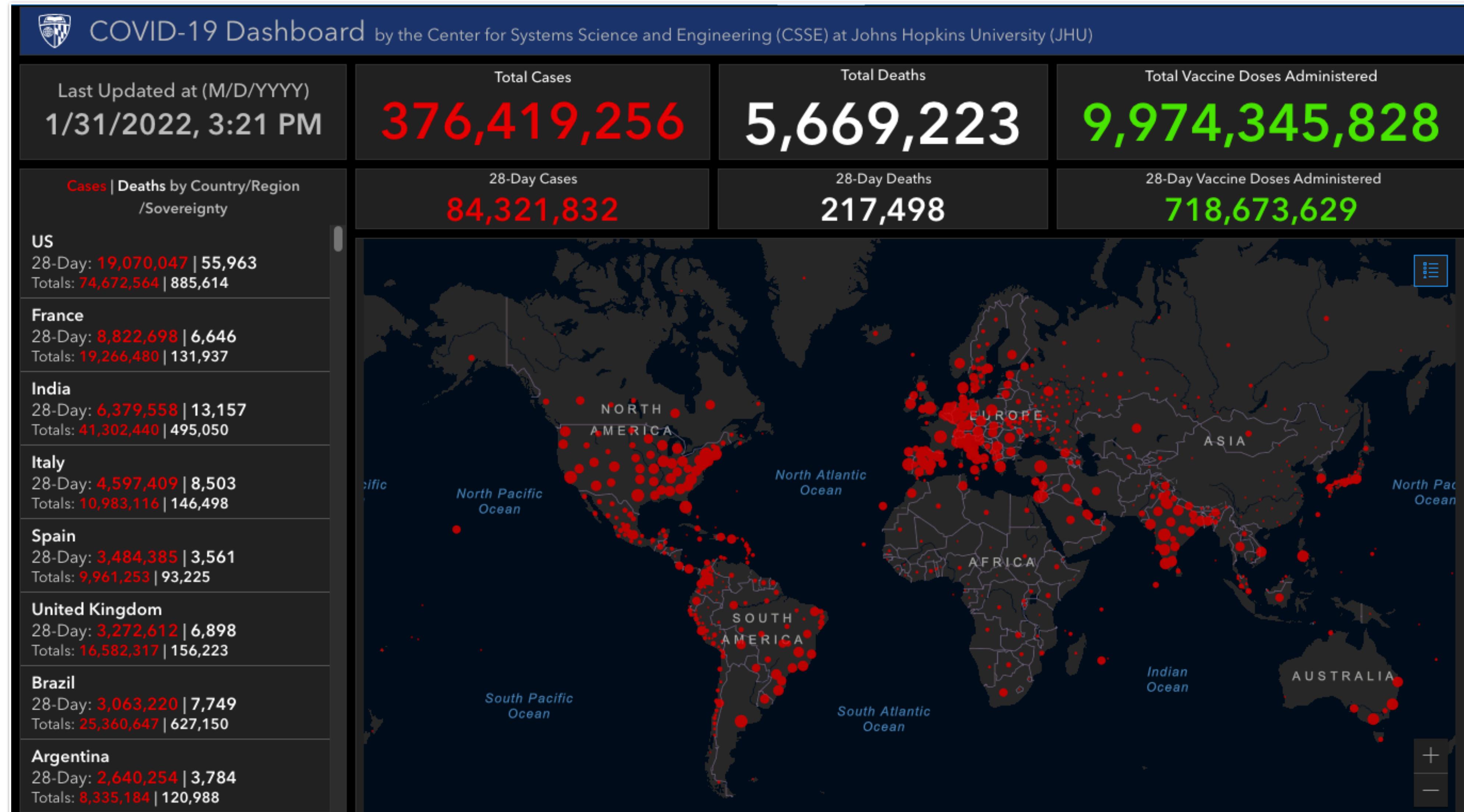


2022 INFORMS Annual Meeting

# The COVID-19 Infodemic: prevalence, adverse actors, and real-world impact

Kaicheng Yang | Observatory on Social Media  
Oct 18, 2022

# COVID-19 pandemic



# COVID-19 misinformation

 **Garret Lewis** ...  
18. marraskuuta kello 9.36 · 

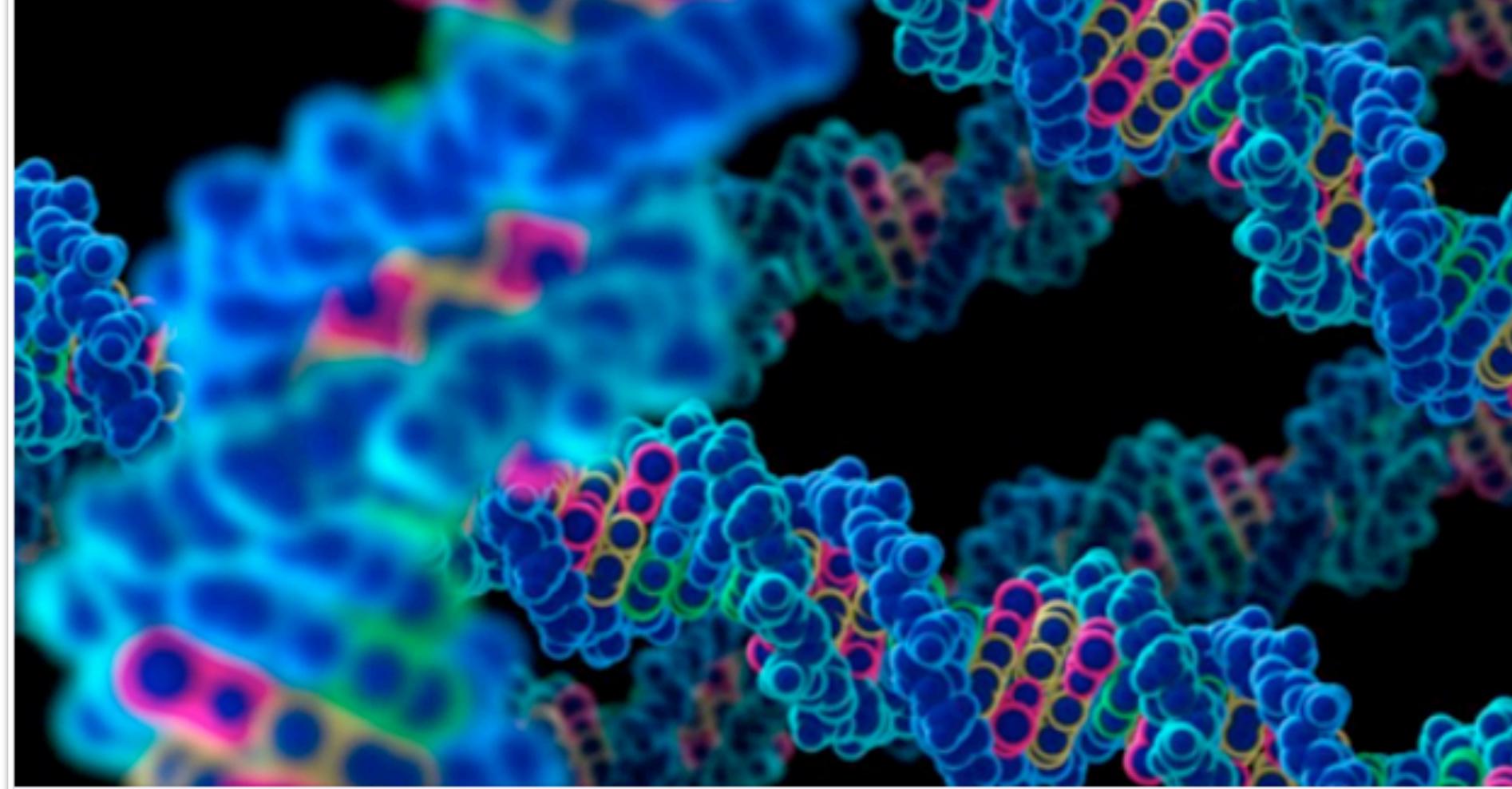
The largest randomized clinical trial mask study has finally come out. It's from Denmark and proves masks offer NO protection from COVID. About 3000 people wore a mask and about 3000 didn't. Mask wearers had a 1.8% infection rate. Non-mask wearers had a 2.1% infection rate. So masks offer you an extra .3% of protection, which is statistically insignificant.

