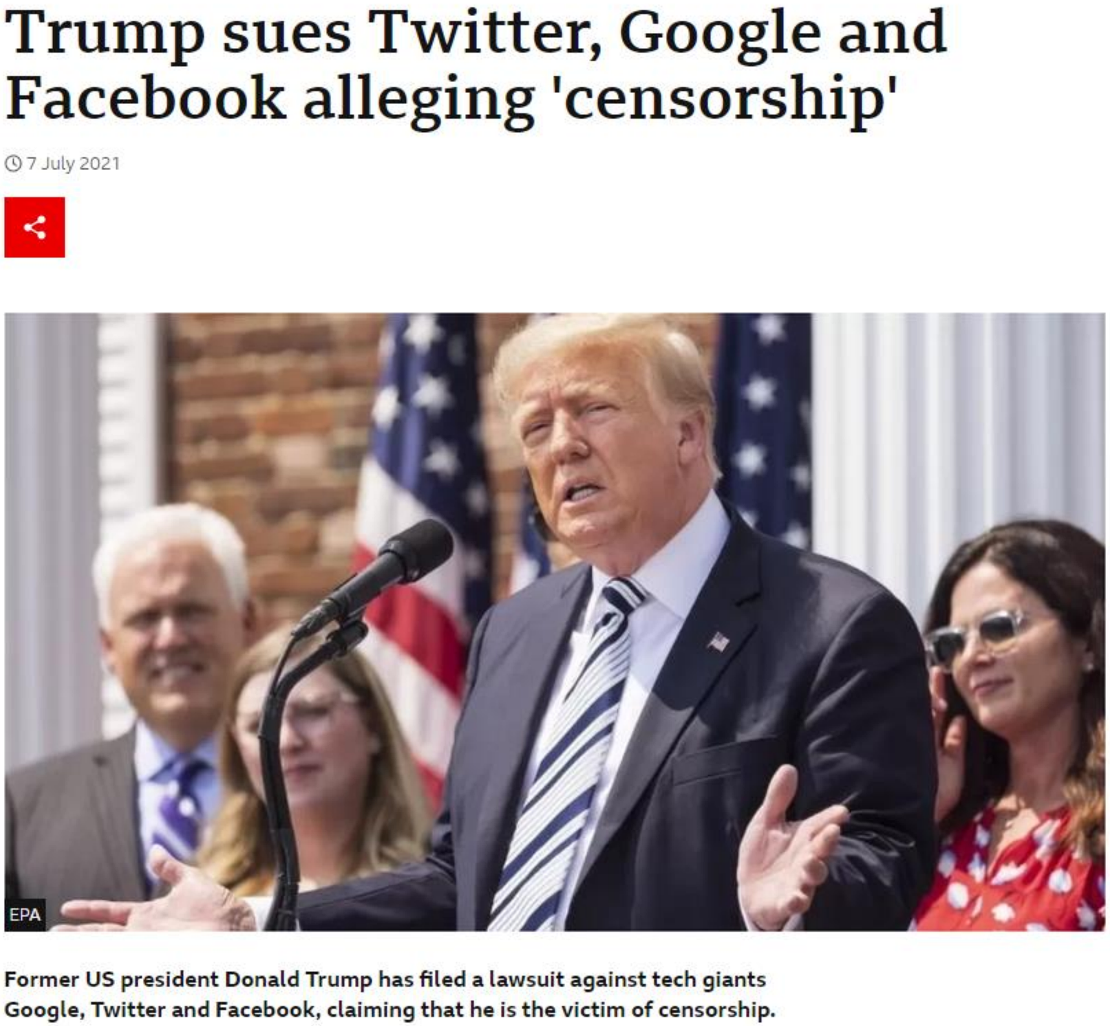
Social Media Suspensions and Shadow Banning: Political Bias or Genuine Disinformation Control?

Tauhid Zaman

tauhid.zaman@yale.edu

Yale SCHOOL OF MANAGEMENT

Censorship on Social Media



Trump sues Twitter, Google and Facebook alleging 'censorship'

7 July 2021

EPA

Former US president Donald Trump has filed a lawsuit against tech giants Google, Twitter and Facebook, claiming that he is the victim of censorship.

Censorship on Social Media

- Two ways to censor content on social media

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1. **Suspension** – remove a user’s account from the platform

Censorship on Social Media

- Two ways to censor content on social media

1. **Suspension** – remove a user’s account from the platform

2. **Shadow banning** – quietly limit the reach of a user’s content

Suspension on Social Media

- Suspensions are used for the most dangerous accounts

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  - Terrorists inciting violence

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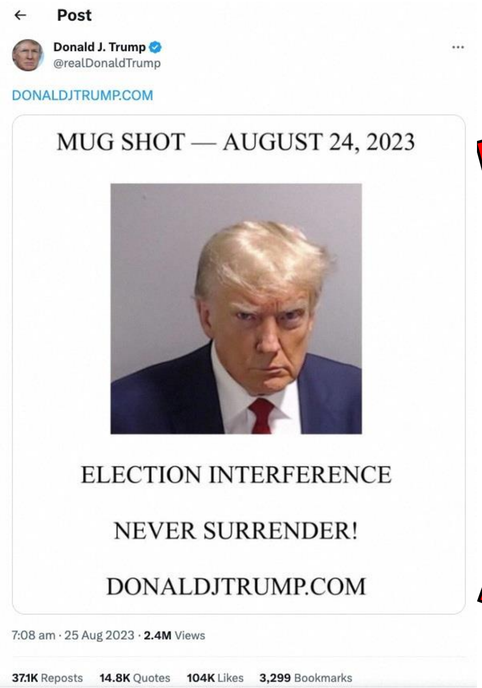
  - Users engaging in hate speech or spreading disinformation

Shadow Banning on Social Media



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ELECTION INTERFERENCE

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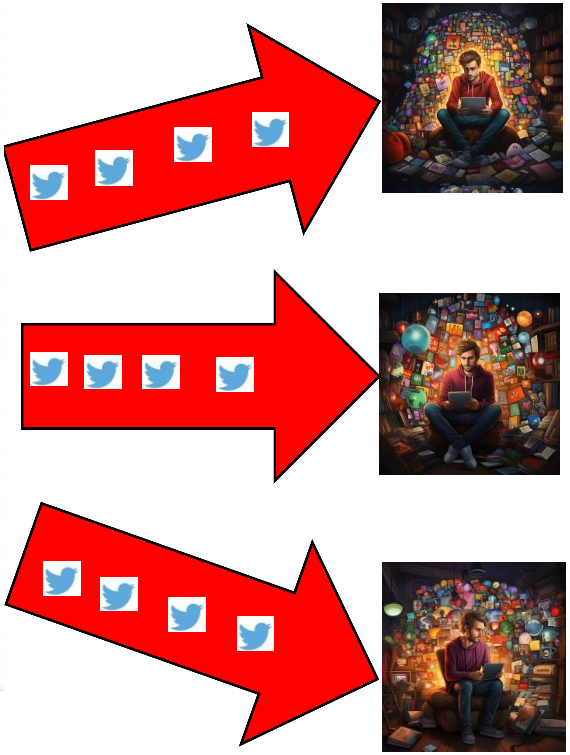
DONALDJTRUMP.COM

7:08 am · 25 Aug 2023 · **2.4M** Views

37.1K Reposts **14.8K** Quotes **104K** Likes **3,299** Bookmarks



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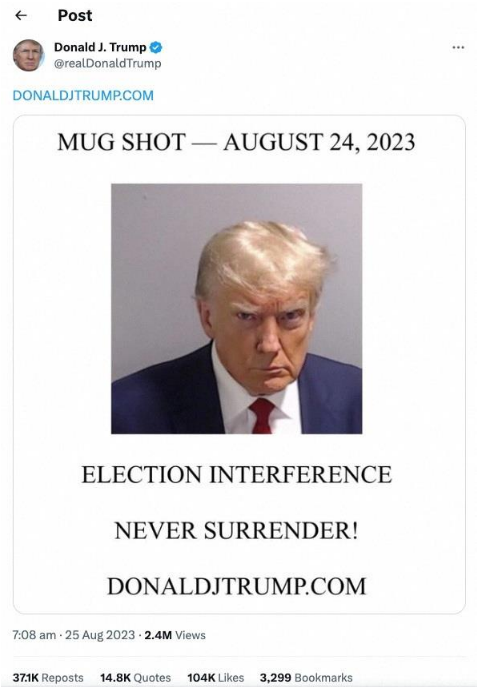

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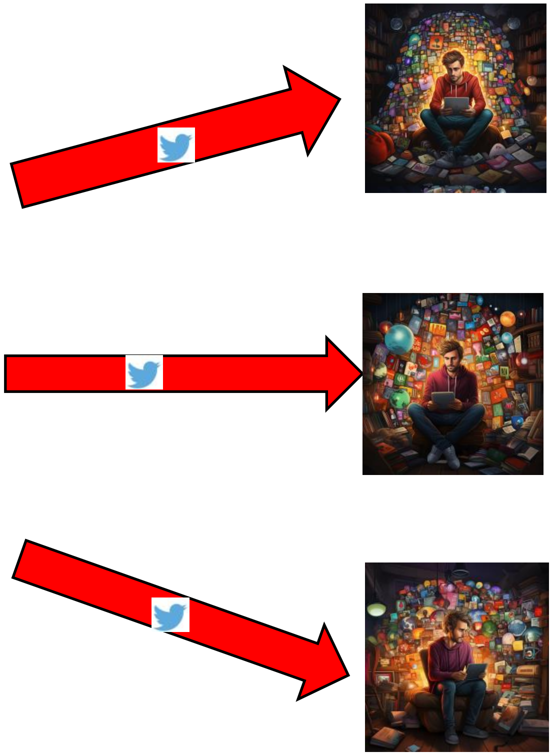

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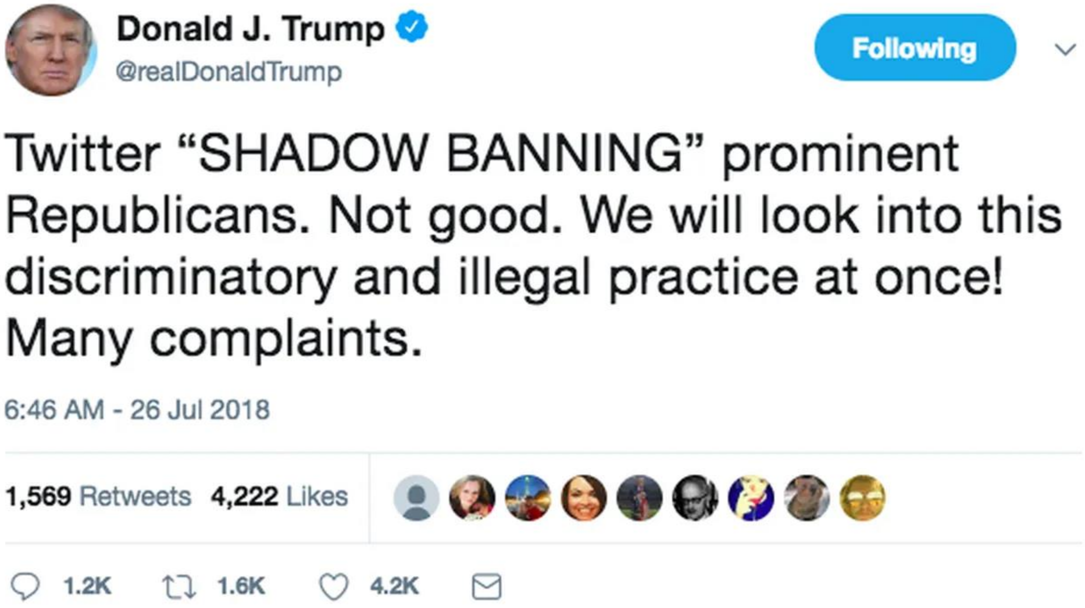

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Twitter “SHADOW BANNING” prominent Republicans. Not good. We will look into this discriminatory and illegal practice at once! Many complaints.

6:46 AM - 26 Jul 2018

1,569 Retweets 4,222 Likes

Political Bias in Social Media Censorship

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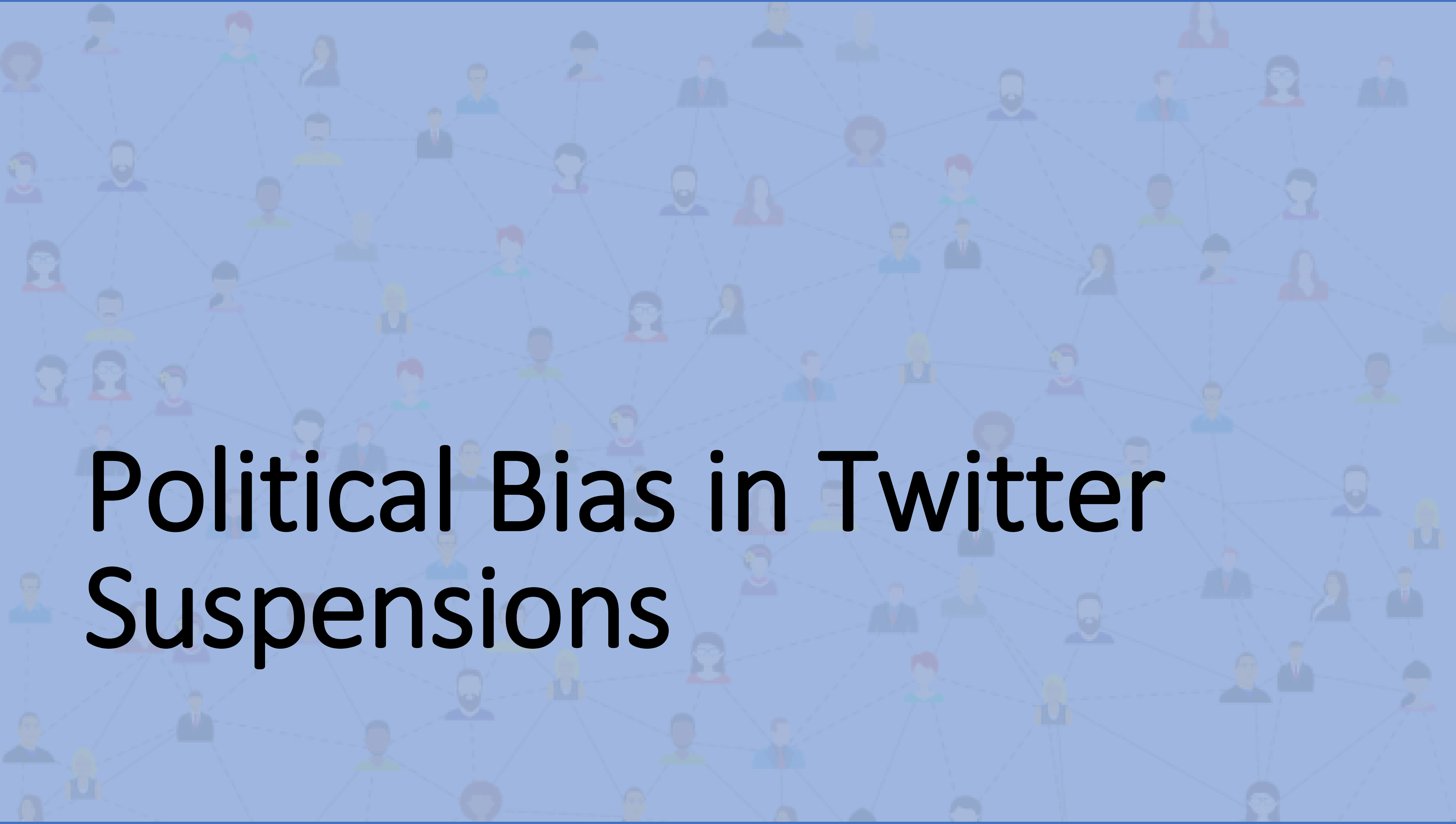


