

Neuropsychiatric Aspects of Physical Disease



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Introduction

WHAT WE KNOW

**Miracles are not contrary to nature, only
contrary to what we know about nature...**

Differential Diagnosis

General Overview



Differentiating neurological disorders from psychiatric disorders:

- At a practical level, the neuropsychological changes associated with cerebral disease include poor affect control or a lack of affect, changes in intellectual functions, impairment of memory and orientation, and defective judgment These changes in themselves have great impact not only on the patient, but on his her interactions with others, perhaps especially family members. Family members or other caregivers often believe, erroneously, that the abnormal behavior evidenced by the patient is willful or directed at them. It is vital that those caring for the patient understand that the observed behaviors are not under the voluntary control of the patient.

(Tucker, Differentiating Neurological Disorders from Psychiatric Disorders, Seminars in Clinical Neuropsychiatry, 2002 Ju1;7(3): 163-9)

Common Diagnostic Tests for Cognitive and Mental Disorders Due to a General Medical Condition

Complete blood count^a

Electrolytes^a

Fasting glucose^a

Blood urea nitrogen and creatinine^a

Calcium, magnesium, and phosphorus^a

Liver function tests^a

Thyroid function tests^a

Rapid plasma reagin/
Venereal Disease Research Laboratory

Vitamin B₁₂ and folate^a

Erythrocyte sedimentation rate

Arterial blood gases

Toxicology

Urinalysis

Cerebrospinal fluid for biomarkers,
infectious agents

Chest radiograph

Electrocardiogram

Structural brain imaging:
Computed tomography/
magnetic resonance imaging^a

Functional magnetic resonance imaging

Positron emission tomography

Single photon emission computed tomography

Electroencephalography

Human immunodeficiency virus

Ceruloplasmin

Specific drug level (e.g., lead, mercury)

Catecholamines

Porphobilinogens

Differential Diagnosis

Specific Disorders



Differential Diagnosis of Anxiety

Medical



AIDS/HIV

Cerebral arteriosclerosis

Encephalitis

Essential hypertension

Hyperthyroidism

Hyperventilation syndrome

Hypocalcemia

Hypoglycemia

Hypokalemia

Impending myocardial infarction

Differential Diagnosis of Anxiety

Medical



Internal hemorrhage

Mitral valve prolapse

Paroxysmal atrial tachycardia and
other cardiac arrhythmias

Pheochromocytoma

Pheochromocytoma

Postconcussion syndrome

Pulmonary embolism

Subacute bacterial endocarditis

Temporal lobe disorder

Differential Diagnosis of Depression

Medical



Hypokalemia

Hyperthyroidism

Hypothyroidism

Infectious mononucleosis

Occult malignancy

Pancreatic carcinoma

Postviral infection syndrome

Steroid psychosis

Vascular dementia

Cognitive Depression and Anxiety

- ➔ The period of time when Diana lost consciousness in Canada may have caused a loss of cognitive functioning, resulting in memory loss (which may be improving), agitation, anxiety when multitasking (called dysexecutive functioning), and depression. These types of cognitive deficits are common after the type of injury she sustained. Doctors are usually so concerned about saving someone's life and/or finding the cause of such a catastrophic injury, cognitive functioning is overlooked. This is particularly true since the dysfunction most commonly shows up in short-term memory and accentuation of behavior, rather than loss of overlearned memory and new behaviors.

Cognitive Depression and Anxiety

- ➔ Needless to say, Diana is depressed and anxious. Depression, as well as apathy, are common neurological sequelae of catastrophic neurological/cardiovascular injury. Anxiety occurs when one sees oneself not functioning as effectively as before, particularly someone who may be more on the obsessive side, as are most successful professionals.

Differential Diagnosis of Mania

Medical



AIDS/HIV

Antidepressant-induced mania

Amphetamine-induced mania

Bronchodilator-induced mania

Decongestant-induced mania

Delirium

Hyperthyroidism

L-Dopa-induced mania

Postencephalitic syndrome

Steroid-induced mania

Drug-Induced Mania

I respectfully demand that I not be subjected to any retaliation, harassment, intimidation, discrimination, punishment, revenge, torment, fear, bullying, badgering, goading, taunting, decreased service, attacks, extra attention to annoy, baiting to admit rule violations, reprisals, injustices, surveillance, requitals, hindrances, or losses by Luise Carolyn, or other personnel, either directly or indirectly by her or through others associated with King County or Jail Health Services, as a result of the fact I filed this or any other grievance or complaint.

