



**INSTRUCTIONS FOR THE NEUROCOGNITIVE BATTERY
AND NEUROCOGNITIVE SUMMARY SCORE FORM:
Modified for the ARIC-PET Clinic Visit (7/21/2014)**

Materials:

Neurocognitive Test Battery Examiner's Packet
Card with intersecting pentagons (MMSE) – 5x8
Card with “close your eyes” (MMSE) – 5x8
MMSE Scoring Key for Spelling WORLD Backward
Digit Symbol Substitution Form and scoring transparency
Set of 10 cards for the Delayed Word Recall – 5x8
Incidental Learning Template
Set of 2 Trail Making Tests (A and B) on card stock per participant. Each card
will have the sample on the front and the test on the back.
Tapper for Finger Tapping Test
Boston Naming picture book
Set of 11 cards for Clock Reading test - 5x8
Stop watch
Wrist watch
Pencil
2 sheets of paper
Digital audio recorder (for QC)
Do Not Disturb sign (for door)
Clipboard

I. General Instructions

1. All neurocognitive measures are performed on paper. Affix a participant ID label to the first page of the Neurocognitive Test Battery Examiner's Packet, or complete the header information if labels are not available. Likewise, label all loose response forms, i.e., MMSE pentagons, Digit Symbol Substitution form, Incidental Learning form, Trails A and B.
2. A trained examiner administers the cognitive function tests in a fixed order, one right after the other, during a single session in a quiet room. A mandatory brief break is offered to each participant after about half of the tests have been completed.
3. Responses are recorded on the paper test packet by the examiner or by the participant and kept in the participant's folder. Test results are tabulated and scored by the examiner after the participant has completed the tests and left the room.
4. The testing environment and examiner behavior should be geared toward optimizing the participant's performance on each of the cognitive measures.
5. Testing should be conducted in a quiet area free of extraneous background noise and interruptions, as these distractions may affect test results. Turn off cell phones, office phones, and place a "quiet please" sign on the room where testing is conducted.
6. Always inquire if the participant uses reading glasses or wears a hearing aid. If so, these items should be worn during testing. Because the materials to be read are printed in large print, all tests should be attempted even if a participant has forgotten to bring his/her glasses. If a participant is hard of hearing, proceed with the testing but make accommodations (speaking in a lower tone is often more effective than trying to speak more loudly).
7. The testing area (either in the clinic or home) must have a table with sufficient work space and appropriate lighting for the participant to work comfortably.
8. A good quality stopwatch is necessary to time components of the cognitive function exam. The stopwatch should be simple to use, easy to read, and one that allows the examiner to begin and end timing silently (some stopwatches produce a sound upon starting and stopping).
9. Timing should always be as discrete as possible to avoid producing anxiety and affecting test results.
10. Always read scripts exactly as written (all scripts are in bold). The scripts should be memorized where possible so that the delivery is fluid and sounds less formal than reading from a script.
11. Each participant should be allowed to attempt every task, unless it is determined that the participant cannot do the task due to an obvious physical impairment.

12. Although time limits are set for some tests, the participant should never be told of any time limit on any measure.
13. With the exception of when a fixed time limit has expired on a task, self-correction is routinely accepted.
14. Participants are often curious as to how well they did. Although scoring does not take place during testing, the interviewer should reassure each participant who asks that he/she did about as well as many others who have taken the tests. Do not indicate to the participant whether specific responses are correct or incorrect or whether scores are high or low. For participants who express concern that they may have performed poorly on the tests, they may be reassured that the tests are designed to be difficult enough that very few people get them all of the questions correct.
15. Most participants will feel challenged, however, some may feel insecure and others possibly hostile. It is important for the examiners attitude to be friendly, non-threatening, reassuring and supportive throughout the testing. Examiners should be sensitive to provide positive reinforcement (e.g., "you're doing fine") as appropriate throughout testing.

II. Detailed Instructions for Each Test

MINI-MENTAL STATE EXAM (MME)

For a participant unable to complete MME items due to cognitive impairment (as opposed to physical impairments such as deafness), mark unanswered questions as incorrect.

Administration:

Introduce the cognitive testing portion of the exam:

“In this next part of the exam I will ask you some questions and give you some short tasks that will require memory and concentration. Some may be a little bit more difficult than others.”

Orientation to time:

1-5. Read each question and record responses. One point is given for each correct response.

If unsure whether a response is correct or not, record the participant's response on the scoring sheet and seek clarification after the testing session.

If the participant gives only the last two digits of the year, prompt by saying, **“what is the full year?”**

Some leeway is allowed for the correct response to season:

Winter: December, January, February, March

Spring: March, April, May, June

Summer: June, July, August, September

Fall/Autumn: September, October, November, December

If the participant gives the date when prompted for the day, give credit for date if the response is correct, and say: **"Good, and what day of the week is it?"**

Orientation to place:

6-10. Read each question and record response. One point is given for each correct response

The correct answer to “what is the name of the place where we are right now” will obviously vary by Field Center and location (clinic vs. home). Any correct name that is reasonably specific is acceptable (e.g., University Medical Center, ARIC clinic, my home, nursing care facility, etc.). If a generic or vague response is given (e.g., hospital), the examiner should prompt for a more detailed response, e.g. **“Can you tell me a more specific name for this place?”**

Registration:

EXPLAIN THE RULES AS FOLLOWS:

“I am going to name three objects. After I have said them, I want you to repeat them all back to me. Ready? Repeat these words after me: Apple, Penny, Table.”

“Please try to remember what they are, because I am going to ask you to name them again in a few minutes.”

11-13. Score one point for each word repeated correctly on the first attempt. If the participant is unable to recall all three words, give up to 3 trials until he/she correctly names all three. After 3 attempts, discontinue this section and select “not attempted/refused” for each item. In this case, items 24-26 (recall) should not be asked and scored as “not attempted/refused.”

