MASSACHUSETTS GENERAL HOSPITAL
PSYCHIATRY ACADEMY

Neurocognitive Screening

Judith Restrepo, MD
Attending in Consultation-Liaison Psychiatry – Massachusetts General Hospital
Instructor in Psychiatry – Harvard Medical School
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Disclosures

"Neither I nor my spouse/partner has a relevant financial relationship with a commercial interest to disclose."

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Screening objectives

- To guide diagnostic hypotheses & further screening/testing
- To facilitate more accurate diagnoses
- To guide appropriate treatment (medication and supportive)
- To help patients, families, and co-treating physicians understand symptoms

What is bedside neuropsychological screening?

- A judiciously employed, systematic assessment of a pt's arousal, cognitive, perceptual, and affective statuses/capabilities

- Formal neuropsychiatric testing is for neuropsychologists
  - *More* rigorously quantitative
  - *Less* diagnostically oriented

Order of Operations

Known medical/neurologic contributions

Level of arousal

Attention + Complex attention

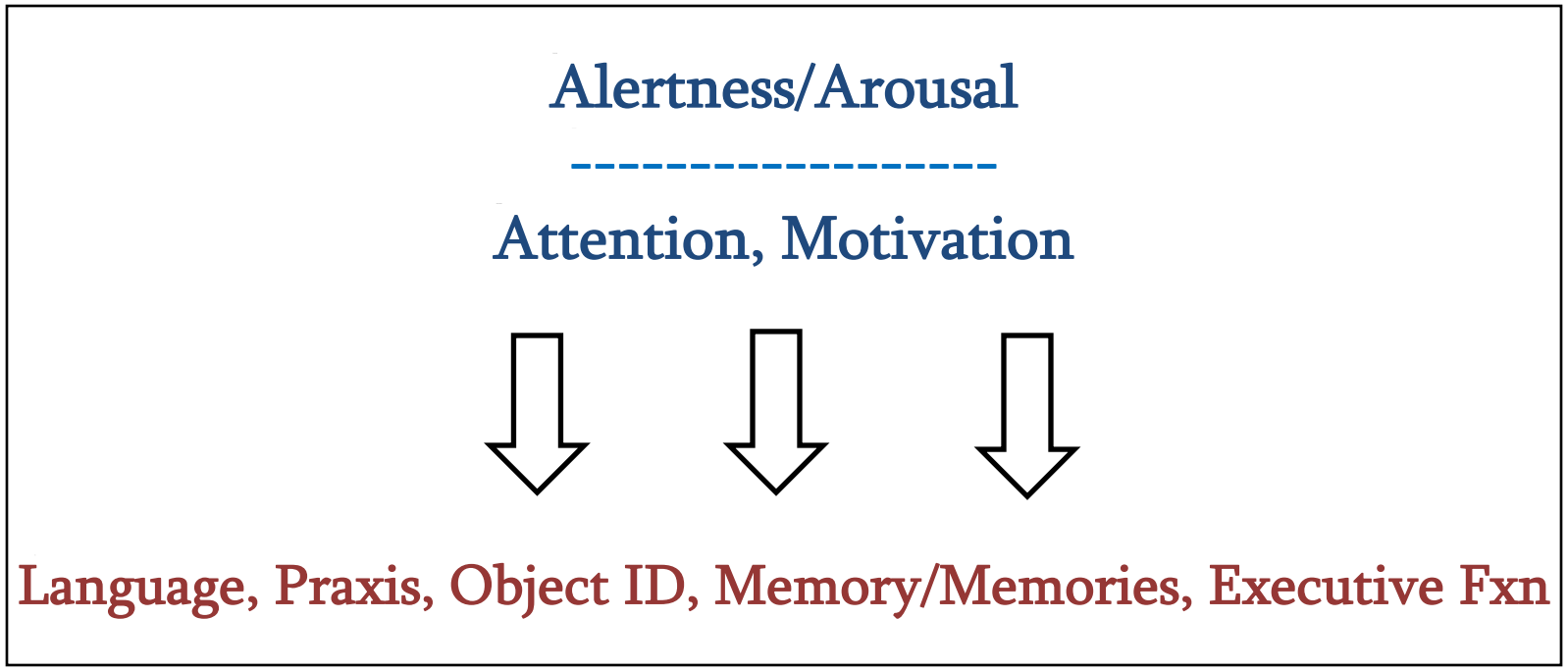
Language and visuospatial

Memory

Executive function

Hierarchy of Functions

State-dependent vs *Channel-dependent* *functions*



STATE DEPENDENT ASSESSMENT

Arousal

- Maintenance of arousal is critical to assess cognition
- Importance often skimmed/escapes notice
- Fluctuation can occur and this may be assessed at multiple points in time
- Three general disruptions
  - Hyperarousal
  - Hypoarousal
  - Mixed concerns (delirium)

