Watch in slide show mode to observe (modest) animation.

comments questions: dan.kahan@yale.edu

papers, etc: www.culturalcognition.net

the Cultural Cognition Project at Yale Law School

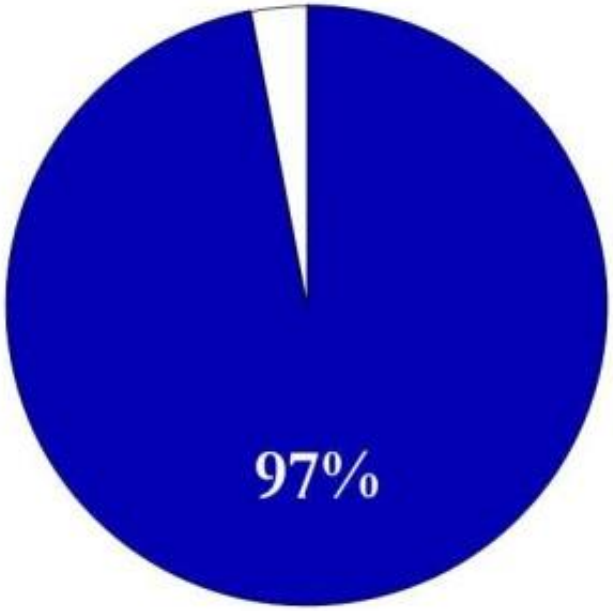
www.culturalcognition.net

Mistrust or (Motivated) Misperception of Scientific Consensus?

Dan M. Kahan
Yale University

& ***many x 10^3 others***

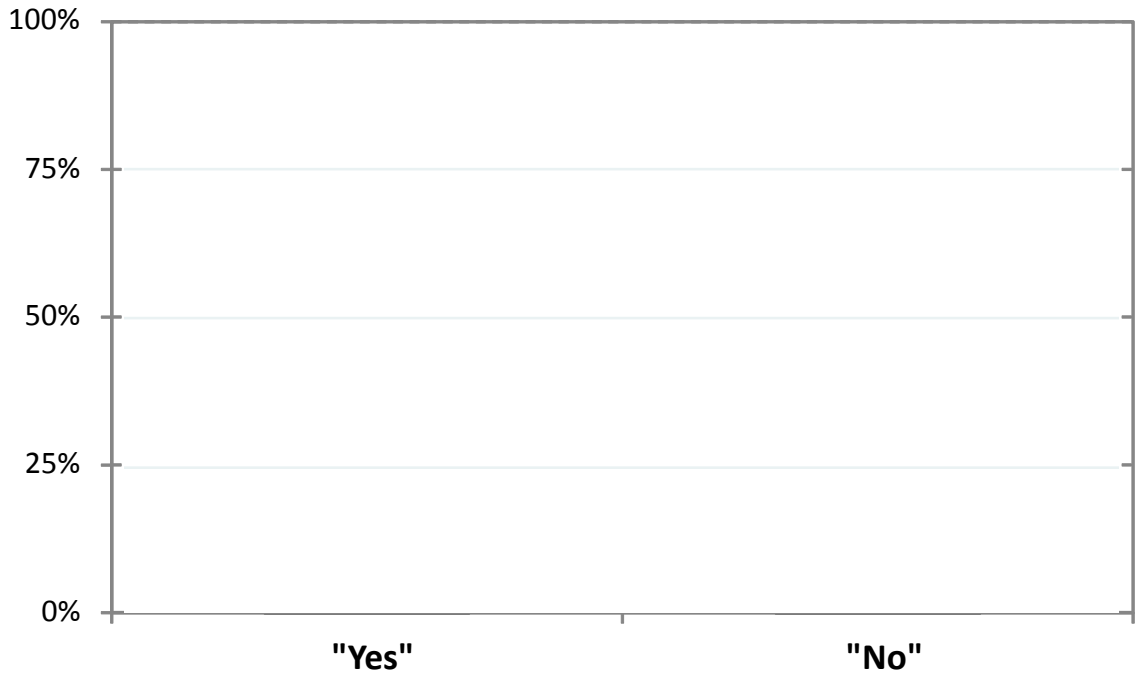
Research Supported by:
National Science Foundation, SES-0922714
Annenberg Public Policy Center



97% of climate scientists have concluded that human-caused climate change is happening.

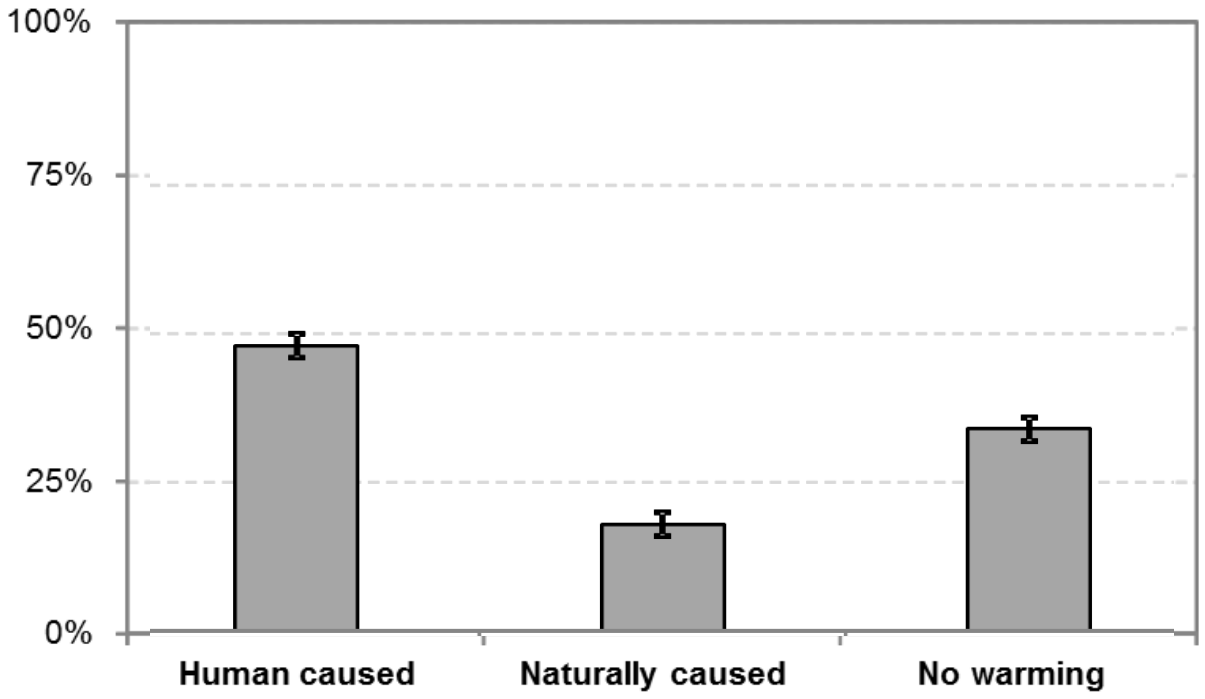
AAAS
ADVANCING SCIENCE, SERVING SOCIETY

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



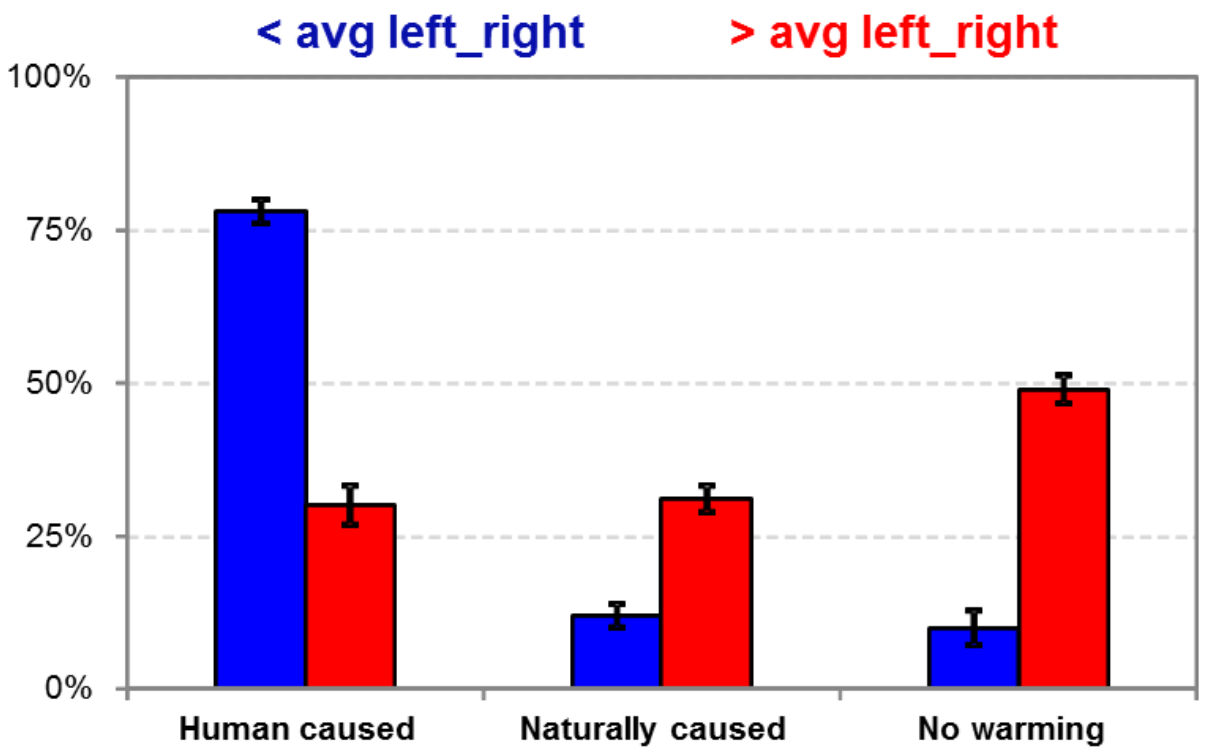
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2436. Nationally representative sample. CIs denote 0.95 level of confidence for estimated population means.

Climate change positions



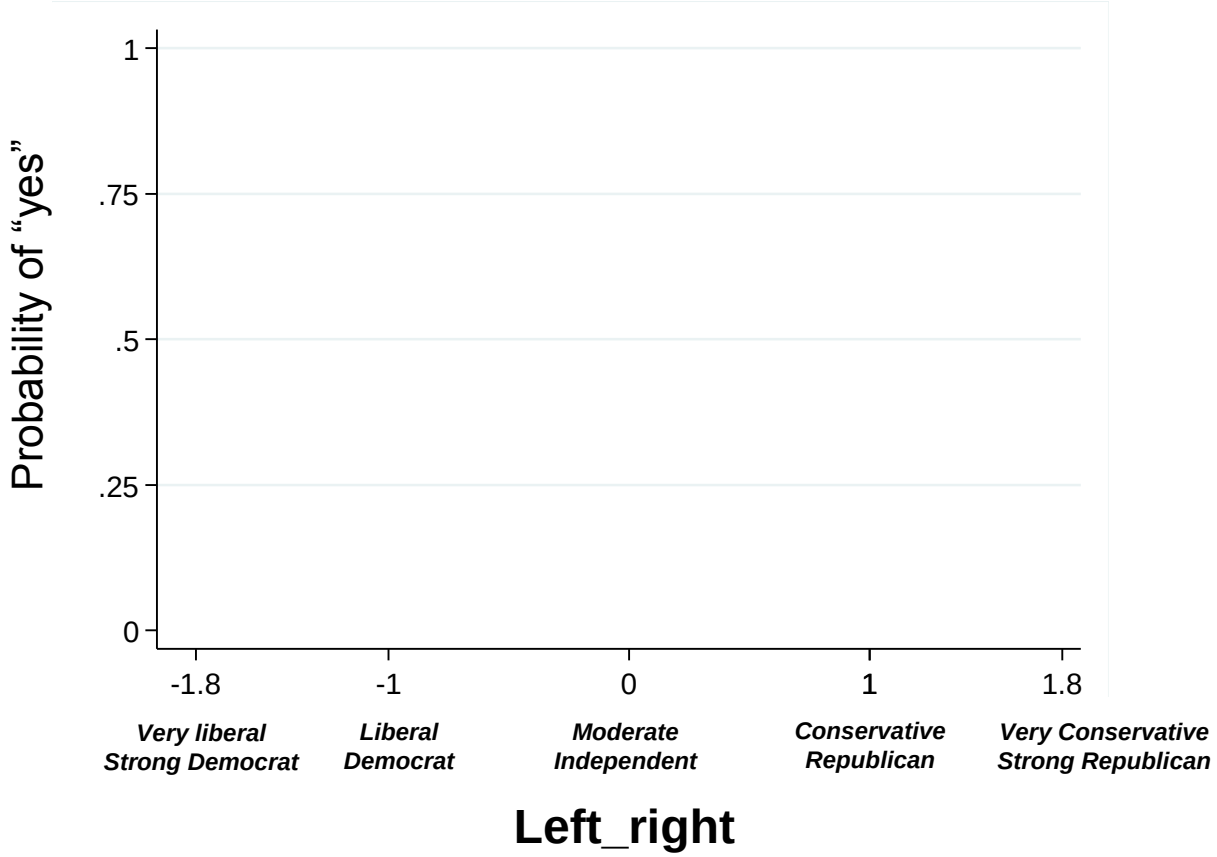
N = 2389. Nationally rep. sample. **Data source:** CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. CIs denote 0.95 level of confidence for estimated population means. Respondents classified in relation to "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80).

Climate change positions



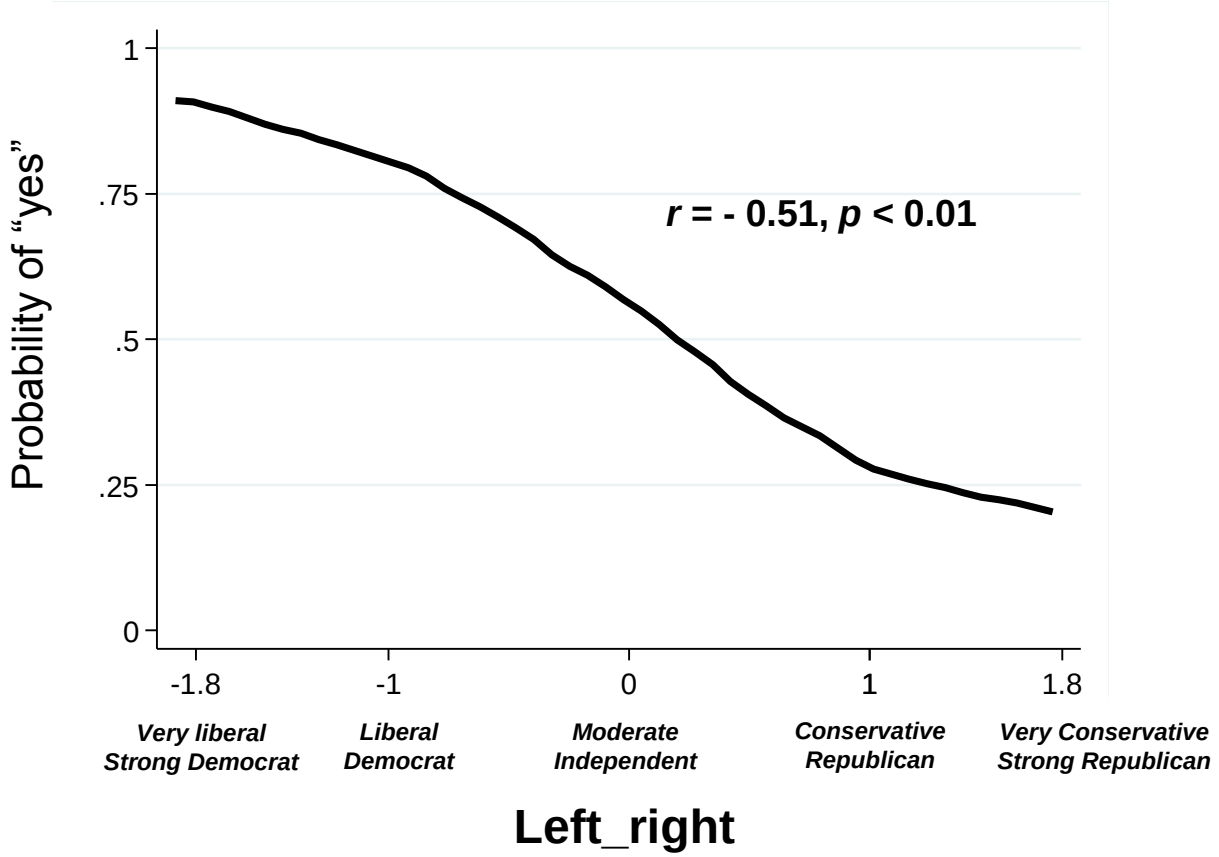
N = 2389. Nationally rep. sample. **Data source:** CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. CIs denote 0.95 level of confidence for estimated population means. Respondents classified in relation to "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80).

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



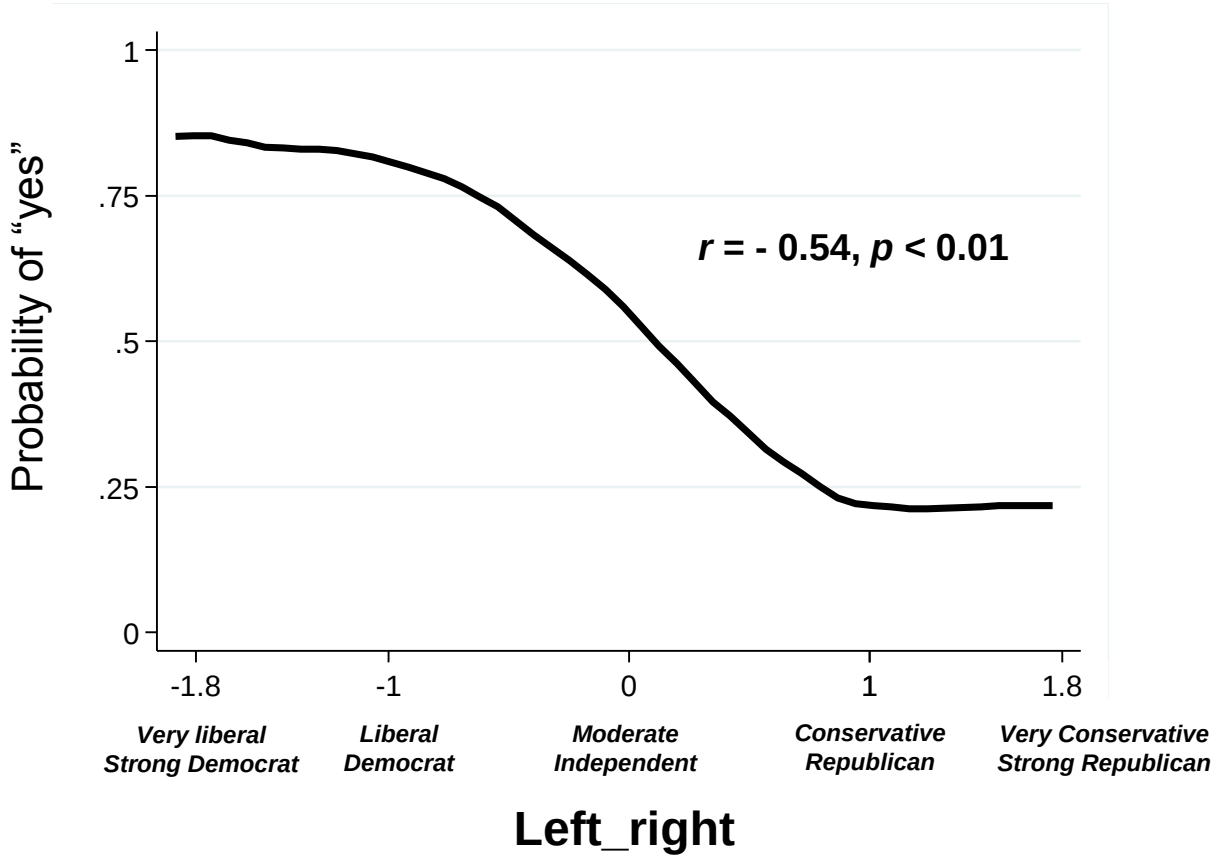
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80). Lowess regression.

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



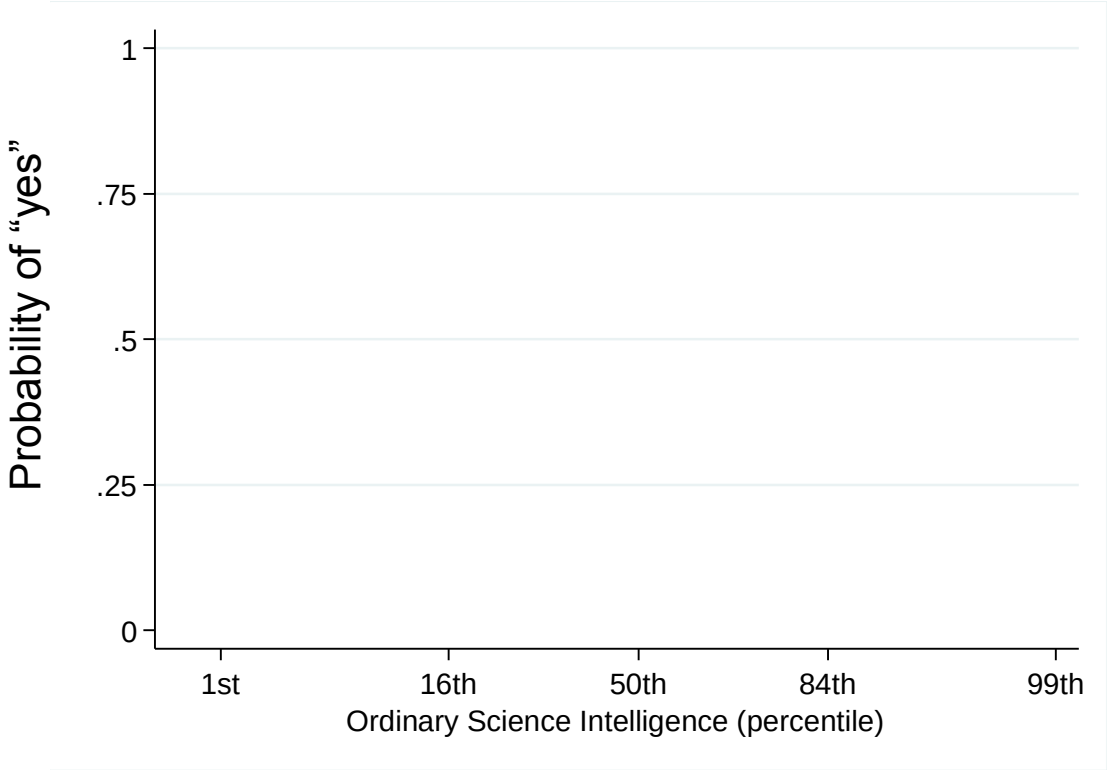
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80). Lowess regression.

*There is **"solid evidence" of recent global warming** due "mostly" to **"human activity** such as burning fossil fuels."*



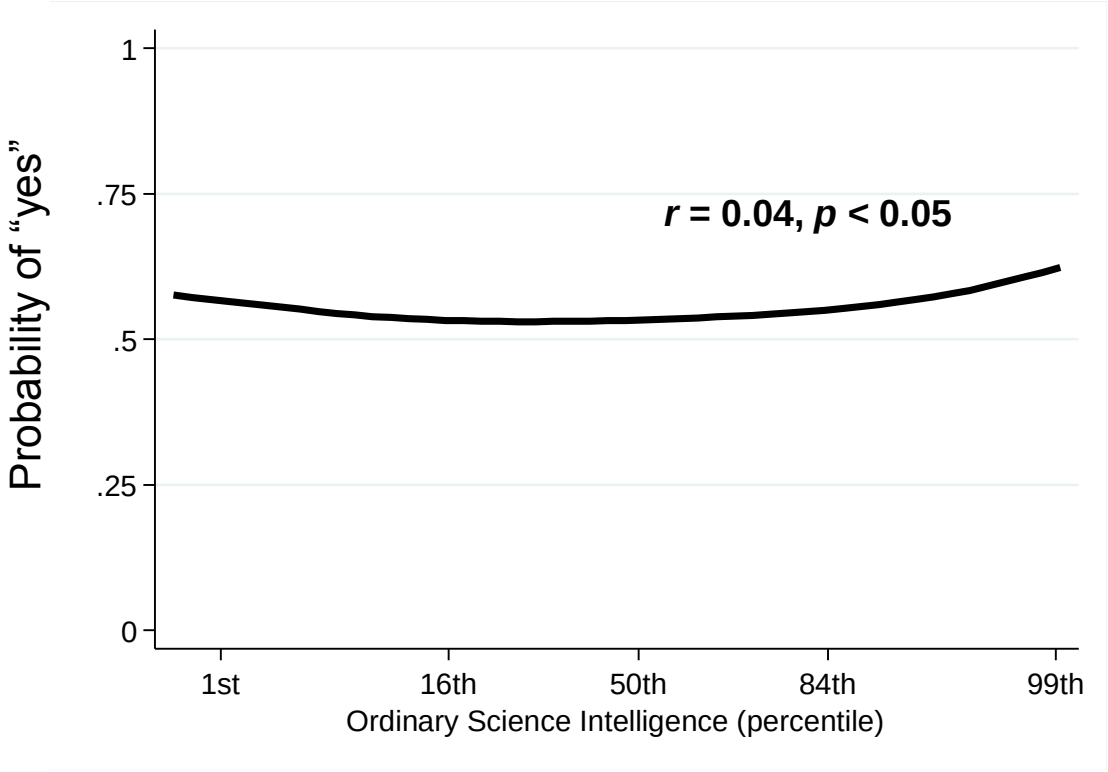
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* =570. Nationally representative sample." "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80). Lowess regression.

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



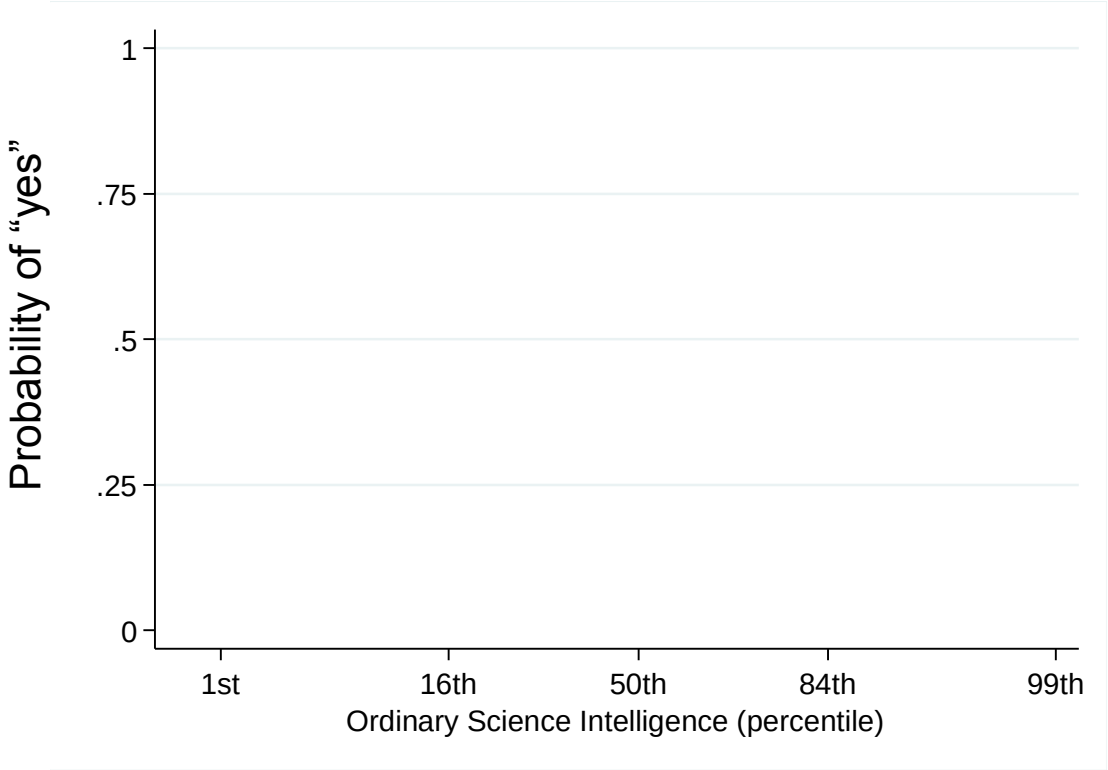
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2436. Nationally representative sample. Lowess regression.

