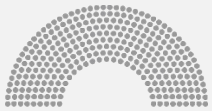
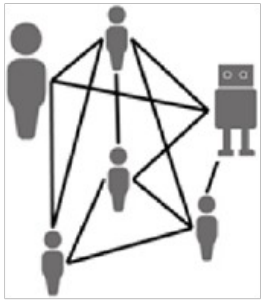
SOCIAL PHYSICS AND COMPLEXITY LAB

		QUESTIONS	DATA	TOOLS
TH		Online vs. Offline Patterns Emergency Now-casting Antibiotic Over-prescription	Google Trends SNS24 Twitter ER acceptance /times SPMS e-prescriptions	**Math Modelling** **ML** **Epidemiology**
LIC Y		Political Decisions Gender Differences Agenda Setting Voting vs. Discourse	Media records Twitter Facebook Parliament data	**NLP** **Networks** **Math Modelling** **Complex Systems**
HA VI		Cognitive Biases Attitudes Towards Science Tracking Anxiety	Large scale surveys Behavioral experiments Twitter Facebook	**Networks** **Math Modelling** **Psychology** **Information**

DISINFORMATION



Fake News | Humans | Networks

INFECTIOUS DISEASES

Pathogens | Hosts | Environment

Framework

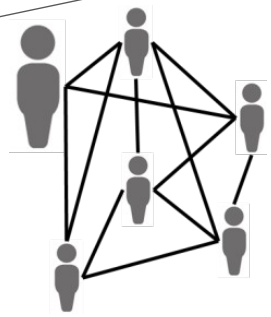
Theoretical

FAKE AND REAL NEWS

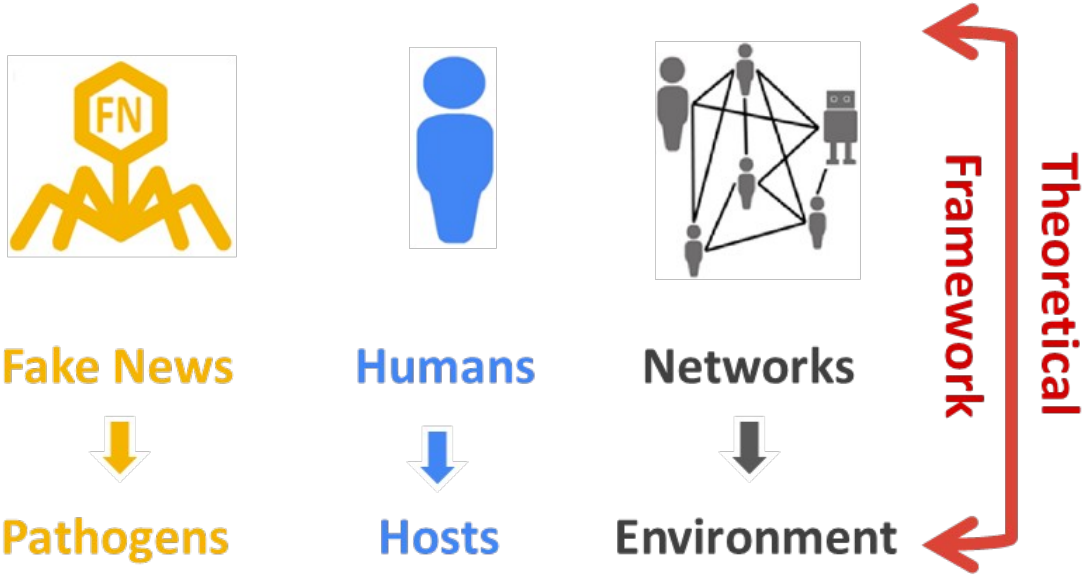
INDIVIDUAL SUSCEPTIBILITIES

DISEASE DYNAMICS MODELS

ANONYMOUS, DISTRIBUTED ENCRYPTED

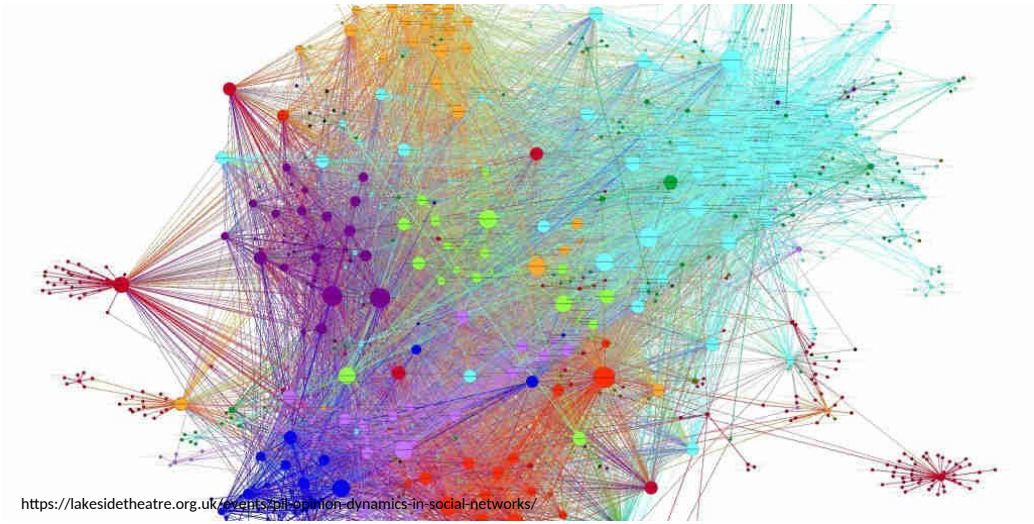


ENVIRONMENT AND HISTORY

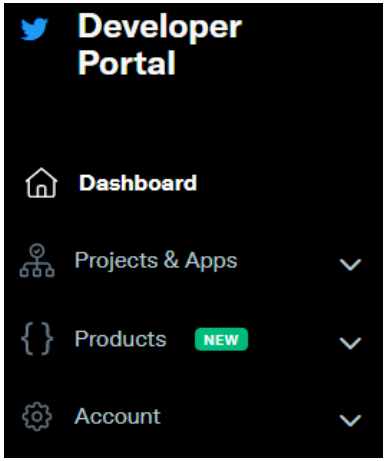


INFORMATION FLOW ON NETWORKS

Paulo Almeida, Pedro Duarte, Joana Gonçalves-Sá, Lília Perfeito



https://lakesidetheatre.org.uk/events/pil-opinion-dynamics-in-social-networks/

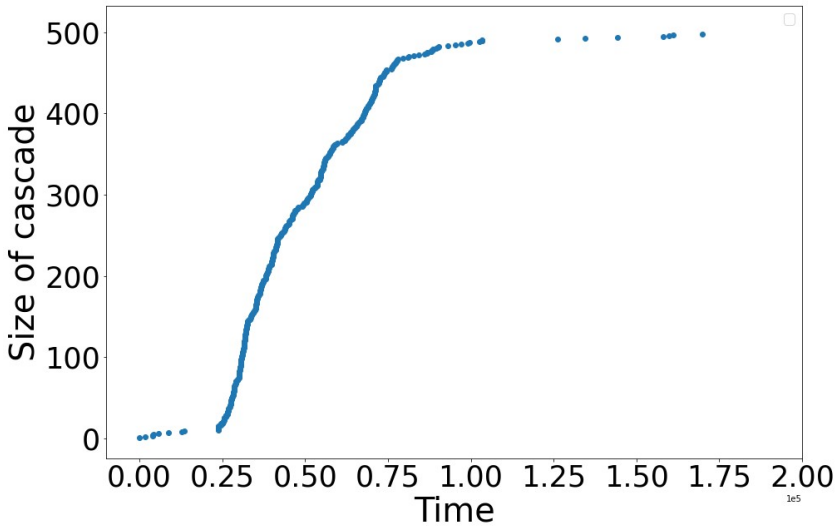


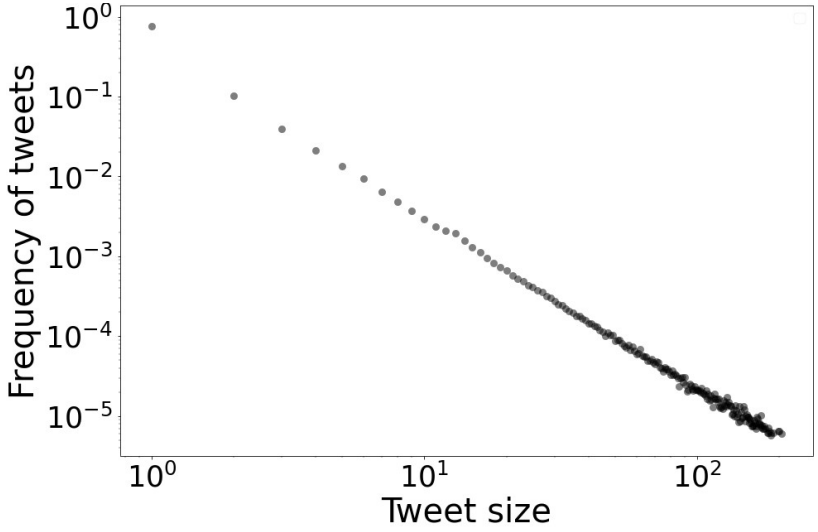
Questions

- Can we estimate the fitness of a tweet?
- What is the contribution of the network?
- What is the contribution of individual heterogeneity?
- Why do some tweets spread further than others?

