Cognitive Testing

Dr. Robert Coen

Mercer's Institute for Research on Ageing

St. James's Hospital, Dublin 8

1st National Memory Clinic Conference

What is a memory clinic?

Memory Clinics have been defined as independent clinics primarily aimed at improving practice in the identification, investigation and treatment of memory disorders, including dementia (Jolley et al 2006).

Memory Clinics are primarily concerned with the early diagnosis and treatment of memory problems (Lindesay et al 2008).

The focus on the individual needs of the person with early stage dementia is a characteristic that differentiates Memory Clinics from other dementia care services.

"Memory Clinics in Ireland. A Guide for Family Members and Health Care Professionals" Compiled by Suzanne Cahill and Laura Maher in association with the Living with Dementia (LiD) Programme, School of Social Work and Social Policy, Trinity College Dublin and the Dementia Services Information and Development Centre (DSIDC), St James' Hospital, Dublin

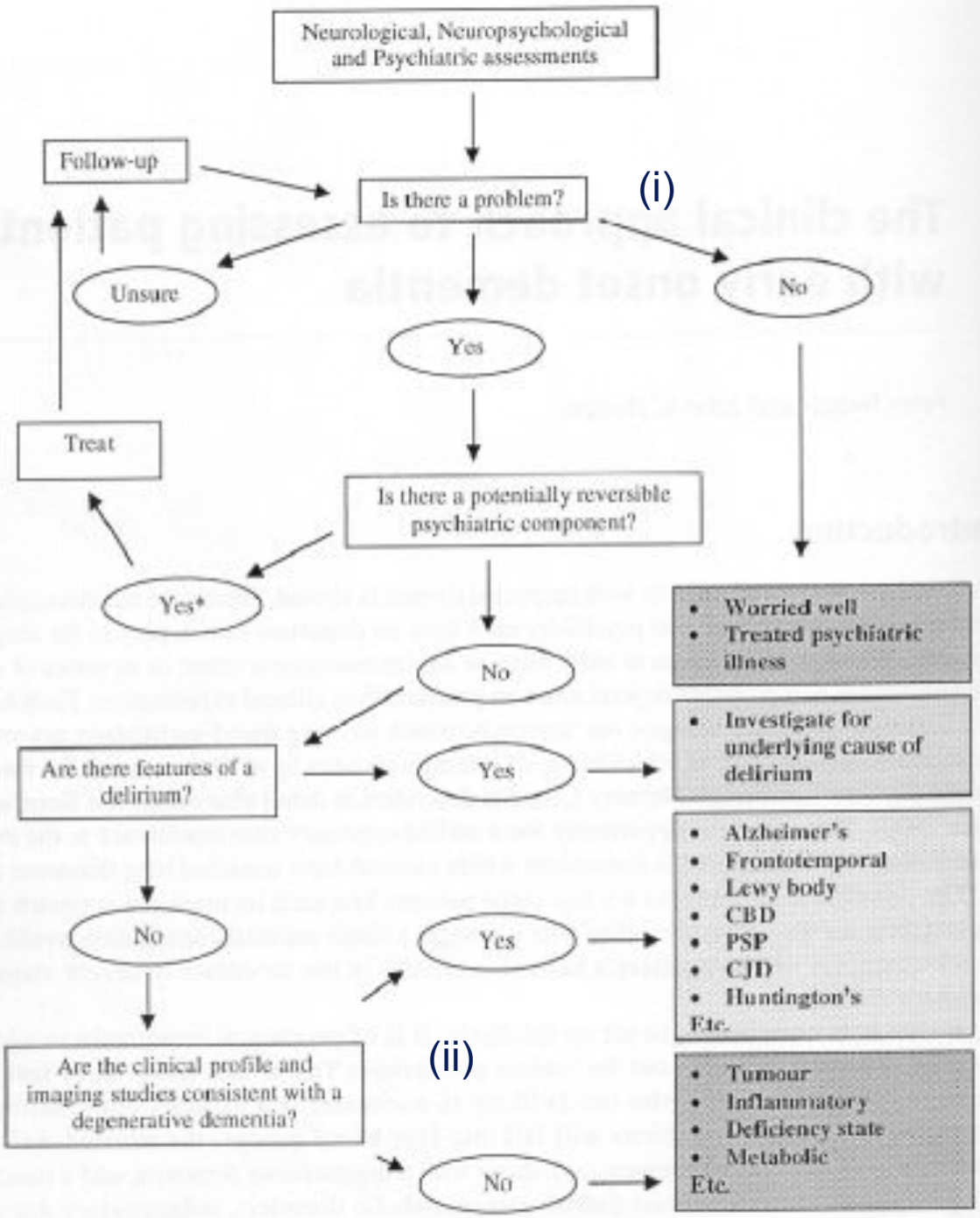
The process of assessing for dementia.

In a memory clinic cognitive assessment has key role in

(i) establishing is there a problem

(ii) Differential diagnosis

From Hodges, Early Onset Dementia



What level of detail is needed?

- Screening?
- Differential diagnosis?
- Detailed neuropsychological analysis?

MMSE > MoCA / ACE-R > CAMCOG > RBANS

WAIS / WMS etc….

or a detailed specialist query

e.g. what *type* of PPA (nonfluent, semantic, logopenic?)

e.g. lobar vs AD

BADS / DKEFS / FrSBe / VOSPB etc….

How early?

- **Alzheimer's Association International Conference on Alzheimer's disease, July 2010:** ***first draft reports from 3 workgroups convened by National Institute on Aging (NIA) and Alzheimer's Association***

  http://www.alz.org/research/diagnostic_criteria/

- **Revised Criteria for Alzheimer's disease Dementia**

- **Criteria for Mild Cognitive Impairment (MCI) due to AD**
  - ***The symptomatic pre-dementia range of cognition and function***

- **Criteria for Preclinical AD (up to 10 years *before* MCI stage)**
  - ***It is likely that measured change in cognition over time will be more sensitive than any one-time measure.***
  - ***Additional longitudinal studies of older individuals, perhaps combining biomarkers with measures sensitive to detecting very subtle cognitive decline, are clearly needed.***

Case characteristics vary

- Type and severity of deficits

  very mild vs immediately evident…

- Pre-morbid ability

  IQ 90, IQ 130…

- Age, health status etc…

  Differential tolerance for testing…

- Different cases will require a more or less detailed battery

  - testing should be tailored to the individual to address the referral question

- Administered by whom?

  - depends on what's being administered….

Who should do the cognitive testing, using what tests?

