Introduction to the Special Issue. Naturalistic Decision Making and Organizational Decision Making: Exploring the Intersections

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Abstract

Although naturalistic decision making (NDM) and organizational decision making (ODM) have much in common, they hardly interact. Both NDM and ODM focus on what decision makers actually do in their 'natural habitats' and reject the equivalence of decision making with normative economic and statistical reasoning which can be studied in sparse laboratory settings. Linking with ODM would help NDM researchers to include organizational goals, norms, and other aspects of context in their models. Conversely, linking with NDM would provide ODM researchers with detailed descriptions of how individuals and groups perform functions such as decision making, sensemaking, and planning on the basis of pattern matching, story telling and argumentation, and detailed descriptions of the processes through which distributed teams build and maintain shared situation awareness. In the introduction to this special issue we outline the two fields, argue why they should be in closer contact, and summarize the papers contributed to this issue.

Keywords: decision research, naturalistic decision making (NDM), organizational decision making (ODM)

Naturalistic decision making (NDM) and organizational decision making (ODM) ought to be deeply engaged with each other. As we will point out in this brief introduction, they have much in common. Yet, they hardly interact, and we believe there are a lot of missed opportunities. At the invitation of Hari Tsoukas, Editor of *Organization Studies*, we are pleased to draw attention to examples of successfully marrying the interests, ideas, and methods of both. In the introduction to this special issue on naturalistic decision making in organizations, we briefly characterize NDM and ODM and why we think they should be in closer contact. We then outline the contributions of the articles in this special issue.

Naturalistic Decision Making and Organizational Decision Making

Naturalistic decision making (NDM) originated among decision and human factors researchers studying decision makers in real-world settings, especially public sector 'experts' such as fire commanders and military leaders. These researchers were impressed with the quality of decisions made in fast-paced,

complex, and often dangerous situations where there is no time for optimization or other elaborate calculations. They wanted to understand what decision makers were doing and to find better ways to structure decisions and train decision makers to be more effective. The NDM label emerged in a 1989 conference run by Gary Klein and colleagues. They convened a community of researchers in a series of conferences and edited a book series based on those conferences (Flin et al. 1997; Hoffman, in preparation; Klein et al. 1993; Montgomery et al. 2005; Salas and Klein 2001; Zsambok & Klein 1997).

Organizational decision making (ODM) can be traced back to the work of Herbert Simon (1955, 1957) and James March (March and Simon 1958; Cyert and March 1963), political scientists whose broadly influential work and affiliations include psychology, economics, and management. They conceptualized decision makers as boundedly rational in contrast to the Olympian rational economist assumed by classical decision theory. Further, they situated decision makers within organizational contexts, exploring the incentive structures and social norms that shape expectations and behaviors. Many of their colleagues and students moved toward more micro studies of individual decision making, but others, especially former students of March (e.g. Feldman and Pentland 2003; Cohen and Levinthal, 1990), focused on organizations. The ODM label began to be used widely in the 1980s, with edited books by Ungson and Braunstein (1982), March (1994), and Shapira (1997).

Our brief description suggests that NDM and ODM share many familial resemblances. Both NDM and ODM focus on what decision makers actually do and the nature of the tasks they are trying to accomplish, as defined by their organizational and real-world context (Shapira 1997), in contrast to the sparse and unrealistic decision theory available at the time, which equated decision making with normative economic and statistical reasoning. Both NDM and ODM reject the notion of decision making as choosing among alternative courses of action: NDM hypothesizes sequential option generation and evaluation based on pattern matching, situation awareness, and story construction (Cohen et al. 1996; Endsley and Garland 2000; Klein 1998; Pennington and Hastie 1993) whereas ODM hypothesizes matching situations with appropriate action based on the logic of obligation (March 1994; Messick 1999; Zhou 1997) and 'garbage can' organizational processes that are far from rational (Cohen et al. 1972). Both NDM and ODM began by using observational and interview methods, including case studies and best practices based on informative exemplars (Lee 1999; Lipshitz 2005; Militello 2001), and later developed specific research technologies such as computer simulations (in ODM, Cohen et al. 1972) and cognitive task analysis (in NDM, Crandall et al., in press.)

Despite their similarities, NDM and ODM have barely interacted. Although funded by organizational clients, NDM researchers began by studying individuals and small teams. Whereas some NDM researchers explicitly include organizational goals and norms as part of the decision context (Orasanu and Connolly 1993), others leave this out (Cannon-Bowers et al. 1996; Lipshitz et al. 2001). Only some NDM researchers argue explicitly that macrocognitive functions such as decision making, sensemaking, planning, and replanning

need to be performed and studied at individual, team, and organizational levels (Klein et al. 2003). From the other side, few ODM researchers are aware of the work in NDM, possibly because NDM emerged studying organizations such as military and paramilitary command posts rather than for-profit corporations.

