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Mental Status Testing and the Problem of Executive Dysfunction

> Charles J. Vella, PhD Consultant, Neuropsychology July 7, 2014

Talks available on line

- www.charlesjvellaphd.com
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What we are going to cover

- Need for MS testing
- Normal Aging and Decline
- Prefrontal Lobe and Executive
 Functioning
- MS Testing
- Executive Functioning Measures

The Brain





Neurons: We have 86 billion with 10,000 synapses each



Dendrites

Suzana Herculano-Houzel et al., 2009

Aging: Importance of White Matter

Neuronal Structure

Dendrites (receive messages from other cells)

Cell body (the cell's lifesupport center) Axon (passes messages away from the cell body to other neurons, muscles, or glands)

> Neural impulse (electrical signal traveling down the axon)

Myelin sheath

Terminal branches of axon (form junctions with other cells)

> (covers the axon of some neurons and helps speed neural impulses)

Mental Status Testing Characteristics

- Brief: 10-20 minutes; ideally less than 10 minutes
- Observational: trust your perception
- Behavioral descriptions
- Screening tests are <u>negatively correlated with</u>:
 - age
 - lower education (need to know education level)
 - severe depression
 - poor effort
- Evaluation for <u>decision making capacity</u> for self-care and finances or decision making
- MS Testing is <u>first step only</u>; Raises the need for formal neuropsychological or neurological evaluation

Classic Mental Status Domains

- Level of Consciousness: alert/awake/lethargic
- Mood:
 - depressed, manic, flat, inappropriate
- Language: fluency, comprehension
- Thought Content: hallucinations, delusions

Mental Status Domains: Cognitive

- Memory: <u>classic focus of MS testing</u>
 New learning
- VisualSpatial:
 - Figure Copy, clock drawing
- Executive Functioning: <u>often neglected</u> Problem solving, judgment, self awareness, set shifting, disinhibition

Hippocampus & Prefrontal Cortex



<u>Hippocampus</u> is index to your memory database. It connects anything new you experience to what you already know.

<u>Prefrontal Cortex</u> makes you a rational adult (reasoning, problem solving, behavioral inhibition)

Remembrance of things past



Prospective Memory: Remembrance of future

- Remembering to remember
 in the future
- Intentions
- Single best predictor of independent functioning
- Medication adherence is a prospective memory task



Case: 56 year old woman

- College educated, technical writer
- Relocated to new town: no job search, community activities decreased, poor hygiene, home neglect, less emotional expression
- Lived off of savings, stopped paying bills; stopped babysitting grandkids
- Denied anything wrong; Antidepressants did not work
- Large bilateral meningioma, near OFC

Graduate school, 1970

- <u>Neurologist comment</u>: "You can remove a tablespoon or 2 of brain from either the right or left frontal lobes, and it will make no difference in their IQ or behavior."
- We have come a long way in last 40 years in our understanding of the functions of the frontal lobe

Prefrontal area is last to mature: Synaptogenesis & Synaptic Pruning



Fig. 2. A depiction of the time course of brain development in human prefrontal cortex, sensorimotor cortex, and parietal and temporal association cortex. Modified from Thompson and Nelson (2001).

Teen Brain: age 5 to 21



Lose 50% of all synaptic connections.

Myelin Sheets on Axons Mature Slowly in Frontal Lobes; may increase into 60s.



Regional Maturation: Myelogenetic Cycles

<u>Amount of white</u> <u>matter</u> (axon interconnections) <u>distinguishes us</u> <u>from primates</u>, not amount of prefrontal lobes.

<u>Creates "greater</u> <u>bandwidth" and</u> <u>processing speed</u>.

Einstein had more white matter, not neurons.

Yakovlev & Lecours 1967

How important are the frontal lobes?



Walter Freeman & 40 K lobotomies

Only Nobel Prize in Medicine: António Egas Moniz, 1949; Also shot 4 x by a patient

Jack Nicholson: One Flew Over the Cuckoo's Next



Executive Functioning

 Executive functioning consists of numerous self-regulatory processes

novel problem solving,

- modification of behavior in response to new information,
- planning and generating of strategies for complex actions.

Frontal prosthesis: Acting as someone else's frontal lobe

- <u>Being Frontal</u>: Another person directs an activity, sets the pace, starts and stops the activity, makes all major decisions, i.e.
 - Neuropsychologist during testing
 - Parent supervising kid's homework
 - Home visit nurse setting up pill box
- <u>All representing forms of external frontal prosthesis</u>: assuming they have normal executive functioning while we act as their external executive monitor
- We need to be aware of when we are doing the executive work for someone else

The frontal lobe problem: Executive dysfunction and anosognosia

- Nothing insures that a person who knows how to do something is capable of doing it on his own.
- The person whose frontal lobes are impaired cannot tell you what the problem is or that they even have a problem because normal frontal lobes are what give you the ability to be aware of the problems you are having.
- Examples: Addiction, BPD, TBI, Stroke, NCD, FTD

Classic Neuropsych Testing vs. Real World

- Patients with frontal lobe deficits tended to do normally on classic structured NP tests of memory, spatial ability, language, etc.
- What they can do in testing room (quiet, unemotional, frontal prosthesis) is often very different from their real world performance.
- People in their lives or family, rather than doctors in their office, see the real EF disabilities.

Real world complaints of families

- poor or unreliable judgment/decision making,
- carelessness,
- apathy,
- poor adaptability to new situations,
- blunted affect,
- being stimulus bound,
- poor delayed responses,
- poor abstraction,
- poor flexibility,
- perseveration

Neuroanatomy and Functions of the Frontal Lobes

Frontal Subdivisions



Motor control, action in the world was original purpose of PC; how to do it effectively is purpose of rest of PC

3 Major Divisions of Frontal Lobes

 1 <u>Dorsolateral Frontal</u>: <u>Cognitive</u> Control (Attention, memory strategies, planning, organization)

 2 Orbital frontal: Social Regulation & emotional control

3 Ventromedial: Monitoring what to do

Prefrontal Lobes

Lateral/Superior Medial Orbital



Dorsolateral Prefrontal: Cognition



Ventromedial: Emotional Evaluation



DMPFC (BA 9, 32): Certainty in evaluations.

VMPFC (BA 10, 32): Socioemotional significance or cognitive quality of information? VACC (BA 25): Sensitivity to

information based on its potential to fulfill motivation.

MOFC (BA 11, 12): Shifts in evaluation standards under threat.