<https://www.acpjournals.org/doi/10.7326/M20-6817>

 120      40 Comments 108 Shares  
[Like](#)   [Comment](#)   [Share](#)

 **WorldTruth.TV** ...  
August 3 · 

Fast-Tracked Covid-19 Vaccine Alters Human DNA, Turns People Into Genetically Modified Property



WORLDTRUTH.TV

 **Fast-Tracked Covid-19 Vaccine Alters Human DNA, Turns People Into Genetically Modified Property**

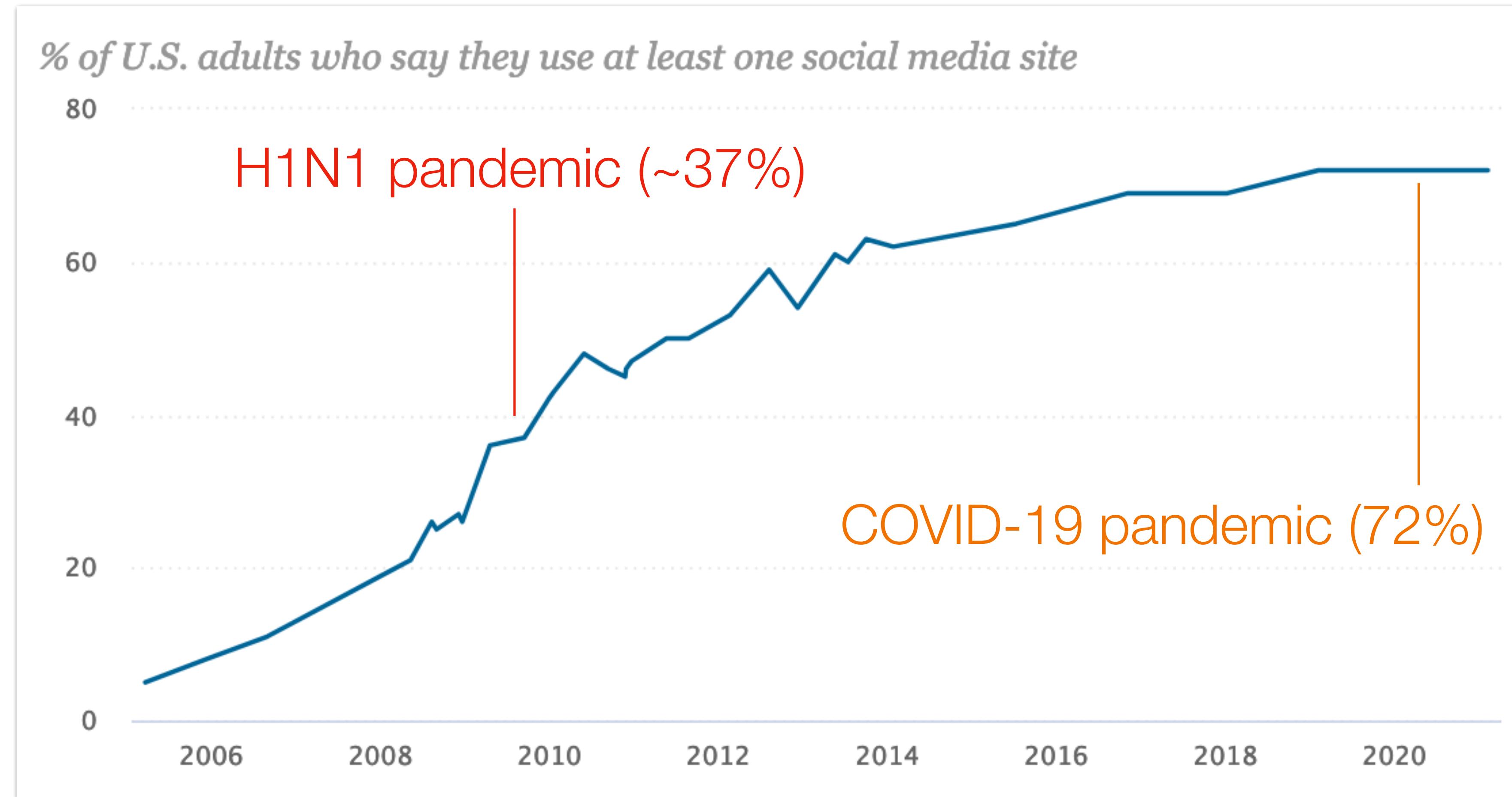
# COVID-19 Infodemic

“ We’re not just fighting an epidemic  
we’re fighting an infodemic ,”

*--WHO Director-General Tedros Adhanom Ghebreyesus*

In this talk: Infodemic = COVID-19 misinformation on social media

# Why social media?



<https://www.pewresearch.org/internet/fact-sheet/social-media/>

# Why social media?

**Roughly half of Americans get at least some news about COVID-19 vaccines on social media...**

*% of U.S. adults who say they have been getting news and information about COVID-19 vaccines on social media*



# Data collection



*COVID-19 vaccine keywords | English*

**300M tweets from 20M users**

Jan 4 to Dec 31, 2021

# Identification of misinformation at scale

Links	Low-credibility?
<a href="https://beforeitsnews.com/prophecy/2020/05/5g-whistleblower-coronavirus-test-spreading-virus-you-cannot-catch-the-coronavirus-unless-you-take-the-covid-19-test-or-covid-19-vaccines-exposing-the-covid-19-lie-great-videos-2511687.html">https://beforeitsnews.com/prophecy/2020/05/5g-whistleblower-coronavirus-test-spreading-virus-you-cannot-catch-the-coronavirus-unless-you-take-the-covid-19-test-or-covid-19-vaccines-exposing-the-covid-19-lie-great-videos-2511687.html</a>	Yes
<a href="https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html">https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html</a>	No
<a href="https://humansarefree.com/2020/04/covid-19-and-5g-whats-the-connection.html">https://humansarefree.com/2020/04/covid-19-and-5g-whats-the-connection.html</a>	Yes
<a href="https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html">https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html</a>	No

# Identification of misinformation at scale



HOME THE GATEWAY PUNDIT

## The Gateway Pundit

Share:

