



NACC UNIFORM DATA SET

Instructions

For the Neuropsychological Battery (Form C2)

Version 3.0, March 2015

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Rewrites made to this document since UDS3 implementation (March 15, 2015)

Date yyyy-mm-dd	Description	Test(s) affected	Question(s) affected	Data element(s) affected
2018-05-01	Additional instructions added for administration	Number Span Backward	N/A	N/A
2018-01-31	Additional clarification added to scoring instructions for Element 8	Benson immediate, delayed	N/A	N/A
2017-08-24	Scoring instructions for Element 8 corrected from >8mm to >5mm	Benson immediate, delayed	N/A	N/A
2016-08-02	Sample worksheet updated to restore missing word from "anvil" definition	MINT	29	N/A
2016-04-08	Further instructions were provided for scoring Delayed Recall.	MoCA	10	N/A
2015-04-24	The sample worksheet was updated to reflect change to instructions, allowing only 4 minutes.	Benson Immediate	N/A	N/A

Instructions for administering and scoring the UDS v3 Neuropsychological Battery FORM C2

General principles of assessment and testing

This section is intended to help technicians and other non-clinicians adopt appropriate test etiquette.

1. Establish rapport. This is essential to the interview in general and the assessment of cognitive function in particular. The subjects are volunteers who will typically have little experience with cognitive assessment procedures. Cognitive testing has the potential to be an uncomfortable or even threatening experience. The following considerations will help to establish and maintain rapport:
 - a. It is important to convey appreciation for the time and effort being volunteered. Remember that the subjects are people (not sources of data) who are donating their time. The interviewer should convey respect for the subject, interest in the interview process, and sensitivity to the needs and concerns of the subject.
 - b. The subject will respond to the interviewer's emotional state. If the interviewer is anxious, unsure, or uninterested, the subject will often respond in kind. Therefore, it is critical that the examiner be thoroughly trained and confident about test administration. Subjects will be most cooperative and at ease with an interviewer who is secure in his/her role and who has a firm command of test administration, delivering instructions in a fluent, practiced manner with proper inflections.
 - c. Avoid subtle coaching or cheerleading. Your job is to administer each item as specified and obtain a response that can be scored.
2. Ensure uniformity in data collection and scoring. This is essential for all portions of the interview. To this end:
 - a. Strictly adhere to the wording of instructions and items.
 - b. Be sure to gain and hold the subject's attention as items are administered.
 - c. Do not assume that partial answers or misstatements are correct. When in doubt about the acceptability of a response, refer to the manual and/or your supervisor.
3. Avoid missing data. Every reasonable attempt should be made to administer all performance items and all tests. Note that if an item is administered and the correct response is not made, the response should be scored as an error.

Failure to complete an item or test may be the result of a subject's physical problem (coded as 95 or 995), cognitive/behavioral problem (96 or 996), other problem (97 or 997), or refusal (98 or 998). Select the appropriate reason and enter the code in the space provided. If more than one reason applies, enter the lowest numbered reason.

It is intended that the tests be administered in the order in which they appear on NACC UDS Form C2. This is necessary in order to standardize the delay intervals for testing memory among Centers, and also to eliminate any differences that may result from varying the order of test administration. It is therefore important that both the current UDS and the crosswalk tests be administered in their entirety either before or after the administration of other tests commonly used by the Center.

DESCRIPTION

The Montreal Cognitive Assessment (MoCA) is a rapid screening instrument designed to help health professionals detect mild cognitive dysfunction. It assesses numerous cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation.

SOURCE

All information on this test, including publications and norms and cut-off scores, appears on <http://www.mocatest.org>.

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MoCA

ADMINISTRATION

Time to administer the MoCA is approximately 10 minutes. The examiner is permitted to repeat each item once, if asked. Following are detailed instructions.

1. Alternating trail making

The examiner instructs the subject: “**Please draw a line, going from a number to a letter in ascending order. Begin here (point to 1) and draw a line from 1 then to A then to 2 and so on. End here (point to E).**”

2. Visuoconstructional skills (cube):

The examiner gives the following instructions, pointing to the cube: “**Copy this drawing as accurately as you can, in the space below.**”

3. Visuoconstructional skills (clock):

Indicate the right third of the space and give the following instructions: “**Draw a clock. Put in all the numbers and set the time to 10 past 11.**”

4. Naming

Beginning on the left, point to each figure and say, “**Tell me the name of this animal.**”

5. Memory

The examiner reads a list of five words at a rate of one per second, giving the following instructions: “**This is a memory test. I am going to read a list of words that you will have to remember now and later on. Listen carefully. When I am through, tell me as many words as you can remember. It doesn't matter in what order you say them.**”

Mark a check in the allocated space for each word the subject produces on this first trial. When the subject indicates that he/she has finished (has recalled all words), or can recall no more words, read the list a second time with the following instructions: “**I am going to read the same list for a second time. Try to remember and tell me as many words as you can, including words you said the first time.**” Put a check in the allocated space for each word the subject recalls after the second trial.

At the end of the second trial, inform the subject that he/she will be asked to recall these words again by saying, “**I will ask you to recall those words again at the end of the test.**”

6. Attention

FORWARD DIGIT SPAN: Give the following instruction: “**I am going to say some numbers and when I am through, repeat them to me exactly as I said them.**” Read the five-number sequence at a rate of one digit per second.

BACKWARD DIGIT SPAN: Give the following instruction: “**Now I am going to say some more numbers, but when I am through you must repeat them to me in the backwards order.**” Read the three-number sequence at a rate of one digit per second.

VIGILANCE: The examiner reads the list of letters at a rate of one per second, after

giving the following instruction: “**I am going to read a sequence of letters. Every time I say the letter A, tap your hand once. If I say a different letter, do not tap your hand.**”

SERIAL 7S: The examiner gives the following instruction: “**Now I will ask you to count by subtracting seven from 100, and then, keep subtracting seven from your answer until I tell you to stop.**” Give this instruction twice if necessary.

7. Sentence repetition

The examiner gives the following instructions: “**I am going to read you a sentence. Repeat it after me, exactly as I say it** [pause]: **I only know that John is the one to help today.**” Following the response, [SAY]: “**Now I am going to read you another sentence. Repeat it after me, exactly as I say it** [pause]: **The cat always hid under the couch when dogs were in the room.**” Space is also provided (MoCA notes page) to record responses.

8. Verbal fluency

The examiner gives the following instruction: “**Tell me as many words as you can think of that begin with a certain letter of the alphabet that I will tell you in a moment. You can say any kind of word you want, except for proper nouns (like Bob or Boston), numbers, or words that begin with the same sound but have a different suffix, for example, love, lover, loving. I will tell you to stop after one minute. Are you ready?** [Pause] **Now, tell me as many words as you can think of that begin with the letter F.** [Time for 60 sec]. **Stop.**” Space is also provided (MoCA notes page) to record responses.

9. Abstraction

The examiner asks the subject to explain what each pair of words has in common, starting with the example: “**Tell me how an orange and a banana are alike.**” If the subject answers in a concrete manner, then say only one additional time: “**Tell me another way in which those items are alike.**” If the subject does not give the appropriate response (fruit), say, “**Yes, and they are also both fruit.**” Do not give any additional instructions or clarification. After the practice trial, [SAY]: “**Now, tell me how a train and a bicycle are alike.**” Following the response, administer the second trial, saying: “**Now tell me how a ruler and a watch are alike.**” Do not give any additional instructions or prompts.

10. Delayed recall

The examiner gives the following instruction: “**I read some words to you earlier, which I asked you to remember. Tell me as many of those words as you can remember.**” Make a check mark (✓) for each of the words correctly recalled spontaneously without any cues, in the allocated space. If the subject fails to freely recall one or more, proceed to cueing, as indicated below.

Following the delayed free recall trial, prompt the subject with the semantic category cue provided below for any word not recalled. Make a check mark (✓) in the allocated space. If the subject does not recall the word after the category cue, give him/her a multiple choice trial. For example, if the word FACE was not freely recalled with the category cue, ask, “**Which of the following words do you think it was, NOSE, FACE, or HAND?**” Use the following category and/or multiple-choice cues for each word, when appropriate:

	Category cue	Multiple choice
FACE	part of the body	nose, face, hand
VELVET	type of fabric	denim, cotton, velvet
CHURCH	type of building	church, school, hospital
DAISY	type of flower	rose, daisy, tulip
RED	a color	red, blue, green

11. Orientation

The examiner gives the following instructions: “**Tell me the date today.**” If the subject does not give a complete answer, then prompt accordingly by saying: “**Tell me the [year, month, exact date, and day of the week].**” Then [SAY]: “**Now, tell me the name of this place, and which city it is in.**”

ADDITIONAL INSTRUCTIONS FOR ADMINISTERING THE MOCA

- The MoCA need not be administered by the clinician who is administering the rest of the UDS battery, and it need not be administered in the same session as the other tests (it can be administered one to seven days before the rest of the battery).
- In drawing the clock and cube, the subject may erase his/her work after one or two pencil strokes and try again if they realize they didn't leave enough room or stop for a similar reason. The subject may not erase and try again, however, after drawing most or all of the item.
- The clinician may not demonstrate the tapping for the vigilance item. If the subject does not understand, the clinician may repeat the entire instruction once.
- Even though verbal fluency for F and L appear later in the battery, it is still necessary to administer the fluency test for the letter F in the language section of the MoCA.

SCORING

If any of the individual items cannot be administered, enter the appropriate reason code (95/995 – 98/998) from the key.

1. Alternating trail making

Allocate one point if the subject successfully draws the following pattern:
1–A–2–B–3–C–4–D–5–E, without drawing any lines that cross. Any error that is not immediately self-corrected earns a score of 0. Enter the score for “Visuospatial/executive — Trails” on NACC UDS Form C2, Question 1g.

2. Visuoconstructional skills (cube)

One point is allocated for a correctly executed drawing.

- Drawing must be three-dimensional
- All lines are drawn
- No line is added
- Lines are relatively parallel and their length is similar (rectangular prisms are accepted)

A point is not assigned if any of the above criteria are not met. Enter the score for “Visuospatial/executive — Cube” on NACC UDS Form C2, Question 1h.

3. Visuoconstructional skills (clock)

One point is allocated for each of the following three criteria:

CONTOUR (1 PT.): the clock face must be a circle with only minor distortion acceptable (e.g., slight imperfection on closing the circle). If acceptable, enter 1; otherwise, enter 0 for “Visuospatial/executive — Clock contour” on UDS Form C2, Question 1i.

NUMBERS (1 PT.): all clock numbers must be present with no additional numbers; numbers must be in the correct order and placed in the approximate quadrants on the clock face; Roman numerals are acceptable; numbers can be placed outside the circle contour. If all criteria are met, enter 1; otherwise, enter 0 for “Visuospatial/executive — Clock numbers” on NACC UDS Form C2, Question 1j.

HANDS (1 PT.): there must be two hands jointly indicating the correct time; the hour hand must be clearly shorter than the minute hand; hands must be centered within the clock face with their junction close to the clock center. If all criteria are met, enter 1; otherwise, enter 0 for “Visuospatial/executive — Clock hands” on NACC UDS Form C2, Question 1k.

For the MoCA Total Score, a point is not assigned for a given element if any of the above criteria are not met.

4. Naming

One point each is given for the following responses: (1) lion (2) rhinoceros or rhino (3) camel or dromedary. Enter the score for “Language — Naming” on NACC UDS Form C2, Question 1l.

5. Memory

For the MoCA Total Score, no points are given for Trials One and Two. Count the number correct for both trials and enter the score for “Memory — Registration (two trials)” on NACC UDS Form C2, Question 1m.

6. Attention

FORWARD DIGIT SPAN, BACKWARD DIGIT SPAN: Allocate one point for each sequence correctly repeated. (N.B.: the correct response for the backwards trial is 2–4–7.) Enter the score for “Attention — Digits” on NACC UDS Form C2, Question 1n.

VIGILANCE: Give one point if there is zero to one errors (an error is a tap on a wrong letter or a failure to tap on letter A). Enter the score for “Attention — Letter A” on NACC UDS Form C2, Question 1o.

SERIAL 7S: This item is scored out of 3 points. Give no (0) points for no correct subtractions, 1 point for one correction subtraction, 2 points for two to three correct subtractions, and 3 points if the subject successfully makes four or five correct subtractions. Count each correct subtraction of 7 beginning at 100. Each subtraction is evaluated independently; that is, if the subject responds with an incorrect number but continues to correctly subtract 7 from it, give a point for each correct subtraction. For example, a subject may respond “92–85–78–71–64” where the “92” is incorrect, but all subsequent numbers are subtracted correctly. This is one error and

the item would be given a score of 3. Enter the score for “Attention — Serial 7s” on NACC UDS Form C2, Question 1p.

7. Sentence repetition

Allocate 1 point for each sentence correctly repeated. Repetition must be exact. Be alert for errors that are omissions (e.g., omitting “only,” “always”) and substitutions/additions (e.g., “John is the one who helped today;” substituting “hides” for “hid;” altering plurals, etc.). Enter the score for “Language — Repetition” on NACC UDS Form C2, Question 1q.

8. Verbal fluency

Allocate one point if the subject generates 11 words or more in 60 sec. Record the subject’s response in the bottom or side margins. Enter the score for “Language — Fluency” on NACC UDS Form C2, Question 1r.

9. Abstraction

Only the last two item pairs are scored. Give 1 point to each item pair correctly answered.

The following responses are acceptable:

Train – bicycle means of transportation, means of traveling,

you take trips in both

Ruler – watch measuring instruments, used to measure

The following responses are not acceptable:

Train – bicycle they have wheels

Ruler – watch they have numbers

Enter the number correctly answered for “Abstraction” on NACC UDS Form C2, Question 1s.

10. Delayed recall

Allocate 1 point for each word recalled freely without any cues.

Scoring this section for the MoCA Total Score: No points are allocated for words recalled with a cue. A cue is used for clinical information purposes only and can give the test interpreter additional information about the type of memory disorder. For memory deficits due to retrieval failures, performance can be improved with a cue. For memory deficits due to encoding failures, performance does not improve with a cue.

Enter the number of words recalled without a cue for “Delayed recall — No cue” on NACC UDS Form C2, Question 1t.

Scoring for cued recall

If a category cue was given, enter the number of words recalled; otherwise, enter “88=Not applicable” for “Delayed recall — Category cue” on NACC UDS Form C2, Question 1u. If a multiple choice cue was given, enter the number of words recalled; otherwise, enter “88=Not applicable” for NACC UDS Form C2, Question 1v.

The total possible words recalled and entered in Questions 1t, 1u, and 1v should be 5 or less. If a subject remembers all five words on the MoCA delayed recall without cueing (i.e., uncued), enter 5 total correct for Question 1t; in this case, the number

correct with a category cue and recognition cue (1u and 1v) should be set to “88=Not applicable” because they were not administered.

If a subject does not remember all five words uncued, record the number correct uncued for Question 1t, then provide the category cue for the words that were not recalled without a cue, and enter the number correct with the category cue (if any) for Question 1u.

If the subject did not recall all the words presented with category cue, administer those not recalled using the recognition cue and enter the total correct with the recognition cue (if any) for Question 1v.

11. Orientation

For the MoCA Total Score, give one point for each item correctly answered. The subject must tell the exact date and the exact place (name of hospital, clinic, office). No points are allocated if subject makes an error of one day for the day and date. For each item, enter 1 if correct or 0 if incorrect for Orientation on NACC UDS Form C2, Questions 1w – 1bb.

