



# Science and Social Media

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*National Academy of Sciences and National Academy of Medicine:  
Committee Science of Science Communication: A Research Agenda  
Washington DC, February 25, 2016*



# This Talk: An Overview

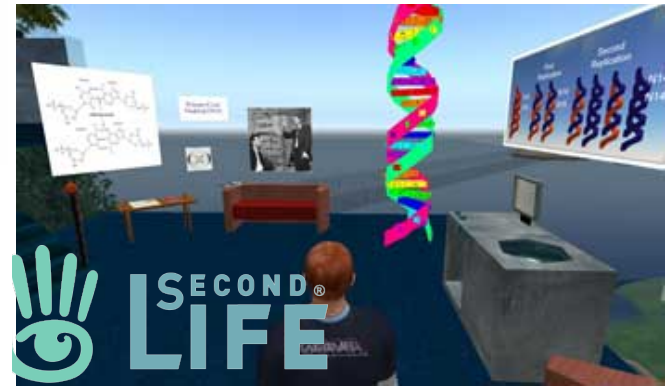
- What are social media?
- Why should research focus on understanding their role?
- Where should we go from there?



# 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*





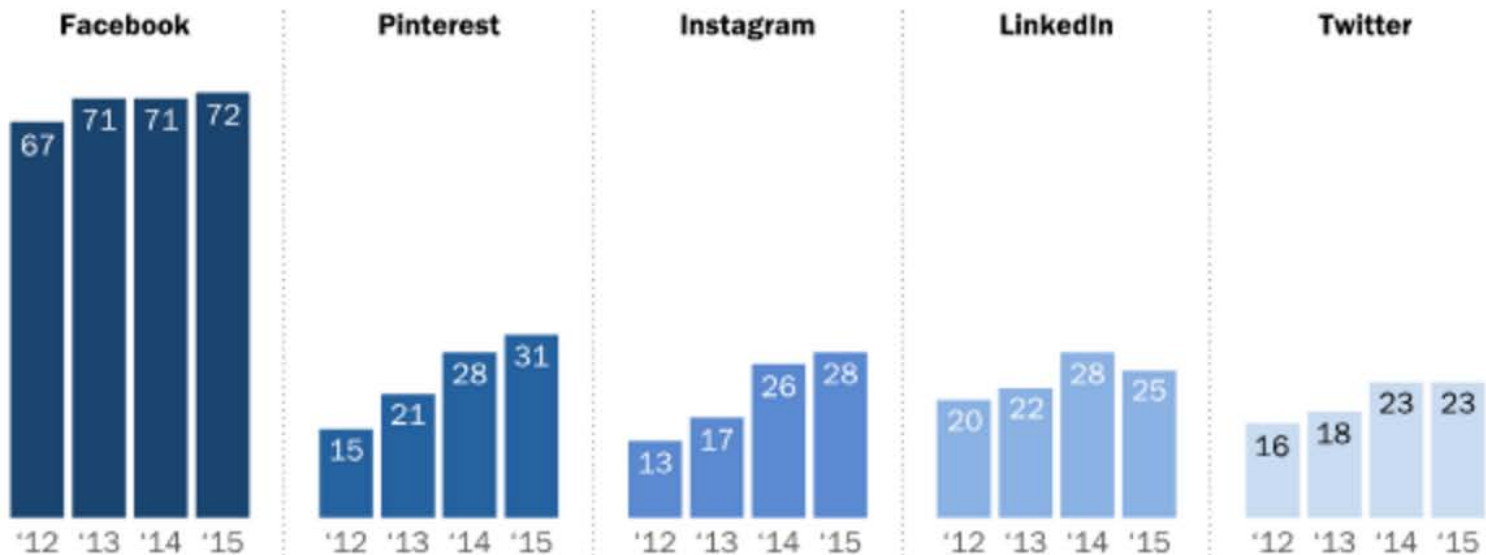
# This Talk: An Overview

- What are social media?
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- Where should we go from there?