- That will depend on how detailed the testing needs to be
- Many brief screening tests do not *need* specialist knowledge and training (though that's always desirable if available)
- More detailed tests require a trained specialist *or input from a trained specialist in interpreting the results*
  - "Targeting neuropsychological tests at the appropriate level requires skilled judgement. Understanding the implications of this heterogeneity for diagnosis, intervention and advice requires the special skills of a clinical psychologist or clinical neuropsychologist". (*British Psychological Society survey of UK Memory Clinics)*

Importance of Specialist interpretation

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Archives of CLINICAL NEUROPSYCHOLOGY

To Err is Human: "Abnormal" Neuropsychological Scores and Variability are Common in Healthy Adults

Laurence M. Binder[a,*], Grant L. Iverson[b,c], Brian L. Brooks[b]

[a]*Department of Neurology, Oregon Health & Science University, Beaverton, Oregon, USA*
[b]*British Columbia Mental Health & Addiction Services, Vancouver, BC, Canada*
[c]*University of British Columbia, Vancouver, BC, Canada*

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Abstract

Normative studies of variability in performance by healthy adults on neuropsychological batteries are reviewed. Regarding test score scatter, normative participants often have large discrepancies between best and worst scores. When "abnormality" was defined as a score more than one standard deviation below the mean, in test batteries with at least 20 measures, the great majority of normative participants had one or more abnormalities. Restricting samples to participants with above average IQ or educational levels and using more conservative definitions of abnormality, such as two standard deviations below the mean did not eliminate the presence of abnormal scores. We conclude that *abnormal* performance on some proportion of neuropsychological tests in a battery is psychometrically *normal*. Abnormalities do not necessarily signify the presence of acquired brain dysfunction because low scores and large intraindividual variability often are characteristic of healthy adults. We recommend that test battery developers provide data on the amount of variability in normal samples and also provide base rate tables with false positive rates that can be used clinically when interpreting test performance.

Staffing

Table VII.7.1 Staff required in a memory clinic.

Essential	Desirable	Optional
Medical doctor, old-age psychiatrist, geriatrician or neurologist	Psychologist	Neuropsychologist
Psychometrician, doctor, nurse or psychologist	Specialist dementia nurse	Speech and language therapist
Neuropsychological advice (for referral)	Administrative support	Occupational therapist Social worker

Neuropsychologists are "optional" because

(i) Not everyone needs detailed neuropsychological assessment
(ii) They are as rare as hen's teeth…..

"Diagnosis and Management of Dementia. A manual for memory disorders teams". Wilcock, GK et al Uni Press 1999.

Is there one set of tests that everyone should use?

Is there one set of tests that everyone should use?

- No

Table 2: Summary of neuropsychological and other tests

Test	Number of Clinics
Estimation of Premorbid IQ	
National Adult Reading Test (NART)	12 (52)
Schonell Graded Word Reading Test	3 (13)
Speed and Capacity of Language Learning Test (SCOLP)	1 (4)
Screening Tests	
Mini Mental State Examination (MMSE)	12 (52)
Cambridge Cognitive Examination (CAMCOG)	8 (35)
Middlesex Elderly Assessment of Mental State (MEAMS)	7 (30)
Cognitive Scales	
Wechsler Adult Intelligence Scale (Versions Revised or III)	11 (48)
Alzheimer's Disease Assessment Scale (ADAS)	2 (9)
Memory Scales	
Rivermead Behavioural Memory Test	7 (30)
Adult Memory and Information Processing Battery (AMIPB)	6 (26)
Warrington Recognition Memory Test (WRMT)	6 (26)
Wechsler Memory Scale - Revised (WMS-R)	4 (17)
Doors and People Test	2 (9)
Verbal Learning	
Names Learning Test	5 (22)
Hopkins Verbal Learning Test (HVLT)	2 (9)
Rey Auditory Verbal Learning Test (RAVLT)	3 (13)
Buschke Selective Reminding Test	1 (4)
Executive Function and Problem Solving	
Benton Verbal Fluency (FAS)	11 (48)
Weigl's Colour Form Sorting Test	6 (26)
Trail Making Tests	5 (22)
Wisconsin Card Sorting Tests (long and short forms)	3 (13)
Raven's Progressive Matrices (including Coloured)	3 (13)
Behavioural Assessment of Dysexecutive Syndrome (BADS)	2 (9)
Cognitive Estimation Test	2 (9)
Language and Semantic Function	
Graded Naming Test	9 (39)
Semantic Fluency	3 (13)
Frenchay Aphasia Screening Test (FAST)	2 (9)
Pyramids and Palm Trees	2 (9)
Speed, visuo-perceptual skills and praxis	
Visual Object Space Perception Battery (VOSP)	5 (22)

From British Psychological Society survey of UK Memory Clinics

Recent update of previous PSIGE 1998 survey

- Tests used by Psychologists in Memory Clinics vary
- Covering the *appropriate domains* is probably more important than the specific tests used…

Table 3. The range of functions covered in neuropsychological testing

1.1 life-long intellectual level
1.2 attention and concentration
1.3 orientation (time, place and person)
1.4 visual, auditory and tactile perception
1.5 visuo-spatial skills
1.6 language comprehension (oral and reading)
1.7 language expression (repetition, fluency, naming, writing)
1.8 memory functioning (recognition, learning, recall; verbal, non-verbal; immediate, delayed; everyday memory, including prospective memory)
1.9 executive (frontal) functioning
1.10 psychomotor speed
1.11 praxis
1.12 arithmetic
1.13 everyday function e.g. handling money

"No prescribed list of tests has been recommended because of the individual nature of client's strengths and deficits"

From British Psychological Society survey of UK Memory Clinics

Recent update of previous PSIGE 1998 survey

What is a neuropsychological assessment?

Neuropsychological assessment goes beyond psychometrics

- Clinical interview
- Formal testing - *tailored to client and referral question*
- Interpretation in context of what we know about
  - brain-behaviour relationships
  - multiple other factors that can affect performance
- *tests are of limited usefulness by themselves and must be interpreted in conjunction with other clinical, imaging and laboratory information*

(AAN 1996)

Multi-disciplinary consensus is crucial for assessment and diagnosis….

Factors associated with inconsistent diagnosis of dementia between physicians and neuropsychologists. McKnight, Graham, Rockwood (1999) JAGS;47:1294-1299

- Canadian Study of Health Ageing

- "Physicians and neuropsychologists have different, complementary approaches to the diagnosis of dementia, and a consensus approach should be used".

Purpose of Neuropsychological assessment

profile presence / <u>absence</u> of cognitive *deficits*

– *nature* and extent of deficits

early detection

differential diagnosis

intervention -> *strengths* / weaknesses

monitor change over time

Coen 2011, Aging Health, 7(1), 155-162

TABLE 3.2 Test Battery for Neuropsychological Evaluation of Older Adults

American New Adult Reading Test (AMNART)
WMS-III Information and Orientation
WMS-III Mental Control
WMS-III Logical Memory I
WMS-III Visual Reproductions I
Trail-Making Test
Judgment of Line Orientation
WMS-III Logical Memory II
WMS-III Visual Reproductions II
Mattis Dementia Rating Scale
WMS-III Word Lists I
WMS-III Digit Span
Clock Drawing
WAIS-III Block Designs
WMS-III Word Lists II
Boston Naming Test
Letter and Category Fluency
WAIS-III Similarities
Geriatric Depression Scale or Beck Depression Inventory

Optional tests:
- Complete WAIS-III
- Wisconsin Card Sorting Test
- California Verbal Learning Test
- Motor tests: Finger Tapping, Grooved Pegboard

For movement-impaired patients:
- Replace WMS-III Visual Reproductions with WMS-III Faces
- Replace Trail-Making Test with WMS-III Letter–Number Sequencing
- Replace WAIS-III Block Design with WAIS-III Matrix Reasoning

This kind of battery is going to need a Psychologist…..