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



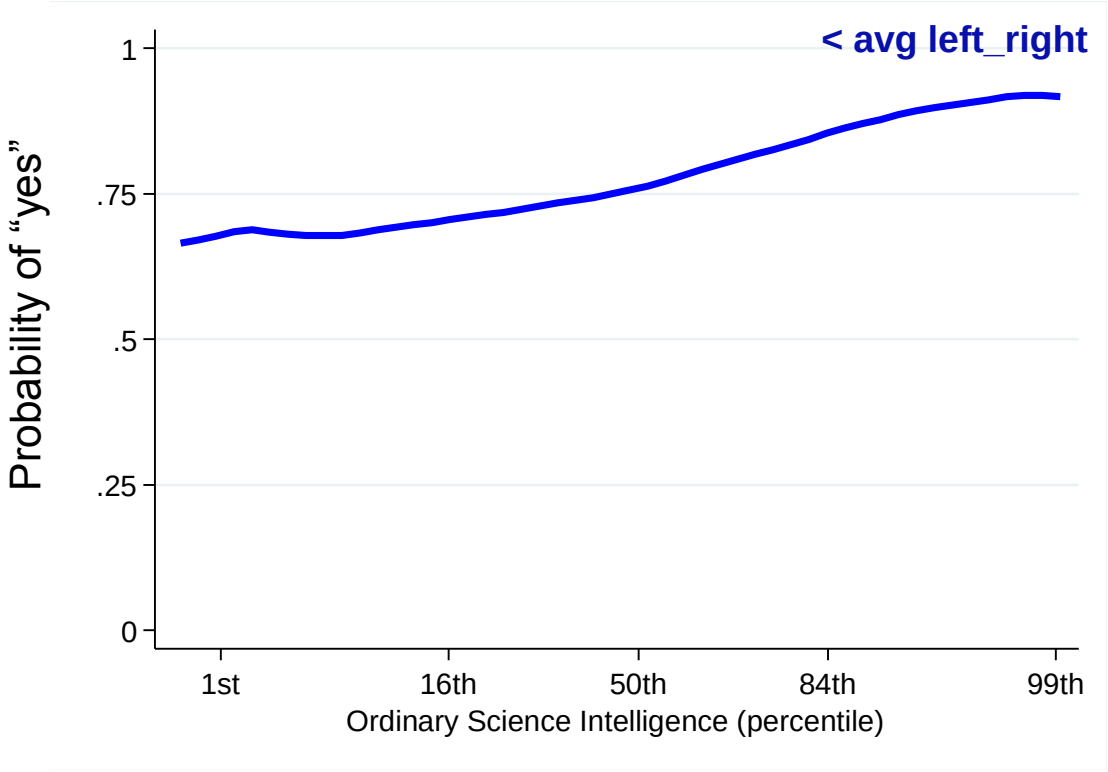
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2436. Nationally representative sample. Lowess regression.

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



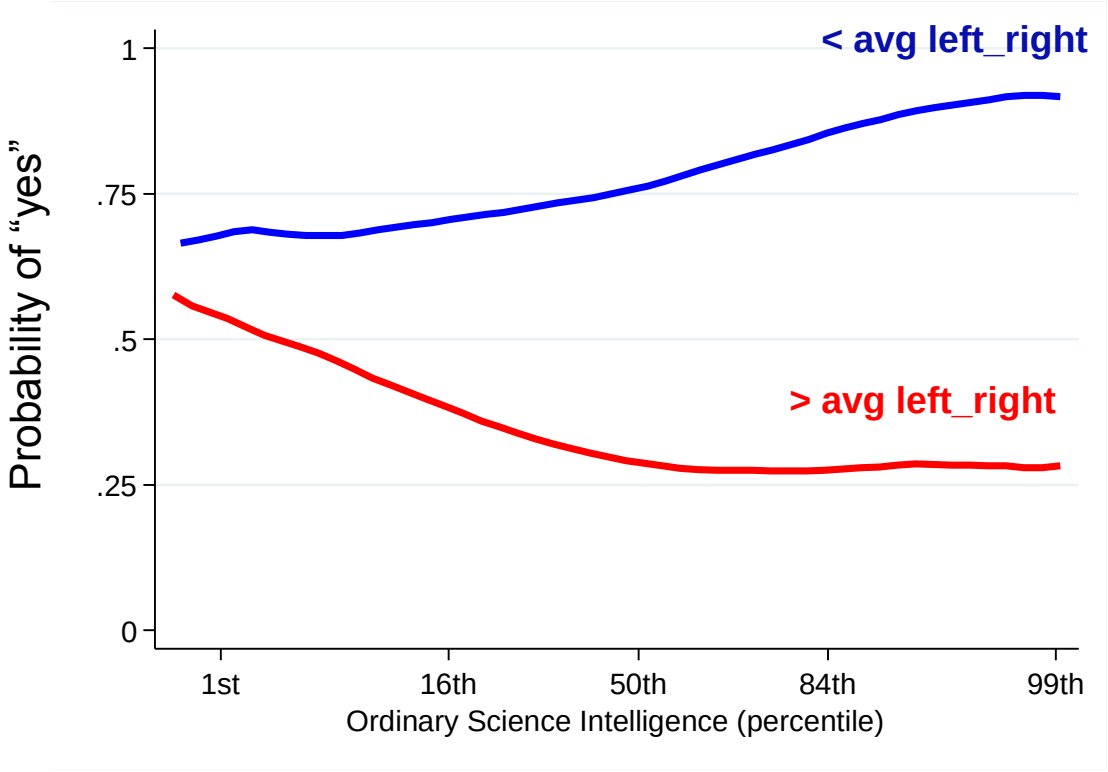
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80). Lowess regression.

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



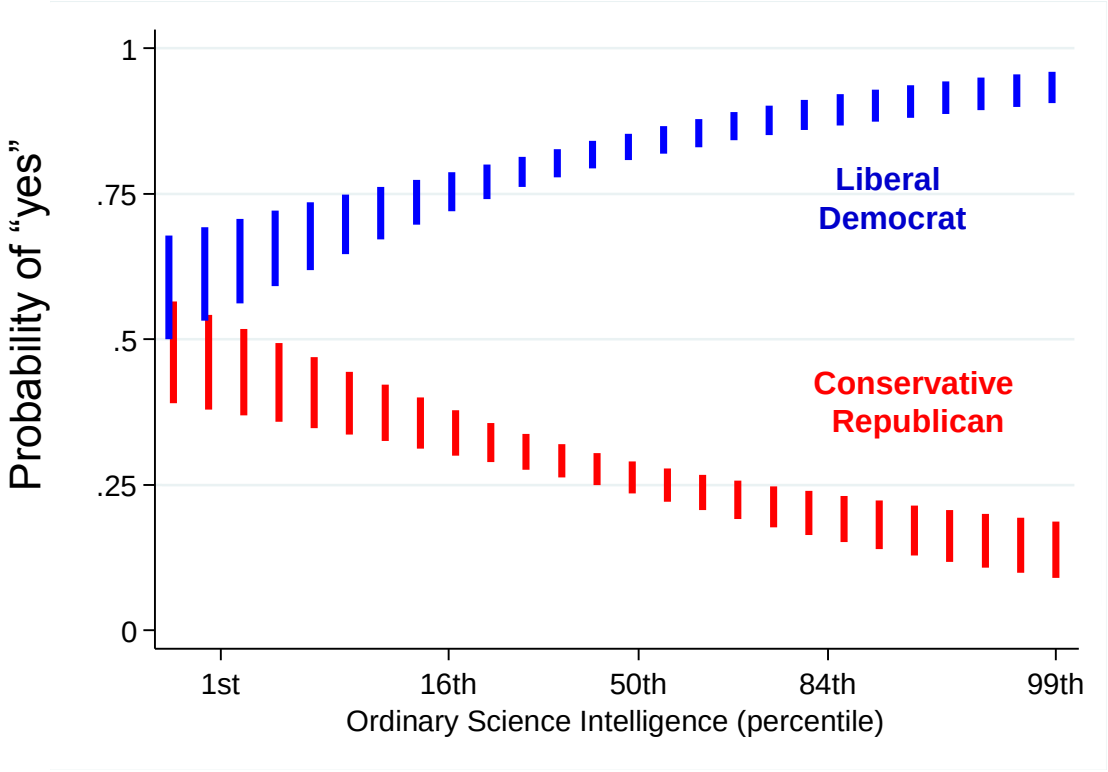
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80). Lowess regression.

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



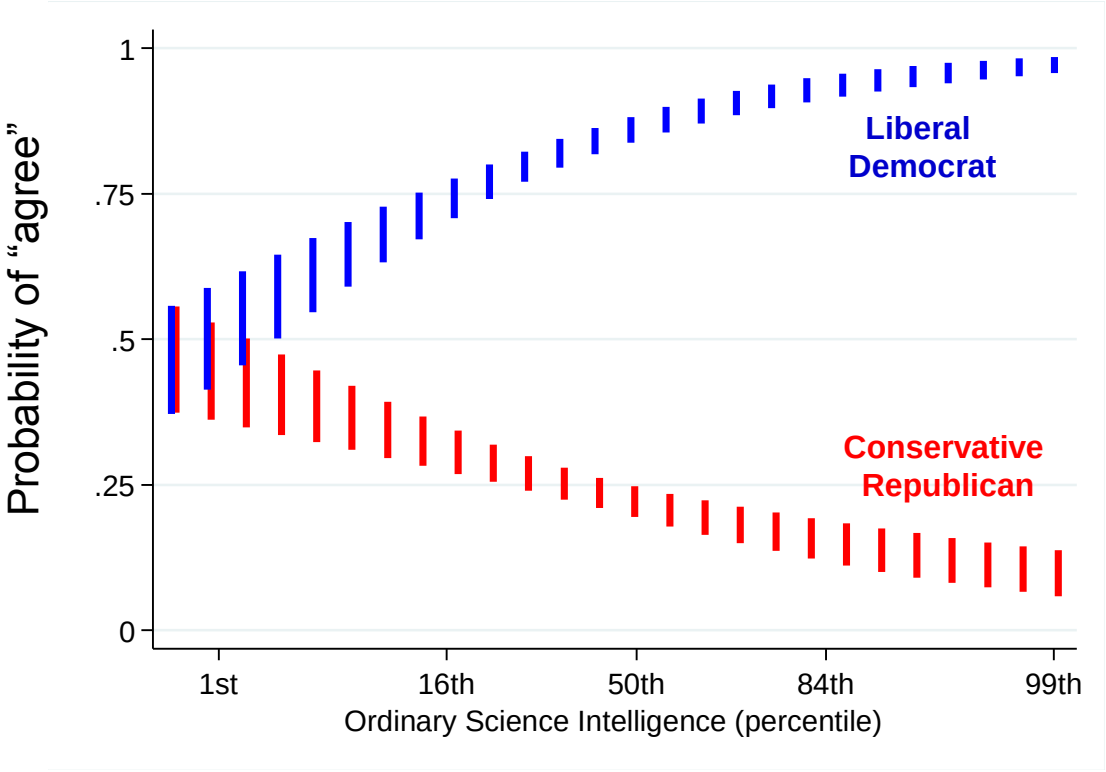
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80). Lowess regression.

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Liberal Democrat" and "Conservative Republican" reflect values for predictors set to those values on 5-point ideology & 7-point party-identification items. Colored bars denote 0.95 CIs.

*There is **"solid evidence" of recent global warming** due "mostly" to **"human activity** such as burning fossil fuels."*



Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Liberal Democrat" and "Conservative Republican" reflect values for predictors set to those values on 5-point ideology & 7-point party-identification items. Colored bars denote 0.95 CIs.

American Academy of Pediatrics

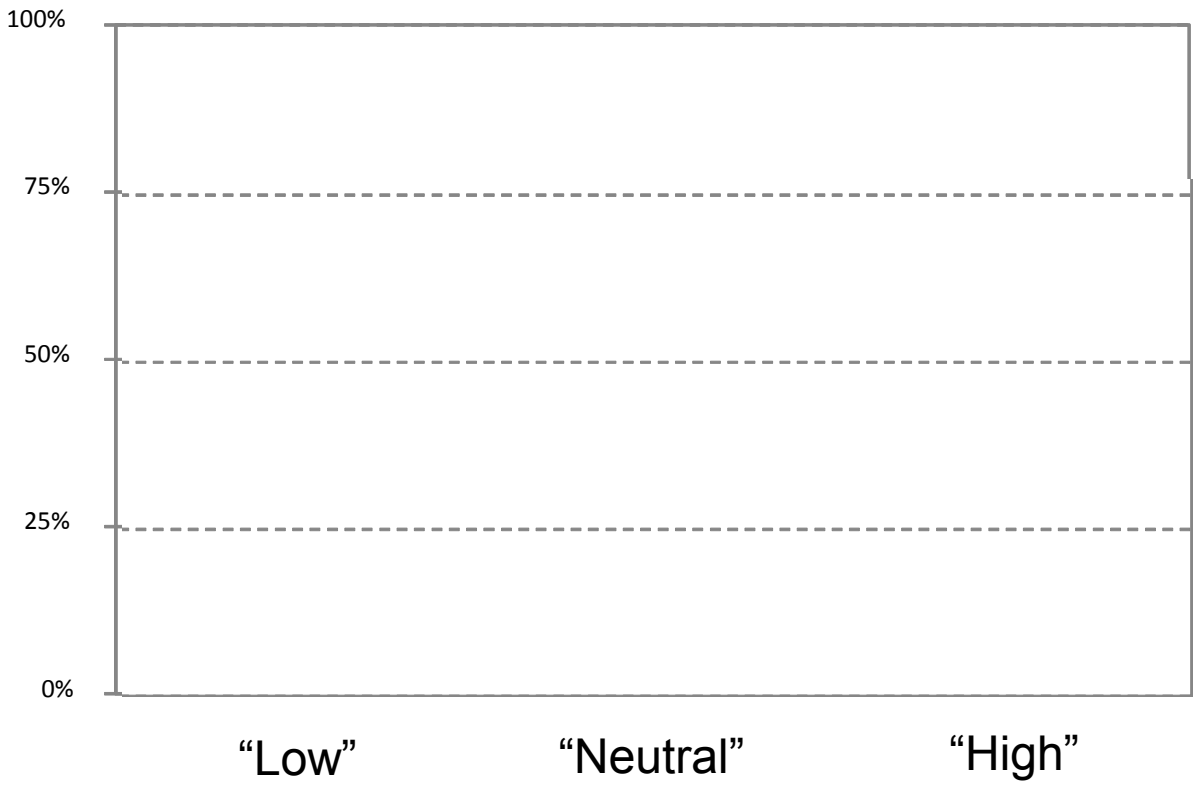
DEDICATED TO THE HEALTH OF ALL CHILDREN™

Updated April 2013

Vaccine Safety: Examine the Evidence

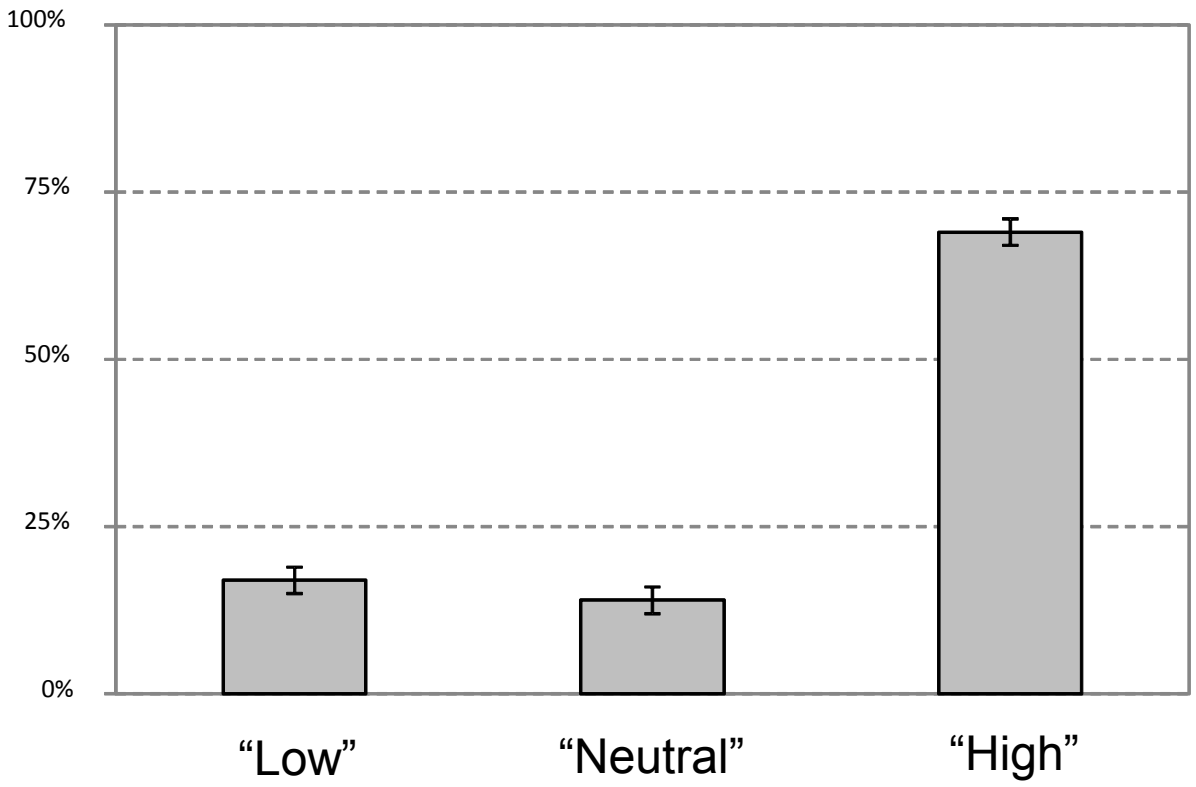
* * *

*"How would you **rate your level of confidence** in the judgment of the **American Academy of Pediatrics** that vaccines are a "**safe and effective** way to prevent serious disease"?*



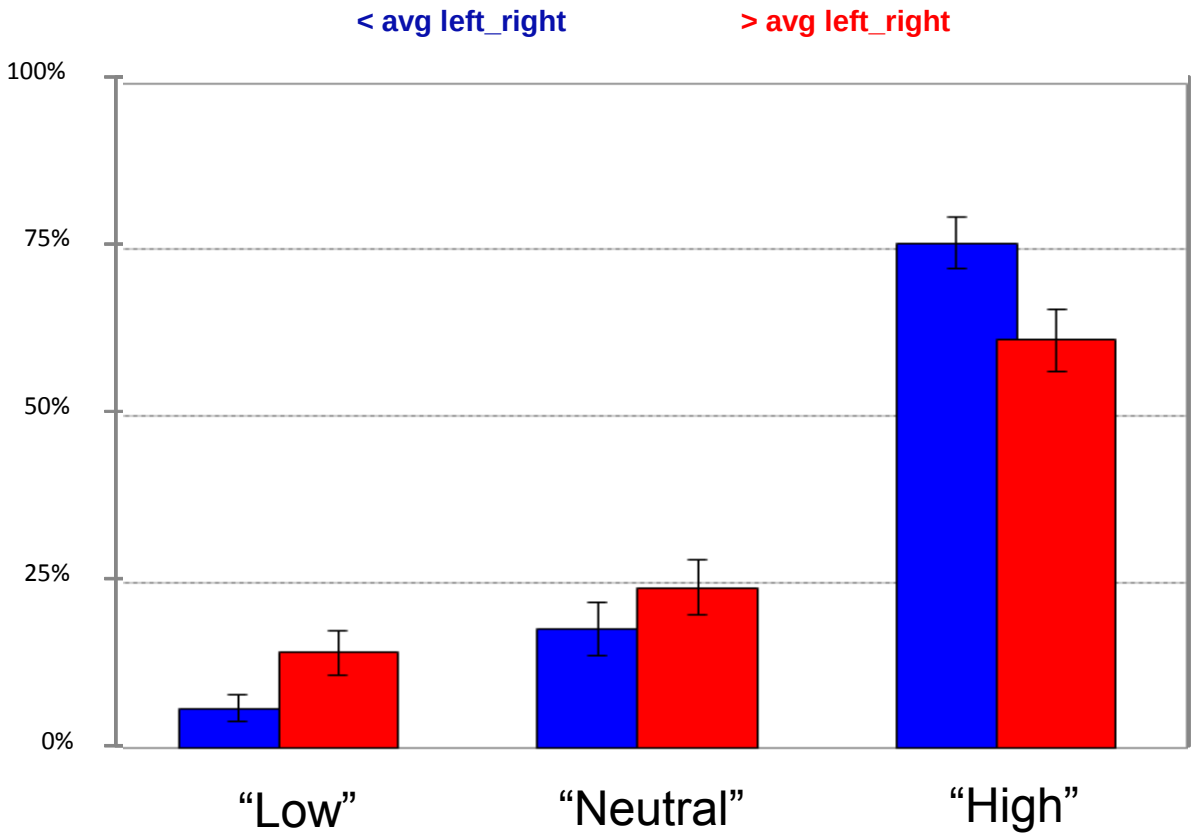
Data source: Cultural Cognition Project, 2014. *N* = 1996. Nationally representative sample. "CIs denote 0.95 CIs for estimated population means.

*"How would you **rate your level of confidence** in the judgment of the **American Academy of Pediatrics** that vaccines are a "**safe and effective** way to prevent serious disease"?*



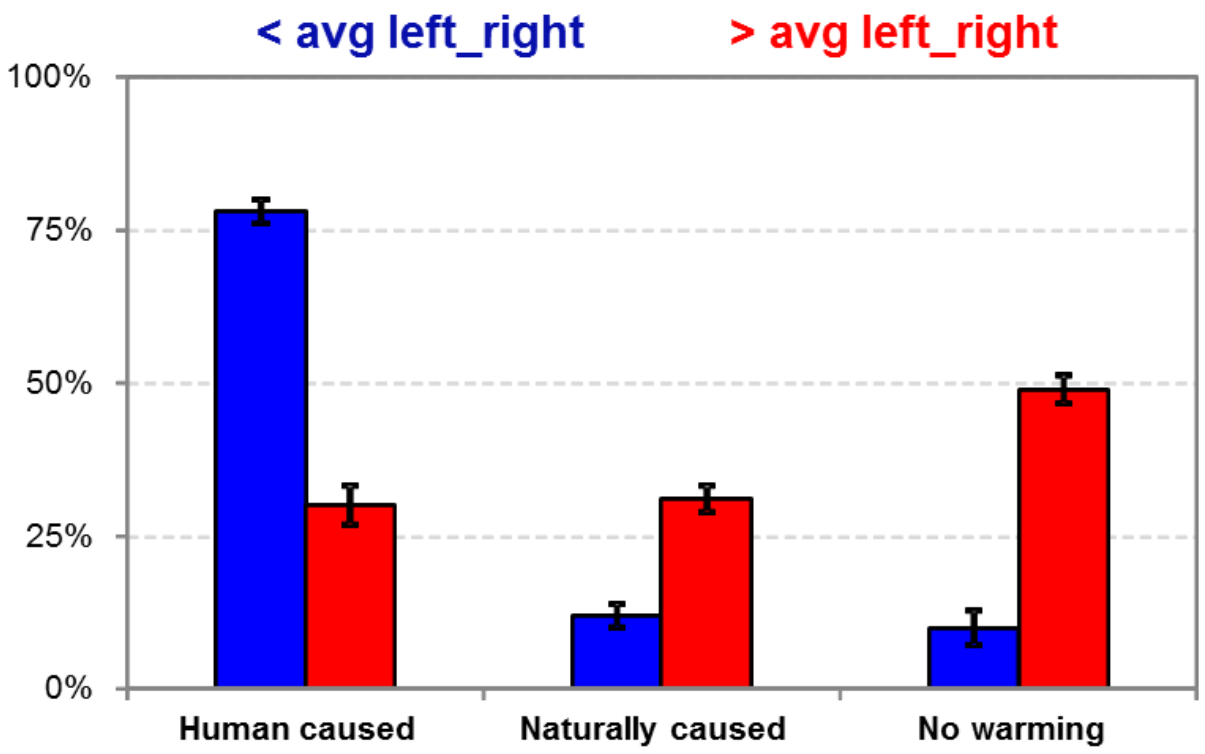
Data source: Cultural Cognition Project, 2014. *N* = 1996. Nationally representative sample. "CIs denote 0.95 CIs for estimated population means.

*"How would you **rate your level of confidence** in the judgment of the **American Academy of Pediatrics** that vaccines are a "**safe and effective** way to prevent serious disease"?*



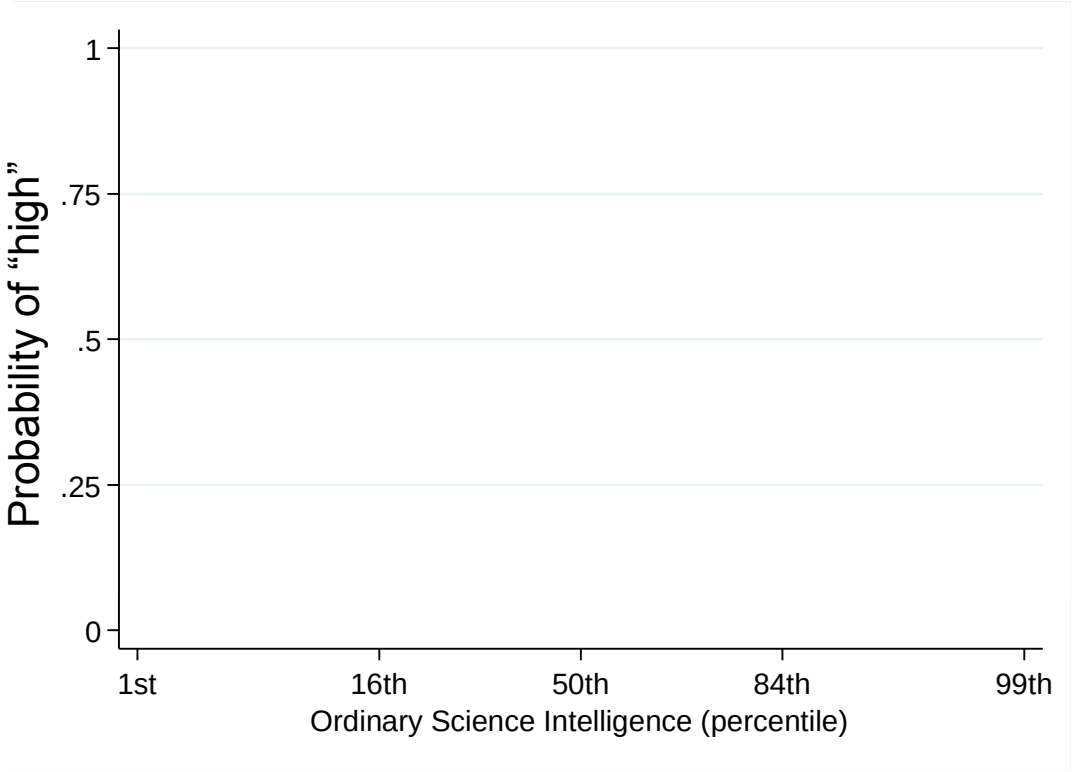
Data source: Cultural Cognition Project, 2014. *N* = 789. Nationally representative sample. Respondents classified in relation to "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 7-point "liberal-conservative" ideology item. Error bars reflect 0.95 confidence interval.

Climate change positions



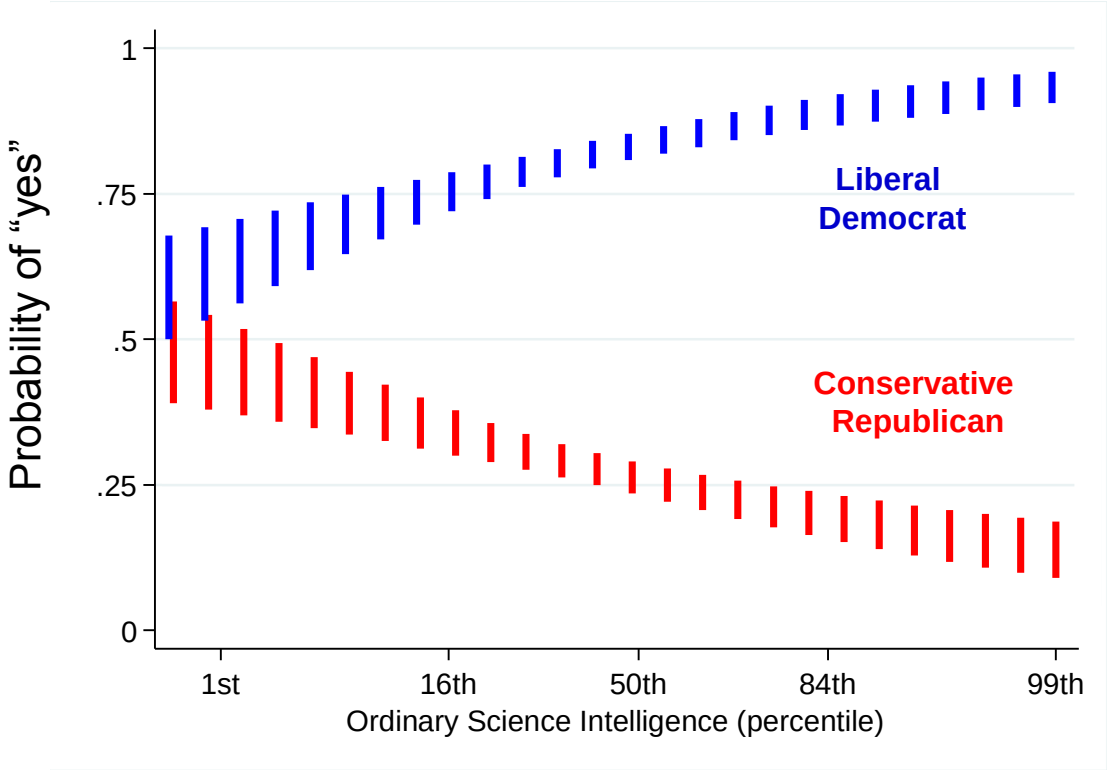
N = 2389. Nationally rep. sample. **Data source:** CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. CIs denote 0.95 level of confidence for estimated population means. Respondents classified in relation to "Left_Right," a continuous political outlook scale formed by aggregating responses to 7-point party identification item and 5-point "liberal-conservative" ideology item (α = 0.80).

