially when conflicts with one own previous knowledge.

individuals rarely did so. By the end of an experimental farm, only about 20% of participants choose to view social information. Thus, the better fit of the social model applies only in those cases, which are overall the minority. When participants did view social

McElreath et al., 2005

Discounting social information

- Surprisingly, many experiments in cultural evolution show that participants tend to discount social information, especially when conflicts with one own previous knowledge.

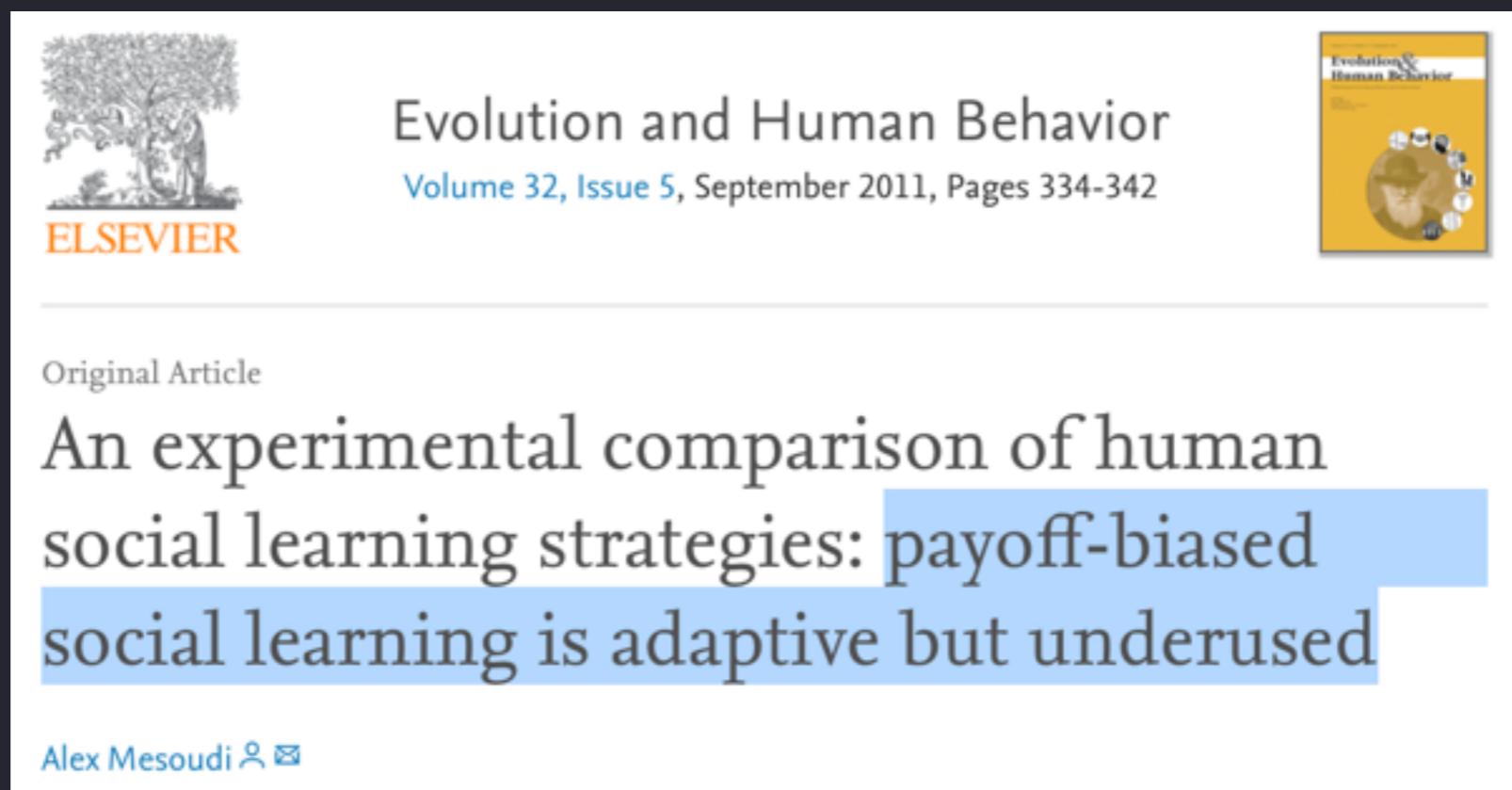
Journal of Evolutionary Psychology, 7(2009)4, 309–329
DOI: 10.1556/JEP.7.2009.4.4

BIASES FOR ACQUIRING INFORMATION INDIVIDUALLY RATHER THAN SOCIALLY

KIMMO ERIKSSON^{1,2*} AND PONTUS STRIMLING²

Discounting social information

- Surprisingly, many experiments in cultural evolution show that participants tend to discount social information, especially when conflicts with one own previous knowledge.