Data:

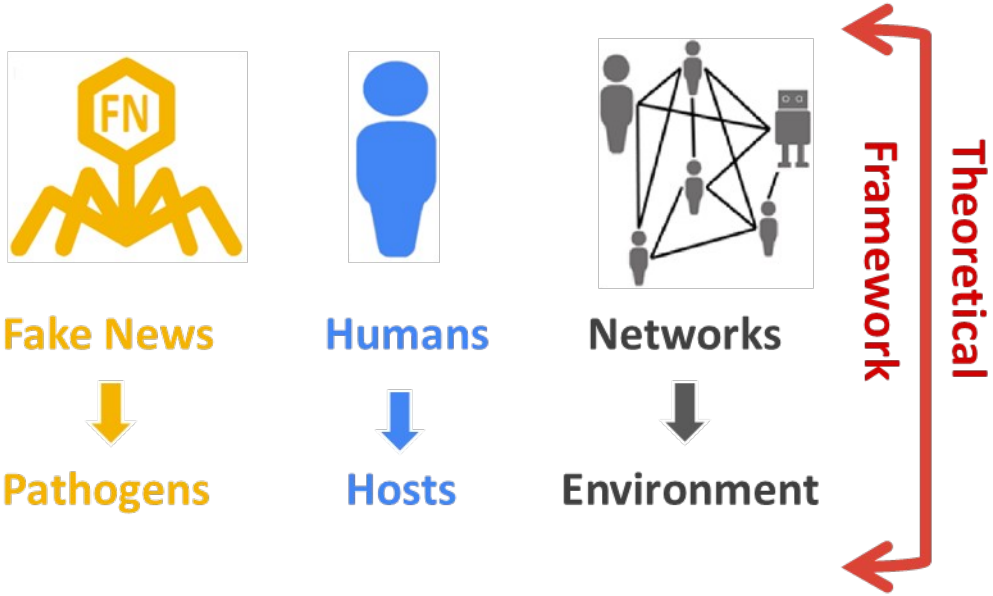
- Tweets and user profiles (from Twitter API)
- Feed into database (being built)
- Group tweets by content (cascades)





Tools:

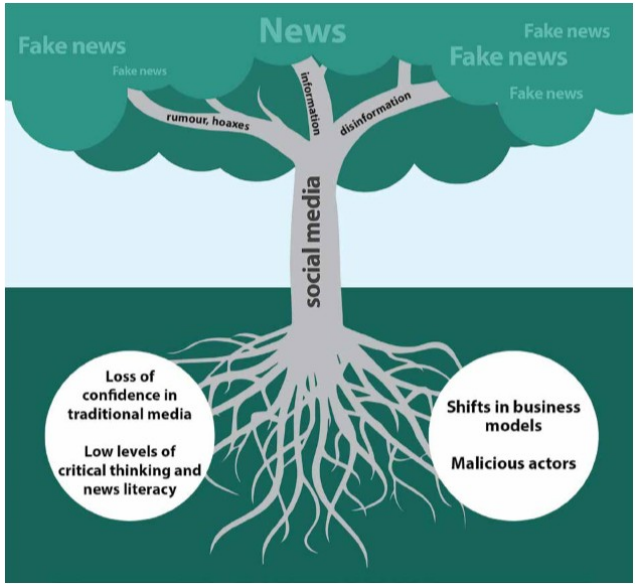
- Model process:
  - Analytical model - diffusion, population dynamics, epidemiological, etc.
  - Simulations
- Fit observations and compare parameters
- Estimate the effect of different features of tweets, network and users



INDIVIDUAL CHARACTERISTICS THAT PROMOTE "DISEASE" SUSCEPTIBILITY

Frederico Francisco (former member), Joana Gonçalves-Sá, Simone Lackner (former member), Cristina Mendonça, Ângela Rijo

Individual susceptibility



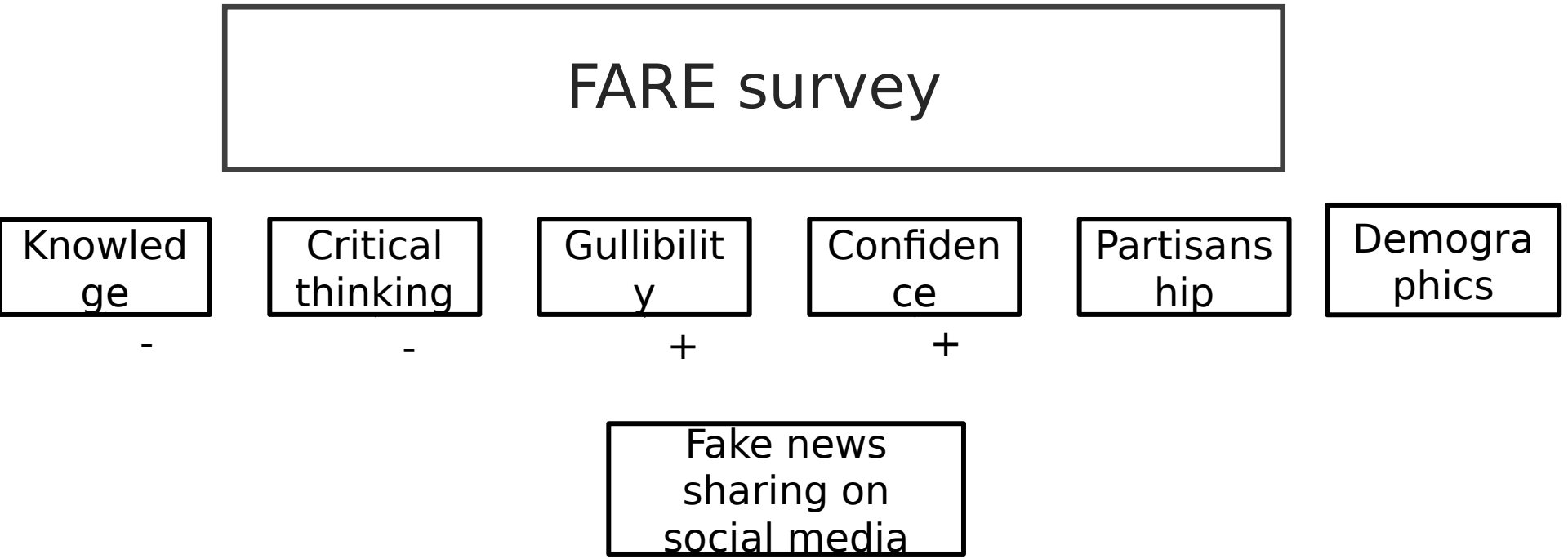
UNESCO's World Trends Report

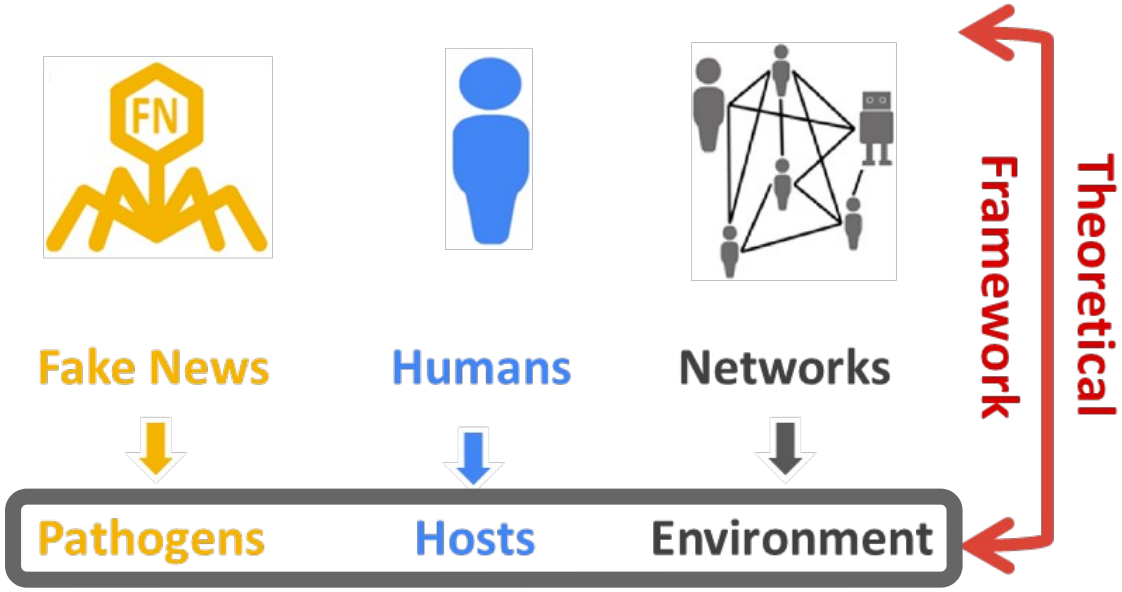
Question:
What individual characteristics explain irrational judgment and behavior (e.g., fake news sharing)?

