Communicating about Environmental Health Risks

WHY SCIENCE, EMOTION, VALUES, TIME, AND PLACE ARE IMPORTANT

CONSORTIUM FOR RESILIENT GULF COMMUNITIES

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RAND CORPORATION

CLIMATE RESILIENCE CENTER

Roadmap for this Talk

1. Background: Why is this important?
2. Characteristics of individuals: emotion, sex, politics
3. Characteristics of systems: place, time, and trust
4. Priorities for improving risk communications: suggestions and questions

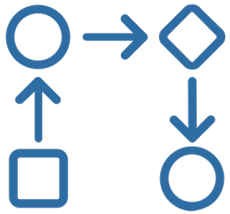
Risk communication failures erode trust and decision processes

GettyImages

Understanding risk has practical importance

Articulate gaps between different stakeholder or interest group values

Facilitate risk debates and communications



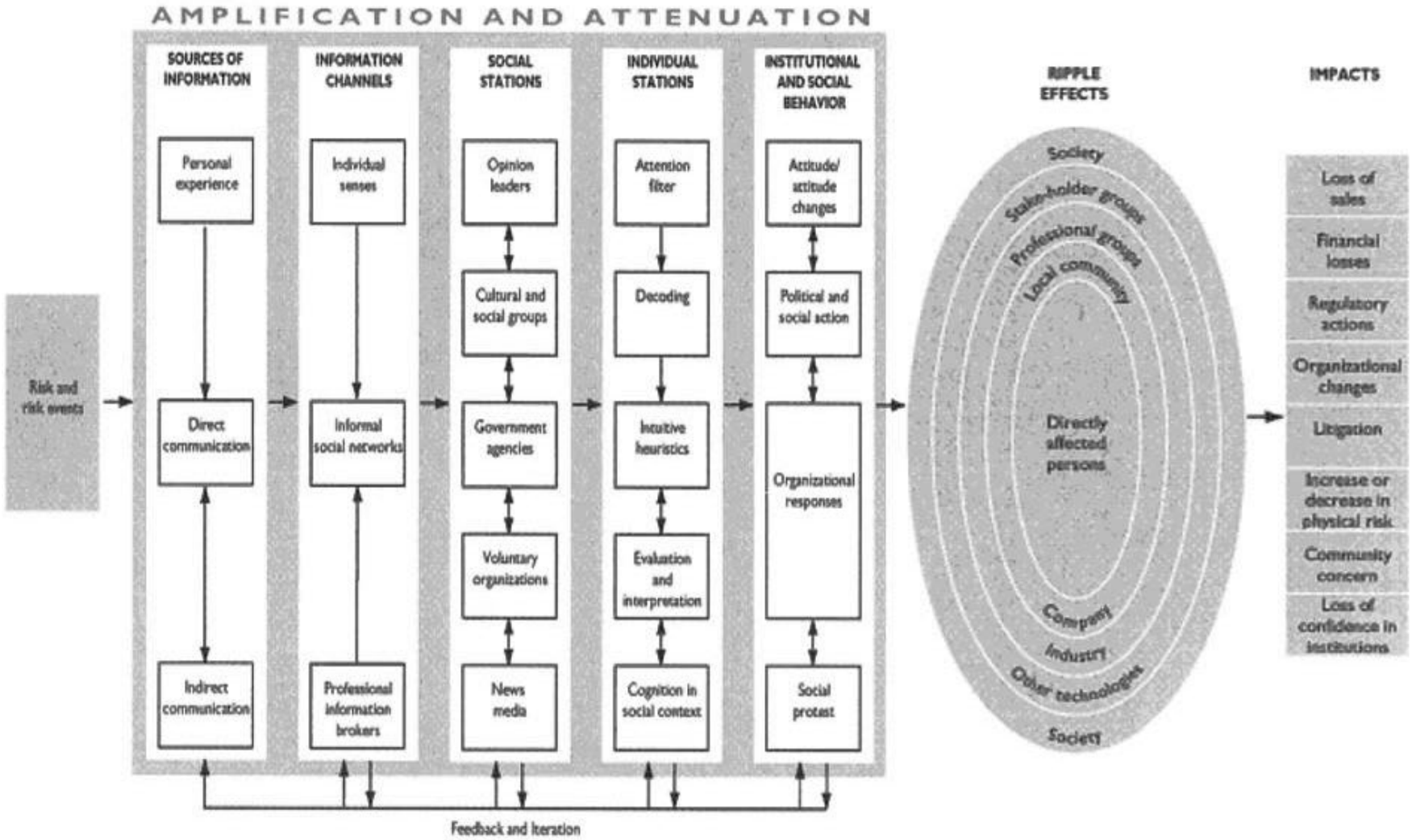
Improve decision processes and outcomes

Reduce local, regional, global conflict

Environmental health risk communications are challenging for multiple reasons

1. Characteristics of the decision problem
   - Sparse information and deep uncertainty (e.g., about wind climate parameters)
   - Ubiquity of misinformation or misrepresentation of facts (e.g., harm to birds; noisy)
2. Characteristics of decision makers
   - Absent a disaster, communities have other priorities (e.g., financial stability)
   - Diverse values and worldviews
   - Lack of trust in government and industry
3. Characteristics of the socio-political context
   - Inconsistent legal requirements or funding for engagement
   - Different access to power or other social resources
   - History of disadvantage, disenfranchisement

Social Amplification of Risk Framework



Roger Kasperson, and J. X. Kasperson, "The Social Amplification and Attenuation of Risk: A Conceptual Framework", *The Annals of the American Academy*, Vol. 545, May, (1996), pp. 112-123

