

# Ch. 17: Neuropsychology

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## Neuropsychology

- Definitions
- History
- Goals
- Methods
- State of the art
- Issues
- Demographic Norms
- Careers / Training

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## Clinical Neuropsychology

- Field: Subfield of clinical psychology
- Setting: outpatient and inpatient
- Subjects/Patients: children, adolescents, adults, geriatric
- Methods: Measure function of specific brain areas & systems.
- Measures: Standard tests (IQ tests) as well as specialized test batteries
- Norms: standard, as well as specialized, normative data

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## Goals of NP Assessment

- Diagnosis
  - Clinical
  - Scientific
  - Medico-legal / forensic
- Understanding of neurological basis of disorder
  - Prognosis
  - Treatment plan
    - surgical, pharmacological, psychosocial, remediation
- Track changes over time

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## Neurology v. Neuropsychology

	Neurology	Neuropsychology
Education	MD	PhD
Methods	hands on, informal	hands off, structured
Decisions	clinical judgement	statistics & norms
Focus	motor / sensory	cognitive
Psychosocial	some	much
Treatments	drugs, surgery	rehabilitation, compensation

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## Behavioral tests vs. biological

- Q: What has better reliability/validity to diagnose brain disease? brain imaging vs. neuropsychological tests?
- A: Often, most sensitive test of early dysfunction is a NP test
- Example: Alzheimer's disease shows a very specific pattern of "rapid forgetting" that can be detected by memory testing, long before it shows up on brain imaging scans.
- NP testing is relatively non-invasive, though not particularly inexpensive

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## Behavioral tests vs. biological 2

- Behaviors are mediated by multiple brain systems located throughout the brain.
- Not easily imaged with MRI
- Behavior is what matters. Testing behavior directly can be more accurate.
- Why not both? Imaging shows the damage, NP tests show the effects.

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## Assessment

- Psychological Test
  - administration
  - results
  - interpretation
- Test Battery
  - multiple tests
- Other sources of data
  - Clinical Interview
  - History
  - other records...

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## Neuropsych. Batteries

- Fixed Battery
  - Give all patients same set of tests
  - Increase chance of finding subtle/hidden impairments
  - Excellent statistics and normative data
- Flexible Battery
  - Tailor specific tests to specific patients
  - More like neurology, more hands on
  - Poor statistics, possible to miss hidden issues

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## Fixed Batteries

- Halstead-Reitan
  - WAIS-IV plus additional tests of memory, learning, motor and sensory skills
  - Approx 6 hours to administer
- Luria-Nebraska
  - Luria had a flexible battery based on theory of pluripotentiality (multiple brain systems could compensate to do the same tasks)
  - Test battery improved and standardized at U. Nebraska
  - Approx 24 hours(!) to administer

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## Halstead-Reitan Battery

- Full WAIS IQ Test
- Additional tests:
  - Category test
  - Grooved pegboard
  - Rhythm
  - Speech comprehension
  - Finger tapping
  - Trail making
  - Grip Strength
  - Sensory-perceptual exam

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## Gardner's 8 Intelligences

- logical-mathematical (\*)
- verbal-linguistic (\*)
- spatial (\*)
- musical
- bodily-kinesthetic
- naturalist
- interpersonal
- intrapersonal

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## Limitations of NP Testing

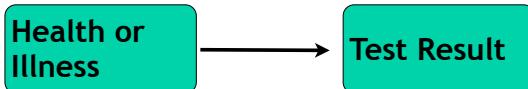
- Most tests predate modern neuroscience
- Lack of pre-test data
  - reliance on normative data
- Lack of international standardization
- Lengthy
  - 2 - 20 hours of testing
- Expensive
- Requires Ph.D. level training

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## Demographic Corrections

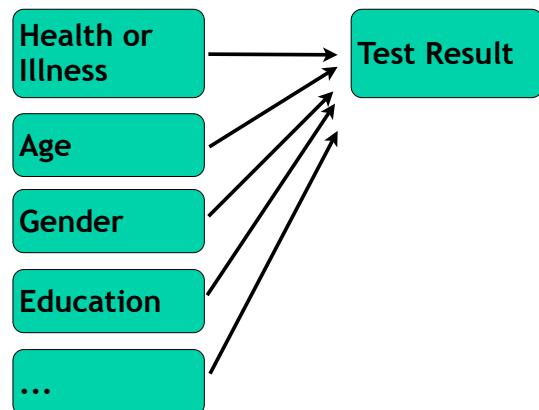
- Normative Data would be simple if there was one definition of “normal”
- Simple model



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## Demographic Model



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## Common Demographic Covariates

- Race/Ethnicity
- Sex
- Age
- Education
- Language

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## Diehr et al. (1998)

- Paced Auditory Serial Addition Test
- Demographic variables:
  - ethnicity : self-identified as either White / Black
  - age
  - gender
  - education

