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How Fair Is Safe Enough? The Cultural Approach to Societal Technology Choice[1]

Steve Rayner[2] and Robin Cantor[2]

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This paper consists of an argument and a pilot study. First is a general, perhaps philosophical, argument against the National Academy's viewpoint[1] that dealing with risk is a two-stage process consisting of (a) assessment of facts, and (b) evaluation of facts in sociopolitical context. We argue that societal risk intrinsically revolves around social relations as much as around evaluations of probability. Second, we outline one particular approach to analyzing societal risk management styles. We call this the *fairness hypothesis*. Rather than focusing on probabilities and magnitudes of undesired events, this approach emphasizes societal preferences for principles of achieving consent to a technology, distributing liabilities, and investing trust in institutions. Conflict rather than probability is the chief focus of this approach to societal risk management. This view is illustrated by a recent empirical pilot study that explored the fairness hypothesis in the context of new nuclear technologies.

KEY WORDS: Technology choice; fairness hypothesis; consent, liability, and trust; new nuclear technologies.

Revisiting Rayner & Cantor (1987)—How Fair is Safe Enough? The Cultural Approach to Societal Technology Choice

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Ortwin Renn

Abstract

This paper provides a critical review of Rayner and Cantor's seminal 1987 work, 'How fair is safe enough?' which challenged the technocratic dominance of 1980s risk analysis. By shifting the focus from statistical safety to institutional fairness, the authors utilised Mary Douglas's 'Grid-Group' cultural theory to explain societal technology choices. They categorised public responses into four cultural prototypes—entrepreneurs, egalitarians, bureaucrats and stratified individuals—each possessing a distinct, 'rational' framing of risk and justice. The analysis highlights the paper's innovation in redefining 'consent' as a social contract rather than a legal hurdle. However, the review also notes significant limitations, including a lack of empirical evidence, a 'blind spot' regarding power imbalances and decreasing applicability to the incremental, digital risks of the modern era. Despite these critiques, the text remains a transformative link between psychometric perception studies and social constructivism, asserting that in pluralistic societies, safety is ultimately a social construct rooted in trust and procedural equity.

Keywords

Distributive and procedural fairness • Cultural theory of risk • Group-grid distinction • Multiple rationalities of risk • Risk as a social construct

O. Renn (✉)
Research Institute for Sustainability Potsdam, Potsdam, Germany
e-mail: ortwin.renn@rifs-potsdam.de

Dialogik non-profit Institute, Stuttgart, Germany

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11.1 Introduction

The publication of 'How fair is safe enough?' in 1987 arrived at a climactic moment in the history of science and technology studies. The 1980s were defined by a series of high-profile technological failures—most notably the Chernobyl disaster in 1986 and the Challenger shuttle explosion—which had shattered the public's unquestioning faith in expert systems (Renn 2008, p. 53ff.). The risk community was divided between two philosophies. On one side stood the 'technocrats', who believed that risk was a purely objective calculation of probability times magnitude. On the other side were emerging social scientists who argued that 'risk' was as much a product of social perception and culture as it was of engineering and objective threats to humans and nature (Campbell 1998).

11.2 Analysis

Steve Rayner and Robin Cantor were uniquely positioned to observe this friction. Rayner, an anthropologist by training, and Cantor, an economist, sought to bridge the gap between risk as an objective feature of events or activities and risk as a social construct. Their reputation, particularly Rayner's, was built on the ability to translate the concept of cultural theory developed and refined by Mary Douglas, Aaron Wildavsky and Michael Thompson into the language of risk (Douglas 1970, 1972, 1985, 1990; Thompson and Wildavsky 1982). By 1987, the 'acceptable risk' problem had reached a stalemate: no matter how many safety redundancies were added to a nuclear plant or a chemical facility, public opposition remained fierce. Rayner and Cantor observed this debate and suggested that the experts were answering the wrong question. It was not the case that the public did not understand the 'safety' of the technology; it was that they did not trust the 'fairness' of the institutions managing it. The focus shifted from the statistical safety record to the distribution of consequences in case of a disaster and the fairness of the process by which decisions about risk technologies were made (Earle and Siegrist 2008).

