Public Understanding and Trust of Biomedical Research

Scientific Approaches to Strengthening Research Integrity
in Nutrition and Energetics
August 7-8, 2012, New Paltz, New York

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Planning Strategic Communication

- What is the problem?
  - Bad data? Bad reporting? Bad journalism? Too much/not enough disclosure? Bad policy?
- Where is it occurring?
  - Labs? Classrooms? Boardrooms? Journals? Popular press?
- When is it occurring?
  - Research design? Data collection? Time of publication?
- Why is it occurring?
  - Ignorance? Logistics? Intention to deceive? Laziness?
- Who is the target audience?
  - Scientists? Grad students? University administration? Journals (editors and reviewers)? Corporations? Journalists?
- What are the incentives and barriers to change behavior?

Take Scientists' Disclosure of FCOI, for example

Barriers

- Don't know what to do
- Difficult process
- Time consuming
- Don't believe it's effective
- Don't care
- Fear negative consequences on self or others
- Different cultures
- Forbidden to disclose

Incentives

- Believe it's the right thing to do
- Maintain funding
- To publish
- Keep job
- "Stamp of approval"
- Feel sense of responsibility
- Maintain social approval
- Keep public trust

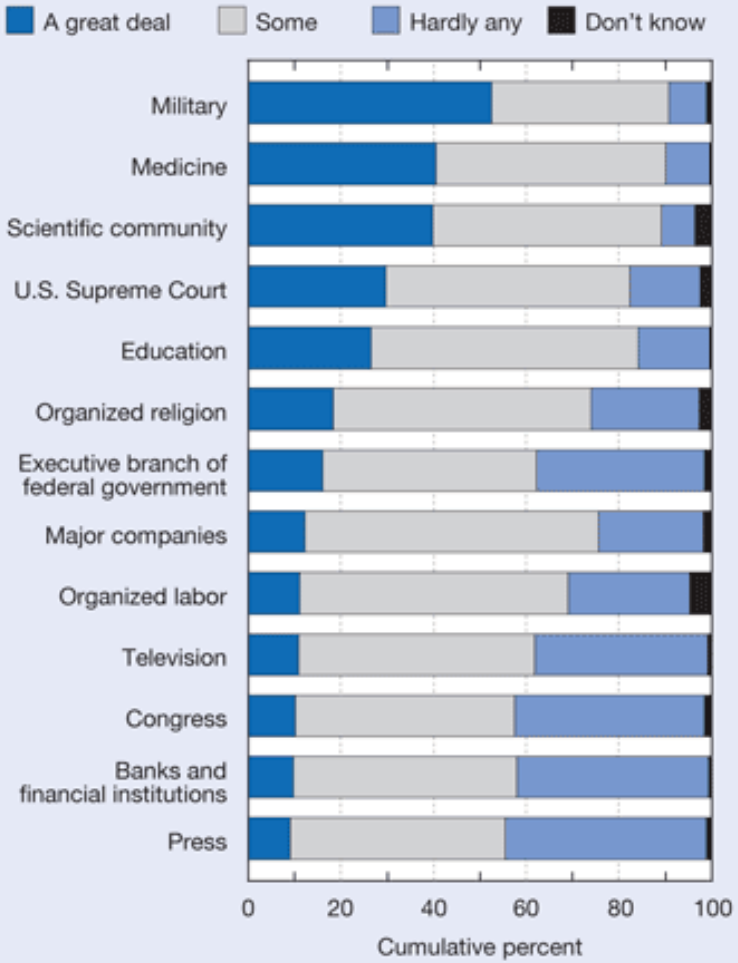
What Do We Mean by Trust/Trustworthiness/Credibility?

- Accuracy
- Expertise
- Openness
- Bias
- Fairness
- Competence
- Caring
- Timeliness

First, the good news…

Public trust is generally high.

Figure 7-15
Public confidence in institutional leaders, by type of institution: 2010



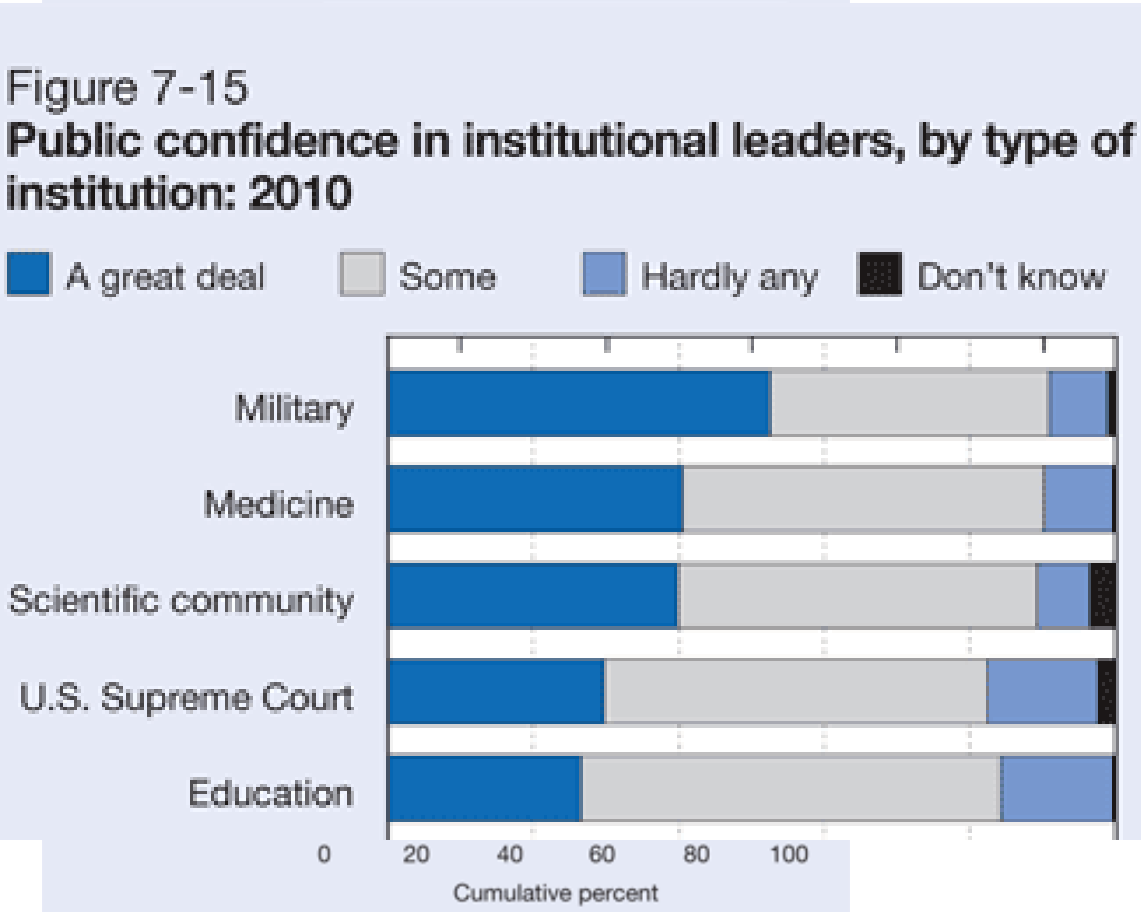
NOTE: Responses to *As far as the people running these institutions are concerned, would you say that you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?*

