



Cornell University

The “problem” of public understanding of science:

Public knowledge of, attitudes toward, and interest in science

Bruce V. Lewenstein

Departments of Communication and
of Science & Technology Studies

Cornell University

Ithaca, NY 14853 USA

b.lewenstein@cornell.edu

Perception of a “problem”

- ◆ Mid-20th century

- Public understanding of science =
Public appreciation of the benefits science provides to society

- ◆ 1985 Bodmer report

- “Hostility, or even indifference, to science and technology...weakens the nation's industry. Such an attitude appears to be more common in Britain than in our major industrial competitors” (p. 9). *[similar rationales for personal decisions, civic and policy matters, government officials – both executive and Parliamentary, cultural goals]*



Long-perceived solution

[n.b., from the science community's perspective]

- ◆ More knowledge will lead to “better”...
 - Better appreciation?
 - Better attitudes?
 - Better use of science?
 - More agreement with science?
- ◆ Leads to measurement

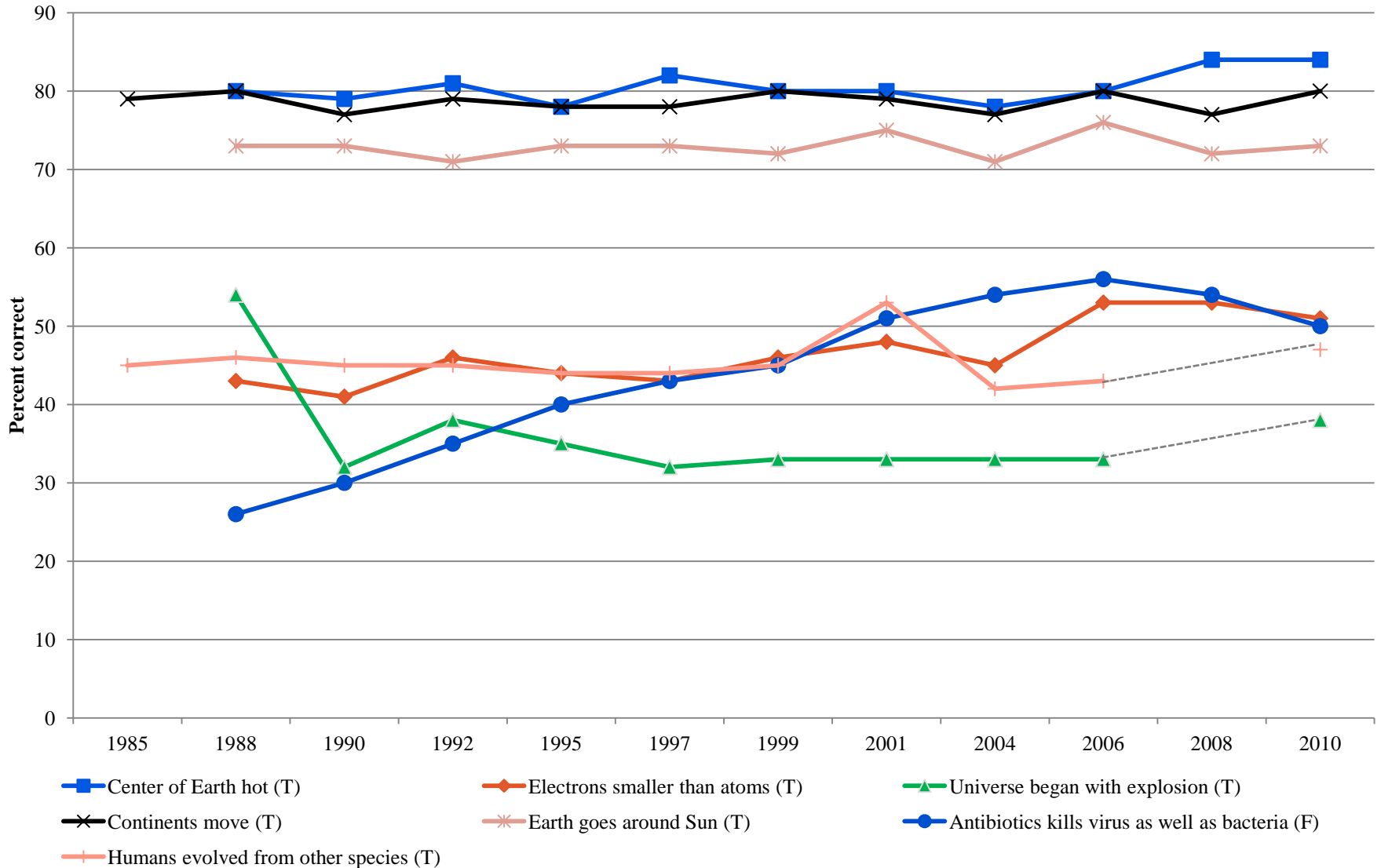


Knowledge, attitude, and interest measurements

- ◆ NSF sponsored, 1957/58, 1972, 1979-onward
- ◆ Knowledge has three components
 - Basic science factual knowledge
 - Basic science process knowledge
 - Science in society knowledge [early NSF Indicators years; knowledge of specific policy issues]
- ◆ Attitudes toward specific topic areas, topics varied over the years



Factual knowledge (correct answers)



Knowledge of science process

(Probability, experiment, scientific study)

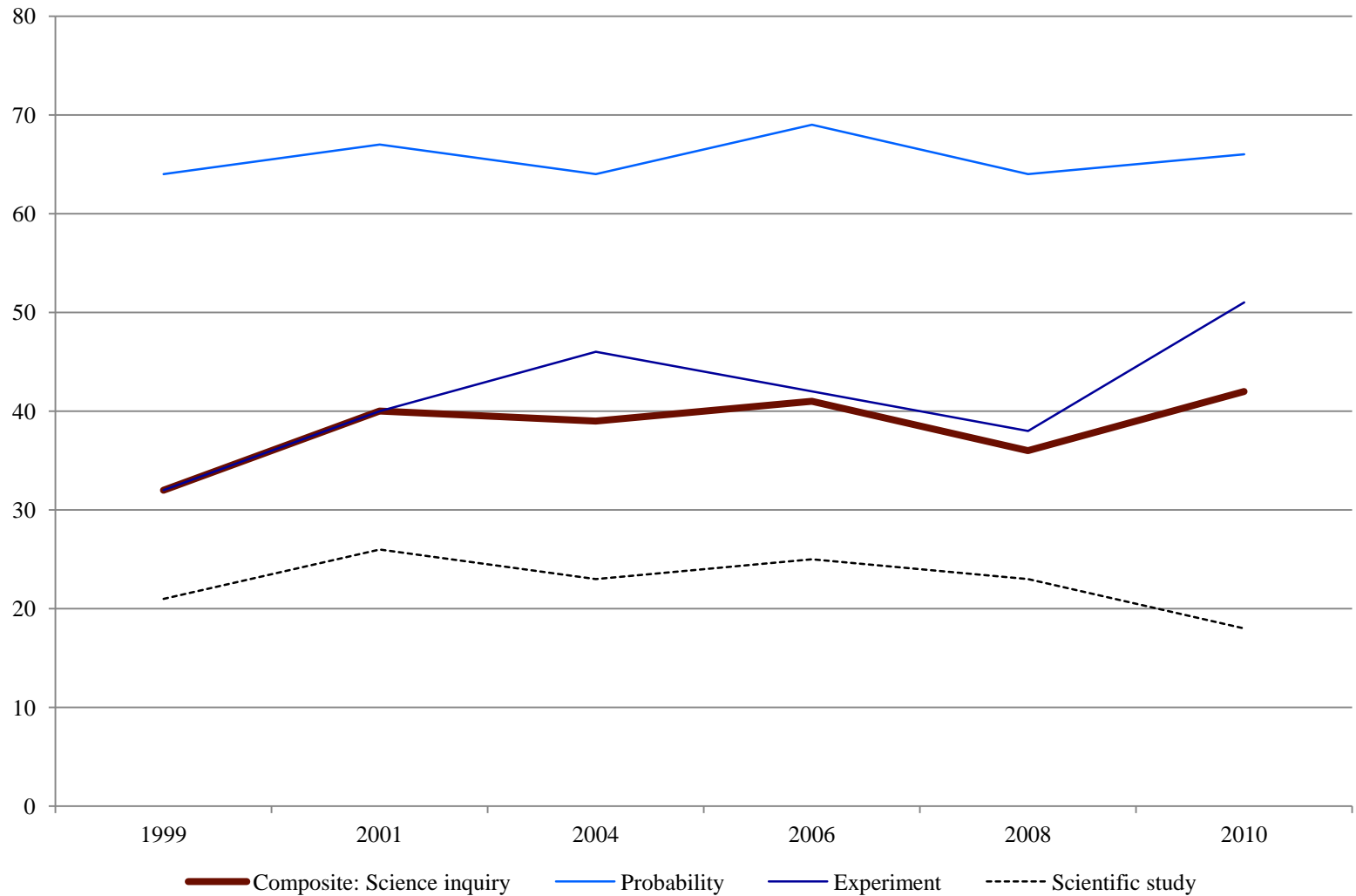
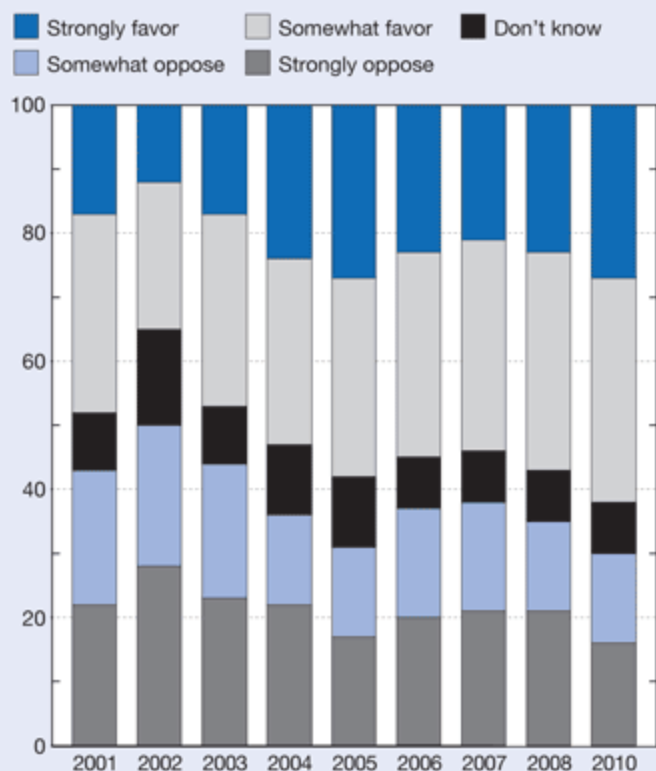


