

Cognitive Assessment of Health Professionals

Gregory K. Gable, Psy.D.

Caron Treatment Centers

Disclosure of Relevant Financial Relationships Content of Activity: NOAP 2019

Name	Commercial Interests	Relevant Financial Relationships: What Was Received	Relevant Financial Relationships: For What Role	No Relevant Financial Relationships with Any Commercial Interests
Gregory K. Gable	None, I work for Caron Foundation, a non-profit organization			None

Re-Entry Issues

- ▶ Relapse Risk
- ▶ Recovery Support or "Scaffolding"
- ▶ Specialty Related Risk
- ▶ Competency Issues
- ▶ Cognitive Deficits

Neuropsych Assessment of Health Professionals

- ▶ Why neuropsych assessment?
 - ▶ Quantification of cognitive functions
 - ▶ Identify significant deficits/strength areas
 - ▶ Provide a baseline to measure against
 - ▶ Determine functional readiness to return to work
 - ▶ Rule out specific neurocognitive problems
 - ▶ Ability to participate in treatment/recovery

Reasons for Assessing Patient While in Treatment

- ⊙ Concerns about memory function
- ⊙ Ability to participate in treatment and make treatment accommodations as needed
- ⊙ Concerns about readiness to return to work
- ⊙ Patient may not be progressing well while demonstrating signs of difficulty thinking
- ⊙ Desire to differentiate between psychiatric and organic barriers to progress
- ⊙ Age related concerns

Validity of Neuropsych Data

- ▶ Use of well-normed instruments
- ▶ Can be compared against age related peers
- ▶ Data is reproducible
- ▶ Validity is increased because we can choose instruments that adequately challenge resources.

Cognitive Measures

- ▶ Global Cognitive Status
- ▶ Attention/ Processing Speed
- ▶ Learning/Memory (Verbal Learning)
- ▶ Language Skills/ Verbal Fluency
- ▶ Visuospatial Skills
- ▶ Executive Functions

Testing Instruments

- ▶ Rey Complex Figure (visuospatial construction and learning/memory)
- ▶ COWAT (verbal fluency)
- ▶ Semantic naming
- ▶ Verbal Learning tasks (California; Hopkins)
- ▶ Trails A and B from Halstead-Reitan
- ▶ Symbol Digit Modalities Test (attention/processing speed)

Testing Instruments

- ▶ Wisconsin Card Sort (Executive Functioning)
- ▶ Stroop Color-Word (Executive Functioning)
- ▶ Category from Halstead-Reitan (Executive Functioning)
- ▶ PASAT (challenging resources, working memory, attention, executive functions)
- ▶ Wechsler Memory Scale subtests
- ▶ WAIS-IV

Cognitive Reserve

- ▶ Neuronal Reserve
 - ▶ Larger number of neuronal synapses
- ▶ Brain Reserve
 - ▶ Larger brain size
- ▶ Cognitive Reserve
 - ▶ Ability to use brain networks more efficiently
 - ▶ Ability to use alternate strategies in response to task demands
- ▶ Compensation
 - ▶ The facility of calling upon alternate neural networks to compensate for brain damage or aging process

Normative Data

- ▶ Normative Data grouped according to :
 - ▶ Age
 - ▶ Education (not all norms include education level data)
- ▶ Questions arise when evaluating health professionals as to whether age related normative data should be relied upon
- ▶ Education level data combined with age is a stronger comparative tool

Normative Data

- ▶ Should age-related norms be used for assessment of physicians and advanced practice health professionals?
- ▶ Adjusted normative data may be appropriate for this group

Normative Data

- ⦿ Rentz et al, 2004
- ⦿ Study carried out at Brigham and Womens Hospital, Harvard Medical School, and Umass at Boston
- ⦿ Used IQ adjusted norms to predict progressive cognitive decline in highly intelligent older individuals
- ⦿ Adjusted norms accurately predicted decline in many cases. (82% declined; 55% met MCI criteria)

Normative Data

- ▶ Should age-related norms be used for assessment of physicians and advanced practice health professionals?
- ▶ Adjusted normative data may be appropriate for this group