# 1. (Online) Americans are using these platforms

## Pinterest and Instagram Usage Doubles Since 2012, Growth on Other Platforms is Slower

*% of online adults who say they use the following social media platform, by year*

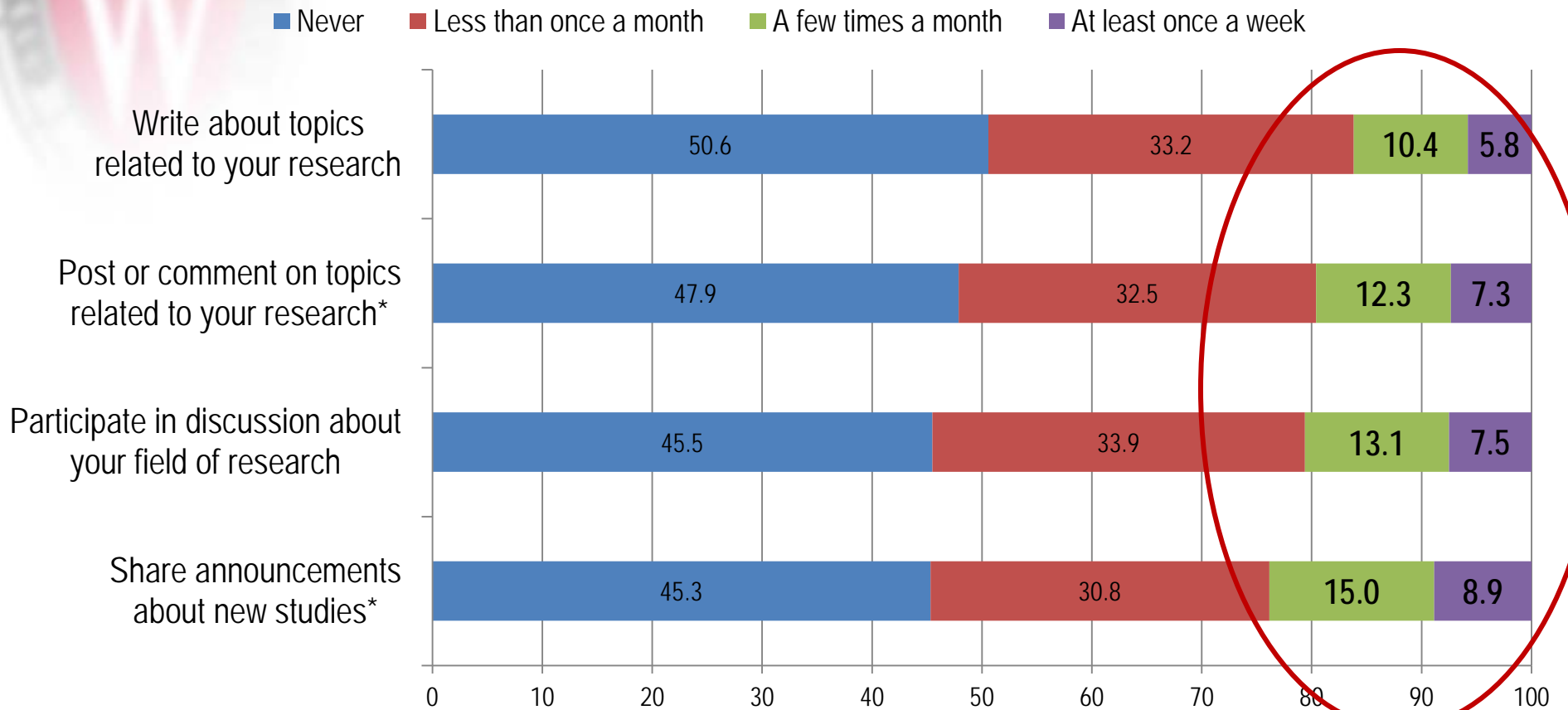


Pew Research Center Survey, March 17-April 12, 2015.

PEW RESEARCH CENTER

And they are using them for science related purposes

...and this include a growing number of scientists who use social media to directly communicate with lay publics



