



Social Media Research: Challenges and Opportunities for Science Communication

Dominique Brossard, Professor and Chair

Department of Life Sciences Communication

College of Agricultural and Life Sciences

University of Wisconsin-Madison

USA

Holtz Center for Science and Technology Studies

Center for Global Studies

Morgdrige Institute for Research

 [@brossardd](https://twitter.com/brossardd)

Museu da Vida, Fundacao Oswaldo Cruz, Fiocruz, July 31st-August 1st 2017



This Talk: An Overview

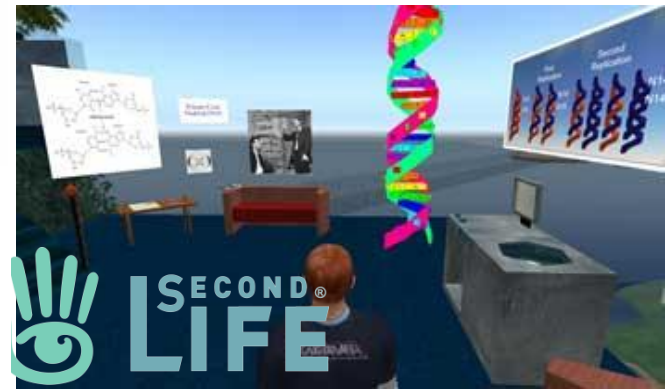
- Science and social media: A challenging research context
- An example of “big data’ analysis: A trilingual analysis of Zika discussions on social media
- An example of online randomized experimental study: the “nasty effect” of rude comments online



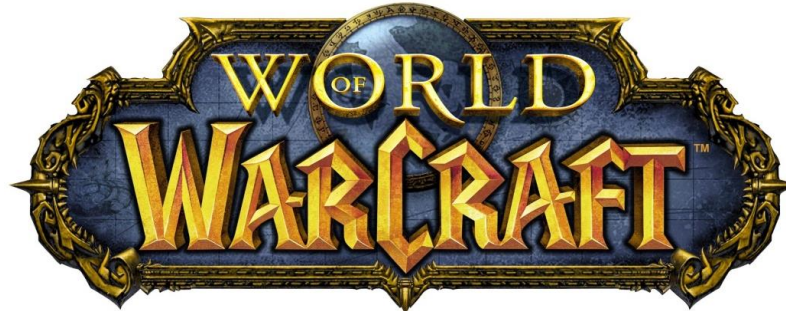
First, what are social media?

		Social presence/Media richness		
		<i>Low</i>	<i>Medium</i>	<i>High</i>
Self presentation/ self disclosure	<i>High</i>	We(blogs)	Social networking sites (e.g., Facebook)	Virtual social worlds (e.g., Second Life)
	<i>Low</i>	Collaborative projects (e.g., Wikipedia)	Content communities (e.g., YouTube)	Virtual game worlds (e.g., World of Warcraft)

Brossard, D. (2012): *A Brave new world: Challenges and opportunities for communicating about biotechnology in new information environments*. In: Weitze, Marc- Denis, Puehler, Alfred et al. (Eds.): Biotechnologie-Kommunikation: Kontroversen, Analysen, Aktivitäten, Heidelberg: Springer.

