Forecasting Novel Technology Risk Perceptions: Are We There Yet?

Dan M. Kahan
Yale University

& $10^3$ others!

Research Supported by:
National Science Foundation, SES-0621840 & -0922714
Annenberg Public Policy Center
2017: ~ 30th Anniversary of the study of anticipated public reaction to nanotechnology as “novel” or “emerging” technology!
2017: ~ 30th Anniversary of the study of anticipated public reaction to nanotechnology as “novel” or “emerging” technology!

*Jan. 1986...*

**Environmental Health and Toxicology**

Published online January 1, 1986

**Risk Communication Study for Nanotechnology Using Risk Cognitive Map**
Chun-Woong Choi, Ji-Yoon Jeong, Myung-Sil Hwang, Ki-Kyung Jung, Hyo-Min Lee, Kwang-Ho Lee

*...May 2017*

**Journal of Nanoparticle Research**

Selective perception of novel science: how definitions affect information processing about nanotechnology

Authors: Jiyoun Kim, Heather Akin, Dominique Brossard, Michael Xenos, Dilettra A. Schuèfele
Are we there yet? . . .

1. 

2. 

3. 

1. Avoid “hyping” (or contributing to same in media)
2. Study triggering conditions with realistic stimuli
3. Investigate locally, with field-study methods
4. Prefer administrative to popular political risk-management authorities
Are we there yet? . . .

1. 

2. 

3. 

Making it the rest of the way

1. 

2. 

3. 

4.
Identity-protective cognition:

“They Saw a Protest”
Identity-protective cognition: “They Saw a Game”

CASE REPORTS
THEY SAW A GAME: A CASE STUDY
ALBERT H. HASTORF AND HADLEY CRANTR
Dartmouth College
Princeton University

On a brisk Saturday afternoon, November 25, 1951, the Dartmouth football team played Princeton in Princeton’s Palmer Stadium. It was the last game of the season for both teams and of rather special significance because the Princeton team had won all its games so far and one of its players, Kazmaier, was receiving All-American mention and had just appeared as the cover man on Time magazine, and was playing his last game.

A few minutes after the opening kick-off, it became apparent that the game was going to be a rough one. The referees were kept busy blowing their whistles and penalizing both sides. In the second quarter, Princeton’s star left the game with a broken nose. In the third quarter, a Dartmouth player was taken off the field with a broken leg. Tempers flared both during and after the game. The official statistics of the game, which Princeton won, showed that Dartmouth was penalized 70 yards, Princeton 25, not counting more than a few plays in which both sides were penalized.

Needless to say, accusations soon began to fly. The game immediately became a matter of concern to players, students, coaches, and the administrative officials of the two institutions, as well as to alumni and the general public who had not seen the game but had become sensitive to the problem of big-time football through the recent exposures of subsidized players, commercialism, etc. Discussion of the game continued for several weeks.

One of the contributing factors to the extended discussion of the game was the extensive space given to it by both campus and metropolitan newspapers. An indication of the fervor with which the discussions were carried on is shown by a few excerpts from the campus dailies.

For example, on November 27 (four days after the game), the Daily Princetonian (Princeton’s student newspaper) said:

This observer has never seen quite such a disgusting exhibition of so-called “sport.” Both teams were guilty but the blame must be laid primarily on Dartmouth’s doormat, Princeton, obviously the better team, had no reason to rough up Dartmouth. Looking at the situation rationally, we don’t see why the Indians should make a deliberate attempt to cripple Dick Kazmaier or any other Princeton player. The Dartmouth psychology, however, is not rational itself.

The November 30th edition of the Princeton Alumni Weekly said:

But certain memories of what occurred will not be easily erased. Into the record books will go in indelible fashion the fact that the last game of Dick Kazmaier’s career was cut short by more than half when he was forced out with a broken nose and a mild concussion, sustained from a tackle that came well after he had thrown a pass.

This second-period development was followed by a third quarter outbreak of roughness that was climaxd when a Dartmouth player deliberately kicked Brad Glass in the ribs while the latter was on his back. Throughout the often unpleasant afternoon, there was undeniable evidence that the losers’ tactics were the result of an actual style of play, and reports on other games they have played this season substantiate this.

Dartmouth students were “seeing” an entirely different version of the game through the editorial eyes of the Dartmouth (Dartmouth’s undergraduate newspaper). For example, on November 27 the Dartmouth said:

However, the Dartmouth-Princeton game set the stage for the other type of dirty football. A type which may be termed as an unjustifiable accusation.

Dick Kazmaier was injured early in the game. Kazmaier was the star, an All-American. Other stars have been injured before, but Kazmaier had been built to represent a Princeton ideal. When an idol is hurt there is only one recourse—the tag of dirty football. So what did the Tiger coach Charley Caldwell do? He announced to the world that the Big Green had been out to extinguish the Princeton star. His purpose was achieved.

After this incident, Caldwell instilled the old see-what-they-did-go-get-them attitude into his players. His talk got results. Gene Howard and Jim Miller were both injured. Both had dropped back to pass, had passed, and were standing unprotected in the backfield. Result: one bad leg and one leg broken.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>N</th>
<th>DARTMOUTH TEAM</th>
<th>PRINCETON TEAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dartmouth</td>
<td>48</td>
<td>4.3* 2.7</td>
<td>4.4 2.8</td>
</tr>
<tr>
<td>Princeton</td>
<td>49</td>
<td>9.8* 5.7</td>
<td>4.2 3.5</td>
</tr>
</tbody>
</table>

* Significant at the .01 level.
Did protestors cross the line between “speech” and “intimidation”?
Experimental Conditions

**Abortion Clinic Condition**

Outside the reproductive health clinic 15 minutes before it was scheduled to open.

Scene at the entrance of clinic. Patient approaches but does not enter.

**Recruitment Center Condition**

Outside the campus recruitment center 15 minutes before it was scheduled to open.

Scene at the entrance of recruitment center. Student approaches but does not enter.
Cultural Cognition Worldviews

Hierarchy

Individualism  Communitarianism

Egalitarianism
Cultural Cognition Worldviews

*Representative items:* Agree/disagree, 6 pt likert measure

**Individualism-Communitarianism**
IPROTECT.
CLIMCHOI.

**Hierarchy-Egalitarianism**
EWEALTH.
HFEMININ.
Representative items:
Agree/disagree, 6 pt likert measure

Individualism-Communitarianism
IPROTECT. “It's not the government's business to try to protect people from themselves.”
CLIMCHOI.