TOTAL SCORE

Sum all subscores listed on the right-hand side of the MoCA worksheet. The maximum score is 30 points. A final total score of 26 and above is considered normal.

Enter the uncorrected score for NACC UDS Form C2, Question 1f. If any of the scored MoCA items (1g–1l, 1n–1t, and 1w–1bb) were not administered, enter 88=Not applicable for the total score.

RULES FOR SINGLE-ITEM SCORING AND INDEX SCORE CALCULATIONS FOR THE MOCA***

ITEMS	Points towards Total Score	INDEX SCORES					
		Memory **	Executive	Attention/ Concentration	Language	Visuo-spatial	Orientation
Trails	1	-	1	-	-	-	-
Cube	1	-	-	-	-	1	-
Clock — Contour	1	-	1	-	-	1	-
Clock — Numbers	1	-	1	-	-	1	-
Clock — Hands	1	-	1	-	-	1	-
Language — Naming	3	-	-	-	3	3	-
Memory — Registration (2 learning trials, total possible=10)	0, not scored			Immediate recall 2 trials total / 10	-	-	-
Attention — Digits	2	-	2	2	-	-	-
Attention — Letter A	1	-	1	1	-	-	-
Attention — Serial 7s	3	-	3	3	-	-	-
Language — Repetition	2	-	-	2	2	-	-
Language — Fluency	1	-	1	-	1	-	-
Abstraction	2	-	2	-	-	-	-
Delayed recall, no cue	5	=3X number of words no cue (max=15)					
Delayed recall, category cue	0*	=2X number of words retrieved with category cue (max=10)	-	-	-	-	-
Delayed recall, recognition	0*	=1X number of words recognized (max=5)	-	-	-	-	-
Orientation — Date	1	-	-	-	-	-	1
Orientation — Month	1	-	-	-	-	-	1
Orientation — Year	1	-	-	-	-	-	1
Orientation — Day	1	-	-	-	-	-	1
Orientation — Place (name)	1	-	-	-	-	-	1
Orientation — City	1	-	-	-	-	-	1
TOTALS	30	15	13	18	6	7	6

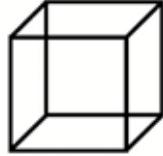
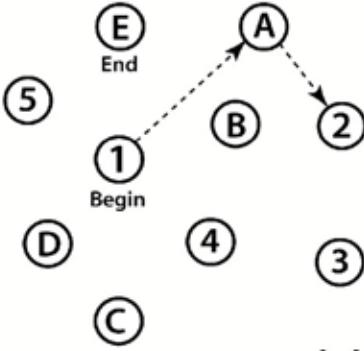
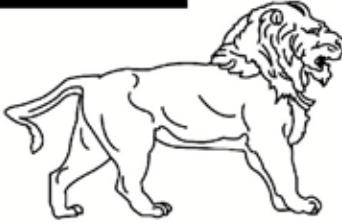
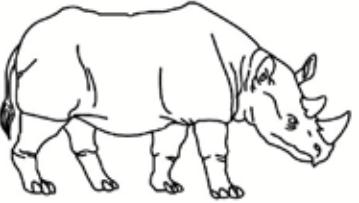
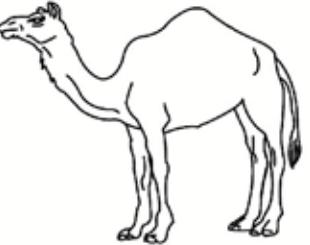
* The standard administration of the MoCA does not score category and recognition responses, even if administered.

** If all five words are freely recalled, cued and category recall are not administered and the total score would be 15 (3 points for each word recalled freely). After free recall, category cues are given *only for items not recalled*. Each word correct with category cue is awarded 2 points. After category cues, only words not correct are then tested with recognition. Award 1 point for each word correct on recognition (max=5). Here is an example: Subject gets two free recall, two cued, and recognizes the fifth word. Memory index score: $(2 \times 3) + (2 \times 2) + (1 \times 1) = 11/15$

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Subject ID _____ Date _____ / _____ / _____ Examiner's initials _____

Montreal Cognitive Assessment (MoCA)

VISUOSPATIAL / EXECUTIVE			Draw CLOCK (Ten past eleven) (3 points)	Copy cube	POINTS			
 <input type="checkbox"/> [] <input type="checkbox"/> [] <input type="checkbox"/> [] <input type="checkbox"/> []					/5			
NAMING								
		<input type="checkbox"/> []	<input type="checkbox"/> []	<input type="checkbox"/> []	/3			
MEMORY Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.		<input type="checkbox"/> FACE	<input type="checkbox"/> VELVET	<input type="checkbox"/> CHURCH	<input type="checkbox"/> DAISY	<input type="checkbox"/> RED	No points	
		<input type="checkbox"/> 1st trial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/> 2nd trial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
ATTENTION Read list of digits (1 digit/sec.).		Subject has to repeat them in the forward order <input type="checkbox"/> 2 1 8 5 4						
		Subject has to repeat them in the backward order <input type="checkbox"/> 5 4 8 1 2					/2	
Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors		<input type="checkbox"/> F B A C M N A A J K L B A F A K D E A A A J A M O F A A B					/1	
Serial 7 subtraction starting at 100		<input type="checkbox"/> 93	<input type="checkbox"/> 86	<input type="checkbox"/> 79	<input type="checkbox"/> 72	<input type="checkbox"/> 65		
		4 or 5 correct subtractions: 3 pts. 2 or 3 correct: 2 pts. 1 correct: 1 pt. 0 correct: 0 pt					/3	
LANGUAGE Repeat: I only know that John is the one to help today. <input type="checkbox"/> The cat always hid under the couch when dogs were in the room. <input type="checkbox"/>								
Fluency / Name maximum number of words in one minute that begin with the letter F		<input type="checkbox"/> (N ≥ 11 words)					/1	
ABSTRACTION Similarity between e.g. banana - orange = fruit		<input type="checkbox"/> train - bicycle	<input type="checkbox"/> watch - ruler					
DELAYED RECALL WITH NO CUE		<input type="checkbox"/> FACE	<input type="checkbox"/> VELVET	<input type="checkbox"/> CHURCH	<input type="checkbox"/> DAISY	<input type="checkbox"/> RED	Points for UNCUED recall only	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Optional Category cue		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Multiple choice cue		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
ORIENTATION		<input type="checkbox"/> Date	<input type="checkbox"/> Month	<input type="checkbox"/> Year	<input type="checkbox"/> Day	<input type="checkbox"/> Place	<input type="checkbox"/> City	/6
© Z.Nasreddine MD		www.mocatest.org					TOTAL	/30
							Add 1 point if ≤ 12 yr edu	

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SAMPLE WORKSHEET

Rules for single-item scoring and index score calculations for the MoCA*

ITEMS	Points towards total score	Memory***	INDEX SCORES				
			Executive	Attention/concentration	Language	Visuospatial	Orientation
Trails	1	–	1	–	–	–	–
Cube	1	–	–	–	–	1	–
Clock Circle	1	–	1	–	–	1	–
Clock Hands	1	–	1	–	–	1	–
Clock Time	1	–	1	–	–	1	–
Language Naming	3	–	–	–	3	3	–
Memory: Registration (2 learning trials, total possible = 10)	0, not scored	–	–	Immediate recall, 2 trials total, max=10	–	–	–
Attention: Digits	2	–	2	2	–	–	–
Attention: Letter A	1	–	1	1	–	–	–
Attention: Serial 7s	3	–	3	3	–	–	–
Language: Repetition	2	–	–	2	2	–	–
Language: Fluency	1	–	1	–	1	–	–
Abstraction	2	–	2	–	–	–	–
Delayed Recall with no cue	5	=3x number words recalled freely (max=15)	–	–	–	–	–
Delayed Recall with category cue	0**	=2x number of words retrieved with category cue (max=10)	–	–	–	–	–
Delayed Recall, recognition	0**	=1x number of words recognized (max=5)	–	–	–	–	–
Orientation: date	1	–	–	–	–	–	1
Orientation: month	1	–	–	–	–	–	1
Orientation: year	1	–	–	–	–	–	1
Orientation: day	1	–	–	–	–	–	1
Orientation: place (name)	1	–	–	–	–	–	1
Orientation: city	1	–	–	–	–	–	1
TOTALS	30	15	13	18	6	7	6

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DESCRIPTION

This test assesses the ability to recall a short story. The examiner reads the story to the subject in a clear voice. Immediately after hearing the story, the subject is asked to retell the story from memory. The story should be read with adequate volume and clarity for the subject to understand during the presentation. No repetitions are permitted.

It is important for the examiner to get a sense of the subject's hearing acuity and modulate her/his voice accordingly. Please note that for the hard of hearing, it is not necessarily helpful merely to increase the volume. A change in pitch tends to be effective, with a lower-pitched voice more audible than a loud, high-pitched voice. As with all neuropsychological testing, it is best if the examiner projects his/her voice at the subject, rather than down toward a clipboard.

SOURCE

Craft S, Newcomer J, Kanne S, Dagogo-Jack S, Cryer P, Sheline Y, Luby J, Dagogo-Jack A, Alderson A. Memory improvement following induced hyperinsulinemia in Alzheimer's disease. *Neurobiol Aging*. 1996 Jan-Feb;17(1):123-30.

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Craft Story 21 Recall (Immediate)

ADMINISTRATION

Making sure you have the subject's attention, read the following instructions aloud. Then read the story slowly, articulating clearly and with normal inflection.

[SAY]: “I am going to read you a story. Listen carefully, and when I am through, I want you to tell me everything you can remember. Try to use the same words I use but you may also use your own words. The story is ...”

As soon as the story is over, give the recall instruction:

[SAY]: “Now tell me the story I just told you. Try to remember as much as you can.”

Record the subject's recall, writing between the lines of the story. For rapid and accurate transcribing of the story, use abbreviations as needed, omit filler words and irrelevant verbiage, and if absolutely necessary, say “**A little slower, please,**” rather than miss story elements. Make sure your transcription of the story is legible before proceeding.

Your transcriptions should be an exact replica of the subject's verbal responses. Write legibly, in ink, and leave room between each line for scoring. If it is difficult to write the subject's response, the examiner may prefer to tape-record the subject's response and then transcribe the results after the session; this is acceptable if appropriate consent has been obtained.

After the subject tells the story, you must give the delayed recall cue.

[SAY]: “Later on, I will ask you to tell me this story again, so try not to forget it.” Note the time so that later you can calculate the time that has elapsed between Craft Story 21 Recall (Immediate) test and the Craft Story 21 Recall (Delayed) test.

SCORING

A. GENERAL INSTRUCTIONS

Scoring can be deferred until after the entire battery is administered but should be performed close to the completion time. Use the score sheets to score the transcription. One sheet is for verbatim scoring and the second is for paraphrase scoring.

The verbatim score is independent of the paraphrase score. Treat each scoring effort separately: they are not additive. Score the story first for verbatim recall and then score it for paraphrase recall.

For verbatim scoring, the story is divided into 44 “bits.” All bits contain one “content” word, which is scored. Some bits also contain “non-content” words, which are not considered in scoring. Each bit is demarcated by a slash (/) at the beginning and at the end of the bit (e.g., /Barry/) on the score form.

For the paraphrase scoring, there are 25 bits of information to score.

Separately sum verbatim and paraphrase points earned for each story, for both the immediate and delayed recall conditions. Record all sums, in the appropriate boxes, on the summary scoring sheet.

Remember with verbatim and paraphrase scoring to consider each bit individually. The order that the bits were given does not matter in the scoring system.

B. DEFINITIONS

1. **CONTENT WORDS:** nouns, adjectives, adverbs, verbs, pronouns, prepositions with semantic load. These are considered during the scoring process.
2. **NON-CONTENT WORDS:** conjunctions, articles, helping verbs, prepositions without semantic load. These are not considered during the scoring process.

VERBATIM SCORING

PERFECT VERBATIM RESPONSE (1.0 POINT): Give the subject 1 point for every bit for which content words are recalled exactly and completely. Allowances can be made for variations of verbs (e.g., “likes” for “liked,” “join” for “joining”) and minor omissions (e.g., “neighbor” for “neighbor’s”) or changes in number (e.g., “games” for “game”). The content words do not need to be recalled by the subject in the same order they were read to receive credit. The words can appear anywhere in the recall.

Enter the verbatim score on NACC UDS Form C2, Question 8a. If the test was not completed, enter the appropriate reason code, 95 – 98, and leave the paraphrase score blank.

PARAPHRASE SCORING

PARAPHRASE RESPONSE (1.0 POINT): Give a point for a response that captures the elements of the story although not necessarily with the exact words (see table on page 16). If the subject provides a bit verbatim (e.g., the name), you should give a point for that bit.

Enter the paraphrase score on NACC UDS Form C2, Question 8b.

CRAFT STORY 21 RECALL (IMMEDIATE): VERBATIM SCORING

Maria's	
child	
Ricky	
played	
soccer	
every	
Monday	
three thirty	
he	
liked	
going	
field	
behind	
their	
house	
joining	
game	
one	
day	
he	
kicked	
ball	
TOTAL	

Number of items recalled for **verbatim scoring**:

Immediate Recall Score: _____/44 maximum

GUIDELINES FOR PARAPHRASE SCORING, CRAFT STORY 21

Item	General rule	Alternative 1-point responses	0-point responses	Points
Maria's	"Maria" or a variant of the name	Mary, Marie	Martha, Anna	
child	"child" or a phrase denoting it was a young person	son, kid, boy, teenager, young man	guy, children, daughter	
Ricky	"Ricky" or a variant of the name	Rick, Rich, Richie, Richard, Ricardo	Randy, Rusty, Robert	
played	"played" is required	to play, plays	did (soccer)	
soccer	"soccer" is required	futbol	baseball, volleyball, other sport	
every Monday	"Monday" or an indication that it occurred on a weekday	—	every day, another day of the week	
at 3:30	an indication that the activity took place in the afternoon	after school, every afternoon	after dinner, at night, in the morning	
He liked going to the field	an indication that he went to an outdoor area	went outside, went to the yard, going to the backyard	went to the school, gym	
behind their house	"house" or word denoting a house	home, residence, where they lived	any other building	
and joining	an indication that he participated in a game	played w/ other kids, became part of the team, playing w/ the team	watching, played in the park	
the game.	"game" in any context	—	—	
One day	"One day" is required	—	—	
he kicked	indication that he performed the activity with his foot	booted, punted	threw, hit (with no mention of the foot)	
the ball	"Ball" is required	football, soccer ball	baseball, volleyball	
so hard	an indication that force was used	so much force, so strongly, (kicked it) so far	—	
that it went over	"Over" is required	—	—	
the neighbor's	an indication that the person lived in the same area	nearby resident	friend's	
fence	"fence" or a word denoting a fence of some kind	garden wall, wall	property line, street	
where three	"Three" is required	three (boys)	—	
large dogs lived.	an indication that there were dogs present	hounds, doggies	puppies, cats, kittens, other animals	
The dogs' owner	an indication that the person was responsible for the dogs	neighbor (if owner implied and "neighbor" mentioned twice)	a bystander, the police	
heard loud barking	an indication that the dogs were making noise	yelping, baying, yapping, heard the dogs	saw the dogs running around	
came out	a word or phrase indicating that the owner was present	(owner) saw the ball	his mother came out, the dogs came out	
and helped them	a word or phrase indicating that help was provided	assisted, aided, had to help	—	
retrieve the ball.	an indication that they got the ball back	gave him the ball, return the ball, (helped him) get the ball —		

Number of items recalled for **paraphrase scoring**: Immediate Recall Score: _____ /25 maximum

Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Craft Story 21 Recall (Immediate)

INSTRUCTIONS: Making sure your have the participant's attention, read the following instructions aloud. Then read the story slowly, articulating clearly and with normal inflection.