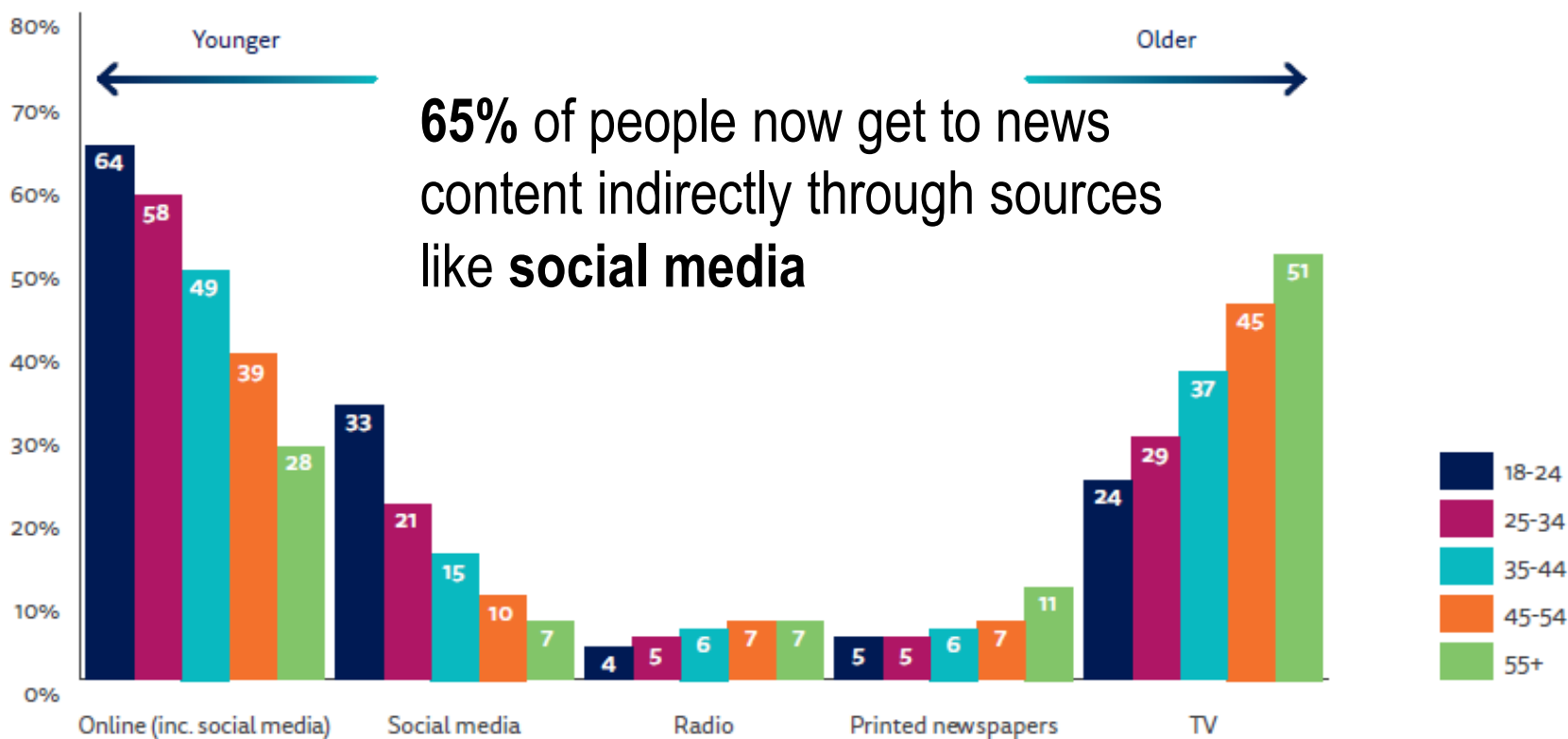


WIKIPEDIA
The Free Encyclopedia



Global trend: Younger groups more likely to use social media as main source of news


MAIN SOURCE OF NEWS BY AGE - ALL MARKETS



Q4. You say you've used these sources of news in the last week, which would you say is your MAIN source of news? Base: Aged 18-24/25-34/35-44/45-54/55+ that used a source of news in the last week: All markets = 7754/12,332/12,976/12,630/24,620.

Source: Reuters Institute for the Study of Journalism – Digital News Report 2017

Latin Americans get more news via social media and chat apps than other parts of the world



	FACEBOOK		TWITTER	
	Overall use	Use for news	Overall use	Use for news
Argentina	83%	65%	32%	19%
Brazil	76%	57%	25%	12%
Mexico	78%	63%	40%	23%
U.S.	71%	48%	26%	15%


Sources: Reuters Institute for the Study of Journalism – Digital News Report 2017

New media environments ...The promise of a new information commonwealth?



- They provide essentially unlimited information
 - on a large number of issues
 - which can be obtained anywhere and
 - with relatively limited effort
- and opportunities for citizens to connect with others through social media and other 2.0-type tools to make sense of this information

People like to share news ...



	Demographics		Media			
	Population (2015)	Internet penetration	Trust in news	Trust in news I use	Share news weekly	
Argentina	43,416,755	79%	39%	52%	63%	
Brazil	207,847,528	68%	60%	60%	64%	
Mexico	127,017,224	56%	49%	55%	63%	
U.S.	321,418,820	89%	38%	53%	41%	

Sources: Reuters Institute for the Study of Journalism – Digital News Report 2017, World Bank, and Freedom House



... and people like to create content

“The people formerly known as the audiences”



Another issue to take into account: An augmented selectivity

Scheufele, D. A., & Nisbet, M. C. (2012). Online news and the demise of political debate. In C. T. Salmon (Ed.), *Communication Yearbook* (Vol. 36, pp. 45-53). Newbury Park, CA: Sage.

Media-
based
filters

- Polarized news tailored toward niche partisan audiences
- Algorithms as editors

- Self-reinforcing search and ranking spirals
- Augmented individual selectivity

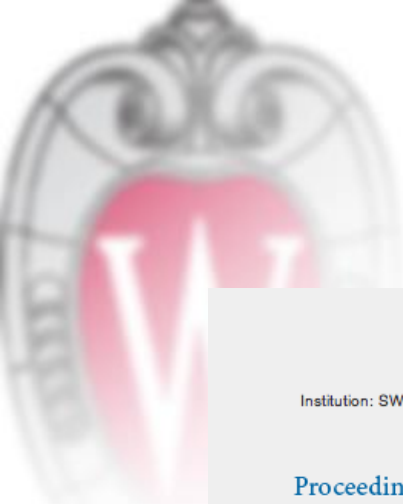
Audience-
based
filters

- Homogeneous social networks as filters
- Selective exposure/attention



=>

Science and social media:
a complex environment to study



New media landscapes and the science information consumer

Dominique Brossard¹

[Author Affiliations](#) ↗

Edited by Dietram A. Scheufele, University of Wisconsin–Madison, Madison, WI, and accepted by the Editorial Board June 26, 2013 (received for review February 11, 2013)

Abstract

Individuals are increasingly turning to online environments to find information about science and to follow scientific developments. It is therefore crucial for scientists and scientific institutions to consider empirical findings from research in online science communication when thinking about science in the public sphere. After providing a snapshot of the current media landscape, this paper reviews recent major research findings related to science communication in the online environment and their implications for science in the 21st century. Particular emphasis is given to the bias introduced by search engines, the nature of scientific content encountered online, and the potential impact of the Internet on audiences' knowledge and attitudes toward science.



This Issue
August 20, 2013
vol. 110
Supplement 3
[Table of Contents](#)

[◀ PREVIOUS ARTICLE](#) [NEXT ARTICLE ▶](#)

Published online before print
August 12, 2013, doi:
[10.1073/pnas.1212744110](https://doi.org/10.1073/pnas.1212744110)
PNAS August 20, 2013 vol. 110 no.
Supplement 3 14096-14101

Classifications

The Science of Science
[Communication Sackler
Colloquium](#)
Social Sciences
Social Sciences

Access



This Talk: An Overview

- Science and social media
- An example of “big data’ analysis: A trilingual analysis of Zika discussions on social media
- An example of randomized experimental study: the “nasty effect” of rude comments online



A Trilingual and Comparative Approach to Understanding the Conversation about the Zika Virus on Social Media

Wirz, C. D., Chung, J. H., Xenos, M. A., Brossard, D.,
Scheufele, D. A., Massarani, L., & Maynard, A. D.

