

Neuropsychiatric Approach

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Full course menu



Appetizer: Approach to Neuropsychiatry

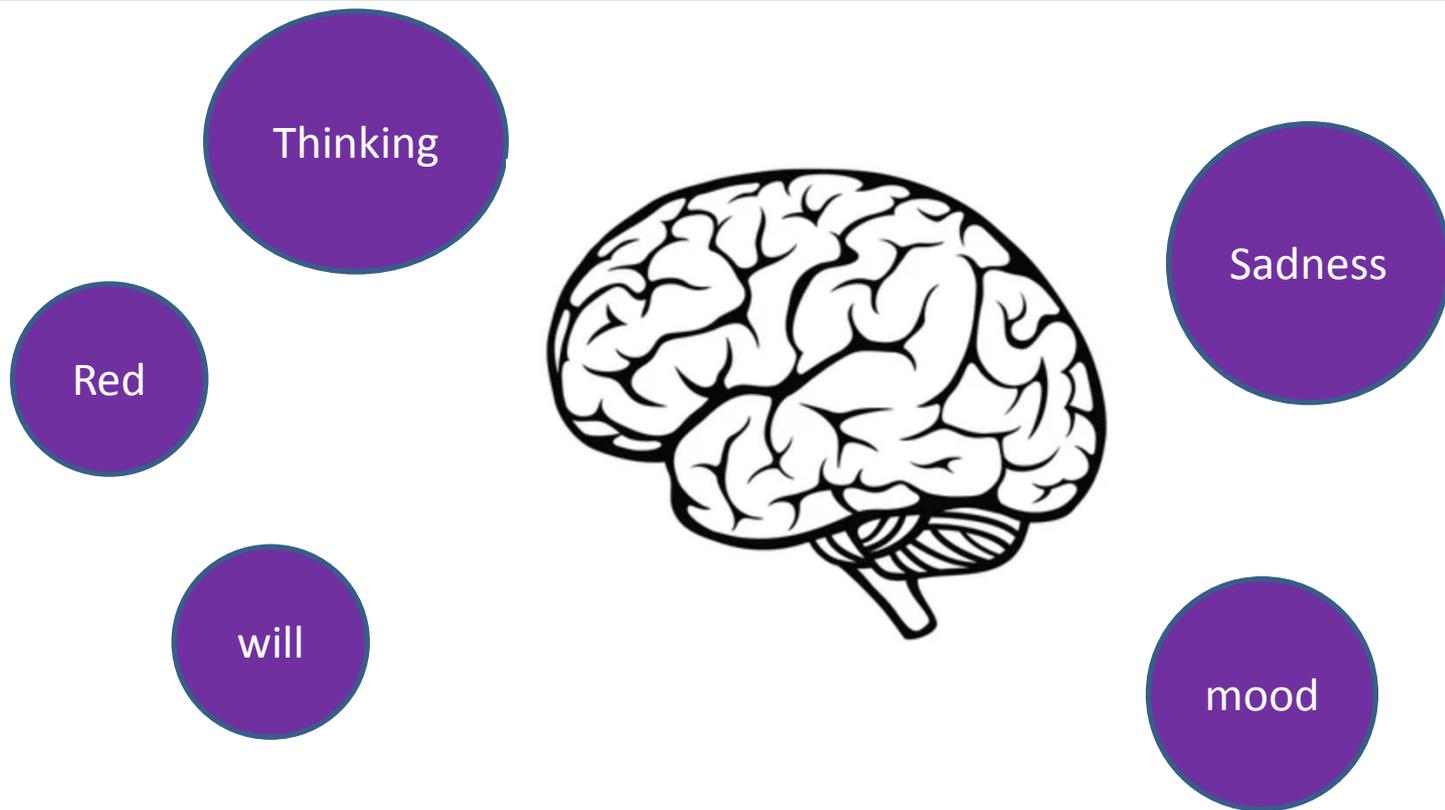
Main course: Case group discussion

Dessert: group feedback

Appetizer

*Approach to
neuropsychiatry*

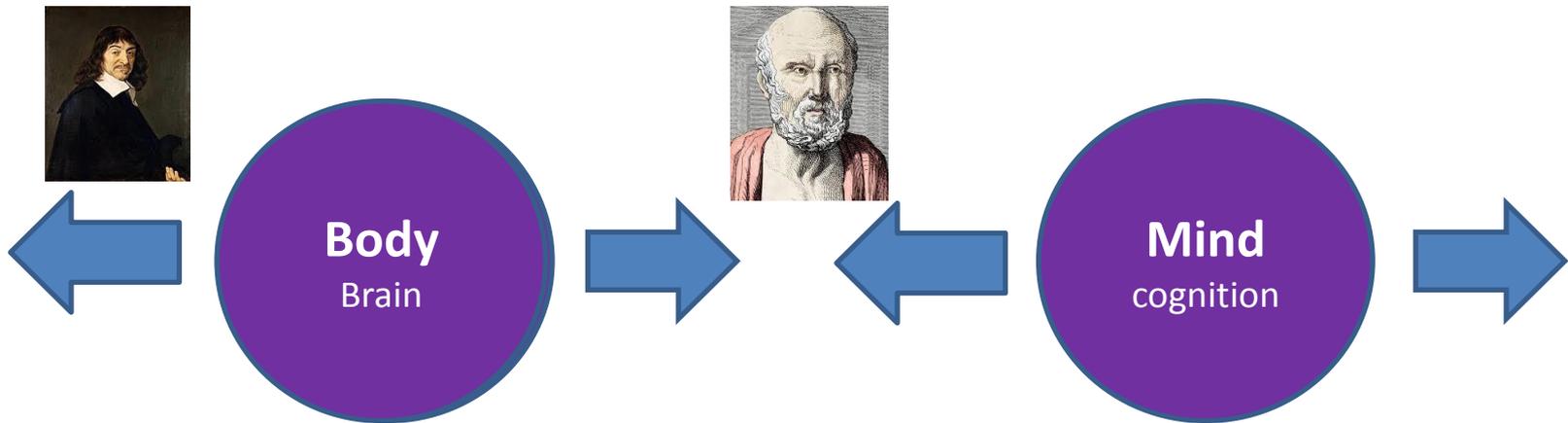
Brain and mind linkage



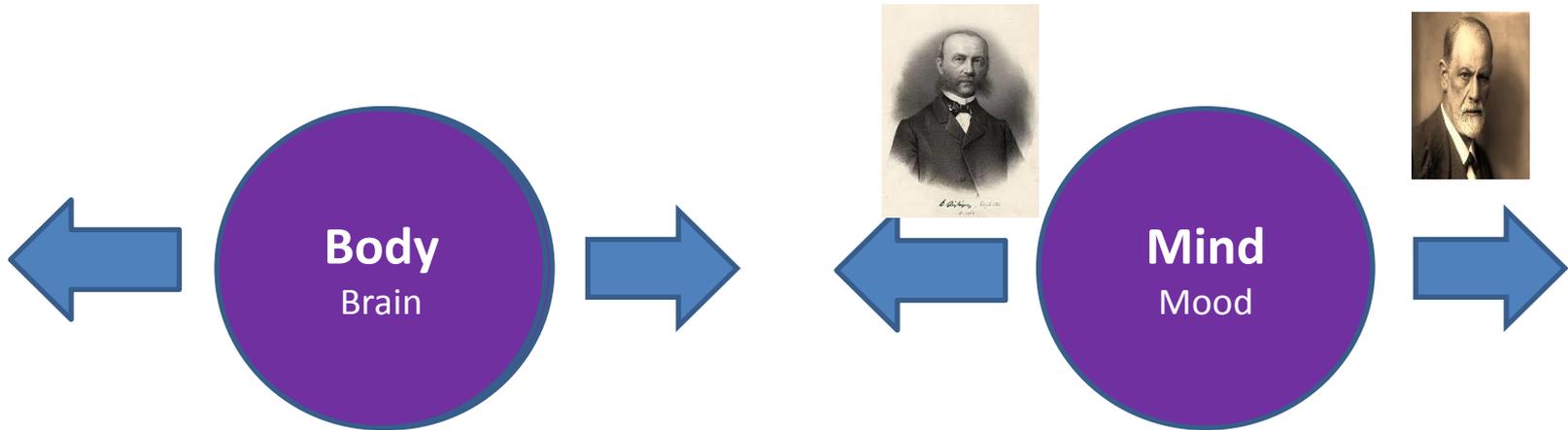
Neuropsychiatric approach



