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Background

Social engagement is increasingly recognized as a modifiable factor that may promote resilience^{1–3}. While larger social networks have been associated with better cognitive and brain health, social relationships may also contribute to resilience through their influence on stress-related processes⁴. Evidence suggests that these associations may differ between males and females^{5–7}, yet sex-specific effects remain unclear.

Objective

To examine how **sex** influences the association between **social network** (size and diversity) and **resilience proxies**.

Participants

	Males	Females	<i>p</i> value
N	44	60	
Age (years)	73.8 ± 3.44	73.8 ± 3.71	0.97
Education (years)	13.9 ± 3.19	12.9 ± 2.85	0.08
AGE-WELL People in the social network (number)	22.3 ± 15.6	23.6 ± 16.3	0.69
High-contact roles (0-10)	5.8 ± 1.3	5.4 ± 1.3	0.1

Methods

Social Network Index

- Number of people in the social network (**network size**)
- Number of high-contact roles (**network diversity**)

1

Psychobiological factors

- MOS social support survey
- PSS-14: Perceived stress scale
- Cortisol
- Hippocampal volume

2

Cognitive composite scores

- PACC5
- Episodic Memory
- Executive functioning
- Attention/Speed

Statistical analyses: Linear models (LM) were used to test:

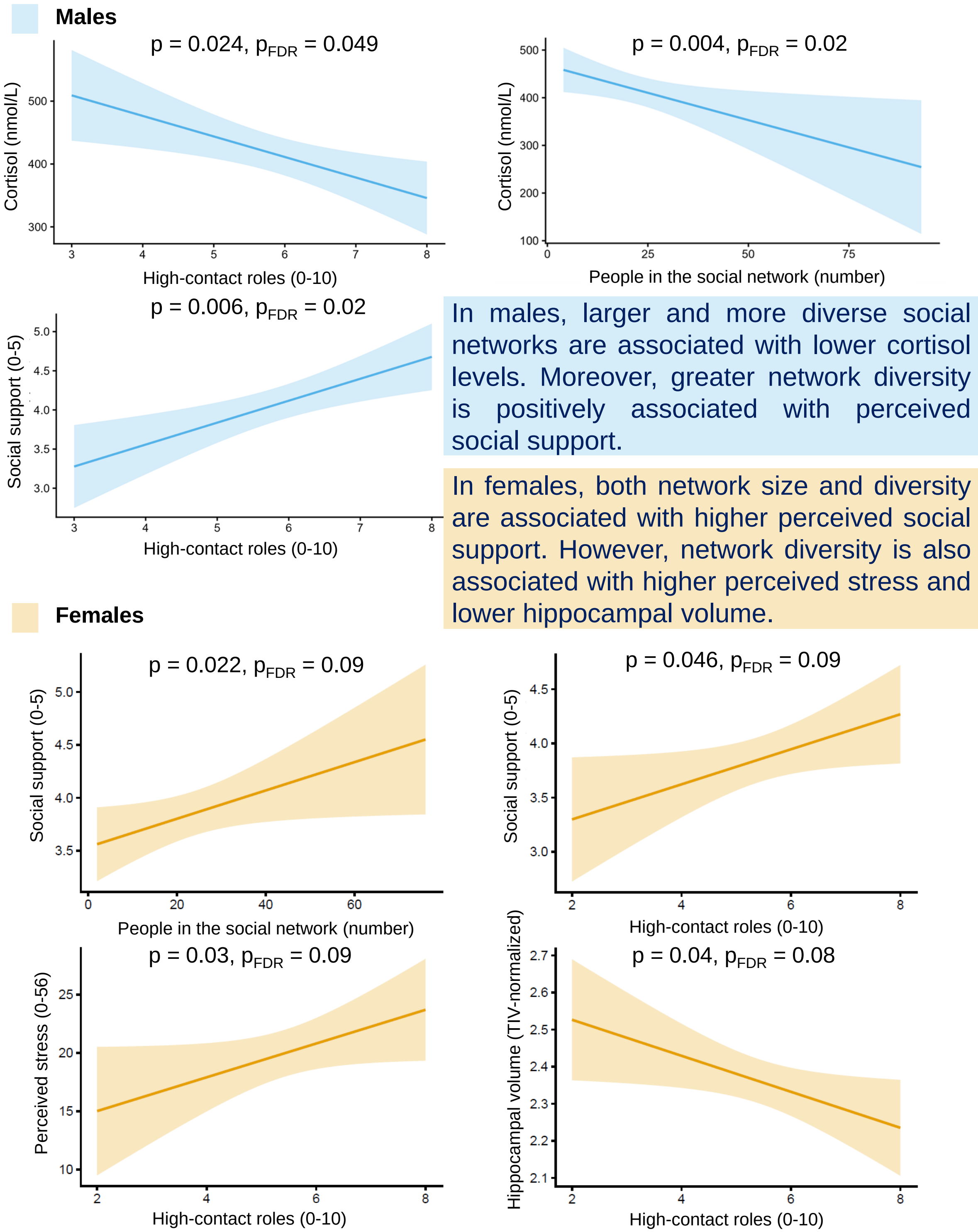
- associations** between social network metrics and psychobiological factors in males and females separately.
- interactions** between sex and social network metrics on cognition.

All models were adjusted for age, education level and intervention arm.