Science Media and the Public (Scimep) Research Group

University of Wisconsin-Madison, USA

The Oswaldo Cruz Foundation

Rio de Janeiro, Brazil

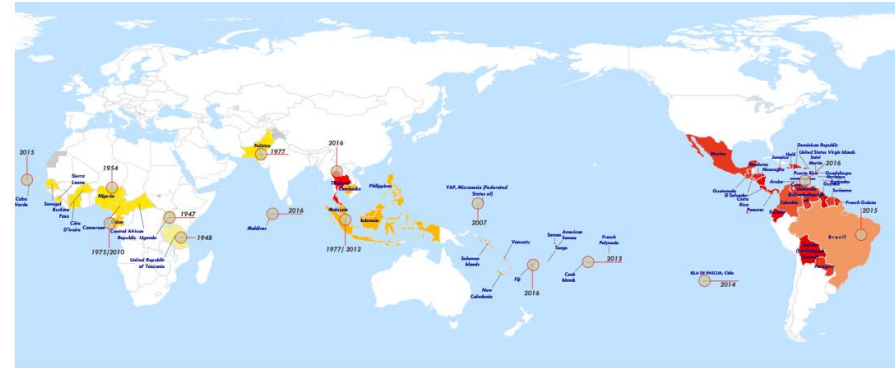
School for the Future of Innovation in Society

Arizona State University, USA

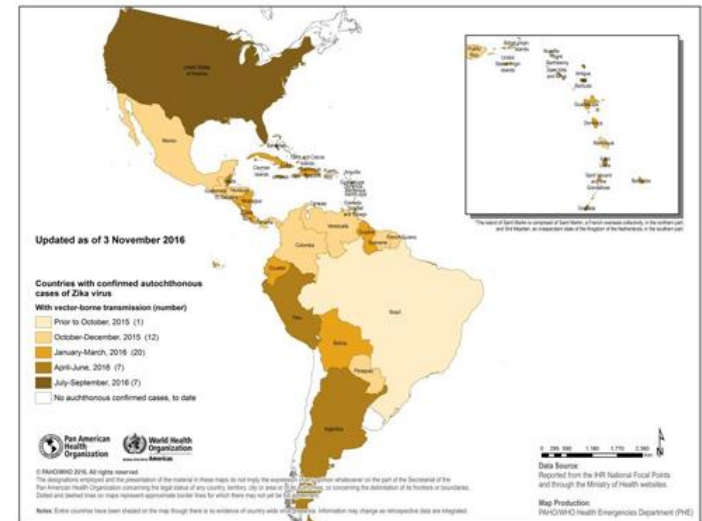
*Paper presented at the 2017 World Association of Public Opinion Research
(WAPOR) Convention, Lisboa, Portugal*



- **Zika** is associated with birth defects and other complications
- **84 countries and territories** have reported mosquito-borne transmission of the Zika virus



- **Americas**
 - **211,500** confirmed cases
 - **563,168** suspected cases
- **Brazil**
 - **11,000** pregnant women with Zika in 2016







The study

- **ANALYSIS OF BLAME FOR THE OUTBREAK**
 - **RQ: To what extent do social media provide platforms for blaming and amplifying risk of Zika across the three languages?**
- **ANALYSIS OF STRATEGIES BEING DISCUSSED**
 - **RQ: What strategies are most prominent over time and how do these strategies vary by language?**

Sentiment analysis of Zika related discussions on Facebook and Twitter in Portuguese, English and Spanish

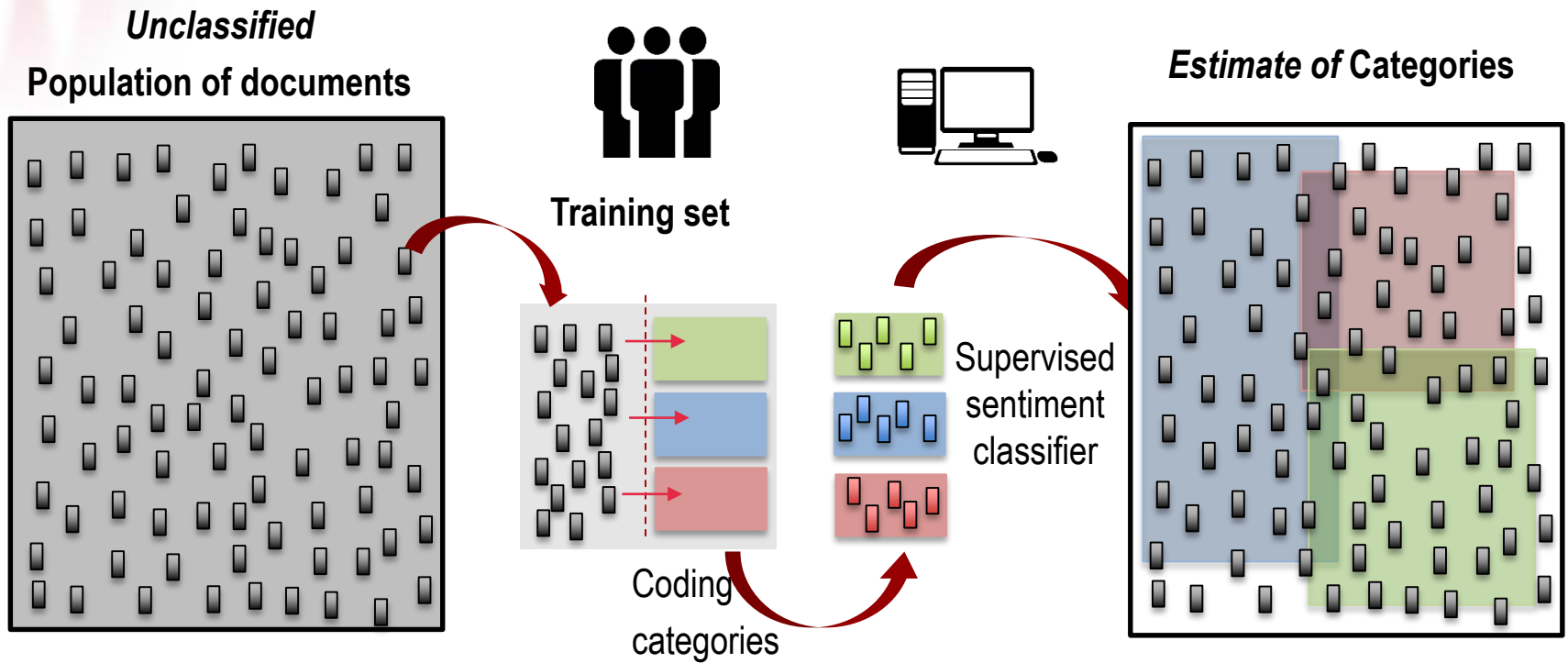
- **Date Range of Analysis**
 - November 2015 – February 2017
- **Social Media Data**
 -  Twitter
 -  Facebook*
- **Method of Analysis**
 - Supervised machine learning



