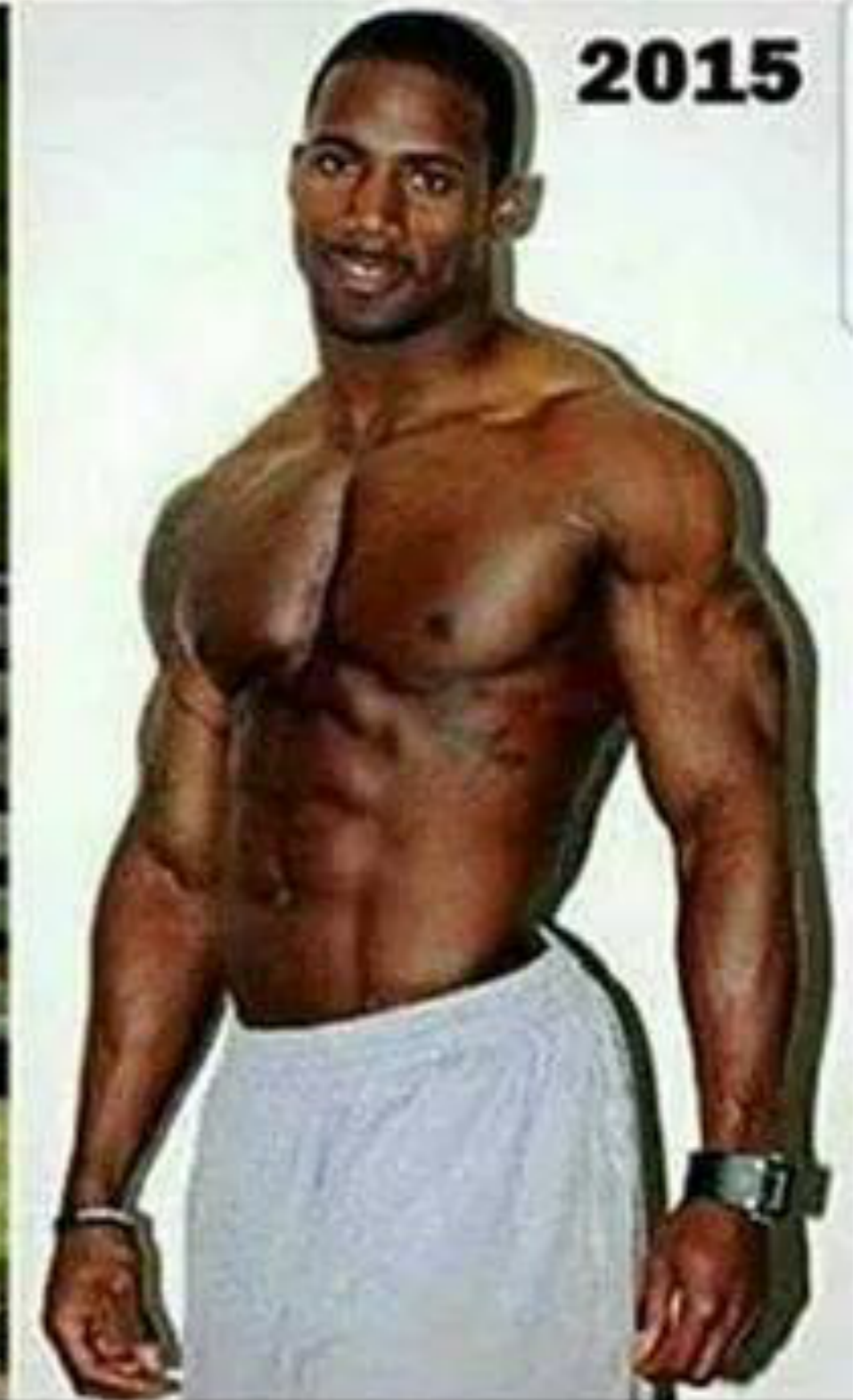


Never give up 🍌 100



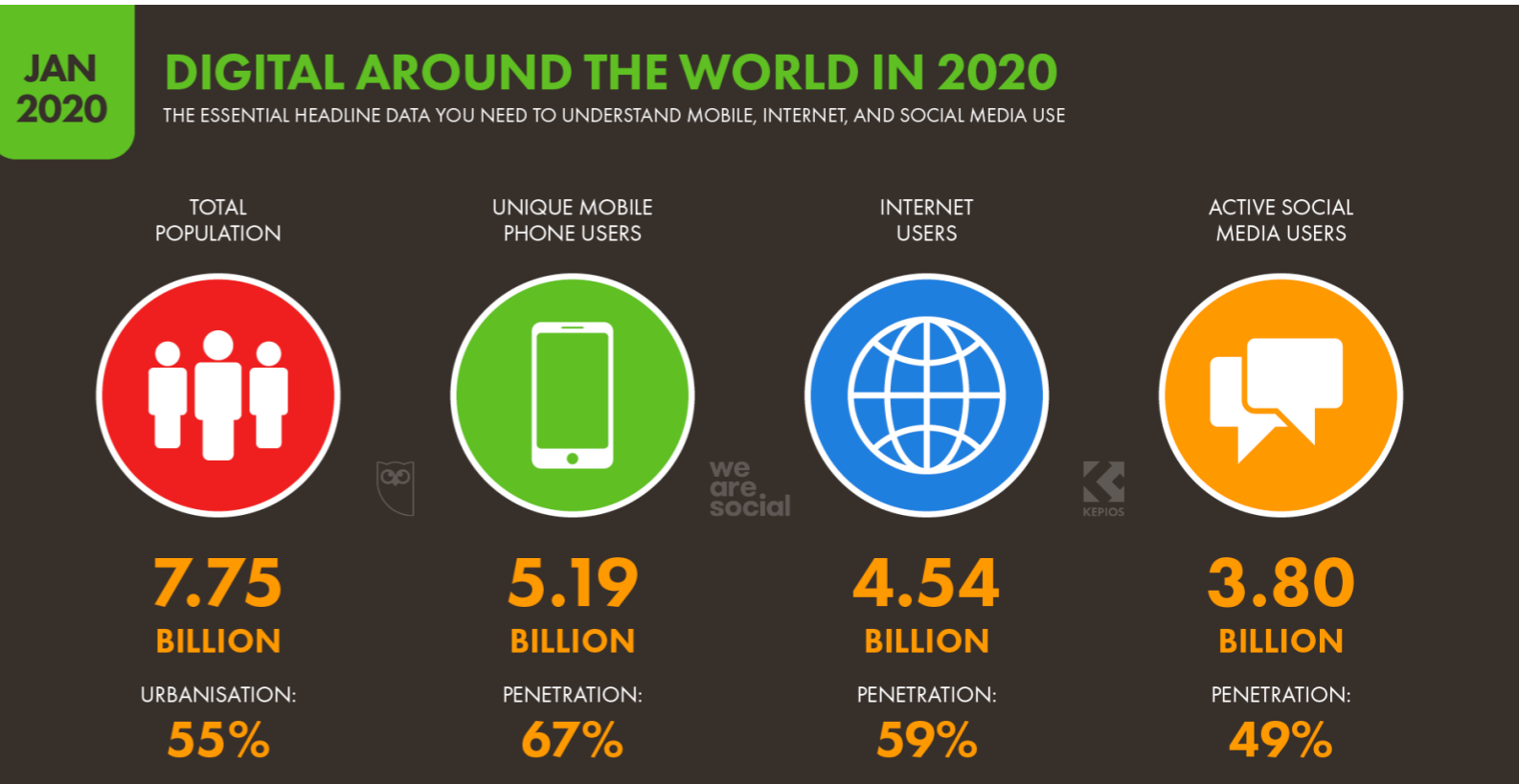
Oxford Dictionaries' word of the year is

Post-truth

relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief



2020 *This Is What Happens In An Internet Minute*



THE ROLE OF THE MEDIA

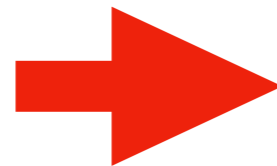
“The press may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about”

(Bernard Cohen, 1963)



Agenda Setting is the process of the mass media presenting certain issues **frequently** and **prominently** with the result that large segments of the public perceive those issues as more important than others.

MORE COVERAGE



MORE IMPORTANT

A SHIFT OF PARADIGM



OLD MEDIA

- Follow the “Ritual of Objectivity”
- Publication patterns are driven by most followed sources (imitation) (Marlow 2005)

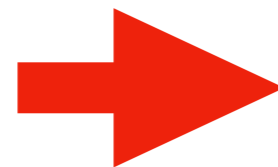
MEDIATED



NEW MEDIA

- Information production is the work of interconnected actors spanning over organizations, professional identity and geographical location

DISINTERMEDIATED



facebook



“We're not thinking about ourselves as a community — we're not trying to build a community — we're not trying to make new connections. [...]

*What we're trying to do is just make it really efficient for people to communicate, **get information and share information.***

We always try to emphasize the utility component.”

Mark Zuckerberg Jul. 2007



Wired Italia ✓
22 aprile 2015 · 🌐

Le dinamiche sono sempre le stesse.



Bufale, i complottisti sono tutti uguali - Wired

Uno studio italiano svela il comportamento degli utenti che seguono pagine che diffondono bufale su Facebook: seguono tutti le stesse dinamiche

WIRED.IT | DI SANDRO JANNACCONE

👍 Mi piace 💬 Commenta ➦ Condividi



Walter Quattrocchi e un take!!!!

Mi piace · Rispondi · 👍 1 · 22 aprile 2015 alle ore 12:18



la Risalta benissimo come l'utente che si crede informato e illuminato sia la persona meno aperta mentalmente, chiusa com'è nel suo loop di auto(dis)informazione. Patetici.

Mi piace · Rispondi · 👍 25 · 22 aprile 2015 alle ore 12:11

^ Nascondi 83 risposte



Walter Quattrocchi perche meglio invece chi si informa sulle fonti ufficiali come cicap o quark? svegliatevi.