SAY: "I am going to read you a story. Listen carefully, and when I am through, I want you to tell me everything you can remember. Try to use the same words I use but you may also use your own words. The story is ..."

Maria's / child / Ricky / played / soccer / every / Monday /

at 3:30. / He / liked / going / to the field / behind / their / house /

and joining / the game. / One / day, / he / kicked / the ball / so / hard /

that it / went / over / the neighbor's / fence / where three / large /

dogs / lived. / The dogs' / owner / heard / loud / barking, / came /

out, / and helped / them / retrieve / the ball.

Record time administration ended: _____

Total story units recalled (VERBATIM SCORING): _____ / 44

Total story units recalled (PARAPHRASE SCORING): _____ / 25

As soon as the story is over, give the recall instruction:

SAY: "Now tell me the story I just told you. Try to remember as much as you can."

Record the participant's recall, writing between the lines of the story above. For rapid and accurate transcribing of the story, use abbreviations as needed, omit filler words and irrelevant verbiage, and if absolutely necessary, say "A little slower, please," rather than miss story elements. Make sure your transcription of the story is legible before proceeding.

After transcribing the story, you must give the delayed recall cue.

SAY: "Later on, I will ask you to tell me this story again, so try not to forget it." Note the time so that later you can calculate the time that has elapsed between Craft Story 21 Recall (Immediate) test and the Craft Story 21 Recall (delayed) test.

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SAMPLE WORKSHEET

CRAFT STORY 21 RECALL (IMMEDIATE): VERBATIM SCORING

PERFECT VERBATIM RESPONSE (1.0 POINT): Give the subject 1 point for every bit for which content words are recalled exactly and completely. Allowances can be made for variations of verbs (e.g., "likes" for "liked," "join" for "joining") and minor omissions (e.g., "neighbor" for "neighbor's") or changes in number (e.g., "games" for "game"). The content words do not need to be recalled by the subject in the same order they were read to receive credit. The words can appear anywhere in the recall.

Maria's	
child	
Ricky	
played	
soccer	
every	
Monday	
three thirty	
he	
liked	
going	
field	
behind	
their	
house	
joining	
game	
one	
day	
he	
kicked	
ball	
so	

hard	
it	
went	
over	
neighbor's	
fence	
three	
large	
dogs	
lived	
dogs'	
owner	
heard	
loud	
barking	
came	
out	
helped	
them	
retrieve	
ball	

TOTAL

SCORING

Number of items recalled for verbatim scoring: Immediate Recall Score: _____ /44 maximum

SAMPLE WORKSHEET

GUIDELINES FOR PARAPHRASE SCORING, CRAFT STORY 21

Item	General rule	Alternative 1-point responses	0-point responses	Points
Maria's	"Maria" or a variant of the name	Mary, Marie	Martha, Anna	
child	"child" or a phrase denoting it was a young person	son, kid, boy, teenager, young man	guy, children, daughter	
Ricky	"Ricky" or a variant of the name	Rick, Rich, Richie, Richard, Ricardo	Randy, Rusty, Robert	
played	"played" is required	to play, plays	did (soccer)	
soccer	"soccer" is required	futbol	baseball, volleyball, other sport	
every Monday	"Monday" or an indication that it occurred on a weekday	—	every day, another day of the week	
at 3:30	an indication that the activity took place in the afternoon	after school, every afternoon	after dinner, at night, in the morning	
He liked going to the field	an indication that he went to an outdoor area	went outside, went to the yard, going to the backyard	went to the school, gym	
behind their house	"house" or word denoting a house	home, residence, where they lived	any other building	
and joining	an indication that he participated in a game	played w/ other kids, became part of the team, playing w/ the team	watching, played in the park	
the game.	"game" in any context	—	—	
One day	"One day" is required	—	—	
he kicked	indication that he performed the activity with his foot	booted, punted	threw, hit (with no mention of the foot)	
the ball	"Ball" is required	football, soccer ball	baseball, volleyball	
so hard	an indication that force was used	so much force, so strongly, (kicked it) so far	—	
that it went over	"Over" is required	—	—	
the neighbor's	an indication that the person lived in the same area	nearby resident	friend's	
fence	"fence" or a word denoting a fence of some kind	garden wall, wall	property line, street	
where three	"Three" is required	three (boys)	—	
large dogs lived.	an indication that there were dogs present	hounds, doggies	puppies, cats, kittens, other animals	
The dogs' owner	an indication that the person was responsible for the dogs	neighbor (if owner implied and "neighbor" mentioned twice)	a bystander, the police	
heard loud barking	an indication that the dogs were making noise	yelping, baying, yapping, heard the dogs	saw the dogs running around	
came out	a word or phrase indicating that the owner was present	(owner) saw the ball	his mother came out, the dogs came out	
and helped them	a word or phrase indicating that help was provided	assisted, aided, had to help	—	
retrieve the ball.	an indication that they got the ball back	gave him the ball, return the ball, (helped him) get the ball —		

Number of items recalled for paraphrase scoring: Immediate Recall Score: _____ /25 maximum

DESCRIPTION

This test is a simplified form of the Rey-Osterrieth Complex Figure. The purpose of the test is to assess a subject's visuoconstructional and visual memory functions.

SOURCE

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Possin, KL, Laluz VR, Alcantar OZ, Miller BL, Kramer JH. Distinct neuroanatomical substrates and cognitive mechanisms of figure copy performance in Alzheimer's disease and behavioral variant frontotemporal dementia. *Neuropsychologia*. 2011 Jan; 49(1):43-8.

Benson Complex Figure Copy (Immediate)

ADMINISTRATION

Give subject a pen, place sheet with figure in front of the subject, and say, "**Please copy this design as best you can.**" Please do not use colored pencils for each element because this can be disruptive and will not be consistent with other ADCs. Instead, please write notes to track progress. Have the subject make his or her copy in the lower half of the page below the figure. When design is completed, leave the figure in front of the subject for 5 seconds and say "**Be sure to remember this design, because I'll ask you to draw it again later from memory.**" A maximum of 4 minutes should be allowed for completing the drawing. Do not administer other figure-copy tests during the delay, and do not administer the Rey-Osterrieth before the Benson on the same day.

The subject may start over once. Since a pen must be used, the subject cannot erase. They may, however, cross out or write over their first attempt. If the subject produces more than one figure, ask them which drawing is the final figure for scoring.

SCORING

Follow the scoring instructions as closely as possible and use your best judgment when scoring the Benson Complex Figure Copy.

The scoring system for the Benson Figure is modeled after Taylor's widely used scoring system for the Rey-Osterrieth Figure. Eight major figural elements have been identified. Each figural element is scored as 2 points if the element is drawn accurately and placed correctly in the figure (1 point for accuracy, 1 point for placement). Score 1 point if the element is poorly drawn but placed correctly or is correctly drawn but misplaced, and 0 points if the element is neither accurately drawn nor correctly placed. Detailed scoring rules are on the following page.

Enter the total score on NACC UDS2 Form C2, Question 4a. If the test could not be administered, enter the appropriate reason code, 95 – 98, from the key.

- | | | |
|-------------------------------------|---|--|
| <input type="checkbox"/> | 1. Four-sided, 90° angles, width > height, any gaps or overlaps < 8mm | <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 |
| <input checked="" type="checkbox"/> | 2. Reasonably straight lines; any gaps or overlaps < 8mm | <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 |
| <input checked="" type="checkbox"/> | 3. Connects at middle third, no overlap with diagonals | <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 |
| <input type="checkbox"/> | 4. Reasonably round, doesn't touch sides | <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 |
| <input type="checkbox"/> | 5. Vertical lines > 1/2 distance to diagonals, width > height, 90° angles | <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 |
| <input type="checkbox"/> | 6. Connects below #3, top of square above bottom | <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 |
| <input type="checkbox"/> | 7. Vertex corresponds to middle third; any gaps or overlaps < 8mm | <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 |
| <input type="checkbox"/> | 8. Gap between #8 and #7 < 5mm, angle at end of stem = 90° | <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 |
| BONUS | | <input type="checkbox"/> 0 <input type="checkbox"/> 1 |

Time of day design completed: _____ : _____ AM PM

Total score (circle one): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Always score leniently for borderline responses. If a response is borderline for accuracy and borderline for placement, give 1 point. Self-corrected responses are acceptable. Multiple attempts are acceptable at the subject's request either on an empty area of the page or, if more room is needed, on a fresh page. Ask the subject which drawing he or she would like you to score. If the subject copies directly on top of the stimulus instead of drawing below, the subject should be directed one more time to draw below the figure. If a subject draws close to the edge of the paper, that subject can start again. Instances may occur where test administrators should consider the test invalid (e.g., if the subject did not bring his or her glasses and can't see well enough to take the test). In these instances, enter the appropriate code listed on NACC UDS Form C2. If a subject has motor problems and cannot complete the Benson Figure Complex Copy, a code of 95 (Physical problem) should be entered for the score on NACC UDS Form C2, Question 4a.

For accuracy (A), element drawn must be recognizable as the target element and meet the additional criteria listed below. Leniency is given for wavy lines or rounded angles (e.g., due to tremor). A protractor and ruler should be used for making angle and distance judgments. Extraneous lines do not impact scoring.

For placement (P), element need not be accurate, it must only bear some slight resemblance to the target element (with leniency), be placed correctly, and meet the additional placement criteria below. Major rotation of an element is not acceptable for placement credit.

ELEMENT 1

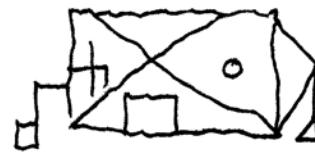
Accuracy: Four reasonably straight sides must be present with 90° angles ($\pm 10^\circ$); width > height; corners do not have to touch and lines can be broken, but gaps or overlaps cannot exceed 8mm.

Placement: Any square-like or rectangular figure is present with at least 3 sides but no more than four sides. Less precise angles are acceptable. Rotation of the entire figure should not exceed 30°. If height is greater than width, this is considered an accuracy failure rather than a rotation-related placement failure.

2-point examples:

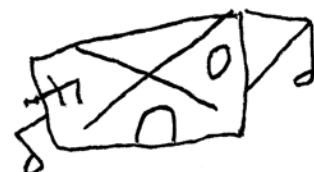


Figure is not rotated more than 30°, and gaps at corners and at broken lines do not exceed 8mm.

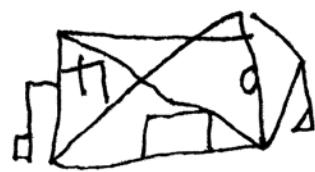


Leniency is given for wavy lines.

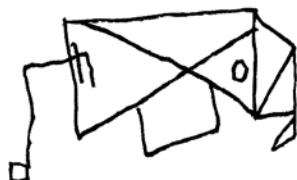
1-point examples:



Accuracy: 0 Placement: 1
Bottom left angle is not precise.



Accuracy: 0 Placement: 1



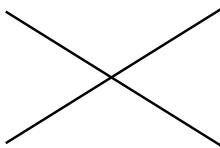
Accuracy: 0 Placement: 1
Three sides of the rectangle are present, and element bears enough of a resemblance to the target element to receive placement credit.



Accuracy: 1 Placement: 0
Placement credit is lost due to rotation.

0-point examples: pentagon, circle, triangle

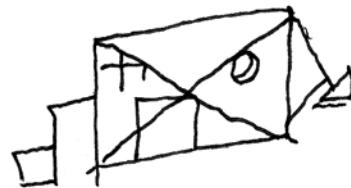
ELEMENT 2



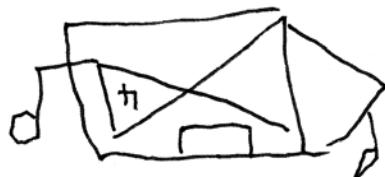
Accuracy: Two reasonably straight intersecting lines are recognizable as the target figure. Rotation is acceptable for accuracy, and lines need not be diagonal.

Placement: Gap or overlap at the corners of the large rectangle must not exceed 8mm. If only one line is present but placement is correct, credit is given.

2-point examples:



1-point examples:



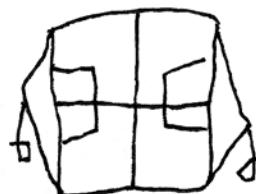
Accuracy: 1 Placement: 0

These lines are recognizable as the target figure (A), but the gaps at corners exceed 8mm (P).



Accuracy: 0 Placement: 1

Element loses accuracy point because one line is missing, but it is placed correctly.



Accuracy: 1 Placement: 0

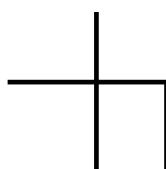
Lines are recognizable (A) but rotated (P).



Accuracy: 1 Placement: 0

Lines are recognizable but not correctly placed.

ELEMENT 3



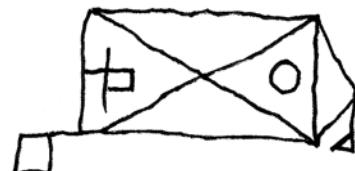
Accuracy: Figure is correctly shaped.

Placement: Figure is connected at the middle third of the large rectangle but does not need to be above element 6. Any gap with the large rectangle does not exceed 8mm. Lines may cross the large rectangle but not the diagonal lines.

2-point examples:



Placement credit is given because it connects at the middle third.

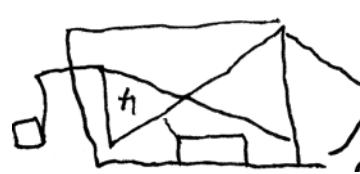


Do not deduct accuracy because of the extraneous line.

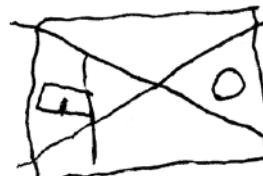
1-point examples:



*Accuracy: 1 Placement: 0
Connects at upper third.*



*Accuracy: 1 Placement: 0
Element is correctly shaped (A), but the gap between the element and large rectangle exceeds 8mm (P).*

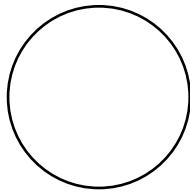


*Accuracy: 0 Placement: 1
Element bears some slight resemblance to the target element (with leniency) and is placed correctly, at the middle third (P). This is an example of the least resemblance an element might have to receive credit for placement.*



*Accuracy: 1 Placement: 0
Placement credit is lost due to overlap with diagonals. This element barely receives accuracy credit.*

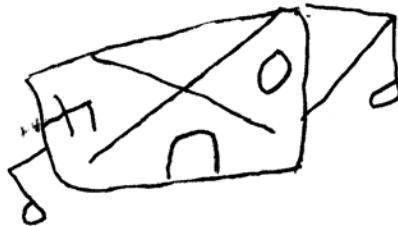
ELEMENT 4



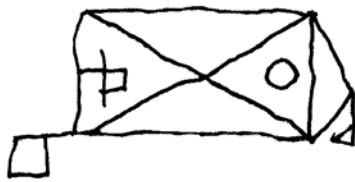
Accuracy: Reasonably round (longest diameter to shortest ratio < 2:1).

