



# NEUROCOGNITIVE BATTERY SUMMARY FORM



ID  
NUMBER:

FORM CODE: 

N	C	S
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DATE: 08/22/2017  
Version 3.0

## ADMINISTRATIVE INFORMATION

0a. Completion Date: //  
Month Day Year

0b. Staff ID:

If a test was discontinued, record the reason for discontinuation using the appropriate letter:

A = Refusal (participant declines/refuses to perform a test)

B = Task difficulty (participant could not fully understand the instructions or became frustrated)

C = Impairment (Visual, hearing, literacy, or limb or motor problem)

	CHECK IF DISCONTINUED	REASON FOR DISCONTINUATION	SCORE
2. Digit Symbol Substitution .....	<input type="checkbox"/>	2a. <input type="checkbox"/>	2b. <input type="text"/> <input type="text"/>
3. Delayed Word Recall .....	<input type="checkbox"/>	3a. <input type="checkbox"/>	3b. <input type="text"/> <input type="text"/>
4. Incidental Learning.....	<input type="checkbox"/>	4a. <input type="checkbox"/>	
4b. Symbols .....	<input type="checkbox"/>		
4c. Digit-Symbol Pairs .....	<input type="checkbox"/>		
5. Word Fluency (FAS).....	<input type="checkbox"/>	5a. <input type="checkbox"/>	
5b. F total .....	<input type="checkbox"/>		
5c. A total .....	<input type="checkbox"/>		
5d. S total .....	<input type="checkbox"/>		
6. Animals Naming.....	<input type="checkbox"/>	6a. <input type="checkbox"/>	6b. <input type="text"/> <input type="text"/>
7. Logical Memory I.....	<input type="checkbox"/>	7a. <input type="checkbox"/>	
7b. Story A .....	<input type="checkbox"/> <input type="checkbox"/>		
7c. Story B.....	<input type="checkbox"/> <input type="checkbox"/>		
8. Digit Span Backwards.....	<input type="checkbox"/>	8a. <input type="checkbox"/>	8b. <input type="text"/> <input type="text"/>

	CHECK IF DISCONTINUED	REASON FOR DISCONTINUATION	SCORE
9. Trail Making Test (Part A, TMT A).....	<input type="checkbox"/>	9a. <input type="checkbox"/>	
9b. Time to complete .....	<input type="checkbox"/>	9c. <input type="text"/> <input type="text"/>	(minutes) (seconds) (Max = 4:00)
9d. Number of errors .....	<input type="checkbox"/>		(Max = 5)

10. Trail Making Test (Part B, TMT B) ..... ☐ ..... 10a. ☐  
 10b. Time to complete ..... ☐ (minutes) 10c. ☐ ☐ (seconds) (Max = 4:00)  
 10d. Number of errors: ... ☐ (Max = 5)

12. Boston Naming Test..... ☐ ..... 12a. ☐ ..... 12b. ☐ ☐

	<b>CHECK IF DISCONTINUED</b>	<b>REASON FOR DISCONTINUATION</b>	<b>SCORE</b>
15. Logical Memory II..... <input type="checkbox"/> ..... 15a. <input type="checkbox"/>			
15b. Story A ..... <input type="checkbox"/> <input type="checkbox"/>			
15c. Story B..... <input type="checkbox"/> <input type="checkbox"/>			
15e. Which story was recalled first? ( <i>check one</i> )			
<input type="checkbox"/> Story A			
<input type="checkbox"/> Story B			
<input type="checkbox"/> Neither			
15f. Was a reminder offered for Story A?	<input type="checkbox"/> Y Yes	<input type="checkbox"/> N No	
15g. Was a reminder offered for Story B?	<input type="checkbox"/> Y Yes	<input type="checkbox"/> N No	

16. For any tests that were fully completed (not discontinued), was there anything that you feel may have substantially influenced the test results for this participant? These might include for example: hearing loss, vision problems, tremor, arthritis in the hands, sedation, or if performed in the home/LTC setting, environmental factors such as poor lighting, background noise or interruptions during the testing session.

