

# Neuropsychology of Criminal Behavior

Indiana DOC and Brain Injury  
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# The Biological Basis of Our Consciousness, Our Identity, and Adaptability



Men ought to know that from nothing else but the brain come joys, delights, laughter and sports, and sorrows, grief's, despondency, and lamentations. And by this, in a special manner, we acquire wisdom and knowledge, and see and hear and know what are foul and what are fair, what are bad and what are good, what are sweet and what are unsavory... And by the same organ we become mad and delirious, and fears and terrors assail us...All these things we endure from the brain when it is not healthy...In these ways I am of the opinion that the brain exercises the greatest power in man.

-Hippocrates, *On the Sacred Disease* (Fourth century B.C.)

# Preface

- Criminal Behavior is driven by multiple factors (biological, social, psychological)
- TBI however has been demonstrated to be a significant risk factor for incarceration even in subjects with no previous criminal history
- TBI + other risk factors represents an even greater risk factor for criminal behavior
- This talk will focus exclusively on the effects of TBI

# TBI and Criminal Behavior

- TBI in offenders is associated with <sup>1, 2</sup>
  - higher rates of infraction while in custody
  - Higher levels of reoffending
  - Committing more violent crimes
- Inmates with TBI were found to have significantly greater risk of violence and self-harm<sup>3</sup>

1. Williams WH, Cordan G, Mewse AJ et. al. (2010). Self-reported traumatic brain injury in male young offenders: a risk factor for re-offending, poor mental health, and violence? *Neuropsychol Rehabil*, 20: 801-812.
2. Shiroma EJ, Pickelsimer EE, Ferguson, PL et. al., (2010). Association of medically attended traumatic brain injury and in-prison behavioral infractions: a statewide longitudinal study. *J Corr Health Care*, 16; 273-286. 3-286.
3. Hawley CA and Maden A. (2003). Mentally disordered offenders with a history of previous head injury: are they more difficult to discharge. *Brain Injury*, 17: 743-758.

# TBI and Criminal Behavior

- Aggressive behavior in TBI was significantly associated with
  - Major depression
  - Frontal lobe injury
  - History of drug and alcohol abuse (further compromise of brain functioning)

Tateno A, Jorge RE, Robinson RG et al. (2003). Clinical correlates of aggressive behavior after traumatic brain injury. *The J of Neuropsychiatry and Clin Neurosci*, 15: 155-160.