Mi piace · Rispondi · 22 aprile 2015 alle ore 12:19



la Eccallá. Hai letto l'articolo? Mi pare evidente che leggere notizie su pagine che si autocitano e si autorimandano non sia una buonissima cosa. Serve una visione d'insieme, il WEBBE non ha la risposta definitiva. E tranquillo che sono sveglio ed attento A TUTTO, anche alle bufalate deliranti.

Mi piace · Rispondi · 👍 8 · 22 aprile 2015 alle ore 12:22



Eccolo è arrivato puntuale il fenomeno che dice sveglia al resto del mondo .Le scie chimiche fanno brutti effetti 😊

Mi piace · Rispondi · 👍 1 · 22 aprile 2015 alle ore 12:25



Walter Quattrocchi E la risposta di insieme te la da piero angela (o il figlio)? Non lo sai che da sempre la storia la scrivono i vincitori e i potenti?

Mi piace · Rispondi · 22 aprile 2015 alle ore 12:30



Se la "storia" è scritta dai vincitori, lo è anche la "storia" narrata su internet.

Mi piace · Rispondi · 👍 1 · 22 aprile 2015 alle ore 12:33 · Modificato



la Quello che mi fa piu ridere della gente come te è che rinnegate il confronto, siete un disco rotto, provo più piacere a conversare con un muro

Mi piace · Rispondi · 👍 5 · 22 aprile 2015 alle ore 12:32

CONFIRMATION BIAS AND INFORMATION CONSUMPTION



The cognitive attitude to search for, interpret, favor, and recall information in a way that confirms one's beliefs

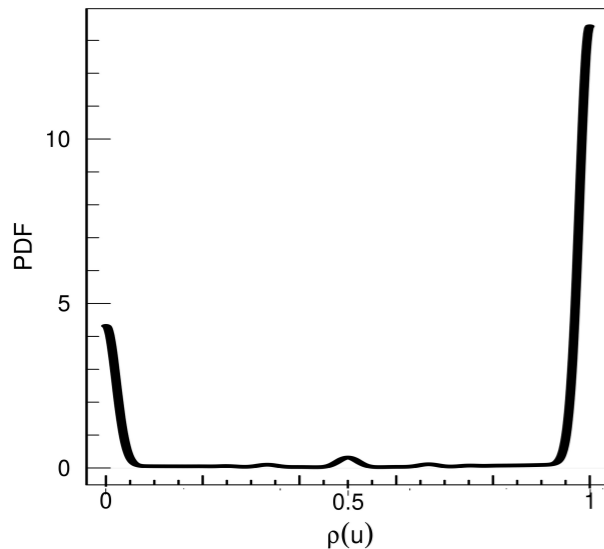
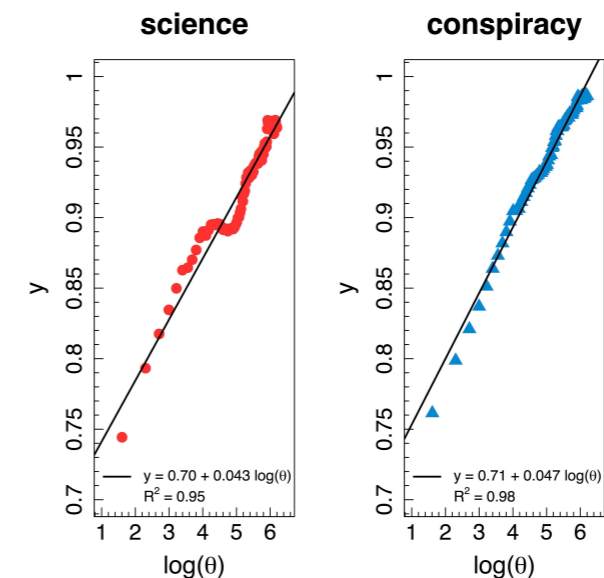
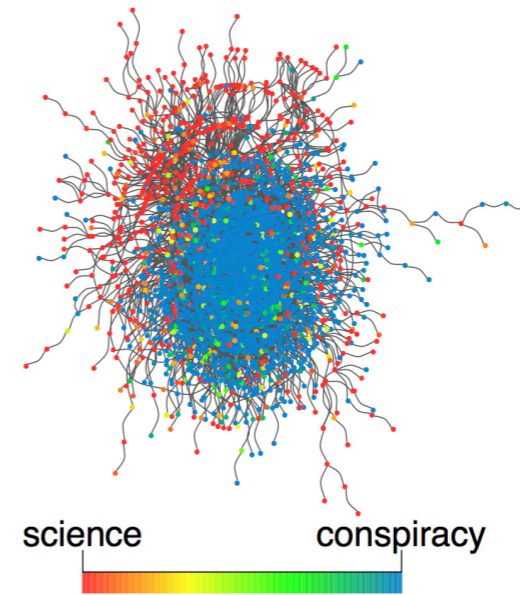
THE DATASET(s)

Facebook ITALY and **USA** from Jan 2010 to Dec 2014

FB ITALY	TOTAL	SCIENCE	CONSPIRACY	TROLL
Pages	73	34	39	2
Posts	271,296	62,705	208,591	4,709
Likes	9,164,781	2,505,399	6,659,382	40,341
Comments	1,017,509	180,918	836,591	58,686
Likers	1,196,404	332,357	864,047	15,209
Commentsers	279,972	53,438	226,534	43,102

FB USA	TOTAL	SCIENCE	CONSPIRACY	DEBUNKING
Pages	478	83	330	66
Posts	679,948	262,815	369,420	47,780
Likes	603,332,826	453,966,494	145,388,117	3,986,922
Comments	30,828,705	22,093,692	8,304,644	429,204
Likers	52,172,855	39,854,663	19,386,131	702,122
Commentsers	9,790,906	7,223,473	3,166,726	118,996

CONTENT CONSUMPTIONS AND FRIENDS



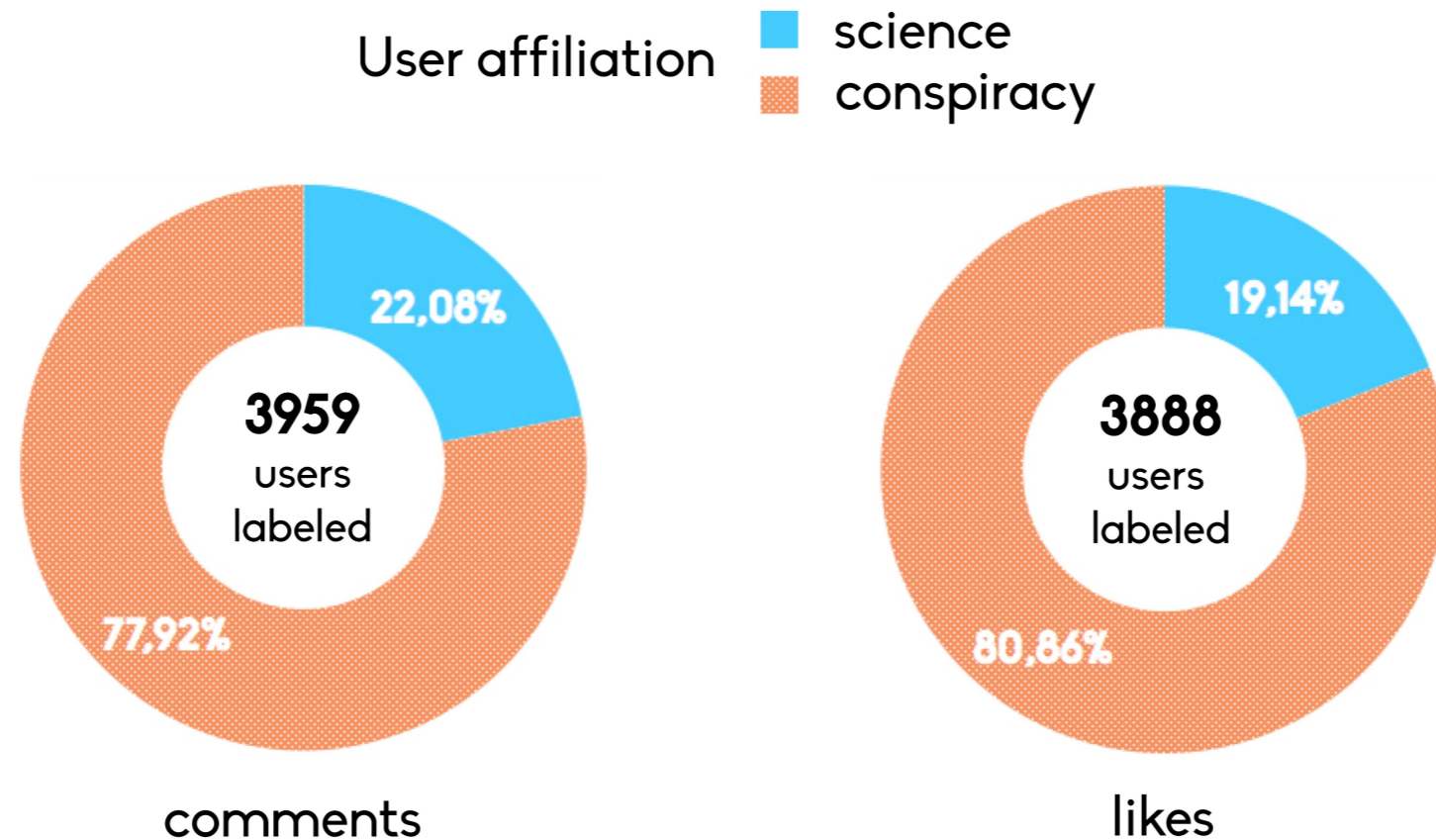
Polarization on contents. Probability density function (PDF) of users' polarization. Notice the strong bimodality of the distribution, with two sharp peaks localized at $0 < \rho < 0.005$ (science users) and at $0.95 < \rho < 1$ (conspiracy users).