☐ Y Yes  
☐ N No

16a. If yes, specify: \_\_\_\_\_

**Question by Question Instructions (QxQ) for  
the Neurocognitive Battery and  
Neurocognitive Summary Form for  
Visits 8 and 10**



**I. MATERIALS**

- Neurocognitive Test Battery Examiner's Packet
- Card with intersecting pentagons and "Close your eyes" (MMSE) – 5x8
- MMSE Scoring Key for Spelling WORLD Backward
- Pencil
- Wrist watch
- 1 sheet of paper
- Set of 10 cards for the Delayed Word Recall – 5x8
- Digit Symbol Substitution Form
- Digit Symbol Substitution scoring transparency
- Incidental Learning Template
- Digital audio recorder (for QC)
- Do Not Disturb sign (for door)
- Clipboard
- Stop watch

**II. GENERAL INSTRUCTIONS**

Block A neurocognitive measures are expected on all participants for visits 8, 10. The Block A measures include Ensuring Speech Understanding-ESU, Mini Mental State Exam-MMSE, Digit Symbol Substitution-DSS, Delayed Word Recall-DWR, Incidental Learning, and World Fluency/FAS, Animal Naming.

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, and Incidental Learning form.

- A. 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.
- B. 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.
- C. The testing environment and examiner behavior should be geared toward optimizing the participant's performance on each of the cognitive measures.
- D. 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.
- E. 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).
- F. 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.

- G. A good quality stopwatch is necessary to time components of the cognitive 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).
- H. Timing should always be as discrete as possible to avoid producing anxiety and affecting test results.
- I. 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.
- J. 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. Although time limits are set for some tests, the participant should never be told of any time limit on any measure.
- K. With the exception of when a fixed time limit has expired on a task, self-correction is routinely accepted.
- L. 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 all of the questions correct.
- M. 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.
- N. It is important that scores accurately reflect the participant’s responses. Listening carefully and sometimes further prompting is needed to clarify a participant’s response.
  - 1. If a participant responds, “I don’t know” or “I don’t know how to do that.” - The participant has clearly stated he/she does not know the answer and thus no further clarification is needed. Score the item as Incorrect/Don’t Know (e.g., on the MMSE).
  - 2. If a participant responds, “I don’t know. I don’t want to do that.” – The participant reports both not knowing and not wanting to do the task. Because the participant first stated, “I don’t know,” score the item as Incorrect/Don’t Know.
  - 3. If a participant responds, “I don’t want to do that; I never could do that kind of thing.” - The examiner should prompt, “Will you give it a try?” or “Would you give me your best guess?” If the participant declines to answer, score the item as Not Attempted/Refusal (e.g., on the MMEE).
  - 4. Scoring can be subjective. In cases where a judgment must be made, record the participant’s verbatim response and score after the testing session. Examiners may want to consult with another psychometrist at their site or may contact Tiffany Owens ([taowens@umc.edu](mailto:taowens@umc.edu)) at the Jackson Field Center to discuss an item or question.
- O. If a participant asks what the NCS battery or a specific test is measuring, you can say something like “A lot of these tests measure things that may change with age like thinking and functioning.” Please do not explain what a test is measuring, as this can affect the results.
- P. Regarding administration of the battery to individuals who are blind, aphasic, or illiterate, the following subtests can be administered:
  - 1. Blind: MMSE items 1-18, 21, & 24-26, Verbal Fluency, and Animal Naming.
  - 2. Aphasic: MMSE items 22, 23, & 27-30, Digit Symbol Substitution, and Incidental Learning.
  - 3. Illiterate: MMSE items 1-13, 19-21, & 23-30, Digit Symbol Substitution, Incidental Learning, and Animal Naming.