**Data comes from high-volume
pages of News sources*

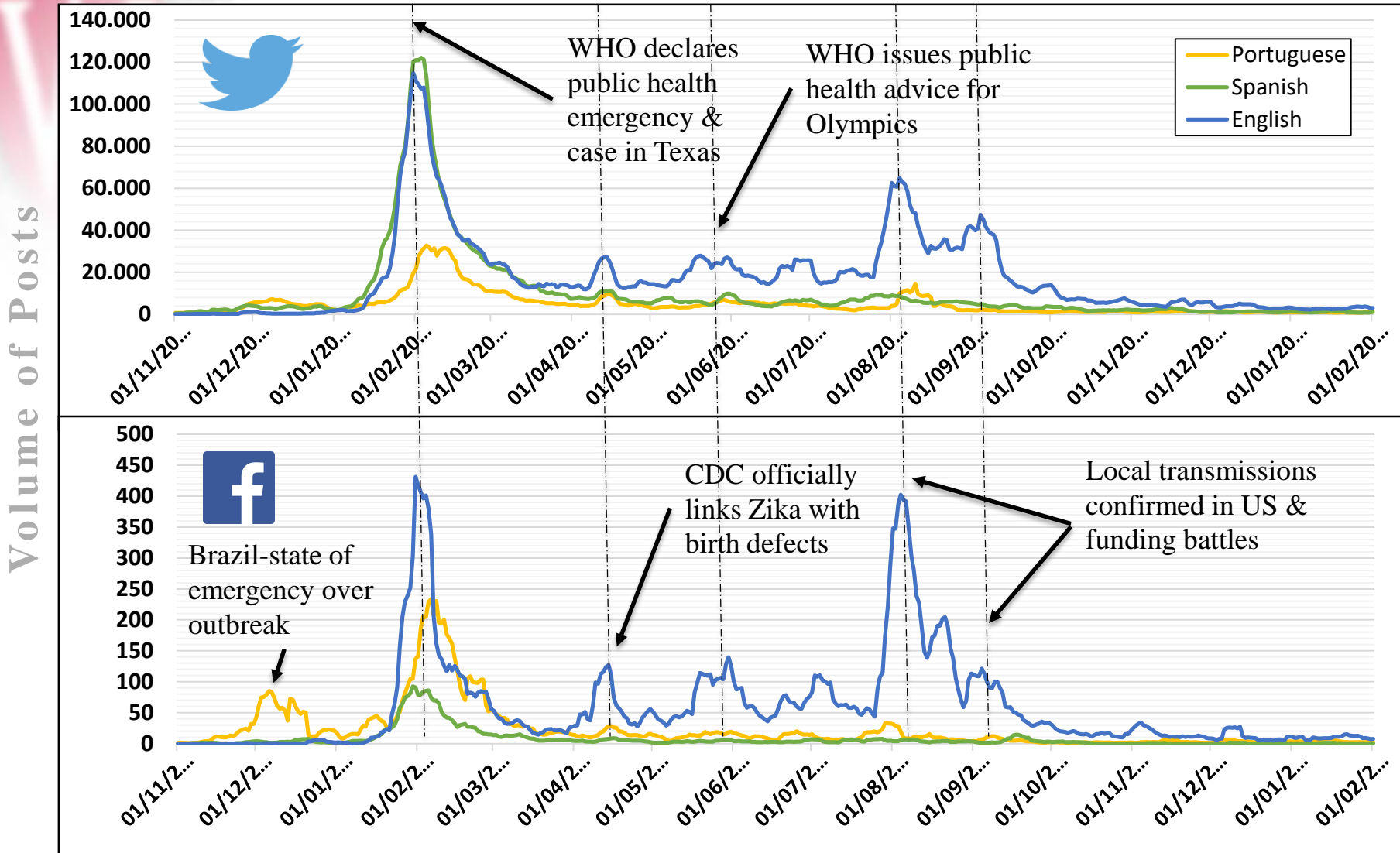


Human-trained algorithms



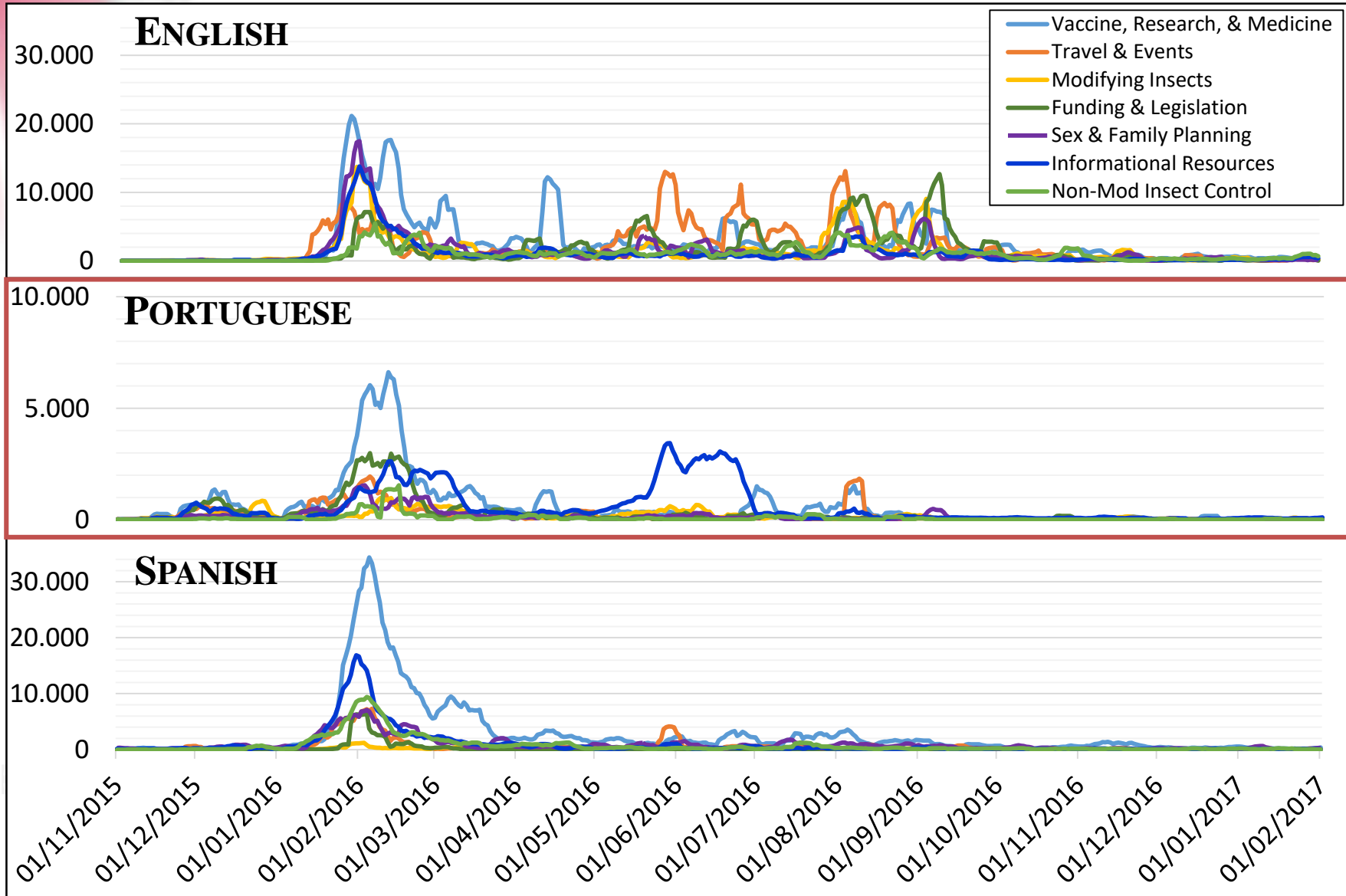
Human training used reliability trials and were performed by coding teams of native speakers of English, Portuguese, and Spanish

Variations in online discussions of risk events between languages



Strategies to fight Zika are more focused in Spanish and Portuguese

NUMBER OF SENTIMENTS ON



Higher proportion of blame in Spanish and English than Portuguese

- More blame on Facebook



▪ English

- **30%** of sentiments place **blame**

▪ Portuguese

- **18%** of sentiments place **blame**

▪ Spanish

- **39%** of sentiments place **blame**



▪ English

- **71%** of sentiments place **blame**

▪ Portuguese

- **34%** of sentiments place **blame**

▪ Spanish

- **36%** of sentiments place **blame**



Conclusion:

The machine learning research method approach allowed for a more robust understanding of differences in international social media discussions

▪ STRATEGIES BEING

DISCUSSED

- More focus on **research** and **informational** resources in Spanish and Portuguese
- English conversation is varied- more on **funding** and **travel**

▪ BLAME FOR VIRUS

- More blame for the virus in English and Spanish- much less in Portuguese
- Higher proportion of blame on Facebook

▪ PLATFORM DIFFERENCES

- Variations occur both between languages and between social media platforms






- **Implications for Global Health Practitioners**

- Variations in the discussions about Zika between languages and platforms show the need for more targeted messaging for public health

- **Theoretical Implications**

- Social media can be a place for blaming and as a result amplify risk
- English-only research is not necessarily generalizable to other contexts, and meaningful variations are lost if other languages are not considered