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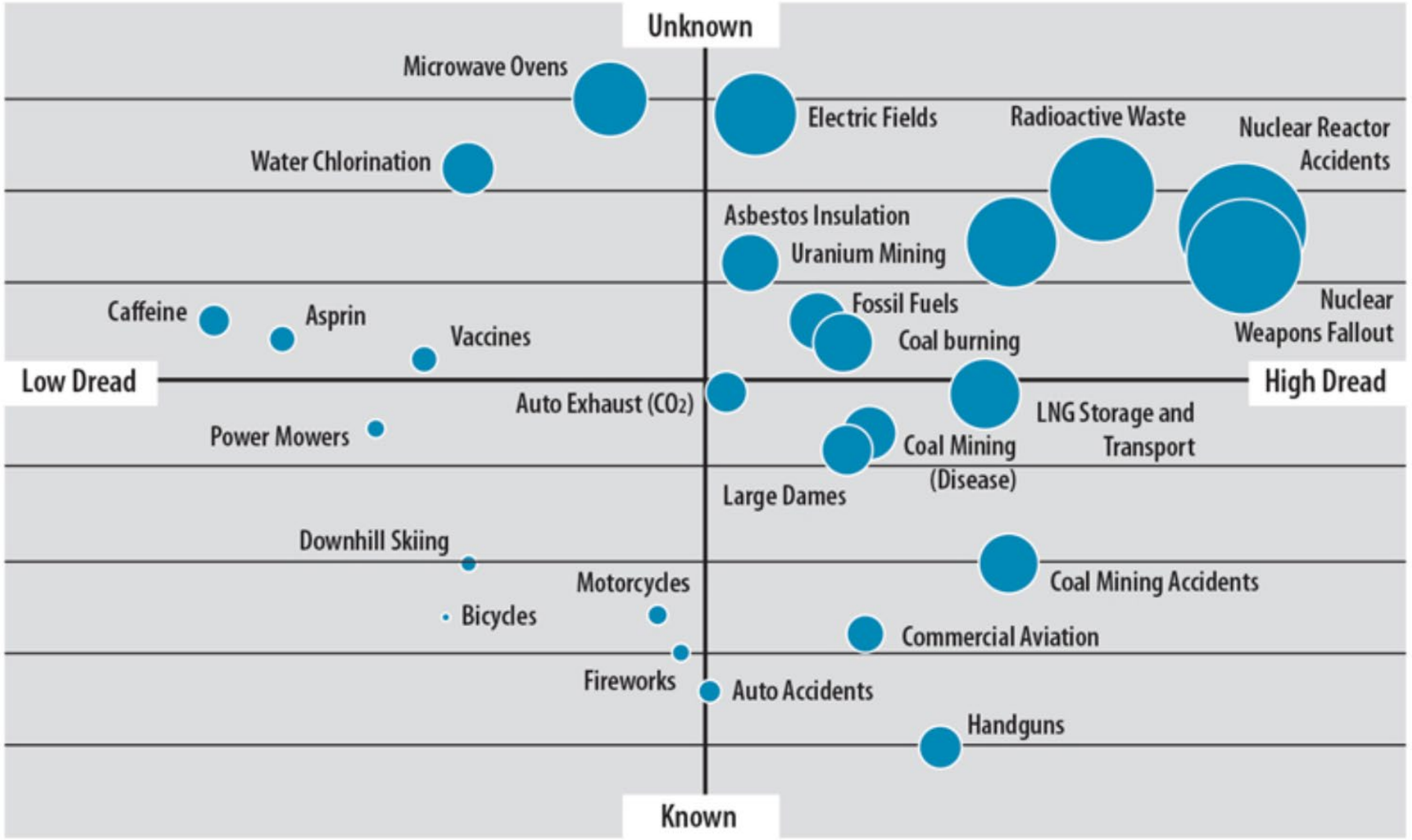
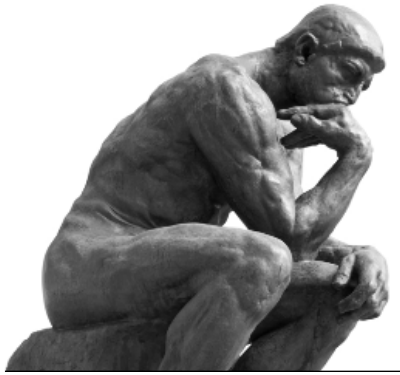
How do people think about risk and uncertainty?

Probability isn't the only concern

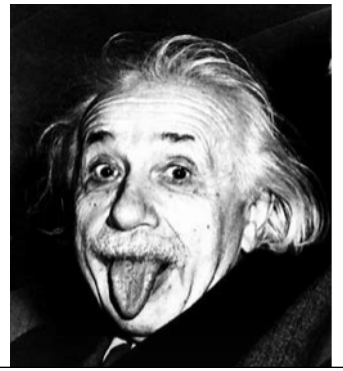


Slovic, P. (1987). Perception of Risk. *Science*, 236(4799):280-5. doi: 10.1126/science.3563507.

