Post-truth society under the lens of Science

Walter Quattrociocchi
walterquattrociocchi@gmail.com

SOCIAL MEDIA: TAKING OVER THE WORLD

News·Today

ALL THE NEWS YOU NEED TO KNOW

FAKE NEWS INVASION

FOX NEWS

CNN

USA TODAY

NBC NEWS

FAKE NEWS QUIET!

THE RED MENACE IS REAL!

KNOW YOUR PLACE SHUT YOUR FACE!

The Washington Post

RT

A MESSAGE FROM THE MINISTRY OF HOMELAND SECURITY

Photo Illustration @21W

Oxford Dictionaries

WORD OF THE YEAR

post-truth

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

Computational social science refers to the academic sub-disciplines concerned with **computational approaches** to the **social sciences**.

A SHIFT OF PARADIGM

OLD MEDIA
- Follow the "Ritual of Objectivity"
- Publication patterns are driven by most followed sources (imitation) (Marlow 2005)
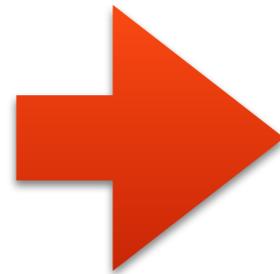
NEW MEDIA
- Information production is the work of interconnected actors spanning over organizations, professional identity and geographical location

MEDIATED

DISINTERMEDIATED

# WHAT ABOUT THE QUALITY OF INFORMATION?

SALON NEWS POLITICS ENTERTAINMENT LIFE TECH BUSINESS SUST

Conspiracy theories running rampant: How misinformation spreads on Facebook

Researchers studied how people interacted with "trolls" posting false information -- the results are terrifying

SARAH GRAY

TOPICS: CONSPIRACY THEORIES, FACEBOOK, POLITICS, TECHNOLOGY, MISINFORMATION, INNOVATION NEWS, TECHNOLOGY NEWS, POLITICS NEWS

From the steady roll of theories on what happened to Malaysian Airlines Flight 370, to Sarah Palin's "death panels" panic, to Donald Trump's birther theories, misinformation spreads like wildfire in the age of Facebook.

In 2013, professor Walter Quattrociocchi of Northeastern University along with his team studied how more than 1 million Facebook users engaged with political information during the Italian election. During that election a post appeared titled: "Italian Senate voted and accepted (257 in favor and 165 abstentions) a law proposed by Senator Cirenga to provide policy makers with €134 billion Euros to find jobs in the event of electoral defeat."

READ IT ON THE INTERNET

MUST BE TRUE
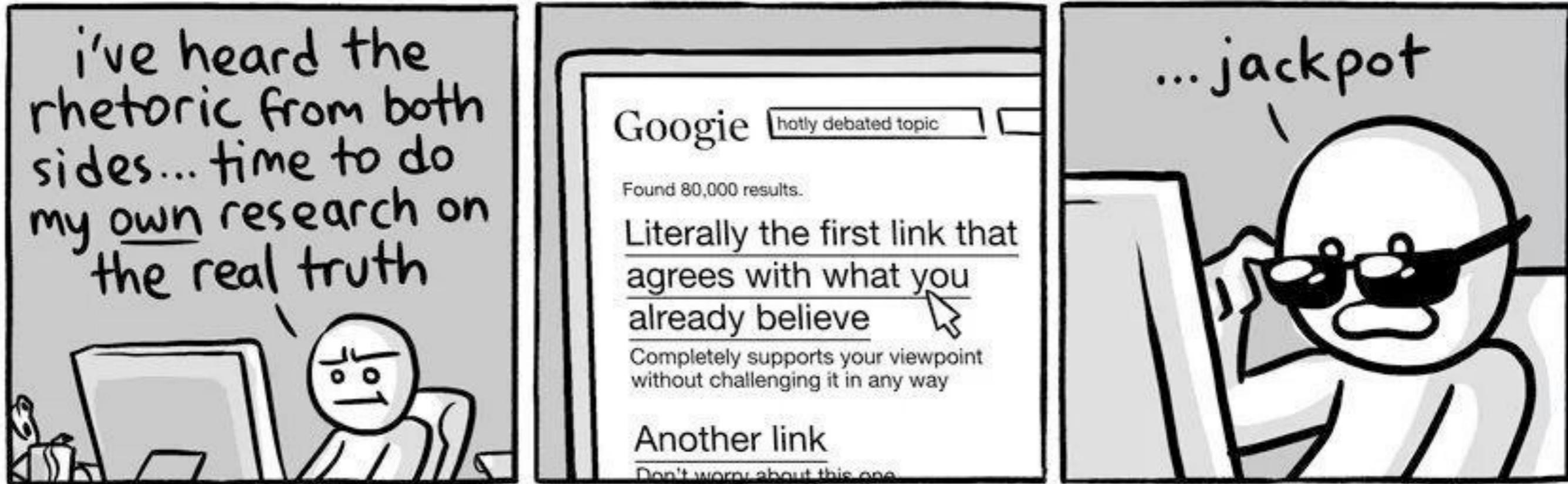
CONFIRMATION BIAS

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

Global Risks 2013
Eighth Edition

Critical systems failure
Cyber attacks
Massive digital misinformation
Massive incident of data fraud/theft
Terrorism
Rising religious fanaticism
Failure of diplomatic conflict resolution
Major systemic financial failure
Global governance failure
Backlash against globalization
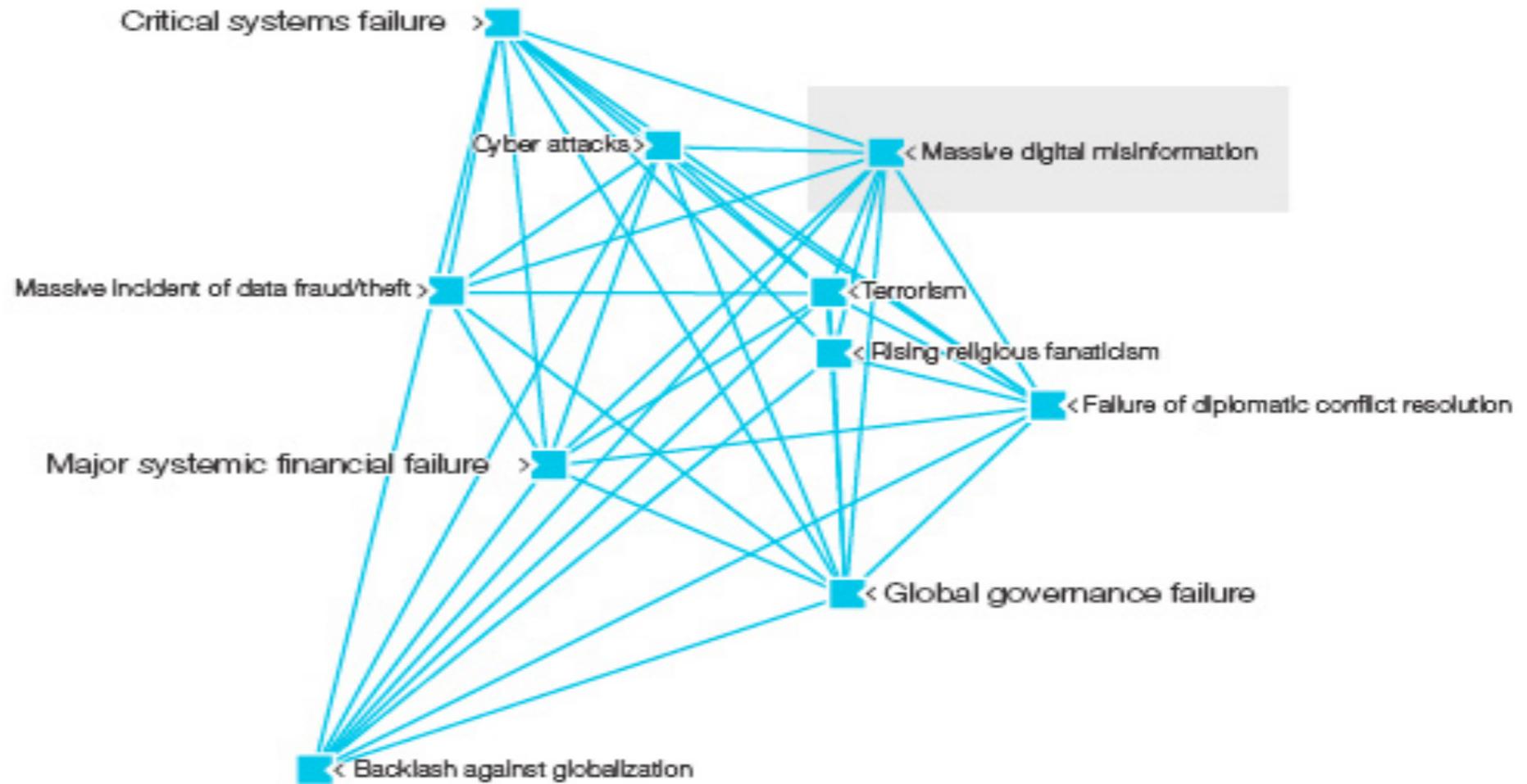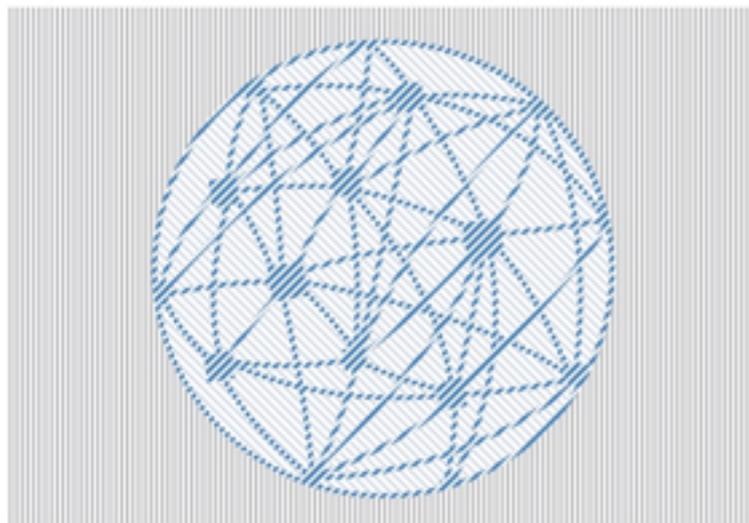
THE WORLD ECONOMIC FORUM HAS POINTED OUT
MASSIVE DIGITAL MISINFORMATION
AS ONE OF THE MAIN RISKS FOR OUR SOCIETY

