

Increased cognitive fatigue in Alzheimer's disease : Insights from subjective reports and actigraphy



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Introduction

Do sleep-wake rhythm disruptions play a role in trait cognitive fatigue in AD?

- **Trait cognitive fatigue** (tCF) is a persistent and aversive feeling of reduced mental efficiency, lasting from weeks to months.
 - Fatigue is highly prevalent (>50%) in many **neurological conditions** (e.g., MS, Parkinson's, stroke, cancer).
 - Among people living with AD (PL-AD), trait cognitive fatigue (tCF) remains **under-investigated**.
 - Only **indirect evidence** links fatigue in at-risk or early AD to brain atrophy, β -amyloid/Tau burden, and cognitive decline.
- **Disruption of sleep-wake rhythms**, which are known to impair cognitive functioning, may contribute to tCF among PL-AD.
 - Understanding this link may help **clarify mechanisms underlying cognitive fatigue in PL-AD** and **guide interventions** such as psychoeducation to support well-being.

Materials and Method

Participants

Group	PL-AD (n = 19)	Control (n = 19)
Sex, % female	26.3%	26.3%
Age, years, M \pm SD	76.8 \pm 6.4	76.9 \pm 7.0
Education, years, M \pm SD	14.4 \pm 2.9	13.4 \pm 2.8
Montreal Cognitive Assessment (MoCA), M \pm SD	20.1 \pm 2.64	26.5 \pm 1.71

→ T-tests showed no significant group differences for age, sex, or education, except for MoCA ($p < .001$)

Extracted Measures

Subjective Questionnaires

- Fatigue Scale for Motor and Cognitive Functions (FSMC)
 - Brugman Fatigue Scale (BFS)
- **Composite cognitive and physical fatigue scores**
- FSMC + BFS (PCA : \approx 79% / 77% variance explained)