The composition of the article is based on the premises of the 'cultural theory of risk'. Several sociologists and anthropologists have attempted to develop typical combinations of values, worldviews and convictions to form what they call cultural prototypes. These prototypes represent social and cultural constructions of what different subcultures within a society define and evaluate as posing a risk to them (Johnson and Covello 1987; Johnson 1987). They have identified four or five prototypes that distinguish different cultural groups in society (Douglas and Wildavsky 1982; Rayner 1990, 1992; Schwarz and Thompson 1990; Thompson et al. 1990; Wildavsky and Dake 1990, see Chap. 17). These different groups have formed specific positions on risk topics and have developed corresponding attitudes and coping strategies. They differ in the degree of group cohesiveness (the extent to which someone finds identity in a social group) and the degree of grid (the

extent to which someone accepts and respects a formal system of hierarchy and procedural rules).

These groups include the entrepreneurs, the egalitarians, the bureaucrats, the stratified individuals and—added in some publications—the group of the hermits (Thompson 1980; review in Renn 2008, p. 121ff.). They can be localised within the group-grid space (see Fig. 11.1). Organisations or social groups belonging to the entrepreneurial prototype perceive risk-taking as an opportunity to succeed in a competitive market and to pursue their personal goals. They are characterised by a low degree of hierarchy and a low degree of cohesion. They are less concerned about equity issues and would like the government to refrain from extensive regulation or risk management efforts. This group contrasts most with organisations or groups belonging to the egalitarian prototype, which emphasises cooperation and equality rather than competition and freedom. Egalitarians are also characterised by low hierarchy but have developed a strong sense of group cohesiveness and solidarity. When facing risks, they tend to focus on long-term effects of human activities and are more likely to abandon an activity (even if they perceive it as beneficial to them) than to take chances. They are particularly concerned about equity.

The third prototype, i.e. the bureaucrats, relies on rules and procedures to cope with uncertainty. Bureaucrats are both hierarchical and cohesive in their group relations. As long as risks are managed by a capable institution and coping strategies have been provided for all eventualities, there is no need to worry about risks. Bureaucrats believe in the effectiveness of organisational skills and practices and regard a problem as solved when a procedure to deal with its institutional management is in place.

The fourth prototype, the group of atomised or stratified individuals, principally believes in hierarchy, but they do not identify with the hierarchy to which they belong. These people trust only themselves, are often confused about risk issues and are likely to take high risks for themselves, but oppose any risk that they feel is imposed on them. At the same time, however, they see life as a lottery and are often unable to link harm to a concrete cause.

In addition to the four prototypes, there may be a hybrid group called the autonomous individuals or the hermits who can be grouped in the centre of the group-grid coordinates. Thompson describes autonomous individuals as self-centred hermits and short-term risk evaluators (Thompson 1980). They may also be referred to as potential mediators in risk conflicts since they build multiple alliances with the four other groups and believe in hierarchy only if they can relate the authority to superior performance or knowledge.

This understanding of risk as a social construction designed and interpreted by four distinct cultural subgroups (the hermits are not mentioned) has enlightened the paper by Rayner and Cantor and stimulated their argumentation about fairness as a decisive variable to judge the tolerability of risk (Renn 2008, p. 122). Rayner and Cantor do not merely list these four categories; they weave them into a narrative of competing worldviews. In a slightly different interpretation of the original concept of cultural theory, they argue that ‘grid’ represents the degree to which an individual’s life is circumscribed