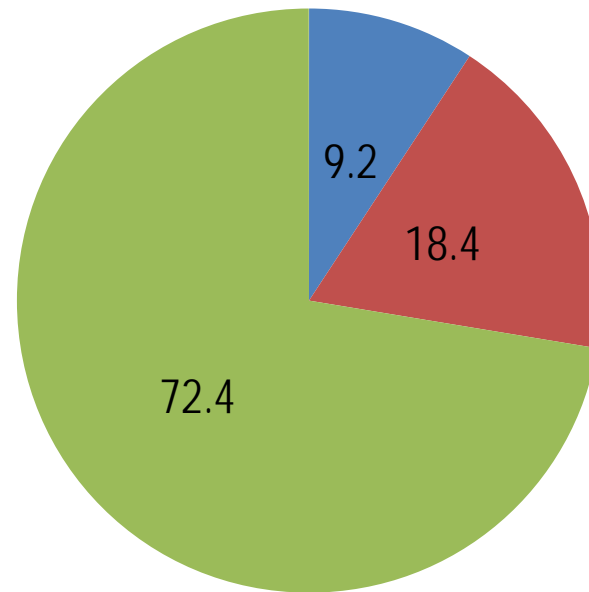
\*42 and younger significantly more often than other age groups ( $p < 0.05$ )

Brossard et. al (2016, February). Scientists and Synthetic Biology: New Science, New Media, (New) Public Engagement. Data presented at AAAS 2016 Convention

# A majority of synthetic biologists view social media as important public engagement platforms

Scientists should discuss potentially controversial topics, such as synthetic biology, on social media.<sup>†</sup>

■ Disagree ■ Neither disagree nor agree ■ Agree



<sup>†</sup>42 and younger significantly more than 55+ age group

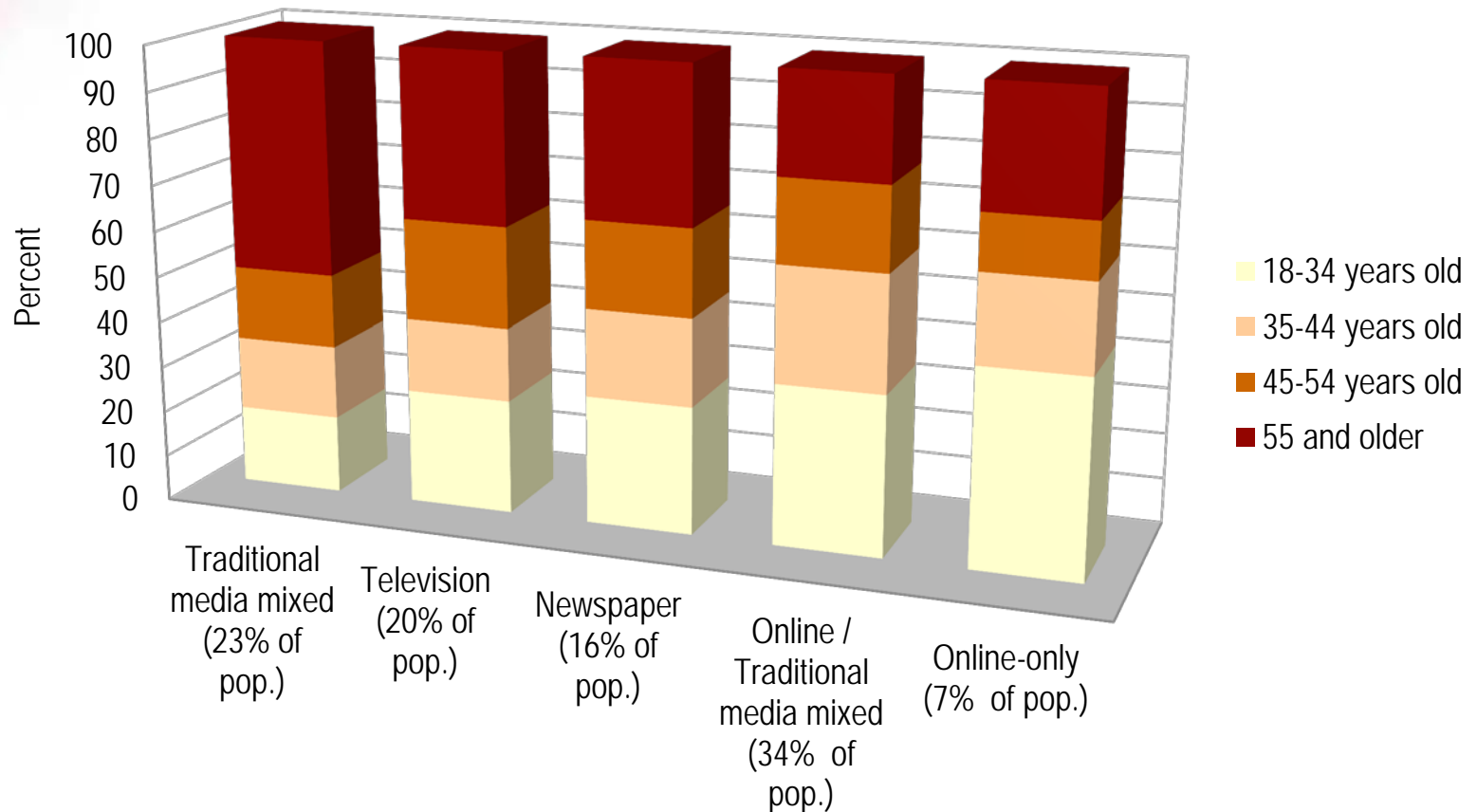
% of respondents (N=779)