Hierarchy-Egalitarianism
EWEALTH.
HFEMININ.
Cultural Cognition Worldviews

**Representative items:**
Agree/disagree, 6 pt likert measure

**Individualism-Communitarianism**
IPROTECT. “It's not the government's business to try to protect people from themselves.”
CLIMCHOI. “Government should put limits on the choices individuals can make so they don't get in the way of what's good for society.”

**Hierarchy-Egalitarianism**
EWEALTH.
HFEMININ.
Cultural Cognition Worldviews

**Representative items:**
Agree/disagree, 6 pt likert measure

**Individualism-Communitarianism**
IPROTECT. “It's not the government's business to try to protect people from themselves.”
CLIMCHOI. “Government should put limits on the choices individuals can make so they don't get in the way of what's good for society.”

**Hierarchy-Egalitarianism**
EWEALTH. “Our society would be better off if the distribution of wealth was more equal.”
HFEMININ.
Cultural Cognition Worldviews

Representative items:
Agree/disagree, 6 pt likert measure

Individualism-Communitarianism
IPROTECT. “It's not the government's business to try to protect people from themselves.”
CLIMCHOI. “Government should put limits on the choices individuals can make so they don’t get in the way of what's good for society.”

Hierarchy-Egalitarianism
EWEALTH. “Our society would be better off if the distribution of wealth was more equal.”
HFEMININ. “Society as a whole has become too soft and feminine.”
Cultural Cognition Worldviews

Hierarchy

Hierarchical individualists

Hierarchical communitarians

Individualism

Egalitarian individualists

Egalitarian communitarians

Communitarianism

Egalitarianism
“They Saw a Protest”: Who decided what & when?

Police Liable

abortion clinic
recruitment center

Police Enjoined

abortion clinic
recruitment center
“They Saw a Protest”: Who decided what & when?

Pct. Agree

Police Liable

Police Enjoined

0%

25%

50%

75%

100%

abortion clinic

recruitment center

abortion clinic

recruitment center

Egal individ

Egal individ
“They Saw a Protest”: Who decided what & when?
“They Saw a Protest”: Who decided what & when?

- Hierarch commun
- Egal individ

- Police Liable
- Police Enjoined

<table>
<thead>
<tr>
<th>abortion clinic</th>
<th>recruitment center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hierarch commun</td>
<td>Egal individ</td>
</tr>
<tr>
<td>Egal individ</td>
<td>Hierarch commun</td>
</tr>
</tbody>
</table>
“They Saw a Protest”: Who saw what & when?

- Protestors blocked:
  - Pct. Agree
  - Egal individ
  - Hierarch commun
  - Hierarch individ

- Screamed in face:
  - Hierarch commun
  - Hierarch individ
  - Egal individ
  - Egal commun

- Pedestrians just not want to listen:
  - Hierarch commun
  - Hierarch individ
  - Egal individ
  - Egal commun

- Police just annoyed:
  - Hierarch commun
  - Hierarch individ
  - Egal individ
  - Egal commun
Cultural cognition of the risks and benefits of nanotechnology

Dan M. Kahani, Donald Braman, Paul Slovic, John Gastil and Geoffrey Cohen

How is public opinion towards nanotechnology likely to evolve? The ‘familiarity hypothesis’ holds that support for nanotechnology will likely grow as awareness of it expands. The basis of this conjecture is opinion polling, which finds that few members of the public claim to know much about nanotechnology, but that those who say they do are substantially more likely to believe its benefits outweigh its risks. Some researchers, however, have avoided endorsing the familiarity hypothesis, stressing that cognitive heuristics and biases could create anxiety as the public learns more about this novel science. We conducted an experimental study aimed at determining how members of the public would react to balanced information about nanotechnology risks and benefits. Finding no support for the familiarity hypothesis, the study instead yielded strong evidence that public attitudes are likely to be shaped by psychological dynamics associated with cultural cognition.

Cultural cognition refers to the tendency of people to base their factual beliefs about the risks and benefits of a potentially dangerous activity on their cultural appraisals of those activities. From a psychological point of view it is easier to believe that behaviour one finds noble is socially beneficial, and that behaviour one finds debased is dangerous, than vice versa. Those who are ‘individualistic’ and ‘hierarchical’ in their cultural worldviews tend to dismiss claims of environmental risk, for example, because acknowledging such hazards would threaten the autonomy of markets and the authority of social elites. Persons who hold ‘egalitarian’ and ‘communism’ worldviews, on the other hand, take environmental risks seriously because they believe unregulated markets are a source of inequality and, therefore, harmful to society. Consistent with this dynamic, researchers have found evidence that people of exposing cultural outlooks polarize on various environmental and technological risks—from nuclear power and global warming to genetically modified foods and ‘mad cow’ disease.

The ‘cultural cognition’ hypothesis holds that these same patterns are likely to emerge as members of the public come to learn more about nanotechnology. That is, rather than adopt uniformly positive attitudes, as the familiarity hypothesis suggests, members of the public who hold relatively egalitarian and communistic worldviews will perceive its risks to be greater and its benefits smaller than those who hold relatively hierarchical and individualistic worldviews.

We designed a public opinion study to test the familiarity and cultural cognition hypothesis. The study reflected an experimental design aimed at detecting causal links, if any, between information exposure and attitude formation. We divided a diverse, national online sample of 1,462 Americans into two groups. Those in the ‘no-information condition’ were told nothing about nanotechnology other than it is a scientific process for producing and manipulating very small particles. Those in the ‘information-exposed condition’, in contrast, were furnished with two paragraphs of equal length and comparable information content, one identifying possible benefits of nanotechnology, the other possible risks. We then compared the two groups’ perceptions of nanotechnology risks and benefits to see what effect information exposure had.