Political Bias in Twitter Suspensions

Data

- We tracked 9,000 Twitter users who used political hashtags during the 2020 U.S. presidential election on October 6, 2020

#VoteBidenHarris2020

4,500 Twitter users

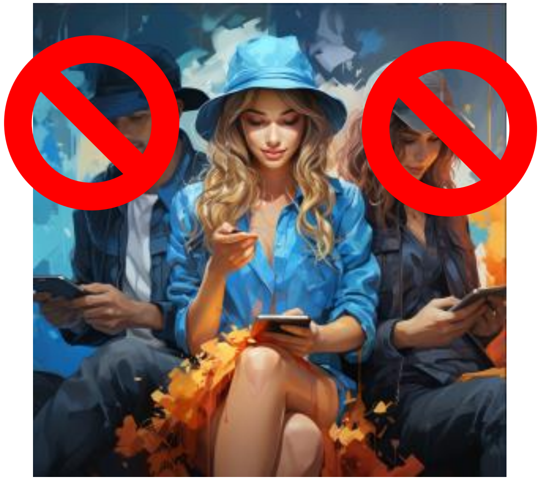
#Trump2020

4,500 Twitter users

Suspension Data

- After 9 months, we checked who was suspended on Twitter

#VoteBidenHarris2020



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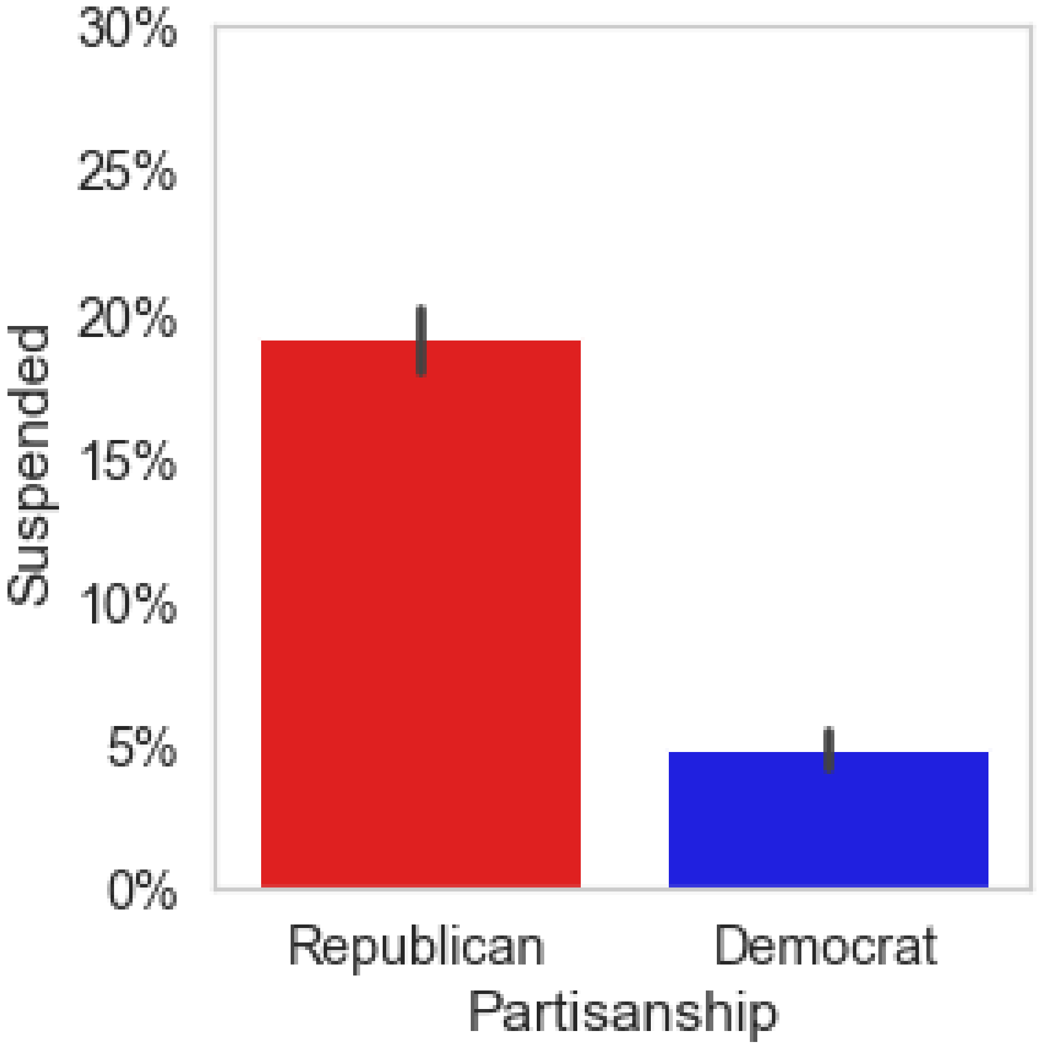
Political Bias in Suspensions



Political Bias in Suspensions?

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- The asymmetry in suspensions could be the result of a **non-political suspension policy**

- Example: mitigate the spread of **disinformation**

Media Quality Scores

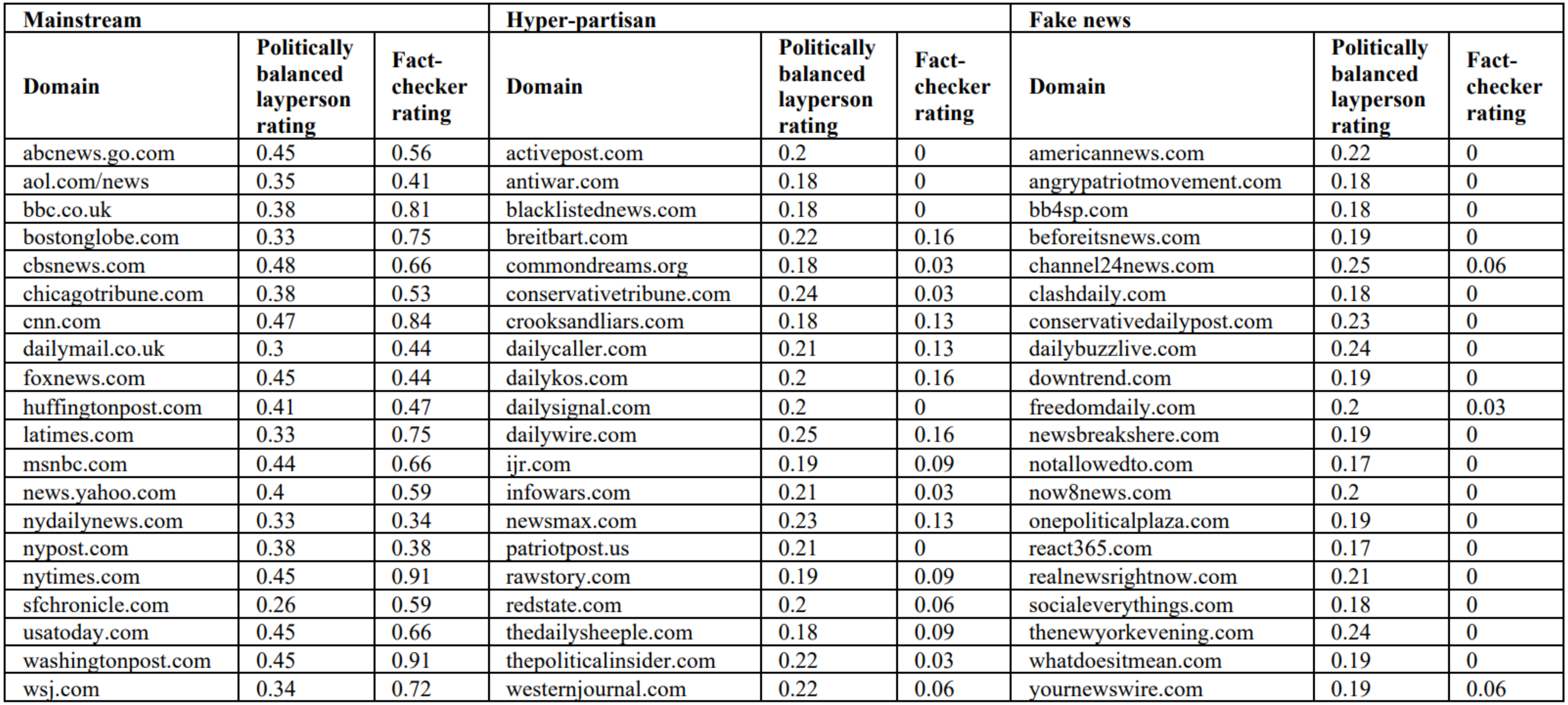
- Scores exist that rate the quality of news sites
  - Low score means the news is more likely to be misinformation or fake news

- **Professional fact-checker** trustworthiness ratings [1]

- **Politically-balanced layperson crowd-sourced** trustworthiness [2]

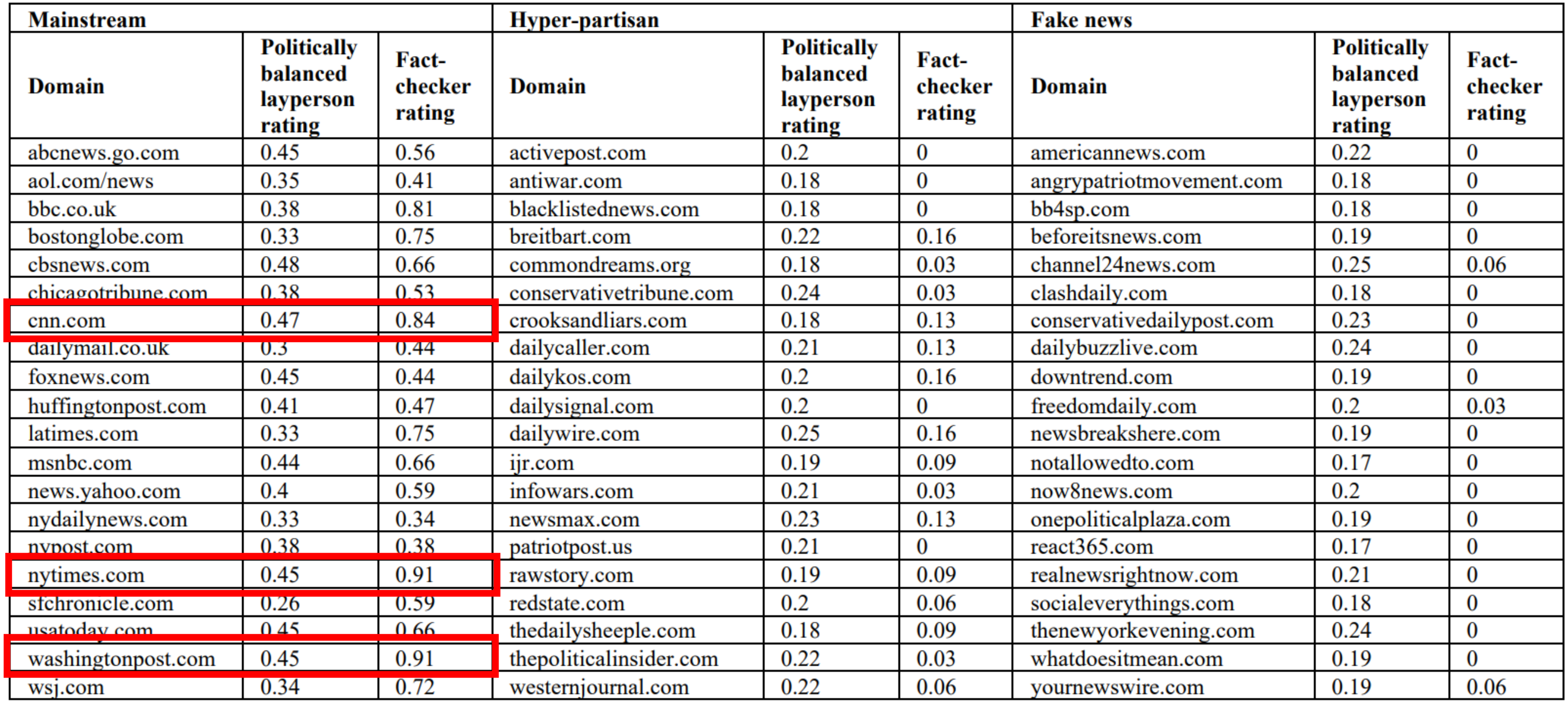
1. *Barberá, P.; Jost, J. T.; Nagler, J.; Tucker, J. A.; and Bonneau, R. 2015. Tweeting from left to right: Is online political communication more than an echo chamber? Psychological science 26(10):1531–1542.*
2. *Pennycook, G., and Rand, D. G. 2019. Fighting misinformation on social media using crowdsourced judgments of news source quality. Proceedings of the National Academy of Sciences 116(7):2521–2526.*