Best decisions are based not on just reasoning, but on emotional evaluation

Prefrontal Functioning: Brain's CEO

- All neuronal white matter pathways lead to PC, especially from other association areas: all info about external world and internal body
- PC correlates & integrates all information: external, internal, cs & uncs, memory, visceral arousal
- PC attends to, integrates, formulates, executes, monitors, modifies, and judges all behavior
- Site of executive functioning

Frontal Functions

- Controls all non-automatic behavior
- Analysis and decision making about everything new, challenging, or different
- Attention, vigilance, inhibition of distraction, divided attention
- Task switching (TMT)
- Maintaining set, focus
- Intelligence
- Problem solving
- Intentions

Executive Functioning

- Only highest level behaviors; if EF impaired, other cognitive functions can be totally intact (i.e. memory)
- Importance of:
 - contextual decisions (whether to do something; context assessment)
 - organization,
 - plans to achieve goals (how),
 - correct temporal application of skills (when),
 - correction of errors,
 - evaluation of success

Executive Functioning

- Lezak test:
 - "How or whether" (executive control), not "what or how much" (memory, calculation)
 - Executive functioning examples:
 - Self monitoring behavior
 - Anticipate consequence of action
 - Ability to give reason for an action
 - Disregard erroneous strategies
 - Inhibit automatic but inappropriate response
 - Modify behavior in response to contextual changes
 - Finish what is started
 - Comply with treatment
 - Do something when needed (not just knowing how to do it)

Executive Dysfunction

- Executive Dysfunction dissociates the <u>Capacity</u> to perform the elements of a complex task from its orchestration and the <u>Actual Execution</u>.
- Difference between what they say they can do in hospital and what they can actually do at home
- How to do it vs. when and whether to do it
Types of Executive Dysfunction

- Poor decision making capacity (lack of capacity to make financial, medical, treatment decisions)
- Do not learn from negative feedback
- Inability to live without supervision
- Inability to use psychotherapy or rehabilitation
- Need behavioral management
- Often involves Adult Protective Services, Public Guardianship, Need for Conservatorship

Frontal behavioral problems

- <u>Poor initiative</u>, starting things ∴ apathy
- Inertia (dissociation between words & deeds): Look lazy, "talk a good game" but no follow through
- <u>Difficulty with behavioral shifting</u>: lack flexibility, perseveration, no error correction, inability to stop wrong behavior, cannot falsify a belief
- Problems in stopping behavior: impulsive, disinhibited
- <u>Deficient self awareness/anosognosia</u>: lack of appreciation of impact one makes on others, lack of empathy
- <u>Poor planning</u>, or sustained goal-directed behavior

Duck or Fish?



Right frontal deficits

- Lack of prosody,
- Lack of understanding of jokes or sarcasm
- Faulty picture descriptions
- Anosognosia: lack of awareness of deficits
- Compromised capacity to adapt to disabilities
- Poor emotional expression, regulation and appreciation

Dorsolateral prefrontal

- Higher order control, regulation & integration of cognitive activities
- Integration of attention, memory, motor & affect
- Working memory, online processing of information, RAM, holding in temporary attention

Dorsolateral 2

- Fluid IQ: problem solving, general intelligence in IQ testing
- Problem solving for unfamiliar and novel tasks (area 10, left anterior dIPFC)
- Verbal regulation of behavior
- Verbal & design fluency
- Impoverishment of spontaneous speech

Fluency Tests

Verbal

Words beginning with S: Small Similar Single Sound Semi Soldier Sat Swim Sing

Design

_____ 2

Dorsolateral Prefrontal

- <u>Prospective Memory</u>: remember to remember, time awareness & monitoring, when to do things (deficit: know what to do but not when) i.e. buy milk
- <u>Source memory</u> (context of a memory) i.e. who were you with when you 9/11 happened.
 - If impaired, more false memories

Dorsolateral PC

- Executive control of memory processing:
 - LF: <u>retrieval strategies</u> for general klg (semantic memory) & encoding aspects of new info into episodic (unique events) memory
 - RF: <u>episodic memory retrieval</u> (Where were you when 9-11 happened?)

Medial Prefrontal

Social and emotional behavior

Motivation: low drive, initiation

Affective capacity and control

Attention to internal states

Anterior Cingulate

- <u>ACC = Default Network hub</u>: subjective, self referential cognitive processes; highly active at rest
- <u>Self reference</u>: self-knowledge, autobiographic memory retrieval, self face recognition, first person perspective taking, mind wandering, future thinking

Anterior Cingulate

- Monitoring errors and conflict resolution
- Adaptive changes in attention that enhance performance
- Appropriate response selection
- Impairment: poor decision making, hoarding, FTD

Iowa gambling task



Bad decks give good rewards, but occasionally dole out hefty penalties.

Normals stop using bad decks

Pts with vmPFC deficits never stop using them

Do not learn from negative experience

Trolley Problem 1: <u>DL PFC</u> most active



9 of 10 people confronted with this scenario say it's O.K. to kill 1 to save 5.

Trolley Problem 2: vmPFC most active



Must push person off bridge; 9 of 10 people say it's <u>not O.K</u>. to kill one person to save five; Individuals with vmPFC damage 3x more likely to push the person off.

Ventromedial Prefrontal

- Impulse control
- Regulation of set
- Future consequences of behavior
- Deficits: impulsivity, disinhibition, aggressive outbursts, sexual promiscuity, social appropriateness, poor decision making, lack of foresight, psychopathy
- But normal memory, free of cognitive deficits

Ventromedial Deficits

- Inability to organize future activity
- Inability to hold down a job
- Diminished capacity to respond to punishment
- Unrealistic favorable view of self
- Inappropriate emotional reactions
- Childishness, jocular attitude, sexually disinhibited humor, inappropriate self indulgence
- Lack of concern for others, lack of empathy
- Psychopathy

Orbital Frontal

- Olfactory processing/odor discrimination
- Anosmia predicts severity of brain damage
- Very connected to amygdala and hippocampus
- Emotional control

Best current recommendation related to cognitive aging & having good EF

- If you want a healthy brain in old age, <u>start good habits</u> when you are young.
- It is <u>life long behavior patterns</u> which produce important small effects over many years that keep your brain safe.
- <u>Physical exercise</u> has robust effects for executive-control processes.
- Being bilingual and learning a musical instrument are correlated with better EF in old age

Life Long Stability

- <u>Cognitive abilities unchanged</u> throughout life:
 - Autobiographical memory
 - Theory of mind tasks (attribution of mental states to other individuals)
 - Emotional processing
 - Behavioral memory
 - Recognition/Familiarity memory

Neuronal Changes

- Lower volumes of grey matter from lower synaptic densities
- Prefrontal Cortex undergoes the largest age related volumetric changes in adulthood:
 - estimated <u>average linear decline of about 5% per</u> decade after the age of 20.
 - In healthy older adults, the largest declines in volume are in lateral regions of the PFC (vs. inferior PFC in AD).