Figure 7-17
Public attitudes toward stem cell research: 2001–10

Cumulative percent



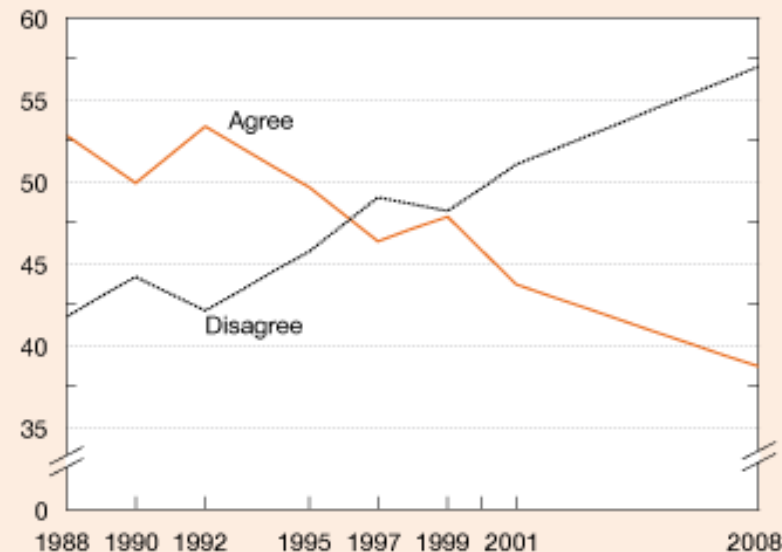
NOTES: Responses to *On the whole, how much do you favor or oppose medical research that uses stem cells from human embryos?* Question most recently asked 12–18 May 2010. Survey not conducted in 2009. Detail may not add to total because of rounding.

SOURCE: Virginia Commonwealth University (VCU), VCU Life Sciences Survey (2010), <http://www.vcu.edu/lifesci/images2/survey2010.pdf>, accessed 4 March 2011.