Media Quality Scores



Mainstream			Hyper-partisan			Fake news		
Domain	Politically balanced layperson rating	Fact-checker rating	Domain	Politically balanced layperson rating	Fact-checker rating	Domain	Politically balanced layperson rating	Fact-checker rating
abcnews.go.com	0.45	0.56	activepost.com	0.2	0	americannews.com	0.22	0
aol.com/news	0.35	0.41	antiwar.com	0.18	0	angrypatriotmovement.com	0.18	0
bbc.co.uk	0.38	0.81	blacklistednews.com	0.18	0	bb4sp.com	0.18	0
bostonglobe.com	0.33	0.75	breitbart.com	0.22	0.16	beforeitsnews.com	0.19	0
cbsnews.com	0.48	0.66	commondreams.org	0.18	0.03	channel24news.com	0.25	0.06
chicagotribune.com	0.38	0.53	conservativetribune.com	0.24	0.03	clashdaily.com	0.18	0
cnn.com	0.47	0.84	crooksandliars.com	0.18	0.13	conservativedailypost.com	0.23	0
dailymail.co.uk	0.3	0.44	dailycaller.com	0.21	0.13	dailybuzzlive.com	0.24	0
foxnews.com	0.45	0.44	dailykos.com	0.2	0.16	downtrend.com	0.19	0
huffingtonpost.com	0.41	0.47	dailysignal.com	0.2	0	freedomdaily.com	0.2	0.03
latimes.com	0.33	0.75	dailywire.com	0.25	0.16	newsbreakshere.com	0.19	0
msnbc.com	0.44	0.66	ijr.com	0.19	0.09	notallowedto.com	0.17	0
news.yahoo.com	0.4	0.59	infowars.com	0.21	0.03	now8news.com	0.2	0
nydailynews.com	0.33	0.34	newsmax.com	0.23	0.13	onepoliticalplaza.com	0.19	0
nypost.com	0.38	0.38	patriotpost.us	0.21	0	react365.com	0.17	0
nytimes.com	0.45	0.91	rawstory.com	0.19	0.09	realnewsrightnow.com	0.21	0
sfchronicle.com	0.26	0.59	redstate.com	0.2	0.06	socialeverythings.com	0.18	0
usatoday.com	0.45	0.66	thedailysheeple.com	0.18	0.09	thenewyorkevening.com	0.24	0
washingtonpost.com	0.45	0.91	thepoliticalinsider.com	0.22	0.03	whatdoesitmean.com	0.19	0
wsj.com	0.34	0.72	westernjournal.com	0.22	0.06	yournewswire.com	0.19	0.06

Media Quality Scores



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aol.com/news	0.35	0.41	antiwar.com	0.18	0	angrypatriotmovement.com	0.18	0
bbc.co.uk	0.38	0.81	blacklistednews.com	0.18	0	bb4sp.com	0.18	0
bostonglobe.com	0.33	0.75	breitbart.com	0.22	0.16	beforeitsnews.com	0.19	0
cbsnews.com	0.48	0.66	commondreams.org	0.18	0.03	channel24news.com	0.25	0.06
chicagotribune.com	0.38	0.53	conservativetribune.com	0.24	0.03	clashdaily.com	0.18	0
cnn.com	0.47	0.84	crooksandliars.com	0.18	0.13	conservativedailypost.com	0.23	0
dailymail.co.uk	0.3	0.44	dailycaller.com	0.21	0.13	dailybuzzlive.com	0.24	0
foxnews.com	0.45	0.44	dailykos.com	0.2	0.16	downtrend.com	0.19	0
huffingtonpost.com	0.41	0.47	dailysignal.com	0.2	0	freedomdaily.com	0.2	0.03
latimes.com	0.33	0.75	dailywire.com	0.25	0.16	newsbreakshere.com	0.19	0
msnbc.com	0.44	0.66	ijr.com	0.19	0.09	notallowedto.com	0.17	0
news.yahoo.com	0.4	0.59	infowars.com	0.21	0.03	now8news.com	0.2	0
nydailynews.com	0.33	0.34	newsmax.com	0.23	0.13	onepoliticalplaza.com	0.19	0
nypost.com	0.38	0.38	patriotpost.us	0.21	0	react365.com	0.17	0
nytimes.com	0.45	0.91	rawstory.com	0.19	0.09	realnewsrightnow.com	0.21	0
sfchronicle.com	0.26	0.59	redstate.com	0.2	0.06	socialeverythings.com	0.18	0
usatoday.com	0.45	0.66	thedailysheeple.com	0.18	0.09	thenewyorkevening.com	0.24	0
washingtonpost.com	0.45	0.91	thepoliticalinsider.com	0.22	0.03	whatdoesitmean.com	0.19	0
wsj.com	0.34	0.72	westernjournal.com	0.22	0.06	yournewswire.com	0.19	0.06

Media Quality and Suspensions

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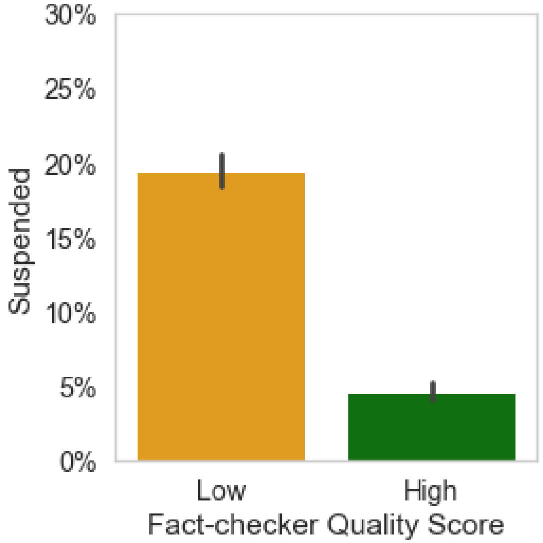

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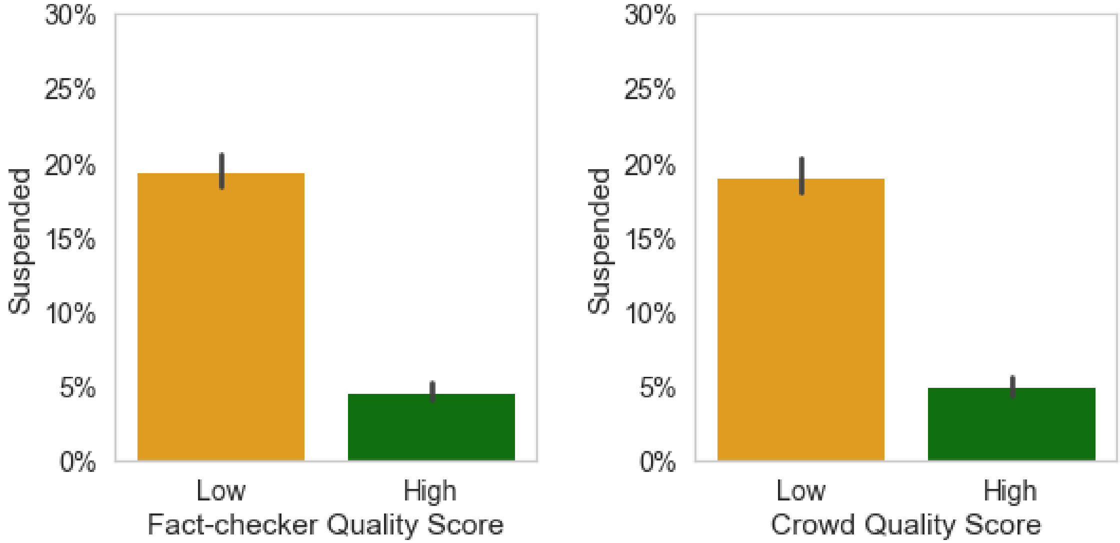

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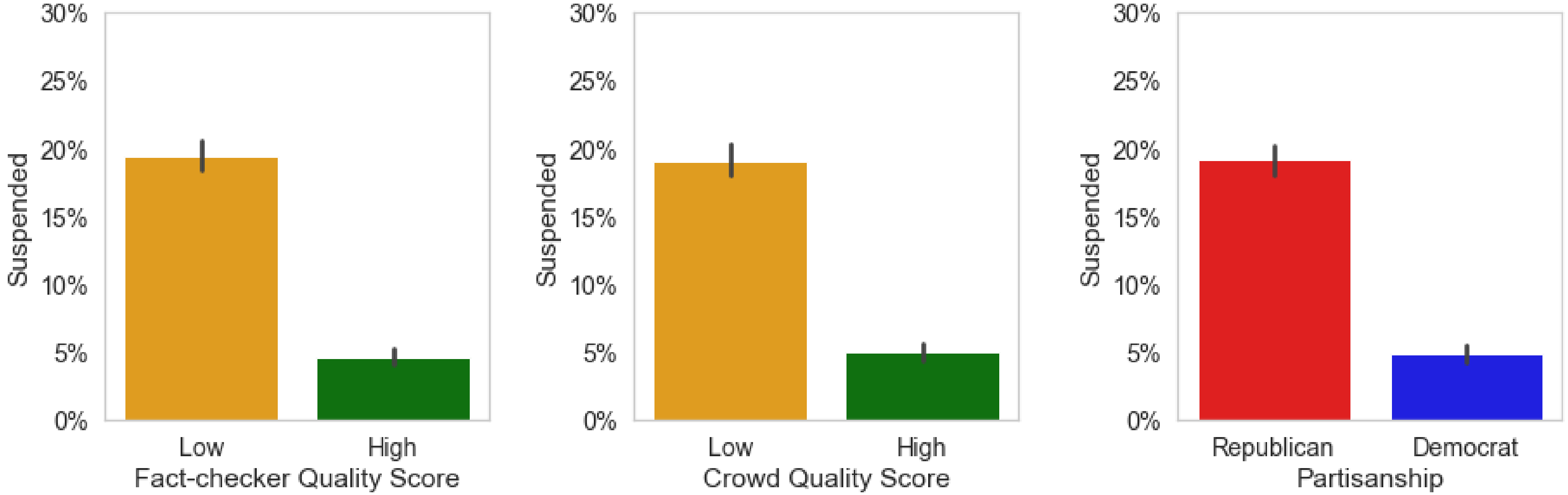
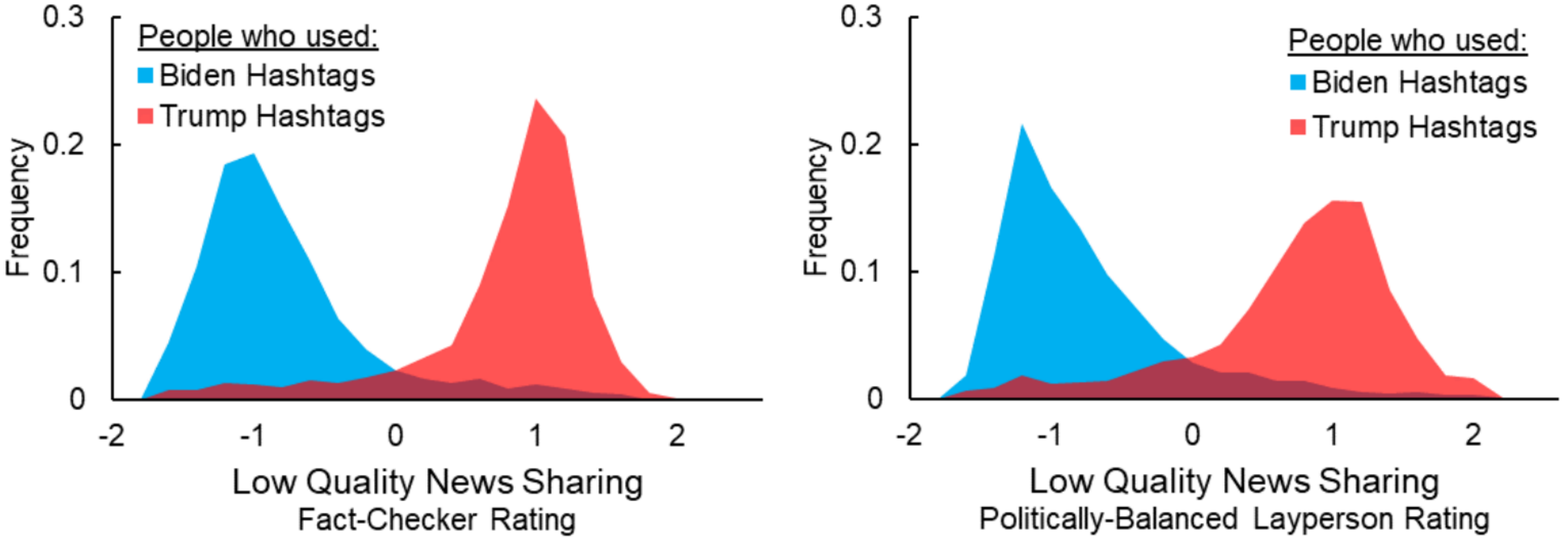


Media Quality and Political Sentiment



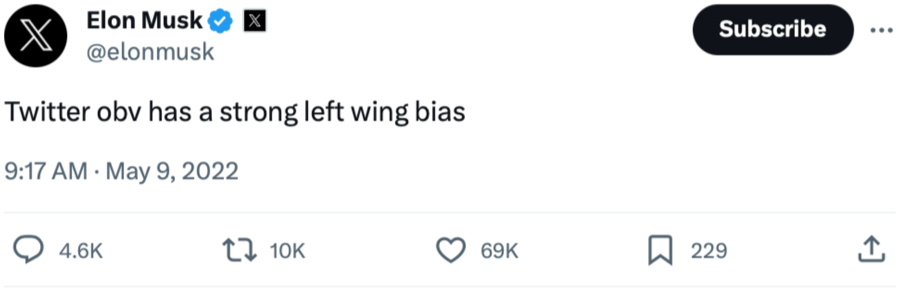
Political Bias in Suspensions?