Homophily. Fraction of polarized friends with the same polarization respect to the number of likes $\log(\theta(u))$ of user u .

Bessi, A., Petroni, F., Del Vicario, M., Zollo, F., Anagnostopoulos, A., Scala, A., ... & Quattrociocchi, W. (2015, May). Viral misinformation: The role of homophily and polarization. In *Proceedings of the 24th International Conference on World Wide Web* (pp. 355-356). ACM.

webSci@WWW (Bessi et al. 2015)
 Bessi, A., Petroni, F., Del Vicario, M., Zollo, F., Anagnostopoulos, A., Scala, A., ... & Quattrociocchi, W. (2016). Homophily and polarization in the age of misinformation. *The European Physical Journal Special Topics*, 225(10), 2047-2059.

RESPONSE TO 4,709 INTENTIONAL FALSE CLAIMS (TROLLS)



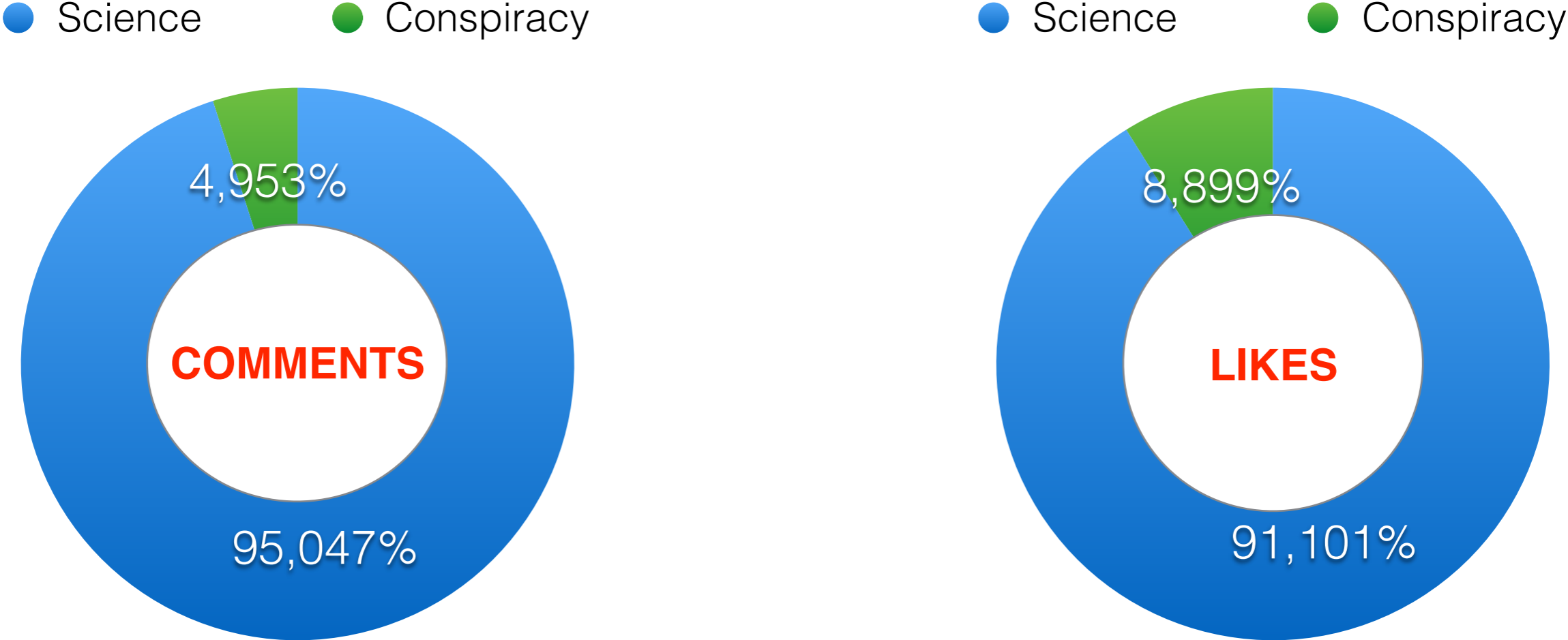
Polarized users on false information.

Percentage of likes and comments on intentional false information posted by a satirical page from polarized users of the two categories.

Mocanu, D., Rossi, L., Zhang, Q., Karsai, M., & Quattrociocchi, W. (2015). Collective attention in the age of (mis) information. *Computers in Human Behavior*, 51, 1198-1204.

Bessi, A., Coletto, M., Davidescu, G. A., Scala, A., Caldarelli, G., & Quattrociocchi, W. (2015). Science vs conspiracy: Collective narratives in the age of misinformation. *PloS one*, 10(2), e0118093.

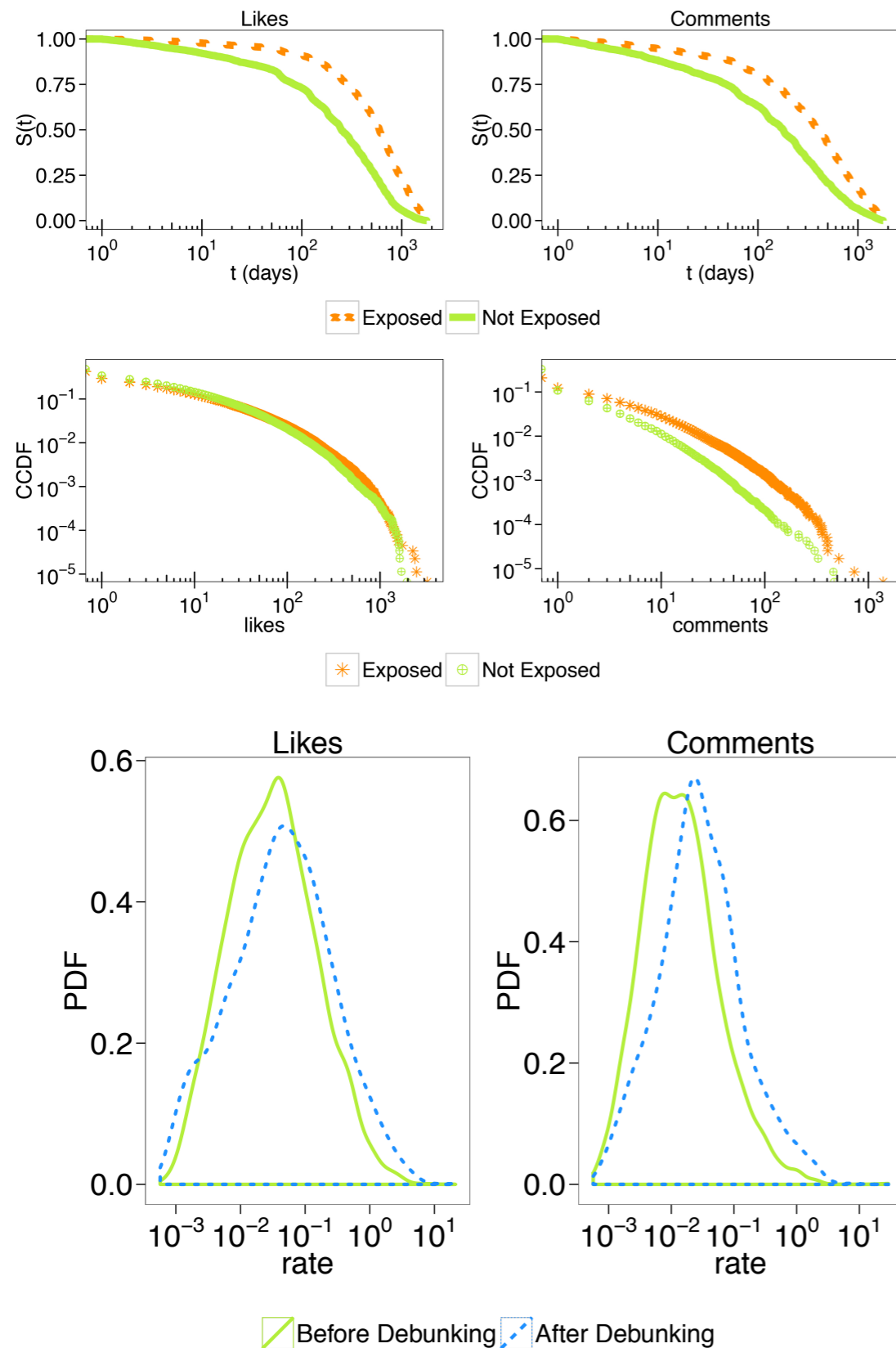
RESPONSE TO 47,780 DEBUNKING POSTS (1)



Debunking information are ignored by users in the conspiracy echo-chamber
(out of 9,790,906 polarized conspiracy users only 5, 831 interact)

Zollo, F., Bessi, A., Del Vicario, M., Scala, A., Caldarelli, G., Shekhtman, L., ... & Quattrociocchi, W. (2017). Debunking in a world of tribes. *PloS one*, 12(7), e0181821.

RESPONSE TO 47,780 DEBUNKING POSTS (1)



Exposure to debunking: survival functions and attention patterns. Top panel: Kaplan-Meier estimates of survival functions of users exposed and not exposed to debunking. Users lifetime is computed both on their likes (left) and comments (right).

Bottom panel: Complementary cumulative distribution functions (CCDFs) of the number of likes (left) and comments (right), per each user exposed and not exposed to debunking.

Exposure to debunking: comments and likes rate. Rate –i.e., average number of likes (left) (resp., comments (right)) on conspiracy posts over time of users exposed to debunking posts.