Green 2000

What relatively brief cognitive tests are readily available and can be recommended?

- I will overview some of the tests we have found useful in our memory clinic in MIRA

This overview is by nature very selective. There are a wide variety of tests available…

But first some BASICS!

- Age?
- Education?
- Gender?

- Vision?
- Hearing?

–Motivation / engagement
–Anxiety
–Fatigue
–Depression
–Dysphasia
–drugs (psychotropic, social)
–psychosocial stressors
–pain
–physical illness….

Any of these factors can affect performance.
Therefore qualitative aspects of assessment are every bit as important as the quantitative aspects

- **MMSE is widely used**
- ***Better the devil you know…?***
- **Has just been revised into briefer, standard and longer forms**
- **Now comes with norms for age and ed**

Mini-Mental State Examination (MMSE)

Patient name _____

Date of birth _____ Date of test _____

Max. points	Patient score	
		Orientation
5	[ ]	What is the (year) (season) (date) (day) (month)?
5	[ ]	Where are we: (country) (county) (town/city) (building) (floor)?
		Registration
3	[ ]	Name 3 common objects (eg, "apple," "table," "penny"): Take 1 second to say each. Then ask the patient to repeat all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3. Count trials and record. Trials: [ ]
		Attention & Concentration
5	[ ]	Subtract 7 from 100 and keep subtracting 7 from what's left. Score 1 for every correct subtraction from the previous number (93__ 86__ 79__ 72__ 65__)
5	[ ]	Spell "world" backwards. The score is the number of letters in the correct order (D__ L__ R__ O__ W__) [Note: Administer both Serial 7s and "WORLD" backwards.Use the higher score for total MMSE]
		Recall
3	[ ]	Ask for the 3 objects repeated above. Give 1 point for each correct answer. [Note: recall cannot be tested if all 3 objects were not remembered during registration]
		Language
2	[ ]	Name a "pencil" and a "watch." (2 points)
1	[ ]	Repeat the following. "No ifs, ands, or buts." (1 point)
3	[ ]	Follow a 3 stage command: "Take a paper in your right hand, fold it in half, and put it on the floor." (3 points)
1	[ ]	Read and obey the following: Close your eyes (1 point) (see over)
1	[ ]	Write a sentence (1 point) (see over)
1	[ ]	Copy the following design (1 point) (see over)

No construction problem

30	[ ]	**Total**

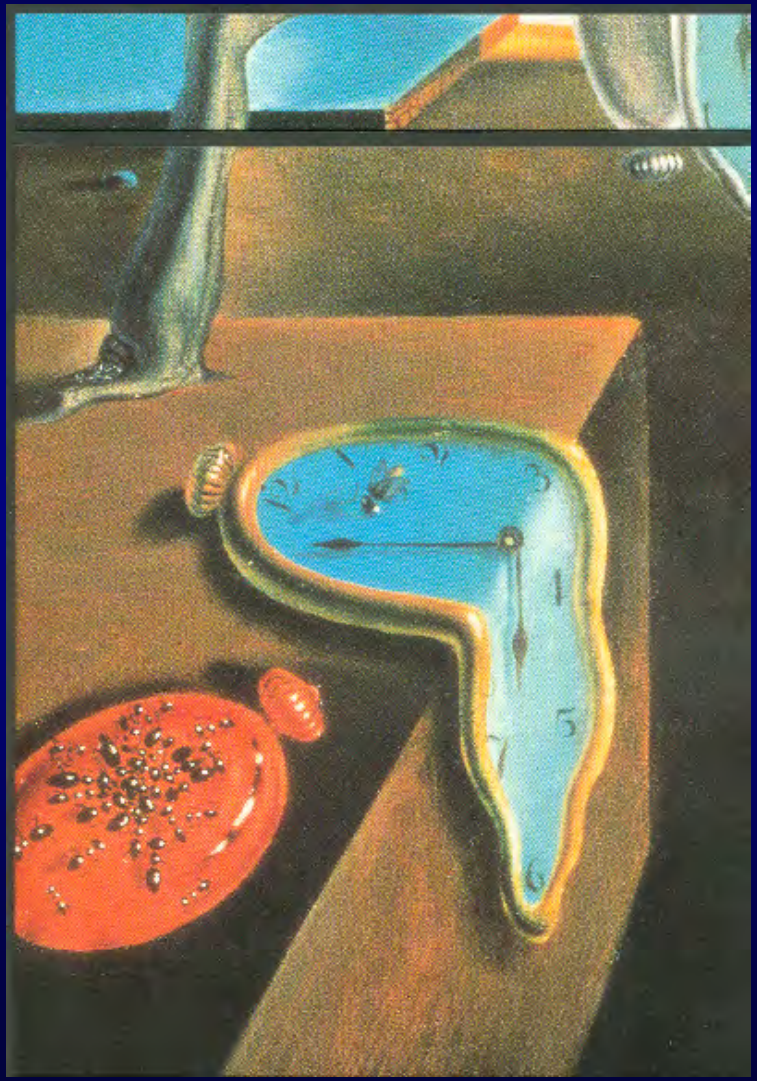
Examiner _____ Notes _____

Adapted from Folstein MF, Folstein SE, and McHugh PR. "Mini-Mental State": a practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975; 12: 196-198 and Cockrell JR, and Folstein MF. Mini-Mental State Examination (MMSE). Psychopharm Bull. 1988; 24(4): 689-692. Note: © 1975, 1998 Mini-Mental LLC. Used by permission.

Prescribing information can be found on back of pad

Clock Drawing Test

- Quick and easy to administer…..