### III. DETAILED INSTRUCTIONS FOR EACH TEST

#### A. ENSURING SPEECH UNDERSTANDING (ESU)

1. Administration for Trial 1
  - a) Participant will be examined in a quiet room with the examiner facing the participant. Background noise should be minimized.
  - b) Participant should use any sensory aids they would normally use.
  - c) Introduce the test: **"We are going to do a quick exercise to ensure that you can hear me. Listen carefully because I am going to read you several sentences. After I read each sentence try to repeat out loud as much of the sentence as possible."**
  - d) If the participant understands the instructions, say: **"The first sentence is..."**
  - e) Read each sentence from Trial 1 slowly, about 2-3 seconds articulating clearly with normal inflections. No repetitions are allowed.
  - f) If the participant does not understand the instructions, repeat the instructions for Trial 1.
  - g) Examiner should read sentences at a pace and volume commensurate with normal neurocognitive testing.
  - h) It is important that pace and volume be maintained throughout Trial 1 regardless of the participant's performance.
2. Scoring
  - a) Circle and sum the CAPITALIZED words that are repeated correctly.
  - b) If total score for Trial 1  $\geq 13$ : STOP ESU and proceed with neurocognitive testing per protocol.
  - c) If total score for Trial 1  $\leq 12$ : proceed with Trial 2 using a slightly louder and lower tone of voice.
3. Administration for Trial 2
  - a) Read each sentence from Trial 2 slowly, about 2-3 seconds, articulating clearly with normal inflections. No repetitions are allowed.
  - b) Examiner should read sentences at the same pace but in a slightly louder and lower tone of voice. Pace and volume should be maintained throughout Trial 2.
4. Scoring
  - a) Circle and sum the CAPITALIZED words that are repeated correctly.
  - b) If total score for Trial 2  $\geq 13$ : proceed with neurocognitive testing using a slightly louder and lower tone of voice.
  - c) If total score for Trial 2  $\leq 12$ : proceed with neurocognitive testing using a slightly louder and lower tone of voice and supplement verbal instructions with written prompts.
  - d) Plurals and tense changes are admissible (e.g., "The players lose their shoes" would receive 3 pts.).

## B. MINI-MENTAL STATE EXAM (MMSE)

### 1. Administration

- a) 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."**

### 2. Blessed Test Items (Questions 0c-0f)

- a) These items have been added to the MME form for efficiency.
- b) Read each question and record responses. One point is given for each correct response.
- c) 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.
- d) Q0e. First and last name is sufficient for "full name" to be correct.
- e) Q0f. The participant must be within one hour for the "time of day" to be correct.

### 3. Orientation to Time (Questions 1-5)

- a) Read each question and record responses. One point is given for each correct response.
- b) 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.
- c) If the participant gives only the last two digits of the year, prompt by saying, **"What is the full year?"**
- d) Some leeway is allowed for the correct response to season:
  - (1) Winter: December, January, February, March
  - (2) Spring: March, April, May, June
  - (3) Summer: June, July, August, September
  - (4) Fall/Autumn: September, October, November, December
- e) If the month has just changed (or is about to change), it is correct to say either month (i.e., it is within one "day" of the correct month).
- f) If the participant gives the date when prompted for the day, give credit for date (item 5) if the response is correct, and say: **"Good, and what day of the week is it?"**

### 4. Orientation to Place (Questions 6-10)

- a) Read each question and record response. One point is given for each correct response.
- b) 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?"** or **"If you were telling someone where you were coming today, what would you tell them?"**
- c) **"Are we on the ground floor or higher floor of this building?"** can be asked in the clinic, multi-level nursing home or long-term care facilities. An alternative question for home visits would be, **"Is this a one or two story house?"**

### 5. Registration (Questions 11-13) NOTE: the 3 words used will change each year. The words in this script are used in Visits 8 and 10.

