Functional Cognition:

Assessments that lead to person-centered care

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A little Background….

- About the speaker
- About references
- About content
- Special thanks

Functional Pathways LLC

fxpathways@gmail.com

Models for assessment presented were conceptually created by Sarah Foidel

Property of Sarah Foidel, 2022

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Learning Objectives:

1. Briefly discuss models of cognition including APA's declared domains
2. Discuss and identify the difference between skill based and performance-based testing
3. Gain understanding of the concept of functional cognition and the importance for quality patient care
4. Differentiate cognitive terms and identify primary cognitive capacities from attention to higher level thinking
5. Review assessments and discuss pros, cons, & application.

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Cognitive Functions

Cognition is overarching term: integrated functions resulting in thought & goal-directed action; process by which we gain knowledge

- Attention
- Learning and Memory
- Executive Function
- Social Cognition
- Perceptual Motor
- Higher Level Cognition (combining and generalizing skills)
- *Functional Cognition*

Considerations: processing speed, adaptation, strategies

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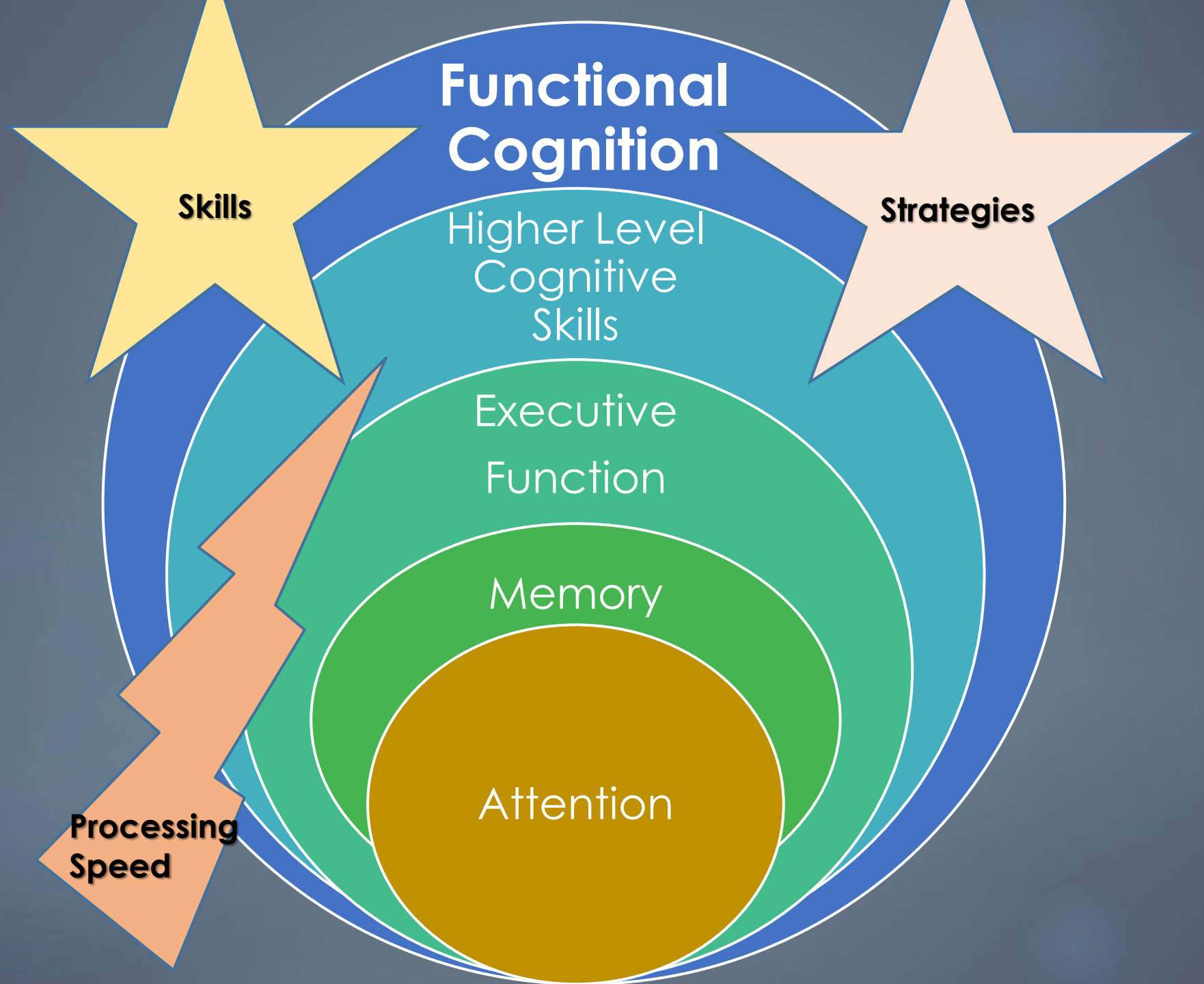
Functional Cognition
Skills
Strategies
Higher Level Cognitive Skills
Executive Function
Memory
Attention
Processing Speed

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Neuroanatomy of Cognition : Frontal Lobe is Essential

- Primary Motor Cortex
- Premotor Cortex
- Supplementary Motor cortex
- Frontal Eye Fields
- Broca's area
- Area for Prosody
- Prefrontal Cortex
  - Dorsolateral
  - Orbitofrontal

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But it is not the only part of the brain that impacts CNS function

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Frontal

Temporal

Occipital

Insular

Parietal

Subcortical

Cerebellum

What does functional cognition mean?

- Joe got a 21/30 on a SLUMS… can he cook safely?
- How much care does a person need?
- Janet has very poor memory scores, but she uses lists and can still take meds on time.
- Can you please give this patient a MMSE to see if they can drive?
- His scores on the MoCA are a 29 out of 30, his anger must be a mental health problem.

AOTA (American OT Association) Definition of Functional Cognition

2016

- Integration of process skills
- Ability to access cognition to perform everyday activities
- Influenced by dynamic environments
- Defines OT's unique role with cognition

Baum et. al from AOTA Conference 2016

2018

- The ability to use and integrate cognitive skills to complete ADLs and IADLs
- Includes skills and strategies
- Includes psychosocial elements (motivation, familiarity)
- Looks at dynamic environments as an independent factor

Giles et. al from AOTA Conference 2018

AMA's change to CPT codes 2018

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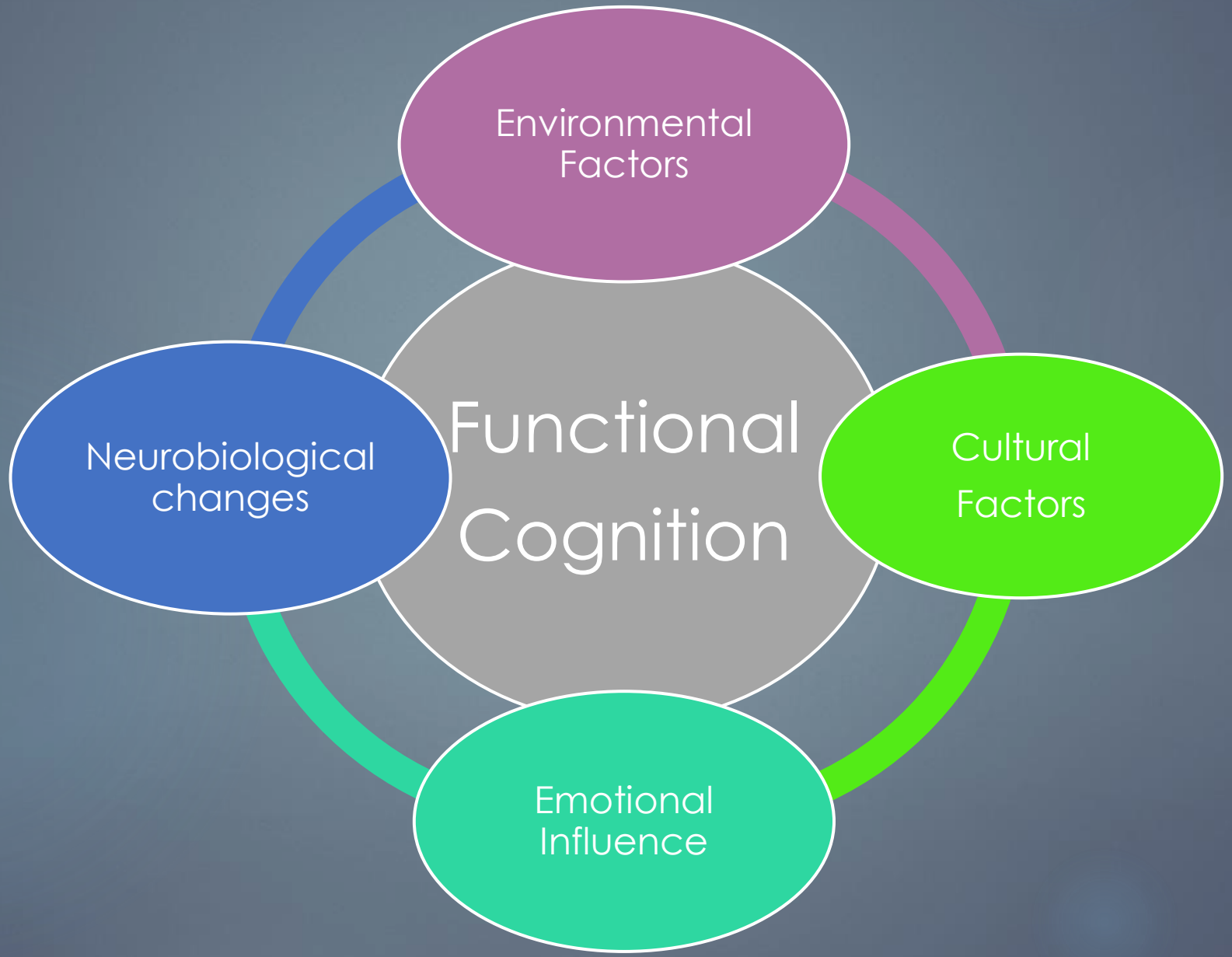
97127

- Therapeutic interventions that focus on cognitive function (e.g., attention, memory, reasoning, executive function, problem solving, and/or pragmatic functioning) and compensatory strategies to manage the performance of an activity (e.g., managing time or schedules, initiating, organizing and sequencing tasks), direct (one-on-one) patient contact.