SOURCE: University of Chicago, National Opinion Research Center, General Social Survey (2010). See appendix table 7-27.

Science and Engineering Indicators 2012

Figure 7-15
Public confidence in institutional leaders, by type of institution: 2010

A great deal | Some | Hardly any | Don't know



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Science and Engineering Indicators 2012

Table 7-14
Public perceptions of various groups' impartiality in making policy recommendations about public issues: 2010 or most recent year
(Percent and mean score)

Public issue/group	Extent to which group would support (on scale of 1 to 5): What is best for country 5	4	3	2	Own narrow interests 1	Don't know	Mean score
Global warming							
Environmental scientists	42	22	18	7	7	4	3.9
Elected officials	11	10	25	22	28	4	2.5
Business leaders	6	4	24	27	34	4	2.2
Genetically modified foods							
Medical researchers	34	29	19	7	6	5	3.8
Elected officials	6	10	32	25	21	5	2.5
Business leaders	2	4	25	32	32	5	2.1
Stem cell research							
Medical researchers	30	28	21	9	7	5	3.7
Elected officials	6	10	25	26	29	4	2.4
Religious leaders	9	10	24	24	27	6	2.5
Nuclear power							
Nuclear engineers	27	28	22	9	8	6	3.6
Elected officials	8	16	32	22	17	6	2.7
Business leaders	6	9	28	28	23	6	2.4
Federal income taxes							
Economists	19	27	28	11	9	6	3.4
Elected officials	10	11	27	22	24	6	2.6
Business leaders	5	11	23	29	27	6	2.4

NOTES: Responses to *When making policy decisions about [public issue], to what extent do you think [group] would support doing what is best for the country as a whole or what serves their own narrow interests?* Responses on global warming, stem cell research, federal income taxes, and nuclear power are for 2010. Responses on genetically modified foods are for 2006. Mean impartiality score based on 5-point scale, where 5 = best for the country and 1 = own narrow interests. Detail may not add to total because of rounding.

SOURCE: University of Chicago, National Opinion Research Center, General Social Survey (2006, 2010). See appendix table 7-30.

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Now, the not-so-good news…

When the public thinks scientists are biased, trust decreases, affecting perceived risk and research satisfaction.

“Forget my question. Never mind. I wouldn’t believe the answer anyway.”

(Opening public comment from the floor at the 9/28/93 public hearing on the proposed Victory Landfill in Bartlesville, OK)

Trust-Destroying Events

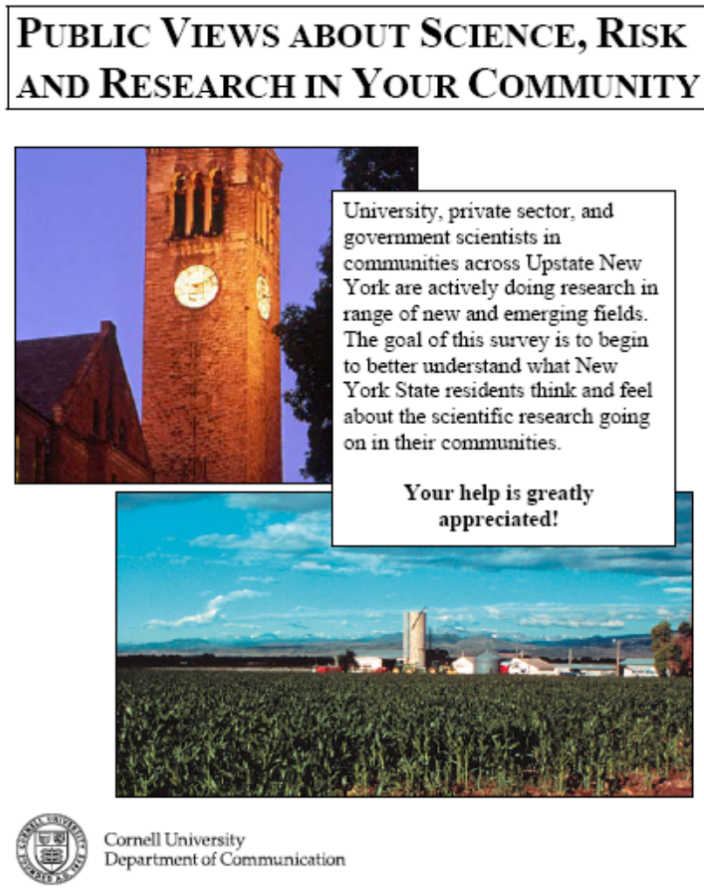
"Conflicts and controversies surrounding risk management are not due to public irrationality or ignorance but, instead, can be seen as expected side effects of…psychological tendencies interacting with our remarkable form of participatory democratic government, and amplified by certain powerful technological and social changes in our society."

