Culturally Contested Facts:
One Good Explanation, Three Not so Good Ones, and a Fitting Solution

Dan M. Kahan
Yale University

& 10^3 others!
Culturally contested facts . . .
“How much **risk** do you believe **global warming** poses to human health, safety, or prosperity?”

N = 1,885. Nationally representative sample, June 2013 (YouGov). Subjects “color coded” based on response to risk-perception outcome variable. X-axis reflects subjects’ Score on composite scale that aggregates responses to 7-point party identification item and 5-point “liberal-conservative” ideology item (α = 0.82).
Culturally contested facts . . .

“How much **risk** do you believe **global warming** poses to human health, safety, or prosperity?”

\[ r = -0.65, p < 0.01 \]

\[ N = 1,885. \text{ Nationally representative sample, June 2013 (YouGov). Subjects “color coded” based on response to risk-perception outcome variable. X-axis reflects subjects’ Score on composite scale that aggregates responses to 7-point party identification item and 5-point “liberal-conservative” ideology item (\( \alpha = 0.82 \)).} \]
There is “solid evidence” of recent global warming due “mostly” to “human activity such as burning fossil fuels.” [true/false]

Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. N = 1166. Logistic regression. “Left_right” scale comprises responses to 5-point liberal-conservative ideology and 7-point party-identification measures. Bars denote 0.95 CIs.
“... human-caused global warming will result in flooding of many coastal regions.” [True or False]

Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. N = 785. Logistic regression. “Left_right” scale comprises responses to 5-point liberal-conservative ideology and 7-point party-identification measures. Bars denote 0.95 CIs.
“... nuclear power generation contributes to global warming.” [True or False]

Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. N = 785. Logistic regression. “Left_right” scale comprises responses to 5-point liberal-conservative ideology and 7-point party-identification measures. Bars denote 0.95 CIs.
Culturally contested facts . . .

“How much **risk** do you believe **global warming** poses to human health, safety, or prosperity?”

-Extremely high risk
-High
-Between moderate and high
-Moderate
-Between low and moderate
-Low
-Very low
-None at all

Very liberal
Strong Democrat
Liberal
Democrat
Moderate
Independent
Conservative
Republican
Very Conservative
Strong Republican

\[ r = -0.65, \ p < 0.01 \]

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“How much risk do you believe fracking poses to human health, safety, or prosperity?”

Culturally contested facts . . .

\[ r = -0.50, p < 0.01 \]

\( N = 1,885 \). Nationally representative sample, June 2013 (YouGov). Subjects “color coded” based on response to risk-perception outcome variable. X-axis reflects subjects’ score on composite scale that aggregates responses to 7-point party identification item and 5-point “liberal-conservative” ideology item (\( \alpha = 0.82 \)).
Culturally contested facts . . .

“How much risk do you believe private gun possession poses to human health, safety, or prosperity?”

\[ r = -0.65, \quad p < 0.01 \]

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Culturally contested facts . . .
Culturally contested facts . . .

I. One good explanation
Culturally contested facts . . .

I. One good explanation
Culturally contested facts . . .

I. One good explanation

II. Three not so good ones …
   A.
   B.
   C.
Culturally contested facts . . .

I. One good explanation

II. Three not so good ones …
   A.
   B.
   C.

III. One fitting solution
Culturally contested facts . . .

I. One good explanation
Culturally contested facts . . .

I. One good explanation: identity-protective cognition
Culturally contested facts . . .

“How much risk do you believe global warming pose to human health, safety, or prosperity?”

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Cultural cognition of scientific consensus

Dan M. Kahan\textsuperscript{a*}, Hank Jenkins-Smith\textsuperscript{b} and Donald Braman\textsuperscript{c}

\textsuperscript{a}Yale Law School, Yale University, New Haven, USA; \textsuperscript{b}Department of Political Science, University of Oklahoma, Norman, USA; \textsuperscript{c}George Washington Law School, George Washington University, Washington, USA

(Received 13 February 2010; final version received 23 July 2010)

Why do members of the public disagree—sharply and persistently—about facts on which expert scientists largely agree? We designed a study to test a distinctive explanation: the cultural cognition of scientific consensus. The ‘cultural cognition of risk’ refers to the tendency of individuals to form risk perceptions that are congruent to their values. The study presents both correlational and experimental evidence confirming that cultural cognition shapes individuals’ beliefs about the existence of scientific consensus, and the process by which they form such beliefs, relating to climate change, the disposal of nuclear wastes, and the effect of permitting concealed possession of handguns. The implications of this dynamic for science communication and public policy-making are discussed.

Keywords: cultural cognition of risk; scientific consensus; climate change; nuclear energy; handgun regulation

1. Introduction

Despite the steady and massive accumulation of scientific evidence, the American public is as divided about climate change today as it was 10 years ago (Newport 2008; Pew Research Center 2009). Nor is this the only issue on which the emergence of consensus, or near consensus, among scientists has failed to achieve anything close to that among members of the public: the safety of nuclear power (Slovic, Flynn, and Layman 1991; Barke and Jenkins-Smith 1993); the toxicity of arsenic, radon, and other groundwater chemicals (Sunstein 2005); the health consequences of vaccinating school girls against the human papillomavirus (Kahan et al., forthcoming) – all have featured intense political contestation over empirical issues on which technical experts largely agree.

Not all policy disputes turn on issues amenable to scientific investigation, of course, so no one would or should expect that what scientists have to say will resolve every conflict. But when empirical assessments of risk and risk abatement are exactly what members of the public are fighting about, why is the prevailing opinion of scientists – on questions only they are equipped to answer – so infrequently treated as decisive?

Myriad theories have been advanced for the limited influence of science in formulating the factual basis for public policy debates, but none seems complete. If the answer were that members of the public are simply less informed than experts (Irwin...
Is this a knowledgeable and credible expert on ...?

Robert Linden

Position: Professor of Meteorology, Massachusetts Institute of Technology
Education: Ph.D., Harvard University
Memberships:
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- National Academy of Sciences

Global Warming

Oliver Roberts

Position: Professor of Nuclear Engineering, University of California, Berkeley
Education: Ph.D., Princeton University
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Nuclear Power

James Williams

Position: Professor of Criminology, Stanford University
Education: Ph.D., Yale University
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Gun Control

Cultural Cognition Worldviews

- Hierarchy
- Environment: climate, nuclear
- Guns/Gun Control

Risk Perception Key:
- Low Risk
- High Risk

Axes:
- Individualism
- Communitarianism
- Egalitarianism
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Gun Control

Climate Change

<table>
<thead>
<tr>
<th>High Risk</th>
<th>Low Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Science conclusive)</td>
<td>(Science inconclusive)</td>
</tr>
</tbody>
</table>

"It is now beyond reasonable scientific dispute that human activity is causing 'global warming' and other dangerous forms of climate change. Over the past century, atmospheric concentration of carbon dioxide (CO₂)—called a "greenhouse gas" because of its contribution to trapping heat—has increased to historically unprecedented levels. Scientific authorities at all major universities agree that the source of this increase is human industrial activity. They agree too that higher CO₂ levels are responsible for steady rises in air and ocean temperatures over that period, particularly in the last decade. This change is resulting in a host of negative consequences: the melting of polar ice caps and resulting increases in sea levels and risks of catastrophic flooding; intense and long-term droughts in many parts of the world; and a rising incidence of destructive cyclones and hurricanes in others."