CPT 97532 regarding cognitive skills development was no longer used for functional cognition

Multiple Determinant Model



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CNS changes….
Functional cognition is directly related to behavior

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What HAPPENS	What You Might OBSERVE
Breakdown of processing	Confusion
Breakdown of information intake	Perseveration "getting stuck"
Poor situational awareness	Impulsivity
Poor transfer of information	Aggression
Poor ability to alter decisions or plans	Frustration, Irritability
	Denial
	Personality change
	Decreased independence

Assessing Functional Cognition

Performance Based Tests versus Skill Based Testing

- Bottom-up versus Top-down view
- Controlled outcome versus many outcomes
- Allows for strategies and skill development
- Incorporates motivation
- Includes client's perspective on occupational performance
- Identifies functional deficits essential to ADL and IADL performance
- Identifies mild impairment that may not be indicated by skill-based tests
- Generalizable to function

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Performance Based Testing Examples

- Multiple Errands Test
- Kettle Test
- Weekly Calendar Planning Activity
- Executive Function Task Performance
- Kitchen Task Assessment
- ACLS & Cognitive Performance Tasks/ Routine Task Inventory

MORE THAN FUNCTIONAL OBSERVATION- Standardized/ Validated to be PBT

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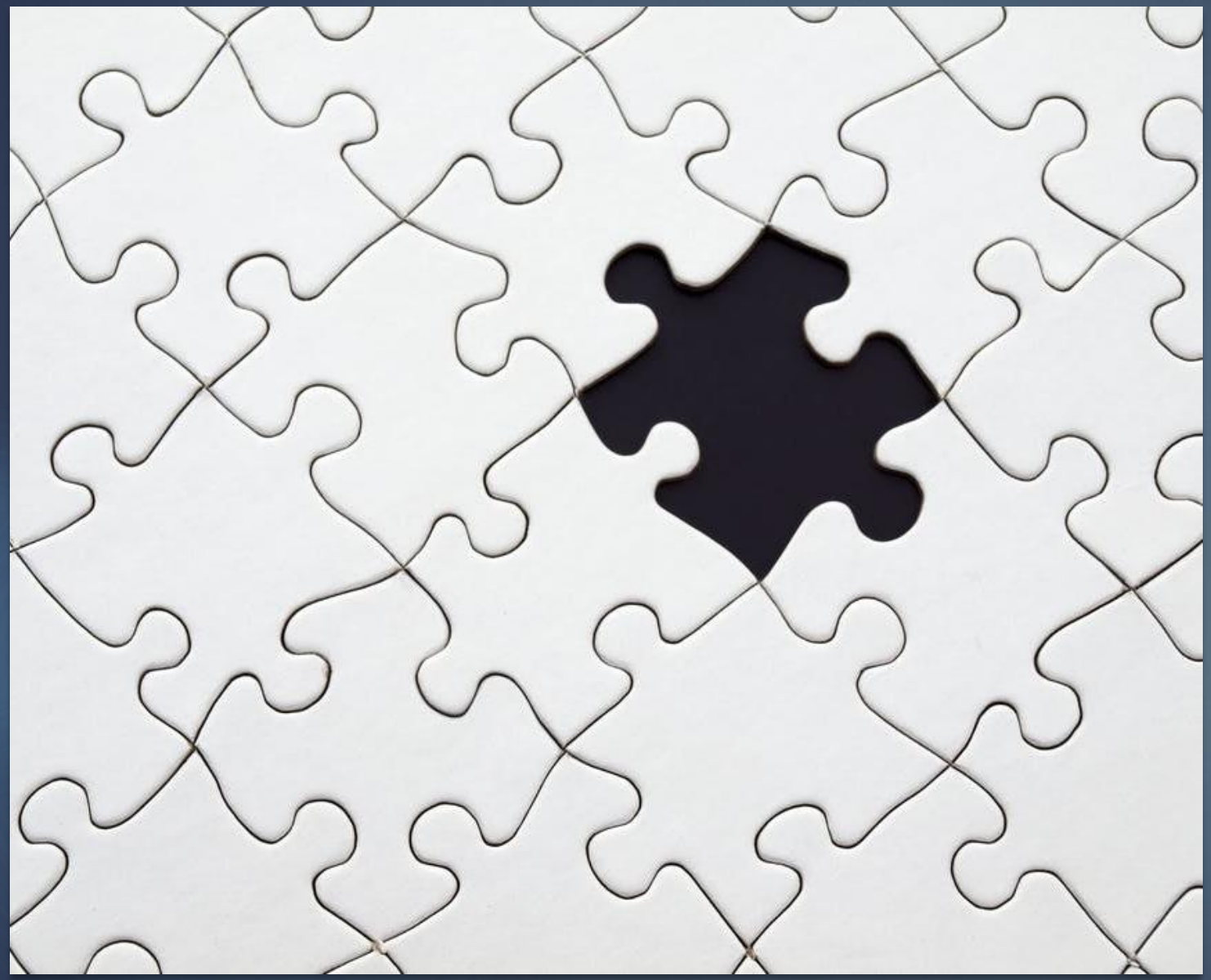

How to use skill-based assessments to look at functional cognition

WHAT ASSESSMENTS DO YOU SEE BEING USED WITH PWD?

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DSM-5
Neurocognitive Disorders(NCD)

- Delirium
- Mild NCD
- Major NCD
- (NCD Not Otherwise Specified)

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DSM 5 Criteria: Neurocognitive Disorder

- Change from DSM IV
- Minor versus Major
- Sub Classification is by Etiology
- The defining characteristics of NCD:
  - core deficits are in cognition
  - one or more domains impacted
  - not developmental
  - deficits represent a decline from baseline
  - requires concern & clinical evaluation
  - decrease in everyday activities is key

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Sub classification by Etiology

Alzheimer's disease

Lewy body disease

Frontotemporal dementia

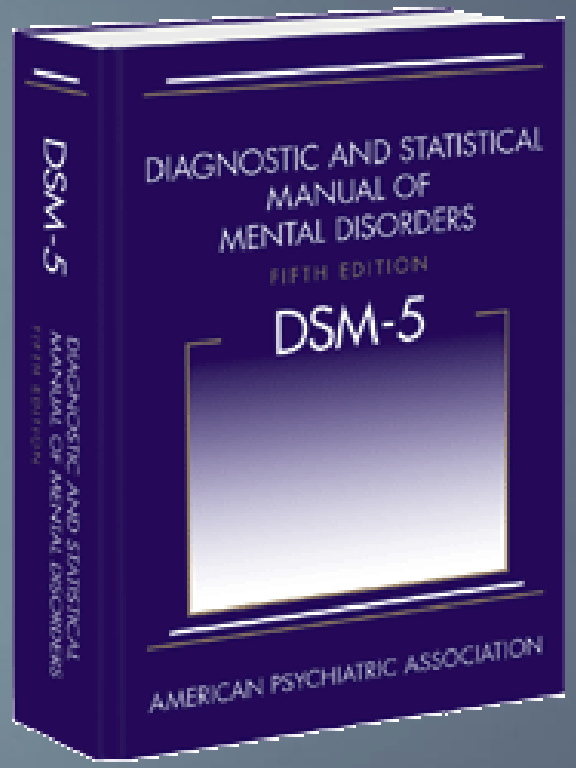
Vascular neurocognitive impairment

Traumatic brain injury

HIV

Huntington's disease

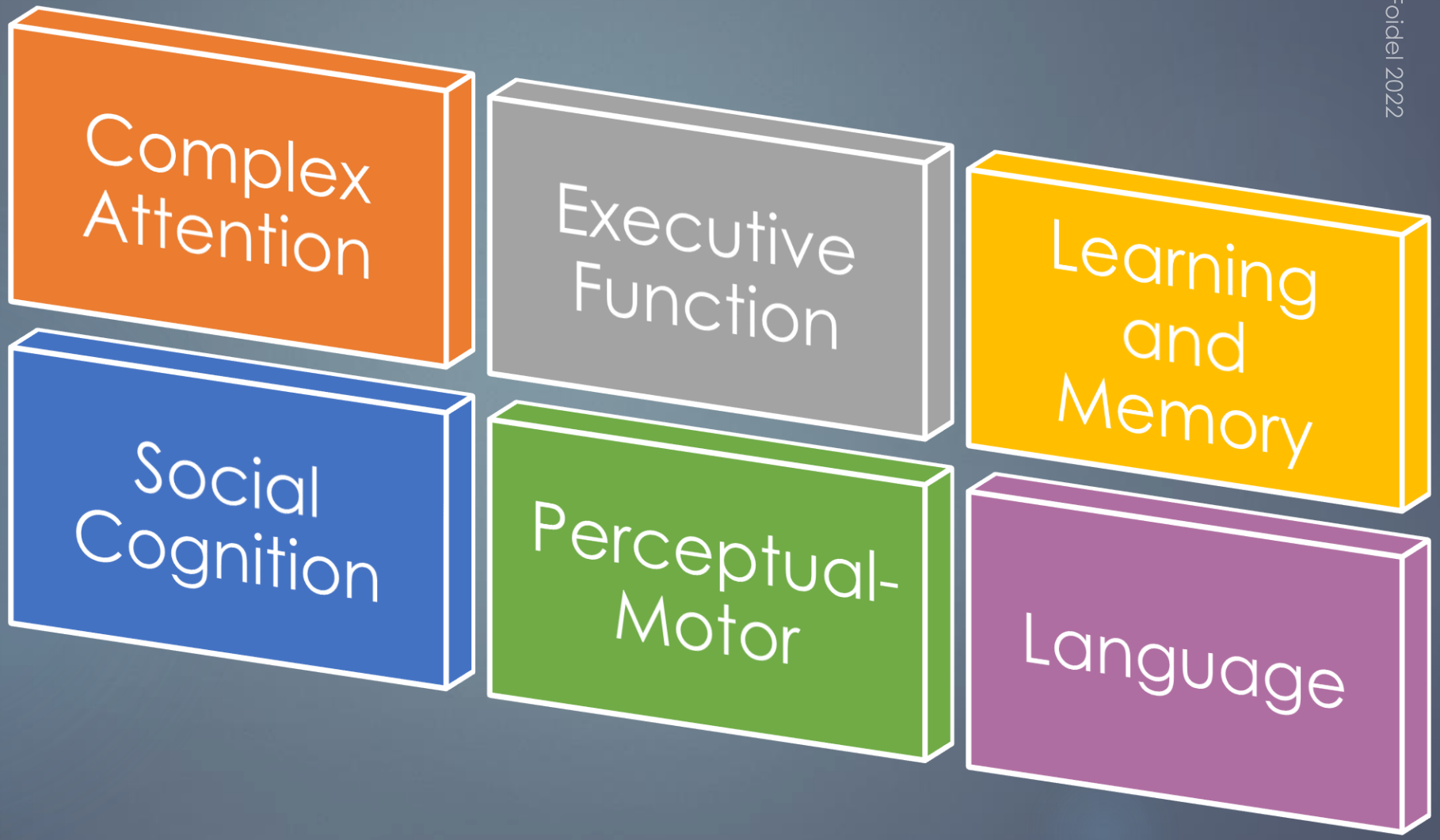
Other causes



http://www.psychiatry.org/mental-health/understanding-mental-disorders

(American Psychiatric Association, 2013)

Neurocognitive Domains
DSM 5: A common language



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Neurocognitive Domains DSM 5