Attention and Concentration:

SAY: **“How do you spell the word World?”**

If the participant is unable to spell “WORLD” forward, prompt with “It is spelled W-O-R-L-D” at the rate of ~ 1 second per letter. Coach only once, then continue with the second part of the question, even if the performance in spelling forward is not perfect.

Ask the participant: **“How would you spell it backwards?”**

14-18. Score one point for each letter given in correct order. Allow additional attempts, if requested. If a letter is omitted, score a point for all letters in correct order. Example: DROW would have 4 letters correctly placed. (L was skipped.) Subtract 1 point for each extra letter (i.e., over 5) provided. Example DLROWD would be scored as 4 correct, because an extra letter was added. Refer to the WORLD scoring sheet for specific scoring examples.

Naming:

19. Point to a pencil. SAY: **“What is this called?”** RECORD whether response is correct or not. If the participant gives a function (e.g., you write with it), say: “yes, but what is it called.”
20. Point to a wristwatch. SAY: **“What is this called?”** RECORD whether response is correct or not.

Repetition:

21. SAY: **“Repeat this phrase after me: No ifs, ands, or buts.”** RECORD whether the participant correctly repeats the phrase. One point is given for an exact repetition of the phrase.

Writing:

Give the participant a pencil and a blank piece of paper and have the participant write a sentence of his or her choice. Correct grammar, spelling, and punctuation are not necessary; score correct if the sentence contains a subject and a verb.

SAY: **"Please write any complete sentence you can think of on this paper."**

If needed, prompt by saying: "write a sentence about the weather".

22. Score 1 point if the participant is able to write a complete sentence (even if not about the weather). A sentence with an implied subject (e.g., "close the door") is acceptable. If the sentence is illegible, asked the participant to read it aloud for scoring.

Drawing:

23. Give the participant a pencil, a piece of paper, and the laminated card with the overlapping pentagons. The card should be oriented in the same direction as the drawing shown on the MMSE form.

SAY **"Here is a drawing. Please copy the drawing on this piece of paper."**

Allow 1 minute for copying. Score 1 if all sides and angles are preserved and two five-sided figures intersect to form a four-sided figure. Ignore tremor, rotation, minor gaps, and self-correction.

Recall:

SAY: "Now, what were those three objects I asked you to remember?"

24-26. RECORD whether or not apple, penny, table were recalled. No hints are given.

Comprehension:

Note dominant hand used for the drawing task.

SAY: **Listen carefully, because I'm going to ask you to do something.** Hold up a piece of paper in plain view of the participant but out of reach. **Take this paper in your <non-dominant > hand** (pause), **fold it in half** (pause), **and put it on the floor** (substitute "hand it back to me," if the participant is disabled or bed-bound or otherwise unable to reach the floor).

After saying the entire command, hold the paper within reach of the participant (but not in favor of either hand). Do not repeat any individual part of the command. One repetition is permitted at the participant's request, but the entire command must be repeated verbatim. If the participant reaches for the paper immediately after hearing the first portion of the command, move your hand away so that the paper is out of reach and continue to state the next two parts of the command without interruption.

27. Score 1 point if the participant takes paper in non-dominant hand.

28. Score 1 point if the participant folds the paper in half.

29. Score 1 point if the participant places the paper on the floor.

Reading:

Display laminated card containing the sentence command 'CLOSE YOUR EYES'.

“Please read this sentence out loud and then do what it says.”

The participant can be reminded not just to read a sentence, but to perform the action. If the participant is unable to read, read the sentence out loud.

30. Score 1 point only if the participant closes his/her eyes.

Scoring: One point is scored for each correct answer. No points are scored for incorrect or “don't know” responses. A prorated score is generated in the case where items are not attempted, e.g., due to vision or hearing problems. Each item response should be entered into the DMS, which will calculate the total score into item 31.

32. This question is on the DMS screen, not on the paper form. Count the number of questions that were 'Not attempted/Refused' and enter the total. If none, enter 0. This question must be answered before the selection to Stage 2 can be determined.

WIDE RANGE ACHIEVEMENT TEST – WRAT 3

THIS FORM WILL BE LEFT BLANK (IT IS NOT BEING RE-ADMINISTERED IN THE ARIC-PET CLINIC VISIT). THE DMS WILL NOT MARK A MISSING VALUE AS AN ERROR.

DELAYED WORD RECALL - EXPOSURE

Say: **“I am going to show you some words that I'd like you to try to remember. I will read each word first. I would like you to repeat the word I say out loud, and then use it in a sentence. Do not use words from a previous card in your sentence. The first word is...”**

Present each word card to the participant in a fixed order.

Check each word in Column A after the participant has read it aloud and used it in a sentence.

If the participant has trouble forming a sentence, the examiner may offer suggestions or make corrections, if necessary, at any point during the procedure. Do not correct for homophone (sentence with flour vs. flower) or plurals. For other incorrect suffixes (e.g., “ing”, etc.), politely remind the participant of the correct word.

Encourage the participant to form sentences that convey the meaning of the word. For example, do not allow sentences like “The chimney is nice”, but encourage sentences like, “The smoke went up the chimney”.

Each sentence may contain only the word on the card (i.e., sentences linking multiple words from the word list are not allowed). If this occurs, say **“please use only one word from the cards in each sentence.”**

After column A is completed, say **“To help you remember, we'll go through the words again. Just like before, I will read each word first, then I would like you to repeat the word and use it in a sentence. You may use the same sentence you used the first time or make up a different one. The first word is...”** Again present each card to the participant in order.

Check each word in Column B after the participant has read it aloud and used it in a sentence the second time.

