Week 6

- Tuesday: Midterm #1
- Thursday: Ogden Chapter 1 : Clinical Neuropsychology

Aims of Clinical Neuropsychology

- Applied
  - diagnose, treat, rehabilitate people with neurological disorders
  - prevention
- Academic
  - how does the "normal" brain work by studying the damaged brain
- Training:
  - Subfield of Clinical Psychology

Assumptions of Clinical Neuropsychology

- Similarity of human brains
  - in adult brains, functions are generally localized the same places
  - Is this a good assumption with children?
- Formal Assessment & Tests can be better than casual/ informal observation
  - example: NP Testing can detect Alzheimer's disease before behaviors are obvious

Related Disciplines

Discipline	Focus	Subjects	Setting	Tests & Measures
Cognitive Psychology	Mind	Healthy Undergrads	Research University	Computerized Reaction Time(RT)
Cognitive Neuropsychology	↕	↕	↕	↕
Clinical Neuropsychology				
Behavioral Neurology	↕	↕	↕	↕
Neurology	Brain	Patients with Neurological Disease	Hospital	Informal, behavioral

Brain Anatomy Notes

- Ogden calls the Secondary zones "Association cortex" whereas KW calls the Tertiary zones "Association cortex"

Functional Systems

- (From Luria)
- Brain has numerous small modules (aka "subunit", "factor", "component") which combine to form *functional systems*
- Damage to small area of brain will therefore impact any functional system which uses that area

Compensation

- Functional systems require participation from many modules
- If module is damaged…
- Person may be able to find new way of performing task by using different module, or by re-training module(s) to perform task that the damaged module can not do
- Example
  - Normal:
    - A B C D E
  - Damage:
    - A B Ć D E
  - Compensation
    - A B R D E
- Example :
  - Howard Engel / Alexia sine Agraphia

Disconnection Syndrome

- When damage is not to the modules, but to the connections between them
- Odd patterns of behavior
  - Conduction Aphasia : can speak and understand, but can't repeat speech
  - Ideomotor Apraxia : can perform tasks spontaneously, but not to command
- Both examples due to damage to *Arcuate Fasiculus* which connects Wernicke's area to frontal lobes

NP Terms 1

- Deficit, Dysfunction, Impairment, Disorder
  - often used as synonyms
- Syndrome
  - group of related symptoms

NP Terms : Lesions

- Lesion
  - damaged area
  - *focal* or *diffuse*
- Infarct, Infarction
  - area of dead (or damaged) brain tissue
- Atrophy
  - reduction in size/health. shriveled / shrunken

NP Terms : Causes of Lesions

- Physical Injury / Trauma
  - open, closed head injury
- Stroke - blood flow interruption
  - ischemic
    - blockage (temporary or permanent)
  - hemorrhagic
    - bleed / burst vessel
- Infections
  - bacteria
  - viruses
    - herpes simplex encephalitis

NP Terms : Causes of Lesions

- Hematoma
  - pool of blood
- Edema : swelling due to fluid, injury, inflammation
- Mass effects
  - shifting of brain tissue causes pressure
  - death if brain stem is affected

NP Terms - Prefix, Roots, Suffixes

- Roots:
  - -phasia : speech
  - -graphia : writing
  - -lexia : reading
  - -praxia : purposeful motor actions
  - -gnosia : to know
- Prefixes:
  - a-, ano- : lack of (or impairment in)
  - dys- : diminished, malfunctioning
- Suffixes :
  - -itis : inflammation
  - -ectomy : removal of
  - -otomy : cut into

NP Terms 3 : Examples

- Modifiers
  - visual : sight
  - tactile : touch
  - prosopos : face
  - motor : movement
  - olfactory : smell

NP Terms : Combinations

- Examples:
  - Prosopagnosia
  - Anoagnosia
  - Visual Agnosia
  - Visual Anoagnosia
  - Ideomotor Apraxia

O1 : Cerebral Lateralization

- Historical
  - Broca's Area (1861)
  - Wernicke's Area (1874)
- Data from Split-brain studies
- Normal Language dominance (left hemisphere):
  - 92% of right handers
  - 69% of left handers

O1 : Cerebral Dominance Myths

- LH was considered "dominant"
  - Consciousness
- RH considered specialized for "creativity"
  - Subconscious
- People : either "Right-brained" vs. "Left-brained"
- Problems
  - data from split brain patients
  - unfair importance of language
- Modern understanding
  - both hemispheres participate in most tasks
  - LH and RH are more specialized for certain tasks

Review : Cerebral Dominance

- LH was considered "dominant"
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- How does this jibe with first-hand-experience, e.g. *Stroke of Insight* video

Plasticity

- Brain can recover from big injuries in childhood
  - example: hemispherectomy
  - up to age 12, perhaps 15 - yes
  - adults : ? not clear ?
- Example in people who went blind:
  - before age 12 : no visual dreams or imagery
  - after age 12 : report visual dreams & imagery
  -

Dissociation

- Single or simple dissociation:
  - Lesion to brain area L1 causes behavior problem B1
  - Lesion to other area L2 does not cause B1
- Double Dissociation:
  - Lesion to brain area L1 causes B1 but not B2
  - Lesion to other area L2 causes B2 but not B1
- Reality:
  - due to high interconnection between brain systems, may not be this simple.
  - dysfunction in another area (L3) may cause both patterns

Neuropsychology as Scientist-Practitioners

- Interplay of Research vs. Clinical Practice
- Finding (double) dissociations is hard
  - Research is limited by
    - lack of lesions
    - unclear lesions
      - (easier now with neuroimaging)
    - patients able to participate in research
    - patients willing to participate
    - etc.

Roles of Neuropsychologists

- Clinical
  - seeing patients
  - diagnosing disorders
  - recommending treatments
  - tracking progress
- Consulting
  - e.g. assessment prior to surgery
- Forensic
  - competency hearings / ability to stand trial
  - lawsuits, damages due to accidents/injuries
- Research
  - drug research
  - epidemiological
  - ...