

**The Edinburgh Cognitive and Behavioral ALS Screen (ECAS)
North American Version
Administration and Guidance Notes 2013**

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The ECAS is a practical screening tool that incorporates a range of short cognitive tests that have been shown to be sensitive to cognitive impairment in ALS. The ECAS has been designed to differentiate between the different profiles common with aging including depression, Alzheimer's disease and Frontotemporal Dementia. Executive Functions, Memory, Language, Visuo-Spatial skills and Social cognition are specifically assessed while a Behavioral and Psychosis brief interview can be carried out with caregivers or relatives. The ECAS is designed for ALS patients and answers can be given verbally, or by a combination of writing or pointing. It is suitable for patients who are anarthric or patients who have no hand motor function. The total score is 136 points and should take no longer than 15 minutes to administer.

Equipment required: To carry out the ECAS, you will need a clock or a watch with a second hand (though a stopwatch would be preferable). A calculator is recommended for calculations (though these can also be carried out by hand). Answers can be written or spoken, though should be spoken where possible. If answers are to be written, extra sheets of paper and a selection of pens that will suit the person's writing ability will be required.

Language – Naming: Score 0-8

Administration: There are eight pictures displayed. Ask the person to name the objects shown. No time limit is enforced for the task. Incorrect answers are recorded and no prompt for alternative word is provided. A correct score will only be given if the **exact name is said or spelled correctly**. Self-corrections are allowed; only the **final** answer is taken for scoring.

Scoring: One point is given for every correct name given. Correct answers are (left to right, top to bottom); **scorpion, bow, helicopter, fox/wolf/coyote, axe/hatchet, squirrel, swan, accordion**. If the subject answers with a more general response (e.g. "ribbon" for "bow") please give the following prompt: "is there a more specific name for this?" If the subject answers with a regionally similar response (e.g. "squeeze box" for "accordion"), please give the following prompt: "is there another name for this?"

Language – Comprehension: Score 0-8

Administration: Using the pictures from the naming task, ask the person to correctly answer the questions. Questions are either read by the person or to the person, depending on preference. Some questions will require the repetition of an earlier item to serve as an answer; participants are not warned about this in advance but this can be clarified if queried. If no answer is provided, answer space is to be left blank. Self-corrections are allowed; only the final answer is taken for scoring.

Scoring: One point is given for every correct answer given. **Correct answers are; helicopter, swan, squirrel, axe, helicopter, axe, scorpion, squirrel.**

Memory – Immediate Recall: Score 0-10

Administration: Say: “*I am going to read you a short story. Please listen carefully. When I am finished, say or write as much as you can remember.*” Story should be read at a steady pace of 2 words per second/the story should take around 20 seconds to read out. When finished reading story aloud, say to participant “*Now that’s the end of the story, what can you remember?*” Time for recall is unlimited, until participants say that they can remember no more. Self-corrections are allowed; only the final answer is taken for scoring.

Scoring: Score 1 point for each (either entire or part of) underlined section recalled. For example “annual park cleanup” recalled as ‘*annual cleanup*’, ‘*park cleanup*’, or ‘*annual trash cleanup*’ would each score 1 point. Number information must be recalled accurately, for example “Forty two people” recalled as ‘*forty something*’ would score 0 points. This immediate recall score will **also** be used later on to calculate the percentage of memory retained over time. No prompts should be given for specific information, only “is that everything you can remember” should be asked to confirm participant is finished recall.

Language – Spelling: Score 0-12

Administration: Say “*Spell, either by writing or speaking, the following words.*” If the person is using assistive technology, ask them to turn off any predictive text facility. Unlimited time is given for spelling of each word. All words are assessed even if early words in the list are incorrect. Move on to the next word if participant is unable or unwilling to attempt spelling of one word.

Scoring: Score 1 point for each correct spelling. Self-corrections are allowed; only the final answer is taken for scoring. Give one point if the participant inserts a space in the spelling of the words coathanger, lawnmower, skateboard, or screwdriver.

Fluency - Letter S: Score 0-12

Administration: The person can perform this task either by speaking or writing. Say: “*I am going to give you a letter of the alphabet and I would like you to say or write as many words as you can beginning with that letter.*”

But not names of people or places, or numbers

- If speaking, say “You will have one minute and the letter is S.”
- If writing, say: “You will have two minutes and the letter is S.”

Next the person copies/repeats these words.

- If speaking, say: “*Read aloud these words as fast as possible. Before you do this, check that you can read them. I will time you. Ready? Begin.*”
- If writing, say: “*Copy these words as fast as possible. I will time you. Ready? Begin.*”

Scoring: All answers provided are recorded however the following rules apply for scoring items as correct.