One key to effective risk communication: Recognizing there are 2 modes of thinking



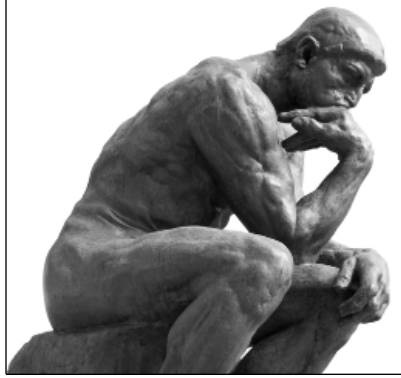
Analytic System



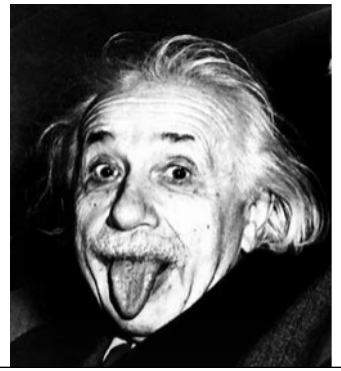
Experiential System

Analytic	Holistic
Logical (reason oriented)	Affective (pleasure-pain oriented)
Behavior mediated by conscious appraisal of events	Behavior mediated by “vibes” from past experiences
Encodes reality in abstract symbols, words, and numbers	Encodes reality in concrete images, metaphors, and narratives
Slower processing (oriented toward delayed action)	More rapid processing (oriented toward immediate action)
Requires justification via logic and evidence	Self-evidently valid (experience is believing)

Analytic and affective processes work together



Analytic System

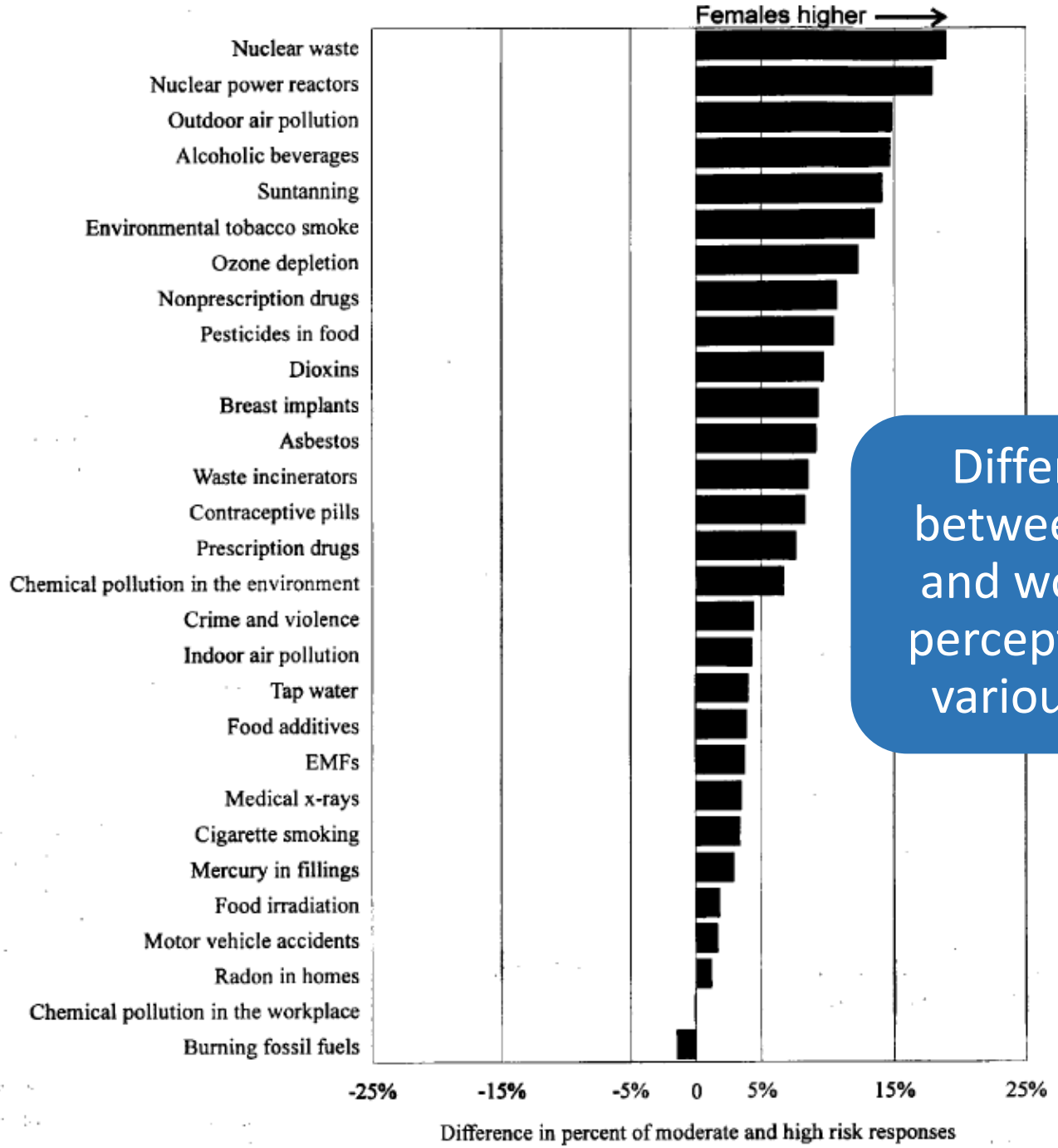


Experiential System

- To identify and prioritize experiences that are valued positively (pursued) or negatively (avoided)
- To comprehensively govern the valuation of risk information in order to maintain a particular way of life