Like most members of the American public, our study subjects reported being relatively unfamiliar with nanotechnology. The vast majority—over 80%—reported having heard either ‘just a little’ (28%) or ‘not much at all’ (44%) about it. Only 7% reported having heard ‘a lot’ about nanotechnology before the study, and 14% reported having heard ‘a lot’ of information about nanotechnology risks and benefits. Among subjects in the no-information condition, familiarity with nanotechnology was positively correlated with the perception that nanotechnology’s benefits outweigh its risks (r = .38, p < .0001), a finding also consistent with previous public opinion studies. Information exposure had no discernible effect on subject’s perceptions of nanotechnology risks and benefits. The mean assessment on a four-point risk–benefit measure (NANOBIBS) for subjects in the information-exposed condition (M = 2.37, s.d. = 1.03) was virtually identical to the mean assessment for subjects in the no-information condition (M = 2.34, s.d. = .99). To assess whether the impact of information exposure varied based on either familiarity with nanotechnology or cultural worldviews, we performed a multivariate regression analysis. The dependent variable for the analysis was whether subjects perceived the benefits of nanotechnology to be greater than its risks or vice versa. Independent variables included cultural worldviews, the interaction of those worldviews, the degree of self-reported knowledge, and appropriate interactions of these variables with the experimental condition to which subjects were assigned. This analysis (see Supplementary Information, Fig. S1) can be used to determine how information exposure influences individuals either conditionally on their cultural worldviews holding their level of familiarity constant, or conditionally on their level of familiarity holding their cultural worldviews constant. The results are illustrated in Fig. 1. Holding cultural worldviews constant (at the sample mean), information exposure does not have a significant effect on the likelihood that either a subject who is relatively familiar with nanotechnology or one who is relatively unfamiliar will perceive the benefits of nanotechnology to be greater than its risks (Fig. 1a).

In contrast, information exposure has a relatively large and statistically significant impact on subjects defined with reference to their cultural worldviews (Fig. 1b). In the no-information condition, information exposure
Nanotechnology Risk Perception: Study Design

Sample

1,850 adults drawn from nationally representative on-line panel

Measures

- Worldviews
- Self-reported familiarity with nanotechnology
- Nanotechnology risks v. benefits
- Other risk perceptions

Experimental Manipulation

No information vs. balanced information (between-subject design)

Kahan , Braman, Slovic, Gastil & Cohen Cultural Cognition of Nanotechnology
Nanotechnology Risk Perception: Study Design

Sample

1,850 adults drawn from nationally representative on-line panel

Measures

- Worldviews
- Self-reported familiarity with nanotechnology
- Nanotechnology risks v. benefits
- Other risk perceptions

Experimental Manipulation

No information vs. balanced information (between-subject design)

Nanotechnology Risk Perception: Study Design

**Sample**

1,850 adults drawn from nationally representative on-line panel

**Measures**

- **Worldviews**
- Self-reported familiarity with nanotechnology
- Nanotechnology risks v. benefits
- Other risk perceptions

**Experimental Manipulation**

No information vs. balanced information (between-subject design)

Cultural Cognition Worldviews

Hierarchy

Individualism

Gays military/gay parenting
marijuana legalization
cats/common varmints

Communitarianism

Environment: climate, nuclear
Guns/Gun Control
HPV Vaccination

Egalitarianism

Risk Perception Key
Low Risk
High Risk
Cultural Cognition Worldviews

Hierarchy

Environment: climate, nuclear

Individualism

Communitarianism

Egalitarianism

Risk Perception Key
Low Risk
High Risk

Environment: climate, nuclear
Nanotechnology Risk Perception: Study Design

**Sample**

1,850 adults drawn from nationally representative on-line panel

**Measures**

- Worldviews
- Self-reported familiarity with nanotechnology
- Nanotechnology risks vs. benefits
- Other risk perceptions

**Experimental Manipulation**

No information vs. balanced information (between-subject design)
Nanotechnology Risk Perception: Study Design

**Sample**

1,850 adults drawn from nationally representative on-line panel

**Measures**

- Worldviews
- Self-reported familiarity with nanotechnology
- Nanotechnology risks v. benefits
- Other risk perceptions

**Experimental Manipulation**

No information vs. balanced information (between-subject design)
Nanotechnology Risk Perception: Study Design

Sample

1,850 adults drawn from nationally representative on-line panel

Measures

- Worldviews
- Self-reported familiarity with nanotechnology
- Nanotechnology risks v. benefits
- Other risk perceptions

Experimental Manipulation

No information vs. balanced information (between-subject design)
* Change across conditions with realistic stimuli significant at $p < 0.05$

* Change across conditions with realistic stimuli significant at $p < 0.05$

Nanotechnology Risk Perception: Study Design

Sample

1,850 adults drawn from nationally representative on-line panel

Measures

- Worldviews
- Self-reported familiarity with nanotechnology
- Nanotechnology risks v. benefits
- Other risk perceptions

Experimental Manipulation

No information vs. balanced information (between-subject design)
Nanotechnology Risk Perception: Study Design

Sample

1,850 adults drawn from nationally representative on-line panel

Measures

- Worldviews
- **Self-reported familiarity with nanotechnology**
- Nanotechnology risks v. benefits
- Other risk perceptions

Experimental Manipulation

No information vs. balanced information (between-subject design)
* Change across conditions significant at $p < 0.05$

Information effect: familiarity

- Familiar with Nano: 85%
- Unfamiliar with Nano: 61%

Information effect: culture

- Hierarchical Individualist: 86%
- Egalitarian Communitarian: 23%

* Change across conditions significant at p < 0.05

Information effect: familiarity

- **Familiar with Nano**
  - No Information: 85%
  - Information-Exposed: 77%
- **Unfamiliar with Nano**
  - No Information: 61%
  - Information-Exposed: 63%

Information effect: culture

- **Hierarchical Individualist**
  - No Information: 61%
  - Information-Exposed: 86%
- **Egalitarian Communitarian**
  - No Information: 23%
  - Information-Exposed: 23%

* Change across conditions significant at $p < 0.05$

Nanotechnology Risk Perception: Study Design

Sample

1,850 adults drawn from nationally representative on-line panel

Measures

- Worldviews
- Self-reported familiarity with nanotechnology
- Nanotechnology risks v. benefits
- Other risk perceptions

Experimental Manipulation

No information vs. balanced information (between-subject design)
Nanotechnology Risk Perception: Study Design

Sample

1,850 adults drawn from nationally representative on-line panel

Measures

- Worldviews
- Self-reported familiarity with nanotechnology
- Nanotechnology risks v. benefits
- Other risk perceptions

Experimental Manipulation

No information vs. balanced information (between-subject design)
High Risk

Moderate Risk

Slight Risk

Almost No Risk

Internet    Mad Cow Disease    Nuclear Power    Genetically Modified Foods    Private Gun Ownership

Familiar with Nanotechnology
Unfamiliar with Nanotechnology

1.00
2.00
3.00
4.00

\[ n = 1,820 \text{ to } 1,830. \] Risk variables are 4-pt measures of “risk to people in American Society” posed by indicated risk. Differences between group means all significant at \( p \leq .01. \)
* Change across conditions significant at $p < 0.05$
Increase in Predicted Likelihood of Self-Reported Familiarity with Nanotechnology