This test may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment (e.g., severe vision or hearing loss). If discontinued, the reason is recorded on the Neurocognitive Scoring Summary Form. In this case, the Delayed Word Recall task should not be given and likewise should be scored as discontinued (recorded as the same reason).

DIGIT SYMBOL SUBSTITUTION (DSS)

Hand the participant a pencil without an eraser. Place the digit symbol form in front of the participant, point to the key above the test items and read the script

Present the instructions deliberately and at a slow pace.

Say: **“This is the digit-symbol task. Look at these boxes across the top of the page. On the top of each box are numbers from one through nine. On the bottom of each box there is a special mark. Each number has its own mark.”**

Point to 1 and its mark, then to 2 and its mark.

Say: **“Down here are boxes with numbers in the top part, but the bottom part is empty.”** Point to the four rows. **“I want you to put the correct mark in each box like this.”**

“Here is a 2; the 2 has this mark.” Point to the first sample item, then to the mark below the 2 in the key. **“So I put it in this box, like this.”** Write in the symbol.

“Here is a 1; the 1 has this mark.” Point to the second sample item, then to the mark below the 1 in the key. **“So I put it in this box.”** Write in the symbol.

“Here is a 3; the 3 has this mark.” Point to the third sample item, then to the mark below the 3 in the key. **“So I put it in this box.”** Write in the symbol.

“Now, just for practice, you fill in all the boxes up to this heavy line.”

If the participant makes an error on a sample item, correct the error immediately and review the use of the key. Continue to help (if necessary) until the seven sample items have been filled in correctly. Do not proceed with the test until the participant clearly understands the task. When the participant fills in a sample item correctly, offer encouragement by saying: "yes" or "right."

When the sample items have been completed successfully, say:

Script: **"Yes, now you know how to do them."**

During the sample exercise, look to see if a left-handed participant blocks or partially blocks the key when filling in the marks. If this occurs, fold a separate template so that only the key is exposed and place it next to the participant's worksheet on the participant's right-hand side so that the extra key is aligned with the one blocked by the participant's left hand. Have the participant use the separate key to complete the sample items and to take the actual test.

To begin the formal test, say:

“When I tell you to begin, start here” point to the first test item **“and fill in as many boxes as you can, one after the other, without skipping any. Work as quickly as you can. When you finish one line”** sweep finger across the first row, **“go on to the next one”** sweep finger across the second row.

“Keep working until I tell you to stop and remember to work as quickly as you can.”

“Ready, go ahead.” Begin timing. Timing should be discrete but also precise.

At the end of 90 seconds, say: **“Stop. That’s good, thank you.”**

If the participant omits an item or starts doing only one type (e.g., only the 1’s), say, **“Do them in order. Don’t skip any.”** Point to the first item skipped and say, **“Do this one next.”** Do not stop timing.

Do not intervene if the participant fills in a wrong symbol, but if the participant has clearly lost focus as to what to do (e.g., starts filling in something other than symbols), you may give the following reminder: **“Remember, you are to fill in the mark that goes below each number, as indicated in the key up above.”**

If the participant pauses at the end of a row or stops working, encourage him/her to continue, say **“Good, keep going.”** Point to the beginning of the next row, if necessary.

Give no further assistance except (if necessary) to remind the participant to continue until instructed to stop.

Scoring: After the participant has left the room, the examiner scores the DSS. Using the DSS scoring transparency, record 1 point for each correctly drawn symbol completed within the 90-second time limit and record in the DMS Neurocognitive Scoring Summary Form.

A response is scored as correct if it is clearly identifiable as the keyed symbol, even if it is drawn imperfectly (e.g., "v" instead of "u") or if it is a spontaneous correction of an incorrect symbol.

Credit is not given for items completed out of sequence (e.g., doing all the 1’s). Credit is given for a skipped item that is completed after being pointed out. Blank spaces between completed items receive no credit.

If there is more than one symbol in the box, and one is correct, give the participant credit. The seven sample items are not included in the participant's score.

The DSST may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment such as a tremor or significant visual impairment. If discontinued, the reason is recorded on the Neurocognitive Scoring Summary (NCS) Form.

DELAYED WORD RECALL

Say: **“A few minutes ago, you read and made a sentence with several words. Please tell me all of the words you can remember.”**

Allow 60 seconds. Use the stopwatch discreetly to avoid creating anxiety or a sense of time pressure.

Some encouragement may be necessary because participants may spontaneously report fewer words than they actually could recall with further effort. When the respondent indicates that he/she cannot remember any more words (or after a pause of 10 - 15 seconds), provide one prompt for more words, say **“can you think of any more words.”**

Scoring: Check off all the words correctly recalled. One point is given for each correct word. Credit is given for plurals. Record the total score at the bottom of the Delayed Word Recall Form and the Neurocognitive Scoring Summary Form. Note: this test is not given, if the exposure trial was not performed.

INCIDENTAL LEARNING

The participant's task is to record as many symbols and symbol-digit pairs as he/she can recall from the DSS administered earlier.

Place IL template in front of the participant.

For Part A (symbols), say: **"Now I'd like you to write down all of the symbols you can remember (point to the bottom row of the IL template), in any order, from the task you did a moment ago. Tell me when you have finished."**

Allow 60 seconds. Timing should be discrete.

For Part B (digit-symbol pairs), say: **"Now I'd like you to fill in the numbers that you think goes with each symbol (point to the top row of the IL template). Tell me when you are finished."**

Allow 60 seconds.

Scoring: Record 1 point for each correct symbol and record this total at the bottom of the form. Record 1 point for each correct digit-symbol pair and record this total at the bottom of the form. Both totals are then entered on the Neurocognitive Scoring Summary Form. Note: this test is not administered, if the DSS was not attempted.