# TBI and Criminal Behavior

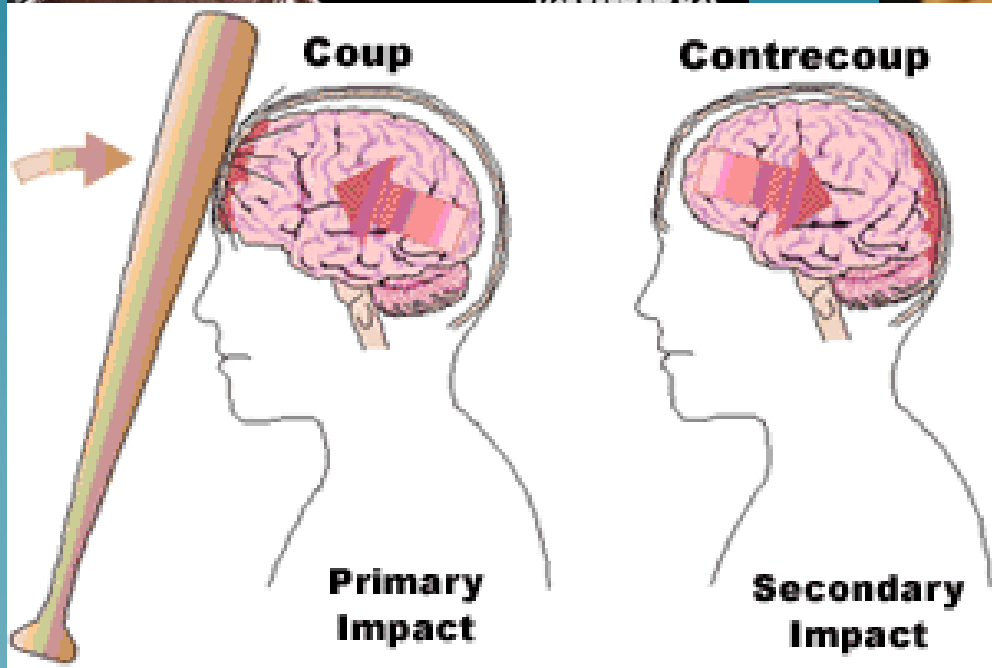
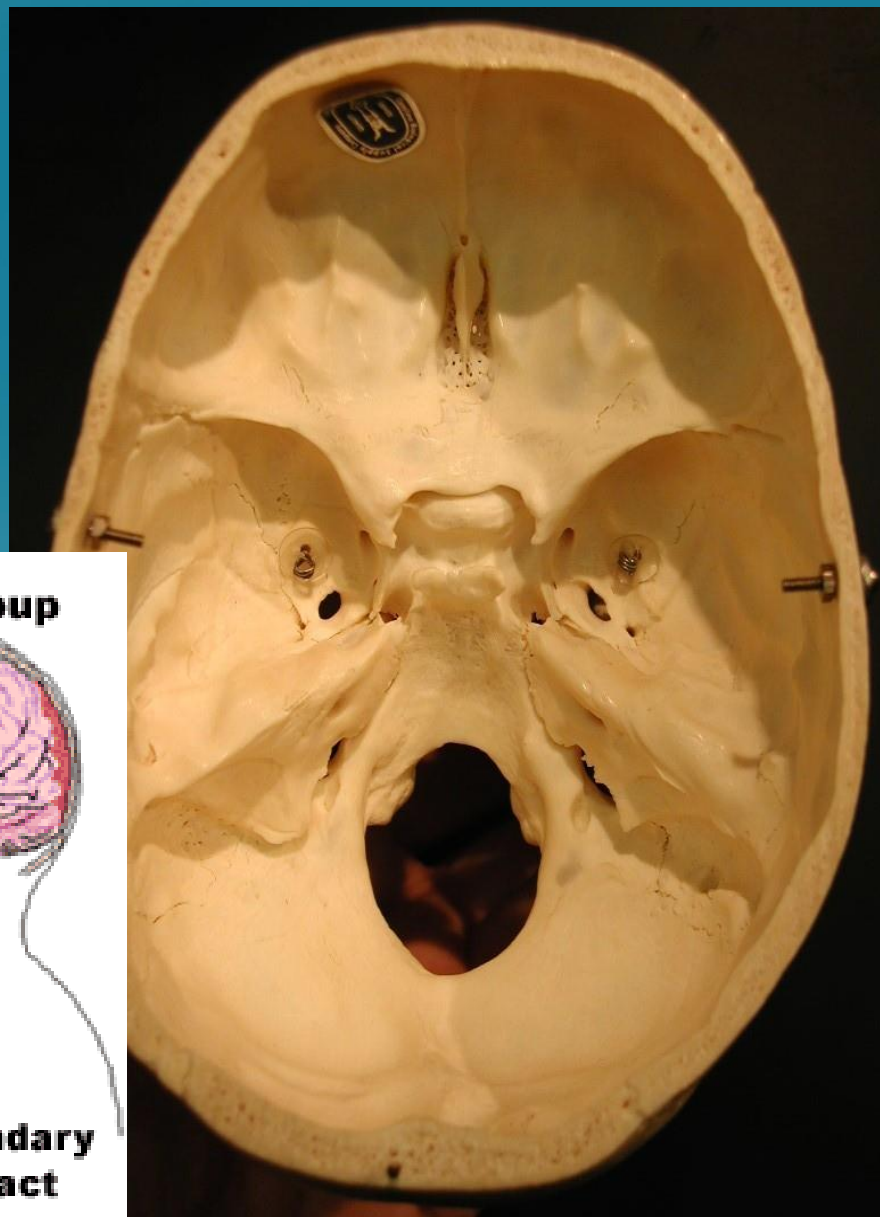
- In a study of incarcerated adults,
  - violent inmates had a history of TBI as well as academic and behavioral problems in school
  - Non-violent inmates had only a history of academic and behavioral problems in school