Placement: The circle is inside the right quadrant of the rectangle, which is defined by the diagonal lines. If the diagonal lines are not present or are misplaced, score based on their correct placement, with leniency. The circle cannot touch the large rectangle.

2-point examples:

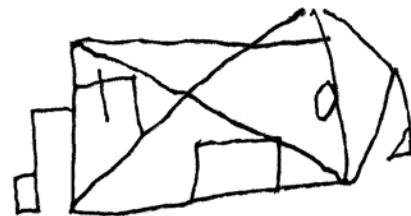


The ratio for this circle is 1.8:1, and so it barely receives accuracy credit.



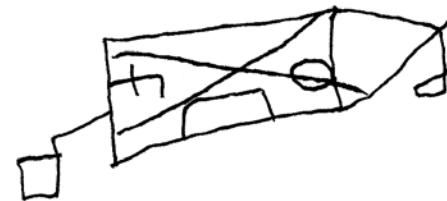
Placement is scored based on where the diagonal lines should have been placed.

1-point example:



Accuracy: 1 Placement: 0

0-point example:



Exceeds ratio requirement (A). Circle touches the rectangle (P).

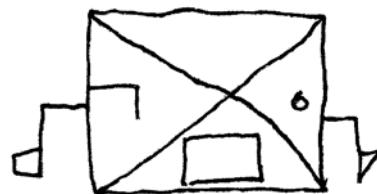
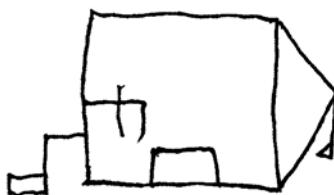
ELEMENT 5



Accuracy: The width must be > the height, and the angles are $90^\circ (\pm 10^\circ)$. The vertical sides of the rectangle are > $\frac{1}{2}$ of the vertical measurement between the bottom of the large rectangle and the closest part of diagonal lines. If the diagonal lines are not present, calculate based on where the lines should be placed (see first 2-point example). Extraneous lines are acceptable.

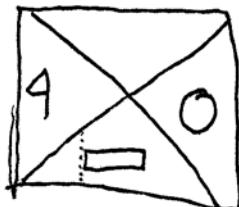
Placement: Figure is located in bottom quadrant of the large rectangle as defined by the diagonal lines. The gap or overlap with the bottom of the large rectangle does not exceed 8mm, and any overlap with the diagonal lines does not exceed 8mm.

2-point examples:



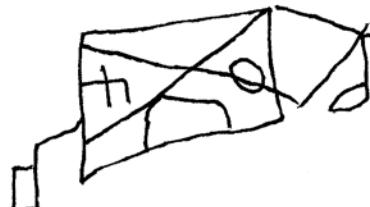
Extraneous lines are acceptable.

1-point examples:



Accuracy: 0 Placement: 1

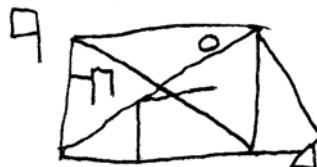
Vertical sides are < $\frac{1}{2}$ vertical measurement.
Dotted lines were added to illustrate vertical measurement.



Accuracy: 0 Placement: 1

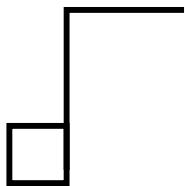
Top left angle is not precise.

0-point example:



This response would have received placement credit if the overlap with the diagonal lines did not exceed 8mm.

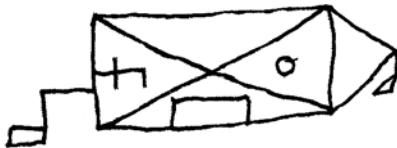
ELEMENT 6



Accuracy: Flag points in the correct direction and shares a side with its staff. Flag may resemble a rectangle or a square.

Placement: Element must be outside the large rectangle and below the left internal element (#3). If left internal element is not present, score placement leniently based on where left internal element should have been placed. The top of the flag must be above the bottom of the large rectangle.

2-point examples:



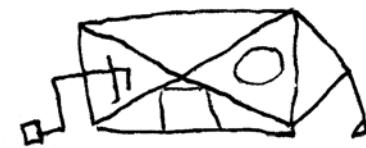
Extraneous lines are acceptable.

1-point examples:



Accuracy: 0 Placement: 1

Flag does not point in the correct direction (A).
Placement is scored based on where element 3
should have been placed.



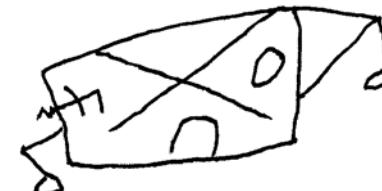
Accuracy: 0 Placement: 1

Element is just below element 3 (P), but flag
does not share a side with the staff (A).



Accuracy: 0 Placement: 1

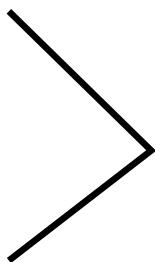
In this example, the element bears some slight
resemblance to the target element and is placed
correctly.



Accuracy: 1 Placement: 0

Top of the flag is below the bottom of the large
rectangle (P).

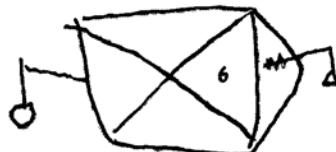
ELEMENT 7



Accuracy: Element is composed of two lines that form a triangle that is roughly the correct size, relative to element 1. The vertex of the angle must correspond to the middle third of the rectangle.

Placement: External lines must be outside the large rectangle on the right. Gap or overlap with the large rectangle should not exceed 8mm. Lines do not need to connect at corners for accuracy or placement credit.

2-point examples:



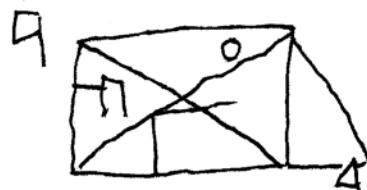
The lines to the right form a triangle-like shape, but if they were more rounded than this (i.e., if they formed a semi-circle), accuracy credit would be lost.

1-point examples:



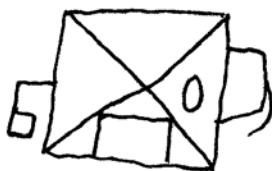
Accuracy: 1 Placement: 0

The vertex of the angle corresponds to the middle third of the large rectangle (A) but is on the wrong side (P).



Accuracy: 0 Placement: 1

The vertex corresponds to the bottom third of the large rectangle (A).



Accuracy: 0 Placement: 1

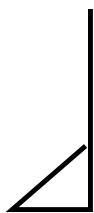
This element is considered to bear enough slight resemblance to target element to receive placement credit, although it is a borderline response.



Accuracy: 0 Placement: 1

Element is too small to receive accuracy credit

ELEMENT 8



Accuracy: There must be a triangle and a stem. The angle of the triangle at the farthest end of the stem must approximate 90° ($\pm 15^\circ$). The flag and stem are in correct relationship to each other.

Placement: Either a stem or flag must be present and placed to the right of the rectangle. The flag need not be a triangle. The element must connect directly to element 7 or be within 5mm of element 7. No credit is lost for an additional stem of any length, provided one of the stems meets the placement criteria (see examples). The top of the flag must be above the bottom of the large rectangle. Rotation > 45° is not allowed.

2-point examples:



1-point examples:



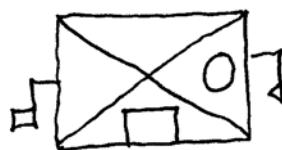
Accuracy: 0 Placement: 1

Stem is present and placed correctly (P). This is an example of the minimal amount of resemblance required to be eligible for placement credit.



Accuracy: 1 Placement: 0

The entire element is rotated > 45° (P), but the relationship between the triangle and stem is preserved (A).



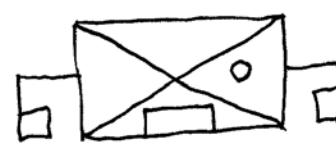
Accuracy: 0 Placement: 1

The angle does not approximate 90° (A).



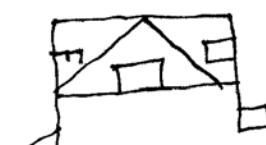
Accuracy: 0 Placement: 1

No stem.



Accuracy: 0 Placement: 1

Element bears resemblance and is placed correctly.

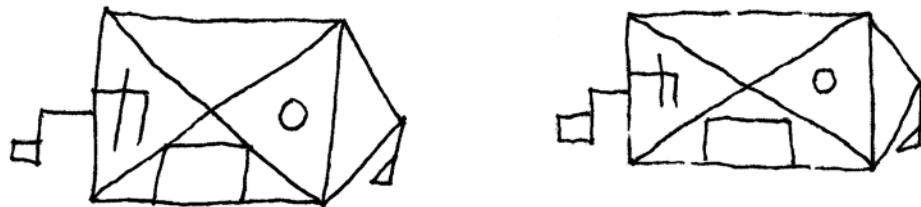
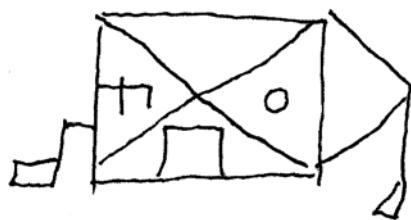


Accuracy: 1 Placement: 0

Accurate but not placed correctly.

BONUS POINT

Each element must be accurately drawn, all elements must be properly placed, all elements must be drawn in proper proportions, all connections between elements must be clean, and no extraneous lines may be present.

1-point examples:**0-point example:**



Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Benson Complex Figure Copy (Immediate)

Give subject a pen, place sheet with figure in front of subject.

SAY: "Please copy this design as best you can."

Please do not use colored pencils for each element because this can be disruptive and will not be consistent with other ADCs. Instead, please write notes to track progress. Have subject make his or her copy in the lower half of the page below the figure. When design is completed, leave the figure in front of the subject for 5 seconds and say,

SAY: "Be sure to remember this design, because I'll ask you to draw it again later from memory."

A maximum of 4 minutes should be allowed for completing the drawing. Do not administer other figure-copy tests during the delay, and do not administer the Rey-Osterrieth before the Benson on the same day.

Allow approximately 10 – 15 minutes before administering the delayed recall portion of the test.

<input type="checkbox"/>	1. Four-sided, 90° angles, width > height, any gaps or overlaps < 8mm	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> X	2. Reasonably straight lines; any gaps or overlaps < 8mm	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> +	3. Connects at middle third, no overlap with diagonals	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> O	4. Reasonably round, doesn't touch sides	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/>	5. Vertical lines > 1/2 distance to diagonals, width > height, 90° angles	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> L	6. Connects below #3, top of square above bottom	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> >	7. Vertex corresponds to middle third; any gaps or overlaps < 8mm	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> J	8. Gap between #8 and #7 < 5mm, angle at end of stem = 90°	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2
BONUS		<input type="checkbox"/> 0	<input type="checkbox"/> 1	

Time of day design completed: ____ : ____ AM PM

TOTAL SCORE (circle one): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

SCORING: For scoring guidelines, please see *NACC Uniform Data Set (UDS) Instructions for Neuropsychological Tests*. Each figural element is scored as 2 points if the element is drawn accurately and placed correctly in the figure (1 point for accuracy, 1 point for placement). Score 1 point if the element is poorly drawn but placed correctly or is correctly drawn but misplaced, and 0 points if the element is neither accurately drawn nor correctly placed.

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DESCRIPTION

This is a test of working memory, and it taps two different working memory constructs. The first, Forward Number Span, measures the capacity for holding information very briefly for the purpose of repeating it exactly. The second, Backward Number Span, measures the ability not only to hold the information but also to manipulate the numbers and reverse the sequence. This test is also referred to as Digit Span.

Numbers for both forward and backward span tests are presented, with sequences ranging from 2 to 9 numbers. Two trials are administered at each sequence length. There are two scores: total number of correct trials; longest sequence repeated correctly prior to failing two consecutive trials of the same length.

SOURCE

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Number Span Test (Forward and Backward)

ADMINISTRATION — FORWARD NUMBER SPAN

[SAY]: “I am going to ask you to repeat some numbers for me. Wait until I finish saying the numbers and then repeat them in the same order. For example, if I say 1–8–7, you would say 1–8–7. If I say 2–9–8, what would you say?” If the subject gives the wrong answer, say, “Actually, you would say 2–9–8.”

[SAY]: “Repeat only the numbers I say each time.” Then start with the test items. Before each item, say, “Ready?”

Administer the items in the order indicated on the test form. Write the subject's response on the answer sheet. Continue testing until two number strings at the same length are failed. Record total number of trials correct and longest number sequence repeated correctly prior to the two failed trials.

SCORING — FORWARD NUMBER SPAN

Enter the total forward trials correct on NACC UDS Form C2, Question 5a. If the test was not completed, enter the appropriate reason code, 95 – 98, from the key, and leave Question 5b blank. If the test was completed, enter the longest span forward that was correct for Question 5b.

ADMINISTRATION AND SCORING — BACKWARD NUMBER SPAN

[SAY]: “I am now going to ask you to repeat some numbers for me but to reverse them from the way I say them. Wait until I finish saying the numbers and then repeat them in reverse order, or backward. For example, if I say 3–7–4, you would say 4–7–3. If I say 7–3–6, what would you say?” If the subject gives the wrong answer, say, “Actually, you would say 6–3–7.”

[SAY]: “Repeat only the numbers I say each time, backward, in reverse order.” Then start with the test items. Before each item, say, “Ready?”

If the participant repeats the numbers in the forward order on either of the first two test items, you may remind them to say the numbers in reverse order by saying, “Remember, after I say the number sequence, repeat the sequence backwards. Ready?” Do not give them the number sequence again. Score correct if the participant is able to give the correct reverse order after the prompt. This unrequested reminder of the instructions can only be given once. For all future test items, if the participant repeats the numbers in forward order, score as errors.

Stop testing after two consecutive failures of the same span length. Administer the items in the order indicated on the test form. Write the subject's response on the answer sheet. Continue testing until two number strings at the same length are failed. Record total number of trials correct and longest number sequence repeated correctly prior to the two failed trials.

SCORING — BACKWARD NUMBER SPAN

Enter the total backward trials correct on NACC UDS Form C2, Question 6a. If the test was not completed, enter the appropriate reason code, 95 – 98, from the key, and leave Question 6b blank. If the test was completed, enter the longest span forward that was correct for Question 6b.



Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Number Span Test: Forward

SAY: "I am going to ask you to repeat some numbers for me. Wait until I finish saying the numbers and then repeat them in the same order. For example, if I say 1-8-7, you would say 1-8-7. If I say 2-9-8, what would you say?" If the subject gives the wrong answer, say, "Actually, you would say 2-9-8."

SAY: "Repeat only the numbers I say each time." Then start with the test items. Before each item, say, "Ready?"

Stop testing after two consecutive failures of the same span length.

Span length	Response	Response code incorrect = 0 correct = 1
3	1-8-4 2-7-9	_____
4	4-1-6-2 8-1-9-5	_____
5	6-4-9-2-8 7-3-8-6-1	_____
6	3-9-2-4-7-5 6-2-8-3-1-9	_____
7	9-6-4-7-1-5-3 7-4-9-2-6-8-1	_____
8	4-7-2-5-8-1-3-9 2-9-5-7-3-6-1-8	_____
9	6-8-4-1-9-3-5-2-7 1-3-9-2-7-5-8-6-4	_____
Total correct:		_____
Length of longest correct series:		_____

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Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Number Span Test: Backward

SAY: "I am now going to ask you to repeat some numbers for me but to reverse them from the way I say them. Wait until I finish saying the numbers and then repeat them in reverse order, or backward. For example, if I say 3-7-4, you would say 4-7-3. If I say 7-3-6, what would you say?" If the subject gives the wrong answer, say, "Actually, you would say 6-3-7."