WORD FLUENCY

In this task, participants are asked to produce as many words as possible that begin with the letters F, A and S within a time limit of 60 seconds for each letter, avoiding proper nouns, variations, plurals, and repetitions.

Explain the task to the participant.

Say, **“On this next task, I will say a letter. Then I want you to tell me as many different words as you can think of, as fast as you can, that begin with that letter.**

Leave out names of people, names of places, and numbers. So, if I were to say ‘T,’ you should not say words like ‘Thomas,’ ‘Texas,’ or the number ‘Ten.’ But you could say words like ‘table,’ ‘take,’ or ‘turtle.’

Also, do not use the same word again with a different ending. For example, if you said ‘take,’ then you should not say ‘takes,’ or ‘taking.’ These would all be considered the same word. Are you ready? Tell me as many words as you can think of that start with the letter F. I will tell you when to stop. Ready, go.”

Discretely start the stopwatch and record the participant's responses verbatim. Record all words produced (use the back of the page if more space is needed).

If the participant cannot think of any more words, wait quietly for ~ 15 seconds. After 15 seconds of silence prompt for more words, saying: **“Can you think of any other words that that begin with the letter __?”**

Do not stop the test until the entire 60 seconds is over.

A participant may stop producing words because he/she feels he/she made an error (e.g., repeated a word or said a proper name). In this instance, prompt the participant to continue, saying: **“that's okay; just go on.”**

The examiner should never interrupt the exam to correct sporadic errors. However, if the participant has clearly lost focus or clearly misunderstood the instructions (e.g., begins naming only inadmissible words, such as numbers, or begins to name only variants of a previous word, such as “flower” followed by “rose,” “daisy” etc.), clarify the instructions: **“Tell me words that start with F (A or S) but do not include numbers”** (or people, etc. depending on the error).

While recording the words, if the examiner cannot keep up with the words produced and misses a word, but is certain that the participant produced an admissible word, place an x on the line to indicate the participant should receive credit for the word.

After 60 seconds has passed, the examiner stops the test, provides encouragement, and states the next letter.

Script: **"Stop. Thank you. Now, tell me as many words as you can think of that start with the letter A. I will tell you when to stop. Ready, go."**

Discretely start the stopwatch and record the participant's responses verbatim.

After 60 seconds has passed, the examiner stops the test, provides encouragement, and states the next letter. Say: **"Okay, thank you. Now, tell me as many words as you can think of that start with the letter S. I will tell you when to stop. Ready, go."**

After 60 seconds has passed, the examiner stops the test.

Scoring: After the participant has left the room, the examiner must proof all the responses for admissibility. The examiner should finish writing out any words that were not completely written out during the exam. Clarify any words that may have been unclear during the time the test was given. If unable to spell the word, write it out phonetically. Check any ambiguous words in the dictionary (only after the participant has left the room).

Place a single strike mark through inadmissible words, i.e., proper nouns (names or places), simple variations (adding "ed" or "ly"), plurals, and repetitions. Record the number of admissible words for each letter at the bottom of the form and on the Neurocognitive Scoring Summary Form. New examiners should check their word count with an audio tape of the participant's responses for 2 months after initial certification.

Words like "anyone, anything, and anybody" are counted as separate words. If a word is capitalized (e.g., Santa), it is a proper noun and would not count. Homonyms like "ant" and "aunt" may be counted if given consecutively otherwise it is considered a repetition and only counted as one word.

Homophones (i.e., words that sound like they are spelled with F, A or S but actually begin with another letter) are inadmissible.

Words from other languages (e.g., apropos) are also counted; however, it's up to the examiner to verify the word in cases where the examiner is not familiar with a given word.

Word Fluency may be discontinued due to participant refusal or task difficulty (meaning the participant never understood the instructions). If discontinued, the reason is recorded on the Neurocognitive Scoring Summary Form.

ANIMAL NAMING

In this task, the participant is asked to name as many different animals as he/she can think of in 60 seconds.

Say, **“Now we’ll try something different. On this task, I want you to tell me as many different animals as you can think of. Name them as quickly as you can. I will tell you when to stop. Ready? Go ahead.”**

Start timing. Allow 60 seconds.

If there is a pause of 15 seconds or more, repeat basic instructions and give the starting word “dog.”

If the participant discontinues before the end of the time period, encourage him/her to try to think of more names.

Write down all of the words verbatim in the order in which they were produced. The examiner may also indicate that an acceptable word was produced by simply making a plus-sign (+) on the form if production is too rapid for verbatim recording. Verbatim words are preferred however.

Scoring: After the participant has left the room, the examiner totals the valid responses. Place a single strike mark through repetitions and plurals; these should only be counted once. Names of extinct, imaginary, or magical animals are admissible (e.g., dragon). Given names for animals like “Fido” or “Spot” are not counted. Credit is given for: breeds (e.g., terriers); male, female, infant names of a species (e.g., bull, cow, calf); both superordinate and subordinate examples of a species (e.g., both dog and terrier are credited); birds; fish; reptiles; and insects.

Record the number of admissible animals at the bottom of the form. New examiners should check their count with an audio tape of the participant’s responses for 2 months after initial certification.

Animal Naming may be discontinued, e.g., due to participant refusal or task difficulty (meaning the participant never understood the instructions). If discontinued, the reason is entered in the DMS Neurocognitive Scoring Summary Form.

5-Minute Break

Following Animal Naming, the participant is given a mandatory 5-minute rest.

Give the participant some encouraging words, for example, **“You are doing a great job. Now we’ll take a 5-minute break. After that we’ll try a few more tasks and finish up this part of the exam.”**

Examiners should take advantage of the break to begin scoring the first half of the battery.

LOGICAL MEMORY I

This test assesses the participant's ability to recall a short passage from a story.