Differential Diagnosis of Thought Disorder

Medical 

AIDS/HIV

Dementia due to Pick's Disease

Dementia of the Alzheimer's type

Endocrine disease

Frontal lobe neoplasm

Migraine equivalent

Pernicious anemia

Steroid psychoses

Syphilis

Temporal lobe epilepsy

Liver dysfunction

Vascular dementia

When the body breaks down

- When your liver becomes cirrhotic, your life is limited, and your metabolizing of certain medications, including Depakote, is thrown awry. The normal rate of drug metabolism is disrupted and often drug dosages have to be individualized, since the metabolism of many drugs is decreased in cirrhosis. This means that certain drugs that rely upon the liver to break them down are not broken down as efficiently. This may lead to higher blood levels in persons with cirrhosis than blood levels of those without cirrhosis.

More complex than agitation...

The result

- ➔ At times his behavior spiraled out of control, while at other times even jurors and newspaper reporters noted his unusual affect. As the trial continued, counsel chose to bring in another psychologist to provide supportive therapy. It did no good. At this point in the legal proceedings, Mr. ..'s pharmacological treatment for agitation and anger was not working. He was not being treated, in any way, for his significant impairments in attention, memory, nor his pronounced executive functioning problems with sequencing, focusing, or disinhibition of thought, language, and behavior.