*"How would you **rate your level of confidence** in the judgment of the **American Academy of Pediatrics** that vaccines are a "**safe and effective** way to prevent serious disease"?*

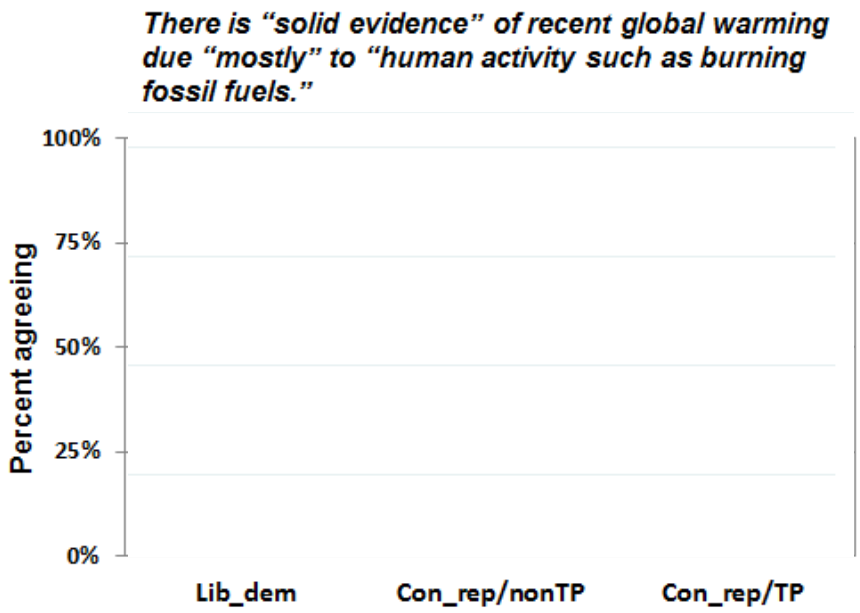


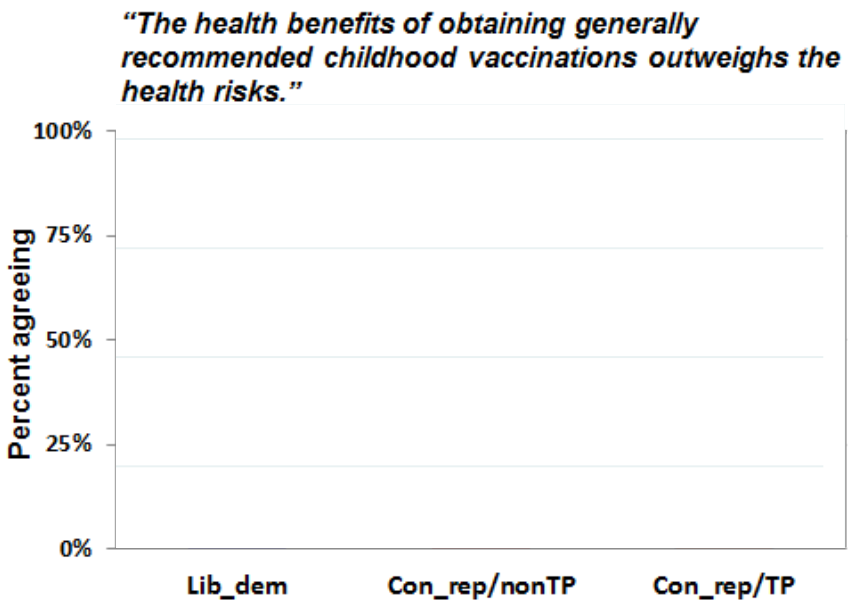
Data source: Cultural Cognition Project, 2013. *N* = 1894. Nationally representative sample." Based on ordered logistic regression. Colored bars denote 0.95 CIs

*Do you **believe** the statement "97% of climate scientists have concluded that human activity is causing global climate change"?*



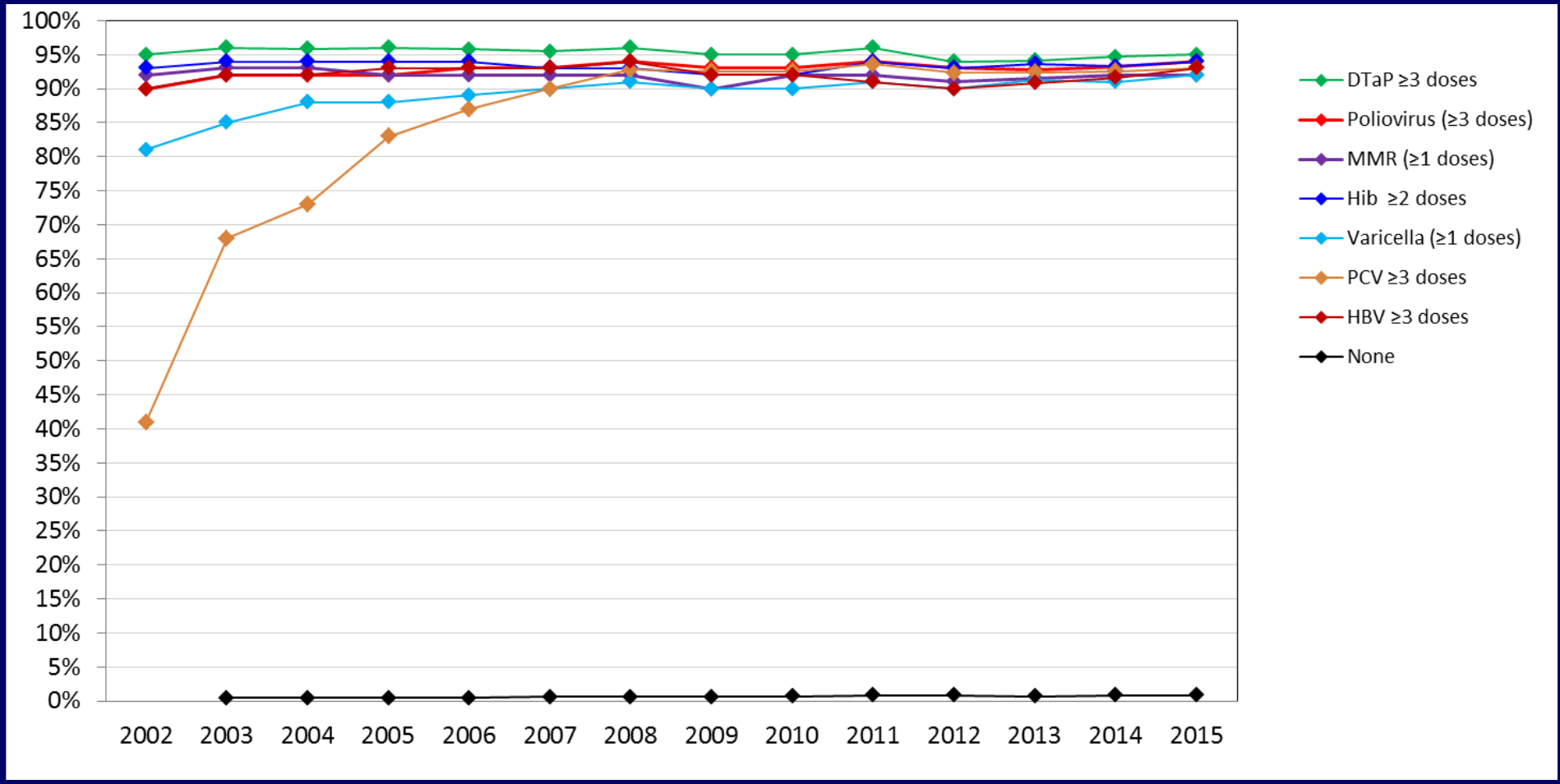
Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Liberal Democrat" and "Conservative Republican" reflect values for predictors set to those values on 5-point ideology & 7-point party-identification items. Colored bars denote 0.95 CIs.





Cultural Cognition Project National Vaccine Risk Perception Study. *N's* = 671 & 686. Nationally representative sample, May/June 2013 "Lib_dem" and "Con_rep" designate members of sample scoring below and above the mean, respectively, on political outlook scale formed by aggregating respones to 5-point liberal-conservative ideology scale and 7-point party-identification scale ($\alpha = 0.85$); "nonTP" and "TP" reflect nonmember and member of Tea Party, respectively (28% of Con_rep identified as Tea Party members; less than 1% of Lib_dems did). CI's reflect 0.95 confidence intervals for estimated population means.

Childhood vaccinate rates (CDC, Nat'l Imm. Survey)



I am going to name some institutions in this country. As far as the people running these institutions are concerned, would you say you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?

a. Banks and Financial Institutions

b. Major Companies

c. Organized Religion

d. Education

e. Executive Branch of the Federal Government

f. Organized Labor

g. Press

h. Medicine

i. TV

j. U.S. Supreme Court

k. Scientific Community

l. Congress

m. Military

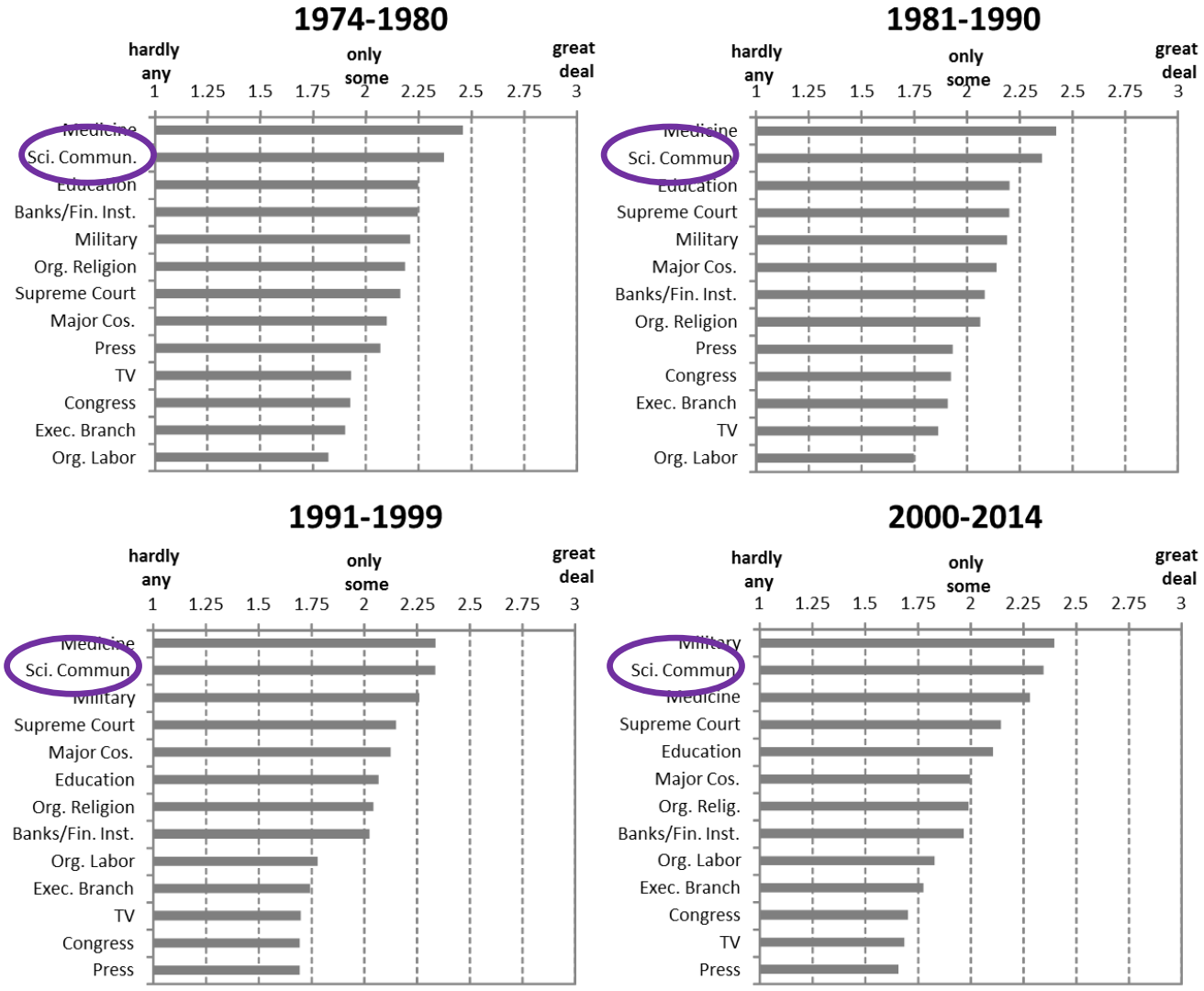
Trends in Public Attitudes about Confidence in Institutions

Tom W. Smith and Jaesok Son
May, 2013

On average the public's confidence in institutions has declined over the last four decades. (For the wording of this and all other questions see Appendix 1: Question Wordings. For full percentages for all years, see the attached tables.) As Figure 1 shows, across the 12 institutions measured from 1973 through 2012 the average saying they had a great deal of confidence fell from 29.9% in 1973-1977 to an all-time low of 22.6% in 1993-1996. (All subsequent figures on confidence in this report are the percent with a great deal of confidence.) Confidence then rebounded slightly before slumping to a second low point of 23.3% in 2008-2012. Similarly, a scale covering 13 institutions (adding Banks and Financial Institutions

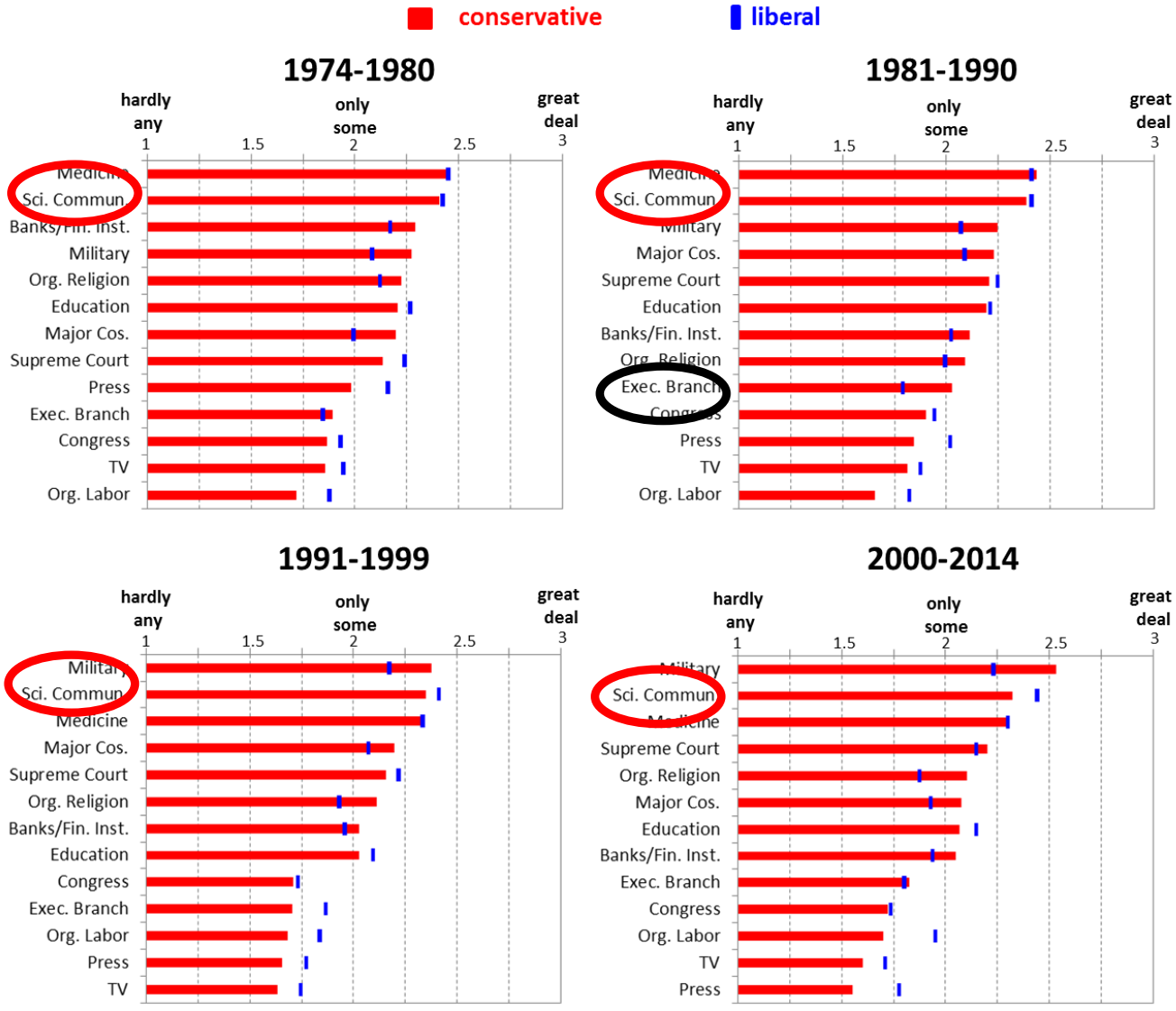
The final four institutions deal mostly with learning and knowledge. On average they have had higher ratings that the economic, governmental, and media groups, but with one exception have shown decline over time (Figure 5). The exception is that confidence in the Scientific Community has varied little and shown no decline. The 2012 rating of 39.7% is very close to the long-term average of 40.2%. Confidence

Institutional Confidence Ratings Over Time



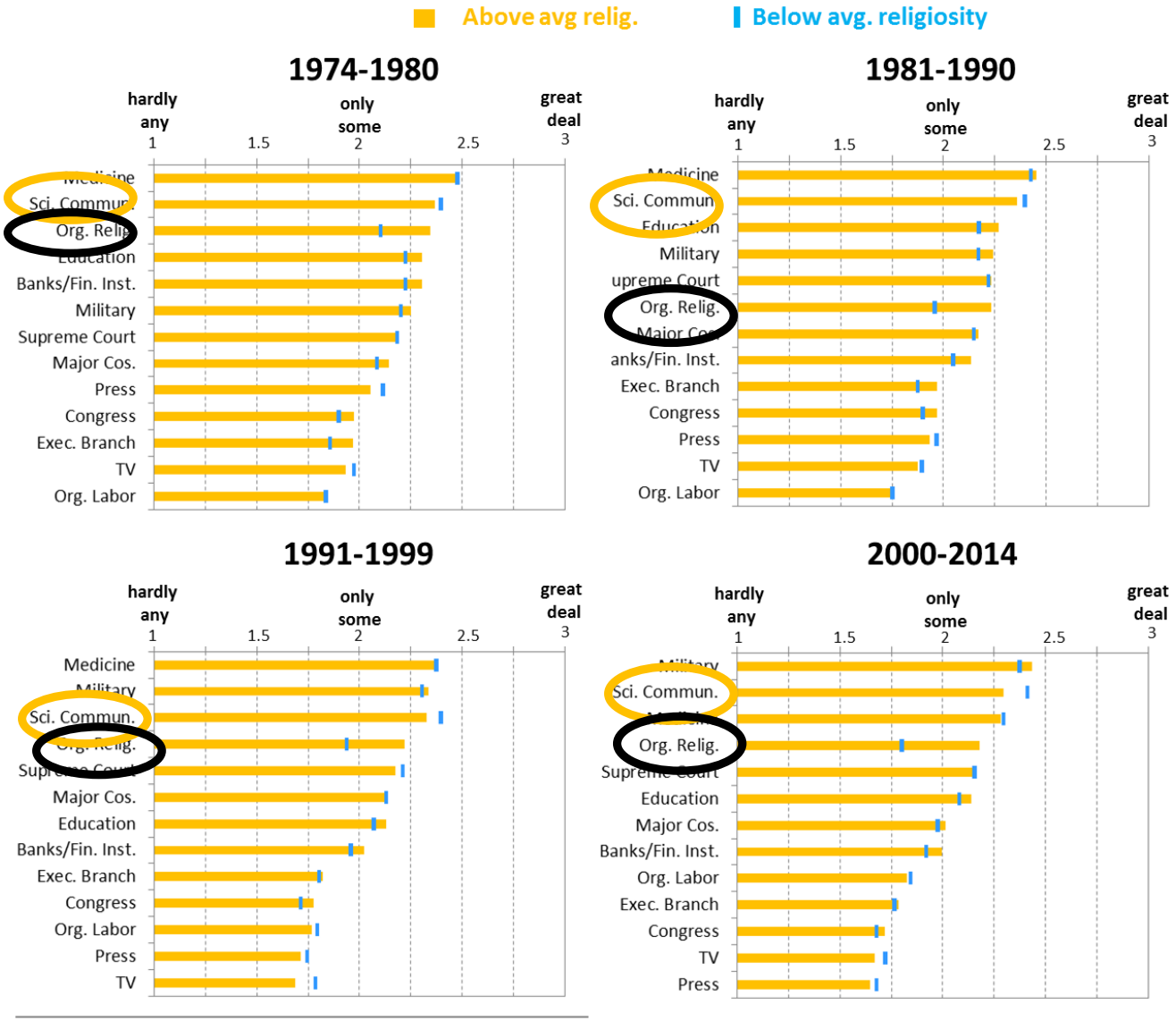
N's range from 4000 to 10,000 in indicated time periods ; means reflect reflect "true" population mean at ± 0.06 or less, 0.95 LC . Means calculated with "hardly any" scored ast 1, "only some" as 2, and "great deal" as 3. Institutions listed in descending order of confidence (most to least).

Institutional Confidence Ratings Over Time

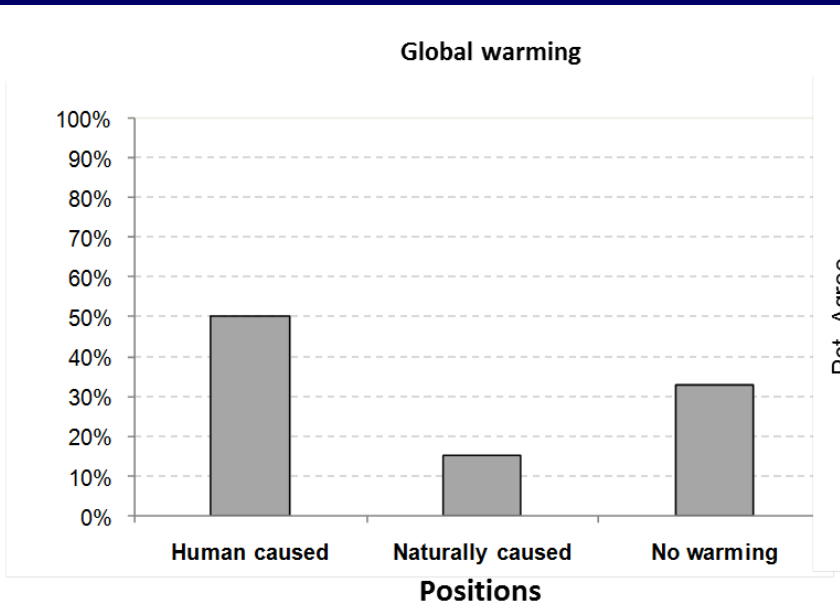


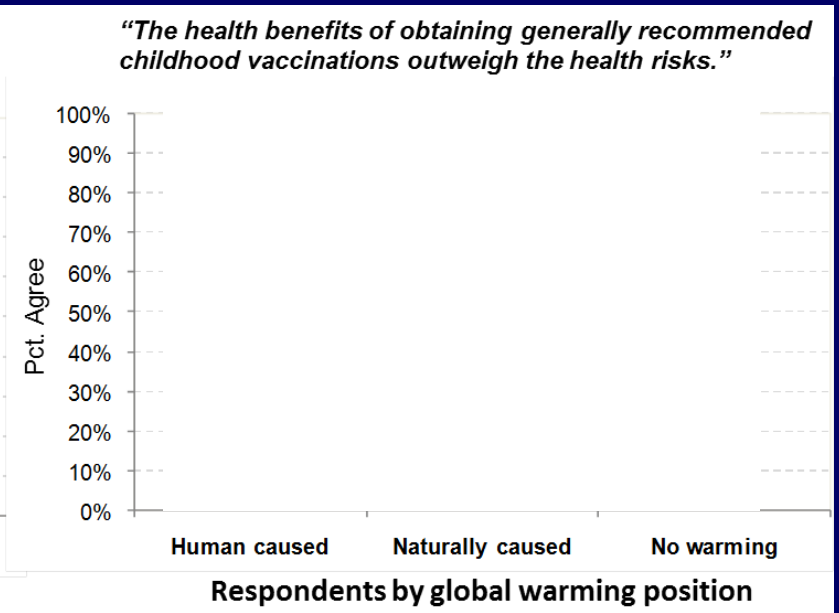
N's range from 4000 to 5500 in indicated time periods ; means reflect reflect "true" population mean at ± 0.06 , 0.95 LC . Liberal" and "conservative" reflect scores < 4 & > 4, respectivelty, on the GSS 7-point liberal-conservative ideology item. Bars (for conservative) and hash marks (for liberal) reflect mean score for specified institution in GSS CON_x item where "hardly any" is scored ast 1, "only some" as 2, and "great deal" as 3. Institutions listed in descending order of confidence (most to least) for "conservative" respondents.

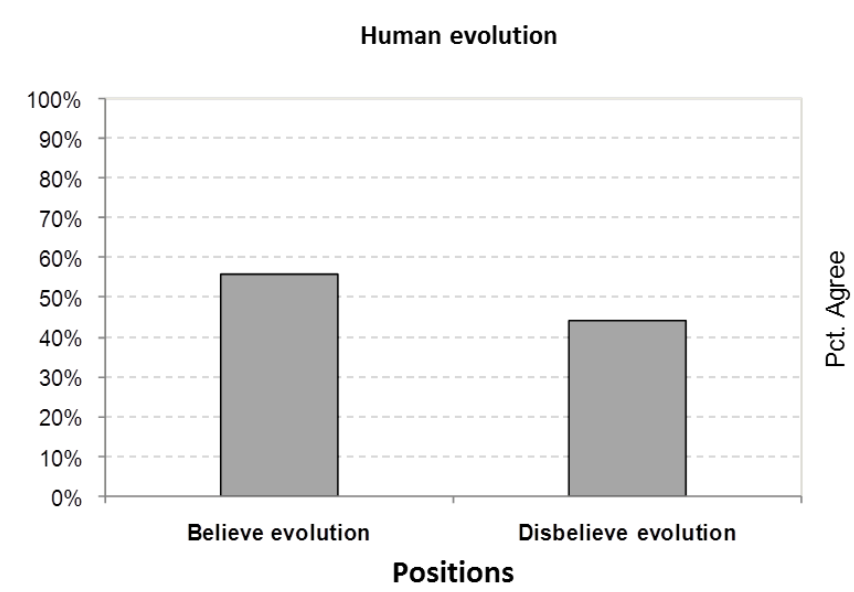
Institutional Confidence Ratings Over Time

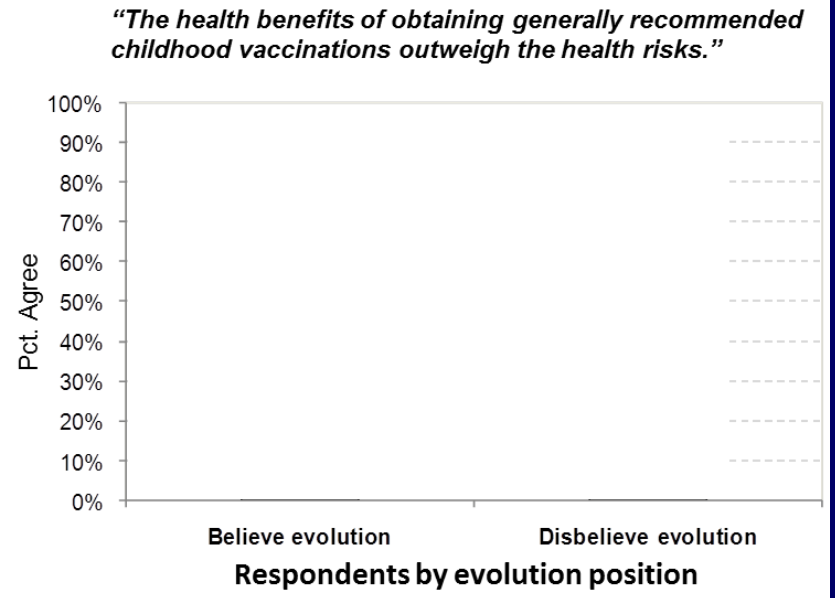


N's range from 4000 to 5500 in indicated time periods ; means reflect reflect "true" population mean at ± 0.06 , 0.95 LC . "Above average" and "below average" based on median split for religiosity scale comprising church attendance, frequency of prayer, and importance of religion. Bars (for "above average") and hash marks (for "below") reflect mean score for specified institution in GSS CON_x item where "hardly any" is scored ast 1, "only some" as 2, and "great deal" as 3. Institutions listed in descending order of confidence (most to least) for "conservative" respondents.









Source: CCP, Vaccine Risk Perception Report (2014) . *N* ≈775. Standard errors ≈ 0.05.

Journal of Risk Research
2010, 1–28, iFirst Article

Routledge
Taylor & Francis Group

Cultural cognition of scientific consensus

Dan M. Kahan[a]*, Hank Jenkins-Smith[b] and Donald Braman[c]

[a]*Yale Law School, Yale University, New Haven, USA;* [b]*Department of Political Science, University of Oklahoma, Norman, USA;* [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 congenial 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?