Robert Linden
Position: Professor of Meteorology, Massachusetts Institute of Technology
Education: Ph.D., Harvard University
Memberships:
- American Meteorological Society
- National Academy of Sciences

"Judged by conventional scientific standards, it is premature to conclude that human CO₂ emissions—so-called "greenhouse gases"—cause global warming. For example, global temperatures have not risen since 1998, despite significant increases in CO₂ during that period. In addition, rather than shrinking everywhere, glaciers are actually growing in some parts of the world, and the amount of ice surrounding Antarctica is at the highest level since measurements began 30 years ago. Scientists who predict global warming despite these facts are relying entirely on computer models. Those models extrapolate from observed atmospheric conditions existing in the past. The idea that those same models will accurately predict temperature in a world with very different conditions—including one with substantially increased CO₂ in the atmosphere—is based on unproven assumptions, not scientific evidence."

Robert Linden
Position: Professor of Meteorology, Massachusetts Institute of Technology
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## Low Risk (safe)

“Radioactive wastes from nuclear power plants can be disposed of without danger to the public or the environment through deep geologic isolation. In this method, radioactive wastes are stored deep underground in bedrock, and isolated from the biosphere for many thousands of years. Natural bedrock isolation has safely contained the radioactive products generated by spontaneous nuclear fission reactions in Oklo, Africa, for some 2 billion years. Man-made geologic isolation facilities reinforce this level of protection through the use of sealed containers made of materials known to resist corrosion and decay. This design philosophy, known as ‘defense in depth,’ makes long-term disposal safe, effective, and economically feasible.”

<table>
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<tr>
<th>Oliver Roberts</th>
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<tbody>
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</tr>
<tr>
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</tr>
<tr>
<td>• National Academy of Sciences</td>
</tr>
</tbody>
</table>

## High Risk (not safe)

“Using deep geologic isolation to dispose of radioactive wastes from nuclear power plants would put human health and the environment at risk. The concept seems simple: contain the wastes in underground bedrock isolated from humans and the biosphere. The problem in practice is that there is no way to assure that the geologic conditions relied upon to contain the wastes won’t change over time. Nor is there any way to assure the human materials used to transport wastes to the site, or to contain them inside of the isolation facilities, won’t break down, releasing radioactivity into the environment. . . . These are the sorts of lessons one learns from the complex problems that have plagued safety engineering for the space shuttle, but here the costs of failure are simply too high.”

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“So-called ‘concealed carry’ laws increase violent crime. The claim that allowing people to carry concealed handguns reduces crime is not only contrary to common-sense, but also unsupported by the evidence. . . . Looking at data from 1977 to 2005, the 22 states that prohibited carrying handguns in public went from having the highest rates of rape and property offenses to having the lowest rates of those crimes. . . . To put an economic price tag on the issue, I estimate that the cost of “concealed carry laws” is around $500 million a year in the U.S.”

James Williams
Position: Professor of Criminology, Stanford University
Education: Ph.D., Yale University
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- American Society of Criminologists
- National Academy of Sciences

“Overall, ‘concealed carry’ laws decrease violent crime. The reason is simple: potential criminals are less likely to engage in violent assaults or robberies if they think their victims, or others in a position to give aid to those persons, might be carrying weapons. . . . Based on data from 1977 to 2005, I estimate that states without such laws, as a group, would have avoided 1,570 murders; 4,177 rapes; and 60,000 aggravated assaults per year if they had made it legal for law-abiding citizens to carry concealed handguns. Economically speaking, the annual gain to the U.S. from allowing concealed handguns is at least $6.214 billion.”

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Gun Control

Featured Scientist is a knowledgeable and credible expert on ...

N = 1,500. Derived from ordered-logit regression analysis, controlling for demographic and political affiliation/ideology variables. Culture variables set 1 SD from mean on culture scales. CIs reflect 0.95 level of confidence.

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Egalitarian Communitarian
More Likely to Agree

Hierarchical Individualist
More Likely to Agree

Pct. Point Difference in Likelihood of Selecting Response

- Climate Change:
  - Low Risk: 72%
  - High Risk: 54%

- Nuclear Power:
  - Low Risk: 31%
  - High Risk: 22%

- Concealed Carry:
  - Low Risk: 61%
  - High Risk: 58%

- Low Risk
- High Risk

---
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Gun Control

"What is the position of expert Scientists?"

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<th>Communitarian</th>
<th>Hierarchical</th>
<th>Individualist</th>
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<tbody>
<tr>
<td>Global temperatures are increasing.</td>
<td>Most agree</td>
<td>Most disagree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human activity is causing global warming.</td>
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<td></td>
<td></td>
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<tr>
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<td>Most agree</td>
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Cultural Cognition Worldviews

Hierarchy

Environment: climate, nuclear

Guns/Gun Control

Individualism ← Hierarchy → Communitarianism

Egalitarianism

Risk Perception Key
Low Risk
High Risk
I. One good explanation: identity-protective cognition
I. One good explanation: identity-protective cognition

II. Three not so good ones …
   A.
   B.
   C.

III. One fitting solution
I. One good explanation: identity-protective cognition

II. Three not so good ones ...
   A. Science denial
   B. 
   C. 

III. One fitting solution
Cultural cognition of scientific consensus

Dan M. Kahan*, Hank Jenkins-Smith† and Donald Braman‡

*Yale Law School, Yale University, New Haven, USA; †Department of Political Science, University of Oklahoma, Norman, USA; ‡George Washington Law School, George Washington University, Washington, USA

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http://www.informaworld.com
### “What is the position of expert Scientists?”