- a) Explain the rules as follows, **"I am going to name three words. After I have said all three words, I want you to repeat them all back to me. Ready? Repeat these words after me: blue, pear, sofa. Please try to remember what they are, because I am going to ask you to name them again in a few minutes."**
- b) Score one point for each word repeated correctly on the first attempt. If the participant is

unable to recall all three words, give 2 more trials until he/she correctly names all three. If after 3 attempts (initial exposure plus 2 additional trials) the participant is unable to correctly repeat all 3 words, move on to the next question. In this case, items 24-26 (recall) should not be asked and would be scored as “not attempted/refused.”

6. Attention and Concentration (Questions 14-18)

- a) Say, **“How do you spell the word, World?”**
- b) 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.
- c) Ask the participant: **“How would you spell it backwards?”**
- d) 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.) If the ppt gives more than 5 letters, use the first 5 letters to score. Refer to the WORLD scoring sheet for specific scoring examples.

# **Mini-Mental State Examination (MMSE)** **Scoring Key for Spelling WORLD Backwards**

5 point	4 point	3 point	2 point		1 point		0 point	
DLROW	_LROW	DELW	D_ROD	DO_LW	_ROLD	DR	12345	R
	DILRW	DL__W	DDW	DOAW	BOWLD	DRAL	4	R8
	DL_OW	DL_LW	DL	DOL_W	D	DRALD	A	RDOLD
	DLDOV	DL_R	DL_LD	DOLR	D_ORD	DRING	ARHR	RLDO
	DILRW	DLAW	DL_O	DOLRD	D_R	DRL	B	SWALD
	DLO_W	DLDR	DL46	DOLW	DA	DRLA9	BALD	U
	DLODW	DLDRD	DLA	DONRW	DAKL	DRIC	BLD	UOL
	DLOOW	DLDW	DLA7	DORHW	DAY	DRLD	E	W
	DLOUW	DLERO	DLAB	DORLW	DC	DRLO	EAHR	W_RL
	DLOW	DLEW	DLB	DOROL	DD	DRLOD	ELBO	WA_LD
	DLOWD	DLLW	DLD	DORW	DDWOR	DRLWD	ENAOU	WALRD
	DLR_W	DLOIW	DLDO	DOWAB	DE	DRLWO	GB	WARD
	DLRAW	DLOLW	DLDO	DOWAL	DEALD	DROAL	HO	WARLE
	DLRLO	DOLOR	DLE	DOWE	DEID	DROLD	L	WERLD
	DLRLW	DLORW	DLEM	DOWL	DEIHL	DRWL	LAD	WH
	DLRO	DLOWA	DLES	DOWLD	DER	DRWLD	LD	WHO
	DLROD	DLOWL	DLG	DOWLW	DEWOR	DRWOL	LDO	WIRP
	DLROE	DLOWR	DLL	DOWOL	DO	DWALD	LDORE	WL
	DLROL	DLR	DLLD	DOWOR	DOALD	DWL	LDORH	WLDOR
	DLROO	DLR_D	DLE	DOWR	DOD	DWLD	LDORL	WLDOR
	DLROR	DLRAD	DLLOR	DOWRE	DOIL	DWLI	LDWLD	WLOD
	DLROY	DLRD	DLLU	DOWRL	DOL	DWLR	LDWO	WLS
	DLRRO	DLRDL	DLM	DR__W	DOLB	DWO	LDWRL	WO_LD
	DLRRW	DLRL	DLNOR	DR_W	DOLD	DWOL	LERD	WOLD
	DLRW	DLRLD	DLO	DRADW	DOLO	DWOLD	LLFA	WOLED
	DLUOW	DLRN	DLOB	DRL_W	DOR	DWOR	LOCBL	WOLRD
	DLVRO	DLRRD	DLOD	DRLRD	DORD	DWORD	LODA	WOR
	DLWOW	DLRUR	DLODL	DRLW	DORDL	DWORL	LOPD	WORAL
	DLWRO	DLRWD	DLODR	DRO	DORL	LDORW	LORD	WORLD
	DOROW	DLRWO	DLOHT	DROD	DORLD	DLOWR	LORL	WRLD
	DR_OW	DLW	DLOL	DROF	DORWD	LDRO	LORLD	WORLD
	DROOW	DLWDW	DLOLD	DROL	DORWL	LDRWO	LRWD	WWWLO
	DROW	DOLOW	DLOLO	DROLO	DORWR	LORDW	LRWO	
	LROW	DOOW	DLOLR	DROR	DOUWL	LOROD	LWD	
	LWROW	DOW	DLOOO	DROU	DOYLD	LORW	M	
		DOWOW	DLOR	DROWL		LOWL	NOLOR	
		DRLOW	DLORD	DRW		LOWR	NORLD	
		DRODW	DLORF	DUW		OLEW	O	
		DROLW	DLORL	DW		RO	OLD	
		DRORW	DLORY	DWOWD		RW	OLDE	
		LDROW	DLPR	DWROL		WAROR	OLWRD	
		LRO	DLPS	DWROR			ORLD	
		LROR	DLWAD	LDLOW				
			DLDO	LDOW				
			DLWOL	LOW				
			DLWOR	LRDW				
			DLWR	LRW				
			DLY	OW				
			DNLD	RLOW				
				ROWLD				