Differential Diagnosis of Violent Behavior

Medical



Cerebral infection

Cerebral neoplasm

Electrolyte Imbalance

Hepatic disease

Hypoglycemia

Hypoxia

Infection

Renal disease

Temporal lobe epilepsy

Vitamin deficiency

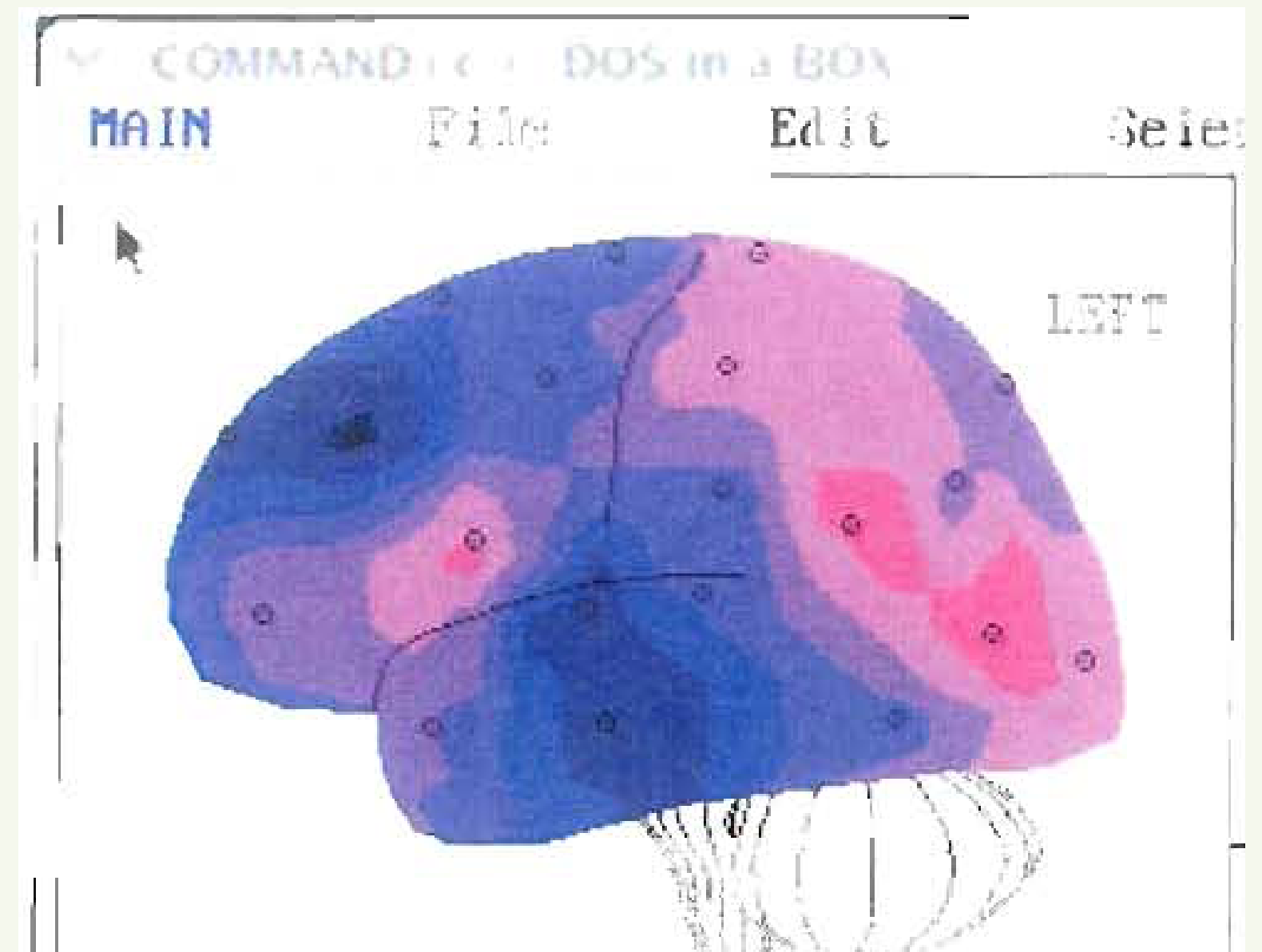
Memory and Cognition



What can the brain say?

- ➔ During ...'s testimony, he repeatedly made comments that were inflammatory and self-defeating, with no basis in fact. When his attorney, Mr. Torrei, asked him what his business consisted of, ... replied, "Buying stolen merchandise, mainly. Fencing anything that had the appearance of a legitimate front for the purpose of conducting business." There is no indication, either at the time of his trial, nor in subsequent years, that this statement had any basis in fact.