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<tr>
<td>Global temperatures are increasing.</td>
<td>Most agree 4x</td>
<td></td>
<td></td>
<td>12x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Most disagree 6x</td>
<td></td>
<td></td>
<td>5x</td>
<td></td>
</tr>
<tr>
<td>Human activity is causing global warming.</td>
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<td></td>
<td></td>
<td>5x</td>
<td></td>
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<tr>
<td></td>
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<tr>
<td>Radioactive wastes from nuclear power can be safely disposed of in deep underground storage facilities.</td>
<td>Most agree 2x</td>
<td></td>
<td></td>
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I. One good explanation: identity-protective cognition

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Culturally contested facts . . .

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   B. Public irrationality thesis (PIT)
   C.

III. One fitting solution
Experience-Based and Description-Based Perceptions of Long-Term Risk: Why Global Warming does not Scare us (Yet)

Elke U. Weber

ON THE DIVERGENT AMERICAN REACTIONS TO TERRORISM AND CLIMATE CHANGE

Cass R. Sunstein*

Two of the most important sources of catastrophic risk are terrorism and
The polarizing impact of science literacy and numeracy on perceived climate change risks

Dan M. Kahan1,2, Ellen Peters2, Maggie Wittlin3, Paul Slovic4, Lisa Larrimore Ouellette3, Donald Braman2 and Gregory Mandle5

Seeming public apathy over climate change is often attributed to a deficit in comprehension. The public knows too little science, it is claimed, to understand the evidence or avoid being misled. Widespread limits on technical reasoning aggravate the problem by forcing citizens to use unreliable cognitive heuristics to assess risk. We conducted a study to test this account and found no support for it. Members of the public with the highest degrees of science literacy and technical reasoning capacity were not the most concerned about climate change. Rather, they were the ones among whom cultural polarization was greatest. This result suggests that public divisions over climate change stem not from the public’s incomprehension of science but from a distinctive conflict of interest: between the personal interest individuals have in forming beliefs in line with those held by others with whom they share close ties and the collective one they all share in making use of the best available science to promote common welfare.

The study collected data on the climate-change risk perceptions of a large representative sample of US adults (N = 1,549). Measures were used to permit assessment of two competing accounts of public opinion on climate change. One, already adverted to, can be called the science comprehension thesis (SCT). As members of the public do not know what scientists know, or think the way scientists think, they predictably fail to take climate change as seriously as scientists believe they should.

The alternative explanation can be referred to as the cultural cognition thesis (CCT). CCT posits that individuals, as a result of a complex of psychological mechanisms, tend to form perceptions of societal risks that cohere with values characteristic of groups with which the individual identifies. Whereas SCT emphasizes a conflict between scientists and the public, CCT stresses one between different segments of the public, whose members are motivated to fit their interpretations of scientific evidence to their competing cultural philosophies.

Explanations for the public’s perceptions of climate change risk can be tested by observational study insofar as such hypotheses imply correlations between concern over climate change and specified individual characteristics. We instructed subjects to rate the seriousness of climate change risk on a scale of 0 (no risk) to 10 (high risk), for a general risk concern measure that furnishes a parsimonious focus for such testing.

SCT asserts, first, that ordinary members of the public underestimate the seriousness of climate change because of the difficulty of the scientific evidence. If this is correct, concern over climate change should be positively correlated with science literacy—that is, concern should increase as people become more science literate.

Second, and even more important, SCT attributes low concern with climate change to limits on the ability of ordinary members of the public to engage in technical reasoning. Recent research in psychology posits two discrete forms of information processing: system 1, which involves rapid visceral judgments that manifest themselves in various decision-making heuristics; and system 2, which requires conscious reflection and calculation. Most members of the public, according to this research, typically employ system 1 reasoning without resorting to more effortful system 2 processing. Although system 1 works well for many daily contingencies, ordinary citizens’ predominant reliance on heuristics rather than analytic modes of reasoning is viewed as leading them to underestimate climate change risks, which are remote and abstract compared with a host of more emotionally charged risks (for example, terrorism) that the public is thought to overestimate.

If this position is correct, one would also expect concern with climate change to be positively correlated with numeracy. Numeracy refers to the capacity of individuals to comprehend and make use of quantitative information. More numerate people are more disposed to use accuracy-enhancing system 2 forms of reasoning and are less vulnerable to system 1 cognitive errors. Hence, they should, on this view, form perceptions of climate-change risk less biased towards underestimation.

These predictions were unsupported (Fig. 1). As respondents’ science-literacy scores increased, concern with climate change decreased (r = −0.05, P = 0.05). There was also a negative correlation between numeracy and climate change risk (r = −0.08, P < 0.01). The differences were small but nevertheless inconsistent with SCT, which predicts effects in the opposite signs. CCT also generates a testable prediction. CCT posits that people who subscribe to a hierarchical, individualistic world-view—say that ties authority to conspicuous social rankings and eschews collective interference with the decisions of individuals possessing such authority—tend to be sceptical of environmental risks. Such people intuitively perceive that widespread acceptance of such risks would license restrictions on commerce and industry, forms of behaviour that hierarchical individualists value. In contrast, people who hold an egalitarian, communitarian world-view—one favouring less regimented forms of social organization and greater collective attention to individual needs—tend to be more suspicious of commerce and industry, to which they attribute social inequity. They therefore find it congenial to believe those forms of behaviour are dangerous and worthy of restriction.

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4Decision Research, 1201 Oak Street, Suite 200, Eugene, Oregon 97401, USA. 5George Washington University, 2000 H Street, NW, Washington DC 20052, USA. 6Temple University, 1715 North Broad St, Philadelphia, Pennsylvania 19122, USA. E-mail: dan.kahan@yale.edu.

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“How much risk do you believe climate change poses to human health, safety, or prosperity?”

**PIT prediction: knowledge deficit & Bounded Rationality**

![Graph showing perceived risk (z-score) versus science comprehension.](image)

“How much risk do you believe climate change poses to human health, safety, or prosperity?”

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![Graph showing the relationship between science comprehension and perceived risk](image)

“How much risk do you believe climate change poses to human health, safety, or prosperity?”

![Diagram showing the relationship between perceived risk and science literacy or numeracy. The x-axis represents science literacy or numeracy (low to high), and the y-axis represents perceived risk (z-score) from lesser risk to greater risk. The PIT prediction line shows an increasing trend from low to high in both science literacy and numeracy.]

“How much risk do you believe climate change poses to human health, safety, or prosperity?”

U.S. general population survey, $N = 1,500$. Scale 0 (“no risk at all”) to 10 (“extreme risk”), $M = 5.7, SD = 3.4$. CIs reflect 0.95 level of confidence.
“How much risk do you believe climate change poses to human health, safety, or prosperity?”

Mine is bigger!

