

# The Science of When Science Doesn't Matter (and what to do about it)

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Maine Sustainability and Water Conference  
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Lead with the relationship.

Follow with the science.

“If facts mattered, we wouldn’t be here.”

**Jennifer Hahn**  
Fenton Communications

“If you were to design a problem that the mind is not equipped to deal with, it’s climate change. It’s distant. It’s abstract. It’s contested. It is not going to be solved by presenting more evidence.”

**Daniel Kahneman**

Nobel Prize in Economics

Author: “Thinking, Fast and Slow”



Daily News and Headlines

# Fake news spreads faster than true news on Twitter—thanks to people, not bots

By Katie Langin | Thu, 08 Mar 2018



RESEARCH

SOCIAL SCIENCE

## The spread of true and false news online

Soroush Vosoughi,<sup>1</sup> Deb Roy,<sup>1</sup> Sinan Aral<sup>2\*</sup>

We investigated the differential diffusion of all of the verified true and false news stories distributed on Twitter from 2006 to 2017. The data comprise ~126,000 stories tweeted by ~3 million people more than 4.5 million times. We classified news as true or false using information from six independent fact-checking organizations that exhibited 95 to 98% agreement on the classifications. Falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information, and the effects were more pronounced for false political news than for false news about terrorism, natural disasters, science, urban legends, or financial information. We found that false news was more novel than true news, which suggests that people were more likely to share novel information. Whereas false stories inspired fear, disgust, and surprise in replies, true stories inspired anticipation, sadness, joy, and trust. Contrary to conventional wisdom, robots accelerated the spread of true and false news at the same rate, implying that false news spreads more than the truth because humans, not robots, are more likely to spread it.

**F**oundational theories of decision-making (1–3), cooperation (4), communication (5), and markets (6) all view some conceptualization of truth or accuracy as central to the functioning of nearly every human endeavor. Yet, both true and false information spreads rapidly through online media. Defining what is true and false has become a common political strategy, replacing debates based on a mutually agreed on set of facts. Our economies are not immune to the spread of falsity either. False rumors have affected stock prices and the motivation for large-scale investments, for example, wiping out \$130 billion in stock value after a false tweet claimed that Barack Obama was injured in an explosion (7). Indeed, our re-

Current work analyzes the spread of single rumors, like the discovery of the Higgs boson (13) or the Haitian earthquake of 2010 (14), and multiple rumors from a single disaster event, like the Boston Marathon bombing of 2013 (10), or it develops theoretical models of rumor diffusion (15), methods for rumor detection (16), credibility evaluation (17, 18), or interventions to curtail the spread of rumors (19). But almost no studies comprehensively evaluate differences in the spread of truth and falsity across topics or examine why false news may spread differently than the truth. For example, although Del Vicario *et al.* (20) and Bessi *et al.* (21) studied the spread of scientific and conspiracy-theory stories, they did not evaluate their veracity. Scientific and

support their positions as unreliable or fake news, whereas sources that support their positions are labeled reliable or not fake, the term has lost all connection to the actual veracity of the information presented, rendering it meaningless for use in academic classification. We have therefore explicitly avoided the term fake news throughout this paper and instead use the more objectively verifiable terms “true” or “false” news. Although the terms fake news and misinformation also imply a willful distortion of the truth, we do not make any claims about the intent of the purveyors of the information in our analyses. We instead focus our attention on veracity and stories that have been verified as true or false.

We also purposefully adopt a broad definition of the term news. Rather than defining what constitutes news on the basis of the institutional source of the assertions in a story, we refer to any asserted claim made on Twitter as news (we defend this decision in the supplementary materials section on “reliable sources,” section SI.2). We define news as any story or claim with an assertion in it and a rumor as the social phenomena of a news story or claim spreading or diffusing through the Twitter network. That is, rumors are inherently social and involve the sharing of claims between people. News, on the other hand, is an assertion with claims, whether it is shared or not.