I Cannot tell a lie



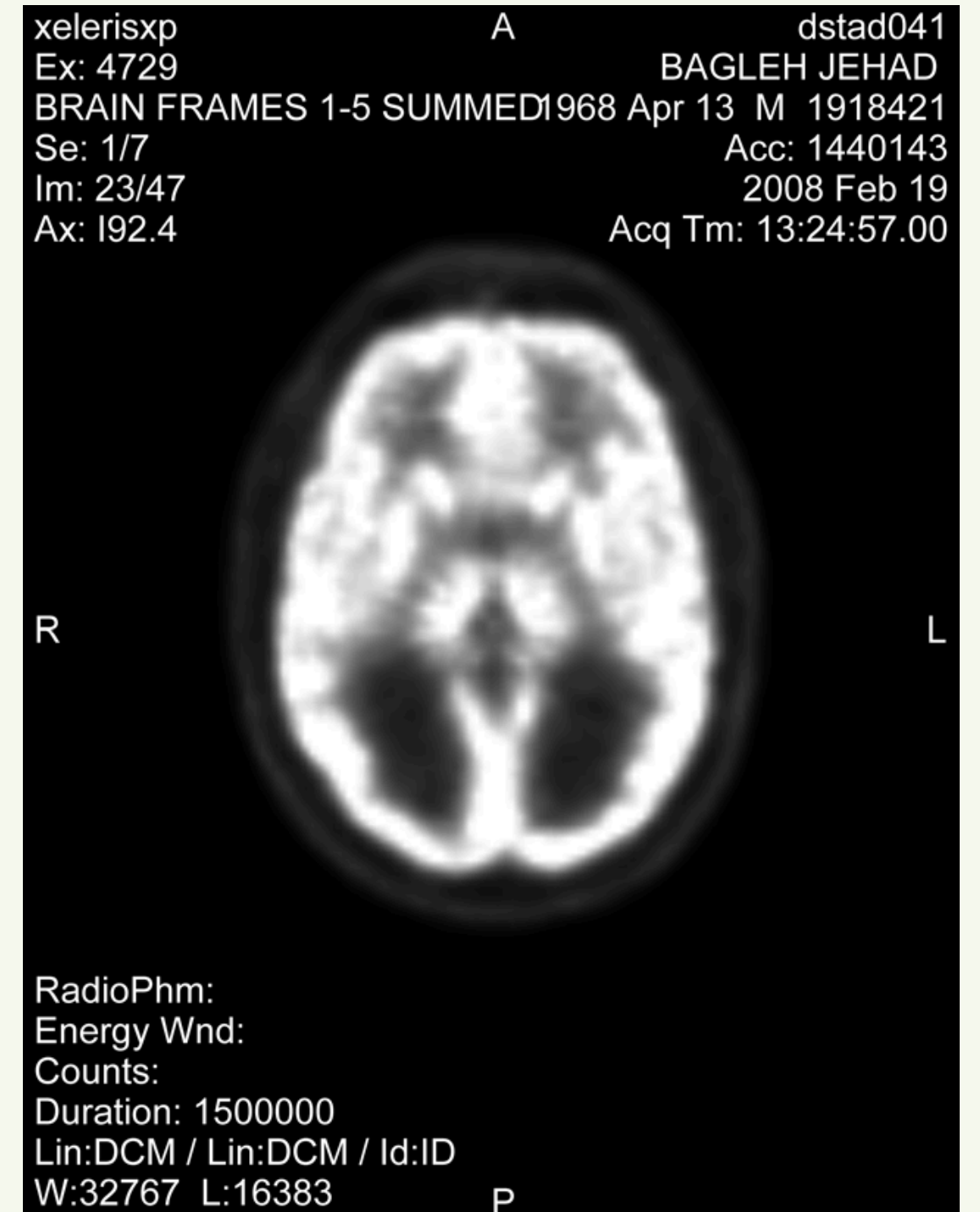
Conclusion

- Memories lost in time
- Failure to make fine-grained distinctions within memory
- Impaired Retrieval
- Can be induced without temporal confusion
- Introduction of idiosyncratic themes unique to confabulators
- A sign of temporal lobe dysfunction (*Gilboa et al, Mechanisms of spontaneous confabulations: a strategic retrieval account, Brain, June 2006, Page 1413*)

Specific symptoms of left temporal lobe deficits that compromise his competency

- 1 Systematized, complex, paranoid delusions
- 2 Altered interpersonal dispositions, which included increased preoccupation with detail
- 3 Circumstantiality of speech
- 4 Hypergraphia
(Butterworth-Heinemann, 1997, New York, Sydney, Page 218)
- 5 Declarative Memory impairment
(Trimble and Cummings, Page 143)

Where do you need to go?

