

## ADDENBROOKE'S COGNITIVE EXAMINATION-III

### Scoring and Instructions Guide for Indian English Version

These instructions were designed in order to make questions and scoring clear for the tester. Please read them carefully before giving the test.

If possible, leave scoring for the end of the session, as the patient will not be able to check whether the tester is ticking for correct answers or crossing for wrong ones. It might avoid anxiety that usually disturbs patient's performance on the test.

#### **1. ATTENTION - Orientation - score 0 to 10**

**Administration:** Ask the participant for the day, date, month, year, season as well as the name of the hospital (or building, or number if an address), floor (or room, or street if an address), city, state and country.

**Scoring:** Score 1 point for each correct answer. A mistake of  $\pm 2$  days is allowed for the date (e.g., 5<sup>th</sup> when the actual date is the 7<sup>th</sup>). If the participant says "23<sup>rd</sup> of the 3<sup>rd</sup>", then prompt for the name of the month. If the participant is at home, ask for the name of the place such as the apartment complex/retirement village and, for the floor, you might ask for the name of the room (e.g., kitchen, living room, etc). If at a single storey health setting, you could ask about a local landmark. When the season is changing (e.g., at the end of February) and the participant says, "Autumn" then ask, "could it be another season?" If the answer is "Summer", give 1 point since the two seasons are in transition. Do not give 1 point if the answer is "Winter" or "Spring". If participants come from interstate, orientation for city may be scored somewhat more liberally. For instance, participants may say neighbouring cities, localities which can be accepted for city.

*Seasons:* Spring - September, October, November; Summer - December, January, February; Autumn - March, April, May; Winter - June, July, August.

*For aphasic patients:* Allow patients to write down their answer, if unable to give verbal responses.

#### **2. ATTENTION - Registration of 3 Items - score 0 to 3**

**Administration:** Ask the participant to repeat and remember the three words. Speak slowly. Repeat the words if necessary but up to a maximum of 3 times only. Tell the participant that you will ask for this information later.

**Scoring:** Score the first attempt only. Record the number of trials it takes to learn all 3 words.

#### **3. ATTENTION - Serial 7 Subtraction - score 0 to 5**

**Administration:** Ask the participant to subtract 7 from 100, record the answer, and then ask the participant to keep subtracting 7 from each new number until you ask them to stop. Stop the participant after 5 subtractions.

**Scoring:** Record responses and do not stop the participant if they make a mistake. Allow them to carry on and check subsequent answers for scoring (e.g., 92, **85**, 79, **72**, **65** - score = 3).

#### 4. MEMORY - Recall of 3 Items - score 0 to 3

**Administration:** Ask the participant to recall the words that you asked them to repeat and remember earlier.

**Scoring:** Record responses and score 1 point for each correct item. Do not prompt the participant for the items.

#### 5. VERBAL FLUENCY - Letter and Category - score 0 to 14

##### Letters - score 0 to 7

**Administration:** Tell the participant: *"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. For example, if I give you the letter 'C', you could give me words like 'cat, cry, clock' and so on. But, you can't give me words like Catherine or Canada. Do you understand? Are you ready? You have one minute. The letter I want you to use is the letter 'P'."*

**Scoring:** First, record the total number of words that the participant generates. Then, count the total number of correct words, which do not include: (1) repetitions, (2) perseverations (e.g., pay, paid, pays - score = 1), (3) intrusions (i.e., words beginning with other letters), (4) proper names (i.e., names of people or places) and (5) plurals (e.g., pot, pots - total = 2, correct = 1). Use the table provided on the ACE-III sheet to obtain the final score for this test.

##### Animals - score 0 to 7

**Administration:** Tell the participant: *"Now can you name as many animals as possible. It can begin with any letter."* **Scoring:** Again, record the total number of animals that the participant generates. Then, count the total number of correct words, which do not include higher order categories when specific exemplars are given (e.g., "fish" followed by "salmon" and "trout" - total = 3; correct = 2). All types of animals are accepted, including insects, humans, prehistoric, extinct as well as mythical creatures (e.g., unicorn). If the participant misunderstands the instructions and perseverates by naming animals beginning with "p" (e.g., panda, possum, platypus etc), then reiterate to the participant that they should name animals beginning with any letter.

