

## ***intuition, neuroscience, decision making and learning***

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### **Introduction**

My personal starting point in this paper is that the decision makers who influence, change and govern the lives of millions can expand the horizons of their decision making capabilities to encompass intuition. In doing so they might engage in a form of intuitive learning which could have the potential to expand the life spaces that they co-create with people, organisations and society as a whole.

The perspective that I take in this paper is that scientific knowledge about the human being's intuitive decision making capacity can be a potent force for a better understanding of the decision making process and for individual and collective learning and transformation.

The story for me began when I read Herbert Simon's critique in *Administrative Behavior* of the rational choice model. The essence of Simon's argument (for which he won the Nobel Prize in 1978) is encapsulated in the notions that: (a) managers can never be perfectly rational (rationality is 'bounded'); (b) managers will often act upon a decision that works rather than upon the best of all decisions that might be available (they 'satisfice'); (c) intuition has an important role to play in decision making (the nature of the problem is a principal determinant of how effective intuition is likely to be)<sup>1</sup>.

The preface to the first edition of *Administrative Behavior* was written by an AT&T executive, Chester Barnard. It promoted me to read the Appendix to Barnard's own book *The Functions of the Executive* (1938). In this Appendix, entitled *The Mind in Everyday Affairs*, he made a plea for a dismantling of the hegemony of rational, logical forms of thought in management practice (not their rejection) and recognition of the utility and value of the non-logical (intuitive) processes. This notion was reinforced by my re-reading of Donald Schön, which confirmed for me a view of effective practice in the real world of uncertainty, dynamism and time pressure as founded upon the decision maker's experience and expertise "implicit in the artistic, intuitive processes which some practitioners do bring to situations of uncertainty, instability, uniqueness and value conflict"<sup>2</sup>.

This line of thinking was given greater impetus for me when I read about the research carried out in the 1980s by Gary Klein into naturalistic decision-making processes. This articulated in a convincing manner a mechanism by which decision makers use their experience to recognise patterns that indicate

the dynamics of complex, uncertain and dynamic situations but which may not belong to the level of



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and intuition operate below the level of conscious awareness and that there are specific regions of the brain that are implicated in these processes.

These are exciting and challenging times for management researchers and their colleagues in other disciplines, because for the first time the opportunity exists to put an understanding of the ubiquitous phenomenon of intuition on a firm scientific footing based upon developments over the past half century in medical, psychological and social sciences. It also affords the opportunity for us to apply these understandings to the two processes which are the keys to the effective functioning and well-being of people, organizations and society - decision making and learning. What challenges do we face if we are to use these scientific understandings to envision 'not-yet-existent future realities'<sup>3</sup> which open up alternative conceptions of life space?

### Intuition

Intuition is part of that 'knowing' referred to by Polanyi when he declared that 'we know more than we can tell'<sup>4</sup>. An intuition is a recognition or judgement that is: (a) arrived at rapidly, without deliberative rational thought; (b) difficult to articulate verbally; (c) based on a broad constellation of prior learning and past experiences; (d) accompanied by a feeling of confidence or certitude; (e) affectively-charged<sup>5</sup>.

I think we acquire our capability to intuit through experiences in particular domains (intuition is not a generic ability; it is domain specific) via explicit and implicit learning processes<sup>6</sup>, which result in the acquisition of highly complex and subtle patterns of tacit knowledge that cannot be described or explained easily. These mental models are stored in long term memory under a variety of sophisticated rules (often too complex for verbal exposition) for how to achieve specific goals in particular situations and which are activated by the cues that we perceive from the environment<sup>7</sup>. Intuitions enable us to solve problems, take decisions, achieve insights and generate scientific discoveries and artistic creations.

### Neuroscience

Intuition is synonymous in many languages and cultures with visceral signals often referred to as 'gut feelings'. Neurological research has identified an awareness that operates below our level of consciousness and which may serve like a physical 'alarm bell'. The neurologist Antonio Damasio and his colleagues have argued that unconscious processing accompanied by physiological 'somatic markers' force our attention on positive or negative outcomes, which manifest in our conscious awareness as a 'gut feeling' (they called this the 'somatic marker hypothesis').

Other research by Jung-Beeman and his colleagues<sup>8</sup> using neuro-imaging techniques has identified brain regions that are implicated in those insights (the 'aha' or eureka moments) where we experience the pieces of a problem that has been perplexing us falling into place often after a period of unconscious 'incubation'.

Alongside this, the methods of neuroscience are also beginning to shed light upon the brain regions and processes that are involved in intuitive judgements. For example, Le Douarin<sup>9</sup> has discussed the role of working memory in feelings, emotion, unconscious processing and human consciousness itself. Lieberman and his colleagues found that high-experience domain judgments (i.e. high familiarity) produced activation in a network of neural structures involved in automatic social cognition (referred to as the X-system - i.e. reflexive). Low-experience domain judgments (i.e. low familiarity) produced activations in a network involved in effortful social cognition and propositional thought (the C-system,

i.e. reflective). It seems as though the physical locations of insight (gut feel) and intuition is the body.



