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Is My Brain My Client? The Rise of Neuro-Evidence in Criminal Defence

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The Hook: The "Broken Machine" Defence

Imagine this. A man who has never committed an act of violence suddenly does. In this case, his defence attorney does not claim he's innocent. She claims he has a tumour. She projects this client's brain scan during her defence, and this scan is a color-coding brain map that shows a tumour invading a space on the amygdala, the area of the brain responsible for the control of the emotions. She then poses the question to the jury. Did he commit the crime, or did the tumour?

As this is already happening, this goes beyond the hypothesis and into a modification of the law. We are getting to the point, due to the literal scan-able applications and the actual scannable data, where the brain's data will be used as a primary witness, and the implications of this phenomenon will be substantial and probably quite uncomfortable art for the public to review.

The Shift: From "evil" to "ill"

For many centuries, the law has maintained a simple moral law stating that someone is guilty if they intended to do what is considered to be wrong. This concept of guilty and intentional is what the law calls mens rea, or "guilty mind." Did you intend to do it?

Neuroscience is slowly modifying that law. Defence attorneys are beginning to ask themselves if the client did, in fact, intend to act, but were they biologically incapable of acting otherwise? This is a major movement from 'immoral' acts, to 'ill' acts, from moral to neurological failure.¹

¹ Z. Khalid et al., *The Use of Neurobiological Evidence in Sentencing Mitigation*, 42 Behav. Sci. & L. 65 (2024).

Functional Magnetic Resonance Imaging (fMRI) and PET scans are significant contributors to the present advancements in neuro-law. For the first time, juries are able to visualize the workings, and the neurological basis of impulse control, and decision-making, processes that were once strictly internal.² Evidence of behaviour once described as a "defect of character" can now be explained as a "defect of wiring," and is pushing the limits of legal reasoning.

The Strategy: Mitigation and the Image

The use of neuro-evidence virtually negates the "not guilty" and "innocence" defence strategies³. Courts are unwilling to accept a scan and declare a defendant innocent, but they will use the findings of a scan as evidence to reduce a sentence, remove a defendant from the death penalty,⁴ or reduce a charge.

It is known that juries are more sympathetic to colourful images from neuro-imaging scans than standard psychiatric evidence. A 500-page evidence document, while it may be logical or contain research, will never be more persuasive than an image of a neuro-imaging scan from a suffered brain. This persuasive image, in capital cases, provides the jury with a reason to be more lenient.

The field is expanding into the legal system and also to the field of genetics. The low-activity variant of the MAOA gene has been associated with an increased likelihood of aggression, especially in the context of childhood trauma⁵. The answer remains for the law to combat this: if your genetics predispose you to be more violent, should the law reduce your sentence in order to combat this? And if so, to what extent?

The Dark Side: The Double-Edged Sword

While strategies can gain the favour of the court in the short term with the goal of achieving the best sentencing, in the long run, they usually lose the larger "war." The best example is the consequence of revealing the neuron make-up of defendants and proving their "brain of a

² Michael J. Saks et al., *Neuroscientific Evidence in the Courtroom: A Review*, 4 Cognitive Rsch.: Principles & Implications 1 (2019).

³ James Brewer, *Genes as a Defence to Homicide: Trends in Neuroimmunology*, INPACT Psychol. Conf. (2022), <https://inpact-psychologyconference.org/wp-content/uploads/2022/05/2022inpact102.pdf>.

⁴ LDF Amicus Brief Challenges Racialized "Warrior Gene" in Capital Case, Death Penalty Info. Ctr. (2026), <https://deathpenaltyinfo.org/ldf-files-amicus-brief-challenges-racialized-warrior-gene-in-capital-case>.

⁵ Joshua W. Buckholtz & Andreas Meyer-Lindenberg, *The MAOA Genetic Predisposition to Impulsive Violence: Is It Relevant to Criminal Trials?*, 5 Neuroethics 81 (2012).

criminal mindset.” If a defendant is seen as ‘biologically’ predisposed, would a judge conclude they would be safe to release in the long term? Defendants run the risk of being seen as a ‘glitch’ in the system and presenting a defence of ‘uncontrollable’ biology as opposed to an indefinable mindset.⁶

The Future: AI and the Pre-Crime Problem

The current trajectory of advocates for the ‘Pre-Crime’ syndrome lies within unauthorized neuro-evidence. Predictions of ‘future dangerousness’ are placed within AI-based models that use neuro-imaging and algorithms in unexpected ways to achieve the end goal⁷. Brain scans lie on top of the COMPAS and other models that are criticized for their racial bias⁸. The California Supreme Court has ruled that the Neuroscience of Criminology cannot be used to ensure a defendant will be the best candidate for the prosecution of a crime.

The goal of the defence is to ensure neural evidence of being biologically responsible for what is ‘sub-humans’ is not incorporated into the case and the legal arguments presented to the court with respect to the National Academy of Criminal Defenders.⁹

Reality Check: Who is the True Client?

Law has always dealt with the soul. The concern was inner thoughts that willed a person to act. The law's response was punishment. Neuro-evidence gives us a more radical challenge: let us focus on the synapse. For the first time we look at the inner workings of the biological machine and ask ourselves, how much blame is left for the machine user when the machine is malfunctioning?

This is not a question that neuroscience can answer. There can be a scan that shows structural abnormality, but the scan certainly cannot show where the biological ends and the person begin. The scan won't be able to tell us where the line between determinism and free will lies.

⁶ *Monoamine Oxidase A ("Warrior Gene")*, EBSCO Rsch. Starters (2024), <https://www.ebsco.com/research-starters/biology/monoamine-oxidase-warrior-gene>.

⁷ Stephan Schleim & Thomas V. Wiecki, *Neuroprediction and A.I. in Forensic Psychiatry and Criminal Justice*, 11 *Frontiers in Psychol.* 1 (2020).

⁸ *Predicting Crime or Perpetuating Bias? The AI Dilemma*, 39 *AI & Soc'y* (2024).

⁹ *Artificial Intelligence in Criminal Justice*, Colls. of L. (Jan. 12, 2024), <https://www.collegesoflaw.edu/blog/2024/01/12/artificial-intelligence-and-criminal-law/>.

If the brain is the client, we must then be quite prepared to face the fact that some people act badly not because they willed to act badly, but bad acting was the end result of their bad biological structures. This is not legal question; it is more of a moral question. Unlike the scan, the answer will not present itself in a million different colours.