Say: **"I am going to read you a little story. Listen carefully, and try to remember as many details of the story as you can. When I am through, I want you to tell me everything you can remember. The story is..."**

Read the story on the form slowly, taking approximately 30 seconds to read the entire passage. Ensure you have the participant's attention. Articulate clearly and use normal inflections.

No repetitions are allowed.

After reading the story, say: **"Now, begin at the beginning and tell me everything you can remember from the story."**

Make a check mark by any words of the story that the participant repeats unchanged. In general, record the participant's words verbatim between the lines of the story provided on the form. Make sure that the recorded story is decipherable before proceeding.

Allow 90 seconds for recall of the story, but if the participant indicates that he or she cannot recall any more details from the story, there is no need to wait until the 90 seconds are up.

Introduce the Story B.

Say: **Okay, that was fine. Allow at least 10 seconds to pass before moving on to Story B. Now I am going to read you another little story. Just like you did with the first story, listen carefully, and when I am through I want you to tell me everything you can remember. The story is...**

Read the story slowly (~ 30 seconds), articulating clearly, with normal inflections. No repetitions are allowed.

Again, make a check mark by any words of the story that the participant repeats unchanged. In general, record the participant's words verbatim between the lines of the story provided on the form. Make sure that the recorded story is decipherable before proceeding.

Allow 90 seconds for recall of the story.

After the story has been recalled, let participant know that he/she will be asked to recall the story again, say: **"Okay, good. Later on I will ask you to tell me this story again, so try not to forget it."**

Allow at least 10 seconds to elapse before beginning the next test.

Scoring: Scoring is deferred until after the cognitive battery is completed. Score one point for each item/story element correctly repeated. For questionable responses, refer to the tables below. New examiners should check their hand-written record with audio tape of the responses for 2 months after initial certification. Record the total score at the bottom of the form and enter in the DMS.

This test may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment (e.g., severe hearing loss). If discontinued, the reason is recorded in the DMS Neurocognitive Scoring Summary Form. In this case, Logical Memory II (the recall task) should not be given and likewise should be scored as discontinued (recorded as the same reason).

Logical Memory Scoring Criteria

STORY A SCORING

Text for Story A	General Rule	Examples of Alternative 1-Point Response	Examples of 0-Point Responses
Anna	"Anna" or variant of the name	Ann; Annie; Annette	Angela; Allison
Thompson	"Thompson" is required		Thompkins; Thomas
of South	"South" (in any context)	from South; who lived in South; who came from the South	
Boston,	"Boston" (in any context)	who worked in Boston; on a trip to Boston	
employed ²	An indication that she held a job	worked; had a job as; who was; who earned a living as	who wanted to be; employed as a cook
as a cook ²	"Cook" or some form of the word is required	who cooked	as a waitress; in the kitchen
in a school	"School" is required	at a high school; by a school	in a hospital; at a company
cafeteria,	"Cafeteria" is required		lunchroom; dining hall; diner; restaurant; kitchen
reported	Indication that a formal statement was made to someone in authority (in any context)	filed a complaint; said to the police; made a statement; notified the police; told the police	said; told how
at the City Hall	"City Hall" (in any context)	went to City Hall; called City Hall	
Station	"Station" in any context, or a word or phrase denoting a police station	police station; train station; stationhouse; police headquarters; precinct house; police department	office; building
that she had been held up	An indication that she had been held up (i.e., gun point or knife	that someone held her up; that she was in a stick-up	that she was beaten; she was attacked; that she was robbed; she got mugged
on State Street	"State Street" (in any context)	she lived on State Street; on her way to State Street	on some street; State Avenue

Text for Story A	General Rule	Examples of Alternative 1-Point Response	Examples of 0-Point Responses
the night before	Indication that the hold-up occurred the previous night	last night; the previous night	at night; one night; yesterday; the day before
and robbed	Indication that a robbery took place	was robbed; her money was stolen; they took her money; someone took her purse	lost her money; somebody took her things
of fifty-six dollars.	Indication that an amount of money greater than \$49 but less than \$60 was taken from her	fifty-some dollars; fifty-five dollars; about fifty dollars	sixty-five dollars; a lot of money; the police collected fifty-six dollars for her
She had four	“Four” is required together with an indication that the children were hers	she was the mother of four	she had two; she had some; there were some
small children,	“Children” or a synonym is required	little children; kids; small kids; young children	babies; girls; sons; small boys
the rent was due,	A phrase indicating that the rent was due	she had not paid the rent; she owed for the rent; the landlord had to be paid; she needed money for the rent	she owed money; she needed money; there was no money
and they had not eaten	Indication that her children, or the family, were without food	they had gone without food; they were hungry; there was no food; her kids had nothing to eat; she couldn’t feed her family	there wasn’t much food; they had only a little food; she had not eaten; didn’t have money to buy food
for two days.	“Two days” is required, or a phrase meaning about two days	for a couple of days; for one or two days; for two or three days	for days; for several days; for a day; for three days
The police,	A word or phrase signifying one or more members of the police department (in any context)	the cops; the policeman; the detectives; the police officer; they (where police is clearly meant)	they (unspecified); some people; her neighbors; somebody

Text for Story A	General Rule	Examples of Alternative 1-Point Response	Examples of 0-Point Responses
touched by the woman's story,	An indication that her story evoked sympathy	were touched; felt sorry for the woman; wanted to help her; were sympathetic; were impressed by her story (implying emotional reaction)	listened to her story; helped her; believed her
took up a collection	A phrase indicating that money was collected	chipped in; collected money; donated collected some food	gave her some money; found some money
for her.	An indication that the money collected was for her or her children	and gave it to her; for her children; for her family; for them; to help her out	as a gift; to make things better; for food