SAY: "Repeat only the numbers I say each time, backward, in reverse order." Then start with the test items. Before each item, say, "Ready?"

Stop testing after two consecutive failures of the same span length.

Span length	Response	Response code
		incorrect = 0 correct = 1
2	2 - 5 4 - 7	
3	2 - 9 - 6 3 - 7 - 4	
4	7 - 1 - 8 - 6 5 - 1 - 6 - 3	
5	5 - 2 - 4 - 9 - 1 9 - 1 - 7 - 3 - 6	
6	6 - 8 - 5 - 7 - 9 - 2 8 - 1 - 6 - 3 - 5 - 9	
7	1 - 5 - 2 - 9 - 7 - 3 - 8 7 - 3 - 1 - 6 - 8 - 5 - 2	
8	3 - 6 - 4 - 9 - 5 - 2 - 7 - 1 6 - 3 - 5 - 7 - 1 - 8 - 2 - 9	
		Total correct: _____
		Length of longest correct series: _____

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DESCRIPTION:

This is a widely used measure of semantic memory (verbal fluency, language). The subject is asked to name different exemplars of a given semantic category, and the number of unique exemplars named is scored.

SOURCE:

The procedure is adapted from CERAD administration and scoring procedures for Verbal Fluency (Morris et al., 1989).

Category Fluency

ADMINISTRATION

Read the initial instruction:

[SAY]: “I am going to give you a category and I want you to name, as fast as you can, all of the things that belong in that category. For example, if I say ‘articles of clothing’, you could say ‘shirt’, ‘tie’, or ‘hat’. Can you think of other articles of clothing?”

Allow up to 20 seconds for the subject to produce two responses. Circle the number corresponding to the subject’s responses, and read the associated instruction.

Response Code	Instruction
0 (No response)	“You could have said ‘shoes’ or ‘coat’ since they are articles of clothing.”
1 (One or more incorrect responses, no correct response)	“No, _____ is (are) not an article(s) of clothing. You could have said ‘shoes’ or ‘coat’ since they are articles of clothing.”
2 (One or more correct response, no incorrect responses)	“That’s right. You also could have said ‘shoes’ or ‘coat’.”
3 (One or more correct responses, one or more incorrect responses)	“_____ is (are) correct, but _____ is (are) not an article of clothing. You also could have said ‘shoes’ or ‘coat’.”
4 (Two or more correct responses)	“That’s right.”

Next, read the instructions for the Animals category:

[SAY]: “Now I want you to name things that belong to another category: Animals. You will have one minute. I want you to tell me all the animals you can think of in one minute. Ready? Begin.”

Start timer as you say “Begin.” Write actual responses as legibly as possible on the Worksheet for Category Fluency — Animals. Stop the procedure at 60 seconds. One prompt (“Tell me all the animals you can think of”) is permitted if the subject makes no response for 15 seconds or expresses incapacity (e.g., “I can’t think of any more.”). It is also permissible to repeat the instruction or category if the subject specifically requests it. Do not cue the subject about including more than mammals. However, if the subject inquires prior to initiating the response or asks during the test, the examiner is permitted to say “yes.”

Next, read the instructions for the Vegetables category:

[SAY]: “Now I want you to name things that belong to another category: Vegetables. You will have one minute. I want you to tell me all the vegetables you can think of in one minute. Ready? Begin.”

Start timer as you say “Begin”. Write actual responses as legibly as possible on the Worksheet for Category Fluency — Vegetables. Stop the procedure at 60 seconds. One prompt (“Tell me all the vegetables you can think of”) is permitted if the subject makes no response for 15 seconds or expresses incapacity (e.g., “I can’t think of any more.”). It is also permissible to repeat the instruction or category if the subject specifically requests it.

SCORING

Defer scoring until after all test administration is finished.

The Animal Total score on the *Worksheet for Category Fluency — Animals* is the number of correct unique animal names produced within the one-minute time limit.

- CREDIT: Breeds (e.g., terriers); male, female, and 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, insects.
- DO NOT CREDIT: Repetitions, mythical animals.

The Animal Total score (0–77) should be entered on NACC UDS Form C2, Question 7a. If the test was not completed, enter the appropriate reason code, 95 – 98, from the key.

The Vegetable Total score on the Worksheet for Category Fluency — Vegetables is the total number of correct unique names of vegetables produced within the 1-minute time limit.

- CREDIT: Both superordinate and subordinate responses (e.g., peppers and jalapeños are credited); less specific names (e.g., greens); nuts (e.g., peanuts, acorns); and grains such as corn or rice.
 - Names of vegetables found in other cultures but perhaps unfamiliar to you (e.g., jicama) are acceptable only if they can be verified in the dictionary. After completion of the task, ask the subject to spell the word if you are unsure of the correct spelling.
 - Grains (e.g., rice, wheat, oats, etc.), gourds, sugarcane, herbs, and seaweed are counted as acceptable vegetable responses.
 - Tomato, avocado, and pumpkin are acceptable responses.
 - Legumes are acceptable responses.
 - Nuts are acceptable responses.
- DO NOT CREDIT:
 - Repetitions.
 - Prepared vegetable products (e.g., pickles, tomato sauce, ketchup, etc.) are not acceptable responses.
 - Spices are not acceptable responses.

The Vegetable Total score (0–77) should be entered on NACC UDS Form C2, Question 7b. If the test was not completed, enter the appropriate reason code, 95 – 98, from the key.

Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Category Fluency

INSTRUCTIONS

SAY: "I am going to give you a category and I want you to name, as fast as you can, all of the things that belong in that category. For example, if I say 'articles of clothing,' you could say 'shirt,' 'tie,' or 'hat.' Can you think of other articles of clothing?"

Allow up to 20 seconds for the subject to produce two responses. Circle the number corresponding to the subject's responses, and read the associated instruction.

Response code	Instruction
0 (No response)	"You could have said 'shoes' or 'coat' since they are articles of clothing."
1 (One or more incorrect responses, no correct response)	"No, ____ is (are) not an article(s) of clothing. You could have said 'shoes' or 'coat' since they are articles of clothing."
2 (One or more correct response, no incorrect responses)	"That's right. You also could have said 'shoes' or 'coat'."
3 (One or more correct responses, one or more incorrect responses)	"____ is (are) correct, but ____ is (are) not an article of clothing. You also could have said 'shoes' or 'coat'."
4 (Two or more correct responses)	"That's right."

Next, read the instructions for the Animals category (worksheet follows this instruction page):

SAY: "Now I want you to name things that belong to another category: Animals. You will have one minute. I want you to tell me all the animals you can think of in one minute. Ready? Begin."

Start timer as you say "Begin." Write actual responses as legibly as possible on the Worksheet for Category Fluency — Animals. Stop the procedure at 60 seconds. One prompt ("Tell me all the animals you can think of") is permitted if the participant makes no response for 15 seconds or expresses incapacity (e.g., "I can't think of any more"). It is also permissible to repeat the instruction or category if the subject specifically requests it.

Next, read the instructions for the Vegetables category (worksheet follows this instruction page):

SAY: "Now I want you to name things that belong to another category: Vegetables. You will have one minute. I want you to tell me all the vegetables you can think of in one minute. Ready? Begin."

Start timer as you say "Begin." Write actual responses as legibly as possible on the Worksheet for Category Fluency — Vegetables. Stop the procedure at 60 seconds. One prompt ("Tell me all the vegetables you can think of") is permitted if the participant makes no response for 15 seconds or expresses incapacity (e.g., "I can't think of any more"). It is also permissible to repeat the instruction or category if the participant specifically requests it.

Worksheet for Category Fluency — Animals

1.	27.	53.
2.	28.	54.
3.	29.	55.
4.	30.	56.
5.	31.	57.
6.	32.	58.
7.	33.	59.
8.	34.	60.
9.	35.	61.
10.	36.	62.
11.	37.	63.
12.	38.	64.
13.	39.	65.
14.	40.	66.
15.	41.	67.
16.	42.	68.
17.	43.	69.
18.	44.	70.
19.	45.	71.
20.	46.	72.
21.	47.	73.
22.	48.	74.
23.	49.	75.
24.	50.	76.
25.	51.	77.
26.	52.	

SAMPLE WORKSHEET

Worksheet for Category Fluency — Vegetables

1.	27.	53.
2.	28.	54.
3.	29.	55.
4.	30.	56.
5.	31.	57.
6.	32.	58.
7.	33.	59.
8.	34.	60.
9.	35.	61.
10.	36.	62.
11.	37.	63.
12.	38.	64.
13.	39.	65.
14.	40.	66.
15.	41.	67.
16.	42.	68.
17.	43.	69.
18.	44.	70.
19.	45.	71.
20.	46.	72.
21.	47.	73.
22.	48.	74.
23.	49.	75.
24.	50.	76.
25.	51.	77.
26.	52.	

DESCRIPTION

This is a test of processing speed and executive function. Although both Parts A and B depend on visuomotor and perceptual-scanning skills, Part B also requires considerable cognitive flexibility in shifting from number to letter sets under time pressure.

Part A consists of 25 circles numbered 1 through 25 distributed over a white sheet of $8\frac{1}{2} \times 11\frac{1}{2}$ paper. The subject is instructed to connect the circles with a drawn line as quickly as possible in ascending numerical order.

Part B also consists of 25 circles, but these circles contain either numbers (1 through 13) or letters (A through L). The subject must connect the circles while alternating between numbers and letters in an ascending order (e.g., A to 1; 1 to B; B to 2; 2 to C).

The subject's performance is judged in terms of the time, in seconds, required to complete each Trail. The time to complete Part A (150-second maximum) and Part B (300-second maximum) will be the primary measure of interest (testing is stopped if the maximum time is reached).

SOURCE

This test, originally called Partington's Pathways¹, was a component of the Army Individual Test Battery². It was popularized by Reitan and colleagues and subsequently became part of the Halstead-Reitan Neuropsychological Battery³. The instructions for administration are adapted from Spreen and Strauss⁴.

Trail Making Test

ADMINISTRATION

PART A

Place the form for SAMPLE A in front of the subject. Read aloud the instructions:

[SAY]: “**T**here are numbers in circles on this page. Please take the pencil and draw a line from one number to the next, in order. Start at 1 (point to the number), then go to 2 (point to the number), then go to 3 (point to the number) and so on. Please try not to lift the pencil as you move from one number to the next. Work as quickly as you can. Begin here (point to “Begin” number) and end here (point to “End” number).”

If the subject makes an error, mark through the line and go back to the point at which the error was made and say, for example, “**Y**ou were at number 2. What is the next number?” Wait for the subject's response. If the subject indicates 3, say “**P**lease start here (pointing to 2) and continue.” If the subject indicates any other number, say “**T**he next number would be 3.” Then point to 2 and say “**P**lease start here and continue.” If the subject cannot complete the sample and clearly does not comprehend the task, do not administer Test A. In that event, on the recording form enter the appropriate code (996=cognitive/ behavioral problem).

If the subject completes the sample, go to TEST A.

[SAY]: “**O**n this page there are more numbers in circles. Please take the pencil and draw a line from one circle to the next, in order. Start at 1 (point to the “Begin” number) and end here (point to “End” number). Please try not to lift the pencil as you move from one circle to the next. Work as quickly as you can.” Start timing as soon as the instruction is given to begin.

NOTE: In giving the instructions for the test form (as opposed to the sample), the examiner tells the subject to move from one circle to the next and does not use the word “number.”

If the subject makes an error, mark through the line and say “**T**hat one was not correct.” Point to the last correct number and say “**P**lease start here and continue.” This is done for each error. The examiner should attempt to provide corrections as quickly as possible. Stop timing when the Trail is completed, or stop subject when the maximum time is reached. Allow a maximum of 150 seconds for the test.

PART B

Place the form for SAMPLE B in front of the subject. Present the sample for Part B even if the subject failed the sample for Part A. Read aloud the instructions:

[SAY]: “**T**here are numbers and letters in circles on this page. Please take the pencil and draw a line, alternating in order between the numbers and letters. Start at number 1 (point to the number), then go to the first letter, A (point to the letter), then go to the next number, 2 (point to the number), and then the next letter, B (point to the letter), and so on. Please try not to lift the pencil as you move from one number or letter to the next. Work as quickly as you can.”

If the subject makes an error, mark through the line and go back to the point at which the error was made and say, for example, “**Y**ou were at number 2. What is the next

letter?" Wait for the subject's response. If it is correct, say "**Please start here** (point to the 2) **and continue.**" If the subject picks the wrong item, say, "**The next letter would be B** (point to the B)." Then point to the 2 and say "**Please start here and continue.**" If the subject cannot complete the sample and clearly does not comprehend the task, do not administer the test. Enter the appropriate code (996=cognitive/behavioral problem.)

If the subject completes the sample correctly, go to TEST B.

[SAY]: "**On this page, there are more numbers and letters in circles. Please take the pencil and draw a line from one circle to the next, alternating in order between the numbers and letters. Start at 1** (point to the "Begin" number) **and end here** (point to the "End" number). **Please try not to lift the pencil as you move from one circle to the next. Work as quickly as you can.**" Start timing as soon as the instruction is given to begin.

NOTE: In giving the instructions for the test form (as opposed to the sample), the examiner tells the subject to move from one circle to the next and does not use the words "number" or "letter."

If the subject makes an error, mark through the line and say, "**That one was not correct.**" Point to the last correct item and say, "**Please start here and continue.**" This is done for each error. Do not indicate if the next item has to be a number or a letter. The examiner should attempt to provide corrections as quickly as possible. Stop timing when the Trail is completed, or stop subject when the maximum time is reached. Allow a maximum of 300 seconds for the test.

SCORING

Record the total number of seconds to complete Part A, up to a maximum of 150 seconds. If the subject is not finished by 150 seconds, the score is 150. Enter the score for Part A on NACC UDS Form C2, Question 8a. If the test was not completed, enter the appropriate reason code, 995 – 998, from the key, and leave Questions 8a1 and 8a2 blank.

Record the total number of seconds to complete Part B, up to a maximum of 300 seconds. If the subject is not finished by 300 seconds, the score is 300. Enter the score for Part B on NACC UDS Form C2, Question 8b. If the test was not completed, enter the appropriate reason code, 995 – 998, from the key, and leave Questions 8b1 and 8b2 blank.

For both Part A and Part B, record errors of commission and number of correct lines as described below:

"Errors of commission" are defined as errors occurring when the subject connects two circles in the incorrect sequence. Each time this occurs, one error of commission is scored. Essentially, any connecting line drawn by the subject that elicits a correction from the examiner is an error of commission. For example, on Part B, if the subject draws a line from C to D (instead of C to 3), the examiner would point out the error and have the subject go back to C. This would count as an error of commission.

"Number of correct lines" is defined as the total number of correct connections between circles. The maximum number of correct lines on each condition of Trail Making is 24, so whenever a subject completes the task within the time limit, the total number of correct lines will always equal 24. Scores less than 24 will occur when the subject is slow and does not complete the task in the time allotted. For example, a subject who gets as far as the number 6 on Part B when the allotted time elapses has

only completed 10 correct connecting lines (1-A, A-2, 2-B, B-3, 3-C, C-4, 4-D, D-5, 5-E, E-6).