Complex Attention

Divided
Sustained
Selective

Executive Function

Planning
Decision Making
Working Memory
Inhibition
Error Correction
Flexibility

Learning and Memory

Working Memory
Short Term Memory
Explicit and Implicit Memory
Semantic

Social Cognition

Theory of Mind
Perspective Taking
Emotional
Recognition

Perceptual-Motor

Construction
Visual Perceptual
Gnosia
Praxis

Language

Expressive
Grammar
Syntax
Receptive

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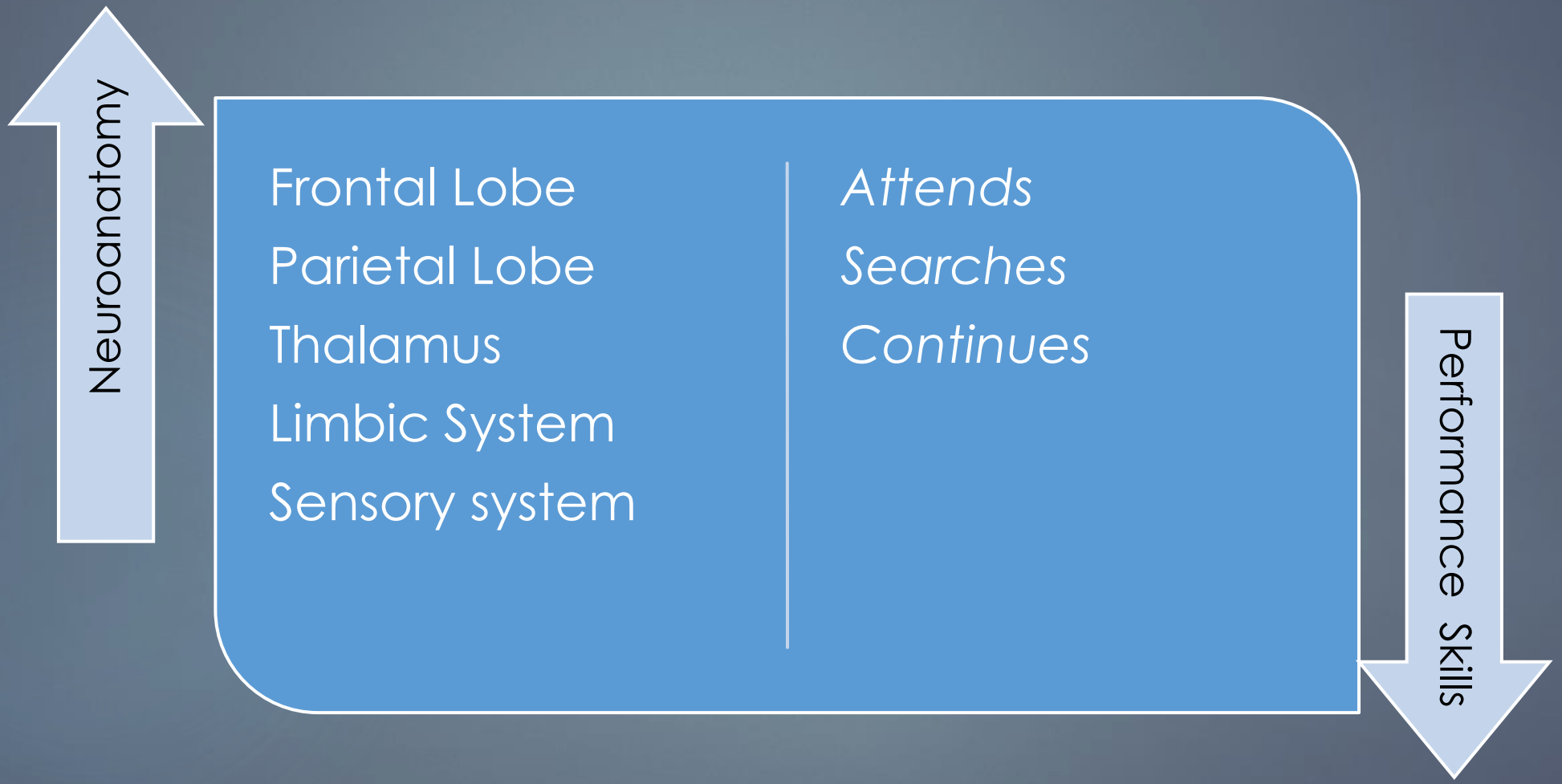
Attention



Conditions?

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Complex Attention

Mild	Major
• Normal tasks take longer • Errors occur in routine tasks; • Concentration more difficult with competing stimuli	• Slowed thinking • Inability to do calculations • Easily distracted

(American Psychiatric Association, 2013)

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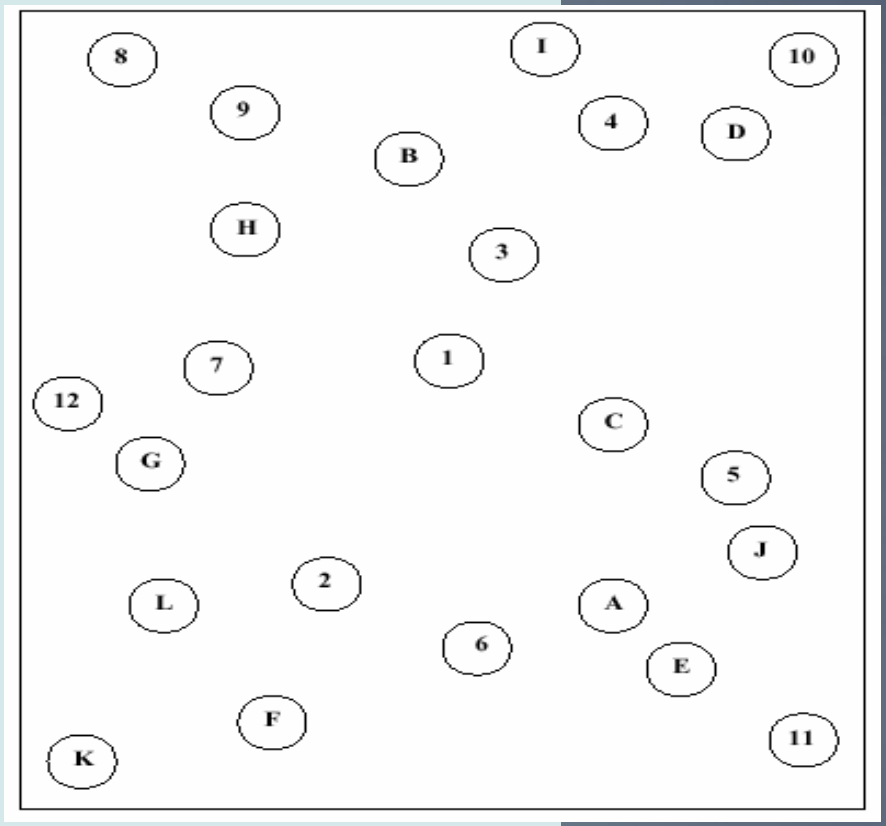
Trail-Making Test

- Part A
  - Numbers 1→ 25
  - Ave 29 sec
- Part B
  - Numbers + letters
  - 1A → 13M
  - Ave 75 sec
- Advantages
  - Free
  - Often used by DMV
- Disadvantage
  - Difficult for patients to understand at times



www.granddriver.net/data/media/docs/UIowa_**trail**Making.pdf

Tuality Healthcare
Building a healthier community.

Additional Screenings for Attention:

- Moss Attention Rating Scale
- Test of Everyday Attention
- Months Backwards Test
- Serial Sevens
- Scanning activities
- Test of Every Day Attention
- Rating Scale of Attentional Behavior
- Cognitive Failures Questionnaire
- Attention Rating and Monitoring Scale

- Consider Delirium Scales/ Screenings

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Functional Observations

- Distraction mid task
- Failure to register multistep commands
- Loosing track of conversation
- Needing frequent verbal cues to redirect to task
- Missing details
- Incomplete or inadequate hygiene
- Difficulty with math
- Difficulty scanning systematically

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Executive Function

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Conditions?

Executive Function

Mild	Major
• Increased effort for multistep actions, limited multitasking. • Extra fatigue with tasks that require organization planning, and decision making. • Avoidance of large social situations; fatigued and taxed by social demands	• Abandons complex projects. • Dependency in IADLs. • Completes one step activities

(American Psychiatric Association, 2013)

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Allen Diagnostic Module

Example: Box ADM

Patient project at 3.6

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AD8: Caregiver Questionnaire

Figure 3: 8-item Informant Interview to Differentiate Aging and Dementia*
(Positive Predictive Value = 87% for CDR 0 vs CDR ≥ 0.5)

Report only a change caused by memory and thinking difficulties		
	Yes	**No**
1. Is there repetition of questions, stories, or statements?		
2. Are appointments forgotten?		
3. Is there poor judgment (e.g., buys inappropriate items, poor driving decisions)?		
4. Is there difficulty with financial affairs (e.g., paying bills, balancing checkbook)?		
5. Is there difficulty in learning or operating appliances (e.g., television remote control, microwave oven)?		
6. Is the correct month or year forgotten?		
7. Is there decreased interest in hobbies and usual activities?		
8. Is there overall a problem with thinking and/or memory?		
TOTAL AD8 SCORE		

*Adapted from Galvin et al, "The AD8: A Brief Informant-Interview to Detect Dementia", *Neurology*. 2005;65:559-564.

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St. Louis University Mental State Exam (SLUMS)

http://medschool.slu.edu/agingsuccessfully/pdfsurveys/slumsexam_05.pdf

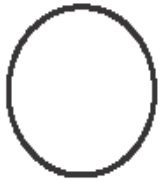
VAMC
SLUMS EXAMINATION

Questions about this assessment tool? E-mail aging@slu.edu

Name_____ Age_____

Is the patient alert?_____ Level of education_____

__/1	(1) 1. What day of the week is it?
__/1	(1) 2. What is the year?
__/1	(1) 3. What state are we in?
	4. Please remember these five objects. I will ask you what they are later. Apple Pen Tie House Car
__/3	5. You have $100 and you go to the store and buy a dozen apples for $3 and a tricycle for $20. (1) How much did you spend? (2) How much do you have left?
__/3	6. Please name as many animals as you can in one minute. (0) 0-4 animals (1) 5-9 animals (2) 10-14 animals (3) 15+ animals
__/5	7. What were the five objects I asked you to remember? 1 point for each one correct.
__/2	8. I am going to give you a series of numbers and I would like you to give them to me backwards. For example, if I say 42, you would say 24. (0) 87 (1) 648 (1) 8537
__/4	9. This is a clock face. Please put in the hour markers and the time at ten minutes to eleven o'clock. (2) Hour markers okay (2) Time correct
__/2	(1) 10. Please place an X in the triangle. (1) Which of the above figures is largest?
__/8	11. I am going to tell you a story. Please listen carefully because afterwards, I'm going to ask you some questions about it. Jill was a very successful stockbroker. She made a lot of money on the stock market. She then met Jack, a devastatingly handsome man. She married him and had three children. They lived in Chicago. She then stopped work and stayed at home to bring up her children. When they were teenagers, she went back to work. She and Jack lived happily ever after. (2) What was the female's name? (2) When did she go back to work? (2) What work did she do? (2) What state did she live in?