Some groups tend to judge hazards to be more versus less risky

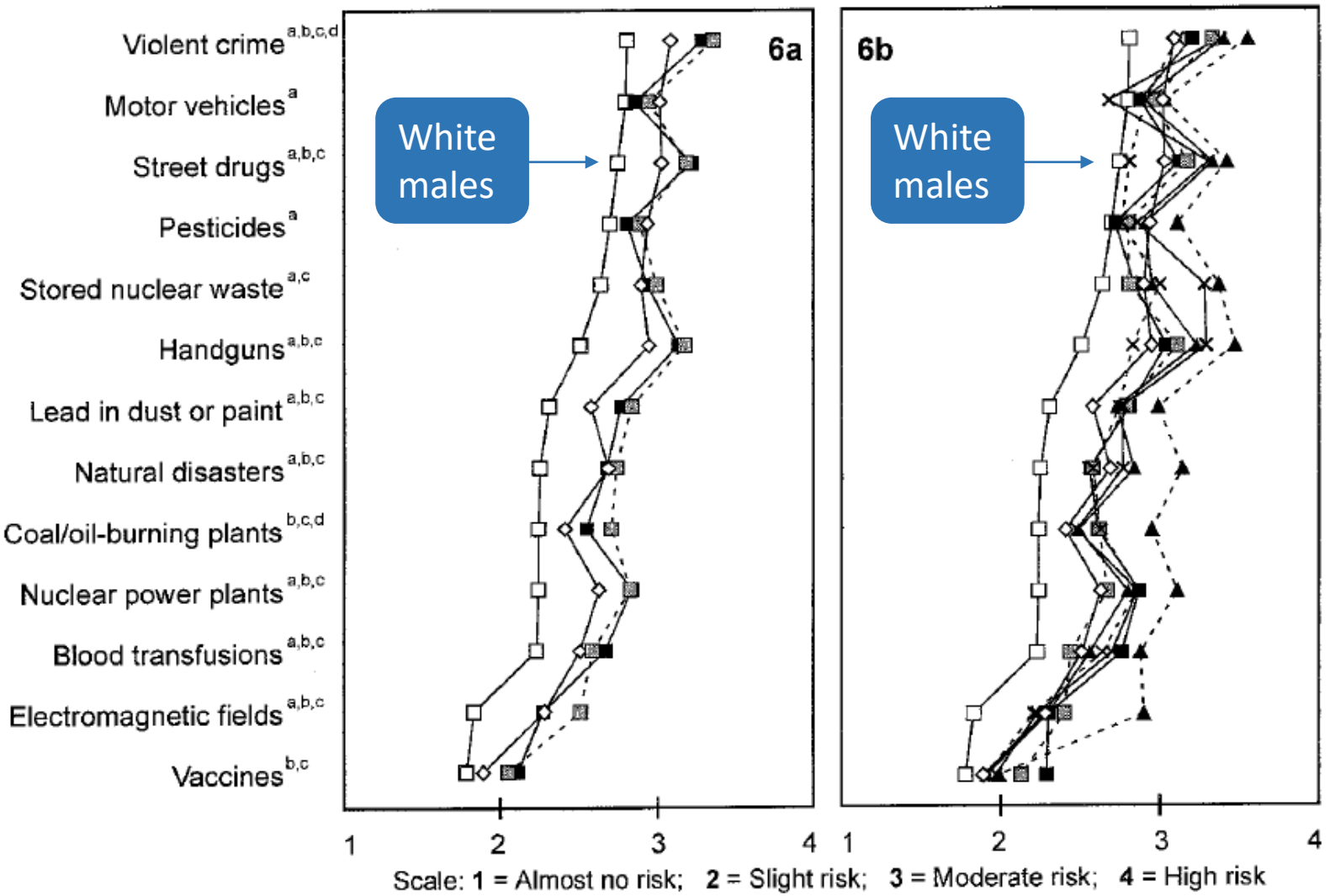
Gender differences even exist among experts



Difference between men and women's perceptions of various risks

Slovic et al., (1995). *Risk Analysis*, 15(6): 661-675. https://doi.org/10.1111/j.1539-6924.1995.tb01338.x

White males generally perceive less risk than any other group

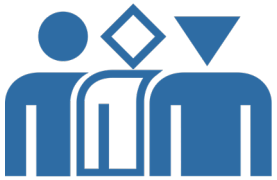


Finucane et al., (2000). *Health, Risk, & Society,* 2:2, 159-172, DOI: 10.1080/713670162

Risk perceptions reflect deep-seated values

People with low risk perceptions are more likely to:

- ✓Agree with statements reflecting hierarchical views
- ✓Disagree with egalitarian statements
- ✓Disagree with community-based decision making