# Therefore

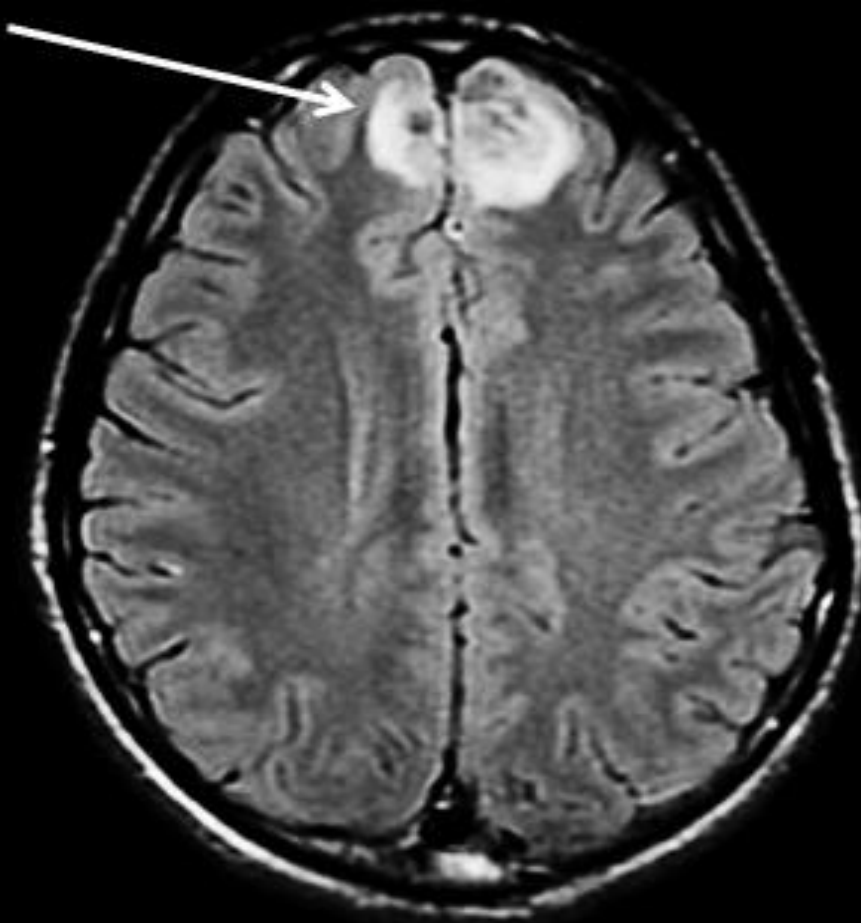
- Appropriate brain injury rehabilitation may prevent crime
- Screening for TBI at intake into the DOC and staff training and TBI-specific behavioral protocols may reduce incidents
- Screening at discharge and triage to brain injury resources may reduce re-offending and re-incarceration



So why are people with TBI more  
at risk for criminal behavior?

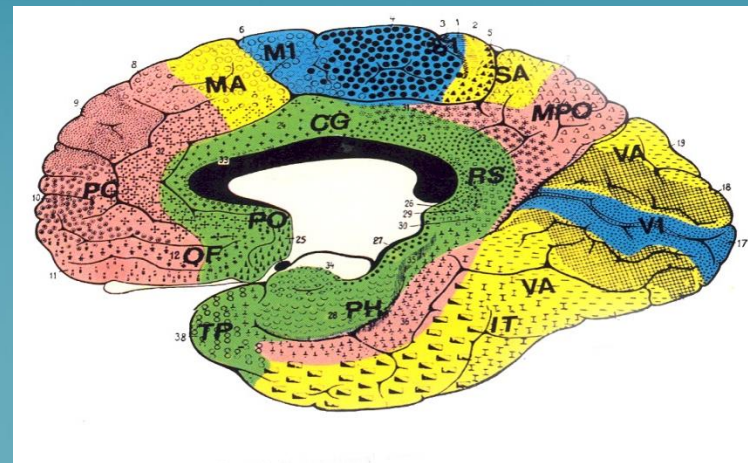
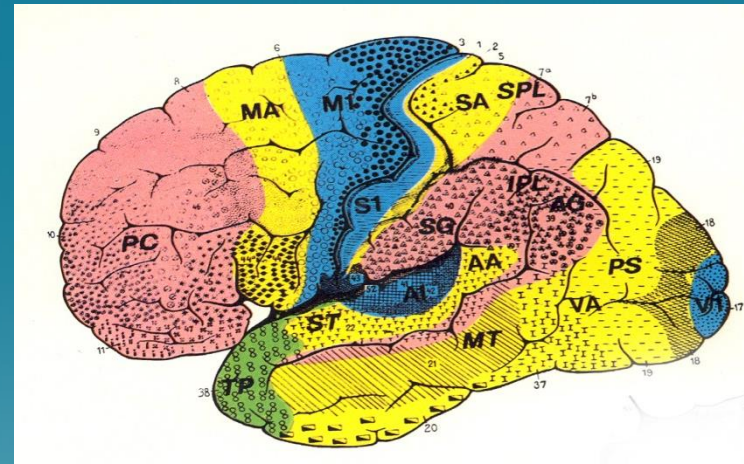