#### 6. MEMORY - Anterograde Memory - Name and Address - score 0 to 7

**Administration:** Instruct the participant: *"I'm going to give you a name and address and I'd like you to repeat the name and address after me. So you have a chance to learn, we'll be doing that 3 times. I'll ask you the name and address later."* If the participant starts repeating along with you, ask them to wait until you give it in full.

**Scoring:** Record responses for each trial but only responses in the third trial contribute to the ACE-III score (0- 7points).

#### 7. MEMORY - Retrograde Memory - Famous People - score 0 to 4

**Administration:** Ask the participant for the name of the current Chief Minister of the State, the current Prime Minister of India, the actor who was the hero in the film 'Mera Naam Joker' and the Father of our Nation.

**Scoring:** Score 1 point each. Allow surnames (e.g., "Singh") and ask for a surname if only the first name is given (e.g., "Manmohan"). If the full name given is incorrect (e.g., "N.T. Rama Rao"), then the score would be 0. If there has been a recent change in leaders, probe for the name of the outgoing politician.

#### 8. LANGUAGE - Comprehension - score 0 to 3

**Administration:** Place a pencil and a piece of paper in front of the participant. As a practice trial, ask the participant to "*pick up the pencil and then the paper*". If this is incorrectly performed, score 0 and do not continue any further.

Otherwise, continue onwards with the three other commands listed on the protocol. Before beginning each trial, always place the pencil and piece of paper in front of the participant.

**Scoring:** A score of 1 is given for each command performed correctly.

#### 9. LANGUAGE - Sentence Writing - score 0 to 2

**Administration:** Ask the participant to write at least two sentences about his/her last holiday/weekend/Festival. Ask the participant to write in complete sentences (i.e., do not write in point form) and without use of any abbreviations (e.g., "&").

**Scoring:** Give 1 point if there are at least two sentences about the one topic; and, give another 1 point if grammar and spelling are correct.

Note: These are examples from the ACE-III Australian version. This is just to give you an idea about the errors. The errors in Indian English may not follow the same pattern.

Examples:

Score = 1	
<p>last christmas I spent holidays with my family H. I was hot and grandsons went surfing</p>	Grammar incorrect
<p>WE WENT TO AMERICA IN DECEMBER 2011. I LIKE COMING TO NEURO SCIENCE FOR MY CHECK UPS.</p>	Sentences are not related to the one topic
<p>we when to Coolangatta for our last holiday and it was great. <del>when dad goes away we make christmas</del> <del>to the</del> we when for walk along the beach to Rainbow bay and play in the water.</p>	Spelling and grammar are both incorrect although these are two sentences related to the one topic

Score = 0	
<p>Sunny Wetter</p>	

#### 10. LANGUAGE - Single Word Repetition - score 0 to 2

**Administration:** Ask the participant to repeat each word after you, saying only one word at a time.

**Scoring:** Only the first attempt is scored. Score 2 if all words are correct; 1 if only 3 are correct; 0 if 2 or less are correct.

#### 11. LANGUAGE - Proverb Repetition - score 0 to 2

**Administration:** Ask the participant to repeat

each proverb.

**Scoring:** Do not accept partially correct repetitions (e.g., "all that glistens is not gold"). Score 1 point for each proverb.

*Note:* Following the repetition of each proverb, the examiner may wish to ask the participant "What does this proverb mean?" or "How would you explain this proverb to someone who has not heard it before?" This additional measure can aid the clinician in the qualitative assessment of verbal abstract thinking.

## **12. LANGUAGE - Object Naming - score 0 to 12**

**Administration:** Ask the participant to name each picture.

**Scoring:** Correct answers are: book; spoon; goat; candle; flag; camel; sickle; giraffe; drum; umbrella; pig; crocodile/alligator. Score 1 point for each item.

## **13. LANGUAGE - Comprehension - score 0 to 4**

**Administration:** Ask the participant to point to the pictures according to the statement read. Do not provide any feedback regarding the word meaning.

**Scoring:** Score 1 point for each item. Self-corrections are allowed.

## **14. LANGUAGE - Reading - score 0 or 1**

**Administration:** Ask the participant to read the words aloud.

**Scoring:** Score 1 point if all five words are read correctly. Record the mistakes using the phonetic alphabet, if possible.

