

Introduction

The effects of physical activity interventions on cognition in older African American adults are underexplored

- Background:** Sedentary older adults who engage in aerobic exercise interventions tend to improve cognitive functioning.
- Gap:** Studies have not included large numbers of African Americans.
- Relevance:** African Americans have higher rates of dementia, and lower physical activity attainment, than White Americans.
- Goal:** We enrolled cognitively healthy older African American adults into a one-year physical activity intervention, and assessed effects on cognitive functioning.

Methods

126 older African Americans randomized to one year of physical activity or a successful aging control group



Figure 1: RAATE Physical Activity Group Session

- Design:** The Reducing African Americans' Alzheimer's Disease Risk Through Exercise (RAATE) Study randomized 126 initially sedentary, cognitively healthy, older African Americans to one year of a physical activity program (PA, Figure 1) or successful aging education (SA, Figure 2).
- Physical activity program:** Twice-weekly, 80-minute supervised group aerobic, strength, flexibility, and balance training sessions, along with 2 or more home sessions per week amounting to approximately 60 total minutes of brisk walking, strength, flexibility, and balance exercises.
- Successful aging education:** Once-weekly, 60-minute sessions combining low-intensity activity (stretching, balance training, flexibility, relaxation) and education on topics such as financial scams, fall prevention, and living wills.
- Cognitive functioning:** At baseline, 26 week, and 52 week follow-up assessments, participants completed the NIH Toolbox Cognitive Battery and the Rey Auditory Verbal Learning Test (RAVLT).
- Statistical analysis:** Changes in cognitive test scores between baseline and intervention week 26, and between baseline and intervention week 52, were compared between PA and SA groups using repeated measures ANOVA models, in intention to treat (ITT) and completers analyses.



Figure 2: RAATE Successful Aging Group Session

Results

Predominantly female, highly educated cohort in their late 60s

- A total of 126 individuals enrolled; 107 completed the intervention and provided complete phenotyping data.
- Participants were in their late 60s on average; the sample was predominantly female; about a third has income below \$50k/year; about half were married; and over 90% received at least some university education.

Age at baseline	67.7 (5.31)
Sample size at baseline	126
Female sex	97 (77%)
Highest education attended	
High school	12 (9%)
College	75 (59%)
Post-graduate	39 (31%)
Household income	
Less than \$50k/year	45 (36%)
\$50k-\$100k/year	45 (39%)
Over \$100k/year	24 (19%)
Marital status	
Married	56 (44%)
Widowed	19 (15%)
Divorced / separated	37 (29%)
Single / never married	14 (11%)
Cognitive function	
NIH Toolbox Total Composite Score	52.91 (6.42)
RAVLT Total Score	47.33 (7.42)
Aerobic Fitness	
VO ₂ Peak (ml/kg/min)	16.91 (4.02)
Estimated VO ₂ Max (ml/kg/min)	18.59 (4.59)
METs at 80% APHR	4.98 (1.67)
Est. VO ₂ at 80% APHR	3.90 (1.08)

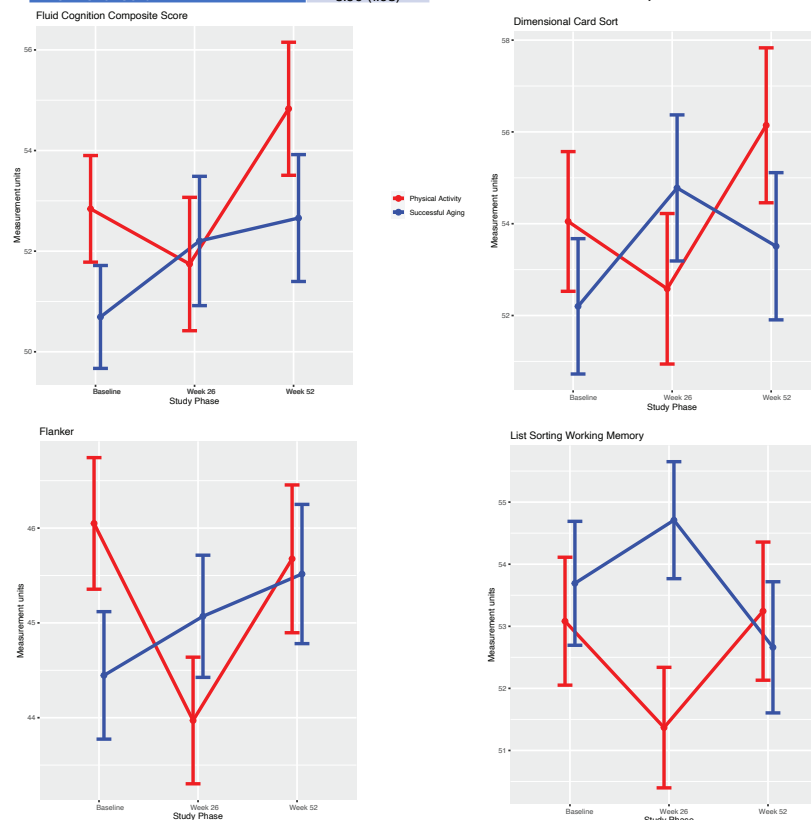


Figure 3: Cognitive changes over the course of the RAATE intervention in physical activity (red) and successful aging (blue) groups.

Results

Mixed group differences over 6 months; no clear group differences over 1 year

- ITT analysis (Baseline to week 26):** SA improved significantly more than PA in several cognitive measures between baseline and week 26 including the NIH Toolbox fluid cognition composite, Dimensional Card Sort, Flanker, and List Sorting Working Memory. PA improved significantly more than SA in the RAVLT Total score (all $p < .05$, see Figure 3).
- ITT analysis (Baseline to week 52):** PA-SA group differences were not statistically significant.
- Completers analysis:** Results from the completers analysis largely mirrored those of the ITT analysis.

Discussion

Complex pattern of short-term cognitive benefits for both physical activity and successful aging groups

- Better improvements in executive measures over 6 months in the successful aging group may be due to the beneficial effects of learning and social interaction during group sessions.
- Better improvements in episodic memory over 6 months in the physical activity group are promising but not generalized across cognitive domains.
- The lack of sustained benefits over 12 months suggest greater intervention intensity or variety during the second half of the year may be needed.
- The groups were not well matched at baseline in terms of individual cognitive test scores, making group comparisons more difficult.
- Cognitive benefits of physical activity interventions may be different in older African American adults compared to other groups.

Data availability

Data from this study is available by request to the authors, with some limitations.

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CONTACT INFORMATION:
Owen Carmichael: owen.carmichael@pbrc.edu

@PenningtonBiomedical Pennington Biomedical Research Center
@PBRCNews T: (225) 763-2989
news@pbrc.edu www.pbrc.edu