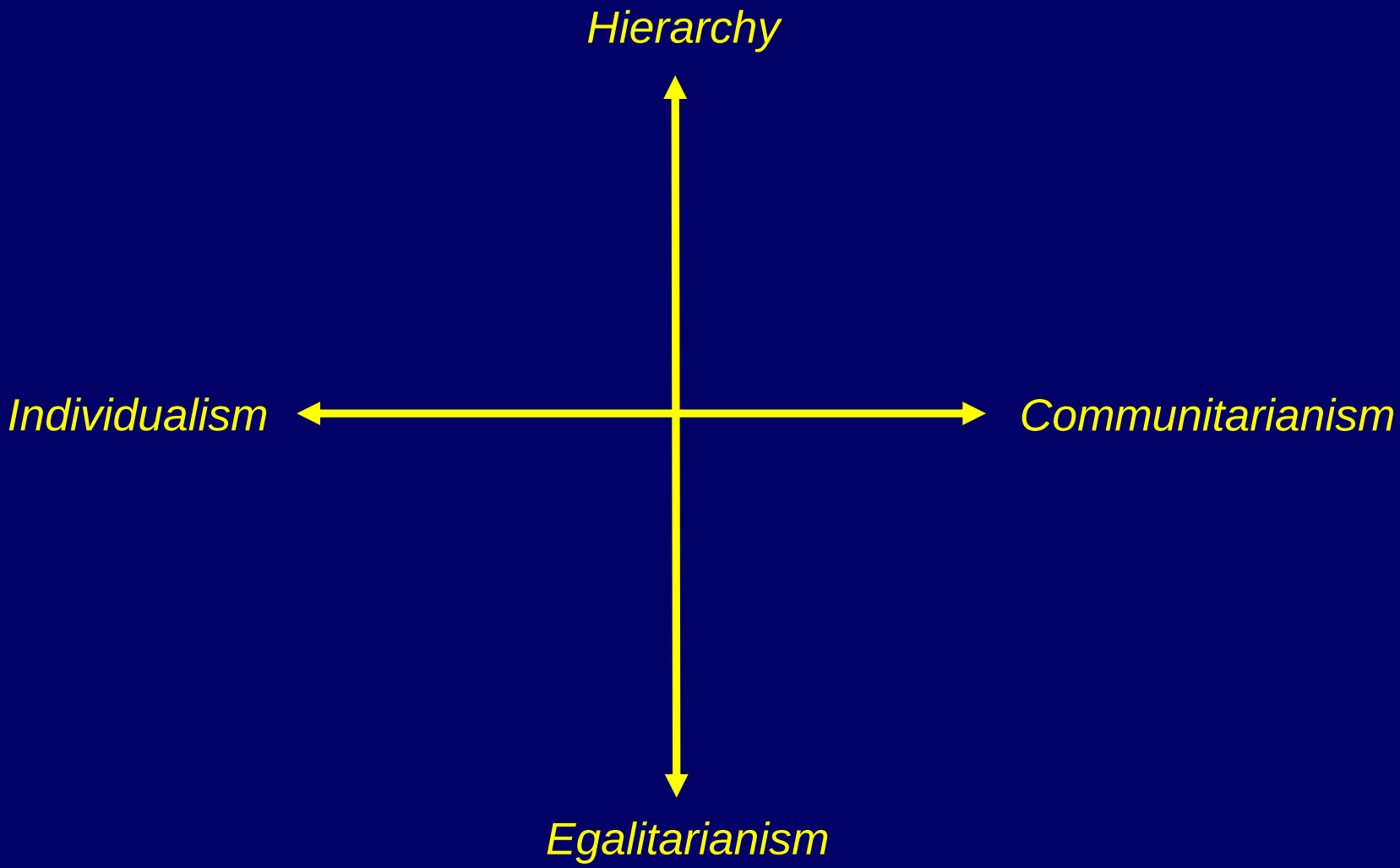
Myriad theories have been advanced for the limited influence of science in formulating the factual basis for public policy debates, but none seems complete. If the answer were that members of the public are simply less informed than experts (Irwin

*Corresponding author. Email: dan.kahan@yale.edu

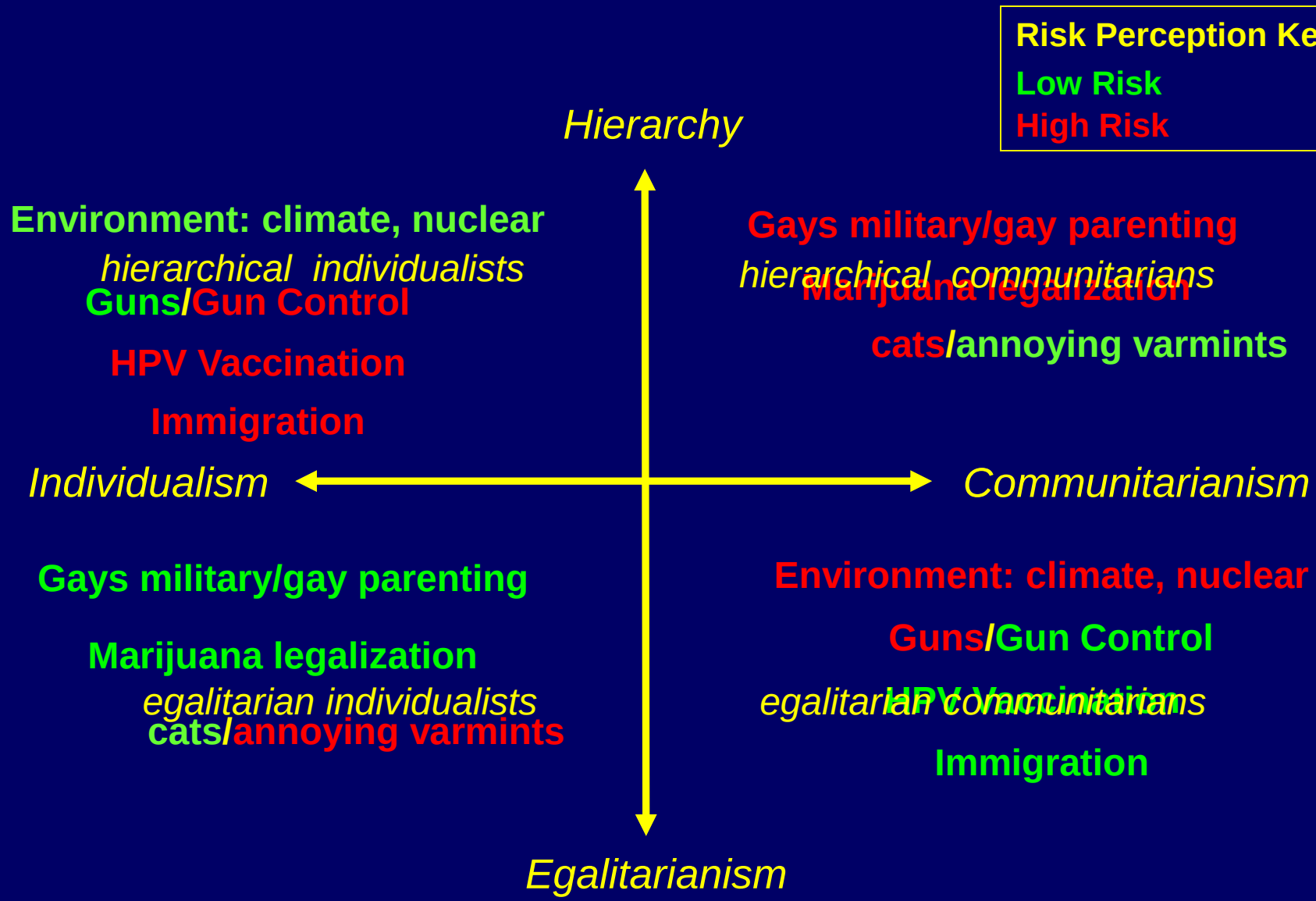
ISSN 1366-9877 print/ISSN 1466-4461 online

DOI: 10.1080/13669877.2010.511246
http://www.informaworld.com

Cultural Cognition Worldviews



Cultural Cognition Worldviews



Is this a knowledgeable and credible expert on ... ?

Robert Linden

Position: Professor of Meteorology, Massachusetts Institute of Technology

Education: Ph.D., Harvard University

Memberships:

- American Meteorological Society
- National Academy of Sciences

Global Warming

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

Nuclear Power

James Williams

Position: Professor of Criminology, Stanford University

Education: Ph.D., Yale University

Memberships:

- American Society of Criminologists
- National Academy of Sciences

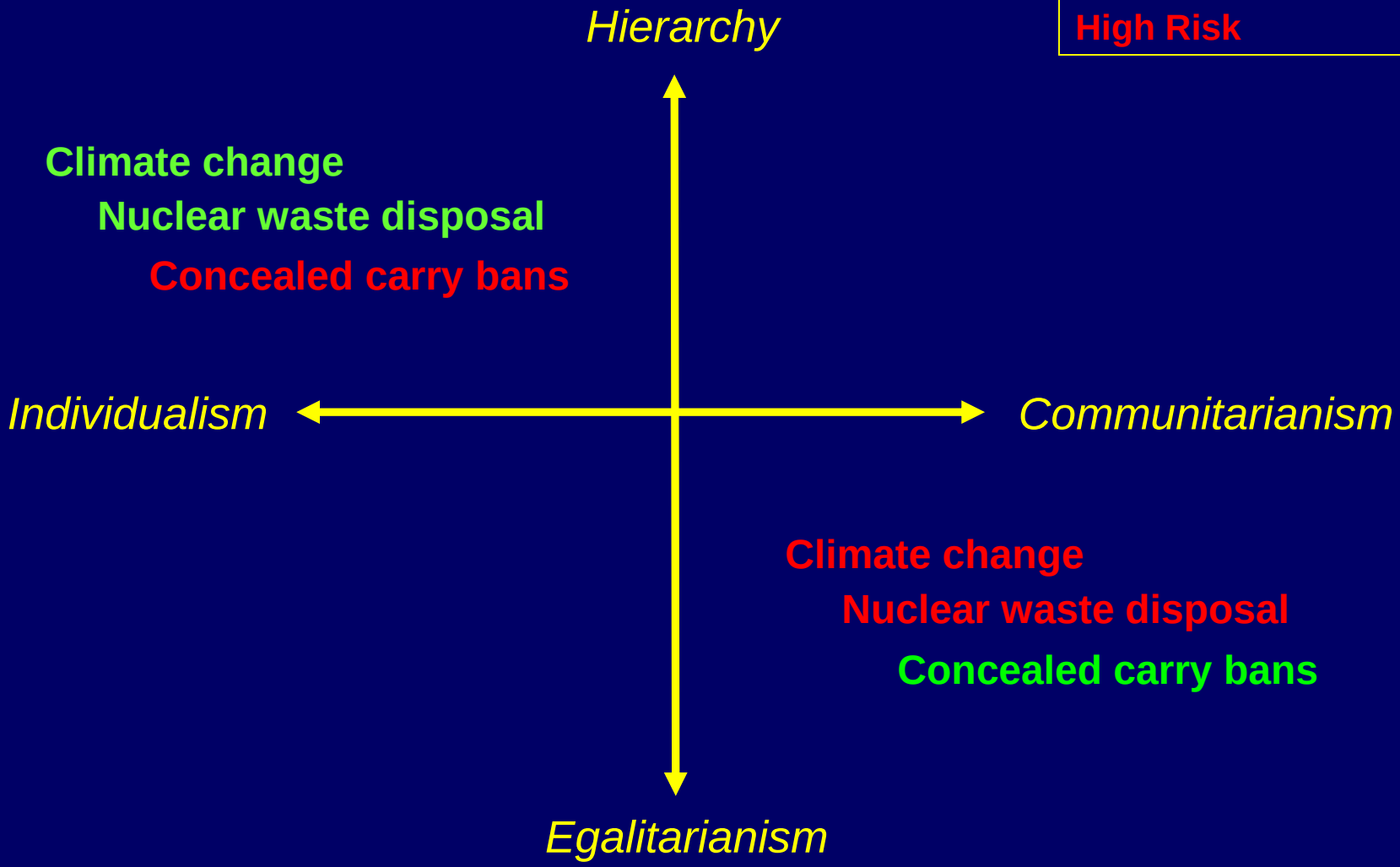
Gun Control

Cultural Cognition Worldviews

Risk Perception Key

Low Risk

High Risk



Climate Change

High Risk
(science conclusive)

"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 $C0_2$ 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

Low Risk
(science inconclusive)

"Judged by conventional scientific standards, it is premature to conclude that human $C0_2$ emissions—so-called 'greenhouse gasses'—cause global warming. For example, global temperatures have not risen since 1998, despite significant increases in $C0_2$ 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 temperature 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

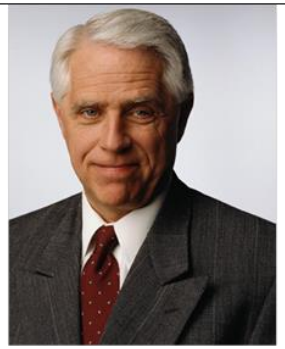
Memberships:

- American Meteorological Society
- National Academy of Sciences

Geologic Isolation of Nuclear Wastes

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.



Oliver Roberts

Position: Professor of Nuclear Engineering, University of California, Berkeley

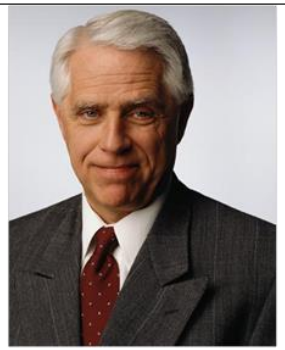
Education: Ph.D., Princeton University

Memberships:

- American Association of Physics
- National Academy of Sciences

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."



Oliver Roberts

Position: Professor of Nuclear Engineering, University of California, Berkeley

Education: Ph.D., Princeton University

Memberships:

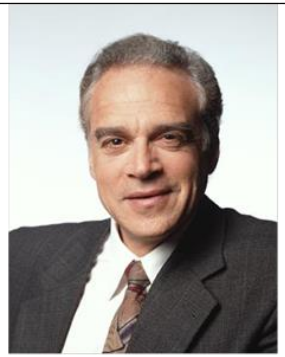
- American Association of Physics
- National Academy of Sciences

Concealed Carry Laws

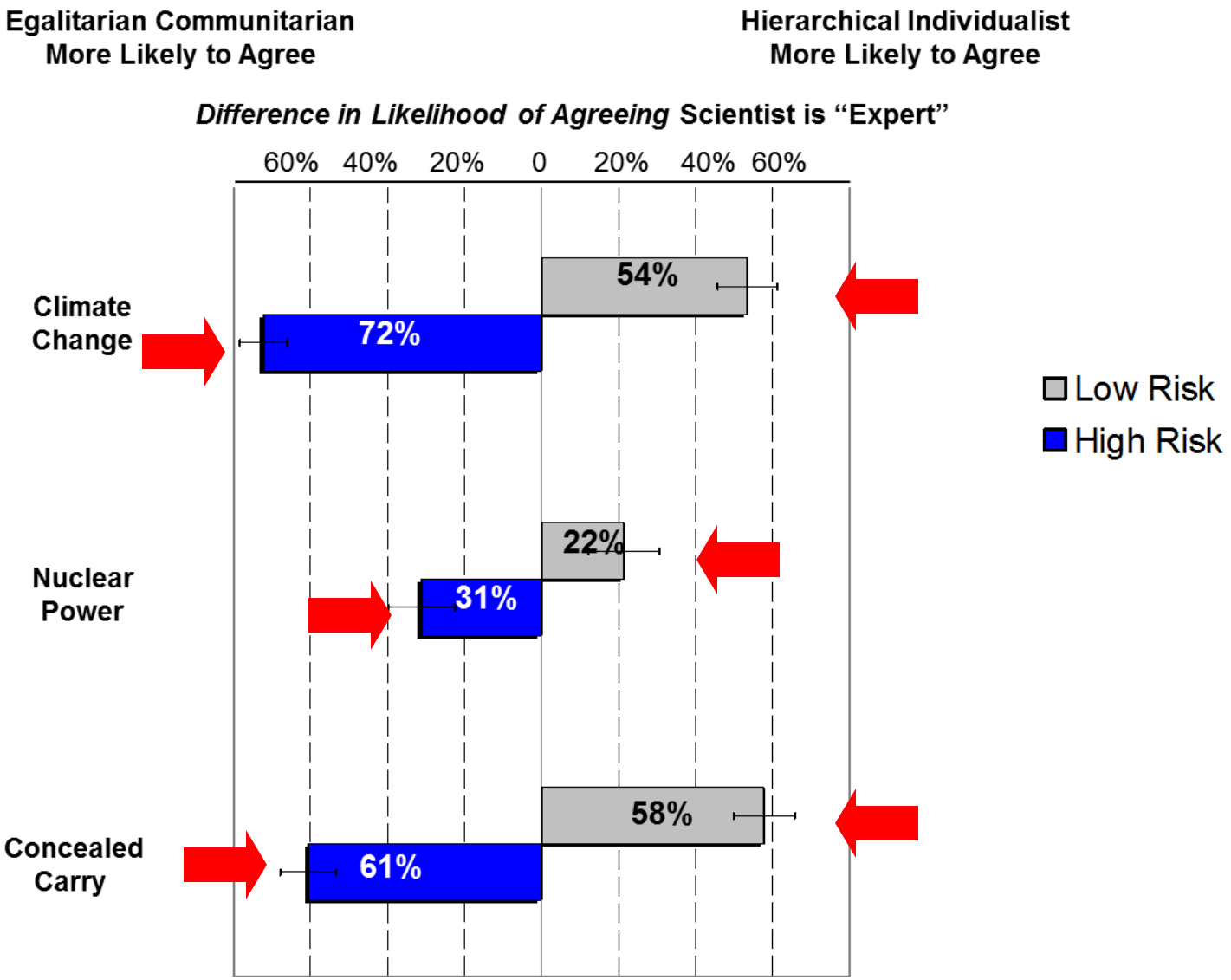
High Risk
(Increase crime)

"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

Low Risk
(Decrease Crime)

"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

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

Is this a knowledgeable and credible expert on ... ?

Robert Linden

Position: Professor of Meteorology, Massachusetts Institute of Technology

Education: Ph.D., Harvard University

Memberships:

- American Meteorological Society
- National Academy of Sciences

Global Warming

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

Nuclear Power

James Williams

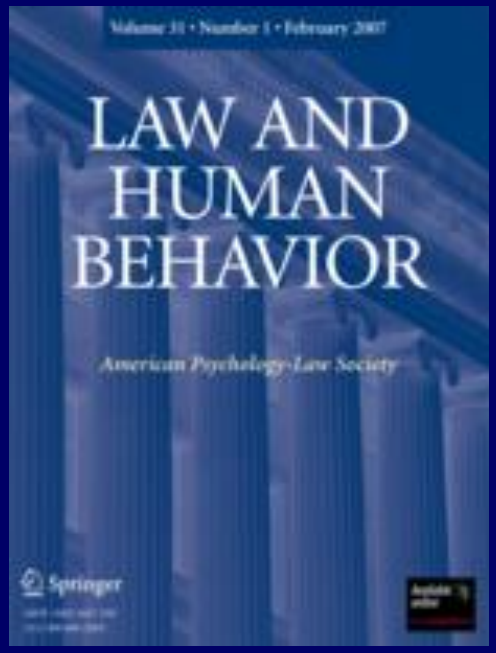
Position: Professor of Criminology, Stanford University

Education: Ph.D., Yale University

Memberships:

- American Society of Criminologists
- National Academy of Sciences

Gun Control



Law Hum Behav
DOI 10.1007/s10979-009-9201-0

ORIGINAL ARTICLE

Who Fears the HPV Vaccine, Who Doesn't, and Why? An Experimental Study of the Mechanisms of Cultural Cognition

Dan M. Kahan · Donald Braman · Geoffrey L. Cohen · John Gastil · Paul Slovic

Abstract The cultural cognition thesis holds that individuals form risk perceptions that reflect their commitments to contested views of the good society. We conducted a study that used the dispute over mandatory HPV vaccination to test the cultural cognition thesis. Although public health officials have recommended that all girls aged 11 or 12 be vaccinated for HPV—a sexually transmitted virus that causes cervical cancer—political controversy has blocked adoption of mandatory school-enrollment vaccination programs in all but one state. An experimental study of a large sample of American adults ($N = 1{,}538$) found that cultural cognition generates disagreement about the risks and benefits of the vaccine through two mechanisms: biased assimilation, and the credibility heuristic. We discuss theoretical and practical implications.

Keywords Cultural cognition · Risk perception · HIV · Biased assimilation · Source credibility

D. M. Kahan (✉)
Yale Law School, PO Box 208215, New Haven, CT 06520, USA
e-mail: dan.kahan@yale.edu

D. Braman
George Washington Law School, Washington, DC, USA

G. L. Cohen
Stanford University, Stanford, CA, USA

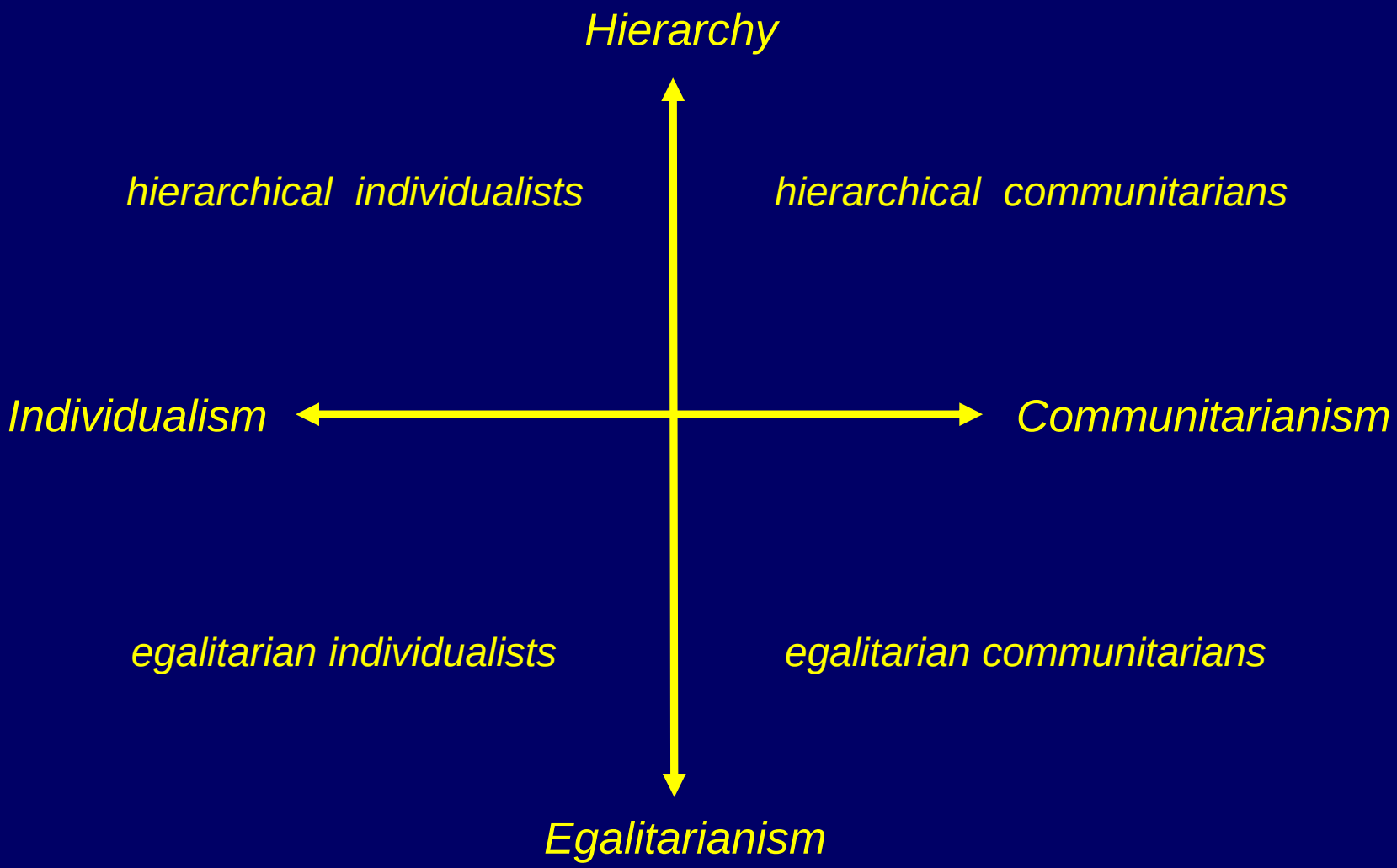
J. Gastil
University of Washington, Seattle, WA, USA

P. Slovic
Decision Research, Eugene, OR, USA

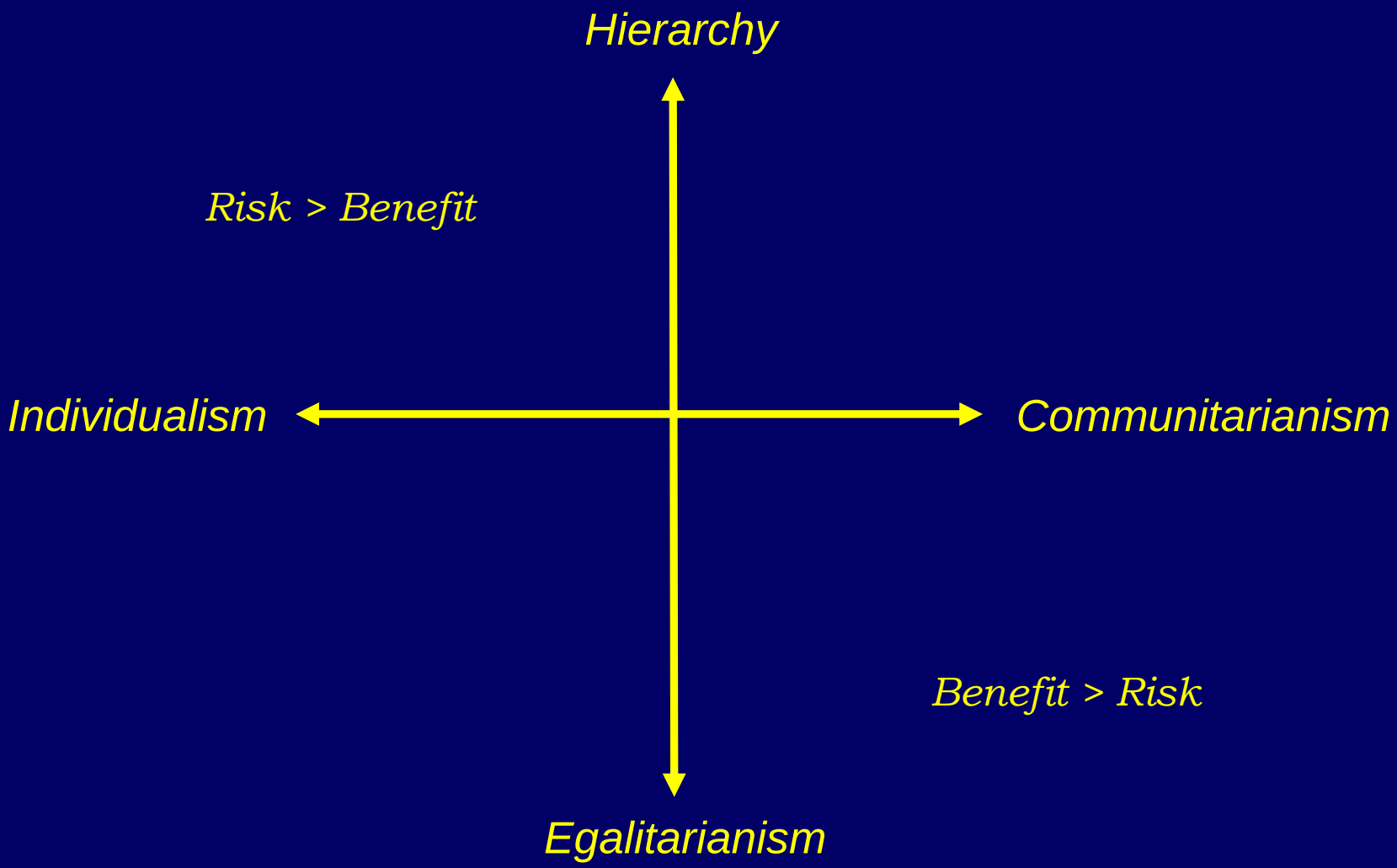
The advent of the human-papillomavirus (HPV) vaccine was widely heralded as a "major public health breakthrough" (Kaufman, 2006, p. A1) that would "eventually save thousands of lives each year in the United States" (Harris, 2006, p. A1). Transmitted by sexual contact, HPV is the leading (likely the sole) cause of cervical cancer. It is estimated that as many as 45% of women in their early twenties have been infected by it (Dunne et al., 2007). Shortly after the FDA awarded "fast track" approval to the vaccine, the Center for Disease Control recommended that it be administered to all girls (no vaccine is currently approved for males) at age 11 or 12, before they are likely to have been exposed to the virus, at which point the vaccine becomes ineffective (Centers for Disease Control and Prevention, Office of Enterprise Communications [CDC], 2006). Public health advocates—financed conspicuously by Merck & Co., manufacturer of the vaccine—thereafter initiated a campaign to secure enactment of mandatory vaccination laws like those that require school children to be immunized against mumps, measles, rubella, and other childhood diseases (Saul & Pollack, 2007).

Nevertheless, the proposal for mandatory vaccination of schoolgirls has been mired in intense controversy. The vaccine admittedly fails to protect against 30% of the strains of HPV that cause cervical cancer, and critics question its reported effectiveness against the remainder. They also worry about the likelihood that vaccination will have unanticipated (or undisclosed) adverse side effects (Merck & Co., they point out, also manufactured Vioxx). Debate rages, too, over the possibility that vaccinated girls and young women, lulled into a false sense of security, will engage in greater amounts promiscuous and unprotected sex, thereby increasing their risk of pregnancy and other STDs (Alliance for Human Research Protection, 2007; Gibbs, 2006).

