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MarkVCID Evaluator's Instructions Manual for the Neuropsychological Testing Battery

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MarkVCID Consortium

By the MarkVCID Clinical Data, Physiological Data & Cognitive Assessments Subcommittee (Deborah Blacker, MD, ScD, Chair) and Coordinating Center (PI Steven Greenberg, MD, PhD).

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¹ The MarkVCID neuropsych battery does not include the Benton Complex Figure Test. MarkVCID instructions advise evaluators to administer the delayed recall Craft Stories subtest after the MINT to ensure the MarkVCID delay interval matches that of the NACC UDS 3.

If your site co-enrolls patients into the NACC, the UDS 3 Battery can be used for MarkVCID patients despite the test order differences since the delay interval matches that of the MarkVCID battery. Your site will need to add word list learning (HVLT/SEVLT/CVLT) because this is not included in the UDS 3 battery.

MoCA Instructions

Corresponds with NACC Form C2 Neuropsychological Battery Scores (UDS 3)

INSTRUCTIONS:

The Montreal Cognitive Assessment (MoCA) is a screening scale that evaluates the following cognitive domains: Visuospatial/executive, Language, Memory, Attention, Abstraction, Delayed recall, and Orientation. The MoCA is scored as the number of correctly completed items, with lower scores indicative of poorer performance and greater cognitive impairment.

Review the direction below and complete the worksheet. Compute the raw, uncorrected scores for the MoCA Total Score and all the sub-items, and enter those numbers in the spaces provided on the MarkVCID e-Case Report Form – MoCA section.

Source: All information on this test, including publications and norms and cut-off scores, appears on <http://www.mocatest.org>. © Ziad Nasreddine MD 2004. MoCA® is a registered trademark property of Neurosearch Développements Inc. and is used under license. Form created as part of the National Alzheimer's Coordinating Center Uniform Data Set, copyright 2013 University of Washington.

MoCA (MONTREAL COGNITIVE ASSESSMENT) MarkVCID Sample Case Report Form with Coding	
Was any part of the MoCA administered? <input type="checkbox"/> No <input type="checkbox"/> Yes If No, please provide the primary reason: <input type="checkbox"/> Physical problem <input type="checkbox"/> Verbal refusal <input type="checkbox"/> Cognitive/behavior problem <input type="checkbox"/> Other problem (specify): _____	
Date of Examination: ____ / ____ / ____ (MM/DD/YYYY)	
Language of test administration: <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Other (specify): _____	
KEY: If the subject cannot complete any of the following exams, please give the reason by entering one of the following codes: 95 = Physical problem 96 = Cognitive/behavior problem 97 = Other problem 98 = Verbal refusal	
1. Visuospatial/ executive — Trails:	____ [0-1, 95-98]
2. Visuospatial/ executive — Cube:	____ [0-1, 95-98]
3. Visuospatial/ executive — Clock contour:	____ [0-1, 95-98]
4. Visuospatial/ executive — Clock numbers:	____ [0-1, 95-98]
5. Visuospatial/ executive — Clock hands:	____ [0-1, 95-98]

6. Language — Naming:	___ ___ [0-3, 95-98]
7. Memory — Registration (two trials):	___ ___ [0-10, 95-98]
8. Attention — Digits:	___ ___ [0-2, 95-98]
9. Attention — Letter A:	___ ___ [0-1, 95-98]
10. Attention — Serial 7s:	___ ___ [0-3, 95-98]
11. Language — Repetition:	___ ___ [0-2, 95-98]
12. Language — Fluency:	___ ___ [0-1, 95-98]
13. Abstraction:	___ ___ [0-2, 95-98]
14. Delayed recall — No cue: <i>(if not completed, enter reason code and skip to question 17)</i>	___ ___ [0-5, 95-98]
15. Delayed recall — Category cue:	___ ___ [0-5, 95-98]
16. Delayed recall — Recognition:	___ ___ [0-5, 95-98]
17. Orientation — Date:	___ ___ [0-1, 95-98]
18. Orientation — Month:	___ ___ [0-1, 95-98]
19. Orientation — Year:	___ ___ [0-1, 95-98]
20. Orientation — Day:	___ ___ [0-1, 95-98]
21. Orientation — Place:	___ ___ [0-1, 95-98]
22. Orientation — City:	___ ___ [0-1, 95-98]

Time to administer the MoCA is approximately 10 minutes. The examiner is permitted to repeat each item once, if asked. Note that scoring for F fluency has been expanded from the original MoCA criteria. 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.”**

PROMPTS:

If the subject pauses for 15 seconds:

Say “Keep going.” – or – “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):

Say “We are now using the letter F.”

