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Effect of sex and lifestyle activities on cognitive reserve in a cohort of ethnically diverse, community-dwelling older adults.

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Background

- Physical activity and cognitive stimulation may mitigate age-associated declines in cognition and the onset of dementia.
- **The current study examined the interaction between sex and physical and cognitive activities on cognitive reserve in the domains of memory and processing speed, with a secondary analysis of APOE4 status.**

Methods

Participant Characteristics

Variable	All subjects	Female	Male	p values
n	758	474	284	-
Age (years)	76.11 (6.31)	76.63 (6.54)	75.26 (5.82)	*<0.01*
Education (years)	12.14 (4.49)	12.11 (4.44)	12.18 (4.58)	0.83
APOE4 status (Carrier / Non Carrier)	213 / 545	135 / 339	78 / 206	0.83
Cohort (Wave 2/ Wave 3)	410 / 348	273 / 201	137 / 147	*0.02*
Race (Black / Hispanic / White)	292 / 224 / 242	195 / 142 / 137	97 / 82 / 105	0.05
Diagnosis (Normal / MCI /Dementia)	449 / 242 / 67	279 / 147 / 48	170 / 95 / 19	0.26
Log(METS)	6.12 (2.03)	5.94 (2.06)	6.41 (1.95)	*<0.01*
Cognitive Activities (count)	1.42 (0.70)	1.45 (0.72)	1.39 (0.67)	0.25
Speed Reserve	0.059 (0.917)	0.069(0.965)	0.044(0.831)	0.71
Memory Reserve	0.005 (0.734)	0.087(0.726)	-0.132(0.729)	*<0.01*

Participants were selected based on availability of 3T MRI, physical activity (METS), cognitive activities, cognitive scores and APOE4 status.

Data Processing

- Domain reserve was calculated as the residuals from regression of the domain score on hippocampal volumes, total gray matter volume, and white matter hyperintensities.[1]
- Physical Activities were converted to metabolic equivalent (METS) from the Godin Leisure Time Exercise Questionnaire.[2]
- The self-report measure of cognitive activity was calculated as the sum of yes/no questions on cognitive activities (COGACT).

Statistical Analysis

- Subject characteristics between sex were compared using t tests for continuous variables and χ^2 test for categorical variables.
- Effect size of difference between sex were estimated using Cohen's d.
- Analysis of variance was used to determine the significance levels of variables of interest in the regression analyses
- η^2 (variance explained by variable) was used to compare the effect sizes of variables in sex stratified analyses.
- Analyses explored the role of APOE4 in reserve-activity relationships.
- Covariates included cohort, age, sex, race, education, diagnosis, and APOE4 status, when applicable.

Acknowledgements

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Results

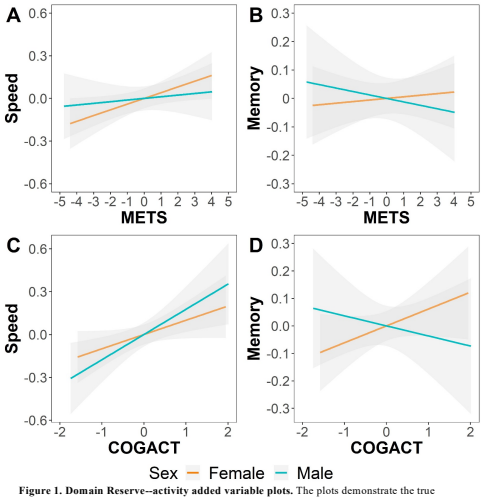

Figure 1. Domain Reserve--activity added variable plots. The plots demonstrate the true association between METS and Speed and Memory Reserves (A,B) and between COGACT and Speed and Memory Reserves (C,D) stratified by sex by regressing out the covariates from both the dependent and independent variables in each panel.

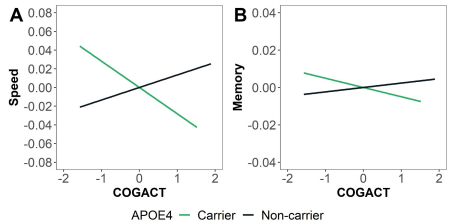

Figure 3. Women only. Domain Reserve and COGACT added variable plots. The plots demonstrate the association between COGACT and Speed and Memory Reserves among women stratified by APOE4 carrier status by regressing out the covariates from both the dependent and independent variables in each panel. Men data not shown.

- Higher METS was associated with greater speed reserve in women (p=.05) but not men (p=.85).
- No association between METS and memory reserve (p>.05).
- More COGACT was associated with greater speed reserve in both women (p=.07) and men (p=.01).
- More COGACT was associated with greater memory reserve in women (p=.15) but not men (p=.52).

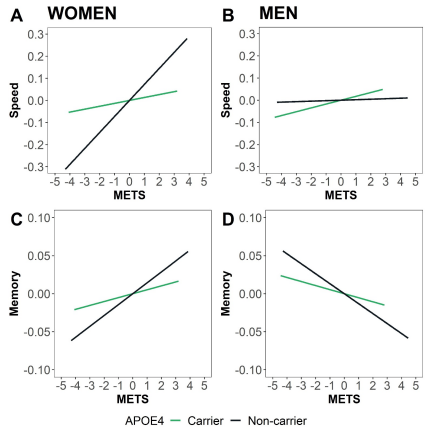

Figure 2. Stratified by sex. Domain Reserve and METS added variable plots separated by sex. The plots demonstrate the association between METS and Speed and Memory Reserves among women (A,C) and men (B,D) stratified by APOE4 carrier status by regressing out the covariates from both the dependent and independent variables in each panel.

- Among women, APOE4 carrier status attenuated associations between physical activity and speed reserve, and between cognitive activity and speed and memory reserves. No effects were observed in men.
- Associations remained in APOE4 non-carrier women (p's<.01).

Conclusion

The association between lifestyle activities involving physical and cognitive activities and cognitive reserve suggest sex differences that are moderated by APOE4 status.

References

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