The effect of a physical activity promotion program on cognitive function in older African American adults

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PROGRAM FOR AFRICAN AMERICAN COGNITION & EXERCISE

Background

Alzheimer's Disease is a health disparity: 9.4% v 6.9%

Prevalence is expected to double by 2050

Physical activity has been shown to maintain cognitive function

Most African Americans do not get the recommended amount of PA

Few randomized studies have included sufficient numbers of African Americans to determine effects

Differential physical activity effects across ethnic groups

Swift et al., J Appl Physiol, 2013; Blondell et al, BMC Public Health, 2014; Callisaya et al., BMC Geriatrics, 2017

Specific Aims & Hypotheses

To tailor a physical activity program for older African Americans

- We hypothesize that the program will be acceptable

To determine if a physical activity promotion intervention in African American adults is effective in increasing levels of physical activity.

- We hypothesize that the program will have a greater increase in PA compared to the control group

To determine if a physical activity promotion intervention in African American adults improves cognition in the following domains

- We hypothesize that cognition will have greater improvement in the PA group compared to the control group

Focus groups

To examine

- understanding of dementia
- willingness to participate in a clinical trial on dementia risk reduction

Four focus groups

51 older AA adults

68.1 (5.9) years

75.0% female

TABLE 2. Participant Characteristics

	Age Range	Age Mean (SD)	% Female
Focus group #1	61-78	69.75 (3.5)	53.8
Focus group #2	57-78	68.1 (5.5)	81.2
Focus group #3	60-78	67.2 (4.9)	91.7
Focus group #4	64-85	68.6 (8.9)	80.0
Total	61-85	68.1 (5.9)	75.0

Pugh et al., Alzheimer Dis Assoc Disord, 2021

Focus group themes

Understanding dementia

- Cognitive decline, loss of autonomy, personality changes

Perceived susceptibility

- Hereditary, stress, lack of cognitive engagement, lifestyle

Willingness to participate in research

- Nonpharmaceutical, transportation, trust, compensation, duration

Pugh et al., Alzheimer Dis Assoc Disord, 2021

Randomized Controlled Trial

Intervention vs. control

N = 56

12 weeks

PBRC staff conducted all sessions

Intervention: Physical activity

Supervised activity

- 2 days/week
- 90-120 min/week
- YMCA
- Aerobic, strength, balance, stretch

Home based

- 2-3 days
- 30-60 min
- Primarily aerobic

Control: Successful aging

Group sessions

- 1 day/week
- Pennington Biomedical

Topics

- Budgeting
- Avoiding scams
- Falls
- Nutrition

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Measures

Activity monitors

- Actigraph GT3X+
- Fitbit Charge 2 (Intervention only)

Repeated Battery for the Assessment of Neuropsychological Status (RBANS)

- Immediate memory
- Delayed memory
- Visuospatial function
- Language capacity
- Attention
- Global cognition

TABLE 1. Baseline participant characteristics.

	All (n = 56)
Age, yr	69.2 (3.4)
Sex, female n	41 (73.2%)
Weight, kg	194.1 (37.6)
BMI, kg·m^{-2}	32.5 (6.1)
Employment	
Full-time	4 (7.1%)
Part-time	10 (17.9%)
Retired	42 (75.0%)
Education	
High school diploma/GED	8 (14.8%)
1–3 yr college	17 (31.5%)
College degree	15 (27.8%)
Postgraduate degree	14 (25.9%)
Income	
<$50,000	36 (64.3%)
$50,000–$100,000	14 (25.0%)
>$100,000	4 (7.1%)
Did not answer	2 (3.6%)
Accelerometer	
ActiGraph steps per day	3619.9 (1285.5)
ActiGraph steps per day %ile	46.1 (15.6)
ActiGraph sedentary, min·d^{-1}	1157.1 (83.5)
ActiGraph light PA, min·d^{-1}	260.4 (71.8)
ActiGraph moderate, min·d^{-1}	6.2 (6.8)
ActiGraph vigorous, min·d^{-1}	0.05 (0.2)
ActiGraph MVPA, min·d^{-1}	6.3 (6.8)