BILATERAL FRONTAL LOBE CONTUSIONS



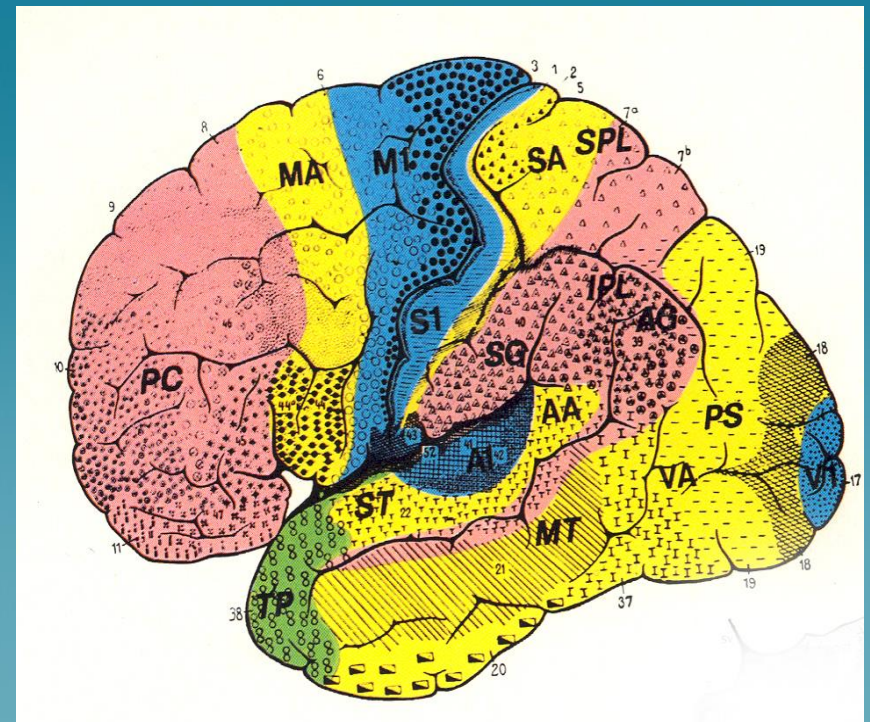
# Major Anatomical Divisions of the Frontal Lobes

- Motor cortex
- Premotor cortex
- Prefrontal cortex
- Limbic prefrontal cortex



# Heteromodal Association Cortices: Precentral

- Anterior Orbitofrontal and Dorsolateral Frontal Convexity:
  - Integration of sensory input with motor output
  - Integration of Internal Milieu (affective & motivational state & memory) with Extrapersonal Space according to Goals/Intent

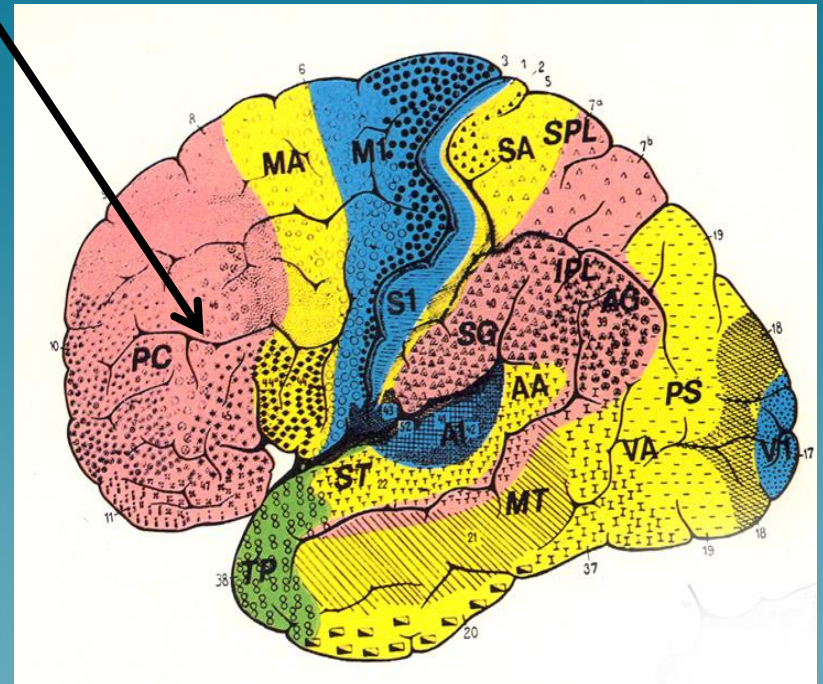


# Executive Function Impairments after Frontal Lobe Injury

- Executive Functions:
  - Planning
  - Judgment/ Decision Making
  - Reasoning and Problem Solving
  - Abstract Thinking
  - Organization
- Awareness
- Attention and Working Memory