- Political bias exists in suspensions

- The bias can be explained by good-faith efforts to **mitigate the spread of low quality news**

- It is still possible the bias is due to **political partisanship by Twitter**

New Management

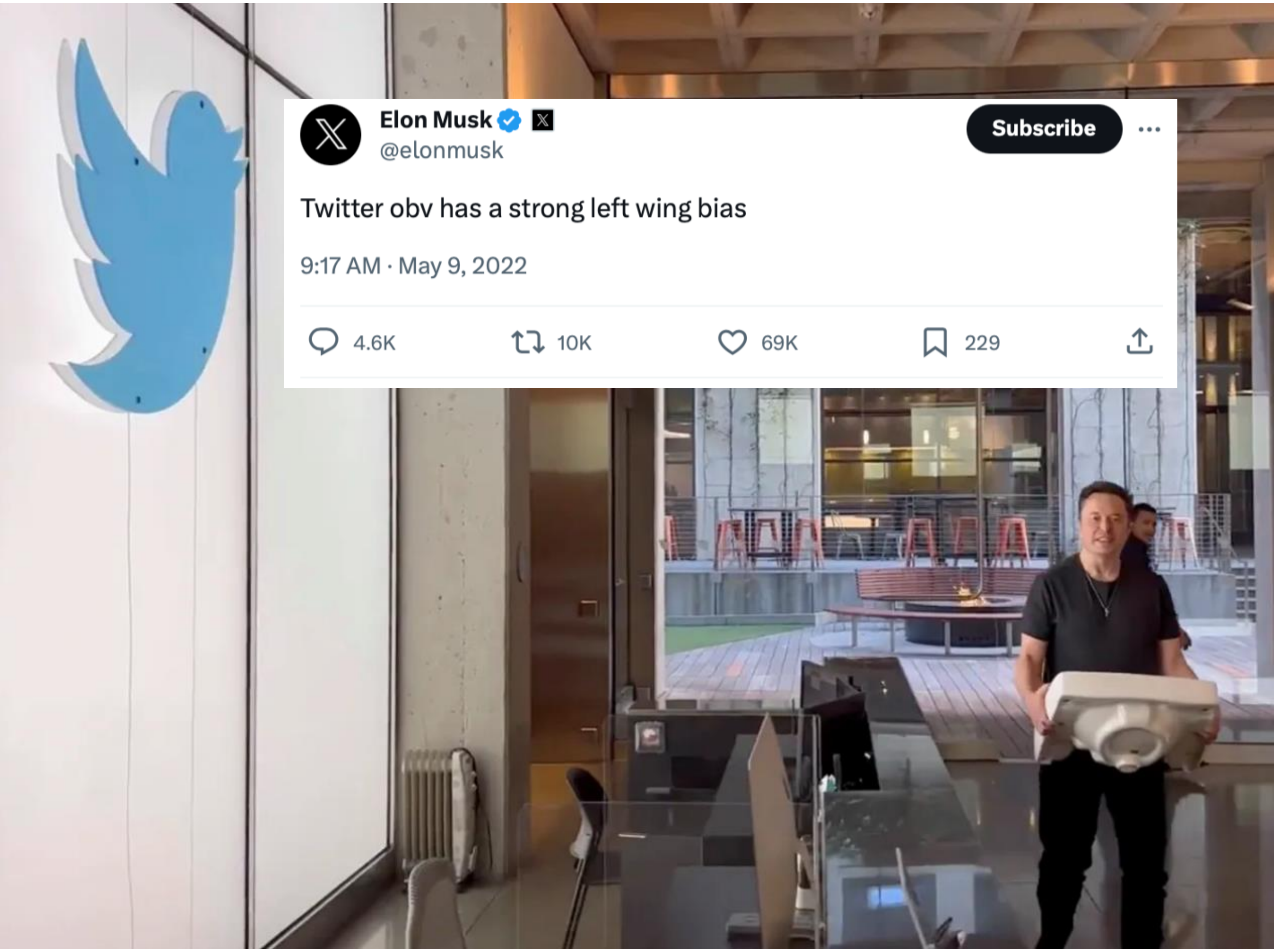


Elon Musk
@elonmusk

Twitter obv has a strong left wing bias

9:17 AM · May 9, 2022

New Management



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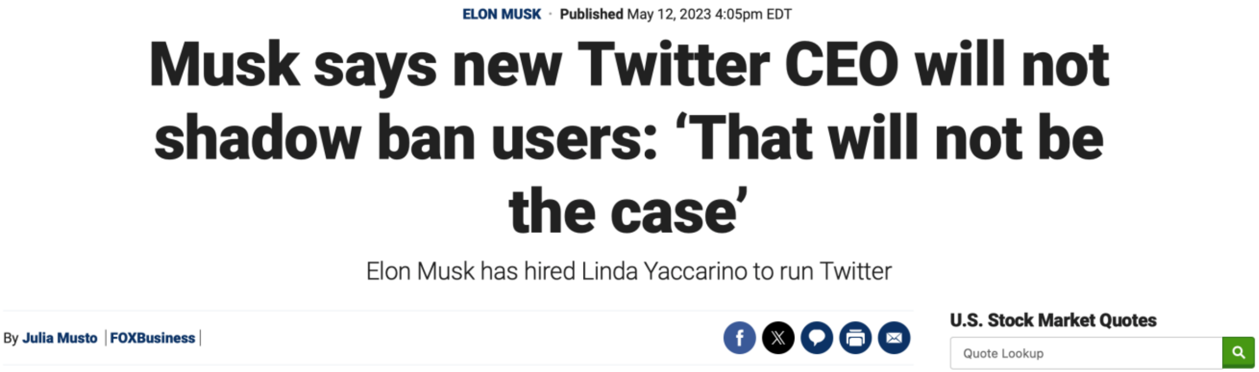
Shadow Banning

Shadow Banning on Twitter



ELON MUSK · **Published** May 12, 2023 4:05pm EDT

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By **Julia Musto** | **FOXBusiness** |

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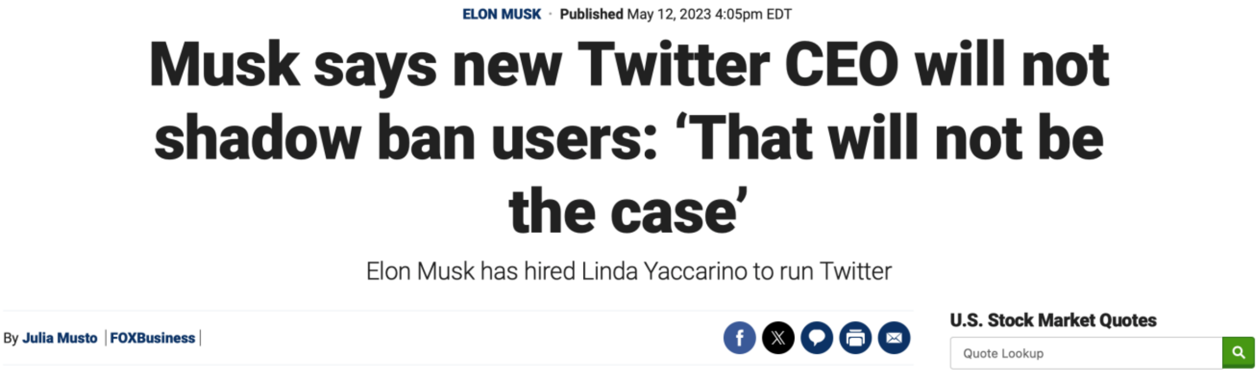

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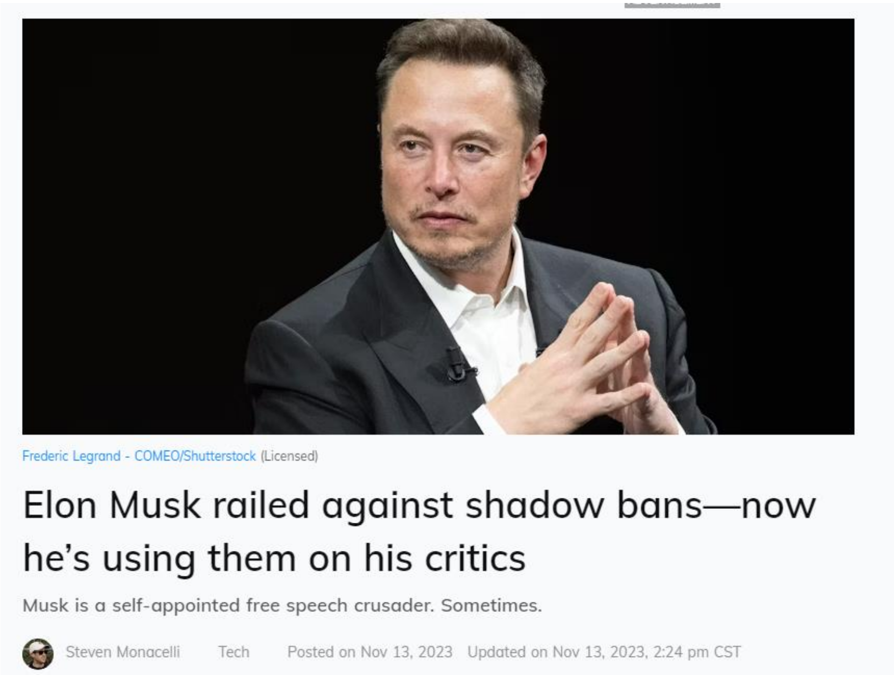
Quote Lookup



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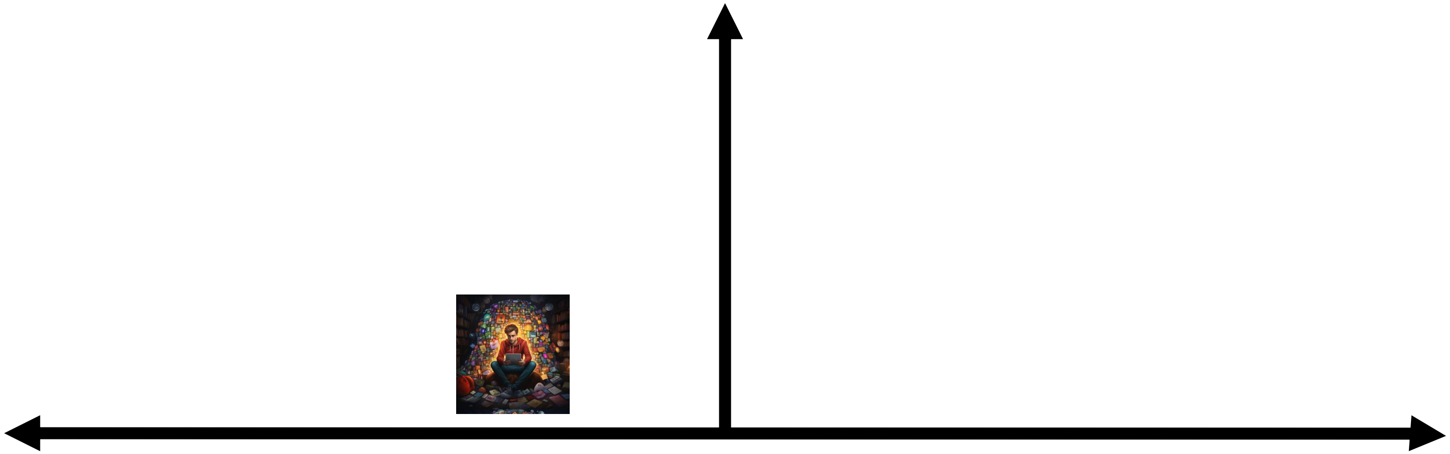
Elon Musk railed against shadow bans—now he's using them on his critics

Musk is a self-appointed free speech crusader. Sometimes.

Steven Monacelli Tech Posted on Nov 13, 2023 Updated on Nov 13, 2023, 2:24 pm CST

Persuasion

- People have opinions



Opinion

Persuasion

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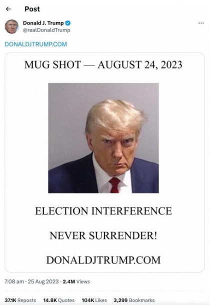
- Tweets have opinions



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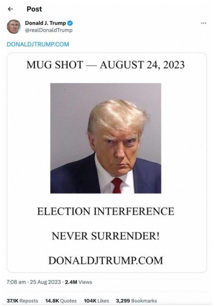
Persuasion

- People have opinions
- Tweets have opinions
- **Persuasion** -tweets move people's opinions towards their own



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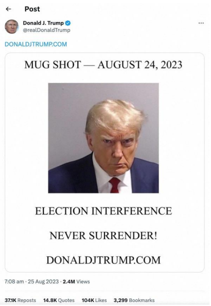

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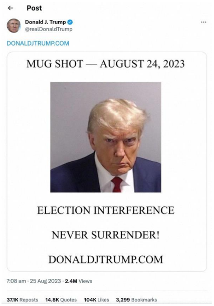
Opinion

DeGroot Model

$\theta_i(t)$

$\theta_i(t+1)$

$\theta_j(t)$



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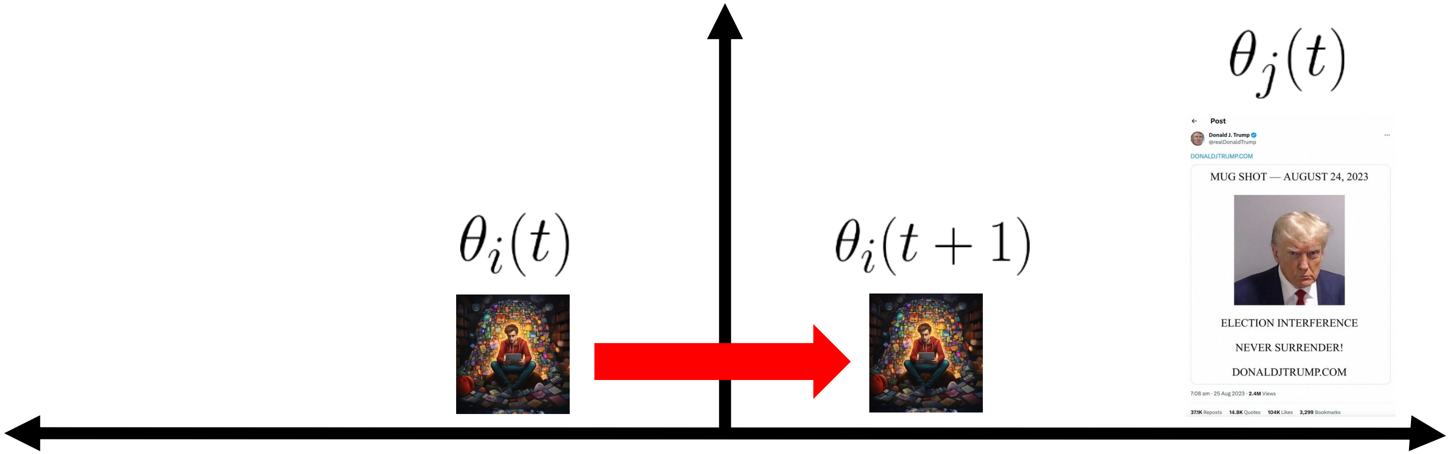
DeGroot Model

