

"Positivist" views of risk

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(S&W1980)

Chris Whipple (1989) "Non pessimistic risk assessment and de Minimis risk as risk management tools" in
D. Paustenbach (ed.) *The Risk Assessment of Environmental Hazards* (Wiley), pp. 1105-1120. (W
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C.E. Harris et al (2000) *Engineering Ethics: Concepts and Cases*. second edition. Wadsworth

1 Steps in quantitative risk estimation (量的なリスク見積もりの手順)

1-1. Risk estimation of chemicals (NRC 1983)

Hazard identification (ハザード同定)

What is the hazard?

↓

Dose-response assessment (用量反応分析)

What is the relationship between the dose and incidents?

↓

Exposure assessment (暴露分析)

What is the actual level of dose?

↓

Risk characterization

What is the amount of risk?

Types of data

- Epidemiological data (疫学データ)
- Animal bioassay data (動物実験データ)
- Short term study (短期調査)
- Comparisons of molecular structure

1- 2. Engineered products (Harris et al 2000)

Fault-tree analysis (フォールトツリー分析)

The method of enumerating possible causes of failure.

Probabilities of all the possible causes are added up to estimate the probability of failure.

Event tree analysis (イベントツリー分析)

The method of enumerating possible courses of events

When we find out a certain course of events leads to a failure, probability of that cause of events is calculated to get the probability of the failure.

2 cost-benefit analysis

The quantitative risk estimation is often associated with risk cost-benefit analysis (RCBA) リスクコストベネフィット分析

-This is the decision procedure that chooses the minimal amount of risk determined by the quantitative risk estimation.

-the undesirability of each outcome (cancer, accident etc.) is decided using societal values and criteria. societal values can be measured using social scientific techniques. (S&W 1980p.1116)

- revealed preference (studying historically accepted risks) 顕示選好法

- expressed preference (studying risk-taking behavior using questionnaire) 表明選好法

3 Motives for “analytical approach” 分析的アプローチの動機

S&W1980 and W 1989 list various reasons to prefer what they call ‘analytical approach’

3-1 motives

- Conflicts over the level of acceptable risk is unavoidable (対立の不可避性 S&W 1980 p. 1114)

←differences in risk taking tendencies.

→how can we minimize the conflict?

- Scarcity of resources (W 1989 p. 1111)

Resources are scarce and we should allocate them wisely

3-2 Problems with intuitive risk-benefit analysis (S&W 1980 pp.1116-1117)

- our probability perception may be biased

control over risk (コントロールできないリスク)

overestimation of low-probability, high consequence risk (確率は低いが大変な結果を産むリスクの過大評価)

3-3 Problems with traditional regulation schemes (p.1118)

3-3-1 zero risk goal (ゼロリスクという目標)

→ignoring trade off (トレードオフの無視)

examples in W 1989 p.1109 :

--safer new power plants are stalled for risk issues and less safer older plants are in use. (従来より安全な発電所がいつまでも建設できない)

--a fire-retardant chemical, TRIS, was found carcinogenic, but the substitutes used after the ban of TRIS was even more harmful. (耐火性のために使われていた薬品が発がんリスクを持つことがわかった。しかもその薬品が禁止されたあとの代替品はもっと危険だった)

--weatherstripping program intended to reduce environmental risk actually increased the exposure to indoor pollutants like radon. (省エネのために家のすきまをふさぐプログラムを推進したところ、ラドンなどの屋内汚染源による被害が発生した)

3-3-2 arbitrariness of decision (決定の恣意性)

→regulatory agency judge reasonableness without congressional guidance

→ having a consistent method reduces the problem of arbitrariness

3-3-3 inconsistency (一貫性のなさ)

because different hazard has different level of control, the overall risk is not effectively controlled.

example from W 1989 p.1109

Saccharin and cyclamate (サッカリンとチクロ)

opposite decisions were made in Canada and U.S.

De minimis policy (些末リスクを放置する政策) : ignoring trivial risks under certain threshold.
this policy has the effect of reducing inconsistencies

3-3-4 specifications based on current technology (現在の技術にもとづく指定)

The requirements are often specified in terms of available technology rather than the risk level. This discourages developing new risk management technology.

3-3-5 problem with pessimistic risk assessment (悲観的なリスク評価の問題) (Wipple 1989 p. 1110)

pessimistic risk assessment: that uses the plausible upper-bound or worst case probability.
'conservative' risk assessment

-- pessimistic risk assessments lead to inconsistency

4 Objectivity (客観性)

S&W1980 p.1115

"Involuntary risks are perceived differently by individuals. Their perceptions may be far from reality."

W 1989 p.1114

-"risk assessers bridge gaps in knowledge with assumptions" (仮定を使って知識のギャップをうめる)

"The need for accuracy implies that the best available scientific knowledge, supplemented as necessary by assumptions that are consistent with science, will be applied." (quoted from NRC 1983)

What is their view of objectivity of risk assessment?

Is this position deserve the name "naive positivist," as Shrader-Frechette call them?