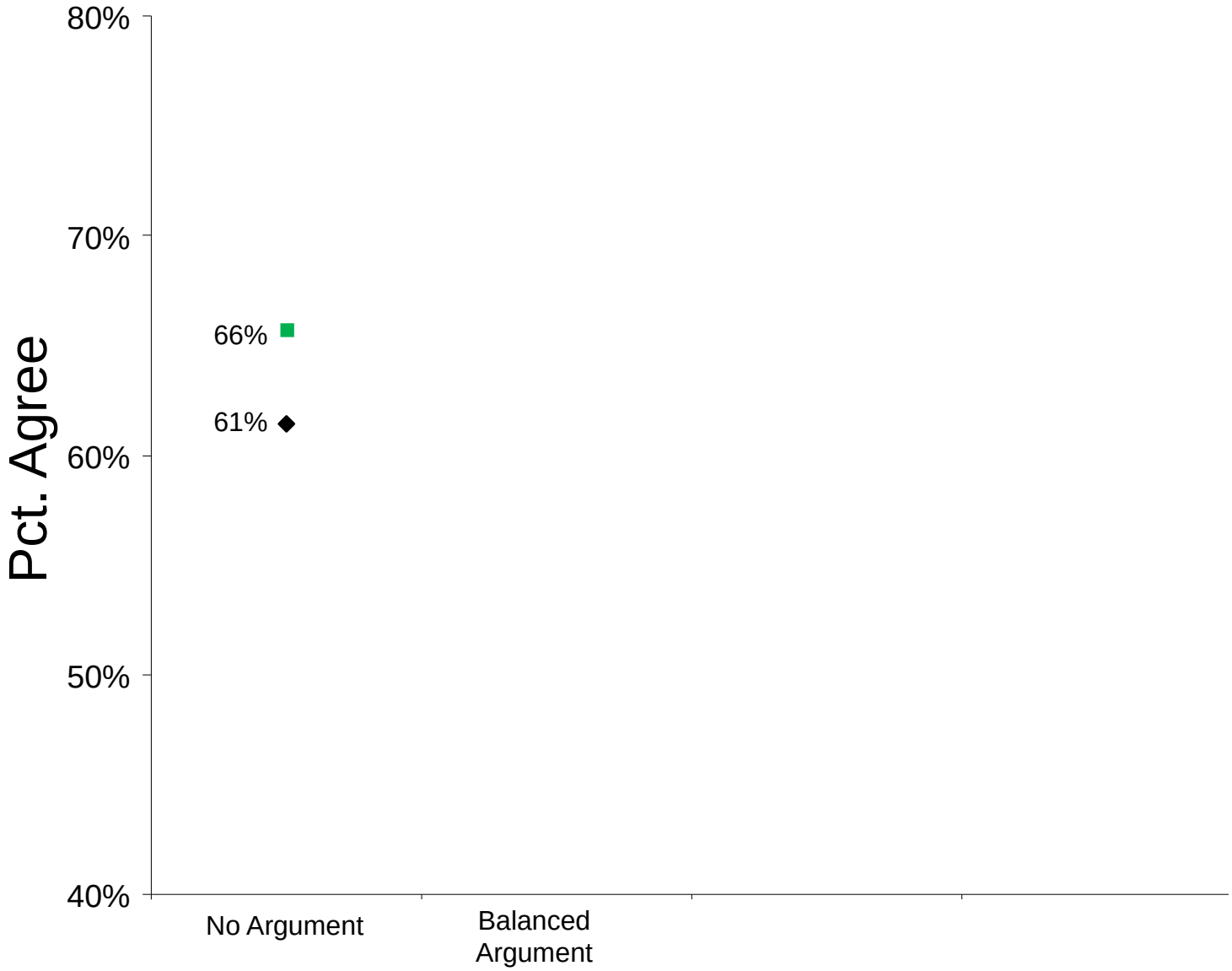
Cultural Cognition of Risk



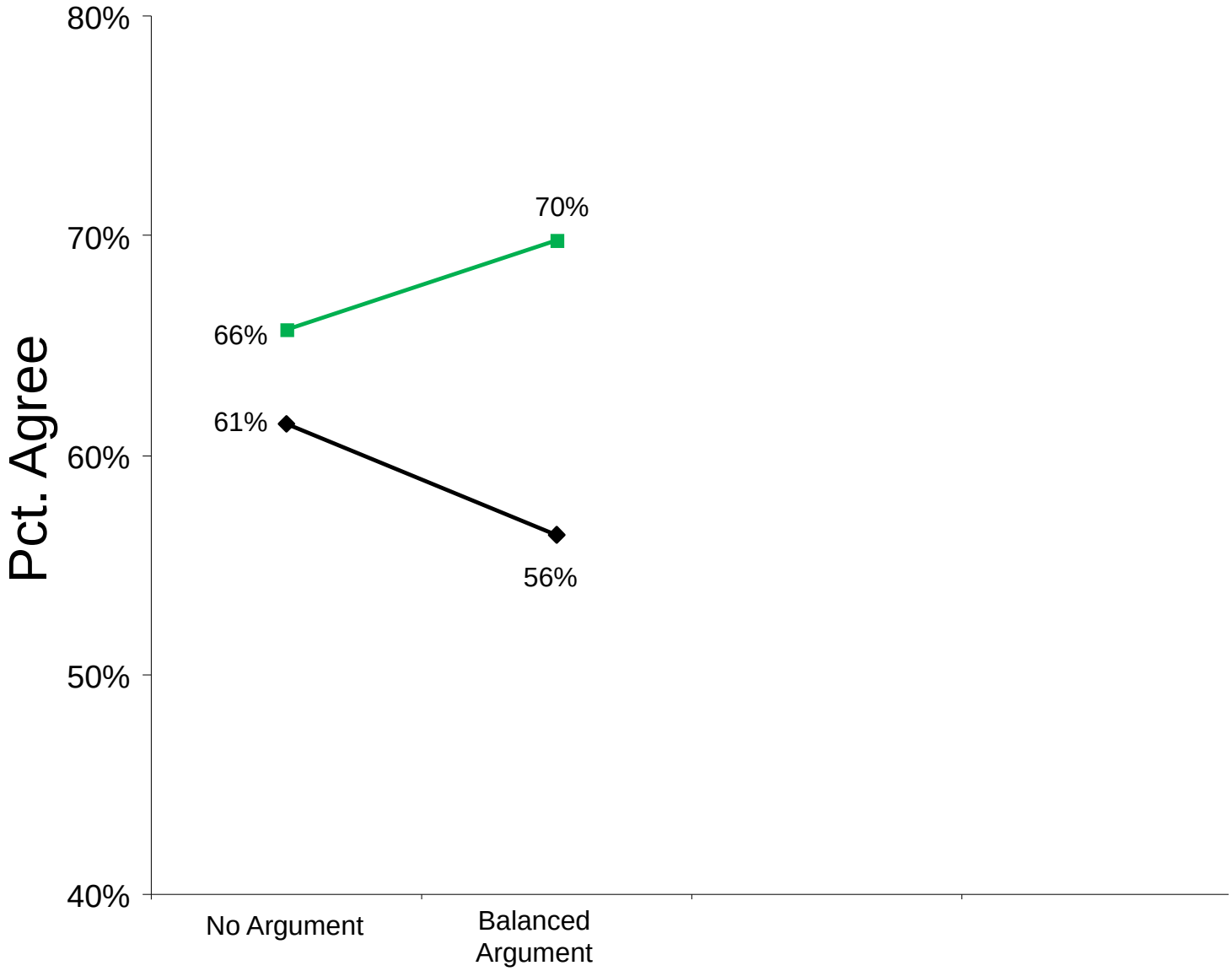
Cultural Cognition of Risk



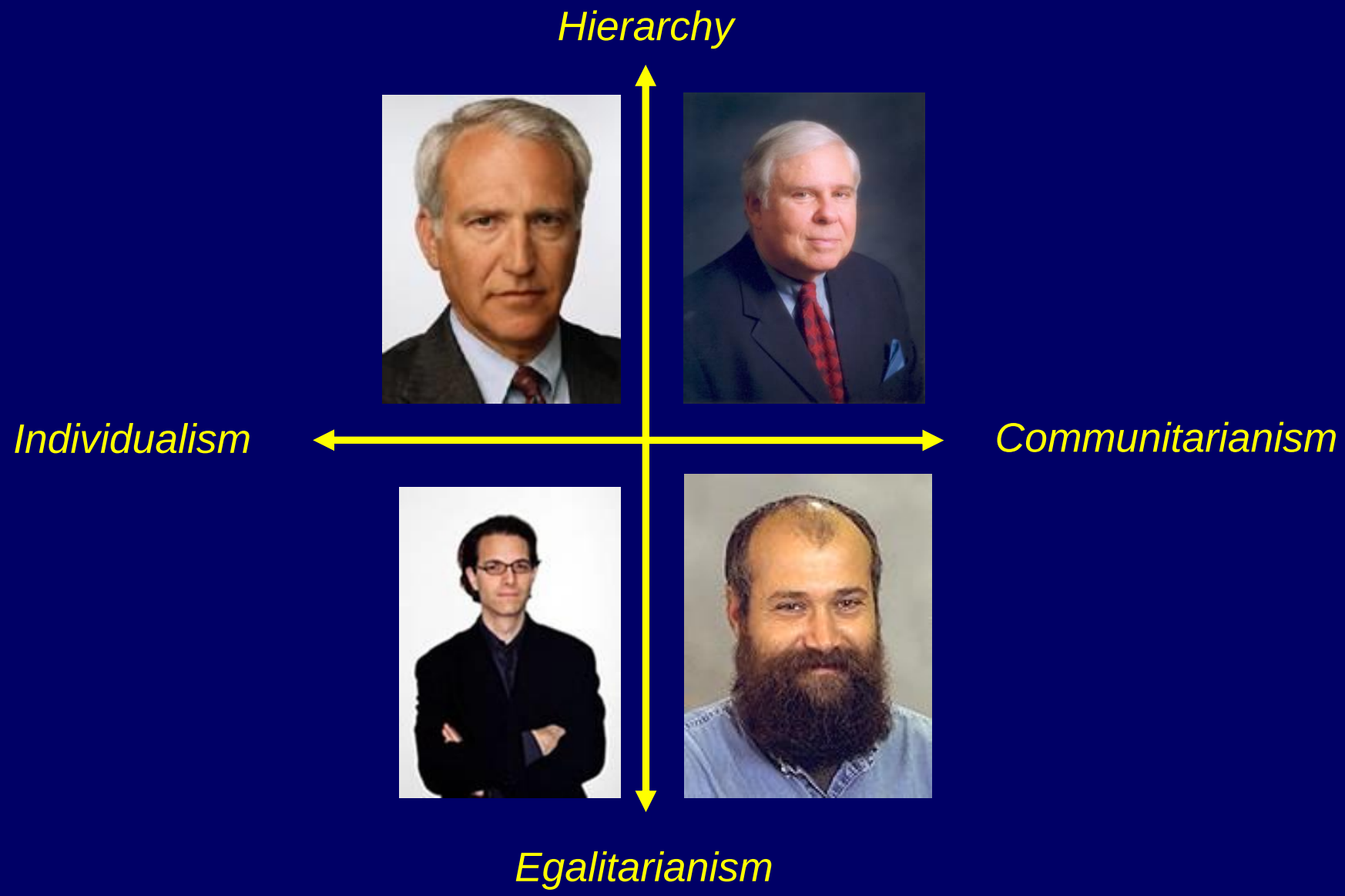
“The HPV vaccine is safe for use among young girls...”



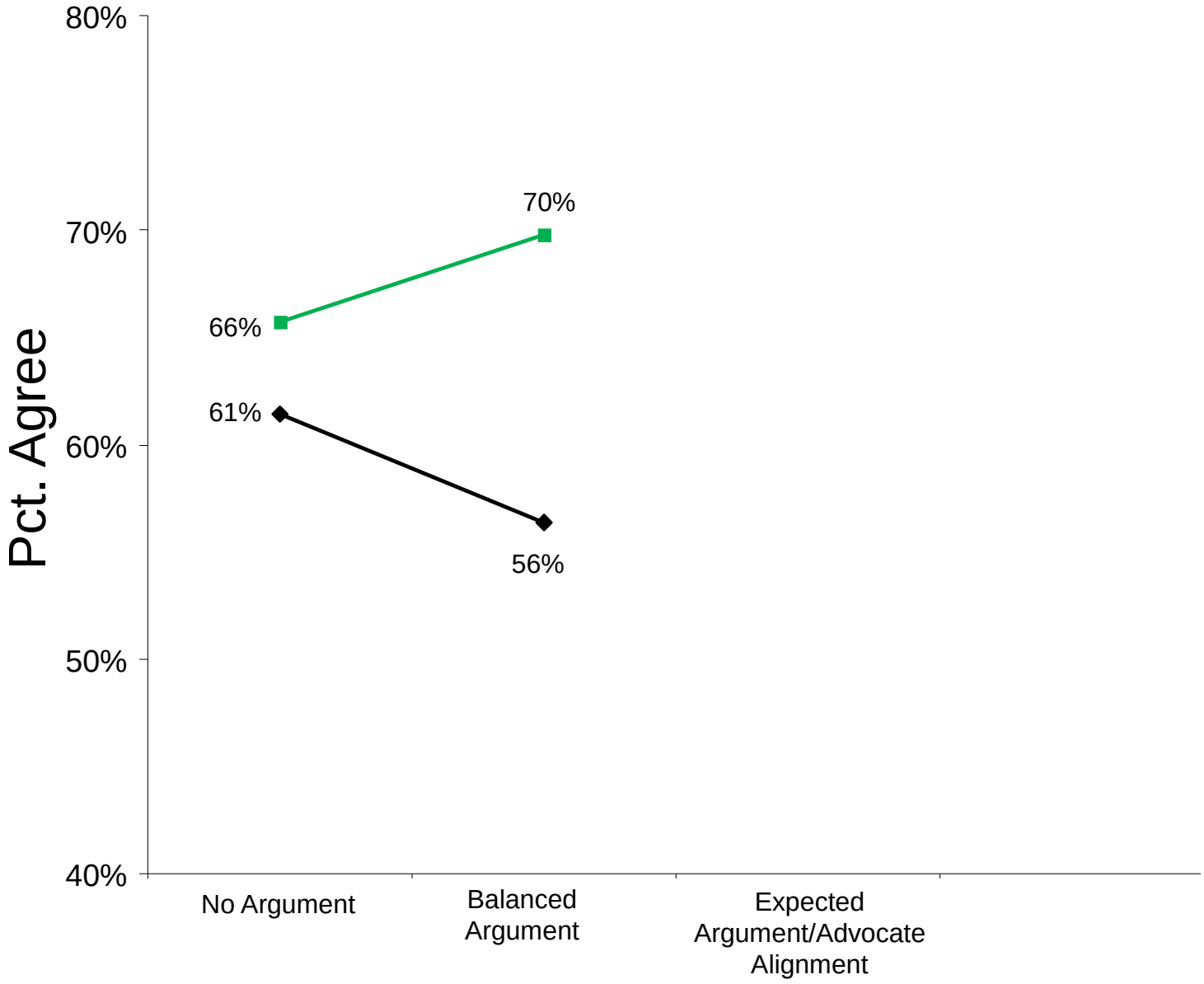
"The HPV vaccine is safe for use among young girls..."



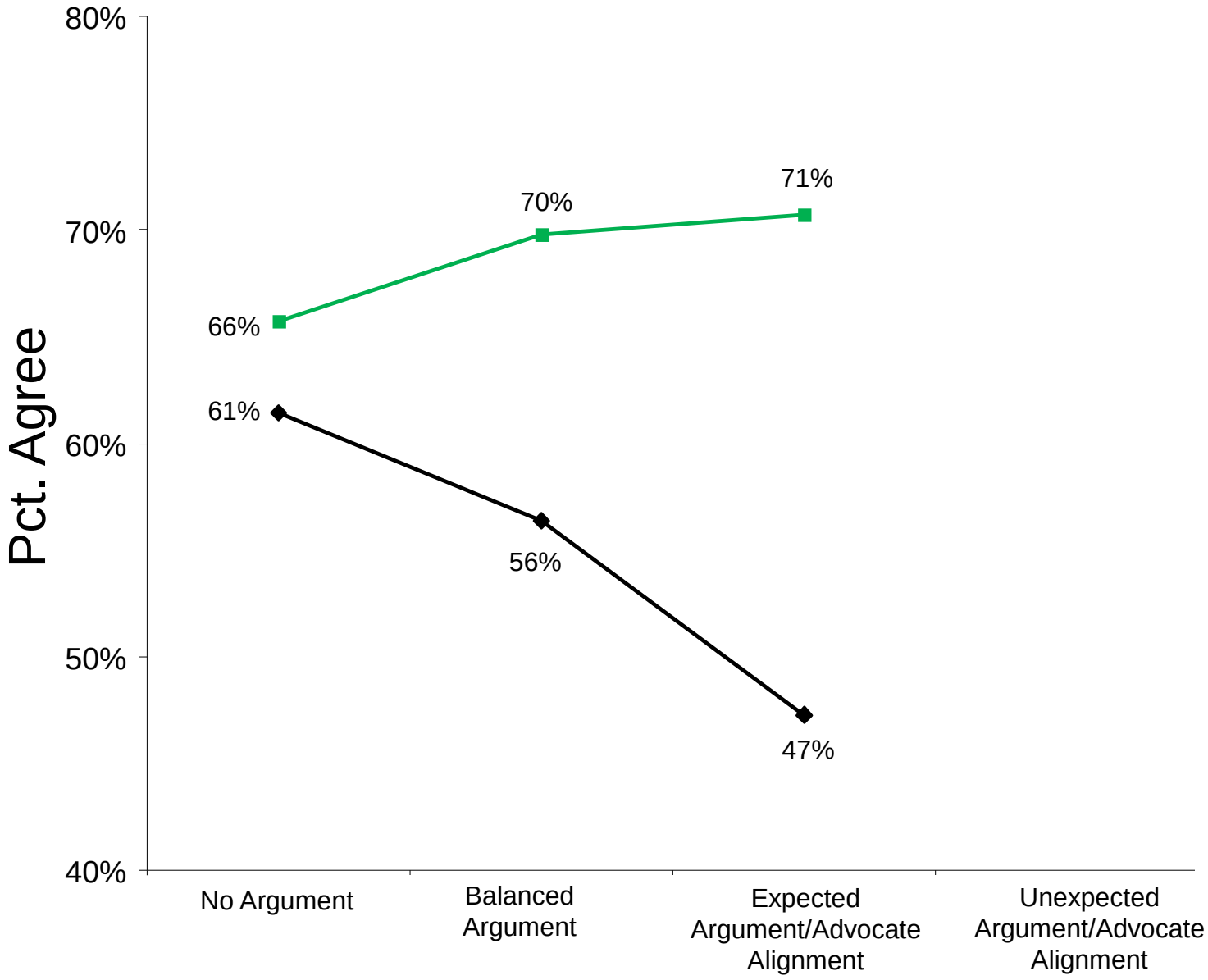
Culturally identifiable “public health experts”



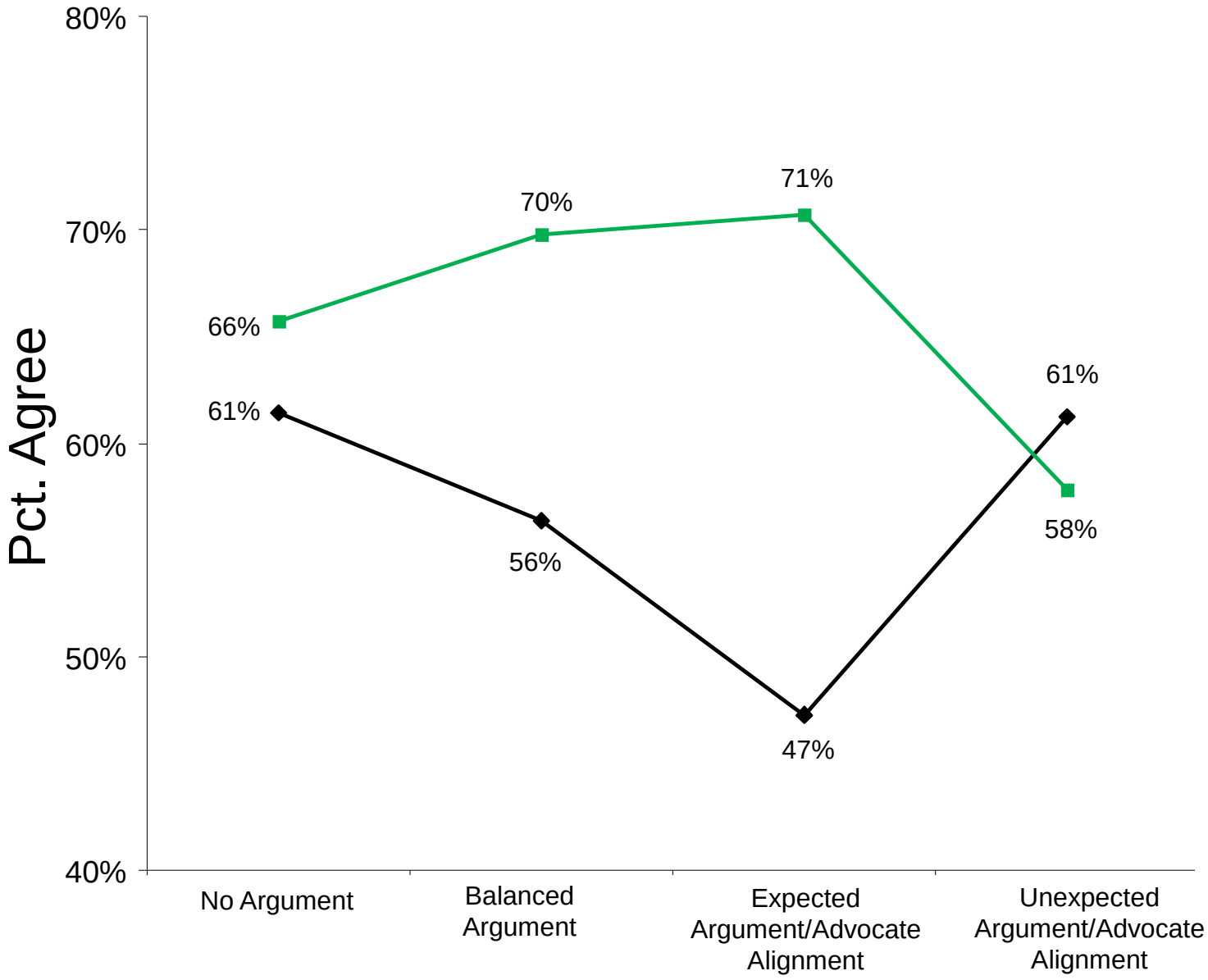
"The HPV vaccine is safe for use among young girls..."



"The HPV vaccine is safe for use among young girls..."



"The HPV vaccine is safe for use among young girls..."



Five theses on perceptions of scientific consensus:

I.

II.

III.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks

II.

III.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

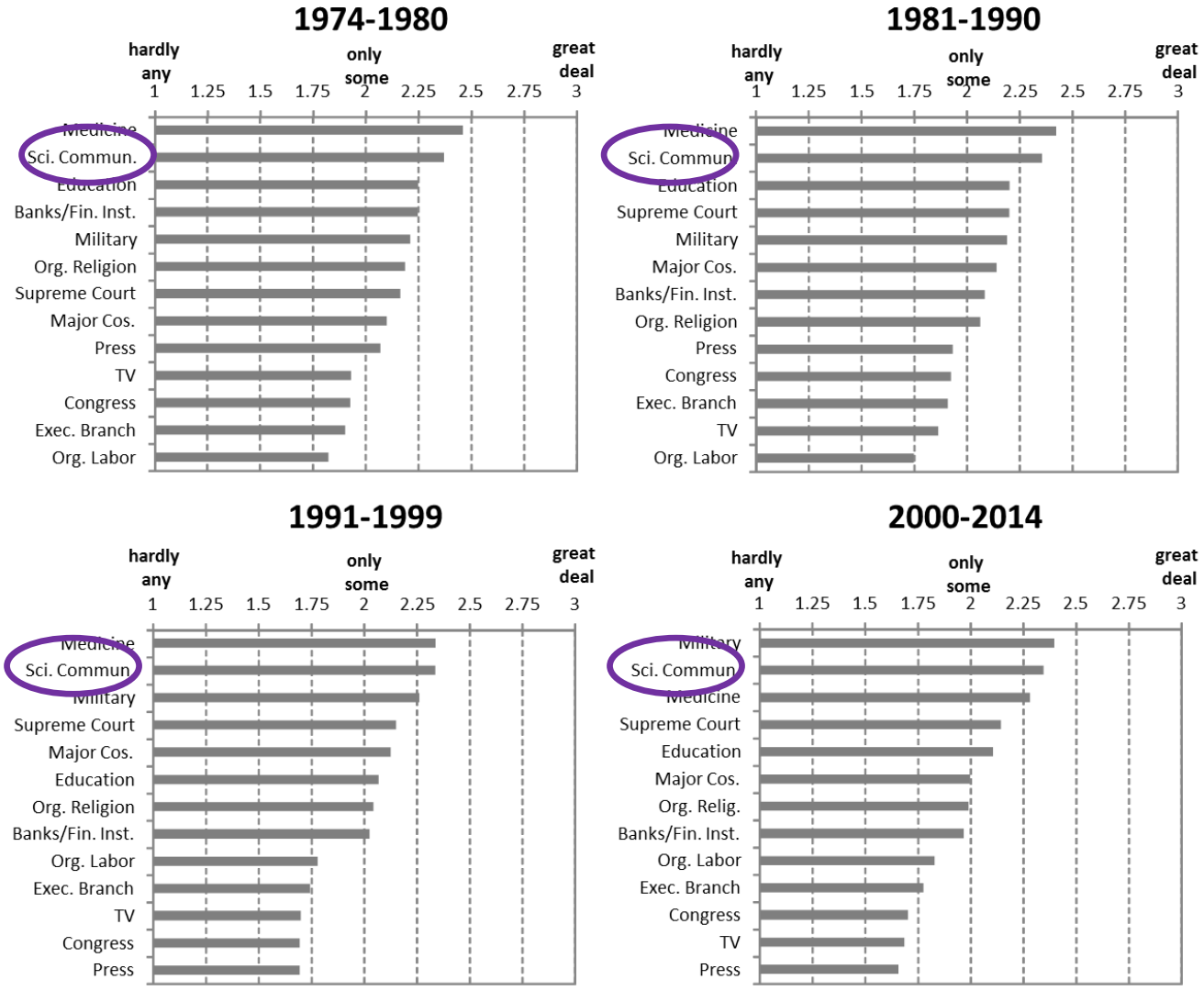
II.

III.

IV.

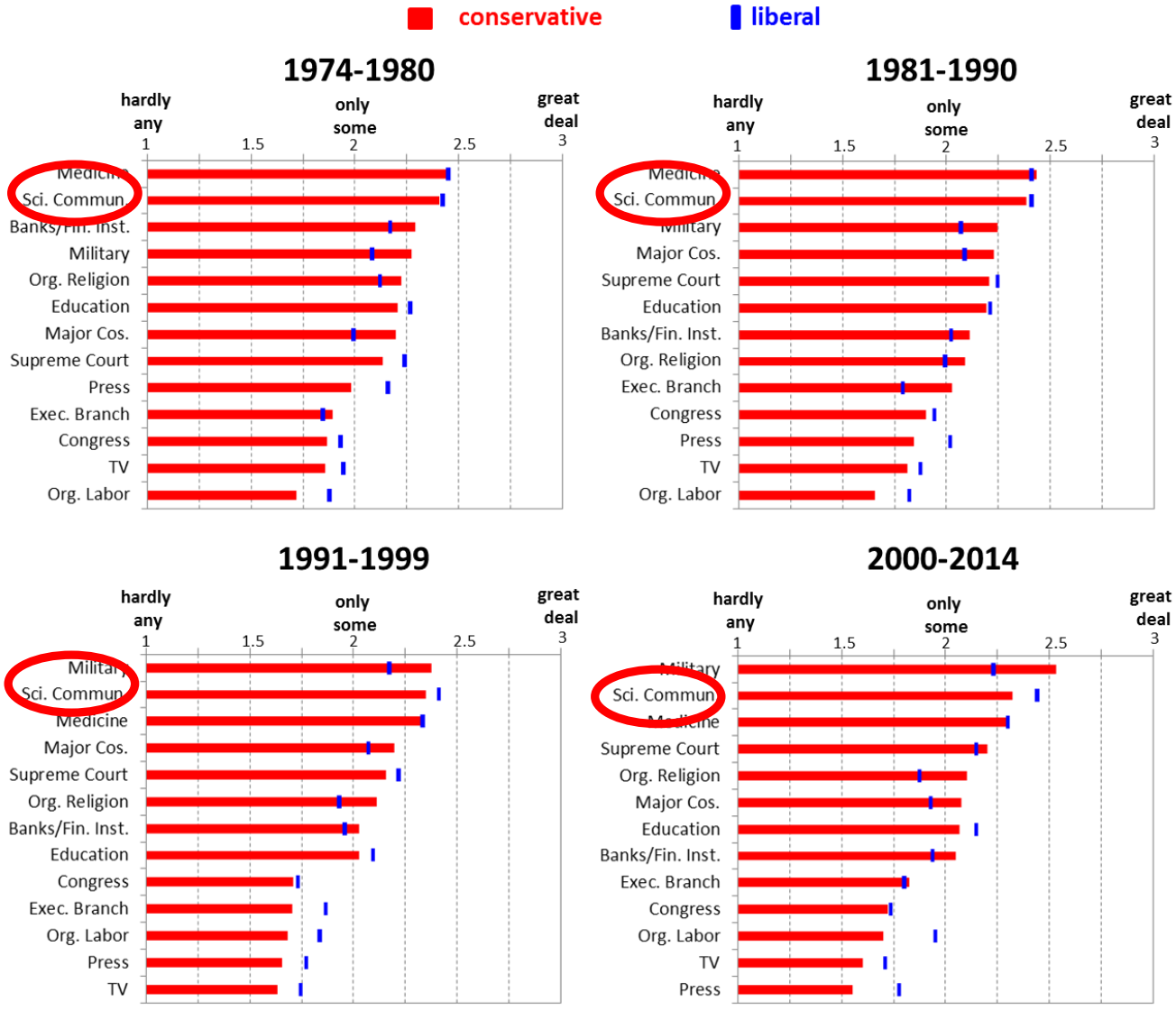
V.