_____ TOTAL SCORE

SCORING

High School Education		Less than High School Education
27-30	Normal	25-30
21-26	Mild Neurocognitive Disorder	20-24
1-20	Dementia	1-19

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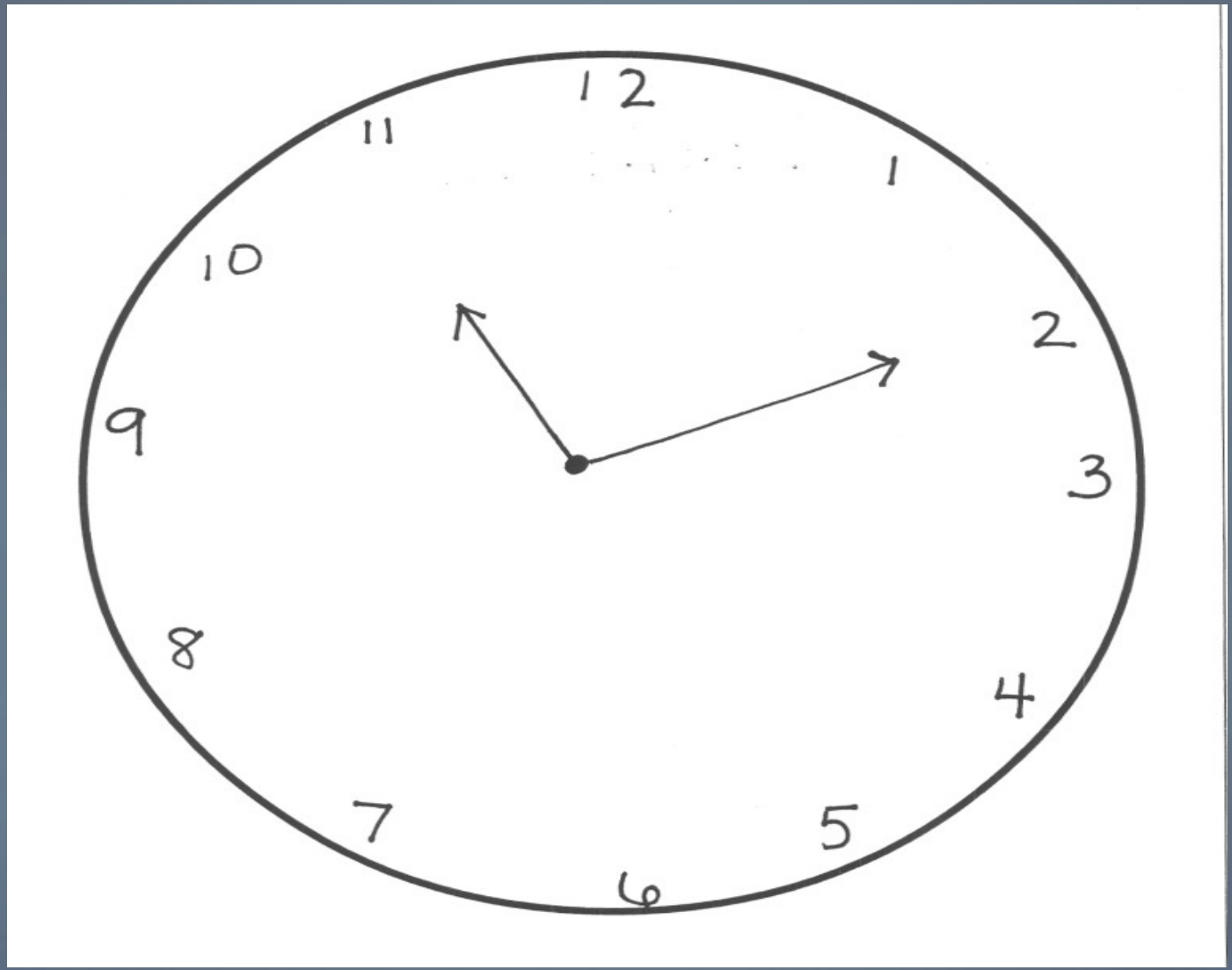
Clock Drawing Test (CDT)



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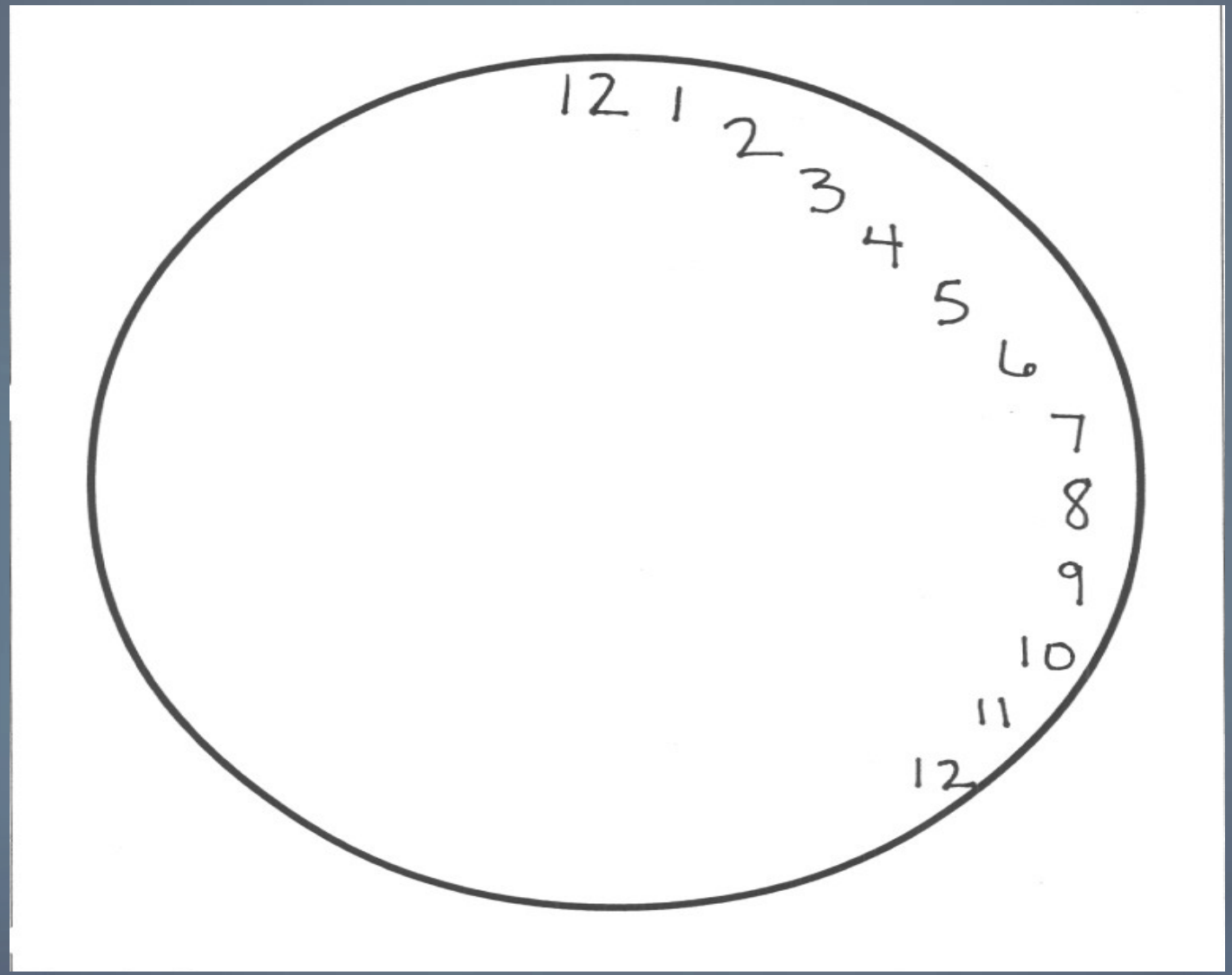
Clock Drawing Test (CDT)



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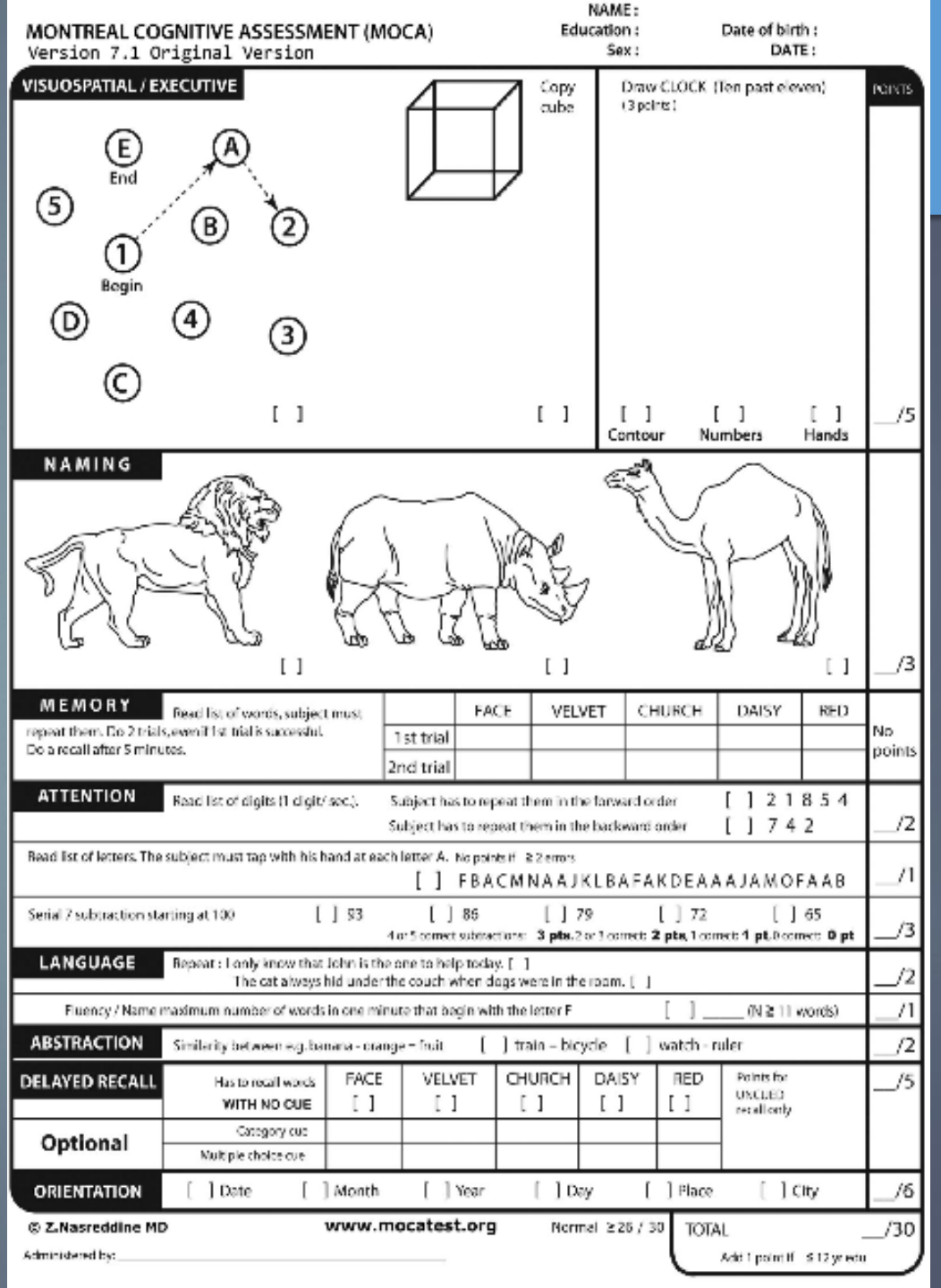
Montreal Cognitive Assessment (MoCA)

