

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

Wayne Reid PhD FAPS
Clinical Neuropsychologist, Clinical Psychologist

Current Issues in sentencing

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www.waynereid.com.au



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**
(*Gillespie v R* (1988) 36 A Crim R 235);
- **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:

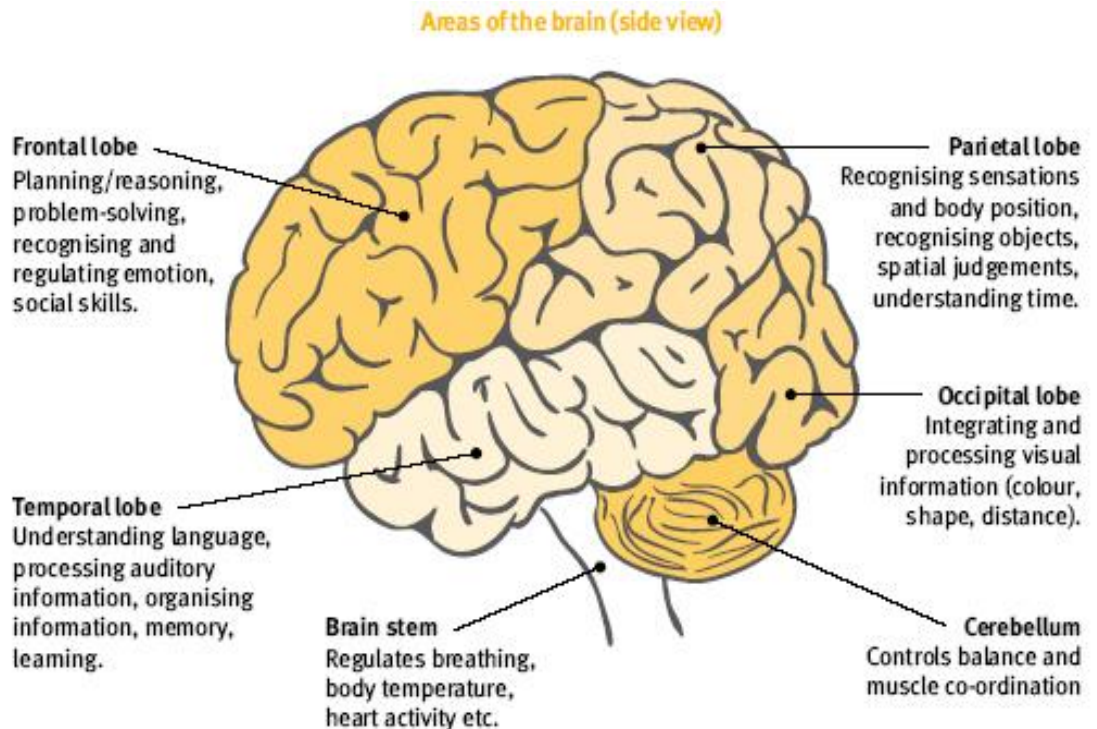
- **Applied science that examines the impact of both normal and abnormal brain functioning on a broad range of cognitive, emotional and behavioural functions.**