Normative Data

- ⦿ Rentz et al, 2004
- ⦿ Study carried out at Brigham and Womens Hospital, Harvard Medical School, and Umass at Boston
- ⦿ Used IQ adjusted norms to predict progressive cognitive decline in highly intelligent older individuals
- ⦿ Adjusted norms accurately predicted decline in many cases. (82% declined; 55% met MCI criteria)

Cognitive Screens

- ▶ Not adequate for this population
 - ▶ MMSE
 - ▶ Cognistat
 - ▶ MOCA
- ▶ Likelihood of false negative findings

Memory Deficits

- May result from different etiology
 - Substance Use
 - Aging
 - Sleep disorder
 - Mild Cognitive Impairment
 - Neurodegenerative Disease
 - Alzheimer's Disease
 - Frontotemporal Dementia
 - Vascular Disease
 - Psychiatric Symptoms
 - Depression
 - Psychotic thought disorder
 - Drug-related impairment

Executive Functions

- ⦿ A set of multiple cognitive processes that act in a coordinated way to direct cognition, management of emotion, and motor activity. Executive Functions are responsible for a person's ability to engage in purposeful, organized, strategic, self-regulated, goal-directed behavior.
- ⦿ Executive functions cue the use of cognitive abilities such as reasoning, language,

Executive Function

- ▶ executive function n. The cognitive process that regulates an individual's ability to organize thoughts and activities, prioritize tasks, manage time efficiently, and make decisions.

Executive Function

- ▶ The term executive function defines complex cognitive processing requiring the co-ordination of several subprocesses to achieve a particular goal. Neuropsychological evidence suggests that executive processing is intimately connected with the intact function of the frontal cortices.

Executive Functions

- ⦿ Inhibition of impulsive responding
- ⦿ Directing and focusing attention, (screening out interference)
- ⦿ Cueing initiation of effort
- ⦿ Interrupting and returning to a task
- ⦿ Demonstrating flexibility in shifting of cognitive resources to a new demand or condition
- ⦿ Planning and Decision-Making

Executive Functions

- ▶ Directing the use of working memory
- ▶ Making use of hindsight and foresight in current decision making
- ▶ Enabling a capacity to 'take the perspective of the other' in order to infer how someone is feeling or thinking
- ▶ Directing efficient use of alteration between pattern and detail processing

Executive Functions

- ▶ Directing the efficient use of fluid reasoning resources
- ▶ Directing the efficient and fluent production of language when highly specific demands are made
- ▶ Ability to synthesize and integrate isolated details into a coherent whole
- ▶ Ability to shift strategies to adapt to changing circumstances

Executive Functioning Measures

- ▶ Trails B
- ▶ Verbal Fluency
- ▶ Visuospatial Constuction
- ▶ Inhibition tasks
- ▶ Reasoning/decision-making (Category/WCST)
- ▶ Shifting set (Category)

Executive Functions: Not Synonymous with IQ

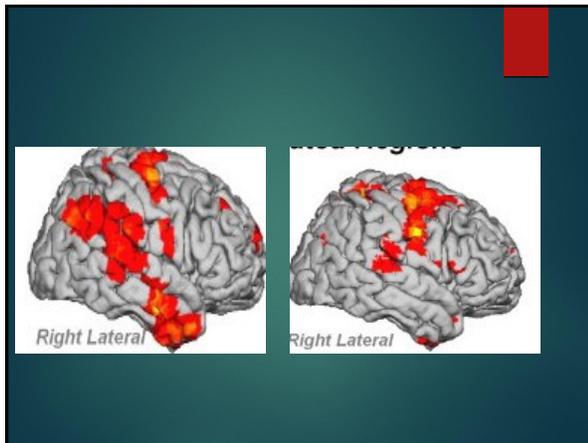
- Use of intelligence test instruments such as WAIS-IV does not measure executive function
 - Explicit Instructions
 - Teaching Items
 - Examiner cueing of attention and performance
- Intelligence tests do not reflect executive functions
- Correlations between most of the purest EF measures and measures of general intelligence tend to be low (.20 to .30)

Cognitive Efficiency

- ▶ Neuroimaging studies examining task-related activation in elderly people suggested that cognitive reserve takes the form of more efficient use of brain networks and/or greater ability to recruit alternative networks to compensate for age-related cerebral changes. (Steffener and Stern, 2011)

Cognitive Efficiency

- ▶ Higher degree of education and verbal intelligence was associated with less metabolic activity in the right posterior temporoparietal cortex and the left anterior intraparietal sulcus.
- ▶ Lower metabolism in the temporoparietal cortex was also associated with better memory abilities.