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

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 manufacture 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).
HPV-Vaccine Risk Perception: Study Design

Sample

1,500 adults drawn from nationally representative on-line panel

Cultural Worldviews

- Hierarchy-egalitarianism
- Individualism-communitarianism

HPV-Vaccine Risk Perceptions

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

Conditions

1. No-argument \((n = 250)\)
2. Balanced Arguments \((n = 250)\)
3. Arguments plus experts \((n = 1,022)\)
HPV-Vaccine Risk Perception: Study Design

Sample

1,500 adults drawn from nationally representative on-line panel

Cultural Worldviews

- Hierarchy-egalitarianism
- Individualism-communitarianism

HPV-Vaccine Risk Perceptions

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

Conditions

1. No-argument ($n = 250$)
2. Balanced Arguments ($n = 250$)
3. Arguments plus experts ($n = 1,022$)
HPV-Vaccine Risk Perception: Study Design

**Sample**

1,500 adults drawn from nationally representative on-line panel

**Cultural Worldviews**

- Hierarchy-egalitarianism
- Individualism-communitarianism

**HPV-Vaccine Risk Perceptions**

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

**Conditions**

1. No-argument \((n = 250)\)
2. Balanced Arguments \((n = 250)\)
3. Arguments plus experts \((n = 1,022)\)
HPV-Vaccine Risk Perception: Study Design

Sample

1,500 adults drawn from nationally representative on-line panel

Cultural Worldviews

- Hierarchy-egalitarianism
- Individualism-communitarianism

HPV-Vaccine Risk Perceptions

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

Conditions

1. No-argument \((n = 250)\)
2. Balanced Arguments \((n = 250)\)
3. Arguments plus experts \((n = 1,022)\)
HPV-Vaccine Risk Perception: Study Design

**Sample**

1,500 adults drawn from nationally representative on-line panel

**Cultural Worldviews**

- Hierarchy-egalitarianism
- Individualism-communitarianism

**HPV-Vaccine Risk Perceptions**

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

**Conditions**

1. No-argument \((n = 250)\)
2. Balanced Arguments \((n = 250)\)
3. Arguments plus experts \((n = 1,022)\)
**HPV-Vaccine Risk Perception: Study Design**

**Sample**

1,500 adults drawn from nationally representative on-line panel

**Cultural Worldviews**

- Hierarchy-egalitarianism
- Individualism-communitarianism

**HPV-Vaccine Risk Perceptions**

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

**Conditions**

1. **No-argument** (n = 250)
2. Balanced Arguments (n = 250)
3. Arguments plus experts (n = 1,022)
HPV-Vaccine Risk Perception: Study Design

Sample

1,500 adults drawn from nationally representative on-line panel

Cultural Worldviews

- Hierarchy-egalitarianism
- Individualism-communitarianism

HPV-Vaccine Risk Perceptions

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

Conditions

1. No-argument \( (n = 250) \)
2. **Balanced Arguments** \( (n = 250) \)
3. Arguments plus experts \( (n = 1,022) \)
“The HPV vaccine is safe for use among young girls...”
“The HPV vaccine is safe for use among young girls...”
HPV-Vaccine Risk Perception: Study Design

**Sample**

1,500 adults drawn from nationally representative on-line panel

**Cultural Worldviews**

- Hierarchy-egalitarianism
- Individualism-communitarianism

**HPV-Vaccine Risk Perceptions**

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

**Conditions**

1. No-argument \((n = 250)\)
2. Balanced Arguments \((n = 250)\)
3. Arguments plus experts \((n = 1,022)\)
HPV-Vaccine Risk Perception: Study Design

Sample

1,500 adults drawn from nationally representative on-line panel

Cultural Worldviews

- Hierarchy-egalitarianism
- Individualism-communitarianism

HPV-Vaccine Risk Perceptions

- 5 individual risk/benefit items
- Risk overall, benefit overall
- Combined into reliable 4-pt “risk scale”

Conditions

1. No-argument \( (n = 250) \)
2. Balanced Arguments \( (n = 250) \)
3. Arguments plus experts \( (n = 1,022) \)
Culturally identifiable “public health experts”

Hierarchy

Individualism

Communitarianism

Egalitarianism
“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...”

Pct. Agree

<table>
<thead>
<tr>
<th>Argument/Advocate Alignment</th>
<th>No Argument</th>
<th>Balanced Argument</th>
<th>Expected Argument/Advocate Alignment</th>
<th>Unexpected Argument/Advocate Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pct. Agree</td>
<td>66%</td>
<td>70%</td>
<td>71%</td>
<td>61%</td>
</tr>
<tr>
<td>Pct. Agree</td>
<td>61%</td>
<td>56%</td>
<td>47%</td>
<td>58%</td>
</tr>
</tbody>
</table>
Culturally identifiable “public health experts”

Hierarchy

Individualism  Communitarianism

Egalitarianism
“The HPV vaccine is safe for use among young girls...”
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1. Avoid “hyping” (or contributing to same in media)

2. Study triggering conditions with realistic stimuli

3. Investigate locally, with field-study methods

4. Prefer administrative to popular political risk—management authorities
Are we there yet? . . .

1. Culture conflict: *affects* science *but is not about* science

2.

3.

*Making it the rest of the way*

1.

2.

3.

4.
“They Saw a Protest”: Who saw what & when?

**Protestors blocked**
- Egal individ
- Hierarch commun
- Hierarch individ

**Screamed in face**
- Egal individ
- Hierarch commun
- Hierarch individ

**Pedestrians just not want to listen**
- Egal individ
- Hierarch commun
- Hierarch individ

**Police just annoyed**
- Egal individ
- Hierarch commun
- Hierarch individ
* * Change across conditions with realistic stimuli significant at $p < 0.05$

“The HPV vaccine is safe for use among young girls...”
“They Saw a Protest”: Who saw what & when?

Protestors blocked

Screamed in face

Pedestrians just not want to listen

Police just annoyed

Egal individ

Hierarch individ

Egal commun

Hierarch commun

Pct. Agree

0%

25%

50%

75%

100%

abortion clinic recruitment center abortion clinic recruitment center abortion clinic recruitment center abortion clinic recruitment center
Culturally identifiable “public health experts”
“The HPV vaccine is safe for use among young girls...”
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2.

3.

Making it the rest of the way

1.

2.

3.

4.
Are we there yet? . . .

1. Culture conflict: *affects* science *but is not about* science

2. Beware survey artifact

3. 

Making it the rest of the way

1. 