- DeGroot model describes how opinions move



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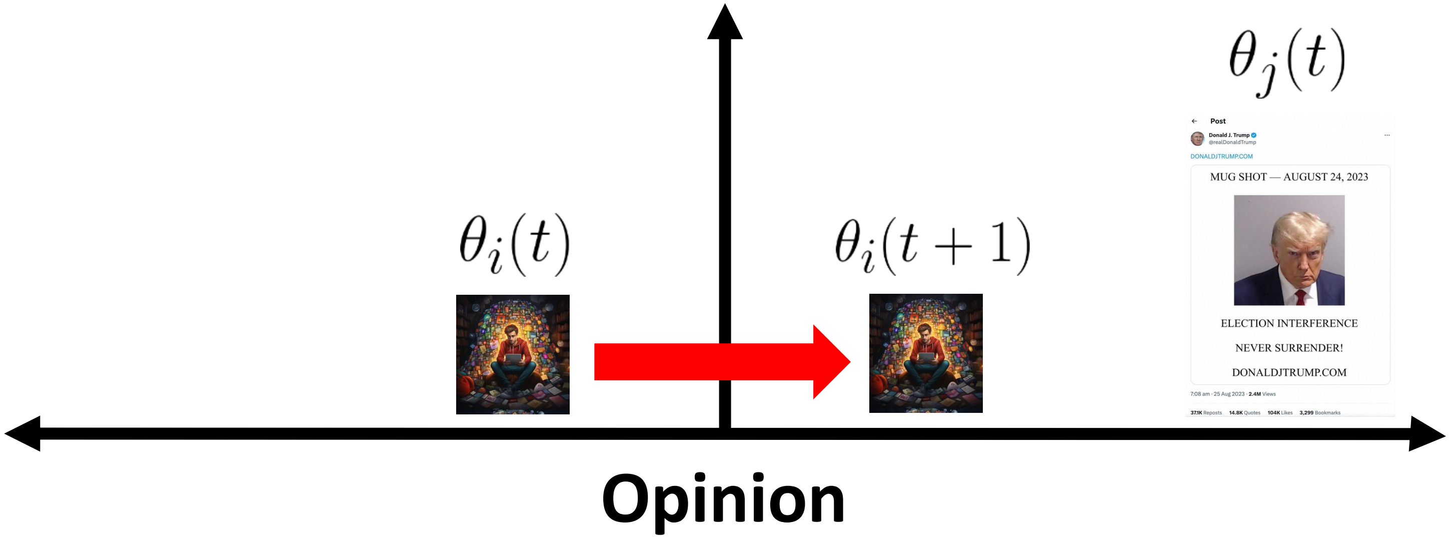
$$\theta_i(t+1) = \theta_i(t) + \omega(\theta_j(t) - \theta_i(t))$$



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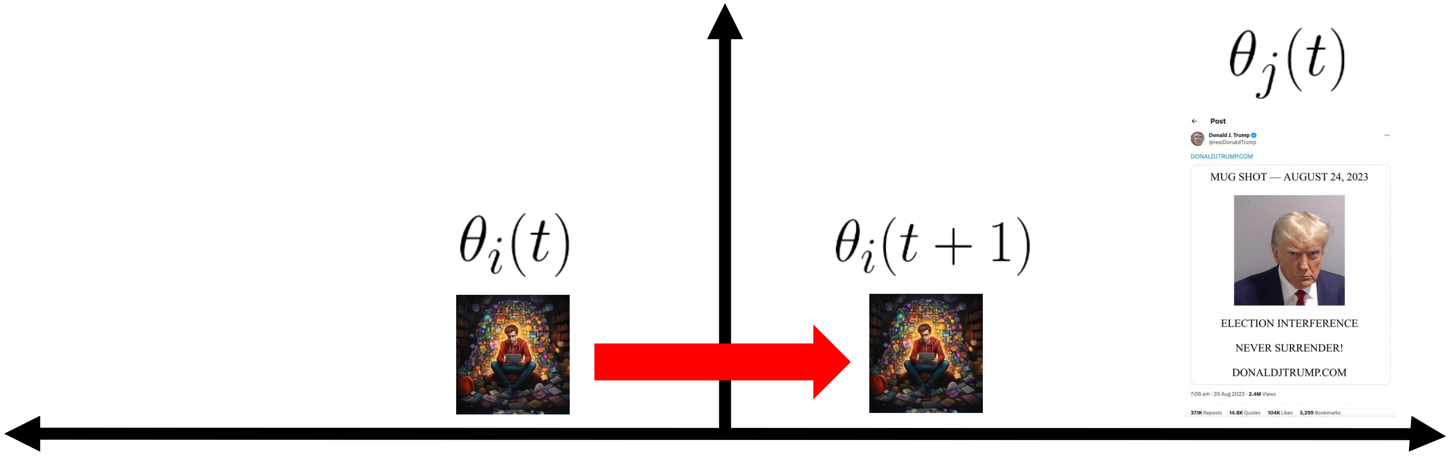
DeGroot Model in Large Networks

- For large networks, we can make time continuous because tweets happen so fast

$$\frac{d\theta_i}{dt} = \sum_j \lambda_{ji}\omega(\theta_j - \theta_i)$$



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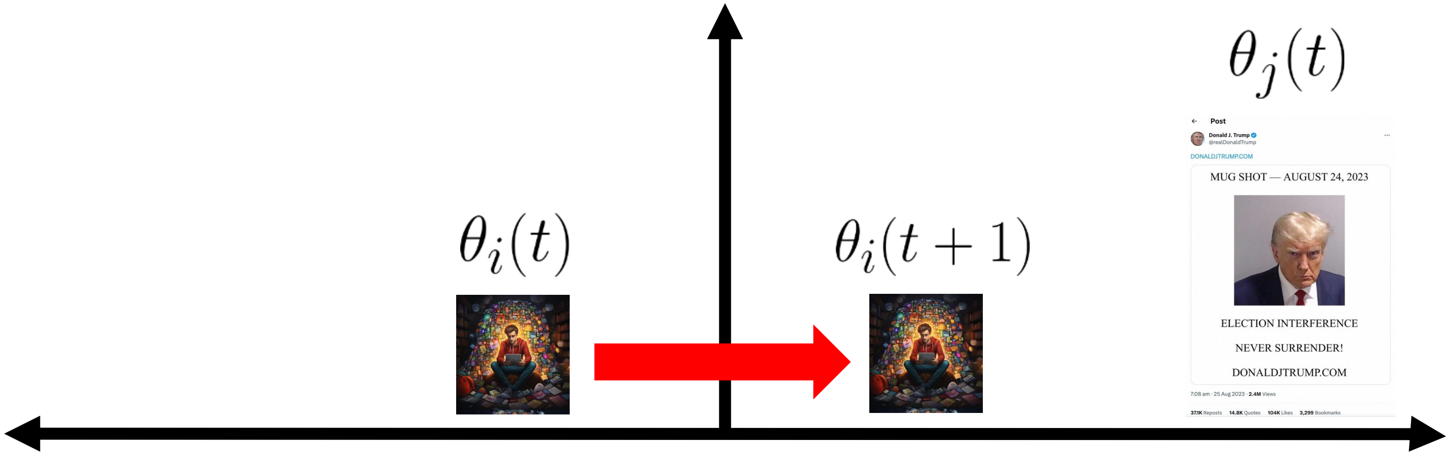
Tweet rate

$$\frac{d\theta_i}{dt} = \sum_j \lambda_{ji}\omega(\theta_j - \theta_i)$$



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Opinion

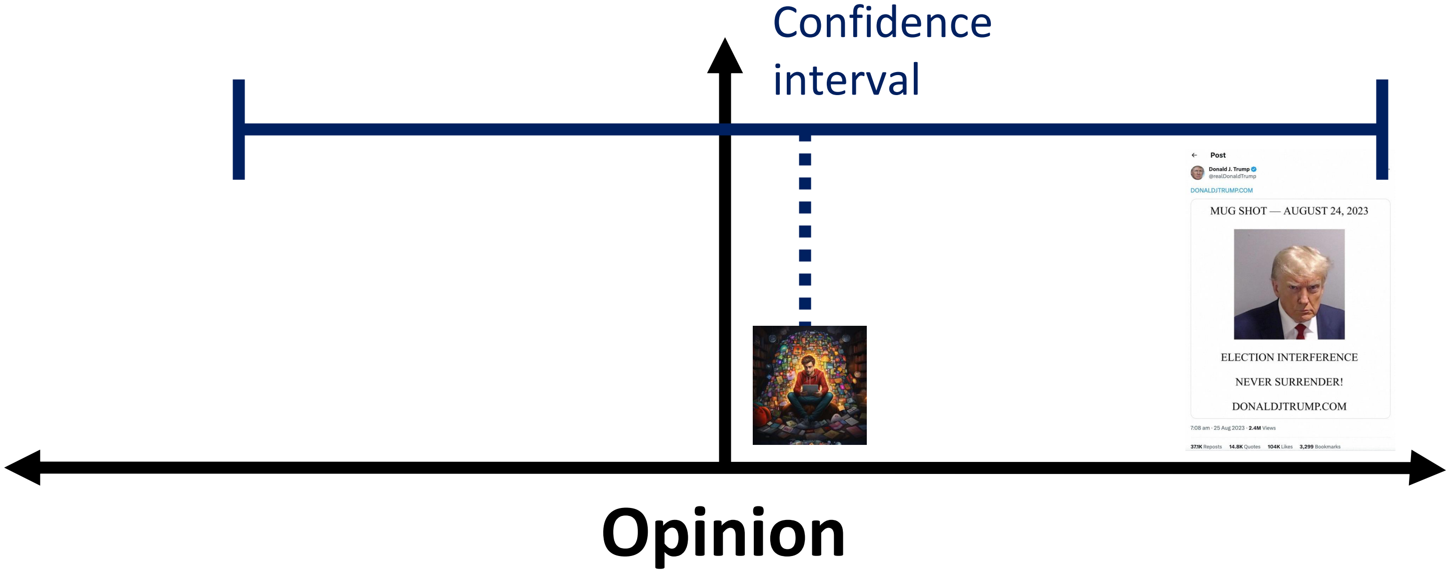
Bounded Confidence Model

- DeGroot model results in consensus – everyone has the same opinion eventually

- In reality there is polarization in social networks

- **Bounded confidence model** – if opinion of tweet is too far away, then there is no persuasion

Bounded Confidence Model



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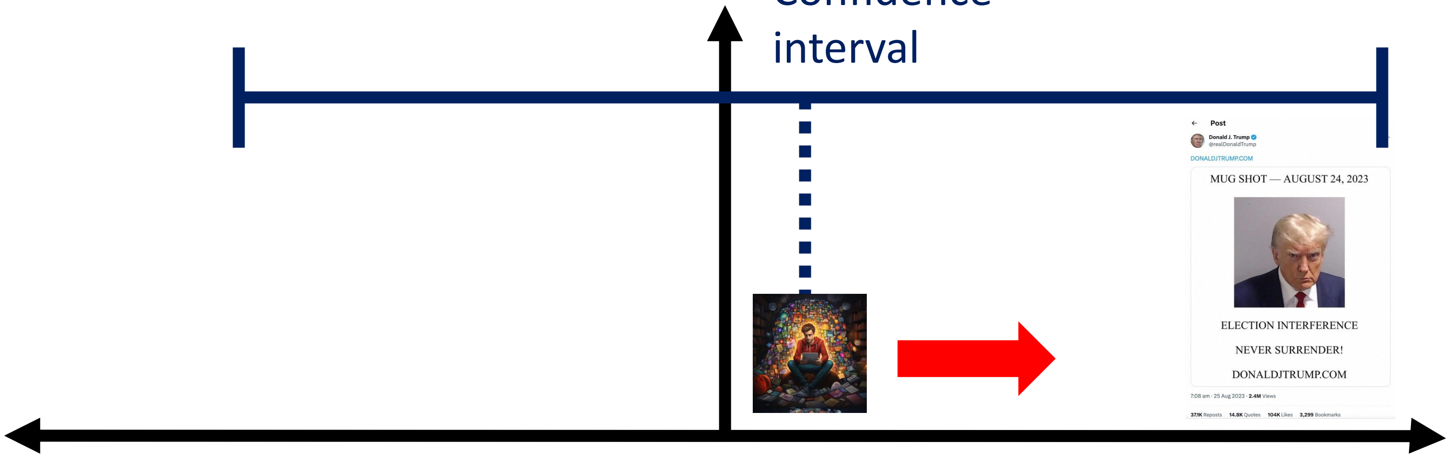
Bounded Confidence Model



Confidence interval

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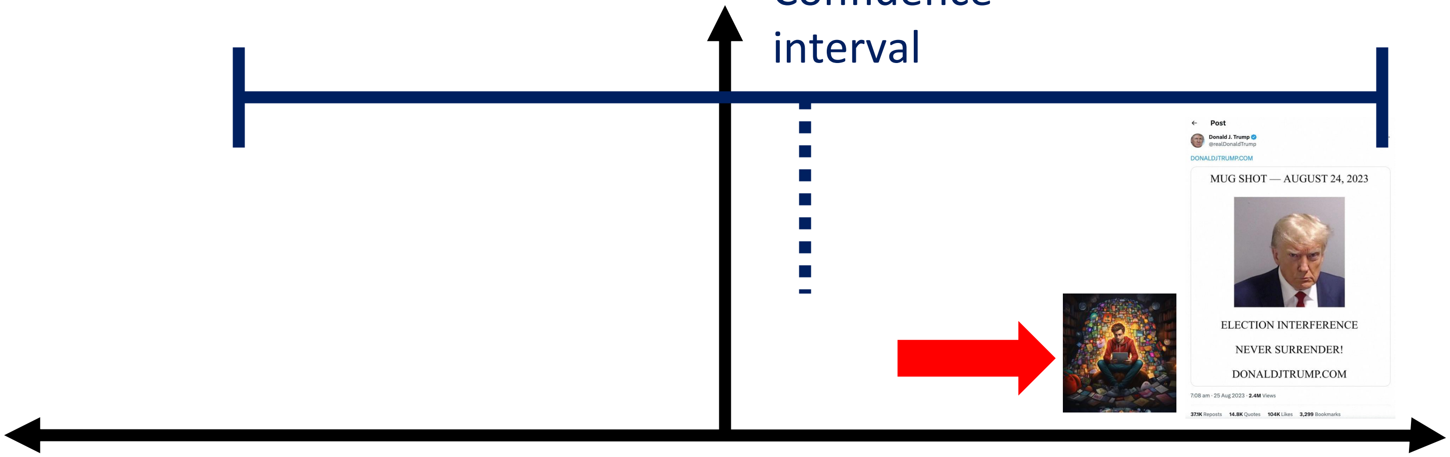
Opinion

Bounded Confidence Model



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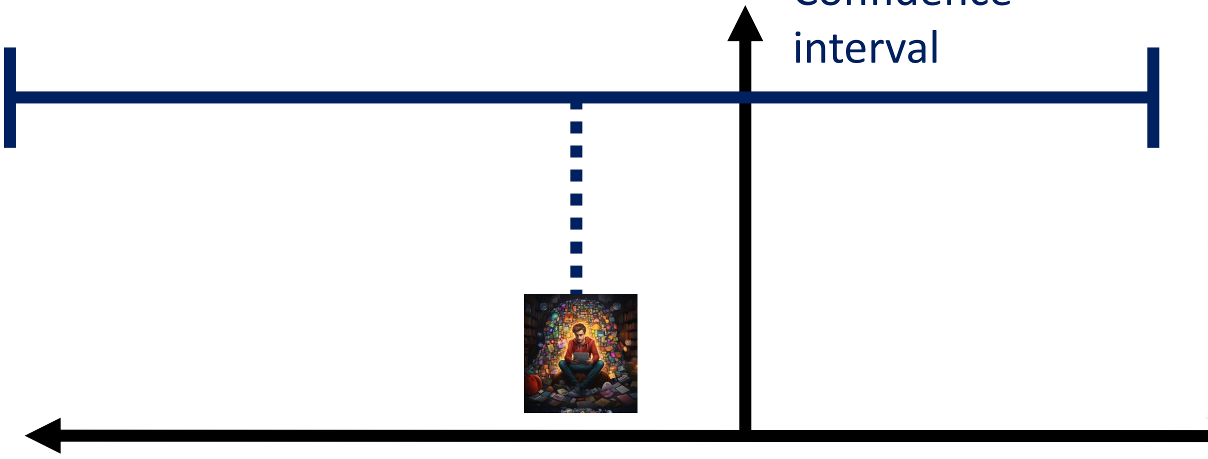