Objectives:

a. **Identify** individual characteristics that influence negative judgment / behavior.
b. **Test** whether individual characteristics improve our "spread" models.

Individual susceptibility

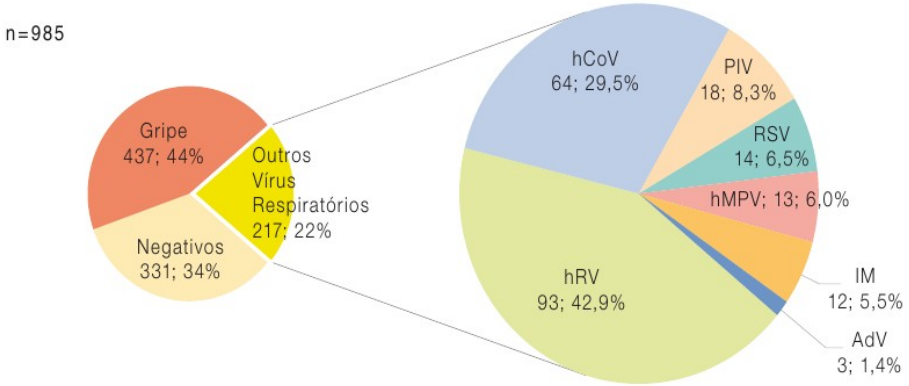




DYNAMICS OF NON-INFLUENZA RESPIRATORY VIRUSES (NIRVS)

João Loureiro, Sara Mesquita, Lília Perfeito, João Oliveira Eleonora Tulumello, Irma Varela-Lashe

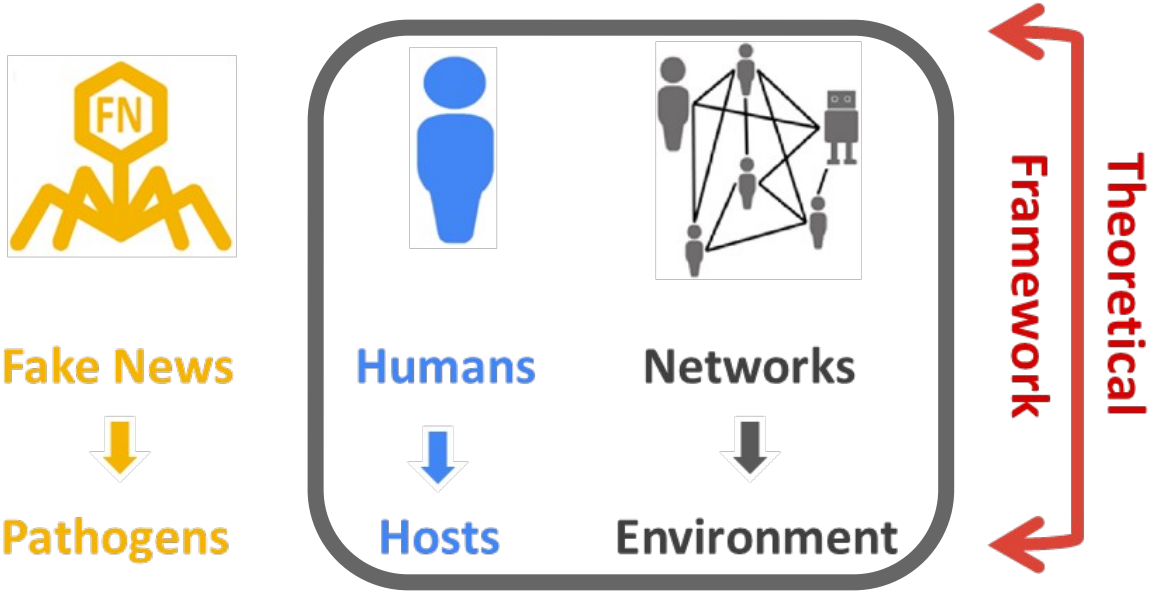
Flu season & respi



INSA National flu surveillance program. Season 2018/2019

General Objectives:

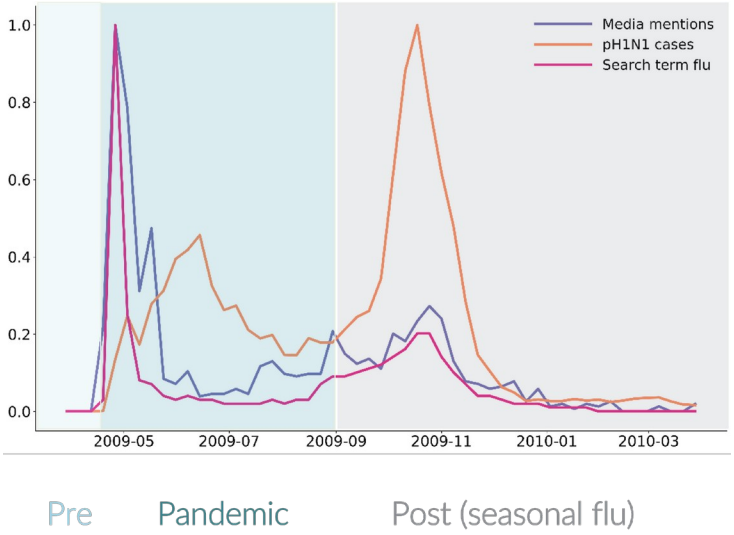
a. **Identify** different epidemic dynamics.
b. **Model** dynamics:
   - **Estimate** the effect of weather or vaccination.
c. **Test** whether different dynamics lead to differences in reported symptoms.
d. **Improve** nowcasting models for the flu-NIRVs season



USING ONLINE BEHAVIOUR TO TRACK DISEASES

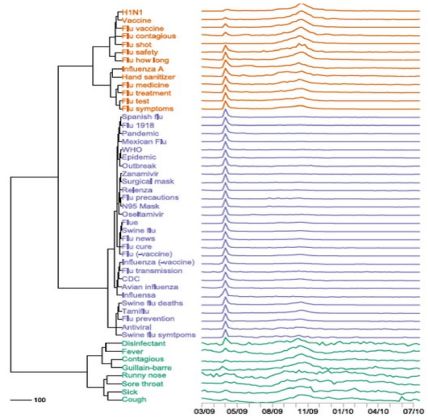
David Almeida, Joao Loureiro, Sara Mesquita, Lília Perfeito, Cláudio Haupt Vieira

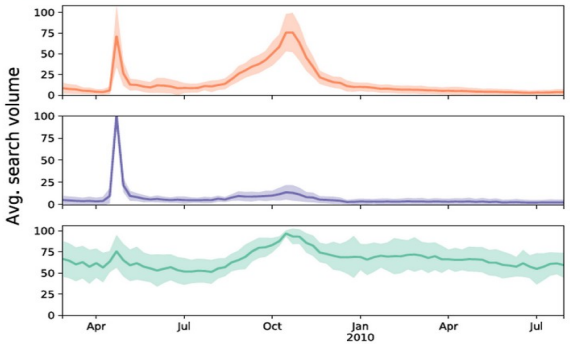
2009 Flu Pandemic - USA

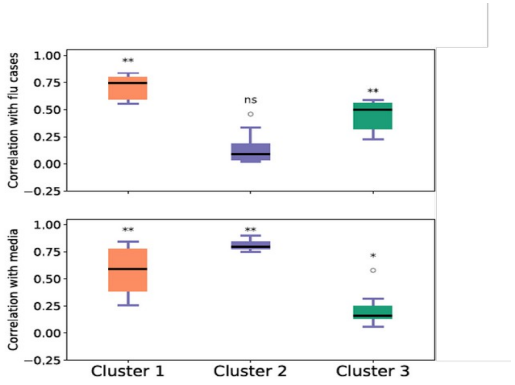


Google searches for “flu” might be driven more by the media than by the disease.