Brossard et. al (2016). Scientists and Synthetic Biology: New Science, New Media, (New) Public Engagement. Data presented at AAAS 2016

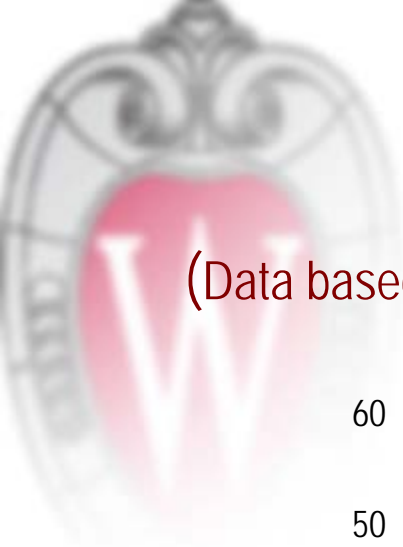


## 2. We know that audiences are developing (new) science media diets

Data based on: Anderson, A. A., Brossard, D., & Scheufele, D. A. (2010). The changing information environment for nanotechnology: Online audiences and content. *Journal of Nanoparticle Research*, 12(4), 1083-1094.

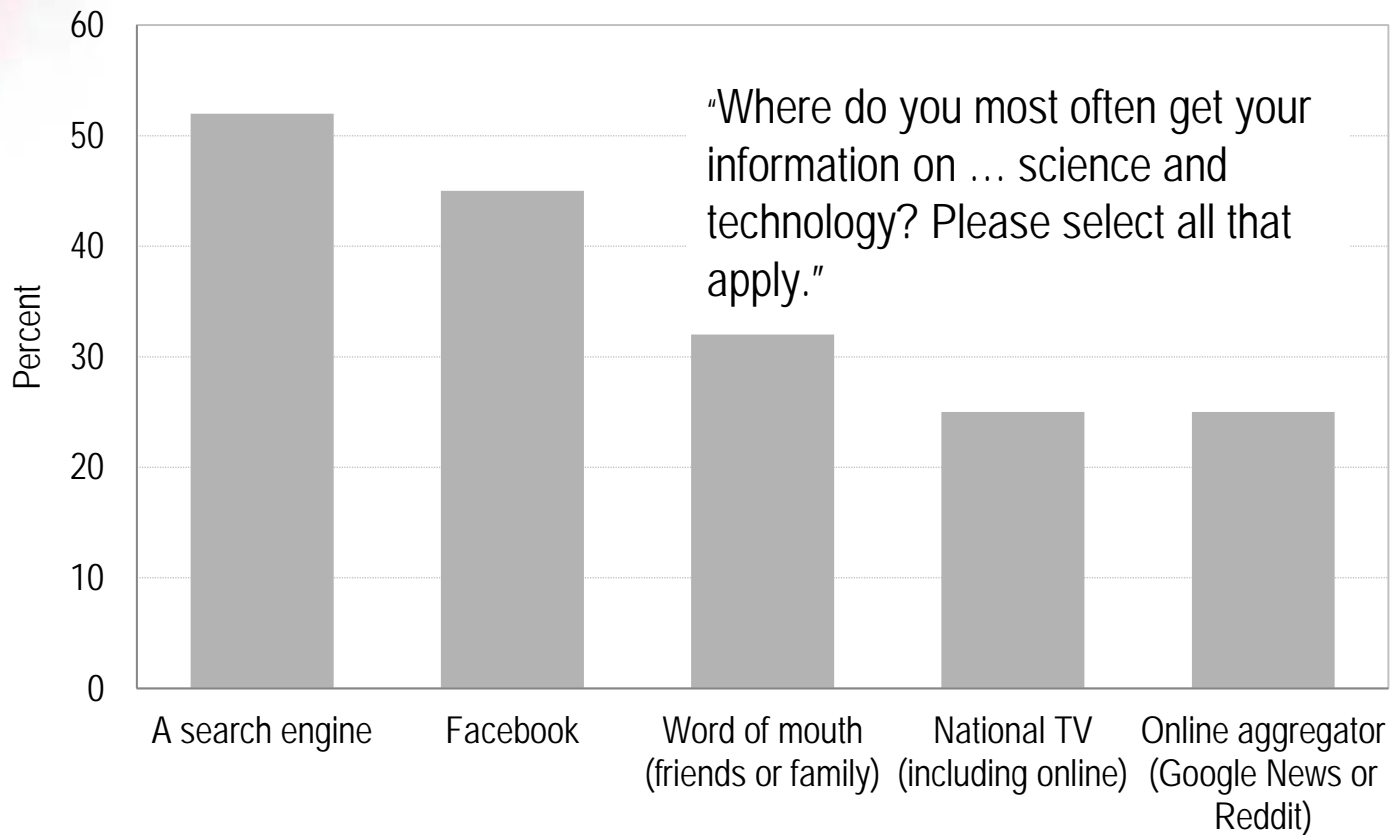