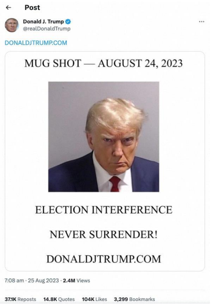
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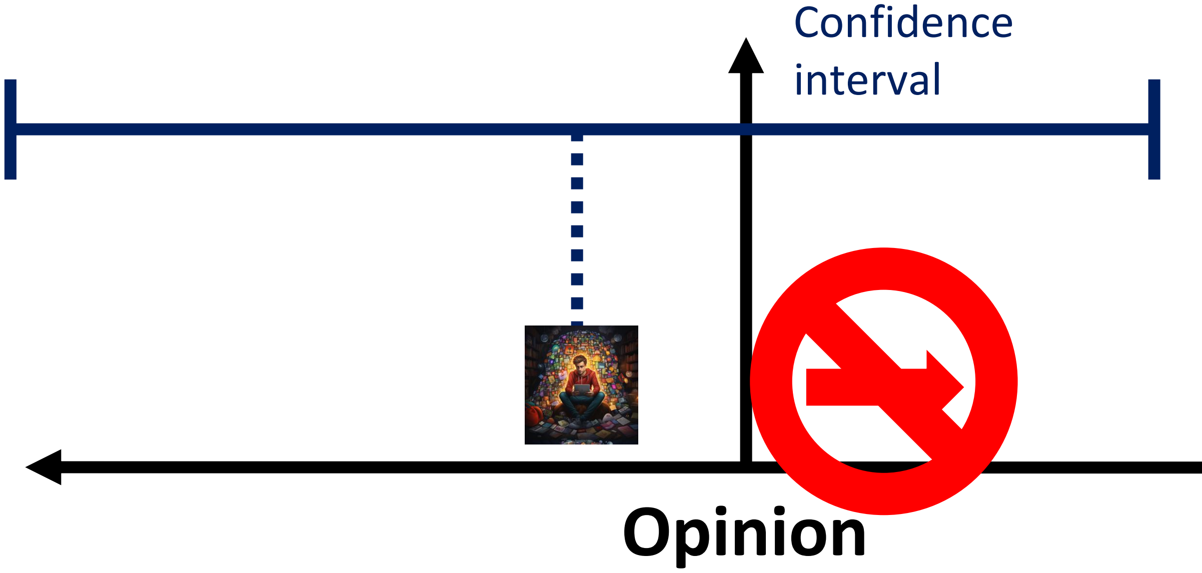

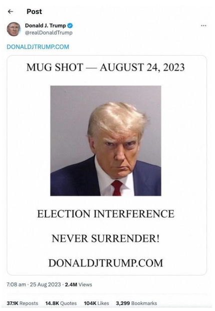
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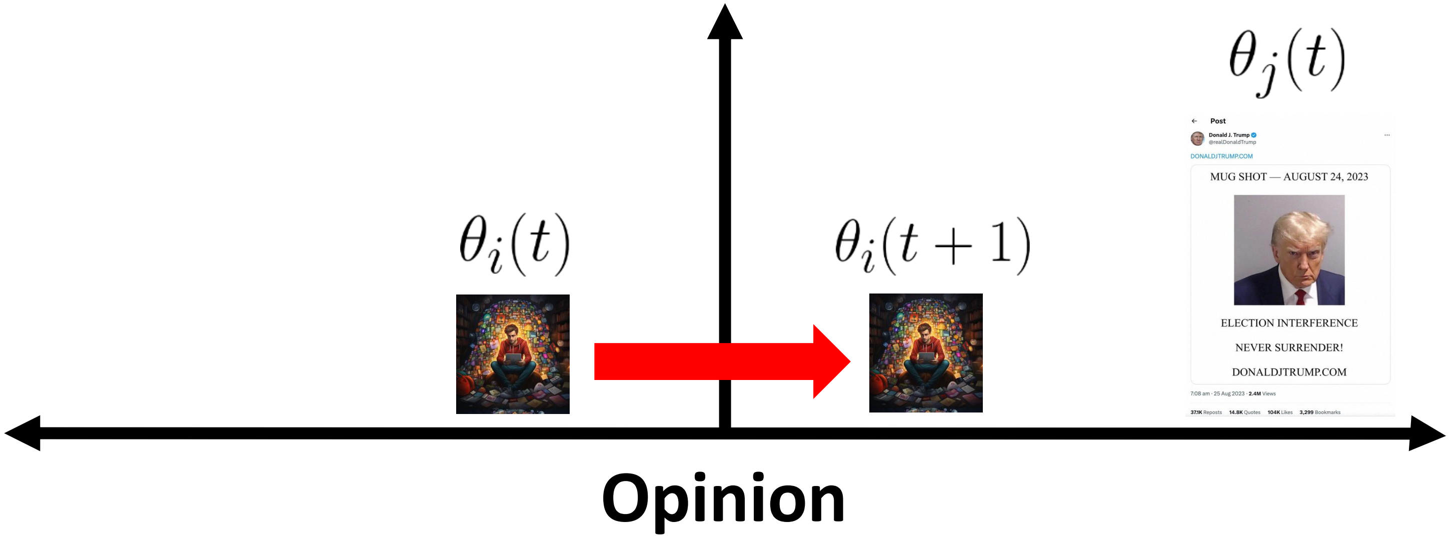
Bounded Confidence Model in Large Networks

- For large networks, we can make time continuous because tweets happen so fast

$$\frac{d\theta_i}{dt} = \sum_j \lambda_{ji} f(\theta_j - \theta_i)$$



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Opinion shift function

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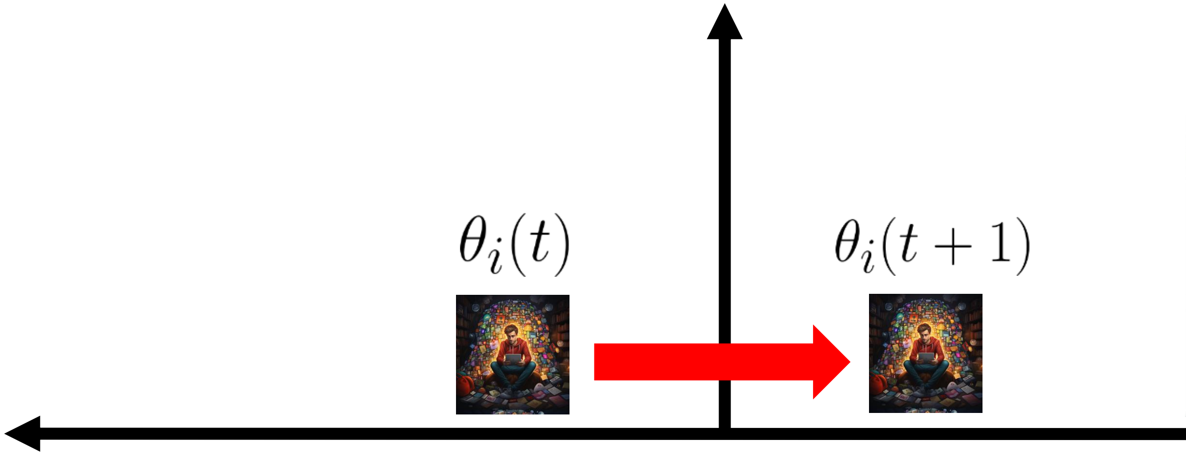

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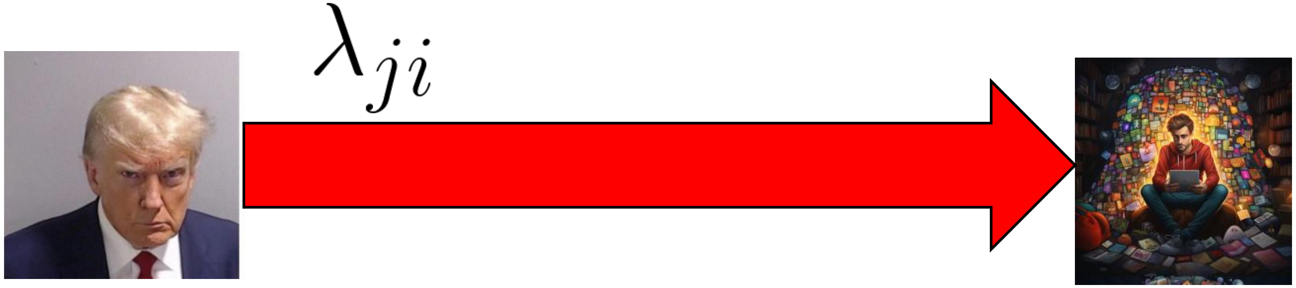
Shadow Banning Control

- Shadow banning reduces the tweet rate on an edge



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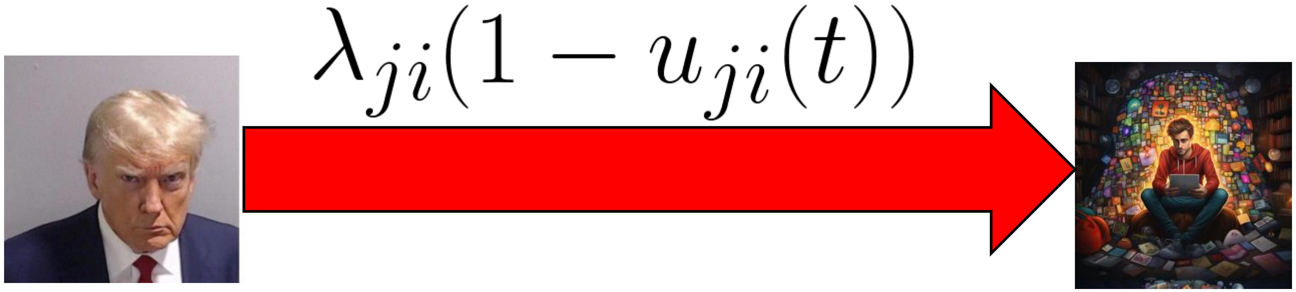

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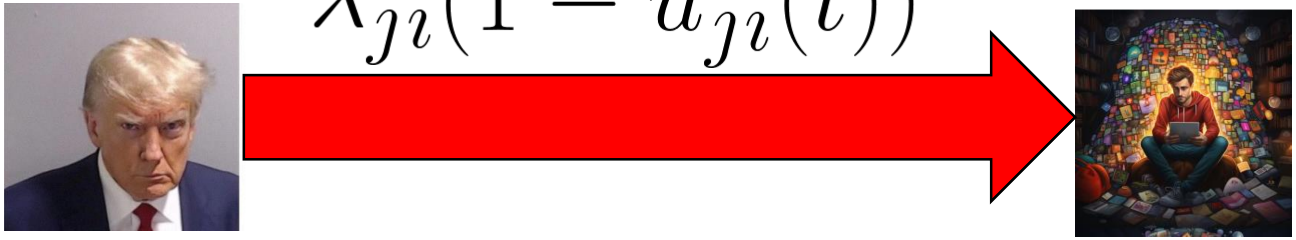

$$u_{ji}(t) = \text{shadow banning strength between } i \text{ and } j$$

Opinion Objectives

- Social media platform wants to maximize some **objective function** of the opinions in the network

- **Opinion mean** – make everyone support a political extreme

- **Opinion variance** – create consensus or polarization

Maximizing Opinion Objective

- Let's call the opinion objective $U(\theta)$
- We will maximize the rate at which the objective increases with respect to the shadow ban strength

$$\max_{u(t)} \frac{dU}{dt}$$

Maximizing Opinion Objective

- Time derivative of objective is linear in the shadow band controls

$$\frac{dU}{dt} = \sum_{i,j} \frac{\partial U}{\partial \theta_i} \lambda_{ji}(1 - u_{ji}(t)) f(\theta_j - \theta_i)$$

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- We can solve for the shadow ban controls for **large networks** very easily (solve a linear program)

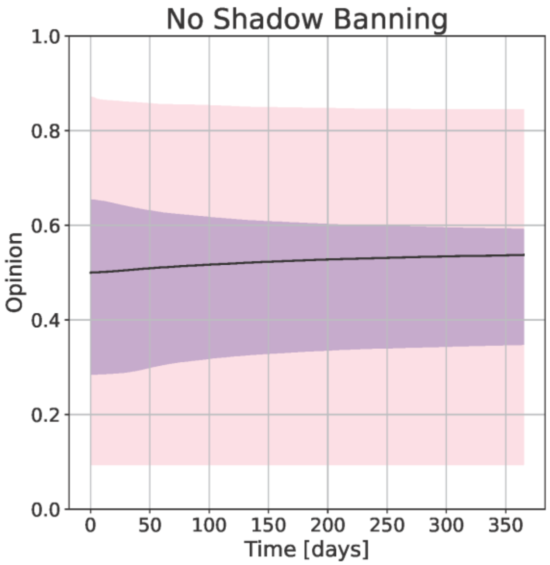
- We can even limit the maximum shadow banning strength on the edges

Real Twitter Network

- Twitter follower network of users tweeting about the 2016 US presidential election[1]
- Network has 30,000 users and 800,000 edges
    - Tweet rates: λ_{ji}
    - Network structure: $(j,i) \in E$
    - Opinions (measured with a neural network): $\theta_i(0)$

[1] N. Guenon des Mesnards. et.al., *Operations Research* (2021)