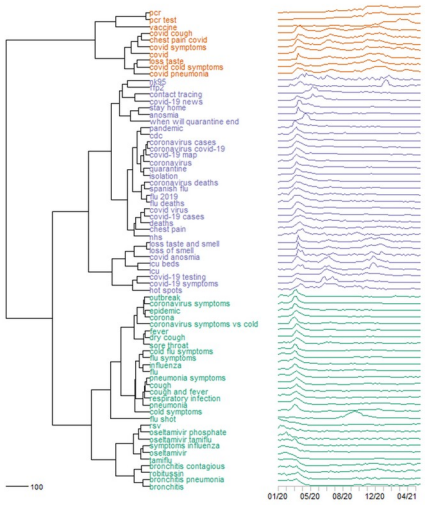
2009 Flu Pandemic

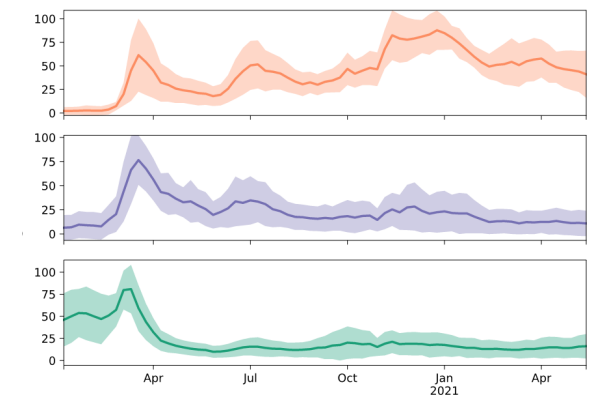


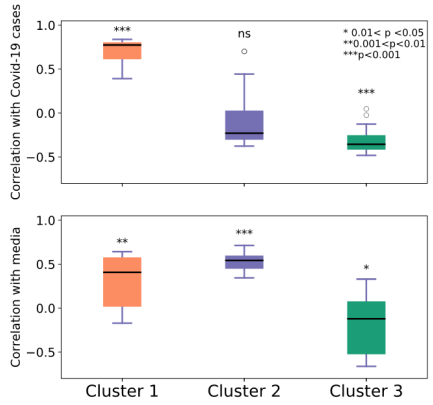


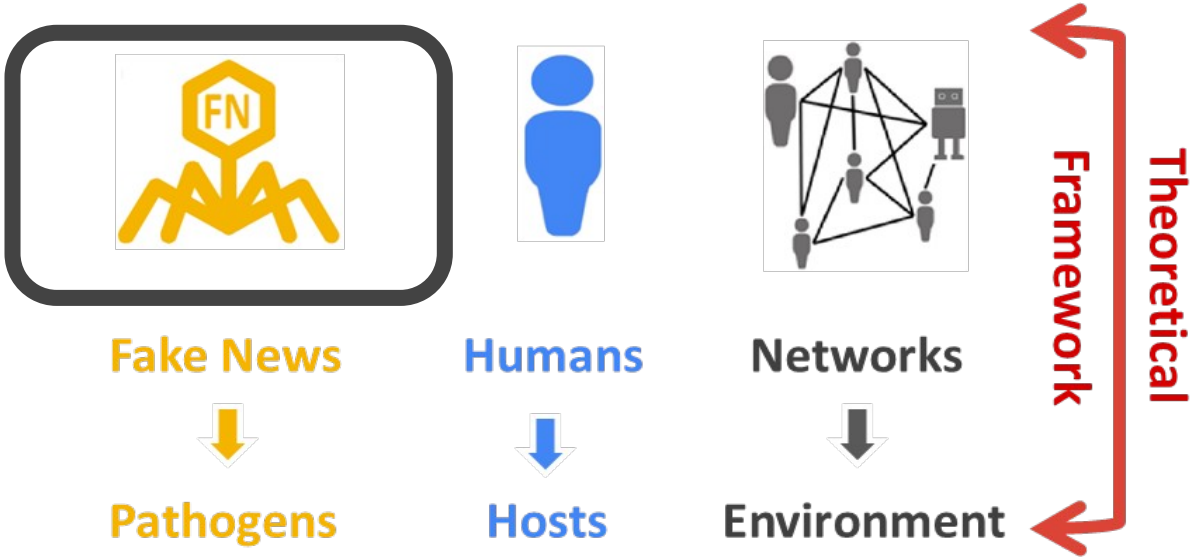


Covid-19 Pandemic





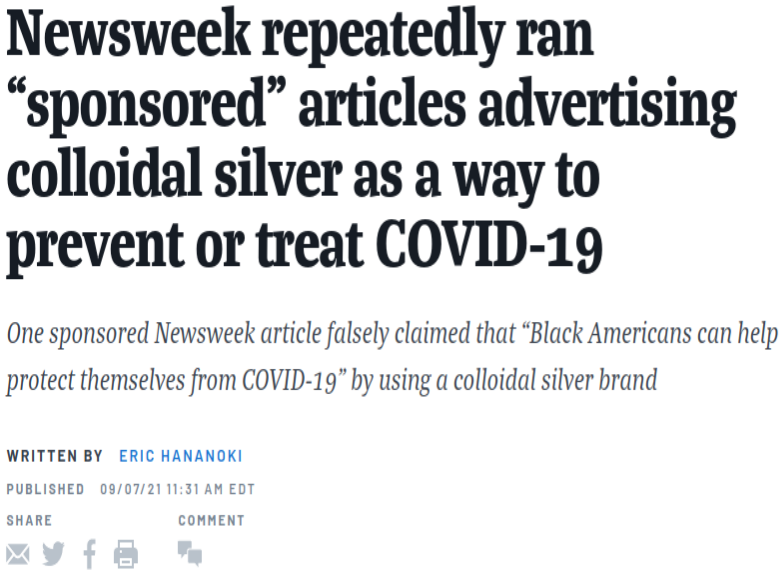




DISINFORMATION, TRACKING, AND BEHAVIORAL TARGETING

Íris Damião, Joana Gonçalves-Sá, and José Reis

Studying differential tracking as a possible spreading mechanism



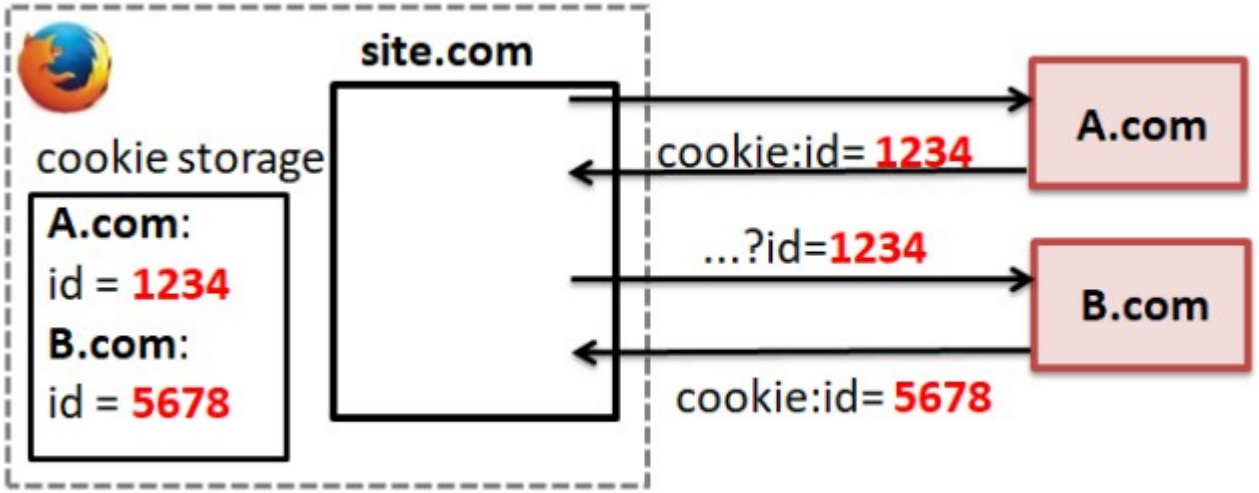
Newsweek repeatedly ran "sponsored" articles advertising colloidal silver as a way to prevent or treat COVID-19

One sponsored Newsweek article falsely claimed that "Black Americans can help protect themselves from COVID-19" by using a colloidal silver brand

