Public Perspectives on the Risks (and Benefits) of Radiation

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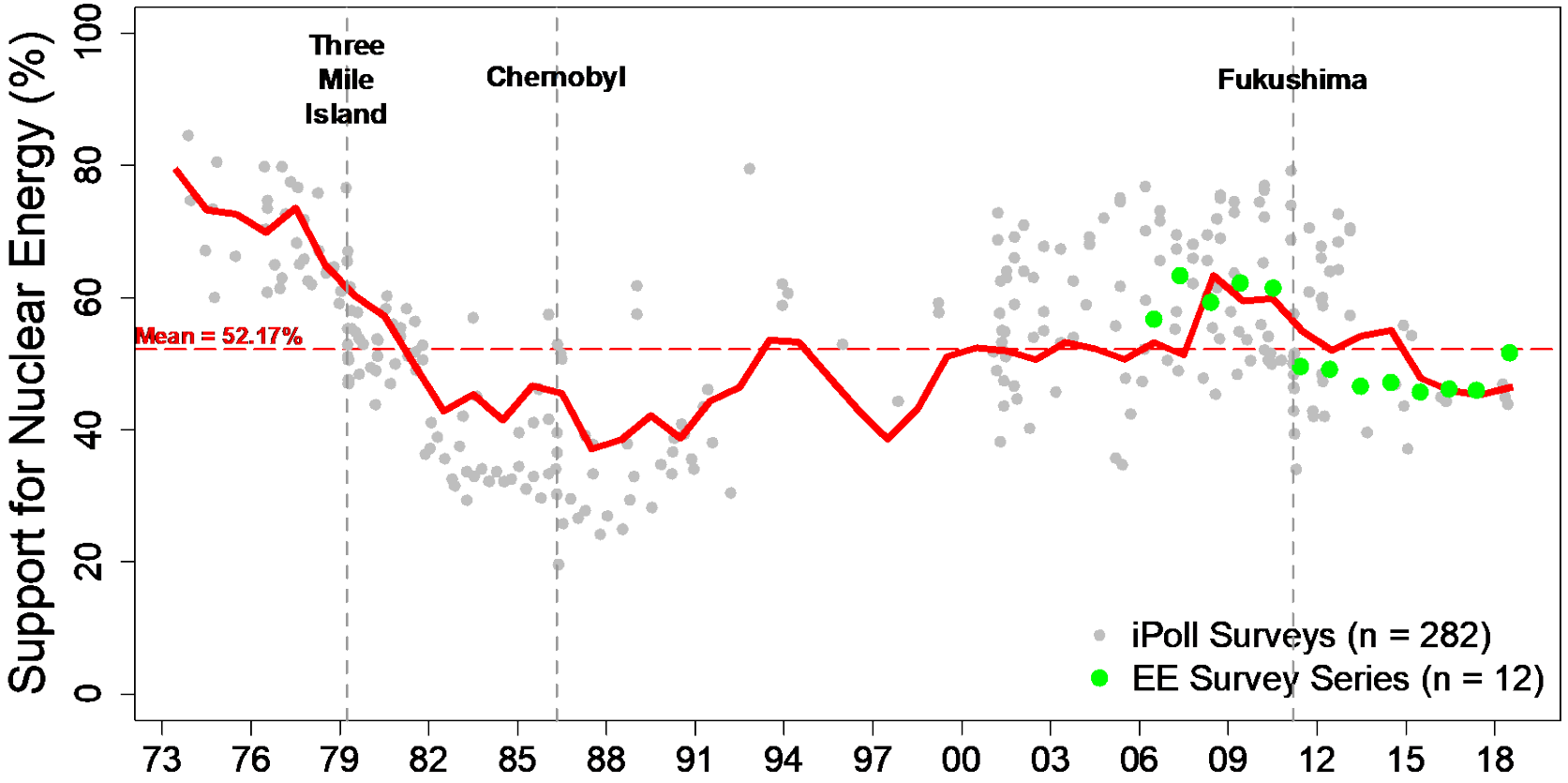
Context of Radiation Risk Perceptions in the US

- Members of the public tend to see radiation risks as bundled with the benefits (or the lack of benefit) of the associated technologies
  - Examples include nuclear energy, nuclear weapons, medical treatments and diagnostics
- Risk and benefit perceptions are dynamic, responding to changing context
  - Events, accidents, shifts in relative priorities

