Commentary

Modeling and Aiding Intuition in Organizational Decision Making: A Call for Bridging Academia and Practice☆

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This commentary provides our reflections on the special issue 'Modeling and aiding intuition in organizational decision making' (Marewski & Hoffrage, 2015). First, we reflect upon our experience of researching, consulting and teaching in this field. Second, we offer suggestions on how we might continue to learn from Klein and his colleagues' research experiences, preserving rich examples of intuitive decision making processes. Third, we note the challenges of both the *Naturalistic Decision Making* and the 'Nudge' approach to decision making for organizations, contrasting academic research and applications. We call for a more pragmatic psychology that aims for a better understanding of professionals' domain-specific intuition, and for an improved evidence base to inform organizational policy and practice.

Keywords: Modeling intuition, Academia, Practice, Naturalistic Decision Making

The purpose of this commentary is to highlight the importance of bridging academia and practice when aspiring to model and aid intuition. We want to discuss some of the obstacles for doing so, and provide positive examples that demonstrate the usefulness of building such bridges. Both of the authors of this commentary to an extent inhabit this bridge, and over the past two decades have been involved with psychology-driven decision making research, teaching and consultancy. J.G. has been researching, educating and developing others to use a range of techniques to examine domain-specific intuitive expertise including naturalistic decision-making and cognitive task analysis in a range of professional domains (Gore, Flin, Stanton, & Wong, 2015a,2015b; Gore & Sadler-Smith, 2011).

Similar to Brown's (2015) experiential evidence based approach in the special issue (Marewski & Hoffrage, 2015), G.C. is a research-practitioner. He has sought to use theory and methods from psychology and Human Factors to understand and address challenges and problems across defence and security, whilst working with practitioners from other disciplines (Baber, Attfield, Conway, Rooney, & Kodagoda, 2016; Wilson & Conway, 2009). He considers how scientific evidence is used alongside professional expertise to inform decisions made in government. From his practitioner perspective he notes counter-intuitive difficulties with getting buy-in from the organizations for psychological approaches to decision research. He also, like Brown, tries to identify gaps in decision aiding, and proposes ideas to instigate interdisciplinary inquiry to address them (as have many NDM scholars, see Roth, 1997). This interdisciplinary approach is favored by US and UK governments. An analysis for the UK Research Excellence Framework (REF2014) highlights the importance of multidisciplinary research approaches to complex problems as being most linked to evidence for societal application (Kings College, 2015). A review considering the utility of the behavioral and social sciences for intelligence analysis describes the importance of considering problems from multiple perspectives; it finds that analysts with diverse perspectives produces better analysis, and it avoids homogenous groupings not recognizing

the limits to their perspectives (National Research Council, 2011). This recommendation was supported by the recently published inquiry into the UK involvement in the Iraq war (Iraq Inquiry, 2016), which highlighted that it is important to identify dissenting (contradictory) views in order to identify gaps in knowledge and consider a range of different options.[1]

Given this experiential evidence we propose that a plurality of approaches to understanding and modeling intuition is required. We agree with Brown (2015), Hogarth and Soyer (2015) and Shanteau's (2015) calls for more work to be completed on the use and effectiveness of decision/intuition aids, as the practical use and evaluation of many aids remain underreported. Perhaps also decision researchers themselves need to be more explicitly aware that they are constrained by context, representation and often satisfice their own intuitions and decisions. Little is documented about decision researchers' own intuitions, although Kahneman and Klein (2009) admits that he is just as likely to fall into error traps as participants in his experiment. Similarly, Klein (2015a, 2015b) and Brown (2015), with their dual careers in academia and consultancy, provide, in this special issue, reflections on their own cognition and call for caution about the importance of domain-specificity and organizational context.

Further to our suggestion that no single approach to modeling and aiding intuition and decision making in organizations is sufficient, we recognize the importance of eliciting and documenting professional intuitive expertise (Hoffman et al., 2014; Klein, Orasanu, Calderwood, & Zsambok, 1993; Sadler-Smith, 2016). This type of approach offers a different starting point than those researchers who model and explore heuristics, biases and errors in cognition in decision making in the tradition of Tversky and Kahneman (1974) and colleagues, and proposes that we can explore human decision making by focusing upon *effectiveness* in cognition. Put simply, the heuristics, biases and errors approach focuses upon what people, mainly undergraduates, in lab-based settings often do wrong when making decisions, whilst the NDM approach explores what experts often do right in domain-specific fields.

In the special issue Klein, Shanteau, and Brown (among many others) demonstrate careers working with intuition, complexities of context, boundaries and the translation of knowledge to a diverse range of people. Their work also illustrates that organizations are messy places where power and control is contested. Allowing intuition to be recognized or acknowledged within many professional contexts moreover is still controversial. Rationality remains an easier 'sell' for most professions and Salas, Rosen, and DiazGranados (2012) suggest that the examination of expertise-based intuition in organizations may be a useful and accessible way to help convey to practitioners the conditions under which intuition is most often accurate, or not. This compliments our preference in supporting Klein and his colleagues' approach to NDM.

Naturalistic Decision Making

NDM started from a desire for a field of decision making whose methods could be applied—a field that was not content with testing hypotheses and revising theories, but sought to provide more powerful methods for improving decisions and cognitive performance in real-world environments. NDM practitioners and researchers explore *positive* aspects of cognition, that is, focus upon what professionals across a range of domains do well with their expertise-based intuition. They seek to reduce mistakes and thereby seek to help decision makers perform skillfully and use their experience and intuition effectively. Pursuing such goals lends itself to a more 'holistic' approach to decision aiding.

Klein (2015a, 2015b) reflects that NDM research has changed many core beliefs that used to be held in the basic research and the applied communities (Kahneman & Klein, 2009). Specifically, NDM research has shown that expertise is based upon domain-specific tacit knowledge and skills; experienced decision makers can draw on patterns to handle time pressure and rarely ever compare options; many projects involve wicked problems and ill-defined goals; experienced personnel use their mental models to define what counts as 'data' in the first place; insights arise by detecting contradictions and anomalies and by noticing connections; and that uncertainty can stem from inadequate framing of data, not just from the absence or 'overload' of data (Grossman, Spencer, & Salas, 2014).

More questions have arisen from these rich expertise-based research investigations. In order to answer these questions, we propose that we need a practical and pragmatic psychology that bridges academia and practice, and that aims at aiding professionals' understanding of domain-based intuition and at providing a strong evidence base to inform policy and practice.

Impact, Evidenced-Based Policy, and Practice

NDM methods emphasize descriptive studies conducted in workplace settings. These have been used to improve performance, revise doctrine and process, develop training that is focused on decision requirements, and design information technologies to support intuitive decision making and related cognitive functions (Hoffman et al., 2014). These are the kinds of productive outputs that the field of NDM has intended to achieve.

Given NDM's research success in many professional domains (Klein, 2015a, 2015b), which has helped bridge the gap between novice and experts in specific work-based tasks, a somewhat unexpected phenomenon here is the apparent difficulty in organizations to buy into the NDM principle of valuing and unpacking expert intuitive judgement as a primary source of evidence on which to base inquiry and intervention design. It appears that this is in part due to a belief that intuition is bad, and that decisions must be based on 'evidence' and 'analysis'. When these views are probed, there is often a belief that intuition is the same as using heuristics, which (often) leads to biases, and therefore (logically) intuition must be bad. Whilst most would agree that domain-specific knowledge can be useful, the rhetoric surrounding *heuristics and biases* are leading to rather peculiar reasoning

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