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**What is relationship of PIT & CCT**

U.S. general population survey, N = 1,500. Scale 0 (“no risk at all”) to 10 (“extreme risk”), $M = 5.7$, $SD = 3.4$. CIs reflect 0.95 level of confidence.
“How much risk do you believe climate change poses to human health, safety, or prosperity?”

**PIT prediction: Culture as heuristic substitute**

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“How much risk do you believe climate change poses to human health, safety, or prosperity?”

**POLARIZATION INCREASES as Science comprehension increases**

U.S. general population survey, \( N = 1,500 \). Scale 0 ("no risk at all") to 10 ("extreme risk"), \( M = 5.7, SD = 3.4 \). CIs reflect 0.95 level of confidence.
$N = 1688$. shaded areas denote 0.95 CIs.
There is “solid evidence” of recent global warming due “mostly” to “human activity such as burning fossil fuels.” [agree, disagree]

Ordinary Science Intelligence (percentile)

Probability of “agree”

Liberal Democrat

Conservative Republican

$N = 1600$. shaded areas denote 0.95 CIs.
There is “solid evidence” of recent global warming due “mostly” to “human activity such as burning fossil fuels.” [agree, disagree]

Actively Open-minded Thinking (zscore)

Probability of “agree”

N= 750. Derived from logistic regression. Colored bars denote 0.95 CIs.
There is “solid evidence” of recent global warming due “mostly” to “human activity such as burning fossil fuels.” [agree, disagree]

$N = 1722$. Brackets denote 0.95 CIs.
“How much risk do you believe private gun ownership poses to human health, safety, or prosperity?”

N = 1756. Shaded area denote 0.95 CIs.
“How much risk do you believe fracking poses to human health, safety, or prosperity?”

N = 1759. Shaded area denote 0.95 CIs.
Motivated System 2 reasoning

Motivated numeracy and enlightened self-government

DAN M. KAHAN*
Yale University, USA
ELLEN PETERS
The Ohio State University, USA
ERICA CANTRELL DAWSON
Cornell University, USA
PAUL SLOVIC
Decision Research & University of Oregon, USA

Abstract: Why does public conflict over societal risks persist in the face of compelling and widely accessible scientific evidence? We conducted an experiment to probe two alternative answers: the ‘science comprehension thesis’ (SCT), which identifies defects in the public’s knowledge and reasoning capacities as the source of such controversies; and the ‘identity-protective cognition thesis’ (ICT), which treats cultural conflict as disabling the faculties that members of the public use to make sense of decision-relevant science. In our experiment, we presented subjects with a difficult problem that turned on their ability to draw valid causal inferences from empirical data. As expected, subjects highest in numeracy – a measure of the ability and disposition to make use of quantitative information – did substantially better than less numerate ones when the data were presented as results from a study of a new skin rash treatment. Also as expected, subjects’ responses became politically polarized – and even less accurate – when the same data were presented as results from the study of a gun control ban. But contrary to the prediction of SCT, such polarization did not abate among subjects highest in numeracy; instead, it increased. This outcome supported ICT, which predicted that more numerate subjects would use their quantitative-reasoning capacity selectively to conform their interpretation of the data to the result most consistent with their political outlooks. We discuss the theoretical and practical significance of these findings.

Submitted 18 June 2016; accepted 11 October 2016

* Correspondence to: Yale Law School, PO Box 208215, New Haven, CT 06520, USA. Email: dan.kahan@yale.edu
Medical researchers have developed a new cream for treating skin rashes. New treatments often work but sometimes make rashes worse. Even when treatments don’t work, skin rashes sometimes get better and sometimes get worse on their own. As a result, it is necessary to test any new treatment in an experiment to see whether it makes the skin condition of those who use it better or worse than if they had not used it.

Researchers have conducted an experiment on patients with skin rashes. In the experiment, one group of patients used the new cream for two weeks, and a second group did not use the new cream.

In each group, the number of people whose skin condition got better and the number whose condition got worse are recorded in the table below. Because patients do not always complete studies, the total number of patients in each two groups is not exactly the same, but this does not prevent assessment of the results.

Please indicate whether the experiment shows that using the new cream is likely to make the skin condition better or worse.

<table>
<thead>
<tr>
<th>Result</th>
<th>Rash Got Better</th>
<th>Rash Got Worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients who did use the new skin cream</td>
<td>223</td>
<td>75</td>
</tr>
<tr>
<td>Patients who did not use the new skin cream</td>
<td>107</td>
<td>21</td>
</tr>
</tbody>
</table>

What result does the study support?

- People who used the skin cream were more likely to get better than those who didn’t.
- People who used the skin cream were more likely to get worse than those who didn’t.
A city government is trying to decide whether to pass a law banning private citizens from carrying concealed handguns in public. Government officials are unsure whether the law will be more likely to decrease crime by reducing the number of people carrying weapons or increase crime by making it harder for law-abiding citizens to defend themselves from violent criminals.

Researchers completed a study of two groups of cities to answer that question. The study involved comparing changes in annual crime rates for one group of cities that had banned concealed handguns with changes in annual crime rates for a second group of cities that had not banned concealed handguns.

In each group, the number of cities in which the crime rate decreased and the number of cities in which the crime rate increased are recorded in the table below. The exact number of cities in each group is not the same, but this does not prevent assessment of the results.

Please indicate whether the study shows that banning private citizens from carrying concealed handguns in public is likely to decrease crime or to increase crime.

<table>
<thead>
<tr>
<th>Result</th>
<th>Decrease in crime</th>
<th>Increase in crime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cities that did ban carrying concealed handguns in public</td>
<td>223</td>
<td>75</td>
</tr>
<tr>
<td>Cities that did not ban carrying concealed handguns in public</td>
<td>107</td>
<td>21</td>
</tr>
</tbody>
</table>

What result does the study support?

- Cities that enacted a ban on carrying concealed handguns were more likely to have a decrease in crime than cities without bans.
- Cities that enacted a ban on carrying concealed handguns were more likely to have an increase in crime than cities without bans.
“Skin cream experiment”

Please indicate whether the experiment shows that using the new cream is likely to make the skin condition **better** or **worse**.

<table>
<thead>
<tr>
<th></th>
<th>Rash Got Better</th>
<th>Rash Got Worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients who <strong>did</strong> use the new skin cream</td>
<td>223</td>
<td>75</td>
</tr>
<tr>
<td>Patients who <strong>not</strong> use the new skin cream</td>
<td>107</td>
<td>21</td>
</tr>
</tbody>
</table>

What result does the study support?

- ☐ People who used the skin cream were more likely to **get better** than those who didn't.
- ✓ People who used the skin cream were more likely to **get worse** than those who didn't.
Please indicate whether the study shows that banning private citizens from carrying concealed handguns in public is likely to decrease crime or to increase crime.