(Nasreddine , 2005); www.mocatest.org



MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

NAME :
Education :
Sex :
Date of birth :
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

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

/5

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

© Z.Nasreddine MD www.mocatest.org Normal ≥ 26 / 30

TOTAL /30
Add 1 point if ≤ 12 yr edu

Administered by:

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Additional Screenings for Executive Functioning

- Frontal Assessment Battery
- Exit 25
- Wisconsin Card Sorting
- Tests of abstraction

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Functional Observations

- Poor termination of activity (perseveration)
- Poor organization of steps
- Poor follow through with planned activities
- Layering clothing
- Using too little or too much of supplies
- “messy” or disorganized self-care
- Unable to anticipate challenges or fix mistakes

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What does executive function loss look like?

MILD NCD

- Poor social awareness
- Decreased recognition of errors
- Agreeable
- Decreased follow through
- Impaired IADL performance
- Impairment and change in relationships

MAJOR NCD

- Apathy
- Poor initiation
- Poor ADL performance
- Passivity
- Repetitive behaviors
- Inappropriate physical contact
- Impulsive speech

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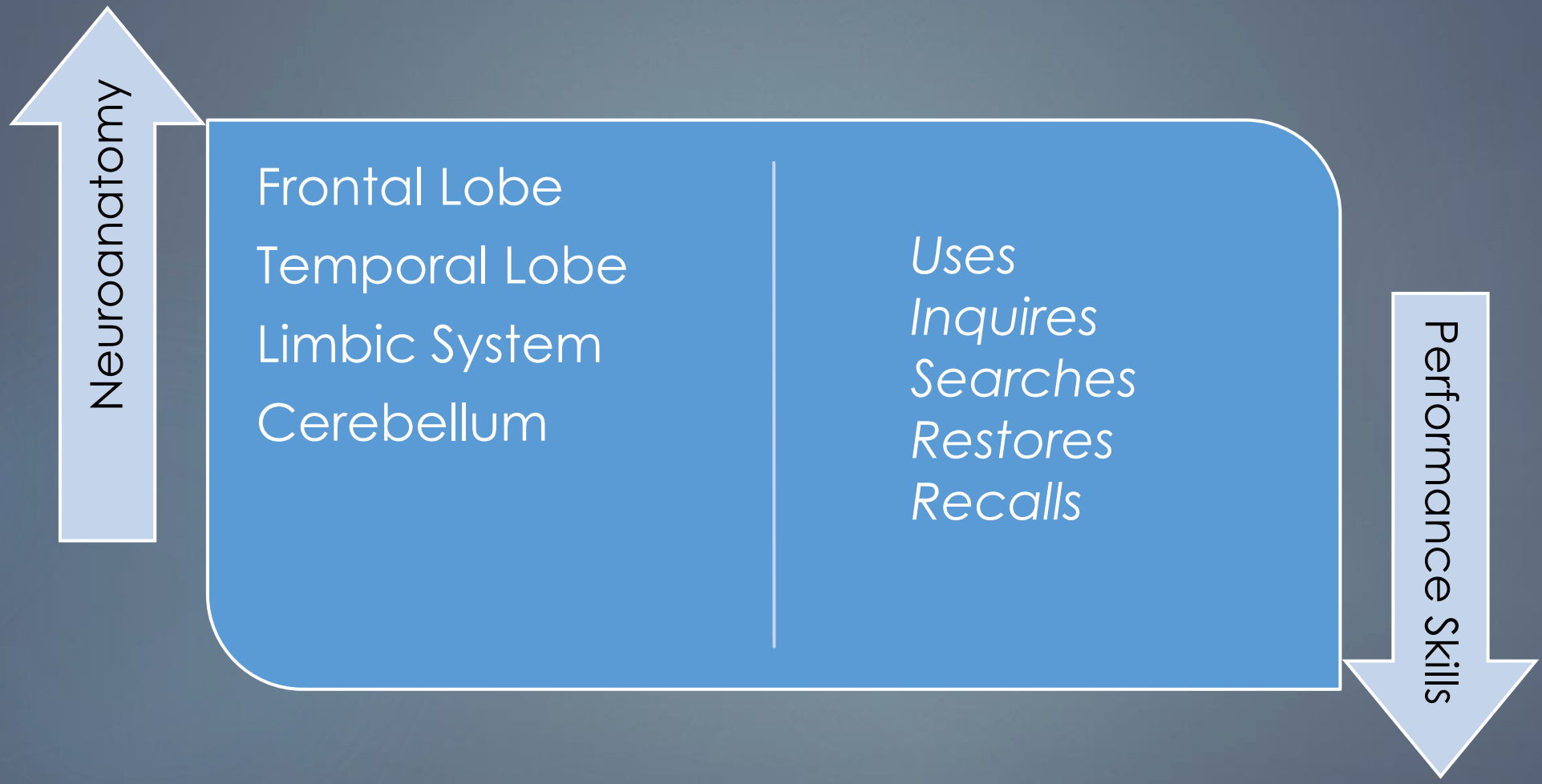
Learning and Memory



Conditions?

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Learning and Memory

Mild	Major
• Decreased ability recalling recent events • Reminders, making lists, or needing to re-reading to keep track of new information. • May repeat self • Decreased ability to remember if bills are paid or appointments, etc.	• Repeats self within a single conversation • Requires frequent reminders to orient • Needs assistance with IADLs.

(American Psychiatric Association, 2013)

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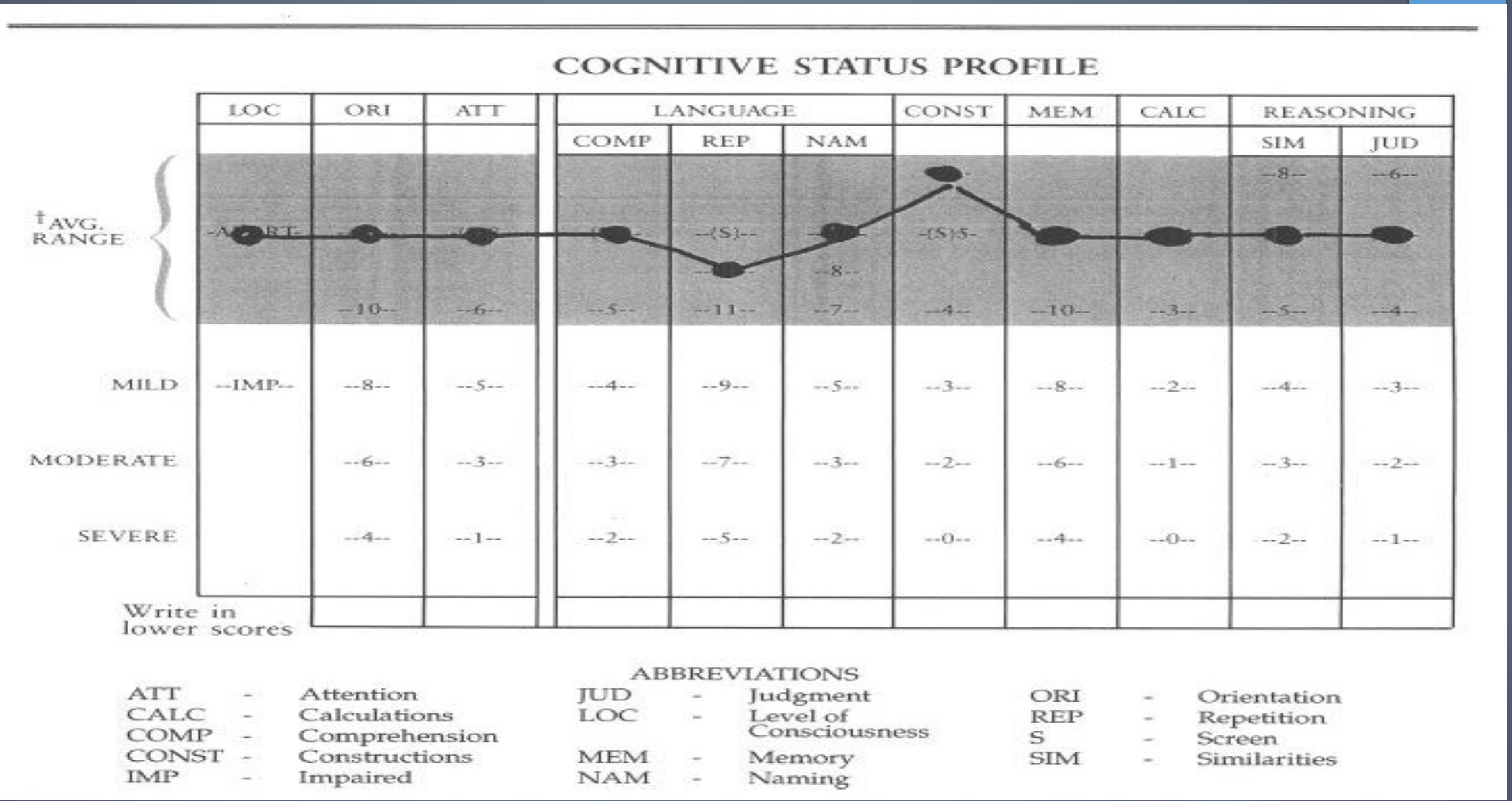
Cognistat/ NCSE

