Mental Abnormality: The Role of Neuropsychological Expert Opinion in Forensic Settings

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Current Issues in sentencing

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Concept of Mental Abnormality & Neuropsychological Evidence

• An arrest or retarded development of the mind

• An inherent cause: – Natural attributes of the mind existing from birth or developing by reason of innate disposition, or natural deterioration resulting from age or other degenerative processes such as disease – IMPLIES A DEGREE OF PERMANENCE

• Induced by disease or injury: organic disorders such as physical harm or physical deterioration of the brain: TBI, Dementias, Stroke, Epilepsy

• Delirium from fever

(Although legal concepts, determination may be established on clinical evidence)
Examples of Causal factors Legally Recognised for purposes of Defence

• Depression, alcoholism & PTSD caused by war experiences
  \((Nielsen v R [1990] 2 Qd R 578)\)

• Depression, ADHD and Brain damage caused by anoxia at birth
  \((R v Morgan; Ex parte A-G [1987] 2 Qd R 627; (1986) 24 A Crim R 342)\);

• Korsakoff’s psychosis or amnestic syndrome arising from alcohol abuse

• Right frontal lobe dysfunction and psycho-social factors
  \((Whitworth v R [1987] 1 Qd R 437;(1987) 31 A Crim R 453)\);

• Frontal lobe brain damage and personality disorder
  \((Chester v R (1981) 5 A Crim R 296)\);

• Outburst of rage
  \((McGarvie v R (1986) 5 NSWLR 270)\);

• Brain disease caused by encephalitis and poliomyelitis
  \((Rolph v R [1962] Qd R 262)\).
American Academy of Clinical Neuropsychology 2007 Defines Neuropsychology as:

- Applied science that examines the impact of both normal and abnormal brain functioning on a broad range of cognitive, emotional and behavioural functions.

This is done by:

- Use of objective neuropsychological tests
- Systematic behavioural observation
- Interpretation of the findings based on knowledge of the neuropsychological manifestations of brain-related conditions
- Considering other evaluations including:
  - Neuroimaging
  - Other neuro-diagnostic studies and informed neuropsychologically orientated rehabilitation interventions
Cognitive Domains Assessed in Neuropsychological Examination

- Intelligence
- Academic abilities
- Attention/information processing
- Language
- Memory
- Visuospatial
- Executive/Adaptive
- Perception
- Motivation

- Mood
- Personality
- Symptom validity
How Neuropsychologists Can assist the Judicial System

- Provide an understanding of neuroanatomy, neuropathology and how neuropathological conditions affect thinking skills and decision-making capacity (Bigler & Clement, 1997, Lezak, 1995)

- Identify behaviours not caused by neuropathological conditions, eg: feigning, psychopathy, personality disorders and potential other psychiatric disorders (Denny, 2005)

- Recommending treatment needs that may be of assistance at the time of sentencing, and prerelease assessments of potential increased dangerousness
Causes of Brain Impairment in Prison Populations

- Stroke
- Head Injury
- Dementia
- Autoimmune Disorders
- Infections
- Toxic Exposure
- Heart Disease
- Epilepsy
- MS
- Brain Tumour

- PTSD
- Depression
- Psychosis
- Drug and Alcohol
Neuropsychological assessment process

- Clinical interview and history
- Administration of well validated test battery
- Test profile analysis
- Integration with historical data, unique aspects of individual performance and life situation
Neuropsychological Decision Making

- Are the data consistent within and between neuropsychological domains
- Is the neuropsychological profile consistent with the suspected etiologic condition
- Are the neuropsychological data consistent with the documented severity of injury
- Are the neuropsychological data consistent with the subject’s behavioural presentation
Normal Distribution Curve

IQ Score Distribution

Percentage of Population

IQ Score

- 0.1%
- 2%
- 14%
- 34%
- 68%
- 95%
- 14%
- 34%
- 2%
- 0.1%

IQ Score Range:
- 55 to 70
- 70 to 85
- 85 to 100
- 100 to 115
- 115 to 130
- 130 to 145
- 145 to 160
Frontal Lobe
Neuropathology/Brain Damage & Criminal Responsibility

- Prefrontal/Frontal Lobes & Violence and Criminal Behaviour
- Impulsive subtype aggression (Brower et al 2001)
Neuropsychological Functions associated with divisions of the prefrontal cortex