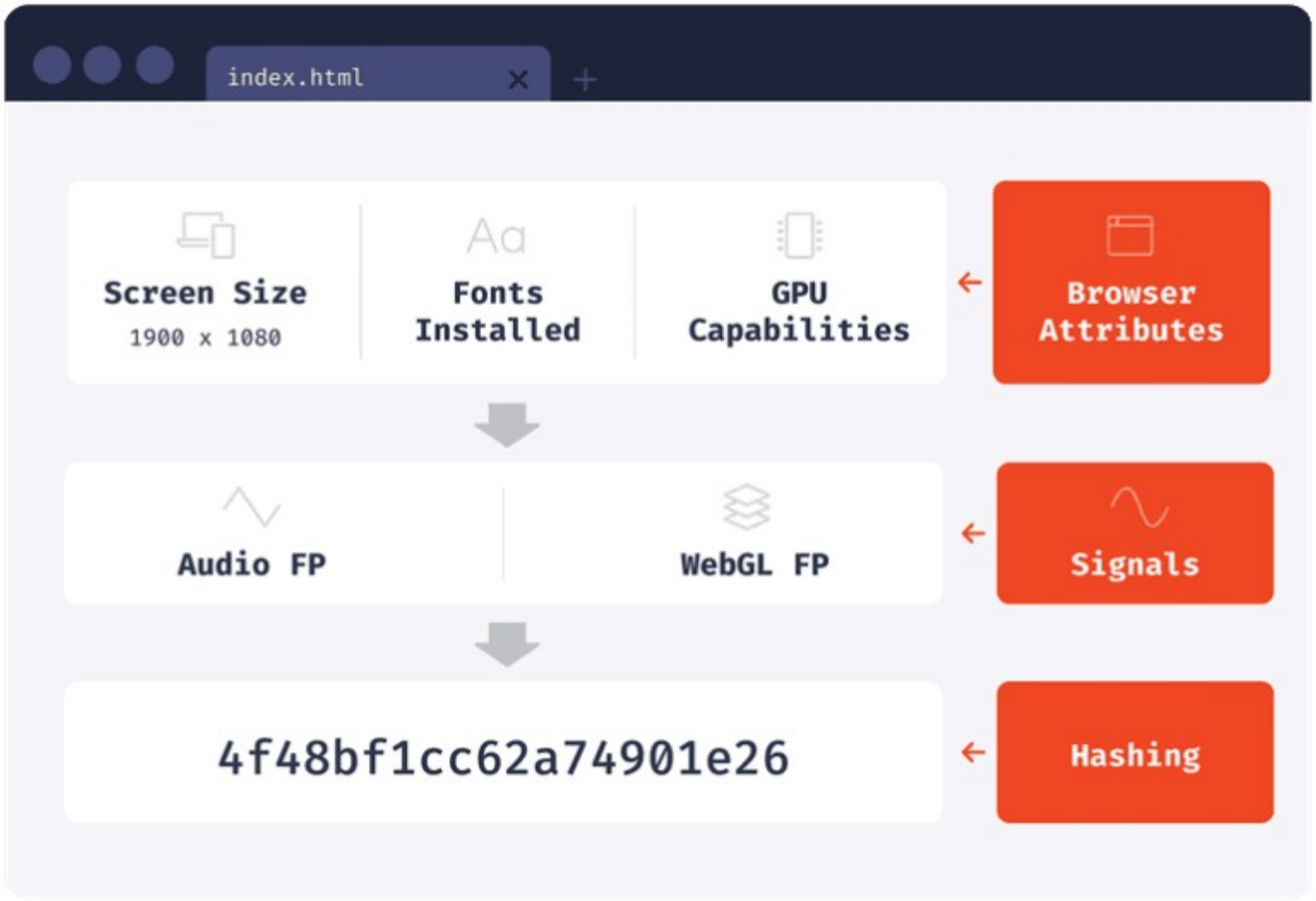
WRITTEN BY ERIC HANANOKI
PUBLISHED 09/07/21 11:31 AM EDT
SHARE COMMENT

General Objective:

a. **Identify** disinformation articles from known fact checkers
b. **Measure** tracking and third-party content in disinformation websites
c. **Test** whether differential tracking and content targeting:
   - Ads
   - Search engine results



Online tracking by setting cookies



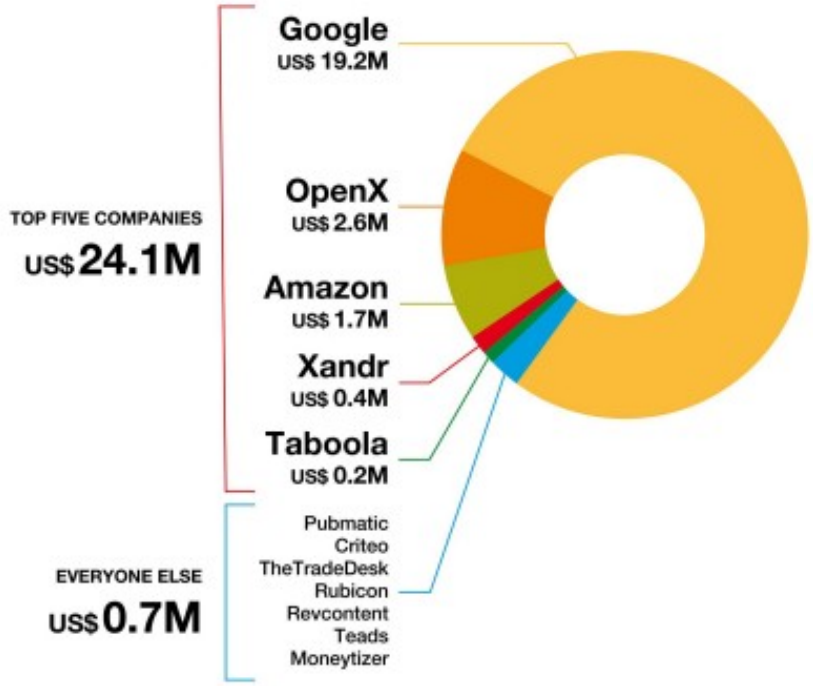
Online tracking via fingerprinting

Rationale 1: profitability of disinfo

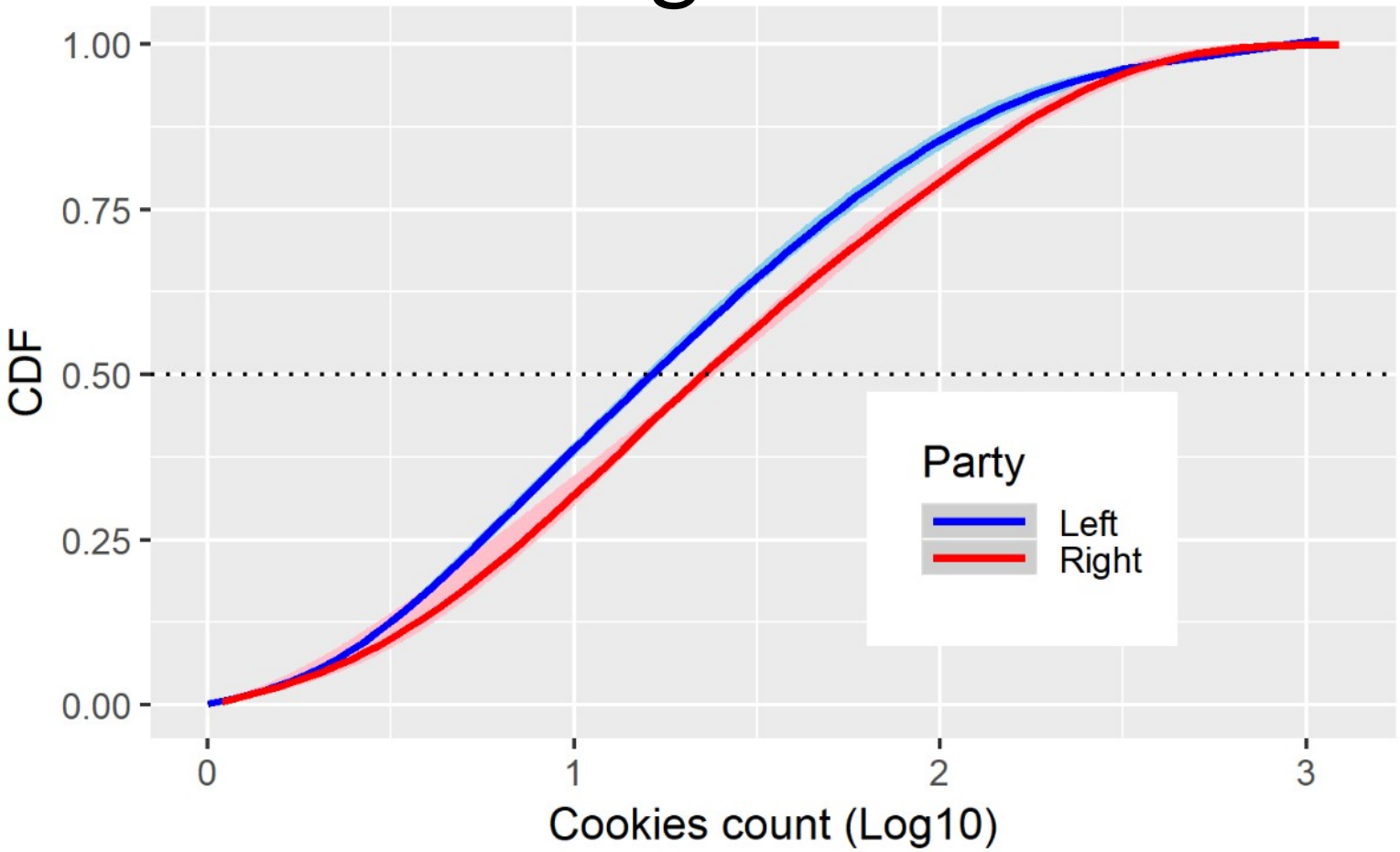
Share of ad revenues generated from COVID-19 disinfo sites