f t p e t s in r G +

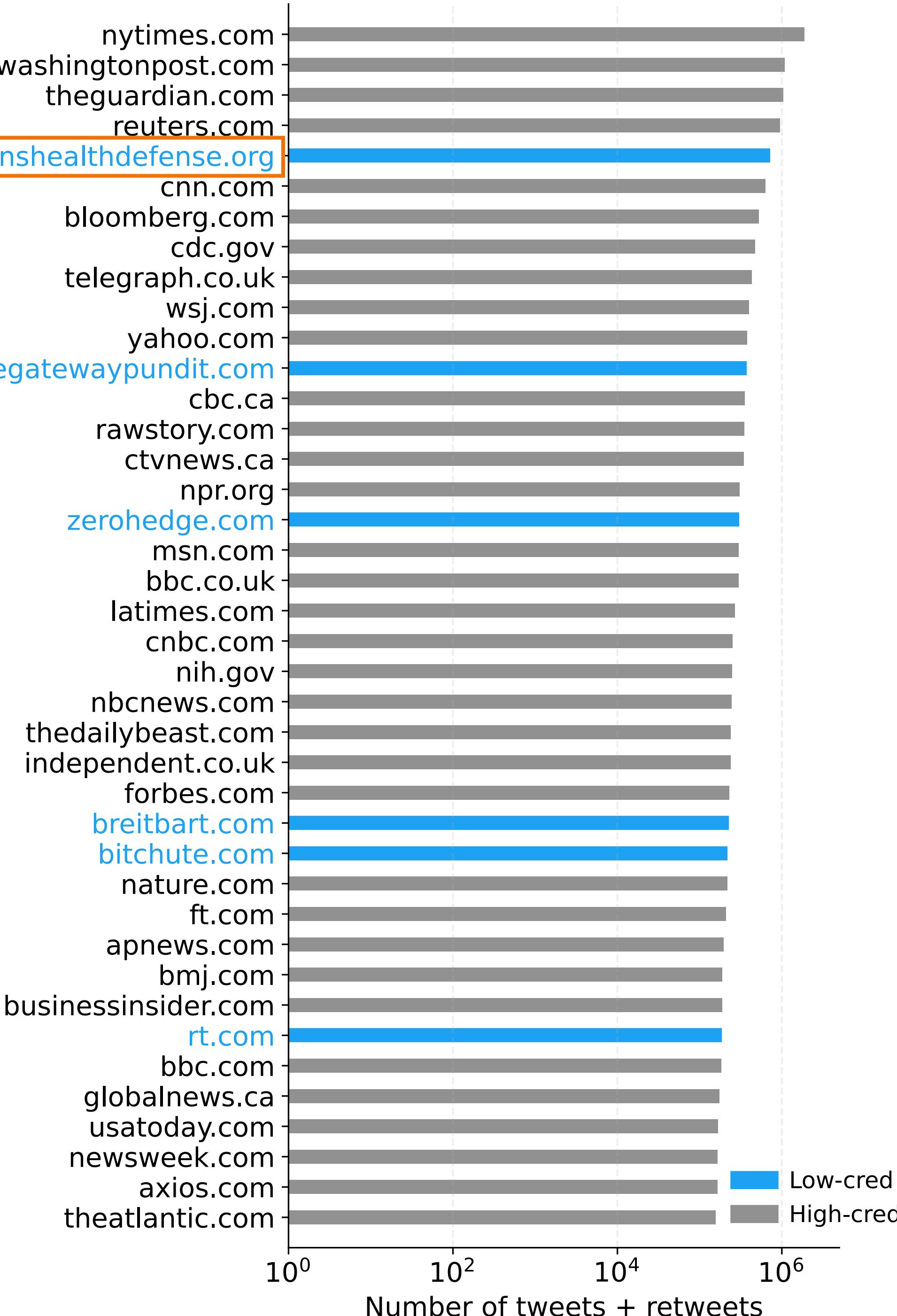
Extreme Left Left-Center Least Biased Right-Center Right Extreme

QUESTIONABLE SOURCE

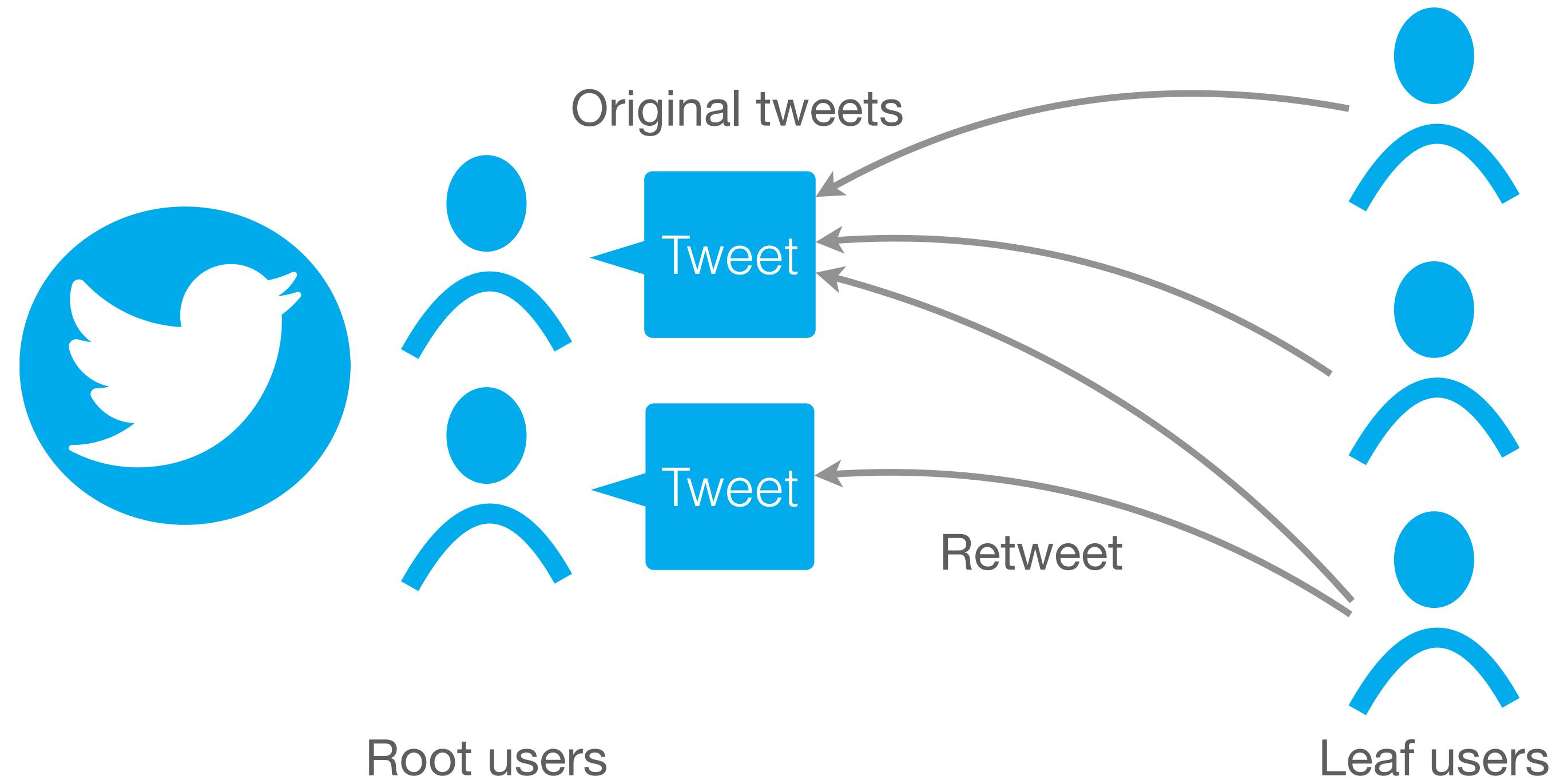
The screenshot shows the header of the website with "HOME" and "THE GATEWAY PUNDIT" buttons. Below the header, the title "The Gateway Pundit" is displayed. A "Share" button is present with icons for various social media platforms. Below the share button is a horizontal color scale with labels: "Extreme" (blue arrow), "Left" (light blue), "Left-Center" (white), "Least Biased" (light green), "Right-Center" (yellow), "Right" (orange), and "Extreme" (red arrow). To the right of this scale is a vertical color scale for "Factual Reporting" with labels: "Very High" (light blue), "High" (medium blue), "Mostly Factual" (white), "Mixed" (light orange), "LOW" (orange), and "Very Low" (red). At the bottom of the screenshot, the text "QUESTIONABLE SOURCE" is underlined.