Lateral Prefrontal Cortex

- Selective attention
- Working memory
- Preparatory set
- Monitoring
- Temporal organisation of behaviour, speech, and reasoning
- Distractibility, perseveration, Dis-inhibition
- Novelty, uncertainty, choice
- Emotional colouring of action, experience & decision making
- Significance, context and ambiguity
- Switching perspectives and mental relativism
Orbital Prefrontal Cortex

- Emotional input, arousal, suppression of distracting signals

Lesions cause:
- Emotional lability
- Disinhibition
- Distractability
- Hyperkinesis
Dorsomedial Prefrontal Cortex

- Motivation
- Initiation of activity

Lesions:
- Apathy
- Decreased drive
- Awareness
- Spontaneous movements
- Akinetic-abulic syndrome & mutism
Dorsolateral Prefrontal Cortex

- Monitors and adjusts behaviour using working memory

Lesions:
- Executive function deficits
- Disinterest
- Emotional reactivity
- Decreased attention to relevant stimuli
Tests of Frontal Lobe Function

Wisconsin Card Sorting Test

Tower of London

Stroop Test

Rey complex Figure
Diseases Commonly Associated with Frontal Lobe Lesions

Closed Head Injury:

- Closed head injury widespread stretching and shearing of fibers throughout the brain
- Frontal lobes more vulnerable
- Contusions and intra-cerebral haematomas

[Diagram showing brain injury and contusions]
Determinants of Behavioural Dysfunction Following Head Injury

Need to know:

- Premorbid cognitive strengths and weaknesses, school reports, learning disability
- History of antisocial behaviour, alcohol or substance abuse, depression, hyperactivity
- Family dynamics
- Pre-existing neurological conditions
- Occupational history
- Site of lesion

Environmental Factors:

- How family responds to changes and the development of behavioural problems
- Social networks – breakdown after injury
- Financial resources
- Vocational outcome
Other diseases associated with frontal lobe lesions

- Tumors - Gliomas, meningiomas - profound personality changes and dementia

- Multiple Sclerosis – associated with plaques in FLs - euphoria, depressed moods, cognitive and behavioural problems

- Huntington's disease
Other Frontal Lobe Disorders

Frontal Lobe Seizures:

- Usually secondary to trauma: can exhibit unusual behavior (inappropriate laughter, crying, verbal automatism, complex gesture)

Vascular disease: More common in elderly:

- ACA territory infarctions – Medial
- MCA territory- Dorsolateral
- ACom aneurysm rupture – Personality change, emotional disturbance
Frontotemporal Dementia (FTD)

Prevalence- 15-22 per 100,000

- A disorder characterised by neuropsychiatric symptoms including alterations in social interpersonal behaviour, personal regulation, empathy and insight

- Sociopathic acts are more prominent compared to other dementing illnesses

- Antisocial behaviours reported in 50% of cases include stealing, hit and run accidents, physical assaults, indecent exposure, inappropriate sexual behaviour, public urination, driving violations and acts of violence
Questions arising from neuropsychological evidence in the legal context

- Whether the accused is fully aware and has insight for their behaviour
- Whether there is premeditation
- Remorse
- Knowledge of right and wrong
- Anticipation of consequences
Neuropsychological contributions to sentencing in Mental Abnormality

- Potential behaviour raising risk of dangerousness
- Assessment of extent and severity of mental impairment
- Assess the likelihood of brain impairment present at the time of the commission of the offence
- Provide an opinion whether the mental impairment potentially could have contributed to the commission of the offence
- Provide an opinion on the prognosis of the mental impairment
- Make recommendations for treatment and rehabilitation within area of specialty
- Recommend specific cognitive and behavioural rehabilitation strategies
- Provide information in regard to community services available eg brain injury, drug rehabilitation, counselling and community mental health.
Dilemmas of Neuropsychological Evidence

- How well do neuropsychological test results correlate with everyday behaviour

- What is abnormal

- How do we account for those with brain diseases who do not engage in antisocial behaviour

- The impact of multiple variable in the commission of an offence
I have presented my evidence your honour.

What is your verdict?
References

- Grafton S., Sinnott-Armstrong WP, Gazzaniga SI & Gazzaniga MS (Dec 2006 Jan 2007) Brain Scans GO Legal Scientific America Mind pp30-37