

Cognitive Dispersion and A β Burden in the Atlas of Retinal Imaging in Alzheimer's Study (ARIAS2) Cohort

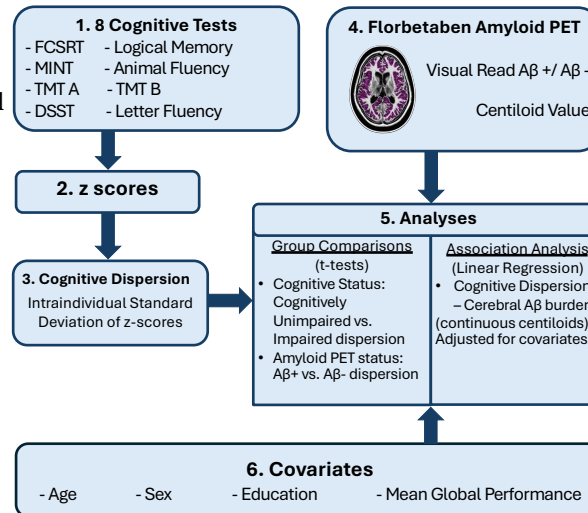
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Introduction

- Cognitive dispersion (intraindividual variability) across neuropsychological measures reflects uneven cognitive functioning within an individual.
- Greater cognitive dispersion has been associated with cognitive decline, Alzheimer's disease (AD), hippocampal atrophy, reduced white matter integrity, and disrupted functional brain networks.
- Cognitive dispersion measured within a single testing session predicts future cognitive decline and AD; however, its relationship with AD biomarkers remains poorly understood.
- Prior studies have reported greater cognitive dispersion among individuals with elevated cerebral amyloid (A β) burden but have primarily relied on binary A β +/A β - classifications and non-mean-adjusted dispersion metrics.
- It remains unknown whether cognitive dispersion is associated with a continuous measure of A β burden in cognitively unimpaired older adults and preclinical AD, independent of age-corrected mean cognitive performance.

Methods



Results

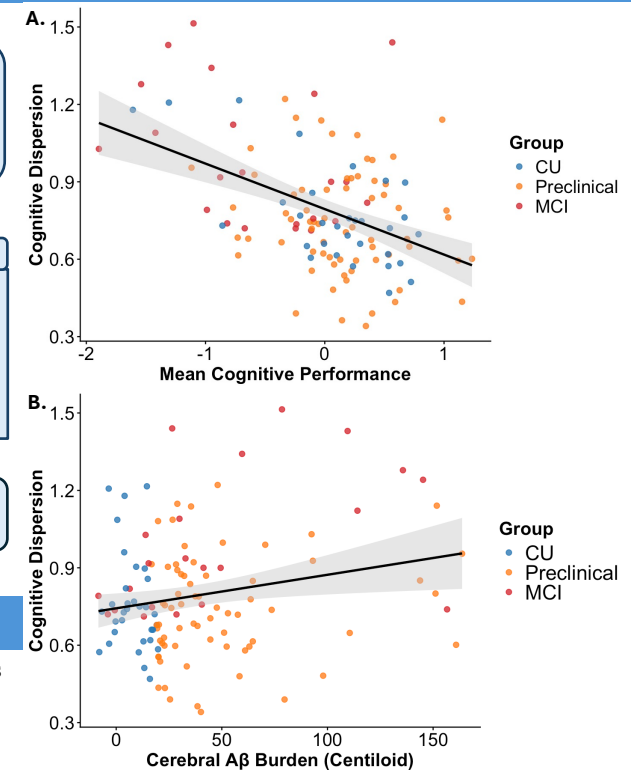


Figure A. Association of cognitive dispersion with mean cognitive performance.
Figure B. Association of cognitive dispersion with cerebral A β burden (centiloid).
Black regression line and shaded 95% CI represent the association across total sample.

Objective

Determine the effects of cerebral A β burden (centiloid scale) on cognitive dispersion (intraindividual variability) in a large cohort of CU older adults, preclinical AD patients, and MCI patients.

Results

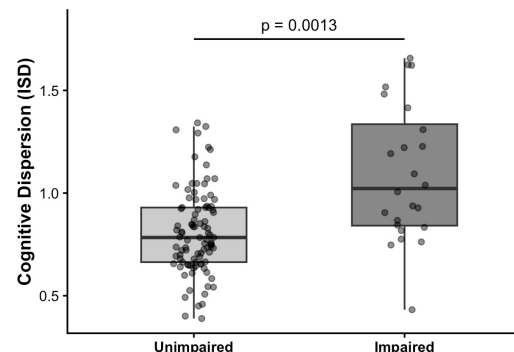
- Cognitive dispersion differed by cognitive status (impaired vs unimpaired; [t(126)=3.56, $p=0.0013$]) but not by amyloid PET status [t(126)=.085, $p>.05$].
- Age-corrected mean cognitive performance was significantly associated with cognitive dispersion ($\beta=-0.228$, $t=-6.25$, $p<.001$), with lower performance associated with greater dispersion.
- Cognitive dispersion was not significantly associated with A β PET burden ($R^2=.279$, $\beta=-0.05558$, $t=0.91$, $p>.05$).
- Age, sex, and education were also non-significant predictors.

Participants

Participants (N=126) were divided into 3 groups:

- Cognitively unimpaired (N=34): MoCA ≥ 26 , CDR=0, A β PET-
- Preclinical AD (N=68): MoCA ≥ 26 , CDR=0, A β PET+
- MCI (N=24): MoCA < 26 and CDR = 0-0.5

Demographics				
	Total Sample (n=126)	Cognitively Unimpaired (n=34)	Preclinical (n=68)	MCI (n=24)
Age, mean (SD), years	71.23 (4.10)	71.12 (3.60)	71.12 (4.32)	71.71 (4.27)
Age, range, years	64-81	65-79	65-81	64-79
Female, n (%)	85 (67.46)	27 (79.41)	44 (64.71)	14 (58.34)
Education, mean (SD), years	16.68 (2.03)	16.18 (1.78)	17.04 (1.88)	16.36 (2.55)
MoCA, mean (SD)	26.70 (2.26)	27.50 (2.06)	27.29 (1.83)	23.87 (1.29)



Conclusion

Cognitive dispersion **was not associated with cerebral A β burden** in CU, preclinical AD, and MCI participants.

Discussion

- Cognitive dispersion was significantly greater in MCI participants compared to CU but was not associated with cerebral A β burden.
- These findings contrast with prior studies linking cognitive dispersion to AD biomarkers and elevated amyloid burden in preclinical AD.
- Ongoing longitudinal analyses will evaluate whether cognitive dispersion predicts future cognitive decline and amyloid accumulation in CU and preclinical older adults.