A rumor cascade begins on Twitter when a user makes an assertion about a topic in a tweet, which could include written text, photos, or links to articles online. Others then propagate the rumor by retweeting it. A rumor’s diffusion process can be characterized as having one or more cascades, which we define as instances of a rumor-spreading pattern that exhibit an unbroken retweet chain with a common, singular origin. For example, an individual could start a rumor cascade by tweeting a story or claim with an assertion

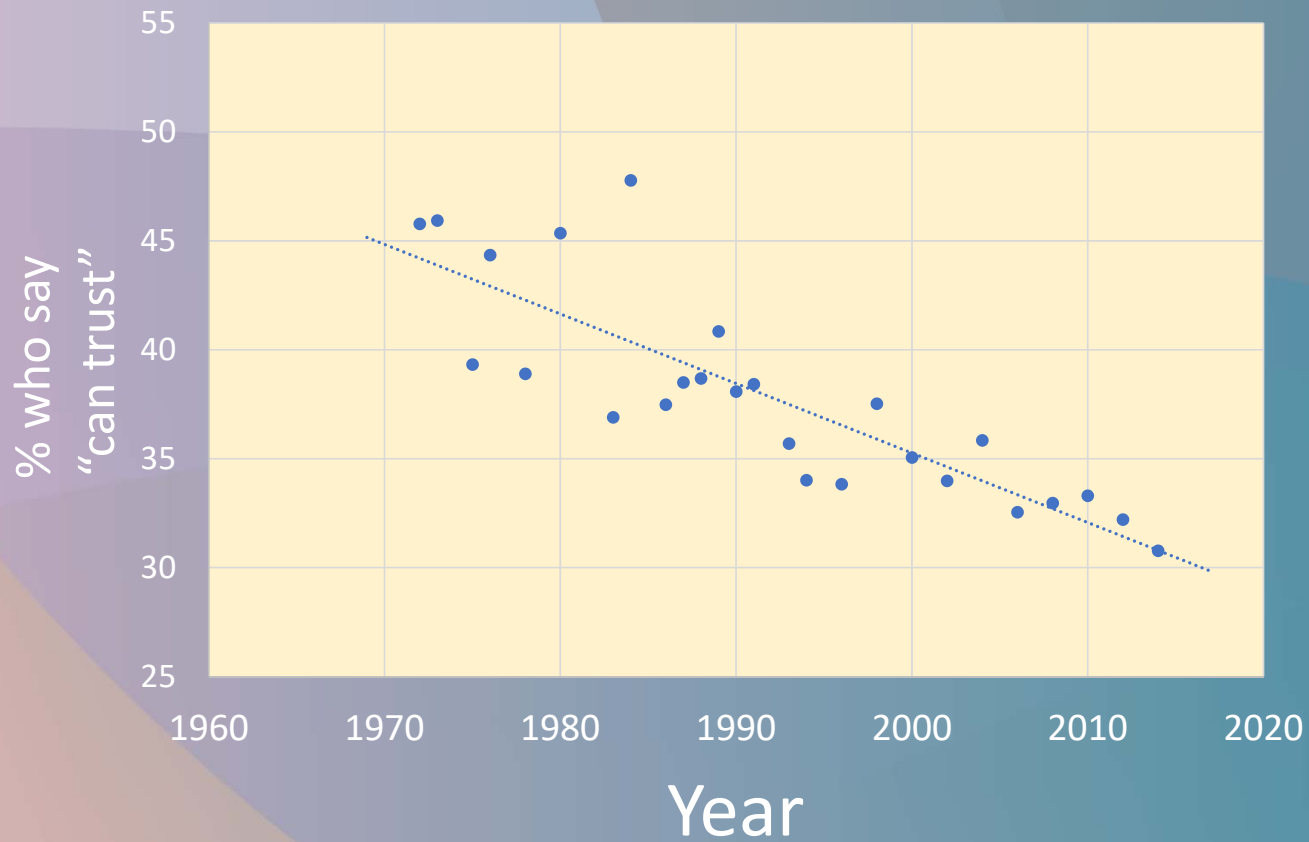


What in the world is going on?



Trust

## Interpersonal Trust in the U.S.



SURVEY QUESTION:

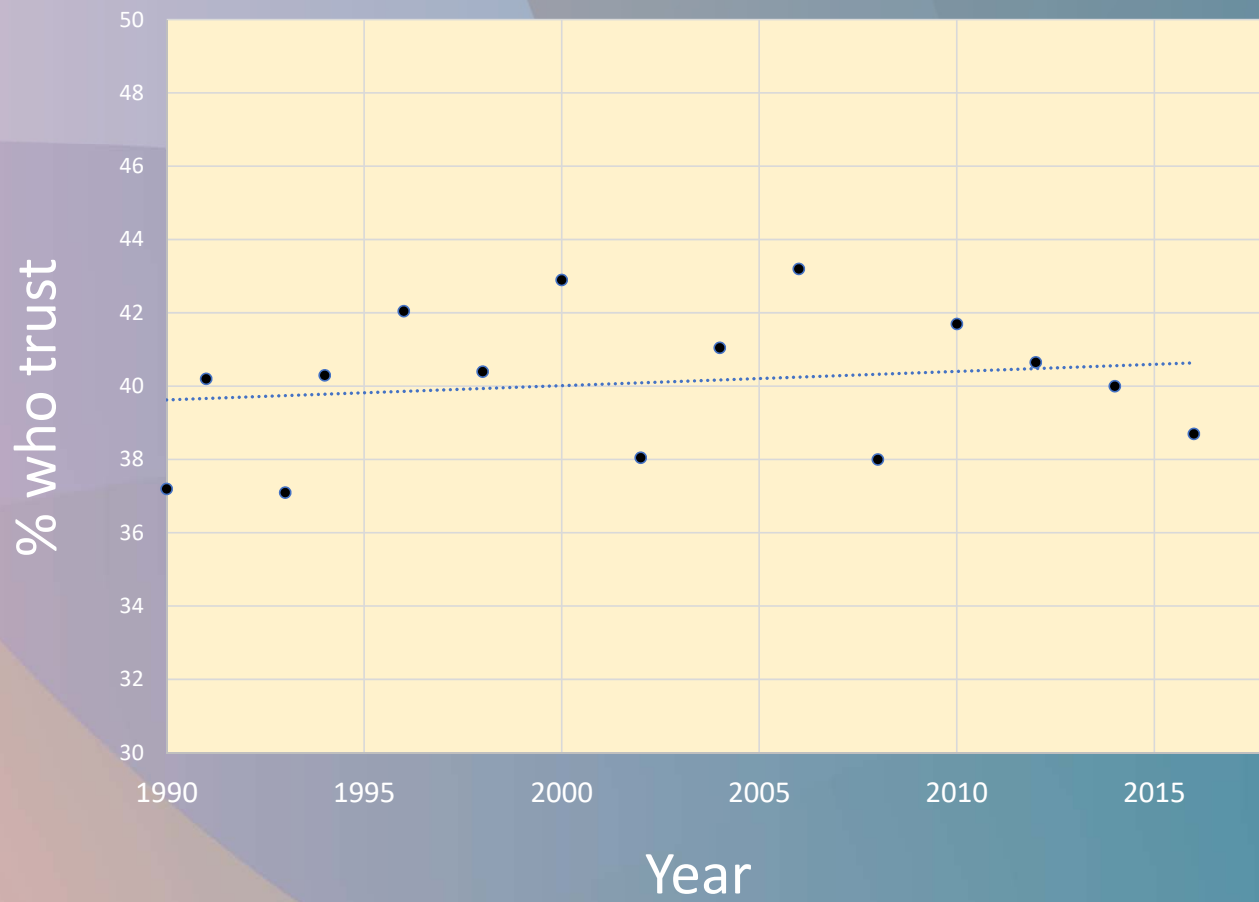
"Generally speaking, would you say that most people can be trusted, or, that you can't be too careful in dealing with people?"

AVAILABLE REPLIES:

1. "Can trust"
2. "Cannot trust"
3. "Depends"
4. "Don't Know"
5. "No answer".