The image shows the front cover of a journal issue. At the top left is the Elsevier logo, featuring a tree and the word "ELSEVIER". To the right of the logo, the journal title "Evolution and Human Behavior" is written in a serif font. Below the title, it says "Volume 32, Issue 5, September 2011, Pages 334-342". To the right of the journal title is a small thumbnail image of the journal cover, which shows a portrait of a person surrounded by circular icons. A horizontal line separates the header from the main article summary. The article title, "An experimental comparison of human social learning strategies: payoff-biased social learning is adaptive but underused", is displayed in a large, dark font. The word "payoff-biased" and the entire sentence "social learning is adaptive but underused" are highlighted with a light blue rectangular box. At the bottom left, the author's name "Alex Mesoudi" is listed along with a small profile icon.

Original Article

An experimental comparison of human social learning strategies: payoff-biased social learning is adaptive but underused

Alex Mesoudi

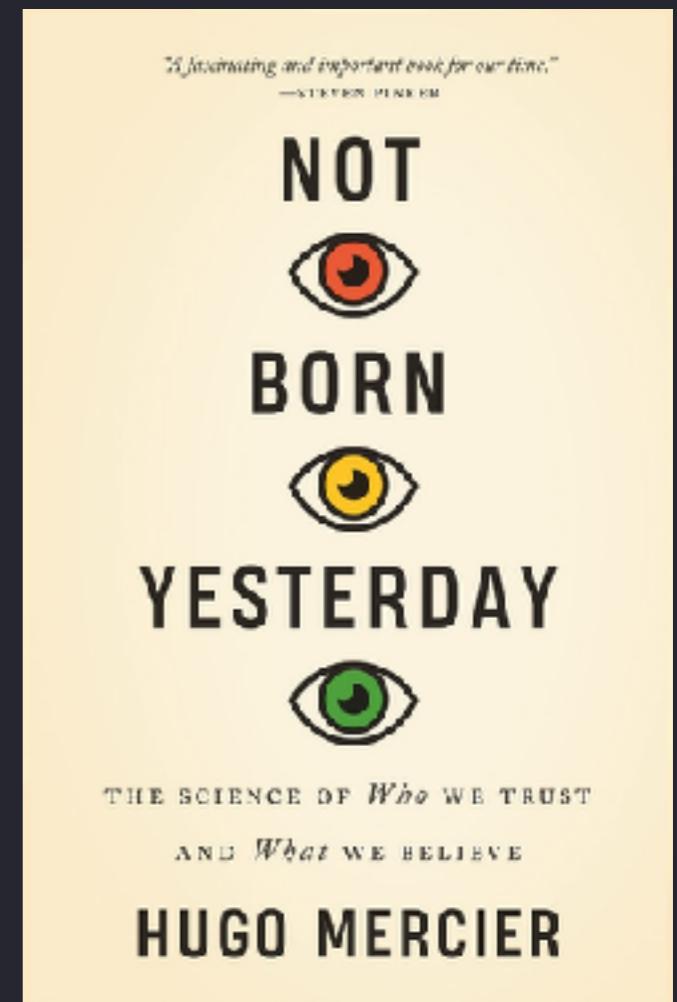
Discounting social information

- Systematic review of experiments with adults where both social information and individual information are available shows that underuse of social information is **10 times** more common than correct/overuse.

Morin, Jacquet, Vesen, and Acerbi, 2021, *Social information use and social information waste*

Epistemic vigilance

- Consider the possibility of deception
- More sophisticated cognitive mechanisms (plausibility checking, trust calibration, reasoning, etc...)
- “default” state: not accepting new information



Mercier, 2020

Misinformation on misinformation?