2. 

3. 

4. 

5.
Cultural cognition of the risks and benefits of nanotechnology

Dan M. Kahan*, Donald Braman‡, Paul Slovic*, John Gastil§ and Geoffrey Cohen

How is public opinion towards nanotechnology likely to evolve? The familiarization hypothesis holds that support for nanotechnology will likely grow as awareness of it expands. The basis of this conjecture is opinion polling, which finds that few members of the public claim to know much about nanotechnology, but that those who say they do are substantially more likely to believe its benefits outweigh its risks1,2,3. Some researchers, however, have avoided endorsing the familiarization hypothesis, stressing that cognitive heuristics and biases could create anxiety as the public learns more about this novel science4,5,6. We conducted an experimental study aimed at determining how members of the public would react to balanced information about nanotechnology risks and benefits. Finding no support for the familiarization hypothesis, the study instead yielded strong evidence that public attitudes are likely to be shaped by psychological dynamics associated with cultural cognition.

Cultural cognition refers to the tendency of people to base their factual beliefs about the risks and benefits of a putatively dangerous activity on their cultural appraisals of those activities7,8. From a psychological point of view it is easier to believe that behaviour one finds noble is socially beneficial, and that behaviour one finds debased is dangerous, than vice versa9,10. Those who are 'individualistic' and 'interindividualistic' in their cultural worldviews tend to dismiss claims of environmental risk, for example, because acknowledging such hazards would threaten the autonomy of persons and the authority of social elites. Persons who hold 'collectivist' and 'intercollectivist' worldviews, on the other hand, take environmental risks seriously because they believe unregulated markets are a source of innovation and, therefore, harmful to society11,12. Consistent with this dynamic, researchers have found evidence that people of opposing cultural outlooks place different weights on various environmental and technological risks—from nuclear power and global warming to genetically modified foods and 'mad cow disease'.

The 'cultural cognizers' hypothesis holds that these same patterns are likely to emerge as members of the public come to learn more about nanotechnology. That is, rather than adapt uniformly positive attitudes, as the familiarization hypothesis suggests, members of the public who hold relatively egalitarian and communicative worldviews will perceive its risks to be greater and its benefits smaller than will those who hold relatively hierarchal and individualistic worldviews.

We adapted a public opinion study to test the familiarization and cultural cognition hypotheses. The study relied on an experimental design aimed at detecting causal links, if any, between information exposure and attitude formation. We divided a diverse, national online sample of 1,862 Americans into two groups. Those in the 'no-information condition' were told nothing about nanotechnology other than it is a scientific process for producing and manipulating very small particles. Those in the 'information-exposed condition,' in contrast, were furnished with two paragraphs of equal length and comparable information content, one identifying possible benefits of nanotechnology, the other possible risks. We then compared the two groups' perceptions of nanotechnology risks and benefits to see what effect information exposure had.

Like most members of the American public13, our study subjects reported being relatively unfamiliar with nanotechnology. The vast majority—over 80%—reported having heard either 'just a little' (28%) or 'nothing at all' (54%) about it. Only 4% reported having heard 'a lot' about nanotechnology before the study, and 14% reported having heard 'some', an amount in between 'just a little' and 'a lot'. Among subjects in the no-information condition, familiarity with nanotechnology was positively correlated with the perception that nanotechnology's benefits outweigh its risks (r = 0.38, p < 0.001), a finding also consistent with previous public opinion studies14.

Information exposure had no discernable main effect on subjects' perceptions of nanotechnology risks and benefits. The mean assessment on a four-point risk–benefit measure (NANOBMS) for subjects in the information-exposed condition (M = 2.37, s.d. = 1.03) was virtually identical to the mean assessment for subjects in the no-information condition (M = 2.34, s.d. = 0.99).

To assess whether the impact of information exposure varied based on either familiarity with nanotechnology or cultural worldviews, we performed a multivariate regression analysis. The dependent variable for the analysis was whether subjects perceived the benefits of nanotechnology to be greater than its risks or vice versa. Independent variables included cultural worldview measures, the interaction of these worldviews with the degree of self-reported knowledge, and appropriate interactions of these variables with the experimental condition to which subjects were assigned. This analysis (see Supplementary Information, Fig. S1) can be used to determine how information exposure influences individuals either conditional on their cultural worldviews holding their level of familiarity constant, or conditional on their level of familiarity holding their cultural worldviews constant.

The results are illustrated in Fig. 1. Holding cultural worldviews constant (at the sample mean), information exposure does not have a significant effect on the likelihood that either a subject who is relatively unfamiliar with nanotechnology or one who is relatively familiar with it will perceive the benefits of nanotechnology to be greater than its risks (Fig. 1a).

In contrast, information exposure has a relatively large and statistically significant impact on subjects defined with reference to their cultural worldviews (Fig. 1b). In the no-information condition,
Nanotechnology “Consumer Product Inventory”

Cultural cognition of the risks and benefits of nanotechnology

Dan M. Kahan\textsuperscript{a}, Donald Braman\textsuperscript{b}, Paul Slovic\textsuperscript{b}, John Gastil\textsuperscript{c} and Geoffrey Cohen\textsuperscript{d}

How is public opinion towards nanotechnology likely to evolve? The ‘familiarity hypothesis’ holds that support for nanotechnology will likely grow as awareness of it expands. The basis of this conjecture is opinion polling, which finds that few members of the public claim to know much about nanotechnology, but that those who say they do are substantially more likely to believe its benefits outweigh its risks\textsuperscript{1,2}. Some researchers, however, have avoided endorsing the ‘familiarity hypothesis’, stressing that cognitive heuristics and biases could create anxiety as the public learns more about this novel science\textsuperscript{3,4}. We conducted an experimental study aimed at determining how members of the public would react to balanced information about nanotechnology risks and benefits. Finding no support for the familiarity hypothesis, the study instead yielded strong evidence that public attitudes are likely to be shaped by psychological dynamics associated with cultural cognition.

Cultural cognition refers to the tendency of people to base their factual beliefs about the risks and benefits of a putatively dangerous activity on their cultural appraisals of those activities\textsuperscript{5,6,7}. From a psychological point of view it is easier to believe that behaviour one finds noble is socially beneficial, and that behaviour one finds debased is dangerous, than vice versa\textsuperscript{8,9}. Those who are ‘individualistic’ and ‘hierarchical’ in their cultural worldviews tend to dismiss claims of environmental risk, for example, because acknowledging such hazards would threaten the autonomy of results and the authority of social elites. Persons who hold ‘societal’ and ‘community’ worldviews, on the other hand, take environmental risks seriously because they believe unregulated markets are a source of inequity and harm, to society\textsuperscript{10,11}. Consistent with this dynamic, researchers have found evidence that people of opposing cultural outlooks place different weights on various environmental and technological risks—from nuclear power\textsuperscript{12} and global warming\textsuperscript{13} to genetically modified foods and ‘mad cow disease’\textsuperscript{14}.