WHY?

Complexity of the world exploded
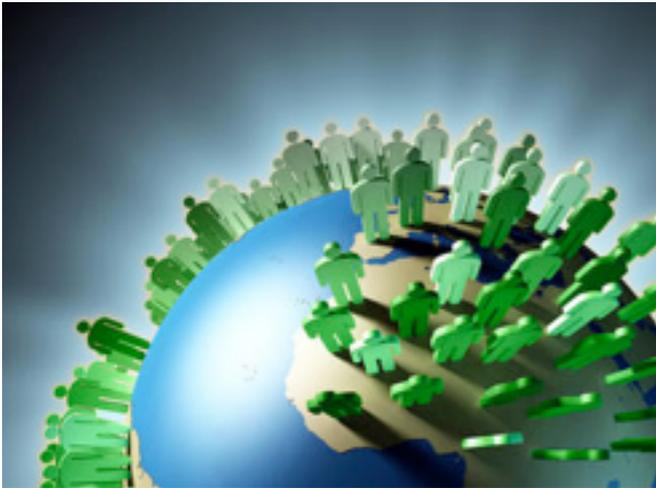
GLOBALIZATION **INTERCONNECTIVITY** **SCIENTIFIC PROGRESS**
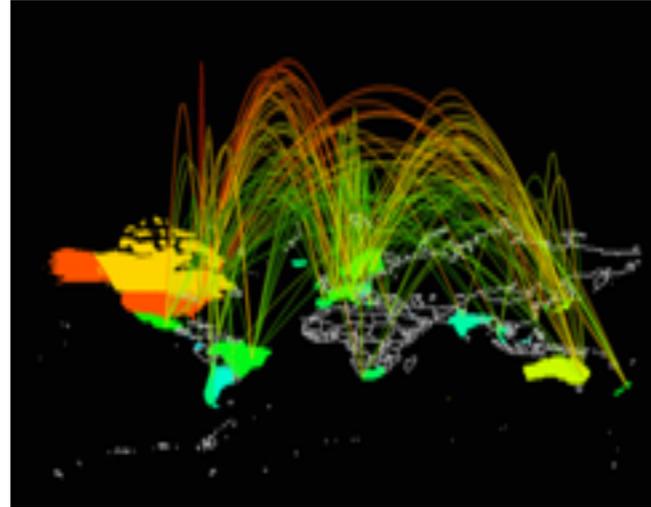
FUNCTIONAL ILLITERACY **INFORMATION OVERLOAD**

Nazione	Persone funzionalmente analfabete (% con età 16–65) 2003-2008[7]
Italia	47,0
Messico	43,2
Stati Uniti	20,0
Ungheria	17,0
Svizzera	15,9
Canada	14,6
Australia	13,9
Nuova Zelanda	13,4

Getting information off the Internet is like taking a drink from a fire hydrant.

Mitchell Kapor
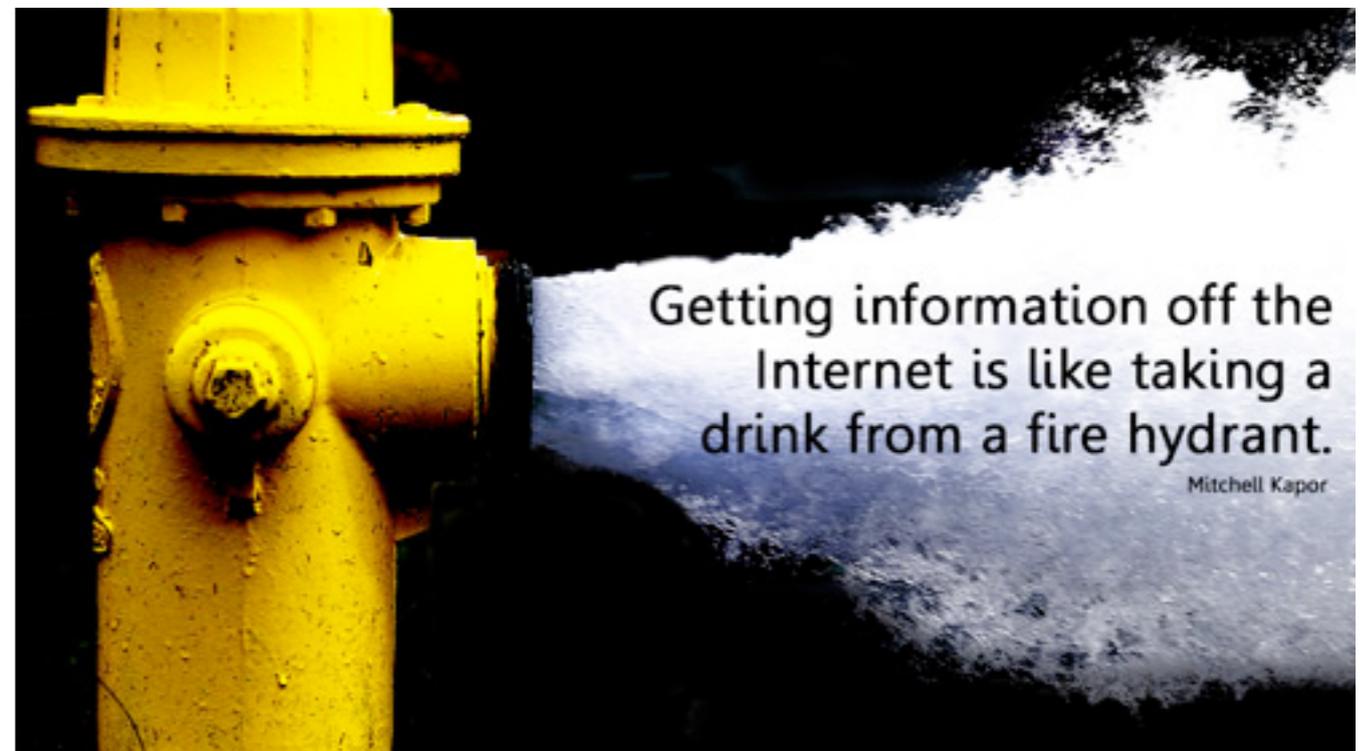
SETTING UP THE (DATA) EXPERIMENT