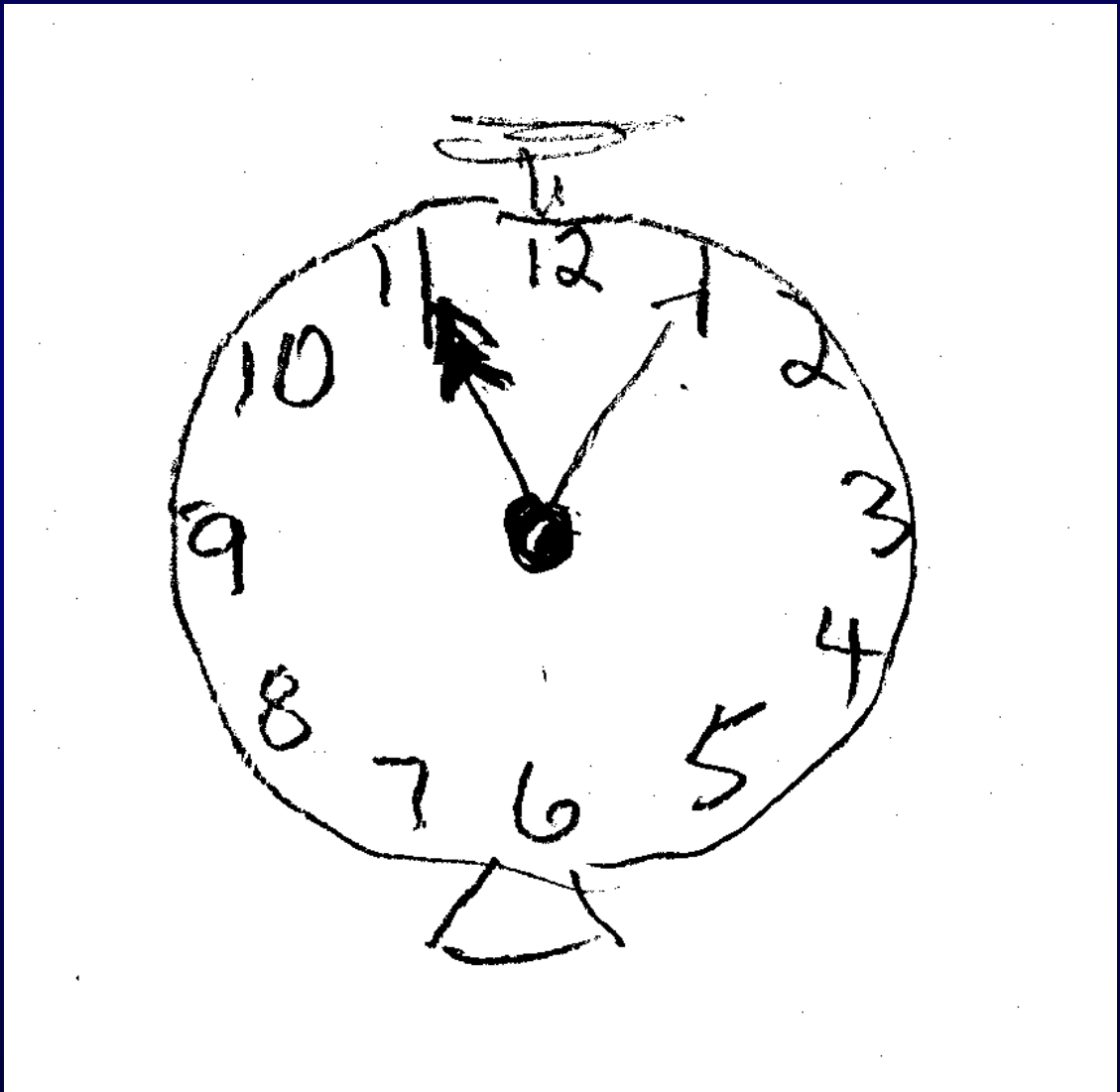
- …..not so quick and easy to interpret.

CDT scoring systems (*not* exhaustive!)

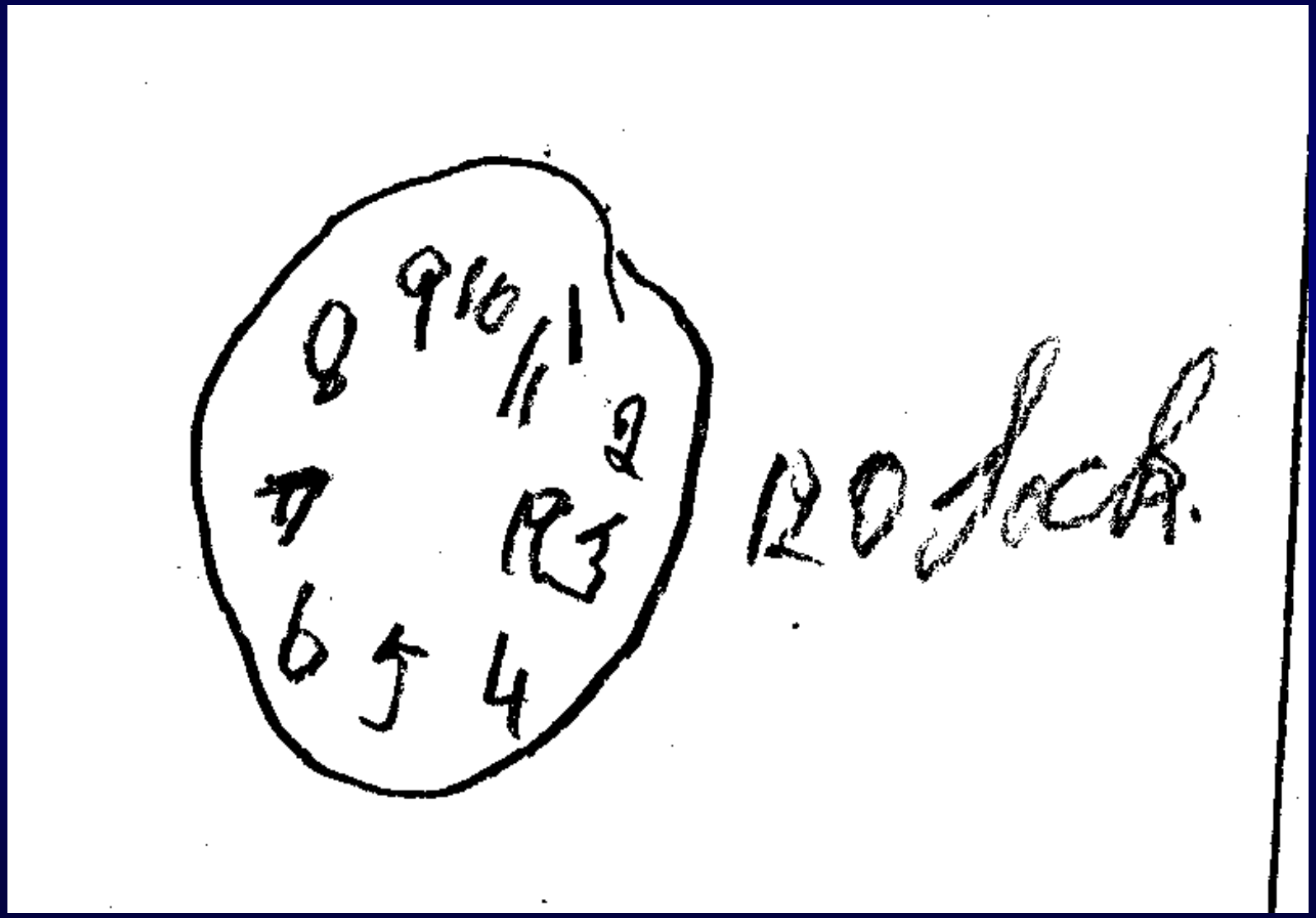
- ***Freedman et al (1994). Clock Drawing. A Neuropsychological Analysis. [15 point]***
- **Goodglass & Kaplan (1983). [12 point]**
- **Shulman et al (1986 / 1993). [6 point]**
- **Wolf-Klein et al (1989). [10 point]**
- **Sunderland et al (1989). [10 point]**
- **Tuokko et al (1995). [Manual. 15 point + errors]**
- **Mendez et al (1992). [CDIS. 20 point]**
- **Rouleau et al (1992). [10 point + qualitative]**
- **Shua-Haim et al (1997) [6 point]**
- **Watson et al (1993). [10 point]**
- **Manos et al (1999). [segmented, 10 point]**
- **Royall et al (1998). [CLOX. Executive(?) 16 point]**

Free drawn CDT. Case CK. AD. MMSE 19/30.

