

Associations Between Multidimensional Health Domains and Cognitive Function in Rural Middle- to Older-Aged Adults

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BACKGROUND/INTRODUCTION

- Cognitive decline and functional impairment are major public health concerns among older adults in rural communities, where social and health-related risks contribute to Alzheimer's disease and related dementias (ADRD).¹
- Few studies have examined how multidimensional health domains — including social–emotional distress, physical function, and sleep disturbance — simultaneously predict cognitive and physical outcomes in racially and ethnically diverse rural older adults.²

STUDY AIM

To examine associations among social–emotional distress, physical function and social participation, and sleep disturbance with cognitive and physical performance outcomes in racially and ethnically diverse rural older adults at heightened risk for ADRD.

METHODS

Study Design

Community-based observational study of dementia-free adults aged ≥45 years from rural communities surrounding Lake Okeechobee, Florida (N = 964). All analyses use Time 1 (baseline) cross-sectional measures.

PROMIS Domain Composites (all self-reported)

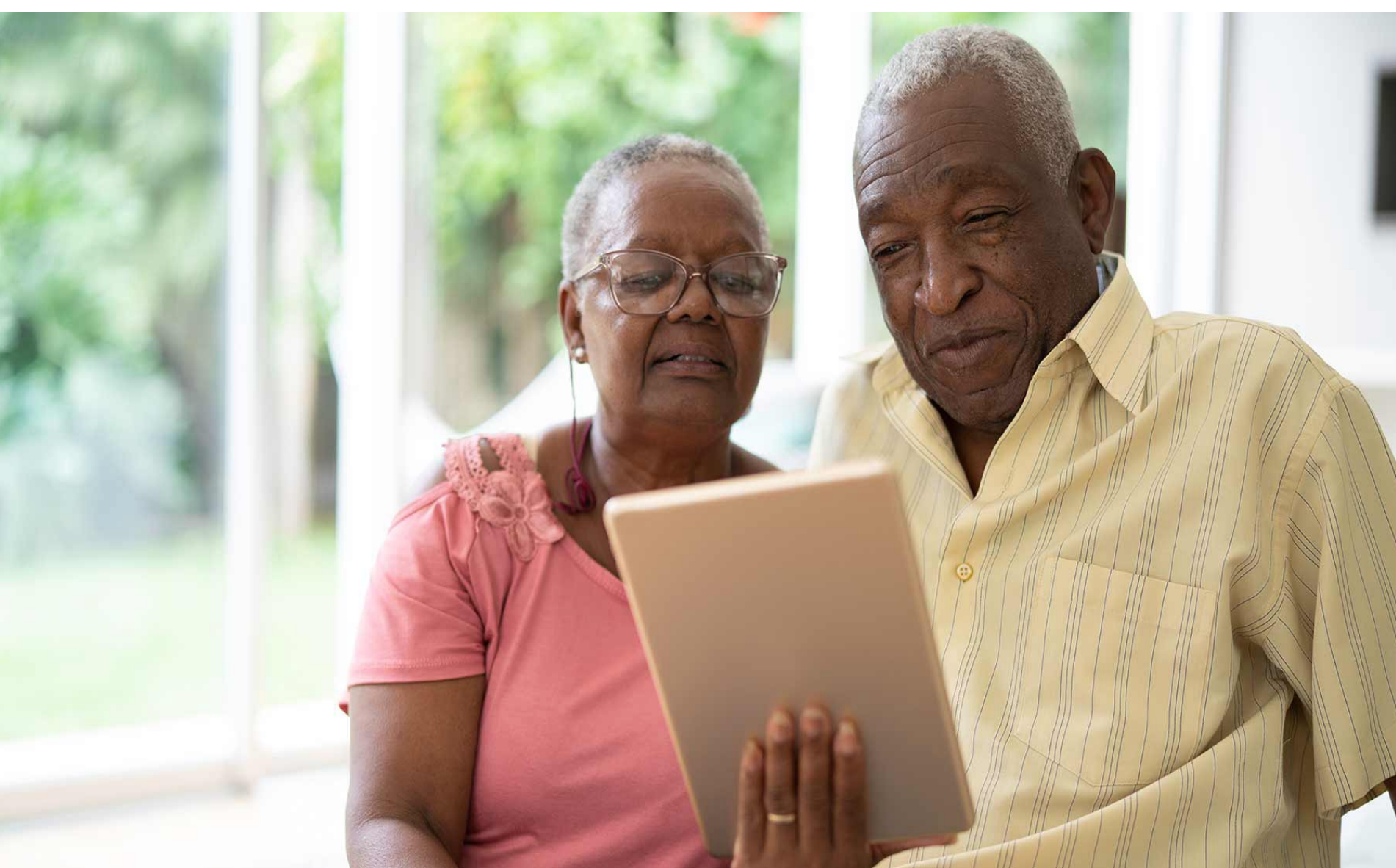
- Social–Emotional Distress-anxiety, depression, anger, and feelings of social isolation
- Physical Function and Social Participation (combined as a single PROMIS domain composite given their shared variance and conceptual overlap in functional capacity) — difficulty with daily physical tasks (e.g., walking, climbing stairs) and ability to participate in social and role activities
- Sleep Disturbance- trouble falling asleep, waking during the night, and poor sleep quality