... and that social media are important sources of news



### 3. We know individuals' top channels for science & technology related information

(Data based on: Associated press/NORC/API Media Insight Project Poll, Jan. 2015)



# What do lay audiences are likely to encounter online?

## 4. We can get insights from "big data" approaches



- 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

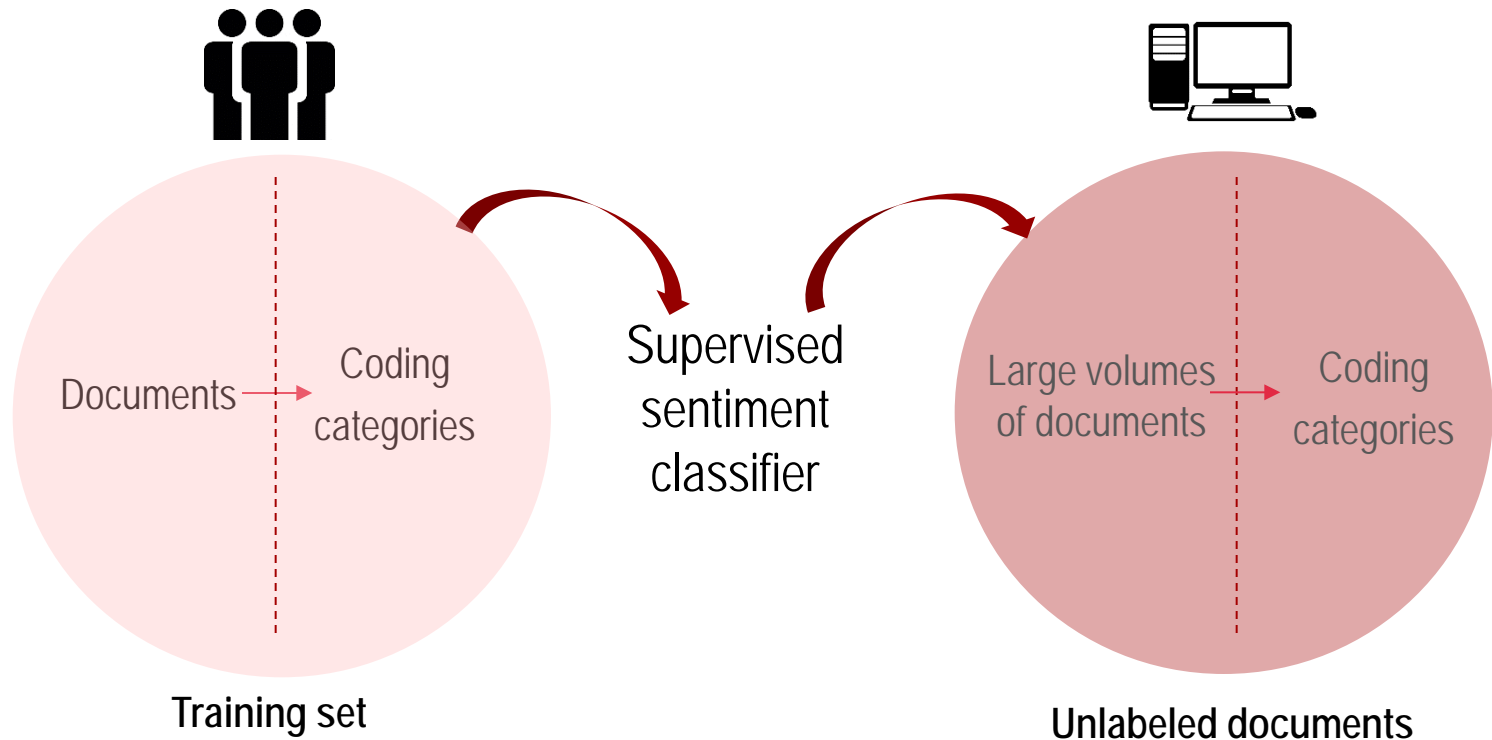
- Potential of “self-reinforcing informational spirals”