Frontal steady life long decline; Hippocampal late life decline



Figure 2 | Cross-sectional estimates of age-related volumetric change in lateral prefrontal cortex, visual cortex and hippocampus measured with magnetic resonance imaging. Points on each scatterplot indicate volumetric estimates from individuals, and the line of best fit is shown. Lateral prefrontal cortex volume declines steadily across the adult lifespan, while hippocampal volume has a curvilinear slope, with its largest declines occurring after age 60. Other areas, such as primary visual cortex, have only slight age-related volume declines. Data from REF. 25; figure courtesy of N. Raz.

Neuronal changes 2

- <u>Greatest age-related white matter</u> <u>changes are in the PFC and the anterior</u> <u>corpus callosum</u>, although all regions show some age related decline in white matter integrity
- White matter abnormalities effect:
 - processing speed,
 - executive function
 - immediate and delayed memory

Cognitive Changes in EF

- Older adults experience greater difficulty than younger adults in performing executive processes:
 - failure to activate PFC regions

 or need to increase recruitment of PFC regions under relatively easy conditions

Older people use more frontal lobe resources

- The <u>aging brain</u>: <u>higher levels of neural activity in</u> prefrontal regions.
- Older adults often <u>show bilateral prefrontal</u> <u>activations on both working memory and long-term</u> <u>memory tasks</u> whereas <u>younger adults show</u> <u>primarily left-lateralized</u> prefrontal activations
- Viewed as <u>compensatory recruitment of additional</u> <u>neural resources</u> that maintain cognitive performance

More cognitively intact elderly use more bilateral areas



Figure 5 | **Neural activations in prefrontal cortex during a memory encoding task.** Activations are shown for young adults, low-performing older adults and high-performing older adults. Low-performing older adults exhibit a similar pattern as do young adults, with lower overall levels of activation. High-performing older adults exhibit greater bilateral activation. RF, right frontal; LF, left frontal. Data from REF. 93. Intellectual Ability in Normal Aging

Normal Age-Related Changes in Cognitive Abilities

Seattle Longitudinal Study: After age 65:

- Verbal Knowledge intact; difficulty with name retrieval, particularly the names of those we've not seen in a while
- <u>Memory Ability</u> = $\frac{1}{2}$ s.d. decrease \downarrow
- Spatial Ability = 1 s.d. decrease $\downarrow \downarrow$

- Perceptual speed = 1 $\frac{1}{2}$ s.d. decrease $\downarrow \downarrow \downarrow \downarrow$

Normal Aging Cognitive Decline in the absence of brain pathology



Based on Schaie and Salthouse

Normal Age-Related Changes 2

- Cognitively better with age if

- higher education
- higher occupation
- better cardiovascular status

 <u>Spouse's cognitive ability</u> was protective: <u>lower IQ spouse gets the</u> <u>benefit</u>, merges toward higher

Language

- <u>Advise to Post Docs on Hospital Consults</u>: Do not necessarily believe what patients, who want to go home, tell you
- Language functions are well preserved in elderly
- <u>Vocabulary</u> continues to increase (or may decline slightly)
- Word finding declines (longer to search; due to processing speed)

Vocabulary relatively intact



Older are Centrally Slowed: Processing Speed Decreases





Diffuse Tensor Images of axonal tracts



One of reasons naming ability decreases



White Matter Hyperintensities on MRIs: Small blood vessel damage



Processing speed declines as white matter hyperintensities increase

Strong associations between vascular risk factors and vascular disease when WMH volumes are extensive.

DeCarli, et al., 2005

Mild to Extensive Vascular Hyperintensities: Slower Processing Speed, poorer EF



The spectrum of small vessel disease-related brain changes in MRI: white matter lesions ranging from punctate foci (*upper left*) to extensive confluent abnormalities (*lower left*) and lacunar infarcts (*lower right*).

EF decline: Older Adults are more distractible



fMRI data illustrating a selective-suppression deficit in older adults

While healthy older adults (above 60 y.o.) were as effective at enhancing activity for relevant information in visual brain regions as young adults, they were <u>unable to successfully suppress activity for irrelevant information</u>;

Some older have normal suppression; are less distractible.
Decline in Spontaneous Verbal Free Recall: 12 items at age 20, 7 items at 80



Number of items learned in 1 attempt

But Prospective Memory tends to remain normal in real world

 Remembering to remember

- Intention
- Correlates with ability to live independently



Executive Functioning (new problem solving, fluid IQ) declines .5 σ in normals



Mild decline in concept formation; abstractions become more concrete

2 Types of Intelligence

- Crystallized abilities: Your Knowledge/Expertise
 - Vocabulary
 - Your fund of knowledge
 - Product (of earlier processing)
 - i.e. you are good at Trivial Pursuits or Jeopardy
- Fluid ability: Your Problem Solving Ability
 - Solving new problems
 - Ability to generate and manipulate information
 - New processing ability

Advantages of Bilingualism: Better EF

- Bilingualism increases EF
- Dementia delayed by four years in bilingual people.
- Better able to block out distracting information.
- Better executive functioning

Bialystok, 2010

Seattle Long. Study: Verbal Ability ok vs. All Else ↓↓



Best preserved...

Verbal ability

Procedural/behavioral memory

 Prospective memory in naturalistic settings

Real World Complexity



Do you want a young or older pilot? "Sully" Sullenberger & Hudson River, age 59



Mental Status Testing

Naming vs. Recognition



- What is name of this person?
- Princess Diana
- <u>State several facts about</u>
 <u>this person</u>
- Married Prince Charles
- Mother of William & Harry
- Died in car crash

Normal Aging : Typical Cognitive Decline

- Explicit/Declarative/Factual Memory: Spontaneous delayed free recall ↓ <u>Recall declines more than recognition</u> Recall shows a steeper decline after the age of 85
- <u>Source memory</u> (for when and where I learned something) is very vulnerable to aging
- Behavioral ("How to") memory better preserved

Parker et. al., *JCEN*, 2004, 428-440; Spencer & Raz, 1955, *Psych. & Aging*, 527-539

Coming Up Next: Example of Procedural Memory

Typewriting skills are procedural memory



Overlearned Memory



Most functioning in life is behavioral memory

 We live ordinarily in behavioral memory: all repetitive behavior (remembering to close garage door or feed the dog)

 We need EF for what is different, new, or challenging (medication change, whether to sign a check)

Normal Memory vs. Real Memory Deficit Types

• <u>Normal</u>:

- Tape recorder works fine for input & output
- Given 16 new words 5 times, you recall 12 at half an hour
- New & old memories are equally accessible

Encoding Failure: Tape recorder is off

Tape recorder: no new input or output

 Poor spontaneous recall and recognition

Cueing does not help

Types: TBI, Alzheimer's, Down's

Retrieval Failure: Trouble finding your memory

- <u>Tape recorder works fine, but is slow; output of</u> <u>memories that exist is slower</u>
- <u>Poor spontaneous recall</u>: poor 1-3 items on spontaneous recall,
- Normal recognition (cueing helps)
- Some normals, depression, subcortical dementias (Korsakoff syndrome, chronic alcohol abuse, Parkinson's, HIV)

Healthy Aging vs. Cognitive/EF decline

- <u>Risk Factors</u>
 - HTN
 - Heart Disease
 - Diabetes
 - Poor Nutrition
 - Family Hx of Dementia
 - Stress, Depression

- Protective Factors
 - Not smoking
 - Exercise
 - Routine Medical care
 - Good CV health:
 what is good for
 heart is good for the brain
 Good social support

Examples of Executive Functioning in Real World



Email to me

Dear Bank of America Customer,

We recently have determined that different computers have tried to log in to your account. Multiple password failures automatically places your account on hold. We now need you to re-confirm your account information to us.