Focus:
Understand the role of confirmation bias in the diffusion of (mis)information

Methodology:
a)   Analyze users' behavior on specific contents Conspiracy and Science News (cont)
b)   Response to intentional false claims (Trolls)
c)   Response to contrasting information (Debunking)

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
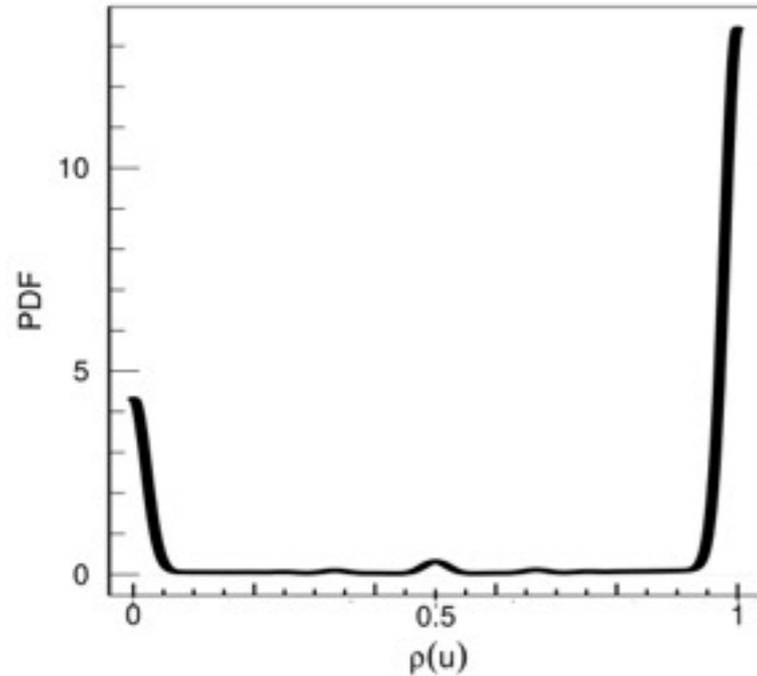
Polarization on contents. Probability density function (PDF) of users' polarization. Notice the strong bimodality of the distribution, with two sharp peaks localized at $0 < \rho < 0.005$ (science users) and at $0.95 < \rho < 1$ (conspiracy users).
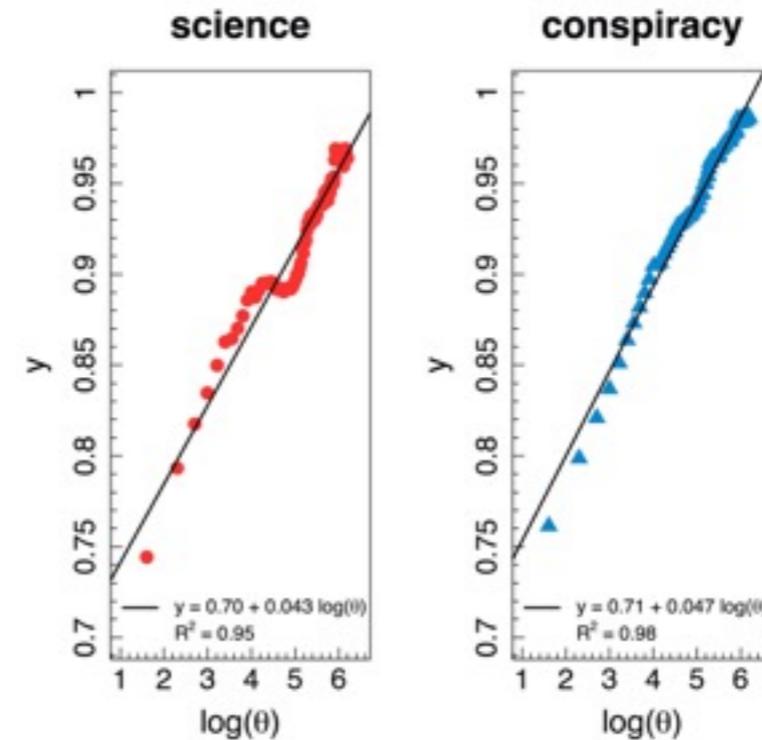
Homophily. Fraction of polarized friends with the same polarization respect to the number of likes $\log(\theta(u))$ of user u.
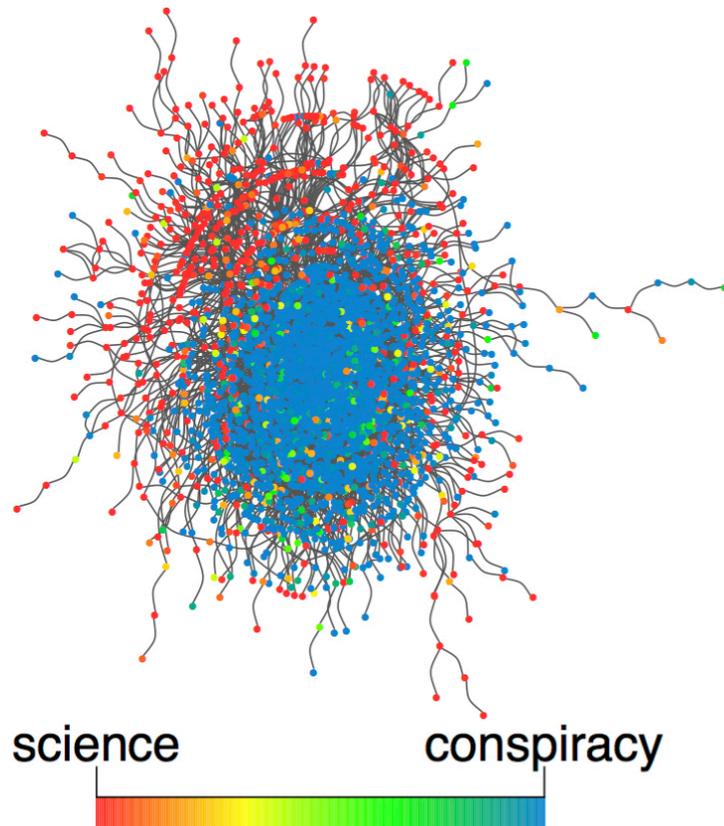
ECHO-CHAMBERS

- Highly separated activity on the 2 categories
- The more the liking activity the higher the probability to have friends with the same attitude
- The more the activity on the narrative, the more the exposure to it

