Understanding the Female Advantage in Verbal Memory Among Individuals with Unimpaired Cognition and Mild Cognitive Impairment

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INTRODUCTION

Sex differences in cognitive abilities has been receiving increasing attention over the past decade. It has been frequently reported that females score better on verbal memory tasks than males.[1]

It is important to **account for sex differences when evaluating memory in older adults** and use sex specific norms to account for this memory advantage, especially when diagnosing memory impairment.[2]

PURPOSE

1. Examine sex differences in verbal memory scores in a sample of older adults.
2. Compare verbal memory performance between sexes among those with unimpaired cognition and mild cognitive impairment (MCI).

METHODS

Participants

Data was obtained from Program Project Grant 3 (P01 AG025204, Klunk, PI), a University of Pittsburgh collection of studies on vascular disease and Alzheimer's disease pathology in the transition to old age, including the HeartSCORE 500 Study (RF1 AG052525, Lopez, PI). Participants were excluded from analysis if there was missing information (date of birth, years of education, race, sex), if the did not complete neuropsychological testing, or if they did not receive a diagnosis.

Measures

The California Verbal Learning Test (CVLT) measures verbal learning and memory, with a 16 item, semantically related list of words.[3]

Participants get five learning trials with List A (Monday's list), one trial with List B (Tuesday's list), then asked to recall List A without cues.

After a 20-minute delay, participants are then asked to recall List A without cue, then complete a recognition task with items from List A, List B, and non-list items.

Verbal memory was measured using the raw total items recalled from List A after the 20-minute delay.

Analysis

Differences between groups was analyzed using ANOVA to account for demographic variables.

RESULTS

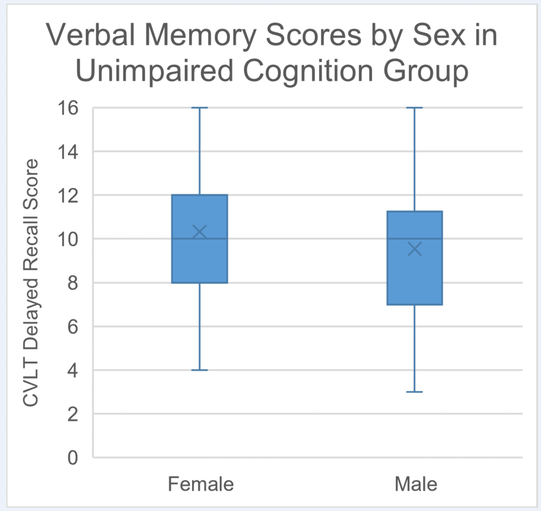
Participant Demographic Information

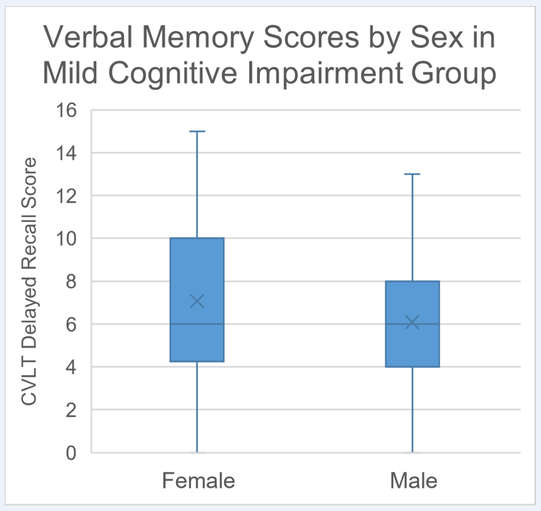
Unimpaired Cognition Group (n=231)

	Females		Males	
Variables	**Mean (SD)**	**Count**	**Mean (SD)**	**Count**
Age	77.4 (7.9)		80.2 (7.9)	
Years of Education	15.3 (2.5)		16.1 (2.8)	
Race				
White:		99		99
African American:		26		7
CVLT DR Score	10.3 (2.6)		9.5 (2.9)	
Total	**n= 125**		**n= 106**	

Mild Cognitive Impairment Group (n=111)

	Females		Males	
Variables	**Mean (SD)**	**Count**	**Mean (SD)**	**Count**
Age	76.6 (11.4)		78.9 (10.1)	
Years of Education	14.8 (2.6)		15.3 (2.8)	
Race				
White:		40		48
African American:		12		11
CVLT DR Score	7.1 (3.6)		6.1 (3.3)	
Total	**n= 52**		**n= 59**	





One-Way Analyses of Variance in CVLT DR Scores between Sexes with Covariates of Age, Education, and Race

	Unimpaired Cognition					Mild Cognitive Impairment				
Measure	Sum of Squares	df	Mean Square	F	Sig.	Sum of Squares	df	Mean Square	F	Sig.
Age	40.563	1	40.563	5.736	.017	28.010	1	28.010	2.407	.124
Years of Education	37.860	1	37.860	5.353	.022	3.223	1	3.223	.277	.600
Race	38.863	1	38.863	5.495	.020	6.320	1	6.320	.543	.463
Sex	47.054	1	47.054	6.653	.011	23.494	1	23.494	2.018	.158

In the unimpaired group, long delay recall scores of the CVLT were higher in females than males, even when accounting for age, race, and education.

In the MCI group, long delay recall scores of the CVLT were not significantly different between females and males, even when accounting for age, race, and education.

CONCLUSION

Results from the present study indicate an advantage in verbal memory in cognitively unimpaired females.

In agreement with previous literature, the results from the current study finds the female advantage in verbal memory does not continue after the onset of impairment.[4]

Other research suggests that in amnestic MCI, using sex specific norms improves diagnostic accuracy.[5] Additionally, some studies find that the female advantage suggests a cognitive reserve that delays verbal memory decline.[2]

Future directions include examining other demographic factors related to verbal memory performance (such as number of years of education in addition to quality of education) and investigating questions related to cognitive reserve and disease stage (such as imaging outcomes). Another direction is looking at the female advantage in verbal memory and its relationship to functional impairment.

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