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

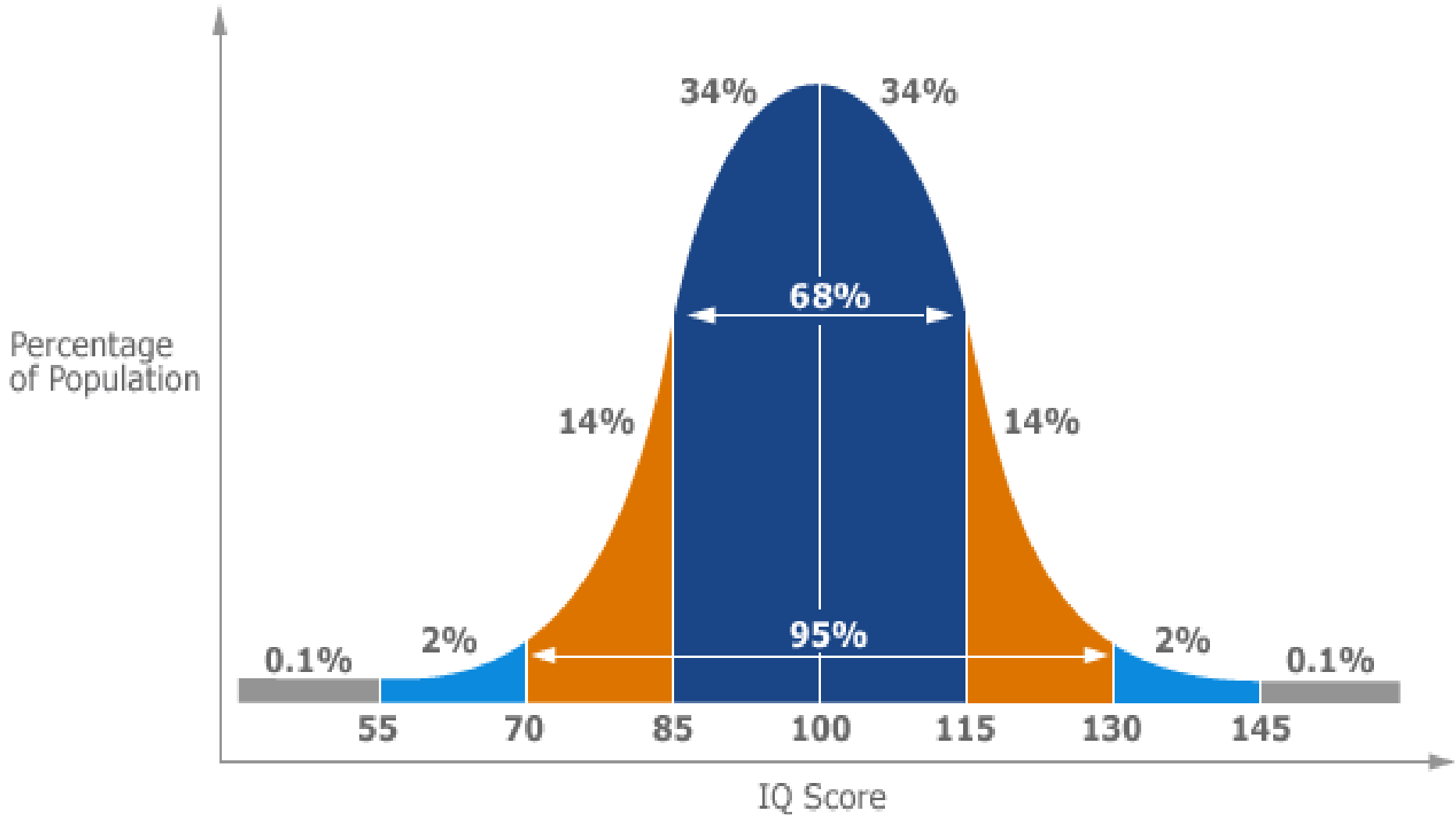
- **Clinical interview and history**
- **Administration of well validated test battery**
- **Test profile analysis**
- **Integration with historical data, unique aspects of individual performance and life situation**