The verbal fluency response form immediately following the MoCA in the testing packet should be used to record ALL responses made by the participant, including repeated words and rule violations. While MoCA scoring is based only on the number correct, more detailed scoring is required for the Neuropsychological Battery Form.

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 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.
- Make sure to record all F-fluency words on the F-fluency response form provided in the testing packet immediately following the MoCA form. Additional scoring criteria are specified and requires entering these supplemental scores into the Verbal Fluency section within the *Neuropsychological Battery Form items #6a-d*. Refer to scoring rules on page 9 of this manual for additional instructions.

SCORING – MoCA:

If any of the individual items cannot be administered, enter the appropriate reason code (95 – 98) 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” in MarkVCID e-Case Report Form MoCA - Question #1.*

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” in MarkVCID e-Case Report Form MoCA - Question #2.*

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” in MarkVCID e-Case Report Form MoCA - Question #3.*

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” in MarkVCID e-Case Report Form MoCA - Question #4.*

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 in MarkVCID e-Case Report Form MoCA - Question #5.*

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” in MarkVCID e-Case Report Form MoCA - Question #6.*

5. Memory

Count the number of correct immediate recall responses for both trials and *enter the score for “Memory — Registration (two trials)” in MarkVCID e-Case Report Form MoCA - Question #7.* Note that this score does not contribute towards the MoCA Total Score.

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” in MarkVCID e-Case Report Form MoCA - Question #8.*

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” in MarkVCID e-Case Report Form MoCA - Question #9.*

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” in MarkVCID e-Case Report Form MoCA - Question #10.*

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” in MarkVCID e-Case Report Form MoCA - Question #11.*

8. Verbal fluency 12 (item combined with #6 Neuropsychological Battery Form)

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 “fôr” 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)

For the MoCA, you only need to keep track of correct responses, but please keep track of repetitions and errors/rule violations for the more detailed scoring required for the Neuropsychological Battery Form, as described below.

MoCA Item Scoring:

Neuropsychological Battery - MarkVCID Sample Case Report Form with Coding	
6. Verbal Fluency – Phonemic Tests (words beginning with F):	
a) If test not completed, enter reason code and skip to question 7a:	___ ___ [95-98]
b) Number of correct F-words generated in 1 minute:	___ ___ [0-40]
c) Number of F-words repeated in 1 minute:	___ ___ [0-15]
d) Number of non-F-words and rule violation errors in 1 minute:	___ ___ [0-15]

Allocate one point if the subject generates 11 correct words or more in 60 sec, otherwise score is zero.
Enter the score for “12. Language — Fluency” on the MarkVCID e-Case Report Form MoCA.

Additional Scoring: Neuropsychological Battery Form:

Enter the total number of correct F-words generated on the Neuropsychological Battery Form item “6b. Verbal Fluency – Phonemic Tests (Number of correct F-words generated in 1 minute)”.

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).

Enter the number of repetitions on the Neuropsychological Battery Form item “6c. Verbal Fluency – Phonemic Tests (Number of F-words repeated in 1 minute)”.

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.

Enter the number of rule violation errors on the Neuropsychological Battery Form item “6d. Verbal Fluency – Phonemic Tests (Number of non-F-words and rule violation errors in 1 minute)”.

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” in MarkVCID e-Case Report Form MoCA - Question #13.

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” in MarkVCID e-Case Report Form MoCA - Question #14.

Scoring for cued recall

If a category cue was given, enter the number of words recalled following a category cue; otherwise, select the ‘Not Done’ checkbox for “Delayed recall — Category cue” in MarkVCID e-Case Report Form MoCA - Question #15.