**Result**

<table>
<thead>
<tr>
<th></th>
<th>Decrease in crime</th>
<th>Increase in crime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cities that did ban carrying concealed</td>
<td>223</td>
<td>75</td>
</tr>
<tr>
<td>handguns in public</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cities that did not ban carrying</td>
<td>107</td>
<td>21</td>
</tr>
<tr>
<td>concealed handguns in public</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What result does the study support?

- Cities that enacted a ban on carrying concealed handguns were more likely to have a decrease in crime than cities without bans.
- Cities that enacted a ban on carrying concealed handguns were more likely to have an increase in crime than cities without bans.
### Four conditions

<table>
<thead>
<tr>
<th>(A) Rash Decreases</th>
<th>(B) Rash Increases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Result</strong></td>
<td><strong>Result</strong></td>
</tr>
<tr>
<td>Rash Got Worse</td>
<td>Rash Got Better</td>
</tr>
<tr>
<td><strong>Patients who did use the new skin cream</strong></td>
<td><strong>Patients who did use the new skin cream</strong></td>
</tr>
<tr>
<td>223</td>
<td>223</td>
</tr>
<tr>
<td>107</td>
<td>107</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(C) Crime Decreases</th>
<th>(D) Crime Increases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Result</strong></td>
<td><strong>Result</strong></td>
</tr>
<tr>
<td>Increase in crime</td>
<td>Decrease in crime</td>
</tr>
<tr>
<td><strong>Cities that did ban carrying concealed handguns in public</strong></td>
<td><strong>Cities that did ban carrying concealed handguns in public</strong></td>
</tr>
<tr>
<td>223</td>
<td>223</td>
</tr>
<tr>
<td>107</td>
<td>107</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(C) Crime Decreases</th>
<th>(D) Crime Increases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Result</strong></td>
<td><strong>Result</strong></td>
</tr>
<tr>
<td>Decrease in crime</td>
<td>Increase in crime</td>
</tr>
<tr>
<td><strong>Cities that did not ban carrying concealed handguns in public</strong></td>
<td><strong>Cities that did not ban carrying concealed handguns in public</strong></td>
</tr>
<tr>
<td>223</td>
<td>223</td>
</tr>
<tr>
<td>107</td>
<td>107</td>
</tr>
</tbody>
</table>
Correct interpretation of data

Liberal Democrats (< 0 on Conservrepub)  Conserv Republicans (> 0 on Conservrepub)

Correct interpretation of data:

- Skin treatment
- Gun ban
Correct interpretation of data

**Liberal Democrats (< 0 on Conservrepub)**

- Correct: rash decreases
- Incorrect: rash increases

**Conserv Republicans (> 0 on Conservrepub)**

- Correct: rash decreases, rash decreases, rash increases
- Incorrect: rash increases, rash decreases, rash increases

**Skin treatment**

**Gun ban**

- Correct: crime decreases, crime increases, crime increases, crime decreases
- Incorrect: crime increases, crime increases, crime decreases, crime decreases

Numeracy score
<table>
<thead>
<tr>
<th></th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>numeracy</td>
<td>0.11 (0.78)</td>
<td>0.01 (0.07)</td>
<td>-0.01 (-0.05)</td>
</tr>
<tr>
<td>rash_decreases</td>
<td>0.36 (1.91)</td>
<td>0.36 (1.42)</td>
<td>0.40 (1.57)</td>
</tr>
<tr>
<td>rash_increases</td>
<td>-0.12 (-0.63)</td>
<td>0.01 (0.02)</td>
<td>0.06 (0.22)</td>
</tr>
<tr>
<td>crime_increases</td>
<td>0.64 (3.46)</td>
<td>1.03 (4.06)</td>
<td>1.07 (4.02)</td>
</tr>
<tr>
<td>numeracy x rash_decreases</td>
<td>0.19 (0.95)</td>
<td>0.21 (1.00)</td>
<td>0.23 (1.05)</td>
</tr>
<tr>
<td>numeracy x rash_increases</td>
<td>0.50 (2.17)</td>
<td>0.51 (2.29)</td>
<td>0.55 (2.29)</td>
</tr>
<tr>
<td>numeracy x crime_increases</td>
<td>0.26 (1.26)</td>
<td>0.38 (1.79)</td>
<td>0.46 (2.01)</td>
</tr>
<tr>
<td>numeracy²</td>
<td>0.32 (2.77)</td>
<td>0.31 (2.46)</td>
<td></td>
</tr>
<tr>
<td>numeracy² x rash_decreases</td>
<td>0.01 (0.08)</td>
<td>0.02 (0.14)</td>
<td></td>
</tr>
<tr>
<td>numeracy² x rash_increases</td>
<td>-0.09 (-0.49)</td>
<td>-0.07 (-0.39)</td>
<td></td>
</tr>
<tr>
<td>numeracy² x crime_increases</td>
<td>-0.39 (-2.39)</td>
<td>-0.31 (-1.75)</td>
<td></td>
</tr>
<tr>
<td>Conserv_Repub</td>
<td></td>
<td>-0.64 (-3.95)</td>
<td></td>
</tr>
<tr>
<td>Conserv_Repub x rash_decreases</td>
<td>0.56 (2.64)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conserv_Repub x rash_increases</td>
<td>0.63 (2.82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conserv_Repub x crime_increases</td>
<td>1.28 (6.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>numeracy x Conserv_Repub</td>
<td></td>
<td>-0.33 (-1.89)</td>
<td></td>
</tr>
<tr>
<td>numeracy x Conserv_Repub x rash_decreases</td>
<td>0.33 (1.40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>numeracy x Conserv_Repub x rash_increases</td>
<td>0.26 (1.08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>numeracy x Conserv_Repub x crime_increases</td>
<td>0.54 (2.17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>constant</td>
<td>-0.58 (-4.06)</td>
<td>-0.91 (-4.64)</td>
<td>-0.96 (-4.70)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>(7, 1102)</th>
<th>(11, 1098)</th>
<th>(19, 1090)</th>
<th>5.06</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-test</td>
<td>6.46</td>
<td>5.78</td>
<td>5.06</td>
<td>5.21</td>
</tr>
<tr>
<td>Δ F-test</td>
<td>(4, 1105)</td>
<td>(8, 1101)</td>
<td>(4, 1105)</td>
<td></td>
</tr>
</tbody>
</table>