<https://mediabiasfactcheck.com/the-gateway-pundit/>

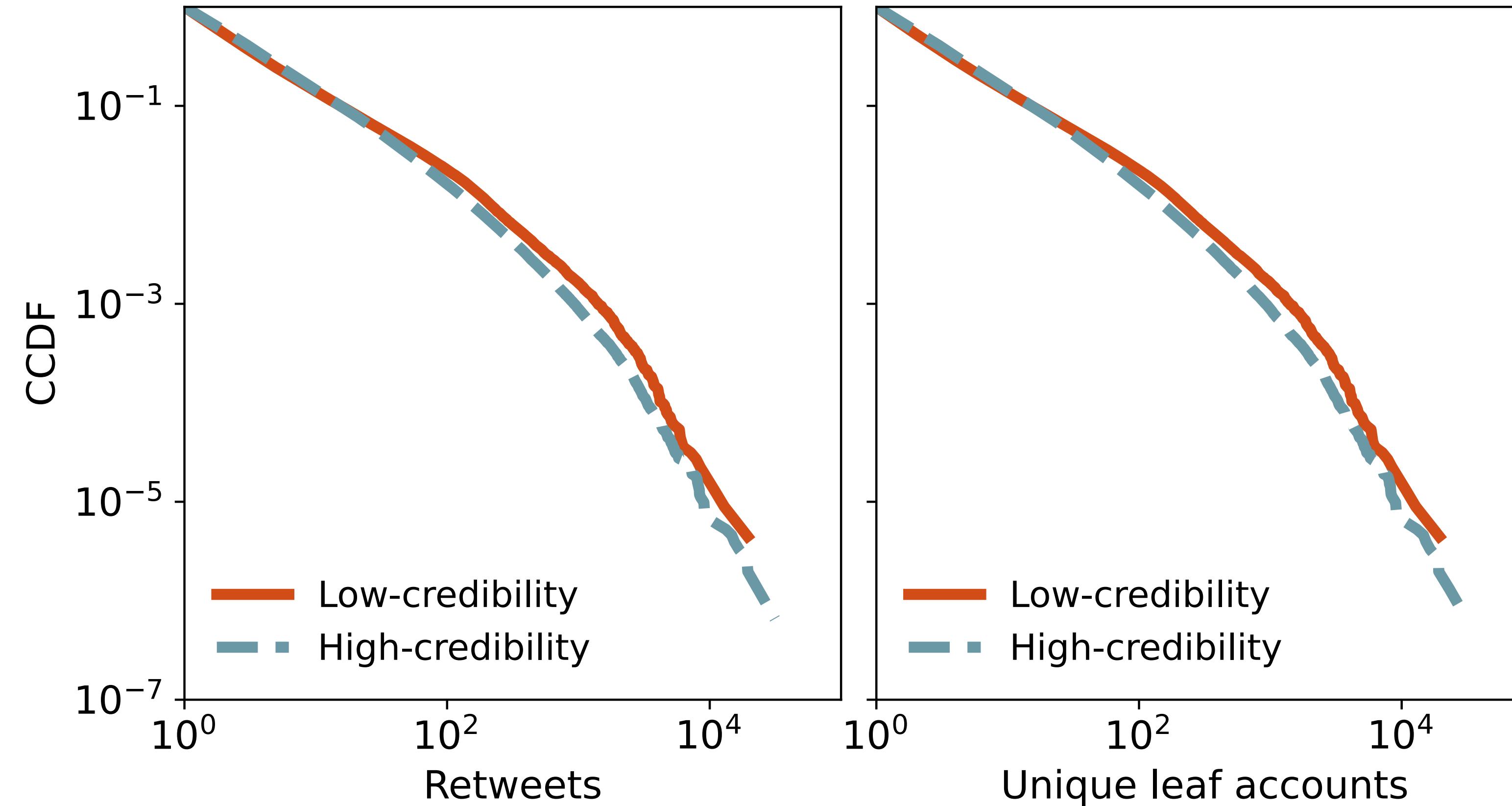
# Prevalence of individual sources: low vs. high



# Information cascade

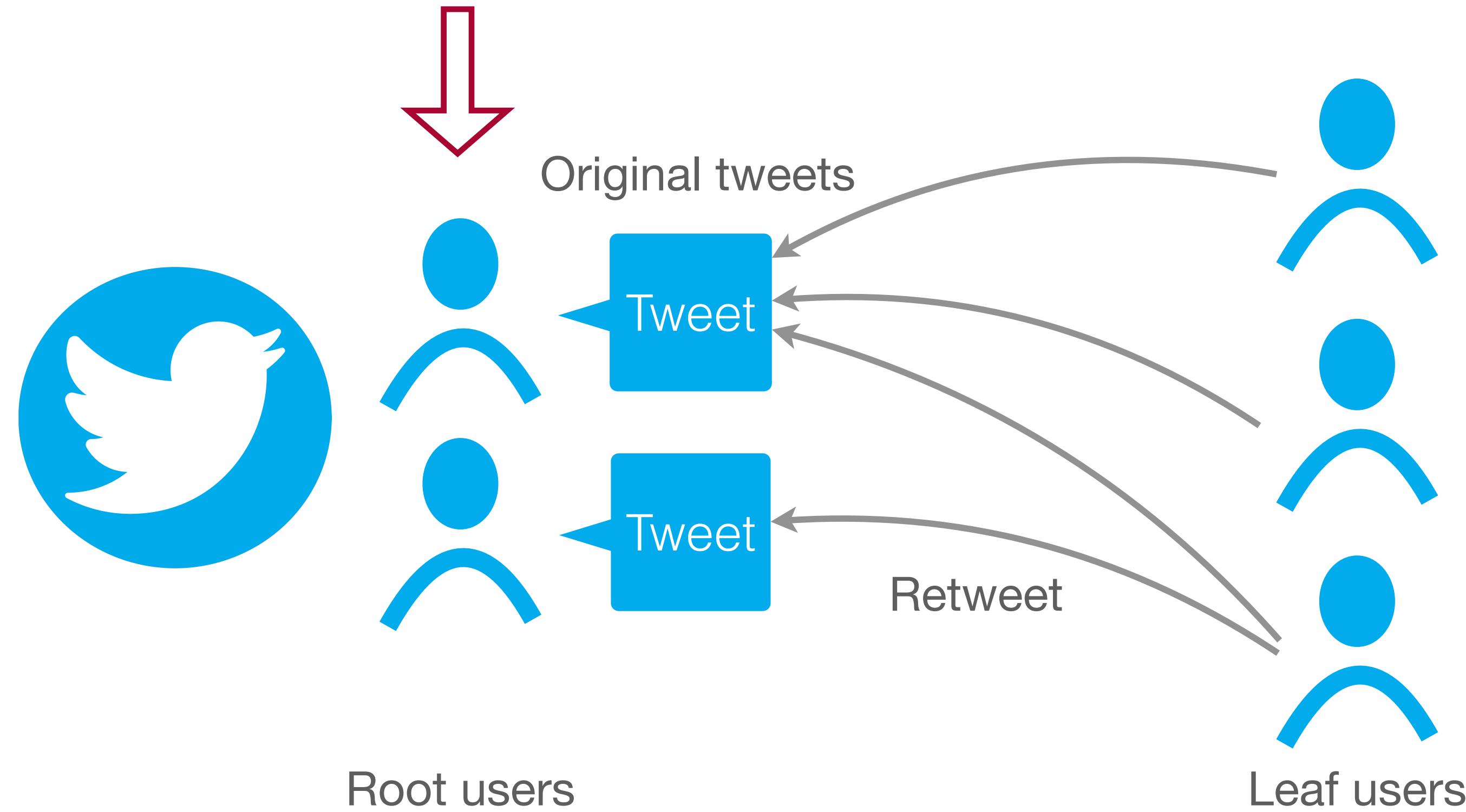


# Cascade size



p<0.001 (Kolmogorov-Smirnov)

# Misinformation spreaders



# Infodemic “superspreaders”



A screenshot of Jim Hoff's Twitter profile (@gatewaypundit). It shows a profile picture of Jim Hoff, a bio stating he is the TGP Founder, and a link to the gatewaypundit.com website. The profile has 1,468 following and 394.9K followers. A call-to-action button labeled "Follow" is present. The entire profile area is highlighted with a large orange circle.



