

Supplementary Materials.

Detailed description of neuropsychological testing procedures and scoring

Cognitive screening tests included Modified Mini-Mental State Examination (3MS) (Teng & Chui, 1987) and Mini-Mental Status Examination (MMSE) (Folstein et al., 1975). The 3MS indexes 10 cognitive domains: attention, concentration, orientation, short-term memory, long-term memory, verbal fluency, reading, writing, constructional praxis, and abstraction. Most of the items from the MMSE are incorporated in the 3MS. The addition of two MMSE items to the 3MS (i.e., which floor the participant is on and writing a sentence), made it possible to derive a total score for each test. Two minor changes were made to the standard administration procedure for the 3MS. First, the three to-be-remembered words were printed on three separate cards in an enlarged font and shown to the participant one at a time while the examiner simultaneously repeated the words aloud. Secondly, the 60-second Animal Fluency test (Morris et al., 1989) was substituted for the 3MS 30-second task of naming four-legged animals.

Language abilities were indexed using confrontational object naming, category fluency (animals), and letter fluency (F). The shortened 15-item version of the Boston Naming Test (BNT) (Fastenau et al., 1998, form 1) was used to assess object-naming ability while minimizing fatigue. The number of correct spontaneous responses and number of correct responses following semantic and/or phonemic cues was calculated as well as the number of errors. Naming errors were classified into one of five categories: semantic paraphasias, circumlocutions, intrusions, perseverations, and visual misidentifications. The Animal Fluency test, performed as part of the 3MS, requires

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participant to name as many animals as possible within 60 seconds. Credit was given for naming general categories as well as specific exemplars, but not for both. For example, if the examinee gave an exemplar (e.g., eagle) from an already named category (e.g., bird), credit was only given for the exemplar. Extinct animals (e.g., dinosaur) were credited, but not mythical creatures (e.g., unicorn). Repeated responses were counted only once.

Although naming of insects was not forbidden by instructions, but was discouraged if participant provided them. Insects were counted as intrusions. Letter fluency was assessed using only letter “F” rather than the more traditional three letters (F, A, S) (Gladsjo et al., 1999; Heaton et al., 2004) to reduce administration time and fatigue. Participant was to name aloud as many words as possible starting the letter “F” in 60 seconds. To avoid confusion with similar-sounding letters, a large “F” printed in 200-size font on a card was presented as a prompt during the test. Although saying numbers was not forbidden by the instructions, sequential counting (e.g., 50, 51, 52, etc.) was discouraged. Points were not awarded for responses that included proper nouns or variations on the same word (e.g., fall, falling). For both fluency tests, the number of correct responses without repetitions was calculated, as well as the number of perseverations (i.e., repeating the same word) and intrusions (i.e., words unrelated to the target category).

Word list memory was indexed with California Verbal Learning Test- Second Edition, Short Form (CVLT-II SF) (Delis et al., 2000). In this test, the participant is asked to remember a list of nine words across four learning trials. The list is composed of three words from each of three different categories presented in a random order. The same order of stimulus presentation is used across the four trials, and each learning trial is

followed by immediate free recall. Our modification to the standard CVLT-II SF was to present the words both verbally and visually (one at a time) during the four learning trials, rather than only saying the words aloud. A Short Delay Free Recall test was administered following a 30-second interference task of counting backwards from 100 by ones. After approximately 10 minutes of nonverbal tasks (i.e., clock drawing and Trail Making Tests Parts A, B, and C), the Long Delay Free Recall was administered and tests of cued-recall and yes/no recognition administered immediately thereafter. The number of words correctly recalled in each of the four learning as well as short- and long-delay free recall trials was recorded along with the number of intrusions and perseverations in the free and cued recall trials. In the 'yes-no' recognition test, we recorded the number of correct responses as well as the number of false positive errors and guesses.

Executive functioning and attention were indexed using the Trail Making Tests (TMT) Parts A and B. Standard administrative procedures (Reitan & Wolfson, 1993) were followed. In Part A the participant is asked to draw a line connecting numbers 1 through 25, semi-randomly arranged on the paper test form, in ascending order as quickly as possible. Part B requires the participant to draw a line connecting 13 numbers and 12 letters, randomly aligned on the paper test form, in an alternating fashion (e.g., 1–A–2–B–3–C and so on) as quickly as possible. Completion time limit was 180 seconds for TMT A and 300 seconds for TMT B. Completion time in seconds and number of errors were recorded for both the training samples and actual tests.

Working memory was indexed using the Forwards and Backwards versions of the Digit Span test from the Wechsler Adult Intelligence Scale-III (Wechsler, 1997). The administration and scoring of this test followed standard procedures. In Forwards Digit

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Span, the participant is asked to repeat a string of numbers immediately after hearing them from the examiner. The length of the number string increases progressively from 2 to 9 digits. In Backwards Digit Span, the participant is asked to repeat the number string (e.g., 7-1-3) in the reverse order in which it was presented (e.g., 3-1-7). In this task, the number string increases progressively from 2 to 8 digits in length.