Table A1. Multivariate regression analysis. N = 1111. Outcome variable is “correct,” a binary variable coded “1” for correctly interpreting the data and “0” for incorrectly interpreting it. Predictor estimates are logit coefficients with t-statistic indicated parenthetically. “Rash_decreases,” “rash_increases,” and “crime_increases” are dummy variables reflecting experimental condition assignment (0 = unassigned, 1 = assigned), the reference assignment is to “crime decreases.” Both Conserv_Repub and numeracy are centered at “0” for ease of interpretation. Bolded typeface indicates predictor coefficient, model F-test, or incremental change in model F-test is significant at p < 0.05.
Monte carlo simulations

Liberal Democrat (-1 SD on Conservrepub)  Conserv Republican (+1 SD on Conservrepub)

High numeracy

Low numeracy

Skin treatment

Gun ban

probability of correct interpretation of data

high numeracy = 7 correct
low numeracy = 3 correct

rash increases

crime decreases

rash increases
Monte carlo simulations

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

High numeracy

rash increases
35%, ± 10

skin treatment

Gun ban

probability of correct interpretation of data

probability of correct interpretation of data
Monte carlo simulations

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

High numeracy = 7 correct
Low numeracy = 3 correct

probability of correct interpretation of data

skin treatment

rash increases

Gun ban

rash increases
Monte carlo simulations

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

High numeracy

Skin treatment

Gun ban

rash decreases
rash increases
rash decreases
rash increases
rash decreases
rash increases

5%, ± 6

5% correct interpretation of data
Monte carlo simulations

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

High numeracy

Skin treatment

Gun ban

probability of correct interpretation of data
Monte carlo simulations

Liberal Democrat (-1 SD on Conservative)  
Conservative Republican (+1 SD on Conservative)

Low numeracy

skin treatment

High numeracy

rash increases
rash increases
rash decreases
rash decreases
rash decreases
rash increases
rash decreases
rash decreases
rash increases
rash increases

High numeracy

crime decreases
crime decreases

Liberal Democrat (-1 SD on Conservative)
Conservative Republican (+1 SD on Conservative)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Monte carlo simulations

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

High numeracy = 7 correct
Low numeracy = 3 correct

Skin treatment

Rash decreases
Rash increases
Rash decreases
Rash increases
Rash decreases
Rash increases

Gun ban

Crime increases
Crime increases
Crime increases
Crime increases
Crime increases
Crime increases

Probability of correct interpretation of data
Monte Carlo simulations

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

High numeracy

Skin treatment

rash increases
rash decreases
rash decreases
rash decreases
rash increases
rash decreases
rash increases
rash decreases
rash increases
rash decreases
rash increases

High numeracy = 7 correct
Low numeracy = 3 correct

Crime decreases

-high numeracy = 7 correct
-low numeracy = 3 correct

Monte Carlo simulations
Monte carlo simulations

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

Rash decreases
Rash increases
Rash decreases

High numeracy

Rash decreases
Rash decreases
Rash increases
Rash increases

Skin treatment

Gun ban

High numeracy = 7 correct
Low numeracy = 3 correct

Probability of correct interpretation of data

Monte Carlo simulations
Monte carlo simulations

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

Avg. “polarization”
on crime data
for low numeracy
partisans
25% (± 9%)

High numeracy

Avg. “polarization”
on crime data
for high numeracy
partisans
46% (± 17%)

Gun ban

probability of correct interpretation of data

Monte carlo simulations

High numeracy

Liberal Democrat (-1 SD on Conservrepub)
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

Avg. “polarization”
on crime data
for low numeracy
partisans
25% (± 9%)

High numeracy

Avg. “polarization”
on crime data
for high numeracy
partisans
46% (± 17%)
High numeracy

Low numeracy

Egalitarian communitarian (-1 SD on Hfac & Ifac)
Hierarch individid (+1 SD on Hfac & Ifac)

High numeracy = 7 correct
Low numeracy = 3 correct

Gun ban

Skin treatment
“How much risk do you believe climate change poses to human health, safety, or prosperity?”
Experience-Based and Description-Based Perceptions of Long-Term Risk: Why Global Warming does not Scare us (Yet)

Elke U. Weber

ON THE DIVERGENT AMERICAN REACTIONS TO TERRORISM AND CLIMATE CHANGE

Cass R. Sunstein*

Two of the most important sources of catastrophic risk are terrorism and
not too little rationality . . .
not too little rationality . . . but too much
tragedy of the Science communications commons
Culturally contested facts . . .

I. One good explanation: identity-protective cognition

II. Three not so good ones …
   A. Science denial
   B. Public irrationality thesis (PIT)
   C.

III. One fitting solution
Culturally contested facts . . .

I. One good explanation: identity-protective cognition

II. Three not so good ones …
   A. Science denial
   B. Public irrationality thesis (PIT)
   C. Misinformation

III. One fitting solution
Theories of misinformation and mass opinion formation

The passive aggregator model:

Culturally/Economically motivated interest groups → misinformation supply → Credulous Public
"What is the position of expert Scientists?"

<table>
<thead>
<tr>
<th>Statement</th>
<th>Egalitarian</th>
<th>Communitarian</th>
<th>Hierarchical</th>
<th>Individualist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global temperatures are increasing.</td>
<td>Most agree</td>
<td>4x</td>
<td></td>
<td>12x</td>
</tr>
<tr>
<td></td>
<td>Most disagree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human activity is causing global warming.</td>
<td>Most agree</td>
<td>6x</td>
<td></td>
<td>5x</td>
</tr>
<tr>
<td></td>
<td>Most disagree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radioactive wastes from nuclear power can be safely disposed of in deep underground storage facilities.</td>
<td>Most agree</td>
<td></td>
<td></td>
<td>2x</td>
</tr>
<tr>
<td></td>
<td>Most disagree</td>
<td></td>
<td></td>
<td>2x</td>
</tr>
<tr>
<td>Permitting adults without criminal records or histories of mental illness to carry concealed handguns in public decreases violent crime.</td>
<td>Most agree</td>
<td></td>
<td></td>
<td>5x</td>
</tr>
<tr>
<td></td>
<td>Most disagree</td>
<td></td>
<td></td>
<td>4x</td>
</tr>
</tbody>
</table>
"It is now beyond reasonable scientific dispute that human activity is causing 'global warming' and other dangerous forms of climate change. Over the past century, atmospheric concentration of carbon dioxide (CO$_2$)—called a "greenhouse gas" because of its contribution to trapping heat—has increased to historically unprecedented levels. Scientific authorities at all major universities agree that the source of this increase is human industrial activity. They agree too that higher CO$_2$ levels are responsible for steady rises in air and ocean temperatures over that period, particularly in the last decade. This change is resulting in a host of negative consequences: the melting of polar ice caps and resulting increases in sea levels and risks of catastrophic flooding, intense and long-term droughts in many parts of the world; and a rising incidence of destructive cyclones and hurricanes in others."