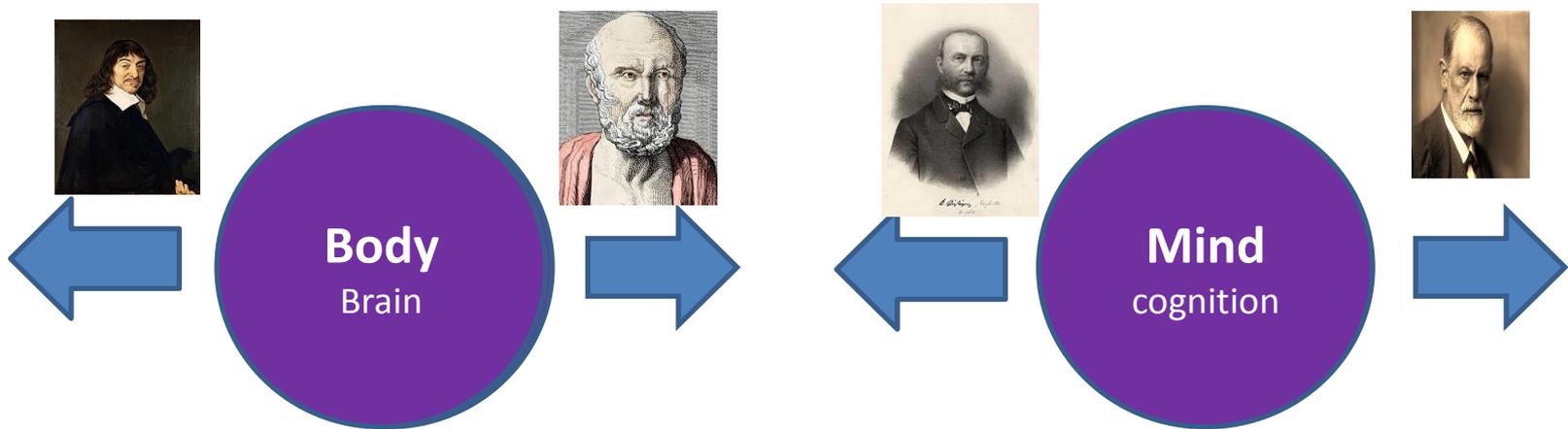
Brain and Mind Story



Brain and Mind Story

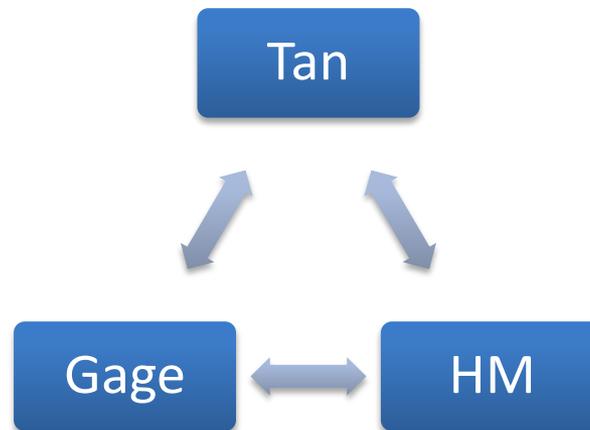


Brain and Mind Story



Neuropsychiatric approach

Where is the location and mechanism of mind function in the brain?



Organ and Mind

- During the 19th century Gall and Spurzheim established the field of phrenology: a bump on the skull indicated a well-developed underlying region; for example 'selfish propensities' were thought to be located in the region above the right ear

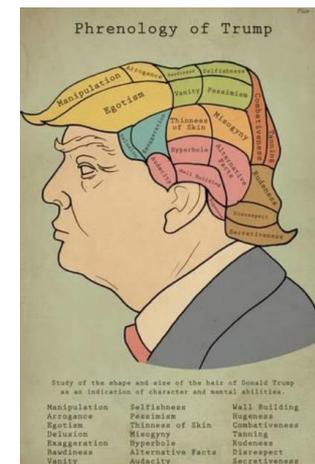
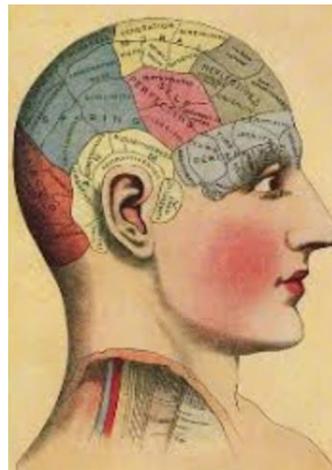


Illustration by allposters1

The case of Tan

- In 1861 Broca published a landmark paper where he described the form of production aphasia which was later to bear his name. At postmortem, one of his patients, 'Tan' was shown to have sustained damage to the third convolution of the left frontal lobe.