We strongly recommend that you visit the Customer Central below and confirm your payment:

[Login to Customer Central]

If payment is not completed by [June 22, 2014] - we will be forced to suspend your account indefinitely. We are currently investigating this issue, if it is a system error, you may disregard this message. We appreciate your prompt attention to this important online security notice.

Hitting login: sends you to "B of A" site which asks for your Information: logon, password, email address, identity.

Pill Box



Read the color of ink not the word





YELLOW ORANGE PURPLE BROWN

Inhibition

Signing a check for a telephone man at the door



Appropriate decision making

Dialing a wrong number 4 times



Error correction

Transferring your home to your pastor

Confidential information removed.

p.1

Assignment of Beneficial Interest in the Security Deed from MERS electronic registry to Wells	
Fargo recorded just before the sale date	Deed Suck Pg Filed and Recorded June 200000 00:49.4
	2009-0082816
MERS cannot easign because it does not hold the underlying note. MERS had no beneficial	
interest in the Security Deed it could transfer to	Ja C. Suchaver
and an burd (man taile?	Br C. Stopperen
Judge in recent California case, "Any attempt to transfer the beneficial interest of a trust deed without ownership of the underlying note is void under California law."	Clerk of Superior Court Court Ly, Sa.
Other states have had similar rulings: example: Kansas, Ohio, Nevada, Arkansas, among others.	
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Debtor: Sale Date: 07/07/2009	
	Roswell, GA 30076
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COUNTY OF	
GOONTY GF	
For value received, Mortgage Electro	nic Registration Systems, Inc. has this day transferred, sold, assigned,
conveyed and set over to Wells Pargo Bank, N	A. da America's Servicing Company, whose address is PO Box
information and to a contain Security Deed for D	hee, its successors, representatives and assigns, all its right, title and
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County, Georgia Records.	
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The Assignor herein specifically trans	fers, sells, conveys and unsigns to the above Assignee, its successors,
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- Charles	

Decision making in the face of emotional coercion

Dr. Michal Weber Sign: EF failure

- 88 year old KP hospitalized woman was asked by Dr. Vella to sign over her house to his resident Dr. Michal Weber, whom he described as "a very trustable person".
- She said "yes"

Wisconsin Card Sorting Test: Gold standard of EF



Guessing color as the sort principle after 3 errors

Staring out a window for hours



Loss of initiation

Watching TV for 8 hours at a time



Loss of initiation

Intrusions & False Positives on a memory test

Original list: dog, cat, window, hat, red

Increased intrusions: cow, yellow

 Increased false positives: Was the word cow on the original list? – Answer: yes

Lack of impulse control or empathy



Favorite repetitive response:

- "I am fine. There is nothing wrong with me."
- "I can take care of myself"

Anosognosia

Ability to keep track of your money



Complex EF

Hoarding Beanie Babies



Loss of impulse control

Fluency Test: Tell me as many words beginning with the letter F; no proper nouns

- Fang
- Fuss
- Finger
- Fabulous
- Fuck
- Fever
- Famous

Lack of inhibition: only found in FTD & psychopaths
Copy this (then recall it in 30 minutes)



Drawing strategy is EF

3 months after an ICU stay







Trail Making Test



Category switching

Executive Functioning

 A woman marries 11 men in 10 years. She divorces none of them, none of them die, and she had not committed any crime. How is this possible?

Executive Functioning

- EF = Applying knowledge toward real world goal directed behavior
- Executive functioning examples:
 - Self monitoring behavior
 - Anticipate consequence of action
 - Disregard erroneous strategies
 - Inhibit automatic but inappropriate response
 - Comply with treatment
 - Do something when needed (not just know how to do it)

Executive Functioning

- <u>EF is distinct from more automatic cognitive</u> processes that have been overlearned by repetition.
- EFs allow us to respond flexibly to the environment
- EF is essential for successfully <u>navigating nearly all</u> of our daily activities.
- Impairments in EF thus have serious real world consequences

Executive Dysfunction: Don't know I can't do it

- <u>Neurogenic denial of deficit</u>: Do not know we have the problem ("I can drive; I can live alone")
- Executive dysfunction is associated with increased need for care

Executive Deficit Predicts:

- Decline in
 - -Functional autonomy
 - –Money management
 - -Medication management

 Poor geriatric orthopedic & stroke rehabilitation outcome

Executive Dysfunction in Dementia

- Associated with impairment of prefrontal and frontal-subcortical circuits
- Executive 1 can be independent of Memory 1
- New changes in behavior: personality changes, dysinhibition, hypomania, apathy

Executive Functioning Measures Decline

- TMT B
- Clock Drawing
- Category (Animal) Naming
- Action Fluency (verbs)
- WCST

Trailmaking Test: Mental Flexibility

Mental Flexibility



Example: Trails A & B of patient with early stage AD

In the public domain: google it

Executive Function: Clock Drawing

Executive Function Draw A Clock: "10 after 11"



79 year old right handed male Mild Vascular Dementia



79 year old right handed male Mild Vascular Dementia

AD Underdiagnosed

- <u>Early Alzheimer's disease is subtle</u> it is easy for family members and physicians to miss the initial signs and symptoms
- Less than half of AD patients are diagnosed
 - PCPs miss up to 91% of mild AD
 - Only 10-15% receive acetylcholinesterase inhibitors
- Undiagnosed AD patients often face avoidable social, financial, and medical problems
- No definitive clinical lab test for diagnosing AD exists

Prevalence of Dementia in 2002 in USA



Plassman, et. Al., 2007

- Cognitive Decline in Elderly Of all Americans in 2002, aged 71+:
- 65% were cognitively <u>normal</u>
- 21 % had some <u>mild neurocognitive</u> <u>disorder (NCD)</u>
- 14% had major NCD