Psychomotor speed was indexed using an instrument developed by our group that is similar to the original Delis–Kaplan Executive Functioning System TMT Part C (Delis et al., 2001). The purpose for developing this test was to measure psychomotor speed with a measure similar to D-KEFS TMT C but that would be short and less tiring for the oldest-old. The test was developed using the stimulus page from TMT Part A as described above. We removed the numbers from the form, leaving the empty circles, which we connected with a dotted line. Additionally, we reversed the Part A starting and ending points in our Part C, so that the Part A ending point (i.e., location of number 25) became the beginning position and the Part A starting point (i.e., location of the number 1) became the ending position. The participant’s task was to trace over the dotted line, connecting the circles as quickly as possible using a colored marker. Completion time limit was 150 seconds. Completion time in seconds and number of errors were recorded for both the training sample and the actual test.

Visual-spatial and constructional abilities were indexed using two tests of drawing ability. First, in the Clock Drawing test, the participant was asked to fill in a pre-drawn, 4-inch diameter circle with numbers to represent a clock face and then draw the hands to show “ten after eleven.” Scoring was based on the presence and sequencing of the numbers as well as the presence and placement of the minute and hour

hands (Rouleau et al., 1992). In addition to visual-spatial and constructional abilities, the Clock Drawing test also involves executive functions and visual-motor coordination. Clock Drawing test is listed under visual-spatial and constructional abilities to be consistent with our previous publication. Secondly, in the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) Construction Test, the participant was required to copy four line drawings of increasing complexity (i.e., circle, four-sided diamond, intersecting rectangles, and cube). Standard scoring criteria were used for each figure, with a maximum total score of 11 points (Morris et al., 1989).

Symptoms of depression were characterized using the Geriatric Depression Scale (GDS) (Yesavage et al., 1982).

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Tables with raw scores by sex and age group

Supplemental Table 1. Raw neuropsychological test scores (mean, standard deviation, percentiles) for women by age group

Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B</i> ± <i>SE</i> / <i>t</i> / <i>p</i> ^c
<i>MMSE</i> Total Score	90-91	85	28.0	1.7	25	26	27	28	29	30	30	-.09±.04 / -2.33 / .02
	92-94	117	28.5	1.5	25	26	28	29	30	30	30	
	≥95	80	27.6	1.9	25	26	27	28	29	30	30	
	Overall	282	28.1	1.7	25	26	27	28	29	30	30	
<i>3MS</i> Total score	90-91	83	94.5	4.5	84	89	92	96	97	99	100	-.27±.10 / -2.67 / <.01
	92-94	109	95.0	3.9	88	90	93	96	98	100	100	
	≥95	71	93.2	5.0	87	88	90	94	96	98	99	
	Overall	263	94.4	4.4	86	89	92	96	97	99	100	
<i>BNT-Short</i> Total correct	90-91	65	13.0	2.0	10	11	12	13	15	15	15	-.22±.05 / -4.15 / <.01
	92-94	94	12.7	2.0	9	10	11	13	14	15	15	
	≥95	53	11.8	2.0	8	9	11	12	13	14	15	
	Overall	212	12.6	2.0	9	10	11	13	14	15	15	
<i>Animal Fluency</i> Total correct	90-91	84	14.7	4.2	9	10	12	14	17	20	22	-.18±.09 / -2.05 / .04
	92-94	117	14.5	3.7	9	10	12	14	18	19	22	
	≥95	79	13.6	3.6	8	10	11	13	16	19	22	
	Overall	280	14.3	3.9	9	10	12	14	17	20	22	
<i>Letter F Fluency</i> Total correct	90-91	68	12.3	4.0	6	8	10	13	14	18	20	.12±.10 / 1.22 / .22
	92-94	96	12.7	3.9	7	8	10	13	16	17	19	
	≥95	65	12.8	4.2	7	7	10	12	15	19	20	
	Overall	229	12.6	4.0	7	8	10	12	15	18	20	
<i>CVLT-II SF</i> Trial 1 Number of words	90-91	73	5.0	1.5	2	3	4	5	6	7	7	-.07±.04 / -1.91 / .06
	92-94	107	5.0	1.6	2	3	4	5	6	7	7	
	≥95	70	4.4	1.4	2	3	4	4	5	7	7	
	Overall	250	4.8	1.5	2	3	4	5	6	7	7	