The ‘cultural cognition’ hypothesis holds that these same patterns are likely to emerge as members of the public come to learn more about nanotechnology. That is, rather than adopt uniformly positive attitudes, as the familiarity hypothesis suggests, members of the public who hold relatively egalitarian and communitarian worldviews will perceive its risks to be greater and its benefits smaller than will those who hold relatively hierarchical and individualistic worldviews.

We adapted a public opinion survey to test the familiarity and cultural cognition hypotheses. The study reflected an experimental design aimed at detecting causal links, if any, between information exposure and attitude formation. We divided a diverse, national online sample of 1,862 Americans into two groups. Those in the ‘no-information condition’ were told nothing about nanotechnology other than that it is a scientific process for producing and manipulating very small particles. Those in the ‘information-exposed condition’, in contrast, were furnished with two paragraphs of equal length and comparable information content, one identifying possible benefits of nanotechnology, the other possible risks. We then compared the two groups’ perceptions of nanotechnology risks and benefits to see what effect information exposure had.

Like most members of the American public\textsuperscript{15,16}, our study subjects reported being relatively unfamiliar with nanotechnology. The vast majority—over 80%—reported having heard either ‘just a little’ (28%) or ‘nothing at all’ (54%) about it. Only 4% reported having heard a lot about nanotechnology before the study, and 14% reported having heard ‘some’, an amount in between ‘just a little’ and ‘a lot’. Among subjects in the no-information condition, familiarity with nanotechnology was positively correlated with the perception that nanotechnology’s benefits outweigh its risks (\textit{r} = 0.36, \textit{P} < 0.001), a finding also consistent with previous public opinion studies\textsuperscript{6}.

Information exposure had no discernable main effect on subjects’ perceptions of nanotechnology risks and benefits. The mean assessment on a four-point risk–benefit measure (NANOBIS) for subjects in the information-exposed condition (\textit{M} = 2.37, \textit{s.d.} = 1.03) was virtually identical to the mean assessment for subjects in the no-information condition (\textit{M} = 2.34, \textit{s.d.} = 0.99).

To assess whether the impact of information exposure varied based on either familiarity with nanotechnology or cultural worldviews, we performed a multivariate regression analysis. The dependent variable for the analysis was whether subjects perceived the benefits of nanotechnology to be greater than its risks or vice versa. Independent variables included cultural worldview measures, the interaction of these worldviews, the depth of self-reported knowledge, and appropriate interactions of these variables with the experimental condition to which subjects were assigned. This analysis (see Supplementary Information, Fig. S1) can be used to determine how information exposure influences individuals either conditional on their cultural worldviews holding their level of familiarity constant, or conditional on their level of familiarity holding their cultural worldviews constant.

The results are illustrated in Fig. 1. Holding cultural worldviews constant (at the sample mean), information exposure does not have a significant effect on the likelihood that either a subject who is relatively unfamiliar with nanotechnology or one who is relatively familiar with it will perceive the benefits of nanotechnology to be greater than its risks (Fig. 1a).

In contrast, information exposure has a relatively large and statistically significant impact on subjects defined with respect to their cultural worldviews (Fig. 1b). In the no-information condition,
External validity: The “survey artifact” effect:
The New Food Fights: U.S. Public Divides Over Food Science

Differing views on benefits and risks of organic foods, GMOs as Americans report higher priority for healthy eating

BY CARY FUNK AND BRIAN KENNEDY
PUBLIC PERCEPTIONS OF GENETICALLY MODIFIED FOODS: A National Study of American Knowledge and Opinion

William K. Hallman, PhD
W. Carl Hebben, BS
Helen L. Aquino, MS
Cara L. Cuite, PhD
and
John T. Lang, MA

Americans pay little attention to agricultural biotechnology.

- Only half of Americans are aware that foods containing genetically modified (GM) ingredients are currently sold in stores.
- Despite the prevalence of such foods, only one-quarter of Americans believe they have eaten them.
- Little more than a third of Americans have ever discussed biotechnology.

Opinions of GM food are easily influenced:

- Approval increases when specific benefits of GM food are mentioned.
- Reactions to the technology depends on what it is called. The term biotechnology evokes the most positive responses, while genetic modification is perceived most negatively and genetic engineering is most often associated with cloning.
External validity: The “survey artifact” effect:

What consumers don’t know about genetically modified food, and how that affects beliefs

Brandon R. McFadden1,3 and Jayson L. Lusk1
1Department of Food and Resource Economics, University of Florida, Gainesville, Florida, USA; and 3Department of Agricultural Economics, Oklahoma State University, Stillwater, Oklahoma, USA

ABSTRACT: In the debates surrounding biotechnology and genetically modified (GM) food, data from consumer polls are often presented as evidence for precaution and labeling. But how much do consumers actually know about the issue? New data collected from a nationwide U.S. survey reveal low levels of knowledge and numerous misperceptions about GM food. Nearly equal numbers of consumers prefer mandatory labeling of foods containing DNA as do those preferring mandatory labeling of GM foods. When given the option, the majority of consumers prefer that decisions about GM food be taken out of their hands and be made by experts. After answering a list of questions testing objective knowledge of GM food, subjective, self-reported knowledge declines somewhat and beliefs about GM food safety increase slightly. Results suggest that consumers think they know more than they actually do about GM food, and queries about GM facts cause respondents to reassess how much they know. The findings question the usefulness of results from opinion polls as a motivation for creating public policy surrounding GM food.—McFadden, B. R., Lusk, J. L. What consumers don’t know about genetically modified food, and how that affects beliefs. FASEB J. 30, 000–000 (2016). www.fasebj.org

KEY WORDS: GM food · labeling · public acceptance · public knowledge

Debate about biotechnology in plant research and about genetically modified (GM) food in the United States has intensified in recent years, with mandatory labeling ballot initiatives appearing in California, Colorado, Connecticut, Maine, Oregon, and Washington. The Vermont legislature passed the first U.S. mandatory labeling law for GM food (1), an action that has prompted competing legislation in the U.S. Congress (2). At the heart of the debate is stated public opposition to GM food, and public opinion may be a proximate cause of policy (3). Indeed, public opinion polls are often used to characterize consumer sentiment and motivate more precautionary policies for GM food. Apparent consumer concern could lead to a climate that impedes particular research methods and lowers the potential return to investments in biotechnology applications.