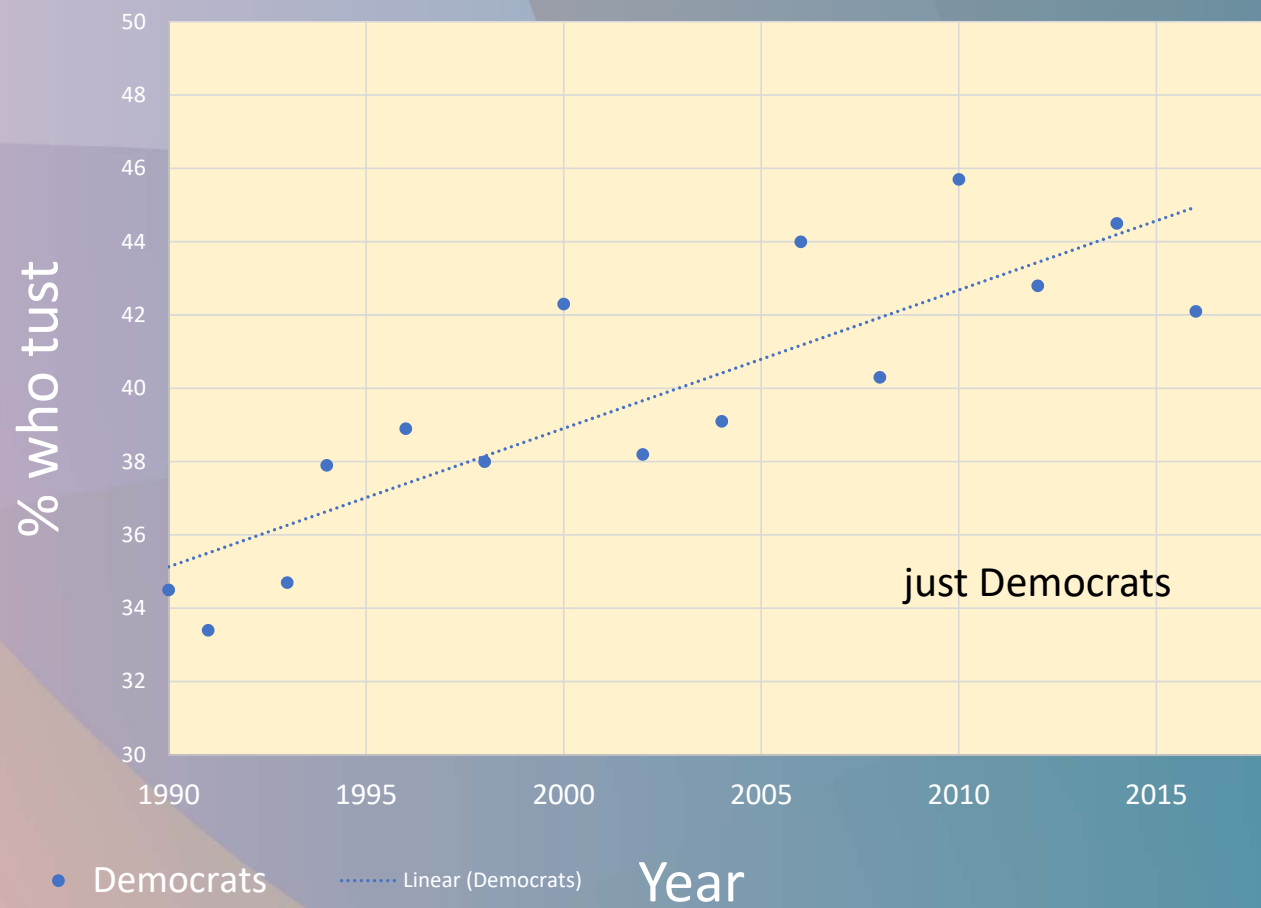
## % who trust scientists



Sources:

<https://ourworldindata.org/trust>

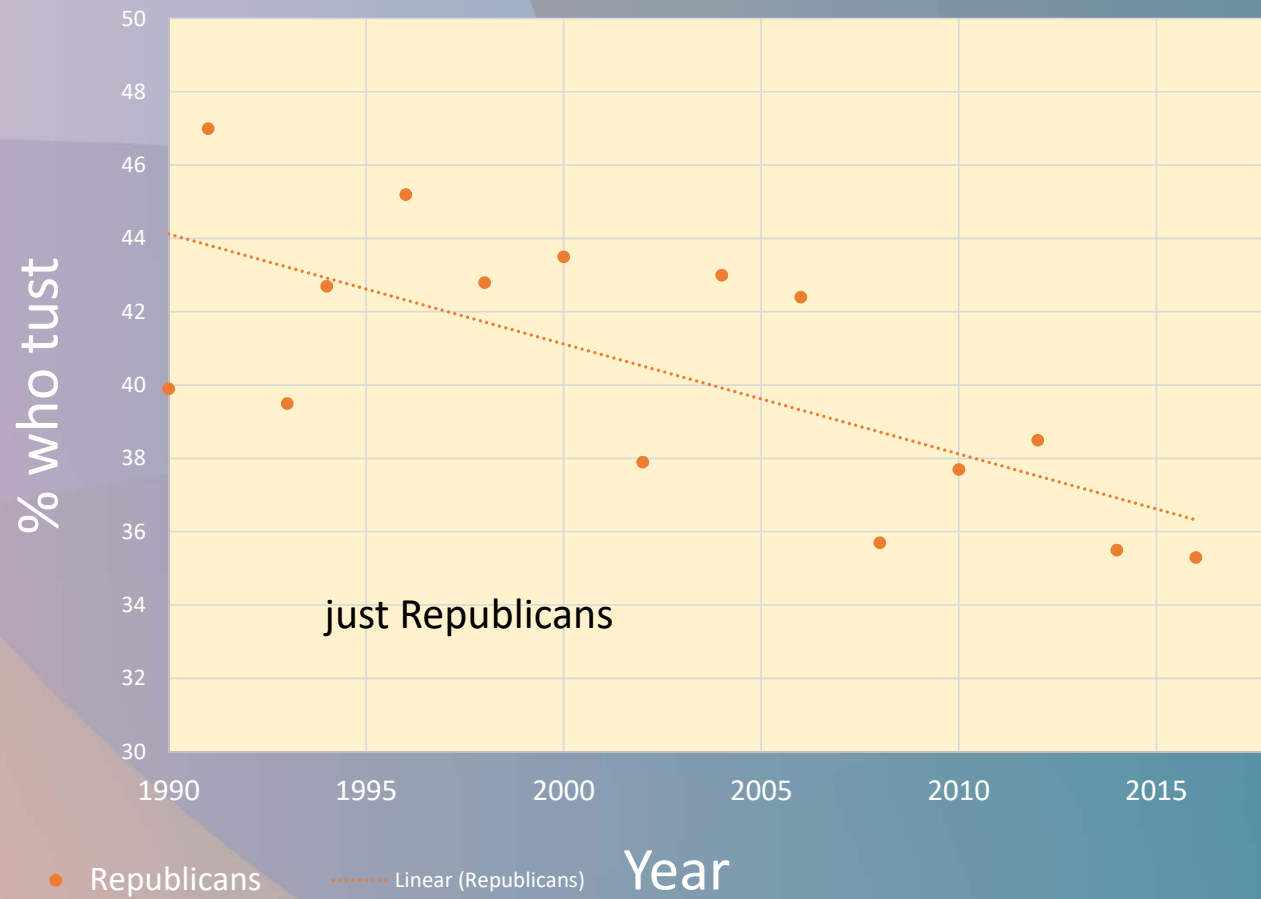
## % who trust scientists



Sources:

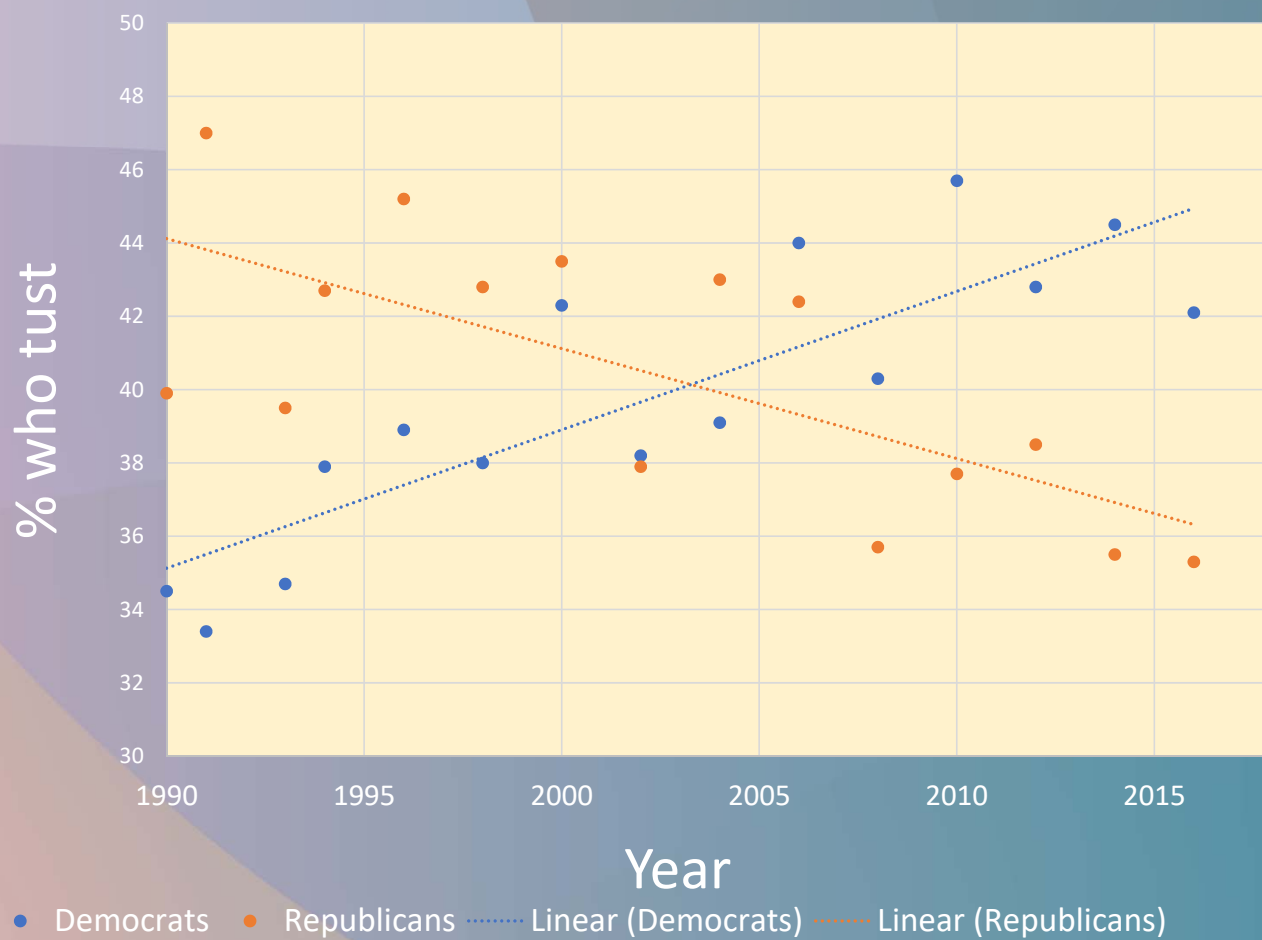
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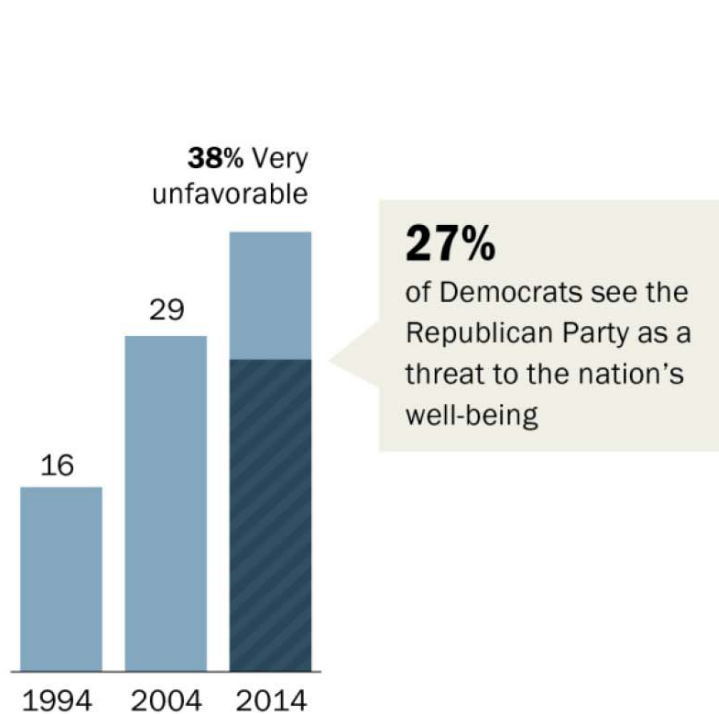


Polarization is the inverse of trust.

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% of Democrats with “very unfavorable” attitude about Republicans

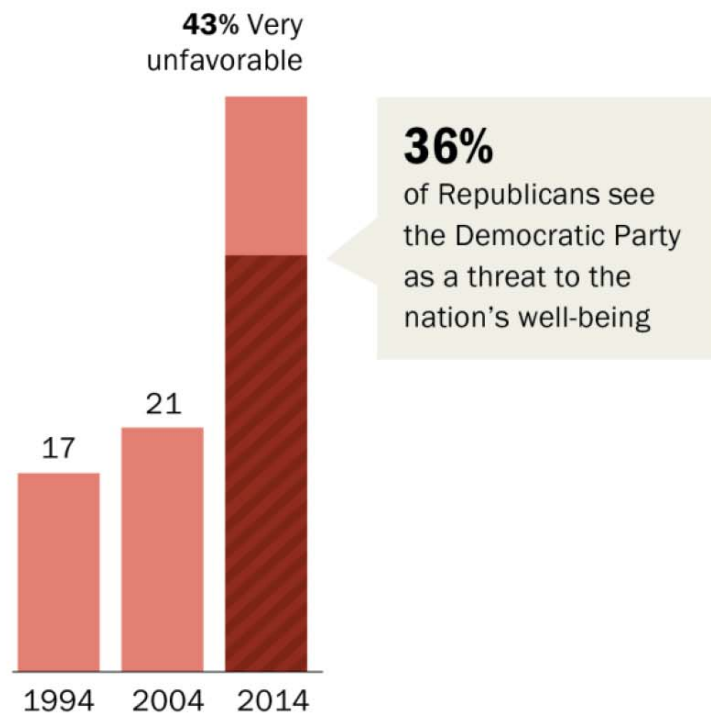
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% of Republicans with “very unfavorable” attitude about Democrats