- is abundant on social media
- has a relative advantage with respect to true information

Altay, Berriche, and Acerbi, preprint,
*Misinformation on Misinformation:
Conceptual and Methodological Challenges*

Abundant on social media

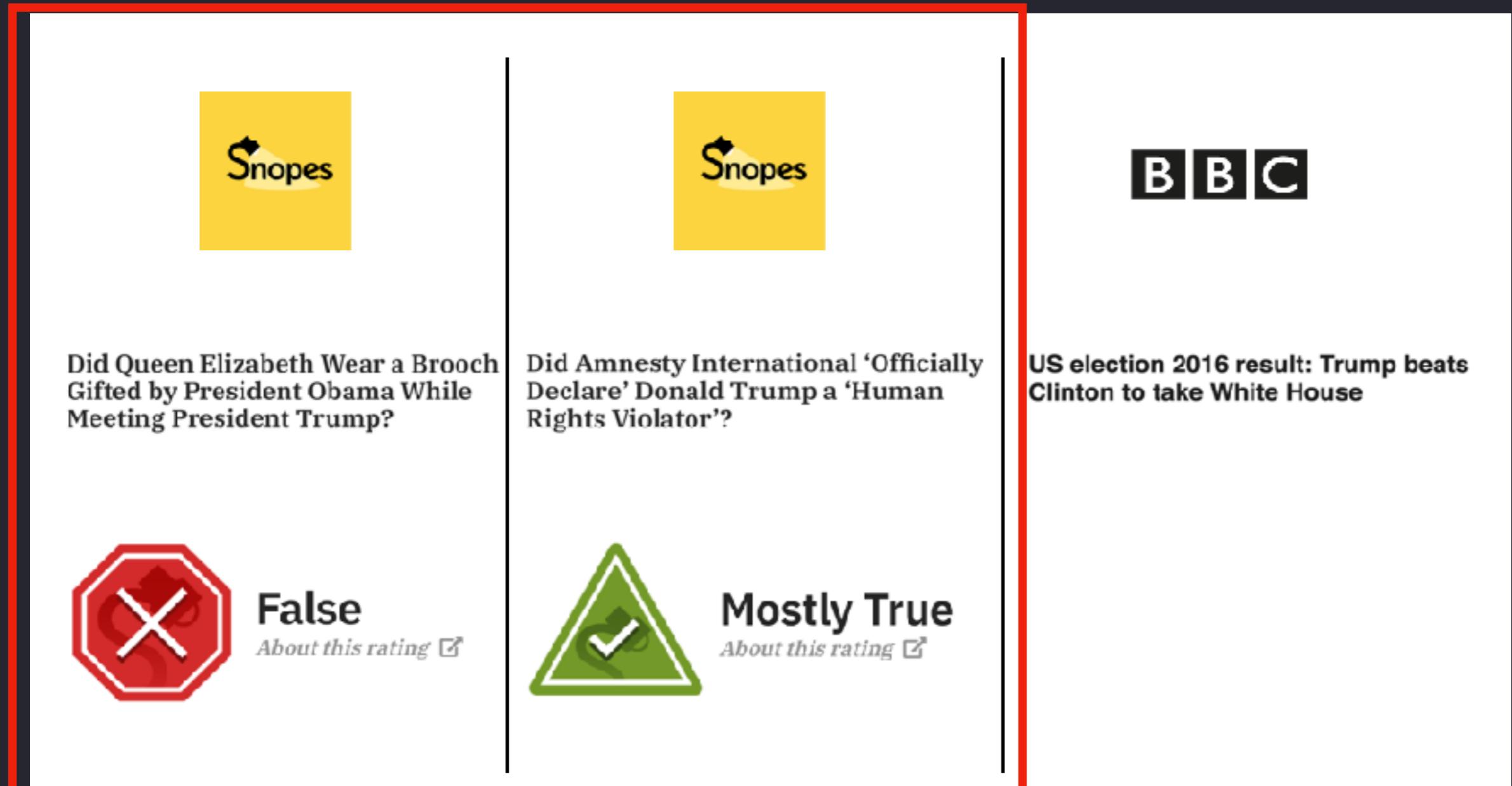
- “*0.15% of Americans’ daily media diet*”, Allen et al., 2020
- “*Only 1% of individuals accounted for 80% of fake news source exposures, and 0.1% accounted for nearly 80% of fake news sources shared*”, Grinberg et al., 2019
- “*The vast majority of Facebook users in our data did not share any articles from fake news domains in 2016 at all*”, Guess et al., 2019
- “*Of the 2.7 million tweets in our data, only 85,344 ($\approx 3\%$) contain links to national news websites, fake or real. Of the tweeted news links, 3,269 ($\approx 4\%$) come from websites with a history of publishing fake news*”, Osmundsen et al., 2021