Executive function – the case of Phineas Gage

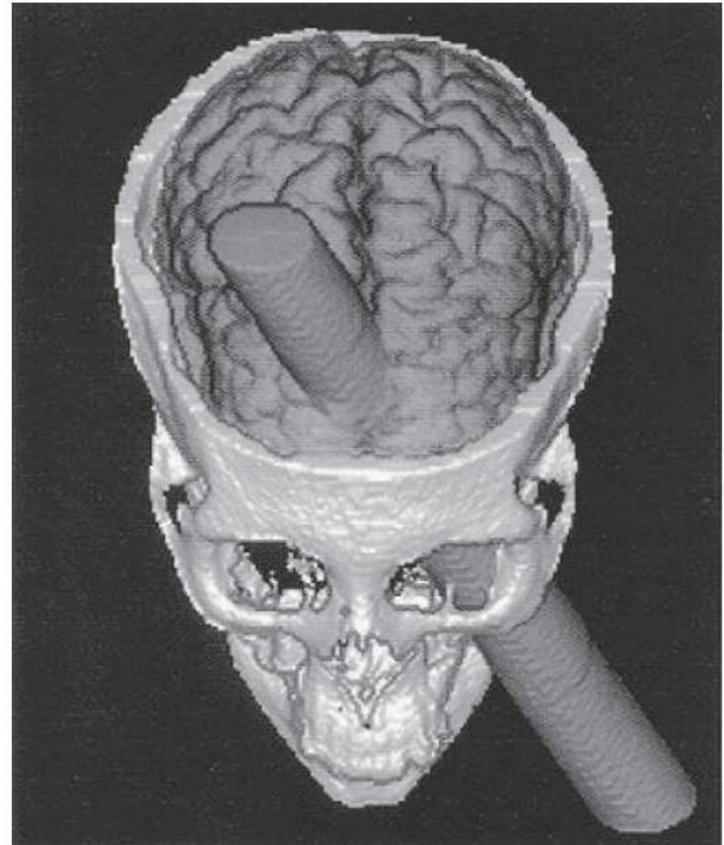
- Seven years following Broca's publication describing Tan, JM Harlow published a paper in the Publications of the Massachusetts Medical Society with the graphic and descriptive title: 'Recovery from the passage of an iron bar through the head'

Executive function – the case of Phineas Gage

- the case is particularly famous owing to Harlow's description of the resulting changes in Gage's behaviour, manifesting but little deference for his fellows, impatient of restraint or advice when it conflicts with his desires, at times pertinaciously obstinate, yet capricious and vacillating, devising many plans for future operations,

Executive function – the case of Phineas Gage

- The bar did not damage brain regions necessary for motor function or language, but appeared to have particularly destroyed the ventromedial prefrontal region, and this led to the marked changes in Gage's ability to plan for the future, conform to social conventions and to decide upon the most appropriate courses of action (Damasio 1994).



Memory function – the cases of HM and CW

- The search for the ‘engram’, the brain location of the memory trace, has a long history. Lashley, working on monkeys, spent over 30 years carrying out selective ablations of different brain areas in an attempt to produce amnesia, and in 1951 he concluded that he had failed to find the location of the memory trace

Memory function – the cases of HM

- Ironically, **2 years later, the neurosurgeon Scoville conducted a bilateral temporal lobectomy on the patient HM** in an attempt to treat his intractable epilepsy. Unfortunately, the operation, though successful in reducing the frequency of seizures, caused a new form of devastating disability: **it rendered HM amnesic** (Scoville & Milner 1957).

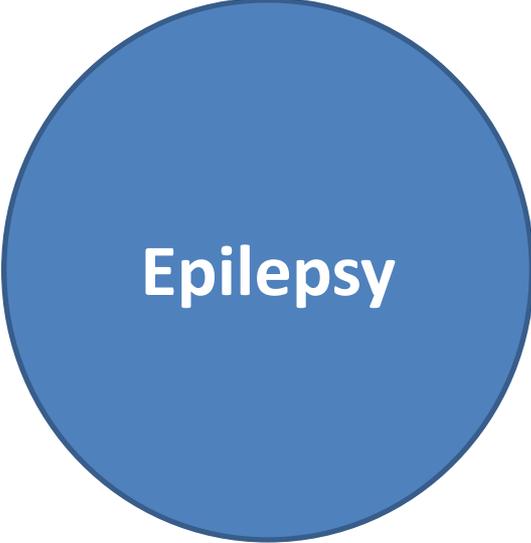
Memory function – the cases of HM

- **Above average intelligence level, with intact perception, attention. He also had preserved procedural learning (such as mirror drawing), but had no conscious recollection of previous learning having occurred.**
- **Demonstrating the classical dissociation between impaired explicit and preserved implicit memory**