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Source: 2014 Political Polarization in the American Public

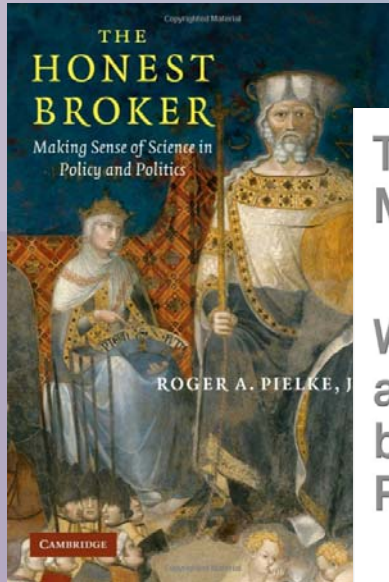
Notes: Questions about whether the Republican and Democratic Parties are a threat to the nation's well being asked only in 2014. Republicans include Republican-leaning independents; Democrats include Democratic-leaning independents (see Appendix B).

**PEW RESEARCH CENTER**

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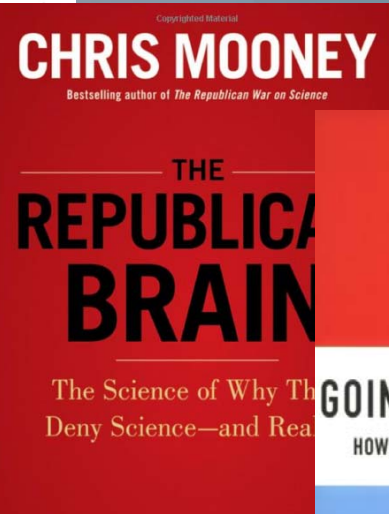


Why are these trends such a problem?



## The Righteous Mind

Why Good People are Divided by Politics and Religion



Polit Behav (2010) 32:303–330  
DOI 10.1007/s11099-010-9112-2

ORIGINAL PAPER

### When Corrections Fail: The Persistence of Political Misperceptions

Brendan Nyhan · Jason Reifler

Published online: 30 March 2010  
© Springer Science+Business Media, LLC 2010

**Abstract** An extensive literature addresses citizen ignorance, but very little research focuses on misperceptions. Can these false or unsubstantiated beliefs about politics be corrected? Previous studies have not tested the efficacy of corrections in a realistic format. We conducted four experiments in which subjects read mock news articles that included either a misleading claim from a politician, or a misleading claim and a correction. Results indicate that corrections frequently fail to reduce misperceptions among the targeted ideological group. We also document