Real Twitter Network



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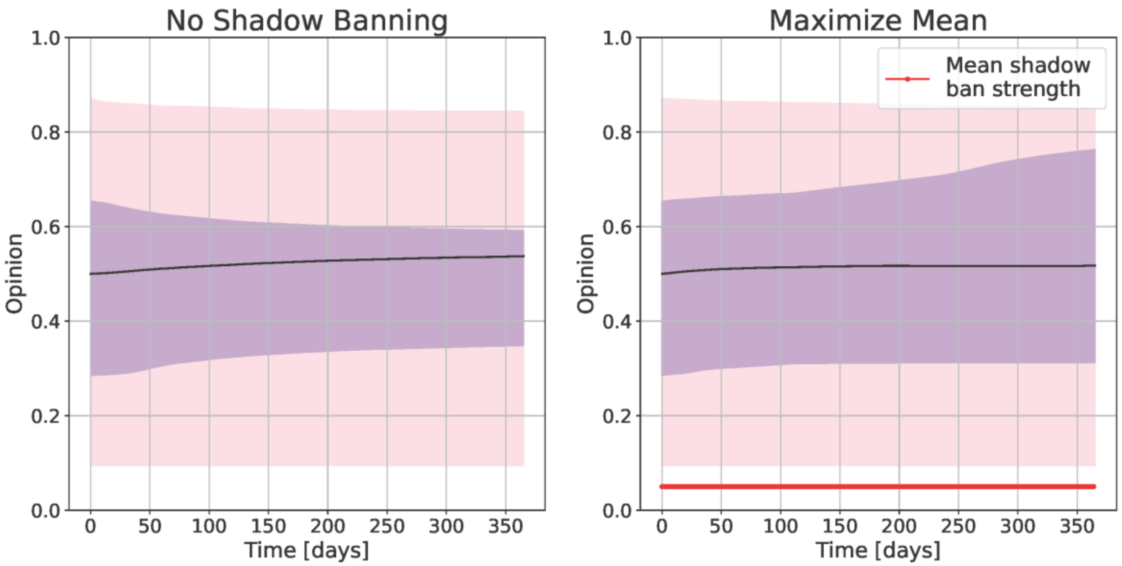

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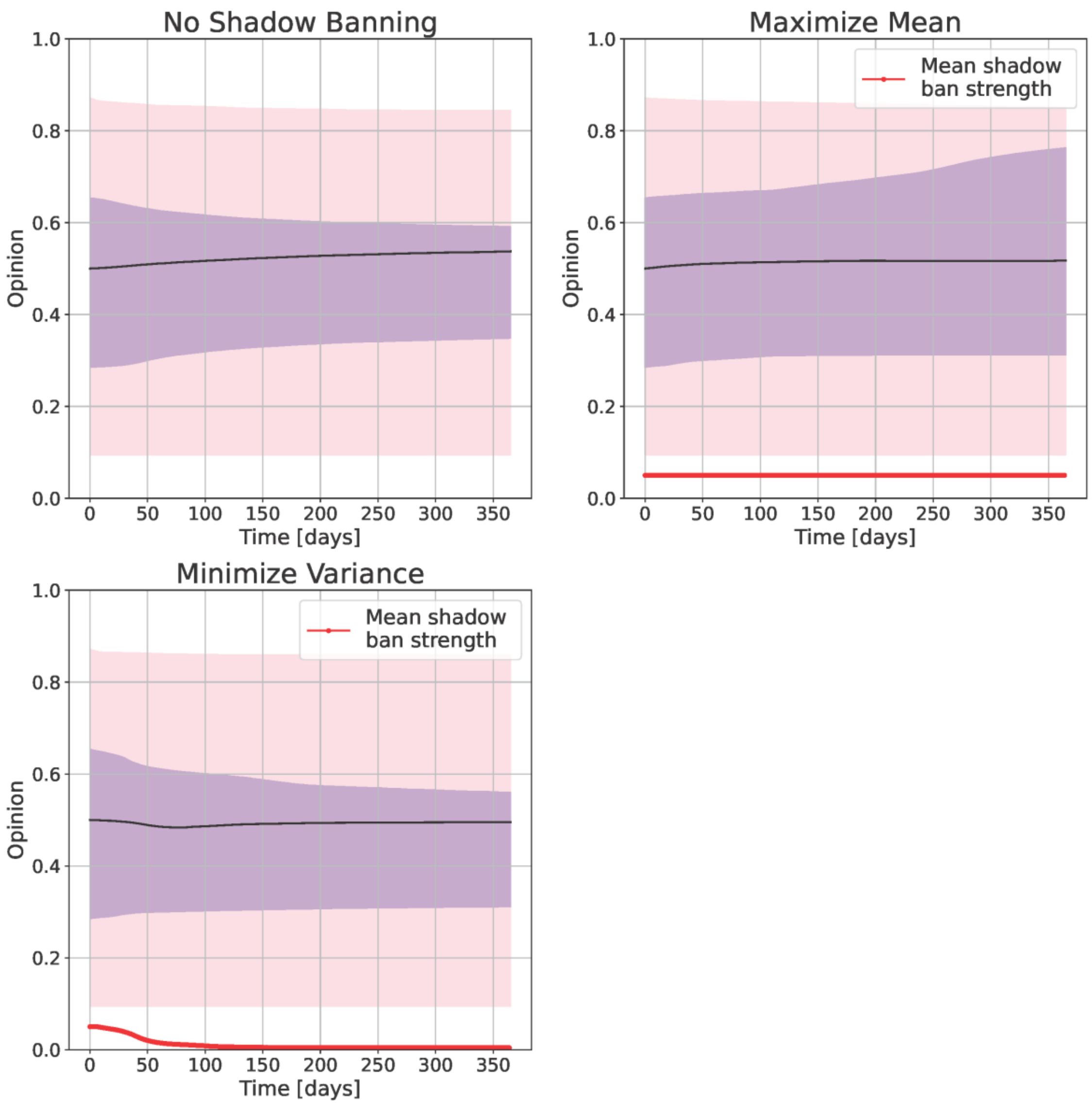

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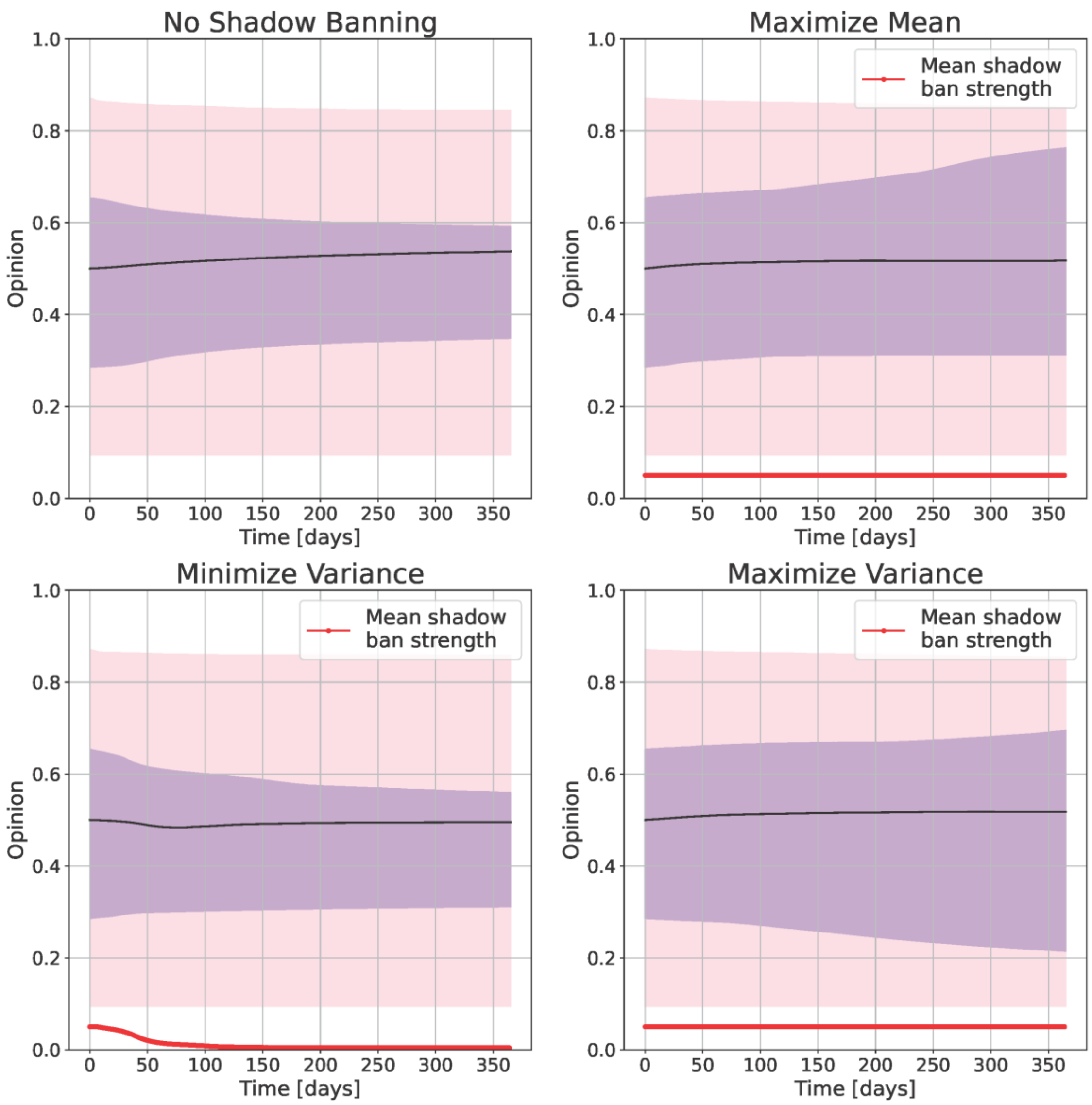
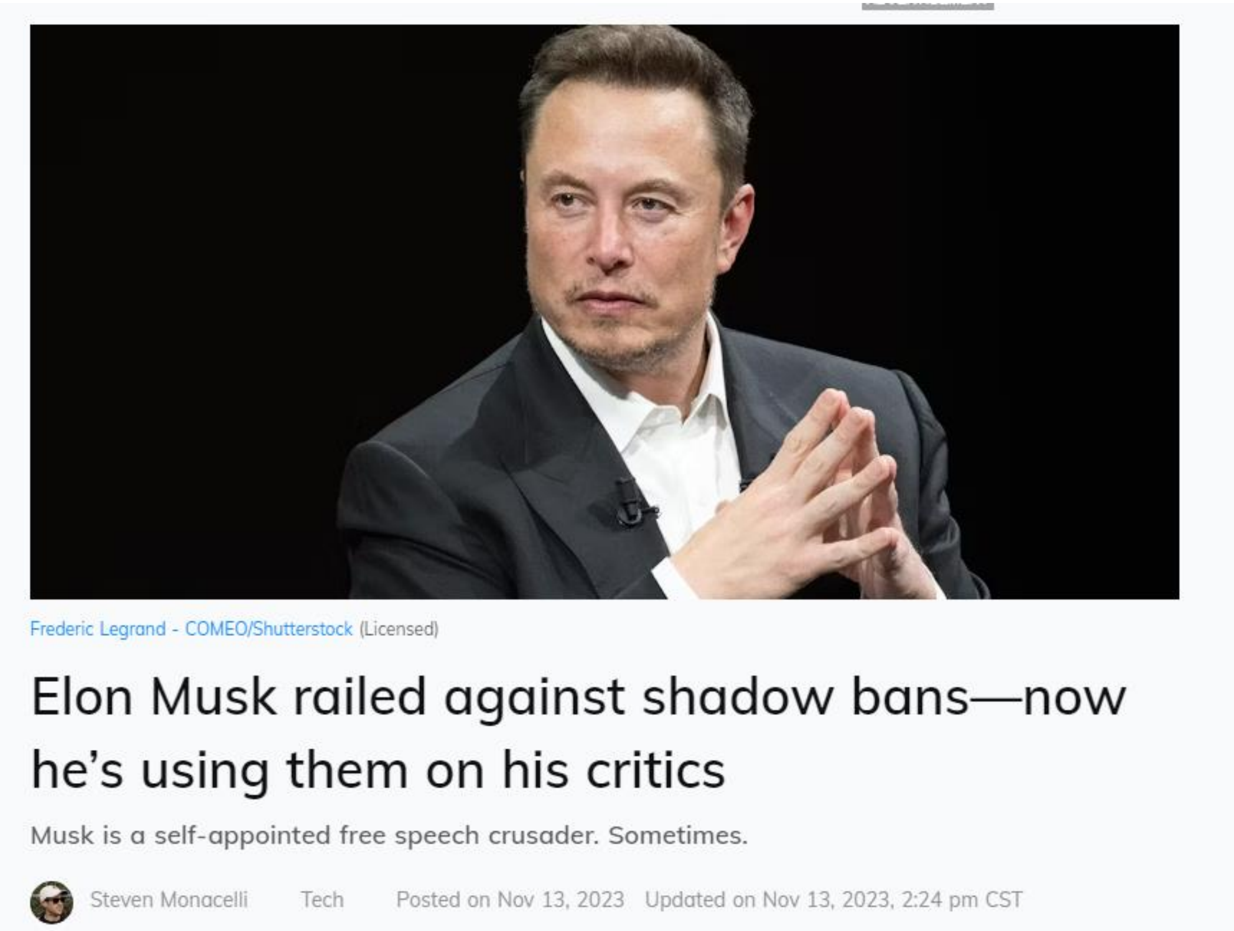


Biased Shadow Banning on Twitter



Frederic Legrand - COMEO/Shutterstock (Licensed)

Elon Musk railed against shadow bans—now he's using them on his critics

Musk is a self-appointed free speech crusader. Sometimes.