RESPONSE TO **4,709** INTENTIONAL FALSE CLAIMS (TROLLS)
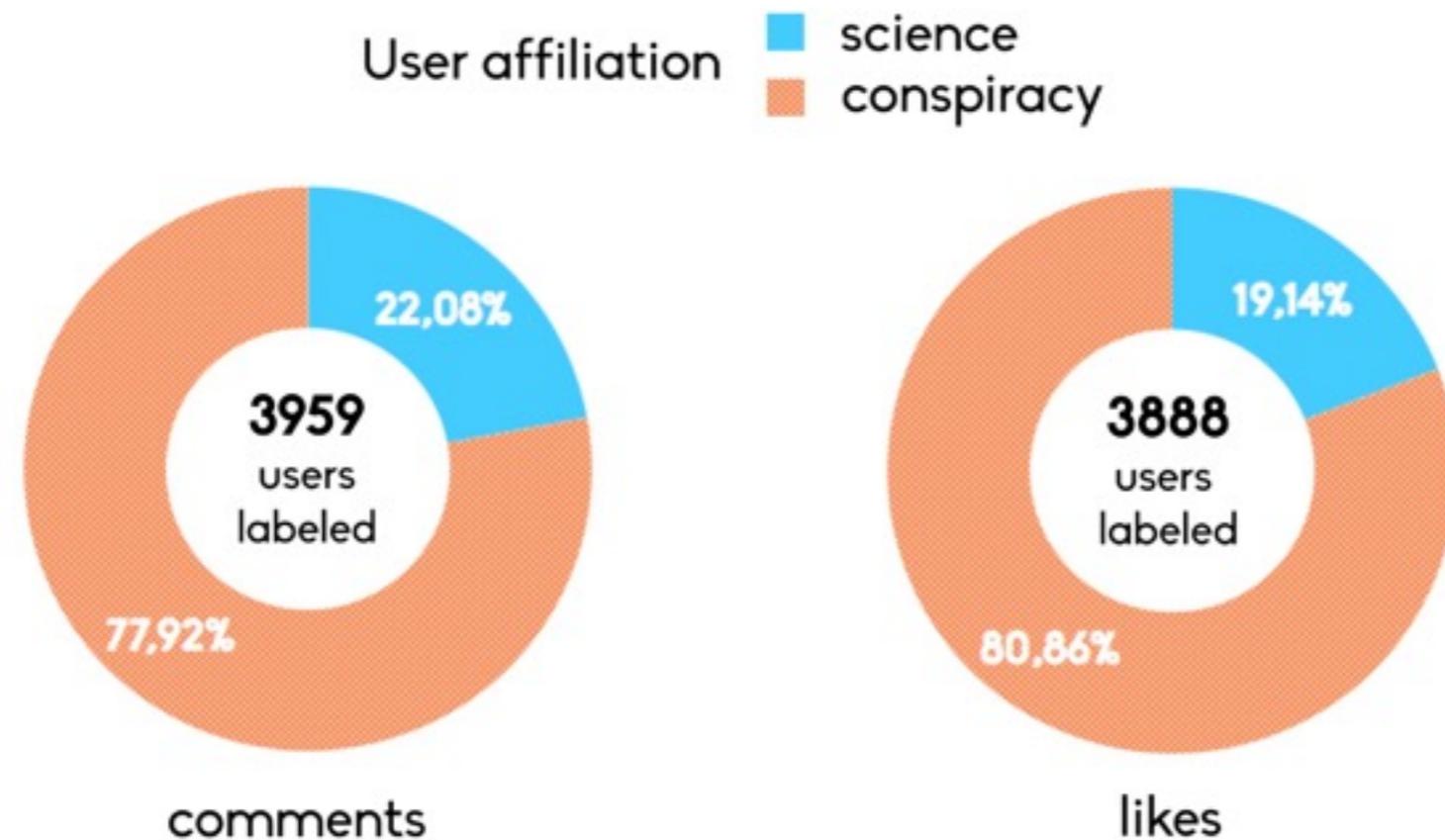
Polarized users on false information.

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

Science vs Conspiracy: Collective Narratives in the age of Misinformation
PLOS ONE (*Bessi et al. 2015*)

RESPONSE TO **47,780** DEBUNKING POSTS (1)

● Science   ● Conspiracy   ● Science   ● Conspiracy

4,953%

COMMENTS

95,047%

8,899%

LIKES

91,101%
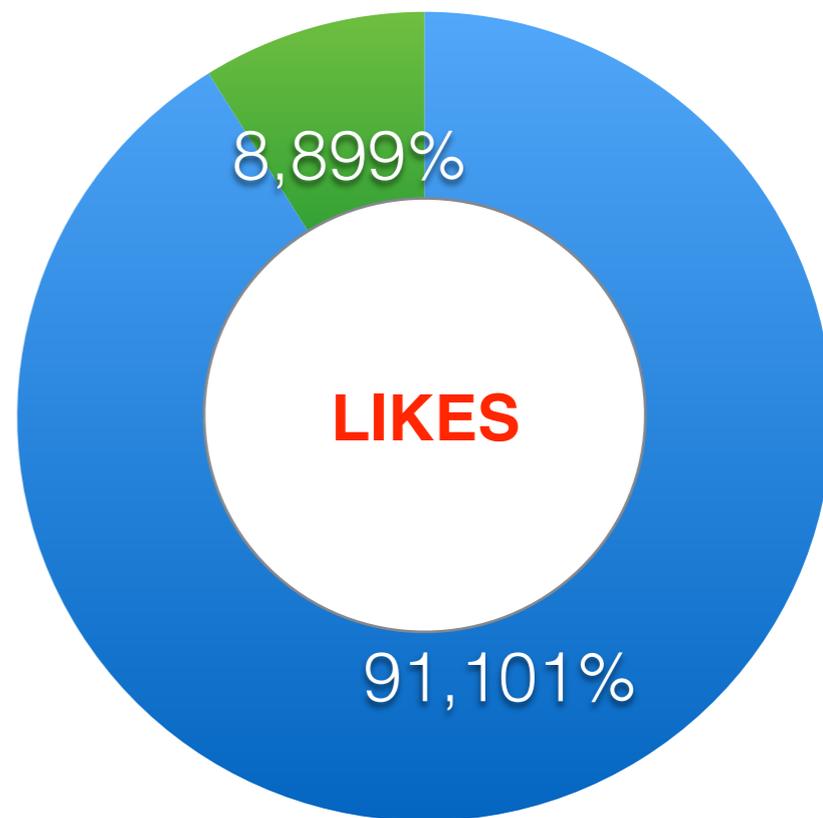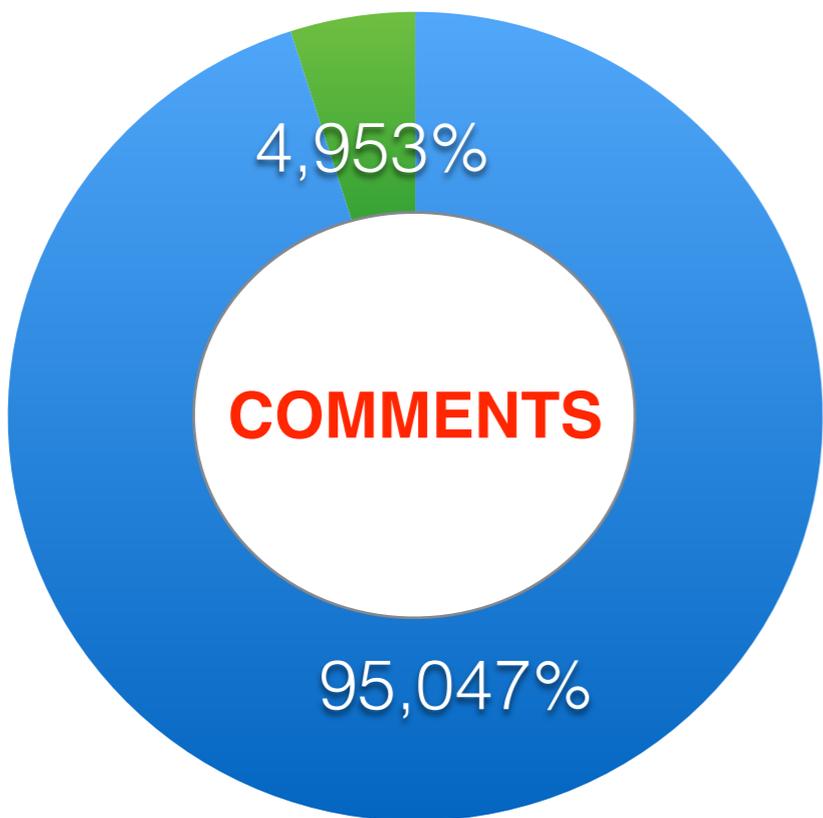
Debunking information are ignored by users in the conspiracy echo-chamber
(out of 9,790,906 polarized conspiracy users only 5, 831 interact)

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]

[a]Laboratory of Computational Social Science, Networks Department, IMT Alti Studi Lucca, 55100 Lucca, Italy; [b]IUSS Institute for Advanced Study, 27100 Pavia, Italy; [c]Sapienza University, 00185 Rome, Italy; [d]ISC-CNR Uos "Sapienza," 00185 Rome, Italy; and [e]Boston University, Boston, MA 02115

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 microblogging platforms on the World Wide Web (WWW) creates a

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).