Age is greatest risk factor; Major NCD doubles every 5 years after 65

... AND AGE IS THE BIGGEST RISK FACTOR FOR ALZHEIMER'S ... Risk of developing Alzheimer's at a given age over the next 10 years, for males and females. Image: state of the state o

Major Neurocognitive Disorder

- 1. Evidence of significant cognitive decline from prior level of performance in 1 or more cognitive domains
 - 1. <u>Concern of person, informant, or clinician of a</u> <u>significant cognitive decline</u>
 - 2. Significant cognitive impairment on NP testing
 - 2. <u>Deficits interfere in independence in everyday</u> <u>activities</u>

Specify due to what (one of 13: AD, FTD, LBD, VD, etc.)
Specify severity (Mild (IADLS), Moderate (ADLS), Severe (full dependence)

The Major NCDs & EF dysfunction

Alzheimer's Disease

Lewy-Body Disease

Vascular Disease

Frontal Temporal Atrophy

Core AD issue: No new memory; EF decline later

 Encoding Deficit: tape recorder does not work

 People with AD no longer have the ability to remember what's new now; they do not have the ability to remember new life experiences.

Their brain has stopped recording

Lewy Body Variant Dementia: Visual hallucinations & EF decline

- <u>Alzheimer's cognitive + Parkinson's</u> motor systems (no tremor)
- <u>Cortical LBD: fastest dementia decline</u>
- <u>Visual hallucinations</u> (fully formed), lucid periods, movement disorders, falls or syncope
- Visual Spatial deficits

Heyman A et al. *Neurology.* 1999;52:1839-1844. Ballard CG et al. *Dement Geriatr Cogn Disord.* 1999;10:104-108.

Visual Hallucinations in LBE

Small Animals
Little People
Dwarves
Odd Creatures
Animals with hats
Well-formed landscapes



Cases with <u>well-formed visual hallucinations</u> had <u>high densities</u> of LB in the amygdala and parahippocampus, with early hallucinations relating to higher densities in parahippocampal and inferior temporal cortices.

NP Profile in LBD

- Attention $\downarrow\downarrow$
- Executive function ↓↓
- Visuoperceptual/visuoconstructional ↓↓
- Memory not affected early on (but recognition cuing does not help)

Why "what is good for the heart is good for the brain"



400 miles of blood vessels in human brain. A plastic emulsion was injected into brain vessels and brain tissue was dissolved.

•Zlokovic & Apuzzo, Neurosurgery, 43(4):877-878, 1998.

Vascular Disease

- Series of mini strokes
- <u>Abrupt onset</u>, stepwise course
- Processing speed & EF deficits
- May or <u>may not include memory</u> deficit
- Often mixed pathology with Alzheimer's

Frontal Temporal NCD

- FTD: <u>Psychiatric Sxs precede Neurological</u> presentation
- <u>Social behavior/Personality changes precede</u> <u>memory deficit</u>: disinhibition, agitation, delusion, hallucinations, apathy
- <u>Cognitive Executive Dysfunction later</u>: poor judgment

FTD: Social Disease

- Apathy, social withdrawal
- Loss of empathy
- Inappropriate touch, familiarity
- 50% arrested or do antisocial behavior
- Silly antisocial: take off clothes, urinate in public
- At work: Embezzlement, insults
- Compulsions: need to touch, shoplift, counting
- Alienation from family
- Divorce
- Legal & financial problems
- Addiction

Subcortical NCDs: Parkinson's, Huntington's, HIV, MS

- White Matter & Prefrontal Disorders:
- Motor problems
- Slow processing speed
- Executive Dysfunction
- Memory Retrieval:
 - Impaired free recall, but normal recognition
 - Cueing helps
- Sustained attention decline
- Visual spatial/PIQ decline

Differential Diagnosis of Neurodegenerative Disorders:

First Symptom

- AD Memory (no encoding)
- VaD Apathy, EF deficits
- DLB Visual hallucinations, Visual Spatial deficits, EF deficits
- FTD Behavior, EF deficits, language

Healthy Brain Aging Behaviors are EF Protective Factors

- Physical Exercise
- Mediterranean-like Diet
- Social Engagement
- Intellectual Stimulation
- Stress Reduction
- Routine Medical Care
- Cardiovascular Care
- Not Smoking

Dissociations in MS Testing

- <u>Shorter the test, the larger the clinical knowledge</u> <u>base needed</u> to interpret the results; multifactorial causation
- Principle 1: <u>We do not see what we are not looking</u>
 <u>for.</u>
 - i.e. executive functioning impairment
- Principle 2: <u>What they say is different from what they can do</u> –

Dissociations of abilities common:

- verbal ok, memory ↓
- verbal ok, nonverbal ↓
- executive ok, memory \downarrow
- memory ok, executive ↓
- know how to (can do behavior) ok, but know when ↓

Mental Status Test Cautions

 Need to know premorbid IQ estimate; higher IQ, harder the test:

(use vocational, educational history, or reading level)

- <u>Severely ill and dysphasic patients</u> may be untestable using a verbal test
- Cognitive tests have <u>poor cross-cultural portability</u> and may reflect low educational level or intelligence rather than cognitive decline
- Single test results do not provide the longitudinal perspective of cognitive function required to establish the diagnosis of dementia; need <u>serial testing</u>

Copyrighted: Mini Mental Status Exam

The Mini-Mental State Examination (MMSE) Practice Tool - Assessment tool (TAT-002) Estimate: 15 minutes

Orientation What is the (date) (day) (month) (year) (season)? 1 point for each correct. Where are we: (oountry) (state) (town) (building) (floor)? 1 point for each correct. Registration Name 3 unrelated objects (e.g. apple, table, penny). Allow one second to say each. Then ask the patient to repeat all three after you have said them. 1 point for each correct. Repeat them until he/she learns all three. Count and record trials. Trials: Attention and Calculation Either: Ask the patient to count backwards from 100 by sevens (93, 80, 79, 72, 65). 17 point for each correct. Stop after 5 answers. Or: spell "world" backwards. 1 point for each letter in correct order Recall Ask the patient to recall the three objects previously stated. 1 point for each correct. Language Show the patient to recall the three objects previously stated. 1 point for each correct. Ask the patient to recall the following: "No ifs, ands, or buts." 1 point for each correct. Ask the patient to read and obey the following sentence, which you have written and, fold it in haif, and put it on the floor." 1 point if correct. Ask the patient to write a sentence.	Maximur Score
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Psychological Assessment Resources (PAR), Inc.