A note on other online environments: “Big data” approaches allow us to find out what audiences are likely to encounter online



- For nanotechnology, **discrepancy** between
 - Searches:
 - what people look for (tracked by Nielsen online)
 - Results:
 - what search terms are suggested to them (Google suggest data)
 - what they find (content analysis of top ranked search results in Google)

Ladwig, P., Anderson, A. A., Brossard, D., Scheufele, D. A., & Shaw, B. (2010). Narrowing the nano discourse? *Materials Today*, 13(5), 52-54. doi: 10.1016/s1369-7021(10)70084-5

What this means for science-informed audiences

- Potential of “self-reinforcing informational spirals”



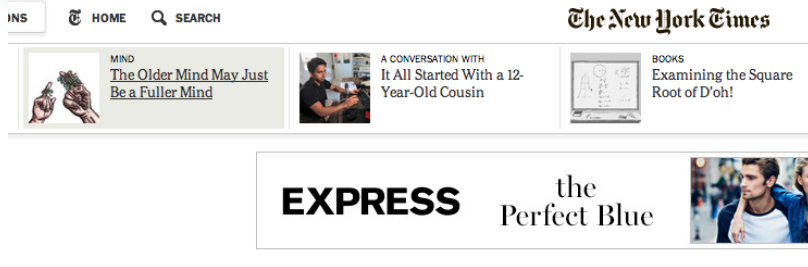
- Are opinions formed based on how Google presents results rather than on what individuals are searching?



This Talk: An Overview

- Science and social media
- An example of “big data’ analysis: A trilingual analysis of Zika discussions on social media
- An example of randomized experimental study: the “nasty effect” of rude comments online

Research question: What is the effect of the contextual information users encounter online?



INS HOME SEARCH

The New York Times

MIND: The Older Mind May Just Be a Fuller Mind

A CONVERSATION WITH: It All Started With a 12-Year-Old Cousin

BOOKS: Examining the Square Root of D'oh!

EXPRESS the Perfect Blue



The New Old Age
Caring and Coping

MIND | JANUARY 27, 2014, 3:27 PM | 177 Comments

The Older Mind May Just Be a Fuller Mind

By BENEDICT CAREY

People of a certain age (and we know who we are) don't spend much leisure time reviewing the research into cognitive performance and aging. The story is grim, for one thing: Memory's speed and accuracy begin to slip around age 50 and keep on slipping. The story is familiar, too, for anyone who is over 50 and, having finally learned to live fully in the moment, discovers it's a senior moment. The finding that the brain slows with age is one of the strongest in all of psychology.