7-day wrist actigraphy recordings

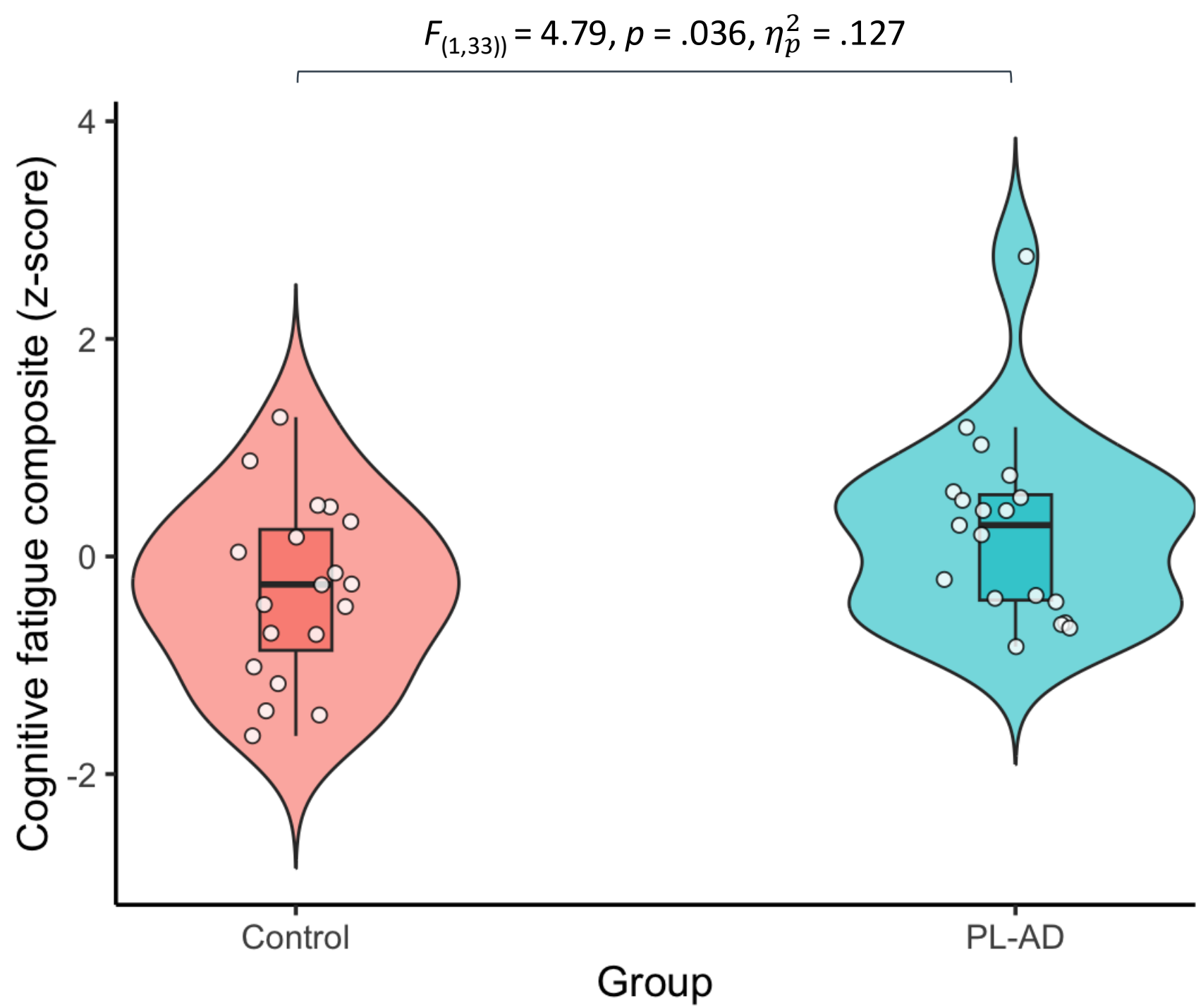
- Rest → Activity transition probability (kRA)
- Activity → Rest transition probability (kAR)
- Sleep Regularity Index (SRI)
- Interdaily-Stability (IS)
- Nap duration & frequency