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

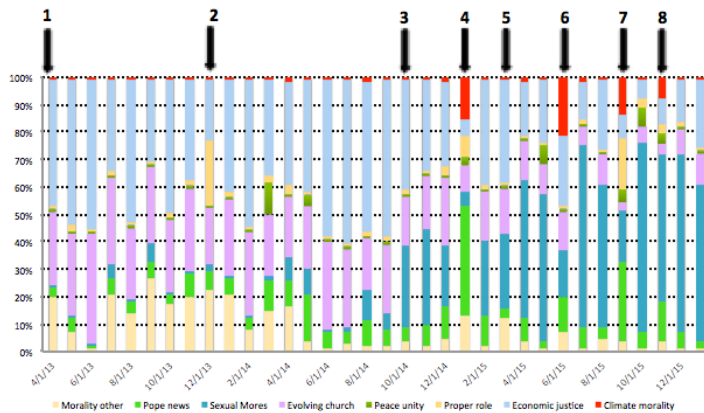
# Novel “big data” content analysis tool based on intelligent algorithms provide insightful data

- “Supervised machine learning methods”
  - Commercial tools (e.g., Crimson Hexagon ForSight)



# RESULTS

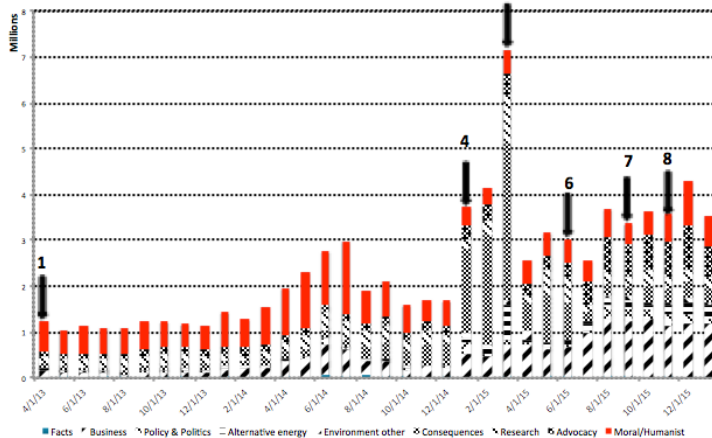
## Pope Francis Themes



## 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 CO<sub>2</sub>
- 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.

# And empirical research highlights 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

E-MAIL

FACEBOOK

TWITTER

SAVE

MORE

10 YEARS

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.