Neuropsychiatric approach



**Functional
Neurological
Disorder**



Epilepsy

Neuropsychiatric approach

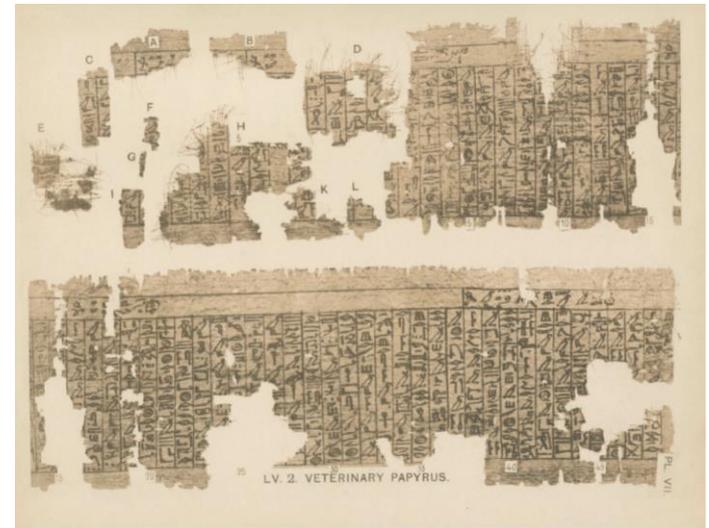


Functional
Neurological
Disorder

Neuropsychiatry of FND

In ancient Egypt in the **papyrus of Kahun**, in the first description of the hysteria, the cause of the disease is considered by the movement of the uterus in the body of women, followed by **papyrus of Iber**,

(G. C. The Long Art: The history of medicine from antiquity to present: Oxford University Press; 1997)



Neuropsychiatry of FND

- After the ancient Egypt, in Greece, they have described the experience of **hysteria as a prelude to the formation of psychiatry** and considered the **melancholy of the uterus** as a result of the loss of natural sexual life (L. S. Greek Medicine. Second ed: Noceto,Essebiemme; 2002).
- After Hippocrates, **Claudius Galen** considered the cause of hysteria as a result of uterine movement, but he **used therapeutic treatments** for treating these patients

Neuropsychiatry of FND

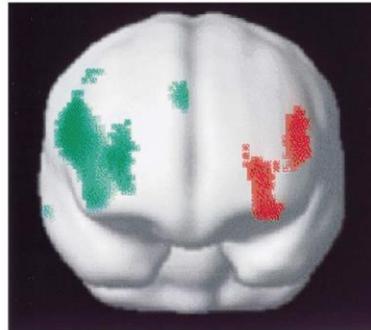
- **Maria Renata Von Mossau(1680-1749 Unterzell, Bavaria)**
- **Since the thirteenth century**, the approach to hysteria has changed in other ways, Hysteria and psychological illness has been introduced **to domination of demons**. Although it was assumed in the early days that **exorcism** was a cure, but in the late medieval ages it was punishment and the line between hysteria and the wizarding was unclear(Kramer HsJ,1982)
- During that time, the **nuns had attacks with blasphemous words and showing genital areas and severe pelvic movements**. However, many of these patients were **punished or killed as a treatment or to prevent the spread of the disease**.(Bartholomew RE ,2002)



Neuropsychiatry and Imaging

Discrete neurophysiological correlates in prefrontal cortex during hysterical and feigned disorder of movement

Sean A Spence, Helen L Crimlisk, Helen Cope, Maria A Ron, Paul M Grasby



Statistical parametric maps on a smoothed magnetic resonance image of the anterior surface of the brain (the right prefrontal cortex is on the left of the image)
 Red: regions where patients with hysterical motor symptoms exhibit hypofunction relative to controls; green: feigners exhibit hypofunction relative to controls.

Region (Brodmann area)	Talairach co-ordinates (mm)	Z score
Hysteria patients versus controls		
Left dorsolateral prefrontal cortex (BA 9/46)	-50, 32, 20	3.51
	-50, 36, 28	3.46
Hysteria patients versus feigners		
Left dorsolateral prefrontal cortex (BA 9/46)	-48, 36, 28	3.97
	-50, 32, 20	3.63
Feigners versus controls		
Right anterior prefrontal cortex (BA 10)	38, 62, 16	3.41
Feigners versus patients		
Right anterior prefrontal cortex (BA 10)	26, 62, 16	3.77

Prefrontal regions showing hypofunction during left-hand movement in two patients with hysteria and two feigners

THE LANCET • Vol 355 • April 8, 2000

Neuropsychiatry and Imaging

- An fMRI study (Voon et al., 2010b) directly addressed this issue by comparing brain activity during a voluntary motor action (intentionally produced tremor) and an **involuntary one (functional tremor) and revealed hypoactivity in the right TPJ during the spontaneous (involuntary) functional tremor (Fig. 7.2)**.

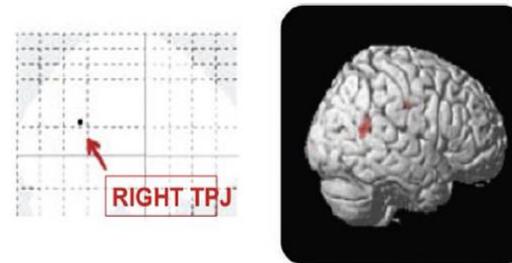


Fig. 7.2. Involvement of the right temporoparietal junction (TPJ) in motor functional neurologic disorder. Right TPJ hypoactivation when patients experience their functional involuntary tremor (compared to a condition where a voluntary similar abnormal movement is actively produced). This region is interpreted as being linked to the sense of self-agency (feeling in control of one's own movement). (Adapted from Voon et al., 2010b, with permission from Wolters Kluwer Publishing.)