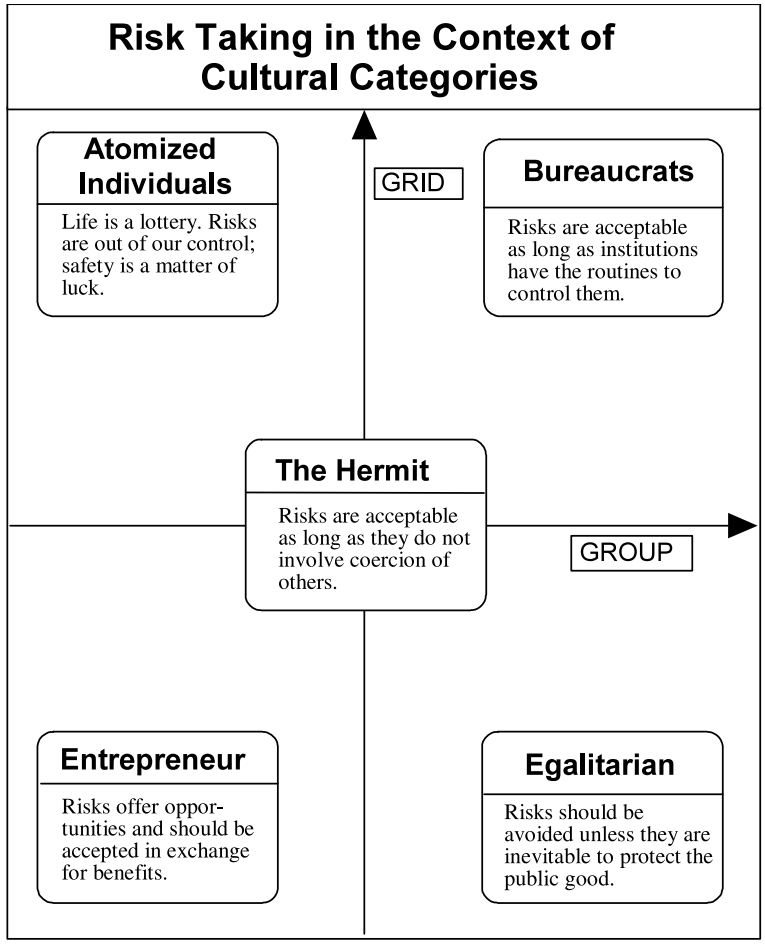


Fig. 11.1 Patterns of value clusters. *Source* After Thompson et al. (1990)

by externally imposed prescriptions (rules and roles), while 'group' represents the strength of the boundaries between 'us' and 'them'. Fairness includes both dimensions: the degree to which people feel restricted by regulations and formal rules and the degree to which different frames of justice are met when making high-risk decisions.

Based on the typical understanding and framing of fairness by each cultural subgroup, Rayner and Cantor move beyond the 'rational vs. irrational' dichotomy. They show that an egalitarian rejecting a nuclear plant is being just as 'rational' (within their social framework) as a hierarchist supporting its construction. This is the paper's main assumption: it provides rationality to public opposition by treating risk perceptions as manifestations of

coherent but distinct philosophical positions rather than a lack of information or a proof of irrational reasoning.

The focus on cultural groups rather than individuals has further consequences. It positions technical risk assessments as one frame among others within the category of entrepreneurs, while other frames would prefer other forms of assessing and evaluating risks. In addition, the approach is rather sceptical about psychological concepts of risk perception. In particular, the authors are critical of the very popular approach of the time: psychometric scaling (Slovic et al. 1986; critical also: Sjöberg 1996). While scholars like Paul Slovic had successfully shown that people fear 'dread' risks (like radiation) more than 'common' risks (like car accidents), Rayner and Cantor argued that this still treated the individual as a flawed computer. Their innovative move was to strip away the focus on the individual perception and look at the social entity (the four cultural groups) in which that individual lives.

The core innovation of the text lies in its redefinition of 'consent'. In traditional risk analysis, consent is treated as a legalistic hurdle. In the Rayner–Cantor model, consent is the very fabric of social stability. They proposed that societal technology choice constitutes a debate about what kind of society we want to live in. By shifting the metric from 'safety' (a technical state) to 'fairness' (a social state), they provided a vocabulary for why a community might reject a one-in-a-million risk if they felt the decision-making process was rigged against them (procedural equity). This was a direct challenge to the 'information deficit model', which assumed that if you just gave the public more facts, they would eventually agree with the experts (Fischhoff 1995). However, according to the authors, consent is not easy to accomplish because the risk frame of what is acceptable and fair differs between the four subcultures. It takes very careful and delicate negotiations to find a consensus that fits the frames of each of the four categories.

When evaluating the logic and evidence provided, the paper relies heavily on the concept of social constructivism. The authors avoid unsupported generalisations by grounding their claims in the established anthropological tradition of Mary Douglas. However, from a modern perspective, a primary weakness is the 'evidence' category. The paper is a conceptual map, not a navigation log. It lacks the quantitative 'hard' data that might satisfy an economist or an empirical sociologist. The evidence is qualitative and anecdotal, drawn from observing how organisations behave under pressure. The cultural perspective, in general, lacks sufficient empirical evidence of its validity. Although some studies reported significant and, at least, modest correlations between cultural prototypes and risk perception (Bouyer et al. 2001; Dake 1991; Grendstad and Selle 2000; Langford et al. 2000), the majority of empirical studies reported either non-significant interactions or rather low correlations between the two sets of variables (Brenot et al. 1998; Marris et al. 1998; Sjöberg et al. 2004; Zwick 2006; Zwick and Renn 2002).