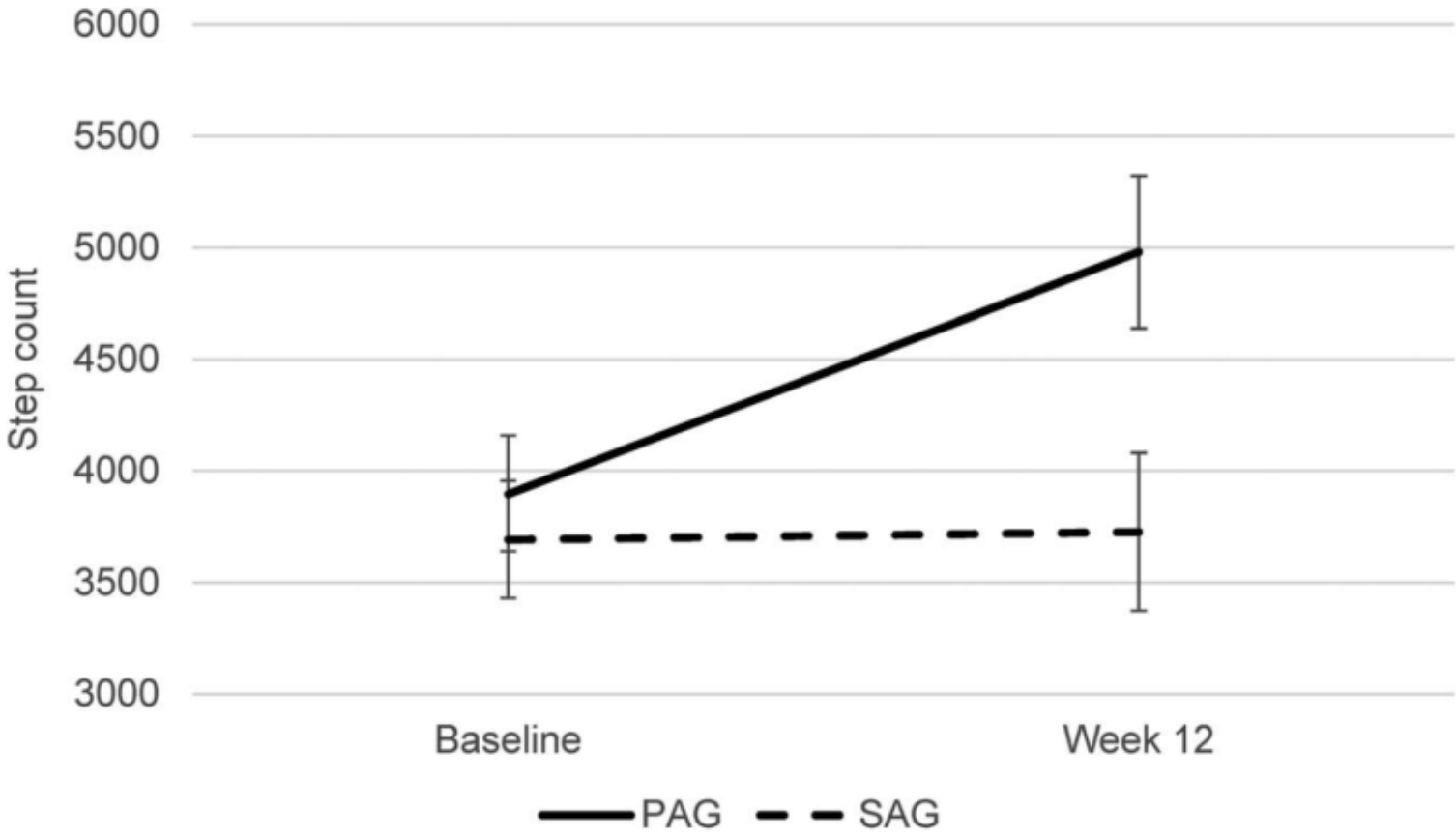


FIGURE 2—Accelerometer-derived step counts at baseline and week 12. The between-group difference is significant ($P = 0.008$).

Newton, et al., Med Sci Sports Exerc, 2022

TABLE 2. Mean baseline and 12-wk values for PA measured by ActiGraph.

	PAG ($n = 28$)			SAG ($n = 28$)			
	Baseline	12-wk	Change	Baseline	12-wk	Change	*P*
Wear days	6.7 ± 0.07	6.9 ± 0.06	0.18 ± 0.09	6.9 ± 0.07	6.9 ± 0.06	−0.04 ± 0.09	0.08
Wear time, min	1418.7 ± 5.06	1440.0 ± 5.06	21.3 ± 7.2	1428.9 ± 5.1	1440.0 ± 5.2	11.14 ± 7.2	0.32
Sedentary, min	1138.1 ± 15.4	1162.5 ± 18.2	24.4 ± 17.0	1178.2 ± 15.4	1186.7 ± 18.5	8.5 ± 17.2	0.51
760 cut point							
Light, min	224.8 ± 9.9	208.9 ± 13.4	−15.9 ± 11.8	201.2 ± 9.9	205.9 ± 13.5	4.7 ± 12.0	0.22
MVPA, min	55.8 ± 6.1	68.6 ± 6.9	12.8 ± 4.9	49.5 ± 6.1	47.6 ± 6.9	−1.9 ± 5.0	0.04
1041 cut point							
Light, min	248.1 ± 11.4	233.8 ± 14.9	−14.3 ± 13.1	223.1 ± 11.4	227.2 ± 15.1	4.1 ± 13.3	0.33
MVPA, min	32.5 ± 4.2	43.7 ± 4.9	11.2 ± 3.4	27.6 ± 4.2	26.3 ± 5.0	−1.4 ± 3.4	0.01
1952 cut point							
Light, min	272.8 ± 13.4	263.5 ± 17.1	−9.3 ± 14.7	245.9 ± 13.4	248.4 ± 17.3	2.5 ± 14.9	0.57
MVPA, min	7.8 ± 1.3	14.1 ± 1.9	6.2 ± 1.6	4.8 ± 1.3	5.1 ± 2.0	0.3 ± 1.7	0.01