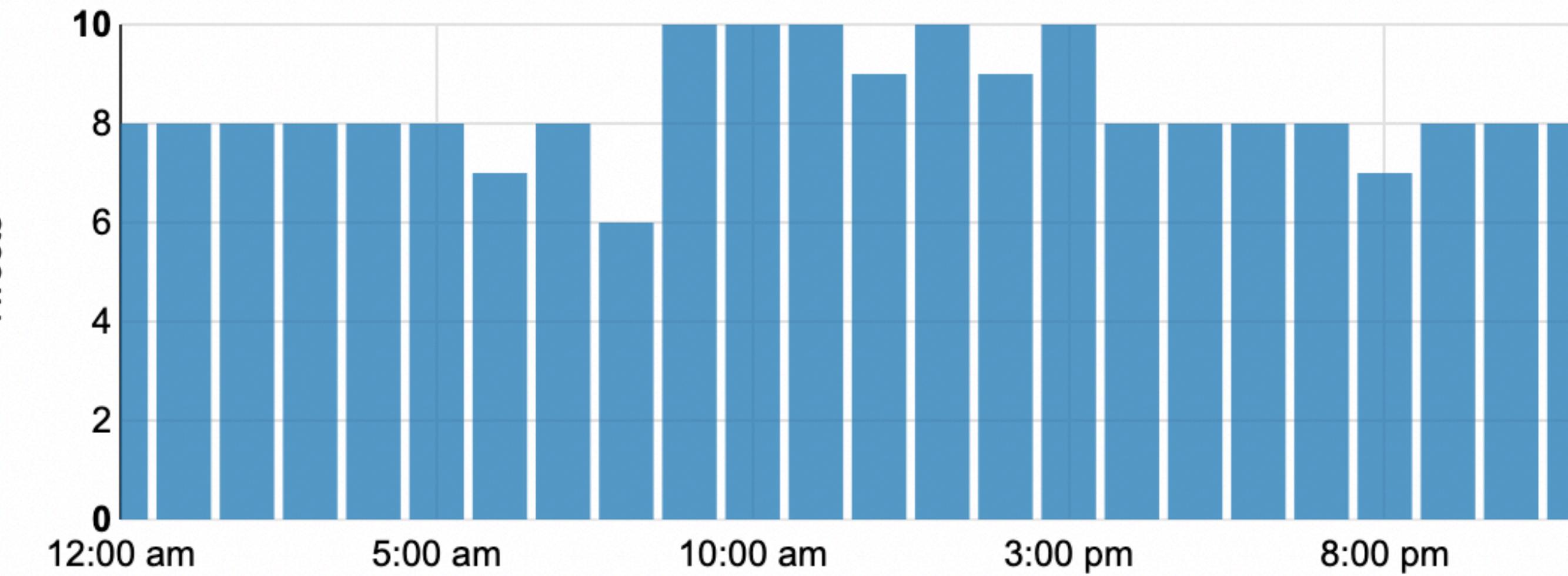
Twitter: 20% retweets  
Facebook: 68% reshares

This account was suspended

# Social bots on Twitter



## Tweets by hour of day



# Bot detection

<https://botometer.osome.iu.edu/>

The screenshot shows the Botometer website interface. At the top, there is a navigation bar with links for FAQ, API, Publications, Bot Repo, BotAmp, BEV, Lite, and a dropdown for @OSoMe\_IU. Below the navigation bar, the title "Botometer®" is displayed, followed by the subtitle "An OSoMe project (bot•o•meter)". To the right of the title are two cartoon bird icons, one blue and one yellow, standing next to each other.

A central text box contains information about the service: "Botometer (formerly BotOrNot) checks the activity of a Twitter account and gives it a score. Higher scores mean more bot-like activity." It also mentions requirements for Twitter authentication and permissions, and provides links for the FAQ and Why? sections. It concludes by stating that Botometer is a joint project of the Observatory on Social Media (OSoMe) and the Network Science Institute (IUNI) at Indiana University.

Below the text box, there are four buttons: "trutherbotprop", "Check user", "Check followers", and "Check friends".

The main content area displays three Twitter accounts with their bot scores:

- @trutherbotprop**: Score 4.2 / 5. The background is orange.
- @elonmusk** (verified): Score 0.9 / 5. The background is green.
- @yang3kc**: Score 0.4 / 5. The background is teal.

Each account entry includes a small profile picture, the Twitter handle, and a "Check" button. To the right of each score is a semi-circular gauge with a black needle pointing to the score value. An "x" icon is located at the end of each gauge.

At the bottom right of the main content area, there is a button labeled "Export data".