RESEARCH IMPACT

The Washington Post

More

The Intersect

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

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POUR LA SCIENCE

Février 2017 - n° 472 — www.pourlascience.fr

Édition française de Scientific American

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Facebook study suggests online users reinforce their views by creating echo chamb...

(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.

# The anatomy of news consumption on Facebook

A.L Schimdt, A. Bessi, F. Zollo, M. Del Vicario, A. Scala, G. Caldarelli, H.Gene Stanley, W. Quattrociocchi
accepted at PNAS

## 376 Million of Facebook Users (Jan 2010- Dec 2015)

Users tend to focus on a limited set of information sources
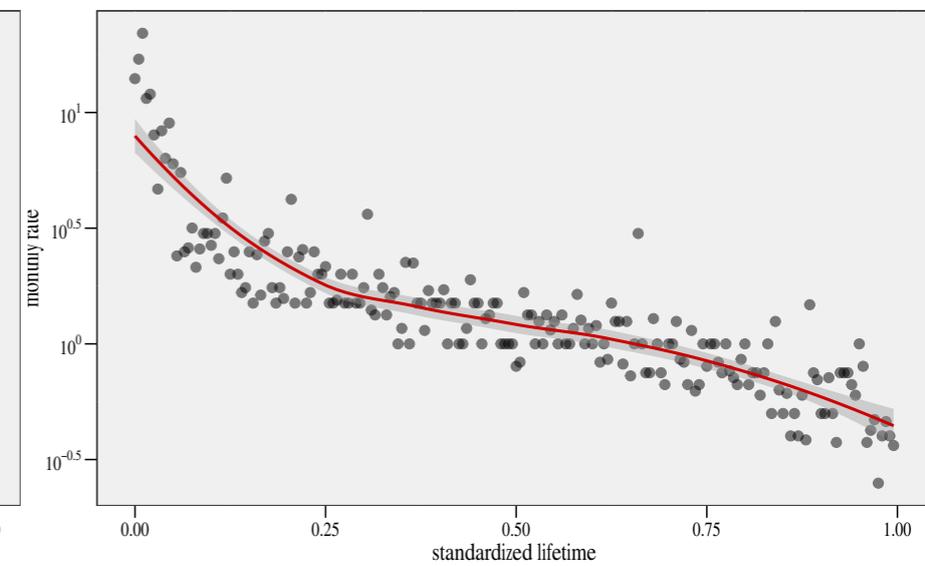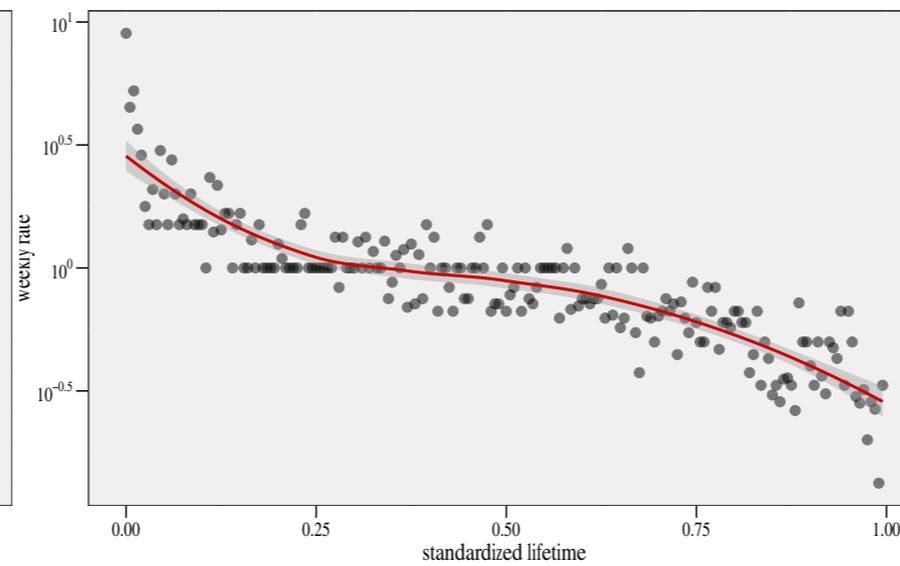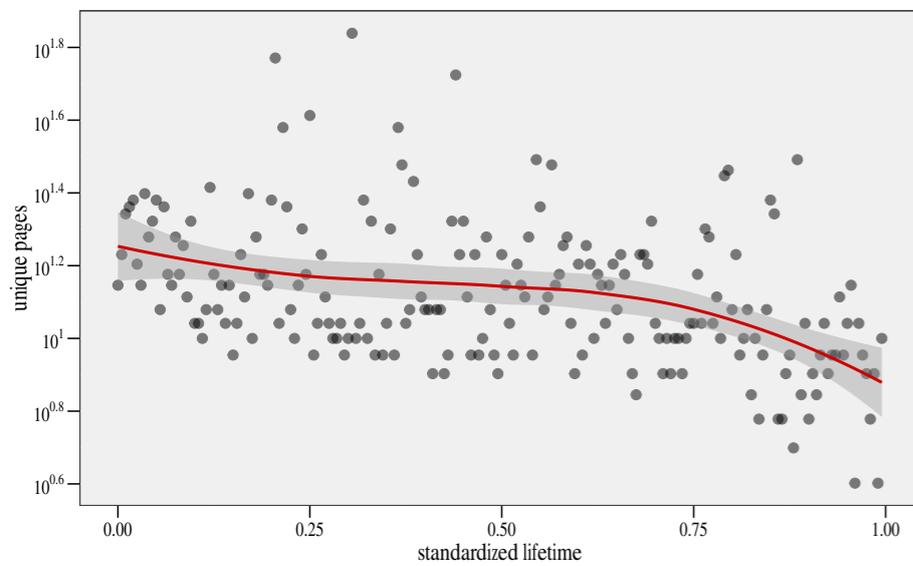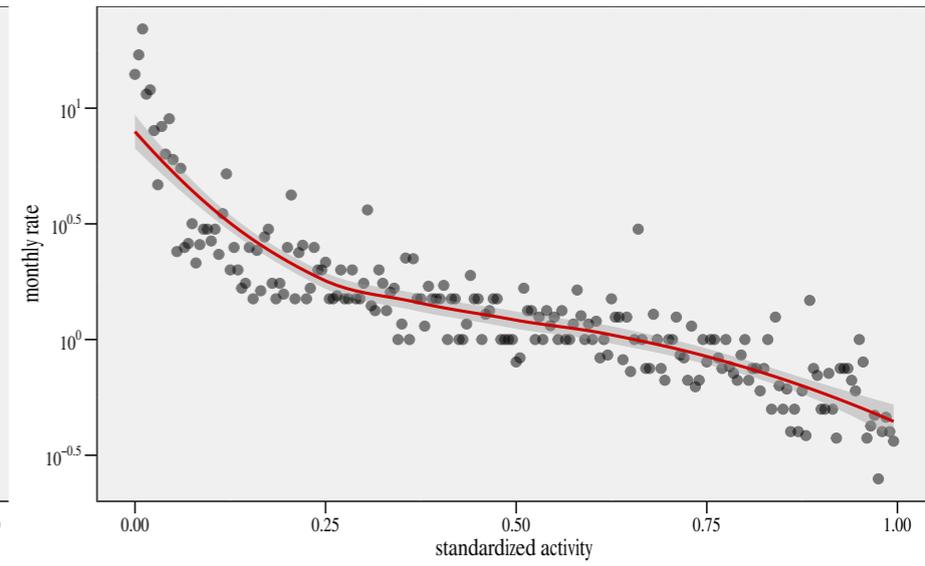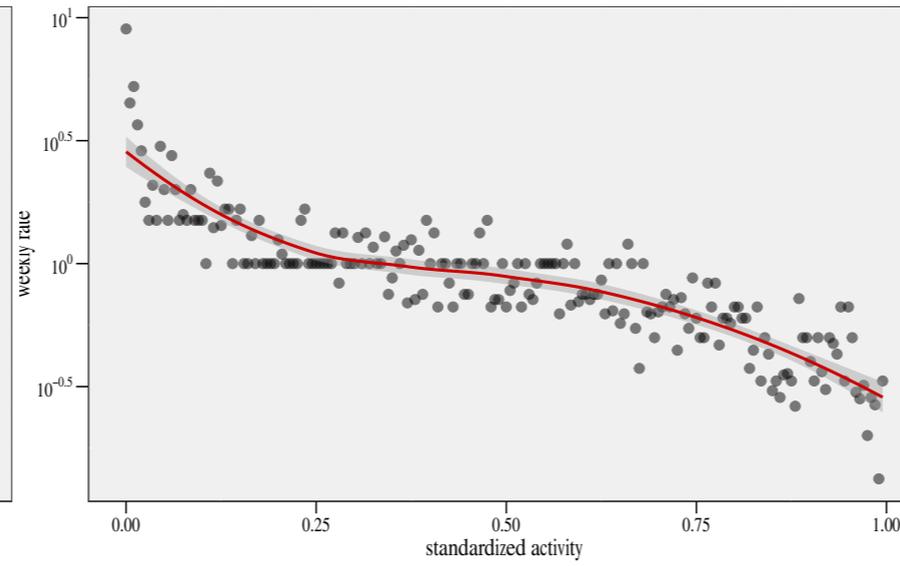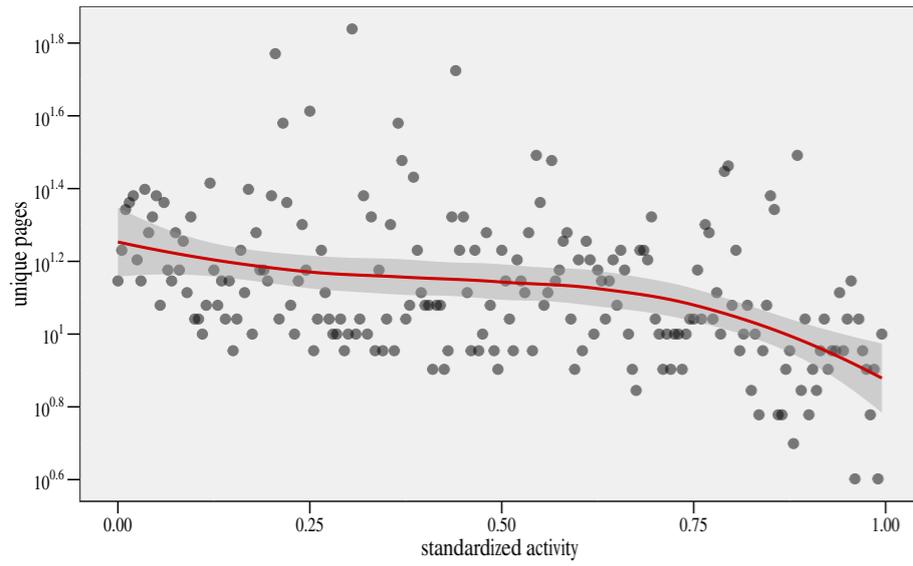
Brexit on Facebook