Changing Public Support for Nuclear Energy



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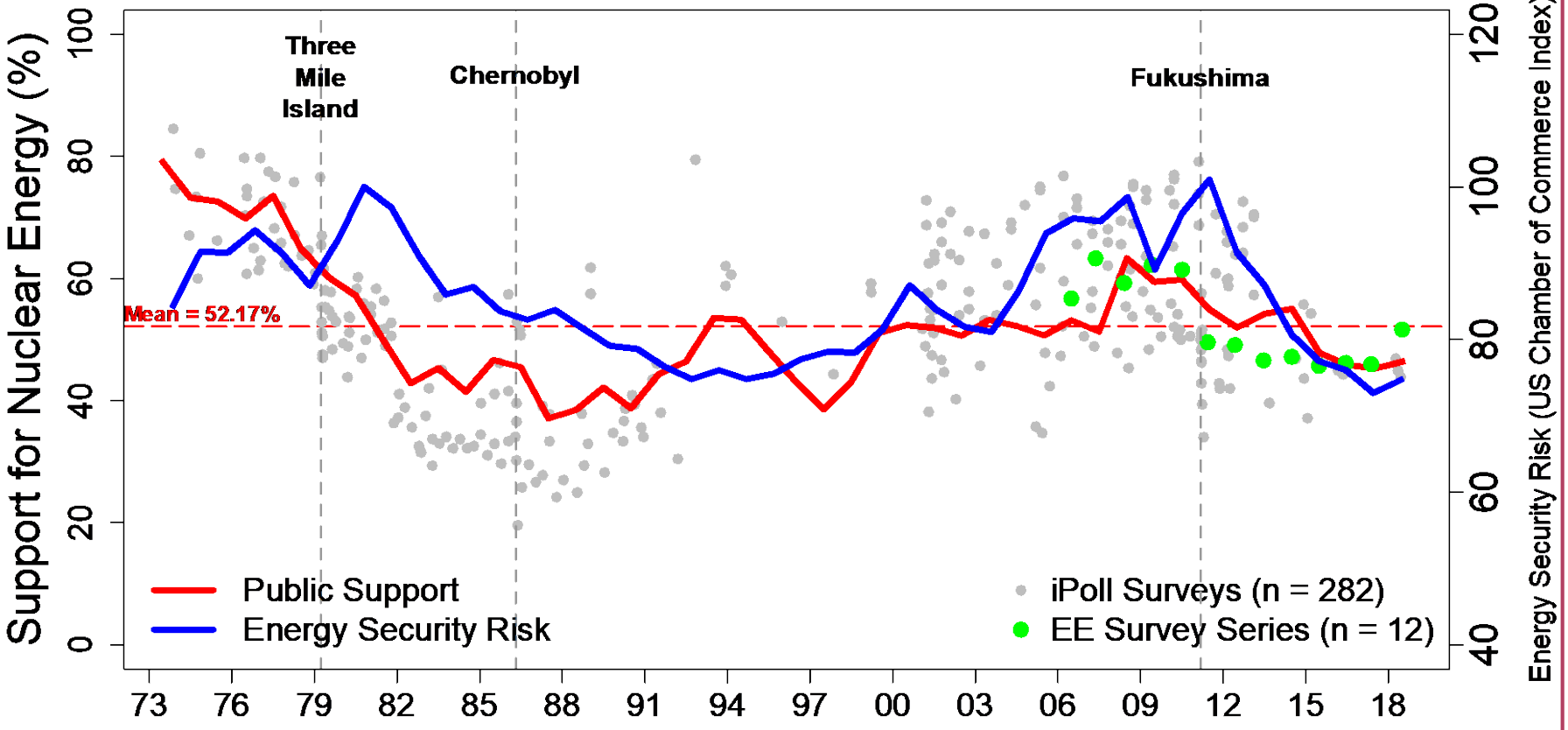
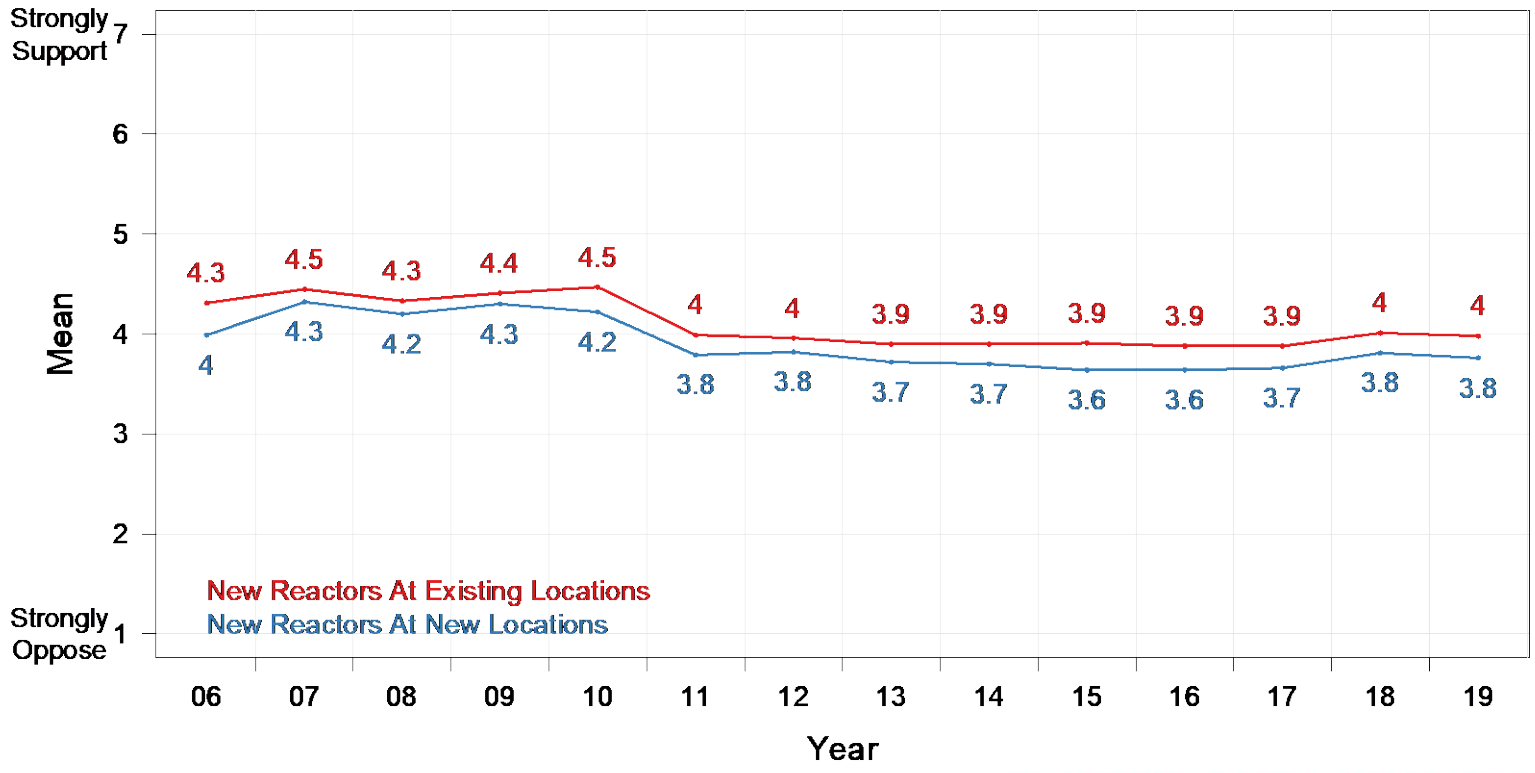