STORY B SCORING

Text for Story B	General Rule	Examples of Alternative 1-Point Response	Examples of 0-Point Responses
Robert	"Robert" or a variant of the name is required	Bob; Rob	Roger; Richard; Rupert
Miller	"Miller" is required		Mills; Mullen
was driving	An indication that Miller was the driver of the truck	drove; was the driver of; was at the wheel of	was riding in; went in; was going
a ten-ton	"Ten-ton" is required		a half-ton; a two-ton; in a large
truck	"Truck" is required	trailer truck; pick-up truck	vehicle; wagon; car; trailer; van
down a highway	An indication that the truck was being driven on a road (but not an unpaved road) or other intercity or interstate artery	down a road; on a country road; along a turnpike; on a thruway; on a freeway	down a dirt road; down a street; on his way
at night	An indication that it was after nightfall	one night; after dark; one evening; last night	one day; one morning
in the Mississippi	"Mississippi" (in any context)	along the Mississippi River; in Mississippi; on his way to Mississippi	in the Missouri
Delta,	"Delta" is required	Delta area	riverbank; lowlands; flats; plains; flood land
carrying eggs	"Eggs" is required together with an indication that they were part of a shipment	with a load of eggs; transporting eggs; freighting eggs; with crates of eggs; delivering eggs; hauling eggs	carrying a load of some kind; and he had some eggs
to Nashville,	"Nashville" (in any context)	on his way from Nashville; he lived in Nashville	to Tennessee
when his axle	"Axle" is required		when his truck; when the wheel; and the tire; the springs
broke.	A word or phrase meaning "broke"	snapped; broke down; broke off; went; fell off; failed; threw an axle	slipped; got stuck

Text for Story B	General Rule	Examples of Alternative 1-Point Response	Examples of 0-Point Responses
His truck skidded	An expression indicating that the truck was out of control	he skidded; the truck slid; his truck went; it ran; it spun out; he went; swerved; skipped; slipped; jackknifed	he pulled his truck; the truck stopped; he drove his truck; the truck tipped over; he crashed; he had an accident/wreck
off the road,	An expression meaning that the truck left the road	off the highway; from the road; off	across the road; on the highway
into a ditch.	"Ditch" is required, or a word or phrase describing a ditch	down an embankment; into a gully; into a hole	into the mud; into a field; against a fence
He was thrown	An indication that he was forcibly propelled	he was slammed; he (or some part of him) hit; he bumped; he knocked; he was tossed	he fell; he slumped; he crashed
against the dashboard	"Dashboard" or "dash" is required	banged against the dash; into the dashboard	into the windshield; against the steering wheel; out of the truck
and was badly shaken.	A word or phrase indicating that he was jarred or upset, but not indicating injury	was shaken; got shaken up; was shook up; got jarred; was jolted; was upset; was trembling; was in a state of shock; was dazed	and hit his head; cut himself; got hurt; was bleeding; was knocked out; bruised himself; broke his arm; had a concussion; he wasn't hurt
There was no traffic	A statement that no other vehicles were passing by	the road was deserted; no cars or trucks came by; he didn't see any cars	nobody was around; there were no lights; no one stopped to help him
and he doubted that help would come.	A phrase expressing doubt that someone would assist him	and he didn't think that help would arrive; he didn't expect any help; he figured help was unlikely; he was sure no one would come	and there was no way to get help; he couldn't get any help; he was out of luck; there was no garage around; he thought he was stuck
Just then his two-way radio	An indication that he has a (two-way) radio	suddenly his C-B; then his radio; he had a two-way radio; he radioed for help	

Text for Story B	General Rule	Examples of Alternative 1-Point Response	Examples of 0-Point Responses
buzzed.	Any word or phrase indicating that an audible signal of any type was received (sound or voice)	He heard someone/something; someone said; received a call; came on; sounded, turned on; squawked; beeped; signaled; called	lit up; flashed
He quickly answered,	An expression signifying that he responded by voice	he answered; Grasshopper answered; he said; he grabbed the mike and said; he replied; he quickly announced	his radio said; the C-B answered; somebody quickly replied; he quickly pressed the button
"This is Grasshopper."	"Grasshopper" in any context	"I'm Grasshopper"; "Calling Grasshopper"; "Grasshopper here"; "Is this Grasshopper?"; Grasshopper answered	"This is Alligator"; "I need help"; "Mayday"; "This is Hopper";

DIGIT SPAN BACKWARDS

In this task, the participant is read a list of numbers and asked to repeat them in the reverse order.

Say, **“Now I am going to say some numbers. When I stop, I want you to say them backwards. For example, if I say: 1-2-3, what would you say?”**

If the participant responds correctly (3-2-1), say **“that’s right”** and proceed to item 1.

If the participant fails the practice trial, say **“no, you would say 3-2-1. I said 1-2-3, so to say those numbers backwards, you would say: 3-2-1.** Proceed to the first item on the form. Say, **“Now try these numbers.”**

Read the digits clearly and at a rate of 1 per second. Administer both trials of each item.

From Trail 2 and beyond, introduce sequence each saying: **“Here’s another.”** Voice inflection should drop slightly on the last digit. Each trial may be presented only once.

The test is discontinued after two consecutive errors of the same length item (i.e., after failing trials A and B of any item set). Note: this is not recorded as a “discontinuation” on the Neurocognitive Scoring Summary Form, because the task was fully attempted and a real score was produced.

Scoring: Record responses verbatim. Score 1 point for each completely correct trial (no partial credit is given). Record the total correct responses at the bottom of the form and enter into DMS Neurocognitive Scoring Summary Form.

This test may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment (e.g., severe hearing loss). If discontinued, the reason is recorded in the DMS Neurocognitive Scoring Summary Form.

TRAILS A

Place SAMPLE A on the table in front of the participant. Give the participant a pencil.