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Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
Trial 4 Number of words	90-91	72	8.0	1.1	5	7	7	8	9	9	9	-.08±.03 /-2.61 /<.01
	92-94	106	7.9	1.2	5	6	7	8	9	9	9	
	≥95	70	7.3	1.2	5	5	7	8	8	9	9	
	Overall	248	7.7	1.2	5	6	7	8	9	9	9	
Sum Trials1-4 Number of words	90-91	72	27.6	4.4	19	22	25	28	31	33	34	-.30±.11 /-2.70 /<.01
	92-94	106	27.3	4.3	19	21	25	28	30	32	33	
	≥95	70	25.0	4.6	17	20	21	25	29	31	32	
	Overall	248	26.8	4.5	19	20	24	27	30	32	33	
Short Delay Recall Number of words	90-91	72	7.7	1.4	5	6	7	8	9	9	9	-.10±.03 /-2.80 /<.01
	92-94	106	7.5	1.4	5	5	7	8	9	9	9	
	≥95	70	6.8	1.4	5	5	6	7	8	9	9	
	Overall	248	7.4	1.4	5	5	7	8	9	9	9	
Long Delay Recall Number of words	90-91	71	7.4	1.7	5	5	7	8	9	9	9	-.21±.05 /-4.60 /<.01
	92-94	105	6.9	1.8	3	4	6	7	8	9	9	
	≥95	70	5.7	2.1	2	3	5	6	7	8	9	
	Overall	246	6.7	2.0	3	4	6	7	8	9	9	
<i>Trail Making Test A</i>												.47±.60 / .79 / .43
Seconds	90-91	71	58.1	26.6	109	87	71	48	39	36	31	
	92-94	93	55.3	18.5	87	80	65	51	43	33	30	
	≥95	51	58.1	19.0	90	84	66	57	44	38	33	
	Overall	215	56.9	21.6	90	83	69	51	42	35	31	
<i>Trail Making Test B</i>												.73±1.84 / .40 / .69
Seconds	90-91	58	145.3	60.9	291	231	185	139	104	70	62	
	92-94	79	143.1	57.9	257	220	173	128	104	83	75	
	≥95	38	147.0	42.7	248	230	166	144	120	98	94	
	Overall	175	144.7	55.7	255	220	172	134	105	83	71	
<i>Trail Making Test C</i>												.12±.36 / .33 / .74
Seconds	90-91	68	25.6	9.5	45	39	34	23	18	15	13	
	92-94	88	27.4	13.7	50	45	35	23	18	14	13	
	≥95	47	25.8	12.5	49	40	28	23	18	14	13	
	Overall	203	26.4	12.1	48	42	33	23	18	14	13	

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Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	$B \pm SE / t / p^c$
<i>Digit Span</i>												
<i>Forward + Backwards</i>	90-91	56	14.5	3.4	10	10	12	14	16	19	22	.17±.08 /2.24 / .03
Total score	92-94	72	14.6	2.4	11	12	13	14	16	17	19	
	≥95	46	15.5	2.6	11	11	14	16	17	19	20	
	Overall	174	14.8	2.8	11	11	13	15	16	18	20	
<i>Clock Drawing</i>												
Total score	90-91	76	6.0	1.7	4	4	5	6	8	8	8	-.13±.04 /-2.97 /<.01
	92-94	101	6.0	1.7	3	4	5	6	8	8	8	
	≥95	63	5.1	1.9	2	3	4	5	7	8	8	
	Overall	240	5.7	1.8	3	3	4	6	7	8	8	
<i>CERAD Construction</i>												
Total score	90-91	67	9.0	1.4	6	7	8	9	10	10	11	-.02±.03 /-.71 / .48
	92-94	89	9.4	1.3	7	8	8	10	10	11	11	
	≥95	56	9.1	1.0	8	8	8	9	10	10	11	
	Overall	212	9.2	1.3	7	8	8	9	10	11	11	

Notes: MMSE – Mini-Mental State Examination, 3MS - Modified Mini-Mental State Exam, BNT-Short – Boston Naming Test – Short Form (15 items), CVLT-II SF – California Verbal Learning Test-II Short Form, CERAD – The Consortium to Establish a Registry for Alzheimer’s Disease.

MMSE and 3MS were used in determination of cognitive status.