Science and Engineering Indicators 2012

Figure 7-21
Public attitudes toward conducting human health research that may inflict pain or injury to animals: Selected years, 1988–2008

Percent

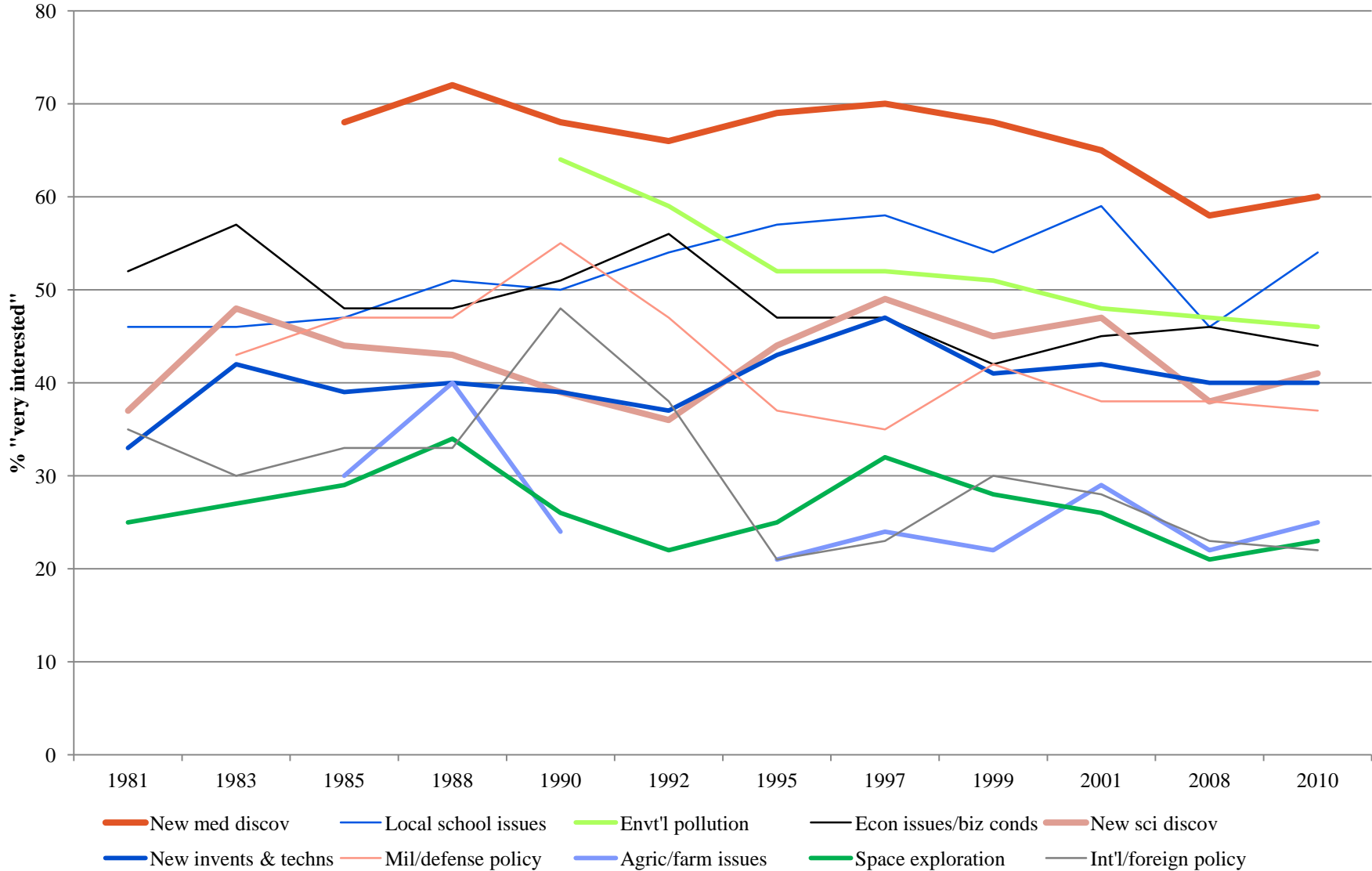


NOTES: Responses to *Scientists should be allowed to do research that causes pain and injury to animals like dogs and chimpanzees if it produces new information about human health problems.* Table includes all years for which data collected. Survey results from 1988, 1990, 1992, 1995, 1997, 1999, 2001, 2008; other years extrapolated.