Robert Linden
Position: Professor of Meteorology, Massachusetts Institute of Technology
Education: Ph.D., Harvard University
Memberships:
• American Meteorological Society
• National Academy of Sciences

"Judged by conventional scientific standards, it is premature to conclude that human CO$_2$ emissions—so-called 'greenhouse gases'—cause global warming. For example, global temperatures have not risen since 1998, despite significant increases in CO$_2$ during that period. In addition, rather than shrinking everywhere, glaciers are actually growing in some parts of the world, and the amount of ice surrounding Antarctica is at the highest level since measurements began 30 years ago... Scientists who predict global warming despite these facts are relying entirely on computer models. Those models extrapolate from observed atmospheric conditions existing in the past. The idea that those same models will accurately predict temperatures in a world with a very different conditions—including one with substantially increased CO$_2$ in the atmosphere—is based on unproven assumptions, not scientific evidence..."

Robert Linden
Position: Professor of Meteorology, Massachusetts Institute of Technology
Education: Ph.D., Harvard University
Memberships:
• American Meteorological Society
• National Academy of Sciences
Featured Scientist is a knowledgeable and credible expert on ...

**Nuclear power**

"Using deep geologic isolation to dispose of radioactive wastes from nuclear power plants would put human health and the environment at risk. The concept seems simple: contain the wastes in underground bedrock isolated from humans and the biosphere. The problem in practice is that there is no way to assure that the geologic conditions relied upon to contain the wastes won't change over time. Nor is there any way to assure the human materials used to transport wastes to the site, or to contain them inside of the isolation facilities, won't break down, releasing radioactivity into the environment. These are the sorts of lessons one learns from the complex problems that have plagued safety engineering for the space shuttle, but here the costs of failure are simply too high.

Oliver Roberts  
Position: Professor of Nuclear Engineering, University of California, Berkeley  
Education: Ph.D., Princeton University  
Memberships:  
- American Association of Physics  
- National Academy of Sciences

"Radioactive wastes from nuclear power plants can be disposed of without danger to the public or the environment through deep geologic isolation. In this method, radioactive wastes are stored deep underground in bedrock, and isolated from the biosphere for many thousands of years. Natural bedrock isolation has safely contained the radioactive products generated by spontaneous nuclear fission reactions in Oklo, Africa, for some 2 billion years. Man-made geologic isolation facilities reinforce this level of protection through the use of sealed containers made of materials known to resist corrosion and decay. This design philosophy, known as ‘defense in depth,’ makes long-term disposal safe, effective, and economically feasible."

Oliver Roberts  
Position: Professor of Nuclear Engineering, University of California, Berkeley  
Education: Ph.D., Princeton University  
Memberships:  
- American Association of Physics  
- National Academy of Sciences

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**Climate Change**

- **Egalitarian Communitarian**  
  More Likely to Agree  
  Pct. Point Difference in Likelihood of Selecting Response  

- **Hierarchical Individualist**  
  More Likely to Agree  

**Concealed Carry**

- **Low Risk (safe)**  
  60% 40% 20% 0 20% 40% 60%  
  - 72%  
  - 58%  

- **High Risk (not safe)**  
  - 31%  
  - 22%
“So-called ‘concealed carry’ laws increase violent crime. The claim that allowing people to carry concealed handguns reduces crime is not only contrary to common-sense, but also unsupported by the evidence. . . Looking at data from 1977 to 2005, the 22 states that prohibited carrying handguns in public went from having the highest rates of rape and property offenses to having the lowest rates of those crimes. . . To put an economic price tag on the issue, I estimate that the cost of “concealed carry laws” is around $500 million a year in the U.S.”

James Williams
Position: Professor of Criminology, Stanford University
Education: Ph.D., Yale University
Memberships:
- American Society of Criminologists
- National Academy of Sciences

“Overall, ‘concealed carry’ laws decrease violent crime. The reason is simple: potential criminals are less likely to engage in violent assaults or robberies if they think their victims, or others in a position to give aid to those persons, might be carrying weapons. . . Based on data from 1977 to 2005, I estimate that states without such laws, as a group, would have avoided 1,570 murders; 4,177 rapes; and 60,000 aggravated assaults per year if they had they made it legal for law-abiding citizens to carry concealed handguns. Economically speaking, the annual gain to the U.S. from allowing concealed handguns is at least $6.214 billion.”

James Williams
Position: Professor of Criminology, Stanford University
Education: Ph.D., Yale University
Memberships:
- American Society of Criminologists
- National Academy of Sciences

**Concealed Carry**

- High Risk (Increase crime)
- Low Risk (Decrease Crime)

**Egalitarian Communitarian**
More Likely to Agree

**Hierarchical Individualist**
More Likely to Agree

Pct. Point Difference in Likelihood of Selecting Response

- Climate Change
  - 72%

- Nuclear Power
  - 31%

- Concealed Carry
  - 61%
Monte Carlo simulations

Liberal Democrat (-1 SD on Conservrepub)  
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

Avg. “polarization” on crime data for low numeracy partisans
25% (± 9%)

High numeracy

Avg. “polarization” on crime data for high numeracy partisans
46% (± 17%)

Gun ban

Monte Carlo simulations

High numeracy

Liberal Democrat (-1 SD on Conservrepub)  
Conserv Republican (+1 SD on Conservrepub)

Low numeracy

Avg. “polarization” on crime data for low numeracy partisans
25% (± 9%)

High numeracy

Avg. “polarization” on crime data for high numeracy partisans
46% (± 17%)
Theories of misinformation and mass opinion formation

The passive aggregator model:

Culturally/Economically motivated interest groups

misinformation supply

Credulous Public
Theories of misinformation and mass opinion formation

The passive aggregator model:

- Culturally/Economically motivated interest groups
- Credulous Public
- Misinformation supply

The motivated-public model:

- Culturally Motivated Public
- Opportunistic Misinformers
- Demand for information
Pope Francis Shocks World, Endorses Donald Trump for President, Releases Statement

American Politic

Denzel Washington Switches to Trump Shocks Hollywood-, Speaks Out Against Obama

You Might Also Like
Social Media and Fake News in the 2016 Election

Hunt Allcott and Matthew Gentzkow

American democracy has been repeatedly buffeted by changes in media technology. In the 19th century, cheap newsmprint and improved presses allowed partisan newspapers to expand their reach dramatically. Many have argued that the effectiveness of the press as a check on power was significantly compromised as a result (for example, Kaplan 2002). In the 20th century, as radio and then television became dominant, observers worried that these new platforms would reduce substantive policy debates to sound bites, privilege charismatic or “telegenic” candidates over those who might have more ability to lead but are less polished, and concentrate power in the hands of a few large corporations (Lang and Lang 2002; Bagdikian 1983). In the early 2000s, the growth of online news prompted a new set of concerns, among them that excess diversity of viewpoints would make it easier for like-minded citizens to form “echo chambers” or “filter bubbles” where they would be insulated from contrary perspectives (Sunstein 2001a, b, 2007; Pariser 2011). Most recently, the focus of concern has shifted to social media. Social media platforms such as Facebook have a dramatically different structure than previous media technologies. Content can be relayed among users with no significant third party filtering, fact-checking, or editorial judgment. An individual user with no track record or reputation can in some cases reach as many readers as Fox News, CNN, or the New York Times.