^aIn years

^bNumber of participants does not always total 403 as not all the participants completed all the tests

^c $B \pm SE / t / p$ – Parameter Estimate±Standard Error /t-value /p-value from linear regression analysis with age as a continuous variable

Supplemental Table 2. Raw neuropsychological test scores (mean, standard deviation, percentiles) for men by age group

Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B</i> ± <i>SE</i> / <i>t</i> / <i>p</i> ^c
<i>MMSE</i> Total score	90-91	38	28.0	1.7	23	26	27	28	29	30	30	-.18±.07 / -2.59 / .01
	92-94	49	27.4	2.0	23	24	27	28	29	30	30	
	≥95	33	27.0	2.0	22	24	26	27	29	29	29	
	Overall	120	27.5	1.9	23	25	27	28	29	30	30	
<i>3MS</i> Total score	90-91	37	94.8	3.4	88	89	93	95	98	98	99	-.32±.18 / -1.80 / .07
	92-94	46	92.9	5.3	82	87	89	92	98	99	99	
	≥95	31	92.8	4.9	83	84	91	95	96	97	98	
	Overall	114	93.5	4.7	83	87	91	95	97	98	99	
<i>BNT-Short</i> Total correct	90-91	32	13.5	1.3	11	12	13	14	14	15	15	-.09±.07 / -1.27 / .20
	92-94	37	13.2	1.8	9	11	13	14	15	15	15	
	≥95	23	12.8	1.7	10	11	12	13	14	15	15	
	Overall	212	12.6	2.0	10	11	12	14	14	15	15	
<i>Animal Fluency</i> Total correct	90-91	38	15.2	4.3	9	10	12	15	17	21	25	-.21±.16 / -1.32 / .19
	92-94	49	15.1	4.0	10	10	12	16	18	21	23	
	≥95	33	14.4	4.7	8	9	11	14	18	20	22	
	Overall	120	15.0	4.3	9	10	12	15	18	21	23	
<i>Letter F Fluency</i> Total correct	90-91	36	14.0	4.4	6	8	12	15	17	19	22	-.22±.18 / -1.26 / .21
	92-94	42	12.6	3.9	7	7	9	13	15	17	19	
	≥95	28	12.6	5.1	4	6	10	12	16	22	22	
	Overall	106	13.1	4.4	6	7	10	13	16	19	21	
<i>CVLT-II SF</i> Trial 1 Number of words	90-91	34	4.7	1.4	2	3	4	5	5	7	7	-.12±.06 / -2.14 / .03
	92-94	43	4.7	1.4	3	3	4	5	5	6	7	
	≥95	26	4.2	1.2	2	3	3	4	5	6	6	
	Overall	103	4.6	1.4	2	3	4	5	5	6	7	
Trial 4 Number of words	90-91	34	7.5	1.1	5	6	7	8	8	9	9	-.12±.05 / -2.30 / .02
	92-94	43	7.4	1.2	5	6	6	8	8	9	9	
	≥95	26	7.0	1.5	5	5	6	7	8	9	9	

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Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
	Overall	103	7.3	1.3	5	6	6	7	8	9	9	
Sum Trials 1-4 Number of words	90-91	34	25.5	4.5	17	19	22	26	29	31	32	-.31±.18 /-1.77 /.08
	92-94	43	25.7	4.4	18	20	23	26	29	32	32	
	≥95	26	24.2	3.9	18	19	21	24	27	29	30	
	Overall	103	25.3	4.3	18	19	22	26	29	31	32	
Short Delay Recall Number of words	90-91	34	6.9	1.5	4	5	6	7	8	9	9	-.09±.06 /-1.45 /.15
	92-94	43	6.9	1.2	5	6	6	7	8	9	9	
	≥95	26	6.6	1.9	3	4	5	7	8	9	9	
	Overall	103	6.8	1.5	4	5	6	7	8	9	9	
Long Delay Recall Number of words	90-91	34	5.9	2.0	3	3	4	6	8	8	8	.01±.08 /.14 /.89
	92-94	43	6.1	1.8	3	5	5	6	7	8	9	
	≥95	26	5.8	2.3	1	3	5	6	8	8	8	
	Overall	103	5.9	2.0	3	3	5	6	7	8	9	
<i>Trail Making Test A</i>												2.32±1.15 /2.02 /.05
Seconds	90-91	31	55.0	21.7	97	92	70	49	39	32	27	
	92-94	37	55.4	19.8	92	86	66	50	40	34	28	
	≥95	27	73.6	40.7	161	154	103	59	45	38	34	
	Overall	95	60.5	28.8	123	97	71	53	41	34	28	
<i>Trail Making Test B</i>												4.87±2.61 /1.86 /.07
Seconds	90-91	29	128.7	49.6	211	204	143	121	93	67	64	
	92-94	30	136.1	49.5	240	213	162	122	101	81	68	
	≥95	21	160.9	85.3	273	250	215	127	84	77	74	
	Overall	80	139.9	61.5	247	228	181	123	96	72	67	
<i>Trail Making Test C</i>												1.22±.46 /2.62 /.01
Seconds	90-91	31	22.0	10.4	37	31	25	20	15	13	11	
	92-94	36	22.1	8.9	37	32	26	21	17	12	10	
	≥95	23	29.6	13.6	55	48	40	26	17	15	14	
	Overall	90	24	11.1	48	38	28	21	17	13	11	
<i>Digit Span</i>												-0.25±.16 /-1.59 /.12
Forward + Backwards Total score	90-91	30	16.3	2.9	12	13	14	16	18	22	22	
	92-94	31	15.0	3.8	10	11	13	14	16	19	24	