Opportunities for Mutual Benefit

In examining the potential for NDM and ODM to become more explicitly cognizant of one another, the benefits to NDM are readily apparent. Work in ODM would help the NDM community include organizational goals, norms, and other aspects of context (part of the NDM 'charter' delineated by Orasanu and Connolly (1993)) that influence the cognitive processes that drive experts' decision making. Among the few existing examples, Vaughan (2005) documented how gradual changes in the norms of what constitutes an error eventually produced the disastrous *Challenger* space shuttle launch; H. A. Klein (2005) documented the cultural barriers that handicap collaboration between multicultural task forces; Mehan (1983) showed that children's placement decisions were primarily based on the recommendations of professionals (e.g. school psychologists) owing to the latter's superior prestige relative to the parents; and Weber et al. (2005) confirmed their prediction, based on cultural analysis, that Chinese decision makers will exhibit more decision processes that are rule-based and fewer processes that are consequential, than their American counterparts.

The principal contributions that NDM can bring to ODM are detailed descriptions of how individuals and groups perform functions such as decision making, sensemaking, and planning on the basis of pattern matching, story telling, and argumentation (Cohen et al. 1996; Pennington and Hastie 1993; Klein 1998), and detailed descriptions of the processes through which distributed teams build and maintain shared situation awareness (Salas and Fiore 2004). Tracking the nature of emergent strategies and behavior changes across levels (individuals–groups–organizations) is a challenge shared by both NDM and ODM researchers.

Contributions to this Special Issue

The contributions to this special issue illustrate the potential for advancing theory, uncovering stimulating empirical examples and results, and changing organizational practices. In the first paper, Gore et al. examine the potential intersections of NDM and ODM. Noting that organizational goals and norms, which are included in Orasanu and Connolly's (1993) characterization of NDM, has received the least attention from NDM researchers, Gore et al. examine how the similarities and differences between NDM and ODM can inform NDM researchers who wish to study decision making in organizations. Using decision making in health care as an illustrative case in which NDM

has been applied successfully, Gore et al. conclude that NDM's principal contributions to ODM lie in the development of ecologically valid practical methods for minimizing error and improving decision quality.

The remaining five papers demonstrate empirical NDM approaches within organizational settings. Alby and Zucchermaglio describe an extended case study of design practices in an Internet company. The study shows how decision making and problem solving are embedded in the flow of work and how organizational features shape the way decisions are identified and managed. Further, it illustrates how the design team itself needs to be considered as the unit of analysis. From a methodological perspective, the paper demonstrates an ethnomethodological approach that combines observations over a three-month period with interviews, reviews of instant messenger logs, and emails.

Roth et al. describe a second case study which used cognitive task analysis combining interviews and field observations to examine the processes by which distributed teams of railway road workers develop and maintain shared situation awareness. The paper documents a variety of informal communication practices (e.g. listening-in on radio dispatches to trains and other roadway teams working in the vicinity) that enhance accident prevention, and develops their implications for high reliability organizations and safety-enhancing technological devices.

Shattuck and Miller present a dynamic model of situated cognition that expands NDM to include technological agents working with human agents in an organizational structure. Their model is designed to represent the variety of perspectives on the way both kinds of agents interact, including the ground truth version of what is going on in the environment, the subset of data elements detected by the technological systems, and the data available to the decision makers. Their model includes different levels of selection, filtering, organization, and inferences for the decision makers. They use a case study of the accidental collision between the submarine USS *Greeneville* and a Japanese fishing vessel to illustrate how we can best understand the interplay of both kinds of agents to appreciate how errors propagate through a dynamic system. One of the key features of their dynamic model is that it provides a broader account of the variety of interacting causes that led to this accident rather than a simplified version of the most dramatic precursors.

Nemeth et al. discuss how cognitive artifacts are used for dealing with distributed cognition. Employing anthropological methods of 'thick description' (Geertz, 1973), the paper shows how anesthesia coordinators employ schedules, display boards, lists, and worksheets to maintain situational awareness and plan and manage anesthesia assignments for surgical procedures across time and among members of the acute care staff.

In the final paper, Carroll et al. study the effectiveness of problem investigation teams in nuclear power plants. Team effectiveness hinged on team composition, partly because of a need to share knowledge and viewpoints, but also because of the organizational features of being able to gain cooperation from information sources and to successfully persuade managers to implement the team recommendations. While diverse functional representation produced deeper analyses and more creative solutions, the inclusion of managers or

supervisors as team members facilitated communication with manager customers and the diffusion of lessons learned.

The six papers in this special issue exemplify some of the potential intersections of NDM and ODM. Although maintenance of shared situation awareness among members of distributed teams, use of cognitive artifacts and informal procedures to coordinate action and reduce error, and altering task structure and technology to improve individual and group decision making are important in their own right, they are just a beginning for the rich research agenda awaiting NDM researchers in organizational settings. We believe that continued efforts at conceptual integration, methodological sharing, and joint focus on specific contexts and problems will be richly rewarding.

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