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Public Attitudes Toward and Understanding of Science and Technology (1988–2001); and University of Chicago, National Opinion Research Center, General Social Survey (2008).

Science and Engineering Indicators 2010

Public interest in selected issues 1981-2010



Are knowledge and attitudes tied?

- ◆ “Overall these results tend to show that people who are more scientifically literate have more positive attitudes to science in general, but are not necessarily more positive about specific technological applications or specialized areas of scientific research” (Allum et al. 2008, p. 37)

- ◆ But:...

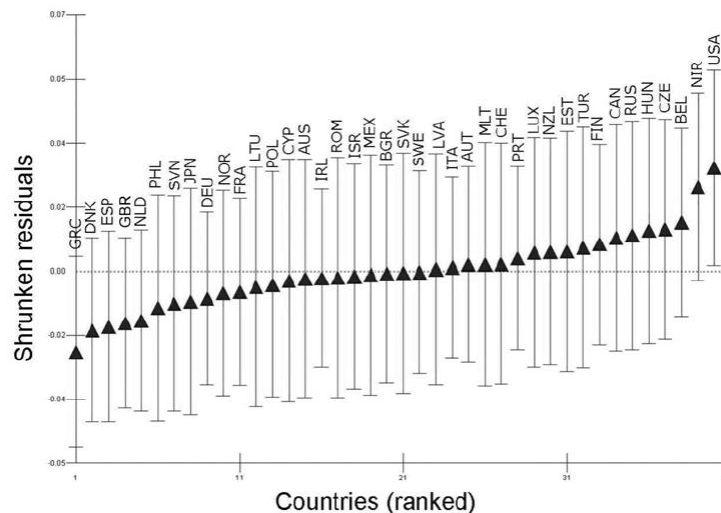


Figure 2. Country residuals with 95% confidence intervals.



For example: Biotechnology

Table 3. Opinions on various applications of biotechnology

	Utility (% definitely agree or tend to agree)	Risk (% definitely agree or tend to agree)	
Use modern biotechnology in the production of foods, for example to make them higher in protein, keep longer, or improve the taste	71.0%	55.0%	
Taking genes from plant species and transferring them into crops to decrease the use of pesticides and increase food output	75.3%	46.7%	
Using genetic testing to detect diseases we might have inherited from our parents such as cystic fibrosis	86.2%	41.9%	
Introducing human genes into animals to produce organs for human transplants, such as into pigs for human heart transplants	67.0%	53.8%	
Cloning human cells or tissues to replace a patient's diseased cells that are not functioning properly, for example in Parkinson's disease	79%	58%	*

* This line missing in chart; data added from text
Ten Eyck 2005



Or: Stem cells

FIGURE 1 Moderating role of religion on awareness

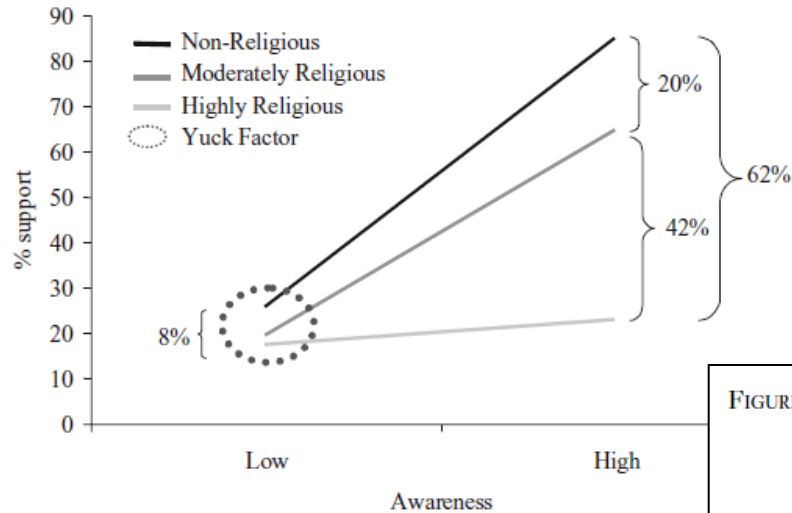
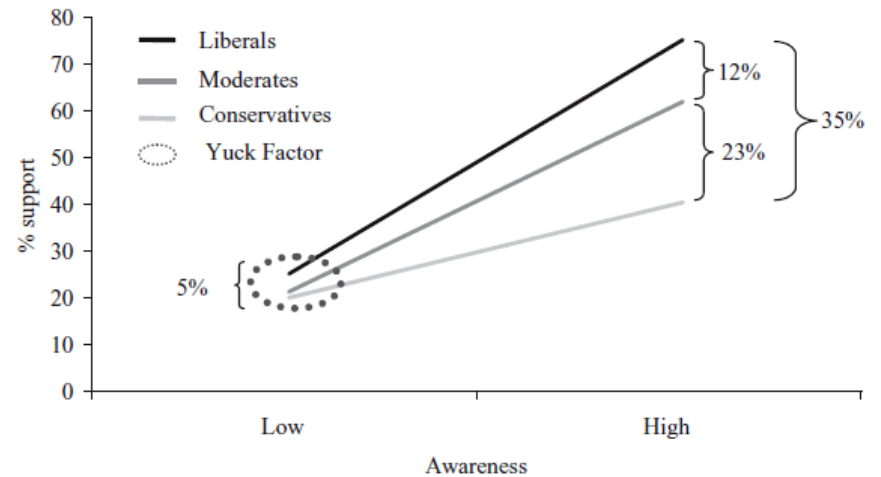