Sociopolitical values vary within groups

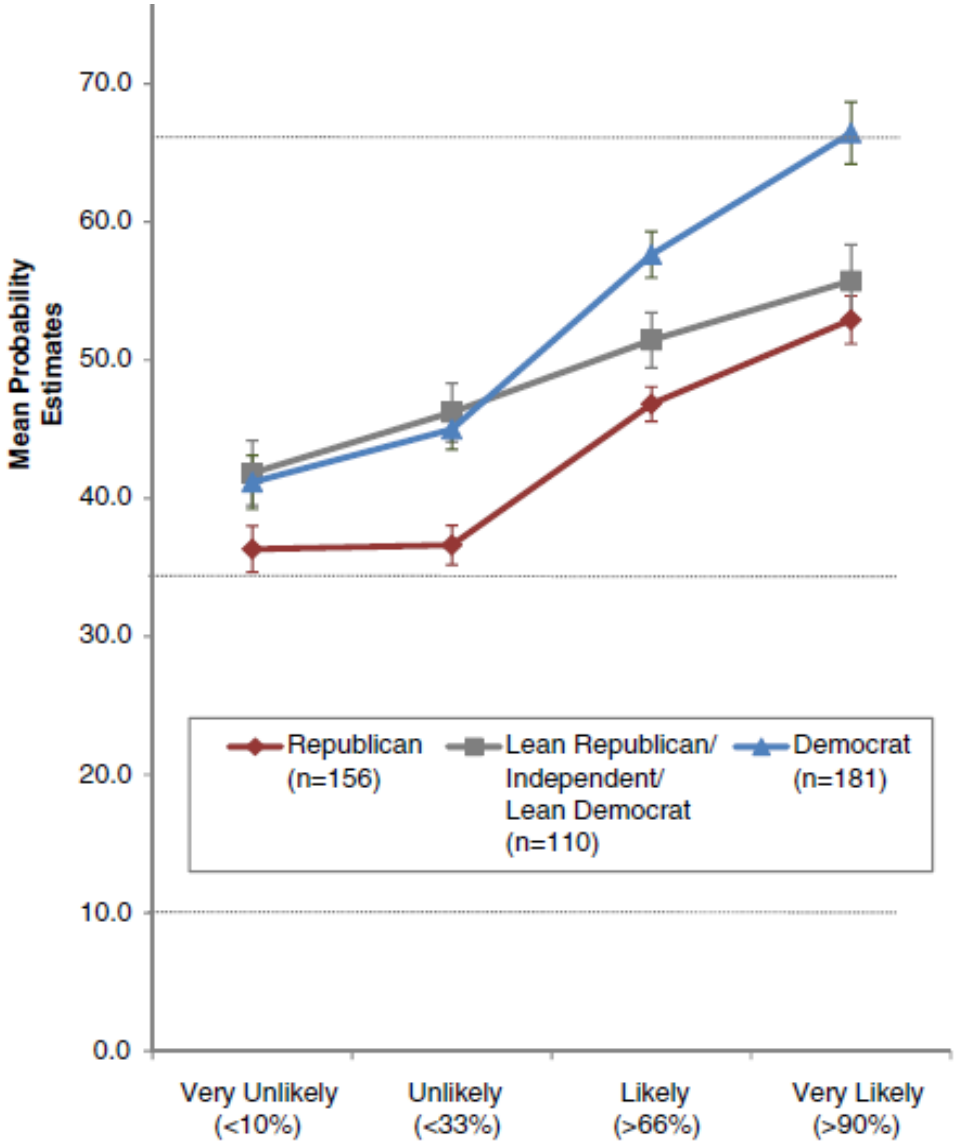
Vulnerability, control, benefits vary within groups

Political affiliation affects interpretation of probabilities

"It is **very likely** that hot extremes, heat waves, and heavy precipitation events will continue to become more frequent."

On a scale from 0-100%, please indicate your best estimate of the probability conveyed by this statement.

(Budescu et al., 2012. *Climatic Change,* 113:181-200, DOI: 10.1007/s10584-011-0330-3)



Policy implications

- Different worldviews matter
  - hierarchists prefer expert groups
  - egalitarians prefer personal choice
- All want to be involved in decision making
- Some are more willing to trust the judgment of others

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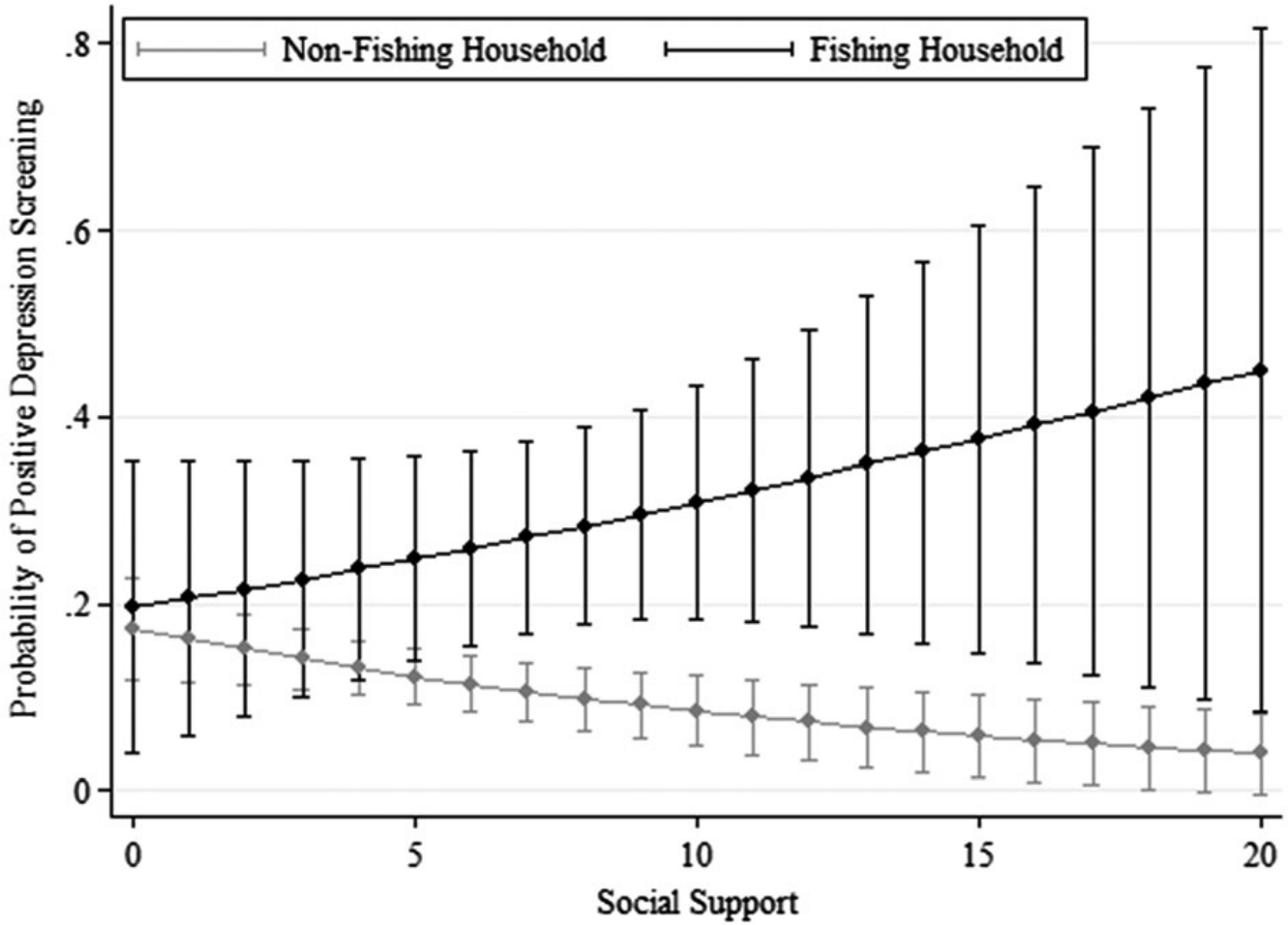
When it comes to perceived risk, place, time, and trust are crucial