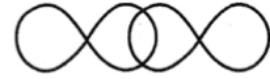
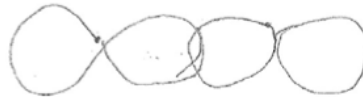
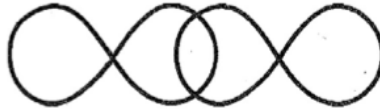
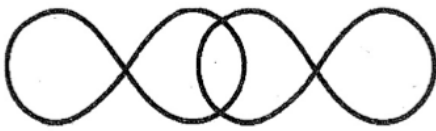
## **15. VISUOSPATIAL ABILITIES - Intersecting Infinity Loops - score 0 or 1**

**Administration:** Ask the participant to copy the intersecting infinity loops.

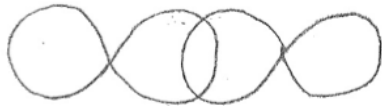
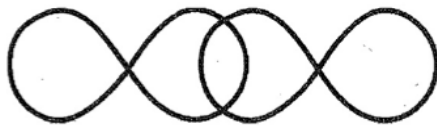
**Scoring:** A score of 1 is given if two infinity loops are drawn and overlap. Both infinity loops must come to a point/cross and do not look like circles.

Examples:

Score = 0



Score = 1

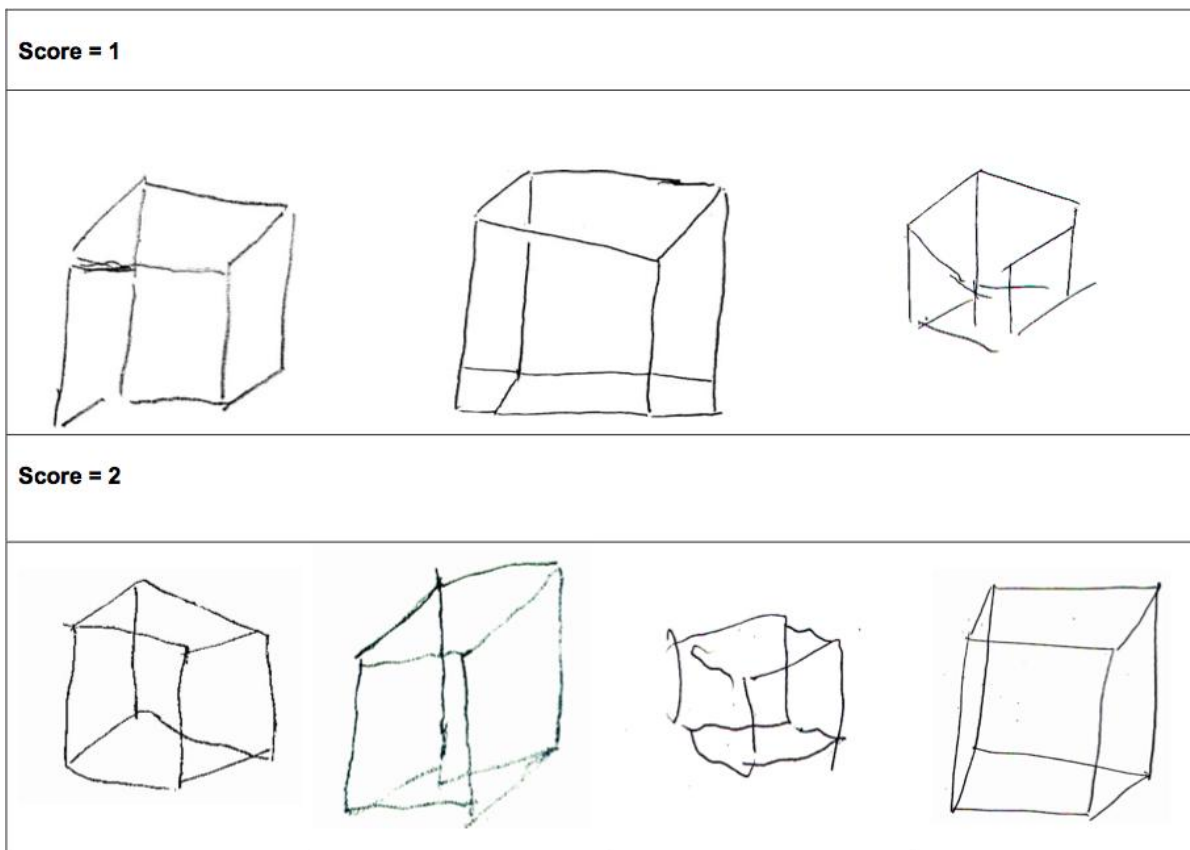


## 16. VISUOSPATIAL ABILITIES - 3D Wire Cube - score 0 to 2

**Administration:** Ask the participant to copy the 3-D wire cube.

**Scoring:** The cube should have 12 lines to score 2 points, even if the proportions are not perfect. A score of 1 is given if the cube has fewer than 12 lines but a general cube shape is maintained.

Examples:



## 17. PERCEPTUAL ABILITIES - Counting Dots - score 0 to 4

**Administration:** Ask the participant for the number of dots in each square. The participant is not allowed to point.



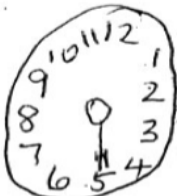

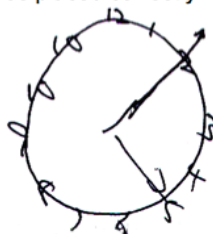
**Scoring:** Score 1 point for each correct answer. Correct answers: 8, 10, 9 and 7.

## 18. VISUOSPATIAL ABILITIES - Clock - score 0 to 5

**Administration:** Ask the participant to draw a clock face with numbers on it. When he/she has finished, ask them to put the hands at "ten past five". If the participant does not like their first drawing and would like to do it again, you can allow for that and score the second clock. Participants may correct their mistakes by erasing it while drawing.

**Scoring:** The following scoring criteria are used below to give a total of 5 points.

Circle	1 point maximum if it is reasonable circle
Numbers	2 points if all numbers are included and well distributed within the circle 1 point if all numbers are included but poorly distributed or outside of the circle 0 points if not all numbers are included