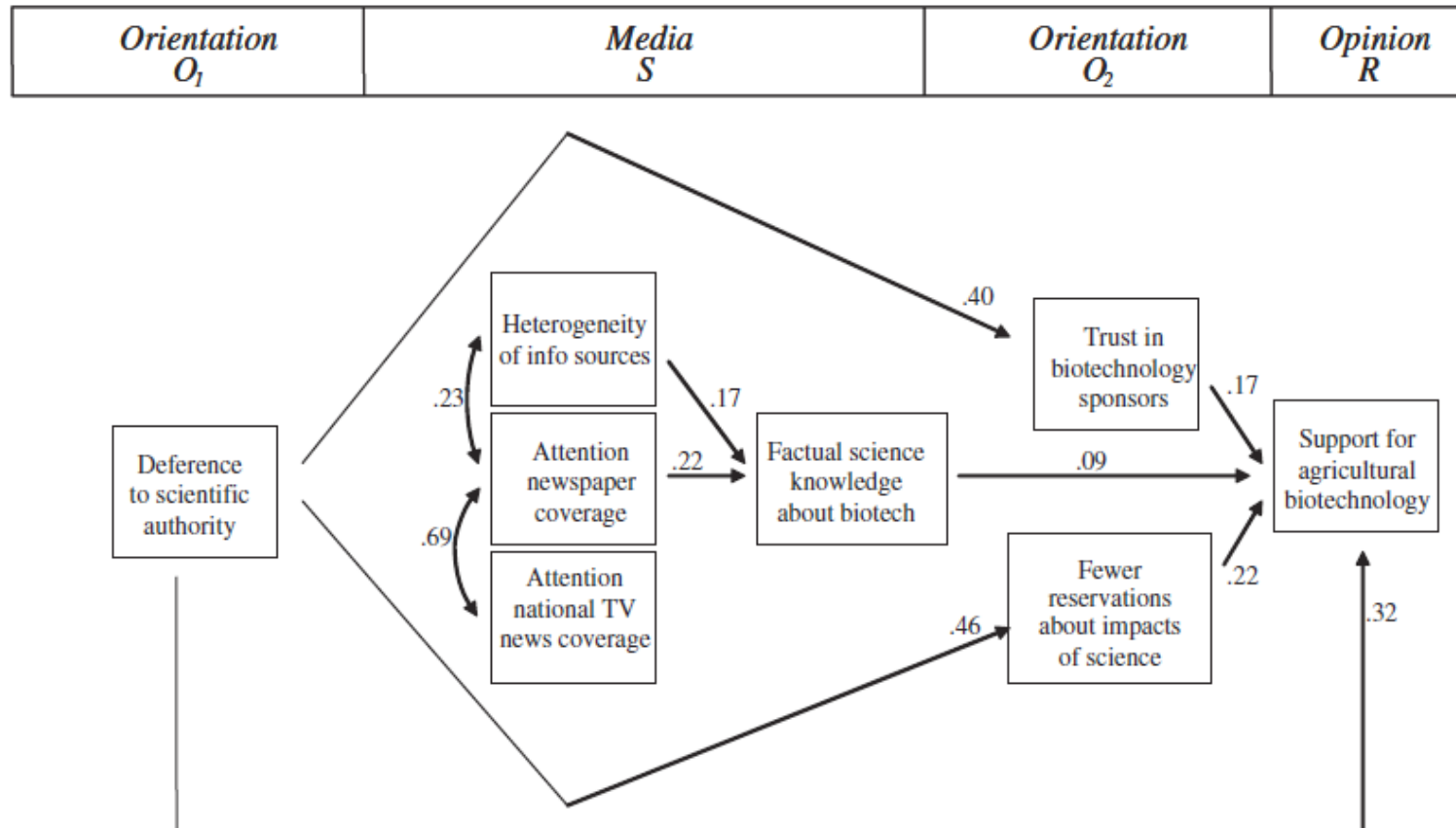
FIGURE 2 Moderating role of ideology on awareness



