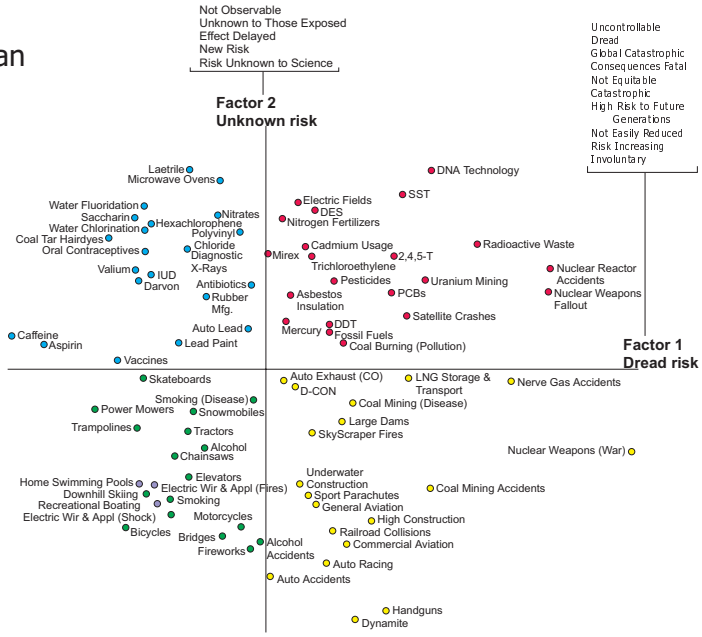
A Brief History of Risk Perception

Perception of Risk

- Public is sensitive to quantitative risk and can generally rank-order a broad domain of hazards.
- Risk is perceived in qualitative terms.
  - Personal controllability over exposure.
  - Dreadedness of potential (or real) consequences.
  - Conflict between scientific/technical experts.
  - Equity or fairness of risk/benefit distributions.
  - Uncertainty
- "How safe am I, my family, my community, things that matter to me?" is a dominant psychological frame on risk issues.
- Risk = cognitive & emotional response to (expected) loss.
- Risk is attenuated by increasing levels of perceived benefit or value.

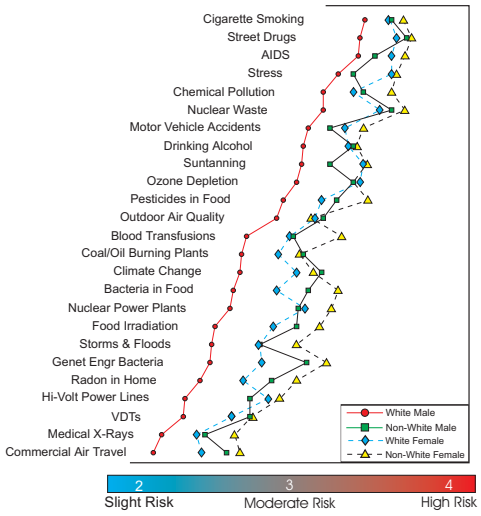


Location of 81 hazards on Factors 1 and 2 derived from the interrelationships among 15 risk characteristics. Each factor is made up of a combination of characteristics, as indicated by the diagram.

Source: Slovic, P., Fischhoff, B., & Lichtenstein, S. (1985). Characterizing perceived risk. In R. W. Kates, C. Hohenemser, & J.X. Kasperson (eds.), Perilous progress: Technology as hazard (pp. 91-123). Boulder, CO: Westview.

Socio-cultural Context

Sociopolitical: "The Gender Effect"

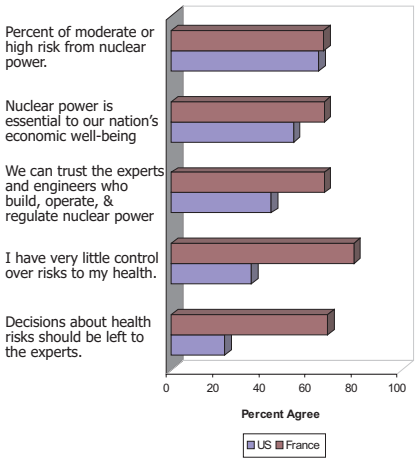


The data in this figure came from a national survey in which perceptions of environmental health risks were measured for 1275 white and 214 nonwhite persons. White males tended to differ from everyone else in their attitudes and perceptions — on average, they perceived risks as much smaller and much more acceptable than did other people. These results suggest that sociopolitical factors such as power, status, alienation, and trust are strong determiners of people's perception and acceptance of risk.

