



# Fast and frugal crisis management: An analysis of rule-based judgment and choice during water contamination events<sup>☆</sup>



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## ABSTRACT

Drawing on the fast and frugal research programme, this paper describes a retrospective field study of decision making during water contamination events. It characterises three heuristics employed in real-world decision making. The credibility heuristic discriminates between signals from targets and noise from distracters on the basis of the perceived trustworthiness of the message conveyor. With the precedent heuristic, the response to an unfolding event is determined by searching for past analogues (i.e. precedents) and, if found, treating the current event in the same fashion. By contrast, the facts-trump-speculation heuristic discriminates between conflicting explanations or claims according to how they rank on pre-determined hierarchies of evidence (orders of cue validities), neglecting utilities and avoiding the aggregation of competing lines of evidence. Rather than cataloguing the biases that these heuristics lead to, this paper focuses on the structural factors which shape each heuristic's ecological rationality. In doing so, the study develops ideas about how particular infrastructure systems and forms of social organisation structure the validity of cues, the accessibility of information, and the application of particular heuristics. The study also introduces the concept of safeguards to rule-based reasoning, and the idea that heuristics can be used to rationalize decisions, and deployed strategically to persuade other social actors. The over-arching claim is that the fast and frugal programme provides a powerful framework for analysing judgment and choice in organisations, and offers a bridge between psychological and political models of organisational behaviour.

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## 1. Introduction: paradigms of organisational decision making

Along with its central role in economics, political theory, and sociology, rational choice theory lay at the heart of much early scholarship on organisational decision making (Renn, 2008, p 26; Simon, 1979). That is, business decisions were broadly conceived of as being structured, evaluated and resolved in accordance with the norms of utility maximisation, probability theory, and the associated hallmarks of rationality. Critics were quick to highlight the implausibility of this decision making paradigm, and empirical studies soon emerged which called into question its basic underlying assumptions (Cyert & March, 1963; Simon, 1979). For example, preferences were found to be inconsistent across time and people; individuals were seen to be satisficers, not maximisers; and search behaviour was revealed to be often local rather

than exhaustive. Yet critics were slow in developing an alternative model of decision making, and rational choice theory continued to dominate the organisational literature, albeit in somewhat different forms (Jaeger, Renn, Rosa, & Weber, 2001; Simon, 1979). Yet by the late 1980s the premise that organisations could be plausibly modelled as rational entities became increasingly untenable. This was largely in response to a series of high profile, costly, and often tragic organisational failures, most notably Chernobyl, Challenger, and Bhopal. The idea was not that disasters indicated or were the sole province of “irrational” organisations. Rather, these events seemed to cast doubt on the conventional ways that academics conceived of and studied *all* organisational behaviour.

And so organisational judgement and choice were re-conceived of as an entirely messier and more problematic affair than rational choice theory suggested. Scholars began to focus on the “dark side of organisations” (Vaughan, 1999), on the ways that judgment and choice departed from classical assumptions of rationality, and on the central importance of norms, rituals, and social structures in shaping organisational behaviour. A key idea cutting across much of this emerging literature is that organisations should be viewed as socio-technical systems, in the sense that the way they work – or fail to work – is shaped by a mixture

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of technical, physical, governance, organisational and behavioural factors (Perrow, 1984; Turner, 1978; Woo & Vicente, 2003). Another core claim is that there are certain intrinsic features of system design and organisation that shape the potential for crises (e.g. interactive complexity and tight coupling; Perrow, 1984), although there are differing views over the extent to which organisational cultures and management systems can mitigate these features (Pidgeon, 2011). A final key concept is that accidents and crises rarely simply happen, but are often preceded by a series of small-scale organisational and technical failings during an “incubation period” that can last for several years (Turner, 1978). This highlights the importance of analysing organisational responses to crises or risk issues as *processes* that unfold over time (MacGillivray, Alcock, & Busby, 2011).

But the shift away from rational choice theory has not been quite as coherent as the above overview implies. Instead, the turn can be grouped – with the licence of simplification – into two broad research paradigms or schools of thought. One focuses on the role of power and politics; the other is mainly concerned with bounded rationality. The former is predominantly composed of sociologists and political scientists, with (behavioural) economists and psychologists in the latter. Of course, there has been cross-fertilisation of ideas and collaborations across these boundaries (e.g. behavioural economists increasingly draw on sociological concepts), and moreover we shouldn't downplay the diversity found *within* these schools (e.g. Edmondson & Mcmanus, 2007). Yet they remain in a sense competing paradigms, with their own contrasting sets of disciplinary assumptions, methodological perspectives, and organising concepts (e.g. choice vs. routines). The basic assumption of the power and politics model is that organisations do not possess a single, superordinate goal (Eisenhardt & Zbaracki, 1992). Instead, they are coalitions of individuals who may share some goals, but who also have conflicting interests and preferences (e.g. safety vs. productivity and competition between departments for funds). These conflicts tend to be resolved in ways that reflect the desires of the most powerful organisational actors (Eisenhardt & Zbaracki, 1992). Moreover, decision makers often attempt to change power structures by engaging in political behaviours, for example coalition formation, strategic uses of information, and so forth. By contrast, the bounded rationality school is psychological in origin, and largely neglects the social, political and cultural aspects of business decision making. The animating idea is that a range of cognitive heuristics (e.g. availability, representativeness, anchoring and adjustment) and biases influence how organisations select, frame, and evaluate decision problems, often in ways that sharply contrast with the norms of utility maximisation (e.g. Bazerman, 1998; Busenitz & Barney, 1997; Starbuck, 2009; Woods & Cook, 1999). Although this turn away from rational choice theory has led to significant improvements in our understanding of how decisions are made in organisational settings, it is not without its limitations.