The top three companies **Google*, OpenX, Amazon:**

- Generate **95% of ad revenues** to the site in our sample.
- Google ad services alone delivers US$3 out of every US$4 that these sites earn in ad revenues.



Rationale 2: partisanship/topic and tracking



Differential Tracking in US Hyper-Partisan Domains, Agarwal et al. (2020)

Rationale 3: recommender systems

Component	Topic	Test	Mean Diff (post-hoc)
Search Results	Vaccines controversies	KW H(2,6517)=6.2953, p=0.04	P >N & P >D
Top5	All	KW H(2,14740)=9.42, p=0.009	P >N & P >D
	9/11 conspiracy theories	KW H(2,2911)=186.68, p=2.9e-41	P >N & P >D
	Chemtrail conspiracy theory	KW H(2,2845)=73.20, p=1.31e-16	P >N & N >D
	Flat Earth	KW H(2,2980)=49.18, p=2.18e-11	N >P & D >P
	Moon Landing conspiracy theories	KW H(2,3005)=17.18, p=0.0002	P >N & D >N
	Vaccines controversies	KW H(2,2999)=48.54, p=2.9e-11	N >P & D >P
Up-Next	All	KW H(2,2963)=10.29, p=0.006	P >N
	9/11 conspiracy theories	KW H(2,487)=60.12, p=8.8e-14	P >N & P >D
	Chemtrail conspiracy theory	KW H(2,570)=16.12, p=0.0003	P >D
	Flat Earth	KW H(2,600)=26.29, p=1.96e-06	P >D & D >N
	Moon Landing conspiracy theories	KW (2,606)=5.99, p=0.049	D >N
	Vaccines controversies	KW H(2,600)=66.86, p=3.0e-15	D >N >P

Table 6. RQ2: Analyzing watch history effects on the three YouTube components. P, N, and D are means of the normalized scores of videos presented (via the YouTube components) to accounts that have built their watch histories by viewing promoting (P), neutral (N), and debunking (D) videos, respectively. For example, P > N indicates that accounts that watched promoting videos received more misinformation (or more promoting videos) compared to accounts that watched neutral videos.

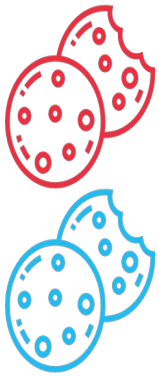
Hussein et al (2020), Measuring Misinformation in Video Search Platforms: An Audit Study on YouTube

Research questions

A)

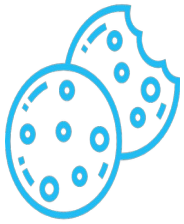
WWW.FAKE.COM

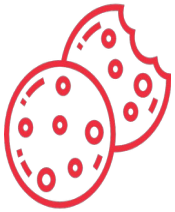
WWW.THEPOST.COM

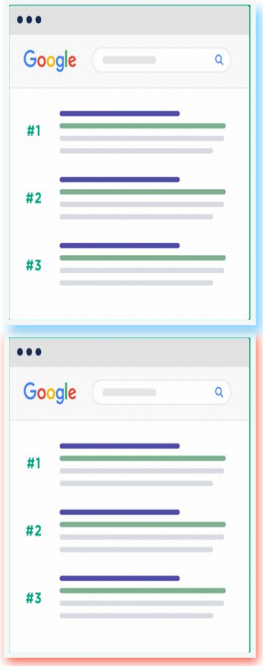


≠ Is third-party tracking different in disinformation websites?

B)