Hunt Allcott is Associate Professor of Economics, New York University, New York City, New York. Matthew Gentzkow is Professor of Economics, Stanford University, Stanford, California. Both authors are Research Associates, National Bureau of Economic Research, Cambridge, Massachusetts.

For supplementary materials such as appendices, datasets, and author disclosure statements, see the article page at https://doi.org/10.1257/jep.31.2.211
Culturally contested facts . . .

I. One good explanation: identity-protective cognition

II. Three not so good ones …
   A. Science denial
   B. Public irrationality thesis (PIT)
   C. Misinformation

III. One fitting solution
Culturally contested facts . . .

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   A. Science denial
   B. Public irrationality thesis (PIT)
   C. Misinformation

III. One fitting solution: Science curiosity
Science Curiosity and Political Information Processing

Dan M. Kahan
Yale University

Ashley Landrum
Annenberg Public Policy Center

Katie Carpenter
Cultural Cognition Project

Laura Helft
Tangled Bank Studios

Kathleen Hall Jamieson
University of Pennsylvania

This article describes evidence suggesting that science curiosity counteracts politically biased information processing. This finding is in tension with two bodies of research. The first casts doubt on the existence of “curiosity” as a measurable disposition. The other suggests that individual differences in cognition related to science comprehension—of which science curiosity, if it exists, would presumably be one—do not mitigate politically biased information processing but instead aggravate it. The article describes the scale-development strategy employed to overcome the problems associated with measuring science curiosity. It also reports data, observational and experimental, showing that science curiosity promotes open-minded engagement with information that is contrary to individuals’ political predispositions. We conclude by identifying a series of concrete research questions posed by these results.

KEY WORDS: science curiosity, motivated reasoning, polarization

A Surprising Discovery About Politically Motivated Reasoning

In less than two decades, politically motivated reasoning has assumed an imperial reach over the study of mass political opinion formation. It has driven to the periphery theories emphasizing rational choice dynamics, heuristic information processing, public-spirited idealism, and popular disengagement (see generally Jost, Hennes, & Lavine, 2013). It has colonized countless individual topics from group polarization to source-credibility effects (Bolsen, Druckman, & Cook, 2015; Taber, Cann &
Evidence-based Science Filmmaking Initiative

Can the craft of science filmmaking be enhanced by the use of evidence-based methods?

If the answer is “yes,” the reason isn’t that such methods supply a substitute for professional judgment. An interconnected web of intuitive powers of discernment and critical reasoning proficiencies, professional judgment enables the specialist to match the critical elements of a decisionmaking task to the inventory of insight and skills she has acquired through experience. There is no alternative to the adroit exercise of professional judgment in science filmmaking, or in any other field that admits of expertise.

The question, then, is only whether the empirical tools that evidence-based methods supply can equip the expert science filmmaker to exercise her professional judgment to even greater effect.
Performance measure

Now we'd like to get your reactions to an interesting news story. One story will be drawn randomly from the story set of your choice. After you read the story, we'll ask you some questions about it. Please pick the story set that contains the stories you'd be most interested in reading.
YIF Clip: Origins of color vision
Figure 9. Engagement as a function of science curiosity. N’s = 2500 for panels A, C, & D; n = 1250 for panel B. Panels A-C based on linear regression analysis; panel B based on logistic regression. Colored bars are 0.95 CIs.
“How much **risk** do you believe XXX poses to human health, safety, or prosperity?”

**Figure 8.** Respective impacts of science comprehension and of science curiosity on ISRPM polarization. Derived from linear regression reported in Table B3. Colored bars denote 0.95 CIs.
Q. Are “curious” partisans more likely to examine surprising contrary evidence?
Q. Are “curious” partisans more likely to examine surprising contrary evidence?

1. believer unsurprising vs. skeptical surprising

2. believer surprising vs. skeptical unsurprising
Q. Are “curious” partisans more likely to examine surprising contrary evidence?

1. believer unsurprising vs. skeptical surprising

- Scientists Find Still More Evidence Linking Global Warming to Extreme Weather

2. believer surprising vs. skeptical unsurprising

- Scientists Report Surprising evidence: Arctic Ice Melting Even Faster Than Expected
- Scientists Find Still More Evidence that Global Warming Actually Slowed in Last Decade
Probability of selecting *surprising* skeptical vs. *unsurprising* believer story
Probability of selecting *surprising* skeptical vs. *unsurprising* believer story

24% (± 18%)
Probability of selecting *surprising* skeptical vs. *unsurprising* believer story

24% (± 18%) 68% (± 20%)

Liberal Dem. below avg.
Science curiosity

Liberal Dem. above avg.
Science curiosity
Probability of selecting *surprising* believer vs. *unsurprising* skeptical story

- **42% (± 13)**
  - Conser. Repub. below avg.
  - Science curiosity

- **62% (± 12%)**
  - Conser. Repub. above avg.
  - Science curiosity
How can Science curiosity be used to fight a polluted Science communication environment?
How can Science curiosity be used to fight a polluted Science communication environment?
How can Science curiosity be used to fight a polluted Science communication environment?
How can Science curiosity be used to fight a polluted Science communication environment?

You tell me!
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The question, then, is only whether the empirical tools that evidence-based methods supply can equip the expert science filmmaker to exercise her professional judgment to even greater effect.
Evidence-based Policy Science Communication Initiative

A Region Responds to a Changing Climate
Southeast Florida Regional Climate Change Compact Counties
Regional Climate Action Plan
October 2012
How can Science curiosity be used to fight a polluted Science communication environment?

You tell me!
How can Science curiosity be used to fight a polluted Science communication environment?

You tell me!
& I’ll measure
How can Science curiosity be used to fight a polluted Science communication environment?

You tell me! & I’ll measure
“I am you!”
How can Science curiosity be used to fight a polluted Science communication environment?

*shifting the curiosity curve*