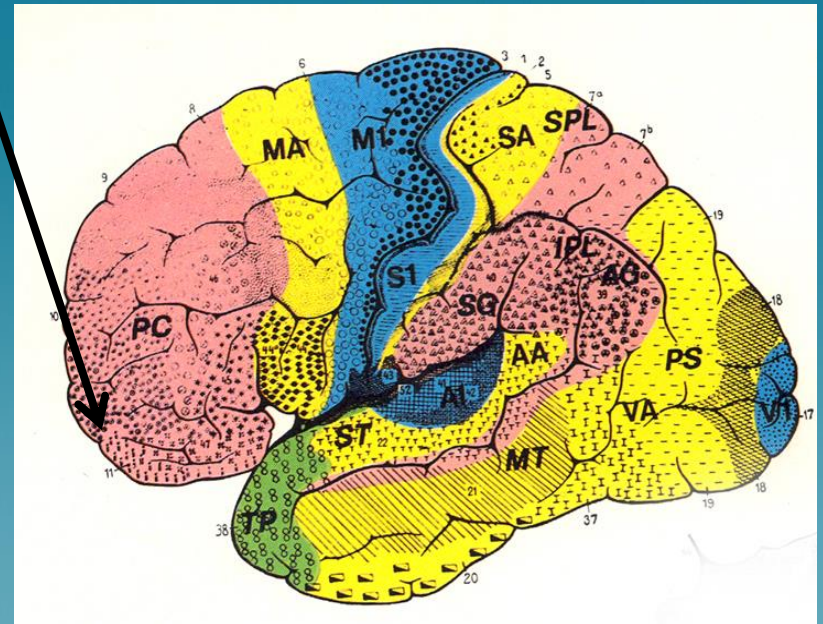
# Pre-Frontal “Syndromes” - 1

- Dorsolateral Convexity
  - impaired control, regulation and integration of cognitive activities
  - impaired initiation & apathy
  - flat and “pseudo-depressed”
  - cognitively slow and impaired generation of cognitive set/strategy



# Pre-Frontal “Syndromes” - 2

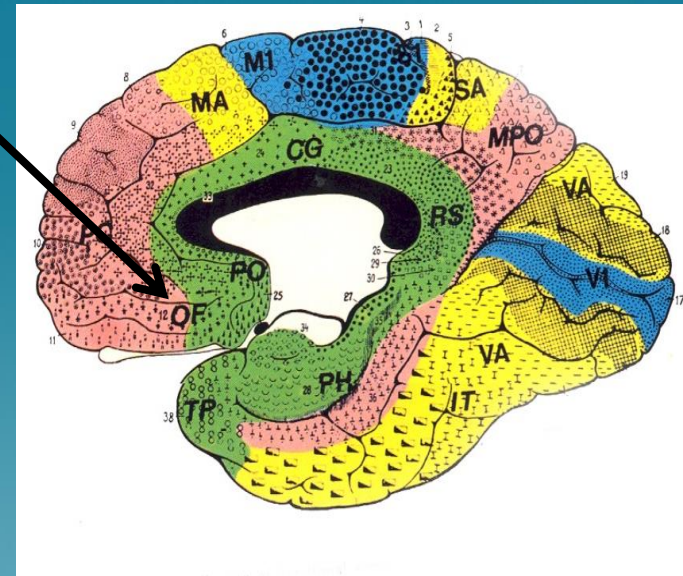
- Orbital-Frontal Lesions
  - disinhibition and impulsivity (“pseudo-psychopathic”)
  - hyperkinetic & jocularity
  - euphoric & irritability
  - impaired maintenance of cognitive set/strategy





# Pre-Frontal “Syndromes”- 3

- Ventro-Medial Lesions
  - decreased drive and motivation
  - decreased emotional experience
  - usually associated with dense amnesias



Most TBI Frontal Behavioral  
Impairments are Mis-Diagnosed  
as Psychiatric Disorders

<b>TBI Consequence</b>		<b>Functional Impact on Behavior</b>
Attention deficit	→	Difficulty focusing on or responding to required tasks or directions
Memory deficit	→	Difficulty understanding or remembering rules or directions
Irritability or Anger	→	Incidents with correctional officers
Uninhibited or Impulsive Behavior	→	Poor Inhibition of emotions or desires (e.g., theft or drug use, rage)
Executive Function deficit	→	Difficulty organizing behavior to execute stated intentions or goals (e.g., don't actually do what they wanted or said they would do)

# Brain Injury as a Chronic Condition

- Higher risk factors for medical and psychosocial difficulties that will prevent or disrupt vocational stability and increase recidivism
  - Hormonal disorders
  - Seizures
  - Psychiatric and psychological disorders
  - Substance abuse
  - Premature cognitive decline
  - Family instability
- Vulnerability to external stressors or change
- “Condition” Management

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