Say, **“On this page (point) are some numbers. Begin at number 1 (point to 1) and draw a line from 1 to 2 (point to 2), 2 to 3 (point to 3), 3 to 4 (point to 4), and so on, in order, until you reach the end (point to the circle marked “end”). Try not to lift the pencil as you move from one number to the next. Draw the lines as fast as you can. Ready? Go ahead.”**

If correct, say **“Good. Let’s try the next one”** and Proceed to Test A.

If the participant makes an error, mark through the line and go back to the point where the error was made and say, for example, **“you were at number 2. What is the next number?”** Wait for the participant’s response. If he/she indicates 3, say, **“correct, please start here and continue.”** If the participant indicates any other numbers say, **“The next number would be 3. Please start here and continue.”**

If the participant cannot complete the sample and clearly does not comprehend the task, do not administer Test A (code as not attempted due to task difficulty).

After Sample A is completed, flip the page over to reveal TEST A.

On this page are numbers from 1 to 25. Do this the same way: Begin at number 1 (point to 1) and draw a line from 1 to 2, (point to 2), 2 to 3 (point to 3), 3 to 4 (point to 4), and so on, in order, until you reach the end (point to end). Try not to lift the pencil as you move from one number to the next. Remember, work as fast as you can. Ready? Go ahead.

Start timing. Call all errors to the participant's attention immediately (draw a small dash through the incorrect line) and have the participant proceed from the point the mistake occurred. Say, **“that one was not correct.”** Point to the last correct number and say, **“Please start here and continue.”** Do not stop timing.

At the end, say, **“That’s fine,”** or **“very good.”**

The test is stopped if the participant makes 5 errors or exceeds 4 minutes. Note: In this case, this is not recorded as discontinued due to refusal, task difficulty or impairment.

Scoring: Record the time to completion and the number of errors at the bottom of the form and on the Neurocognitive Scoring Summary Form. If errors ≥ 5 , the time should be recorded as 4 minutes.

This test may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment (e.g., tremor). If discontinued for these reasons, record this on the Neurocognitive Scoring Summary Form.

TRAILS B

Place SAMPLE B on the table in front of the participant. Give the participant a pencil.

Say, **“On this page are some numbers and letters. Please take the pencil and draw a line, alternating in order between the numbers and letters. Start at number 1 (point to 1), then go to the first letter, A (point to A), then go to the next number, 2 (point to 2), then the next letter, B (point to B), and so on until you reach the end (point to end). Remember, first you have a number, then a letter, then a number, then a letter, and so on. Try not to lift the pencil as you move from one number or letter to the next. Draw the lines as fast as you can. Ready? Go ahead.”**

If the participant makes an error, mark through the line and go back to the point where the error was made and say, for example, **“you were at number 2. What is the next letter?”** Wait for the participant’s response. If the answer is correct say, **“correct, please start here (point to the 2) and continue.”** If the participant picks the wrong item say, **“the next letter would be B” (point to B).** Then point to the 2 and say, **Please start here and continue.”**

If the participant cannot complete the sample and clearly does not comprehend the task, do not administer Test B (code as not attempted due to task difficulty).

If performance is correct, proceed to Test B. Flip the page over to reveal TEST B.

Say, **“Good. Let’s try the next one. On this page are some numbers and letters. Begin at number 1 (point) and draw a line from 1 to A (point to A), A to 2 (point to 2), 2 to B (point to B), B to 3 (point to 3), 3 to C (point to C) and so on in order until you reach the end (point to end). Remember, first you have a number, then a letter, then a number, then a letter, and so on. Try not to lift the pencil as you move from one number or letter to the next. Draw the lines as fast as you can. Ready? Go ahead.”**

Start timing. Call all errors to the participant's attention immediately (draw a small dash through the incorrect line) and have the participant proceed from the point the mistake occurred. Say, **“that one was not correct.”** Point to the last correct number (or letter) and say, **“Please start here and continue.”** Do not stop timing.

At the end, say, **“That’s fine,”** or, **“very good.”**

The test is stopped if the participant makes 5 errors or exceeds 4 minutes. Note: In this case, this is not recorded as discontinued due to refusal, task difficulty or impairment.

Scoring: Record the time to completion and the number of errors at the bottom of the form and enter in the DMS Neurocognitive Scoring Summary Form. If errors ≥ 5 , the time should be recorded as 4 minutes.

This test may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment (e.g., tremor). If discontinued for these reasons, record in the DMS Neurocognitive Scoring Summary Form.

FINGER TAPPING

In this task, the participant will perform 4 trials (2 with each hand for 10 seconds each) of finger tapping.

Explain the instructions.

Say, **“In this next task, we will measure how quickly you can tap your fingers.”**

In order to determine which hand to start with, ask: **“Which hand would you use to throw a ball to hit a target?”**

Say: **“OK – we’ll start with that hand.”**

Ask the participant to place his/her dominant hand palm down with index finger slightly bent on the tapping board. On the very first attempt, have participant practice 3 taps, in order to demonstrate to the participant the range required for a successful tap (i.e., causing the number on the counter to change). Reset the counter.

Instruct the participant to tap as quickly as he/she can, moving only the index finger, not the entire hand or arm. Note that the base of the palm, side of thumb, and fingertips of the remaining fingers must remain on the board.

Say, **“When I say “start”, tap as quickly as you can with your index finger, and keep going until I say stop. Are you ready? Start.”**

After 10 seconds, say **“Stop.”**

(Record the number of taps, and reset counter)

Say, **“Thank you. Let’s try that once more. (*verify the proper positioning of the participant’s hand*). Remember to tap as quickly as you can. Are you ready? Start.”**

After 10 seconds, say: **“Stop.”**

(Record the number of taps, and reset counter)

Say, **“Thank you. Now let’s try the same thing with your other hand. (*verify the proper positioning of the participant’s hand*). Remember to tap as quickly as you can. Are you ready? Start.”**

Stop after 10 seconds and do one more trial.