www.cognistat.com



COGNITIVE STATUS PROFILE

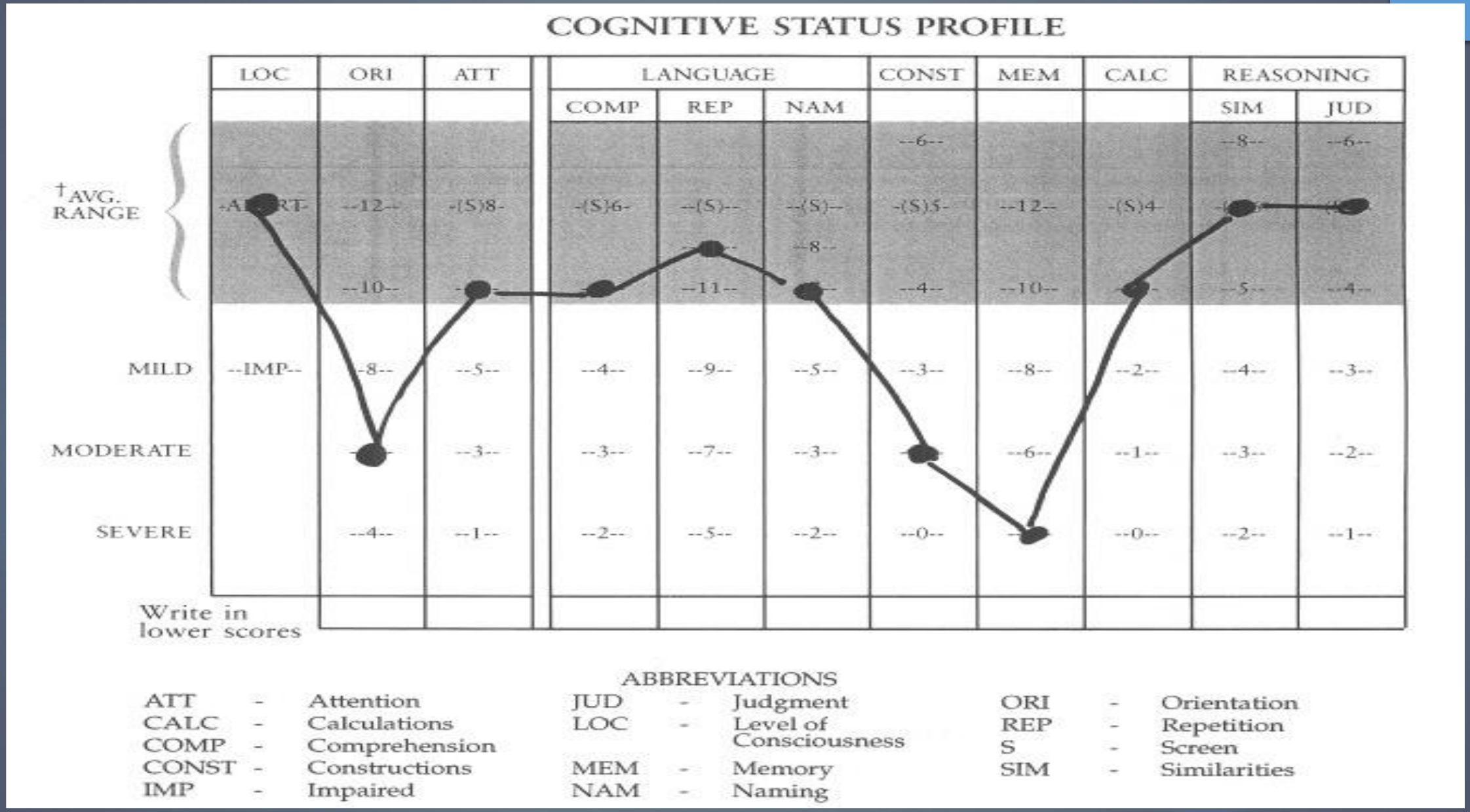
	LOC	ORI	ATT	LANGUAGE			CONST	MEM	CALC	REASONING	
				COMP	REP	NAM				SIM	JUD
†AVG. RANGE		--10--	--6--	--5--	--11--	--7--	--4--	--10--	--3--	--5--	--4--
MILD	--IMP--	--8--	--5--	--4--	--9--	--5--	--3--	--8--	--2--	--4--	--3--
MODERATE		--6--	--3--	--3--	--7--	--3--	--2--	--6--	--1--	--3--	--2--
SEVERE		--4--	--1--	--2--	--5--	--2--	--0--	--4--	--0--	--2--	--1--
Write in lower scores											

ABBREVIATIONS

ATT	-	Attention	JUD	-	Judgment	ORI	-	Orientation
CALC	-	Calculations	LOC	-	Level of Consciousness	REP	-	Repetition
COMP	-	Comprehension				S	-	Screen
CONST	-	Constructions	MEM	-	Memory	SIM	-	Similarities
IMP	-	Impaired	NAM	-	Naming			

Cognistat/ NCSE

www.cognistat.com



St. Louis University Mental State Exam (SLUMS)

http://medschool.slu.edu/agingsuccessfully/pdfsurveys/slumsexam_05.pdf
Retrieved January 2016

VAMC
SLUMS EXAMINATION

Questions about this assessment tool? E-mail aging@slu.edu

Name_____ Age_____

Is the patient alert?_____ Level of education_____

__/1 (1) 1. What day of the week is it?

__/1 (1) 2. What is the year?

__/1 (1) 3. What state are we in?

4. Please remember these five objects. I will ask you what they are later.
Apple Pen Tie House Car

5. You have $100 and you go to the store and buy a dozen apples for $3 and a tricycle for $20.
(1) How much did you spend?
__/3 (2) How much do you have left?

6. Please name as many animals as you can in one minute.
__/3 (0) 0-4 animals (1) 5-9 animals (2) 10-14 animals (3) 15+ animals

__/5 7. What were the five objects I asked you to remember? 1 point for each one correct.

8. I am going to give you a series of numbers and I would like you to give them to me backwards. For example, if I say 42, you would say 24.
__/2 (0) 87 (1) 648 (1) 8537

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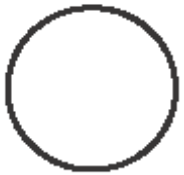

(2) Hour markers okay
__/4 (2) Time correct

(1) 10. Please place an X in the triangle.

__/2 (1) Which of the above figures is largest?

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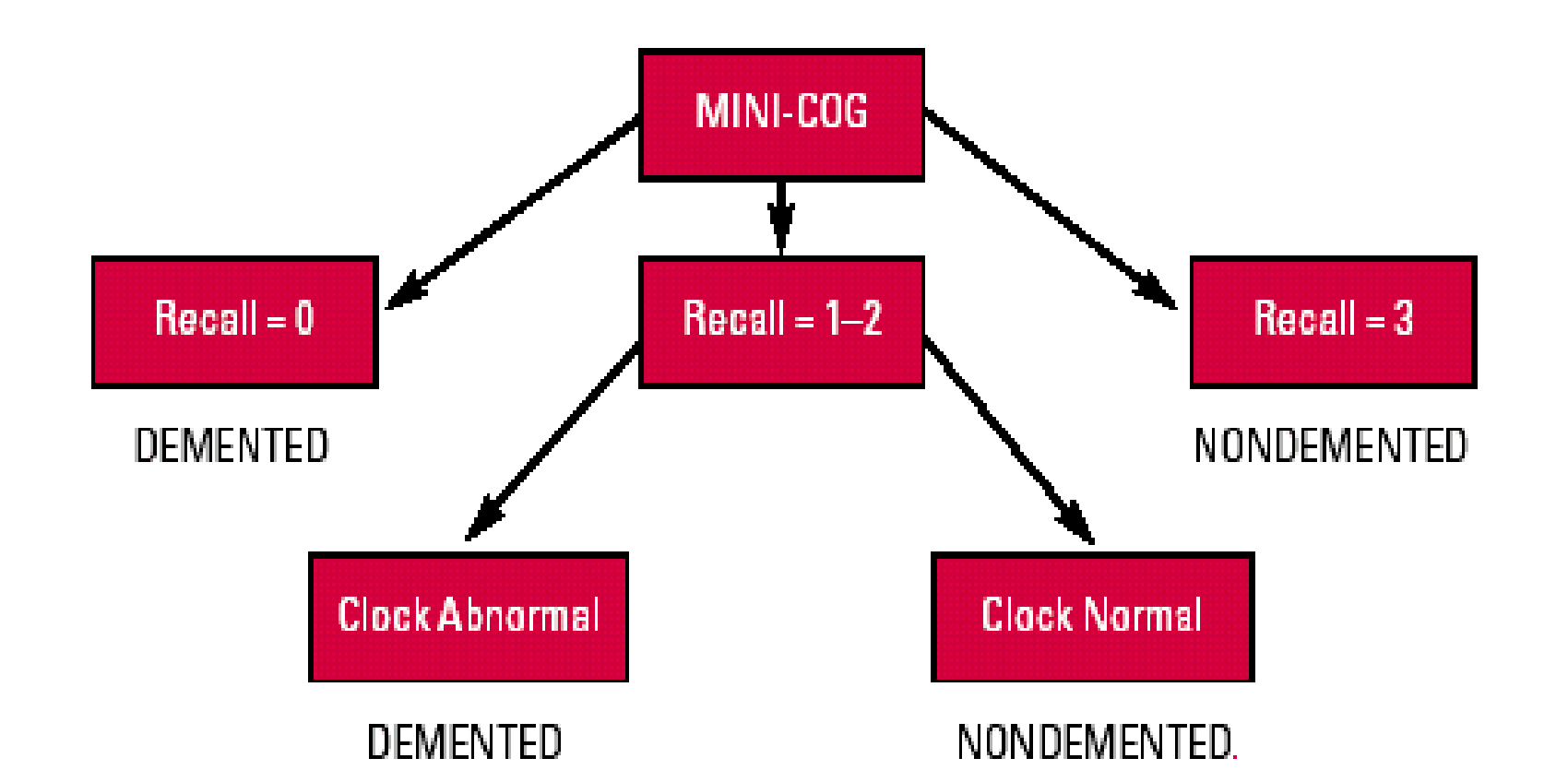
__/8 (2) What was the female's name? (2) What work did she do?
(2) When did she go back to work? (2) What state did she live in?

_____ TOTAL SCORE

SCORING

High School Education		Less than High School Education
27-30	Normal	25-30
21-26	Mild Neurocognitive Disorder	20-24
1-20	Dementia	1-19

Mini Cog


MINI-COG
Recall = 0
Recall = 1–2
Recall = 3
DEMENTED
NONDEMENTED
Clock Abnormal
Clock Normal
DEMENTED
NONDEMENTED.

Social Cognition

Mild	Major
Subtle behavior changes: • Decreased ability to recognize social cues • Decreased empathy • Change in social behavior • Decreased inhibition • Episodic apathy • Restlessness.	Behavior out of social norms • Shows insensitivity to social standards • Focuses excessively on a topic despite redirection. • Behaviors shows no regard to others. • No safety awareness • No insight into changes.

(American Psychiatric Association, 2013)

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Social Cognition

Neuroanatomy

Frontal Lobe
Cerebellum
Parietal Lobe

Approaches
Concludes
Places self
Empathizes
Heeds
Accommodates

Performance Skills

Conditions?

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Functional Observations: Social Cognition

- Interrupting others
- Cursing
- Inability to recognize social norms (standing to close, eye contact– often culturally dependent)
- Inability to follow modelling of social behavior
- Lack of empathy
- Low frustration tolerance

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Perceptual Motor

Neuroanatomy

Parietal Lobe	*Aligns*
Frontal Lobe	*Stabilizes*
Temporal Lobe	*Reaches*
Cerebellum	*Lifts*
Occipital Lobe	*Coordinates*
Basal Ganglia	*Paces*
	Flows
	Searches
	Looks
	Navigates

Performance Skills

Conditions?