If a multiple choice cue was given, enter the number of words recalled following a multiple choice cue; otherwise, select the ‘Not Done’ checkbox for “Delayed recall — Recognition” in MarkVCID e-Case Report Form MoCA - Question #16.

The total possible words recalled and entered in Questions #14, 15, 16 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 #14; in this case, the ‘Not Done’ checkbox for the number correct with a category cue and recognition cue (#15 and 16) should be selected because they were not administered.

If a subject does not remember all five words uncued, record the number correct uncued for Question #14, 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 #15.

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 #16.

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 in MarkVCID e-Case Report Form MoCA - Question #17-22.*

TOTAL SCORE – MoCA:

The MarkVCID e-Case Report Form will auto-calculate the sum of 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.

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

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

ITEMS	Points towards total score	INDEX SCORES					
		Memory **	Executive	Attention/ Concentration	Language	Visio-spatial	Orientation
Trails	1	-	1	-	-	-	-
Cube	1	-	-	-	-	1	-
Clock — Contour	1	-	1	-	-	1	-
Clock — Numbers	1	-	1	-	-	1	-
Clock — Hands		-	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

** 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: (2X3) + (2X2) + (1X1) = 11/15

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

			INDEX SCORES				
ITEMS	Points towards total score	Memory***	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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**The standard administration of the MoCA does not score category and recognition responses, even if administered.

***If all five words are freely recalled, then cued and category recall are not administered and the total score would be 15 (3 points for each word recalled). After free recall, category cues are given only for items not recalled. Each word correct with category cues 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).

NEUROPSYCHOLOGICAL TESTING BATTERY²

MarkVCID Sample Case Report Form with Coding

Administration of the remaining battery: It is intended that the tests be administered in the order in which they appear even if they were previously administered at a recent clinic screening. This is necessary to standardize among centers the delay intervals for testing memory, and to eliminate any differences due to the order of test administration. It is therefore required that the remaining battery be administered in its entirety either before or after the administration of other tests commonly used by the sites.

Was any part of the Neuropsychological Testing Battery administered?

☐ No ☐ Yes

If No, please provide the primary reason: ☐ Physical problem ☐ Verbal refusal

☐ Cognitive/behavior problem ☐ Other problem (specify): _____

Date of Examination: ____ / ____ / ____ (MM/DD/YYYY)

Language of test administration:

☐ English

☐ Spanish

☐ Other (specify): _____

² The MarkVCID neuropsych battery does not include the Benton Complex Figure Test. MarkVCID instructions advise evaluators to administer the delayed recall Craft Stories subtest after the MINT to ensure the MarkVCID delay interval matches that of the NACC UDS 3.

If your site co-enrolls patients into the NACC, the UDS 3 Battery can be used for MarkVCID patients despite the test order differences since the delay interval matches that of the MarkVCID battery. Your site will need to add word list learning (HVL/SEVLT/CVLT) because this is not included in the UDS 3 battery.

Craft Story 21 Recall (Immediate) Instructions

Corresponds with NACC Form C2 Neuropsychological Battery Scores (UDS 3)

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.

ADMINISTRATION – Craft Story (Immediate):

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 ..."**

[Read the story slowly and clearly].

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.

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. Reproduced by permission of the author, Suzanne Craft, PhD. Do not copy or distribute without author's permission. Form created as part of the Uniform Data Set of the National Alzheimer's Coordinating Center, copyright ©2013 University of Washington.

SCORING – Craft Story (Immediate):

MarkVCID Sample Case Report Form with Coding

KEY: If the subject cannot complete any of the following exams, please give the reason by entering one of the following codes:

95 = Physical problem

97 = Other problem

96 = Cognitive/behavior problem

98 = Verbal refusal

1. Craft Story 21 Recall (Immediate):

- a) If test not completed, enter reason code and skip to question 2a: _____ [95-98]
- b) Total story units recalled, verbatim scoring: _____ [0-44]
- c) Total story units recalled, paraphrase scoring: _____ [0-25]

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.

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 in MarkVCID e-Case Report Form Neuropsychological Battery Question #1B. 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). If the subject provides a bit verbatim (e.g., the name), you should give a point for that bit.

Enter the paraphrase score in MarkVCID e-Case Report Form Neuropsychological Battery Question #1C.