VIRAL PROCESSES AND THE SIZE OF ECHO-CHAMBERS



The spreading of misinformation online

Michela Del Vicario^a, Alessandro Bessi^b, Fabiana Zollo^a, Fabio Petroni^c, Antonio Scala^{a,d}, Guido Caldarelli^{a,d}, H. Eugene Stanley^e, and Walter Quattrociocchi^{a,1}

^aLaboratory of Computational Social Science, Networks Department, IMT Alti Studi Lucca, 55100 Lucca, Italy; ^bIUSS Institute for Advanced Study, 27100 Pavia, Italy; ^cSapienza University, 00185 Rome, Italy; ^dISC-CNR Uos "Sapienza," 00185 Rome, Italy; and ^eBoston University, Boston, MA 02115

Edited by Matjaz Perc, University of Maribor, Maribor, Slovenia, and accepted by the Editorial Board December 4, 2015 (received for review September 1, 2015)

The wide availability of user-provided content in online social media facilitates the aggregation of people around common interests, worldviews, and narratives. However, the World Wide Web (WWW) also allows for the rapid dissemination of unsubstantiated rumors and conspiracy theories that often elicit rapid, large, but naive social responses such as the recent case of Jade Helm 15—where a simple military exercise turned out to be perceived as the beginning of a new civil war in the United States. In this work, we address the determinants governing misinformation spreading through a thorough quantitative analysis. In particular, we focus on how Facebook users consume information related to two distinct narratives: scientific and conspiracy news. We find that, although consumers of scientific and conspiracy stories present similar consumption patterns with respect to content, cascade dynamics differ. Selective exposure to content is the primary driver of content diffusion and generates the formation of homogeneous clusters, i.e., “echo chambers.” Indeed, homogeneity appears to be the primary driver for the diffusion of contents and each echo chamber has its own cascade dynamics. Finally, we introduce a data-driven percolation model mimicking rumor spreading and we show that homogeneity and polarization are the main determinants for predicting cascades’ size.

misinformation | virality | Facebook | rumor spreading | cascades

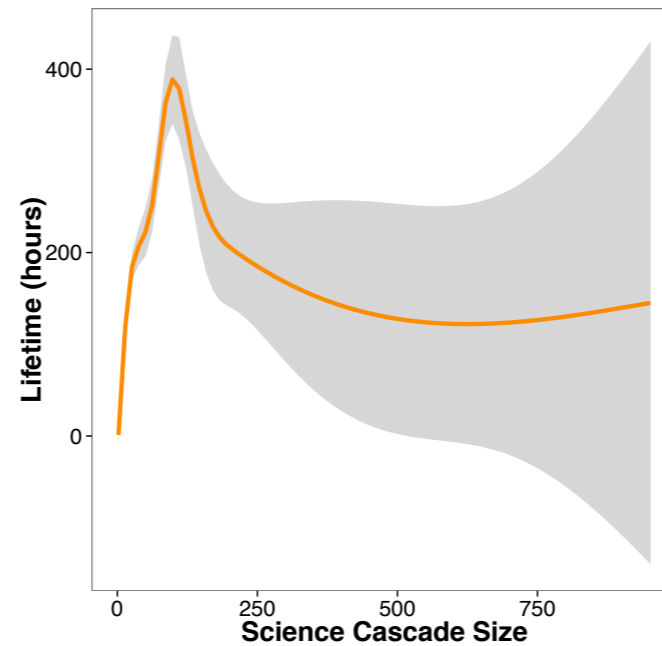
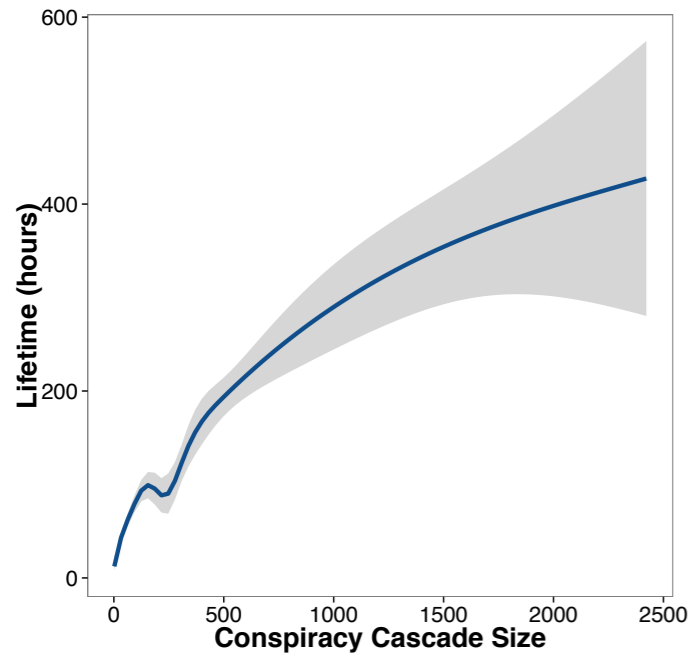
The massive diffusion of sociotechnical systems and micro-blogging platforms on the World Wide Web (WWW) creates

the main difference between the two is content verifiability. The generators of scientific information and their data, methods, and outcomes are readily identifiable and available. The origins of conspiracy theories are often unknown and their content is strongly disengaged from mainstream society and sharply divergent from recommended practices (22), e.g., the belief that vaccines cause autism.

Massive digital misinformation is becoming pervasive in online social media to the extent that it has been listed by the World Economic Forum (WEF) as one of the main threats to our society (23). To counteract this trend, algorithmic-driven solutions have been proposed (24–29), e.g., Google (30) is developing a trustworthiness score to rank the results of queries. Similarly, Facebook has proposed a community-driven approach where users can flag false content to correct the newsfeed algorithm. This issue is controversial, however, because it raises fears that the free circulation of content may be threatened and that the proposed algorithms may not be accurate or effective (10, 11, 31). Often conspiracists will denounce attempts to debunk false information as acts of misinformation.

Whether a claim (either substantiated or not) is accepted by an individual is strongly influenced by social norms and by the claim’s coherence with the individual’s belief system—i.e., confirmation bias (32, 33). Many mechanisms animate the flow of false information that generates false beliefs in an individual, which, once adopted, are rarely corrected (34–37).

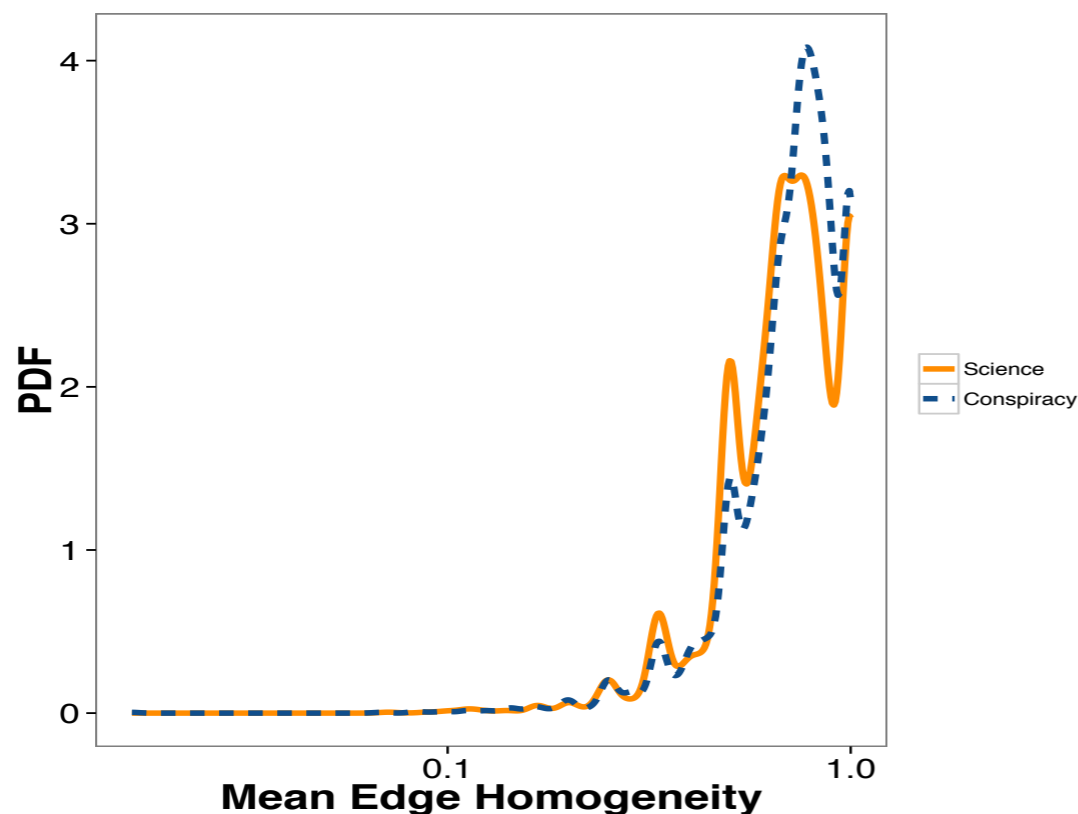
VIRAL PROCESSES AND ECHO CHAMBERS



Lifetime as a function of the cascade size for conspiracy news (left) and science news (right).

Science news quickly reach a higher diffusion, a longer lifetime does not correspond to a higher level of interest.

Conspiracy rumors are assimilated more slowly and show a positive relation between lifetime and size.



