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Morality: My brain made me do it
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Understanding how morality is linked to brain function will require us to rethink our justice system, says ***Martha J. Farah***

AS SCIENCE exposes the gears and sprockets of moral cognition, how will it affect our laws and ethical norms?

We have long known that moral character is related to brain function. One remarkable demonstration of this was provided by Phineas Gage, a 19th-century construction foreman injured in an explosion. After a large iron rod was blown through his head, destroying bits of his prefrontal cortex, Gage was transformed from a conscientious, dependable worker to a selfish and erratic character, described by some as antisocial.

Recent research has shown that psychopaths, who behave antisocially and without remorse, differ from the rest of us in several brain regions associated with self-control and moral cognition (*Behavioral Sciences and the Law*, vol 26, p 7). Even psychologically normal people who merely score higher in psychopathic traits show distinctive differences in their patterns of brain activation when contemplating moral decisions (*Molecular Psychiatry*, vol 14, p 5).

The idea that moral behaviour is dependent on brain function presents a challenge to our usual ways of thinking about moral responsibility. A remorseless murderer is unlikely to win much sympathy, but show us that his cold-blooded cruelty is a neuropsychological impairment and we are apt to hold him less responsible for his actions. Presumably for this reason, fMRI evidence was introduced by the defence in a recent murder trial to show that the perpetrator had differences in various brain regions which they argued reduced his culpability. Indeed, neuroscientific evidence has been found to exert a powerful influence over decisions by judges

and juries to find defendants "not guilty by reason of insanity" (*Behavioral Sciences and the Law*, vol 26, p 85).

Outside the courtroom, people tend to judge the behaviour of others less harshly when it is explained in light of physiological, rather than psychological processes (*Ethics and Behavior*, vol 15, p 139). This is as true for serious moral transgressions, like killing, as for behaviours that are merely socially undesirable, like overeating. The decreased moral stigma surrounding drug addiction is undoubtedly due in part to our emerging view of addiction as a brain disease.

What about our own actions? Might an awareness of the neural causes of behaviour influence our own behaviour? Perhaps so. In a 2008 study, researchers asked subjects to read a passage on the incompatibility of free will and neuroscience from Francis Crick's book *The Astonishing Hypothesis* (Simon and Schuster, 1995). This included the statement, " 'You', your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules." The researchers found that these people were then more likely to cheat on a computerised test than those who had read an unrelated passage (*Psychological Science*, vol 19, p 49).

So will the field of moral neuroscience change our laws, ethics and mores? The growing use of brain scans in courtrooms, societal precedents like the destigmatisation of addiction, and studies like those described above seem to say the answer is yes. And this makes sense. For laws and mores to persist, they must accord with our understanding of behaviour. For example, we know that young children have limited moral understanding and self-control, so we do not hold them criminally accountable for their behaviour. To the extent that neuroscience changes our understanding of human behaviour - and misbehaviour - it seems destined to alter society's standards of morality.

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