Number Span Test (Forward & Backward) Instructions

Corresponds with NACC Form C2 Neuropsychological Battery Scores (UDS 3)

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 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.

ADMINISTRATION – Number Span Test:

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.

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?”**

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.

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SCORING – Number Span Test:

Neuropsychological Battery - MarkVCID Sample Case Report Form with Coding	
3. Number Span Test — Forward:	
a) If test not completed, enter reason code and skip to question 4a:	___ ___ [95-98]
b) Number of correct trials:	___ ___ [0-14]
c) Longest span forward:	___ ___ [0, 3-9]

4. Number Span Test — Backward:	
a) If test not completed, enter reason code and skip to question 5a:	___ ___ [95-98]
b) Number of correct trials:	___ ___ [0-14]
c) Longest span backward:	___ ___ [0, 2-8]

Number Span Test Forward: After completing the worksheet, calculate the number of total correct trials and the length of the longest number sequence repeated correctly prior to the two failed trials.

Enter the total number of correct trials MarkVCID e-Case Report Form Neuropsychological Battery Question #3b.

Enter the longest span length for MarkVCID e-Case Report Form Neuropsychological Battery Question #3c.

If the test was not completed, enter the appropriate reason code, 95 – 98, for MarkVCID e-Case Report Form Neuropsychological Battery Question #3a.

Number Span Test Backward: After completing the worksheet, calculate the number of total correct trials and the length of the longest number sequence repeated correctly prior to the two failed trials.

Enter the total number of correct trials MarkVCID e-Case Report Form Neuropsychological Battery Question #4b.

Enter the longest span length for MarkVCID e-Case Report Form Neuropsychological Battery Question #4c.

If the test was not completed, enter the appropriate reason code, 95 – 98, for MarkVCID e-Case Report Form Neuropsychological Battery Question #4a.

Category Fluency Instructions

Corresponds with NACC Form C2 Neuropsychological Battery Scores (UDS 3)

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

ADMINISTRATION – Category Fluency:

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.”

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

SCORING - Category Fluency:

Neuropsychological Battery - MarkVCID Sample Case Report Form with Coding	
5. Category Fluency – Animals:	
a) If test not completed, enter reason code and skip to question 6a:	____ [95-98]
b) Total number of animals named in 60 seconds:	____ [0-77]

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.

If the test could not be completed, enter the appropriate reason code, 95 – 98 in MarkVCID e-Case Report Form Neuropsychological Battery Question #5a. Enter the total number of correct animals in MarkVCID e-Case Report Form Neuropsychological Battery Question #5b.

Trail Making A & B Instructions

Corresponds with NACC Form C2 Neuropsychological Battery Scores (UDS 3)

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 8½" x 11" 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).

ADMINISTRATION – Trail Making A & B:

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 (pointing to 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 (96=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 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 **"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 subject cannot complete the sample and clearly does not comprehend the task, do not administer the test. Enter the appropriate code (96=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.

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.

SCORING – Trail Making A & B:

Neuropsychological Battery - MarkVCID Sample Case Report Form with Coding	
7. Trail Making Test A:	
a) If test not completed, enter reason code and skip to question 8a:	____ [95-98]
b) Total number of seconds to complete (if not finished by 150 seconds, enter 150)	____
____ [0-150]	
i. Number of commission errors:	____ [0-40]
ii. Number of correct lines:	____ [0-24]
8. Trail Making Test B:	
a) If test not completed, enter reason code and skip to question 9a:	____ [95-98]
b) Total number of seconds to complete (if not finished by 300 seconds, enter 300):	____
____ [0-300]	
i. Number of commission errors:	____ [0-40]
ii. Number of correct lines:	____ [0-24]

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 time to completion in seconds for Part A in MarkVCID e-Case Report Form Neuropsychological Battery Question #7B.

If the test was not completed, enter the appropriate reason code in #7A.

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 time to completion in seconds for Part B in MarkVCID e-Case Report Form Neuropsychological Battery Question #8B.

If the test was not completed, enter the appropriate reason code in 8A.

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.

Enter the total commission errors for Part A in MarkVCID e-Case Report Form Neuropsychological Battery Question #7Bi.