Institutional Confidence Ratings Over Time



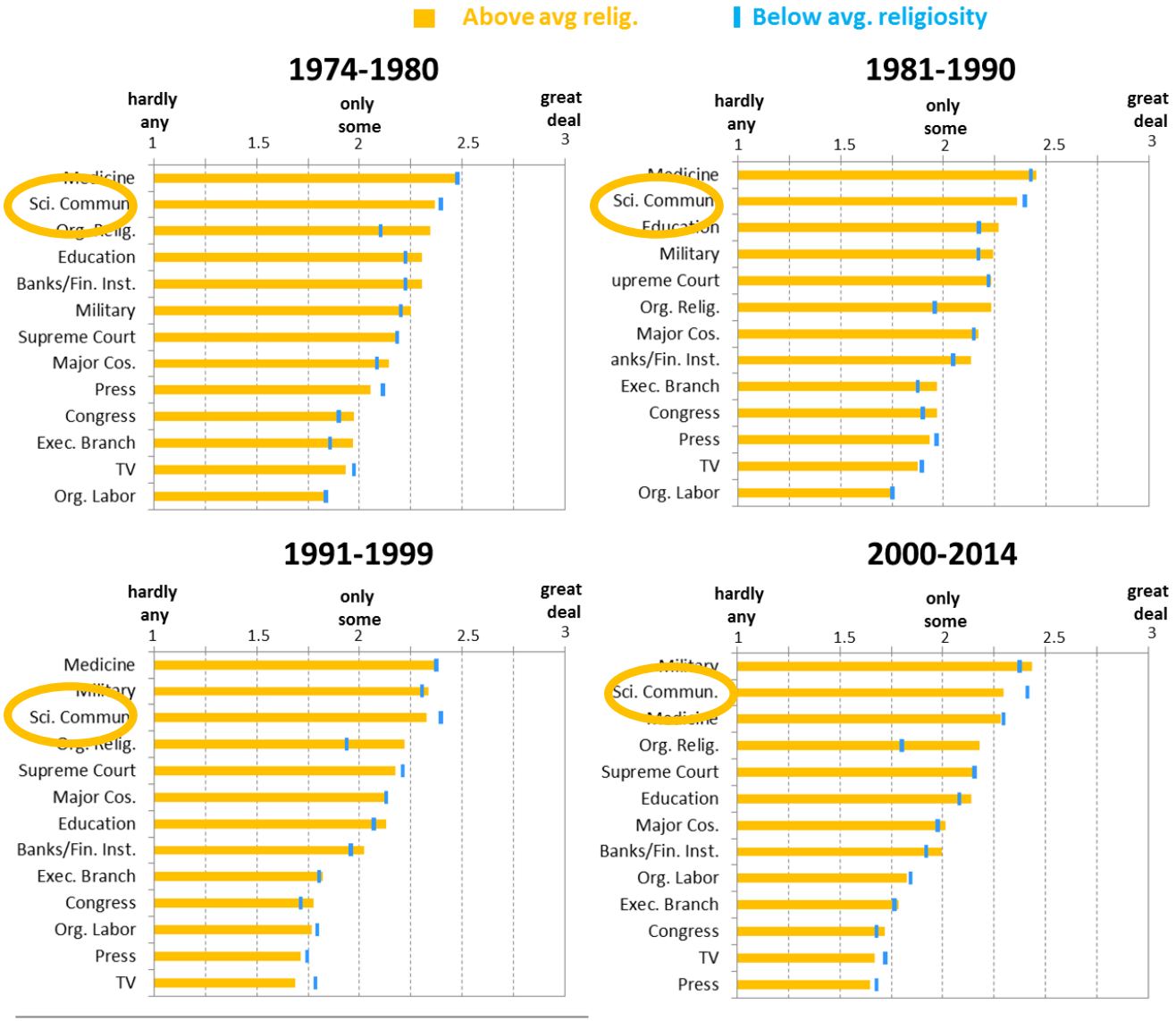
N's range from 4000 to 10,000 in indicated time periods ; means reflect reflect "true" population mean at ± 0.06 or less, 0.95 LC . Means calculated with "hardly any" scored ast 1, "only some" as 2, and "great deal" as 3. Institutions listed in descending order of confidence (most to least).

Institutional Confidence Ratings Over Time



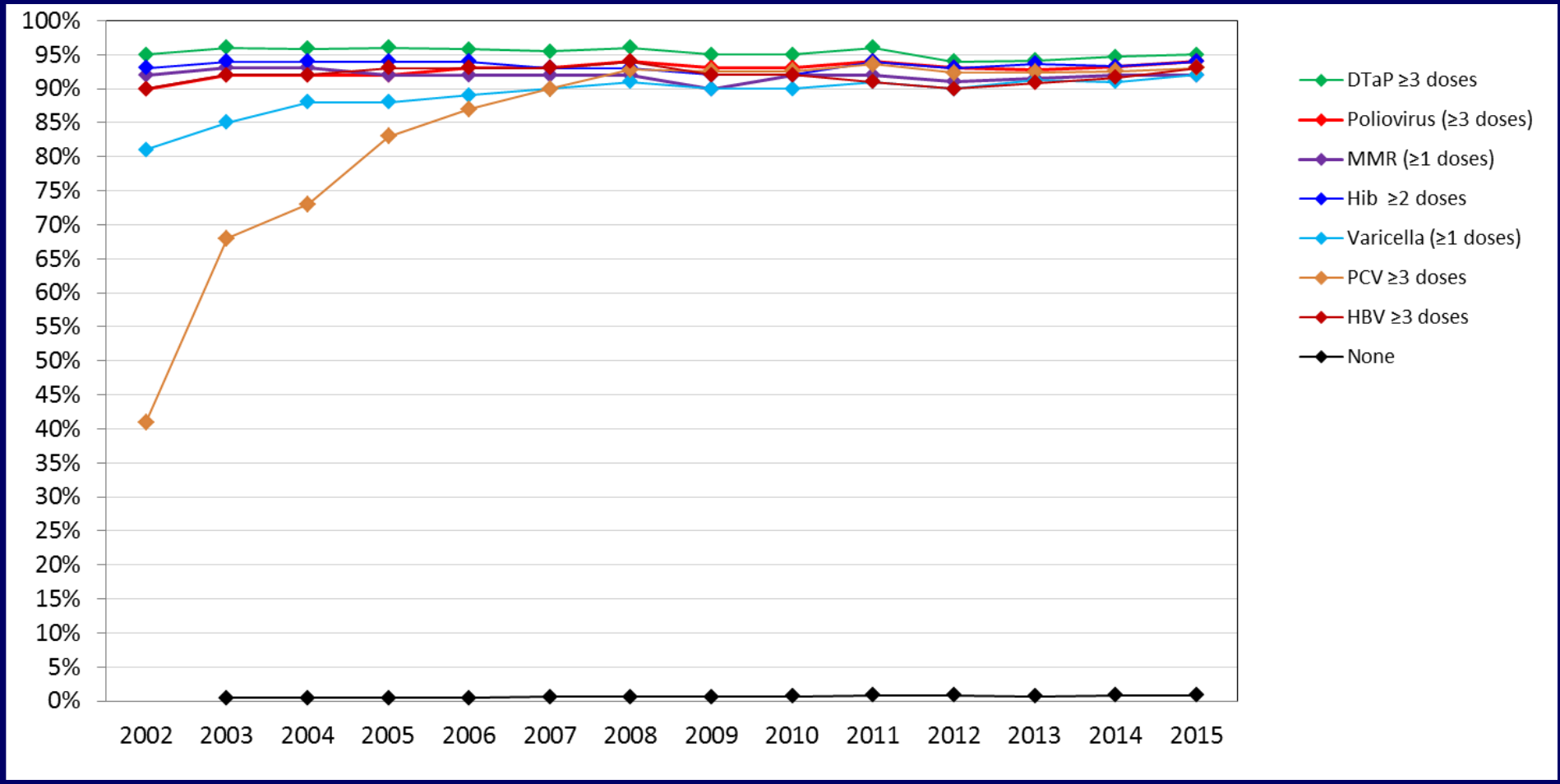
N's range from 4000 to 5500 in indicated time periods ; means reflect reflect "true" population mean at ± 0.06 , 0.95 LC . Liberal" and "conservative" reflect scores < 4 & > 4, respectivelty, on the GSS 7-point liberal-conservative ideology item. Bars (for conservative) and hash marks (for liberal) reflect mean score for specified institution in GSS CON_x item where "hardly any" is scored ast 1, "only some" as 2, and "great deal" as 3. Institutions listed in descending order of confidence (most to least) for "conservative" respondents.

Institutional Confidence Ratings Over Time



N's range from 4000 to 5500 in indicated time periods ; means reflect reflect "true" population mean at ± 0.06 , 0.95 LC . "Above average" and "below average" based on median split for religiosity scale comprising church attendance, frequency of prayer, and importance of religion. Bars (for "above average") and hash marks (for "below") reflect mean score for specified institution in GSS CON_x item where "hardly any" is scored ast 1, "only some" as 2, and "great deal" as 3. Institutions listed in descending order of confidence (most to least) for "conservative" respondents.

Childhood vaccinate rates (CDC, Nat'l Imm. Survey)



The New York Times

The Opinion Pages | OP-ED CONTRIBUTOR

Welcome to the Age of Denial

By ADAM FRANK AUG. 21, 2013

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II.

III.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science

III.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science

III.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension

III.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally;

III.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

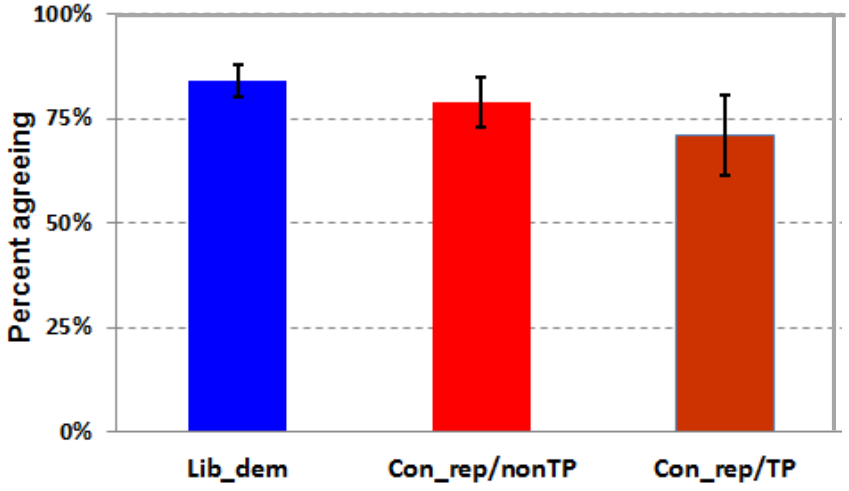
II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III.

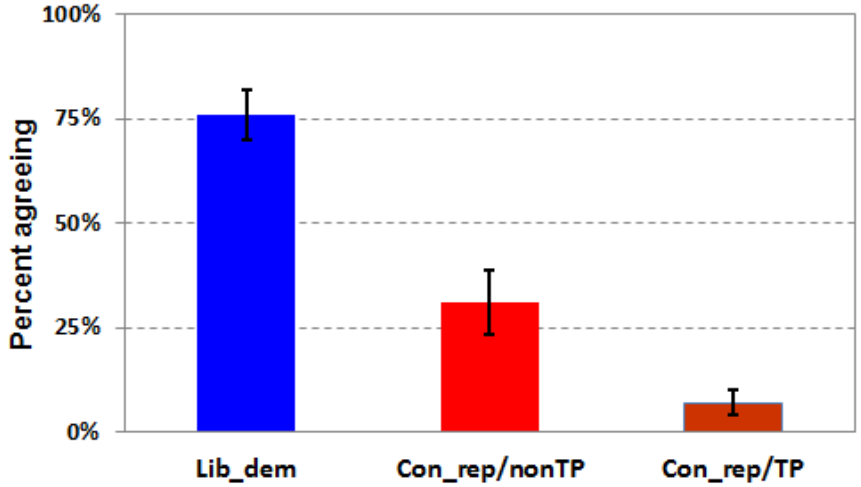
IV.

V.

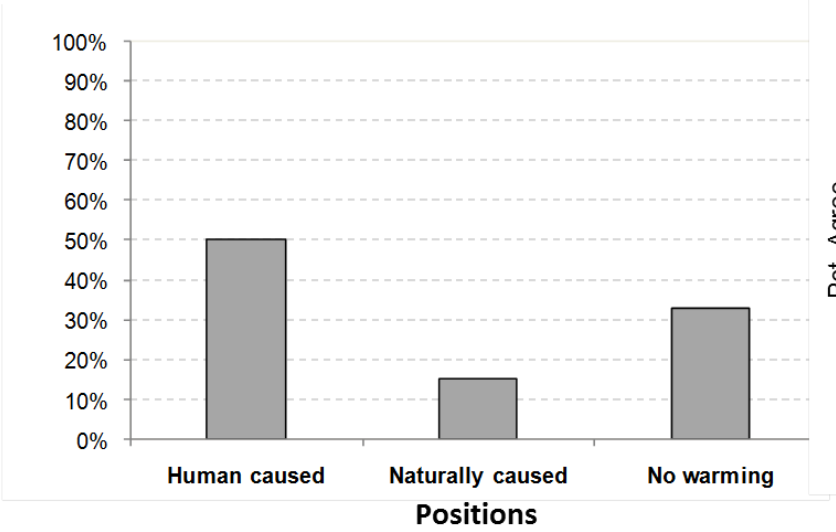
"The health benefits of obtaining generally recommended childhood vaccinations outweighs the health risks."

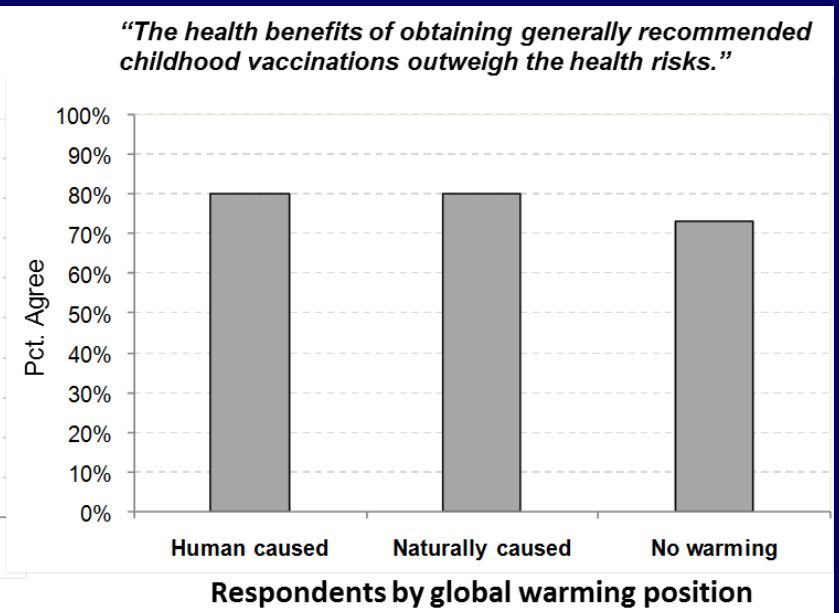


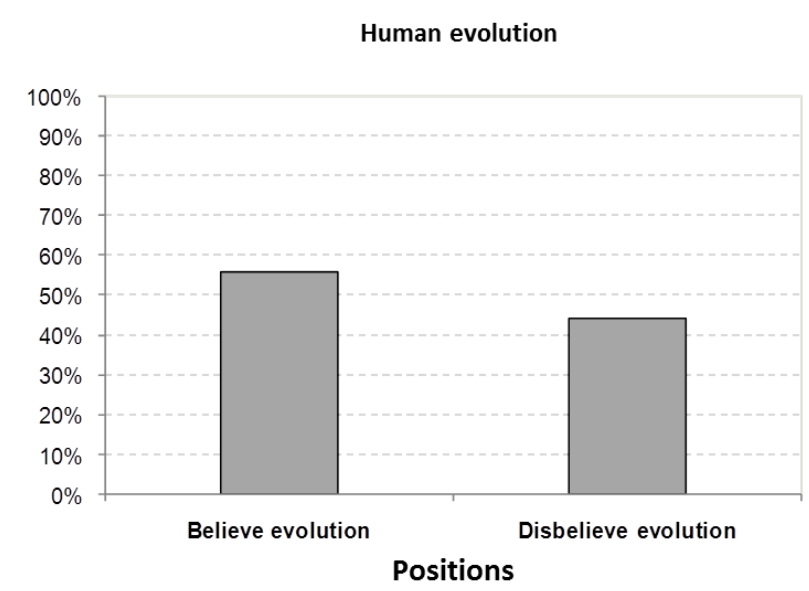
There is "solid evidence" of recent global warming due "mostly" to "human activity such as burning fossil fuels."

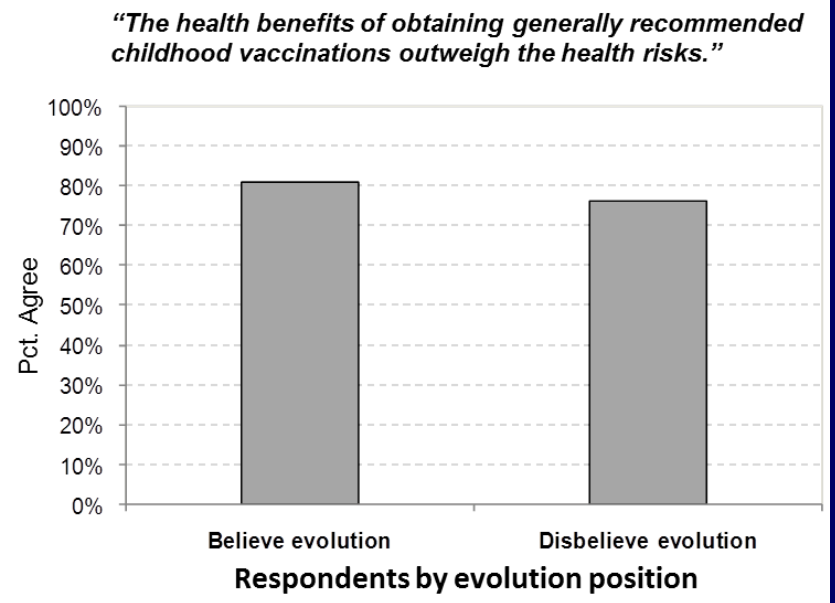


Cultural Cognition Project National Vaccine Risk Perception Study. *N's* = 671 & 686. Nationally representative sample, May/June 2013 "Lib_dem" and "Con_rep" designate members of sample scoring below and above the mean, respectively, on political outlook scale formed by aggregating respones to 5-point liberal-conservative ideology scale and 7-point party-identification scale ($\alpha = 0.85$); "nonTP" and "TP" reflect nonmember and member of Tea Party, respectively (28% of Con_rep identified as Tea Party members; less than 1% of Lib_dems did). CI's reflect 0.95 confidence intervals for estimated population means.


Global warming
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Human caused
Naturally caused
No warming
Positions


"The health benefits of obtaining generally recommended childhood vaccinations outweigh the health risks."
Pct. Agree
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Human caused
Naturally caused
No warming
Respondents by global warming position


Human evolution
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Believe evolution
Disbelieve evolution
Positions


"The health benefits of obtaining generally recommended childhood vaccinations outweigh the health risks."
Pct. Agree
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Believe evolution
Disbelieve evolution
Respondents by evolution position

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings,

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

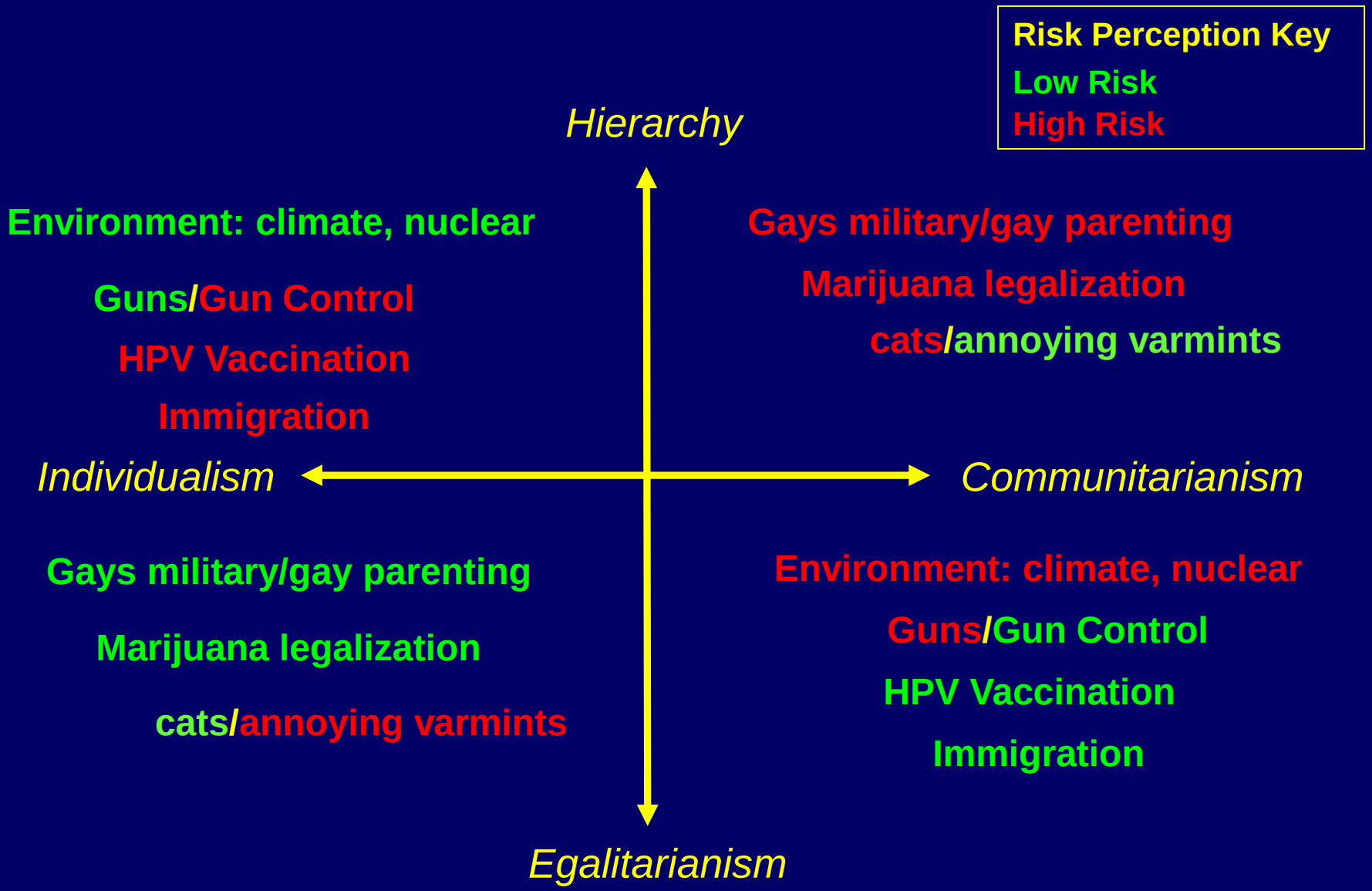
II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV.

V.

Cultural Cognition Worldviews

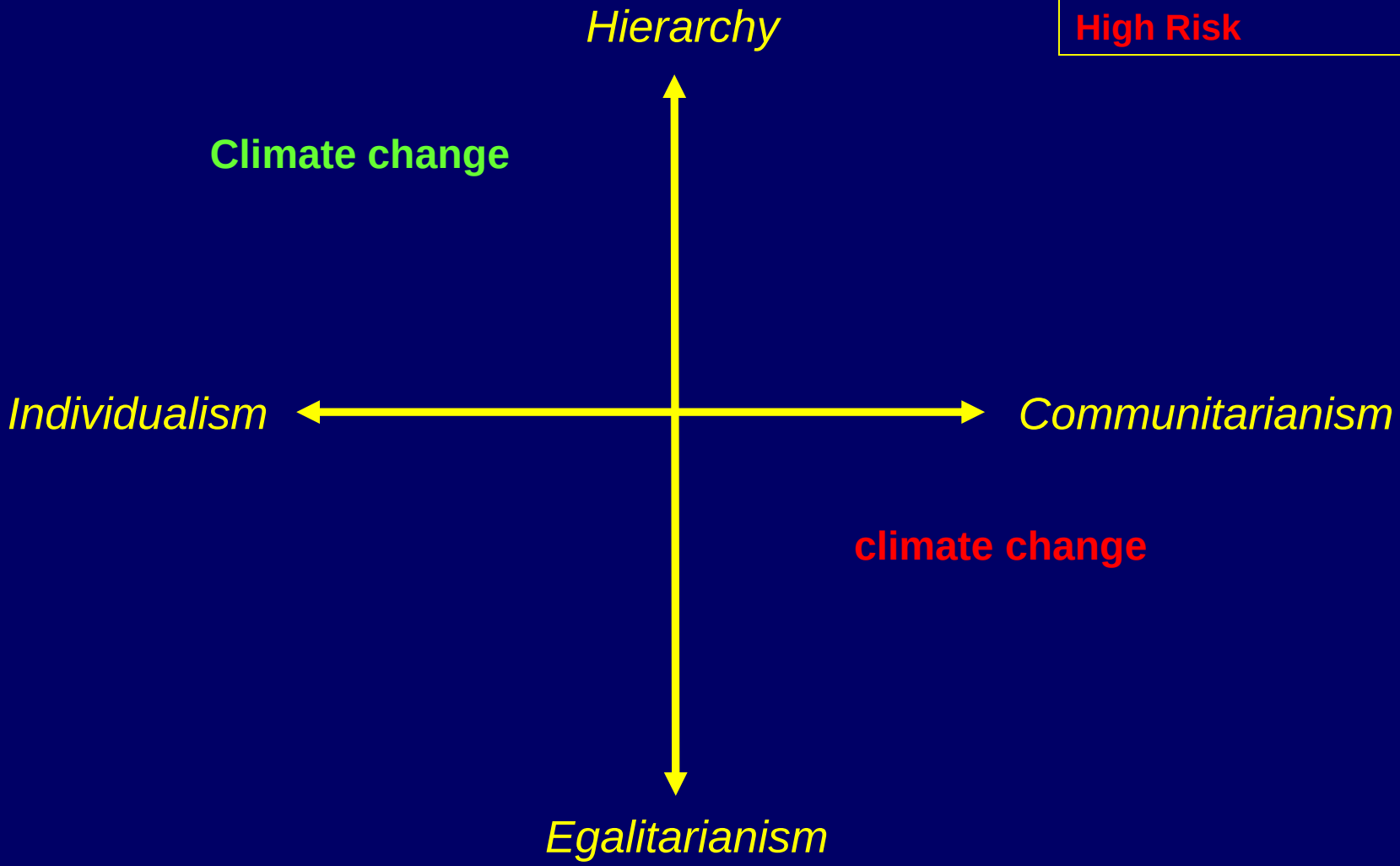


Cultural Cognition Worldviews

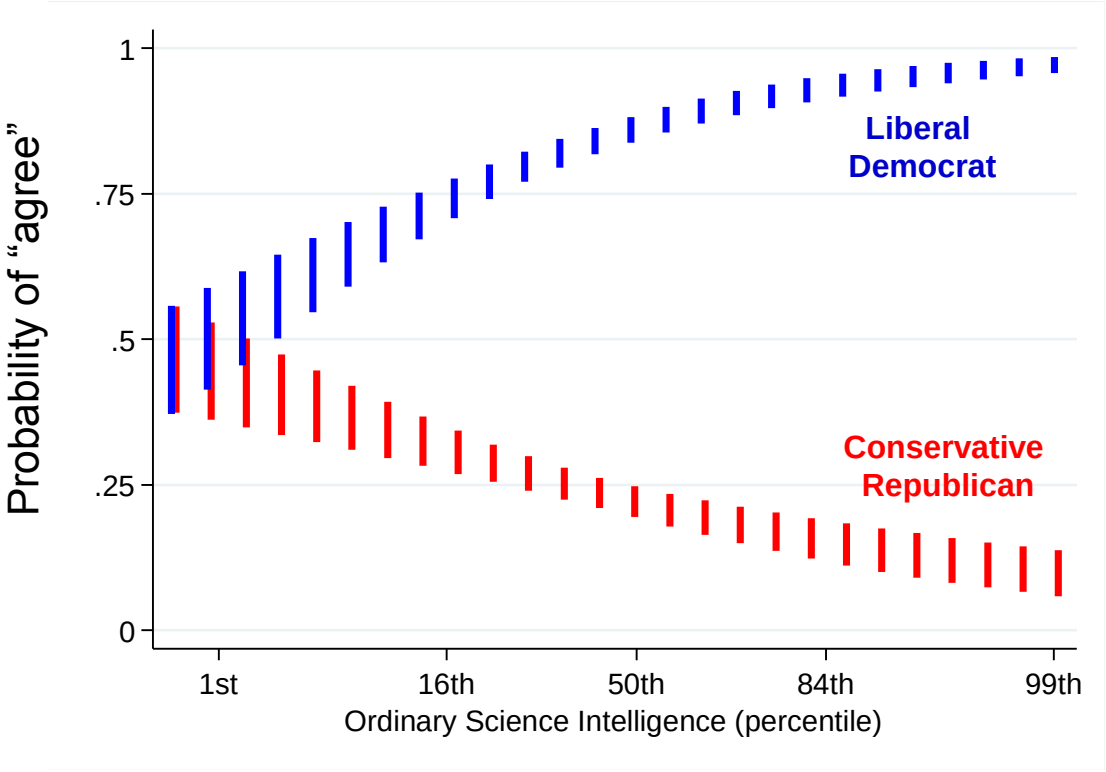
Risk Perception Key

Low Risk

High Risk



*There is **"solid evidence" of recent global warming** due "mostly" to **"human activity** such as burning fossil fuels."*



Data source: CCP/Annenberg Public Policy Cntr, Jan. 5-19, 2016. *N* = 2383. Nationally representative sample." "Liberal Democrat" and "Conservative Republican" reflect values for predictors set to those values on 5-point ideology & 7-point party-identification items. Colored bars denote 0.95 CIs.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV. When policy-relevant facts become entangled in antagonistic social meanings,

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV. When policy-relevant facts become entangled in antagonistic social meanings, citizens don't lose trust in science;

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV. When policy-relevant facts become entangled in antagonistic social meanings, citizens don't lose trust in science; rather, they lose the *practical ability* to recognize what science knows.