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Perceptual-Motor

Mild	Major
• Shows more reliance on maps, notes or others to find new places. • May find self lost when not concentrating on task • Decreased ability to park a car • Needs greater effort for spatial tasks	• Significant difficulties with familiar activities • Poor ability to navigate familiar environments • More confused in evening/ low light

(American Psychiatric Association, 2013)

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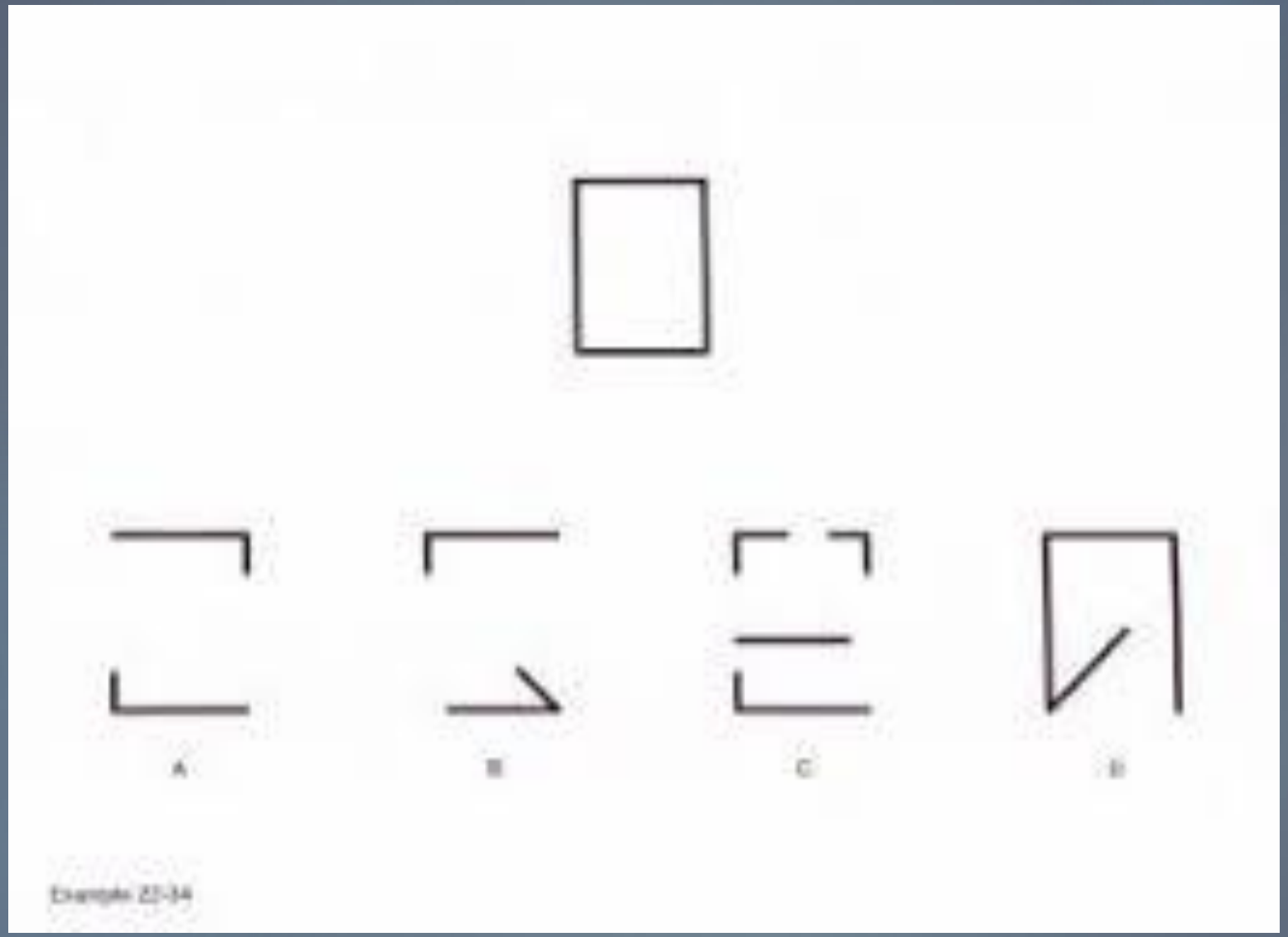

- https://strokengine.ca/en/assessments/motor-free-visual-perception-test-mvpt/

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Functional Observation: Perceptual Motor

- Getting lost
- Dressing apraxia
- Difficulty with copying and drawing tasks
- Undershooting and over shooting
- Missing the chair when sitting
- Poor spatial awareness
- Difficulty with visual spatial skills– visual closure, figure ground, form constancy

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Language

Neuroanatomy

Frontal Lobe
Temporal Lobe
Cerebellum

Speaks fluently
Produces speech
Questions
Gesticulates
Expresses emotion
Times responses
Matches languages

Performance Skills

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Conditions?

Language

Mild	Major
• Observable word-finding difficulty. • Uses general terms for specific terms. • Errors include omission or incorrect use of articles, prepositions, auxiliary verbs, etc.	• Significant difficulties with expressive or receptive language • Uses vague terms and non-specific nouns. • May not even recall names • Idiosyncratic word usage, grammatical errors, and spontaneity of output and economy of utterances occur. • Echolalia and automatic speech • Eventual mutism.

(American Psychiatric Association, 2013)

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Functional Observation: Language

- Searching for words
- Inability to understand directions
- Loss of nouns during conversation
- Inability to read or write for IADLs
- Inability to understand change of affect
- Decreased symbol recognition

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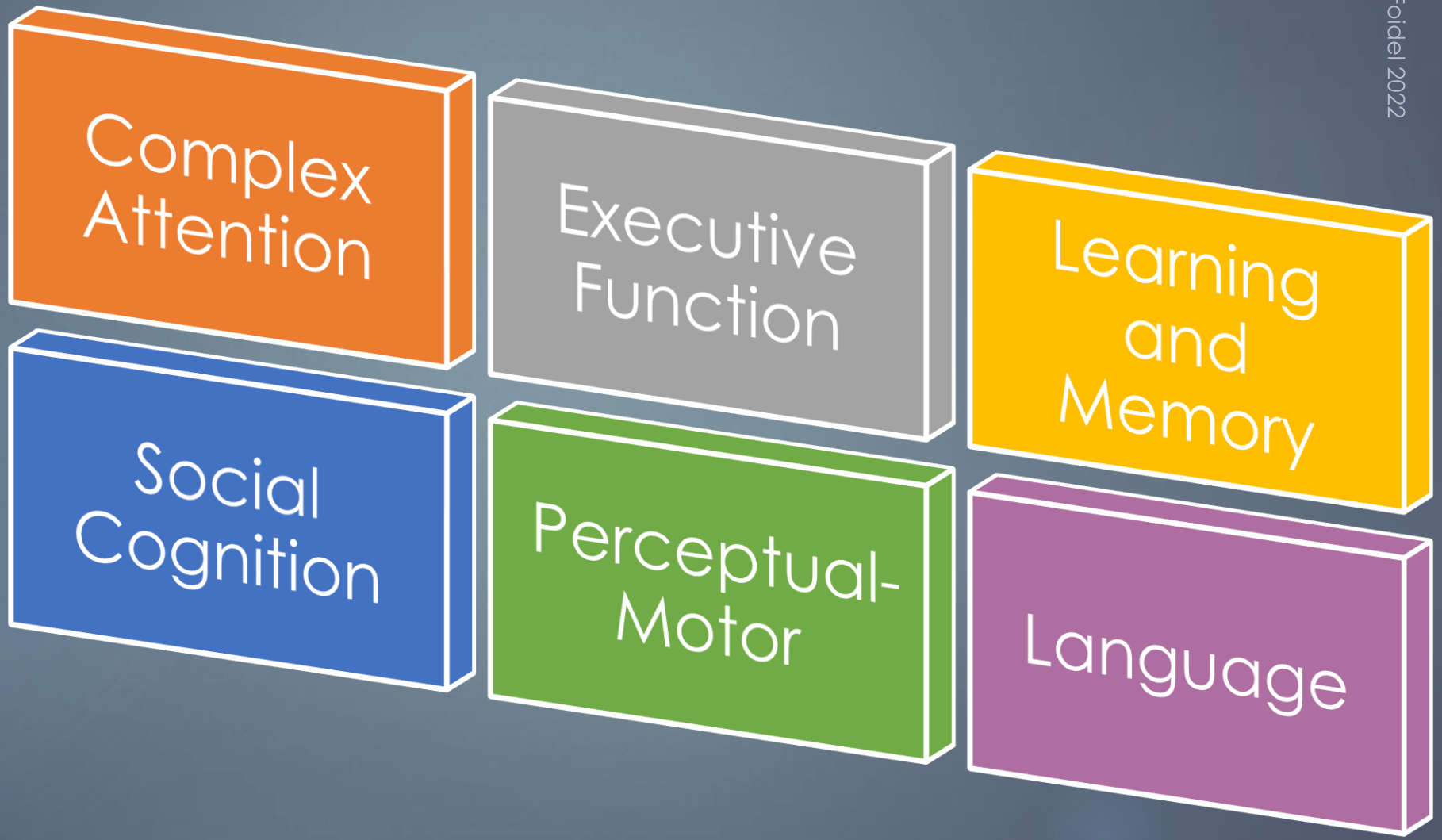
Apply to Strengths and Challenges to care planning



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Higher Level Cognition

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Higher Level Cognitive Skills

Combination Skill	Definition
Concept formation: Abstraction and categorization	Analyzing relationships between object properties, allows us to process large amounts of information
Mental Flexibility	Ability to initiate, stop, and switch activity. Includes shifting responses and negotiate shifts in responses. Tied closely to EF
Generalization	Ability to transfer skills to appropriate situations
Reasoning, Problem Solving, Decision Making	

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PURPLE YELLOW RED
BLACK RED GREEN
RED YELLOW ORANGE
BLUE PURPLE BLACK
RED GREEN ORANGE