7. Naming (Questions 19-20)
  - a) 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?”**
  - b) Point to a wristwatch. SAY, **“What is this called?”** RECORD whether response is correct or not.
8. Repetition (Question 21)
  - a) Say, **“Repeat this phrase after me: No ifs, ands, or buts.”**
  - b) One repetition is permitted at the participant’s request, if the participant has not yet verbalized a response.
  - c) Record whether the participant correctly repeats the phrase. One point is given for an exact repetition of the phrase.
9. Writing (Question 22)
  - a) 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. Note dominant hand used.
  - b) Say, **“Please write any complete sentence you can think of on this paper.”**
  - c) If needed, prompt by saying: **“Write a sentence about the weather”**.
  - d) 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. Greetings or salutations are not acceptable, e.g., “Happy Birthday” or “Good Morning”.
10. Drawing (Question 23)
  - a) 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.
  - b) Say, **“Here is a drawing. Please copy the drawing on this piece of paper.”**
  - c) Allow 1 minute for copying. Note dominant hand used for the drawing task.
  - d) Score 1 if all sides and angles are preserved and two five-sided figures intersect to form a four-sided figure within 60 seconds. Only convex pentagons are admissible. Ignore tremor, rotation, minor gaps, and self-correction.
11. Recall (Questions 24-26)
  - a) Say, **“Now, what were those three words I asked you to remember?”**
  - b) RECORD whether or not blue, pear, sofa were recalled. No hints are given.
12. Comprehension (Questions 27-29)
  - a) Recall dominant hand used for the drawing task.
  - b) 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).
  - c) 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. If the ppt has already taken the piece of paper and requests a repetition of the instructions, you must get the paper back from the ppt and repeat the entire instruction verbatim.

- d) Q27 - Score 1 point if the participant takes paper in non-dominant hand.
- e) Q28 - Score 1 point if the participant folds the paper in half.
- f) Q29 - Score 1 point if the participant places the paper on the floor.

13. Reading (Question 30)

- a) Display laminated card containing the sentence command 'CLOSE YOUR EYES'.
- b) Say, **"Please read this sentence out loud and then do what it says."**
- c) 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.
- d) Score 1 point only if the participant closes his/her eyes.

