The Relationship Between Adverse Childhood Experiences and Working Memory in Older Adults

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INTRODUCTION

- Adverse childhood experiences (ACE) are linked to poorer physical, emotional, and cognitive outcomes across the lifespan [1,2,3].

- The effect of early life adversity upon working memory (WM) remains unclear [4,5,6].

- The current study investigated whether performance in visual and auditory WM tasks is associated with childhood adversity in older adults.

TABLE 1. PARTICIPANT DEMOGRAPHICS

Variables	
Mean Age (SD)	70.69 (6.47)
Sex (% female)	73.5%
Mean Years of Education (SD)	15.63 (2.69)
Mean Montreal Cognitive Assessment (MoCA) score (SD)	26.21 (2.61)

METHODS

Participants
Data was collected as part of the Maine, Aging, Behavior, Learning, and Enrichment (M-ABLE) study at the University of Maine. The M-ABLE study is a community-based research study designed to recruit a socioeconomically diverse sample of 121 older adults.

Inclusion/Exclusion criteria
- Age < 55 years old
- History of neurological impairments, neurodegenerative disorders, recent stroke, or dementia
- Severe cognitive impairment defined by MoCA scores < 18 [7]
- Severe depression defined by Geriatric Depression Scale > 11 [8]

Measures
- Adverse Childhood Experiences (ACE) Questionnaire evaluated early life adversity [9]
- WAIS-IV Digit Span total was used to evaluate auditory WM [10]
- NIH Toolbox (NIHTB) List Sorting Working Memory Test was used to evaluate visual WM [11]
- The MoCA was used to evaluate global cognition [12]

Analyses
- Hierarchical multiple regression analyses investigated the relative contributions of age, education, MoCA, and ACE scores on visual WM and auditory WM.

TABLE 2. REGRESSION MODEL SUMMARIES

Model Summary	R	R²	Adj. R²	ΔR² =	Δdf
AUDITORY WORKING MEMORY					
1	.321	.103	.080	.103	114**
2	.324	.105	.074	.001	115
VISUAL WORKING MEMORY					
1	.451	.203	.183	.203	114**
2	.490	.240	.214	.037	115*

Model 1: Age, Education, MoCA
Model 2: Age, Education, MoCA, ACE
$p < .05^*$, $p < .01^{**}$

TABLE 3. NIHTB LIST SORTING TASK RESULTS

COEFFIICIENTS	
Predictors	**β**
Age	-.154
Education	.347*
Global Cognition	.241*
ACE	.216*

$p < .05^*$

RESULTS SUMMARY

- A hierarchical multiple regression revealed that ACE scores contributed to 3.7% of variance in visual WM performance after adjusting for age, education, and global cognition.

- ACE scores were not significantly associated with auditory WM.

- Age significantly contributed to the variance in visual WM performance

CONCLUSIONS

- ACE scores exhibited a domain-specific effect upon WM performance in older adults.

- Developing a better understanding of domain-specific effects on cognition in those with ACE could lead to improved understanding of underlying neurological mechanisms that may be negatively impacted by early life stress.

- This study was limited by its cross-sectional design.

- In the future, a longitudinal assessment of directional associations between these variables in accordance with a comparison of visuospatial and language functions and their corresponding brain regions in those who have experienced ACE should be performed.

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