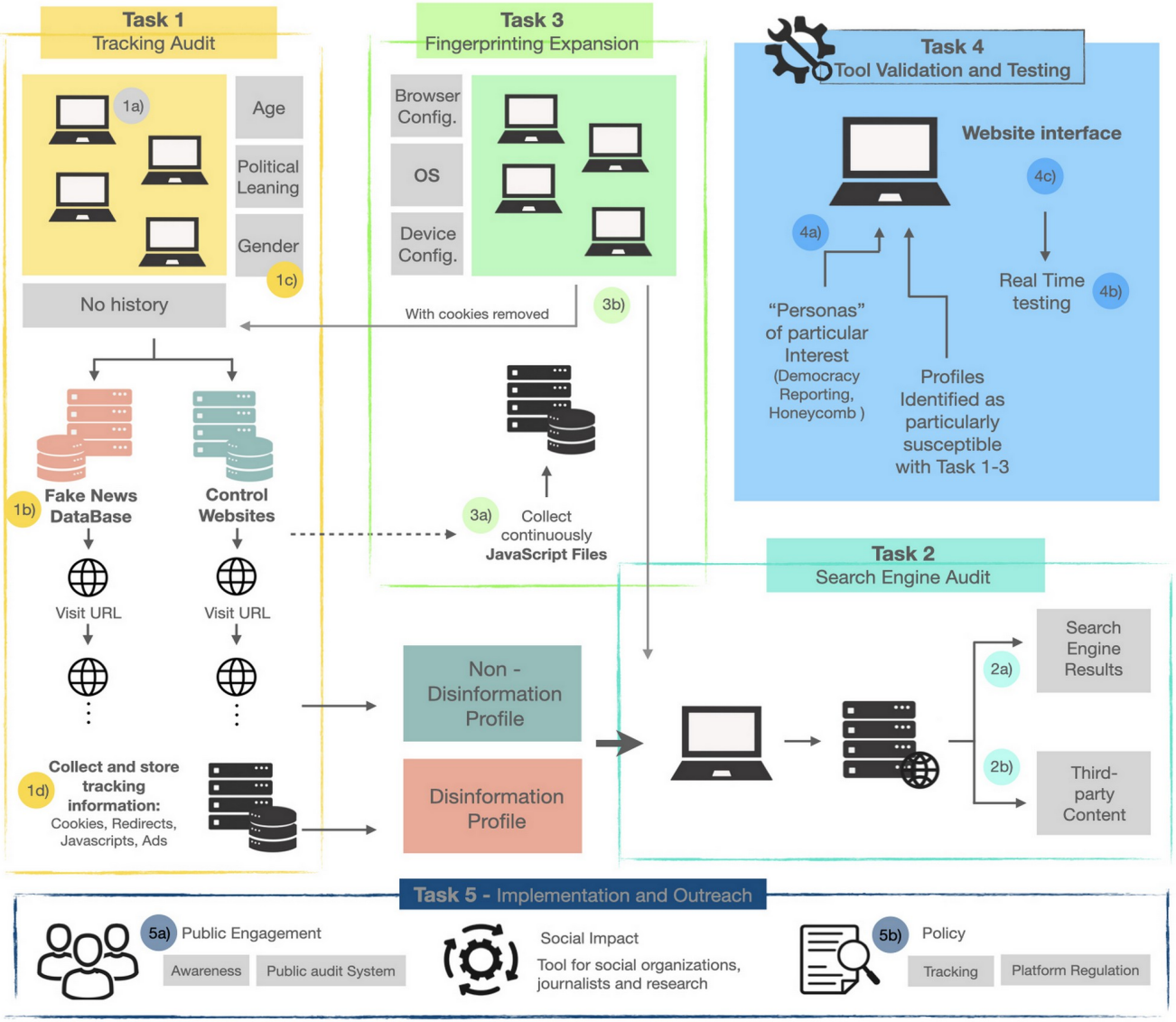






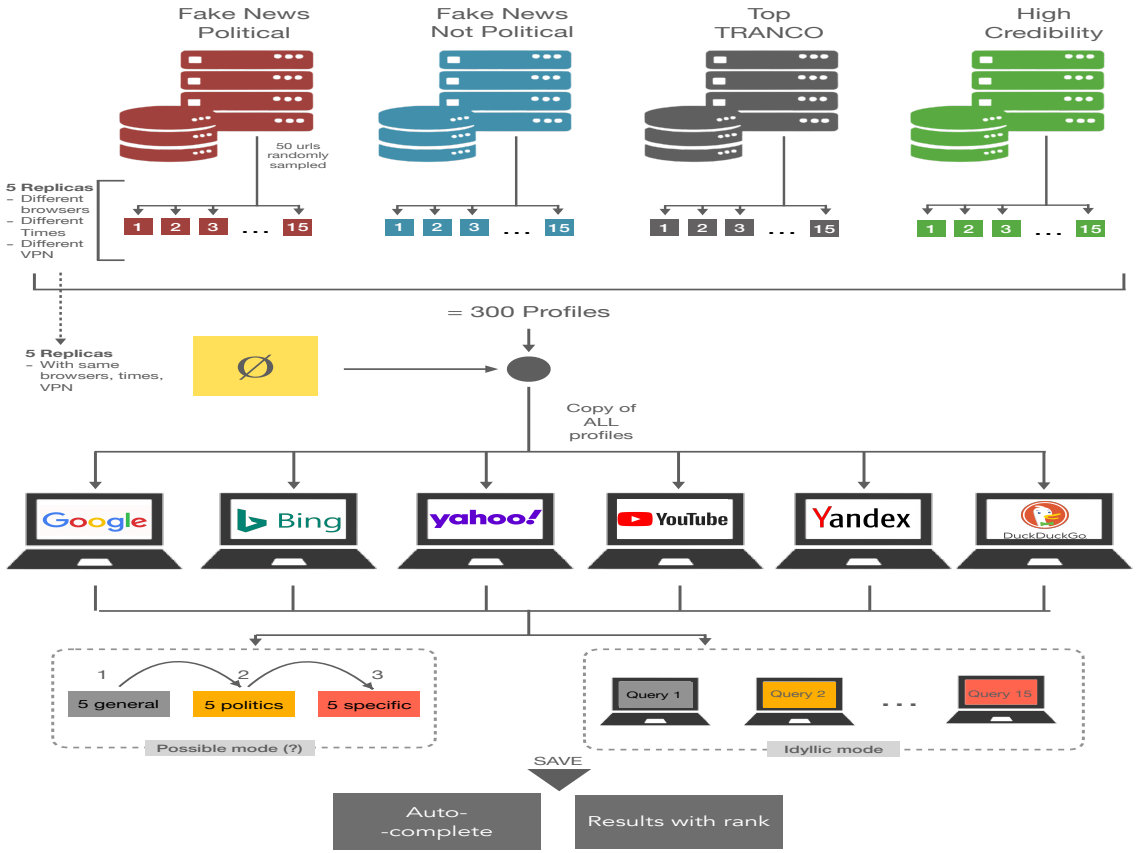
≠ Are results different for disinformation consumers?

FARE_AUDIT PoC

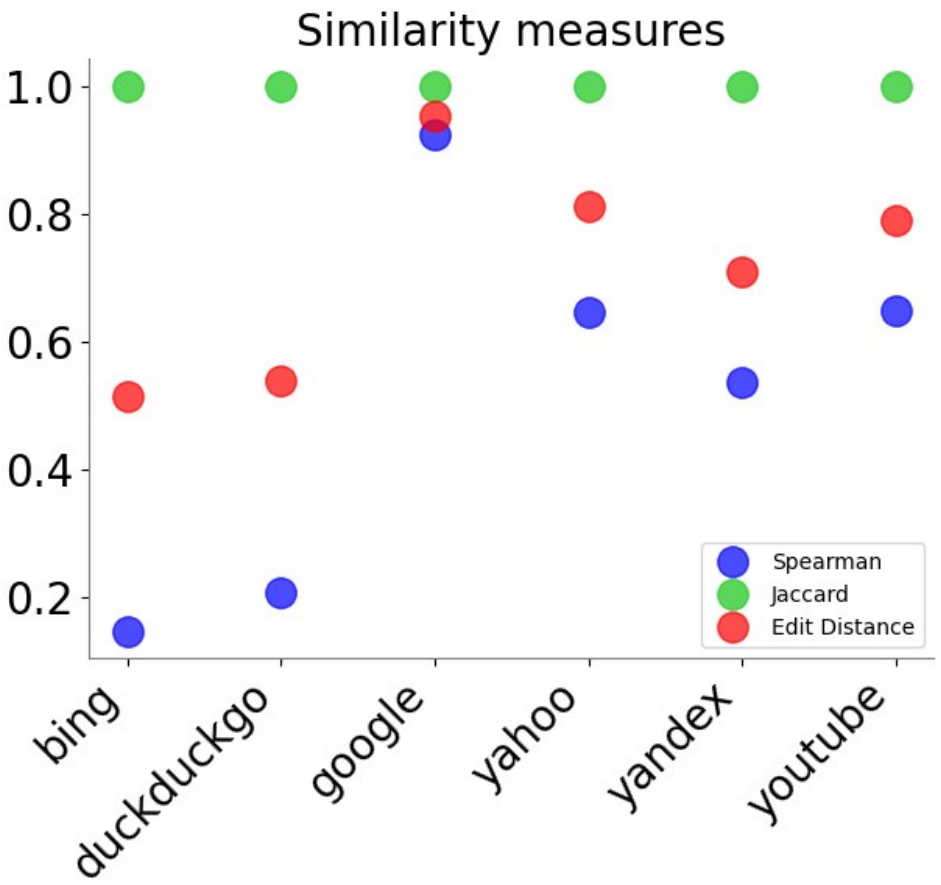


suggestions	typed_characters	query
video	v	vaccine hoax
vk	v	vaccine hoax
vnc	v	vaccine hoax
viber	v	vaccine hoax
vpn	v	vaccine hoax
vavada	va	vaccine hoax
vagabond	va	vaccine hoax
vans	va	vaccine hoax
varta	va	vaccine hoax
valentino	va	vaccine hoax
vacation	vac	vaccine hoax
vacheron constantin geneve	vac	vaccine hoax
vacuum cleaner	vac	vaccine hoax
vacuum	vac	vaccine hoax
vaccine deaths	vac	vaccine hoax
vaccine	vacc	vaccine hoax
vaccine deaths	vacc	vaccine hoax
vaccine shedding	vacc	vaccine hoax
vaccination	vacc	vaccine hoax
vaccinated	vacc	vaccine hoax
vaccine	vacci	vaccine hoax
vaccine deaths	vacci	vaccine hoax
vaccine shedding	vacci	vaccine hoax
vaccinium corymbosum	vacci	vaccine hoax
vaccination	vacci	vaccine hoax
vaccine	vaccin	vaccine hoax
vaccine deaths	vaccin	vaccine hoax
vaccine shedding	vaccin	vaccine hoax
vaccination	vaccin	vaccine hoax
vaccinium corymbosum	vaccin	vaccine hoax
vaccine	vaccine	vaccine hoax
vaccine deaths	vaccine	vaccine hoax
vaccine shedding	vaccine	vaccine hoax
vaccine passport	vaccine	vaccine hoax
vaccine side effects	vaccine	vaccine hoax
vaccine deaths	vaccine	vaccine hoax
vaccine shedding	vaccine	vaccine hoax
vaccine passport	vaccine	vaccine hoax
vaccine death	vaccine	vaccine hoax
vaccine card	vaccine	vaccine hoax
vaccine hungary	vaccine h	vaccine hoax
hepatitis b vaccine	vaccine h	vaccine hoax
human vaccine	vaccine h	vaccine hoax
the u.s. has a higher rate of vaccine opposition than any country tracked besides russia	vaccine h	vaccine hoax