Ethnicity and MMSE: Overdiagnosis of Dementia

- Mexican Americans: 2 x more likely to have MMSE scores <24 (Espino, 2001). Due to <u>acculturation</u> effects (barrio↓ vs. suburban) and <u>lower education</u>.
- African Americans and Hispanics more likely to be <u>erroneously</u> <u>identified as demented</u> (Mulgrew, 1999)
- Health ABC study, n=3075, 42% black, 3MS: blacks scored lower; <u>SES, income, reading level, & education</u> explain 86% of difference (Mehta, et al., 2004)
- CV Health Study, n=2786, 10% black, 3MS: low education (<10y); blacks had 5x dementia risk; being black associated with <u>higher dementia rates after demographic corrections;</u> higher DM, HTN not associated with higher dementia in blacks; lower baserate 3MS (Shadlen, et al., 2006)

MS Tests: Mild vs. Major NCD

- Mild
 - MoCA
 - SLUMS
 - Cognistat
 - Executive measures
- Moderate to Severe
 MMSE

Functional Status (IADLs) correlates with Executive Function

- The Freedom House Study, <u>n =547 normal</u> <u>elderly retirees</u>, mean age 77, over 3 years
- Rate of change in self-reported <u>IADL's best</u> predicted by Executive Functioning (Trails test and Exit25) (but not memory scores).
- Conclusion: <u>executive functioning, rather</u> <u>than memory impairment, is better</u> <u>predictor of elderly functional status and</u> <u>level of care need</u>

High prevalence of executive impairment in medical inpatients

- Among <u>medical inpatients</u>, the <u>prevalence of</u> <u>impairment of executive function</u> referred for <u>psychiatric consultation</u>:
 - 30% failed the MMSE,
 - <u>72% failed</u> a measure of executive function
- 63% of pts who failed EF test were <u>considered</u> <u>normal</u> by consulting psychiatrists
- Impairment of executive function is common among inpatients referred for psychiatric consultation
Executive Deficit Behaviors in NCD

 <u>Noncompliance</u> = lack of executive ability

<u>Apathy</u> (lack of spontaneity)

 <u>Wandering</u> (environmental cuing by "door" to elicit "door opening" behavior; not attempt to escape)

Capacity for self management

- <u>Capacity for self-management of chronic conditions</u> among older adults.
- <u>Self-management often includes taking prescribed</u>
 <u>medications.</u>
- <u>Adherence</u> is defined as <u>taking a prescribed</u> medication at the appropriate time in the correct amount and manner (e.g., with food).

Medication management

 Noncompliance of antihypertensive medication is associated with increased doctor office visits, increased ER visits, and increased hospitalizations with longer stays

Medication noncompliance & EF

- <u>Study: Association between EF and</u> <u>medication adherence among community-</u> <u>dwelling older adults</u>: study of 78 yo, <u>once or</u> <u>twice a day medication</u>
- Medication adherence was examined <u>over 8</u>
 <u>weeks for one prescribed medicine</u>
- Executive function and working memory tasks were the only significant predictors. Memory did not predict.

Medication self management

- Adhering to medicines requires the recruitment of executive function, because taking medicines consistently involves
 - developing and implementing a plan to adhere;
 - remembering to adhere, (prospective memory) and
 - remembering whether the medicine was taken as desired (source monitoring).
- <u>Source monitoring</u>: "Did I do it today or do I just think I did it because I've been taking the same medication everyday for the past 2 years?'

Medication compliance

- <u>Ability to monitor source, that is to determine if the medication</u> was taken as intended, is likely to become more difficult when the action is repetitive
- Antihypertensive drug use in the elderly population: Cognitive impairment has been associated with twice the risk of nonadherence
- In HIV positive: As medication regimen complexity increases, impaired executive function leads to increasing difficulty in adhering to medication.

Impaired inhaler-use declines with EF decline

 Learning proper inhaler-use technique is associated with higher positive scores on the EF measures among older adults (Allen, Jain, Ragab, & Malik, 2003).

"Cognitively intact" elders

- Study: <u>"cognitively intact" elderly sample</u>
 - <u>29%</u> had a <u>different understanding of medication administration than</u> <u>the written label.</u>
 - Only 22% of their sample demonstrated correct administration knowledge of the instruction "take one tablet every 6 h."
- <u>Study: 38% of individuals</u> from a large, urban general medical clinic were unable to identify all of their medications in spite of being able to look at the bottle, label, and pills themselves.
- Increased reliance on routine, resistance to change, poor insight into one's abilities, and environmental dependency/indifference negatively contribute to medication compliance

Executive Function Measures

Pillbox Test

Action Fluency Test

Trail Making Test

Problem Solving Questions

Spontaneous Clock Drawing

NAB Judgment

Pillbox Test

- The Pillbox Test consists of a <u>pillbox and five pill</u> <u>bottles.</u>
- The pillbox contains <u>four rows labeled as "Breakfast,"</u> <u>"Lunch," "Dinner," and "Bedtime"</u> and <u>seven columns</u> <u>labeled for each day off the week, "Sunday" through</u> <u>"Saturday."</u>
- The five pill bottles have standardized administration labels and contain colored beads resembling the approximate size of common aspirin or antihypertensive medications as these were the two most commonly prescribed types of medications

Zartman AL, et al., Arch Clin Neuropsychol. 2013

EF and **Pillbox**

 Executive dysfunction on NP tests was highly correlated with performance on both the Pillbox Test

Action Fluency Test

- I'd like you to tell me as many different things as you can think of that people do. I do not want you to use the same word with different endings, like eat, eating, and eaten. Also, just give me single words such as eat, or smell, rather than a sentence or phrase. Can you give me an example of something that people do?
- <u>Any verb response is acceptable</u>. If the response was acceptable, the examiner stated:
- *"That's the idea. Now you have <u>one minute</u> to tell me as many different things as you can think of that people do.*
- 1 ______ 11 _____ 21 _____
 2 ______ 12 _____ 20 _____
 3 ______ 13 _____ 21 _____
- Score (total # of unique verbs generated in 60 s): ______ Total number of perseverations: ______ Total number of intrusions: _______

Trail Making Test



TMT-B



TMT-B: Alzheimer's



Problem Solving Questions (Cognistat):

- You are stranded in the Denver Airport with \$1 in your pocket. How do you get home?
- You are walking along a lake. You see a 2 year old child at the end of the pier. No one else in sight. What do you do?.
- If Jane has an ulcer, and 85% of people are helped with this medicine, 10% stay the same, and 5% get worse, is this medicine likely to help Jane?

Hayling subtest: frontal inhibition

- Initiation: "Listen carefully to these sentences and as soon as I am done reading them, you must tell me, as quickly as possible, what word completes the sentence."
 - I put my shoes on, and I tie my ... (laces)
 - It was raining cats and ... (dogs).
- Inhibition: "This time, I want you to tell me a word that makes no sense whatsoever in the context of the sentence, and it must not be related to the word that actually completes the sentence."

"For example: Daniel hit the nail with a ... rain."