# Elon Musk cited **this tool** in his bot dispute with Twitter. Its creator has thoughts

## Botometer Me



By [Clare Duffy](#), CNN Business

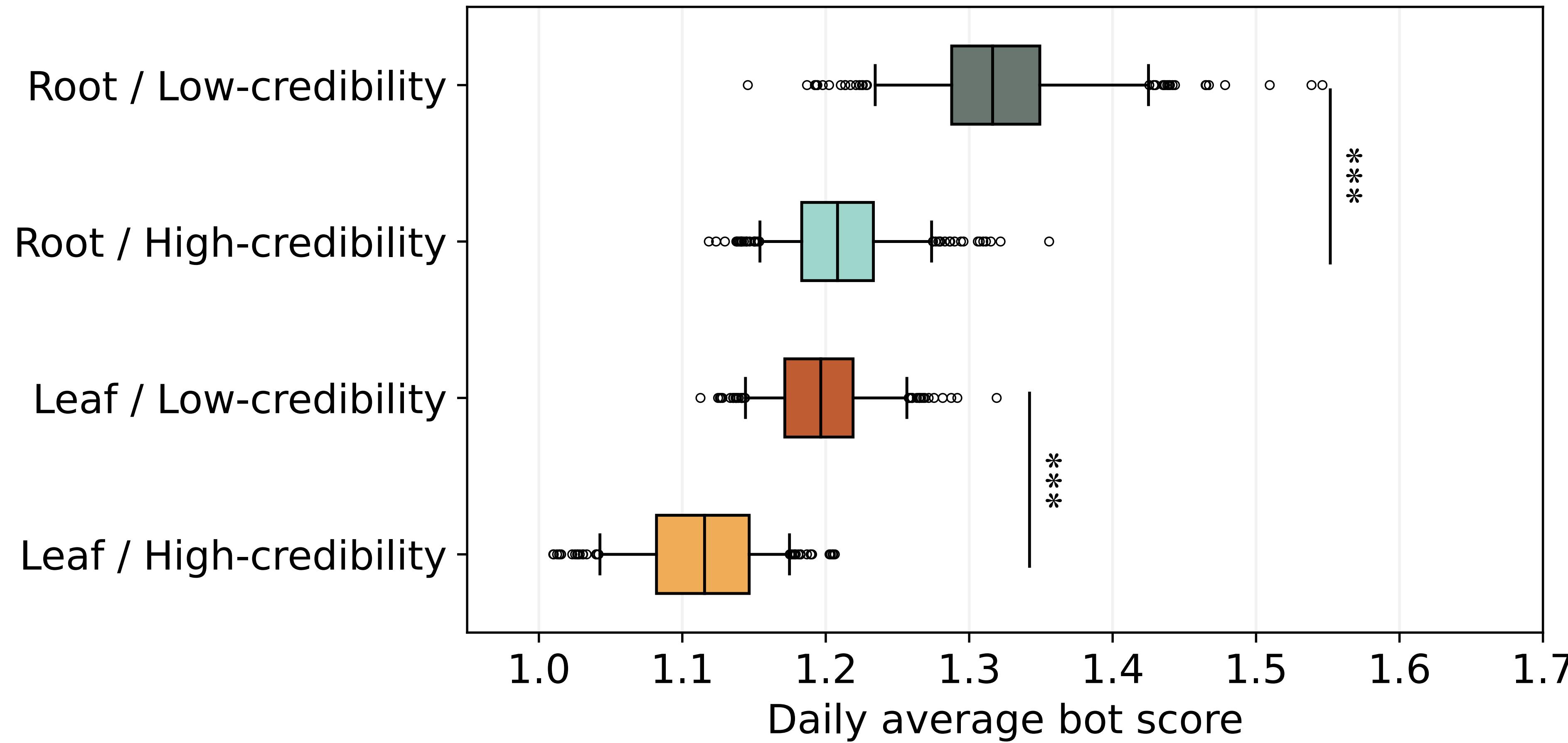
Updated 4:59 PM ET, Tue August 9, 2022



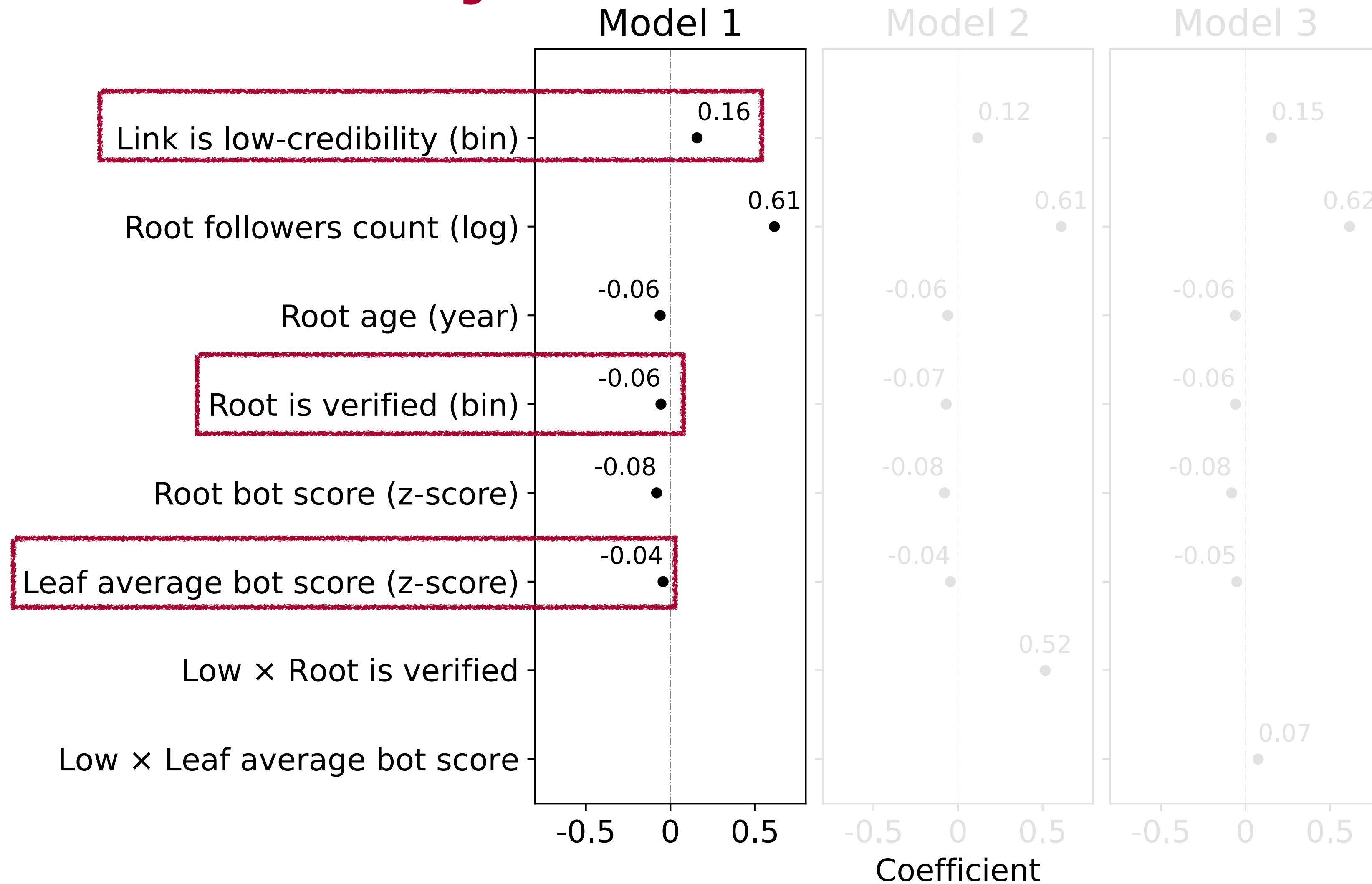
MARCO BERTORELLO/GETTY IMAGES/FILE

**New York (CNN Business)**— Kaicheng Yang, a researcher at Indiana University's Observatory on Social Media, received quite the surprise last week. [Botometer](#), a tool he helped build to examine automated activity on Twitter, had been mentioned in court documents in the legal battle between Twitter and Elon Musk over their \$44 billion acquisition deal.

