RISK PERCEPTION AND RISK ACCEPTANCE: IMPLICATIONS FOR NUCLEAR ENERGY

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Outline

1. What is risk?

2. Risk Perception and Risk Acceptance

3. Factors that Affect Risk Perception and Risk Acceptance

A. Factors Related to the Characteristics of Persons Making the Judgement

1. Ways of Thinking and Decision Making Ability
   a) The "closeness" of other events
   b) experts vs. non-experts
   c) "Dread"
2. Education
3. Personal Values
4. Gender and Ethnicity
5. Addiction

B. Factors Related to the Characteristics of Risk

1. Personal vs. Social
2. Voluntary vs. Non-voluntary
3. Familiar vs. Exotic
4. Natural vs. Technological

C. Other Factors

1. Media

4. Implications For Nuclear Energy: Questions That Need to Be Addressed

RISK

"the chance of an adverse outcome to human health, the quality of life, or the quality of the environment"

(Graham and Wiener, In Risk vs. Risk, 1995, p. 23)

CATEGORIES OF RISK

a) Familiar High Risks
- **large consequences, good information available**

b) Risks of Low Probability & Large Consequences

c) Very Low Probability (Haven't Yet Occurred) & Very Large Consequences)

d) Risks Buried in a Background of "Natural" Occurance

(Lewis, Technological Risk, 1990)

RISK PERCEPTION

- **refers to an individual's intuitive judgement of both aspects of risk: the probability of occurance and the severity of the associated consequences**

- **only a judgement of the hazard or danger without a consideration of the benefits**

RISK ACCEPTANCE

- **involves a subjective balancing of benefits with risks**

- **two people who may agree on the degree of risk involved may disagree on its acceptability**

RISK ASSESSMENT

requires:
- **identification of a hazard**
- **how hazard could occur**
- **assess probability of the event**
- **assess consequences of the event**