14. Scoring (Questions 31-32)

- a) Q31 - CDART will calculate the MMSE total score. The score is calculated as follows:
  - (1) One point is scored for each correct answer. (0 items are not included in the total score.)
  - (2) Zero points are scored for:
    - (a) Incorrect or "don't know" responses
    - (b) Items that were not attempted or refused due to task difficulty (i.e., due to cognitive impairment); these should be marked as "incorrect."
  - (3) Items that are not attempted/refused due to any reason other than cognitive impairment (e.g., vision or hearing problems) are marked as "not attempted/refused" on the paper form and left blank in CDART. Those blank items should be set to missing in field status on the missed field in CDART. Adding a note log may be helpful to explain why those items were not attempted, but a notelog does not have to be entered for every single not-attempted item. A prorated score is generated for the MMSE in the case where items were not attempted. All other item responses should be entered into the DMS, which will calculate the total score for item 31.
- b) Q32 - Count the number of questions that were "not attempted/refused" due to a physical impairment and enter the total (considering only Q1-Q30). If none, enter 0.

## C. DELAYED WORD RECALL - EXPOSURE

### 1. Administration

- a) 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 – this will help you remember the words. Do not use words from a previous card in your sentence. The first word is..."**
- b) Present each word card to the participant in a fixed order.
- c) Check each word in Column A after the participant has read it aloud and used it in a sentence
- d) 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.
- e) Check each word in Column B after the participant has read it aloud and used it in a sentence the second time.

### 2. Prompts

- a) If the participant has trouble forming a sentence or uses word associations (e.g., "smoke" for chimney), the examiner may offer suggestions or make corrections at any point during the procedure. It is acceptable to give the participant a sentence if they are unable to make one up on their own.
- b) 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. Some participants may not pronounce a word correctly (e.g., "chimley" for "chimney"). That is ok. As long as the participant is consistent and recalls the same mispronounced word later, credit is given. Also, some participants may not know the definition of a word (e.g., "harp"). If needed, you may tell them that it is a musical instrument.
- c) 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."
- d) 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."**

### 3. General

- a) The above corrections are designed to standardize administration of the task. However, to maintain good rapport, do not over-correct. After 3 corrections, allow the participant to continue the task without additional corrections.
- b) 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 hearingloss).
- c) 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).

## D. DIGIT SYMBOL SUBSTITUTION (DSS)

### 1. Administration

- a) 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.
- b) Present the instructions deliberately and at a slow pace.
- c) 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."**
- d) 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."**
- e) 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."**
- f) 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.
- g) When the sample items have been completed successfully, say, **"Yes, now you know how to do them."**
- h) 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."**
- i) The examiner should begin timing after saying "Go ahead", not when the participant begins working. Timing should be discrete but also precise.
- j) At the end of 90 seconds, say, **"Stop. That's good, thank you."**

### 2. Prompts

- a) 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.
- b) 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."**

- c) If the participant pauses at the end of a row or stops working, encourage him/her to continue, saying, **“Good, keep going.”** Point to the beginning of the next row, if necessary.
- d) Give no further assistance except (if necessary) to remind the participant to continue until instructed to stop.

### 3. Scoring

- a) 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.
- b) 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.
- c) 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.
- d) 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.
- e) 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 Form.

## E. DELAYED WORD RECALL

### 1. Administration

- a) Say, **"A few minutes ago, you read and made a sentence with several words that were on those cards. Please tell me all of the words you can remember in any order."**
- b) Allow 60 seconds. Use the stopwatch discreetly to avoid creating anxiety or a sense of time pressure.

### 2. Prompts

- a) Some encouragement may be necessary because participants may spontaneously report fewer words than they actually could recall with further effort.
- b) When the respondent indicates that he/she cannot remember any more words (or after a pause of 10 seconds), provide one prompt for more words say, **"Can you think of any more words?"** If the participant responds that they can't think of any more words, the examiner should say, **"That's okay, just try. I will tell you when to stop."**

### 3. Scoring

- a) 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.
- b) Note: this test is not given, if the exposure trial was not performed.

## F. INCIDENTAL LEARNING

### 1. Administration

- a) The participant's task is to record as many symbols and symbol-digit pairs as he/she can recall from the DSS administered earlier.
- b) Place IL template in front of the participant.
- c) 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. Ready? Go ahead."**
- d) Allow 60 seconds. Timing should be discrete.
- e) 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). Ready? Go ahead."**
- f) Allow 60 seconds.

