NEWS, NARRATIVES, AND EMERGING TECHNOLOGIES: THE 'SCIENCE' OF COMMUNICATING SCIENCE"

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Sharing the Adventure with the Public: The Value and Excitement of "Grand Questions" of Space Science and Exploration
NAS Space Studies Board, Irvine, CA

November 10, 2010

THIS TALK … AN OVERVIEW

- How audiences make sense of emerging technologies, with or without information
- Developing communication strategies based on what we have learned from previous technologies
- A quick recap: five ways to create communication failures …

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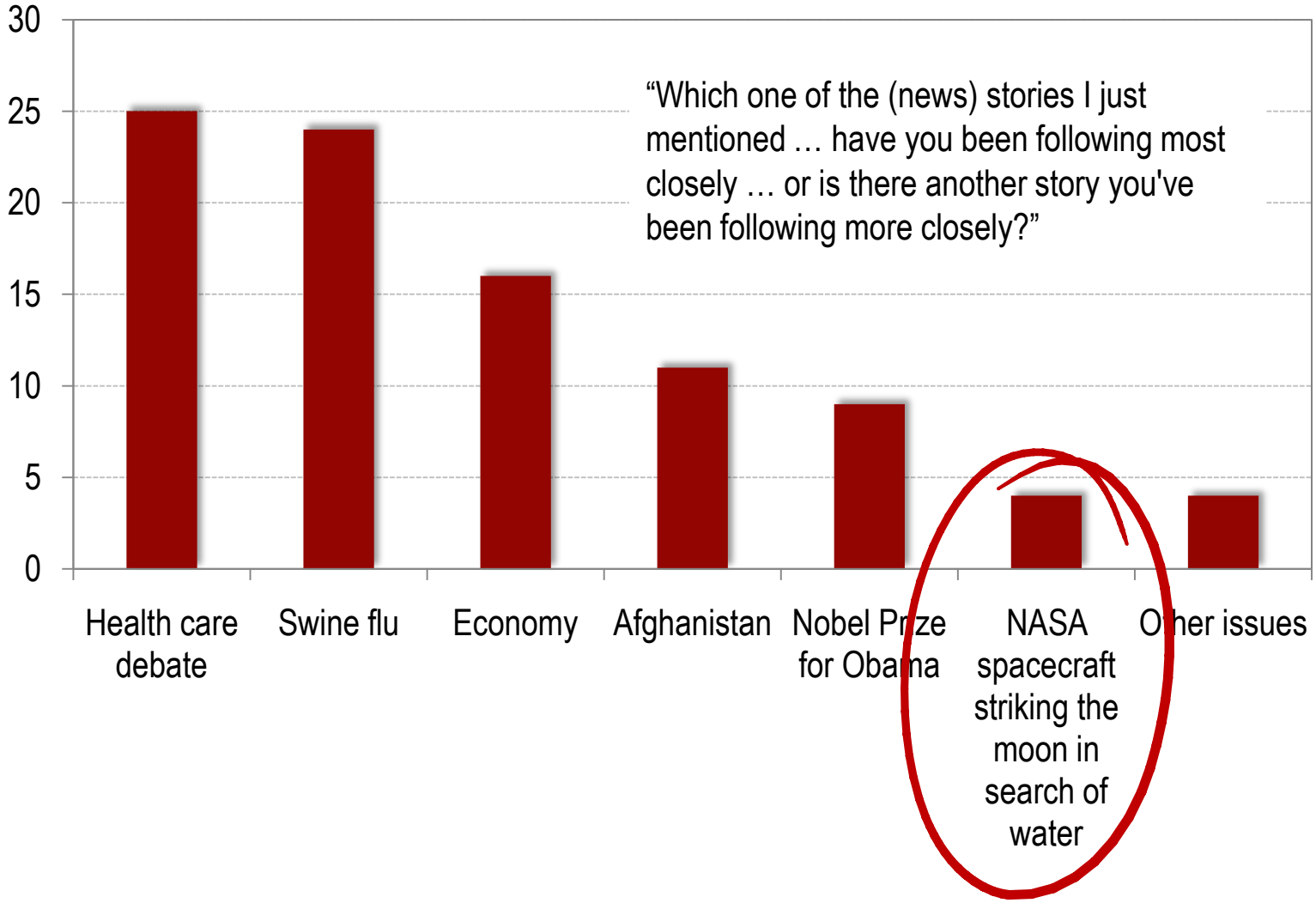
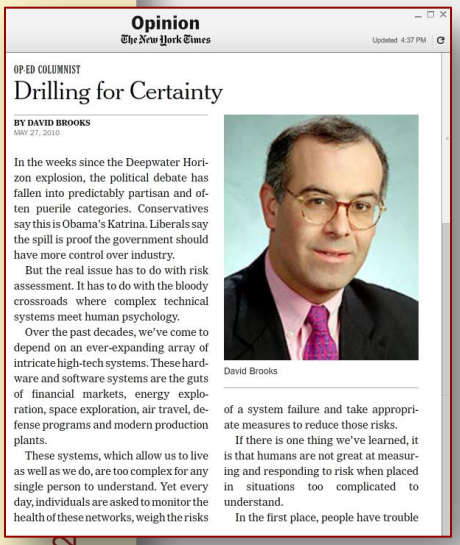
FIRST, A FEW ASSUMPTIONS ABOUT ATTENTIVE SCIENCE AUDIENCES