Conduct 4 trials, two with each hand. Allow 10 seconds per trial, with 10 seconds rest between trials. Timing must be precise.

Note: If the participant starts performing the tapping test incorrectly (e.g., palm and/or

fingertips are lifted from the board) stop the test, switch to the opposite hand, describe the correct technique, perform the test with the opposite hand correctly, and then return to the hand in which the performance was in error.

Scoring: Record total number of taps (from the counter on the tapper) for each trial for each hand on the form and enter in DMS Neurocognitive Scoring Summary Form.

This test may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment (e.g., tremor). If discontinued for these reasons, record this in the DMS Neurocognitive Scoring Summary Form.

BOSTON NAMING TEST

In this test, the participant is shown a series of pictures (line drawings) and asked to provide the name of each item.

Say, **“Next, I am going to show you a series of pictures. For each picture, I want you to try to tell me what the picture is. If you can’t tell me, that’s okay. After we complete each picture, we we’ll go on to the next one. Let’s begin.”**

Show the pictures one at a time and write down any incorrect responses. If the participant is unable to name the item in 20 seconds score the item as an “error” and move on to the next picture.

Introduce each picture, saying: **What is this?**

The examiner should provide no help (hints or clues). For example, if a participant asks “what do you do with it,” repeat the request **“What do you think the name of it is?”**

If the participant responds merely to the shape of an item, for example, “beehive” for “igloo,” prompt him/her to **“take a closer look. “Can you think of a more specific name for it?”**

If the participant gives the correct name, but says that it is not that object (e.g., “Well, it’s not a globe”), the response is considered incorrect.

If the participant gives a general or circumlocutory response (e.g., “you sleep on it” for “bed”), say **“Can you think of a specific name for it?”**

Certain regional synonyms are acceptable and may be counted as correct, e.g., “snake,” “worm,” or “rope” for “pretzel.” “Lock” or “bolt” for latch. Questionable responses should be recorded and addressed with the study coordinator.

Discontinue after 6 consecutive failures. Note: In this case, this is not recorded as discontinued due to refusal, task difficulty or physical impairment.

Score: Record 1 for correct and 0 for incorrect responses. Some leeway is given for regional variations and alternative names for some items (see above). Record the total score at the bottom of the form and enter in the DMS Neurocognitive Scoring Summary Form. If stopped because of errors, record the score at the time the test was stopped.

This test may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment (e.g., visual impairment). If discontinued for these reasons, record this in the DMS Neurocognitive Scoring Summary Form.

CLOCK TIME PERCEPTION

In this test, the participant is shown a series of clock faces and asked to tell the time that each clock displays.

Say to the participant, **“Next, I am going to show you some pictures of clocks. For each clock, I want you to tell me what time it shows. If you’re not sure what time the clock is telling, feel free to guess. After we complete each clock, we’ll go on to the next one. Are you ready? Let’s begin.”**

Present each clock card in order and record the response. If the participant is unable to tell the time after 20 seconds, mark the item as “error” and move on to the next clock.

Introduce each clock, saying **“what time does this clock show?”**

Scoring: Record 1 point for correct and 0 for incorrect responses. Credit is given for time within +/- 1 minutes of the time shown. Credit is given for any correct time, regardless of how it is expressed (e.g., 15 minutes after the hour may be called “quarter past” or “quarter after;” 30 minutes past the hour may be called “half past” or “half after;” military time is also acceptable, etc.). Record the total score at the bottom of the form and DMS Neurocognitive Scoring Summary Form.

This test may be discontinued due to participant refusal, task difficulty (e.g., the participant never fully understood the instructions), or if the examiner determines that the participant is unable to perform the task due to a physical impairment (e.g., visual impairment). If discontinued for these reasons, record this in the DMS Neurocognitive Scoring Summary Form.

SMELL TEST

This test will not be administered as part of the ARIC-PET Clinic visit, so a missing value will be allowed for this item in the DMS.

LOGICAL MEMORY II

This test assessed delayed recall of the stories presented earlier in the exam. Note that Logical Memory II is not given, if Logical Memory I was not attempted or discontinued.

Say, **“Okay, this is the last task. Do you remember the little stories I read to you a few minutes ago? Now I want you to tell me the stories again. Tell me everything that you can remember about the stories.”**

If the participant does not recall one or both of the stories after 15 seconds, offer a reminder.

For Story A, say: **“One story was about a woman who was robbed.”** Allow 90 seconds for recall of the story, but if the participant indicates that he or she cannot recall any more details from the story, there is no need to wait until the 90 seconds are up.

No further help is provided for Story A, other than general encouragement.

If the participant does not mention Story B, offer a prompt, say: **“One story was about a man who had trouble on the highway.”** Allow 90 seconds. No further help is provided for Story B, other than general encouragement.

Use the same scoring procedure as used for Logical Memory I.

If the participant asks a question about the story or for repetition of some or all of it, say: **“Please tell me as much as you can remember about the story.”**

Note whether the reminders were given for Story A or B.

Scoring: Use the same scoring procedure as used for Logical Memory I. In general, record the participant’s words verbatim between the lines of the story provided on the form. Scoring is deferred until after the cognitive battery is completed. Score one point for each item/story element correctly repeated. For questionable responses, refer to the Logical Memory I tables above. Record the total score at the bottom of the form and enter in the DMS Neurocognitive Scoring Summary Form.

This test may be discontinued due to participant refusal or task difficulty (e.g., the participant never fully understood the instructions). If not given because Logical Memory I was not attempted or discontinued, record this in the DMS Neurocognitive Scoring Summary Form (using the same reason as that given for Logical Memory I).