- 1. John bought candy at the
- 2. An eye for an eye, a tooth for a
- 3. I washed my clothes with water and

Executive Tasks

- Voluntary motor actions are frontally based
- Ability to do serial hand sequences is indicator of frontal normality

Serial Hand Sequences



Spontaneous Clock Drawing requires executive functioning

<u>Complex executive task</u>:

- Initiation
- Abstract conceptualization
- Numerical ability
- Verbal memory
- Sequencing

Clox1 detected <u>28% more dementia</u> than MMSE.

Draw a clock. Include all the numbers; make the 2 hands read "10 after 11"



Score Dali's Clock



Clock Drawing in Medically III Patients



ESRD





38-year-old with HIV

53-year-old after a cerebrovascular accident



23-year-old with end-stage renal disease



37-year-old with HIV

Stroke

HIV

168


































Clock 16



Grigsby: Only Study of Prevalence & Incidence of EF Impairment

- <u>Prevalence of EF impairment</u>: <u>n=1,145</u> CO community, <u>mean age = 73</u>; mean educ = 10; Hispanics & NHW; BDS as measure of ECF:
 - -33.7% showed mildly impaired ECF
 - -<u>50%</u> of these had <u>normal MMSE</u>
 - –16.4% showed moderately to severely impaired ECF.

EF deficit prevalence

- Prevalence of EF deficits increased with age:
 - 7% in their 60s,
 - -16% in their 70's,
 - -32.5% in their 80s,

-45% in their 90's being moderately to severely impaired.

• EF was stronger predictor of impaired functional status than MMSE

Grigsby, et al., Neuroepidemiology, 2002

Executive Deficit Predicts:

- Functional autonomy ↓
- Impulsivity & apathy ↑
- ADLs and IADLs \downarrow
- Money management ↓
- Medication management ↓
- Poor geriatric orthopedic & stroke rehabilitation outcome

Decision Making



Does this individual have the capacity to make decisions?



What is "Decision Making Capacity"? In California: "...a person's ability to understand the nature and consequences of a decision and to make and communicate a decision, and includes in the case of proposed health care, the ability to understand its significant benefits, risks and alternatives." California Health Care Decisions Law

AB 1278, 2002 revisions

Decision Making Capacity & Competency

- <u>Decision Making Capacity</u> (DMC): situation and protocol specific
 - How well can one manage their own affairs
 - How well can someone live independently
 - How well can one make decisions (medical, financial, custodial)
- <u>Competency</u> (legal concept): one can be legally incompetent to handle finances but still have DMC

Decision Making Capacity: 4 criteria

- 1 Ability to <u>communicate</u> decision: expression of choice; language; stability of choice
- 2 <u>Ability to reason</u>, to weigh information in a rationally defensible way.

Decision Making Capacity 2

- 3 Ability to <u>understand information</u> relevant to decision: nature of condition, TX, risks; memory produces biggest errors
- 4 <u>Appreciation</u>: Ability to understand how information applies to their situation (vs. overvalued ideas, delusions)
 - i.e. Dr. Weber, Depressive Psychosis

Prospective Memory is best predictor of ability to function in the real world

- Prospective Memory is a predictor of:
 - everyday functioning,
 - medication adherence,
 - unemployment,
 - declines in instrumental activities of daily living

Clinical Recommendations: EF

 Executive Dysfunction is cause of <u>neurogenic lack of awareness</u>

Impairments in Self-Awareness;
 Introspection

 Poor Self Monitoring leads to inability to understand the consequences of one's actions.

Clinical Recommendation: EF

- Caution: when making inferences about motivation based on observed behaviors.
- <u>Non-compliance may not arise from lack</u> of motivation or resistance.
- <u>Unawareness of deficits</u> can be due to executive dysfunction and may not always be due to psychological denial.

Clinical Recommendation: EF

- <u>Inflexibility</u> can <u>lead to perseveration</u> i.e. <u>repeating an inappropriate behavior</u>
- <u>Poor ability to Inhibit a response</u> can lead to a <u>broad range of inappropriate behaviors</u>: safety issues; striking out; verbal outbursts; sexual remarks or behaviors; socially Inappropriate comments

Clinical Recommendation: EF

- Do not assume the individual knows that behavior is inappropriate and is choosing to do so anyway.
- Provide straightforward feedback about when and where behaviors are appropriate.
- Let a person know a behavior is inappropriate.

General MS Tools

- Slums
 - http://medschool.slu.edu/agingsuccessfully/pdfsur veys/slumsexam_05.pdf
- Mini-Cog
- AD8
- Late Life Dementia Risk Index
- Sweet 16 (no EF)
- ADLS
- Cognistat
 - http://www.cognistat.com/
- MOCA
 - http://www.mocatest.org

SLUMS: St. Louis University Mental Status Test



Measure Functional Ability

- If possible, <u>get estimate of or</u> measure ADLs or IADLs
- Use all sources of data regarding functioning:
 - -Functional observations,
 - -Collateral interviews,
 - -Multidisciplinary team input

Self Neglect: Incapacity to live independently

- Is an individual a significant danger to themselves due to
 - -limited functional abilities, or
 - cognitive or psychiatric disturbances
 - And <u>cannot accept or appropriately</u> <u>use assistance</u> that would allow him or her to live independently.

Reporting duty

 A report to APS is required by state law <u>if you conclude incapacity</u> to care for self in a patient if not already done

Table 2 The late-life dementia risk index					
Characteristic	Points				
Age 75-79 y*	1				
Age 80-100 y*	2				
Low 3MS*	2				
Low DSST*	2				
BMI <18.5	2				
≥1 APOE ε4 allele	1				
MRI white matter disease (grade ≥3)	1				
MRI enlarged ventricles (grade ≥4)	1				
Internal carotid artery thickness ≥2.2 mm	1				
History of coronary bypass surgery	1				
Time to put on and button shirt >45 s	1				
Lack of alcohol consumption	1				
Possible range	0 to 15				
c Statistic (95% CI)	0.81 (0.79-0.83)				

*In comparison to those aged 65 to 74 years.

*Low 3MS: \leq 87 (all white subjects and black subjects with \geq 12 years education) or \leq 70 (black subjects with <12 years of education). Low DSST: \leq 33 (white subjects with \geq 12 years education) or \leq 22 (white subjects with <12 years education and all black subjects).