Outcomes

- Global Cognition: MoCA (range 0–30)- higher scores indicate better cognitive function; scores < 26 suggest mild cognitive impairment
- Objective Physical Performance: Mini-PPT-range 0–12; higher scores indicate better physical performance
- Self-Reported Function: PROMIS Physical Function— T-score range 0–100; higher scores indicate better physical function (population mean = 50, SD = 10)

Statistical Analysis

Linear mixed models (MoCA) and general linear models (Mini-PPT, PROMIS Physical Function) adjusted for age, sex, race/ethnicity, education, employment, retirement, years in area, and household size.



RESULTS

Social–Emotional Distress Domain

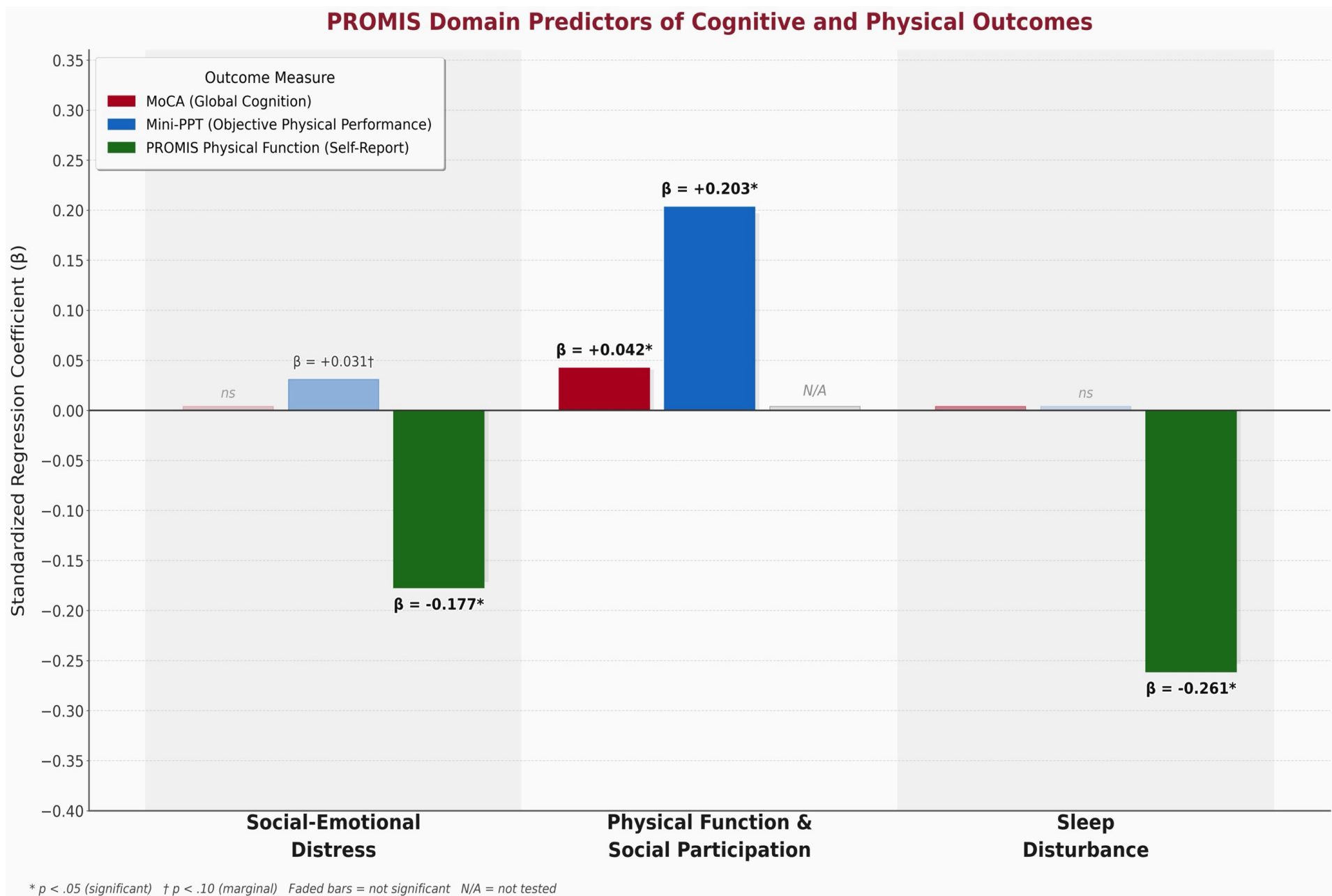
- Associated with worse self-reported physical function ($\beta = -0.177$, $p < .001$)
- Not associated with objective physical performance (Mini-PPT, $p = .091$) or global cognition (MoCA, $p = .951$)