BEHAVIORAL AND BRAIN SCIENCES (2011) 34, 57–111  
doi:10.1017/S0140525X10000968

### Why do humans reason? Arguments for an argumentative theory

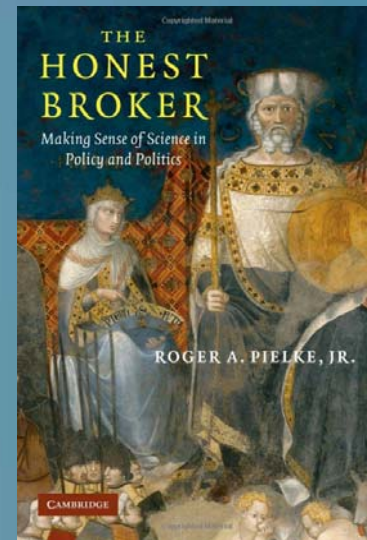
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**Abstract:** Reasoning is generally seen as a means to improve knowledge and make better decisions. However, much evidence shows that reasoning often leads to epistemic distortions and poor decisions. This suggests that the function of reasoning should be rethought. Our hypothesis is that the function of reasoning is argumentative. It is to devise and evaluate arguments intended to persuade. Reasoning so conceived is adaptive given the exceptional dependence of humans on communication and their vulnerability to misinformation. A wide range of evidence in the psychology of reasoning and decision making can be reinterpreted and better explained in the light of this hypothesis. Poor performance in standard reasoning tasks is explained by the lack of argumentative context. When the same problems are placed in a proper argumentative setting, people turn out to be skilled arguers. Skilled arguers, however, are not after the truth but after arguments supporting their views. This explains the notorious confirmation bias. This bias is apparent not only when people are actually arguing, but also when they are reasoning proactively from the perspective of having to defend their opinions. Reasoning so motivated can distort evaluations and attitudes and allow erroneous beliefs to persist. Proactively used reasoning also favors decisions that are easy to justify but not necessarily better. In all these instances



# 1. “Abortion Politics” vs. “Cancer Politics”





## 2. Confirmation bias

3. "Reason ... is the slave to the passions."

**David Hume**

1757



## 4. The Backfire Effect



5. “If we could only educate them.”

## 6. Groups bind and blind

**The Righteous  
Mind**

**Why Good People  
are Divided  
by Politics and  
Religion**

**Jonathan Haidt**

## 7. We evolved to win (not to be right).

BEHAVIORAL AND BRAIN SCIENCES (2011) 34, 57–111  
doi:10.1017/S0140525X1000096S

### Why do humans reason? Arguments for an argumentative theory

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**Abstract:** Reasoning is generally seen as a means to improve knowledge and make better decisions. However, much evidence shows that reasoning often leads to epistemic distortions and poor decisions. This suggests that the function of reasoning should be rethought. Our hypothesis is that the function of reasoning is argumentative. It is to devise and evaluate arguments intended to persuade. Reasoning so conceived is adaptive given the exceptional dependence of humans on communication and their vulnerability to misinformation. A wide range of evidence in the psychology of reasoning and decision making can be reinterpreted and better explained in the light of this hypothesis. Poor performance in standard reasoning tasks is explained by the lack of argumentative context. When the same problems are placed in a proper argumentative setting, people turn out to be skilled arguers. Skilled arguers, however, are not after the truth but after arguments supporting their views. This explains the notorious confirmation bias. This bias is apparent not only when people are actually arguing, but also when they are reasoning proactively from the perspective of having to defend their opinions. Reasoning so motivated can distort evaluations and attitudes and allow erroneous beliefs to persist. Proactively used reasoning also favors decisions that are easy to justify but not necessarily better. In all these instances traditionally described as failures or flaws, reasoning does exactly what can be expected of an argumentative device: Look for arguments that support a given conclusion, and, *ceteris paribus*, favor conclusions for which arguments can be found.

**Keywords:** argumentation; confirmation bias; decision making; dual process theory; evolutionary psychology; motivated reasoning; reason-based choice; reasoning



We need a plan.





Lead with the relationship.

Follow with the science.

## We work with...

- Fishermen
- Institutional investors
- Dairy farmers
- International shipping ports
- Timber companies
- Retailers
- Small business owners
- Crayfish farmers in Louisiana
- Ranchers in Argentina

## My Advice...

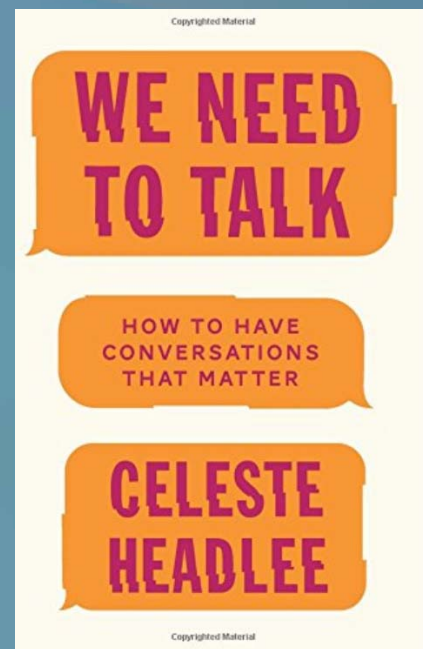
1. Build a relationship with someone who sees the world differently from you.

## My Advice...

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2. The easiest way to do this is to come up with a specific project with a very specific objective that requires both of you.

My Advice...

3. Listen.



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