Enter the total commission errors for Part A in MarkVCID e-Case Report Form Neuropsychological Battery Question #8Bi.

“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).

Enter the total number of correct lines for Part A in MarkVCID e-Case Report Form Neuropsychological Battery Question #7B ii. Enter the total number of correct lines for Part A in MarkVCID e-Case Report Form Neuropsychological Battery Question #8B ii.

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.

MiNT Instructions

Corresponds with NACC Form C2 Neuropsychological Battery Scores (UDS 3)

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.

ADMINISTRATION – MiNT:

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?”**

SOURCES:

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. From A Multilingual Naming Test, Tamar H. Gollan, PhD; reproduced by permission. Do not copy or distribute without author’s permission. Form created as part of the Uniform Data Set of the National Alzheimer’s Coordinating Center, copyright ©2013 University of Washington

Neuropsychological Battery - MarkVCID Sample Case Report Form with Coding

9. Multilingual Naming Test (MINT):

- a) If test not completed, enter reason code and skip to question 10a: ____ [95-98]
- b) Total score: ____ [0-32]
- c) Total correct without semantic cue: ____ [0-32]
- d) Semantic cues – Number given: ____ [0-32]
- e) Semantic cues – Number correct with cue: ☐ N/A ____ [0-32]
- f) Phonemic cues – Number given: ____ [0-32]
- g) Phonemic cues – Number correct with cue: ☐ N/A ____ [0-32]

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 above). 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.

If the test was not completed, enter the appropriate reason code in #9a.

Enter the total number of correctly named items on the MarkVCID e-Case Report Form Neuropsychological Battery Question #9b. For Question #9c, enter the total number of spontaneously correct items (without a semantic cue).

For Question #9d, enter the number of semantic cues given. For #9e, enter the number of items correct with a semantic cue. If no semantic cues were given, select the 'N/A' checkbox for Question #9e.

For Question #9f, enter the number of phonemic cues given. For #9g, enter the number of items correct with a phonemic cue. If no phonemic cues were given, select the 'N/A' checkbox for Question #9f.

Craft Story 21 Recall (Delayed) Instructions

Corresponds with NACC Form C2 Neuropsychological Battery Scores (UDS 3)

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).

ADMINISTRATION – Craft Story (Delayed):

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.”**

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. Reproduced by permission of the author, Suzanne Craft, PhD; do not copy or distribute without author's permission. Form created as part of the Uniform Data Set of the National Alzheimer's Coordinating Center, copyright ©2013 University of Washington.

SCORING – Craft Story 21 Recall (Delayed)

Neuropsychological Battery - MarkVCID Sample Case Report Form with Coding	
2. Craft Story 21 Recall (Delayed):	
a) If test not completed, enter reason code and skip to question 3a:	____ [95-98]
b) Total story units recalled, verbatim scoring:	____ [0-44]
c) Total story units recalled, paraphrase scoring:	____ [0-25]
d) Delay time (minutes):	<input type="checkbox"/> Unknown ____ [0-85]
e) Cue (“boy”) needed:	<input type="checkbox"/> No <input type="checkbox"/> Yes

Complete the worksheet and 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 in MarkVCID e-Case Report Form Neuropsychological Battery Question #2b. If the test was not completed, enter the reason code in #2a.

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 in MarkVCID e-Case Report Form Neuropsychological Battery Question #2c. Enter the delay time, in minutes, in MarkVCID e-Case Report Form Neuropsychological Battery Question #2d. If the delay time is unknown or miss-recorded, select the ‘Unknown’ checkbox for #2d. If the cue (“boy”) was needed, select ‘Yes’ for Question 2e; otherwise, select ‘No.’

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**

Word List Learning with Immediate/Delay/Recognition Instructions

Corresponds with HVLTL, CVLT-SF, CVLT, SEVLT (SPANISH)

Enter each response in MarkVCID e-Case Report Neuropsychological Battery #10 (word list learning).

This manual does NOT contain administration and scoring instructions for the CVLT, CVLT-SF, HVLTL, or SEVLT.

Please contact your site neuropsychologist for additional instructions specific to your site's practices.