### 2. Scoring

- a) Record 1 point for each correct symbol and record this total at the bottom of the form. If the participant writes a symbol after the initial 60 seconds credit should not be given for that symbol. The examiner should make notation of why credit was not given on the incidental learning template. 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.
- b) Credit is given for imperfectly drawn symbols (e.g., V instead of U) as long as the ppt is consistently drawing the symbols the same (from DSST to IL).
- c) This test is not administered, if the DSS was not attempted.
- d) The total # of digit symbol pairs should not exceed the total # of symbols.

## G. WORD FLUENCY

### 1. Administration

- a) 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.
- b) 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.”**
- c) Discretely start the stopwatch after saying “Go” and record the participant's responses verbatim.
- d) Record all words produced (use the back of the page if more space is needed).
- e) Do not stop the test until the entire 60 seconds is over.
- f) After 60 seconds has passed, the examiner stops the test, provides encouragement, and states the next letter. Say, **“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.”**
- g) Discretely start the stopwatch after saying “Go” and record the participant's responses verbatim.
- h) After 60 seconds has passed, the examiner stops the test, provides encouragement, and states the next letter. Say, **“Stop. 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.”**
- i) After 60 seconds has passed, the examiner stops the test.

### 2. Prompts

- a) If the participant cannot think of any more words, wait quietly for ~ 10 seconds. After 10 seconds of silence prompt for more words, saying, **“Can you think of any other words that that begin with the letter \_\_\_?”**
- b) 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.”**
- c) If a participant asks if they already said a word, do not say “yes” or “no”. Instead, encourage more responses by saying, **“It’s ok; keep going!”** or **“You can repeat words.”**
- d) 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 after three or more consecutive errors: **“Tell me words that start with F (A or S) but do not include numbers”** (or people, etc. depending on the error).

### 3. Scoring

- a) 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 or write part of the word to indicate the participant should receive credit for the word.
- b) Place a single strike mark through inadmissible words, i.e., proper nouns (names or places), simple variations (adding “ed” or “ly”); plurals or repetitions should only be counted once. 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.
  - c) 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). Credit is given to all words, as long as they have different meanings. See below for examples.
  - d) Some admissible and inadmissible words are included here:
    - (1) Admissible: felt/feelings, free/freedom, fall/fell, season/seasoning, anxious/anxiety, stand/stood, foot/feet, anonymous/anonymity, sun/sunshine, fuse/fusion, sea/seashore, frank (adj), ford (n), french (adj), & august (adj).
    - (2) Inadmissible: fool/foolish, final/finalize, success/successful, fun/funny, fight/fought, sit/sat, say/said, freeze/froze, friend/friendly, sun/sunny, & small/smaller.
    - (3) 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.
    - (4) Homophones (i.e., words that sound like they are spelled with F, A or S but actually begin with another letter) are inadmissible.
    - (5) Do not give credit for words that the participant says inadvertently (e.g., “I can’t think of any more words.” Do not give the participant credit for “any” under the letter A).
    - (6) Words from other languages (e.g., apropos) are also counted. However, it is up to the examiner to verify the word in cases where the examiner is not familiar with a given word.
  - e) 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



## H. ANIMAL NAMING

### 1. Administration

- a) In this task, the participant is asked to name as many different animals as he/she can think of in 60 seconds.
- b) 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.”**
- c) Start timing. Allow 60 seconds.
- d) 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 an “X” on the form or write part of the word if production is too rapid for verbatim recording. Verbatim words are preferred however.

### 2. Prompts

- a) If there is a pause of 10 seconds or more, repeat basic instructions and give the starting word **“dog.”**
- b) If the participant discontinues before the end of the time period, encourage him/her to try to think of more names.
- c) Prompt participant not to provide given names after 3 consecutive occurrences.