Neuropsychiatry and new therapies

- **Diagnostic explanation**
- Education: structural cause, role of attention
- **Movement retraining**
 - Address secondary problems
- Self management: workbook
- Follow up

Neuropsychiatry and new therapies

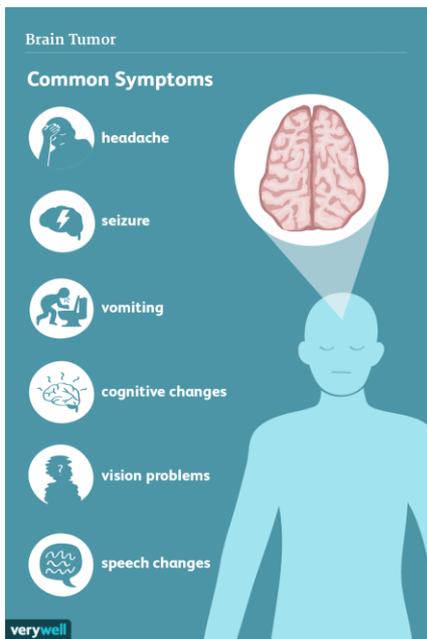
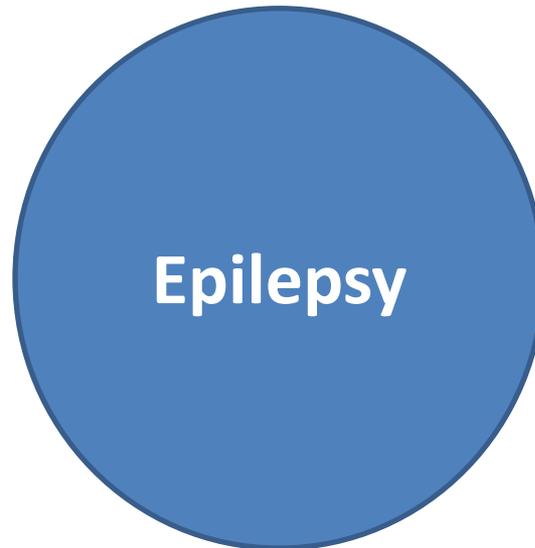