Number of correct lines and commission errors are theoretically orthogonal. Impulsive subjects who make several failure-to-shift errors on Part B but who eventually finish will have several commission errors but have 24 correct lines. Conversely, subjects who work slowly but accurately might have fewer than 24 correct lines because they did not finish in time but have zero commission errors.

If the subject draws a line through another circle while clearly on the way to the next circle in the sequence, caution the subject to avoid touching circles other than the ones intended, and make a note of what occurred on the raw data form, but do not count as an error of commission.

Recording number of correct lines and errors of commission significantly increases the amount of information gleaned from the Trail Making test. Under the current scoring system, a subject who gets as far as "C" within the time limit on Part B would receive the same score as a subject who gets as far as "K," yet clearly the second subject's performance is better. Recoding the number of correct lines allows researchers to measure these performance differences. Recording errors of commission provides an index of impaired rule monitoring, and preliminary data (Kramer, personal communication) suggest that this index may have a more specific relationship with frontal lobe neuroanatomical volumes.



Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Trail Making Test

PART A

Place the form for SAMPLE A in front of the subject. Read aloud the instructions:

SAY: "There are numbers in circles on this page. Please take the pencil and draw a line from one number to the next, in order. Start at 1 [point to the number], then go to 2 [point to the number], then go to 3 [point to the number] and so on. Please try not to lift the pencil as you move from one number to the next. Work as quickly as you can. Begin here [point to "Begin" number] and end here [point to "End" number]."

If the subject makes an error, mark through the line and go back to the point at which the error was made and say, for example, "**You were at number 2. What is the next number?**" Wait for the subject's response. If the subject indicates 3, say "**Please start here** [point to the 2] **and continue.**" If the subject indicates any other number, say "**The next number would be 3.**" Then point to 2 and say "**Please start here and continue.**" If the subject cannot complete the sample and clearly does not comprehend the task, do not administer Test A. In that event, on the recording form enter the appropriate code (996 = cognitive/ behavioral problem).

If the subject completes the sample, go to TEST A.

SAY: "On this page there are more numbers in circles. Please take the pencil and draw a line from one circle to the next, in order. Start at 1 [point to "Begin" number] and end here [point to "End" number]. Please try not to lift the pencil as you move from one circle to the next. Work as quickly as you can." Start timing as soon as the instruction is given to begin.

NOTE: In giving the instructions for the test form (as opposed to the sample), the examiner tells the subject to move from one circle to the next and does not use the word "number."

If the subject makes an error, mark through the line and say "**That one was not correct.**" Point to the last correct number and say "**Please start here and continue.**" This is done for each error. The examiner should attempt to provide corrections as quickly as possible. Stop timing when the Trail is completed, or stop subject when the maximum time is reached. Allow a maximum of 150 seconds for the test.

PART B

Place the form for SAMPLE B in front of the subject. Present the sample for Part B even if the subject failed the sample for Part A. Read aloud the instructions:

[SAY]: "There are numbers and letters in circles on this page. Please take the pencil and draw a line, alternating in order between the numbers and letters. Start at number 1 [point to the number], then go to the first letter, A [point to the letter], then go to the next number, 2 [point to the number], and then the next letter, B [point to the letter], and so on. Please try not to lift the pencil as you move from one number or letter to the next. Work as quickly as you can."

If the subject makes an error, mark through the line and go back to the point at which the error was made and say, for example, "**You were at number 2. What is the next letter?**" Wait for the subject's response. If it is correct, say "**Please start here** [point to the 2] **and continue.**" If the subject picks the wrong item, say "**The next letter would be B** [point to the B]." Then point to the 2 and say "**Please start here and continue.**" If the

SAMPLE WORKSHEET

subject cannot complete the sample and clearly does not comprehend the task, do not administer the test. Enter the appropriate code (996 = cognitive/behavioral problem).

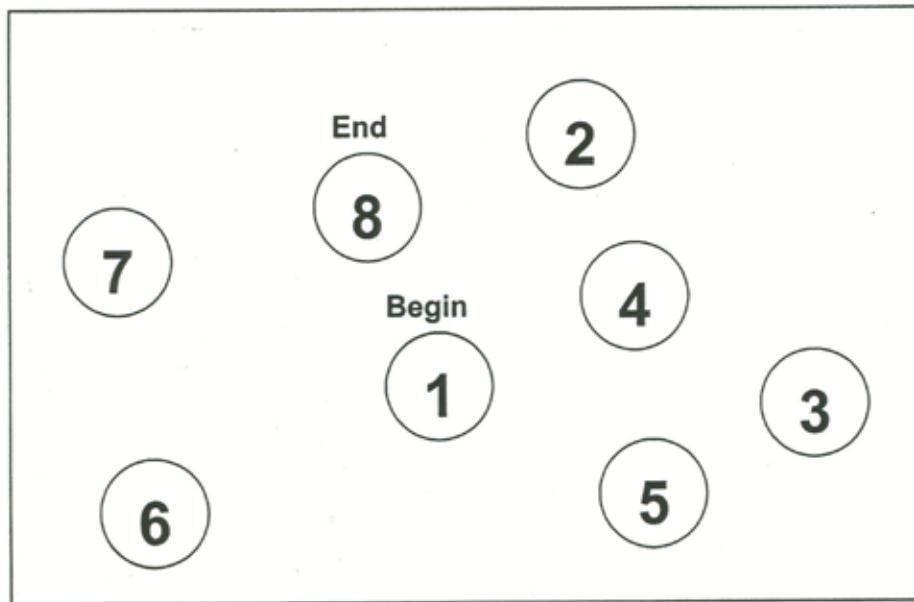
If the subject completes the sample correctly, go to TEST B.

SAY: "**On this page, there are more numbers and letters in circles. Please take the pencil and draw a line from one circle to the next, alternating in order between the numbers and letters. Start at 1 [point to the "Begin" number] and end here [point to the "End" number]. Please try not to lift the pencil as you move from one circle to the next. Work as quickly as you can.**" Start timing as soon as the instruction is given to begin.

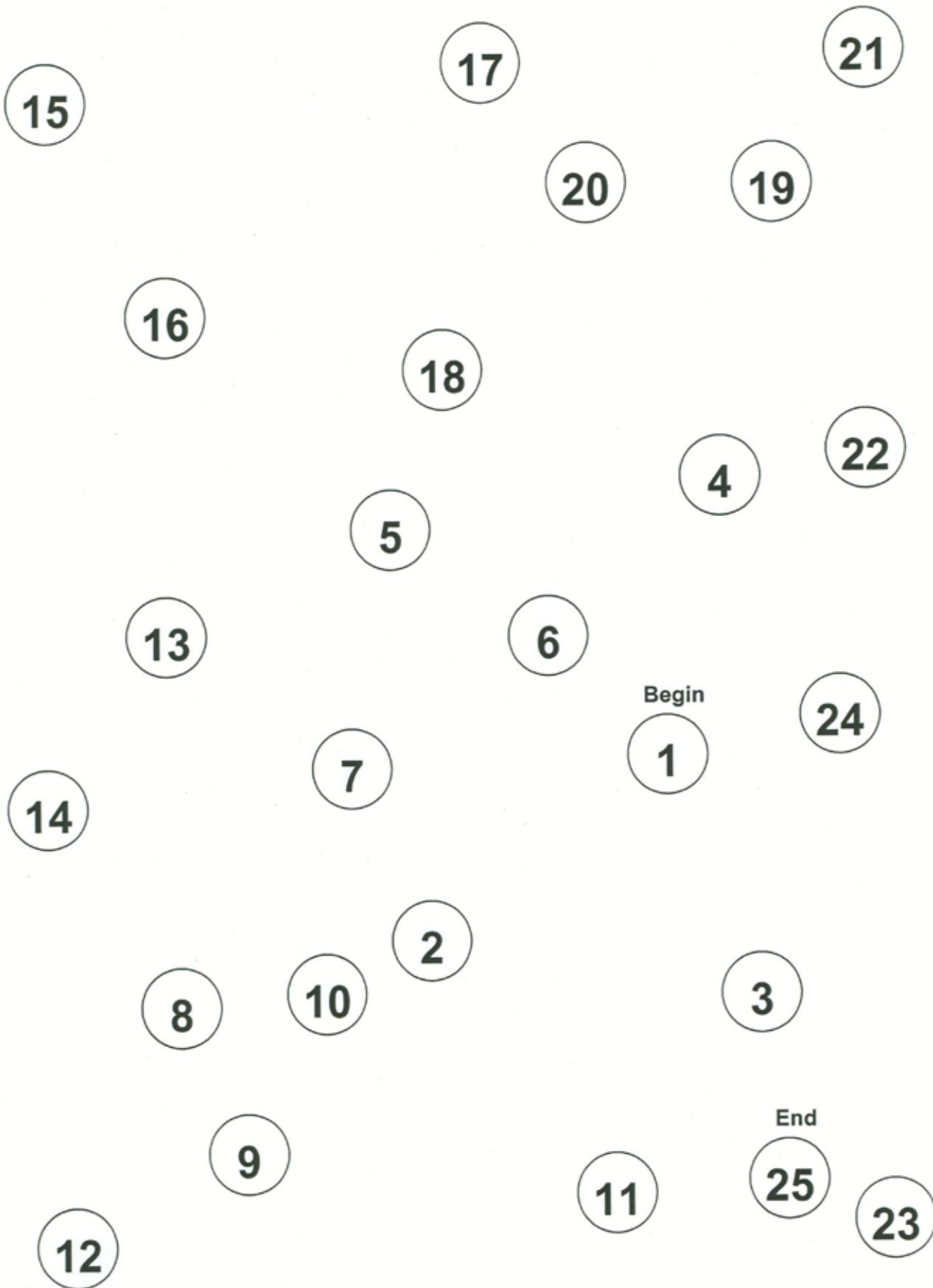
NOTE: In giving the instructions for the test form (as opposed to the sample), the examiner tells the subject to move from one circle to the next and does not use the words "number" or "letter."

If the subject makes an error, mark through the line and say, "**That one was not correct.**" Point to the last correct item and say, "**Please start here and continue.**" This is done for each error. Do not indicate whether the next item should be a number or a letter. The examiner should attempt to provide corrections as quickly as possible. Stop timing when the Trail is completed, or stop subject when the maximum time is reached. Allow a maximum of 300 seconds for the test.

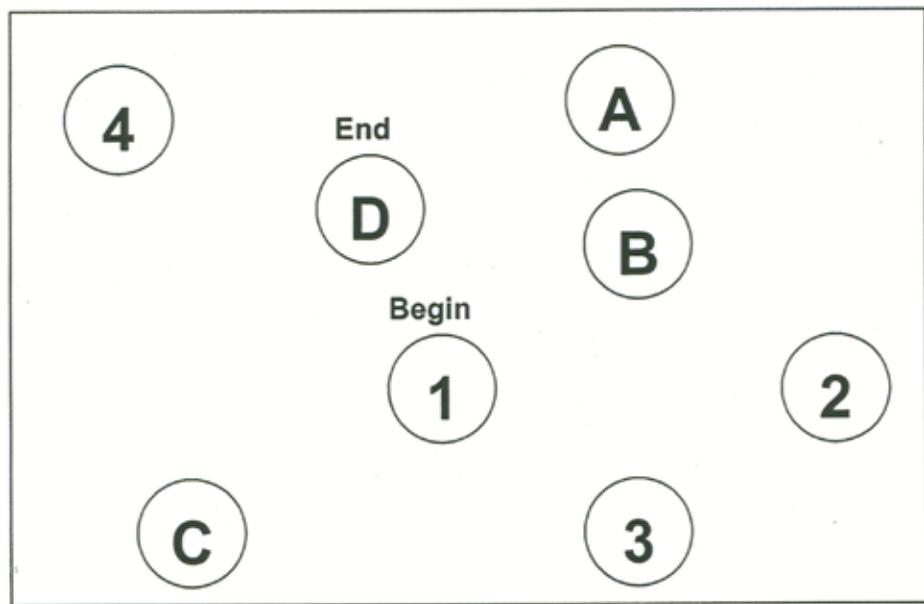
Sample A



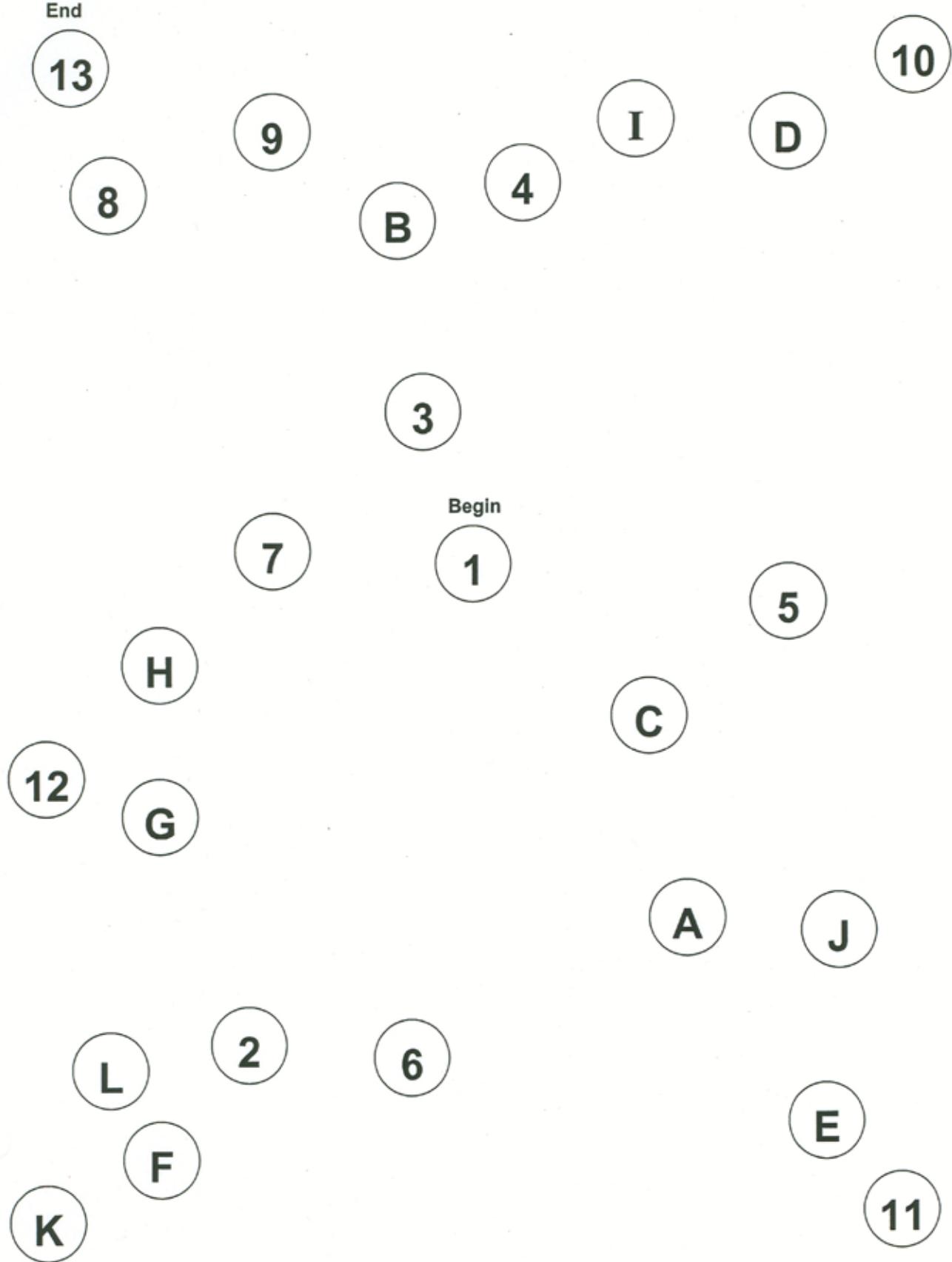
SAMPLE WORKSHEET



Sample B



SAMPLE WORKSHEET



DESCRIPTION

This is a test of delayed recall (episodic memory) of the story read to the subject at the beginning of the testing session, during Craft Story 21 Recall (Immediate).