(Slovic, 1993, p. 679)

Trust-destroying events

What might influence public trust in scientists?

Trust in Science Survey



- Public Opinion Survey
  - Questionnaires mailed to random sample of residents in two upstate New York counties (2,500/county)
  - The counties host major research university and agricultural experiment station
  - N=1,306; 29% response rate

McComas, K. (2008). The role of trust in health communication and the effect of conflicts of interest among scientists. *The Proceedings of the Nutrition Society*, *67*, 428-436.
McComas, K. A., Besley, J. C., Yang, Z. (2008). Risky business: Perceived behavior of local scientists and community support for their research. *Risk Analysis, 28*, 1539-1552

Conflict-of-Interest Questions

Question	Disagree to Strongly Disagree	Don't know	Agree to Strongly Agree
Local scientists would keep secret the results of research that might embarrass an organization that sponsored their work.	31%	42%	27%
Local scientists don't care what the average person thinks about the ethics or morality of their research.	14%	27%	59%
Local scientists who receive corporate funding cannot be relied upon to provide independent advice to decision-makers.	32%	37%	31%
Most scientists try hard to ensure that their reports are as truthful as possible, even if the results conflict with their financial interests.	15%	24%	51%

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Trust 1: Caring and Competence

Question	Disagree to Strongly Disagree	Don't know	Agree to Strongly Agree
Most local scientists cannot be bothered to keep up to date on the skills needed to ensure their research is safe for communities like mine.	58%	35%	7%
If local scientists really cared about the community, they would do more to protect the public health and the environment.	39%	34%	27%
Quite a few local scientists don't seem to know how to protect public health and the environment.	52%	38%	11%
Scientists in my community understand how to protect public health and the environment from potential risks of their research.	11%	39%	52%

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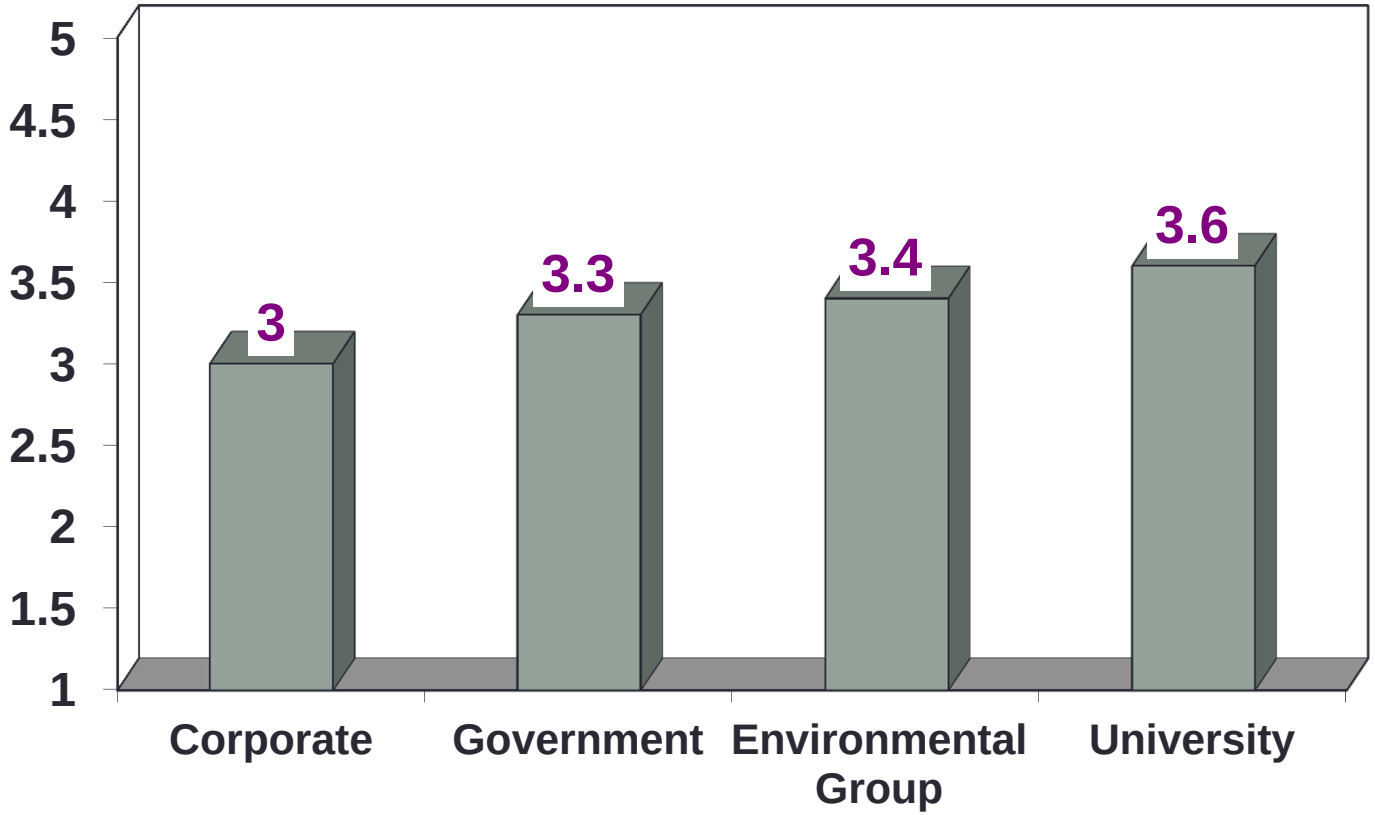
Trust 2: Overall Trustworthiness of Scientists (by Type)