Illustration by verywell

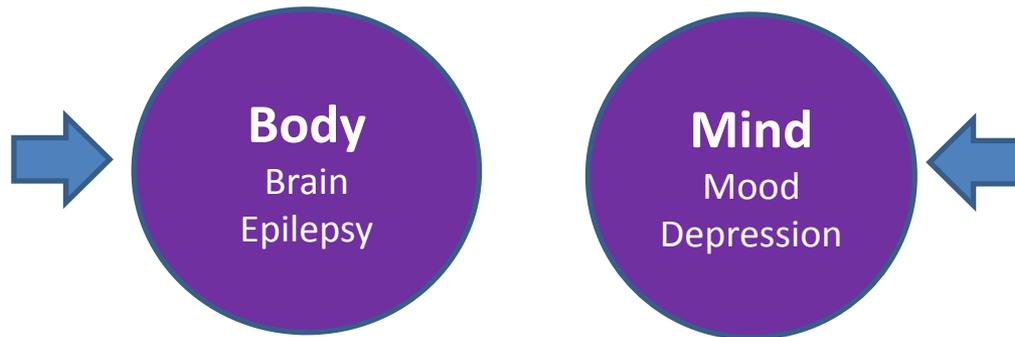
Collaborative Care

Neuropsychiatric approach



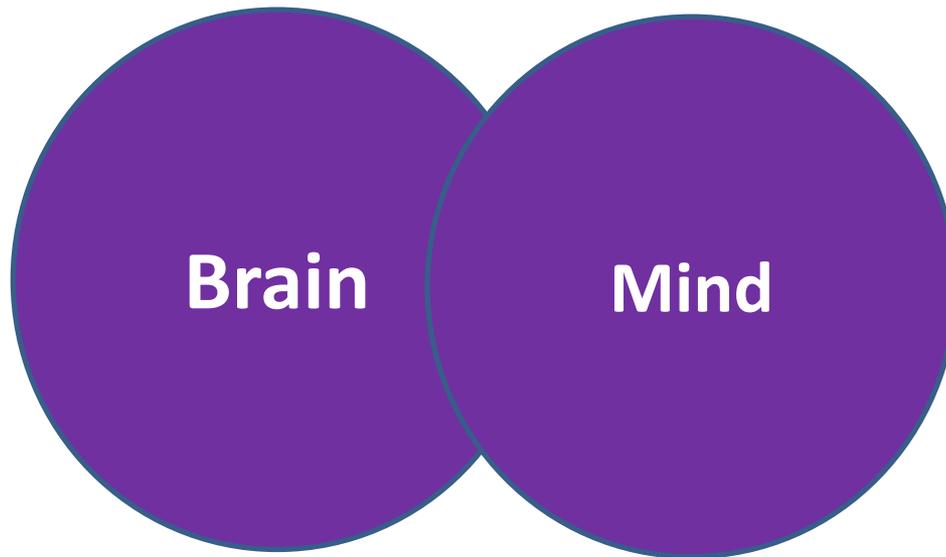
Brain and Mood Story

- Abnormal HPA function in TLE and Depression (Mazurati, 2009)
- impaired serotonin transmission in Depression and TLE (Stockmeier, 1998)



- Pharmacoresistance and Depression (Hitris, 2007)
- Lifetime depression and failure in outcome (Kanner, 2006)
- Depression and suicide increase risk of seizure (Hesdorffer DC, 2006)

Neuropsychiatric approach



Brain Mapping

- Subsequent work led to a crude ‘mapping’ of the brain in terms of neural substrate for psychological functions.

Brain Organization and Neurocognitive Function

Left and right systems motorically controlling and perceptually responding to the contralateral side of the rest of the body .

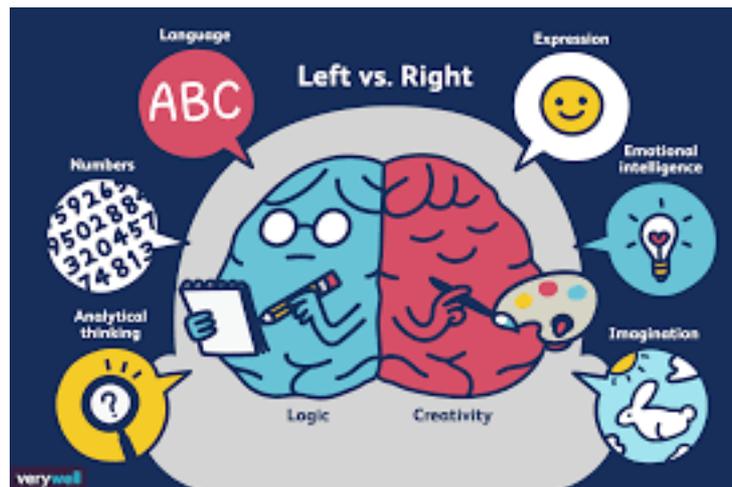
Left and Right Brain Systems

Train station



Left and Right Brain Systems

- **left** being a discrete processor suited *for language related information* (e.g., specific structures are larger)
- the **right** hemisphere being a holistic processor *of broad patterns* of information (e.g., **uniformly more white matter and dendritic communication**).



Hemisphere Specialization

The cerebral hemispheres in humans have different specializations and information processing styles

Left

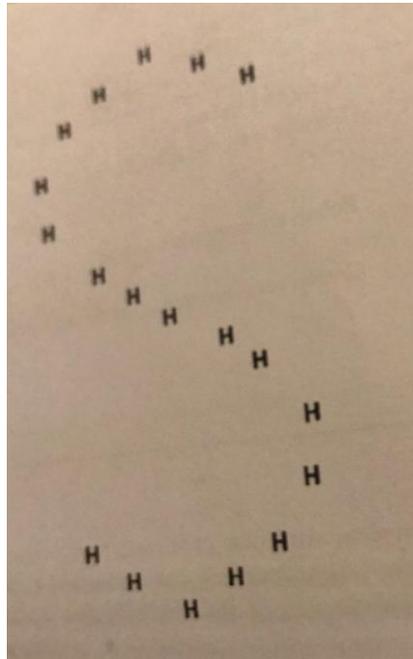
Right

1. Sequential processing
2. Analytic, syllogistic
3. Focal and discreet
4. High frequency

1. Parallel processing
 2. Intuitive, impulsive, emotional, rapid scanning ,holistic
 3. Diffuse
 4. Low frequency
-

Left and Right Brain Systems

high frequency stimulus, versus the *low frequency* stimulus.



In the *real world*, stimuli include **both high and low frequency** information, and the two *hemispheres work together*.

Left and Right Brain Systems

TABLE 1.2. Anatomic Cerebral Hemisphere Asymmetries

Favoring Left

Cerebral hemisphere larger and denser
Larger **planum temporale** (the posterior

roof of the temporal lobe and an extension of Wernicke's area).