Hands	2 points if both hands are well drawn, different lengths and placed on correct numbers (you might ask which one is small and big one) 1 point if both placed on the correct numbers but wrong lengths OR 1 point if one hand is placed on the correct number and drawn with correct length OR 1 point if only one hand is drawn and placed at the correct number i.e. 5 for 'ten past five'

<b>Score 2</b>		
Circle (1); one hand placed correctly (1)	Circle (1); all the numbers but not placed inside the circle (1)	
		
<b>Score 3</b>		
Circle (1); all the numbers but not proportionally distributed (1), one hand placed correctly (1)	Circle (1), all the numbers but not placed inside the circle (1), one hand placed correctly (1).	Circle (1), note that numbers are not inside the circle and there are 2 number 10s (0), hands placed correctly
		

Examples:



**Score 4**

Circle(1); numbers proportionally distributed (2); one hand placed correctly (1)



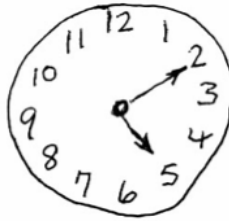
Circle (1); all the numbers but not proportionally distributed (1); both hands placed correctly (2)



Circle (1); numbers proportionally distributed (2), one hand placed correctly (1)

**Score 5**

Circle (1); numbers proportionally distributed on both halves of the clock face (2); hands placed correctly (2)

**19. PERCEPTUAL ABILITIES - Counting Dots - score 0 to 4**

**Administration:** Ask the participant for the number of dots in each square. The participant is not allowed to point.

**Scoring:** Score 1 point for each correct answer. Correct answers: 8, 10, 9 and 7.

**20. PERCEPTUAL ABILITIES - Identifying Letters - score 0 to 4**

**Administration:** Ask the participant to identify the letter in each square. The participant is allowed to point.

**Scoring:** Score 1 point for each correct answer. Correct answers: K, M, T and A.

*For aphasic patients:* If the participant is unable to say the number of dots or letter name, allow them to write their answer. For the letter, allow them to say the correct letter sounds (e.g., "mmm").