Cognitive Efficiency

- ▶ There appears to be an **inverse** relationship between cognitive reserve and resting-state activity (measured by fMRI) in key regions of two functional networks respectively involved in internal mentation and goal-directed attention.

Cognitive Efficiency

- ▶ Citations
 - ▶ Steffener and Stern, 2011, 2012
 - ▶ Steffener et al, 2011
 - ▶ Bosch, et al 2010
 - ▶ Woe-Padulles, et al 2009
 - ▶ Ruff, et al 2003

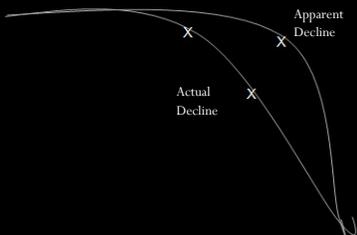
Cognitive Reserve

- ▶ Neuronal Reserve
 - ▶ Larger number of neuronal synapses
- ▶ Brain Reserve
 - ▶ Larger brain size
- ▶ Cognitive Reserve
 - ▶ Ability to use brain networks more efficiently
 - ▶ Ability to use alternate strategies in response to task demands

Cognitive Reserve

- ▶ Compensation
 - ▶ The facility of calling upon alternate neural networks to compensate for brain damage or aging process

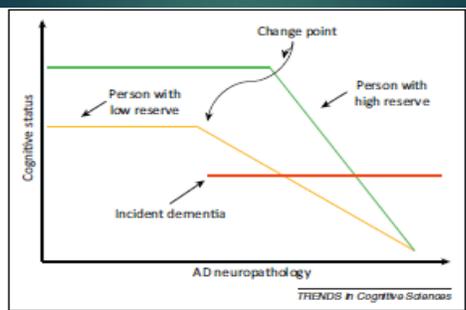
Cognitive Reserve



Cognitive Reserve



Cognitive Reserve



Sam

- ▶ 75 yo Cardiologist
- ▶ Alcohol Use Disorder, Severe
- ▶ Benzodiazepine Use Disorder, Moderate
- ▶ Referred by his practice
- ▶ Having difficulty engaging fully in treatment
- ▶ Neuropsych testing carried out to help inform recommendations for re-entry

Robert

- ▶ 54 year old dentist
- ▶ Referred because of alcohol use
- ▶ Concerns about nitrous oxide use
- ▶ Did well in participating and engaging in treatment
- ▶ Continued to present clinically as having cognitive deficits.

Robert

- ▶ Processing speed 50th percentile (3 errors)
- ▶ Verbal learning and memory
 - ▶ Immediate recall 75 to 25 %ile
 - ▶ 20 minute delayed recall 12th percentile
 - ▶ 13 intrusions semantically related and unrelated
 - ▶ Recognition impaired

Robert

- ▶ Visuospatial learning and memory
 - ▶ Copy average
 - ▶ 3 minute recall 31st percentile
 - ▶ 30 minute recall 14th percentile
- ▶ Verbal fluency average
- ▶ Executive function
 - ▶ Below avg Trails A and B (loss of set)
 - ▶ Category errors = 51; moderate impairment

William

- ▶ 65 year old radiologist
- ▶ Long-term heavy alcohol use
- ▶ Protracted and difficult withdrawal
- ▶ Clinical staff and community concerned about cognition

William

- ▶ Processing speed 10th Percentile (borderline)
- ▶ Working memory index 30th percentile
- ▶ Trails B mild to moderate impairment
- ▶ Verbal Ability 90th percentile
- ▶ Verbal Learning and memory <1st %
 - ▶ 20 minute free recall 1st percentile
- ▶ Visuospatial learning/memory 2nd to 7th %
- ▶ Verbal Fluency phonemic=14th %
 - ▶ Semantic = 2nd percentile

William

- ▶ Executive Functioning
 - ▶ WCST <1st % 22 psv responses
- ▶ Significant defects in executive functioning
 - ▶ Including
 - ▶ Mental flexibility/shifting set
 - ▶ Organization
 - ▶ Sequencing
 - ▶ Problem-Solving