Neuropsychological Battery - MarkVCID Sample Case Report Form with Coding	
10. Word list learning with immediate/delay/recognition:	
a) Name of test:	<input type="checkbox"/> HVLTL <input type="checkbox"/> CVLT <input type="checkbox"/> CVLT-SF <input type="checkbox"/> SEVLT [Spanish] <input type="checkbox"/> Other (specify): _____
b) Total number of words on list:	____
c) If test not completed, please select reason code:	____ [95-98]
d) Learning Trial 1:	____
e) Learning Trial 2:	____
f) Learning Trial 3:	____
g) Learning Trial 4:	<input type="checkbox"/> N/A ____
h) Learning Trial 5:	<input type="checkbox"/> N/A ____
i) Delay duration (if multiple options choose longest):	____
j) Delayed recall (if multiple delay options, choose longest):	____
k) Recognition hits:	____
l) Recognition false positives:	____

Clinical Dementia Rating Instructions

Corresponds with NACC Form B4 (UDS 3)

INSTRUCTIONS: This form is to be completed by the clinician or other trained health professional, based on co-participant report and behavioral and neurological exam of the subject. In the extremely rare instances when no co-participant is available, the clinician or other trained health professional must complete this form using all other available information and his/her best clinical judgment. Score only as decline from previous level due to cognitive loss, not impairment due to other factors, such as physical disability.

Enter each response in MarkVCID e-Case Report Form CDR section.

SECTION 1: Standard CDR

The Washington University ADC provides a CDR (standard version) training website for ADC personnel. This CDR training is required by MarkVCID and may be accessed online at: <http://alzheimer.wustl.edu/cdr/Application/Step1.htm>.

Use all information and make the best judgment. Score each category as independently as possible. Select only one box for each category, rating impairment as decline from the person's usual level due to cognitive loss alone, not impairment due to other factors such as physical disability. Occasionally, the evidence is ambiguous and the clinician's best judgment is that a category could be rated in either one of two adjacent boxes, such as **1=Mild** or **2=Moderate** impairment. In that situation, the standard procedure is to select the box of greater impairment.

Aphasia is taken into account by assessing both language and non-language function in each cognitive category. If aphasia is present to a greater degree than the general dementia, the subject is rated according to the general dementia. Supply evidence of non-language cognitive function.

A box score of 0 for Memory (**M=0**) applies to subjects who, in the clinician's judgment, have no memory impairment or have inconsistent slight forgetfulness. The adjective "slight" indicates that there is not even a suggestion that everyday function has been affected by a memory change. In contrast, a box score of 0.5 in Memory indicates a consistent memory change and also suggests that the change may very subtly affect everyday performance (e.g., having to return to the grocery store after forgetting an item on the list).

Before scoring the CDR boxes, the clinician is to synthesize and evaluate all information: the report of the co-participant, the report (and performance) of the subject, and the clinician's own observations. It may be that an inobservant co-participant reports no memory problems, whereas the subject self-reports memory problems; if the clinician's judgment is that the individual is correct, then a box score of 0.5 for Memory can be given (**M=0.5**). The converse also is true: a 0.5 box score can be given when the co-participant reports a problem but the subject does not. It is also possible for the clinician to rate Memory as 0.5 (**M=0.5**) if he/she believes a problem exists — even though neither the co-participant nor the subject reports a problem.

Standard CDR Sum of Boxes

The MarkVCID e-Case Report Form will auto-calculate the sum of values for all answers.

Standard Global CDR

To calculate the Standard Global CDR, please access the following calculator:

<https://www.alz.washington.edu/cdrnacc.html>

Enter the Calculated Global CDR in the space provided.

The standard global CDR is derived from the scores in each of the six categories ("box score") as follows:

- Memory (M) is the primary category, and all others are secondary.
- CDR = M if at least three secondary categories are given the same score as memory. Whenever three or more secondary categories are given a score greater or less than the memory score, CDR = score of majority of secondary categories on whichever side of M has the greater number of secondary categories. However, when three secondary categories are scored on one side of M and two secondary categories are scored on the other side of M, then CDR = M.
- When M = 0.5, CDR = 1 if at least three of the other categories are scored 1 or greater. If M = 0.5, then CDR cannot be 0; it can only be 0.5 or 1.
- If M = 0, then CDR = 0 unless there is impairment (0.5 or greater) in two more secondary categories, in which case CDR = 0.5.