Satisfaction with Science

Question	Disagree to Strongly Disagree	Don't know	Agree to Strongly Agree
I am satisfied with the scientific research that is going on in my community.	7%	46%	50%
I am satisfied with the procedures in place to manage potential risk to public health and the environment from scientific research in my community.	3%	46%	42%
I would support plans to bring more scientific research to my community.	6%	22%	73%
The scientific research going on in my community is appropriate for the area.	5%	49%	46^

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Correlations

Variable	Trust 1	Trust 2	Satisfaction
Conflicts of Interest	-0.63*	-0.62*	-0.56
Trust 1: Caring and Competence		0.55*	0.62*
Trust 2: Overall Trustworthiness			.55*

* p < 0.01, two-tailed

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Summary of Community Survey Results

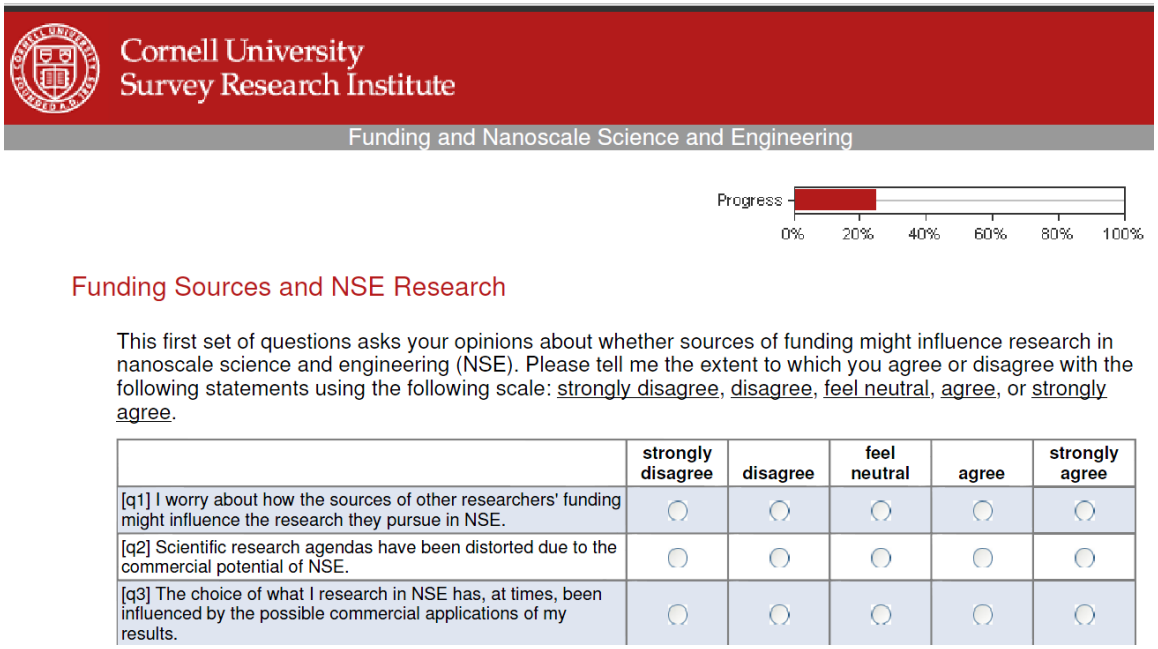
- Public is cautious about conflicts of interest:
  - Many “don’t know” how scientists’ would behave.
  - Almost one-third thought that financial conflicts of interests would bias scientists’ behavior.
  - Strong, negative relationship between trust and conflicts of interest among scientists.
  - Conflicts of interest also related to public satisfaction with science and support for additional research.

Do scientists think differently?

Two studies

First Scientist Survey

- Web survey
- Potential respondents randomly selected from NNIN user database
- 240/662 responded=36 % response rate



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Survey Research Institute

Funding and Nanoscale Science and Engineering

Progress 0% 20% 40% 60% 80% 100%

Funding Sources and NSE Research

This first set of questions asks your opinions about whether sources of funding might influence research in nanoscale science and engineering (NSE). Please tell me the extent to which you agree or disagree with the following statements using the following scale: strongly disagree, disagree, feel neutral, agree, or strongly agree.

	strongly disagree	disagree	feel neutral	agree	strongly agree
[q1] I worry about how the sources of other researchers' funding might influence the research they pursue in NSE.	○	○	○	○	○
[q2] Scientific research agendas have been distorted due to the commercial potential of NSE.	○	○	○	○	○
[q3] The choice of what I research in NSE has, at times, been influenced by the possible commercial applications of my results.	○	○	○	○	○

McComas, K. A. (in press). Researcher views about funding sources and conflicts of interest in nanotechnology. *Science & Engineering Ethics.*

On research directions

	% Agree or Strongly Agree
Funding influences research in nanotechnology	69%
Funding has shifted research from basic to applied	47%
Commercial applications have influenced what I choose to research	53%
I worry about the influence of funding on what I research	46%
I worry about it in relation to others' research	37%

Influence on communication

	% Agree or Strongly Agree
Funding influence how widely I share my results	44%
Funding influences how widely *others* share their results	62%
Financial conflicts of interest (FCOI) might influence researchers to keep secret their results	70%

Financial conflicts of interest (FCOI)