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

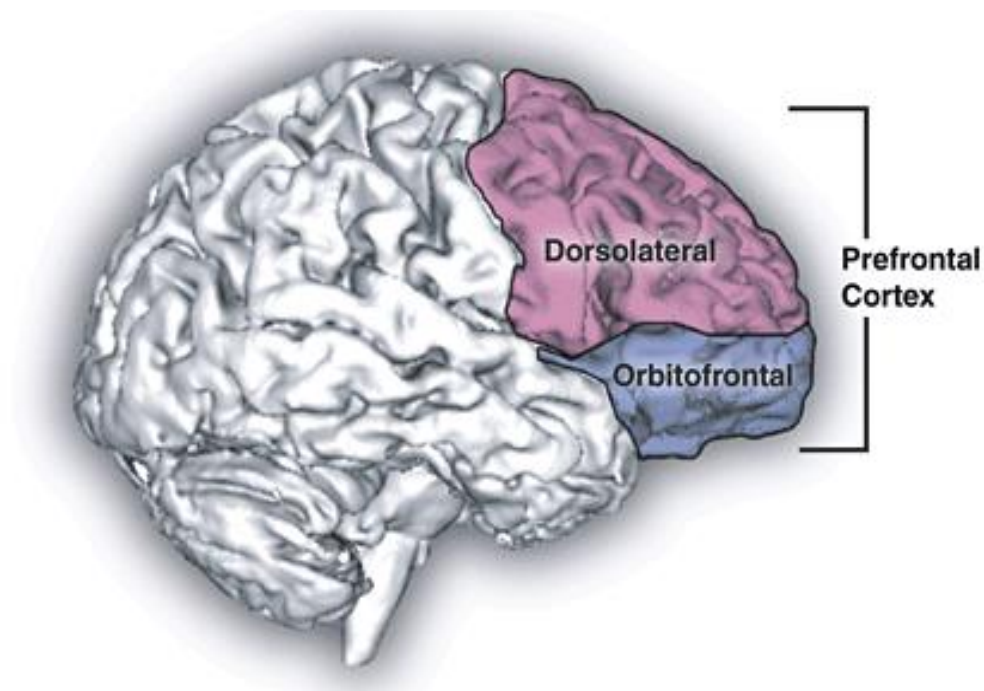
IQ Score Distribution



Frontal Lobe

Neuropathology/Brain Damage & Criminal Responsibility

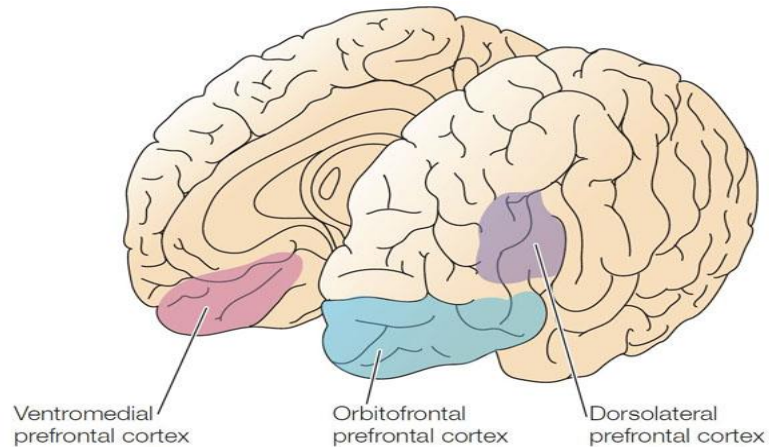
- Prefrontal/Frontal Lobes & Violence and Criminal Behaviour
- Impulsive subtype aggression (Brower et al 2001)



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**

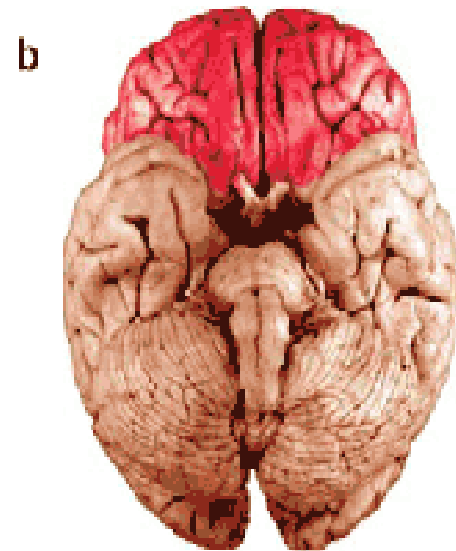
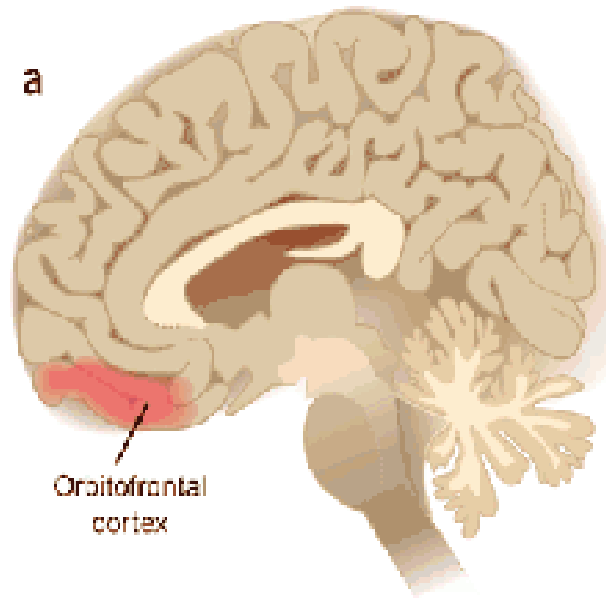


Orbital Prefrontal Cortex

- Emotional input, arousal, suppression of distracting signals

Lesions cause:

- Emotional lability
- Disinhibition
- Distractability
- Hyperkinesia

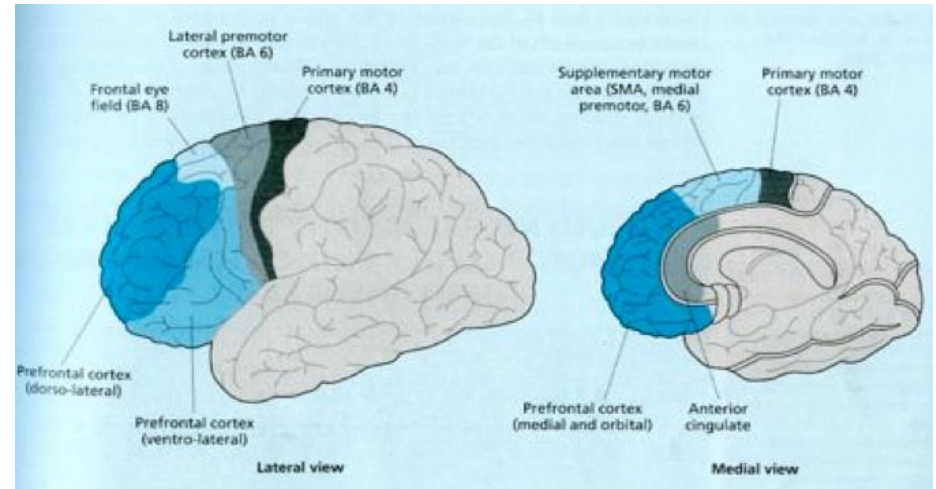


Dorsomedial Prefrontal Cortex

- Motivation
- Initiation of activity

Lesions:-

- Apathy
- Decreased drive
- Awareness
- Spontaneous movements
- Akinetic-abulic syndrome & mutism

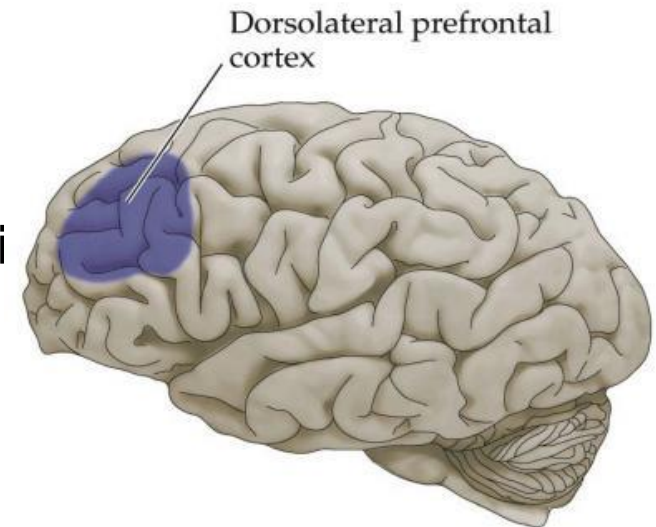


Dorsolateral Prefrontal Cortex

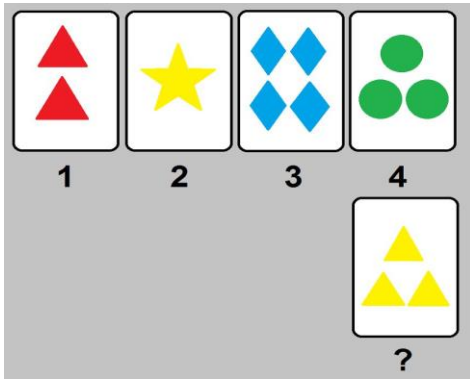
- **Monitors and adjusts behaviour using working memory**

Lesions:-

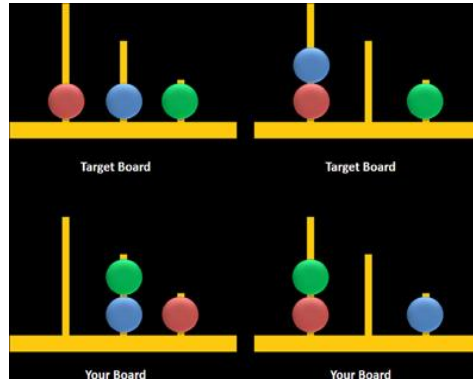
- **Executive function deficits**
- **Disinterest**
- **Emotional reactivity**
- **Decreased attention to relevant stimuli**