Critically, research within the bounded rationality tradition traces its intellectual origins to Tversky and Kahneman's (1974) heuristics and biases programme, rather than to Herbert Simon's earlier work. As a consequence, research on rules of thumb in organisational decision making – whether theoretical or empirical – tends to conceive of heuristics as error-prone rather than adaptive, as broadly specified rather than well defined, and as intuitively rather than consciously applied. This leads to various methodological and conceptual problems:

- Research in this tradition tends to begin with the identification of some pathology of judgment or choice (e.g. a bias, or a bad decision), which is then mapped post-hoc onto one or another cognitive heuristic (e.g. Bazerman, 1998; Marnet, 2007). The process analysis tends to be relatively shallow or even non-existent. This stems from the view that heuristics are intuitive tools whose application is neither explicit nor accessible to the conscious mind (e.g. Krabuanrat & Phelps, 1998). The problem with this approach is that Tversky and Kahneman's heuristics are so broadly specified that they can be called upon, post facto,

to account for almost any flawed choice or behaviour (Gigerenzer, 1991, 1996).

- The empirical research is mostly conducted in the laboratory rather than the field (Elbanna, 2006), and so is not particularly well suited to examining the role that politics, conflicting interests, power-relations, and organisational structures play in shaping heuristic decision making in organisational settings (Clarke, 1992; Heimer, 1988). This lack of representative design also means that the work tends to trade in some rather bold extrapolations.
- Researchers have largely neglected the question of when or in what organisational contexts the use of heuristics might be adaptive (i.e. ecological rationality), focussing instead on the biases that purportedly stem from their application. Yet the fact that some of the standard cognitive biases are in conflict with each other or outright contradictory (Gigerenzer, 1991; Krueger & Funder, 2004) casts doubt on the claim that they reflect universal or hard-wired failings in cognition (MacGillivray & Pidgeon, 2011). This suggests that a keener appreciation of context and its relationship to rationality is required.

However, an alternative concept of heuristics is available – to date largely neglected in the organisational studies and management literatures – that sidesteps some of these limitations. In brief, the fast and frugal research programme emphasises the importance of delineating well specified models of inference and choice, and on paying close attention to the external environments in which heuristics function (Gigerenzer & Goldstein, 1996; Gigerenzer, Todd, & the ABC Research Group, 1999). Importantly, this programme acknowledges its heavy intellectual debt to Herbert Simon, who was a sceptic of dual process theories of cognition (Simon, 1997, p 129, 137) and who preferred to believe that decision makers were broadly aware of – and could articulate – the processes by which they formed judgments and reached choices. Another key principle of this programme is that heuristics are not necessarily inferior to what are classically understood as “optimal” methods of reasoning. For example, the recent financial crisis has highlighted the dangers of relying on sophisticated mechanistic models for governing complicated systems (Haldane & Madouros, 2012). The basic insight is that in many cases, models purporting to describe the states and mechanisms of complex systems may be unobtainable (Scheffer et al., 2012) or perhaps dangerously misleading. In these contexts, the logic of prediction and control, and its central assumption of full or nearly complete mechanistic understanding of the relevant system, can feed rather than prevent crises (Haldane & Madouros, 2012; Haldane & May, 2011; Wynne, 1992). An alternative logic is to design and manage systems – whether water supply, climate, or financial systems – on the basis of simple rules, or heuristics, that capture the essential elements of system operation without aspiring to full description. Simulation work in line with this principle has generated novel and important insights in various settings. For example, it has shown that heuristic models of risk in financial markets can outperform the more complex techniques favoured by regulators (Haldane & Madouros, 2012), and that there may be generic rules of thumb that presage collapse or crisis in systems ranging from physiological ones to ecological ones (e.g. a reduced rate of recovery from perturbations; Scheffer et al., 2012). What the above sketch is intended to convey is that *deliberative* heuristics may have a central role to play in how we analyse, design, and manage all sorts of systems; that this role may not necessarily be a dangerous one; and that, above all, we should take this role seriously. This article makes an attempt to do so, drawing on the principles of the fast and frugal programme, albeit from a rather different methodological perspective.

## 2. Research approach

### 2.1. Rationale

The aim of the research was to explore the role of heuristics in real-world organisational decision making. The research questions were:

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