Greenberg et al., The Relationship Between Attention and Working Memory in Healthy

The Relationship Between Attention and Working Memory in Healthy Individuals

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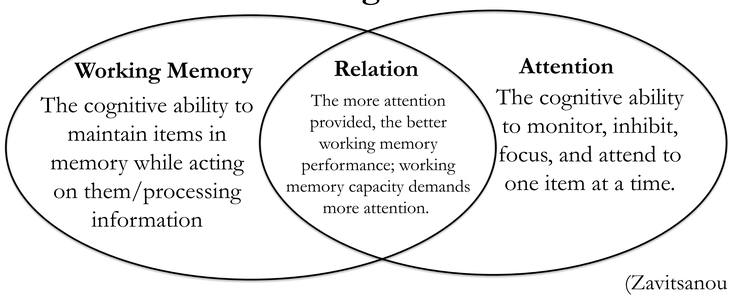
Background



(Zavitsanou 2021)

Objectives

Research Question: Does performance on tasks of non-verbal attention and non-verbal working memory impact performance on lexical retrieval for both young adults and older adults?

Hypothesis: Attention and working memory will have additive impact on lexical retrieval. The impact will be most significant for older individuals.

Next Steps

- ❑ Submit an IRB
- ❑ Recruit participants – healthy young and older individuals
- ❑ Present study via online Gorilla software
- ❑ Collect responses
- ❑ Analyze using paired samples t-tests
- ❑ Use these pilot results to create a study focusing on clinical populations.

Literature Review

Non-Verbal		Verbal		Non-Verbal	
Attention	N-Back Task	Attention	Reading Span	Attention	Span Task
Population: 59 males **Mean age**: 22 years old		**Population**: 3082 participants **Mean age:** 19.3 years old		**Population**: 82 males **Mean age**: 25.5 years old	
(Li Lin 2020)		(Unsworth 2021)		(Tichenor 2022)	

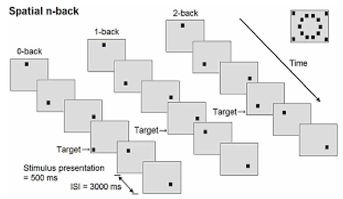
Findings:

1. Older adults perform better than younger adults on tasks of sustained attention, but worse on tasks of divided attention (Kemper et al., 2011).
2. Older adults perform worse than younger adults on tasks of working memory (Dobbs & Rule, 1989).
3. Lexical retrieval has been implicated in working memory (Christensen & Wright, 2010).

Limitations of Previous Studies:

- Representative groups: most studies have young participants
  - Ex. Li Lin (2020 Lin Lin (2020) = mean age of 22 years; Unsworth (2021) = mean age of 19.3 years; Tichenor (2022) = mean age of 25.5 years
- Large batteries of tests may include confounding variables
  1. Tasks that do not isolate non-verbal from verbal tasks
  2. Component of fatigue
  3. A lack of evaluation of the interaction of working memory and attention

Methodology



N-Back: Non-verbal test of working memory.
Blocks are used in lieu of letters or symbols to reduce lexical retrieval confound.

TEA: Test of everyday attention
Visual search for a test of sustained attention. No other subtests will be used as the other subtests have verbal components.

Accuracy and response time for nouns
BNT= 60 items

Accuracy and response time for verbs
VNT= 24 items

Participants:	Tasks:	Analysis:
N=60 HC Y.A N=30 HC O.A Matched for age, education, and SES	N-Back TEA BNT VNT Randomized Blocks	Paired T-test Within Subjects Design Comparing performance on tasks for both accuracy and response time.

Clinical Implications

1. Assessing an interaction between attention and working memory will provide information as to which component of executive function has more of an impact on lexical retrieval.
2. Treatment of lexical retrieval disorders could focus on the level of retrieval that is impacted to improve overall function.
3. Focus on executive function vs. lexical retrieval could explain why some individuals report difficulty in lexical retrieval while scoring WNL on tests of lexical retrieval.

Acknowledgements

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