Record all words the participant says. After the time is up, transcribe the list excluding any intrusions or perseverations. Ask the participant to read back the transcribed list as quickly as possible and record the time to read the transcribed list. Record the number of intrusions and perseverations in the original list, but do not include these words when calculating the fluency index. Words must be varied for example: *sugar, salt, slipper, snow, scream, shoot, scale, scissors*....Do not include repetitions, nonsense words or proper names in scoring items correct. Repetitions where a second meaning is provided (e.g. 'school - the educational institution' or 'school - collective name of fish') are scored as independent items. Likewise, when items are spoken and a different spelling/meaning is indicated (e.g. *scene* and *seen*) items are scored as independently correct. Where a meaning change is indicated (e.g. *savor* and *savory*) items are scored as independently correct. Plural words will be accepted, only if they have not already been provided in singular form (e.g. *slipper, slippers* = score 1). Perseverations of words such as *sit, sat, sitting*... where meaning is not changed, are **not accepted as correct** (e.g. *sit, sat, sitting* = score 1). In order to account for differences in motor speed and speaking time variations, a Verbal Fluency Index (VFI) is calculated using the equation below.

$$\text{VFI} = \frac{(\text{test time} - \text{time taken to repeat words})}{\text{Number of correct words generated}}$$

For example, a participant given 60 seconds to complete the task who generates 5 words and then takes 15 seconds to read these words aloud would have a VFI of 9:

$$\frac{60-15}{5} = \text{VFI of } 9$$

A participant's VFI is converted to a Fluency score using the conversion table provided in ECAS.

Executive – Reverse Digit Span: Score 0-12

Administration: Numbers should be read out at a pace of 1 number per second. Say: "I am going to say some numbers and I would like you to say them back to me in reverse order. For example, if I say '2 3 4', you should say '4 3 2'. Let's practice. If I say '7 1 9', what would you say?" If participant cannot complete the practice trial, another practice trial is provided at the level of two digits, before moving on to test items. If a participant cannot complete a practice trial at the level of two items, the test is scored as 0 out of 12 and no further test items are attempted. Advance warning that the number sequences will increase in length is provided at the start of each line of a trial. In order to score a trial of a line as correct, participant must accurately recall *all* items in reverse order. No score is given for individual numbers correctly recalled in an incorrectly recalled sequence. If person gets at least one trial of a line correct, move on to the next line. Self-corrections are allowed; only the final answer is taken for scoring. Stop when person gets both trials of a line wrong.

Score: Score is total number of trials achieved correctly (out of 12).

Executive – Alternation: Score 0-12

Administration: Say: "I want you to alternate between numbers and letters, in order without skipping any, starting with 1A, then 2B, then 3C, and so on. Let's begin together: 1A, 2B, 3C..." Start scoring at "4D"

Score: One point is given for every correct trial. Administration can end after the participant makes one error.

Fluency - Letter T: Score 0-12

Administration: The person can perform this task either by speaking or writing. Say: *“I am going to give you a letter of the alphabet and I would like you to say or write as many words as you can beginning with that letter.*

But not names of people or places, or numbers. This time the words you give must only be four letters long. No more or less than four letters. Note: Plurals are accepted in order to create four letters – for

example, *Toes.*

- If speaking, say “You will have one minute and the letter is T.”
- If writing, say: “You will have two minutes and the letter is T.”

Next the person copies/repeats these words.

- If speaking, say: *“Read aloud these words as fast as possible. Before you do this, check that you can read them. I will time you. Ready? Begin.”*
- If writing, say: *“Copy these words as fast as possible. I will time you. Ready? Begin.”*

Record all words the participant says. After the time is up, transcribe the list excluding any intrusions or perseverations. Ask the participant to read back the transcribed list as quickly as possible and record the time to read the transcribed list. Record the number of intrusions and perseverations in the original list, but do not include these words when calculating the fluency index.

Scoring: See scoring criteria from previous Fluency task to produce VFI, and conversion table provided in ECAS.

Visuospatial – Dot counting: Score 0-4

Administration: Say *“I would like you to count how many dots are in each box, but without pointing to them”.*

Progress from left to right and top to bottom to move through the squares. All squares should be attempted.

Score: One point for each correct box. **Correct answers are: Top left 10, top right 8, bottom left 7, bottom right 9.**

Visuospatial – Cube counting: Score 0-4

Administration: Ask the person *“How many cubes are in each structure, including the ones you may not be able to see?”* Progress from left to right and top to bottom to move through the cube structures. All structures should be attempted.

Score: one point for each correct answer. **Correct answers are top left 5, top right 6, bottom left 10 and bottom right 7.**

Visuospatial – Number location: Score 0-4

Administration: Ask the person “Which number corresponds to the position of the dot?” Progress from left to right and top to bottom to move through the squares. All squares should be attempted.

Score: One point for each correct answer. **Correct answers are top left 6, top right 5, bottom left 2, bottom right 3**

Executive – Sentence completion: Score 0-12

Administration: Say “Listen carefully to these sentences and as soon as I have finished reading them, please tell me, or write, a word that finishes the sentence as quickly as possible.” **For example, ‘She was so tired that she went straight to...bed’.** Do not score the first two questions. Now say: “I’d like you to do that again, but this time the word you give should not make sense whatsoever in the context of the sentence. It must not be related to the word that actually completes the sentence. **For example, ‘John cut his hand with the sharp...orange’.** If person answers with a word which completes the sentence in context then remind them that the requirement is to provide an answer that bears no significance to the context of the sentence. Score the word that was given **before** the prompt. Only remind participants of the instructions **once**. Progress through all questions, even when incorrect answers are provided. If the person does not respond within 20 seconds, move onto the next question. If the participant repeats a word they have already given ask them to provide a different word.