Source: Pew Research Center for the People & the Press. Methodology; conducted by Opinion Research Corporation, October 9 - October 12, 2009 and based on 1,003 telephone interviews.



AND THAT IS REFLECTED IN WHAT THEY KNOW AND BELIEVE

National Science Board. (2010). Science and Engineering Indicators 2010. National Science Foundation Retrieved March 3, 2010, from http://www.nsf.gov/statistics/seind10/.



Opinion
The New York Times
Updated 4:37 PM

OP-ED COLUMNIST

Drilling for Certainty

BY DAVID BROOKS
MAY 27, 2010

In the weeks since the Deepwater Horizon explosion, the political debate has fallen into predictably partisan and often puerile categories. Conservatives say this is Obama's Katrina. Liberals say the spill is proof the government should have more control over industry.

But the real issue has to do with risk assessment. It has to do with the bloody crossroads where complex technical systems meet human psychology.

Over the past decades, we've come to depend on an ever-expanding array of intricate high-tech systems. These hardware and software systems are the guts of financial markets, energy exploration, space exploration, air travel, defense programs and modern production plants.

These systems, which allow us to live as well as we do, are too complex for any single person to understand. Yet every day, individuals are asked to monitor the health of these networks, weigh the risks of a system failure and take appropriate measures to reduce those risks.

David Brooks

If there is one thing we've learned, it is that humans are not great at measuring and responding to risk when placed in situations too complicated to understand.

In the first place, people have trouble

- Lay audiences have little factual knowledge of science overall, and that's not news …
- But more importantly, their framework for *learning* about new technologies is limited
  - 51% know how long it takes for earth to go around sun
  - 38% understand the logic of an experiment
  - 22% understand the concept of a scientific study
- And they're chronically distracted
  - 13% of the U.S. public reports following science and technology news very closely, down from 20% in 1996
- So how *do* lay audiences make sense of science?

THE ANSWER: "WE ARE ALL COGNITIVE MISERS"

Scheufele, D. A. (2006). Messages and heuristics: How audiences form attitudes about emerging technologies. In J. Turney (Ed.), *Engaging science: Thoughts, deeds, analysis and action* (pp. 20-25). London: The Wellcome Trust.

- "Low information rationality"
  - It does not make sense for most of us to develop an in-depth understanding of complex issues
  - As a result, we form attitudes on issues, including S&T, even in the absence of sufficient information
  - Values, heuristics, etc. become powerful replacements or tools for interpreting information

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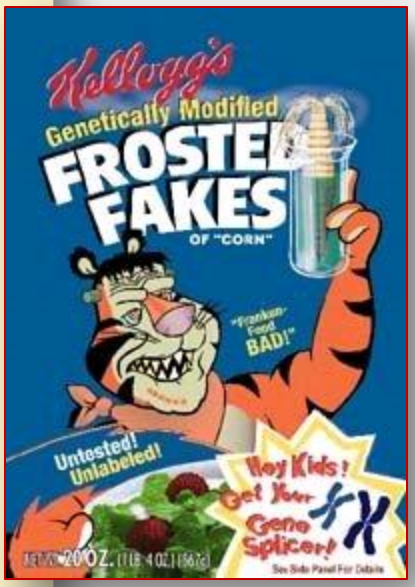
LESSION 1: FRAMES AND NARRATIVES ARE POWERFUL HEURISTICS

Scheufele, D. A., & Tewksbury, D. (2007). Framing, agenda setting, and priming: The evolution of three media effects models. *Journal of Communication, 57*(1), 9-20. doi:10.1111/j.1460-2466.2006.00326.x



- Frames have little to do with changing information
- Rather: Frames differ in how they *present* and contextualize issues
  - Frankenfood vs. GMOs
  - Nano as the next plastic or the next asbestos?
  - Bank Bailout vs. Rescue Package
  - etc.
- As a result: The same scientific information will be *interpreted differently* by lay audiences, depending on how it is framed.