## 21. MEMORY - Recall of Name and Address - score 0 to 7

**Administration:** Say to the participant: *"Now tell me what you remember of that name and address we were repeating at the beginning".*

**Scoring:** Score 1 point for each item recalled, using the score guide provided in the test.

**Sunil Kumar Singh**

**52, Station Road**

**Gandhinagar**

**Allahabad**

Examples:

Example: 1a		
Sunil Kumar Verma 14 Station Road Nehru Nagar .....	1 + 0 0 + 1 + 1 0 0	Score 3/7
Example: 2a		
Sunil Kumar Singh 52 Gandhi Road ..... Allahabad	1 + 1 1 + 0 + 1 0 1	Score 5/7
Example: 3a		
Sunil Kumar Verma 78 Market Street Gandhi Road Lucknow Allahabad	1 + 0 0 + 0 + 0 0 + 0 0 1	Score 2/7

## 22. MEMORY – Recognition of Name and Address – score 0 to 5

**Administration:** This condition is given to participants if they fail to recall one or more items in the Recall condition. This task is given to allow the participant a chance to recognise items that he/she could not recall. If all of the items in the name and address are correctly recalled, this condition is not needed and the participant automatically scores 5 points. However, many participants will recall only parts of the name and address. First, tick the correctly remembered items on the shaded column (right hand side) and then tell the participant, “Let me give you some hints. Was it x, y or z?” and so on.

**Scoring:** Every item recognised correctly scores 1 point. Add the correctly recalled and recognised item to give a total of 5 points for this condition.

Example 1b (based on example 1a)

<p>Tester ticks “Station Road” on the right hand side shadowed column because participant had recalled that item. The tester should then ask:</p> <p>-Was it Sunil Kumar Sharma, Sunil Kumar Singh or Rakesh Yadav?</p> <p>- Was it 25, 52 or 37?</p> <p>- Was it Prakash Nagar, Gandhi Nagar or Patel Nagar?</p> <p>- Was it Allahabad, Gwalior or Indore?</p>	<p>Participant's answers:</p> <p>Sunil Kumar Singh</p> <p>37</p> <p>Gandhinagar</p> <p>Gwalior</p>	<p>1</p> <p>0</p> <p>1</p> <p>0</p> <p>+1 (Station Road)</p> <p>Score 3/5</p>
Example 2b (based on example 2a)		
<p>Tester ticks “Sunil Kumar Singh”, “52” and “Allahabad” on the right hand side shadowed column because participant had recalled those items. The tester should then ask:</p> <p>- Was it Market Road, Sastri Marg or Station Road?</p> <p>- Was it Prakash nagar, Gandhinagar or Patel nagar?</p>	<p>Participant's answers:</p> <p>Station Road</p> <p>Gandhinagar</p>	<p>1</p> <p>1</p> <p>+3 (Sunil Kumar Singh, 52, Allahabad)</p> <p>Score 5/5</p>
Example 3b (based on example 3a)		

Tester ticks “Allahabad”, on the right hand side shadowed column because participant had recalled that item. The tester should then ask:	Participant's answers:	
-Was it Sunil Kumar Sharma, Sunil Kumar Singh or Rakesh Yadav?	Sunil Kumar Sharma	0
- Was it 25, 52 or 37?	25	0
- Was it Market Road, Sastri Marg or Station Road?	Sastri Marg	0
- Was it Prakash nagar, Gandhinagar or Patel nagar?	Patelnagar	0
		+1 (Allahabad)
		Score 1/5

### SCORES – Domain and Total Score of the ACE-III

**Scoring:** Sum the items for each of the five domains (attention, memory, fluency, language and visuospatial) to give the Domain Scores for ACE-III. The total score (/100) consists of the sum of the five domain scores.

Table 1. Common ACE-III cut-off values with sensitivity and specificity levels in diagnosing dementia and MCI

	Education $\leq$ 10			Education >10		
	Cut-off value	Sensitivity	Specificity	Cut-off value	Sensitivity	Specificity
Dementia	82	0.97	0.92	84	0.98	0.96
MCI	86	0.96	0.82	89	0.92	0.81