Artist. 10 past 11 - "couldn't remember which hand should be long". Time inaccurate.
Is the error due to Semantic breakdown or attention failure?



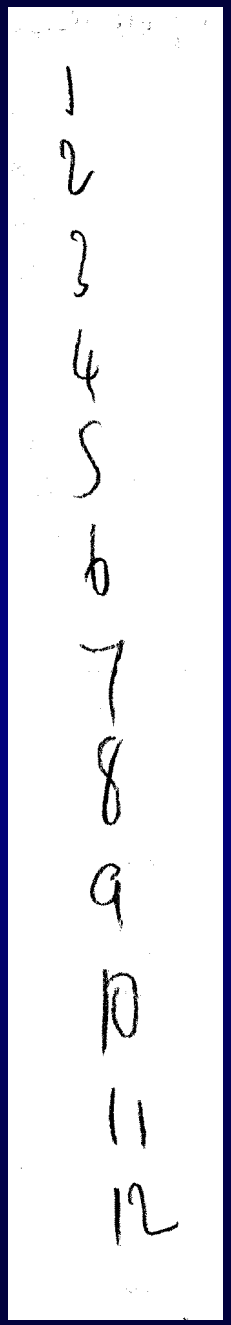
Free drawn CDT. Case MK. DLB. MMSE 19/30.

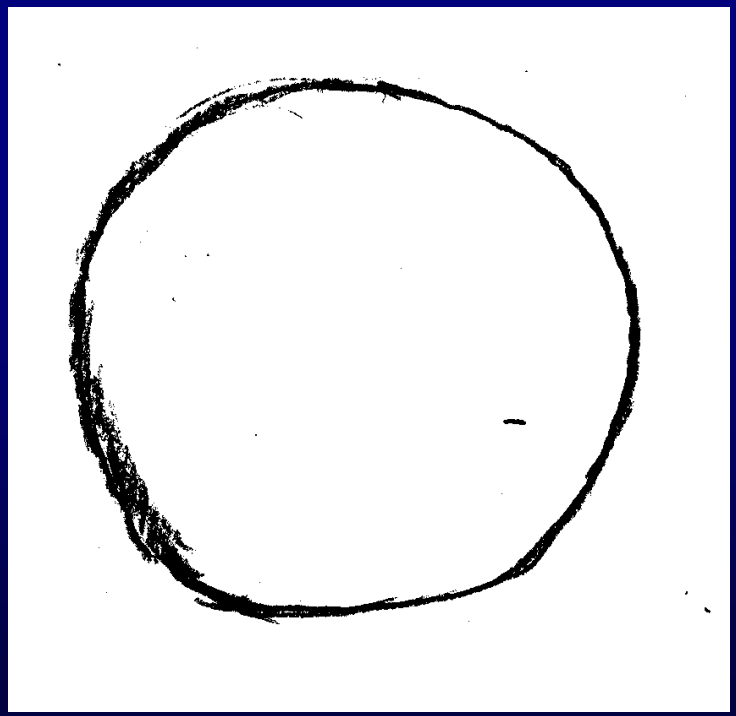


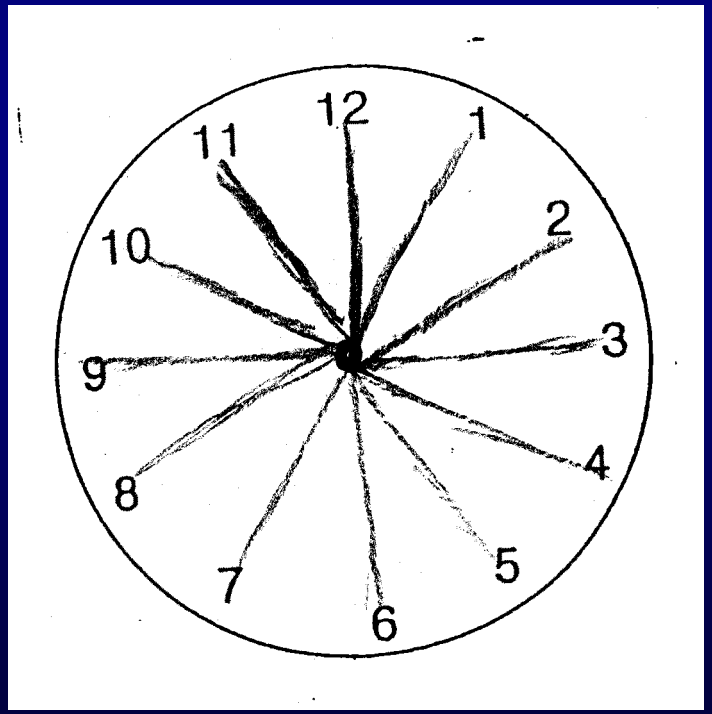
Free drawn CDT.

Case PC. AD with prominent frontal involvement. MMSE incomplete.

Drew circle. Then turned over page and drew the numbers. Could not be persuaded to put numbers in circle.







Montreal Cognitive Assessment (MoCA).

Nasreddine et al 05.

Can detect significant impairment when MMSE is ok e.g. MMSE≥26/30

Less verbal than MMSE

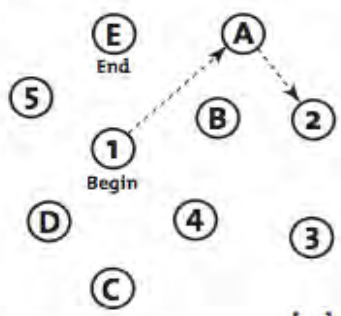
Attention / executive function items

available as a free download

MONTREAL COGNITIVE ASSESSMENT (MOCA)

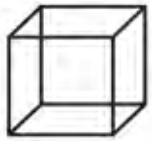
NAME :
Education :
Sex :
Date of birth :
DATE :

VISUOSPATIAL / EXECUTIVE



[ ]

Copy cube



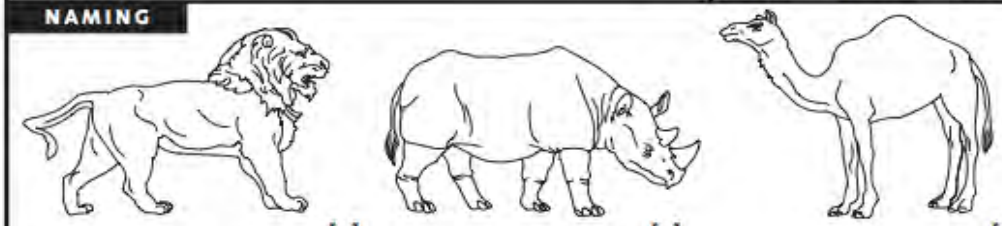
[ ]

Draw CLOCK (Ten past eleven) (3 points)

[ ] Contour [ ] Numbers [ ] Hands

POINTS __/5

NAMING



[ ] [ ] [ ] __/3

MEMORY

Read list of words, subject must repeat them. Do 2 trials. 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

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

Points for UNCUED recall only

__/5

ORIENTATION

[ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City

__/6

© Z.Nasreddine MD Version 7.0 www.mocatest.org Normal ≥ 26 / 30

TOTAL __/30

Add 1 point if ≤ 12 yr edu

Administered by: _____

MoCA Nasreddine et al 2005, JAGS

- Sensitvity high for MCI (90%) and for mild AD (100%). MMSE (cut <26) was 18% and 78% respectively.