E-MAIL

FACEBOOK

TWITTER

SAVE

MORE

10 YEARS

Most Read

- 1 Justice Scalia spent his last hours with members of this secretive society of elite hunters
- 2 Poll: Trump's negatives among Hispanics rise; worst in GOP field
- 3 Life with ISIS is 'really hard,' discovers Swedish teen who joined jihadists
- 4 'It's a death sentence': Facing eviction, 97-year-old woman may wind up on streets
- 5 Scientists finally track down the source of mysterious radio bursts

February 6, 2013, 2:28 pm 16 Comments

Little Blog Post About Little Particles

By MARK BITTMAN





The Most Terrifying Video You'll Ever See



wonderingmind42

Subscribe

22,259

6,886,402

+ Add to Share ... More

22,784 6,664

Uploaded on Jun 8, 2007

Over 11 million total views. Now there's a book:

"...superbly crafted...A must read." -Gen. Anthony Zinni, US CENTCOM Commande (Ret.)

SHOW MORE

Number of YouTube views provide cues about the normative importance of the issue of climate change

Spartz, J.T., Su, Leona Y.F., Dunwoody, S., Griffin, R., Brossard, D. (2017). Social Norms, new media, and climate change. *Environmental Communication: A Journal of Nature and Culture*, Vol. 9. DOI:10.1080/17524032.2015.1047887

A reminder: Audiences apply shortcuts when processing science information, online (on social media) or offline

- Knowledge levels account for only a small amount of variance in attitudes toward different scientific issues
- Heuristics and mental shortcuts play a more important role





Online conversations (such as blog comments) are not neutral and provide cognitive shortcuts to “low information” audiences

Uncertainty

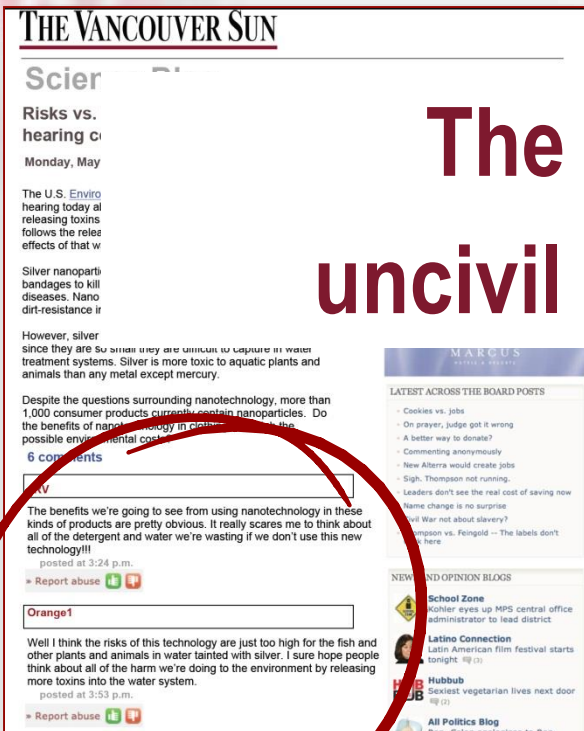
Emotions

Disagreement

Name calling

... and this contextualization influences how we think about (science) information

The nasty effect of uncivil online comments



THE VANCOUVER SUN

Scier

Risks vs. hearing c

Monday, May

The U.S. Enviro hearing today at releasing toxins follows the rele effects of that w

Silver nanoparti bandages to kill diseases. Nano dirt-resistance it

However, silver since they are so small they are difficult to capture in water treatment systems. Silver is more toxic to aquatic plants and animals than any metal except mercury.

Despite the questions surrounding nanotechnology, more than 1,000 consumer products currently contain nanoparticles. Do the benefits of nanotechnology in consumer products outweigh the possible environmental costs?

6 comments

AV

The benefits we're going to see from using nanotechnology in these kinds of products are pretty obvious. It really scares me to think about all of the detergent and water we're wasting if we don't use this new technology!!!

posted at 3:24 p.m.

Report abuse

Orange1

Well I think the risks of this technology are just too high for the fish and other plants and animals in water tainted with silver. I sure hope people think about all of the harm we're doing to the environment by releasing more toxins into the water system.

posted at 3:53 p.m.

Report abuse

an enlightening conversational bridge across the many geographic, social, cultural, ideological and economic boundaries that ordinarily separate us in life, a way to pay bills without a stamp.



Then someone invented "reader comments" and paradise was lost.

The Web, it should be said, is still a marvelous place for public debate. But when it comes to reading and understanding news stories online — like this one, for example — the medium can have a surprisingly potent effect on the message. Comments from some readers, our research shows, can significantly distort what other readers think was reported in the first place.

But here, it's not the content of the comments that matters.