Assessment of Arousal

- Always assume pt will not participate in exam
- Adaptation to environmental change
  - Response to verbal/visual stim
  - Move the patient (head of bed/arms legs)
- Activity
  - Maintenance of response
- Latency
  - Reaction times/consistency
- Task persistence
  - Completes tasks without direction

Level of Arousal

- Terms are often misused/misunderstood; describing state is preferred
- Common terms
  - Hyperarousal
    - Often looped in with agitation, hyperalertness, colloquial use of "manic"
  - Awake/alert
  - Somnolence/Lethargy
  - Obtunded
  - Stupor
  - Coma

Attention

- Does not exist without normal alertness
- Required for appropriate assessment for all following functions
- Considerations
  - Selective vs Sustained vs Directed
  - Attention vs Concentration vs Spatial

Assessing Attention

- Assessment often adequate by interview alone
- Many levels exist

Initial Attention		Selective Attention		Concentration
Automatic or voluntary orientation to sensory stimuli	→→→	Selection of stimuli from array of competing sensory stimuli	→→→	Maintenance of focus on stimuli to complete task

Schoenberg 2011

- Rule of thumb: bedside assessment should include vigilance, maintenance under distraction, and alternating focus

Motivation & Mood

- Aberrations of either can → false positives
- Esp. vulnerable to misinterpretation
- Assess by history & observation

- "Organic" mimics of idiopathic phenomena
  - Depression vs Apathy/Abulia
  - Blunted/inappropriate affect vs Dysprosodias
  - Affective lability vs Pathological affect

- ASK pt
- Compare spontaneous vs elicited (esp recent recall)

CHANNEL DEPENDENT FUNCTIONS

Language and Praxis

- Speech ≠ Language (dysarthrias; modalities)
  - Consider mechanics
- Fluent/Non-Fluent ≠ Sensical/Nonsensical

- Praxis
  - Many types; ideomotor screened
  - "Blow out a match," "flip a coin," etc.
  - Errors: inability, perseveration, vocalization, simulation w/body part

Assessing Language

- Expressive
  - Fluency
  - Articulation
  - Organization
- Receptive
  - Naming
  - Comprehension
- Repetition
- Prosody

Memory

- Includes encoding, storage and retrieval
- Intact sensory, motor, arousal and attentional skills are prerequisite
- Many individual factors affect performance
  - age, education
  - anatomy
  - material (i.e., Verbal, Visual)
- Should include recent memory and remote memory

Memory

- **Content**
  - **Declaritive/Explicit:** *semantic (facts), episodic (events)*
  - **Implicit:** *procedural (skills); conditioning*
- **Timing**
  - **Immediate:** working "memory"
  - **Recent:** min-days
  - **Remote:** weeks-years
- **Encoding**
  - Remote vs. anterograde