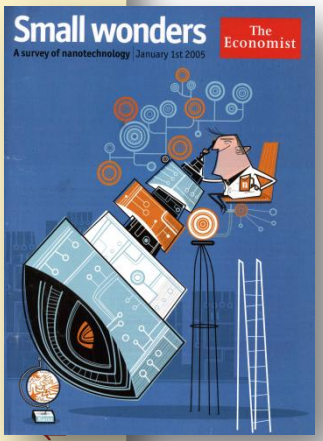
THE SAME INFORMATION … DIFFERENT INTERPRETATION

Kahneman, D. (2003). Maps of bounded rationality: A perspective on intuitive judgment and choice. In T. Frängsmyr (Ed.), *Les Prix Nobel: The Nobel Prizes 2002* (pp. 449-489). Stockholm, Sweden: Nobel Foundation.

- Daniel Kahneman and Amos Tversky: "Perception [of ambiguous stimuli] is reference-dependent."
- Science as complex, ambiguous stimulus, and framing as a way to reduce this ambiguity by contextualizing the information

THE FRAMING LIFE CYCLE OF EMERGING TECHNOLOGIES IN THE NEWS

Nisbet, M. C., Scheufele, D. A. (2007). The future of public engagement [Cover article]. *The Scientist, 21*(10), 38-44.



Social progress	…improving quality of life, or solution to problems. Alternative interpretation as harmony with nature instead of mastery, "sustainability."
Economic development / competitiveness	…economic investment, market benefits or risks; local, national, or global competitiveness.
Morality / ethics	…right or wrong; respecting or crossing limits, thresholds, or boundaries.
Scientific / technical uncertainty	…expert understanding; what is known and unknown; invoking or undermining consensus, "sound science," or peer-review.
Pandora's box / Frankenstein's monster / runaway science	…call for precaution in face of possible impacts or catastrophe. Out-of-control, a Frankenstein's monster, or as fatalism, i.e. action is futile, path is chosen, no turning back.

SYNTHETIC BIOLOGY AS A PERFECT EXAMPLE

Synthetic biology
earlier this year …

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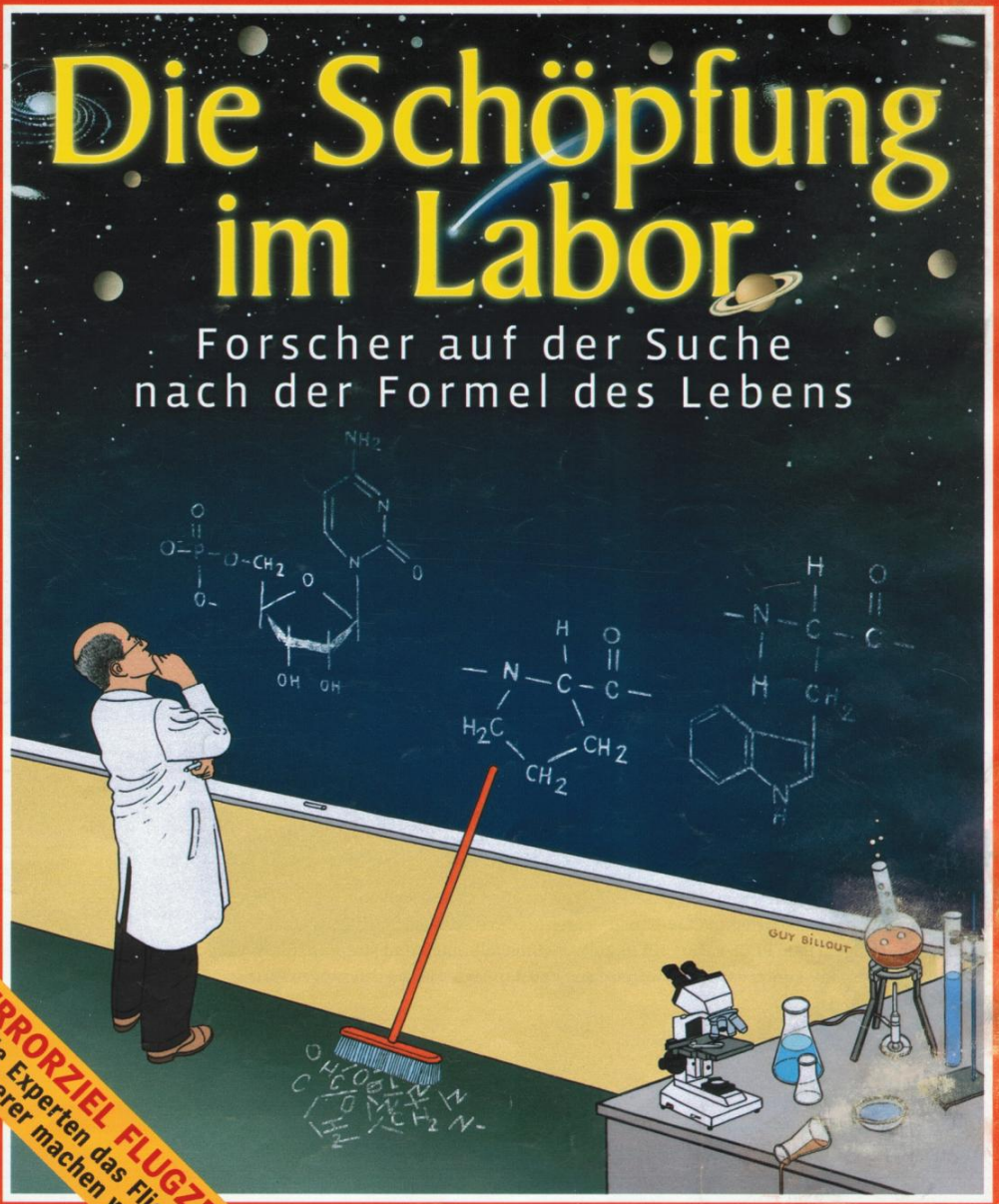
Die Schöpfung im Labor