SOURCE

Craft S, Newcomer J, Kanne S, Dagogo-Jack S, Cryer P, Sheline Y, Luby J, Dagogo-Jack A, Alderson A. Memory improvement following induced hyperinsulinemia in Alzheimer's disease. *Neurobiol Aging*. 1996 Jan-Feb;17(1):123-30.

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Craft Story 21 Recall (Delayed)

ADMINISTRATION

Administer this test approximately 20 minutes after Craft Story 21 Recall (Immediate).

NOTE: If 20 minutes have not elapsed, do not add other tests to fill the interval. Some of the time can be used to obtain blood pressure, weight, etc., if need be. Administer Craft Story 21 Recall (Delayed) and record the actual time elapsed.

[SAY]: **"I read you a story a few minutes ago. Can you tell me what you remember about that story now?"**

If the subject does not recall the story or having been told a story, make a note as indicated below and

[SAY]: **"It was a story about a boy. Can you tell it to me now?"**

Record the subject's response on the *Worksheet for Craft Story 21 Recall (Delayed)*. Make sure that your written record is legible before proceeding. If the subject asks a question about the story or for repetition of some or all of it, say, **"Please tell me as much as you remember about the story."**

SCORING

Score according to instructions for Craft Story 21 Recall (Immediate) in this instruction book. The examiner may prefer to tape-record the subject's response and then transcribe the results after the session; this is acceptable, if appropriate consent has been obtained.

VERBATIM SCORING

PERFECT VERBATIM RESPONSE (1.0 POINT): Give the subject 1 point for every bit for which content words are recalled exactly and completely. Allowances can be made for variations of verbs (e.g., "likes" for "liked," "join" for "joining") and minor omissions (e.g., "neighbor" for "neighbor's") or changes in number (e.g., "games" for "game"). The content words do not need to be recalled by the subject in the same order they were read to receive credit. The words can appear anywhere in the recall.

Enter the verbatim score on NACC UDS Form C2, Question 9a. If the test was not completed, enter the reason code, 95 – 98, from the key and leave the paraphrase score, Question 9b, blank.

PARAPHRASE SCORING

PARAPHRASE RESPONSE (1.0 POINT): Give a point for a response that captures the elements of the story although not necessarily with the exact words (see table on page 51).

Enter the paraphrase score on NACC UDS Form C2, Question 9b. Enter the delay time, in minutes, on NACC UDS Form C2, Question 9c. If the delay time is unknown or misrecorded, enter 99=Unknown. If the cue ("boy") was needed, select 1=Yes for Question 9d; otherwise, select 0>No.

CRAFT STORY 21 RECALL (DELAYED): VERBATIM SCORING

Maria's	
child	
Ricky	
played	
soccer	
every	
Monday	
three thirty	
he	
liked	
going	
field	
behind	
their	
house	
joining	
game	
one	
day	
he	
kicked	
ball	
so	
hard	
it	
went	
over	
neighbor's	
fence	
three	
large	
dogs	
lived	
dogs'	
owner	
heard	
loud	
barking	
came	
out	
helped	
them	
retrieve	
ball	
TOTAL	

Number of items recalled for **verbatim scoring**:

Delayed Recall Score: _____ /44 maximum

GUIDELINES FOR PARAPHRASE SCORING, CRAFT STORY 21

Item	General rule	Alternative 1-point responses	0-point responses	Points
Maria's	"Maria" or a variant of the name	Mary, Marie	Martha, Anna	
child	"child" or a phrase denoting it was a young person	son, kid, boy, teenager, young man	guy, children, daughter	
Ricky	"Ricky" or a variant of the name	Rick, Rich, Richie, Richard, Ricardo	Randy, Rusty, Robert	
played	"played" is required	to play, plays	did (soccer)	
soccer	"soccer" is required	futbol	baseball, volleyball, other sport	
every Monday	"Monday" or an indication that it occurred on a weekday	—	every day, another day of the week	
at 3:30	an indication that the activity took place in the afternoon	after school, every afternoon	after dinner, at night, in the morning	
He liked going to the field	an indication that he went to an outdoor area	went outside, went to the yard, going to the backyard	went to the school, gym	
behind their house	"house" or word denoting a house	home, residence, where they lived	any other building	
and joining	an indication that he participated in a game	played w/ other kids, became part of the team, playing w/ the team	watching, played in the park	
the game.	"game" in any context	—	—	
One day	"One day" is required	—	—	
he kicked	indication that he performed the activity with his foot	booted, punted	threw, hit (with no mention of the foot)	
the ball	"Ball" is required	football, soccer ball	baseball, volleyball	
so hard	an indication that force was used	so much force, so strongly, (kicked it) so far	—	
that it went over	"Over" is required	—	—	
the neighbor's	an indication that the person lived in the same area	nearby resident	friend's	
fence	"fence" or a word denoting a fence of some kind	garden wall, wall	property line, street	
where three	"Three" is required	three (boys)	—	
large dogs lived.	an indication that there were dogs present	hounds, doggies	puppies, cats, kittens, other animals	
The dogs' owner	an indication that the person was responsible for the dogs	neighbor (if owner implied and "neighbor" mentioned twice)	a bystander, the police	
heard loud barking	an indication that the dogs were making noise	yelping, baying, yapping, heard the dogs	saw the dogs running around	
came out	a word or phrase indicating that the owner was present	(owner) saw the ball	his mother came out, the dogs came out	
and helped them	a word or phrase indicating that help was provided	assisted, aided, had to help	—	
retrieve the ball.	an indication that they got the ball back	gave him the ball, return the ball, (helped him) get the ball —		

Number of items recalled for **paraphrase scoring**: Immediate Recall Score: _____ /25 maximum



Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Craft Story 21 Recall (Delayed)

INSTRUCTIONS: Administer this test approximately 20 minutes after Craft Story 21 Recall (Immediate), making note of the time administration of Craft Story 21 Recall (Delayed) began. **NOTE:** If 20 minutes have not elapsed, do not add other tests to fill the interval. You may obtain other data, such as blood pressure, weight, etc. Administer Craft Story 21 Recall (Delayed) and record the actual time elapsed.

SAY: "I read you a story a few minutes ago. Can you tell me what you remember about that story now?"

If the subject does not recall the story or having been told a story, make a note as indicated below and **SAY:** "It was a story about a boy. Can you tell it to me now?"

Maria's / child / Ricky / played / soccer / every / Monday /

at 3:30. / He / liked / going / to the field / behind / their / house /

and joining / the game. / One / day, / he / kicked / the ball / so / hard /

that it / went / over / the neighbor's / fence / where three / large /

dogs / lived. / The dogs' / owner / heard / loud / barking, / came /

out, / and helped / them / retrieve / the ball.

Record time administration began: _____

Total story units recalled (VERBATIM SCORING): _____ / 44

Total story units recalled (PARAPHRASE SCORING): _____ / 25

Time elapsed since Craft Story 21 Recall (Delayed): _____ minutes

Cue ("boy") needed: No Yes

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SAMPLE WORKSHEET

CRAFT STORY 21 RECALL (DELAYED): VERBATIM SCORING

PERFECT VERBATIM RESPONSE (1.0 POINT): Give the subject 1 point for every bit for which content words are recalled exactly and completely. Allowances can be made for variations of verbs (e.g., "likes" for "liked," "join" for "joining") and minor omissions (e.g., "neighbor" for "neighbor's"). The content words do not need to be recalled by the subject in the same order they were read to receive credit. The words can appear anywhere in the recall.

Maria's	
child	
Ricky	
played	
soccer	
every	
Monday	
three thirty	
he	
liked	
going	
field	
behind	
their	
house	
joining	
game	
one	
day	
he	
kicked	
ball	

so	
hard	
it	
went	
over	
neighbor's	
fence	
three	
large	
dogs	
lived	
dogs'	
owner	
heard	
loud	
barking	
came	
out	
helped	
them	
retrieve	
ball	

TOTAL

SCORING

Number of items recalled for verbatim scoring: Delayed Recall Score: _____ /44 maximum

SAMPLE WORKSHEET

GUIDELINES FOR PARAPHRASE SCORING, CRAFT STORY 21

Item	General rule	Alternative 1-point responses	0-point responses	Points
Maria's	"Maria" or a variant of the name	Mary, Marie	Martha, Anna	
child	"child" or a phrase denoting it was a young person	son, kid, boy, teenager, young man	guy, children, daughter	
Ricky	"Ricky" or a variant of the name	Rick, Rich, Richie, Richard, Ricardo	Randy, Rusty, Robert	
played	"played" is required	to play, plays	did (soccer)	
soccer	"soccer" is required	futbol	baseball, volleyball, other sport	
every Monday	"Monday" or an indication that it occurred on a weekday	—	every day, another day of the week	
at 3:30	an indication that the activity took place in the afternoon	after school, every afternoon	after dinner, at night, in the morning	
He liked going to the field	an indication that he went to an outdoor area	went outside, went to the yard, going to the backyard	went to the school, gym	
behind their house	"house" or word denoting a house	home, residence, where they lived	any other building	
and joining	an indication that he participated in a game	played w/ other kids, became part of the team, playing w/ the team	watching, played in the park	
the game.	"game" in any context	—	—	
One day	"One day" is required	—	—	
he kicked	indication that he performed the activity with his foot	booted, punted	threw, hit (with no mention of the foot)	
the ball	"Ball" is required	football, soccer ball	baseball, volleyball	
so hard	an indication that force was used	so much force, so strongly, (kicked it) so far	—	
that it went over	"Over" is required	—	—	
the neighbor's	an indication that the person lived in the same area	nearby resident	friend's	
fence	"fence" or a word denoting a fence of some kind	garden wall, wall	property line, street	
where three	"Three" is required	three (boys)	—	
large dogs lived.	an indication that there were dogs present	hounds, doggies	puppies, cats, kittens, other animals	
The dogs' owner	an indication that the person was responsible for the dogs	neighbor (if owner implied and "neighbor" mentioned twice)	a bystander, the police	
heard loud barking	an indication that the dogs were making noise	yelping, baying, yapping, heard the dogs	saw the dogs running around	
came out	a word or phrase indicating that the owner was present	(owner) saw the ball	his mother came out, the dogs came out	
and helped them	a word or phrase indicating that help was provided	assisted, aided, had to help	—	
retrieve the ball.	an indication that they got the ball back	gave him the ball, return the ball, (helped him) get the ball —		

Number of items recalled for paraphrase scoring: Delayed Recall Score: _____ /25 maximum

DESCRIPTION

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SOURCE

Possin, KL, Laluz VR, Alcantar OZ, Miller BL, Kramer JH. Distinct neuroanatomical substrates and cognitive mechanisms of figure copy performance in Alzheimer's disease and behavioral variant frontotemporal dementia. *Neuropsychologia*. 2011 Jan; 49(1):43-8.

Benson Complex Figure Copy (Delayed)

ADMINISTRATION

10–15 minutes after completion of the copy trial, subjects should be given a blank piece of paper and pen and asked:

[SAY]: "**Remember that figure that I asked you to copy a while ago? I want you to draw as much of it as you can remember.**"

A maximum of 4 minutes should be allowed for completing the drawing. The same scoring guidelines as used for Benson Complex Figure Copy (Immediate) should be used to score recall performance.

RECOGNITION

After the completion of figure recall, place the recognition page in front of the subject and ask:

[SAY]: "**Which of these figures was the one you copied before?**"

SCORING

Enter the total score on NACC UDS2 Form C2, Question 10a. If the test could not be administered, enter the appropriate reason code, 95 – 98, from the key. If the subject recognized the stimulus from among four options, select 1=Yes for Question 10b; otherwise, select 0=No.

SAMPLE WORKSHEET



Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Benson Complex Figure Copy (Delayed)

The interval between copy and recall of the Benson figure should be 10–15 minutes.

SAY: “Remember that figure that I asked you to copy a while ago? I want you to draw as much of it as you can remember.”

Note order of completion.

<input type="checkbox"/>	1. Four-sided, 90° angles, width > height, any gaps or overlaps < 8mm	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
<input type="checkbox"/> X	2. Reasonably straight lines; any gaps or overlaps < 8mm	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
<input type="checkbox"/> +	3. Connects at middle third, no overlap with diagonals	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
<input type="checkbox"/> O	4. Reasonably round, doesn't touch sides	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
<input type="checkbox"/> L	5. Vertical lines > 1/2 distance to diagonals, width > height, 90° angles	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
<input type="checkbox"/> D	6. Connects below #3, top of square above bottom	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
<input type="checkbox"/> >	7. Vertex corresponds to middle third; any gaps or overlaps < 8mm	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
<input type="checkbox"/> J	8. Gap between #8 and #7 < 5mm, angle at end of stem = 90°	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
BONUS		<input type="checkbox"/> 0 <input type="checkbox"/> 1

Time of day design completed: ____ : ____ AM PM

TOTAL SCORE (circle one): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

RECOGNITION

SAY: Which of the figures was the one you copied before?

Did subject recognize original stimulus from among four options?

0 No 1 Yes

SCORING: For scoring guidelines, please see *NACC Uniform Data Set (UDS) Instructions for Neuropsychological Tests*. Each figural element is scored as 2 points if the element is drawn accurately and placed correctly in the figure (1 point for accuracy, 1 point for placement). Score 1 point if the element is poorly drawn but placed correctly or is correctly drawn but misplaced, and 0 points if the element is neither accurately drawn nor correctly placed.

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DESCRIPTION

The Multilingual Naming Test (MINT) is a test of visual object naming designed to contain items that have similar levels of usage and familiarity across four different languages: English, Spanish, Hebrew and Mandarin. Other naming tests designed for English speakers have items that either do not exist in another language or that occur in different frequencies in other languages, making the MINT appropriate for use in diverse populations. Line drawings are presented to the subject with the instruction to say the name of the object.

SOURCE

Tamar H. Gollan, PhD, Department of Psychiatry, University of California, San Diego

Ivanova I, Salmon DP, Gollan TH. The Multilingual Naming Test in Alzheimer's Disease: Clues to the Origin of Naming Impairments. *J Int Neuropsychol Soc*. 2013; 19:272-283.

Gollan TH, Weissburger G, Runnqvist E, Montoya RI, Cera CM. Self-ratings of spoken language dominance: A Multilingual Naming Test (MINT) and preliminary norms for young and aging Spanish–English bilinguals. *Bilingualism: Language and Cognition*. 2011;13:215-8.

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MINT

ADMINISTRATION

[SAY]: “I am going to show you some pictures of objects, one at a time. Please tell me the name of each object, that is, tell me what it is called. If you cannot think of the name try to make your best guess. If you don't know what the object is, I will try to help you. Do you have any questions?”

Allow up to 20 seconds for a response, particularly if the subject is struggling.

