

Background

- Tests of notable public events (news events), are useful tools for measuring memory for the past in the context of brain injury or neurodegenerative disease.^{1,2,3,4}
- These tests are thought to reflect semantic memory because they query memory for facts and knowledge about the world.
- Nevertheless, these types of tests can also reflect other domains of cognition.^{5,6}

Aim

- Understand how a novel news event memory relates to traditional neuropsychological measures of cognitive domains

Methods

Participants

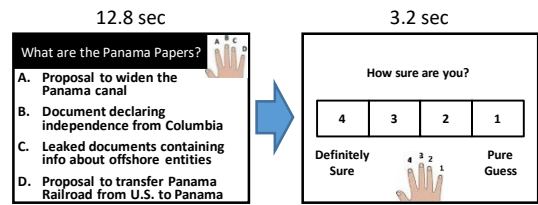
- 65 years old or older
- Exclusions: dementia, major psychiatric or neurological diagnosis

Measures

Comprehensive Neuropsychological Battery

Retrograde Memory News Events Test (RM-NET)

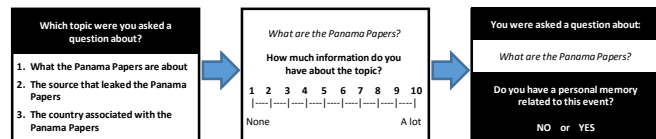
- 223 questions about transient news events (collected 2018-2020)
- 15 time periods covering 64 years (2017 – 1953)



Subsequent Recognition Memory Test for the RM-NET

For News Events from the last 30 years (2017 – 1988):

- Subsequent memory for topic of news event question
- Subjective estimate of one's knowledge about event
- Presence of autobiographical memory associated with event



Participant Characteristics and Neuropsychological Tests

Demographic Information

	Mean (SD)	Count (%)
N	52	
Age	72.9 (6.1)	
Age Range	65 - 91	
Education	15.6 (2.3)	
		Race
		American Indian 2 (3.8%)
		Asian 2 (3.8%)
		Black 4 (7.7%)
		Pacific Islander 1 (1.9%)
		White 46 (88.5%)
		Other 0 (0%)
Gender	33 (63.5%) Male	
Veteran	39 (75%)	
		Ethnicity
		4 (7.7%) Hispanic

Cognition, Functional Abilities, and Emotional Health

	Mean Raw Score (SD)	Mean Z-score (SD)
Global Cognition:		
Mini-Mental State Exam	28.5 (1.4)	
Episodic Memory:		
CVLT-II: Trials 1-5 Total Recall	41.3 (12.2)	
CVLT-II: Recognition (d')	2.5 (0.9)	
CVLT-II Long Delay Free Recall	8.2 (3.9)	0.16 (0.91)
WMS-IV Logical Memory: Immediate Recall	29.6 (9.6)	
WMS-IV Logical Memory: Delayed Recall	18.8 (9.0)	
WMS IV Visual Repro: Immediate Recall	31.8 (6.8)	
WMS IV Visual Repro: Delayed Recall	21.9 (9.8)	
Semantic Memory/Language:		
DKEFS: Category Fluency	41.4 (10.6)	
DKEFS: Letter Fluency	42.4 (12.0)	0.30 (0.72)
Multilingual Naming Test (MINT)	29.9 (2.4)	
Multilingual Aphasia Exam: Token Test	42.3 (2.0)	
Executive Functions:		
WAIS-IV Digit Span (Backward)	9.5 (3.6)	
D-KEFS Fluency Switching	12.8 (4.7)	0.09 (0.65)
D-KEFS Trail Making Cond 4 (equiv. to Trail B)	103.3 (49.5)	
Wisconsin Card Sorting: Categories	2.2 (1.6)	
Wisconsin Card Sorting: Perseverative Errors	11.0 (6.8)	
Attention/Processing Speed:		
D-KEFS Trail Making Cond 2 (equiv. to Trail A)	42.0 (20.4)	
WAIS-IV Digit Span (Sequencing)	7.9 (1.7)	0.10 (0.52)
WAIS-IV Digit Span (Forward)	10.5 (2.3)	
Digit Vigilance Test: Total Time	468.7 (121.0)	
Digit Vigilance Test: Errors	9.0 (7.5)	
Visuospatial Functions:		
Clock Drawing Test Command	9.1 (1.0)	
Clock Drawing Test Copy	9.7 (0.5)	
Overlapping Pentagons	1.6 (1.0)	0.19 (0.37)
WASI-II Block Design	30.0 (10.5)	
WMS-IV Visual Reproduction: Copy	41.6 (1.9)	
Functional Abilities:		
Independent Living Scale: Health and Safety	37.5 (1.9)	
Independent Living Scale: Managing Money	31.9 (2.3)	
Functional Activities Questionnaire (FAQ)	0.9 (1.7)	
Emotional Health:		
Geriatric Depression Inventory	1.02 (0.201)	