Forscher auf der Suche nach der Formel des Lebens



TERRORZIEL FLUGZEUG
Wie Experten das Fliegen sicherer machen wollen

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www.spiegel.de

SYNTHETIC BIOLOGY AS A PERFECT EXAMPLE

… and in the aftermath of the
J. Craig Venter story.

CONTROVERSY
RAND PAUL'S LIBERTARIAN CHALLENGE
p.4

THE LAST WORD
Maybe life *isn't* a bowl of cherries
p.44

INTERNATIONAL
The world's most pathetic former royal
p.13

THE WEEK

THE BEST OF THE U.S. AND INTERNATIONAL MEDIA

It's alive!

Now that science has gained the power to create life, what lies ahead?
p.18

JUNE 4, 2010 VOLUME 10 ISSUE 466

LESSON 2: EFFECTIVE COMMUNICATION IS PROACTIVE

- There is no such thing as a narrative vacuum … at least not for long
- Once terminology is established, it is difficult to change ("global climate disruption" debate of September 2010)

EFFECTIVE NARRATIVES ARE PROACTIVE

- Example: Nanotechnology
  - European product campaigns on nanotechnology much more proactive with “nano is nature” frame, i.e., they learned their lesson from “Frankenfood” and “Magic Nano”
  - Also: pre-emptive image campaigns in mainstream media outlets (“Chemie macht Zukunft”)