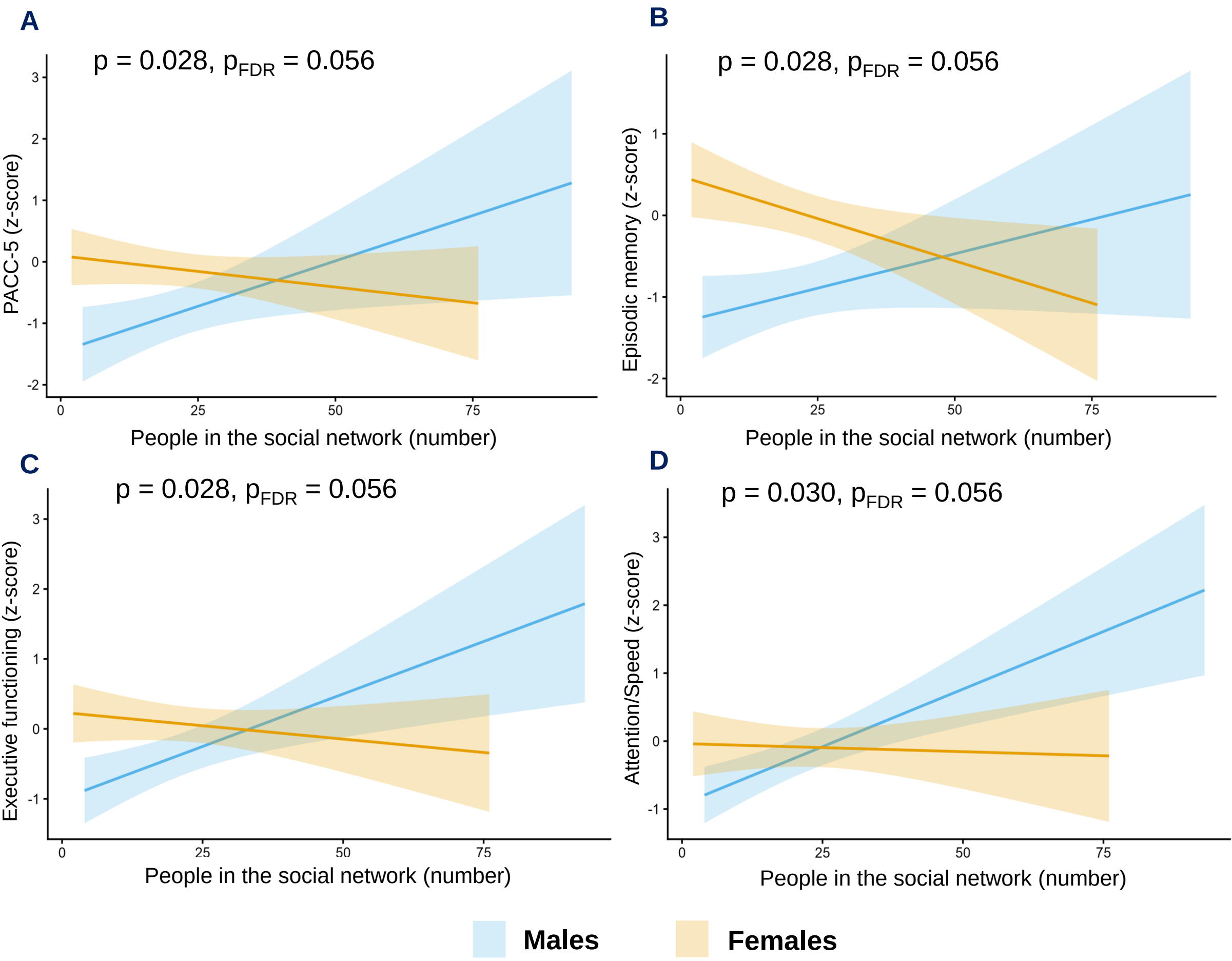
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Psychobiological substrates of social network



Interactions between sex and social network size on cognitive functioning



Interactions between number of people in the social network and sex reveals that larger social networks were more positively associated with PACC-5 (A), episodic memory (B), executive functioning (C) and attention (D) composite scores in males compared to females.

Post-hoc analyses revealed that a larger network was associated with higher attention ($p < 0.01$) and executive functioning ($p < 0.02$) in males but with lower episodic memory in females ($p < 0.02$).

Conclusions

Social network size and diversity are associated with distinct psychosocial and biological factors according to sex. Associations between social network size and cognitive performance also differ between males and females.

- **In males**, greater social network is associated with higher social support, lower physiological stress and better cognitive functioning.
- **In females**, higher social network co-occurs with higher social support, increased stress and reduced hippocampal volume, and poorer episodic memory performance. These findings in females may be due to greater caregiving responsibilities, and mental load associated with social relationships, which may reduce the protective effects of social support and limit cognitive benefits in females.

Accounting for sex-specific differences appears essential when examining social factors in aging, but also when developing effective, sex-informed dementia prevention strategies.

Funding: The Age-Well randomized clinical trial is part of the MeditAgeing project and is supported by the European Union's Horizon 2020 Research and Innovation Program (grant 667,696), Region Normandie (Label d'Excellence), and Fondation d'Entreprise MMA des Entrepreneurs du Futur. D. Farago is funded by Région Normandie.