Cognitive Composite: mean of Z-scores across domains 0.17 (0.50)

Results Distribution of Cognitive Measures

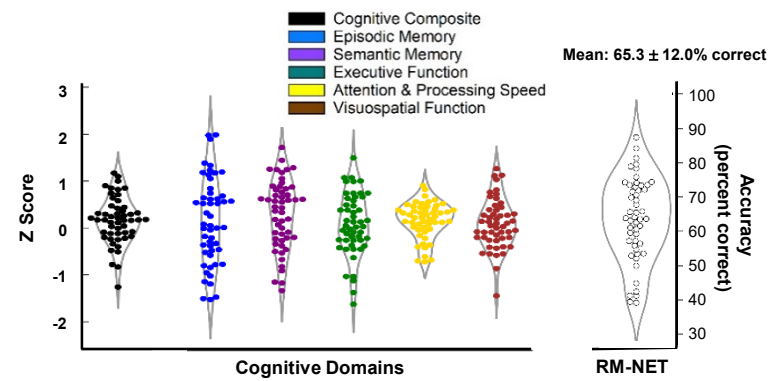


Fig 1. There was substantial variability in the cognitive measures across participants.

Correlations between Cognitive Domains and RM-NET

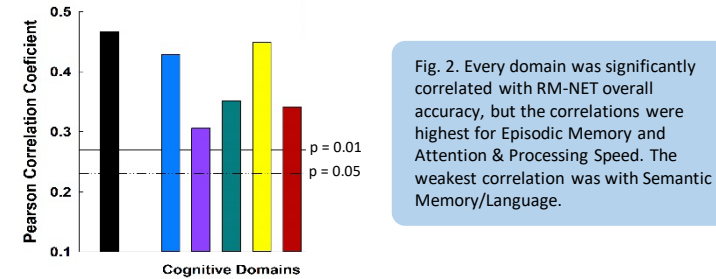


Fig 2. Every domain was significantly correlated with RM-NET overall accuracy, but the correlations were highest for Episodic Memory and Attention & Processing Speed. The weakest correlation was with Semantic Memory/Language.

Correlations between Cognitive Domains and RM-NET time periods

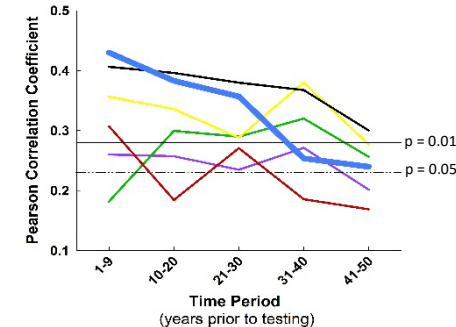


Fig 3. There was a monotonic decrease in the correlation between RM-NET accuracy and Episodic Memory as a function of the time period when the news event occurred.

Correlations between Cognitive Domains and Subsequent Recognition Memory Test for the RM-NET

Mean: 80.4 ± 13.9% correct

Which topic were you asked a question about?

1. What the Panama Papers are about
2. The source that leaked the Panama Papers
3. The country associated with the Panama Papers

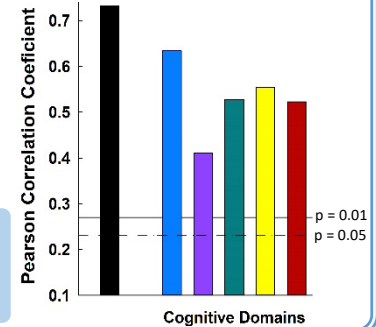


Fig 4. As expected, this traditional recognition memory test was most highly correlated with measures of Episodic Memory.

Summary and Conclusions

- Overall accuracy on the RM-NET as well as accuracy of recent time periods were both highly correlated with Episodic Memory, while the correlations were lower for remote time periods. This finding is consistent with the idea that recent news event memory is hippocampus-dependent while remote memory is not.
- Overall RM-NET accuracy was also correlated with Attention and Processing Speed and the strength of the relationship was steady across time periods. This finding likely reflects the high demand for attention and processing speed because of the time limit imposed on the test.
- Overall RM-NET accuracy was least correlated with Semantic Memory/Language and the strength of the relationship was steady across time periods. This finding likely reflects the RM-NET measuring a component of semantic memory that is not measured by traditional tests.
- Specifically, traditional semantic memory/language tests measure long-established and frequently encountered knowledge about the world (e.g., naming objects). By contrast, the RM-NET measures knowledge about news events that had only limited news exposure and that range in memory age from 1-50 years.
- The RM-NET subsequent memory test provides an opportunity to obtain an additional measure of Episodic Memory.

Future Directions

- Examine RM-NET accuracy in individuals with normal cognition or mild cognitive impairment (MCI).
- Determine if the RM-NET can help distinguish normal and abnormal cognition better than traditional tests.

References

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