If the answer is correct, put a check mark in the column “Uncued-correct.”

For items 30 and 31 (mortar, pestle), there is only one picture.

[SAY]: “On this page there are two things I would like you to name.” Point to the mortar and say “What is this called?” and record the response. Then point to the pestle and say “What is this called?” and record the response. Be sure to ask for both items.

Continue until the subject fails to name six consecutive items, either spontaneously or after receiving semantic cues.

ALTERNATIVE RESPONSES

Item no.	MINT item	Alternative correct response(s)
3	lightbulb	electric bulb, bulb
10	seesaw	teeter-totter
27	gauge	manometer, barometer

CUEING

If the initial response is incorrect, there are several procedures to follow. Responses to cues are not timed, and if they do not occur immediately, the examiner should move on. When the subject indicates knowledge of the object but cannot name it, it is appropriate to give a phonemic cue (the first few sounds of the word). Knowledge of the word can be assumed if the subject makes a phonemic paraphasia, such as “ankle” for “anvil” (substituting a sound within the word, retaining most of its original sounds) or correctly describes the use of the object (e.g., “You use it to mash things up,” for “pestle”).

Please take care to provide only the sound of the letter(s) underlined on the response form. Only three-syllable words have the first two letters underlined. The examiner can practice cuing by starting to say each word and suddenly stopping after the first sound.

Sometimes a subject will give a response that indicates lack of visual recognition of the object, that is, misperception (e.g., focusing only on the flame at the top of the candle and saying “fire” or misperceiving the twigs in the nest and saying “hair”). In that instance, a semantic cue should be given since it helps lead the subject to more accurate visual perception of the object. If the response is correct with the semantic cue, it is marked correct in the appropriate column under “Semantic cue.” If it is incorrect it is marked as wrong and the examiner should then move to the phonemic cue. Note, the semantic cue is only given if the subject does not recognize the object.

PROMPTS ALLOWED FOLLOWING SPONTANEOUS RESPONSE ONLY

Subjects will often say non-target/alternative names. If that happens there are three prompts you can give to try to elicit the target name as follows:

Prompt 1: “**Can you think of a more specific name?**” (code = S)

Prompt 2: “**Can you think of a more general name?**” (code = G)

Prompt 3: “**Can you think of a different or another name?**” (code = A)

If you use one of these three prompts, indicate this on the coding sheet by writing the relevant code in the Spontaneous Response column.

Examples:

- 1) If the subject gives a circumlocutory or more general response (e.g., for “saw” says “it cuts wood” or “it’s a tool”), use Prompt 1 and write (S) on the coding sheet.
- 2) If the subject gives a more specific name (e.g., for “volcano” says “It’s Mt. Vesuvius”), use Prompt 2 and write (G) on the coding sheet.
- 3) If subject gives an alternative, but not incorrect response (e.g., “dromedary” for ‘camel’), use Prompt 3 and write (A) on the coding sheet.

Other useful prompts

Sometimes subjects might tell you other things that they remember about using the object, etc. For example, “My dad had one of those!” If that happens [SAY]:

Prompt 4: “**Can you tell me the name?**”

If the subject gives a correct name, but says it is not that object (e.g., “Well, it’s not a canoe”), cueing proceeds as if the response was incorrect, [SAY]:

Prompt 5: “**Do you know the name?**” or “**Do you know what it is?**”

If the subject is focusing on the wrong part of the picture (e.g., “needle” for “barometer” or “sky” for “rainbow”), point to what they should be focusing on and [SAY]:

Prompt 6: “**What is the whole thing called?**” or “**What is this part called?**”

SCORING

The total MINT score should be calculated using items up to the point where the subject stopped the test. Items are counted as correct only if spontaneously named or named with a semantic cue if needed (see below). If the subject gives the correct name with a phonemic cue, this is not counted towards the total correct. The reason for this is that this test assesses word retrieval under conditions of full recognition of the object. If the subject is cued to the object’s identity after an initially faulty recognition and names the item correctly, it is not a word retrieval problem.

Enter the total score on NACC UDS Form C2, Question 11a. If the test was not completed, enter the appropriate reason code, 95 – 98, from the key and leave Questions 11b – 11f blank.

For Question 11b, enter the total correct without a semantic cue. For Question 11c, enter the number of semantic cues given. For 11d, enter the number of items correct with a semantic cue. If no semantic cues were given, enter 88=Not applicable for Question 11d.

For Question 11e, enter the number of phonemic cues given. For 11f, enter the number of items correct with a phonemic cue. If no phonemic cues were given, enter 88=Not applicable for Question 11f.



Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

MINT (Multilingual Naming Test)

INSTRUCTIONS AND CUEING

SAY: "I am going to show you some pictures of objects, one at a time. Please tell me the name of each object, that is, tell me what it is called. If you cannot think of the name try to make your best guess. If you don't know what the object is, I will try to help you. Do you have any questions?"

Stop testing after six consecutive failures.

Item #	English	Semantic cue	Spontaneous Response(s)	Uncued		Semantic cue		Phonemic cue	
				correct	incorrect	correct	incorrect	correct	incorrect
1	<u>Butterfly</u>	an insect							
2	<u>Glove</u>	an article of clothing							
3	<u>Lightbulb</u>	used to see better and is turned on electrically							
4	<u>Watch</u>	used to tell the time							
5	<u>Candle</u>	is used in the dark to make light							
6	<u>Clown</u>	found in a circus							
7	<u>Kite</u>	a toy that uses the wind to make it fly							
8	<u>Rainbow</u>	it's colorful and is found in the sky after it rains							
9	<u>Witch</u>	a woman with magical powers							
10	<u>Seesaw</u>	found on a playground							
11	<u>Flashlight</u>	used to see better and is battery-operated							
12	<u>Peacock</u>	a bird							
13	<u>Snail</u>	an animal							
14	<u>Whale</u>	an ocean animal							
15	<u>Cage</u>	an enclosure for animals							
16	<u>Nest</u>	it's where birds lay their eggs							

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SAMPLE WORKSHEET

Item #	English	Semantic cue	Spontaneous Response(s)	Uncued	Semantic cue		Phonemic cue	
				correct	correct	incorrect	correct	incorrect
17	<u>Plug</u>	found on electronic devices						
18	<u>Wig</u>	it's worn on the head						
19	<u>Screw</u>	it's like a nail but it grooves into wood or a wall						
20	<u>Scarf</u>	clothing worn on the neck						
21	<u>Well</u>	used to obtain water						
22	<u>Dustpan</u>	used to remove dust and trash						
23	<u>Parachute</u>	used to jump from airplane						
24	<u>Blind</u>	used to block out light						
25	<u>Hinge</u>	part of a door						
26	<u>Funnel</u>	used for pouring liquid from one container to another						
27	<u>Gauge</u>	used to measure air pressure						
28	<u>Porthole</u>	found on a ship						
29	<u>Anvil</u>	used for shaping metal						
30	<u>Mortar</u>	used to grind different substances						
31	<u>Pestle</u>	used to grind different substances						
32	<u>Axle</u>	a supporting shaft on which wheels revolve						

SCORING:

(1.0 point for each correct answer under Uncued or Semantic columns, 0.0 points for correct answer under Phonemic column)

a. Total correct without a cue ("Uncued" column): _____

b. Total correct with a semantic cue given ("Semantic" column): _____

c. Total correct (sum of a+b, maximum of 32): _____

DESCRIPTION

This is a widely used measure of word generation that may be sensitive to dysfunction in the dominant frontal lobe. In this version, the subject is asked to say as many words as possible that begin with the letter "F" in 60 seconds, and then as many words that begin with the letter "L" in 60 seconds.

SOURCE

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Verbal Fluency: Phonemic Test

ADMINISTRATION

LETTER F

MATERIALS: 1-minute timer

[SAY]: "**I'm going to say a letter of the alphabet. When I ask you to start, tell me as many words as you can that begin with that letter. You will have 1 minute before I tell you to stop. None of the words can be numbers or names of people, or places.**

"For example, if I gave you the letter B, you could say brown, bottle or bake, but you wouldn't say Barbara, Boston or billion. Also, please try not to give me the same word with different endings, so if you said bake, you wouldn't also say baked or bakes, and if you said big, you wouldn't also say bigger and biggest.

"Let's begin. Tell me all the words you can, as quickly as you can, that begin with the letter 'F'. Ready? Begin."

Start timer after completing instructions. Write actual responses as legibly as possible.
Stop the procedure at 60 seconds.

PROMPTS:

If the subject pauses for 15 seconds:

- **"Keep going."**
- **"What other words beginning with "F" can you think of?"**

If the subject gives three consecutive words that do not start with the designated letter (provide this prompt only once during this condition):

- **"We are now using the letter F."**

LETTER L

MATERIALS: 1-minute timer

[SAY]: "**Now I want you to do the same for another letter. The next letter is L. Ready? Begin.**

Start timer after completing instructions. Write actual responses as legibly as possible.
Stop the procedure at 60 seconds.

PROMPTS:

If the subject pauses for 15 seconds:

- **"Keep going."**
- **"What other words beginning with "L" can you think of?"**

If the subject gives three consecutive words that do not start with the designated letter (provide this prompt only once during this condition):

- **"We are now using the letter L."**

GUIDELINES

Record all responses, including repeated words and rule violations. When a rule violation (e.g., proper nouns, words beginning with the wrong letter) occurs on three consecutive responses, examiners should remind the subject of the correct rule. Each rule can be repeated only once per trial.

SCORING

Correct responses

Any word that begins with the specified letter, can be found in a dictionary, is not a proper noun or a number, and is not a repetition within that trial, should be scored as a correct response.

Although scoring of most responses is straightforward, many responses are ambiguous. For example, “frank” can refer to a man’s name, a food item, or an adjective. The scoring principle with these sorts of responses is to give the benefit of the doubt and score the item as correct for the first instance of the response in a trial. In some instances, the context in which the response is given can provide clues as to the subject’s meaning. For example, the sound “för” is ambiguous, and could be a preposition (for), golf term (fore), or number (four). If the word is given along with other numbers (e.g., “four, five”), the response can be interpreted as a number and be scored as a rule violation. If the response is at all ambiguous, however, apply the general principle of giving the benefit of the doubt. If a person self-corrects a rule violation or repetition during the trial, the response should not be counted as an error.

Other types of responses that should be scored as correct include:

- Contractions
- Compound words or conjoined words that convey a single meaning (e.g., ferris wheel)
- Slang words if they can be found in a dictionary
- Proper nouns that are not the names of people or places (e.g., days of the week, months of the year, brand names)

Repetitions

Any response that is repeated verbatim within the 60-second trial should be scored as a repetition.

If a repeated word has more than one meaning (e.g., “still” can be an adjective and a noun) or is a homophone (e.g., “flue” and “flew”), score the second response as a repetition error unless the subject explicitly or implicitly (e.g., with intonation or gesture) indicates that the second response has a different meaning or spelling, or if the context strongly suggests that it is a different word. For example, for the string of responses “felt, feeling, fresh, fabric, felt,” the second occurrence of “felt” can be scored as correct since the context implies a different meaning than the first occurrence of “felt.”

Grammatical variants should be scored as rule violations, not repetitions (see below).

Rule violations

Any response that reflects a deviation from the rules provided to the subject should be scored as a rule violation.

Several types of responses are potentially rule violations and include:

- Words beginning with letters other than the designated letter. This includes words that have the same initial sound but begin with a different letter (e.g., “phone” for F-words).
- Non-words
- Proper nouns that are names of people or places
- Numbers
- Grammatical variants of a previous response. These include words that are exactly the same as a previous response but with a different ending that represents a plural, altered tense, or other grammatical variant (e.g., present participle; comparatives). It is important to note that the examples in the instructions only explicitly prohibit plurals (e.g., bake, bakes), alteration in tense (bake, baking), and comparatives (big, bigger), and thus only these types of variants should be scored as rule violations.

Responses that are at all ambiguous should not be scored as rule violations. This particularly applies to responses that use the same root word as a previous response, but the addition is not a plural or change in tense. For example, give credit for “bakery,” even if “bake” was a previous response.

Repeated rule violations count as repetitions, not rule violations.

On NACC UDS Form C2, Question 12a, enter the number of correct F-words generated in 1 minute. If the test was not completed, enter the appropriate reason code, 95 – 98, and leave Questions 12b and 12c blank. Enter scores for 12b and 12c, if applicable.

On NACC UDS Form C2, Question 12d, enter the number of correct L-words generated in 1 minute. If the test was not completed, enter the appropriate reason code, 95 – 98, and leave Questions 12e – 12i blank. Enter scores for 12e and 12f, if applicable. Enter corresponding total scores for 12g – 12i, if applicable.



Subject ID _____

Date ____ / ____ / ____

Examiner's initials _____

Verbal Fluency: Phonemic Test

Materials

1-minute timer

SAY: "I'm going to say a letter of the alphabet. When I ask you to start, tell me as many words as you can that begin with that letter. You will have 1 minute before I tell you to stop. None of the words can be numbers, or names of people, or places.

"For example, if I gave you the letter B, you could say brown, bottle, or bake, but you wouldn't say Barbara, Boston, or billion. Also, please try not to give me the same word with different endings. So if you said bake, you wouldn't also say baked or bakes. And if you said big, you wouldn't also say bigger and biggest.

"Let's begin. Tell me all the words you can, as quickly as you can, that begin with the letter F. Ready? Begin."

Administration

Start timer after completing instructions. Write actual responses as legibly as possible. Stop the procedure at 60 seconds.

Prompts

1. If the participant pauses for 15 seconds:
 - "Keep going."
 - "What other words beginning with F can you think of?"
2. If the participant gives three consecutive words that do not start with the designated letter (provide this prompt only once during this condition):
 - "We are now using the letter F."

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SAMPLE WORKSHEET

Record **F** responses:

1.	11.	21.	31.
2.	12.	22.	32.
3.	13.	23.	33.
4.	14.	24.	34.
5.	15.	25.	35.
6.	16.	26.	36.
7.	17.	27.	37.
8.	18.	28.	38.
9.	19.	29.	39.
10.	20.	30.	40.

SCORING Number of correct **F-words** generated in 1 minute (0–40) _____

Number of **F-words** repeated in 1 minute (0–15) _____

Number of **non-F-words** and rule violation errors in 1 minute (0–15) _____

SAY: "Now I want you to do the same for another letter. The next letter is L. Ready? Begin."

Start timer after completing instructions. Write actual responses as legibly as possible. Stop the procedure at 60 seconds.

Prompts

1. If the participant pauses for 15 seconds:
 - "Keep going."
 - "What other words beginning with L can you think of?"
2. If the participant gives three consecutive words that do not start with the designated letter (provide this prompt only once during this condition):
 - "We are now using the letter L."

SAMPLE WORKSHEET

Record **L** responses:

1.	11.	21.	31.
2.	12.	22.	32.
3.	13.	23.	33.
4.	14.	24.	34.
5.	15.	25.	35.
6.	16.	26.	36.
7.	17.	27.	37.
8.	18.	28.	38.
9.	19.	29.	39.
10.	20.	30.	40.

SCORING Number of correct **L-words** generated in 1 minute (0–40) _____

Number of **L-words** repeated in 1 minute (0–15) _____

Number of **non-L-words** and rule violation errors in 1 minute (0–15) _____

TOTAL number of correct **F-words and L-words** (0–80) _____

TOTAL number of **F-word and L-word** repetition errors (0–30) _____

TOTAL number of **non-F/L words** and rule violation errors (0–30) _____