Communications need to address the complexity of the resource-dependent social systems in which risks are managed

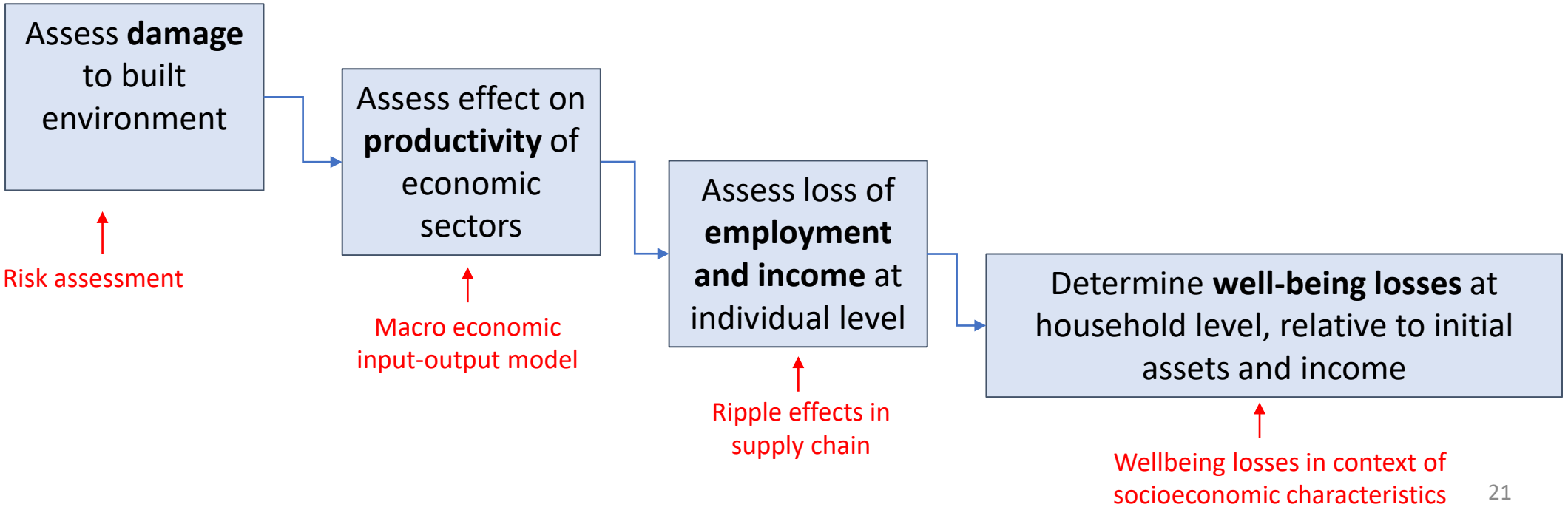


Greater social support is associated with a higher probability of a positive depression screen among fishing households

(Courtesy of: Parks et al., 2020. *Rural Sociology*, https://doi.org/10.1111/ruso.12297)

Emerging Measures of Wellbeing Suggest Broader (System) Conceptualizations of Loss are Useful for Understanding Disaster Impacts

- Alternative impact metric based on welfare economics
  (see Markhvida, Walsh, Hallegatte, & Baker, 2020, doi.org/10.1038/s41893-020-0508-7)
- Quantifies disaster impacts on consumption, accounting for asset losses and changes in income



Communications should enhance partnerships and leverage diverse sets of skills and strengths

Community health workers provide a link between scientists and communities

(Photo courtesy of Keith Nicholls)

Changes in public media channel preferences can inform communication strategies

What is your main source of news?