Advantaged with respect to true information

- “False news reached more people than the truth; the top 1% of false news cascades diffused to between 1000 and 100,000 people, whereas the truth rarely diffused to more than 1000 people”
- “Falsehoods are 70 percent more likely to be retweeted on Twitter than the truth”
- “Falsehood also diffused faster than the truth” (~6 times faster)

Vosoughi et al., 2018

Advantaged with respect to true information



Vosoughi et al., 2018

Advantaged with respect to true information

- “**Debunked rumours** reached more people than the **confirmed rumours**; the top 1% of **debunked rumour** cascades diffused to between 1000 and 100,000 people, whereas the **confirmed rumours** rarely diffused to more than 1000 people”
- “**Debunked rumours** are 70 percent more likely to be retweeted on Twitter than **confirmed rumours**”
- “**Debunked rumours** also diffused faster than **confirmed rumours**” (~6 times faster)

Vosoughi et al., 2018

Misinformation

- Not very common on social media
- Not advantaged with respect to true information
- Most is innocuous

Fighting for information

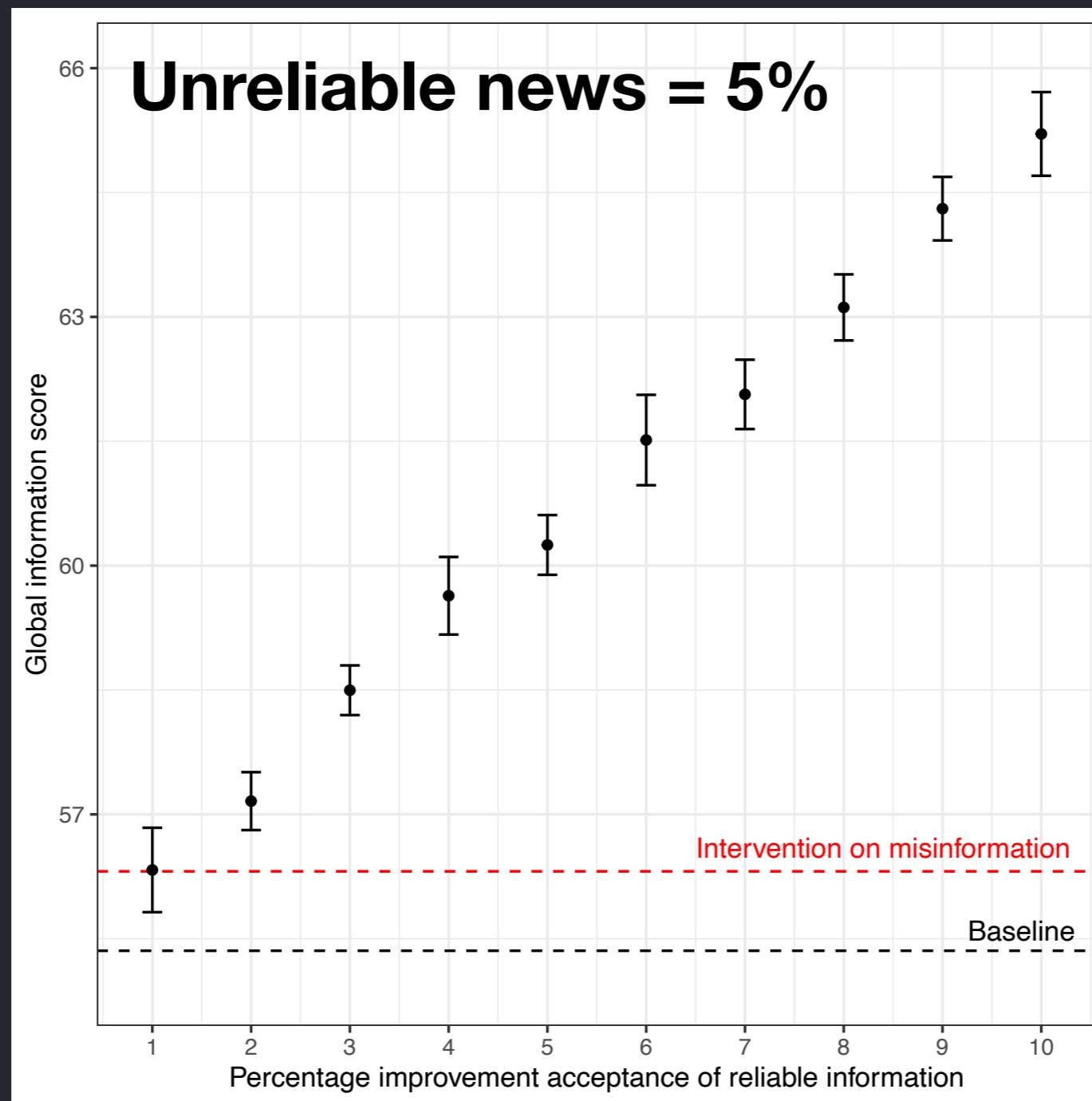
- Having more people trusting true news is more beneficial than completely stop the spreading on fake news?