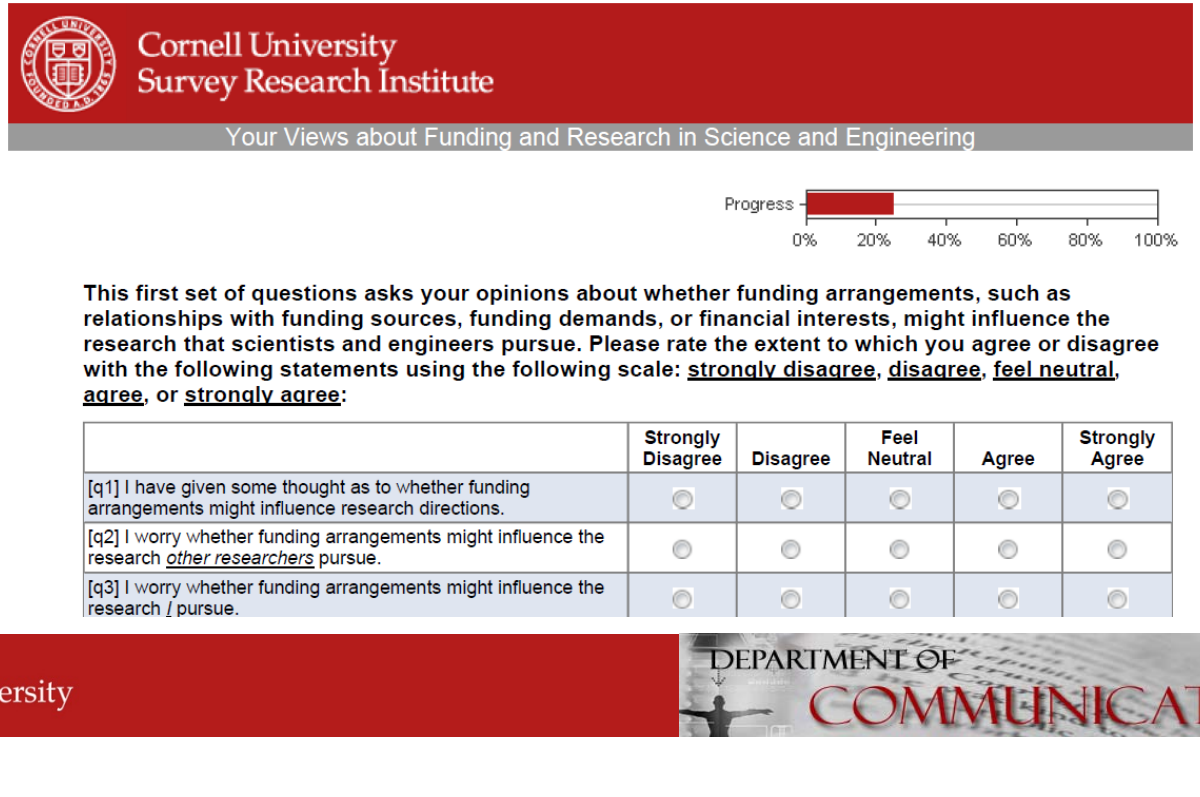
	% Disagree or Strongly Disagree
FCOI *not* a cause for concern	44%
FCOI are uncommon	38%

FCOI and research integrity

	% Agree or Strongly Agree
Full disclosure of FCOI will ensure the public's trust	80%
Full disclosure will ensure that scientific integrity remains intact	72%
Full disclosure neutralizes bias	37%
I pay attention to who sponsored a particular project when evaluating that work's quality	32%
Knowing who sponsored my work might influence how others evaluate the quality of my research	50%

Second Scientist Survey

- Data collected via web survey in summer 2011
- Potential respondents again selected from NNIN user database
- 713 out of 2,963 responded=22% response rate



Cornell University
Survey Research Institute

Your Views about Funding and Research in Science and Engineering

Progress 0% 20% 40% 60% 80% 100%

This first set of questions asks your opinions about whether funding arrangements, such as relationships with funding sources, funding demands, or financial interests, might influence the research that scientists and engineers pursue. Please rate the extent to which you agree or disagree with the following statements using the following scale: strongly disagree, disagree, feel neutral, agree, or strongly agree:

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
[q1] I have given some thought as to whether funding arrangements might influence research directions.					
[q2] I worry whether funding arrangements might influence the research *other researchers* pursue.					
[q3] I worry whether funding arrangements might influence the research I pursue.					