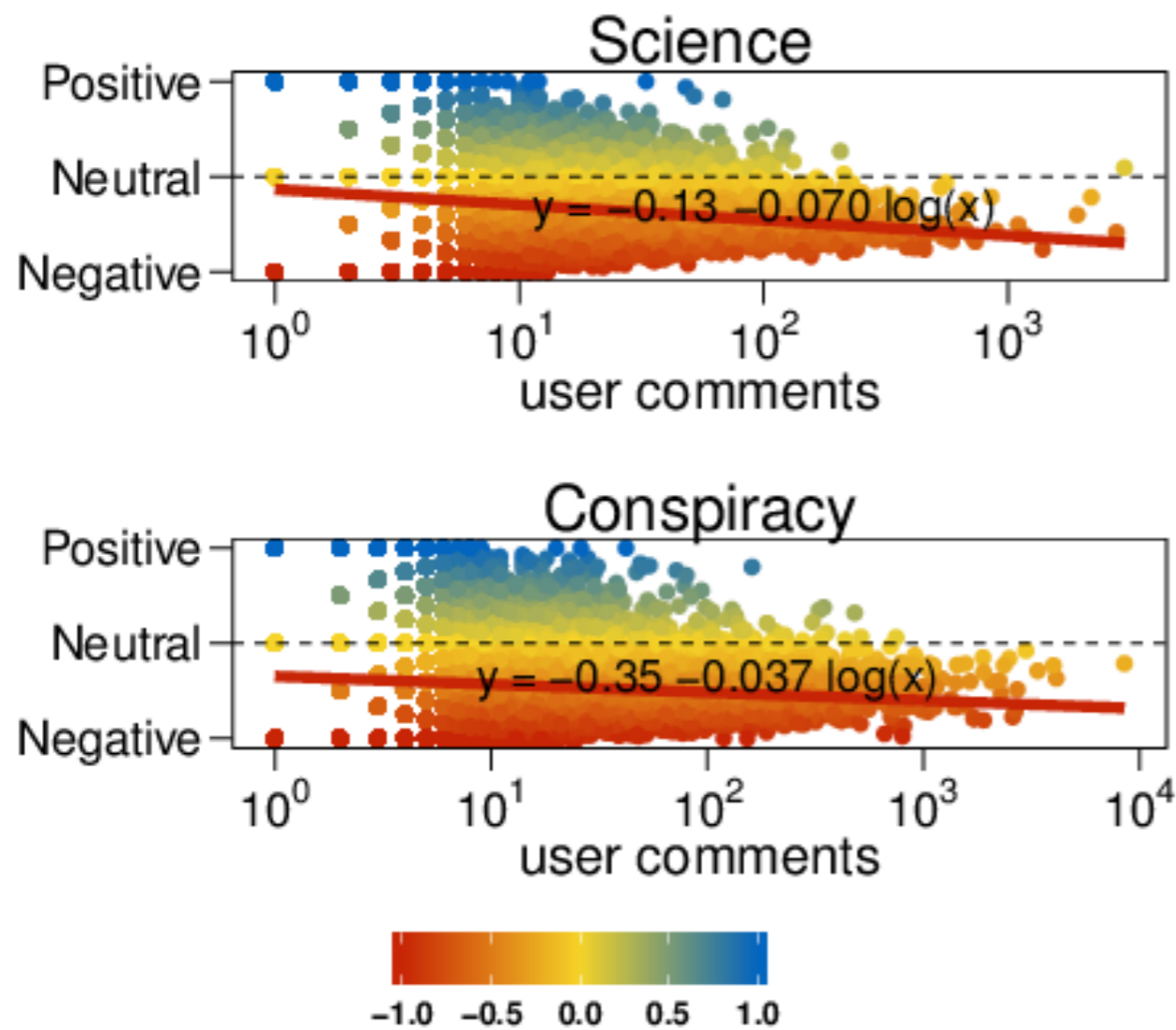
Probability density function (PDF) of edge homogeneity for science (orange) and conspiracy (blue) news.

Homophilic paths are dominant on the whole cascades for both scientific and conspiracy news.

EMOTIONAL DYNAMICS AND ECHO-CHAMBERS

DISCUSSION AND GROUP POLARIZATION

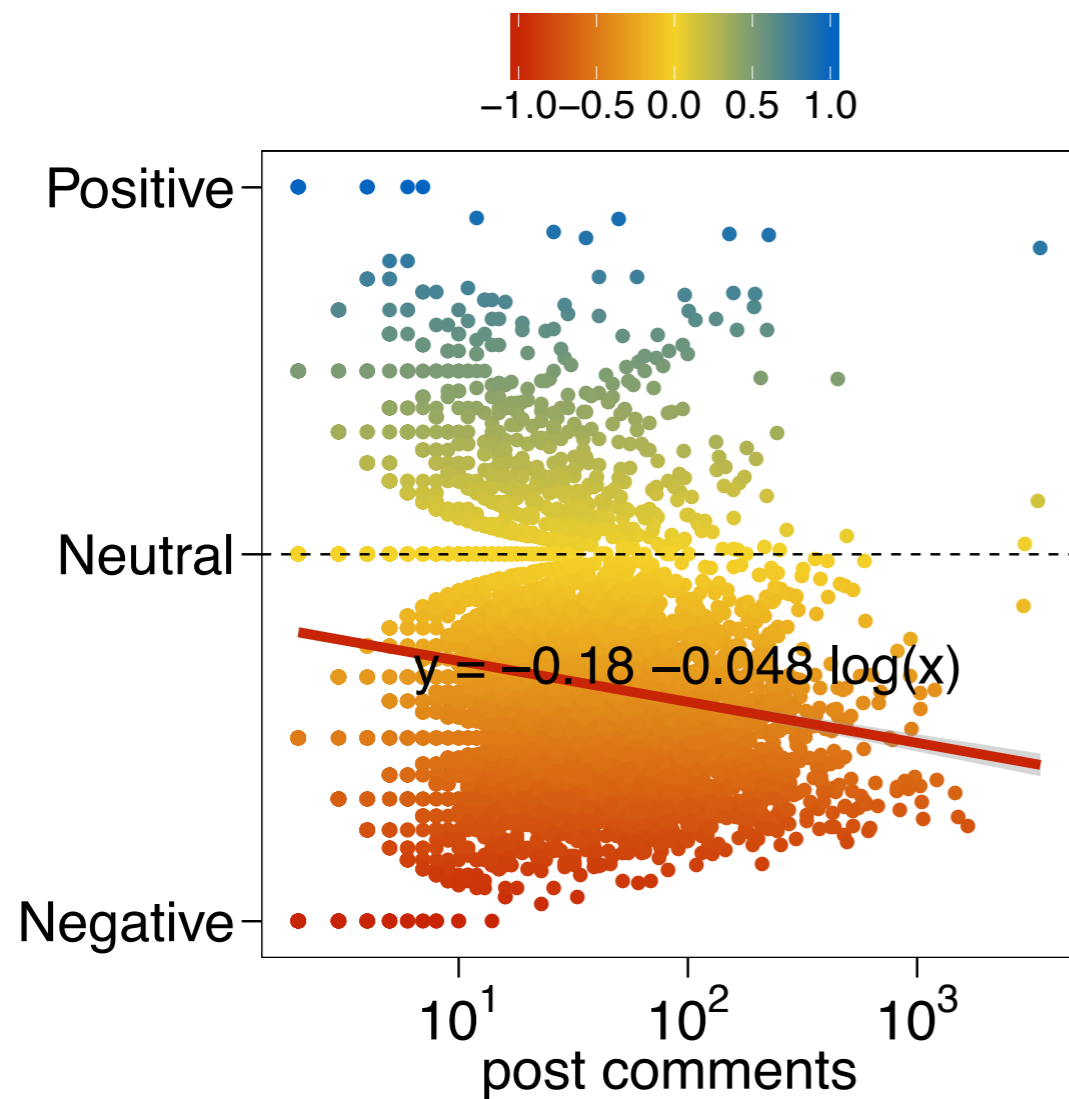
“It is well known that when like-minded groups deliberate, they tend to polarize, in the sense that they generally end up in a more extreme position in line with their predeliberation tendencies” **(Sunstein, 2008)** *Going to extremes: how like minds unite and divide. Oxford University Press*



Sentiment and commenting activity.

Average sentiment of polarized users as a function of their number of comments. Negative (respectively, neutral, positive) sentiment is denoted by red (respectively, yellow, blue) color. The sentiment has been regressed w.r.t. the logarithm of the number of comments.

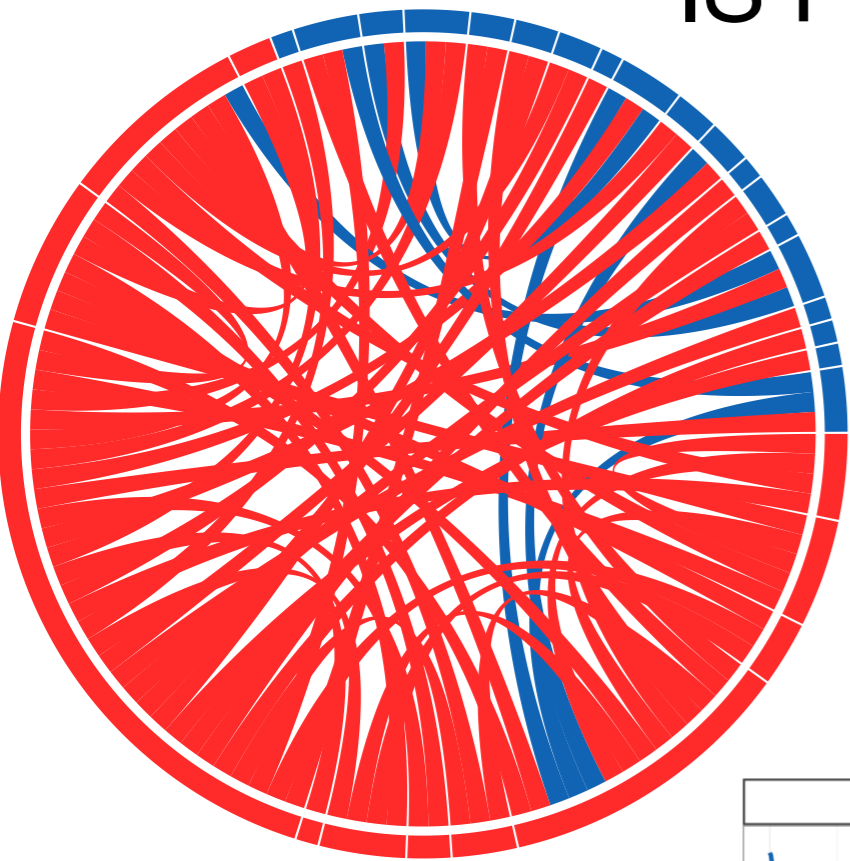
WHEN THE ECHO CHAMBERS MEET



Sentiment and discussion.

