

Sex Differences in Cognitive Reserve Proxies Among Stable and Worsening Participants in Preclinical and Prodromal Stages of Dementia

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BACKGROUND

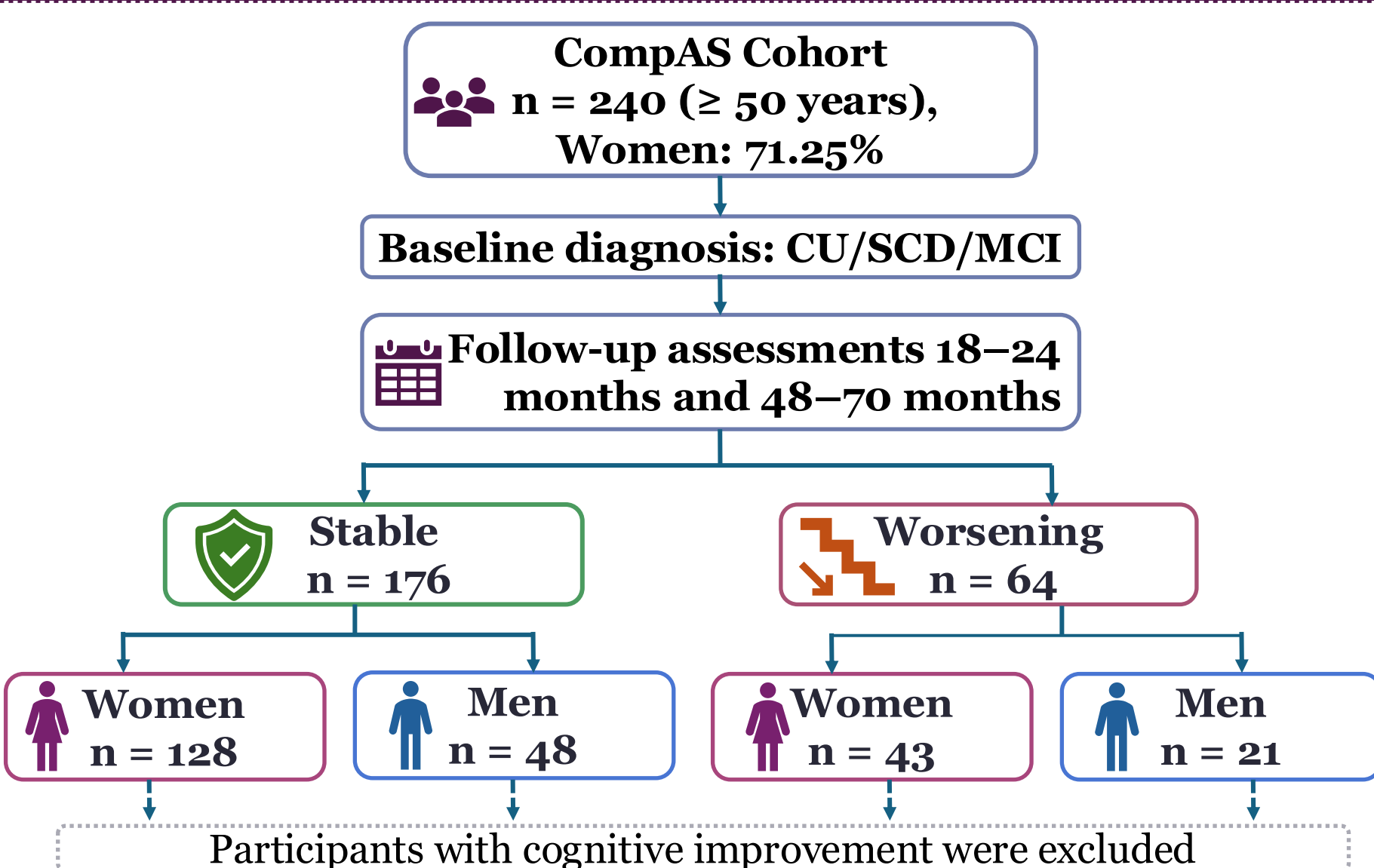
- Cognitive Reserve (CR) reflects resilience against age-related cognitive decline, but **sex-differences** in CR remain unclear (Arenaza et al., 2024).
- Women may show **lower traditional CR** than men due to historical inequalities in education and occupation yet may also exhibit advantages in **cognitive efficiency and resilience** (Emrani et al., 2025; Giacomucci et al., 2022).

AIM



Do sex differences in CR proxies differ between **stable and worsening** participants in preclinical (CU/SCD) and prodromal (MCI) dementia stages?

METHODS



Groups: **Stable** (no change/minimal progression CU→SCD); **Worsening** (progression from CU/SCD→MCI/dementia; MCI→multidomain MCI/dementia).

CR proxies (school, work, leisure) assessed using **CRIq** (Nucci et al., 2012).

Multivariate GLM with CRIq scores and dependent variables; **sex** and **group** as between-subject factors.