THIS MEANS THAT WE NEED TO CONNECT WITH AUDIENCES ON THEIR OWN TURF…

Bundesliga – Dortmund-Leverkusen, August 16, 2008

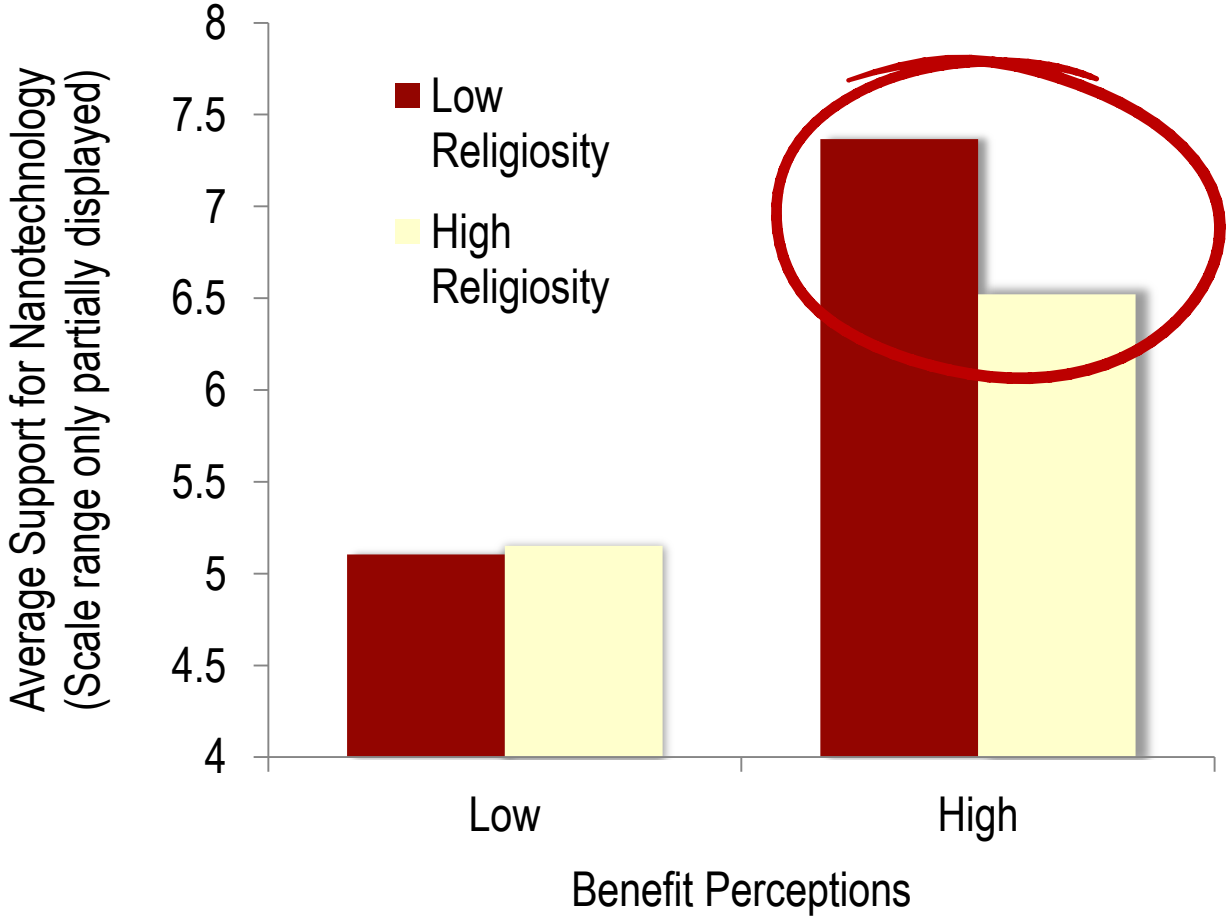
LESSON 3: PUBLIC VALUES MATTER

Brossard, D., Scheufele, D. A., Kim, E., & Lewenstein, B. V. (2009). Religiosity as a perceptual filter: Examining processes of opinion formation about nanotechnology. *Public Understanding of Science, 18*(5), 546–558. doi: 10.1177/0963662507087304

- Emerging technologies increasingly merge realms of science, politics, and people's personal lives
- Perceptual filters and values matter
  - as replacements for information,
  - but also as tools for information processing, i.e., same piece of information will mean different things to different audiences