Public Support for Nuclear Reactor Siting

Using a scale from one to seven, where one means *strongly oppose* and seven means *strongly support*, how do you feel about constructing additional nuclear reactors at [the sites of existing nuclear power plants/at new locations] in the U.S.?



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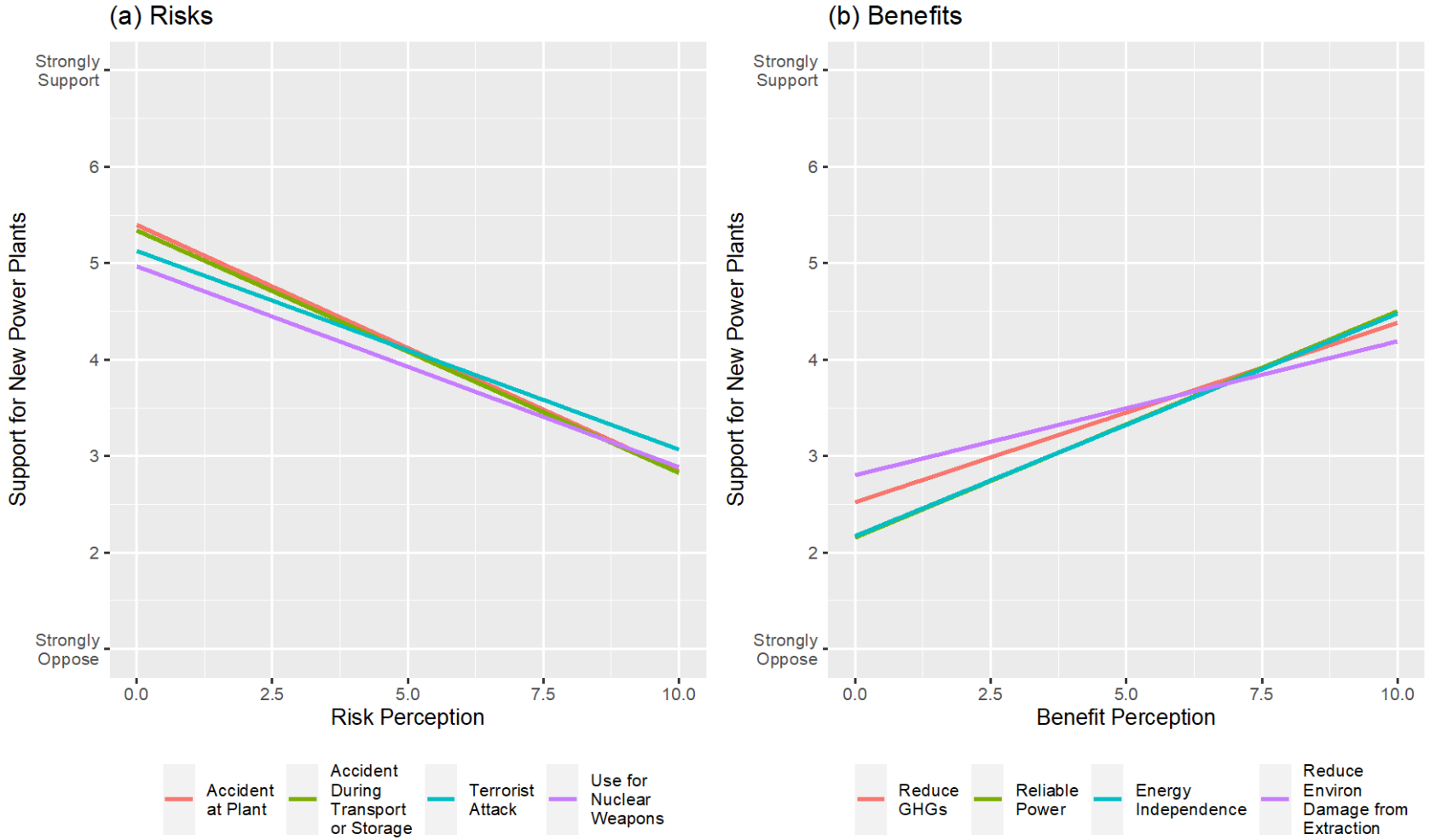
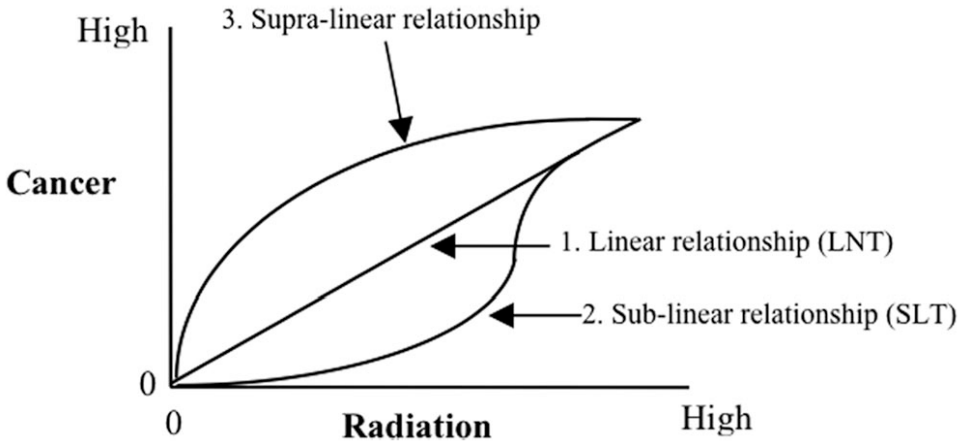