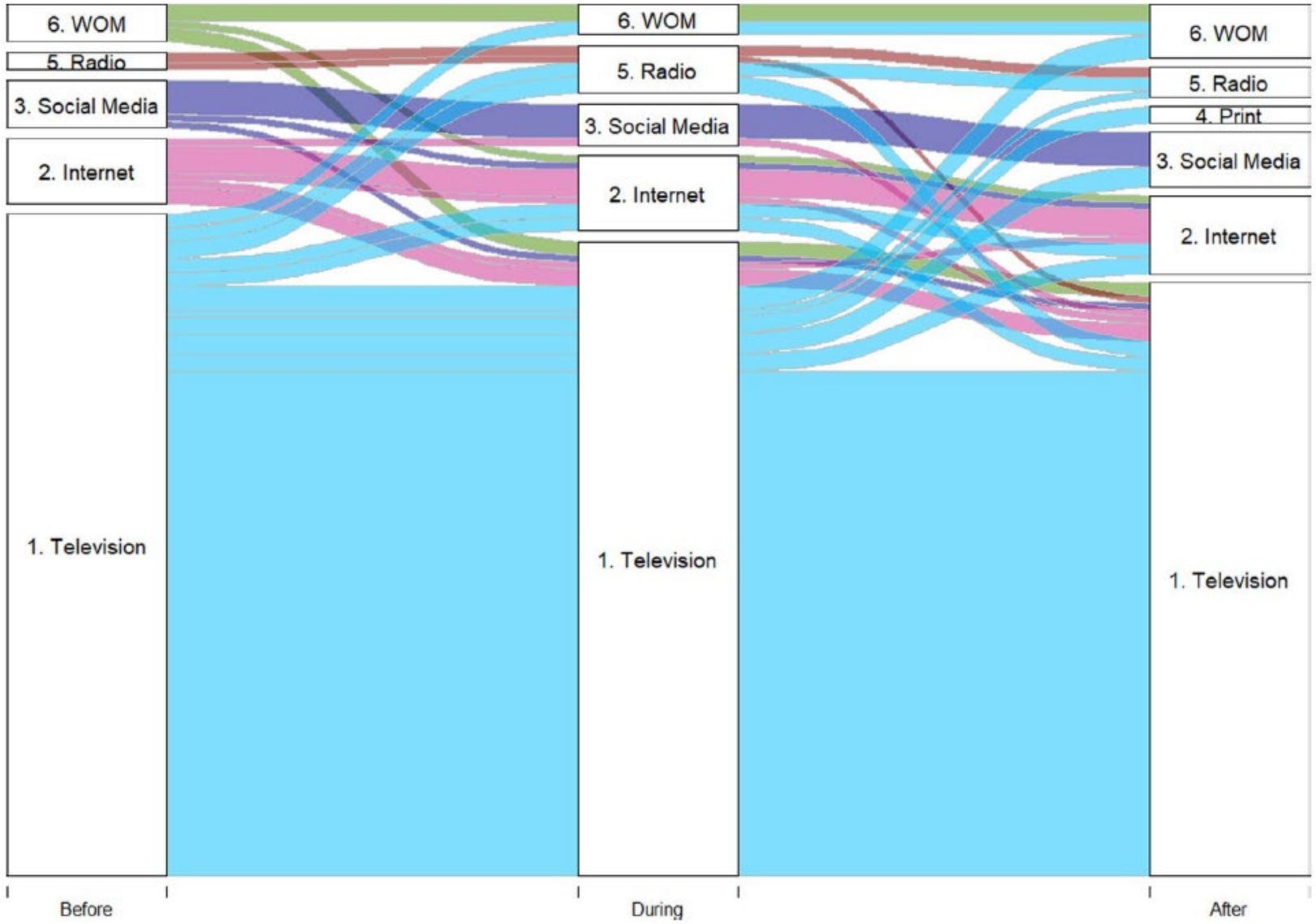
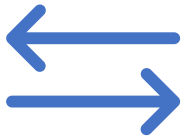


FIGURE 1 Full alluvial diagram of media preferences across crisis phases

(Petrun Sayers et al., 2021, *J Contingencies and Crisis Management,* DOI: 10.1111/1468-5973.12348)



Communications should connect the past, present, and future contexts

Environmental Justice

The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Fair treatment

No group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. (italics added)

www.epa.gov/environmentaljustice

Indices of Vulnerability Are Intended to Simplify the Use of Many Variables

- Different indices incorporate different numbers, types of socio-demographic variables
  - Simple Example: EJSCREEN Demographic Index = (% minority + % low-income) / 2
- Some indices developed using statistical methods
  - E.g., USC's Social Vulnerability Index (SoVI) from principal components analysis of 28 variables
- Other indices use qualitative expert input
  - E.g., CDC's Social Vulnerability Index (SVI) from percentile ranks of 15 variables
- Latent constructs, not directly observable

Indices of Vulnerability Have Questionable Value as Decision Support Tool

- Caution against using vulnerability indices for policymaking due to potential internal and theoretical inconsistencies

  Spielman et al. (2020). *Natural Hazards*, 100:417-436. DOI: /10.1007/s11069-019-03820-z;
  Bakkensen et al. (2017). *Risk Analysis*, 37:982-1004. DOI: /10.1111/risa.12677

- Need to understand limitations
  - Pulling different measures from different regions or time points will generate a different indicator
  - Emphasis is on describing urban areas/ population centers because they are the largest contributors to any data source
  - Focus is on identifying, rather than explaining
  - Some aspects may be context dependent, such that the same value in different places has different meaning
  - Historical data and may not reflect current or future conditions

Example Approach to Equity Indicators/Metrics

King County Washington (2015)