V.

Is this a knowledgeable and credible expert on ... ?

Robert Linden

Position: Professor of Meteorology, Massachusetts Institute of Technology

Education: Ph.D., Harvard University

Memberships:

- American Meteorological Society
- National Academy of Sciences

Global Warming

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

Nuclear Power

James Williams

Position: Professor of Criminology, Stanford University

Education: Ph.D., Yale University

Memberships:

- American Society of Criminologists
- National Academy of Sciences

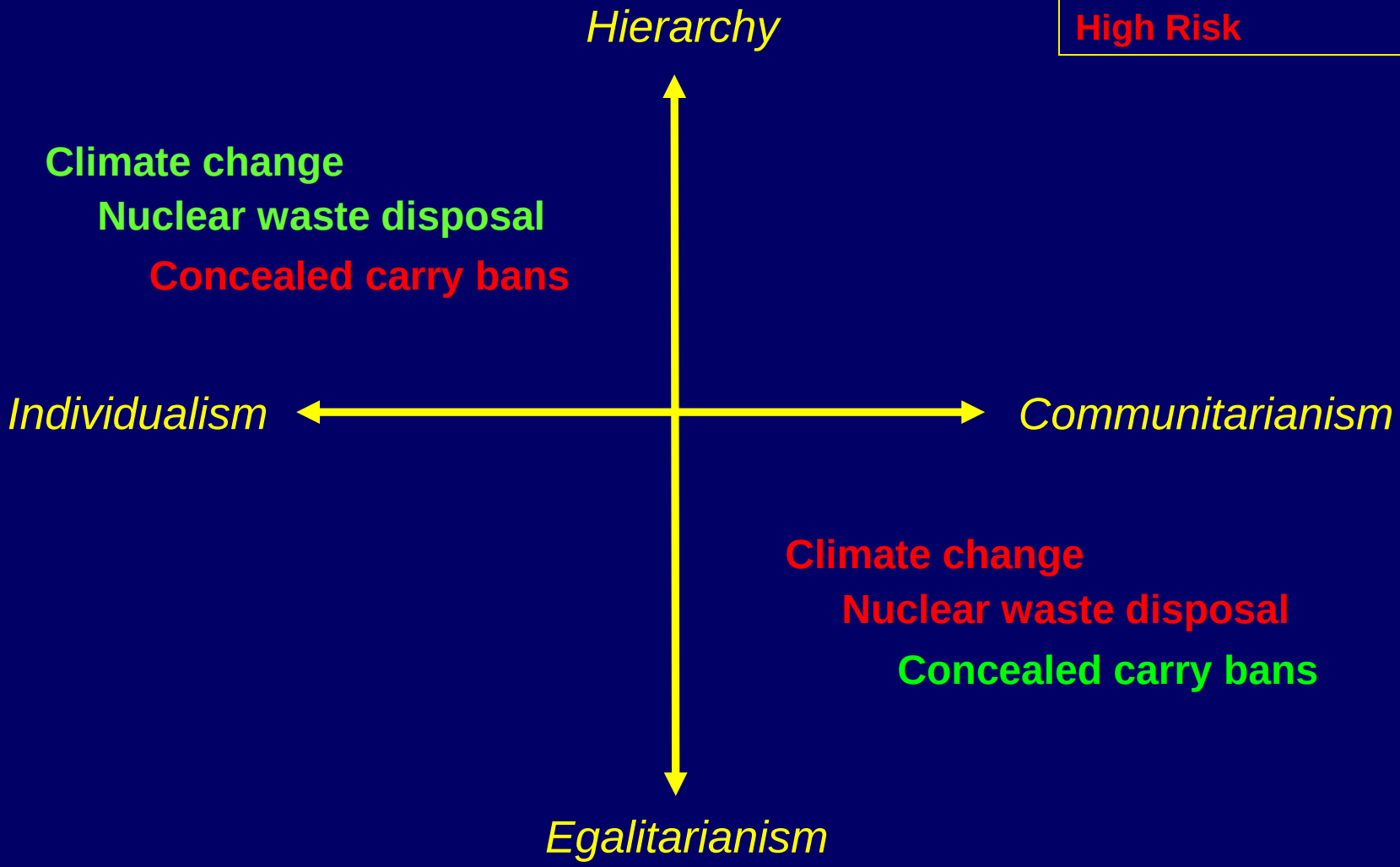
Gun Control

Cultural Cognition Worldviews

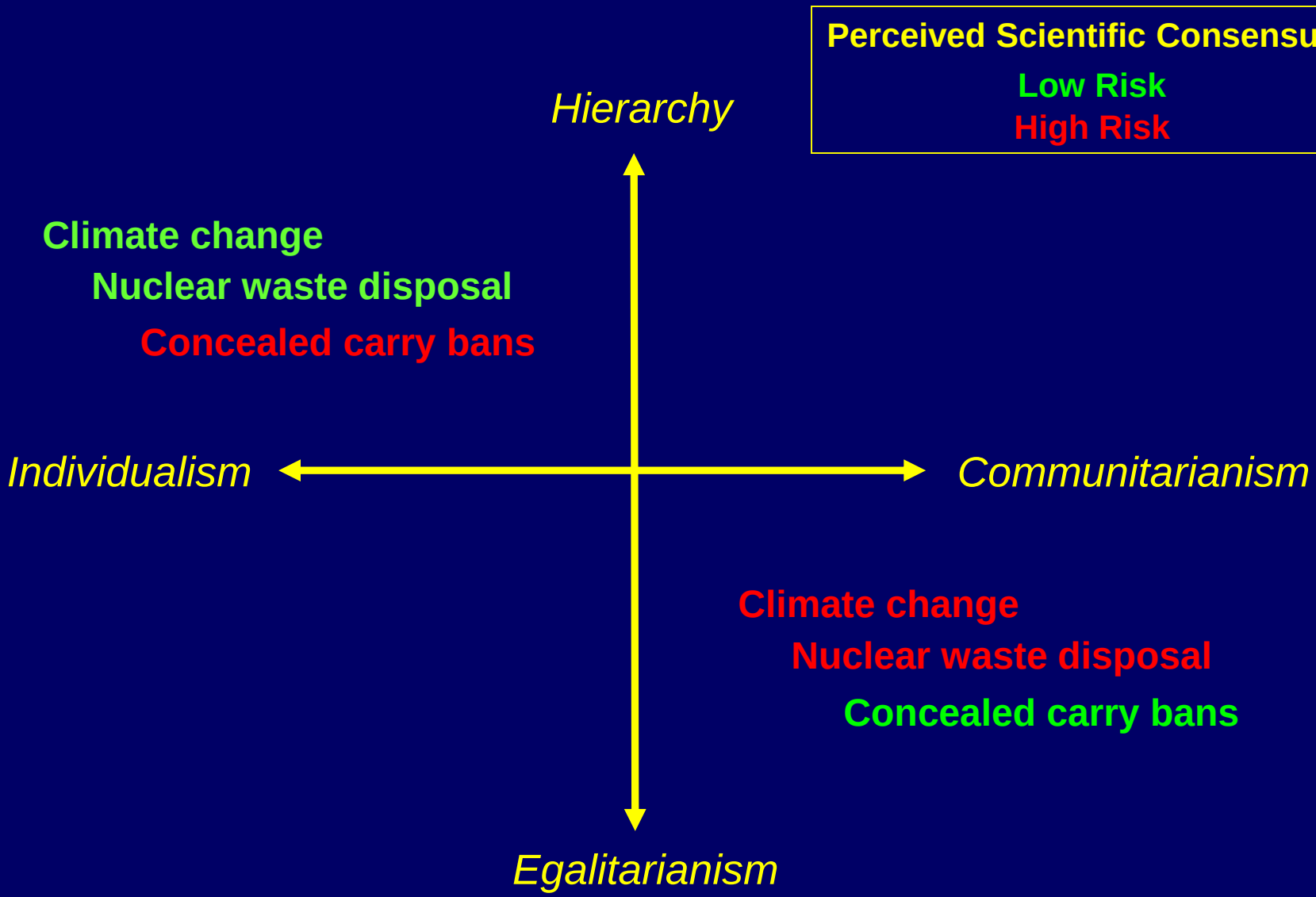
Risk Perception Key

Low Risk

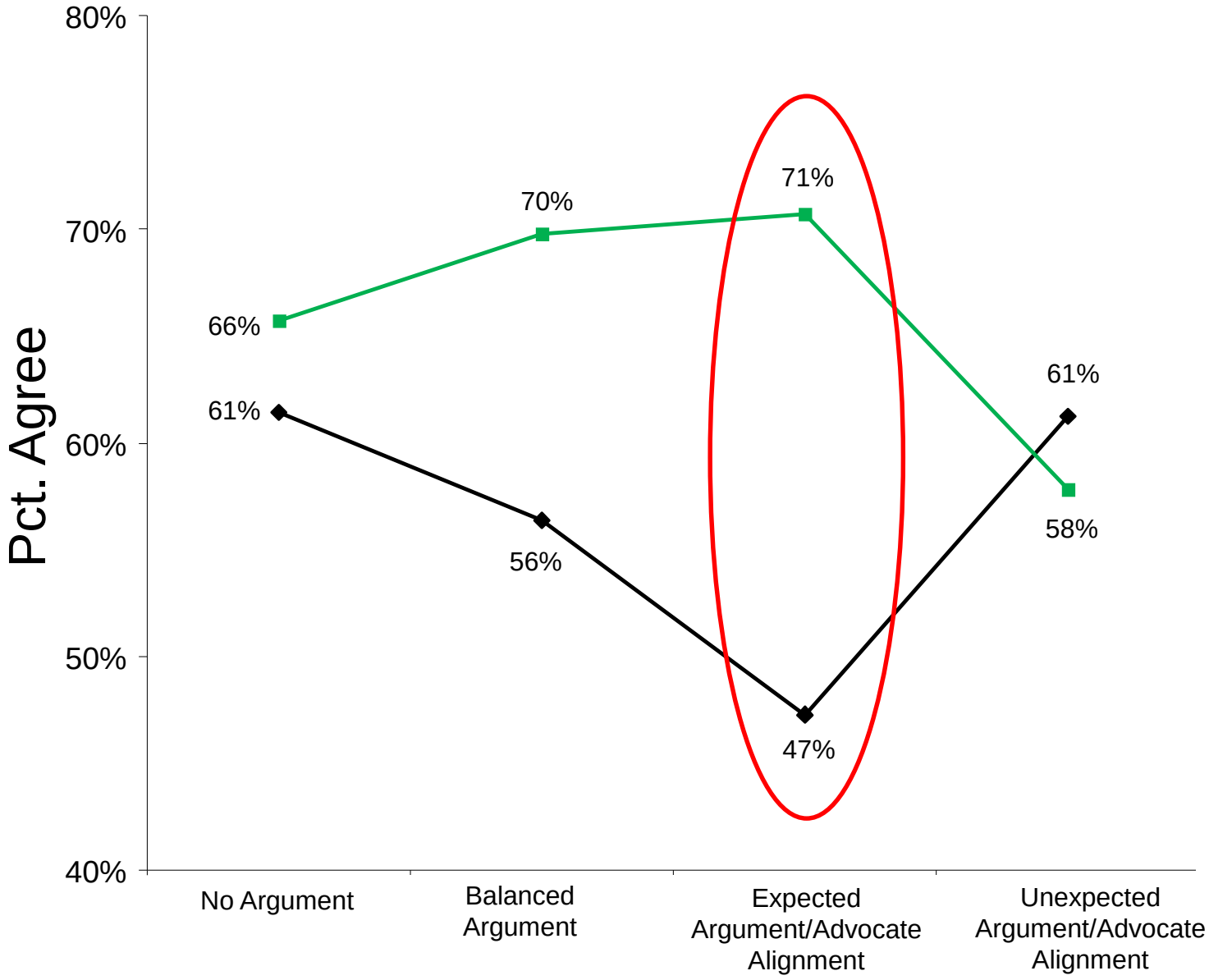
High Risk



Cultural Cognition Worldviews

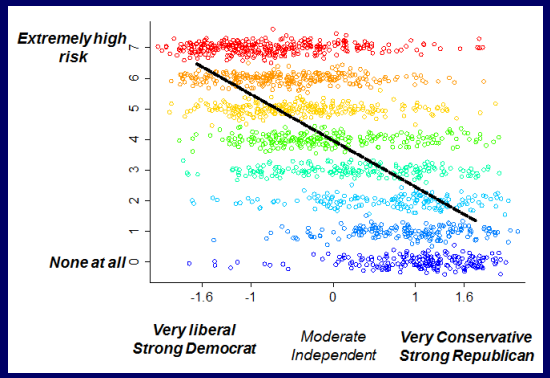


"The HPV vaccine is safe for use among young girls..."