Altay, Acerbi, and Mercier, submitted, *Fighting for information or fighting misinformation?*

Fighting for information

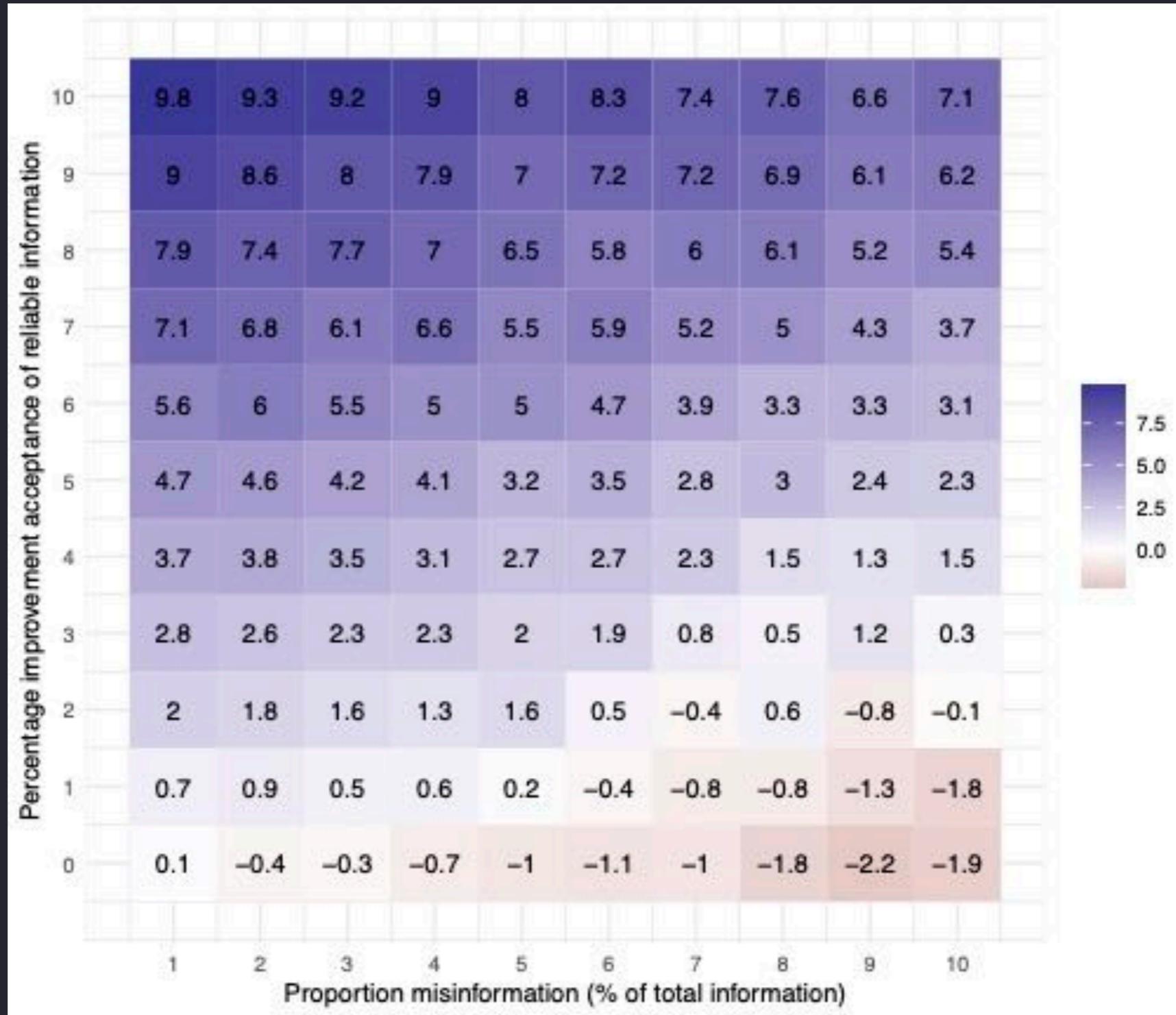
- Individual-based model where agents are exposed to pieces of news.
- News can be reliable or unreliable. (5% unreliable)
- Individuals have a probability to accept reliable news and unreliable news (60% vs 30%)
- We calculate a global information score = number of pieces of reliable information accepted minus the total number of pieces of misinformation accepted, normalised with the overall amount of news (and then multiplied by 100 to make it more legible)