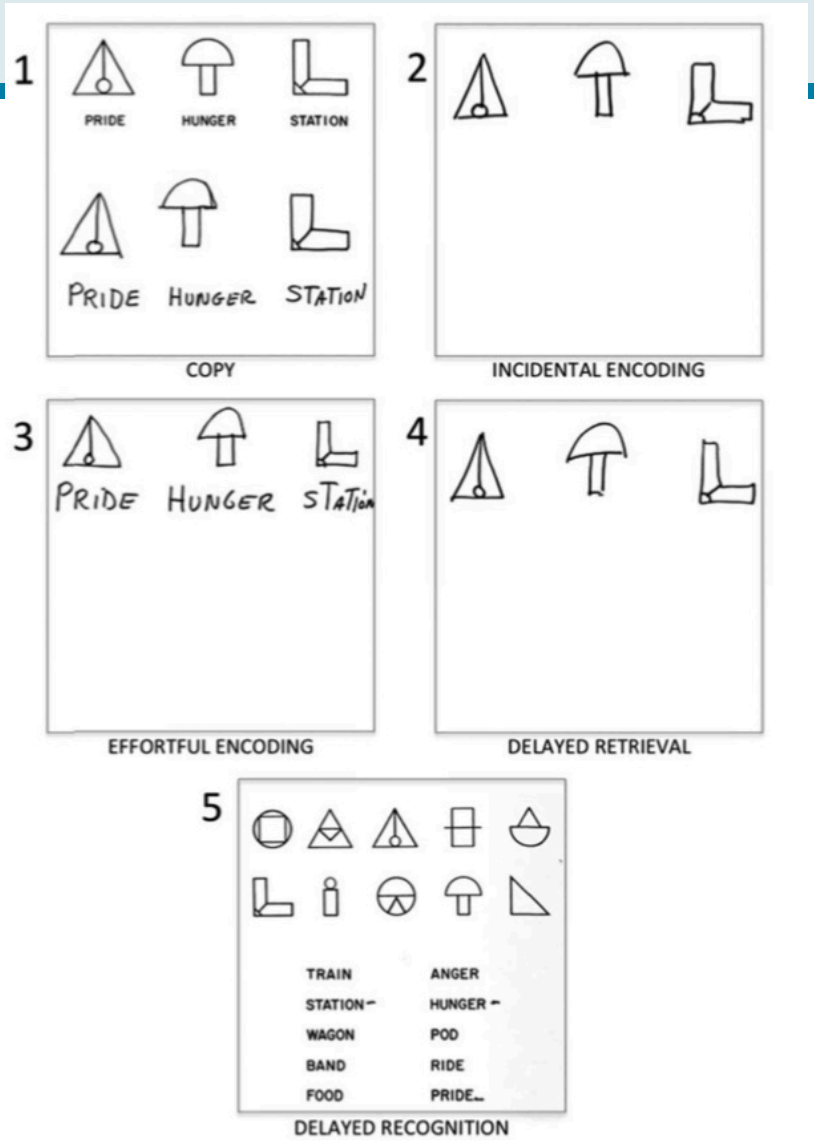
Assessing Memory

- Assessment must include
  - Learning
  - Immediate
  - Delayed
  - Recognition Format (is the problem with encoding or retrieval)
- Often part of extended mental status exam
  - Can include intermediate memory task

On the fly tests

- 3-Words, 3-Shapes
- Hidden $ variant
- List Recall
- Drawing Recall

3 words – 3 Shapes



Cognitive operations indexed by 3W3S scores	
Copy	Perceptuomotor aspects of the task
Incidental encoding	Capacity for effortless, spontaneous encoding of information and its on-line holding for immediate reproduction
Effortful encoding	Capacity for effortful, deliberate encoding of information and its on-line holding for immediate reproduction
Delayed recall	Amount of information that has been transferred to and retrieved from off-line storage
Recognition	Amount of information that has been transferred to off-line storage and retained in a form that can sustain recognition
Difference between effortful encoding and delayed recall	Represents the amount of information that fails to be transferred from on-line to off-line storage in a form that can be retained and reproduced
Difference between recognition and delayed recall	Represents the memory impairment that can be attributed to a deficit of retrieval rather than retention

Weintraub; (2013)

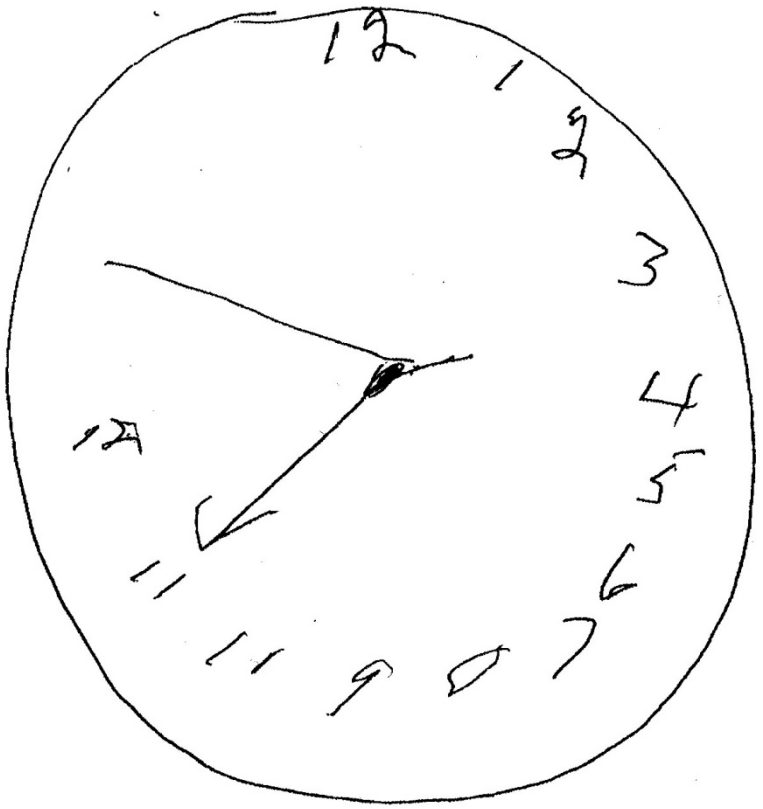
Executive function

- Frontal Lobes are most heavily involved (directly and indirectly)
  - Damage also impacts memory, motor, attention, language and comportment
  - Three syndromes
    - Dorsolateral
    - Orbitofrontal
    - Medial Frontal