expectation of loss = probability X consequence

eg. # fatalities /year

A. Factors Related to the Characteristics of Persons

1. Ways of Thinking or Decision Making Ability

a) The “closeness” of other events

b) experts vs. non-experts

c) “dread” risk

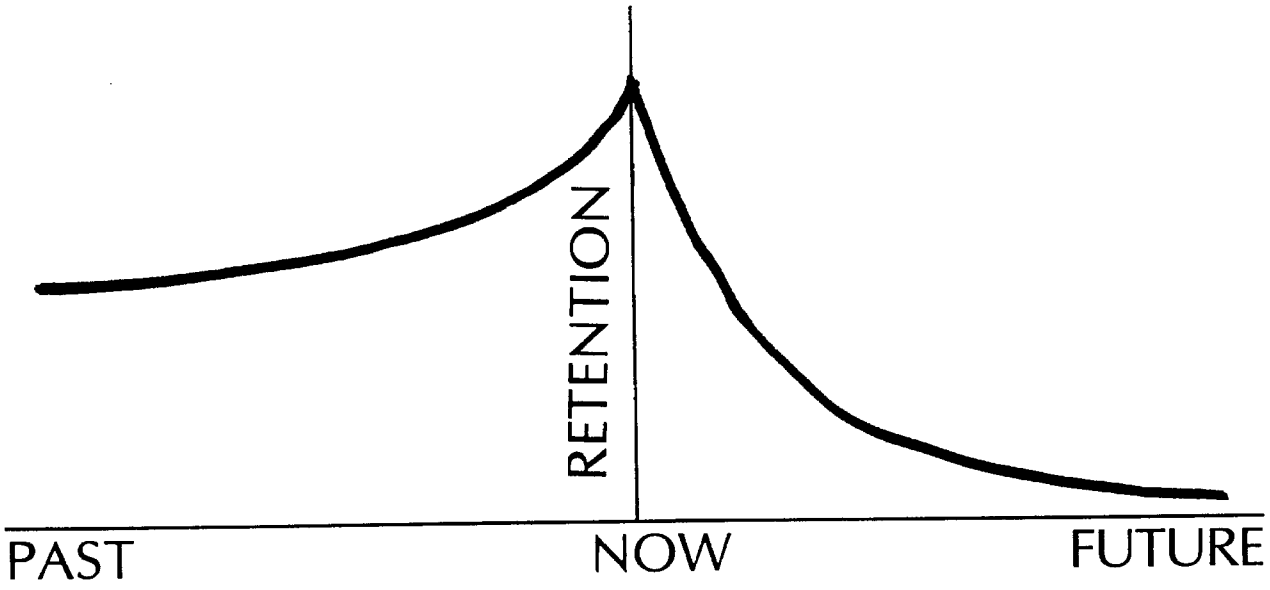
2. Education

3. Personal Values

4. Gender and Ethnicity

5. Addiction

THE "CLOSENESS" OF OTHER EVENTS
(Distal Cognition)



Retention of knowledge as a Function of Time

(Bjorkman, Risk and Society, 1987)

EXPERTS VS. NON-EXPERTS

1. **Exercise: The ranking of risks**

2. **Three Approaches to Risk Assessment**

   i) **Absolute Rationality**

   - **experts (in the 'know') are best able to make the necessary calculations**
   - **public are irrational**

   ii) **Limited or Bounded Rationality**

   - **acknowledges that we all have limits to our knowledge, decision making ability, and experience**
   - **public can be educated to have better 'rules of thumb' (more 'absolute')**

   iii) **Social or Cultural Rationality**

   - **people can't be educated to have better rules of thumb <u>and</u> this is a good thing**
   - **why?**

RANKING RISKY TECHNOLOGIES

Skiing
Hunting
Nuclear Power
Contraceptives
Firefighting
Motorcycles
Railroads
Home Appliances
Handguns
Private Aviation
Mountain Climbing
Food Colouring
Pesticides
Commercial Aviation
Swimming
Vaccinations
Food Preservatives
X-rays
Smoking
Spray Cans
Motor Vehicles
Surgery
Large Construction
Bicycles
Alcoholic Beverages
Power Mowers
High School and College Football
Prescription Antibiotics
Police Work
Electric Power (non-nuclear)

Choose the <u>ten</u> most risky activities or technologies.
Rank them from most risky - 1 to less risky - 10.

DIFFERENT PERCEPTIONS

The rankings of perceived risks for 30 activities and technologies, based on a survey of a group of experts and a group of informed lay people, members of the League of Women Voters (LWV) in the United States. A ranking of 1 denotes the highest level of perceived risk.

LWV	Activity or Technology	Experts
1	Nuclear Power	20
2	Motor Vehicles	1
3	Handguns	4
4	Smoking	2
5	Motorcycles	6
6	Alcoholic Beverages	3
7	Private Aviation	12
8	Police Work	17
9	Pesticides	8
10	Surgery	5
11	Firefighting	18
12	Large Construction	13
13	Hunting	23
14	Spray Cans	26
15	Mountain Climbing	29
16	Bicycles	15
17	Commercial Aviation	16
18	Electric Power (non-nuclear)	9
19	Swimming	10
20	Contraceptives	11
21	Skiing	30
22	X-rays	7
23	High School & College Football	27
24	Railroads	19
25	Food Preservatives	14
26	Food Colouring	21
27	Power Mowers	28
28	Prescription Antibiotics	24
29	Home Appliances	22
30	Vaccinations	25

Source: Science (Paul Slovick/Decision Research)

PATTERNS OF NON-EXPERT RISK PERCEPTION

"Dread Risk"

associated with

- lack of control over activity
- fatal consequences if there were a mishap
- high catastrophic potential
- reactions of dread
- inequitable distribution of risks & benefits
- the belief that risks are increasing and not easily reducible

(Perrow, Normal Accidents, 1984, pg. 326)