RESULTS

Sample descriptives

M(SD)	Women Stable	Men Stable	Women Worsening	Men Worsening
Age	64.45 (8.46)	66.94 (9.50)	68.53 (8.46)	71.52 (8.78)

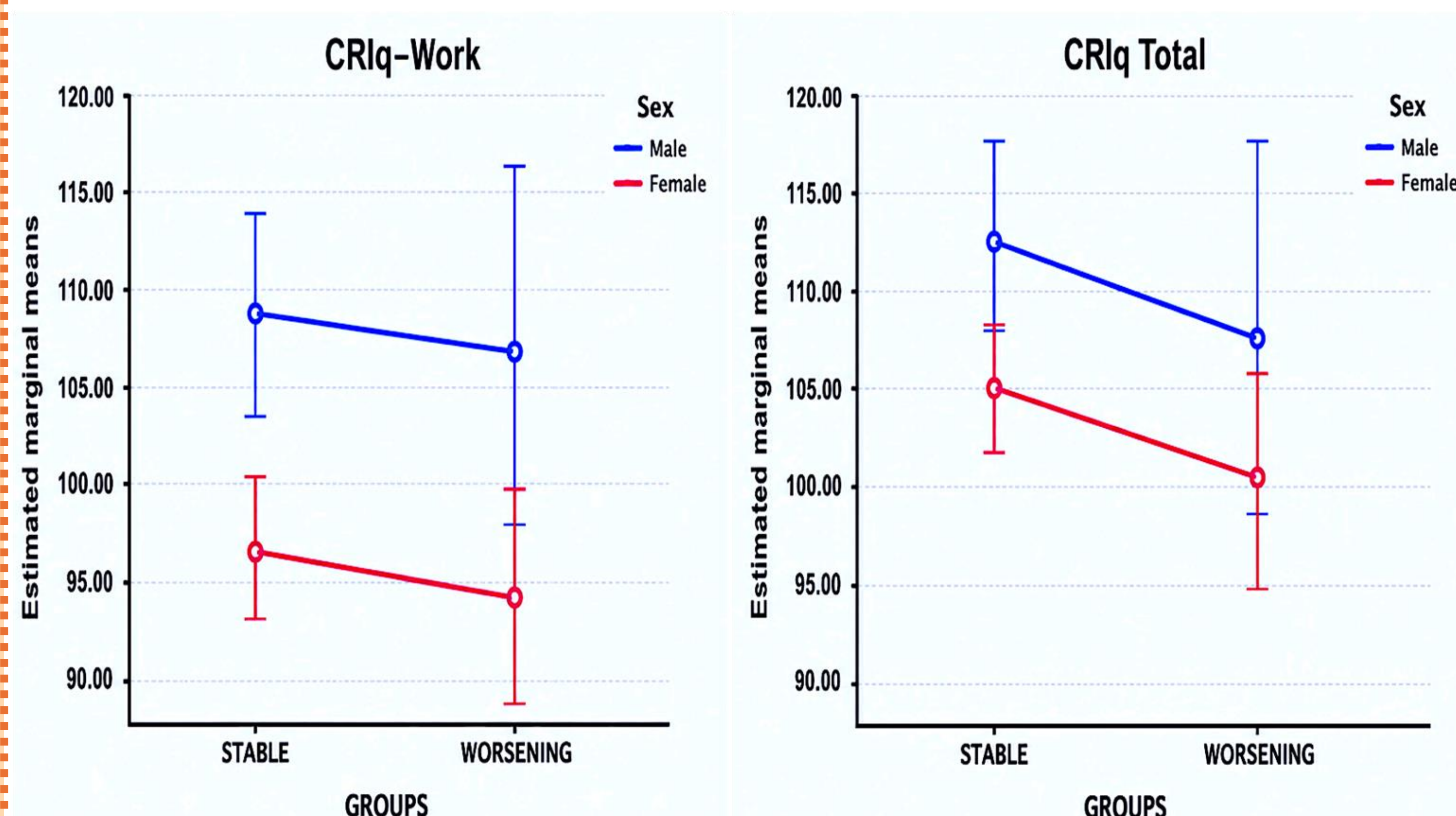
CRIq domains M(SD)

CRIq-School	107.19 (18.63)	109.52 (18.47)	102.07 (17.97)	98.14 (13.76)
CRIq-Work	97.80 (19.18)	108.54 (16.76)	92.65 (16.69)	103.19(20.68)
CRIq-Leisure	109.73 (20.85)	110.90 (20.99)	102.65 (19.55)	101.81 (18.91)
CRIq-Total	106.51 (20.78)	112.73 (20.01)	98.77 (18.28)	101.81 (18.29)

Main findings

- Men showed significantly **higher CRIq-Work** scores than women in both **Stable and Worsening** groups [$F(1, 232)=14.863$; $p < .001$; $\eta^2=.060$] and [$F(1, 232)=5.919$; $p=.016$; $\eta^2=.025$].
- Men also showed **higher CRIq-Total** scores in the **Stable** group [$F(1, 232)=6.116$; $p=.014$; $\eta^2=.026$].
- Women remained **stable or worsened similarly** to men despite lower CRIq scores.