### 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.)

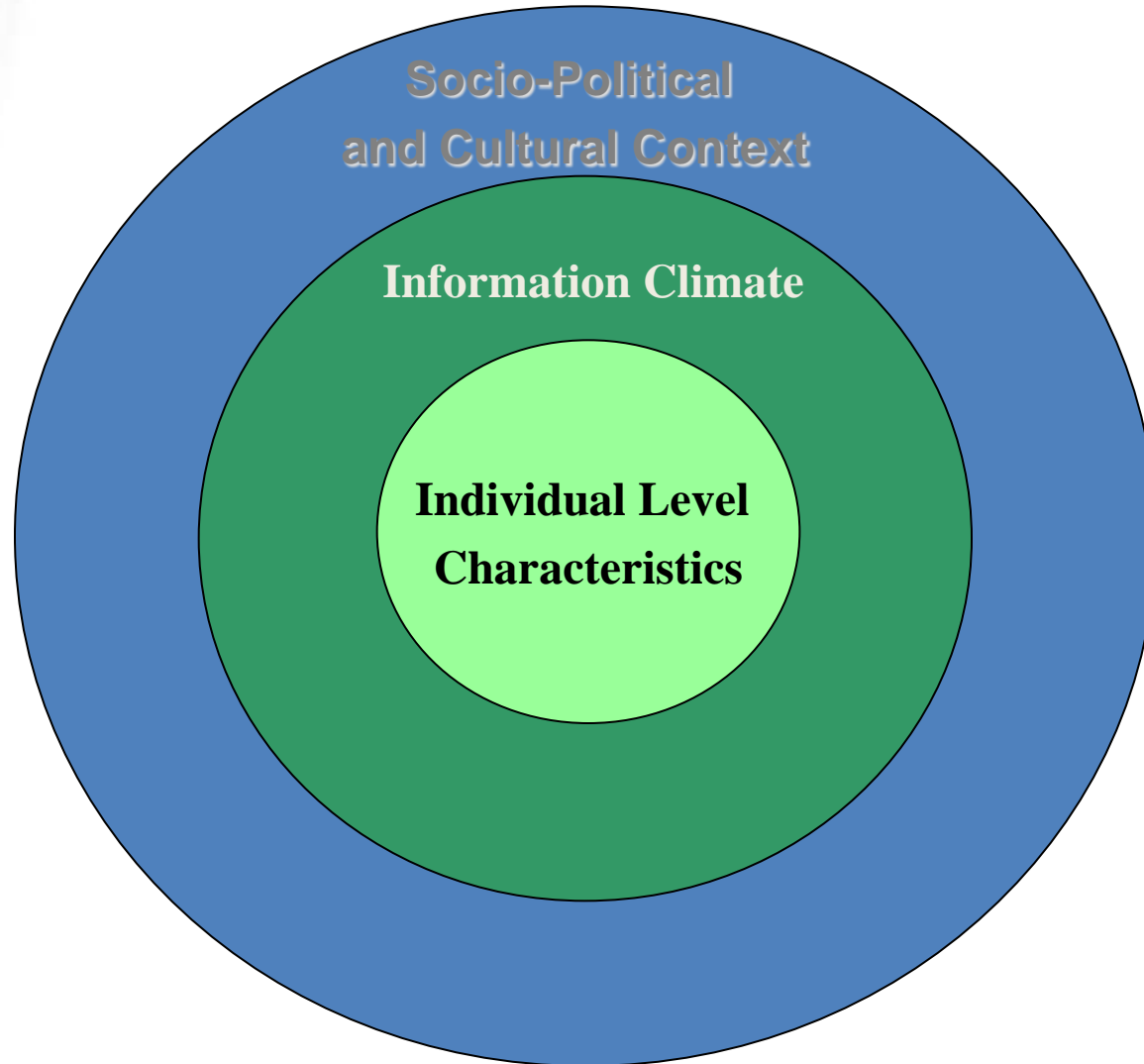
SHOW MORE

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. (2015). Social Norms, new media, and climate change. *Environmental Communication: A Journal of Nature and Culture*, Vol. 9. DOI:10.1080/17524032.2015.1047887



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





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 VANCOUVER SUN**

### Scier

Risks vs. hearing c  
Monday, May

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

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

However, silver since they are so small they are unlikel 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

RV

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

# The nasty effect of uncivil online comments

HOME PAGE TODAY'S PAPER VIDEO MOST POPULAR U.S. Edition

The New York Times

an enlightening conversational bridge across the many geographic, social, cultural, ideological and economic boundaries that ordinarily separates 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.

Enlarge This Image

Submit Comment

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



# 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.



## 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
- More and more scientists are embracing direct communication with lay publics but we don’t know the effects of such efforts
- “Viral” processes are beginning to be understood



- Question to ponder:  
What's "effectiveness?" when we think of  
social media and science communication



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## About

We are a research group at the [University of Wisconsin-Madison](#) working on issues broadly related to the social, legal, and ethical implications of controversial scientific issues and emerging technologies.



