Neuropsychological assessment
Differentiating between typical aging vs. abnormal performances

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Normal Cognitive Aging vs. “Dementia”

“Optimal” vs. “Typical” Normal Aging

- **Optimal Aging:** Studies often exclude people with medical illnesses or those taking medications that may impact cognition (e.g., diabetes, COPD, anxiety)
  - In other words, studies look at “Super Normals”
  - Cross-sectional studies: looking at different groups of different ages
    - Compare performances of older adults to younger adults

Stanford ADRC:

- **Typical Aging:** Assumes that people will experience age-associated medical problems and changes in cognition that are part of physical aging process
  - Crystallized vs. Fluid Cognitive Skills
  - Compares performances longitudinally with a focus on changes within the same group of people.

Clinical utility of neuropsychological assessment

- Age and education adjusted norms - compares your scores to your true peers
  - Better able to determine whether cognitive changes are typical for someone’s age
  - Comprehensive neuropsychological testing - 80-90% accurate in detecting underlying AD found on autopsy (Hu et al., 2010; Salmon, 2002).

- Crystallized intelligence tests against which other fluid measures (memory, processing speed, attention) are compared, to determine whether there is a significant change for each individual person
  1. Establish if there is a DECLINE compared to your peers
  2. Establish if there is an IMPAIRMENT, compared to individual’s own level of past optimal level of functioning

- Can serve as one of the biomarkers of disease recognition and treatment

Disease Progression and Biomarkers
FORMAL NEUROPSYCHOLOGICAL ASSESSMENT

 Typical Neuropsychological Battery
• Varies in length and the nature of tests included
• Tests are geared toward a referral and research question
  › Typical length in ages 25-65: 3-4 hours of testing
  › Typical length in ages 65+: 2-3 hours of testing

Why not brief testing?
• Brief Screening measures:
  › Best at ruling out whether cognitive impairment exists
  › Not great at diagnosis or differentiating what type of cognitive impairment exist
  › Easy to obtain a perfect score—but may still have subtle problems that a general measure cannot detect
  › Examples: Mental Status Examination (MoCA, SLUMS, or MMSE)

Cognitive Domains Assessed
• Attention
• Response Speed
• Working memory
• Judging distances and angles
• Discriminating between shapes
• Recognition of image from details
• Naming objects
• Retrieving words from memory
• Comprehension
• Story memory
• Visual memory
• Word list memory
• Word Reading
• Education/

Neuropsychological Profiles Over Time:

-2 -1.5 -1 -0.5 0 0.5 1 1.5 2 2.5

Visual Reception|
Word List Retention|
Word List Immediate Recall
Story Memory Retention
Story Memory Immediate
Naming
Semantic Categories
Verbal Fluency
Processing Speed
Nonverbal IQ
Verbal IQ
Global Cognition

-2 -1.5 -1 -0.5 0 0.5 1 1.5 2 2.5

MCI on follow up
Normal follow up
Initial
Patterns of Memory Performance

Word List Learning Task:
Raw # of words learned and recalled.

- Recognition
- Retention
- Learning over Trials
- Immediate Recall

Lewy Body Parkinson’s AD Normal

Visuospatial Distortions (Lewy Body Dementia)

Depression and Dementia

Neuropsychiatric symptoms in AD (Hwang et al., 2004)
Neuropsychiatric symptoms in LBD and PDD
(Aarsland et al., 2001)

Thank you for your time, participation and patience.