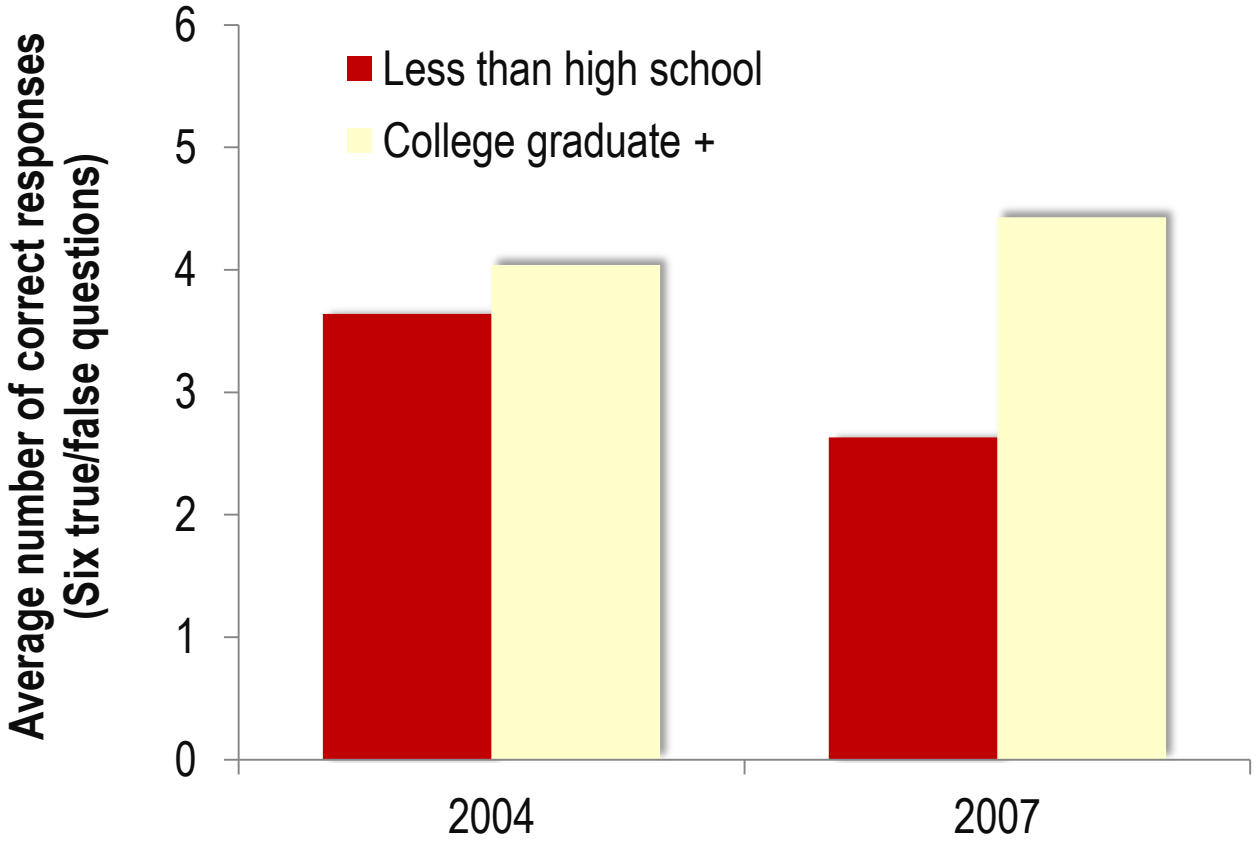
ONE EXAMPLE: NANO ATTITUDES AND RELIGION

Brossard, D., Scheufele, D. A., Kim, E., & Lewenstein, B. V. (2009). Religiosity as a perceptual filter: Examining processes of opinion formation about nanotechnology. *Public Understanding of Science, 18*(5), 546–558.

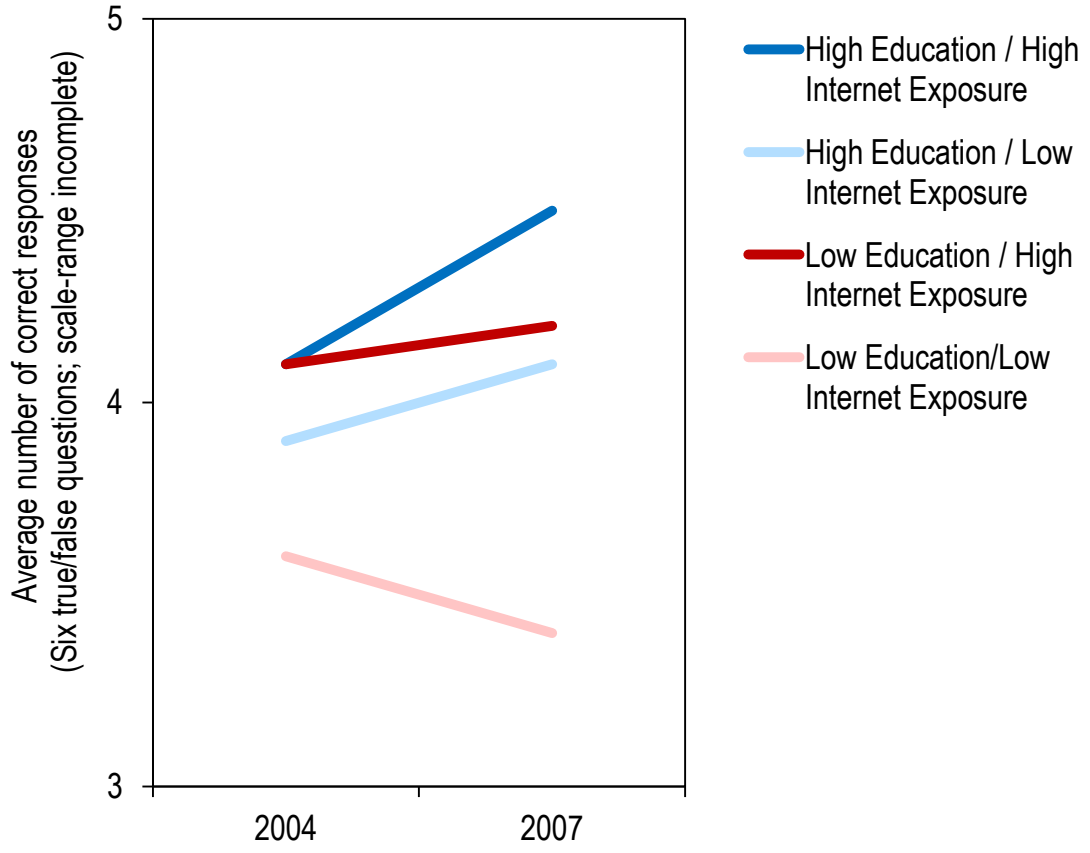


LESSON 4: GOOD COMMUNICATION SHOULD NOT WIDEN ELITE GAPS

Corley, E. A., & Scheufele, D. A. (2010). Outreach gone wrong? When we talk nano to the public, we are leaving behind key audiences. *The Scientist, 24*(1), 22.