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Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
	≥95	19	14.9	2.9	11	11	12	14	16	20	20	
	Overall	80	15.5	3.3	11	12	13	15	17	20	22	
<i>Clock Drawing</i>												<i>-.08±.07 /-1.17 /.24</i>
Total score	90-91	34	6.7	1.6	3	4	6	7	8	8	8	
	92-94	40	5.8	1.9	3	3	4	6	7	8	8	
	≥95	27	5.9	1.8	3	4	5	6	8	8	8	
	Overall	101	6.1	1.8	3	4	5	7	8	8	8	
<i>CERAD Construction</i>												<i>.02±.05 /.37 /.72</i>
Total score	90-91	32	9.1	1.3	7	7	8	9	10	11	11	
	92-94	36	9.4	1.2	7	8	9	10	10	11	11	
	≥95	25	9.3	1.3	7	7	8	10	10	11	11	
	Overall	93	9.3	1.3	7	7	8	9	10	11	11	

Notes: MMSE – Mini-Mental State Examination, 3MS - Modified Mini-Mental State Exam, BNT-Short – Boston Naming Test – Short Form (15 items), CVLT-II SF – California Verbal Learning Test-II Short Form, CERAD – The Consortium to Establish a Registry for Alzheimer’s Disease. MMSE and 3MS were used in determination of cognitive status.

^aIn years
^bNumber of participants does not always total 403 as not all the participants completed all the tests
^c*B±SE /t /p* – Parameter Estimate±Standard Error /t-value /p-value from linear regression analysis with age as a continuous variable

Tables with optional scores (performance on subtests and training samples of tests, cued responses, and errors) by cognitive domain, entire sample by age group

Supplemental Table 3. Raw neuropsychological test scores that index language (mean, standard deviation, percentiles) by age group.

Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B</i> ± <i>SE</i> / <i>t</i> / <i>p</i> ^c
<i>BNT-Short</i>												
Number correct with semantic cue	90-91	97	0.3	0.6	0	0	0	0	0	1	2	.02±.02 / 1.60 / .11
	92-94	131	0.3	0.7	0	0	0	0	1	1	2	
	≥95	76	0.4	0.7	0	0	0	0	1	1	2	
	Overall	304	0.3	0.7	0	0	0	0	0	1	2	
Number correct with phonemic cue	90-91	97	1.1	1.2	0	0	0	1	2	3	3	.05±.03 / 1.81 / .07
	92-94	131	1.2	1.3	0	0	0	1	2	3	4	
	≥95	76	1.4	1.3	0	0	0	1	3	3	4	
	Overall	304	1.2	1.3	0	0	0	1	2	3	4	
Number of semantic paraphasias	90-91	97	1.8	1.3	4	4	3	1	1	0	0	.18±.03 / 5.05 / <.01
	92-94	131	2.1	1.7	5	4	3	2	1	0	0	
	≥95	76	2.7	1.5	5	4	4	3	2	0	0	
	Overall	304	2.1	1.6	5	4	3	2	1	0	0	
Number of circumlocutions	90-91	97	0.8	1.2	3	2	1	0	0	0	0	.04±.03 / 1.39 / .17
	92-94	131	0.9	1.1	3	3	1	0	0	0	0	
	≥95	76	1.2	1.1	4	3	2	1	0	0	0	
	Overall	304	0.9	1.2	3	3	1	1	0	0	0	
Number of intrusions												
<.01±<.01 / 1.01 / .31												

Melikyan-Neuropsychological Test Norms for 90+												
Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
	90-91	97	0.1	0.2	1	0	0	0	0	0	0	
	92-94	131	0.1	0.4	1	1	0	0	0	0	0	
	≥95	76	0.1	0.3	1	1	0	0	0	0	0	
	Overall	304	0.1	0.3	1	1	0	0	0	0	0	
Number of perseverations												
	90-91	97	0.0	0.0	0	0	0	0	0	0	0	
	92-94	131	0.0	0.1	0	0	0	0	0	0	0	
	≥95	76	0.0	0.0	0	0	0	0	0	0	0	
	Overall	304	0.0	0.1	0	0	0	0	0	0	0	
Number of visual misidentifications												
	90-91	97	0.2	0.5	1	1	0	0	0	0	0	
	92-94	131	0.3	0.6	2	1	0	0	0	0	0	
	≥95	76	0.4	0.7	2	1	1	0	0	0	0	
	Overall	304	0.3	0.6	2	1	0	0	0	0	0	
<i>Animal Fluency</i>												
Number of perseverations												
	90-91	122	0.6	0.9	3	2	1	0	0	0	0	
	92-94	166	0.7	1.2	3	2	1	0	0	0	0	
	≥95	112	0.9	1.2	4	3	1	0	0	0	0	
	Overall	400	0.7	1.1	3	2	1	0	0	0	0	
Number of intrusions												
	90-91	122	0.2	0.6	1	1	0	0	0	0	0	
	92-94	166	0.2	0.6	2	1	0	0	0	0	0	
	≥95	112	0.2	0.8	1	0	0	0	0	0	0	
	Overall	400	0.2	0.7	2	1	0	0	0	0	0	
<i>Letter F Fluency</i>												