- BUT what about *specificity?*
  - Nasreddine et al - Specificity 87%
  - Smith et al 2007 - Specificity 50%
  - Bleecke et al - Specificity 44%

- Luis et al 2009. MMSE insensitive to MCI/mild AD
  - MoCA cut-off ≤26, sens 97%, spec 35%
  - MoCA cut-off ≤23, sens 96%, spec 95%

- *Therefore the lower cut-off is likely to be more accurate*

MoCA things to watch out for…*(Coen et al 2011)*

- Memory component may be failed for several reasons
  - Items have been forgotten
  - Poor *instructions* during learning phase
  - Poor encoding
  - Retreval failure (check with *optional* cueing component)

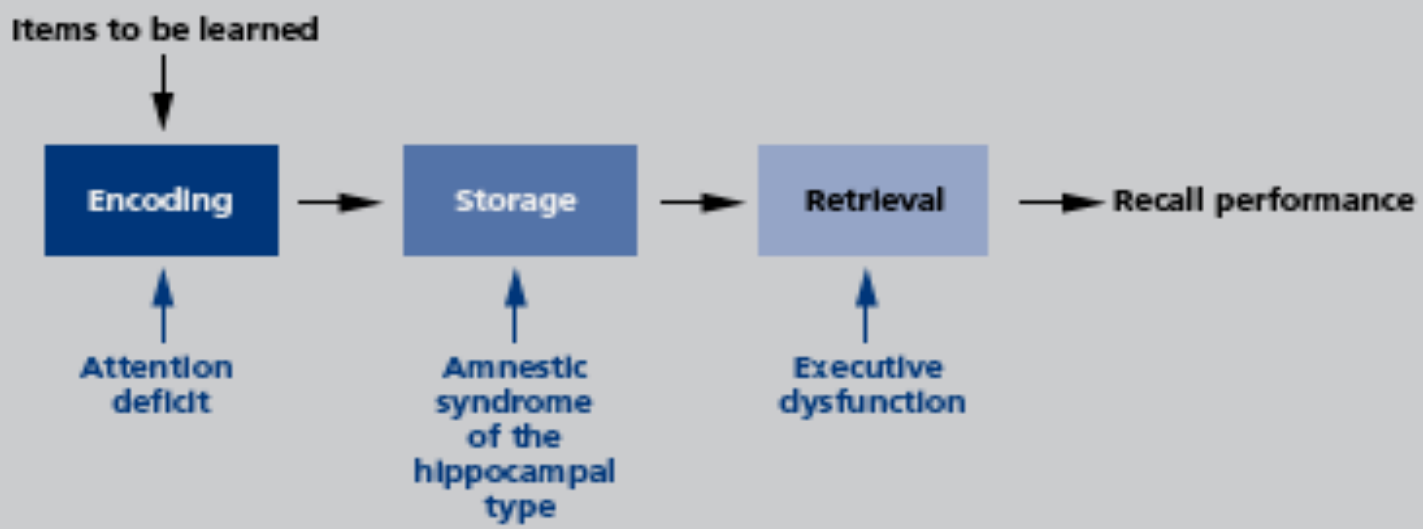


Figure 1. Specific episodic memory processes.

Addenbrooke's Cognitive Examination (ACE)

- *A brief cognitive test battery to differentiate Alzheimer's disease and frontotemporal dementia.* *Mathuranath et al., Neurology 2000; 55:1613–1620*

- ACE is a 100-point test battery assessing 6 cognitive domains. It incorporates the MMSE.
  - Cut-off <88/100 has sens 94% and spec 89% for dementia
  - Cut-off <82/100 has sens 84% and spec100% for dementia

- VLOM ratio [verbal fluency + language] / [orientation + memory] to discriminate FTD from AD using <2.2 for FTD, >3.2 for AD
  - >3.2 AD vs non-AD, sens 75%, spec 84%
  - <2.2 FTD vs non-FTD, sens 58%, spec 97%

Addenbrooke's Cognitive Examination - Revised (ACE-R)

ACE subsequently extensively revised (Mioshi et al 2006). They report similar sens and spec. VLOM ratio still recommended in ACE-R.

Therefore the ACE-R provides a brief and reliable bedside instrument for early detection of dementia, and offers an objective index to assist in differentiating AD and FTD in mildly demented patients.

available as a free download, with detailed instructions and 3 parallel forms

ADDENBROOKE'S COGNITIVE EXAMINATION - ACE-R

Final Revised Version A (2005)

Name :
Date of birth :
Hospital no. :

Addressograph

Date of testing: ...../...../.....
Tester's name: .....
Age at leaving full-time education: .....
Occupation: .....
Handedness: .....

ORIENTATION

➢ Ask: What is the

Day	Date	Month	Year	Season
.....	.....	.....	.....	.....

[Score 0-5]

➢ Ask: Which

Building	Floor	Town	County	Country
.....	.....	.....	.....	.....

[Score 0-5]

REGISTRATION

➢ Tell: 'I'm going to give you three words and i'd like you to repeat after me: lemon, key and ball'. After subject repeats, say 'Try to remember them because i'm going to ask you later'. Score only the first trial (repeat 3 times if necessary).

Register number of trials .....

[Score 0-3]

ATTENTION & CONCENTRATION

➢ Ask the subject: ' could you take 7 away from a 100? After the subject responds, ask him or her to take away another 7 to a total of 5 subtractions. If subject make a mistake, carry on and check the subsequent answer (i.e. 93, 84, 77, 70, 63 -score 4)

Stop after five subtractions (93, 86, 79, 72, 65). ....

➢ Ask: 'could you please spell **WORLD** for me? Then ask him/her to spell it backwards:

....

[Score 0-5]
(for the best performed task)

ATTENTION & ORIENTATION

MEMORY - Recall

➢ Ask: 'Which 3 words did I ask you to repeat and remember?'

....

[Score 0-3]

MEMORY - Anterograde Memory

➢ Tell: ' I'm going to give you a name and address and I'd like you to repeat after me. We'll be doing that 3 times, so you have a chance to learn it. I'll be asking you later'

Score only the third trial

[Score 0-7]

	1st Trial	2nd Trial	3rd Trial
Harry Barnes	....	....	....
73 Orchard Close	....	....	....
Kingsbridge	.....	.....	.....
Devon	.....	.....	.....

MEMORY - Retrograde Memory

➢ Name of current Prime Minister .....
➢ Name of the woman who was Prime Minister .....
➢ Name of the USA president .....
➢ Name of the USA president who was assassinated in the 1960's .....