Community Structure

Backbone of the projections on pages of the users likes (left) and comments (right).
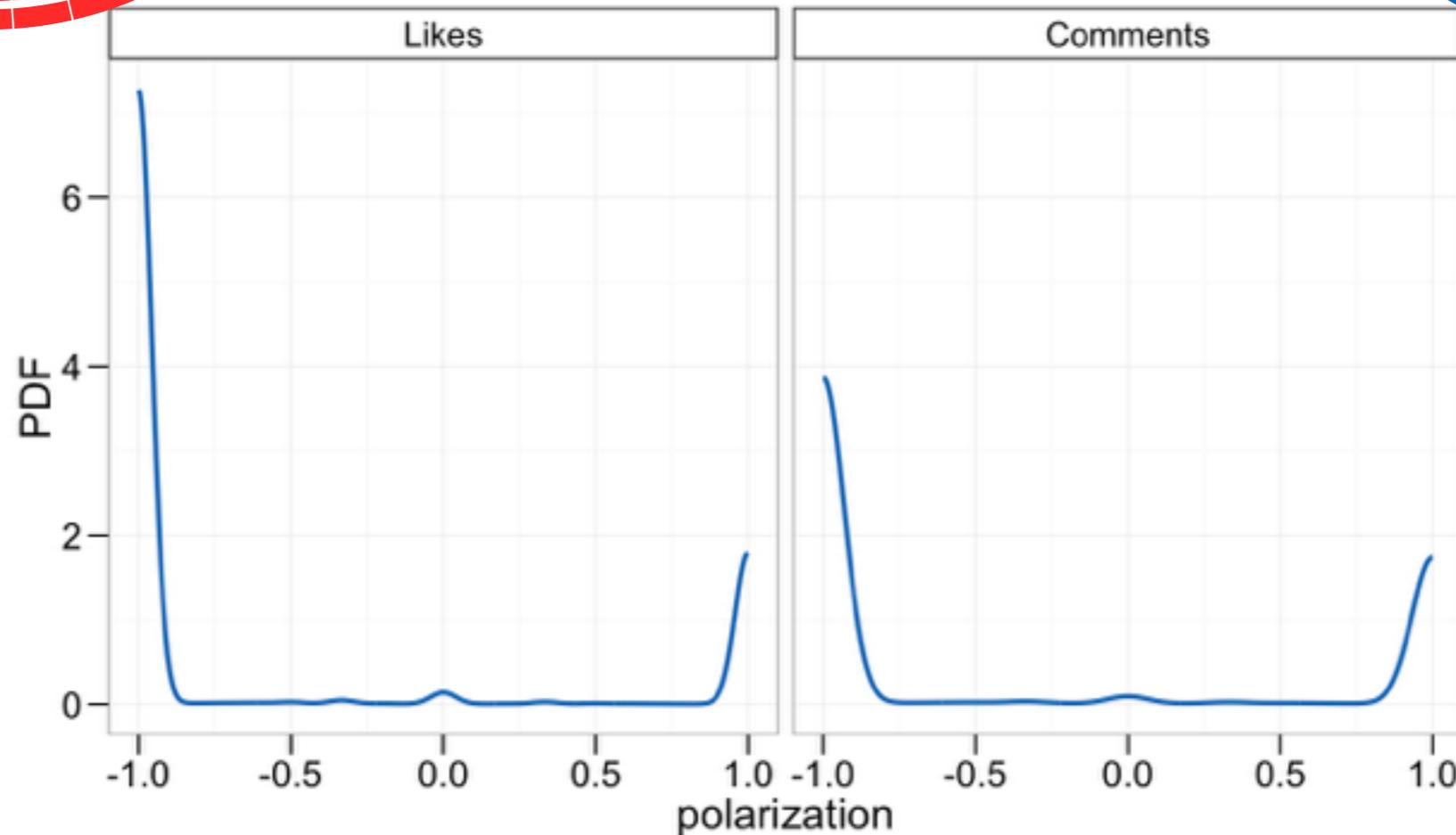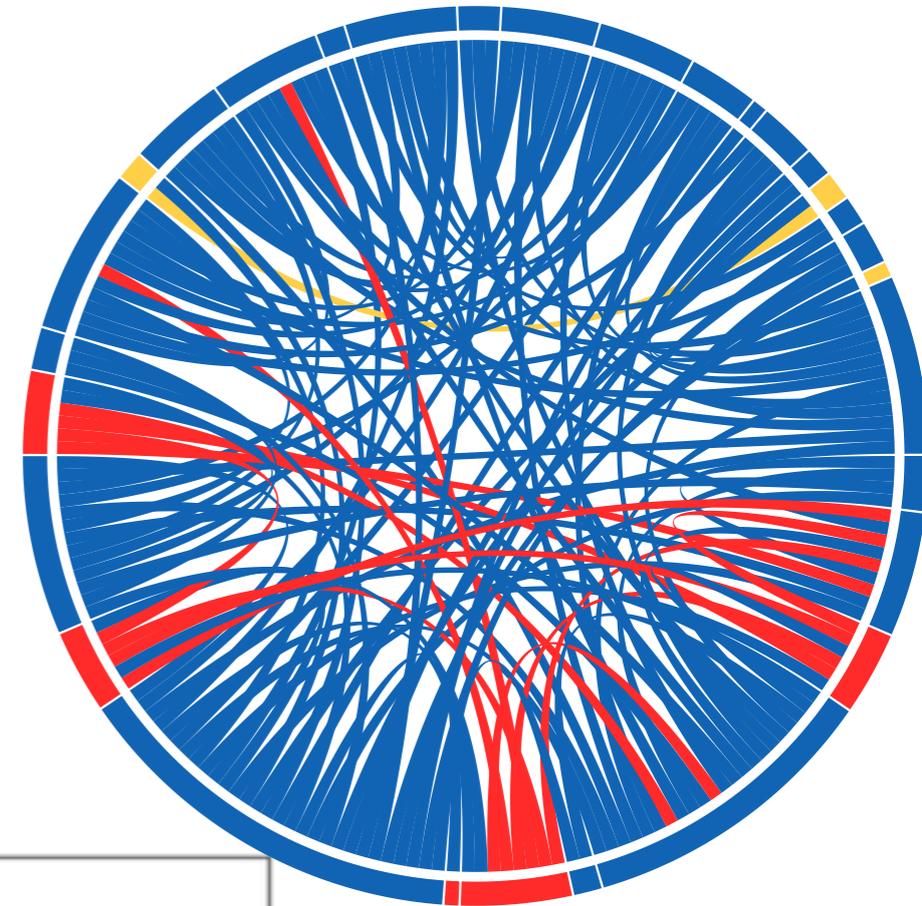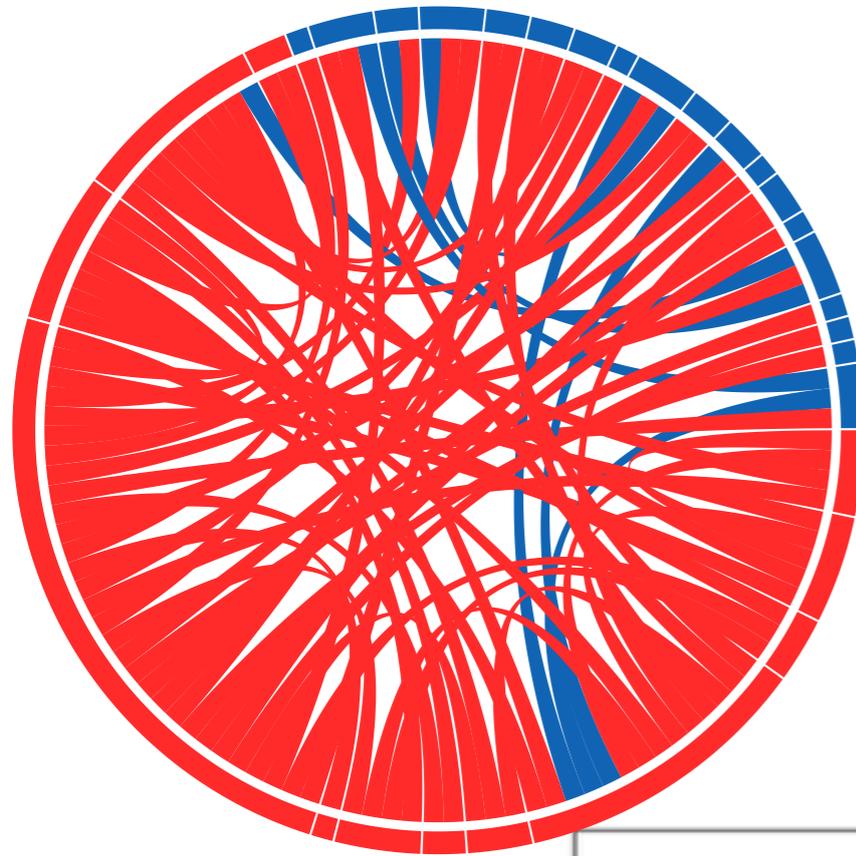
Polarization: Distribution of Users likes and comments on the 2 communities

