

Memory Evidence Neuroimaging in the Courts with Professor Emily Murphy

- Brain imaging evidence of memory
 - Example of Aditi Sharma case: State of Maharashtra v. Sharma (June 12, 2008), Case No. 508/07, Sessions Court, Pune (India)
 - Sharma convicted of murder, based on brain-based memory detection evidence derived from Brain Electrical Oscillations Signature (BEOS) Test.
 - The Indian Supreme Court later held that evidence derived from tests like the BEOS Test is not admissible if they were conducted without consent. Selvi v. State of Karnataka (2010) AIR 2010 SC 1974.
 - Brain image evidence used in courts
 - Hypothetical cases
 - Different types of brain imaging have been used mainly in criminal cases:
 - For post-conviction exoneration or habeas relief
 - In defense to bolster a defense claim
 - Memory detection vs. lie detection
 - Memory detection: whether subject has autobiographical or experiential knowledge of an event. Requires test administrator to have knowledge about the ground truth.
 - Lie detection or guilty knowledge tests: whether subject is being truthful in statements.
 - What is a brain image
 - Electroencephalography (EEG)
 - Measures electrical activity waveform (e.g., P300 event related potential (ERP)) through electrodes placed on head
 - Functional magnetic resonance imaging (fMRI)
 - Uses magnetic fields and radio waves to detect differences in blood oxygenation levels in the brain. Subject must remain very still during the test.
 - Biological limitations of memory
 - Subjective memory state vs. objective experiential history
 - Subject may be truthful and believe to have experiential knowledge. May have false memories. fMRI tests may not be able to distinguish between false memory and experiential knowledge.
- Admissibility in the courts
 - Relevance

- Admissible evidence must be relevant.¹
 - Memory imaging evidence generally would not be admissible to assess *mens rea*.
 - May be admissible to in cases where the disputed issue is the facts about the past event. E.g., corroborate witness testimony.
 - Whether it should be admissible to evaluate the sincerity of a witness or defendant or whether credibility assessments are solely for the jury to decide.
- Reliability
 - Daubert standard. *Daubert v. Merrell Dow Pharmaceuticals Inc.*, 509 U.S. 579 (1993).
 - Whether the technique or scientific knowledge has been tested,
 - Whether it has been subjected to peer review and publications,
 - Known or potential rate of error
 - Existence and maintenance of standards controlling the technique's operations, and
 - Whether there is widespread acceptance in the relevant scientific community.
 - Frye standard. *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).
 - Whether the method is generally accepted by the particular field.
 - Should judges be gatekeepers?
- Probative value
 - Relevant evidence may be excluded if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence.²
 - What is the impact of brain imaging evidence on jurors? How do jurors understand the perceive such evidence?
 - If the technology for brain memory imaging were perfect, should it be used in courts?
 - Concept of cognitive liberty or bodily integrity. Implicates:
 - Fourth Amendment right against unreasonable search and seizure
 - Fifth Amendment right against self-incrimination
 - Supreme Court found that involuntary blood alcohol test does not violate Fifth Amendment right against self-incrimination. *Schmerber v. California*, 384 U.S. 757 (1966). Are memories testimonial or akin blood alcohol levels?

¹ FED. R. EVID. 401.

² FED. R. EVID. 403.

Resources

- Emily R. Murphy and Jesse Rissman, *Evidence of Memory from Brain Data*, J. L. & Biosci.1 (2020). Available at: https://repository.uchastings.edu/faculty_scholarship/1805.
- Emily R. Murphy, Teneille R. Brown, Adina Roskies, and Walter Sinnott-Armstrong, *Brain images as Legal Evidence*, 5 Episteme 359 (2008). Available at: https://repository.uchastings.edu/faculty_scholarship/1508.