[Score 0 -4]

MEMORY

VERBAL FLUENCY - Letter 'P' and animals

➢ **Letters**

Say: 'I'm going to give you a letter of the alphabet and I'd like you to generate as many words as you can beginning with that letter, but not names of people or places. Are you ready? You've got a minute and the letter is P'

[Score 0 - 7]

>17	7
14-17	6
11-13	5
8-10	4
6-7	3
4-5	2
2-3	1
<2	0
total	correct

➢ **Animals**

Say: 'Now can you name as many animals as possible, beginning with any letter?

[Score 0 - 7]

>21	7
17-21	6
14-16	5
11-13	4
9-10	3
7-8	2
5-6	1
<5	0
total	correct

FLUENCY

LANGUAGE - Comprehension

➢ Show written instruction:

[Score 0-1]

Close your eyes

➢ 3 stage command:
'Take the paper in your right hand. Fold the paper in half. Put the paper on the floor'

[Score 0-3]

LANGUAGE - Writing

➢ Ask the subject to make up a sentence and write it in the space below:
Score 1 if sentence contains a subject and a verb (see guide for examples)

[Score 0-1]

LANGUAGE

LANGUAGE - Repetition

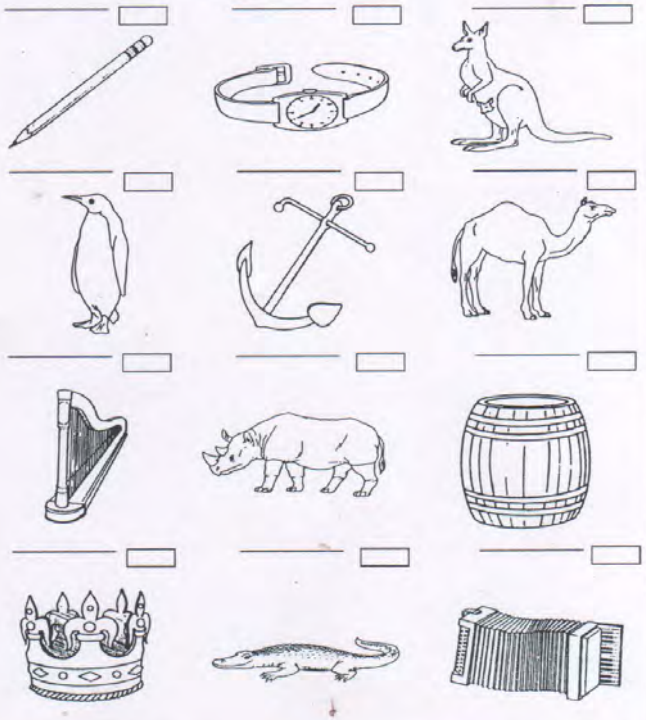
➢ Ask the subject to repeat: **' hippopotamus'; 'eccentricity; 'unintelligible'; 'statistician'**
Score 2 if all correct; 1 if 3 correct; 0 if 2 or less. [Score 0-2]

➢ Ask the subject to repeat: **'Above, beyond and below'** [Score 0-1]

➢ Ask the subject to repeat: **'No ifs, ands or buts'** [Score 0-1]

LANGUAGE - Naming

➢ Ask the subject to name the following pictures: [Score 0-2] pencil + watch



[Score 0-10]

LANGUAGE - Comprehension

➢ Using the pictures above, ask the subject to: [Score 0-4]

- Point to the one which is associated with the monarchy _____
- Point to the one which is a marsupial _____
- Point to the one which is found in the Antarctic _____
- Point to the one which has a nautical connection _____

LANGUAGE

LANGUAGE - Reading

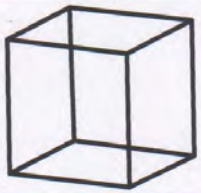
➢ Ask the subject to read the following words: [Score 1 only if all correct] [Score 0-1]

sew
pint
soot
dough
height

VISUOSPATIAL ABILITIES

➢ Overlapping pentagons: Ask the subject to copy this diagram: [Score 0-1]

➢ Wire cube : Ask the subject to copy this drawing (for scoring, see instructions guide) [Score 0-2]



➢ Clock: Ask the subject to draw a clock face with numbers and the hands at ten past five. [Score 0-5]
(for scoring see instruction guide: circle = 1, numbers = 2, hands = 2 if all correct)

VISUOSPATIAL LANGUAGE

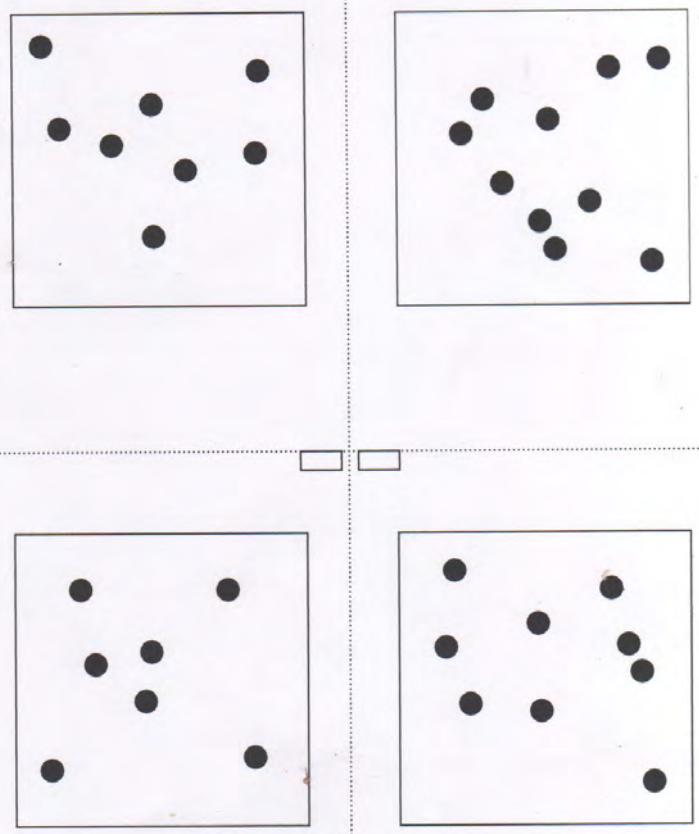
ADDENBROOKE'S COGNITIVE EXAMINATION - ACE-R

Final Revised Version (2005)

PERCEPTUAL ABILITIES

➢ Ask the subject to count the dots without pointing them

[Score 0-4]



VISUOSPATIAL

ADDENBROOKE'S COGNITIVE EXAMINATION - ACE-R

Final Revised Version A (2005)

PERCEPTUAL ABILITIES

➢ Ask the subject to identify the letters

[Score 0-4]

VISUOSPATIAL

RECALL

➢ Ask "Now tell me what you remember of that name and address we were repeating at the beginning"

Harry Barnes	....
73 Orchard Close	....
Kingsbridge	.....
Devon	.....

[Score 0-7]

MEMORY

RECOGNITION

➢ This test should be done if subject failed to recall one or more items. If all items were recalled, skip the test and score 5. If only part is recalled start by ticking items recalled in the shadowed column on the right hand side. Then test not recalled items by telling "ok, I'll give you some hints: was the name X, Y or Z?" and so on. Each recognised item scores one point which is added to the point gained by recalling.