The seemingly high level of public opposition is puzzling given the views of most scientists on the issue. It could be argued that gaps between science and the public have always existed (4) and are increasing (5). However, the gap is extraordinarily large regarding the safety of GM foods. Only 37% of U.S. consumers believe that GM food is safe to eat (4), compared to 89% of scientist members of the American Association for the Advancement of Science believe GM food is safe to eat (6). The gap between public and scientific assessment of GM food safety was the largest among all issues studied, including vaccines, climate change, and fracking, by a recent Pew Research Center study (6). The divide may indicate a need for better science communication. However, previous research on the topic has shown that simply providing statements from the scientific community does not substantively change beliefs about the safety of GM food, and in fact results in a backlash among a segment of the population (7, 8).

There are several psychologic and behavioral-economic factors that may cause the public to form beliefs inconsistent with those of scientists. The world is full of uncertainty, and consumers form beliefs subject to constrained time, information, and computational capabilities. These constraints often require consumers to use heuristics, or rules of thumb, which can lead to biases when decisions concern uncertain risks, benefits, and consequences (9). Biases are perhaps more pronounced when consumers have little knowledge about an issue that is contemporaneously covered by the media, as has been the case with GM food (10, 11). In addition to media, other social influences likely shape beliefs. For example, consumers are more likely to form a belief about an issue that is reflective of others who share similar values, as suggested by cultural cognition theory (12). Moreover, consistent
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2. Beware survey artifact

Making it the rest of the way

1.

2.

3.

4.
Are we there yet? . . .

1. Culture conflict: *affects* science *but is not about* science

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1.

2.

3.

4.
HPV vaccine...

CDC Recommends Girls Be Vaccinated For HPV

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

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

Pct. Agree

40% 50% 60% 70% 80%

No Argument Balanced Argument Expected Argument/Advocate Alignment Unexpected Argument/Advocate Alignment

61% 56% 47% 66% 70% 71%
**HPV vaccine . . .**

*CDC Recommends Girls Be Vaccinated For HPV*

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**

**Health**

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

_E. 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

<table>
<thead>
<tr>
<th>State</th>
<th>Hep B childhood vaccination mandate?</th>
<th>Hep B daycare mandate, year in effect</th>
<th>Hep B elementary school mandate, year in effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ma</td>
<td>yes</td>
<td>2001</td>
<td>2001</td>
</tr>
<tr>
<td>wa</td>
<td>yes</td>
<td>1997</td>
<td>1997</td>
</tr>
<tr>
<td>ny</td>
<td>yes</td>
<td>2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

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

![Graph showing HBV vaccination rate from 2004 to 2008](image)

*Note: The graph shows the HBV vaccination rate from 2004 to 2008, indicating a steady increase.*
A Tale of Two Vaccines—And Their Science Communication Environments

Dan Kahan and Ashely Landrum

Abstract
This chapter examines the difference in the US public’s reactions to proposals for universal administration of two adolescent immunizations: the human papillomavirus (HPV) vaccine, which provoked a firestorm of political controversy, and the Hepatitis B (HBV) vaccine, which aroused no such opposition. This chapter argues that the reason for this was that the public became familiar with the latter (but not the former) in a polluted science communication environment. It identifies decisions made by the vaccine’s manufacturer that drove the HPV vaccine off the nonprioritized administrative approval path followed by the HBV vaccine and every other mandated childhood vaccine and onto a highly prioritized, highly partisan legislative one that predictably provoked identity-protective cognition. The chapter argues that such controversy will likely recur unless protection of the science communication environment is itself made a self-conscious object of the institutions, governmental and nongovernmental, that play a role in the dissemination of decision-relevant science.

Key Words: human papillomavirus, HPV vaccine, Hepatitis B, HBV vaccine, science communication environment, protective cognition

This chapter tries to sharpen the focus of two of this book’s general themes by using them to make sense of a particular science communication failure. The first is the contribution that science communication environments that are “polluted” increase the likelihood of controversy over decision-relevant science. Specifically, when the social processes that normally align diverse citizens with what is known from science are disrupted by antagonistic social meanings or other potentially contaminating influences, persistent, group-based conflict over risk and related facts arises. For that reason, an earlier chapter (Chapter 3) referred to their creation as a form of “pollution” in the science communication environment. The second theme is the value of comparing cases in which science communication fails with examples when it succeeds (or at least no obvious failure exists) in order to make sense of such disruptions. Understanding what typically enables diverse citizens to converge on the best available evidence helps us understand—and ultimately manage—the conditions that account for the atypical situations in which citizens are not using the knowledge prof- fered by science (see Chapter 3). The particular science communication problem that is the focus of our exploration of these themes is the continuing state of controversy over the adolescent human papillomavirus (HPV) vaccine in the United States.

HPV is the most common sexually transmitted infection, currently infecting an estimated 79 million Americans, according to the Centers for Disease Control and Prevention (CDC; www.cdc.gov). It is also the principal cause of cervical cancer, which takes the lives of 3,000 women a year in the United States. In 2006, the Food and Drug Administration (FDA) completed fast-track approval of Gardasil, a vaccine that confers near-perfect immunity to most strains of HPV. It was the potential lethality of infection by HPV that accounted for the FDA’s expedited review, which, as a result, was confined to
Culturally identifiable “public health experts”

Hierarchy

Egalitarianism

Communitarianism

Individualism

Culturally identifiable “public health experts”

State Information
Hepatitis B Prevention Mandates for Daycare and K-12

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

<table>
<thead>
<tr>
<th>State</th>
<th>Hep B childhood vaccination mandate?</th>
<th>Hep B daycare mandate, year in effect</th>
<th>Hep B elementary school mandate, year in effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaska</td>
<td>yes</td>
<td>2001</td>
<td>2001</td>
</tr>
<tr>
<td>Arizona</td>
<td>yes</td>
<td>1997</td>
<td>1997</td>
</tr>
<tr>
<td>Arkansas</td>
<td>yes</td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td>California</td>
<td>yes</td>
<td>1997</td>
<td>1997</td>
</tr>
</tbody>
</table>

Dtap
MMR ≥1 doses
Poliovirus
HBV ≥3 doses
none

Ellen Goodman / Syndicated columnist

They value your virginity

There was a time when only the loony left believed that it was enshrined in...