The theoretical concept of four competing groups shows a significant blind spot regarding 'power'. While the two authors discuss 'fairness', they somewhat ignore the political power that allows, for example, a hierarchist to ignore an egalitarian. The model assumes

a level playing field where these four voices compete for 'cultural hegemony', but in 1987 (and today), the financial and political resources are not evenly distributed among the four subcultures. A plea to negotiate between the four may be naïve at best. At least, the political and economic context needs to be included in the analysis of fairness and, in particular, in the design of consensus-seeking efforts (Boholm 1996).

Furthermore, the 'timeframe' of the study is rooted in the peak of the Industrial Age. While the logic holds for a physical nuclear plant, does it hold for decentralised digital risks like algorithmic bias or social media 'echo chambers'? Rayner and Cantor focus on 'technological choice' as a discrete event—building a dam, a power plant or a waste disposal facility. Modern technology choices, such as the use of artificial intelligence, are often invisible and incremental, which might limit the applicability of the grid-group model in its original understanding. The change of technological choices may also be one of the reasons for the slow demise of the cultural theory of risk: very few publications over the last decade have been based on this theory or made a major reference to this work (except for reviews and historical accounts).

Rayner and Cantor's work is the connective tissue between the formal probabilistic risk assessment models starting in the 1950s, to the risk perception literature of the 1960s and 1970s, to the anthropological and cultural approach in the 1970s and 1980s to the social constructivist concepts of the millennium. Their intellectual lineage can be traced through several key scholars:

- Mary Douglas and Aaron Wildavsky: Douglas provided the blueprint in 'Purity and danger' (1966), elaborated her approach further in 1985 and 1990 (see Chap. 16), but it was her collaboration with Wildavsky in 'Risk and culture' (1982) that first posited that 'risk' serves as a diagnostic tool for identifying social biases. Rayner and Cantor operationalised this for risk management.
- Papers on the Psychometric Paradigm (i.e. Slovic et al. 1986) and Paul Slovic's seminal *Science* article 'Perception of risk' (1987, see Chap. 12) dominated the literature on risk perception in the 1970s and 1980s. Rayner and Cantor's paper acts as the sociological antithesis. While Slovic focused on 'cognitive heuristics' and intuitive judgments, Rayner and Cantor focused on 'social heuristics' in line with cultural predispositions.
- The Social Amplification of Risk Framework (SARF): Developed shortly after this paper (Kasperson et al. 1988, see Chap. 13, 2003), SARF attempted to combine psychology and sociology. It used Rayner's insights to show how certain risks are 'amplified' as they pass through the 'filters' of different cultural groups.
- Contemporary Successors: Kahan et al. (2007) and the Cultural Cognition Project have used quantitative data to prove the grid-group theory, showing that cultural identity is the single best predictor of beliefs regarding climate change or vaccine safety. However, they used scales that do not match the original characteristics of the group-grid framework as proposed by Wildavsky and Rayner. Johnson et al. (2025) published a paper in which they compared cultural theory with value-based approaches (universal

values) and cultural cognition theory. They concluded that each of these approaches was able to explain some part of the measured statistical variances in risk perception but not to a large degree.

11.3 Conclusion

In summary, 'How fair is safe enough?' is a transformative text that fundamentally altered the trajectory of risk research. Rayner and Cantor succeeded in demonstrating that the public's rejection of technology was not a symptom of ignorance, but a sophisticated demand for social justice and institutional accountability.

The positive aspects of the study lie in its enduring explanatory power. Even forty years later, the 'Grid-Group' model explains the polarisation of modern science policy, even though the rigid segregation in four prototypes has been replaced by more sophisticated and complex patterns of risk framing. The limitations, however, remain. The study did not provide a 'how-to' guide for risk managers or regulators, other than asking for more sensitivity in negotiations about siting risky facilities. It diagnosed the problem but offered a philosophical treatment rather than operational advice. Future studies could improve upon this by integrating the cultural model with real-time digital discourse analysis. Ultimately, the paper serves as a vital reminder that in a pluralistic society, 'safety' is not an objective feature of a technology, event or activity but a social construct composed of presumptions about the nature of risk and the legitimate procedures for making decisions about the tolerability of risks.

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