Although applicable to most Alzheimer's disease situations, these rules do not cover all possible scoring combinations. Unusual circumstances that occasionally occur in AD, and may be expected in non-Alzheimer's dementia as well, are scored as follows:

1. With ties in the secondary categories on one side of M, choose the tied scores closest to M for CDR (e.g., if M and another secondary category = 3, two secondary categories = 2, and two secondary categories = 1, then CDR = 2).
2. When only one or two secondary categories are given the same score as M, CDR = M as long as no more than two secondary categories are on either side of M.
3. When M = 1 or greater, CDR cannot be 0; in this circumstance, CDR = 0.5 when the majority of secondary categories are 0.

The source of the CDR scoring algorithm is available at <http://www.biostat.wustl.edu/~adrc/cdrpgm/index.html>

CDR (CLINICAL DEMENTIA RATING)

Was the CDR administered? ☐ No ☐ Yes

If No, please provide the primary reason: ☐ Physical problem ☐ Verbal refusal

☐ Cognitive/behavior problem ☐ Other problem (specify): _____

Date of Evaluation: ____ / ____ / ____ (MM/DD/YYYY)

Section 1: Standard CDR

Please enter score below:	IMPAIRMENT				
	None – 0	Questionable – 0.5	Mild – 1	Moderate – 2	Severe – 3
1. Memory ____ . ____	No memory loss, or slight inconsistent forgetfulness	Consistent slight forgetfulness; partial recollection of events; “benign” forgetfulness	Moderate memory loss, more marked for recent events; defect interferes with everyday activities	Severe memory loss; only highly learned material retained; new material rapidly lost	Severe memory loss; only fragments remain
2. Orientation ____ . ____	Fully oriented	Fully oriented except for slight difficulty with time relationships	Moderate difficulty with time relationships; oriented for place at examination; may have geographic disorientation elsewhere	Severe difficulty with time relationships; usually disoriented to time, often to place	Oriented to person only
3. Judgment and problem solving ____ . ____	Solves everyday problems, handles business and financial affairs well; judgment good in relation to past performance	Slight impairment in solving problems, similarities, and differences	Moderate difficulty in handling problems, similarities, and differences; social judgment usually maintained	Severely impaired in handling problems, similarities, and differences; social judgment usually impaired	Unable to make judgments or solve problems
4. Community affairs ____ . ____	Independent function at usual level in job, shopping, volunteer and social groups	Slight impairment in these activities	Unable to function independently at these activities, although may still be engaged in some; appears normal to casual inspection	No pretense of independent function outside the home; appears well enough to be taken to functions outside the family home	No pretense of independent function outside the home; appears too ill to be taken to functions outside the family home
5. Home and hobbies ____ . ____	Life at home, hobbies, and intellectual interests well maintained	Life at home, hobbies, and intellectual interests slightly impaired	Mild but definite impairment of function at home; more difficult chores abandoned; more complicated hobbies and interests abandoned	Only simple chores preserved; very restricted interests, poorly maintained	No significant function in the home
6. Personal care ____ . 0	Fully capable of self-care (= 0).		Needs prompting	Requires assistance in dressing, hygiene, keeping of personal effects	Requires much help with personal care; frequent incontinence
7. <u>Auto-calculated</u> Standard CDR Sum of Boxes					
8. ____ . ____ STANDARD GLOBAL CDR use calculator: https://www.alz.washington.edu/cdrnacc.html					

SECTION 2: Supplemental CDR

In addition to the factors investigated within the standard CDR, two additional constructs (“Behavior, Comportment, and Personality” and “Language”) have been appended as the UDS & MarkVCID Supplemental CDR, which will aid in the identification subjects with frontotemporal dementia and/or primary progressive aphasia, respectively. Because of their specialized nature, instructions for the scoring of each item are outlined below.

Behavior, Comportment, and Personality

This item should be completed by a clinician or other trained health professional who is skilled in the assessment of FTLD, based on informant report and a review of the subject’s cognitive, functional, and behavioral status. This domain is intended to assess changes in personality, aberrant behaviors, and changes in interpersonal relationships. The kinds of specific issues that might fall under these rubrics include: loss of insight, disinhibition, apathy, social withdrawal and disengagement, emotional lability, easy distractibility, reduced empathy for the feelings of others, impulsivity, and changes in eating habits and table manners. A key element of each of these is the degree to which these behaviors impact interpersonal relationships.