Radiation Risk Communication

- The technical nature of radiation risks places special emphasis on **trust** in the experts who explain and manage the risks
  - The public perceive an array of competing "experts"
  - Experts present the public with a diverse array of signals about the appropriate levels of concern
  - Signals about probabilistic risks are challenging
    - » Essential communication for acceptance, adoption, and protective action
    - » Numeracy: understanding differs significantly across the public

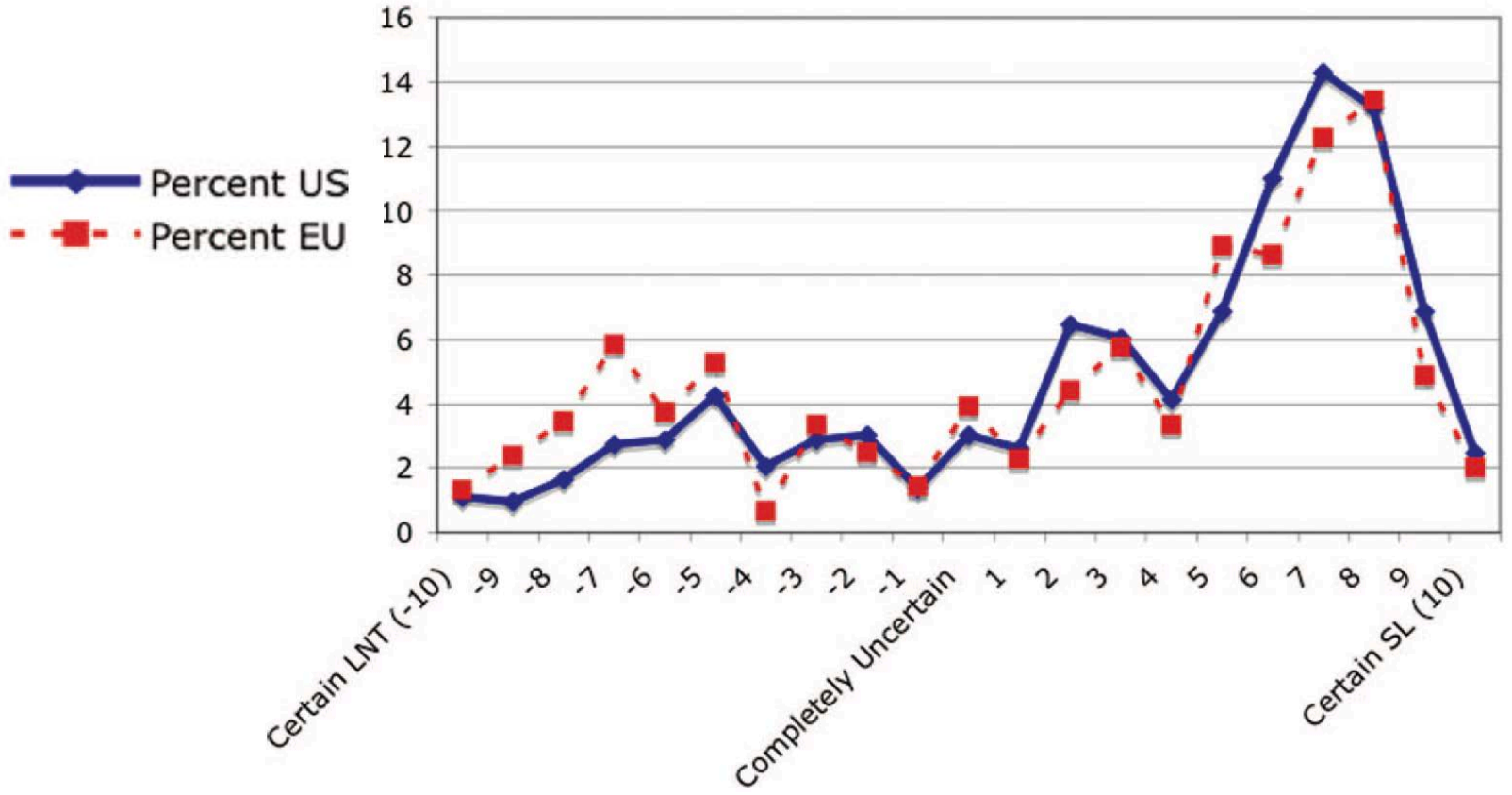
“Expert” views differ …



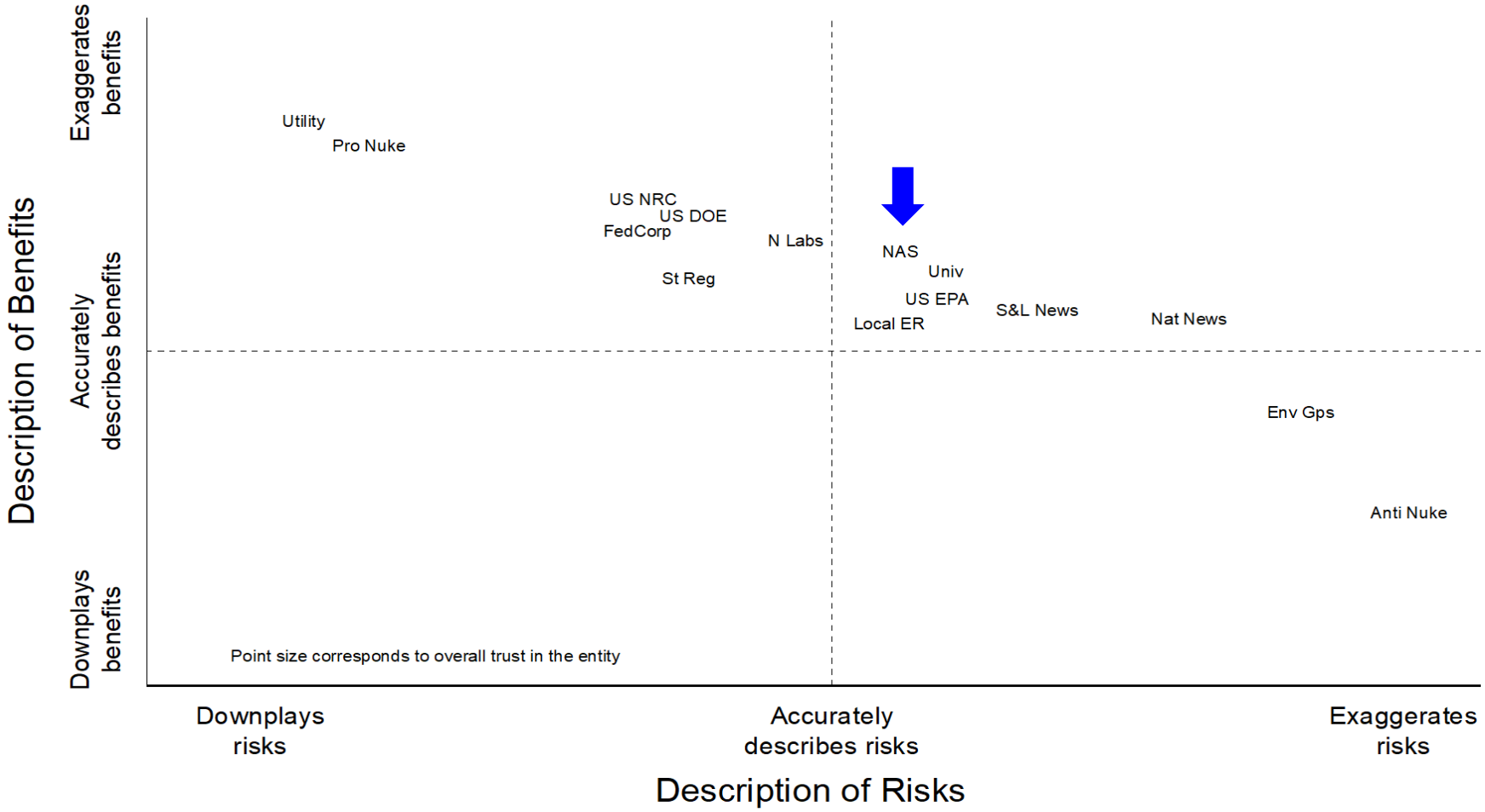
In a 2002 study, we asked a random sample of 1540 US and EU PhD subscribers to Science Magazine: “Given your own knowledge of radiation effects on humans and other organisms, which of the above hypothesized relationships do you think is most likely correct?”