B. Factors Related to the Characteristics of the Risks

1. Personal vs. Social

2. Voluntary vs. Non-Voluntary

3. Familiar vs. Exotic

4. Natural vs. Technological

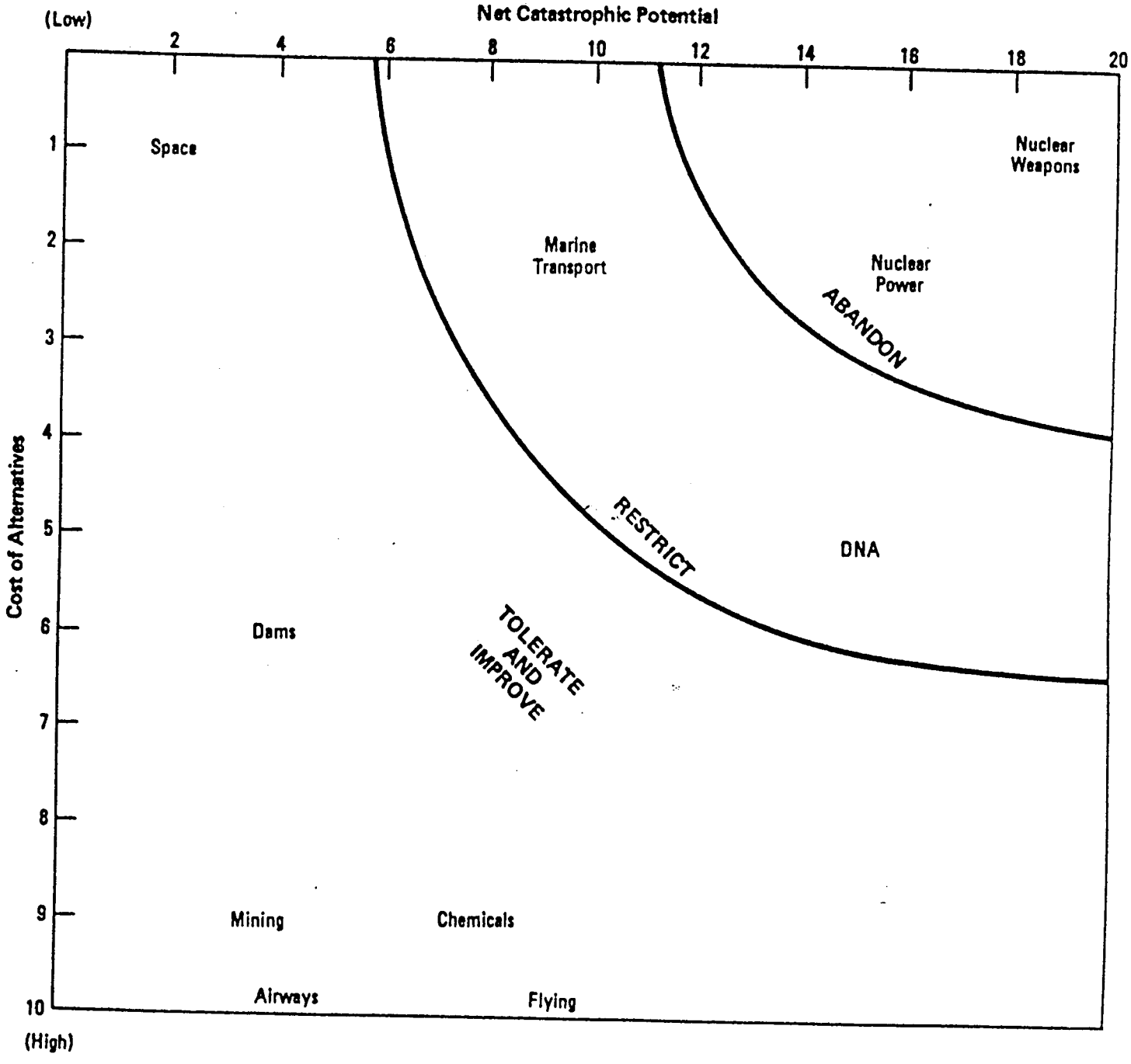
C. Other Factors

Media

IMPLICATIONS FOR NUCLEAR ENERGY

What questions does this raise about technologies that are "perceived" by many to be very risky?

Policy Recommendations



(Perrow, Normal Accidents, 1984, p. 349)