Results

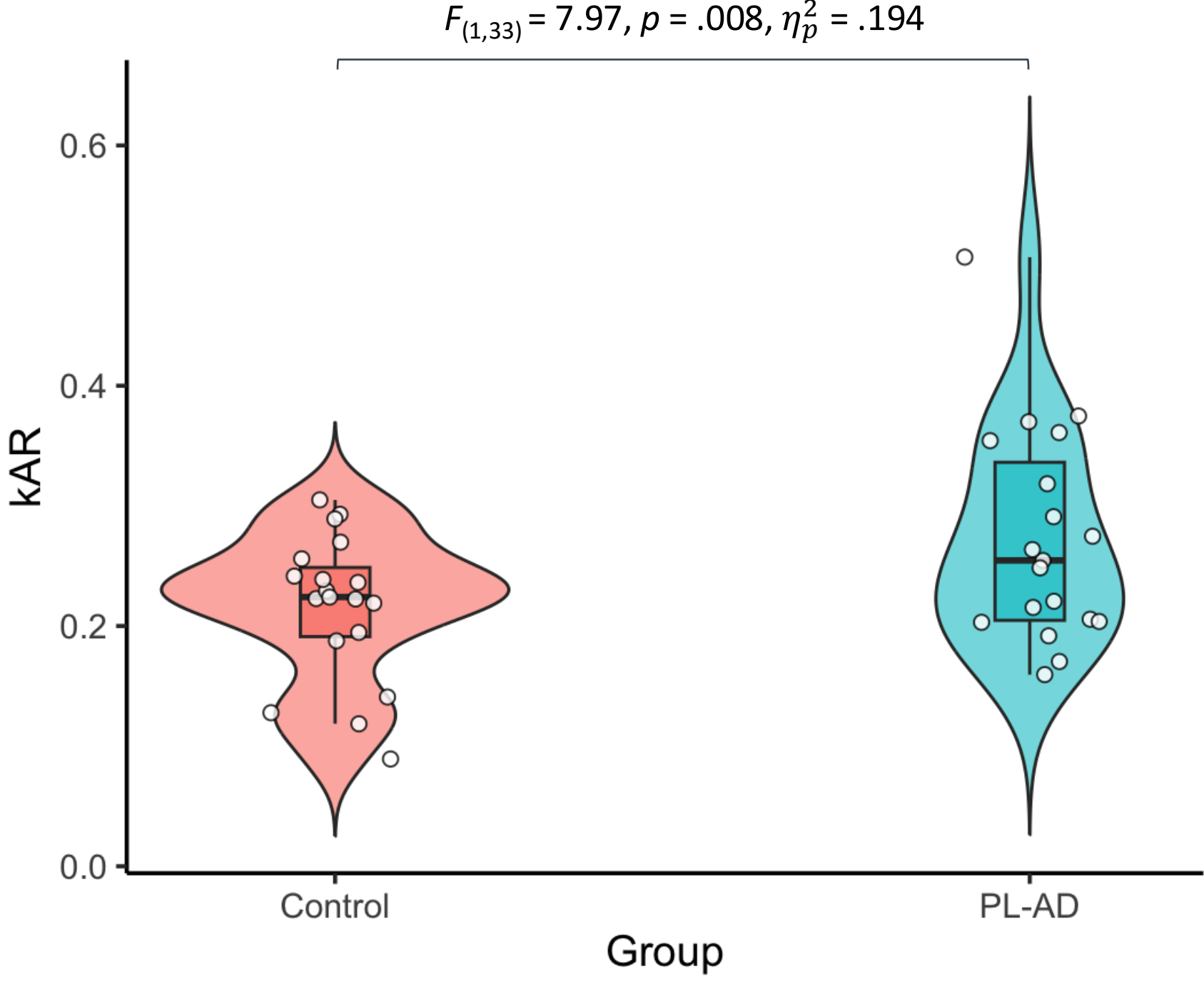
Cognitive fatigue is significantly higher in PL-AD, whereas no significant difference was found for physical fatigue

PL-AD showed greater rest-activity fragmentation (kRA, kAR) and reduced sleep regularity (SRI)

