

Volume 2 | Number 2 | June 2014

scottish justice matters



HEALTH AND (IN)JUSTICE

Edited by Andrew Fraser and Maggie Mellon

Featuring: Health Inequalities • Older Prisoners
Mental Health • Drug Misuse • Neuroscience

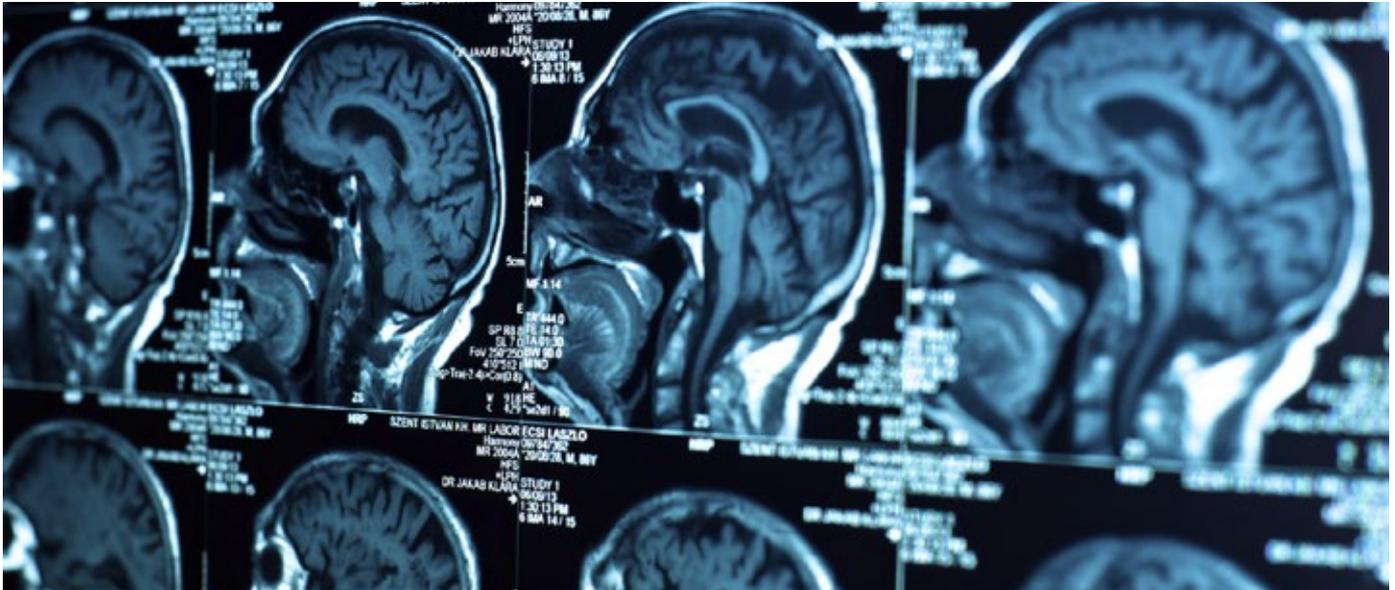
ALSO: Current Issues • History • International

ISSN 2052-7950



9 772052 795005

NEUROSCIENCE IN JUSTICE



Elizabeth Shaw

AS THE development of neuroscience provides new insights into human thought-processes and behaviour, it is likely to have increasing relevance for the criminal justice system. Evidence of brain dysfunction may cast doubt on an accused's mental capacity and therefore culpability. It is also important to consider if neuroscientific evidence fundamentally challenges some of the assumptions on which retributive punishment is based and its potential application in offender rehabilitation.

Mental Capacity

The majority of references to neuroscience in criminal cases in the UK relate to evidence about victims' injuries. However, neuroscientific evidence is increasingly being used in the United States to shed light on whether the accused's mental capacities were impaired. 1500 cases were identified (2005 - 2012), where evidence from neuroscience or behavioural genetics was used to support the defence's claim that the accused could not control himself, or was biologically predisposed to aggression and impulsivity. In most cases, such arguments did not result in acquittals or decreased sentences (Wright 2014).

Neuroscientific evidence may involve neuroimaging. Juxtaposing images of a 'normal' and an allegedly 'abnormal' brain can be a dramatic form of scientific evidence. However, interpreting neuroimaging data is complex. It is important that neuroscience is not given undue weight. Studies show that irrelevant neuroscientific terminology ("neurobabble") can give subjects false confidence in evidence. Scotland should therefore follow most other common law jurisdictions and review its framework on expert scientific evidence, to ensure that only reliable, probative evidence is admitted. Judges and lawyers should undertake training in understanding neuroscientific evidence as part of their continuing professional development.

To what extent then should brain abnormalities provide an excuse for criminal behaviour? Consider this: a 40-year-old schoolteacher underwent disturbing personality changes. He accumulated a large collection of child pornography and molested his young stepdaughter despite having had no previous history of paedophilia. After he began to suffer headaches, it was discovered that he had a brain tumour: this was removed and his deviant interests vanished. A year later he re-offended and it was discovered that the tumour had regrown. Again, after the tumour was removed the deviant urges disappeared. His doctors were convinced that the tumour caused his impulses to offend (Burns and Swerdlow 2003).

It is tempting to blame the tumour rather than the man for the offences. Yet, I would argue, that the fact that his impulse to break the law had an unusual cause, by itself, cannot eliminate his responsibility, if his impulse was resistible. The case for excusing *irresistible* impulses is compelling, (and has recently been supported by the Law Commission in England), but would require a change in the law. Currently, mental disorder is only a defence if it undermines understanding rather than control.