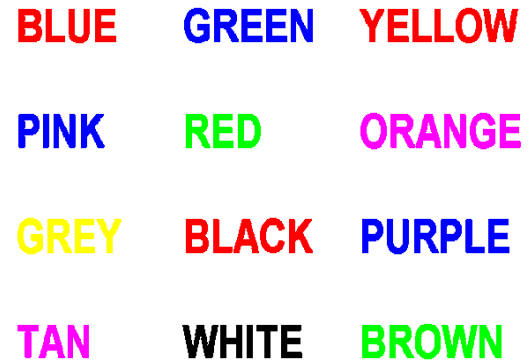
Tests of Frontal Lobe Function



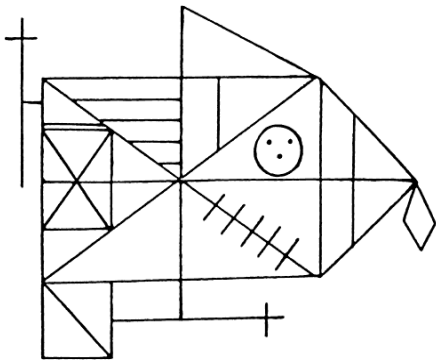
Wisconsin Card Sorting Test



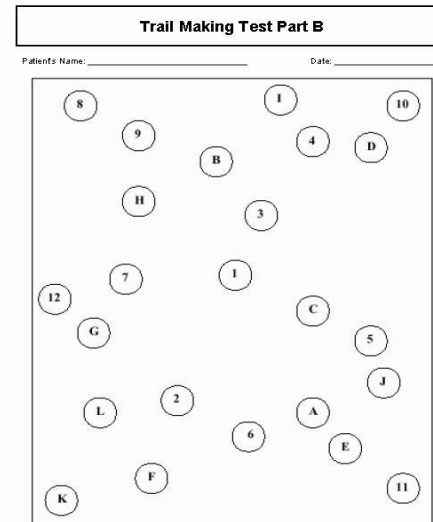
Tower of London



Stroop Test



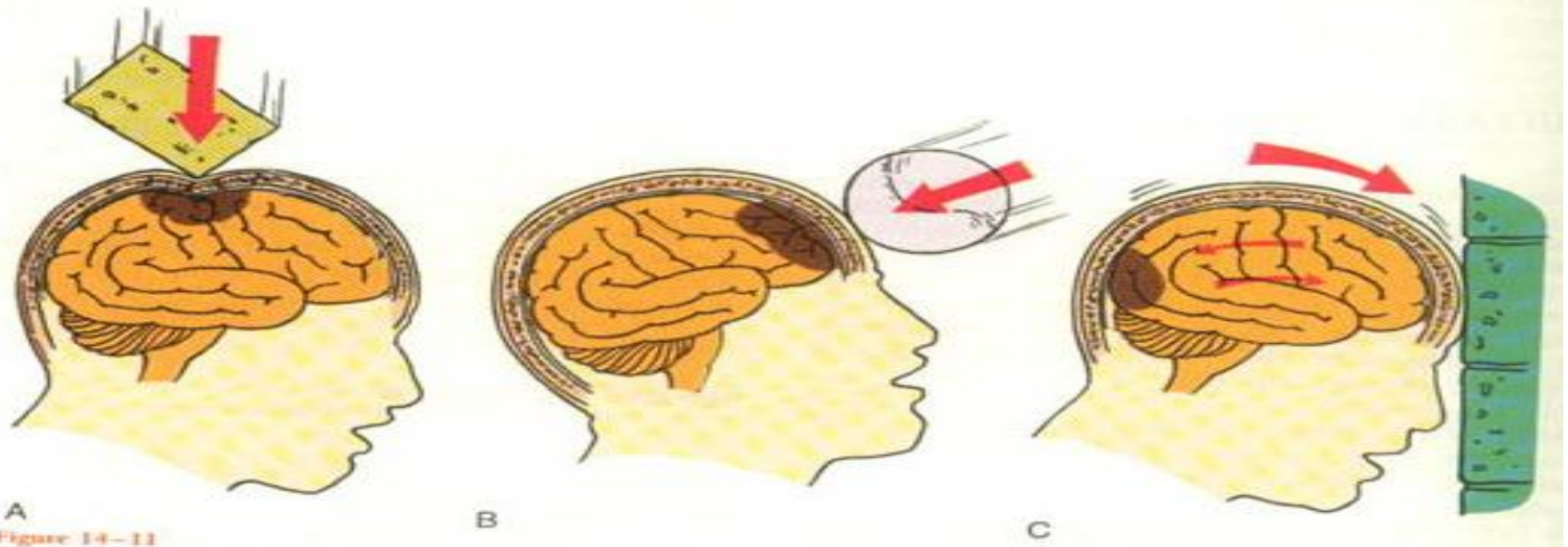
Rey complex Figure