# Bots amplify misinformation on Twitter

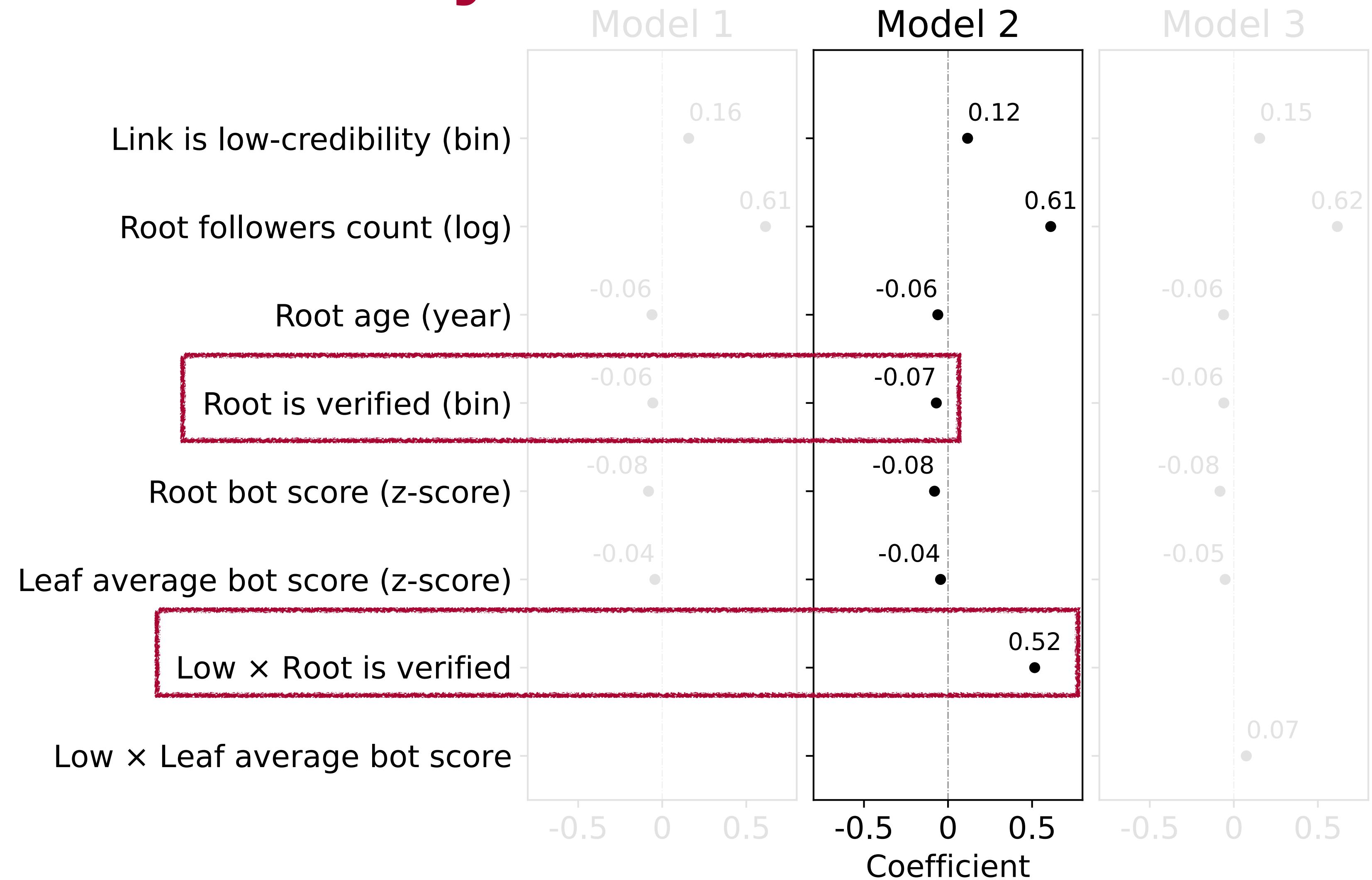


# Regression analyses



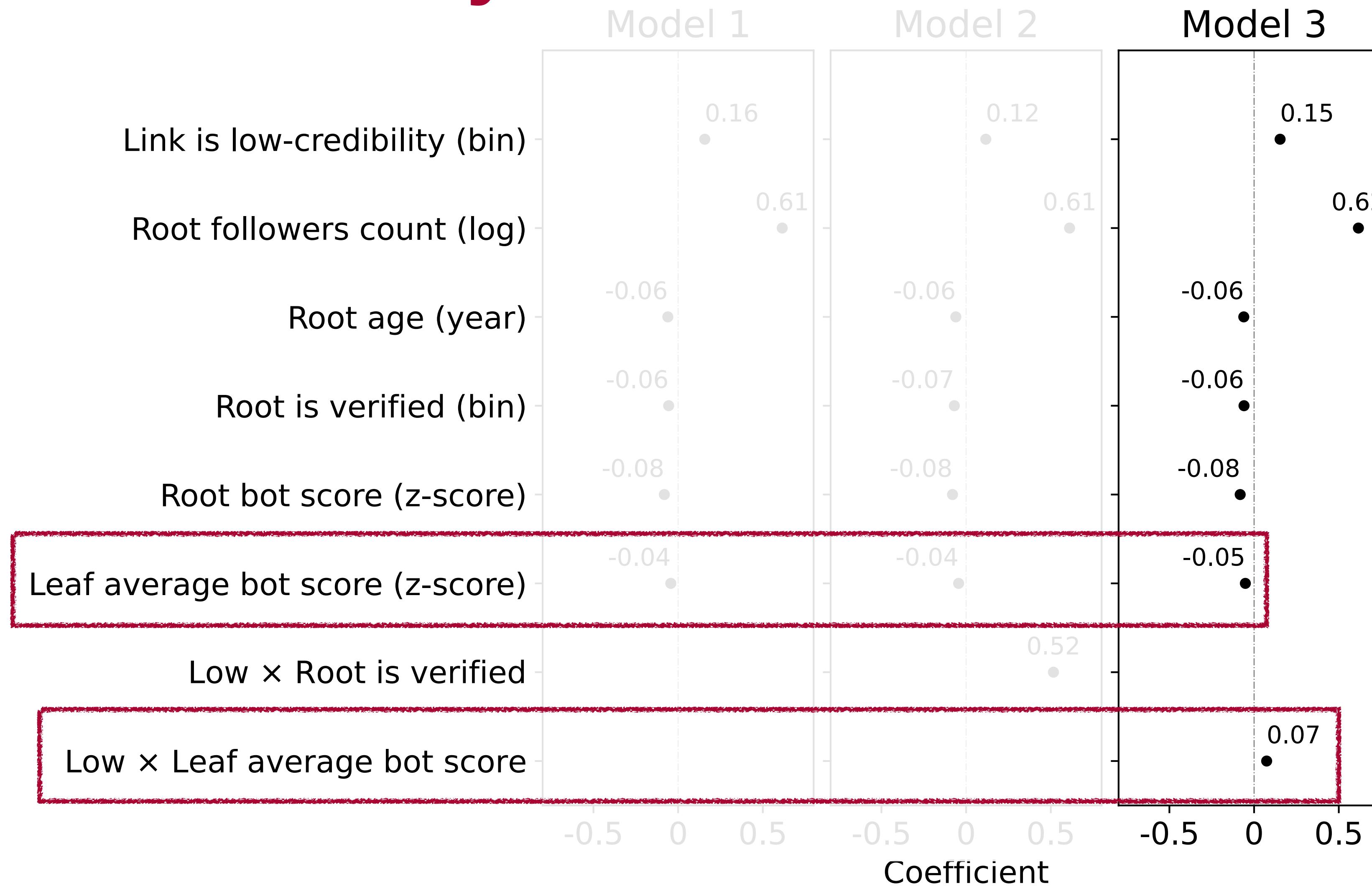
N=1,751,897 cascades; Depended variable = number of retweets (log)

# Regression analyses



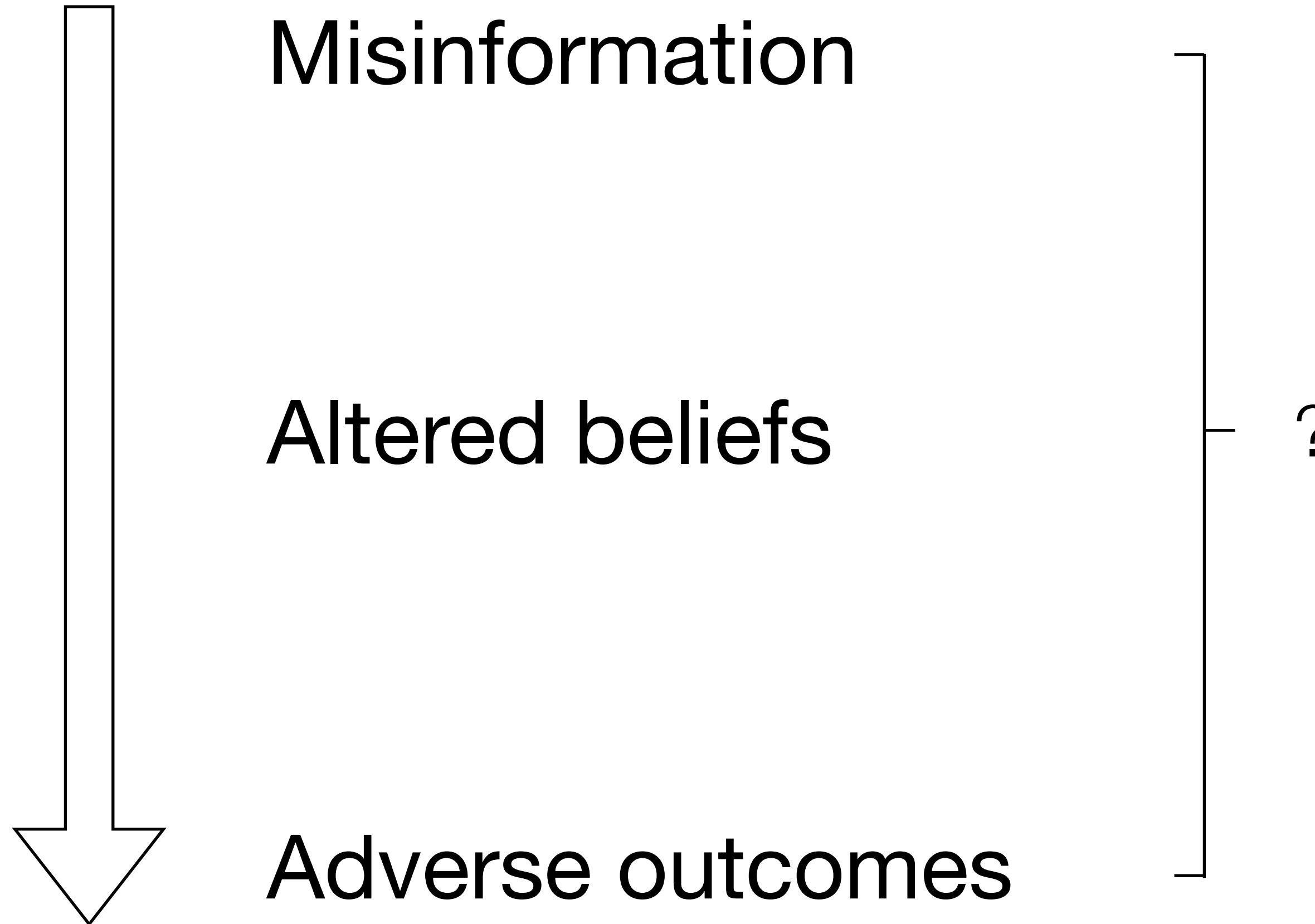
N=1,751,897 cascades; Depended variable = number of retweets (log)