Sam

- ▶ Rapid visual scanning and symbol substitution
 - ▶ Average, 50th %ile with age related norms
 - ▶ Below average, 1.16 SD below the mean when normed against 45-54 year olds. (12th %ile)

Sam

- ▶ Learning and Memory
 - ▶ Verbal learning trial 1 50th %ile per age related norms
 - ▶ Trial 2 38th %ile per age related norms
 - ▶ Trial 3 38th %ile per age related norms
 - ▶ Verbal learning trial 1 16th %ile per middle aged adult
 - ▶ Trial 2 16th %ile per middle aged adult
 - ▶ Trial 3 5th %ile per middle aged adult

Sam

- ▶ Learning and Memory
 - ▶ Visuospatial performance
 - ▶ Rey Complex Figure Copy
 - ▶ > 1st %ile, poor organization, less than complete reproduction of stimulus, gave up, couldn't make his drawing match the stimulus. Became confused.

Sam

- ▶ Language Skills
 - ▶ Verbal Fluency
 - ▶ Phonemic 5th %ile
 - ▶ Semantic <10th %ile

Sam

- ▶ Executive Functions
- ▶ Rapid visual scanning and tracking
 - ▶ Trails A NDS 2 with Reitan norms
 - ▶ Trails A 17th % with Age related norms
 - ▶ Trails B NDS 3 with Reitan norms
 - ▶ Trails B 2nd %ile with age related norms

Sam

- ▶ Executive Functions
 - ▶ Novel Problem solving ability
 - ▶ Category Test NDS 3 with Reitan Norms
 - ▶ 93 errors on 208 items

Mary

- ▶ 54 year old RN
- ▶ Referred from primary care because of concern about cognitive issues
- ▶ Long-term alcohol addiction
- ▶ Clinical staff raised question of cognitive functioning

Mary

- ▶ Rapid visual tracking and symbol sub.
 - ▶ 54th %ile written
 - ▶ 60th %ile oral

Mary

- ▶ Verbal Learning
- ▶ HVTL
 - ▶ 75th %ile
- ▶ Logical Memory of paragraph length prose
 - ▶ 78th %ile
- ▶ Visual Reproduction of graphic images
 - ▶ 94th %ile

Mary

- ▶ Verbal Fluency
 - ▶ Phonemic 38th %ile
 - ▶ Semantic 75th %ile

Mary

- ▶ Visuospatial learning/memory
- ▶ Visual Reproduction of graphic images
 - ▶ 94th %ile (WMS-III)
- ▶ Complex Line Drawing copy and memory
 - ▶ 3 minute recall 50th %ile
 - ▶ 30 minute recall 38th %ile

Mary

- ▶ Executive Functions
 - ▶ Rapid visual tracking
 - ▶ Trails A NDS 2
 - ▶ Trails B NDS 3

Mary

- ▶ 3 month follow up testing
 - ▶ Improvement in all areas
 - ▶ Low avg score on Halstead Reitan Category Test

Sarah

- ▶ 64 yo female
- ▶ Guidance Counselor
- ▶ Referred because of general concern about cognitive function
- ▶ Referent requested neuropsych assessment

Sarah

- ▶ Rapid visual scanning/symbol sub.
 - ▶ 84th %ile
- ▶ Learning and Memory
 - ▶ Verbal Learning
 - ▶ Trial 1: 2nd %ile
 - ▶ Trial 2: 2nd %ile
 - ▶ Trial 3 10th %ile
 - ▶ Recall 25th %ile

Sarah

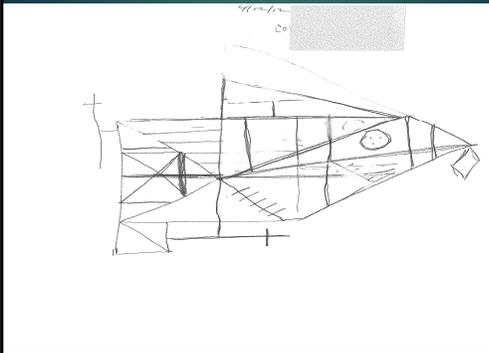
- ▶ Language Skills
 - ▶ Verbal Fluency
 - ▶ Phonemic Fluency 72nd %ile
 - ▶ Semantic Fluency 25th %ile