Score: 2 for completely unconnected word, 1 for related word (e.g. **associated** or opposite meaning) and 0 for exact word. See table below for scoring examples. Note: sentences can be ungrammatical.

	Question	2 points	1 point	0 points
1	The mailman knocked on the...	Car, potato...	Window, gate, mailbag...	Door
2	He brought his umbrella with him in case of...	Rubber, parachute...	Sunshine, wind, ice...	Rain
3	Sally spread her toast with butter and...	Earth, sand...	Cereal, egg, oranges...	Jam, Marmalade, Honey, Cheese, jelly
4	John went to the barber and got his hair...	Moon, table...	Washed, lengthened, singed...	Cut
5	She dived into the swimming...	Garden, swing...	Pond, bath, rock...	Pool
6	They all went to the local café for something to...	Jump, dance...	Do, play, buy...	Eat, drink.

Social Cognition – Part A

Administration: The first page contains six boxes each with four pictures in each corner.

Say: “*You are going to see some pictures, one in each corner of a box. You have to choose **which picture you like best**. Either point to or say which picture you like best. Please respond as quickly as possible.*”

Score: Answers are recorded but not scored; responses are used as information to support scoring in the next section.

Social Cognition – Part B: Score 0-12

Administration: Say: “*You are going to see some pictures, one in each corner of a box. You have to choose which picture **the face likes best**. Either say or point to which **the face likes best**. Please respond as quickly as possible.*’ Progress through all questions even when incorrect answers are provided.

Score: Two points for each correct response. Of the items not correctly identified, score 1 point if answer was NOT the item that participant picked as their own favorite in the previous section, score 0 points if the item WAS picked as their own favorite.

Memory – Delayed recall: Score 0-10

Administration: Say: “*At the beginning of this interview, I read you a story. Tell me as much as you can remember from that story.*” Time for recall is unlimited, until participants say that they can remember no more. Self-corrections are allowed; only the final answer is taken for scoring.

Score: 1 point for each (either entire or part of) underlined section recalled. The percentage of memory retained is now calculated. Take the total score for **Delayed Memory and divide it by the Immediate**

Memory score, before multiplying this number by 100. For example:

With a Delayed Memory Score of 8/10, and an Immediate Memory Score of 9/10

The percentage of retained memory is 89%.

Some patients may recall more at delay than immediate and the percentage will be displayed as being over 100%. **Use the conversion table provided in ECAS to derive scoring.**

Memory – Delayed recognition: Score 0-4

Administration: This test should only be done if the person failed to recall one or more items. If all the items were recalled, skip the test and score 4.

Otherwise, say: “*Let’s see if you can remember anything more about that story. I will ask you some questions, please tell me if they are **true or false**”.*”

Score: Score 1 point for each correct answer; correct answers are marked in bold in this section. If the person gives a “don’t know” answer ask them to make a guess on True or False and score accordingly. **Use the conversion table provided in ECAS to derive final scoring for recognition section.**

SCORES

Language	Naming, Comprehension, Spelling	/28
Verbal Fluency	Fluency Letter S, Fluency Letter T	/24
Executive	Reverse Digit Span, Alternation, Sentence Completion, Social Cognition	/48
ALS-SPECIFIC:		/100
Memory	<i>Immediate recall, Delayed retention, Delayed recognition</i>	/24
Visuospatial	<i>Dot Counting, Cube Counting, Number Location</i>	/12
ALS NON-SPECIFIC:		/36
ECAS TOTAL SCORE		/136

CUT OFF SCORES FOR ABNORMALITY:

ECAS TOTAL SCORE	105
ALS-SPECIFIC	77
ALS NON-SPECIFIC	24
Language	26
Verbal Fluency	14
Executive	33
Memory	13
Visuospatial	10

**ALS Caregiver Behavior Screen
Guidance and Administration
American English Version**

Please ask the caregiver or relative to complete this screen in private from the patient, ideally in a separate room. There are five components to this screen. Some people may have noticed a change in all areas, some in a few, and others may note there are no changes with the patient. Please ask the caregiver or relative to give any examples if possible.

Administration – Score 0-10

Please ask the caregiver about the listed possible behaviors. Symptoms should have occurred **repeatedly** and not just on one instance, and may have occurred prior to the development of any motor signs. Check 'Yes', 'No' or 'Don't Know'. If 'Yes', please provide a brief written description. Give one point for every 'Yes' response (maximum = 10).

**ALS – Psychosis Screen
Guidance and Administration
American English Version**

Guidance: Please ask the caregiver or relative to complete this section away from the patient, ideally in another room. Please remind the caregiver or relative that the questions asked are only relevant since the onset of ALS.

Administration- score 0-3

Please ask the caregiver about the following possible symptoms. Check 'Yes', 'No' or 'Don't Know'. If 'Yes', please provide a brief written description. Give one point for every 'Yes' response (maximum = 3).

Guidance: Please ask the caregiver or relative the listed questions. If the answer is Yes to any question, please note any relevant examples or comments.