SAVE

E-MAIL

SHARE

PRINT

REPRINTS

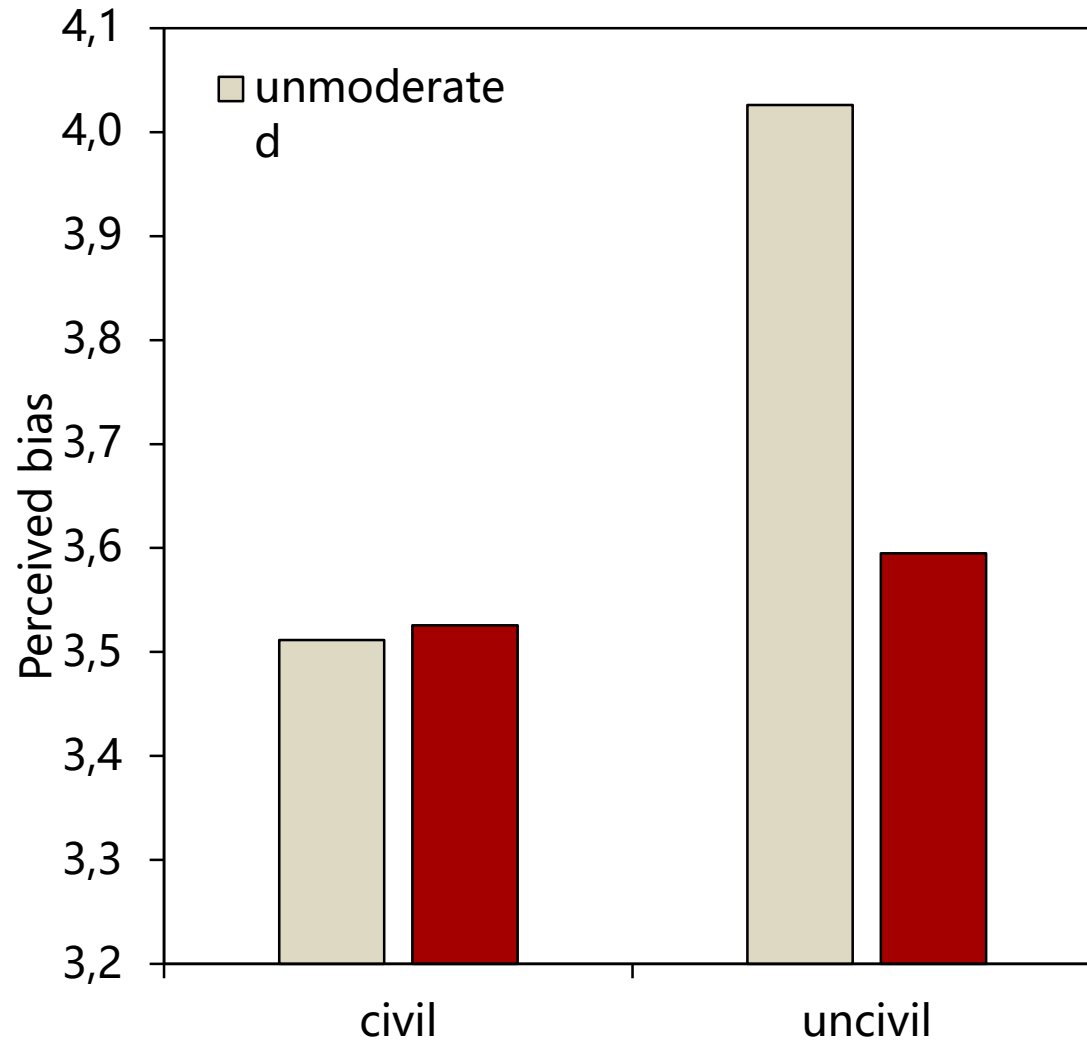
THE WAY BACK WATCH TRAILER

Anderson, A. A., Brossard, D., Scheufele, D. A., Xenos, M. A., & Ladwig, P. (2013). The "nasty effect:" Online incivility and risk perceptions of emerging technologies. *Journal of Computer-Mediated Communication*. doi: 10.1111/jcc4.12009.

The nasty effects of uncivil comments on perceptions of news and science



Yeo, S. K., Su, L. Y.-F., Scheufele, D. A., Brossard, D., Xenos, M. A., & Corley, E. A. (forthcoming). The effect of comment moderation on perceived bias in science news. *Information, Communication & Society*.



Contextual cues are frequent on social media

- high numbers of likes and shares on Facebook (i.e., normative social cues) have significant direct and interactive effects on
 - news evaluation
 - respondents' news consumption intention
 - Etc...