Sarah

- ▶ Spatial and Construction Skills
 - ▶ Complex Line Drawing
 - ▶ Copy trial <1 %ile
 - ▶ 3 minute recall 5th %ile
 - ▶ 30 minute recall <1 %ile

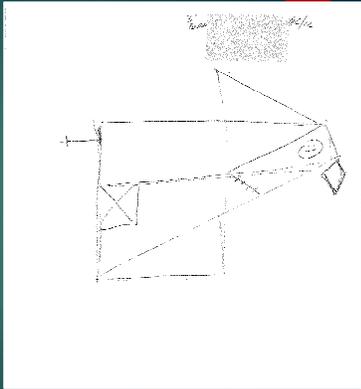
Sarah

▶ RCFT Copy



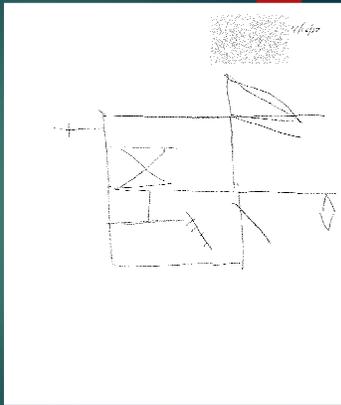
Sarah

- ▶ RCFT
- ▶ 3 min recall

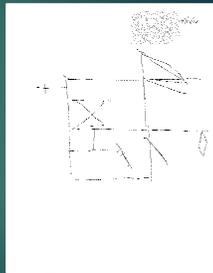
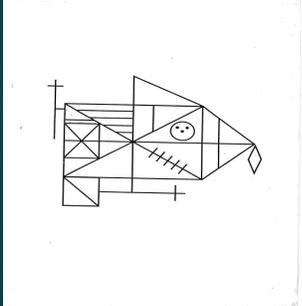


Sarah

- ▶ 30 min recall



Sarah Comparison to Stimulus



Sarah

- ▶ Executive Functions
- ▶ Rapid visual scanning and tracking
 - ▶ Trails A NDS 3 (age norm <10th %ile)
 - ▶ Trails B NDS 3 two errors (age norm ,1%ile)
- ▶ Novel problem solving
 - ▶ Categories 113 Errors NDS 3 (nearly 2x Reitan cutoff for severe impairment)

Sarah

- ▶ Recommend :
 - ▶ No return to work prior to additional evaluation
 - ▶ Neurological work up
 - ▶ Imaging
 - ▶ Full neuropsych battery

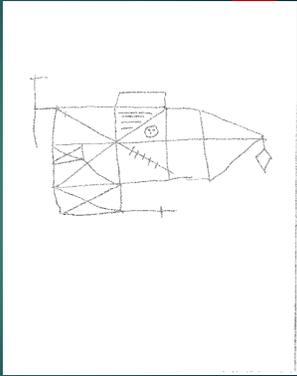
Tom

- ▶ 60 yo physician
- ▶ General surgery plus chart review
- ▶ Long term alcohol use including period of self reported sobriety through AA
- ▶ BAC at time of hospitalization just prior to admission to tx = 0.45

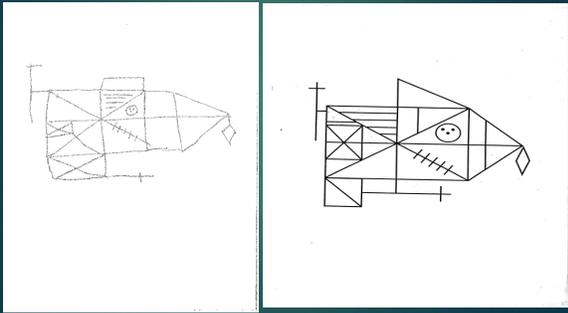
Tom

- ▶ Neuropsych testing showed mild impairments in verbal learning
- ▶ Executive functions showed some inefficiency but low average performance
- ▶ Novel problem solving task: 60th %ile, lost set twice but solved 6 problem sets
- ▶ Verbal fluency 50th %ile

Tom RCFT 30 min delay



Thomas 30 min delay compared to stimulus



Thomas---30 min---Sarah

