

Intuition and the Brain

It has often been stated that human beings' intuitive thinking is vested in the right hemisphere. This was based on a theory which held that the left hemisphere was the brain's verbal, rational and analytical powerhouse, and the right hemisphere was the fount of visual thinking, creativity and intuition. Traditional education has been criticised on the grounds that it did not develop the 'whole brain' but instead emphasised 'left-brainedness'. Although these ideas do possess some validity, advances in neurology and cognitive neuroscience (aided by phenomenal advances in brain-imaging technology) have painted a picture that is slightly different to the conventional left-brain/right-brain model.

One of the pioneers of work in this area has been the neurologist Antonio Damasio. With his colleagues he developed the so-called 'somatic marker hypothesis'. This idea is based on the argument that if we used the 'high road' of rationality to make all of our decision then most decisions would never get taken. The weighing up of 'pros' and 'cons' could go on almost indefinitely and overwhelm the attentional and processing powers of our cognitive systems. Damasio argued that in reality many decisions are influenced by the power of 'gut feel'. Before any kind of rational analysis is applied to a tricky judgemental problem (for example, whether to join up with a potential business partner, buy a particular house, marry someone) if a bad outcome connected with a particular response comes to mind an unpleasant 'gut feeling' is experienced. Another name for this 'gut feeling' is a 'somatic marker', from 'soma', the Greek for body, and 'marker' because the gut feeling marks an image which serves to focus our attention on the potential negative outcome. The somatic marker warns us of potential danger on the road ahead.

Through his clinical work Damasio and his colleagues have been able to identify the brain region that is involved in producing these somatic markers. Much of their work involves treating patients who have experienced some form of damage to specific parts of their brain due to illness, injury or other causes. This type of research helps to shed light upon the deleterious effects of such damage on normal brain functioning and the patient's consequent behaviours in their personal and professional lives, including decision making. One such patient of Damasio's did indeed seem to be almost literally frozen into inaction by 'analysis paralysis'. The patient in question had experienced damage to the ventro-medial prefrontal cortex which is one of a small number of brain sites which are involved in inducing emotions. The patient was unable to make as simple a decision as when to have his next appointment from one of two available dates. He went through a long and laborious tortuous process of weighing up the pros and cons for the best part of an hour (which Damasio described as 'remarkable' to watch). Eventually Damasio and his fellow researchers chose between the two dates on behalf of the patient to which his response was that it was "fine".

This example provides strong evidence for the part of the brain involved in bringing emotions to bear upon decisions and also shows the potentially "calamitous" consequences of not having the necessary automated emotional mechanisms which aid rational choice (because of effects that may accrue from damage to the ventromedial prefrontal cortex).

Recent research that has used functional magnetic resonance imaging (fMRI) has identified the brain regions involved in intuitive social cognition. Matt Lieberman and his colleagues at the University of California at Los Angeles asked participants with high and low experience in

different domains (soccer and acting) to make self-descriptiveness judgments about words from each domain while being scanned. High-experience domain judgments produced activation in the ventro-medial prefrontal cortex, nucleus accumbens, amygdala, and lateral temporal cortex - a network of neural structures Lieberman and his colleagues refer to as the *X-system*, and involved in automatic social cognition. Low-experience domain judgments produced activations in the lateral prefrontal cortex, hippocampus and medial temporal lobe, and posterior parietal cortex - a network of neural structures Lieberman and his colleagues refer to as the *C-system*, and involved in effortful social cognition and propositional thought. Lieberman and his colleagues argued that intuition based self-knowledge is slow to form and slow to change (in the past he has used the term 'glacial' as a metaphor for the speed at which information in basal ganglia develops), and is also relatively insensitive to explicit feedback from others.

The picture that is emerging is that intuitive processing is located in a network of structures in the brain, and that these structures exist in both hemispheres rather than being generally located in a specific hemisphere.

The other important point is that the processes implicated in intuitive judgments operate below the level of conscious awareness. As the neural scientist Joseph Le Doux has argued, even when we make some emotional appraisal of a situation this does not necessarily mean that we understand the basis of the judgment we have arrived at. The conscious outcome might be based on what he calls "nonverbalizable intuitions, so-called 'gut feelings'". The key point he is making is that many of the emotional judgments we arrive at do not depend upon consciousness or processes that we have conscious access to, but that their manifestation is somatic or visceral.

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Further Reading

- Damasio. A.R. 1999. *The feeling of what happens: body, emotion and the making of consciousness*. London: Vintage.
- Damasio. A.R. 1994. *Descartes' error: emotion, reason and the human brain*. New York: Quill.
- Le Doux, J.E. 1996. *The emotional brain: the mysterious underpinnings of emotional life*. New York: Simon and Schuster
- Lieberman, M. D., Jarcho, J. M., & Satpute, A. B. 2004. Evidence-based and intuition-based self-knowledge: An fMRI study, *Journal of Personality and Social Psychology*, 87, 421-35.