In high risk, high social plug-ins setting,



In high risk, low social plug-ins,



In low risk, high social plug-ins,

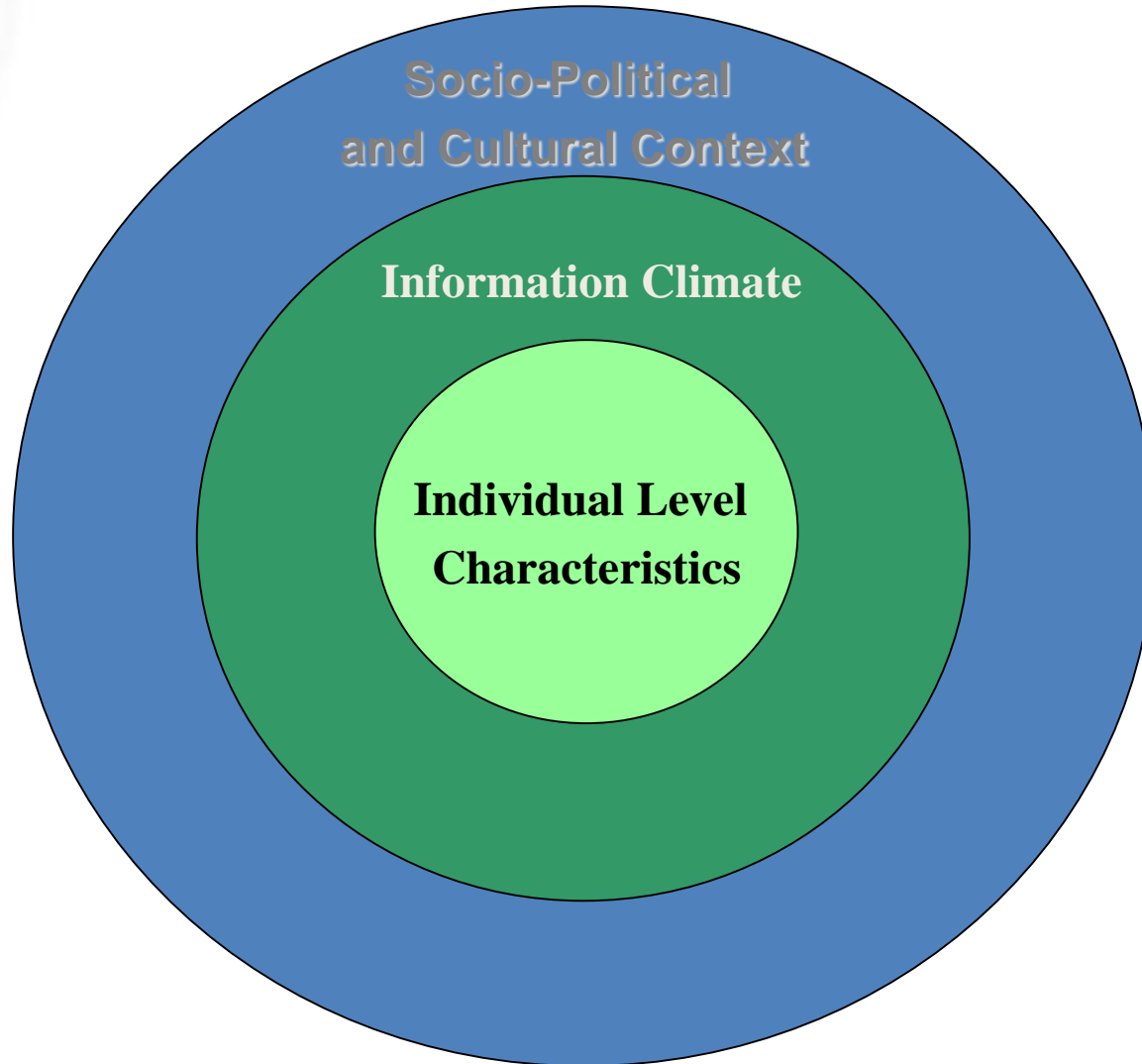


In low risk, low social plug-ins,



Kim, J. (2015, August). Exploring the influence of normative social cues in online communication: From the news consumers' perspective. Presented at the annual conference of the Association for Education in Journalism and Mass Communication, San Francisco, CA.

The (social media) information climate is only one piece of the puzzle when seeking to understand public attitudes toward science





Concluding Thoughts

- Audiences are online and using social media, which play an important role in shaping public attitudes
 - Empirical research can identify the sentiment of online discourses related to controversial science
 - Empirical research has beginning to entangle the effects of “contextual factors” on public attitudes toward science
- “Viral” processes are beginning to be understood
- We are continuously adapting and developing research methods to explore social media environments and their effects on attitudes toward science



Thank you

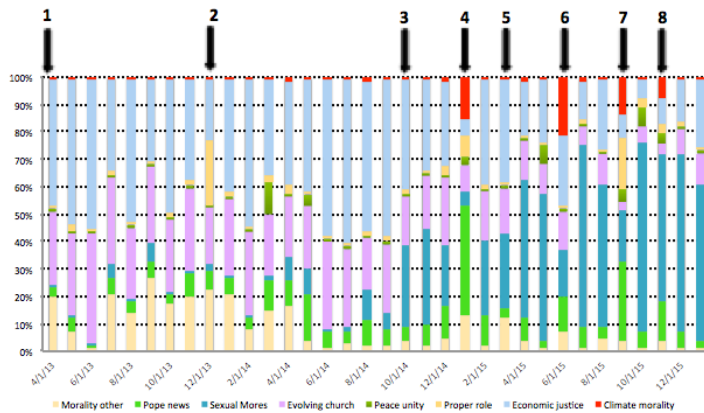
dbrossard@wisc.edu

 @brossardd

scimep.wisc.edu

RESULTS

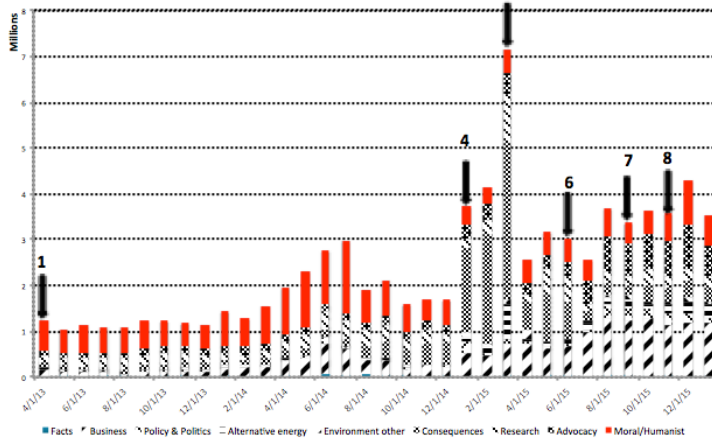
Pope Francis Themes



Important Milestones

- 1 March 2013: Pope Francis is elected
- 2 December 2013: Pope Francis chosen as TIME's Person of the Year
- 3 October 2014: Third Extraordinary General Assembly of the Synod of the Bishops on Families
- 4 January 2015: News breaks that Pope Francis is planning to write an encyclical regarding climate change
- 5 March 2015: The earth passes the global average of 400 ppm of CO₂
- 6 June 2015: January 2015: The Vatican releases the encyclical, Laudato Si
- 7 September 2015: Pope Francis visits the United States
- 8 November 2015: Pope Francis makes strong statements regarding the success or failure of COP21

Climate Themes



Sample Tweets



Moral, Pope Monitor: RT @ClimateReality Retweet if you agree with Pope Francis - we need to take #CareOfCreation. @NRDC

Sexual Mores, Pope Monitor: Pope wades into U.S. gay marriage debate after historic visit

Moral/Humanistic, Climate Monitor: We can't condemn our kids to a planet that's beyond fixing.

Consequence, Climate Monitor: RT @MarcVegan Risk of major sea level rise in England, Northern Europe #global#warming #climate #cha...

REFERENCE

Runge, K., Yeo, S., Cacciatore, M., Scheufele, D., Brossard, D., Xenos, M., Anderson, A., Choi, D., Kim, J., Li, N., Liang, X., Stubbings, M., Su, LY-F. (2013). Tweeting nano: how public discourses about nanotechnology develop in social media environments. *Journal of Nanoparticle Research*. 15: 1381.

Eichmeier, A., Wirz, C., Brossard, D., Scheufele, D., Xenos, M. & Stenhouse, N. (2016, February). Has Pope Francis changed the framing of climate change discourse online? Poster presented at the 2016 American Association for the Advancement of Science Annual Meeting, Washington, DC.