### Research at the intersection of science, media & public opinion

Current research includes ongoing surveys about public attitudes toward nanotechnology, nuclear energy and other emerging technologies, experimental studies of message processing and public understanding of controversial science, and long-term tracking of media coverage. We are also exploring the potential of the online environment for effective public communication and engagement in issues related to emerging and controversial science and technology.

Our various projects bring together researchers from multiple departments on campus, including [Life Sciences Communication, Journalism & Mass Communication, Communication Arts, Materials Science and Engineering, Chemical and Biological Engineering, Medicine & Public Health, Civil and Environmental Engineering, Engineering Physics, and UW-Extension.](#)





Thank you

[dbrossard@wisc.edu](mailto:dbrossard@wisc.edu)

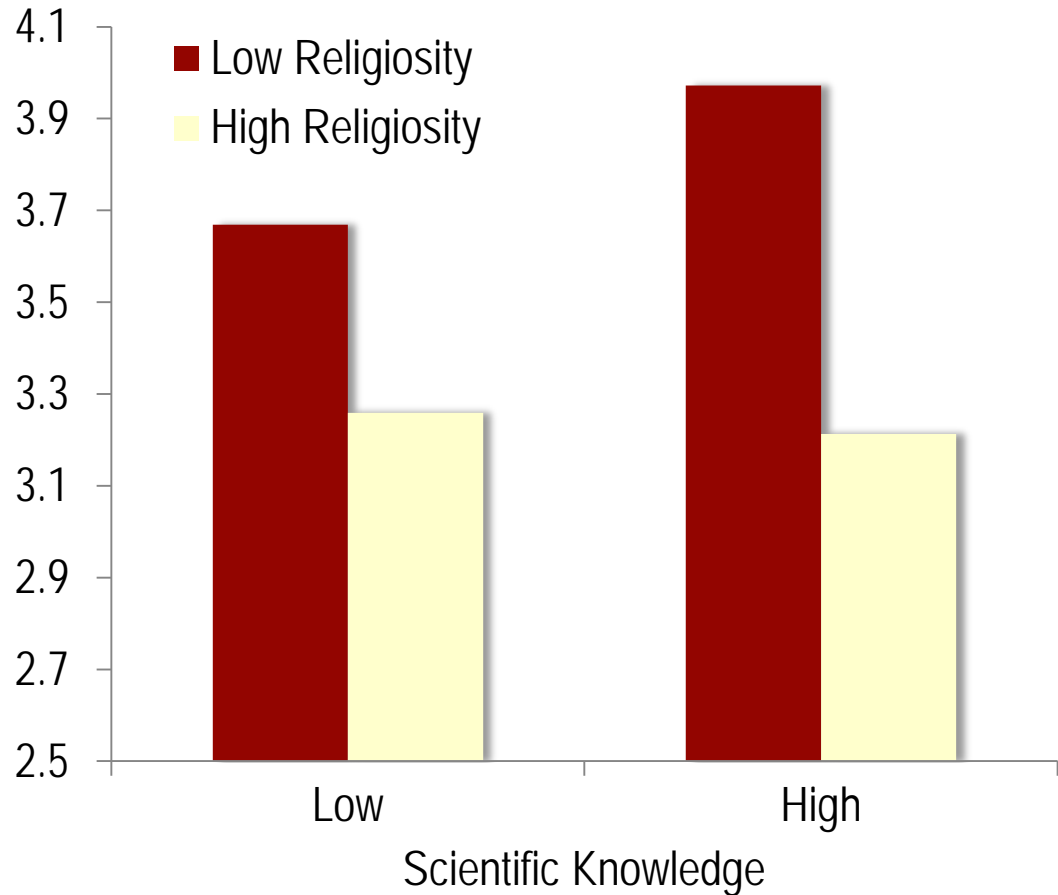
 @brossardd

[scimep.wisc.edu](http://scimep.wisc.edu)

# Little Support For the Science Literacy/Deficit Model: Information Matters In Different Ways for Different Groups



Support for Human Embryonic Stem Cell  
Research (partial scale range displayed)



Ho, S. S., Brossard, D., & Scheufele, D. A. (2008). Effects of value predispositions, mass media use, and knowledge on public attitudes toward embryonic stem cell research. *International Journal of Public Opinion Research*, 20(2), 171-192.