Be Careful about diagnosis

- Mental Status tests are evidence for cognitive dysfunction, not necessarily diagnosis or etiology.
- Need to carefully consider <u>testing</u> <u>context</u>: amount of sleep, alcohol, medications, effort level of pt, attitude of pt toward you

MoCA: Montreal Cognitive Assessment



MoCA: Montreal Cognitive Assessment

- Free of charge, 50 languages, downloadable
- Designed to separate normals from <u>MCI</u>
- 10 minutes
- 30 points
- Limitations: No studies on ethnicity and education effects
- Best replacement for MMSE with <u>higher</u> <u>educated</u> patients
- http://www.mocatest.org/

Zaid Nasreddine, MD: http://www.mocatest.org/

50 Languages

English (Original) English (Additional version 2) English (Additional version 3) English (MoCA-BLIND) Arabic Afrikaans Bulgarian Chinese (Beijing) Chinese (Cantonese) Chinese (Changsha) Chinese (Hong Kong) Chinese (Taiwan) Czech Croatian Danish Dutch Dutch (Additional version 7.2) Dutch (Additional version 7.3) Estonian Filipino Finnish French German German (Additional version 2) German (Additional version 3) Greek Hebrew

Hindi Hungarian (Addtional version 7.2) Italian Japanese Korean Korean-K2 Norwegian Persian Polish Polish (Alternate version) Portuguese Portuguese (Brazil) Romanian Russian Serbian Sinhalese Slovak Slovenian Spanish Swedish Thai Turkish Ukrainian

MoCA

- Four alternative MoCA© forms are in development
- 2 points should be added to the total MoCA© score for subjects with 4-9 years of education, 1 point for 10-12 years of education.
- A version of the MoCA© without the visual elements has been validated for the blind.
- Ace study: normative data for the MoCA© across ages, education levels, in 10 languages and cultures in progress

Different Cognitive Domains Measured by MoCA

- Executive functions
- Visuoconstructional skills
- Language
- Memory
- Attention and concentration
- Calculations
- Conceptual thinking, abstraction
- Orientation.

MONTREAL COGNITIVE ASSESSMEN Version 7.1 Original Version	NT (MOCA)	Ed	NAME : ucation : Sex :		Date of birth : DATE :	
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NAMING			2	Y		_/3
MEMORY Read list of words, subject m repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.	1st trial 2nd trial	FACE VEL	VET CI	HURCH	DAISY RED	No points
ATTENTION Read list of digits (1 digit/ se	c.). Subject has to Subject has to	repeat them in the repeat them in the	ne forward o ne backward	rder order	[] 2 1 8 5 4 [] 7 4 2	_/2
Read list of letters. The subject must tap with his har	id at each letter A. No ([] F F	soints If ≥ 2 errors BACMNAAJ	KLBAFA	KDEAA	AJAMOFAAB	1
Serial 7 subtraction starting at 100	93 [] 86 4 or 5 correct sub	[] tractions 3 pts,	79 E or 3 connect: 1	[] 72 2 pts, 1 con	[] 65 rect: 1 pt,0 correct: 0 pt	_/3
LANGUAGE Repeat : I only know that Jo The cat always his	hn is the one to help to I under the couch whe	iday. [_] n dogs were in th	e 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. bana	na - orange = fruit	[] train – bio	yde []	watch - r	uler	/2
DELAYED RECALL Has to recall words WITH NO CUE	FACE VELVET	CHURCH	DAISY []	RED	Points for UNCUED recall only	_/5
Optional Multiple choice cue						
ORIENTATION []Date []/	Aonth [] Yea	u []D	ay [] Place	[] City	/6
© Z.Nasreddine MD W Administered by:	ww.mocatest.o	rg Norr	mal ≥2673	30 TOT/	NL. Add 1 point # ≤ 12 yred	/30 "

EF functions: TMT Clock Fluency Abstraction

Poor Abstraction

Consider executive processing deficit.

 Verbal abstraction can be normal, while nonverbal is impaired (WCST).
 Latter is more important.

Add NAB Judgment Scale if fail Executive items on MoCA

Record	ling	Scoring	Discontinuation			
Record responses verbatim. If exa place a Q in brackets [Q] at that p	minee is queried to say more, out in examitee's response.	See criteria on page 7.	Administer oner task.			
in the second	Administration	Instructions				
ay, I am going to ask you a few que ree times at examiner's request. If r ingenus") with no specific reference	stions. I want you to answer car exponse is very brief or includes to the question, query by saying,	th question as fully as possible, Q only a general concept (e.g., "For Tell me more.	testions may be repeated up a safety," "For health," or "It's			
Question		Response				
 Why should you blow out candles before going to bed? 						
2. Why should you not leave a young child alone at home?						
 Why should you replace the batteries in a smoke detector regularly? 						
4. What should you do if you take too much of a prescription medication?						
 Why should you not unplug electrical appliances while your hands are wet? 						
6. Why are certain foods marked with an expiration date?						
7. Why is it important for people to brush their teeth?						
8. Why is it important to tell your doctor all the medications that you are taking?						
9. Why should you wash your hands before eating?						
10. What does it mean when your doctor says that there is a 25% chance of having serious side effects from a tention of the serious side effects from a						

1. Why should you blow out candles before going to bed?

10 – What does it mean when your doctor says that there is a 25% chance of having serious side effects from a treatment?

Go to page 8 -

Functional deficits

 Beside MoCA score, are there functional deficits in ability to care for themselves?

- bill paying, memory deficits, medication noncompliance, etc.
- latter less common in mild NCD, more common in major NCD of Alzheimer's type.

Context of Decision Making Capacity 1

- <u>Dissociation of Verbal ability and rest of</u> <u>cognitive functioning</u>
- Information from collateral sources: status of home (mold, leaking roof), refrigerator, food, bathroom
- Level of cleanness of apartment, mold, garbage
- Method for remembering medications
- Presence of paranoia or hallucinations

Context of Decision Making Capacity 2

- Evidence of burning pots, not paying bills
- Presence, or lack thereof, of supervision by family members
- APS involvement
- Executive function level
- <u>Anosognosia (denial of deficits)</u>: including toward testing deficits
- NCD: Cognitive ↓, not etiology

Cautions in MS testing

- Level of effort
- Context: Hospital, Clinic, ER
- Presence of Psychiatric Disorder
- Amount of Sleep, medications
- Did they come in voluntarily or were they brought in with AMS
- Executive ↓ more important than Memory↓
Case Example

MD 1: 72 yo M.D., Normal MMSE 2006



www.hartfordion.org



I am start a

MD 2: 72 yo M.D., 2007, cautionary tale

VISUOSPATIAL / D	RECUTIVE			Copy	Oraw	CLOCK (Fen past elev	(ari) 100
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Score: 26/30*

Executive: 2/5**

Memory: 4/5

Conclusion: MCI (Executive ↓)

Follow-up: NP testing: failed WCST, Category test

Spent \$700,000 in 6 months Conclusion: Frontotemporal Dementia

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Biography

 Executive Skills & Metacognitive Therapy by Dr. Charles Vella (website)

The End

"Happiness is nothing more than good health and a bad memory"

Albert Schweitzer (1875-1965)