Views about Funding

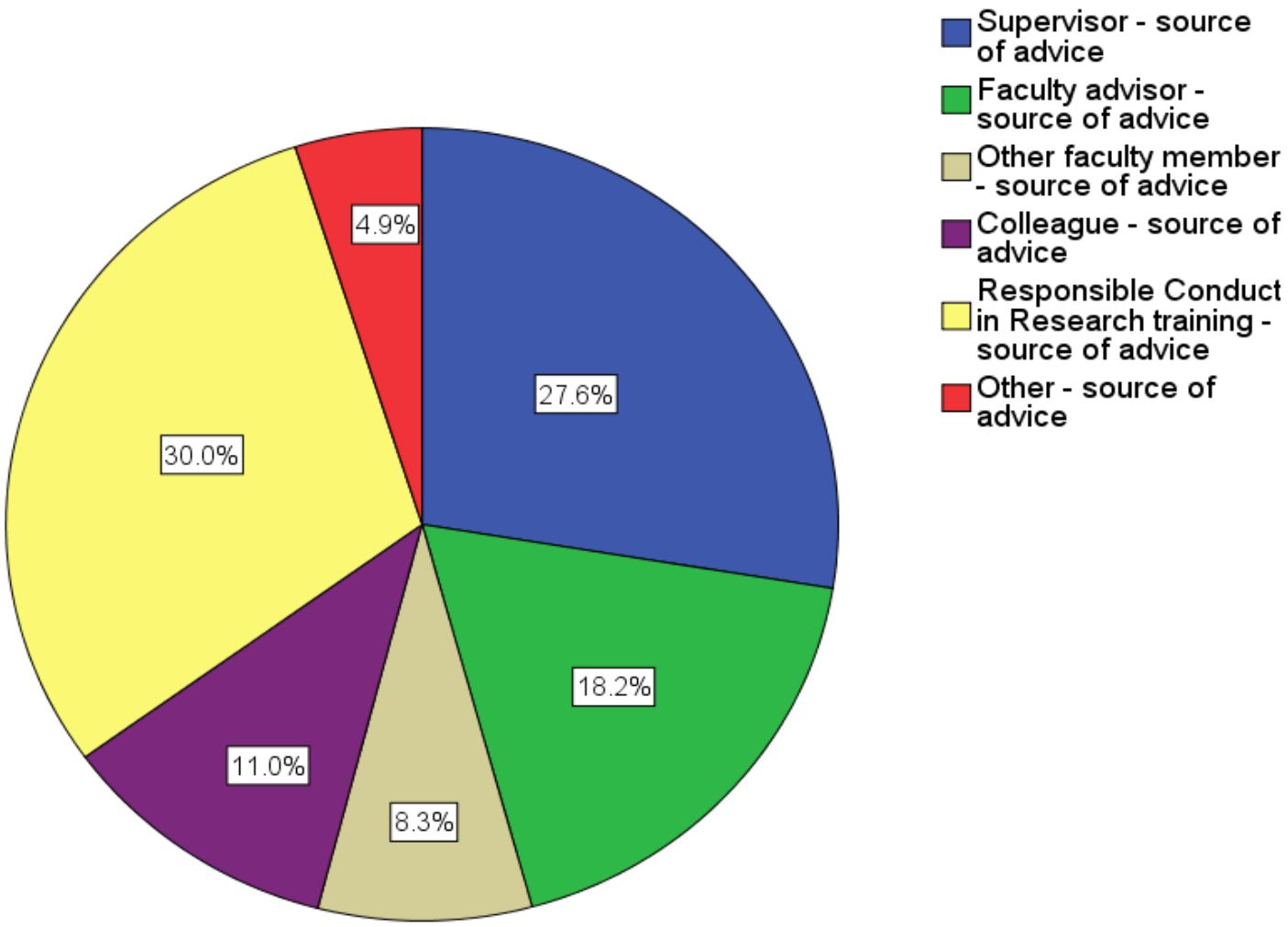
	Agree or Strongly Agree
Funding influences research directions	88%
Funding influences my own research	76%
Funding influences others' research	73%
Funding can lead to FCOI	72%

- *90% said they depend on external funds to support their research.*
- *40% have received advice on how to manage FCOI*

Views about financial conflicts of interest (FCOI)

	Disagree or Strongly Disagree
FCOI are *not* a cause for concern	61%
FCOI are *un*common	46%
Researchers tend to act in their interest if they have a FCOI	24%
Results are not trustworthy if researcher has financial stake in the outcome	58%
You have to expect researchers to have financial stake in the outcome of their work	18%