“Expert” views differ …

“…which of the hypothesized relationships do you think is most likely correct?” combined with respondents’ level of certainty



Mapping Trust in Signals: Risks of Nuclear Waste Repository



Risk Ratchet Effect

"Suppose a scientist from [organization] provided you with information that indicated the risks of radioactive waste were [less/more] than you had previously believed. How likely would you be to change your point of view because of that new information?"

Differential propensities to adjust beliefs in response to risk signals

(US sample n=605, missing values excluded)

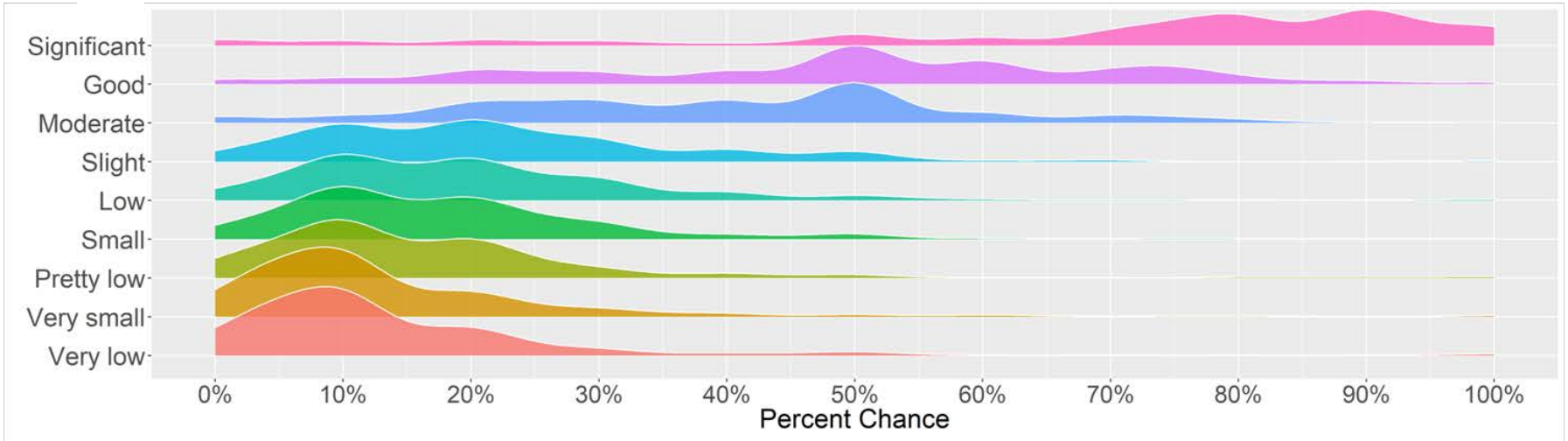
Mean values: 1 = 'very unlikely' to 4 = 'very likely'.

Signal Sending Organization	Likelihood of belief change from less risk signal	Likelihood of belief change from more risk signal	Average likelihood difference
National Academy	2.65	3.07	0.42
National Environ. Gps.	2.58	2.81	0.23
EPA	2.45	2.92	0.47
National Laboratories	2.36	2.97	0.62
DOE	2.22	2.89	0.67
Private contractor	1.93	2.87	0.94

Signaling Probabilistic Risks

(for a relatively easy case: *the weather*)

Density curves show the distribution of responses when survey respondents were asked to assign a percentage to various WEPs



- When provided to the public, verbal descriptions of estimative probabilities result in skewed and widely distributed subjective probabilities
- Patterns of subjective understanding of estimative probabilities of radiation risks has yet to be fully evaluated

Concluding Thoughts

- Risk perceptions and effective communication strategies will differ by type of radioactive source and level of controversy
  - Highly contentious domains are particularly challenging
- Risk perception is dynamic, subject to changing context
  - Accidents and events
  - Climate change, power outages, unstable international energy markets will affect support for nuclear energy
  - The nature of the “expert”
- Risk communication must address this dynamic environment
  - Communication of the probabilistic nature of radiation risks is challenging and not yet well understood
  - Risks cannot be understood outside the context of the benefits

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