Perception inside the echo chamber
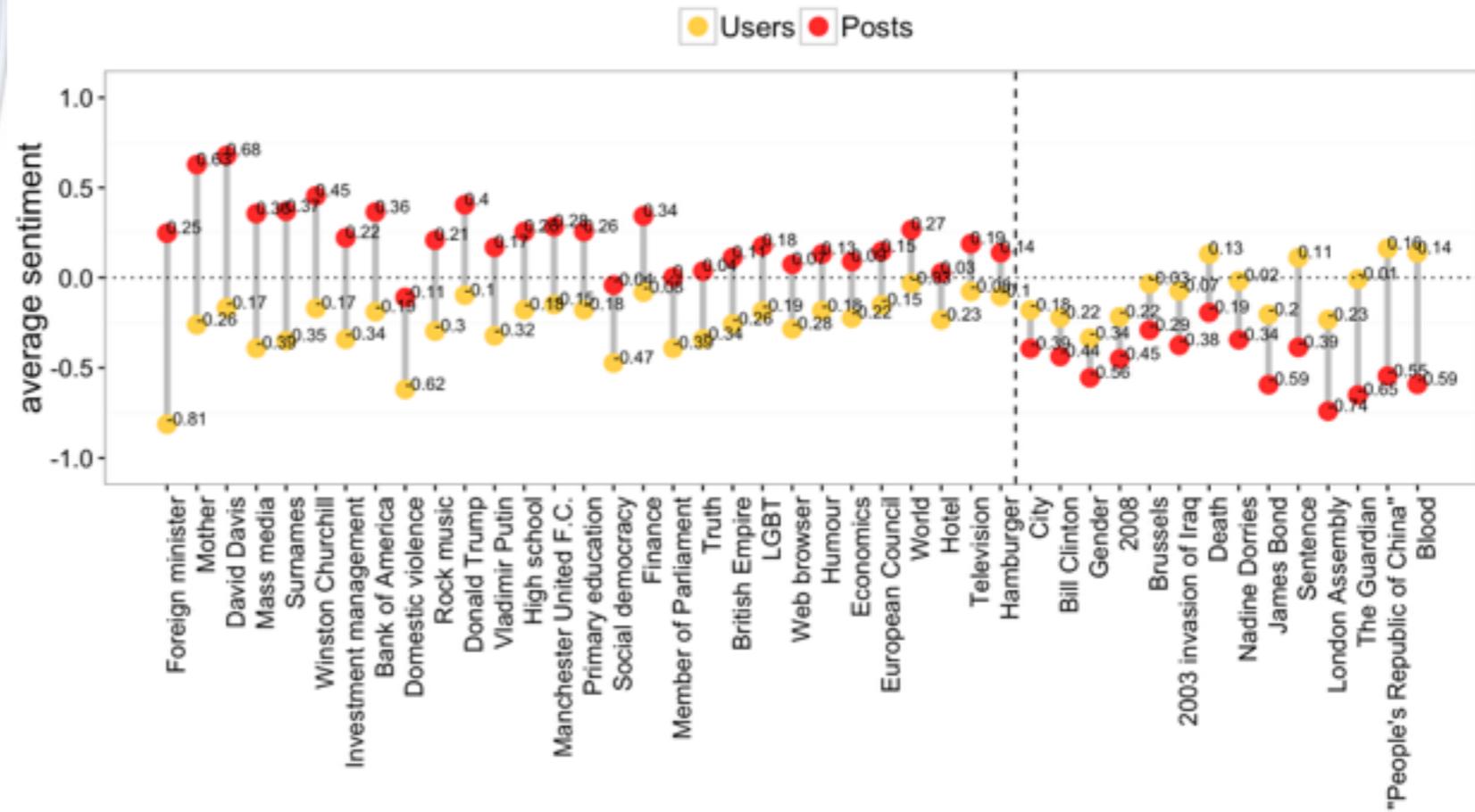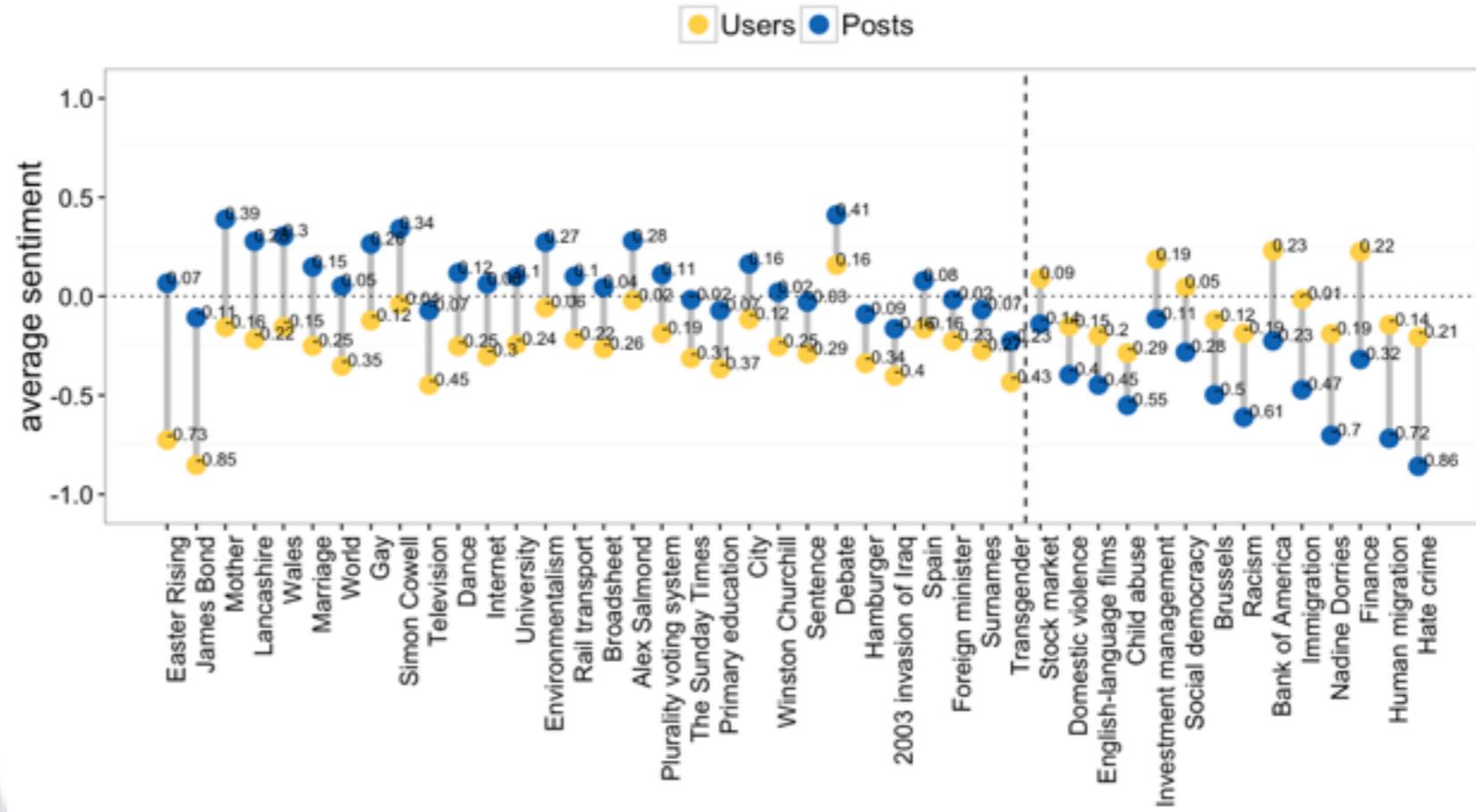
Insight Report