Steven Monacelli Tech Posted on Nov 13, 2023 Updated on Nov 13, 2023, 2:24 pm CST

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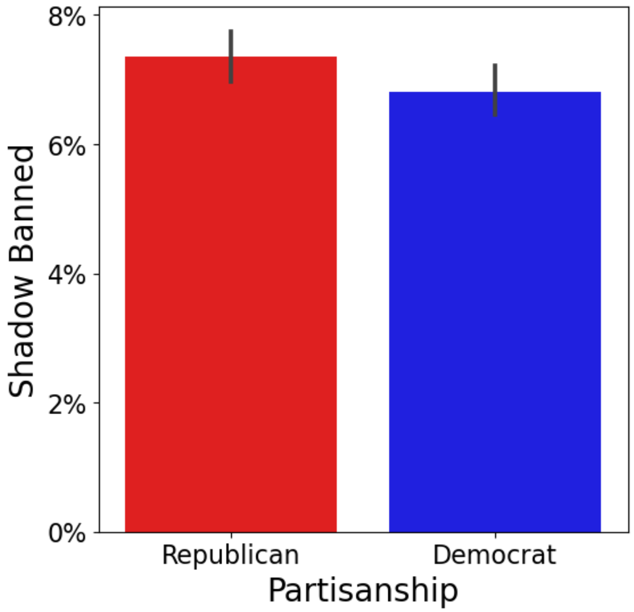
- Surprisingly, the policy shadow bans both parties nearly equally



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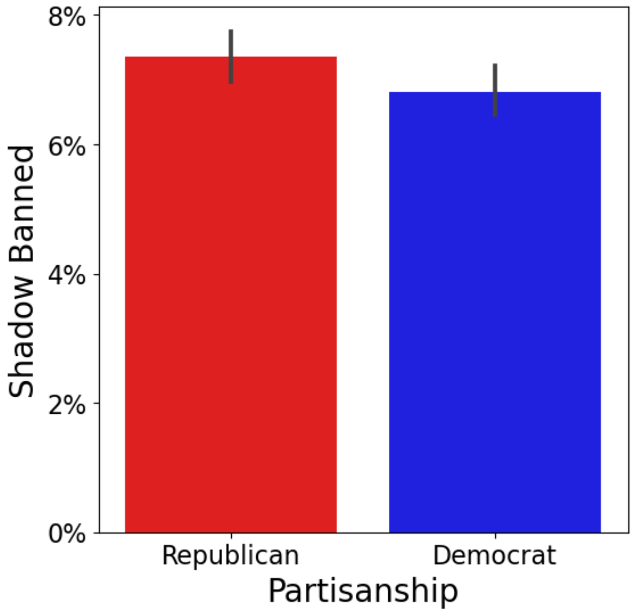
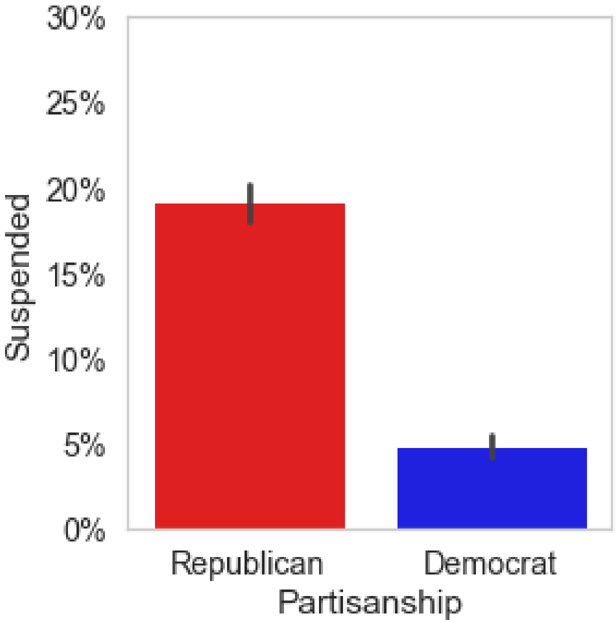
- Surprisingly, the policy shadow bans both parties nearly equally
- In comparison, actual suspensions were biased against republicans by 4X





Why Biased Shadow Banning Looks Unbiased

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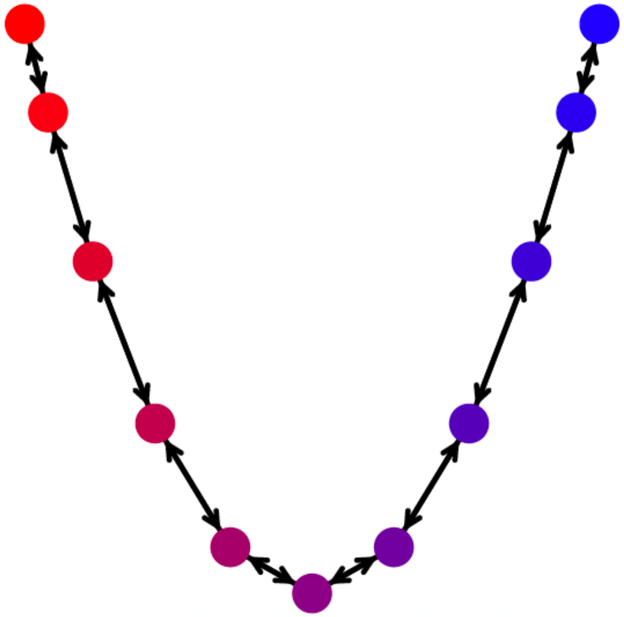
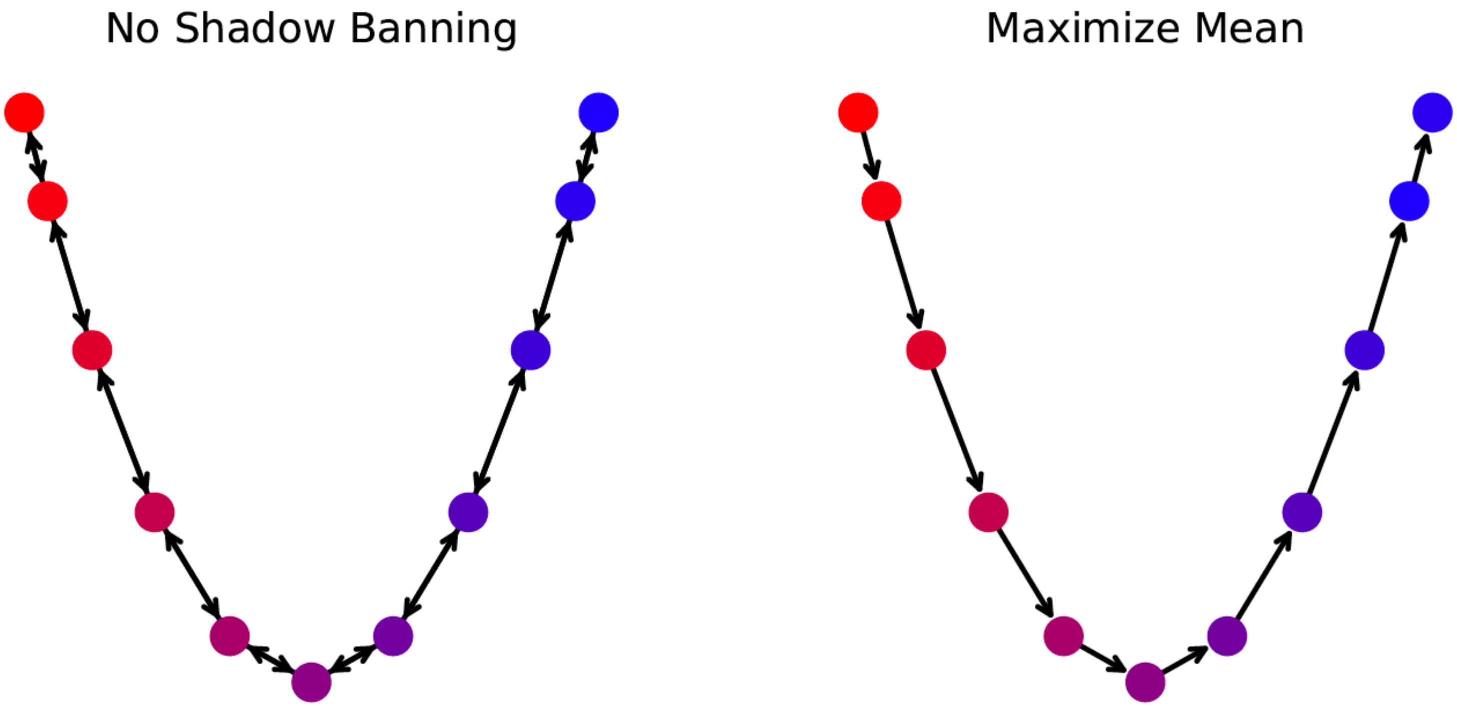


No Shadow Banning

Why Biased Shadow Banning Looks Unbiased



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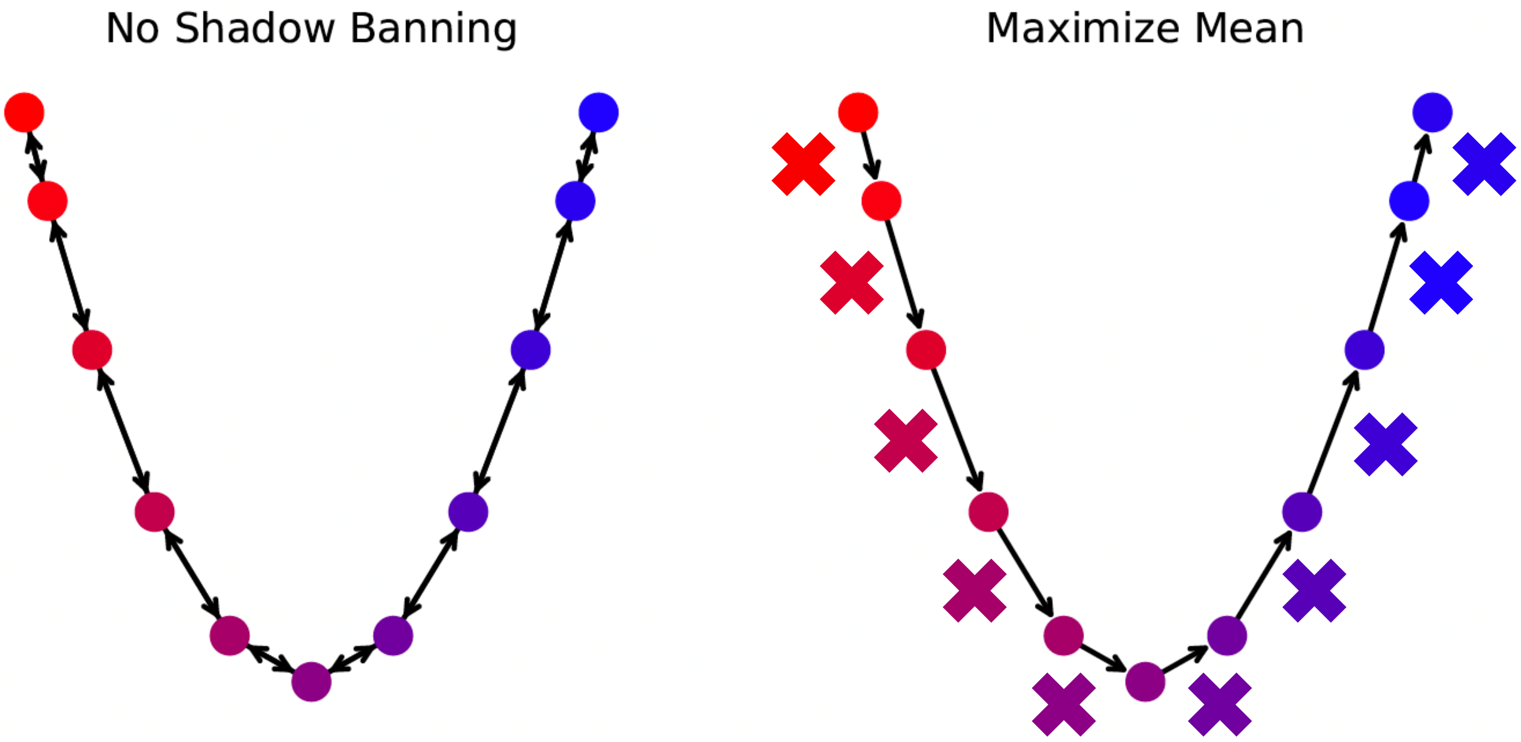

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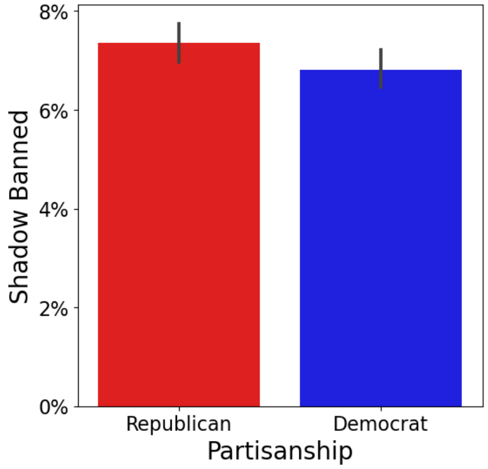

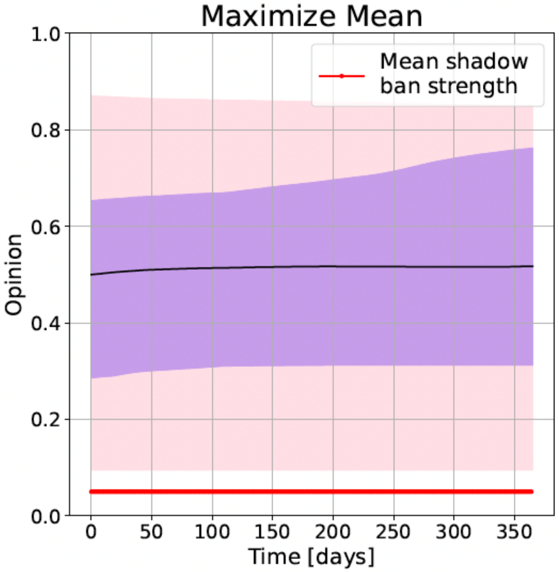

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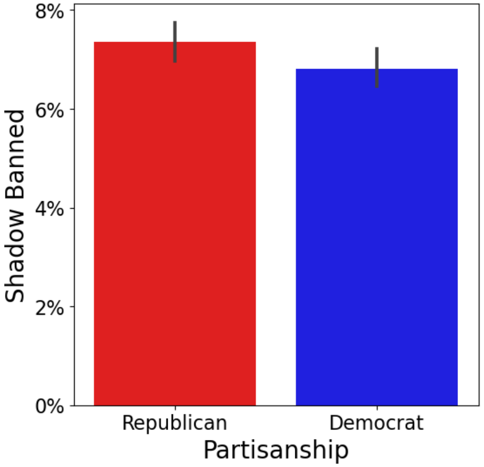

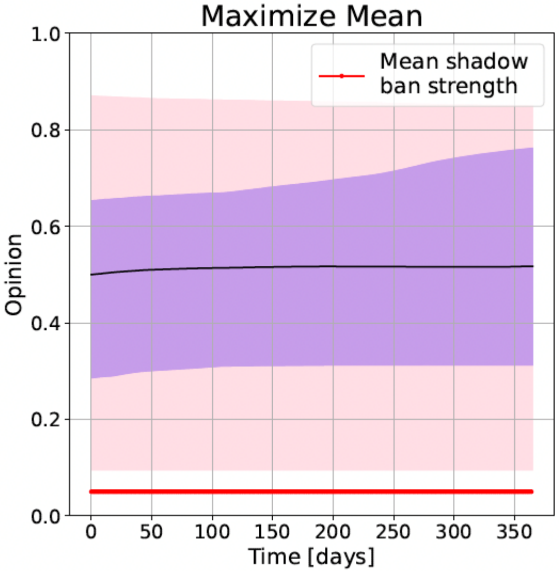

Conclusion

- Censorship by social media platforms is a serious issue with huge implications for societies and democracies

- Politically biased suspensions may be due to good faith attempts to mitigate disinformation

- Politically biased shadow banning may not look politically biased at all, until its too late