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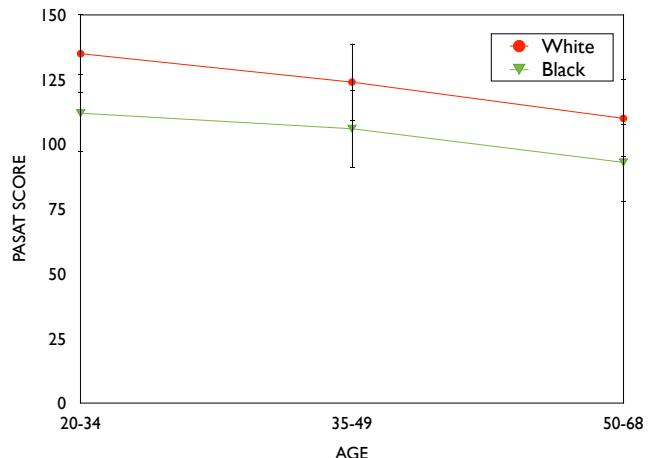
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## Diehr et al. (1998) Results

- Statistically and Clinically-significant differences in PASAT test result found for
  - Age
  - Education
  - Ethnicity
- Results not statistically significant:
  - Gender

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## PASAT by age & ethnicity



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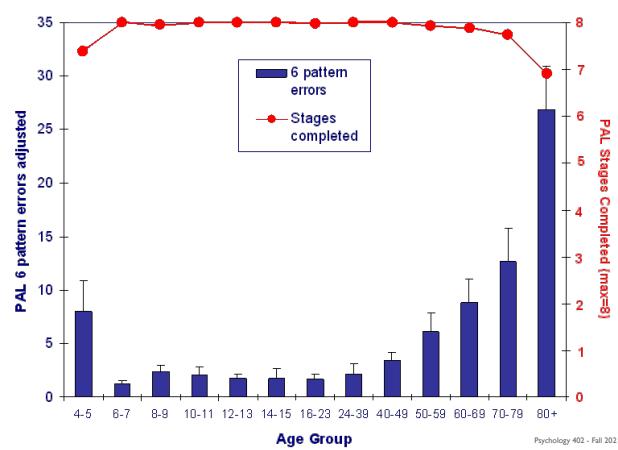
## Age - after age 35...

- Worsens significantly
  - fluid reasoning
  - speed of processing
  - working memory
  - long term memory
- Holds / drops a little
  - Crystallized information
  - semantic memory
- May get better?
  - reasoning
  - vocabulary
  - emotion
  - metacognition

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## CANTAB Paired Associate Learning

Paired Associate Learning (errors)– Computerized Task (n=1444)



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## Sociocultural Events in Neuropsychology

- Sports Concussions
- Marijuana Legalization

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## Sports Concussions



IN RE: NATIONAL FOOTBALL LEAGUE PLAYERS' CONCUSSION INJURY LITIGATION  
No. 2:12-md-02323 (E.D. PENN.)

HOME | NOTICE MATERIALS | COURT DOCUMENTS | FAQs | SIGN UP FOR FUTURE INFORMATION

### Welcome to the NFL Concussion Settlement Program Website

A Settlement of a class action lawsuit was reached with the NFL and NFL Properties and retired NFL players, their representatives and family members. The retired NFL players sued, accusing the NFL of not warning players and hiding the damages of brain injury. On July 7, 2014 the Court granted preliminary approval of this Settlement.

Retired players, legal representatives of incapacitated or deceased players, and families of deceased players may be eligible to receive benefits from this Settlement.

The proposed settlement provides for three benefits:

1. Baseline medical exams for retired NFL players;
2. Monetary awards for diagnoses of ALS (Lou Gehrig's disease), Alzheimer's Disease, Parkinson's Disease, Dementia and certain cases of chronic traumatic encephalopathy or CTE (a neuropathological finding) diagnosed after death; and
3. Education programs and initiatives related to football safety.



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# Cannabis Legalization

Home / News /

## Marijuana compound may halt Alzheimer's disease – study

Published time: August 30, 2014 17:57

[Get short URL](#)

Home > Current Issue > vol. 109 no. 40 > Madeline H. Meier, E2657–E2664, doi: 10.1073/pnas.1206820109  
Persistent cannabis users show neuropsychological decline from childhood to midlife

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# Careers in clinical neuropsychology

- Subfield of Clinical Psychology
- Ph.D. (or Psy.D.) with about 2000 hours clinical training
- Internship : 1 year (2000 hours)
- Post-doc : 1+ year (2000+ hours clinical training)
- Employment -- hospital or clinic, sometimes forensic (legal), often joint with Univ.
- Pay -- good, often better than typical clinical psychologist, not as good as MD.

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