The Global Risks Report 2016
## 11th Edition
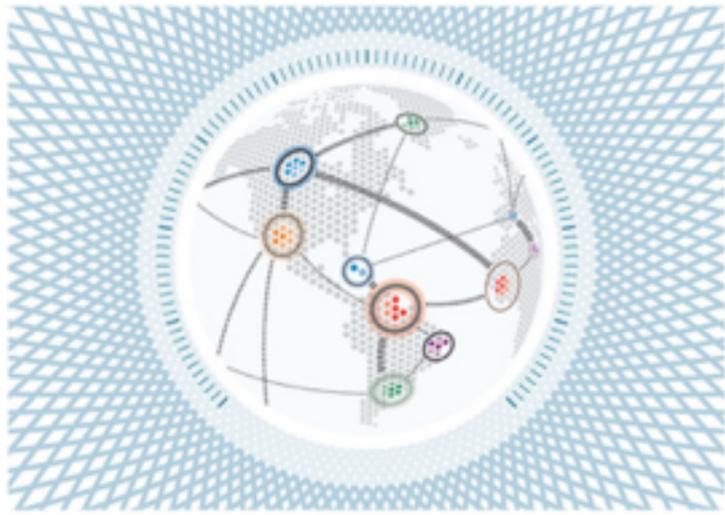
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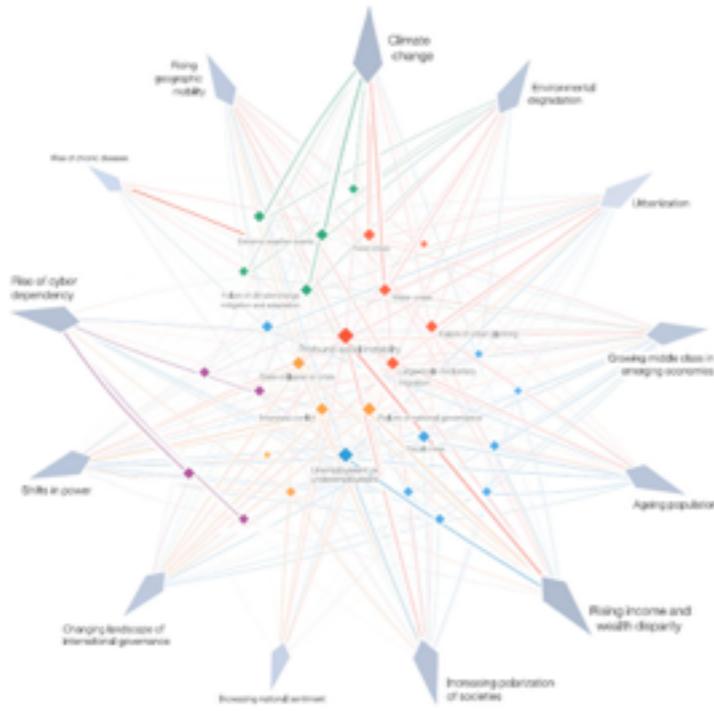
Global Agenda > Digital > Risk and Resilience > Social Media

How does misinformation spread online?

Image: A man poses with his iPad tablet as he sits in a bar, in this photo illustration taken in Rome September 20, 2012. REUTERS/Tony Gentile

Written by

Walter Quattrociocchi, Head of the Laboratory of Computational Social Science, IMT Lucca in Italy

In the run up to the 2013 Italian elections, a social media post exposing the corruption of parliament went viral. Italian politicians were quietly certain that, win or lose, they would be financially secure by taking money from the taxpayer. Parliament had quietly passed a special welfare bill specially designed to protect policy-makers by ensuring them an incredible unemployment package should they lose their seat in the upcoming election. The bill, proposed by Senator

THE BOOK

Walter Quattrociocchi, Antonella Vicini
MISINFORMATION
Guida alla società dell'informazione e della credulità
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Collana: NEO

Previsto in libreria: 5 ottobre 2016 – SN 13

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Argomento: Attualità / Comunicazione e media
Livello: Saggi, scenari, interventi
Promozione: Digital e social media marketing. Interviste. Recensioni.

Il World Economic Forum ha inserito la disinformazione digitale (casuale o costruita ad arte) nella lista dei 'rischi globali': capace di avere risvolti politici, geopolitici e, perfino, terroristici.

I social network sono il terreno di coltura e di diffusione perfetta del virus della dis-informazione, con conseguenze che vanno ben al di là del recinto del mondo digitale. Perché?

Questo libro offre una panoramica sui meccanismi sociali e cognitivi di un fenomeno che ormai è sotto gli occhi di tutti, anche di quelli meno attenti.