Determinants of Equity: Identifying Indicators to Establish a Baseline of Equity in King County

https://kingcounty.gov/elected/executive/equity-social-justice/strategic-plan.aspx

Figure 3: Example of a TOC using the visual "stream" metaphor of ESJ[10]

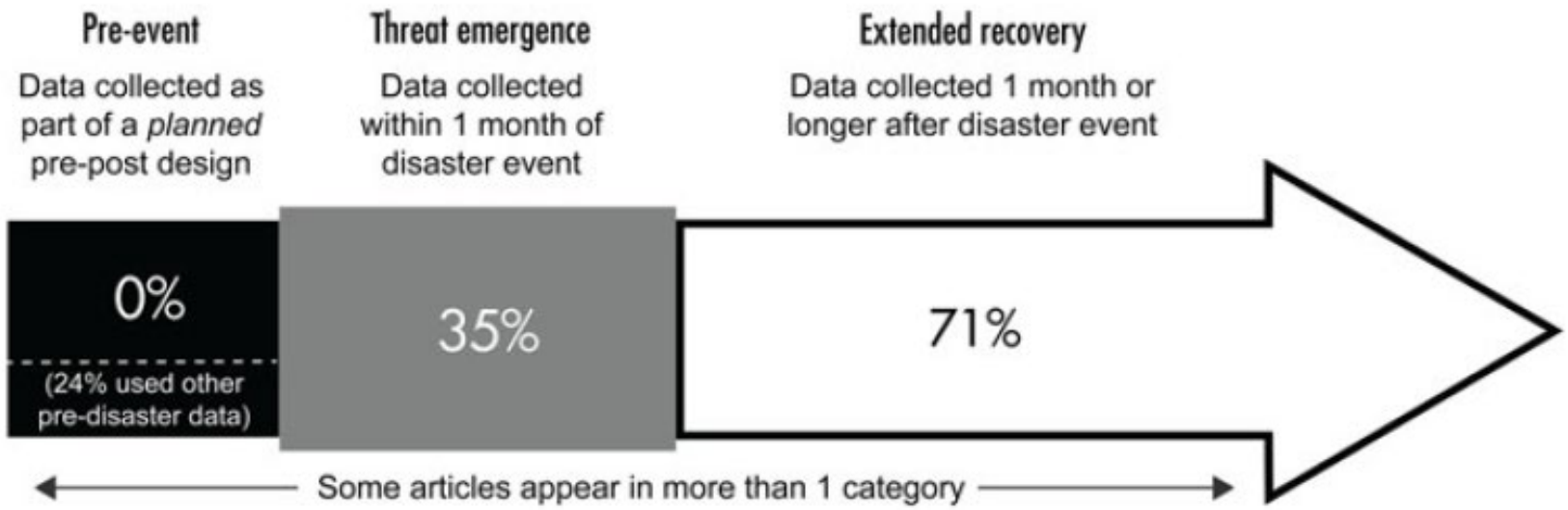
One example of pro-equity policies might be:
- Percent of hiring managers that participate in anti-bias training

- Percent of cost burden home owners
- Medium household income
- Graduation rate
- Food security
- Incarceration rate
- Pollution by region
- Perceived neighborhood safety
- Home ownership rate
- Transportation cost burden
- Uninsured adults
- Park access

- Life expectancy
- Incarceration rate
- Obesity prevalence
- Homelessness
- Infant mortality
- Frequent mental distress

Communications should be evidence-based:

On the need for prospective survey panels



Courtesy of: Parker, Edelman, Carman, & Finucane (2019). *Disaster Medicine and Public Health Preparedness.* DOI: 10.1017/dmp.2019.94

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How do we make information more meaningful?

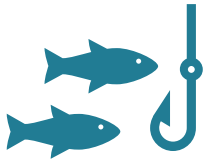
Messages of Hope (evidence based!)

Key lessons learned from health and education research on fostering hope and resilience:

1. Foster caring relationships that promote positive expectations and participation
2. Focus on a broad range of learning styles (experiential, analytic, visual, auditory, etc)
3. Build from perceptions of community strengths (assets-based ecological approach)
4. Ensure inclusionary group practices such as mainstreaming, cooperative learning, and peer tutoring
5. Evaluate with multiple intelligences (e.g., self reflection) and multiple outcomes (change in beliefs or in practices, rather than temperature, SLR)

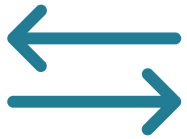
Priority steps for improving risk communications

Expand meaningful engagement to understand/address the needs and concerns of local communities



Address the complexity of the resource-dependent social systems in which risks are managed

Enhance partnerships, leveraging diverse sets of skills and strengths

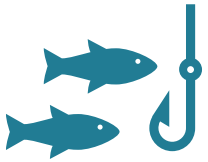


Connect the past, present, and future contexts to support risk communication efforts

Deepen the evidence base to iteratively improve risk communications

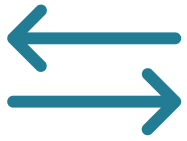
Multiple Knowledge Gaps Need to Be Addressed

- What constitutes meaningful engagement?
- How could risk communications effectively address contextual, procedural, and distributional dimensions of equity?



- How might connections between natural and social systems might be disrupted for some groups and not others?
- How can communications integrate multiple perspectives on the opportunities and challenges posed by transitions?

- What frameworks, methods help to integrate diverse types of knowledge?
- What decision support tools facilitate discussions about tradeoffs?



- What data are needed to track how community needs and concerns change over time?
- How would those data inform adaptive improvement of risk communications?

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