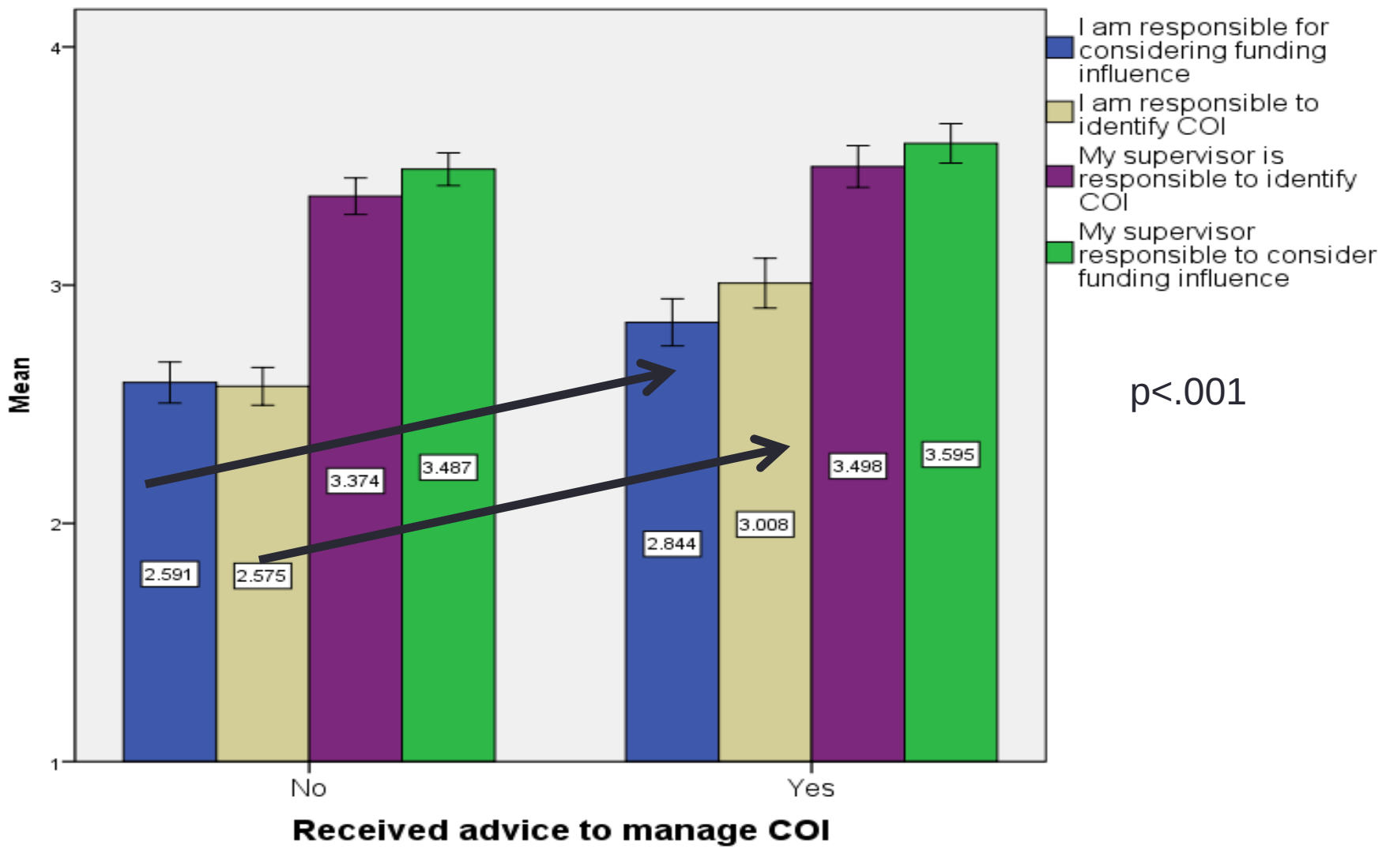
Sources of advice on FCOI



Who is responsible for considering…

	Funding influences on my research		Conflicts of interest in my research	
	My responsibility	**Supervisor's responsibility**	**My responsibility**	**Supervisor's responsibility**
Not at all	6.2%	1.1%	5.7%	2.1%
Just a little	35.1%	6.8%	32.4%	7.0%
A good amount	39.8%	30.3%	42.7%	35.0%
A great deal	**18.8%** →	**58.6%**	**19.2%** →	**52.0%**

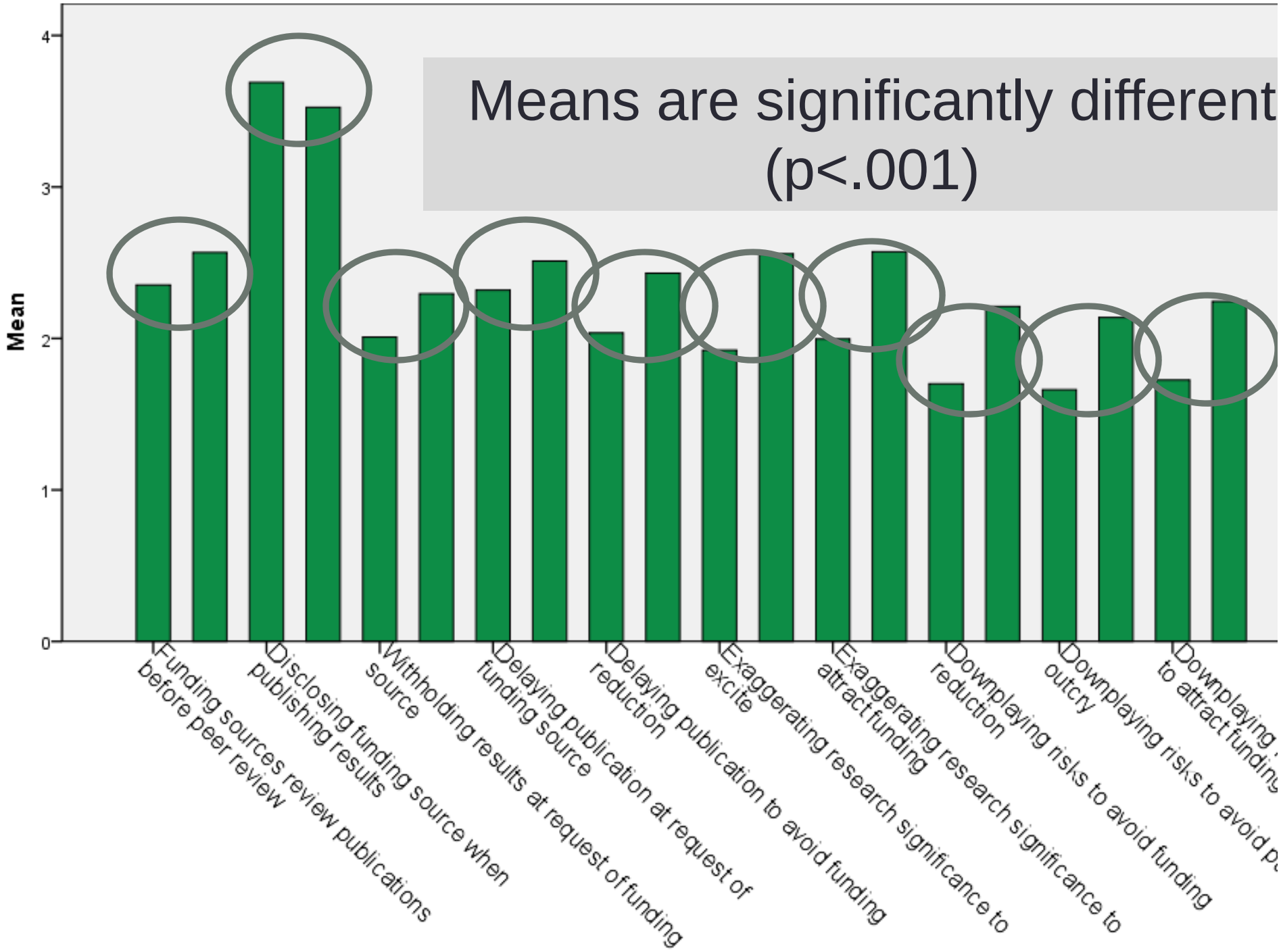
Received Advice by Attributions of Responsibility



p<.001

Acceptability of Ethically Relevant Scenarios

- On a scale of 0=not at all acceptable to 4=totally acceptable, how acceptable are the following to you and to people you work with?