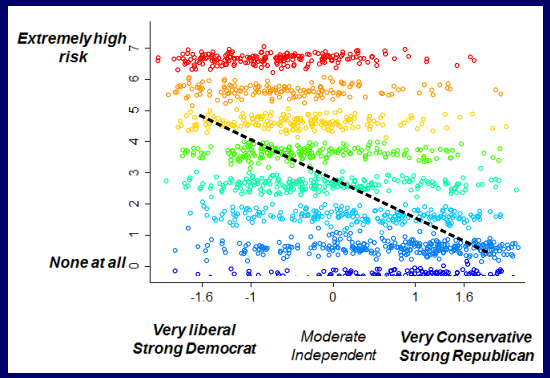


Factual polarization

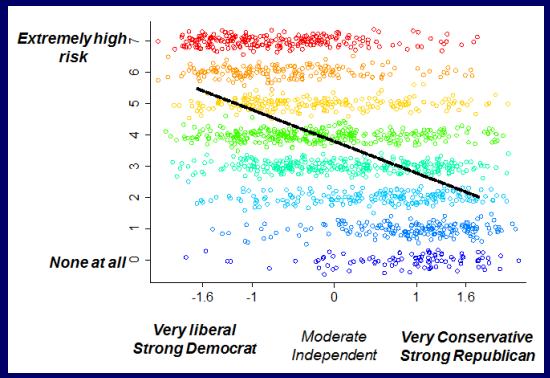
Global warming



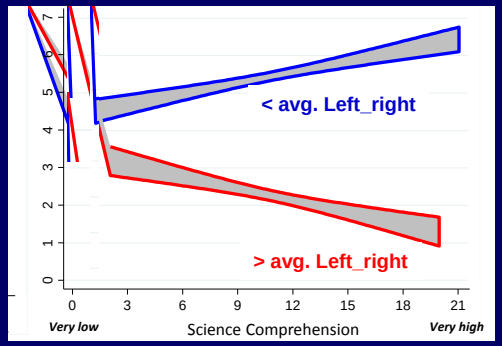
Private gun ownership



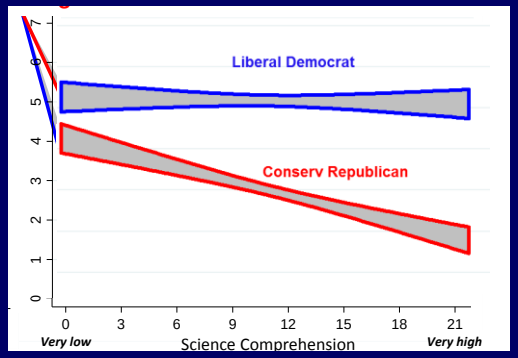
Fracking



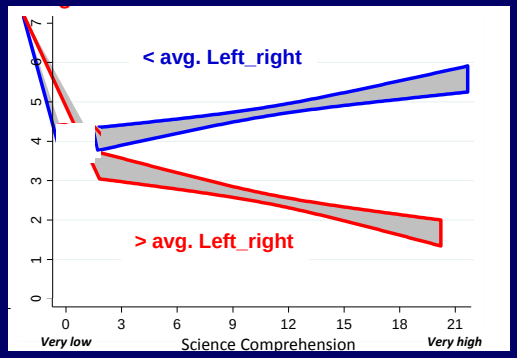
Global warming



Private gun ownership

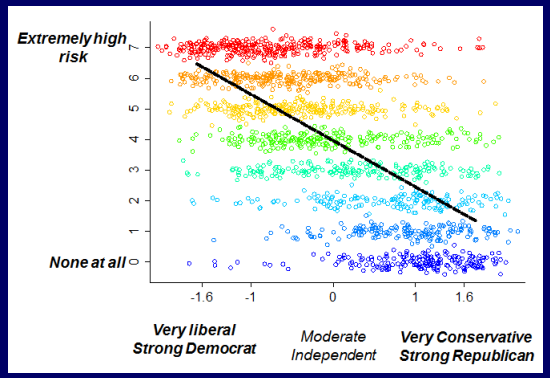


Fracking

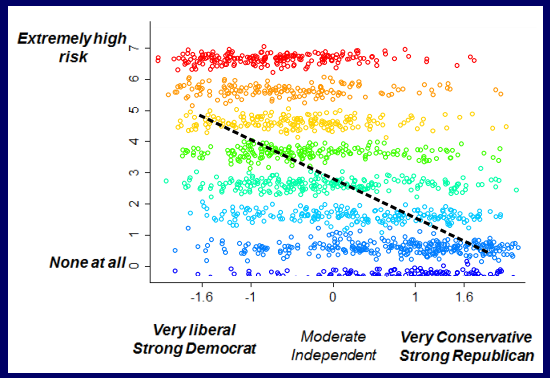


Factual polarization is not *normal*

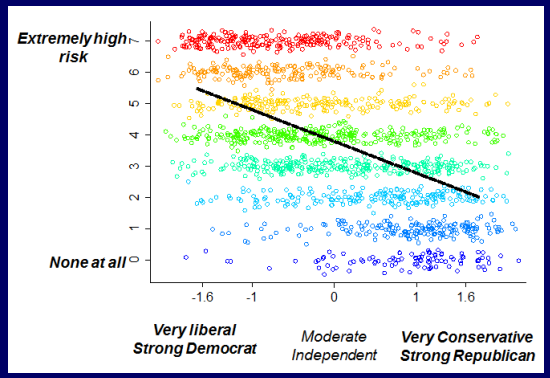
Global warming



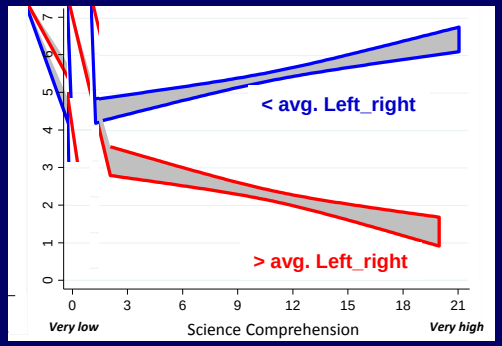
Private gun ownership



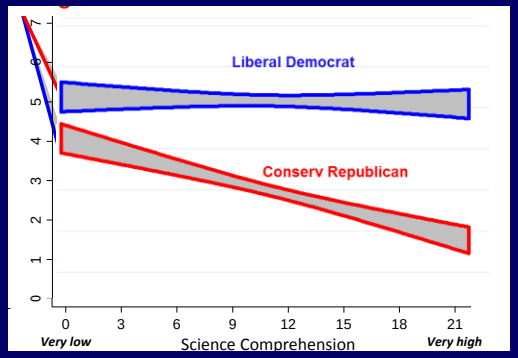
Fracking



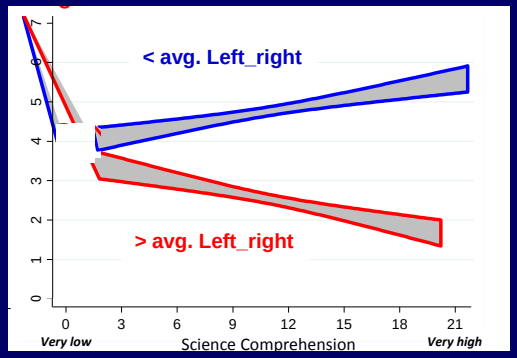
Global warming



Private gun ownership

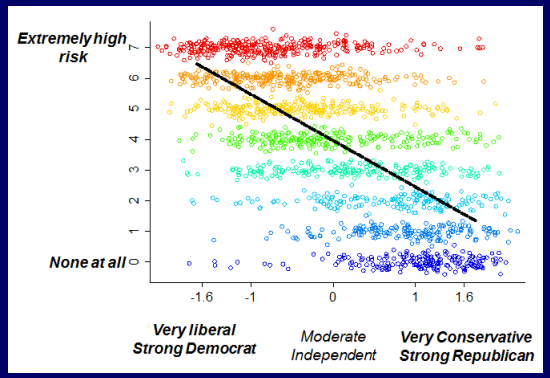


Fracking

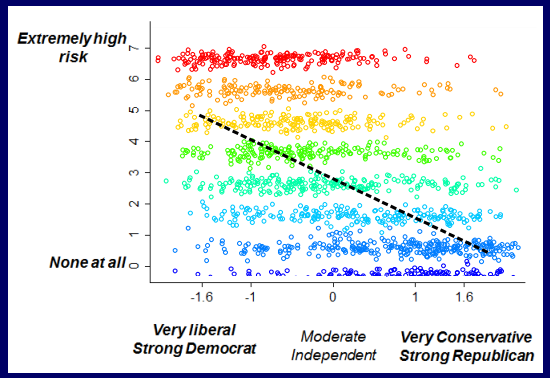


Factual polarization is not *normal*

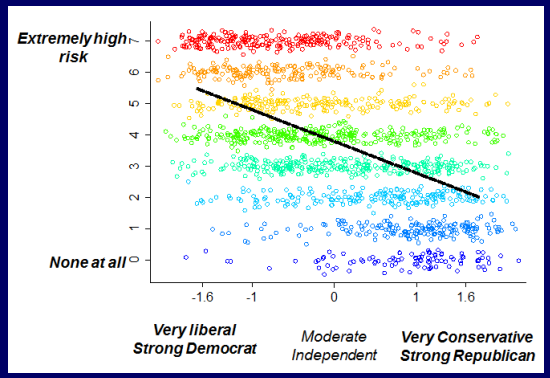
Global warming



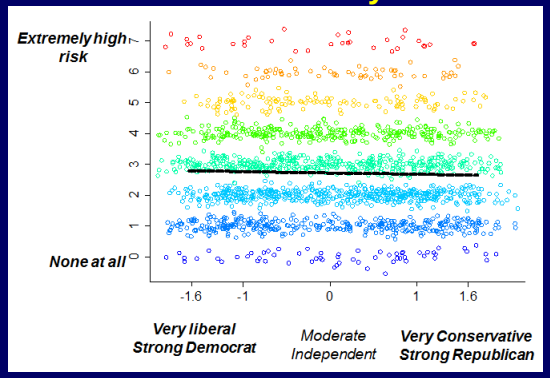
Private gun ownership



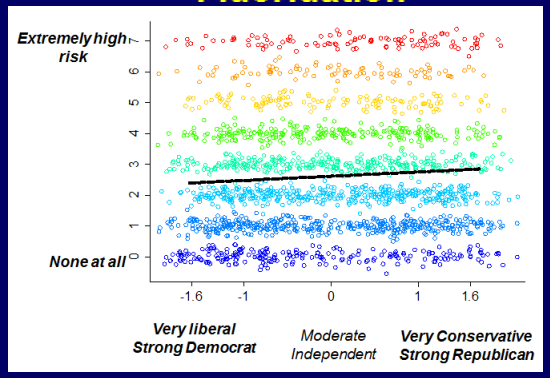
Fracking



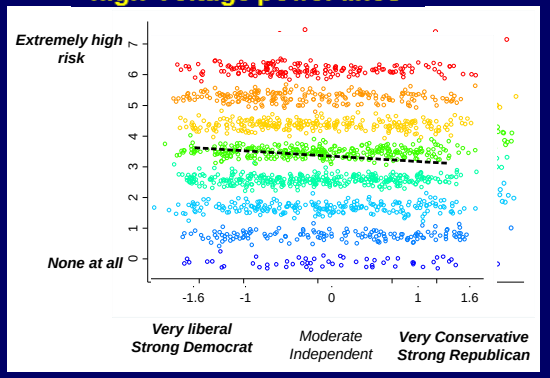
Medical x-ray



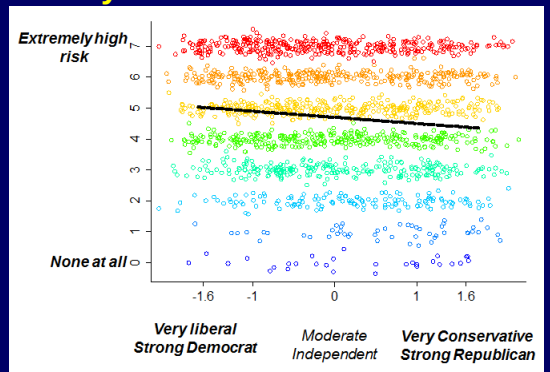
Fluoridation



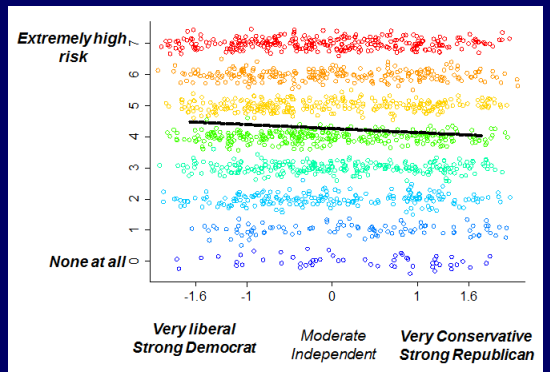
high-voltage power lines



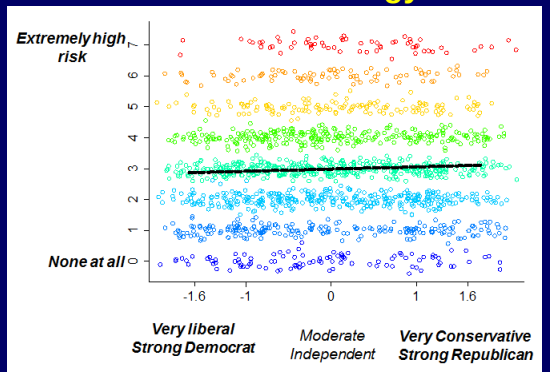
Synthetic beef hormones



GM Foods

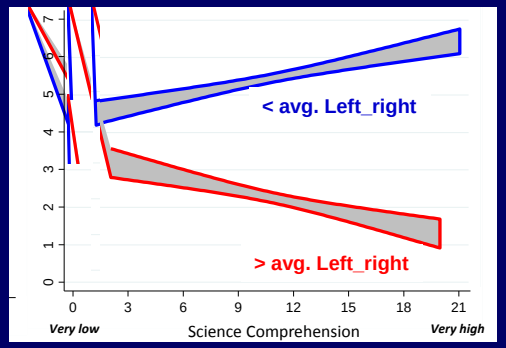


Nanotechnology

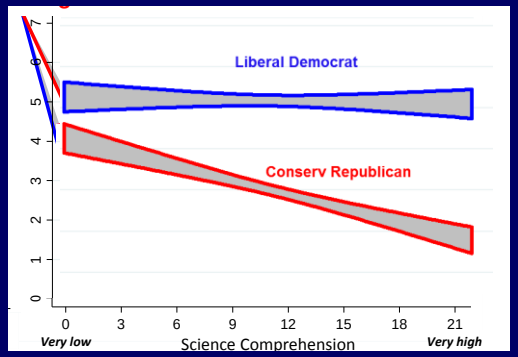


Factual polarization is not *normal*

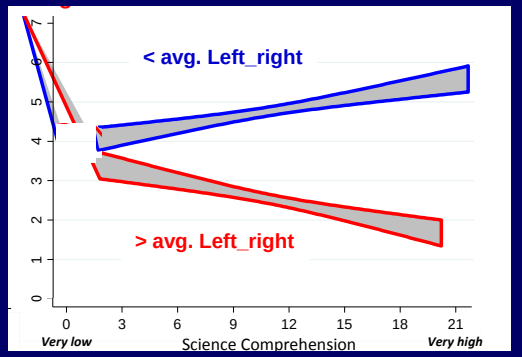
Global warming



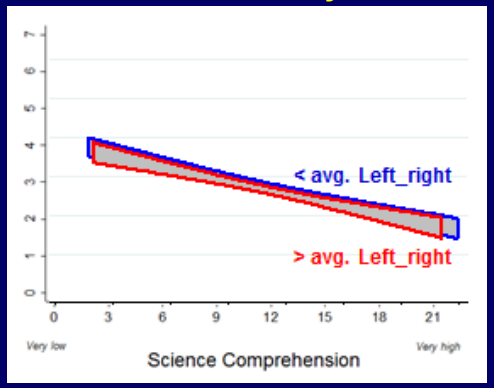
Private gun ownership



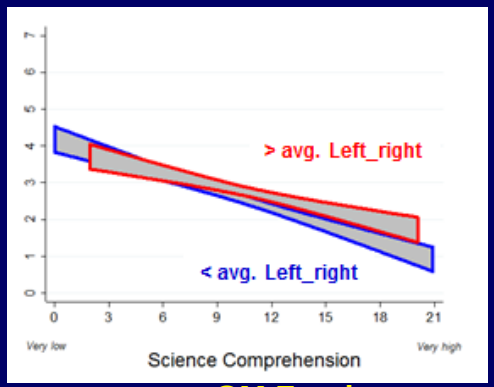
Fracking



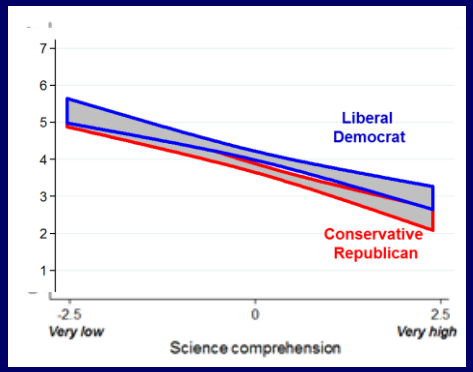
Medical x-ray



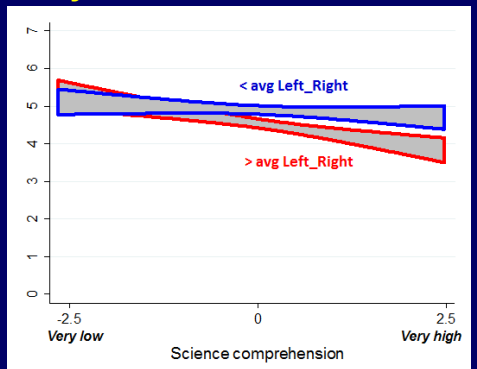
Fluoridation



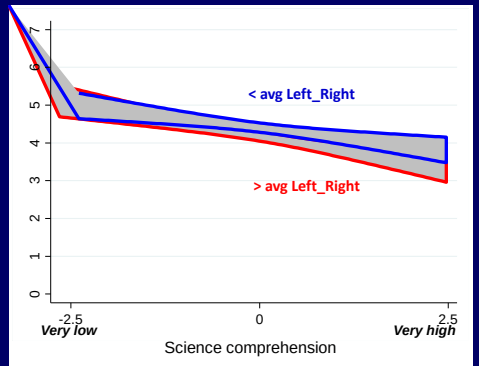
high-voltage power lines



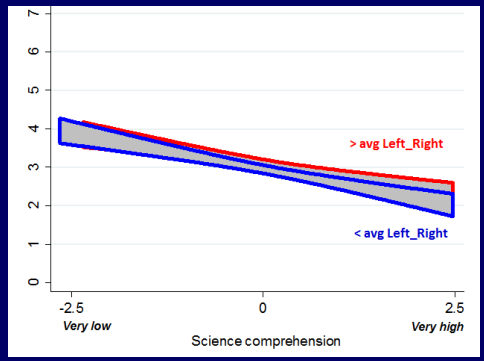
Synthetic beef hormones



GM Foods

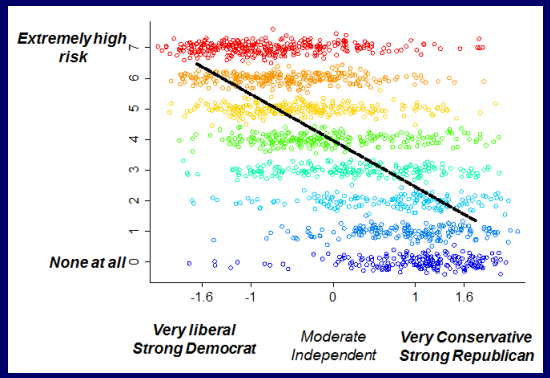


Nanotechnology

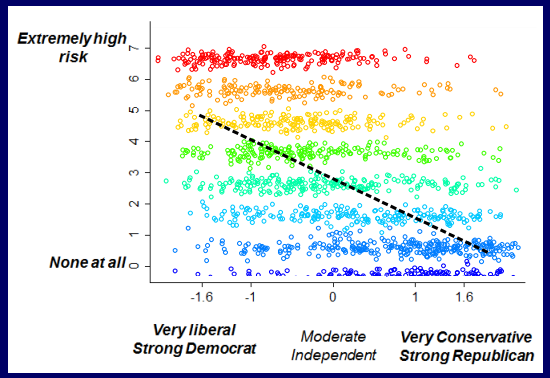


Factual polarization is

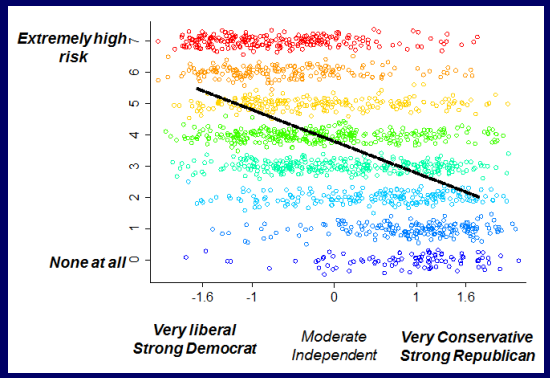
Global warming



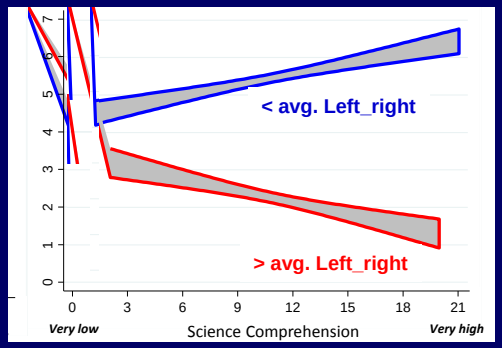
Private gun ownership



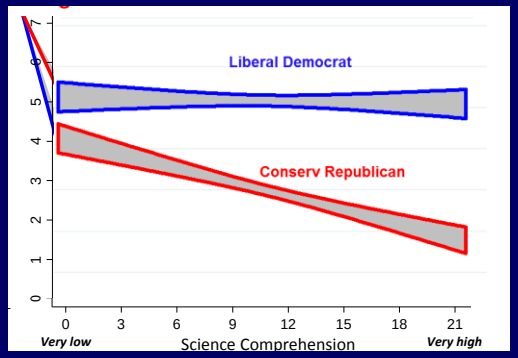
Fracking



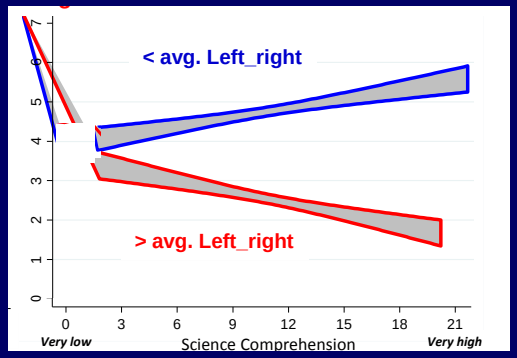
Global warming



Private gun ownership

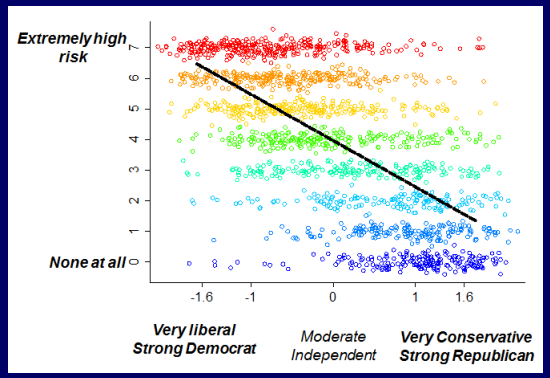


Fracking

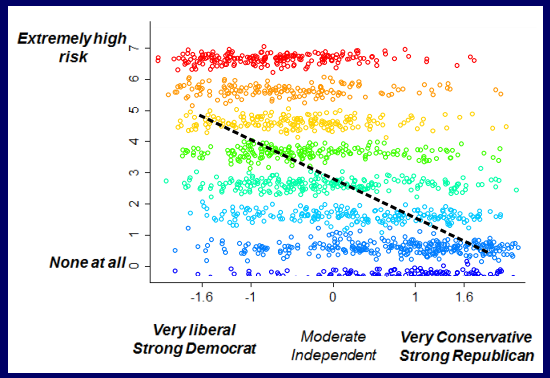


Factual polarization is pathological

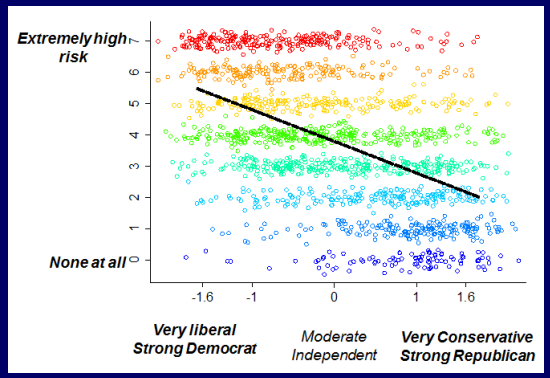
Global warming



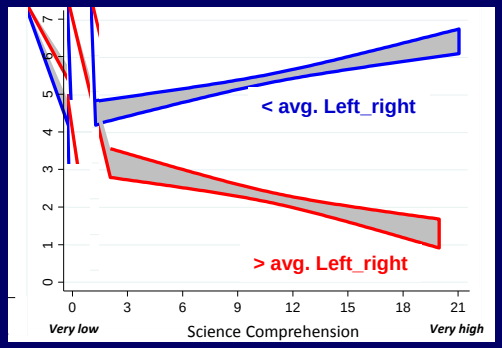
Private gun ownership



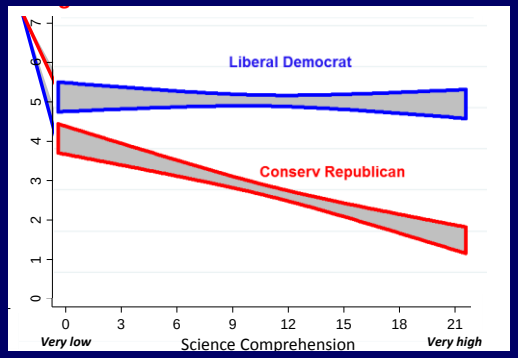
Fracking



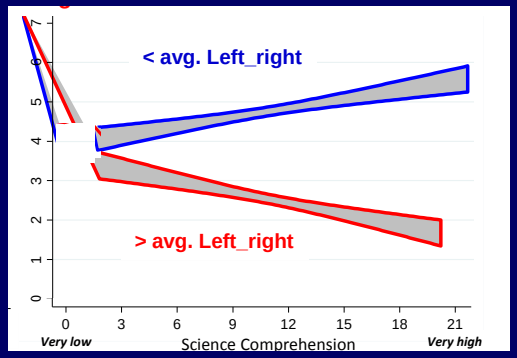
Global warming



Private gun ownership

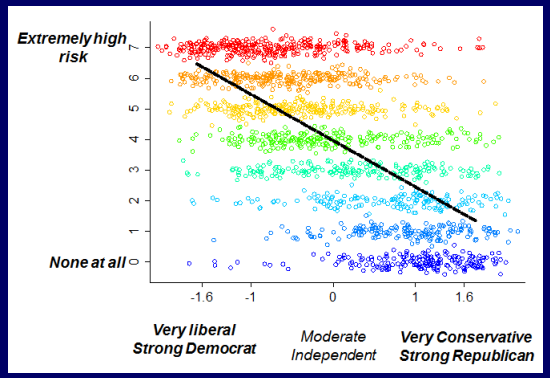


Fracking

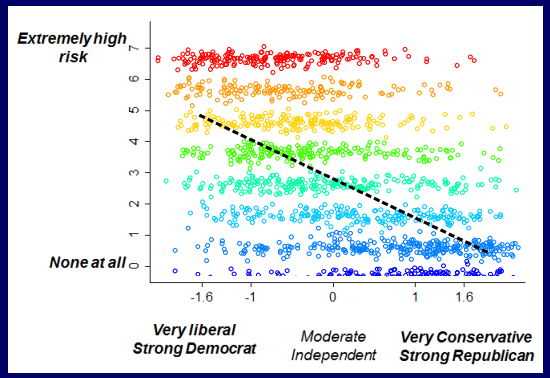


Factual polarization = *polluted communication environment*

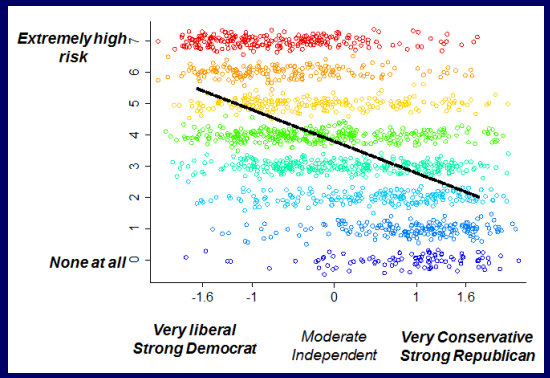
Global warming



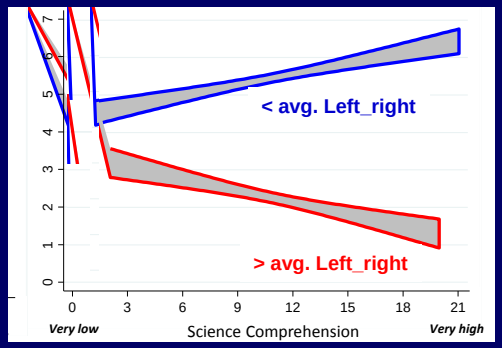
Private gun ownership



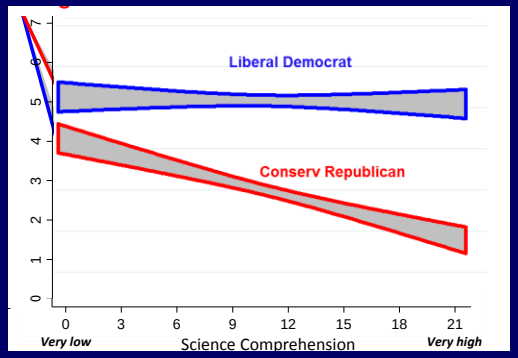
Fracking



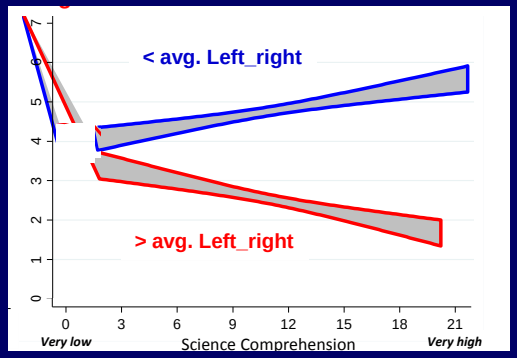
Global warming



Private gun ownership



Fracking



Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV. When policy-relevant facts become entangled in antagonistic social meanings, citizens don't lose trust in science; rather, they lose the *practical ability* to recognize what science knows.

V.

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV. When policy-relevant facts become entangled in antagonistic social meanings, citizens don't lose trust in science; rather, they lose the *practical ability* to recognize what science knows.

V. Ending polarization over decision-relevant science demands

Five theses on perceptions of scientific consensus:

I. Citizens of diverse backgrounds and outlooks all have a positive attitude toward science.

II. Public conflicts over decision-relevant science are not rooted in a defect in science comprehension or in a disagreement over the value of science generally; they stem from considerations *particular* to the issues being decided.

III. A principle source of conflict over decision-relevant science is the entanglement of facts in antagonistic social meanings, which transform competing positions into badges of cultural identity.

IV. When policy-relevant facts become entangled in antagonistic social meanings, citizens don't lose trust in science; rather, they lose the *practical ability* to recognize what science knows.

V. Ending polarization over decision-relevant science demands institutions and norms that protect the science communication environment from antagonistic meanings.

HPV vaccine . . .

CDC Recommends Girls Be Vaccinated For HPV

RS REDSTATE

Jump To » Mobile / Confirm Them / Right Shelf / Sports / State Blogs / About / Conta
Conservative Book Club / Human Events

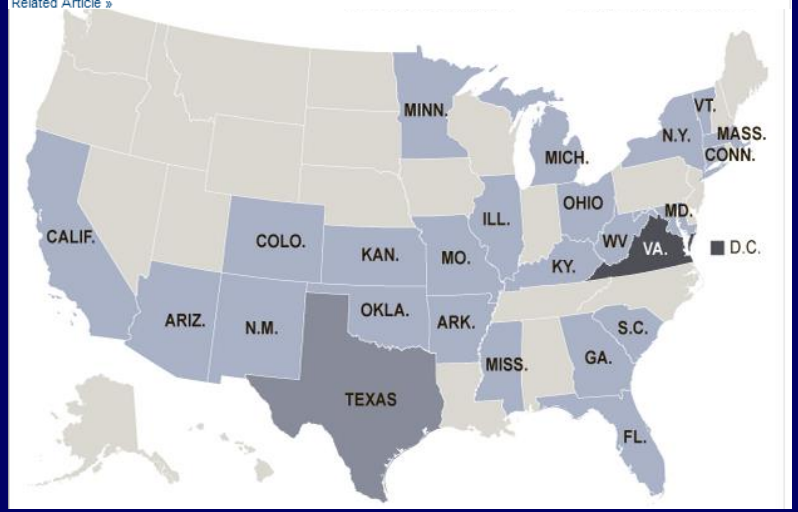
Let's Use Teenage Girls As Lab Rats For a Monopoly

HPV vaccine: Republicans prove themselves morons once again

This is a prime example of how religion, and its willful ignorance of facts in favor of faith, can be deadly. In Monday's debate between Republican presidential candidates, Michele Bachmann laid into Texas governor Rick Perry's order that female students in Texas be vaccinated against the HPV virus, which causes cervical cancer. *The New York Times* blog, the *Caucus*, reports:

Actions by States to Require the HPV Vaccination

Related Article »



. . . HBV vaccine

The New York Times **Health**

Search All

COLLECTIONS

U.S. Panel Urges That All Children Be Vaccinated for Hepatitis B

By GINA KOLATA
Published: March 01, 1991

State Information

Hepatitis B Prevention Mandates for Daycare and K-12

An empty box in this table indicates a "NO" answer

State	Hep B childhood vaccination mandate?	Hep B daycare mandate, year in effect	Hep B elementary schoo year in effect
Alabama			
Alaska	yes	2001	2001
Arizona	yes	1997	1997
Arkansas	yes	2000	2000
California	yes	1997	1997
South Carolina	yes	1994	1998
South Dakota			
Tennessee	yes	7/10	1999
Texas	yes	2004	1998
Utah	yes	7/08	1999 prog†
Vermont	yes	3/11	8/08
Virginia	yes	1994	1994
Washington	yes	1997 prog†	1997 prog†
West Virginia	yes	2000	2008
Wisconsin	yes	1997	1997
Wyoming	yes	1999	1999

† Signifies a "progressive" law in which each new school year another successive grade becomes covered by grade in 2001).

HPV vaccine . . .

CDC Recommends Girls Be Vaccinated For HPV

RS REDSTATE

Jump To » Mobile / Confirm Them / Right Shelf / Sports / State Blogs / About / Conta
Conservative Book Club / Human Events

Let's Use Teenage Girls As Lab Rats For a

U.S. HPV Vaccine Coverage Lags Behind Canada, Mexico

Cancer rates unlikely to decline until more people are vaccinated

By JASON KOEBLER

January 8, 2013 | RSS Feed | Print

. . . HBV vaccine

The New York Times — Health — Search All

COLLECTIONS

U.S. Panel Urges That All Children Be Vaccinated for Hepatitis B

By GINA KOLATA
Published: March 01, 1991

State Information

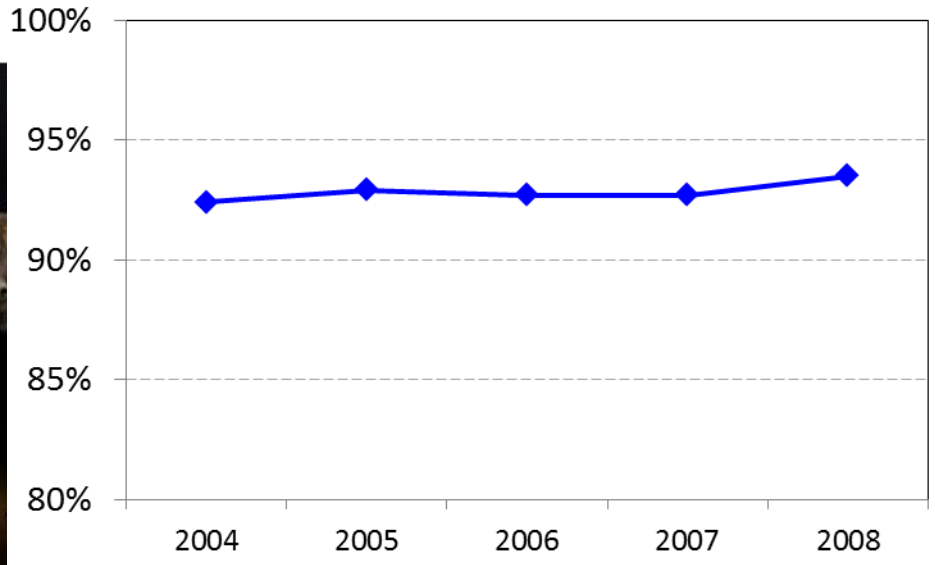
Hepatitis B Prevention Mandates for Daycare and K-12

An empty box in this table indicates a "NO" answer

	Hep B childhood vaccination mandate?	Hep B daycare mandate, year in effect	Hep B elementary schoo year in effect
ma			
	yes	2001	2001
a	yes	1997	1997
as	yes	2000	2000
ng	yes	1999	1999

fies a "progressive" law in which each new school year another successive grade becomes covered by
in 2001).

HBV vaccination rate (CDC, Nat'l Imm. Survey)



SOCIAL SCIENCE

A Risky Science Communication Environment for Vaccines

Neglecting the science of science communication puts the value of decision-relevant science at risk.

Dan M. Kahan

Controversy over childhood vaccinations is an instance of what might be styled the "science communication problem"—the failure of compelling scientific evidence to resolve public dispute over risks and similar facts (*1*). This problem itself has been the focus of scientific study since the 1970s, when psychologists began to investigate the divergence between expert and public opinion on nuclear power. Indeed, the science of science communication that this body of work comprises can now be used not just to explain controversy over risk but also to predict, manage, and in theory avoid conditions likely to trigger it. The example of childhood vaccinations illustrates these points—and teaches an important practical lesson.

One recurring source of risk controversy is a dynamic known as "cultural cognition." Both to avoid dissonance and to protect their ties to others, individuals face a strong psychic pressure to conform their perceptions of risk to those that distinguish their group from competing ones—a bias in reasoning that can actually intensify as the public becomes more science literate (*2*).

A major factor in the dispute over climate change, cultural cognition has contributed to controversy over at least one childhood vaccine as well. In 2006, the U.S. Centers for Disease Control (CDC) recommended universal immunization of adolescent girls against the human papilloma virus (HPV), which is sexually transmitted and causes cervical cancer, but political dispute blocked legislative mandates in every state but one. Experimental evidence showed that individuals tended to selectively credit information relating to the vaccine's risks and benefits in patterns reflecting their cultural predispositions (one perceived risk was that vaccination would lead to the engagement of unsafe sex). The resulting polarization was amplified when individuals were exposed to cues—whether explicit, such as news reports (*3*), or tacit, such as fictional advocates of varying appearances (*4*)— suggesting the vaccine was a focus of group conflict.

CREDIT: ROBERT DUPUIS

Shots of controversy. Conflict over childhood vaccinations reflect the inadequate attention given to understanding factors in the science communication environment that influence the public understanding of science.

Yale Law School, Post Office Box 20815, New Haven, CT 06520, USA. E-mail: dan.kahan@yale.edu

What's next? Zika? . . .

WND EXCLUSIVE

ZIKA VIRUS JOINS LIST OF DISEASES BROUGHT BY ILLEGALS

U.N. declares outbreak an international emergency

Published: 02/01/2016 at 7:53 PM

The Zika virus foreshadows our dystopian climate future

Bill McKibben

The mosquito-borne disease shows that pushing the limits of the planet's ecology has become dangerous in novel ways

What's next? childhood vaccines? . . . .

The Religious Right's Anti-Vaccine Hysteria Is Reviving Dead Diseases in America

September 13, 2013

by Benjamin Shapiro
Senior Editor

Share Tweet

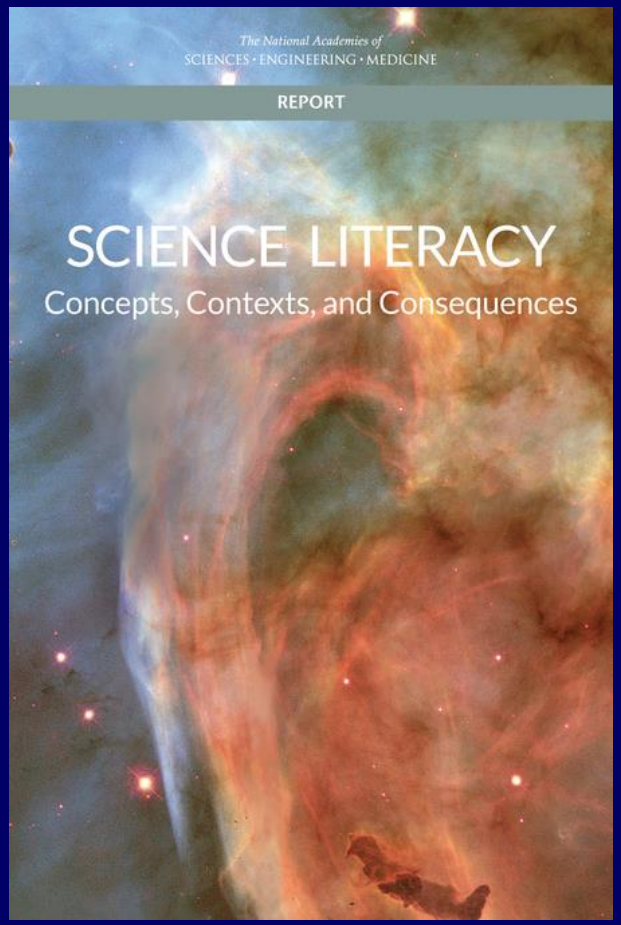
The Anti-Vaccine Movement Is The Left's Intellectual Problem With Science

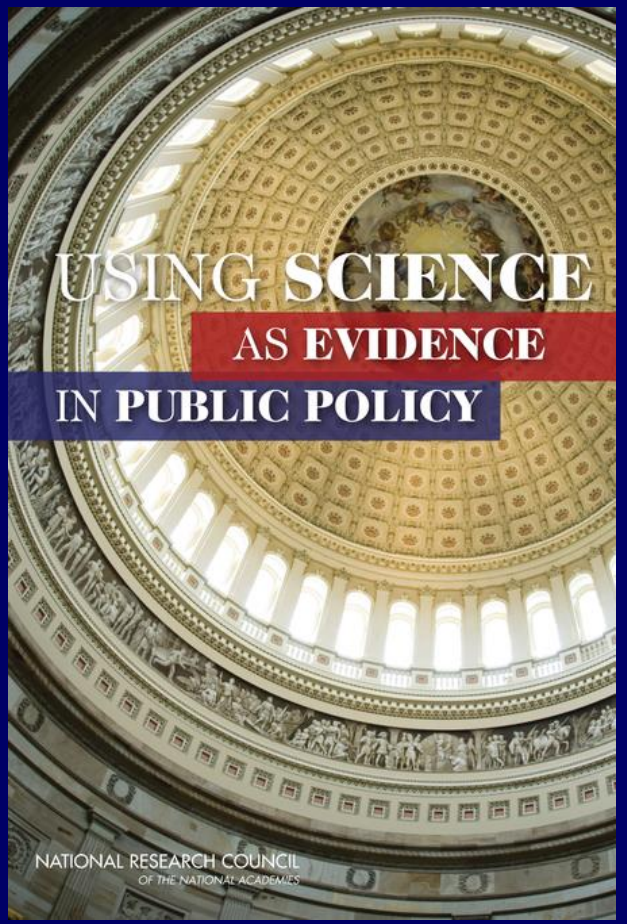
January 21, 2014 By Manny Schewitz 143 Comments

Share 15k

I will often see comments from readers who say things such as "you call yourself a progressive but all you do is bash the right," or other similar statements. The fact of the matter is I will call out people who are being ignorant, regardless of where they identify themselves politically. I have previously called out the anti-science hysteria that has completely overtaken the anti-Monsanto movement, and now it is quite apparent that the same thing needs to be done with those who have taken it upon themselves to try to convince everyone that vaccines are evil. No, these aren't just people on the far right who believe every new story Alex Jones cooks up to sell more of his survivalist gear and fluoride filters. These are people who proudly call themselves liberal or progressive and laugh at conservatives who deny the overwhelming scientific evidence for

The science communication environment as *public good*





the Cultural Cognition Project at Yale Law School

YALE LAW SCHOOL

www. culturalcognition.net

“I am you!”