The Scottish Law Commission doubted whether it were possible to distinguish between being incapable of resisting an impulse and choosing not to resist (SLC 2004). One way of demonstrating such an incapacity to make a choice is to show that a necessary condition for capacity is absent. For example, if a car lacks an engine then it does not have the capacity to move. For humans, the counterpart of the car's engine is the neural correlates underlying the relevant capacities. If reliable correlations are found between certain brain structures' activation and the capacity for self-control, this would strengthen the case for excusing an individual with apparent deficits in the relevant neural circuitry (Brass and Haggard 2007).

Neuroscience, responsibility and punishment

One of the purposes of the penal system is retribution: imposing hardship on wrongdoers because they deserve it. For retribution to be fair the offender must have been responsible for a crime, which in turn assumes the offender had free will. Neuroscience may challenge the assumption that *anyone* has free will in the sense required for retribution to be appropriate.

For example, according to the theory of epiphenomenalism, our actions are *really* caused by unconscious rather than conscious (the decisions, intentions and desires of which we are aware) brain processes. We may *think* that the reason we acted a certain way was because we consciously decided to act that way, but actually our unconscious brain processes had already 'decided' what we would do. This approach is influenced by experiments which seem to reveal that brain activity associated with the initiation of action occurs in the brain *before* subjects consciously decided to perform a simple action such as pressing a button. However, even if unconscious processes cause certain spontaneous actions this does not show that complex courses of conduct performed after much conscious deliberation would happen regardless of that deliberation. Nonetheless, if simple, spontaneous actions can be caused by wholly unconscious processes (for which the person is not blameworthy) this might have implications for legal responsibility in certain cases such as some driving offences.

neuroscience suggests that we all make the decisions that we do because of the state of our brains

A different kind of challenge to the assumption of free will comes from determinism. While not denying that a person's conscious decision to act is a necessary step in the causal chain that brings about her action, determinism does imply that all our conscious thought processes are, in turn, caused by factors beyond our control such as our biological constitution and environment. However, neuroscience suggests that we all make the decisions that we do because of the state of our brains. Many philosophers believe that our conscious thought processes simply are certain brain processes. If everyone's motivations, personality and deliberations were entirely determined by their brains' development, which in turn was caused to develop in that exact way by genetic and environmental factors beyond their control, can it ever be fair to inflict retributive punishment on anyone?

There are essentially two ways of defending retributivism against this challenge. First, libertarians deny that all our decisions are *entirely determined* by prior brain states or anything else. These factors may *influence* us, but do not make the outcome of our deliberations inevitable and it is still possible, up to the moment of choosing, for a free agent to decide differently. Compatibilists, in contrast, believe that capacities such as rationality are all that is required for freedom. If a person is rational, understands the reasons against breaking the law and does not care about them, then she is responsible: that her genes and environment made it inevitable that she would develop into the kind of person who would not care about these reasons, is irrelevant.

Greene and Cohen (2004) argue that most non-philosophers find libertarianism more intuitive than compatibilism, but claim that libertarianism is empirically flawed. They predict that as neuroscience develops, and becomes more widely understood, there will be a tendency towards less retributive and more rehabilitative responses to offending.

Rejecting retributivism does not simply mean reducing the prison population. A non-retributive approach to imprisonment means concentrating on forward-looking aims, such as public protection and enabling offenders to lead useful lives in society.

Neuroscience may help achieve these goals. For example, researchers are developing risk prediction tools involving neuroimaging (Aharoni et al 2013). Although, for the foreseeable future, these techniques seem insufficiently reliable on their own, they may play a helpful role alongside other clinical and actuarial methods. Neuropharmacological treatments such as antidepressants and anti-libidinal medication, are already being used in sex-offender rehabilitation in Scotland. However, there are significant concerns over their safety and effectiveness (Greely 2007). A promising technique without known serious side effects is neurofeedback. Studies demonstrated behavioural improvements in juvenile offenders who viewed real-time visual feedback about their brain activity, and re-trained their brainwave patterns (Smith and Marvin 2006).

Neuroscience provides new insights into mental capacity, may influence our approach to punishment and may offer methods for reducing reoffending. However, an uncritical approach to neuroscience could distort responsibility-assessments and expose offenders to unjustified detention and harmful medication. The relevance, reliability and safety of such evidence and interventions must be carefully assessed.

Aharoni, E. et al (2013) *Neuroprediction of Future Re-Arrest*, Proceedings of the National Academy of Sciences, 110 (15): 6223-6228.

Brass, M. and Haggard, P. (2007) *To Do or Not To Do: The Neural Signature of Self-Control*, The Journal of Neuroscience, 27 (34): 9141-9145.

Burns, J. and Swerdlow, R. (2003). *Right Orbitofrontal Tumor with Pedophilia Symptom and Constructional Apraxia Sign*. Archives of Neurology, 60(3): 437-440.

Greely, H. (2007) *Neuroscience and criminal justice: Not responsibility but treatment*, U. Kan. L. Rev., 56: 1103-1138.

Greene, J. and Cohen, J. (2004) *For the Law Neuroscience Changes Everything and Nothing*, The Royal Society, 359: 1775-1785.

Scottish Law Commission (2004) *Report on Insanity and Diminished Responsibility*, Scot Law Com No 195.

Smith, P. and Marvin, S. (2006) *Neurofeedback with Juvenile Offenders: A Pilot Study in the Use of QEEG-Based and Analog-Based Remedial Neurofeedback Training*, Journal of Neurotherapy, 9(3):87-99.

Weisberg, D. et al. (2008) *The Seductive Allure of Neuroscience Explanations*, Journal of Cognitive Neuroscience, 20: 470-477.

Wright, J. (2014) *My Brain Made Me Pull the Trigger: Neuroscience-Based Defenses are Flooding the Courtroom*, Scientific American Mind, 25 (3).

Elizabeth Shaw is a lecturer at Aberdeen University.