Source: Flynn, J., Slovic, P., & Mertz, C. K. (1994). Gender, race, and perception of environmental health risks. Risk Analysis, 14 (6), 1101-1108.

Important differences in attitudes between America and France

Nuclear power provides 22% of U.S. electricity and 78% of France's electricity.



Adapted from Slovic, P., Flynn, J., Mertz, C.K., Mays, C., & Poumadere, M. (1996). Nuclear power and the public: A comparative study of risk perception in France and the United States (Report number 96-6). Eugene, OR: Decision Research.

- Perceptions of nuclear risks are very similar in US & France.
- French have greater trust in experts and civil authority.
- French have greater trust in nuclear management.
- French see a greater need for nuclear power.
- French are more fatalistic about risks.

Low Dose, Risk, Decisions & Risk Communication

September 1999 to October 2002 (3 year cooperative agreement)

Decision Research (Decision Science Research Institute)
1201 Oak Street
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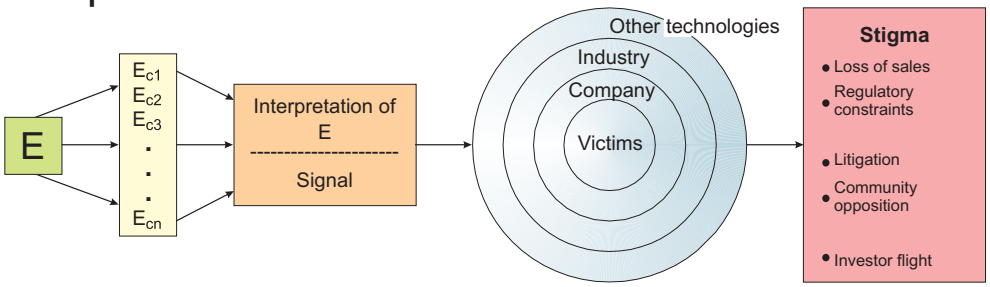
James Flynn, PhD, Principal Investigator
Paul Slovic, PhD, Co-Principal Investigator
Donald MacGregor, PhD, Senior Research Associate

The project provides basic research in the areas of risk perception and decision making as applied to the requirements for communication on behalf of the U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research, and the Low Dose Radiation Research Program, Dr. David Thomassen, Program Director.

Decision Science Research Institute, Inc., dba Decision Research, is an independent, nonprofit research corporation organized under 501(c)(3) of the Internal Revenue Code. Decision Research conducts studies in the areas of judgment and decision making broadly defined.

Social Amplification of Risk



Event | **Event characteristics** | **Interpretation** | **Spread of impact** | **Type of impact (company level)**

Source: Kasperson, R.E., Ortwin, R., Slovic, P., Brown, H., Emel, J., Goble, R.L., Kasperson, J.X., & Ratick, S.J. (1988). The social amplification of risk: A conceptual framework. Risk Analysis, 8 (2), 177-187.

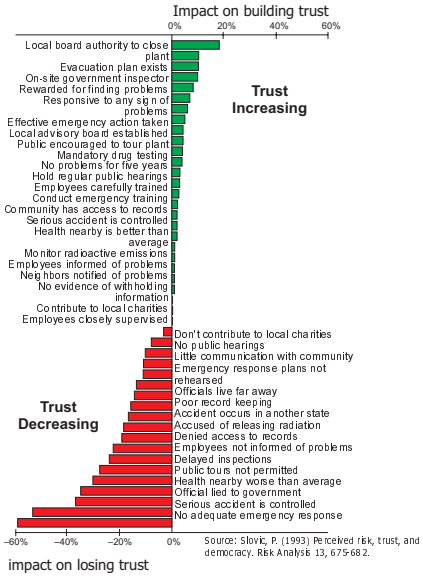
- Social dynamics influence how risk events are represented and communicated.
- Risk events have a "signal value" that is propagated through a social network.