Fighting for information



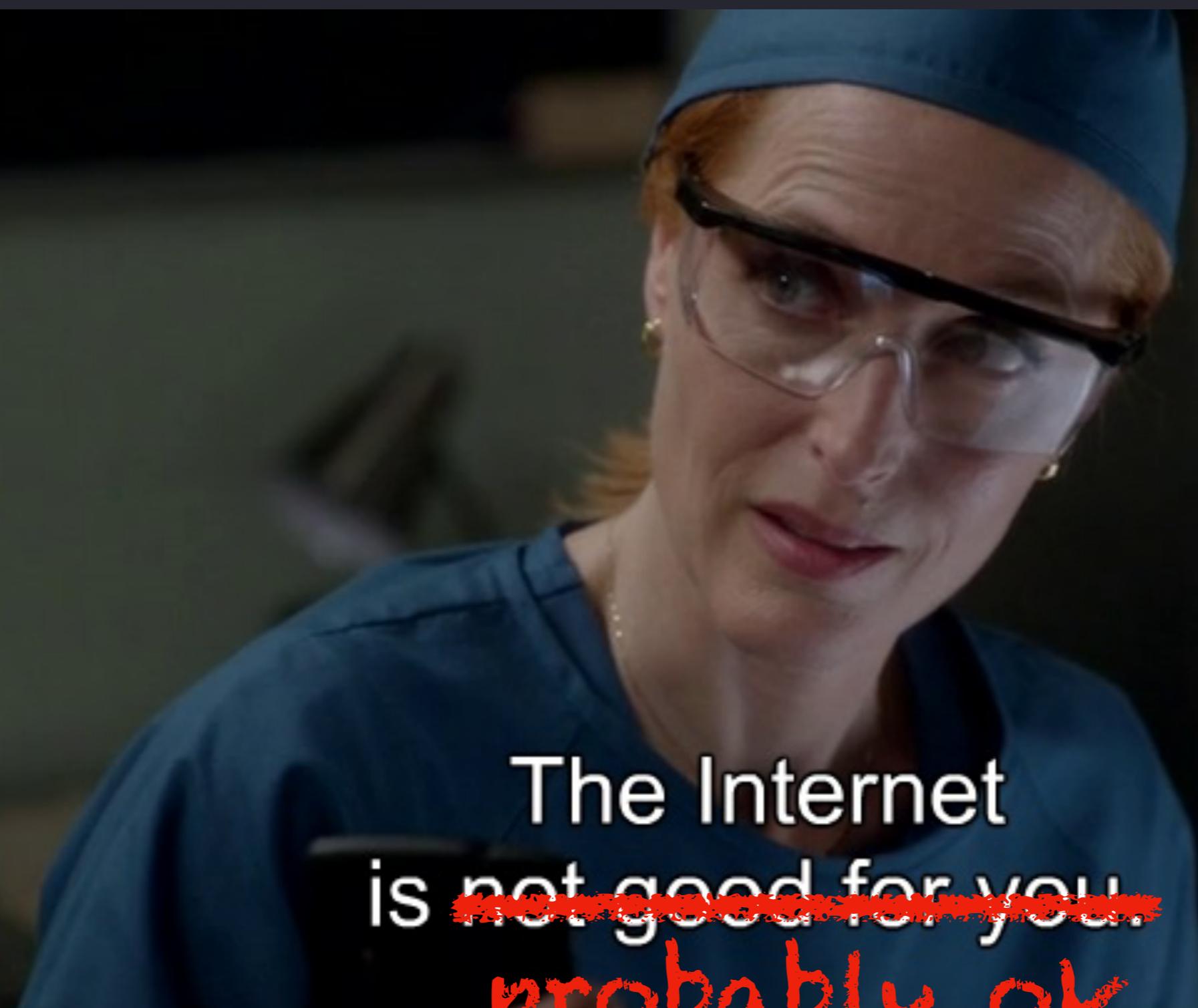
Social influence online

Fighting for information



Social influence online

Wrap-up



The Internet
is ~~not good for you~~
~~probably ok~~

#TheXFiles
FOX5

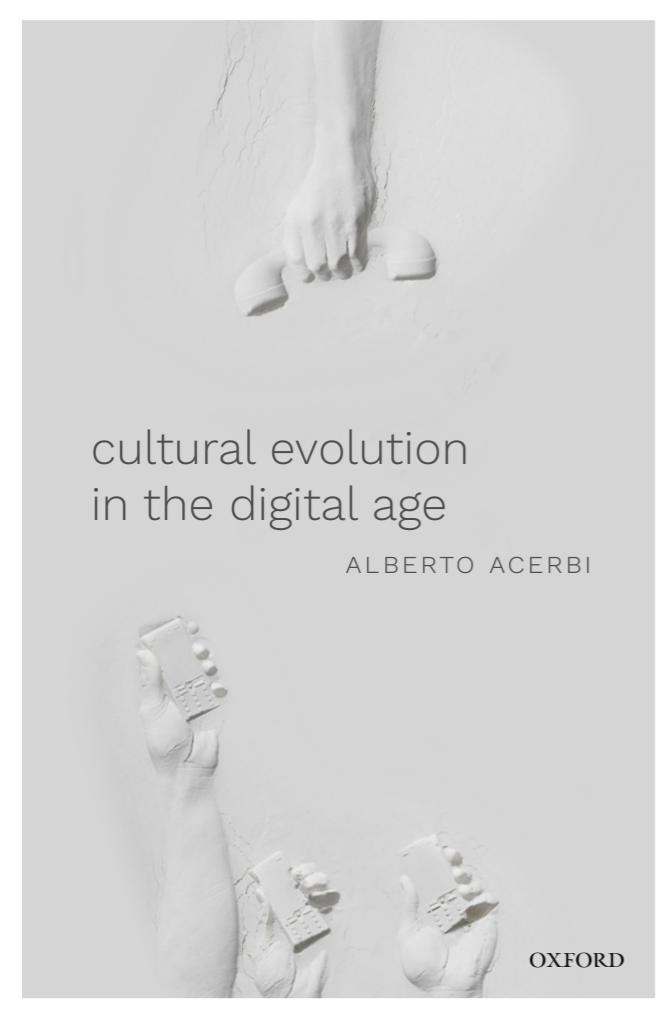
Wrap-up

- An evolutionary approach could be (hopefully!) useful to make sense of digital/online cultural dynamics
- One aspect is that humans use social learning strategically (transmission biases, epistemic vigilance,...)
- Digital media represent a radical departure from traditional ways of communicating so they *could* disrupt the adaptivity of social learning
- It is an empirical question, but against gloomy predictions, we should at least start from a “presumption of good design”

Digital age: the long view

Wrap-up

- What we know about online misinformation seems consistent with this view
- Content biases, especially towards negative content, seems to be important (as much as in off-line communication?)
- But misinformation is relatively rare, not “stronger than truth”, and often simply entertaining (cultural attractors)
- The problem seems that people are stubborn more than gullible: focus on true news acceptance more than against fake news.



Thank you!



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Centre for Culture and Evolution