[Score 0-5]

Jerry Barnes	Harry Barnes	Harry Bradford	recalled
37	73	76	recalled
Orchard Place	Oak Close	Orchard Close	recalled
Oakhampton	Kingsbridge	Dartington	recalled
Devon	Dorset	Somerset	recalled

General Scores

MMSE	/30
ACE-R	/100

Subscores

Attention and Orientation	/18
Memory	/26
Fluency	/14
Language	/26
Visuospatial	/16

SCORE

Normative values based on 63 controls aged 52-75 and 142 dementia patients aged 46-86

Cut-off <88 gives 94% senstivity and 89% specificity for dementia

Cut-off <82 gives 84% sensitivity and 100% specificity for dementia

MIRA -

CAMCOG(-R) as core

additional tests added as required

Currently out of print…..

SHORT NEUROPSYCHOLOGICAL BATTERY ('98 version)

PATIENT'S NAME :_____		DATE -------	DATE -------	DATE -------
ORIENTATION	(CAMCOG) Temporal	=...../5	=...../5	=...../5
	(CAMCOG) Spatial	=...../5	=...../5	=...../5
ATTENTION	(CAMCOG) 20 to 1; serial 7s dlrow	=...../7	=...../7	=...../7
LANGUAGE	(CAMCOG) Expression	=...../21	=...../21	=..../21
	(CAMCOG) Comprehension	=...../9	=...../9	=...../9
(NAMING)	(CAMCOG) 6 objects	=...../6	=...../6	=...../6
	Boston Naming Test	=...../30	=...../30	=..../30
MEMORY	(CAMCOG) Remote	=...../6	=...../6	=...../6
	(CAMCOG) Recent	=...../4	=...../4	=...../4
	Recall 6 objects	=...../6	=...../6	=...../6
	Recognition	=...../6	=...../6	=...../6
	(CAMCOG) Recall address	=...../5	=...../5	=...../5
	CAMCOG Memory	=...../27	=...../27	=..../27
	Remembering a name (RBMT)	=...../4	=...../4	=...../4
	DWR Verbal Recall	=...../10	=...../10	=..../10
	DWR Verbal Recognition	=...../10	=...../10	=..../10
	Visual Reproduction (I)	=...../41	=...../41	=..../41
	(normed percentile)	=.....%ile	=.....%ile	=.....%
PRAXIS	(CAMCOG) Praxis	=...../12	=...../12	=..../12
PERCEPTION	(CAMCOG) Perception	=...../11	=...../11	=..../11
CALCULATION	(CAMCOG) Calculation	=...../2	=...../2	=...../2
ABSTRACTION	(CAMCOG) Similarities	=...../8	=...../8	=...../8
VERBAL FLUENCY	Category (x3)	=	=	=
	Letter (x3)	=	=	=
WRITING TO DICTATION	(CAMCOG) Address	=...../2	=...../2	=...../2
	Sentences (BDAE)	=...../12	=...../12	=..../12
	CAMCOG	..../107	..../107	..../107
	MMSE(W)	...../30	...../30	..../30
	MMSE(7s)	...../30	...../30	..../30
	EXIT	...../50	...../50	..../50

RBANS™

Repeatable Battery for the Assessment of Neuropsychological Status

Christopher Randolph

UK Adaptation

Record Form A

Name _____ Age _____ Sex _____ Education Level _____

Examiner _____ Date of Testing _____ Ethnicity _____

Observations: _____

	Immediate Memory	Visuospatial/ Constructional	Language	Attention	Delayed Memory		Total Scale
Index Score							
Confidence Interval _____%							
Percentile							

Index Score	Percentile Rank	Total Scale Index Score
160	>99.9	160
155	>99.9	155
150	>99.9	150
145	99.9	145
140	99.6	140
135	99	135
130	98	130
125	95	125
120	91	120
115	84	115
110	75	110
105	63	105
100	50	100
95	37	95
90	25	90
85	16	85
80	9	80
75	5	75
70	2	70
65	1	65
60	0.4	60
55	0.1	55
50	<0.1	50
45	<0.1	45
40	<0.1	40

Twelve RBANS subtests yield 5 Indices (mean = 100 ± 15):

- **Immediate Memory**
- **Visuospatial/Construction**
- **Language**
- **Attention**
- **Delayed Memory.**

Original norms are age graded

New norms both age and education graded (Duff K et al 2003 Clin Neuropsychologist)

Which set should you use?

Note that this is a common problem with normed cognitive tests

RBANS in TUDA

- **RBANS is one of the key cognitive instruments being used in the Trinity, University of Ulster and Dept of Agriculture (TUDA) Cohort study.**
  - ***TUDA: collaborative research programme to create a nutritional phenotype / genotype database in cohorts of OPD patients with a range of conditions including hypertension, osteoporosis and cognitive decline, to examining links between diet, genetics and health in adults over 60 years of age.***
- **Clinical observation of the first 400 or so TUDA participants suggested that more were exhibiting cognitive impairment on RBANS than expected.**
- **To compare norms RBANS was administered to 436 community dwelling elderly out-patients attending St. James's Hospital enrolled in the TUDA Study.**

Results

- Using Manual norms 368 (84%) were impaired on at least one RBANS Index (see table below for % failing each).

- Only 275 (63%) were impaired using Duff age & education-corrected norms, which was considered more in line with clinical observation.

	Immediate Memory	*Visuospatial/ Construction*	*Language*	*Attention*	*Delayed Memory*
Manual norms	205/436 (47%)	234/436 (54%)	147/436 (34%)	216/436 (50%)	235/436 (54%)
Duff age-corrected	113/436 (30%)	182/436 (42%)	136/436 (31%)	209/436 (48%)	174/436 (40%)
Duff age & edu corrected	62/436 (14%)	167/436 (38%)	123/436 (28%)	154/436 (35%)	130/436 (30%)

Interpreting RBANS

The Clinical impression was that the Manual norms rate of "cognitive impairment" (84%) was excessive.

- ***Implication: The Manual norms <u>may</u> "pathologise" individuals who are not cognitively impaired.***

Subsequent chart review, which is almost completed, supports the above impression. The original norms do pick up on some cases missed by Duff norms, but the majority appear Clinically normal.

This reinforced User Qualifications in RBANS Manual: "…easily administered and scored by clinical psychologists, speech pathologists, physicians and other health care professionals with experience in mental status assessment."

"…*the test results should ultimately be interpreted only by individuals with appropriate professional training in neuropsychological assessment*"

recommended reading - from brief cognitive testing to detailed neuropsychological assessment

- Cognitive assessment for clinicians.
  Kipps, CM, Hodges, JR.
  J Neurol Neurosurg Psychiatry (2005); 76(Suppl 1), i22-i30

- Assessment: Neuropsychological testing of adults. Considerations for neurologists.
  Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology.
  Neurology (1996); 47, 592-599

- A review of screening tests for cognitive impairment.
  Cullen, B., O'Neill, B., Evans, J.J., Coen, R.F., Lawlor, B.A.
  J Neurol Neurosurg Psychiatry (2007); 78, 790-799