BOSTON — There was a time when only the loony left believed that it was enshrined in...

Not any more.

Legititarianism

Egalitarianism

Communitarianism

Individualism

Let’s Use Teenage Girls As An Anti-Deviance Monopoly


HPV — The most important question in their lives is: ‘HPV is not only sexual.

It’s personal.’

They are using political correctness for their own personal gain.

This willful ignorance of facts in order to create a divide between Republican and Democratic constituencies is monstrous.

RS REDSTATE

Jump To > Mobile / Confirm Them / Right Sheeny

Conservative Book Club / Human Events

Let’s Use Teenage Girls As An Anti-Deviance Monopoly

They value your virginity

There was a time when only the loony left believed that it was enshrined in...

BOSTON — There was a time when only the loony left believed that it was enshrined in...

Not any more.

Legititarianism

Egalitarianism

Communitarianism

Individualism

Let’s Use Teenage Girls As An Anti-Deviance Monopoly

They value your virginity

There was a time when only the loony left believed that it was enshrined in...

BOSTON — There was a time when only the loony left believed that it was enshrined in...

Not any more.

Legititarianism

Egalitarianism

Communitarianism

Individualism

Let’s Use Teenage Girls As An Anti-Deviance Monopoly

They value your virginity

There was a time when only the loony left believed that it was enshrined in...

BOSTON — There was a time when only the loony left believed that it was enshrined in...

Not any more.
“The HPV vaccine is safe for use among young girls...”
Culturally antagonistic memes and the Zika virus: an experimental test

Dan M. Kahan, Kathleen Hall Jamieson, Ashley Landrum and Kenneth Winneg

*Yale Law School, Yale University, New Haven, CT, USA; ‡The Annenberg School for Communication, University of Pennsylvania, Philadelphia, PA, USA; §Annenberg Public Policy Center, University of Pennsylvania, Philadelphia, PA, USA

(Received 19 July 2016; final version received 4 October 2016)

This paper examines a remedy for a defect in existing accounts of public risk perceptions. The accounts in question feature two dynamics: the affect heuristic, which emphasizes the impact of visceral feelings on information processing; and the cultural cognition thesis, which describes the tendency of individuals to form beliefs that reflect and reinforce their group commitments. The defect is the failure of these two dynamics, when combined, to explain the peculiar selectivity of public risk controversies: despite their intensity and disputativeness, such controversies occur less frequently than the affect heuristic and the cultural cognition thesis seem to predict. To account for this aspect of public risk perceptions, the paper describes a model that adds the phenomenon of culturally antagonistic memes—argumentative tropes that fuse positions on risk with contested visions of the best life. Arising adventitiously, antagonistic memes transform affect and cultural cognition from consensus-generating, truth-convergent influences on information processing into conflictual, identity-protective ones. The paper supports this model with experimental results involving perceptions of the risk of the Zika virus: a general sample of US subjects, whose cultural orientations were measured with the Cultural Cognition Worldview Scales, formed polarized affective reactions when exposed to information that was pervaded with antagonistic memes linking Zika to global warming; when exposed to comparable information linking Zika to unlawful immigration, the opposing affective stances of the subjects flipped in direction. Normative and prescriptive implications of these results are discussed.

Keywords: risk perception; affect heuristic; cultural cognition; Zika virus

1. The strange world of public risk controversy

The landscape of public risk perceptions is dominated by two opposing features: pockets of cultural polarization on a very small number of putative hazards; and the absence of conflict over a vast expanse of the same. Variance in cultural conflict across and within societies highlights the dissonance of the juxtaposition. For example, at the very time the US general public was rebelling against universal administration of a vaccine to protect adolescent school girls from the human papilloma
Are we there yet? . . .

1. Culture conflict: *affects* science *but is not about science*

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1.

2.

3.

4.
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1. Avoid “hyping” (or contributing to same in media)

2.

3.

4.
Hyping GM foods

Why we’re so scared of GMOs, according to someone who has studied them since the start.

By Roberto A. Ferdman  July 6, 2015

Why People Oppose GMOs Even Though Science Says They Are Safe

Intuition can encourage opinions that are contrary to the facts.

By Stefaan Blancke on August 18, 2015  Véase en español
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1. Avoid “hyping” (or contributing to same in media)

2.

3.

4.
Are we there yet? . . .

1. Culture conflict: *affects* science *but is not about science*

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1. Avoid “hyping” (or contributing to same in media)

2. Furnish *social proof*, not just facts

3.

4.
Culturally identifiable “public health experts”

Hierarchy

Individualism

Communitarianism

Egalitarianism
“They Saw a Protest”: Who saw what & when?

Protestors blocked

- Egal individ
- Hierarch commun
- Hierarch individ

Screamed in face

- Hierarch commun
- Egal individ
- Egal commun
- Hierarch individ

Pedestrians just not want to listen

- Egal individ
- Hierarch commun
- Hierarch individ

Police just annoyed

- Egal individ
- Egal commun
- Hierarch commun
- Hierarch individ
Cultural Cognition Project
SE Fla. evidence-based science communication initiative

A Region Responds to a Changing Climate
Southeast Florida Regional Climate Change Compact Counties
Regional Climate Action Plan
October 2012
Proselytizing the normality of climate science
Proselytizing the *normality* of climate science
Affinity group members spread the word . . .
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1. Avoid “hyping” (or contributing to same in media)

2. Furnish social proof, not just facts

3.

4.
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1. Avoid “hyping” (or contributing to same in media)

2. Furnish social proof, not just facts

3. Investigate locally, with field-study methods

4.
Affinity group members spread the word . . .
Voters in This Florida County Just Approved GM Mosquitoes to Fight Zika

But there's one small catch.

ERICA LANGSTON  NOV. 9, 2016 11:00 AM
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1. Avoid “hyping” (or contributing to same in media)

2. Furnish social proof, not just facts

3. Investigate locally, with field-study methods

4.
Are we there yet? . . .

1. Culture conflict: affects science but is not about science

2. Beware survey artifact

3. Beware exogenous politicization

Making it the rest of the way

1. Avoid “hyping” (or contributing to same in media)

2. Furnish social proof, not just facts

3. Investigate locally, with field-study methods

4. Prefer administrative to political risk-perception management authorities
### State Information

#### Hepatitis B Prevention Mandates for Daycare and K-12

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

† Signifies a "progressive" law in which each new school year another successive grade becomes covered by the law (e.g., grade in 2001).
“I am you!”