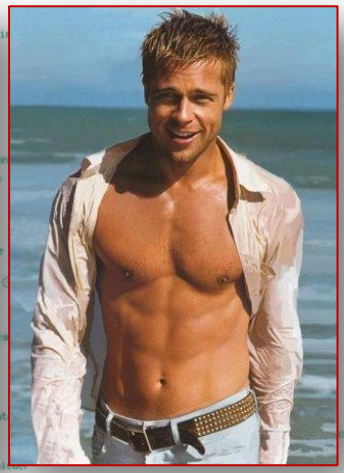


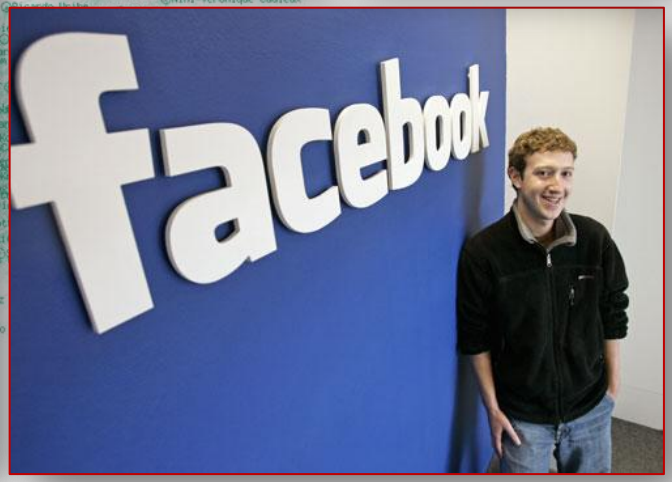
ONLINE CHANNELS EMERGING AS MOST EFFECTIVE TOOLS FOR CLOSING GAPS …



Data based on: Corley, E. A., & Scheufele, D. A. (2010). Outreach gone wrong? When we talk nano to the public, we are leaving behind key audiences. *The Scientist, 24*(1), 22.

MORE IMPORTANTLY, THE POWER OF SOCIAL NETWORKS

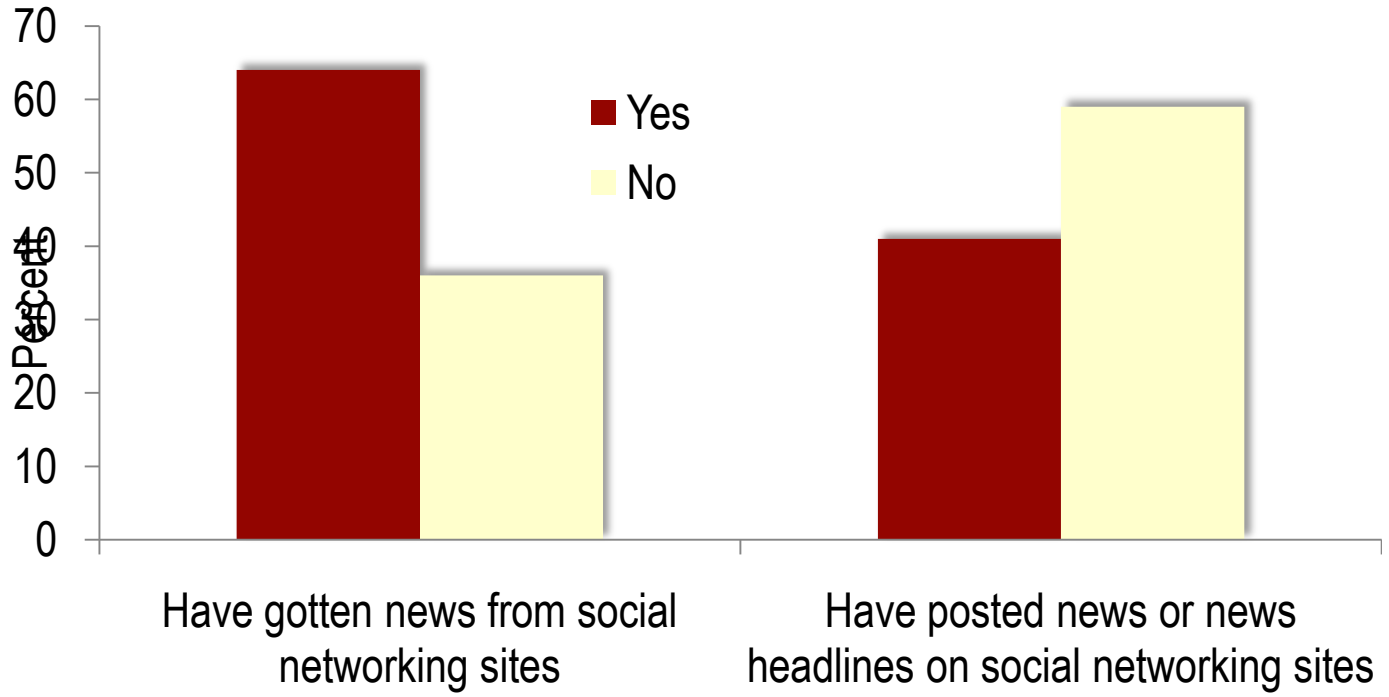




SOCIALLY-NETWORKED OPINION LEADERSHIP?