# Regression analyses

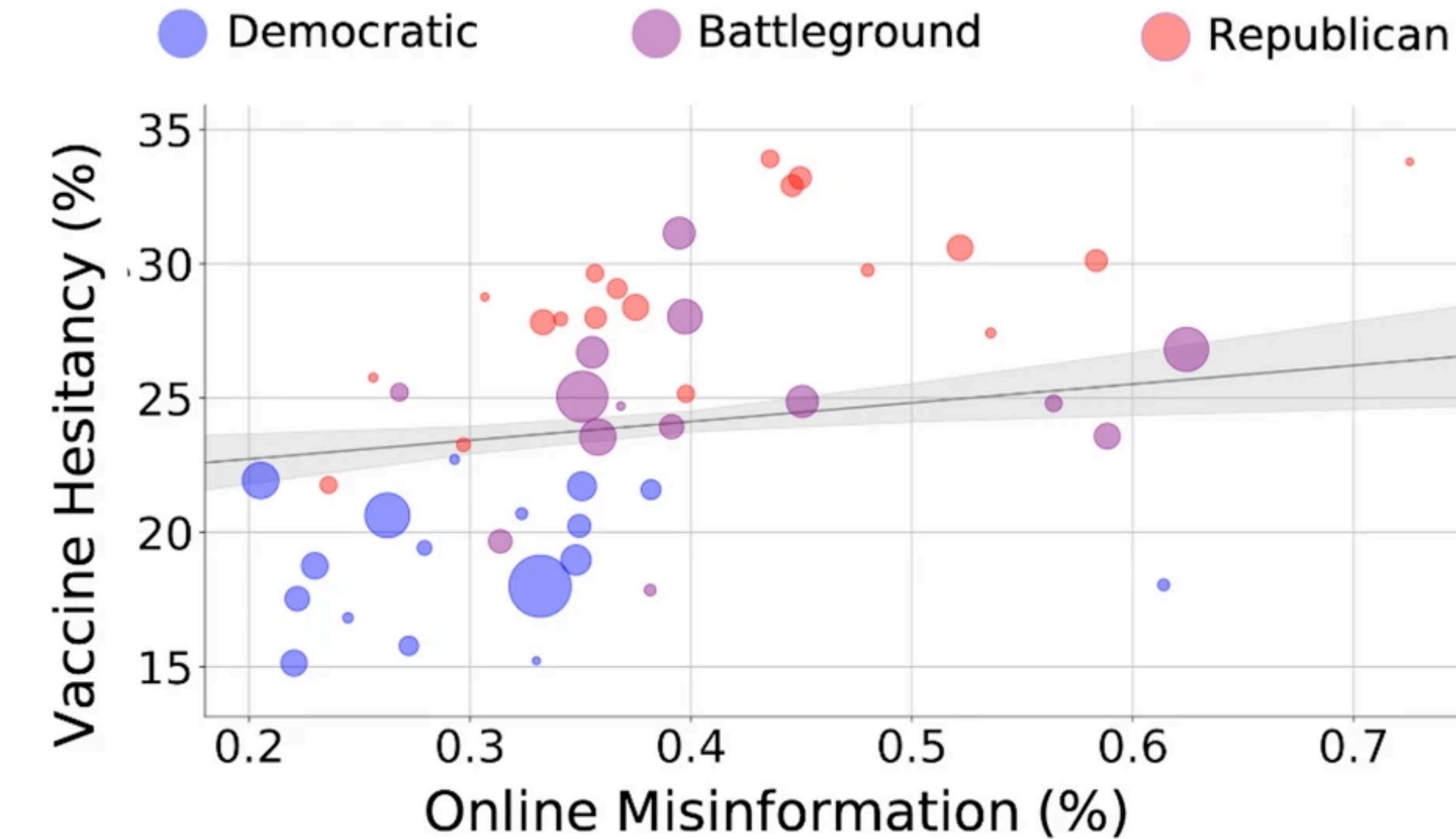
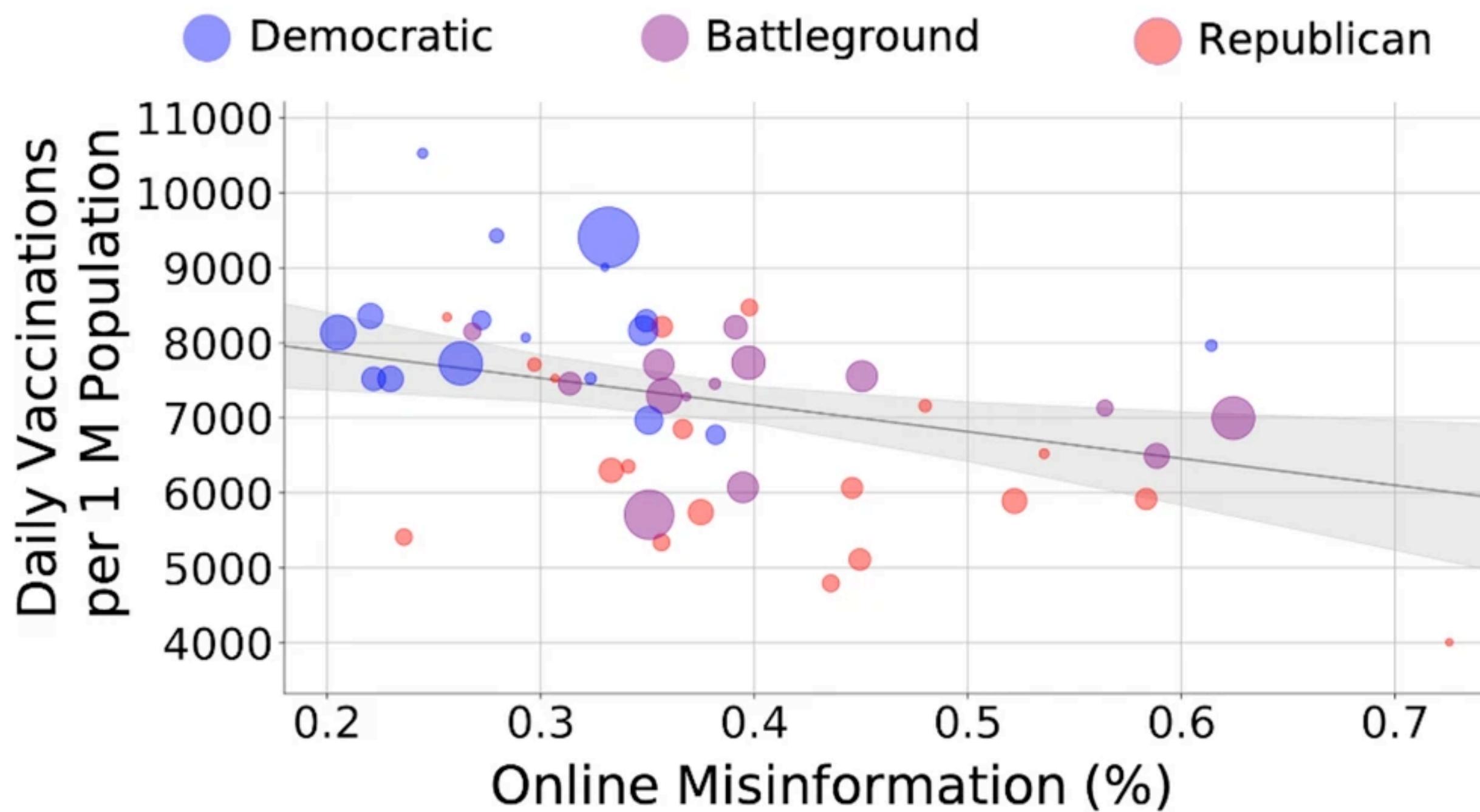


N=1,751,897 cascades; Depended variable = number of retweets (log)

# Real-world impact of misinformation



# Online vaccine misinformation is linked to COVID-19 vaccination refusal and hesitancy



# Takeaways

- COVID-19 infodemic content prevalence is smaller than that of high-credibility news
- Tended to reach larger audiences
- Disseminated by verified accounts and amplified by malicious social bots
- Associated with real-world outcomes

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Website: [www.kaichengyang.me](http://www.kaichengyang.me)

Twitter: [@yang3kc](https://twitter.com/yang3kc)