- Risk is amplified when:
  - A new and possibly catastrophic risk has emerged.
  - The managers try to conceal the risks: they cannot be trusted.
  - The risk managers are not in control of the hazard.
  - The experts do not understand the risks or do not understand the long-term cumulative effects of chemicals.

- Risk is attenuated when:
  - Risks do not resonate with public concerns and dreads.
  - Media reporting on the hazard is limited and not sustained.
  - Benefits of the hazard are necessary.
  - Hazards are well understood and controlled.
  - Managers are trusted and display control and expertise.

Trust & Confidence in Risk Management Institutions

- Asymmetry of trust
  - It is easier to destroy trust than to create it.
- Risk management institutions are <u>sources</u> of risk.
  - Human factors
  - Organizational factors
  - Recreancy



Source: Slovic, P. (1993) Perceived risk, trust, and democracy. Risk Analysis 13, 675-682.

- Local solutions are preferred to imposed solutions.

Social Science to Support Risk Communication

How does the Social Geography of Risk frame risk communications?

- Looks at social and geographical context to understand public perceptions, attitudes, and behaviors.
- Defines empirical data needs for specific cases.
- Identifies information needs for communication.
- Allows efforts to monitor and adjust communication needs on an ongoing basis.

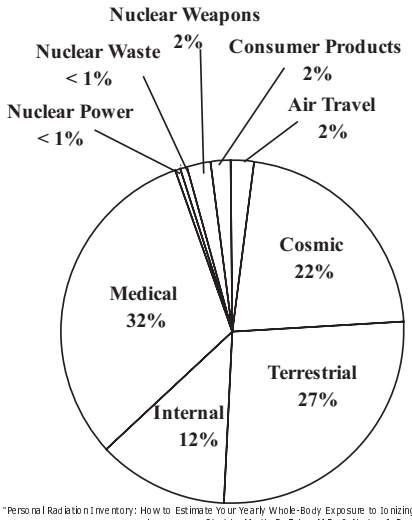
Studies in Progress

Two Modes of Thinking: Comparison of the Experiential and Rational Systems

Experiential System	Rational System
• Holistic	• Analytic
• Affective: pleasure-pain oriented	• Logical: reason oriented (what is sensible)
• Associationistic connections	• Logical connections
• Behavior mediated by "vibes" from past experience	• Behavior mediated by conscious appraisal of events
• Encodes reality in concrete images, metaphors and narratives	• Encodes reality in abstract symbols, words and numbers
• More rapid processing: oriented towards immediate action	• Slower processing: oriented towards delayed action
• Self-evidently valid: "experiencing is believing"	• Requires justification via logic and evidence

Adapted from Epstein, S. (1994). Integration of the cognitive & psychodynamic unconscious. American Psychologist, 49, 709-724.

- Emotion plays an essential role in making risk judgments.



Adapted from "Personal Radiation Inventory: How to Estimate Your Yearly Whole-Body Exposure to Ionizing Radiation" in Radiation: All You Need to Know to Stop Worrying . . . or to Start by Martin D. Ecker, M.D., & Norton J. Brameso, (1980), New York: Vintage.

- People construct different evaluations of radiation exposure depending on the source: Natural, industrial, medical.

Guiding Research Questions

- *What values do the public hold about sciences and how do these values alter perception of risk from radiation?*
- *How does "intuitive epidemiology" shape public attitudes about health-effect outcomes in communities?*
- *How are messages about the research results of low-dose radiation science perceived by non-scientists?*
- *How do people make tradeoffs between the benefits of nuclear science and the risks of radiation?*
- *Why are there differential responses to radiation risks across different communities, states, and regions?*