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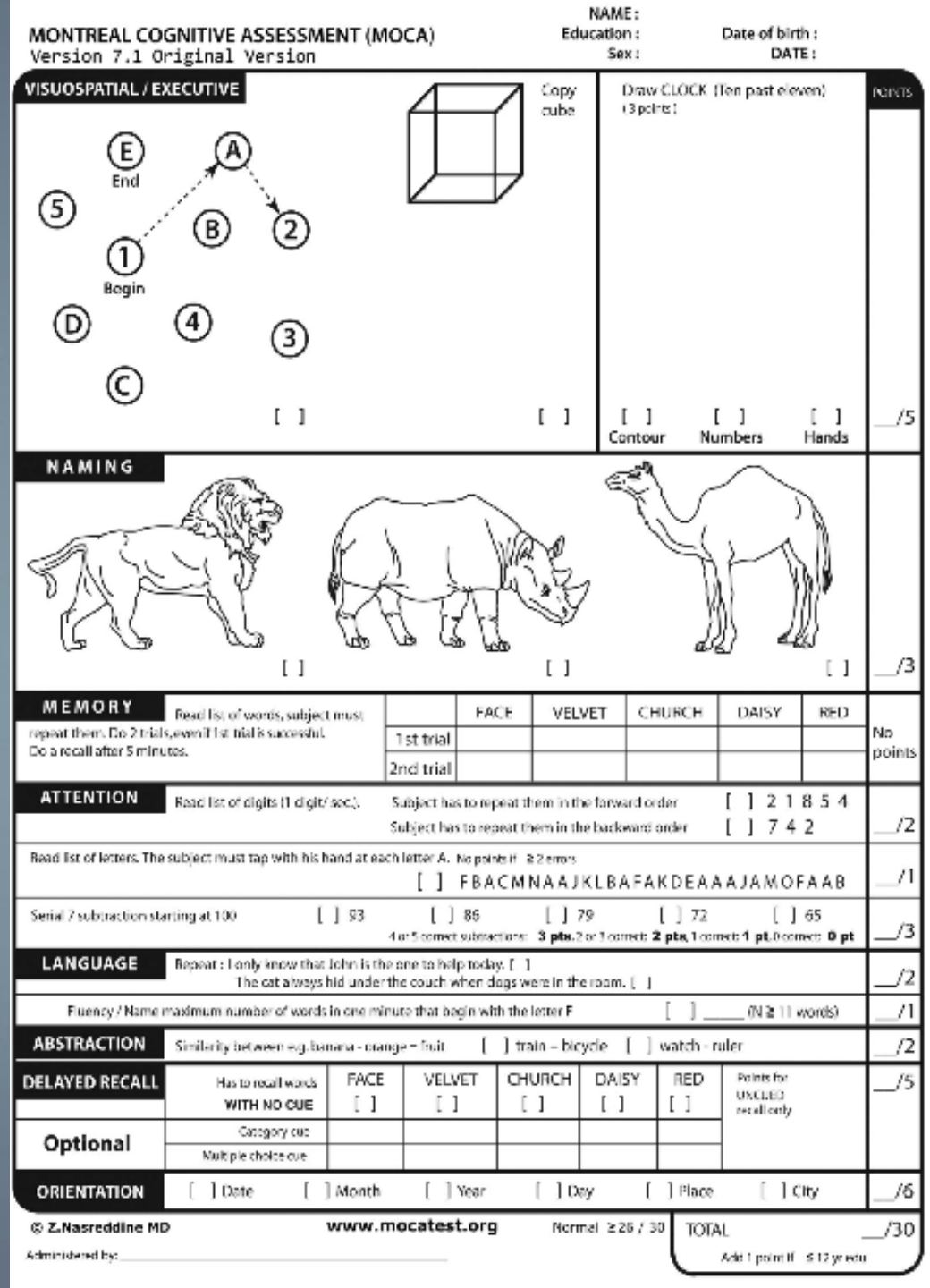
Montreal Cognitive Assessment (MoCA)

- www.mocatest.org
- Includes the CDT /Trails B

(Nasreddine, et al.)



MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

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

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

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 /3
4 or 5 correct subtractions: 3 pts, 2 or 3 correct: 2 pts, 1 correct: 1 pt, 0 correct: 0 pt

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

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

Points for UNCUED recall only /5

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

© Z.Nasreddine MD — www.mocatest.org — Normal ≥ 26 / 30

TOTAL /30

Add 1 point if ≤ 12 years

Administered by: _____

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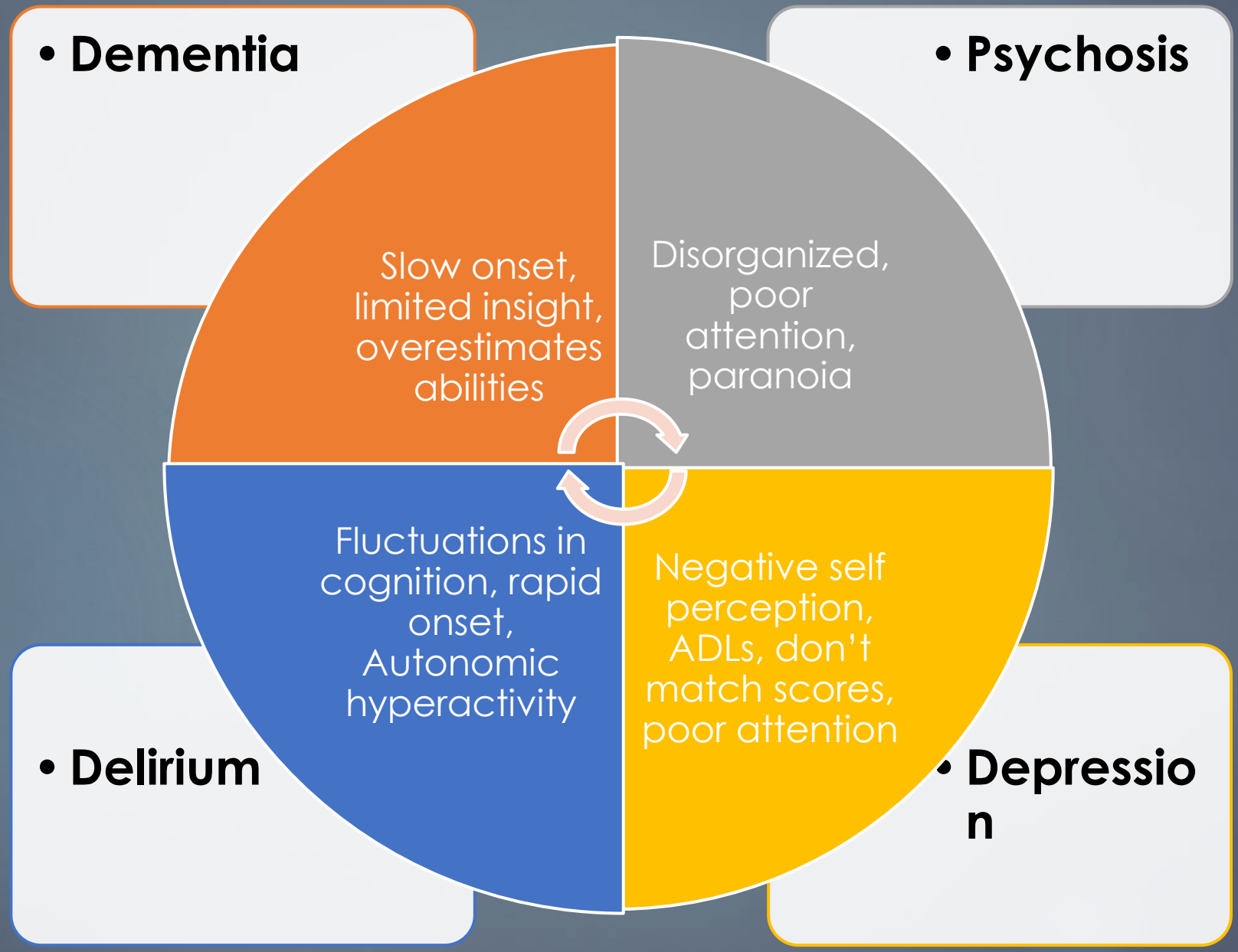
Evaluating Functional Cognition



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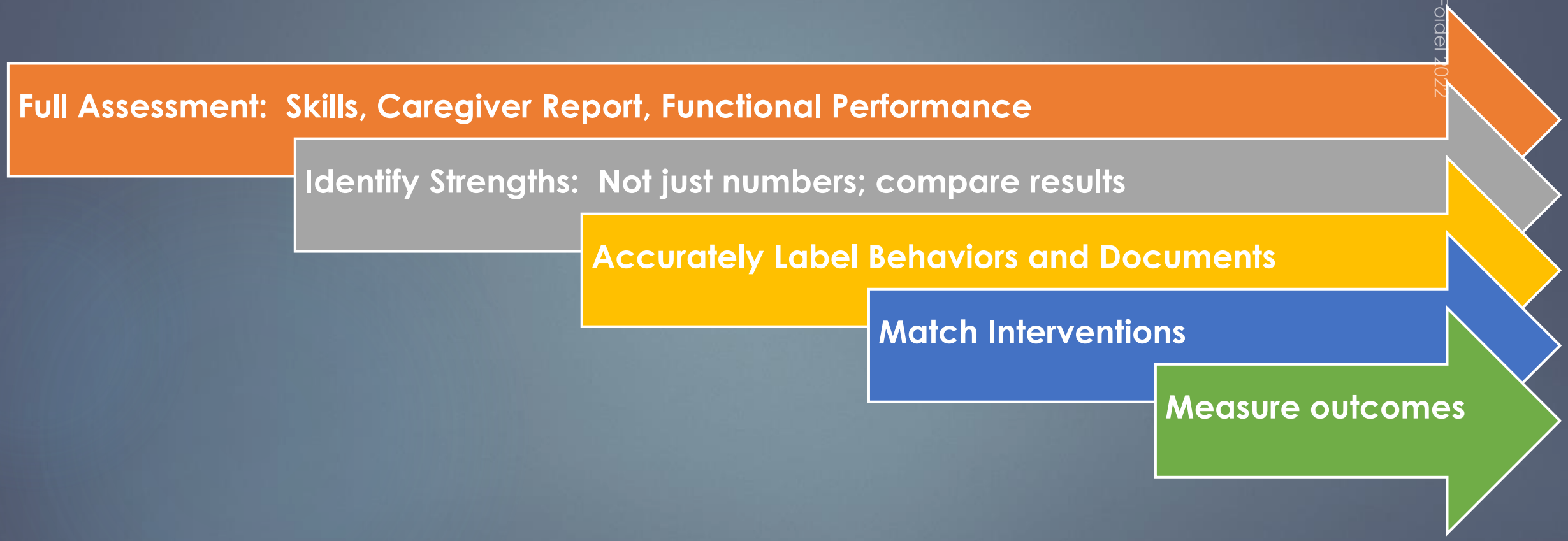
Building a FUNCTIONAL Care Plan



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Example of a Strength-Based Functional Care Plan

Behavioral Challenge	Strength	Interventions	Targeted Outcomes
Frequent Falls (at night)	Mobility, Attention and visual skills	Toileting schedule, frequent daily exercise, motion sensitive lighting, signs to remind to use call bell	Continence, increased sleep at night, maintained mobility, no injury from falls
Physically aggressive with toileting at night	Good attention skills, good social skills, good mobility, skin is in good condition	Daily mobility, positive sleep hygiene, depends at night with only changing in the am with bed bath	Skin remains in good condition, Mobility is maintained, full night of rest

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Why are we choosing non-functional outcomes?

Safety?
Cleanliness?
Productivity?

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Questions…

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