The naturalistic decision researcher Gary Klein has estimated that in 80 and 95 percent of loosely structured time-pressured situations decision makers rely on intuiting rather than rational choice<sup>10</sup>. Much of Klein's work was in the military and emergency services, but it's not only amongst soldiers and fire-fighters that intuition is significant; for example, Burke and Miller found in their study of executives in the USA that 47 percent of them claimed to use intuitive decision making 'often', 37 percent 'occasionally' and only 10 percent 'rarely' used it<sup>11</sup>.

As we all know only too well lengthy analysis is not always possible, and indeed to engage in a rigorous and systematic approach may open-up a decision maker to 'analysis paralysis', especially in those situations where there is time pressure forcing him or her to act quickly. The problem with lengthy rational analysis is that a failure to respond in a timely fashion may mean that, for example in a business situation, the problem (or opportunity) could change, disappear or be solved (or capitalised upon) by one's competitors. The message is clear: the future can overtake us before we've had the chance to collect and analyse all the data which might be out there; the future can also overtake us if we hang around looking for data that does not yet exist.

One feature that distinguishes experts from novices<sup>12</sup> is that experts often unconsciously apply 'what usually works' in a given scenario. Experienced decision makers often come to rely upon intuition in those situations where rationality is at its limits, for example for reasons of under-load or over-load of information, or because of time pressure. Where and how an experienced decision maker can use intuition is likely to depend upon situational factors (for example, the nature of the problem - intuition appears to be better suited to loosely structured tasks) and person factors (for example, the level of a manager's expertise in a particular domain, intuitive ability and preferred thinking style). The pace at which decision makers acquire their expertise can be accelerated by using forms of 'play', which allow them to experiment with representations of reality in safe environments.

## Learning

Whether or not decision makers' intuition can be improved is an open question - the more pressing concern for me in a business context is whether or not managers and leaders (as one group of decision makers) can be educated in order that they might understand their intuitions and use them in an intelligent fashion which is cognisant both of the power and the perils of intuition, and where it can help and where it can hinder. My conviction is that management and leadership education, training and development have a crucial, transformational role.

I think intuition is important because it is a fact of life, it is inevitable, it happens, and it can be powerful if handled well and perilous if handled badly. I think there are several ways in which managers can develop a better awareness of intuition and the way it affects their own decision making<sup>13</sup>. Erella Shefy and I came up with some very preliminary suggestions for how managers (and other decision makers) might use intuitive judgements in an informed rather than misguided or haphazard way and adopt a learning approach to intuition in decision making (see Table overleaf).<sup>14</sup>

Elicit good feedback on your intuitive decisions	Good feedback builds good intuitions <sup>15</sup> , so seek feedback on your intuitive judgements, build confidence in your gut feel, and create a learning environment where you can develop better intuitive awareness. Communicate your intuitions using analogy, metaphor and stories.
Get a feel for your intuitive decision making 'batting average'	How good are your intuitions, have they served you well or badly in the past - why? Get a better feel for how reliable your hunches are; ask yourself how your intuitive judgement might be improved. How good are the intuitions of your colleagues? What can be learned by reflecting on how well your own intuitions, or those of your colleagues, have worked in the past?
Use imagery and stories in intuitive judgement and decision making	Intuitions often arise in a nonverbal mode - if you don't already do so make greater use of imagery rather than words; literally visualise not-yet-existing future realities that take your gut feelings into account - how do they 'feel' and can you imagine them becoming a reality? Be open to expressing intuitions using analogy, metaphor, anecdotes and stories. Use intuition to envision non-existing future realities.
Play devil's advocate with your intuitive decisions	Don't be afraid to test out your intuitive judgements and probe those of others. Prototype your intuitions and not-yet-existent futures, play and experiment with intuitions in safe settings, raise objections to them, generate counter-arguments, and probe how robust your not-yet-existent futures are when challenged.
Create a receptive state and capture and validate your intuitions	Create the inner state to give your intuitive mind the freedom to roam, capture your intuitions, envision not-yet-existent futures, and record them before they are censored by rational analysis. Reflect, retreat and contemplate. Slow down the pace to allow creative intuitions to surface and flourish.