Means are significantly different (p<.001)
Mean
4
3
2
1
0
Funding sources review publications before peer review
Disclosing funding source when publishing results
Withholding results at request of funding source
Delaying publication at request of funding reduction
Delaying publication to avoid funding excite
Exaggerating research significance to attract funding
Downplaying research significance to reduction
Downplaying risks to avoid funding outcry
Downplaying risks to avoid funding to attract funding

Behavioral Intentions to Consider Ethical Issues: Regression Analysis

- My peers would approve of my doing so (Injunctive norms)**
- My peers do so (Descriptive norms)**
- My responsibility to do so (attributions) **
- It's under their control (behavioral control)*

- Adjusted R^2=.36 **

- (**p<.001; *p<.05)

Implications

Where do we go from here? One example...

Normative influence

- Build awareness and stimulate discussion about FCOI via formal and informal channels (e.g., trainings, orientations, informal discussions, editorials)
  - Cultivate “ethical culture” in organization where it is the norm and personal responsibility to consider ethical issues

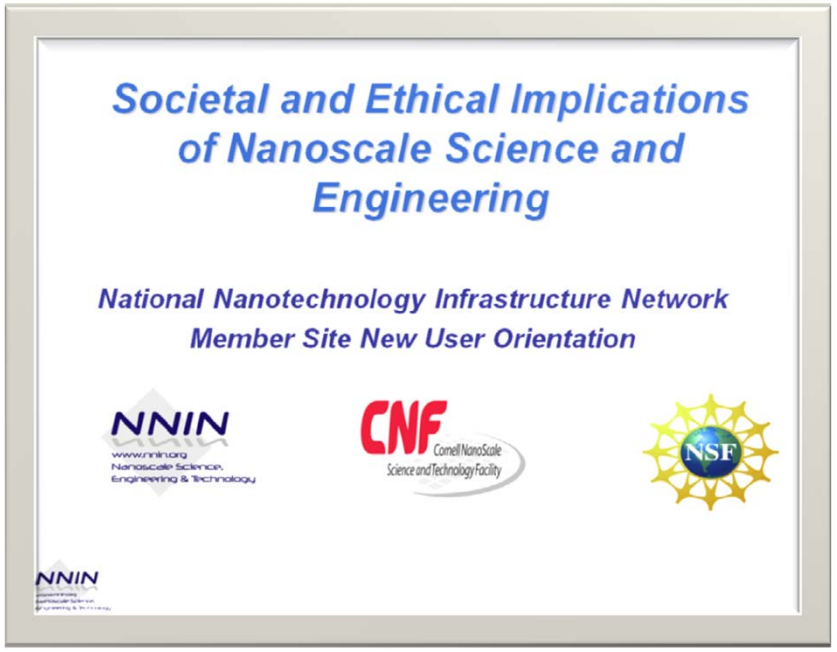
Cornell University

DEPARTMENT OF COMMUNICATION

science technology media

Training and Educational Opportunities: Society and Ethics Orientations

- All new NNIN users (~2,000 annually) attend SEI orientation at their NNIN site
- Learning objectives:
  - ✓ Recognize examples of SEI associated with nanotechnology
  - ✓ Understand ways that SEI is currently being studied and addressed
  - ✓ Build confidence in users' ability to discuss SEI with others
  - ✓ Appreciate how SEI may impact their work
- Orientation format/structure varies by site but we aim for 30 minute face-to-face discussion



Challenges

"Scientists" are not a homogenous group, i.e., one size will not fill all.

- International collaborations are growing
- Multiple organizations collaborating
- Different types of science being conducted
- Interdisciplinarity increasingly emphasized
- Overhead required to "police" effort

Table 5-23
U.S. S&E article coauthorship, by sector, foreign coauthorship, and U.S. coauthor sector: 2000 and 2010
(Percent)

Sector	Foreign coauthor	U.S. coauthor sector					
		Federal government	Industry	Academic	FFRDCs	Private nonprofit	State/local government
2000							
Federal government	21.2	18.1	9.2	55.0	3.1	9.6	2.5
Industry	22.5	9.6	14.5	45.6	3.1	10.3	1.5
Academic	21.7	7.8	6.2	38.6	2.8	9.2	1.5
FFRDCs	35.0	8.0	7.6	51.2	13.4	4.2	0.2
Private nonprofit	20.4	8.4	8.6	57.0	1.4	25.1	2.4
State/local government	11.7	16.2	9.4	68.2	0.6	18.2	13.8
2010							
Federal government	29.6	21.8	10.6	64.8	4.6	14.9	3.1
Industry	31.5	11.8	19.3	55.4	3.8	16.0	2.1
Academic	31.6	8.3	6.4	46.9	3.4	11.7	1.6
FFRDCs	46.4	10.9	8.0	62.2	19.4	8.0	0.3
Private nonprofit	31.6	10.8	10.5	66.5	2.5	30.3	2.8
State/local government	18.8	18.8	11.5	75.6	0.7	23.1	15.6
2000–10 change (percentage points)							
Federal government	8.4	3.7	1.4	9.8	1.5	5.2	0.6
Industry	9.1	2.2	4.8	9.8	0.7	5.7	0.6
Academic	9.9	0.5	0.2	8.3	0.6	2.4	0.1
FFRDCs	11.3	2.9	0.4	11.0	6.0	3.7	*
Private nonprofit	11.2	2.5	1.9	9.5	1.0	5.2	0.3
State/local government	7.1	2.6	2.1	7.4	0.1	4.9	1.8

* = rounds to zero

Thank you

Questions?