Nisbet 2005



Or: Agricultural biotechnology

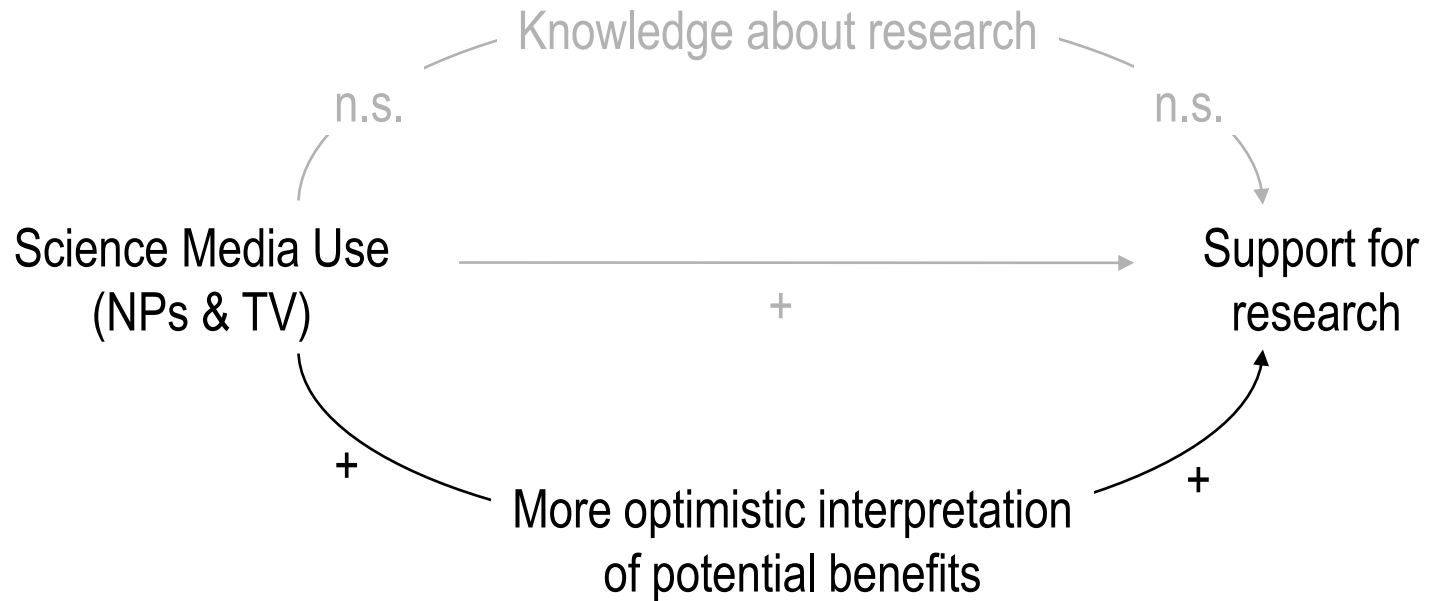


Note: Directional coefficients for direct effects are β 's; for relationships between the media variables they are non-directional ϕ -coefficients.



Or: Nanotechnology

Deficit Model



Heuristic / Framing Model



Conclusion

- ◆ We know a lot about knowledge, attitude, and interest
- ◆ Enough to know that there's not a simple relationship among them
- ◆ Need to reconsider “the problem”
 - Science's problem?
 - Society's problem?
 - *A research* problem?