Diseases Commonly Associated with Frontal Lobe Lesions

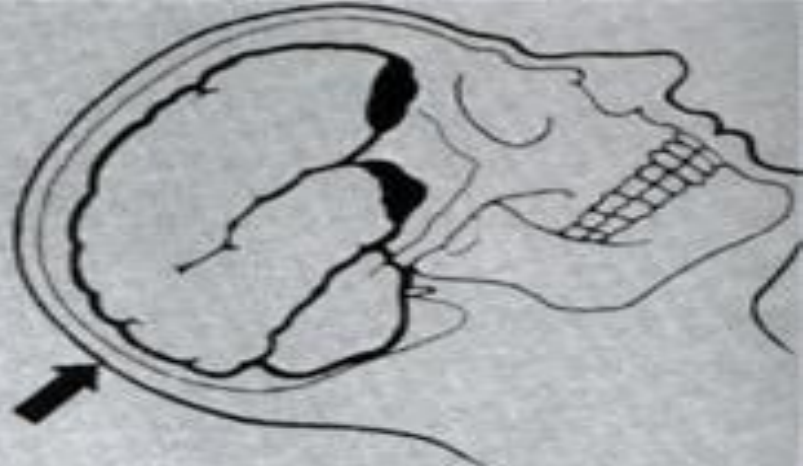
Closed Head Injury :

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





A



B



E



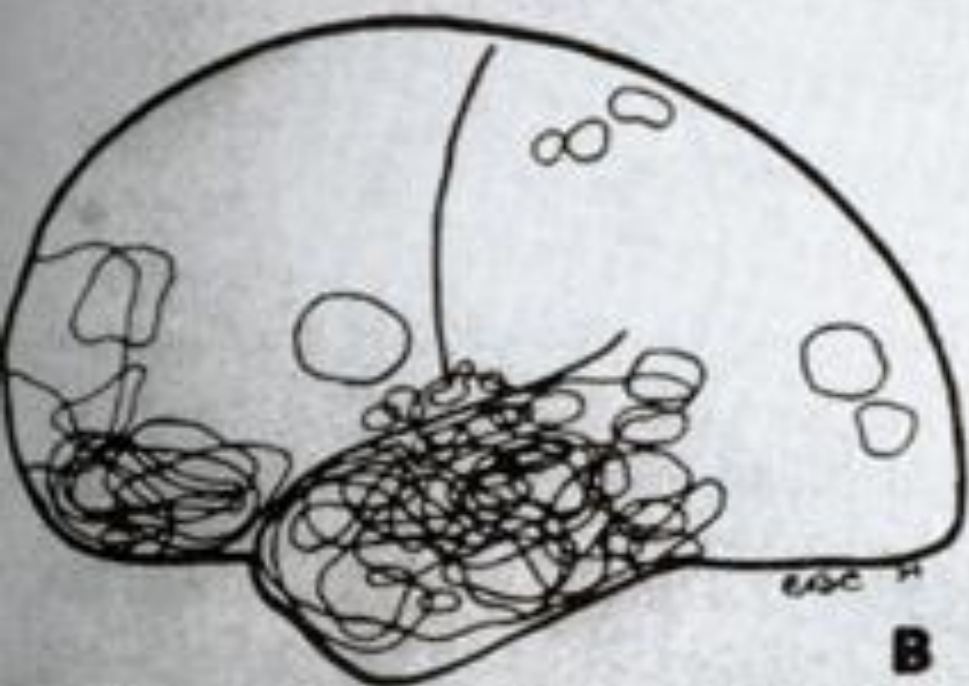
C



D



A



B



C

Determinants of Behavioural Dysfunction Following Head Injury

Need to know:

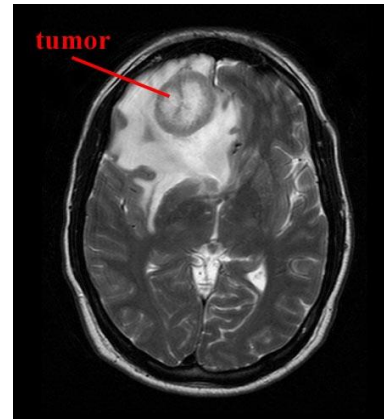
- **Premorbid cognitive strengths and weaknesses, school reports, learning disability**
- **History of antisocial behaviour, alcohol or substance abuse, depression, hyperactivity**
- **Family dynamics**
- **Pre-existing neurological conditions**
- **Occupational history**
- **Site of lesion**

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**

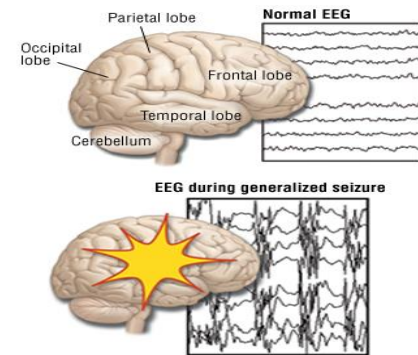


- **Multiple Sclerosis – associated with plaques in FLs- euphoria, depressed moods, cognitive and behavioural problems**
- **Huntingtons disease**

Other Frontal Lobe Disorders

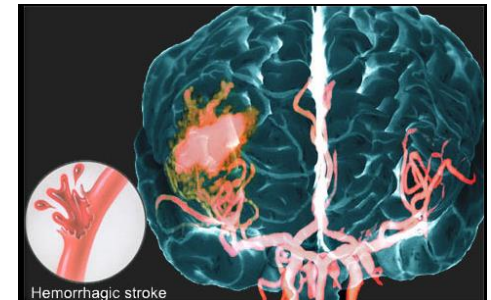
Frontal Lobe Seizures:

- 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 a 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

- Fairall PA, Yeo S 2005, *Criminal Defences in Australia 4th Ed Lexis Nexis Butterworths Australia Chpt 15 Diminished Responsibility* pp 301-320
- Bigler ED., Clement PF. (1997) *Diagnostic clinical neuropsychology (3rd Ed.)*. Austin, TX University of Texas Press.
- Denney RL., (1996) *Symptom validity testing of remote memory in a criminal forensic setting*. *Archives of Clinical Neuropsychology*, 11:589-603.
- Lezak M., Howieson DB., Bigler ED., Tranel D. (2012) *Neuropsychological Assessment 5th ed*. Oxford University Press
- Larrabee GL (Ed) 2005. *Forensic Neuropsychology: A scientific Approach*. Oxford University Press
- Brower MC., Price BH. (2001) *Neuropsychiatry of Frontal Lobe dysfunction in violent and criminal behaviour: A critical review*. *Journal of Neurology, Neurosurgery and Psychiatry*, 71, 720-726
- Raine A., Meloy JR et al. (1998) *Reduced prefrontal and increased subcortical brain functioning assessed using positron emission tomography in predatory and affective murderers*. *Behavioural Sciences and the Law*, 16, 319-332.
- Grafton S., Sinnott-Armstrong WP, Gazzaniga SI & Gazzaniga MS (Dec 2006 Jan 2007) *Brain Scans GO Legal Scientific America Mind* pp30-37
- Probst CC., van Eimeren T. (2013). *The functional anatomy of impulse control disorders*. *Curr Neurol Neuroscience Reports*, 13:386
- Mobbs D., Lau HC, Jones OD, Frith C. (2007). *Law, responsibility and the Brain*. *PloS Biology* 5 (4) 0693-0700
- Mendez MF., Shapira JS., Saul RE. (2011). *Spectrum of Sociopathy in dementia*. *J Neuropsychiatry Clin Neuroscience*. 23:2
- Mendez MF., Chen AK., Shapira JS., Miller BL. (2005) *Acquired Sociopathy and frontotemporal Dementia*. *Dement Geriatr Cogn Disord*. 20: 99-104
- Sapolsky RM. (2004). *The frontal cortex and the criminal justice system*. *Phil. Trans of Royal Society. Biological Science* Vol 359:1451
- Howard D., Westmore B. (2004) *Crime Mental Health Law in New South Wales. A practical guide for lawyers and health care professionals*. LexisNexis Butterworths Australia