Physical Function and Social Participation Domain

- Associated with better global cognition (MoCA: $\beta = +0.042$, $p = .022$)
- Associated with better objective physical performance (Mini-PPT: $\beta = +0.203$, $p < .001$)

Sleep Disturbance Domain

- Associated with worse self-reported physical function ($\beta = -0.261$, $p < .001$)
- Not associated with global cognition (MoCA, $p = .082$) or objective physical performance (Mini-PPT, $p = .296$)



SAMPLE CHARACTERISTICS

Sample size, N	964
Age (years), M (SD)	64.4 (10.0)
Education (yrs), M (SD)	11.7 (3.0)
Years in rural area, M (SD)	37.6 (23.1)
Female, n (%)	655 (68.9%)
Racial group, n (%)	
Black	588 (71.5%)
White	203 (24.7%)
Other	61 (5.0%)
Hispanic, n (%)	167 (17.3%)
Afro-Caribbean, n (%)	49 (5.0%)
Marital status, n (%)	
Single/widow/separated/divorced	541 (65.6%)
Married/partner	281 (34.4%)
Lives alone, n (%)	318 (38.7%)
MoCA (unadjusted, 0-30), M (SD)	26.5 (3.89)
Community group participation, n (%)	653 (67.7%)

M = mean; SD = standard deviation; MCI = mild cognitive impairment.

SUMMARY OF FINDINGS

PROMIS Domain	MoCA	Mini-PPT	PROMIS PF
Social–Emotional Distress	ns	ns	↓ sig. $\beta = -0.177$ $p < .001$
Physical Function & Social Participation	↑ sig. $\beta = +0.042$ $p = .022$	↑ sig. $\beta = +0.203$ $p < .001$	N/A [†]
Sleep Disturbance	ns	ns	↓ sig. $\beta = -0.261$ $p < .001$

[†] Not tested. ns = not significant. All models adjusted for age, sex, education, race/ethnicity, employment, retirement, years in area, household size.

CONCLUSION

- Physical function and social participation were associated with both global cognition and objective physical performance.
- Social–emotional distress was associated with worse perceived, but not objective, physical function.
- Sleep disturbance was associated with worse self-reported physical function but not cognition.

TAKEAWAY MESSAGE

- Findings support integrating multidimensional PROMIS domains in rural ADRD prevention.
- Integrating patient-reported and performance-based measures is essential for capturing ADRD risk in rural, diverse populations.

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