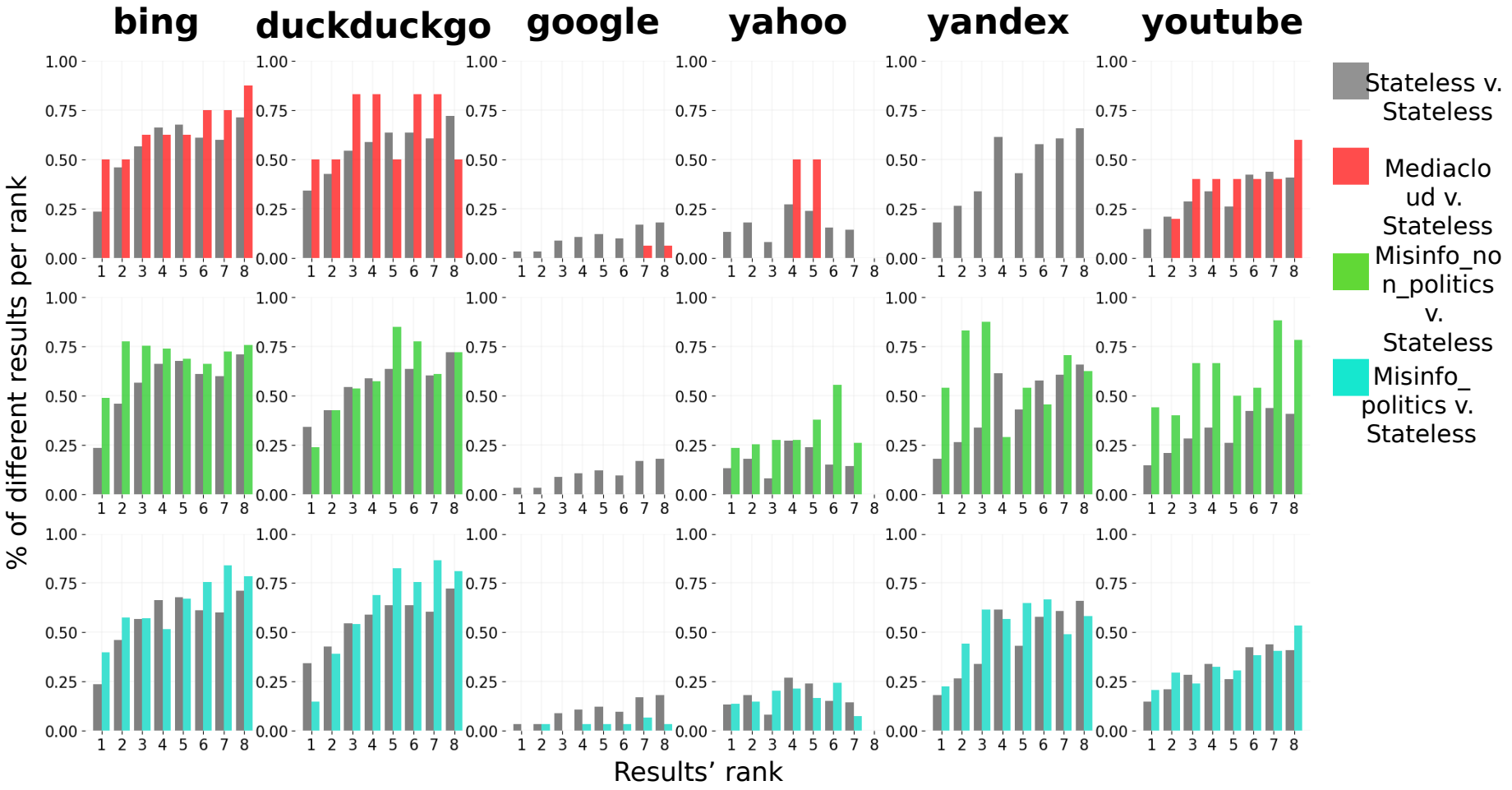
Brazilian elections pilot experiment



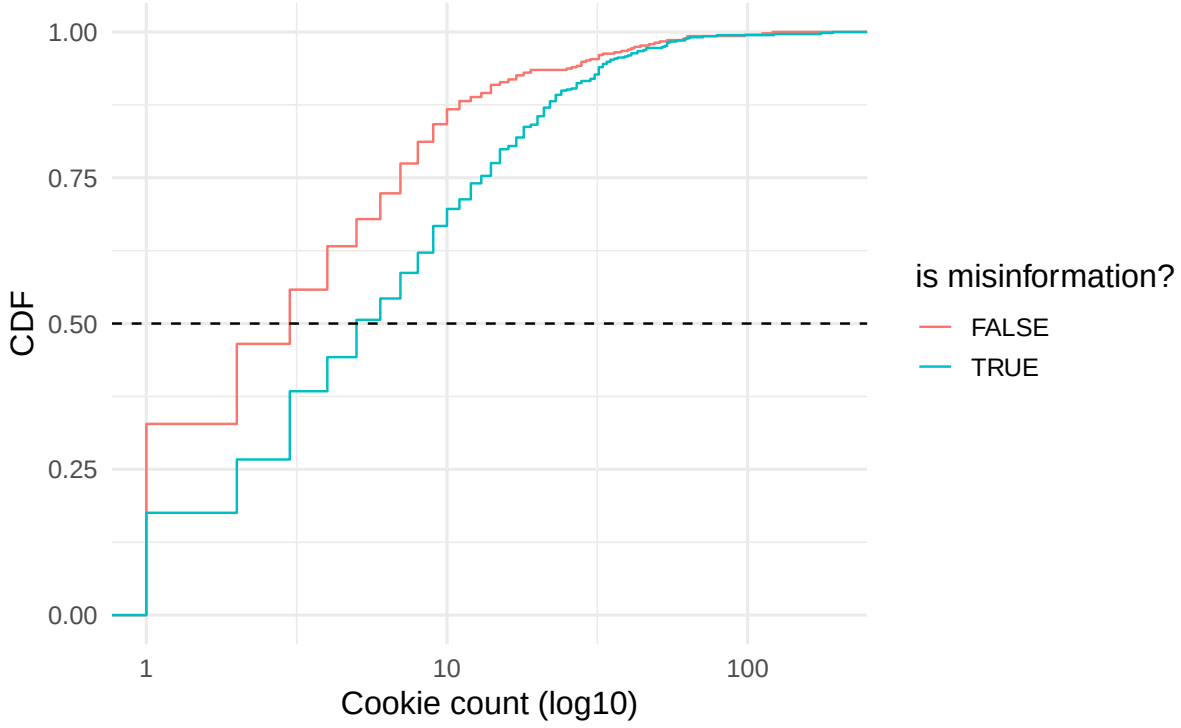
Stateless vs. Stateless



Percentage of different results per rank

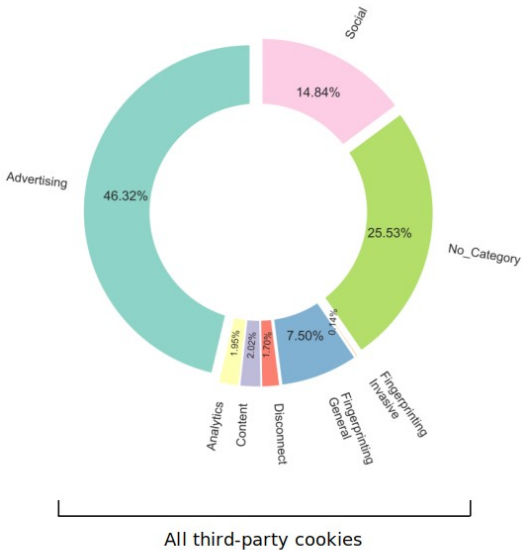


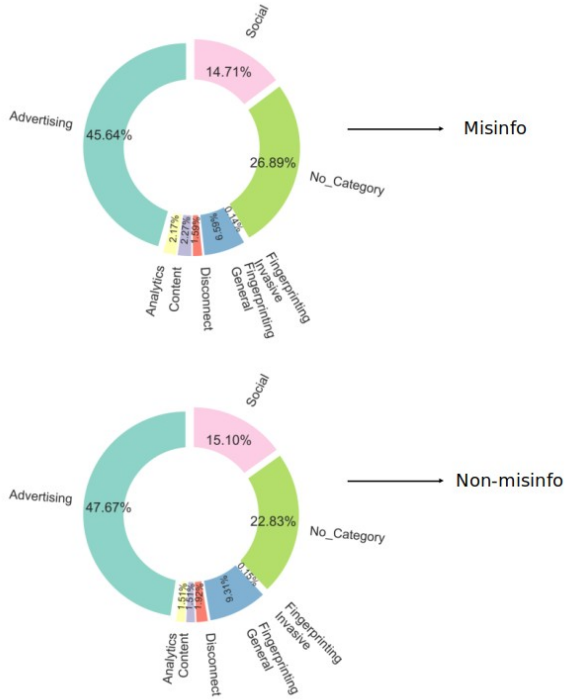
Tracking Audit Pilot



- 500 disinformation websites v. 500 control websites
- Same geo-location

- While there seems to be more tracking in disinformation websites
- Disinformation/non-disinformation websites seem to be tracked by similar entities





Thanks for listening!