Melikyan-Neuropsychological Test Norms for 90+												
Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
Number of perseverations	90-91	104	1.0	1.5	4	3	2	0	0	0	0	
	92-94	138	1.0	1.4	4	3	1	1	0	0	0	
	≥95	93	1.2	1.5	4	3	2	1	0	0	0	
	Overall	335	1.1	1.5	4	3	2	1	0	0	0	
Number of intrusions	90-91	104	0.1	0.4	1	0	0	0	0	0	0	.02±<.01 /1.67 /.10
	92-94	138	0.1	0.4	1	1	0	0	0	0	0	
	≥95	93	0.2	0.5	1	0	0	0	0	0	0	
	Overall	335	0.1	0.4	1	1	0	0	0	0	0	

Notes: BNT-Short – Boston Naming Test – Short Form (15 items)

^aIn years

^bNumber of participants does not always total 403 as not all the participants completed all the tests

^c*B±SE /t /p* – Parameter Estimate±Standard Error /t-value /p-value from linear regression analysis with age as a continuous variable

Supplemental Table 4. Raw neuropsychological test scores that index verbal memory (mean, standard deviation, percentiles) by age group.

Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	$B \pm SE / t / p^c$
<i>CVLT-II SF</i>												-0.08±.03 / -2.69 / <.01
Trial 2	90-91	107	6.8	1.5	4	5	6	7	8	9	9	
Number of words	92-94	150	6.8	1.2	5	5	6	7	8	8	9	
	≥95	96	6.3	1.5	4	4	5	6	7	8	9	
	Overall	353	6.7	1.4	4	5	6	7	8	8	9	
Trial 3												-0.05±.03 / -1.73 / .08
Number of words	90-91	107	7.4	1.3	5	5	7	8	8	9	9	
	92-94	150	7.4	1.2	5	6	7	8	8	9	9	
	≥95	96	7.0	1.4	5	5	6	7	8	9	9	
	Overall	353	7.3	1.3	5	5	6	7	8	9	9	
Long Delay Cued Recall												-0.14±.04 / -3.94 / <.01
Number of words	90-91	105	7.2	1.6	4	5	6	7	9	9	9	
	92-94	148	7.0	1.7	4	5	6	7	8	9	9	
	≥95	96	6.4	1.6	3	4	6	6	8	8	9	
	Overall	349	6.9	1.7	4	4	6	7	8	9	9	
Number of free recall intrusions												<.01±.04 / .05 / .96
	90-91	105	0.8	2.2	5	2	0	0	0	0	0	
	92-94	149	0.7	1.3	3	2	1	0	0	0	0	
	≥95	96	0.8	1.4	4	2	1	0	0	0	0	
	Overall	350	0.8	1.7	4	2	1	0	0	0	0	
Number of cued recall intrusions												.02±.02 / 1.00 / .32
	90-91	105	0.3	0.8	1	1	0	0	0	0	0	
	92-94	148	0.4	1.2	2	1	1	0	0	0	0	
	≥95	96	0.4	0.7	2	1	1	0	0	0	0	

Melikyan-Neuropsychological Test Norms for 90+												
Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
	Overall	349	0.4	1.0	2	1	1	0	0	0	0	
Number of total repetitions												<.01±.04 /.20 /.84
	90-91	105	1.3	1.6	4	3	2	1	0	0	0	
	92-94	149	1.7	2.4	6	4	2	1	0	0	0	
	≥95	96	1.5	1.9	5	4	2	1	0	0	0	
	Overall	350	1.5	2.1	5	4	2	1	0	0	0	
Number of long delay recognition hits												-.05±.02 /-2.08 /.04
	90-91	105	8.4	1.2	5	7	8	9	9	9	9	
	92-94	148	8.3	1.0	6	7	8	9	9	9	9	
	≥95	96	8.1	1.0	6	7	8	8	9	9	9	
	Overall	349	8.3	1.1	6	7	8	9	9	9	9	
Number of long delay recognition false positives												.03±.03 /.91 /.37
	90-91	105	0.9	1.2	4	2	1	0	0	0	0	
	92-94	148	1.1	1.5	3	2	1	1	0	0	0	
	≥95	96	1.1	1.1	4	2	2	1	0	0	0	
	Overall	349	1.0	1.3	4	2	1	1	0	0	0	

Notes: CVLT-II SF – California Verbal Learning Test-II Short Form

^aIn years

^bNumber of participants does not always total 403 as not all the participants completed all the tests

^c*B±SE /t /p* – Parameter Estimate±Standard Error /t-value /p-value from linear regression analysis with age as a continuous variable

Supplemental Table 5. Raw neuropsychological test scores that index executive function and psychomotor speed (mean, standard deviation, percentiles) by age group.

Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
<i>Trail Making Test A Sample</i>												.12±.13 /.93 /.35
Seconds	90-91	83	7.4	4.8	14	12	9	7	5	4	3	
	92-94	88	7.2	3.2	12	11	10	7	5	4	3	
	≥95	55	8.6	6.6	24	16	9	7	5	4	3	
	Overall	226	7.6	4.8	15	12	9	7	5	4	3	
<i>Trail Making Test A Sample</i>												<-.01±<.01 /-.35 /.72
Number of errors	90-91	83	0.0	0.0	0	0	0	0	0	0	0	
	92-94	88	0.0	0.2	0	0	0	0	0	0	0	
	≥95	55	0.0	0.0	0	0	0	0	0	0	0	
	Overall	226	0.0	0.1	0	0	0	0	0	0	0	
<i>Trail Making Test A</i>												<.01±.01 /.82 /.42
Number of errors	90-91	102	0.2	0.4	1	1	0	0	0	0	0	
	92-94	130	0.2	0.5	1	1	0	0	0	0	0	
	≥95	78	0.2	0.5	1	1	0	0	0	0	0	
	Overall	310	0.2	0.5	1	1	0	0	0	0	0	
<i>Trail Making Test B Sample</i>												.09±.37 /.24 /.81
Seconds	90-91	81	15.7	11.5	43	31	19	12	8	7	6	
	92-94	87	16.0	14.5	44	29	18	11	8	5	5	
	≥95	52	16.6	14.8	62	32	18	12	8	6	5	
	Overall	220	16.0	13.5	45	31	19	11	8	6	5	
<i>Trail Making Test B Sample</i>												<.01±.02 /.15 /.88
Number of errors	90-91	81	0.3	0.7	1	1	1	0	0	0	0	
	92-94	87	0.3	0.6	1	1	1	0	0	0	0	
	≥95	52	0.4	0.8	3	1	1	0	0	0	0	
	Overall	220	0.4	0.7	2	1	1	0	0	0	0	
<i>Trail Making Test B</i>												.01±.03 /.47 /.64
Number of errors	90-91	87	0.9	1.1	3	3	1	1	0	0	0	
	92-94	109	0.9	1.2	3	2	1	1	0	0	0	
	≥95	59	1.1	1.1	3	3	2	1	0	0	0	
	Overall	255	1	1.1	3	2	1	1	0	0	0	
<i>Trail Making Test C Sample</i>												.05±.11 /.46 /.65
Seconds	90-91	80	6.2	5.0	11	9	7	5	4	3	3	

Melikyan-Neuropsychological Test Norms for 90+												
Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
	92-94	86	6.0	3.7	14	11	7	5	4	3	3	
	≥95	52	6.4	3.3	12	10	8	5	4	3	3	
	Overall	218	6.2	4.1	13	10	7	5	4	3	3	
<i>Trail Making Test C Sample</i>												
Number of errors	90-91	80	0.0	0.1	0	0	0	0	0	0	0	<i><.01±<.01 / .79 / .43</i>
	92-94	86	0.1	0.3	1	0	0	0	0	0	0	
	≥95	52	0.1	0.2	1	0	0	0	0	0	0	
	Overall	218	0.0	0.2	0	0	0	0	0	0	0	
<i>Trail Making Test C</i>												
Number of errors	90-91	99	0.0	0.2	0	0	0	0	0	0	0	<i>.01±.01 / 1.44 / .15</i>
	92-94	124	0.1	0.6	1	0	0	0	0	0	0	
	≥95	70	0.1	0.4	1	1	0	0	0	0	0	
	Overall	293	0.1	0.4	1	0	0	0	0	0	0	

Notes: ^aIn years

^bNumber of participants does not always total 403 as not all the participants completed all the tests

^c*B±SE /t /p* – Parameter Estimate±Standard Error /t-value /p-value from linear regression analysis with age as a continuous variable

Supplemental Table 6. Raw neuropsychological test scores that index attention/working memory (mean, standard deviation, percentiles) by age group

Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B±SE /t /p^c</i>
<i>Digit Span Forward</i>												.02±.05 / .37 / .71
Total score	90-91	86	9.3	2.0	6	7	8	9	10	12	13	
	92-94	10	9.0	1.9	7	7	8	8	10	12	12	
		5										
	≥95	65	9.2	1.6	7	7	8	9	10	11	12	
	Overall	25	9.2	1.9	7	7	8	9	10	12	13	
		6										
<i>Digit Span Forward</i>												.01±.03 / .42 / .67
Maximum number of digits	90-91	75	6.1	1.1	4	5	5	6	7	8	8	
	92-94	80	5.9	1.0	5	5	5	6	6	7	8	
	≥95	60	6.1	1.0	5	5	5	6	7	7	8	
	Overall	21	6.0	1.0	5	5	5	6	7	7	8	
		5										
<i>Digit Span Backwards</i>												.05±.04 / 1.14 / .25
Total score	90-91	86	5.8	1.8	4	4	5	6	7	8	9	
	92-94	10	5.7	1.7	3	4	5	6	7	7	8	
		3										
	≥95	65	6.1	1.6	4	4	5	6	7	8	9	
	Overall	25	5.9	1.7	4	4	5	6	7	8	9	
	4											
<i>Digit Span Backwards</i>												.04±.03 / 1/28 / .20
Maximum number of digits	90-91	75	4.3	1.1	3	3	4	4	5	6	6	
	92-94	80	4.2	1.1	3	3	3	4	5	5	6	

Melikyan-Neuropsychological Test Norms for 90+										
≥95	60	4.6	1.0	3	3	4	4	5	6	6
Overall	21	4.3	1.1	3	3	4	4	5	6	6
	5									

Notes: ^aIn years

^bNumber of participants does not always total 403 as not all the participants completed all the tests

^c $B \pm SE$ / t / p – Parameter Estimate \pm Standard Error / t -value / p -value from linear regression analysis with age as a continuous variable

Supplemental Table 7. Raw neuropsychological test scores that index construction/visual-spatial (mean, standard deviation, percentiles) by age group

Test	Age group ^a	No ^b	Mean	SD	5%	10%	25%	50%	75%	90%	95%	<i>B</i> ± <i>SE</i> / <i>t</i> / <i>p</i> ^c
<i>Clock Drawing</i>												-.08±.03 / -2.86 / <.01
Hands	90-91	110	2.9	1.3	1	1	2	3	4	4	4	
	92-94	141	2.6	1.3	0	1	2	3	4	4	4	
	≥95	90	2.2	1.4	0	0	1	2	4	4	4	
	Overall	341	2.6	1.3	0	1	2	3	4	4	4	
<i>Clock Drawing</i>												-.04±.02 / -2.11 / .04
Numbers	90-91	110	3.3	0.9	2	2	3	4	4	4	4	
	92-94	141	3.3	0.8	2	2	3	3	4	4	4	
	≥95	90	3.1	1.0	1	2	3	3	4	4	4	
	Overall	341	3.2	0.9	2	2	3	3	4	4	4	
<i>CERAD Construction</i>												<.01±<.01 / .32 / .75
Circle	90-91	99	2.0	0.2	2	2	2	2	2	2	2	
	92-94	127	2.0	0.2	2	2	2	2	2	2	2	
	≥95	83	2.0	0.1	2	2	2	2	2	2	2	
	Overall	309	2.0	0.2	2	2	2	2	2	2	2	
<i>CERAD Construction</i>												<.01±<.01 / .90 / .37
Diamond	90-91	99	2.9	0.4	2	3	3	3	3	3	3	
	92-94	127	2.9	0.3	2	3	3	3	3	3	3	
	≥95	82	3.0	0.2	3	3	3	3	3	3	3	
	Overall	308	2.9	0.3	2	3	3	3	3	3	3	
<i>CERAD Construction</i>												<-.01±<.01 / -.95 / .34
Two rectangles	90-91	100	1.9	0.4	1	1	2	2	2	2	2	
	92-94	126	1.9	0.3	1	1	2	2	2	2	2	

		Melikyan-Neuropsychological Test Norms for 90+									
	≥95	82	1.8	0.4	1	1	2	2	2	2	2
	Overall	308	1.9	0.4	1	1	2	2	2	2	2
<i>CERAD Construction</i>		-.01±.02 /-.56 /.58									
	Cube										
	90-91	99	2.3	1.0	1	1	1	2	3	4	4
	92-94	125	2.6	1.0	1	1	2	3	3	4	4
	≥95	81	2.4	1.0	1	1	2	2	3	4	4
	Overall	305	2.4	1.0	1	1	2	3	3	4	4

Notes: CERAD – The Consortium to Establish a Registry for Alzheimer’s Disease

^aIn years

^bNumber of participants does not always total 403 as not all the participants completed all the tests

^c $B \pm SE / t / p$ – Parameter Estimate ± Standard Error / t -value / p -value from linear regression analysis with age as a continuous variable