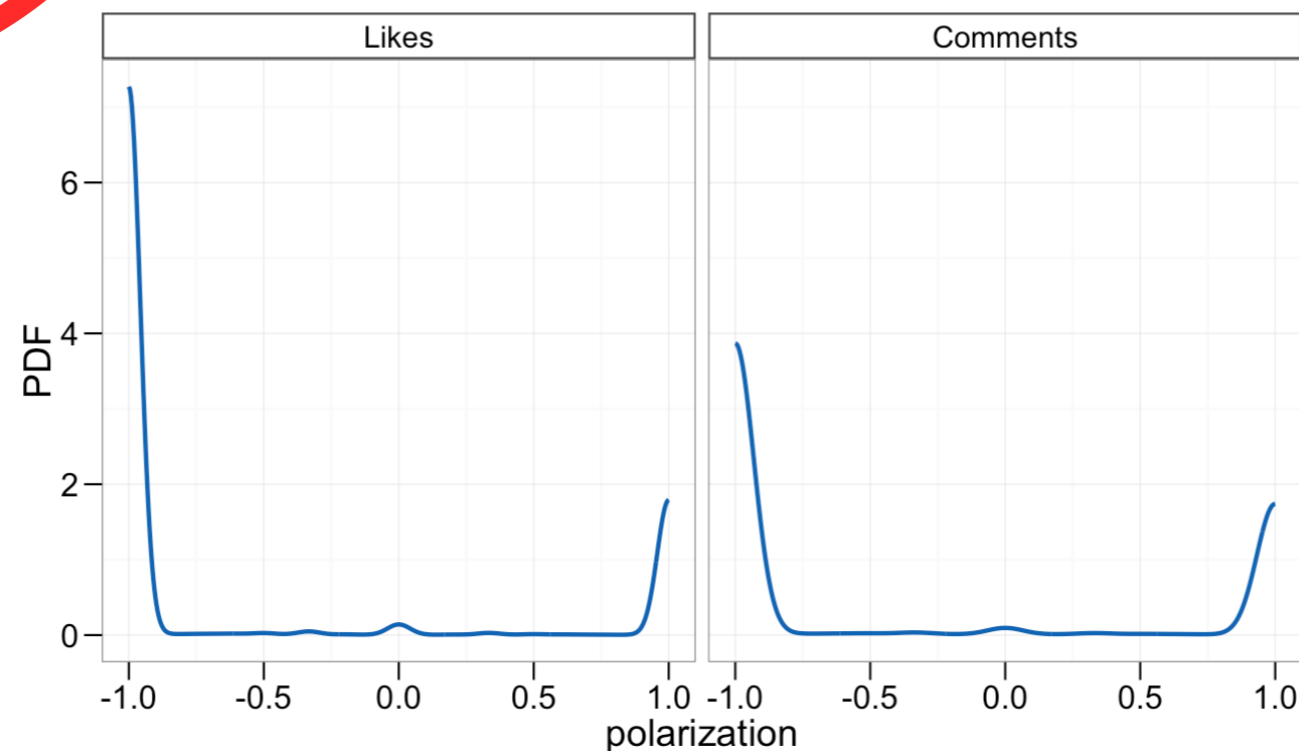
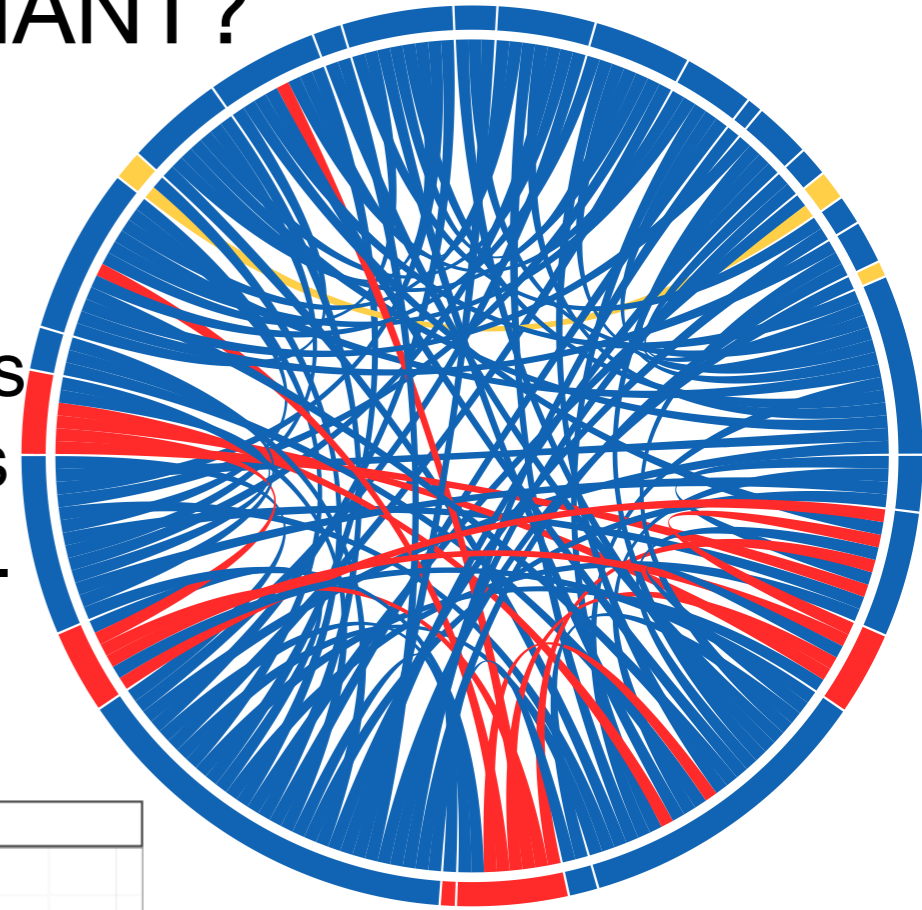
Aggregated sentiment of posts as a function of their number of comments. Negative (respectively, neutral, positive) sentiment is denoted by red (respectively, yellow, blue) color.

IS POLARIZATION DOMINANT?



Community Structure

Backbone of the projections on pages of the users likes (left) and comments (right).



Polarization: Distribution of Users likes and comments on the 2 communities

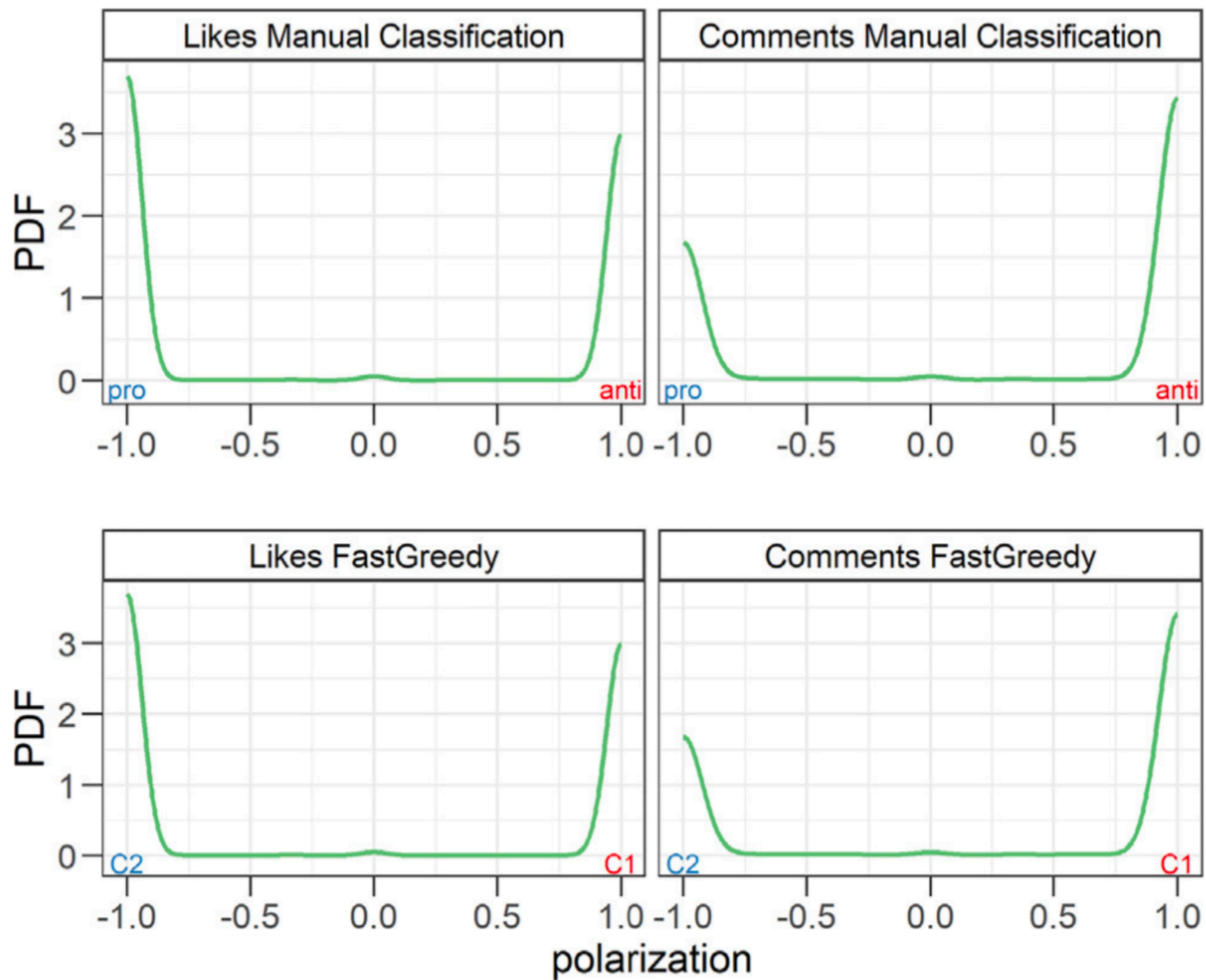


Fig. 2. Probability Density Function (PDF) of the users' liking (left) and commenting (right) behavior in the manual communities (top) and the 2 largest communities detected with FastGreedy (bottom). The distribution of the users is bimodal for all cases, which indicates a strong polarization among the communities, that is, the majority of the users are active in only one community.