### 3. Scoring

- a) After the participant has left the room, the examiner totals the valid responses. Credit would be given for prompt 2a ("DOG" noted above) if participant verbalized "dog" back.
- b) Place a single strike mark through repetitions and plurals, these should only be counted once.
- c) 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: “human/homosapien”, 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.
- d) 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.
- e) 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.

## I. NEUROCOGNITIVE BATTERY SUMMARY FORM

1. All tests are scored and the Neurocognitive Battery Summary Form completed after the participant has completed the cognitive tests and left the exam area.
2. There are some occasions when a particular test will not be performed. The reasons may include:
  - a) Participant refusal: The participant declines/refuses to perform a test;
  - b) Task difficulty: The participant could not fully understand the instructions or is becoming notably frustrated and hence a test is stopped in order to preserve rapport;
  - c) Impairment: The examiner determines that the participant is unable to perform a test due to a significant impairment such as visual, hearing, literacy or motor problem.
3. If a test is not performed or discontinued for one of these reasons, the reason is recorded on the Neurocognitive Battery Summary Form.
4. **Visits 9, 11:** note that some tests (e.g., Trails A & B and Boston Naming) have specific criteria for when the test should be stopped. If the test was stopped because the participant met the test's criteria (e.g., exceed time on Trails, etc.) to stop, select 'No' as the response to 'was the test discontinued,' and enter the score (rather than one of the 'A, B, C' reasons for discontinuation) on the Neurocognitive Battery Summary Form.
5. For Questions 2-6: Record the score(s) for each test. If tests were discontinued, record the reason.
6. For Questions 7-15: For Visit 8 and 10, Block B will not be collected, therefore, these questions will be left BLANK. The missing fields report has been programmed to ignore these questions.
7. For Question 16: The examiner is asked to comment on whether there were any mitigating factors that the examiner felt may have adversely affected the participant's performance. This would not include tests that were discontinued (as the reasons for these issues will have already been noted). Examples that may have affected performance would include: hearing loss, vision problems, tremor, arthritis in the hands, sedation, or if performed in the home/LTC setting, environmental factors such as poor lighting, background noise or interruptions during the testing session. If so, the examiner should provide a brief description of the issue in 16a.



# NEUROCOGNITIVE BATTERY SUMMARY FORM

FORM CODE: 

N	C	S
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If a test was discontinued, record the reason for discontinuation using the appropriate letter:

**A = Refusal** (participant declines/refuses to perform a test)

**B = Task difficulty** (participant could not fully understand the instructions or became frustrated)

**C = Impairment** (Visual, hearing, literacy, or limb or motor problem)

BLOCK A			
TEST NAME	IF DISCONTINUED: Enter reason for discontinuation.	SCORE	
2. Digit Symbol Substitution	2a. <input style="width: 40px; height: 25px;" type="text"/>	2b.	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>
3. Delayed Word Recall	3a. <input style="width: 40px; height: 25px;" type="text"/>	3b.	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>
4. Incidental Learning	4a. <input style="width: 40px; height: 25px;" type="text"/>	4b. Symbols	<input style="width: 40px; height: 25px;" type="text"/>
		4c. Digit-Symbol Pairs	<input style="width: 40px; height: 25px;" type="text"/>
5. Word Fluency (FAS)	5a. <input style="width: 40px; height: 25px;" type="text"/>	5b. F Total	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>
		5c. A Total	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>
		5d. S Total	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>
6. Animal Naming	6a. <input style="width: 40px; height: 25px;" type="text"/>	6b.	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>
BLOCK B			
7. Logical Memory I	7a. <input style="width: 40px; height: 25px;" type="text"/>	7b. Story A	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>
		7c. Story B	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>
8. Digits Backwards	8a. <input style="width: 40px; height: 25px;" type="text"/>	8b.	<input style="width: 40px; height: 25px;" type="text"/> <input style="width: 40px; height: 25px;" type="text"/>