Figure 1. Estimated marginal means in CR scores by sex and stable/worsening groups with age as a covariate.



Error bars: 95% CI

Abbreviations: CompAS: Compostela Ageing Study; CU = Cognitively Unimpaired; SCD = Subjective Cognitive Decline; MCI = Mild Cognitive Impairment; CRIq = Cognitive Reserve Index Questionnaire; GLM = General Linear Model

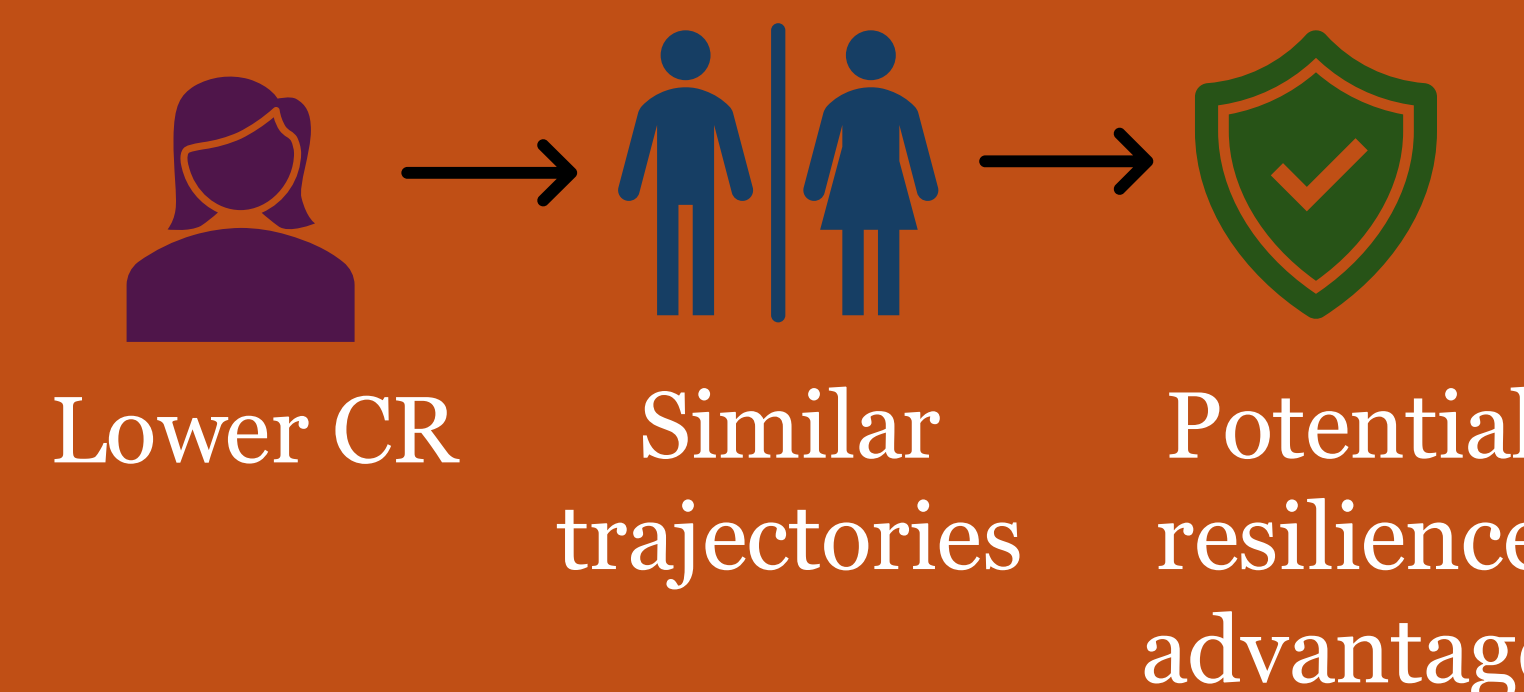
CONCLUSIONS

- ☒ **Lower CRIq scores** in women compared to men were not associated with **greater cognitive worsening**.
- ☒ Findings suggest **sex-specific advantage in cognitive resilience** in the face of ageing and early cognitive decline.
- ☒ **Psychosocial and biological factors** may contribute to **resilience** in women **despite** lifelong **socio-economic** and **socio-educational disadvantages**.



TAKE-HOME MESSAGE

Despite lower CRIq scores, women showed similar stable and worsening trajectories, suggesting that traditional CR proxies may underestimate women's cognitive resilience.



REFERENCES

- Arenaza-Urquijo EM, et al. *Nat Rev Neurol*. 2024.
Emrani S, et al. *Front Neurol*. 2025.
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