The echo chamber effect on social media

Matteo Cinelli^a , Gianmarco De Francisci Morales^b , Alessandro Galeazzi^c , Walter Quattrociocchi^{d,1} , and Michele Starnini^b 

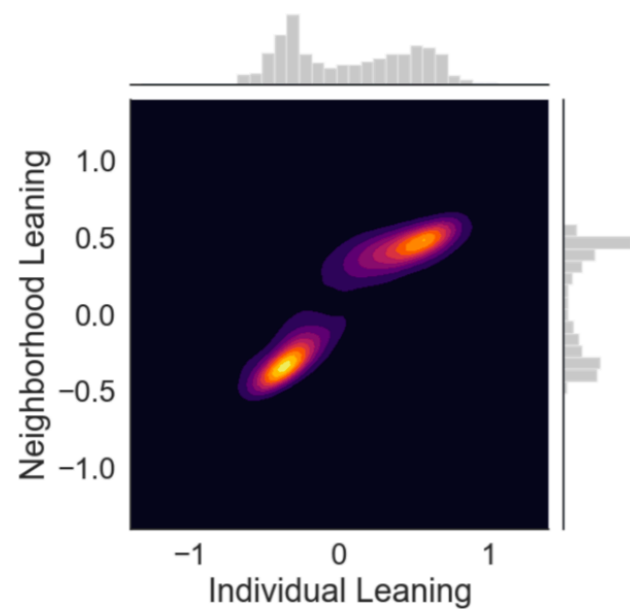
^aDepartment of Environmental Sciences, Informatics and Statistics, Ca'Foscari University of Venice, 30172 Venice, Italy; ^bInstitute for Scientific Interchange (ISI) Foundation, 10126 Torino, Italy; ^cDepartment of Information Engineering, University of Brescia, 25123 Brescia, Italy; and ^dDepartment of Computer Science, Sapienza University of Rome, 00185 Rome, Italy

Edited by Arild Underdal, University of Oslo, Oslo, Norway, and approved January 14, 2021 (received for review November 15, 2020)

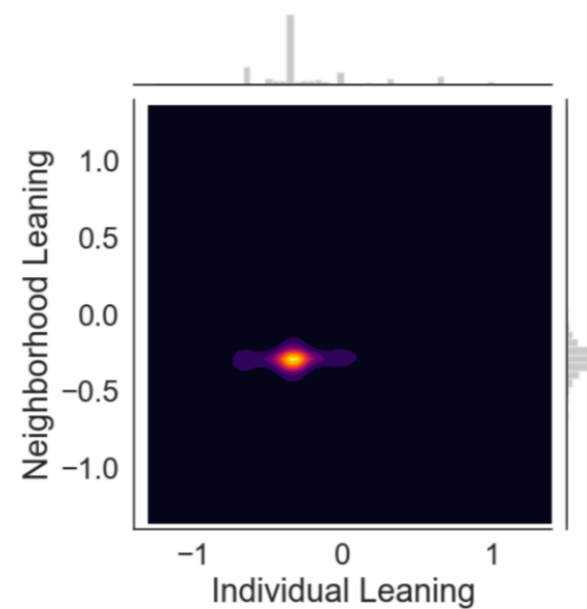
Social media may limit the exposure to diverse perspectives and favor the formation of groups of like-minded users framing and reinforcing a shared narrative, that is, echo chambers. However, the interaction paradigms among users and feed algorithms greatly vary across social media platforms. This paper explores the key differences between the main social media platforms and how they are likely to influence information spreading and echo chambers' formation. We perform a comparative analysis of more than 100 million pieces of content concerning several controversial topics (e.g., gun control, vaccination, abortion) from Gab, Facebook, Reddit, and Twitter. We quantify echo chambers over social media by two main ingredients: 1) homophily in the interaction networks and 2) bias in the information diffusion toward like-minded peers. Our results show that the aggregation of users in homophilic clusters dominate online interactions on Facebook and Twitter. We conclude the paper by directly comparing news consumption on Facebook and Reddit, finding higher segregation on Facebook.

tion and public opinion formation. In this paper, we explore the key differences between social media platforms and how they are likely to influence the formation of echo chambers or not. As recently shown in the case of selective exposure to news outlets, studies considering multiple platforms can offer a fresh view on long-debated problems (34). Different platforms offer different interaction paradigms to users, ranging from retweets and mentions on Twitter to likes and comments in groups on Facebook, thus triggering very different social dynamics (35). We introduce an operational definition of echo chambers to provide a common methodological ground to explore how different platforms influence their formation. In particular, we operationalize the two common elements that characterize echo chambers into observables that can be quantified and empirically measured, namely, 1) the inference of the user's leaning for a specific topic (e.g., politics, vaccines) and 2) the structure of their social interactions on the platform. Then, we use these elements to assess echo chambers' presence by looking

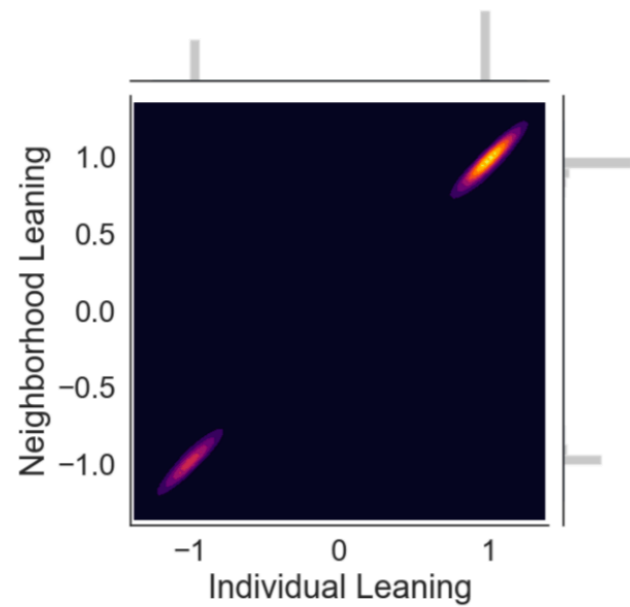
POLARIZATION ON DIFFERENT PLATFORMS



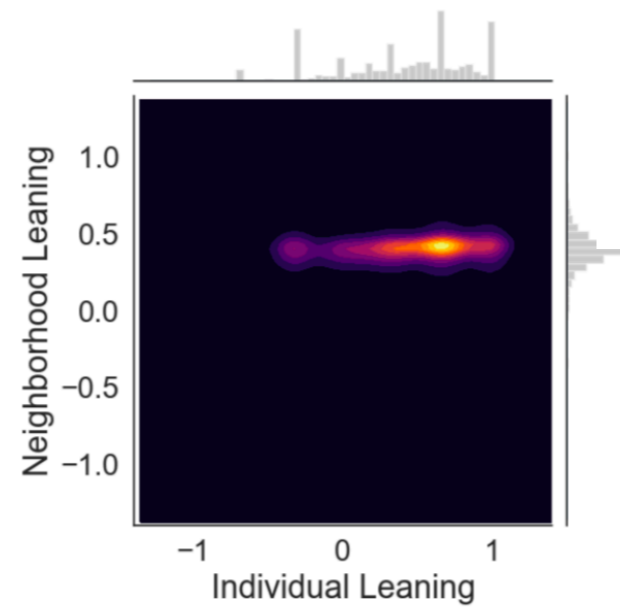
(a) Twitter



(b) Reddit

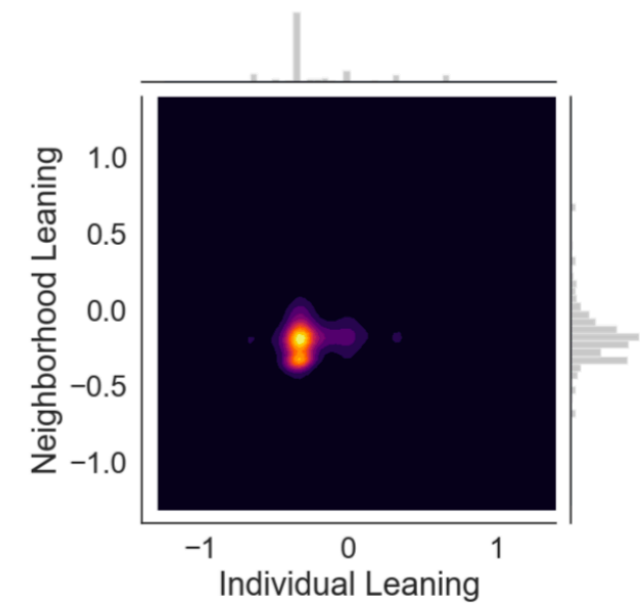
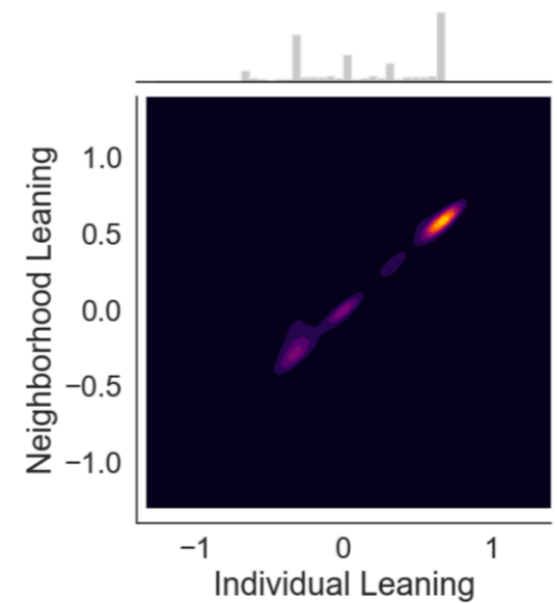