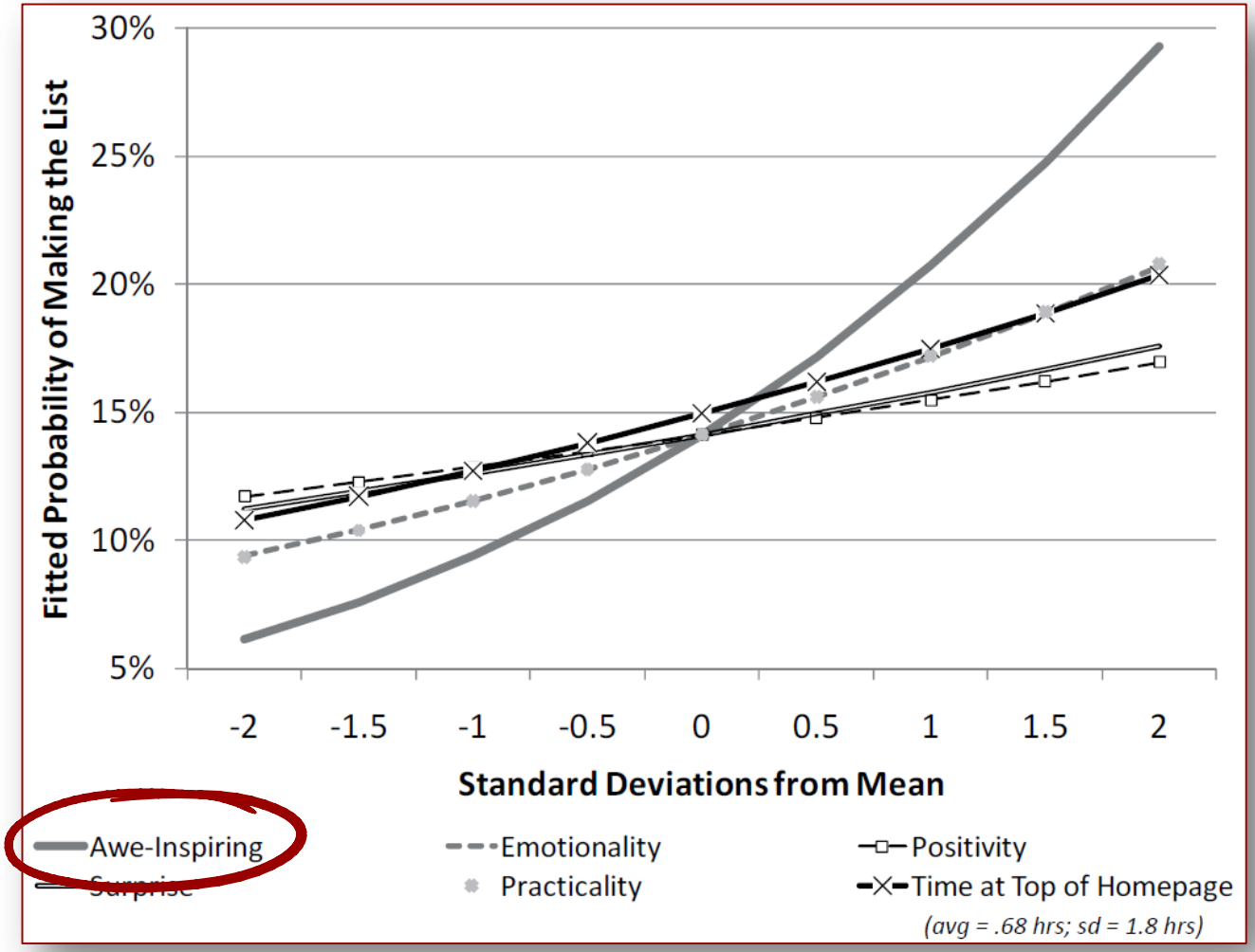
Pew Research Center for the People & the Press. Methodology: Interviewing conducted by Princeton Survey Research Associates International, June 8-June 28, 2010 and based on 3,006 telephone interviews.

Among internet users with social networking profiles…



AND SCIENCE AND HEALTH AMONG TOP VIRAL STORIES IN THE NYT

Berger, J., & Milkman, K. L. (2010). *Social transmission and viral culture*. Unpublished paper. University of Pennsylvania. Philadelphia, PA. Retrieved from http://opim.wharton.upenn.edu/~kmilkman/Virality_Feb_2010.pdf



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A QUICK RECAP: FIVE SUREFIRE STRATEGIES FOR COMMUNICATION FAILURE

- Be reactive rather than proactive, i.e., only start going public after a crisis/event occurs
- Address only issues and ignore values, emotions, etc. that people bring to the table
- Assume that scientific findings will triumph over everything else (including how they're initially framed in public discourse)
- Assume that new and social media don't matter as much as traditional media
- Assume that communication is an art rather than a science, i.e., rely on intuition rather than communication experts

THANK YOU FOR YOUR IDEAS AND QUESTIONS

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National Science Foundation

U.S. Department of Agriculture

University of Wisconsin—Madison Graduate School

Worldwide Universities Network

etc.