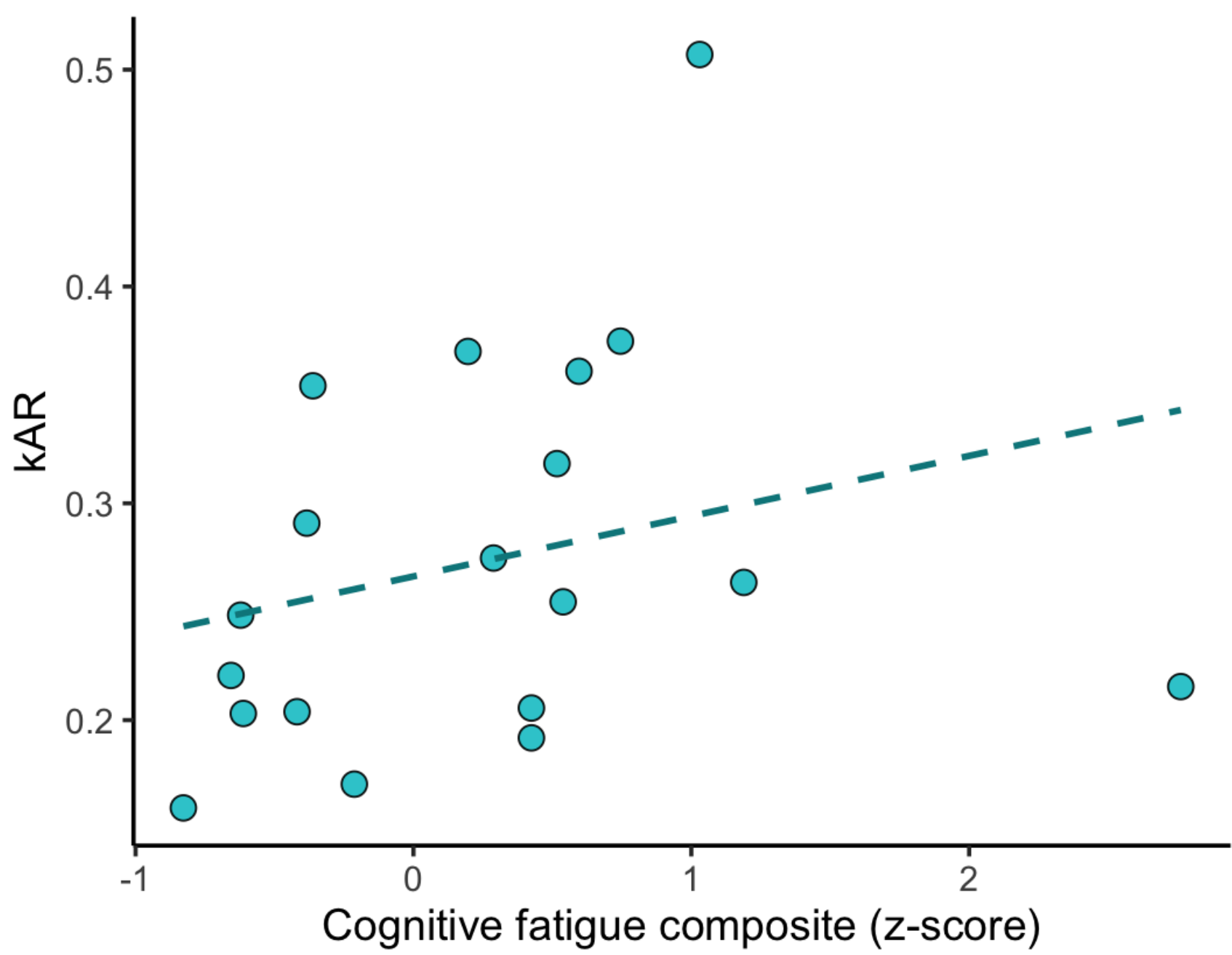
In PL-AD, greater activity fragmentation (kAR) was associated with higher cognitive fatigue



Physical fatigue : $F_{(1,33)} = 2.64, p = .114, \eta^2_p = .074$
→ Group comparisons were adjusted for age, education level, and sex



Probability rest-to-activity (kRA) : $F_{(1,33)} = 4.47, p = .042, \eta^2_p = .119$
Sleep Regularity Index (SRI) : $F_{(1,33)} = 5.90, p = .021, \eta^2_p = .152$



→ In PL-AD, kAR correlated negatively with IS ($p = -.59, p = .010$) and SRI ($p = -.47, p = .045$)

Discussion

- tCF in AD may represent a **disease-related symptom** and has been suggested to emerge **early in the disease course**^{3,5}.
- Findings point to **more fragmented activity patterns and less regular sleep-wake timing** in PL-AD, consistent with actigraphy studies in older adults⁷.
- **Sleep-wake and activity rhythm alterations** may contribute to persistent fatigue and cognitive decline in AD³⁻⁵.
 - **Activity fragmentation (↑kAR) is linked to higher tCF in PL-AD**, echoing evidence that fragmentation may contribute to cognitive vulnerability⁷.

Follow-up

Current limitations

- Small sample size (n = 38) and short actigraphy window (7 days)
- Cross-sectional design, no causal inference
- Potential confounders: medication, psychological, physical health

Ongoing project

- Multimodal characterization from subjective cognitive decline to PL-AD
- Magnetic resonance imaging (MRI)
- Cognitive & behavioral profiling

References

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