Longer sylvian fissure and lateral ventricle

Relatively **more gray matter**

Larger posterior temporal/parietooccipital regions

Greater concentration of **dopaminergic**

Favoring Right

Larger **frontal area**

Greater dendritic arborization

Relatively **more white matter**

Greater concentration of **serotonergic neurons**

Left and Right Brain Systems

Some Specific Functions of the Left and Right Cerebral Hemispheres

Left

1. Language
2. Verbal learning and memory
3. Verbal reasoning and planning
4. Complex fine motor function

Right

1. Visuospatial
2. Visual learning and memory
3. Nonverbal reasoning and planning
4. Facial recognition

Left and Right Brain Systems

- Although most people ***are left hemisphere dominant*** for ***language*** and ***right hemisphere*** specialized for ***visuo-spatial function***.

Neuropsychiatric evaluation

- Neuropsychiatric evaluation is the medical ***examination of the brain***.
- The ***mental status examination***, and the psychiatric interview are terms from the era of a mind-body dichotomy
- When you assess "***mental functions***" and behavior you are ***assessing brain functions***.
- In examining for brain disease or dysfunction, behavior changes are the patient's signs and symptoms. Your ***questions and comments*** are your ***osculation and percussion***.
- The brain also has ***component parts or systems*** with ***different signs and symptoms***.

THE EXAMINATION STRUCTURE

The examination structure follows the ***logical steps*** underlying the diagnostic and treatment planning process.

Step 3-Cooccurring conditions

Step 2-Primary or Secondary

Step 1-Determine the syndrome



Main course

Case base discussion

Brain Mapping

- location using neuropsychological measures should be conservative
- . First, most neuropsychological tests are extremely complex and tap a variety of cognitive functions, e.g. perception, attention, working memory and require some motor response, thus activity in widely distributed brain regions is required for successful task completion.

Brain Mapping

- Second, developments in high-resolution structural and functional neuroimaging provide more accurate ways of determining localized brain damage or metabolic abnormality

Brain Mapping

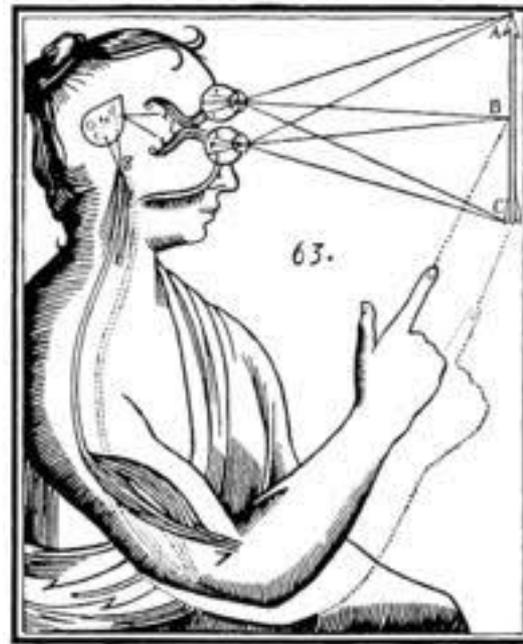
- Third, for many psychiatric disorders there has been no consensus over putative localized disturbance of the central nervous system.

Brain Mapping

- Shallice et al (1991) who proposed that from a neuropsychological perspective, the attempt to understand the nature of the information processing impairment in psychiatric disorder should precede the attempt to localize it.

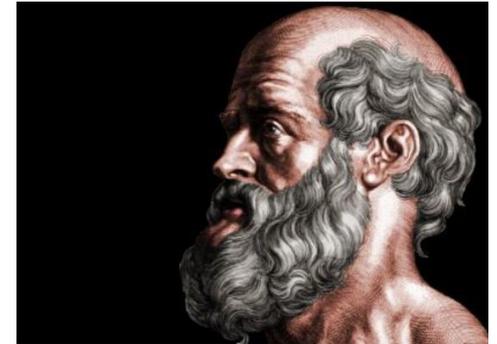
Thank you!

Organ and Mind



Neuropsychiatric approach

- Association between epilepsy and depression has been observed for over 2,400 years. As reviewed by Kanner, Hippocrates stated (Kanner, 2005)
- ***”Melancholics ordinarily become epileptics, and epileptics, melancholics; what determines the preference is the direction the malady takes, if it bears upon the body, epilepsy, if the upon the intelligence, melancholy”***



افسرندگان معمولاً دچار صرع می شوند و صرع زدگان هم دچار افسردگی، آنچه را که بیماری تعیین کند نمایان می شود، چیرگی بیماری بر بدن صرع می شود و غلبه بر ذهن افسردگی

Appetizer

*Approach to
neuropsychiatry*

Main Cou

*Brain
Organization*

Main Course

The case of Tan

The case of Tan