Assessing Planning

- Collateral is often key as patients often lack awareness
- Disinhibition
  - Frontal lobe reflexes (release signs)
  - Contradictory verbal commands “don’t take this”
  - Go-no-go
- Motor and Sequencing
  - Perseveration (loops or ramparts)
  - Finger tapping
  - Luria
  - Rapid alternating movement
- Abstraction
- Organizational abilities
  - Clock

Examples of frontal-subcortical network dysfunction findings



Other channel-dependent functions

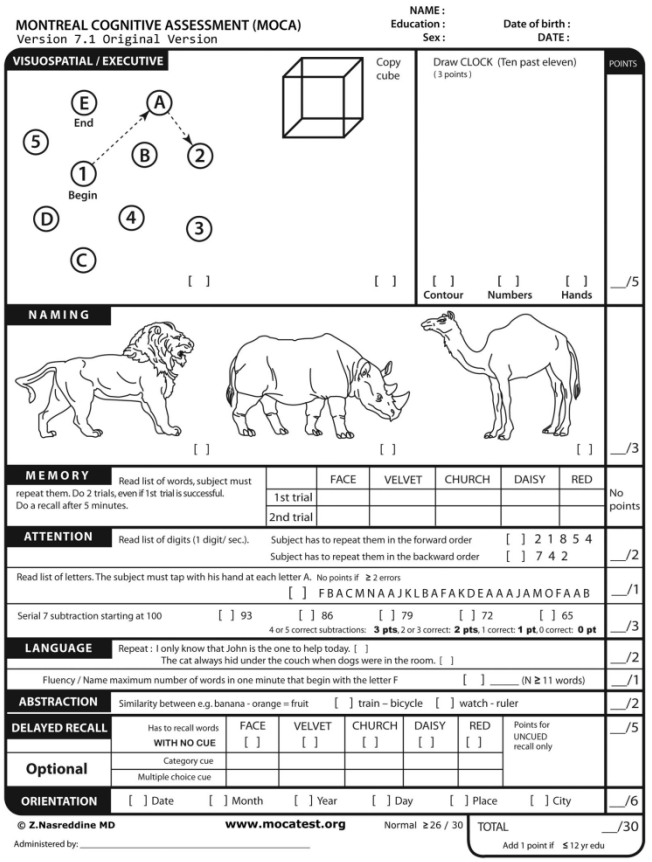
- Construction/visuospatial
  - R hemisphere & parietal – “big picture”
  - L hemisphere & frontal – details
  - Neglect ----- 2x simultaneous stimulation

- Gnosis
  - Distinguished from anomia by ability to use objects

Standardized screens

MMSE *MOCA*

- Orientation x10: Mixed function of attention, short term memory
- Registration x3: Attention
- Calculation/WORLD x5: attention/working memory
- Recall x3: Short term memory
- Language x5: name, repeat, read, write
- Construction x1
- Praxis x3



MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

NAME :
Education : Date of birth :
Sex : DATE :

VISUOSPATIAL / EXECUTIVE — Copy cube — Draw CLOCK (Ten past eleven) (3 points) — POINTS

E End, A, 5, B, 2, 1 Begin, D, 4, 3, C

[ ] [ ] [ ] Contour [ ] Numbers [ ] Hands __/5

NAMING __/3

MEMORY Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.

	FACE	VELVET	CHURCH	DAISY	RED
1st trial					
2nd trial					

No points

ATTENTION Read list of digits (1 digit/ sec.). Subject has to repeat them in the forward order [ ] 2 1 8 5 4. Subject has to repeat them in the backward order [ ] 7 4 2 __/2

Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors
[ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B __/1

Serial 7 subtraction starting at 100 [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65
4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt**, 0 correct: **0 pt** __/3

LANGUAGE Repeat : I only know that John is the one to help today. [ ]
The cat always hid under the couch when dogs were in the room. [ ] __/2

Fluency / Name maximum number of words in one minute that begin with the letter F [ ] _____ (N ≥ 11 words) __/1

ABSTRACTION Similarity between e.g. banana - orange = fruit [ ] train – bicycle [ ] watch - ruler __/2