Language

This item should be completed by a clinician or other trained health professional who is well versed in aphasia and aphasic disorders, based on information derived from the informant and also from clinical assessment of the patient’s language functions in the course of the clinical interview and the mental status examination. This domain is intended to assess changes in language. The components of language that are primarily of interest include: spontaneous speech, auditory comprehension, object naming, reading and writing. Using these in combination, the goal is to assess the subject’s ability to create and understand various forms of information. The rate at which these are generated or comprehended is also of interest.

Section 2: Supplemental CDR					
Please enter score below:	IMPAIRMENT				
	None – 0	Questionable – 0.5	Mild – 1	Moderate – 2	Severe – 3
9. Behavior, comportment, and personality ____ . ____	Socially appropriate behavior	Questionable changes in comportment, empathy, appropriateness of actions	Mild but definite changes in behavior	Moderate behavioral changes, affecting interpersonal relationships and interactions in a significant manner	Severe behavioral changes, making interpersonal interactions all unidirectional
10. Language ____ . ____	No language difficulty, or occasional mild tip-of-the tongue	Consistent mild word-finding difficulties; simplification of word choice; circumlocution; decreased phrase length; and/or mild comprehension difficulties	Moderate word-finding difficulty in speech; cannot name objects in environment; reduced phrase length and/or agrammatical speech and/or reduced comprehension in conversation and reading	Moderate to severe impairments in either speech or comprehension; has difficulty communicating thoughts; writing may be slightly more effective	Severe comprehension deficits; no intelligible speech

Geriatric Depression Scale Instructions

Corresponds with NACC Form B6 (UDS 3)

The form is intended for completion by the participant as a self-report form. The form is not to be administered to the co-participant. If your Center prefers to administer the entire 30-item GDS, please first administer this 15-item form and score appropriately; then administer the remaining 15 items on a separate form.

The Geriatric Depression Scale was developed by Stanford University as a basic screening measure for depression in older adults. Further information is available online at <http://www.stanford.edu/~yesavage/GDS.html>

ADMINISTRATION – GDS:

Instruct the subject: “This next form will be asking you questions about your mood and feelings. Some of the questions may not apply, and some may make you feel uncomfortable. Please try to answer each question to the best of your ability by circling “yes” or “no,” depending on how you have been feeling in the past week, including today.”

NOTE: Any missing items in this form will prevent calculation of a total GDS score. Please check over the participant’s response sheet for any missing items before moving on to the next section. If a response is missing, query the participant whether they meant to leave this item blank, and if not, encourage them to pick the best option that describes their recent mood.

SCORING – GDS:

GDS (GERIATRIC DEPRESSION SCALE)			
Was the GDS administered? <input type="checkbox"/> No <input type="checkbox"/> Yes If No, please provide the primary reason: <input type="checkbox"/> Physical problem <input type="checkbox"/> Verbal refusal <input type="checkbox"/> Cognitive/behavior problem <input type="checkbox"/> Other problem (specify): _____			
Date of Evaluation: ____ / ____ / ____ (MM/DD/YYYY)			
	Yes	No	Did not answer
1. Are you basically satisfied with your life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Have you dropped many of your activities and interests?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you feel that your life is empty?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you often get bored?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are you in good spirits most of the time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Are you afraid that something bad is going to happen to you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Do you feel happy most of the time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Do you often feel helpless?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Do you prefer to stay at home, rather than going out and doing new things?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Do you feel you have more problems with memory than most people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Do you think it is wonderful to be alive?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Do you feel pretty worthless the way you are now?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Do you feel full of energy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Do you feel that your situation is hopeless?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Do you think that most people are better off than you are?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Enter each item response in the MarkVCID e-Case Report Form GDS questions #1-15.

Total GDS scores will auto-calculate in the MarkVCID e-Case Report Form. If any of the items are unanswered, the test will be considered incomplete and the Total GDS Score will not be calculated.