## Conclusions and questions

My current interest in intuition and the discussions with colleagues at the Society for Organizational Learning (SOL-UK) raised for me a number of important questions for researchers in management studies, psychology, neuroscience, philosophy and linguistics, for example:

1. *Language*: (a) how do decision makers articulate their intuitions? can intuitions be shared? (b) what are the possible mechanisms which might enable this to happen? (c) how important is metaphor? (d) can metaphor give us a 'window' into intuitions? (e) are there other, e.g. non-verbal, ways 'in'?
2. *Context and Power*: (a) when decision makers exercise intuition is it legitimised by the power which they hold? (b) does this create a 'kind' or a 'wicked' learning environment for them and the organizations of which they are a part? (c) how much do contextual factors (such as organizational culture, time horizons, etc) influence individual, organizational and institutional decision making?
3. *Neuroscience*: (a) what is the current state of knowledge of intuition in the field of neuroscience? (b) how much do we know about the neuroscience of intuitions in organizational

and other institutional settings? can the techniques of neuroscience be applied in



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intuitive decision process operate in 'top teams', the boardroom or other decision making settings (such as government)? (c) what techniques are available to us to study intuitive judgements in these settings? (d) is intuition an emergent property of a complex system? (e) does this property manifest itself at the individual and collective levels?

5. *Learning*: (a) under what circumstances do decision makers rely upon intuitions? (b) to what extent do they use intuition in an intelligent way? (c) can intuition be a learning process and do decision makers use intuition as a learning process? (d) is it possible to develop intuition, and if so how? (e) how can intuitions be used to learn collectively?

Perhaps one of our aims should be to endeavour to create an inquiring, reflective, contemplative and mindful approach to decision making which enables us, in the words of Francisco Varela and his colleagues, to "cut the chain of habitual thought patterns and preconceptions such that it can be open-ended reflection, open to possibilities other than those contained in one's current representations of life space".<sup>16</sup> If there is one over-arching question for me based on the SOL discussions it is this: what role can our intuitions play in envisioning our not-yet-existent future realities, and in helping to bring to pass those futures that have not yet happened but which have the potential to transform people, organisations and societies?<sup>17</sup>

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Eugene Sadler-Smith, September 2006

### References

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<sup>1</sup> Simon, H.A. (1987). Making management decisions: the role of intuition and emotion, *Academy of Management Executive*, 1: 57-64.

<sup>2</sup> These discussions are not intended to imply any one to one correspondence between the arguments of Simon and Schön, indeed Schön argues that Simon attempts to preserve technical rationality by proposing a science of design which depends on having well-formed instrumental problems to begin with. For Schön, part of the artistry of professional practice lies in the ways in which the problems themselves are framed. See page 48 of *The reflective practitioner*.

<sup>3</sup> I have taken the liberty of borrowing this phrase from Arie de Geus, President of SOL-UK.

<sup>4</sup> Polanyi, M. (1966). *The tacit dimension*. London: Routledge & Kegan Paul

<sup>5</sup> Based upon the following:

Dane, E.I., and Pratt, M.G. (forthcoming). Exploring intuition and its role in managerial decision-making. *Academy of Management Review*

Davis, S.H. and Davis, P.B. (2003) *The intuitive dimensions of administrative decision-making*. Lanham: Scarecrow;

Sinclair, M. and Ashkanasy, N.M. (2005) Intuition: Myth or a Decision-making tool, *Management Learning*, 36 (3): 353-370.

<sup>6</sup> Implicit learning is a means by which knowledge is acquired largely independently of any conscious attempt to learn. See: Reber, A.S. (1993) *Implicit Learning and Tacit Knowledge: An Essay on the Cognitive Unconscious*. New York: Oxford University Press.

(2004) Neural activity when people solve verbal problems with insight. *Public Library of Science Biology*, 2: 97.

<sup>9</sup> Le Doux, JE. (1996). *The emotional brain: the mysterious underpinnings of emotional life*. New York: Simon and Schuster.

<sup>10</sup> Klein. G. (1998). *Sources of power: how people make decisions*. Cambridge, MA.: The MIT Press.

<sup>11</sup> Burke, L.A. and Miller, M.K. (1999) Taking the mystery out of intuitive decision making, *Academy of Management Executive*, 13 (4): 91-99

<sup>12</sup> See: Dreyfus, H. & Dreyfus, S. (1986). *Mind over machine: the power of intuition and experience in the era of the computer*. Oxford: Blackwell.

<sup>13</sup> Based upon: Sadler-Smith, E., and Shefy, E. (2004) The intuitive executive: Understanding and applying "gut feel" in decision making. *The Academy of Management Executive*, 18 (4): 76-92

<sup>14</sup> Sadler-Smith, E. & Shefy, E. (forthcoming). Developing intuitive awareness in management education, *Academy of Management Learning and Education*

<sup>15</sup> Hogarth, R.M. (2001) *Educating Intuition*. Chicago: Chicago University Press.

<sup>16</sup> Varela, F.J., Thompson, E. & Rosch, E. (1993). *The embodied mind: cognitive science and human experience*. Cambridge, MA.: MIT Press

<sup>17</sup> Senge. P.M., Scharmer, C.O., Jaworski, J. & Flowers, B.S. (2005). *Presence: exploring profound change in people, organisations and society*. London: Nicholas Brealey