DELAYED RECALL __/5

	Has to recall words WITH NO CUE	FACE [ ]	VELVET [ ]	CHURCH [ ]	DAISY [ ]	RED [ ]	Points for UNCUED recall only
Optional	Category cue						
	Multiple choice cue						

ORIENTATION [ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City __/6

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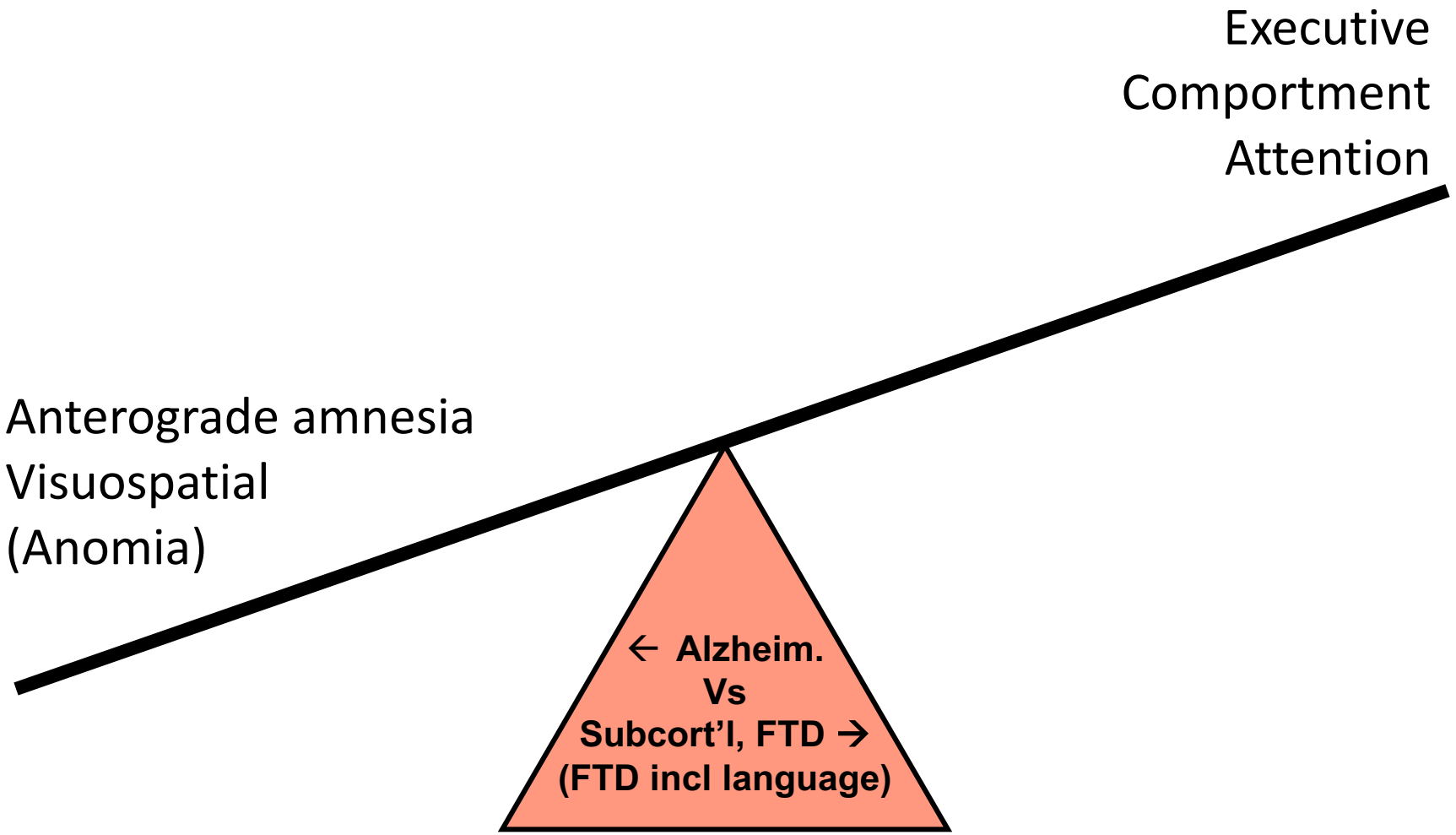
Add 1 point if ≤ 12 yr edu

Administered by: _____

Bedside screening in action

Dementia Subtype Hypothesizing



What's next?

- You may be done
- Imaging
- EEG (for fine-grained delirium questions)
- Formal NPT

- Use findings to formulate questions & make predictions

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