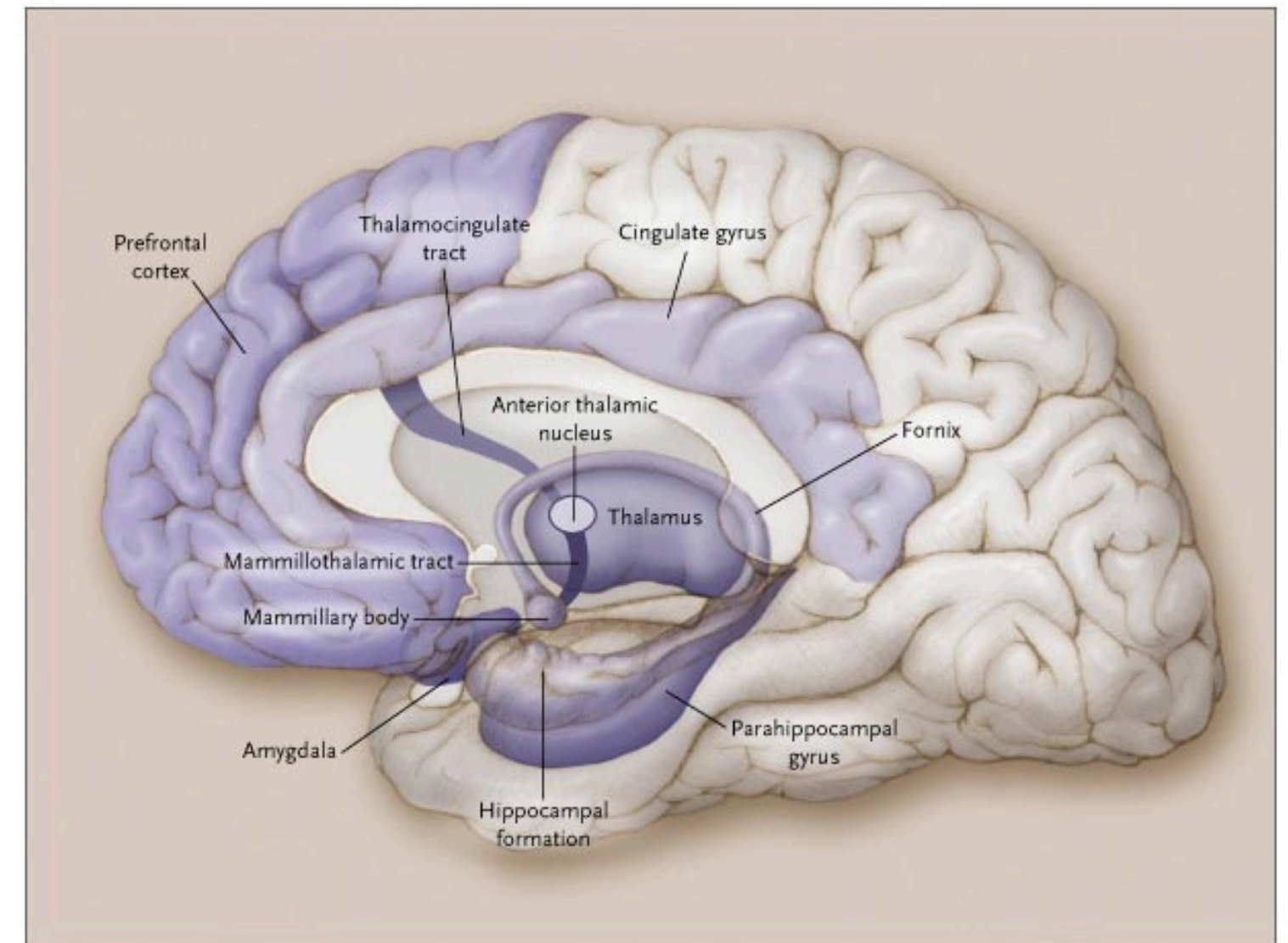


Selected Memory Systems

TABLE 1. SELECTED MEMORY SYSTEMS

Memory System	Major Anatomical Structure Involved	Length of Storage of Memory	Types of Awareness	Examples
Episodic Memory	Medial temporal lobes, anterior thalamic nucleus, mammillary body, fornix, prefrontal cortex	Minutes to years	Explicit, declarative	Remembering a short story, what you had for dinner last night, and what you did on your last birthday.
Semantic Memory	Inferolateral temporal lobes	Minutes to years	Explicit, declarative	Knowing who was the first president of the United States, the color of a lion, and how a fork differs from a comb.
Procedural Memory	Basal ganglia, cerebellum, supplementary motor area	Minutes to years	Explicit or implicit, nondeclarative	Driving a car with a standard transmission (explicit) and learning the sequence of numbers on a touch tone phone without trying (implicit)
Working Memory	Phonologic: prefrontal cortex, Broca's area, Wernicke's area Spatial: prefrontal cortex, visual-association areas	Seconds to minutes; information actively rehearsed or manipulated	Explicit, declarative	Phonologic: keeping a phone number "in your head" before dialing Spatial: mentally following a route or rotating an object in your mind