(c) Facebook



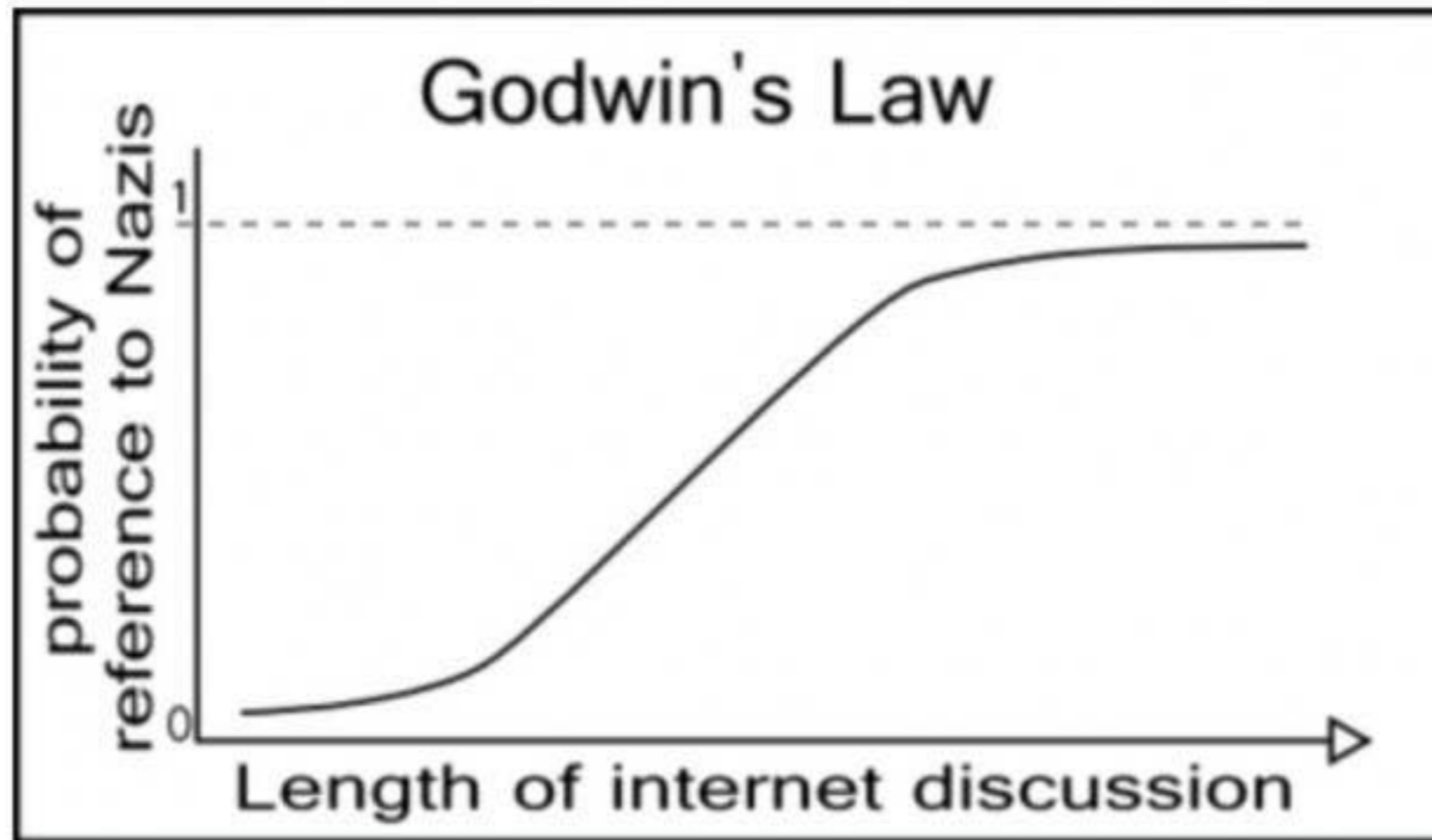
(d) Gab

NEWS AND POLARIZATION



The Godwin's Law

As an online discussion grows longer, the probability of a comparison involving Nazis or Adolf Hitler becomes more likely



Behavioral Dynamics of Hate Online

IMSyPP -Innovative Monitoring Systems and Prevention Policies of Online Hate Speech – is an EU REC AG project, ID 875263.



1 Million comments on youtube videos

- no evidence of the presence of “serial haters”
- users skewed towards one of the two categories of video channels (questionable, reliable) are more prone to use inappropriate, violent, or hateful language toward their opponents
- users following reliable sources use on average a more toxic language than their counterpart
- the overall toxicity of the discussion increases with its length, measured both in terms of number of comments and time (toward a validation of the **Godwin’s law**)

RESEARCH IMPACT

The Washington Post

More

Vola negli USA a prezzi economici.* DELTA PRENOTA SUBITO >

The Intersect

What was fake on the Internet this week: Why this is the final column

A 128 Save for Later Reading List

By **Caitlin Dewey** December 18, 2015 Follow @cattindewey

PHYS ORG Nanotechnology Physics Earth Astronomy & Space Technology Chemistry Biology Other Sciences

Home > Other Sciences > Social Sciences > January 5, 2016

Facebook study suggests online users reinforce their views by creating echo chambers

January 5, 2016 by Bob Yirka [report](#)



11k Like 43 G+ 1 Tweet 9 reddit Favorites Email Print PDF

(Phys.org)—A team of researchers from several institutions in Italy and one in the U.S. has found evidence that suggests Internet users follow a pattern similar to that found in other media regarding how they look for and use information they find. In their paper published in *Proceedings of the National Academy of Sciences*, the team describes how they downloaded data from Facebook, analyzed it and found examples of echo chamber type behaviors.

ACCORHOTELS.COM

Featured Last comments Popular

Did Henry VIII suffer same brain injury as some NFL players? © Feb 03, 2016 0

New technique leads to creation of elastic high-strength carbon nanotube film © 20 hours ago 1

Film coating transforms contact lenses into computer screens © Feb 04, 2016 6

INSIDE THE ECHO CHAMBER

SOCIAL SCIENCE

COMPUTATIONAL SOCIAL SCIENTISTS ARE STUDYING HOW CONSPIRACY THEORIES SPREAD ONLINE—AND WHAT, IF ANYTHING, CAN BE DONE TO STOP THEM

By *Walter Quattrociocchi*

IN BRIEF

Despite optimistic talk about "collective intelligence," the Web has helped create an echo chamber where misinformation thrives. Indeed, the viral spread of hoaxes, conspiracy theories and other false or misleading information reflects one of the most disturbing social trends of the early 21st century. Social scientists are studying this echo chamber by applying computational methods to the traces people leave on Facebook, Twitter and other such outlets. Through this work, they have established that users happily embrace false information as long as it reinforces their prevailing beliefs. faced with complex global issues, people of all educational levels choose to believe "correct"—but false—narratives that clearly identify an object of blame. Unfortunately, attempts to debunk false beliefs seem only to reinforce them. Stopping the spread of misinformation is thus a problem with no apparent simple solution.

60 Scientific American, April 2017 Illustration by Chris Malloy April 2017, ScientificAmerican.com 61

Le Scienze

L'era della disinformazione

April 2017

CLIMATOLOGIE El Niño n'explique pas tout!

COSMOLOGIE Où sommes-nous dans l'Univers ?

NEUROBIOLOGIE Les bienfaits des toxines végétales

POUR LA SCIENCE

Février 2017 - n° 472 www.pourlascience.fr

Édition française de Scientific American

Désinformation et réseaux sociaux

Ce que révèlent les statistiques

CANCER LES NOUVELLES PISTES DE L'IMMUNOTHÉRAPIE



EPIDEMICS AND INFODEMICS: AN IMPERFECT ANALOGY

**Together with WHO, CDC US, CDC EU, CDC China, Epidemiologists
Submitted to LPH**

G7 Leaders' Statement

“...promote transparent and responsible practices, and vaccine confidence.”

Press release

G7 Leaders' Statement: 19 February 2021

Statement by the leaders of the G7.

Published 19 February 2021

From: [Prime Minister's Office, 10 Downing Street](#) and [The Rt Hon Boris Johnson MP](#)



Delivery-focused multilateralism



Addressing vaccine hesitancy and tackling misinformation through delivery-focused multilateralism



COMMITTED PARTNERS

Coordinated, collaborative, well-funded support from partners



GLOBAL INSIGHT

Deep, data-led, evidence-based understanding of the problem and what is needed



MULTILATERAL COMMS DELIVERY

Government partners & multilateral institutions are enabled to deliver impact to address the issue

Delivery-focused multilateralism: committed partners delivering insight-led, evidence-based communications at speed

Principles



- 50+ country OECD Expert Group on Public Communications established
- Best-practice international principles and models to build vaccine confidence and address misinformation.
- Guide a holistic and evidence-based response to misinformation to achieve meaningful impact
- OECD Best Practice Principles:
 - Draft Principles will be shared with G7 by April, 2021
 - Launch at G7 Health Ministerial in June, 2021
 - Endorsed at OECD Working Party on Open Government and by the OECD Expert Group on Public Communication in June, 2021

Partnering

Deliver **joint research initiatives** to understand vaccine hesitancy and misinformation:

- A global research coalition has been established called '**VIDERE**' ('see' in Latin) involving 6 research institutes from three G7 nations
- The focus: vaccine hesitancy drivers, spread of misinformation, susceptibility to and inoculation from misinformation, fact-based communications, government systemic capabilities
- **With G7 partner support:** expand funding and expand the network