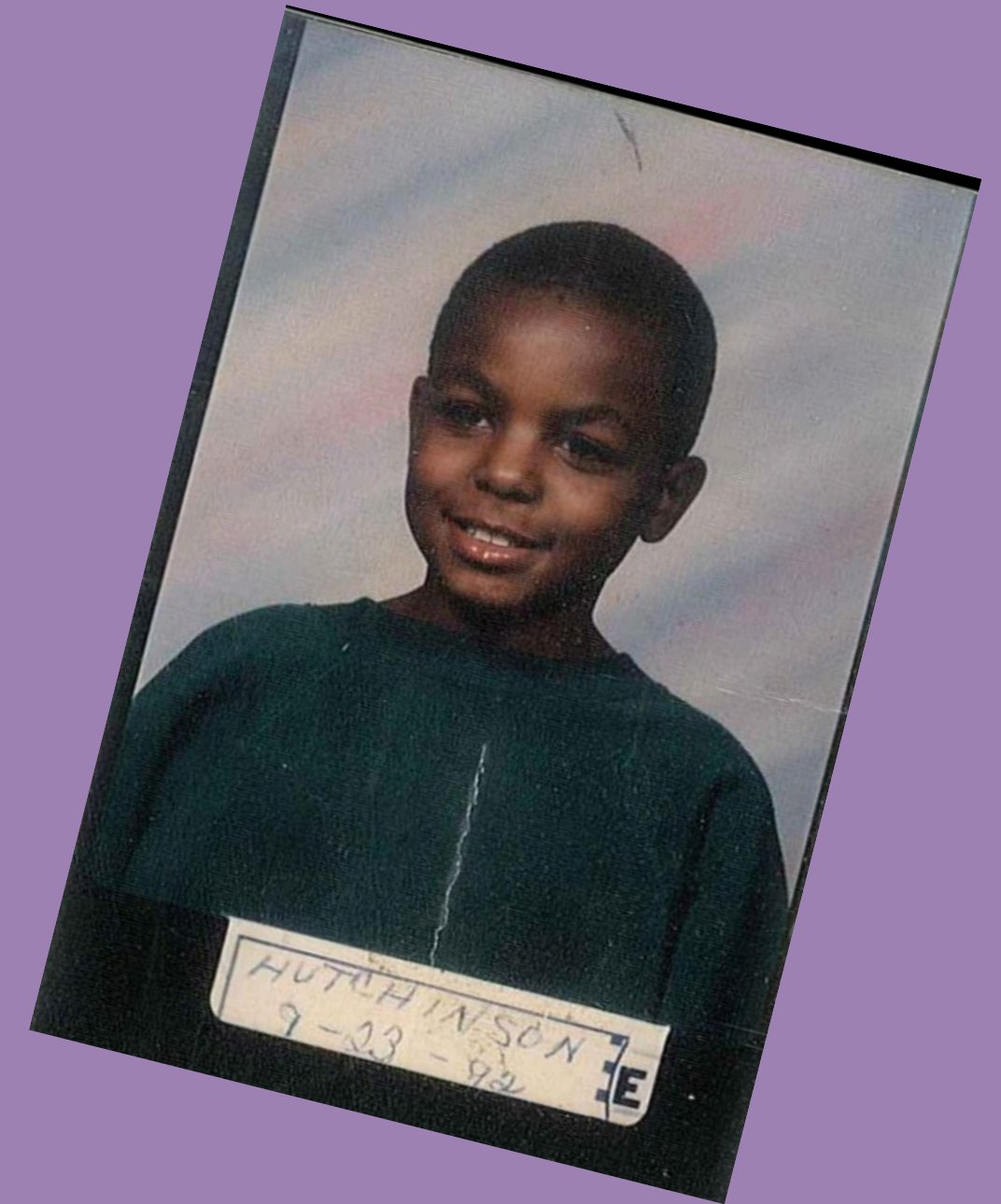
Episodic Memory



Clinical Case Examples

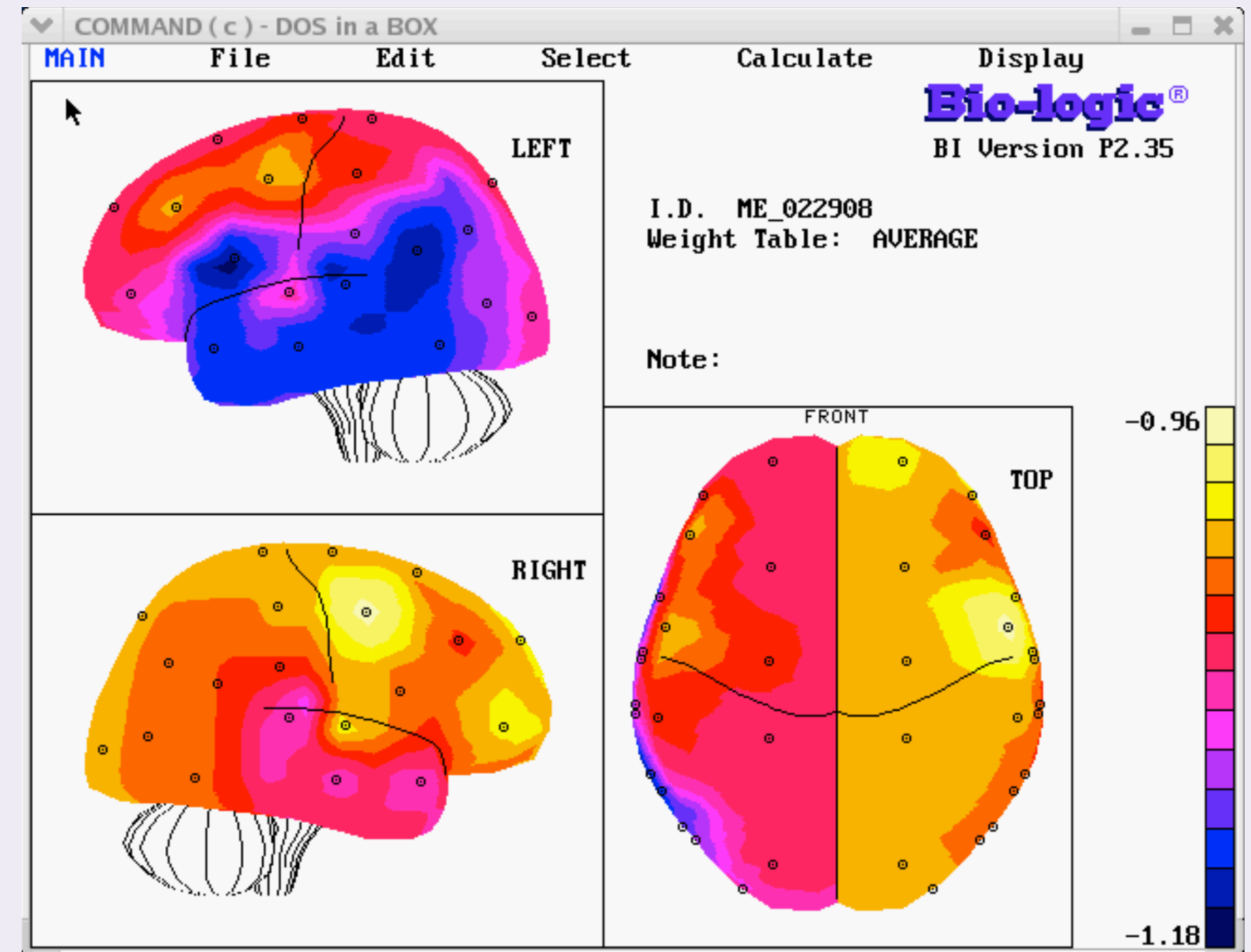


Is there a diagnosis?



Impression:

Small Right Parietal
Lobe Developmental
Venous Anomaly



A lack of detail and context

- ...notes that, after being pressured repeatedly by the arresting officers, it was his belief that, if he were to provide a story that was consistent with what the officers were suggesting, he would be able to go home.
- In his April 18th, 2002 statement, Mark describes night time as “dark time.” There is little detail. There is little punctuation. He ends the statement with “RIP (rest in peace), and other gibberish inconsistent with the context of the circumstances.

What diagnosis was not made?

- ➔ On April 13, 1991, only two weeks after being taken in for drug testing, which proved negative, tried to kill himself with a rifle. The barrel of the gun slipped, sparing's life, but inflicting extensive facial trauma that required multiple surgeries.

Exhibit 7, ¶ 19.

The Argument

- ➞ It is also now apparent that Mr. ... suffers from impairment of his temporal lobes, which create memory and problems with confabulation (inaccurate reporting). Mr. ... has corpus callosal dysfunction. Consequently, the communication between his right and left hemisphere is not fully functional.
- ➞ Mr. ... has a functionally inadequate thalamus, nucleus accumbens, and amygdala, leading to impaired fear responses and poor stimulus discrimination. His occipital lobes are also not functioning adequately which most probably led to his academic problems in his early school years.

What does it mean?

- His deep deficits in social understanding and contextual responsiveness made him incapable of effectively assisting his defense team in the preparation of his defense.
- Mr. ...'s memory confabulation, inaccurate reporting, consistently confounded the team in developing consistent information from him.
- His inability to effectively sequence his thoughts made small things, like following his travels during the week of the offense, very difficult.

Conclusion



**Miracles are not
contrary to nature,
but what we know
about nature.**

| St. Augustine

- 1 Always think medically
- 2 Don't assume
- 3 History, history, history