Newton, et al., Med Sci Sports Exerc, 2022

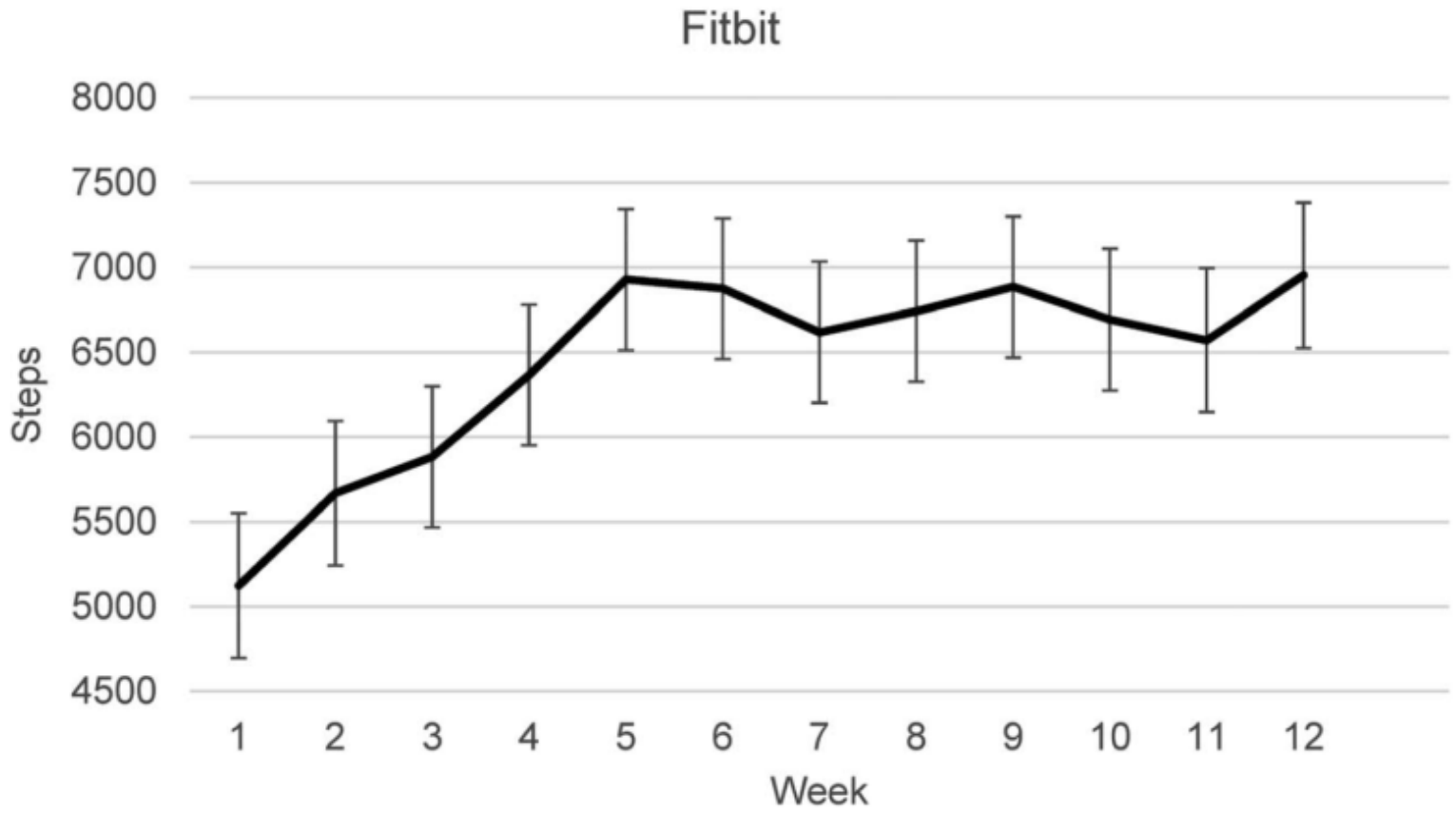


FIGURE 3—Average daily Fitbit step counts in PAG participants.

Newton, et al., Med Sci Sports Exerc, 2022

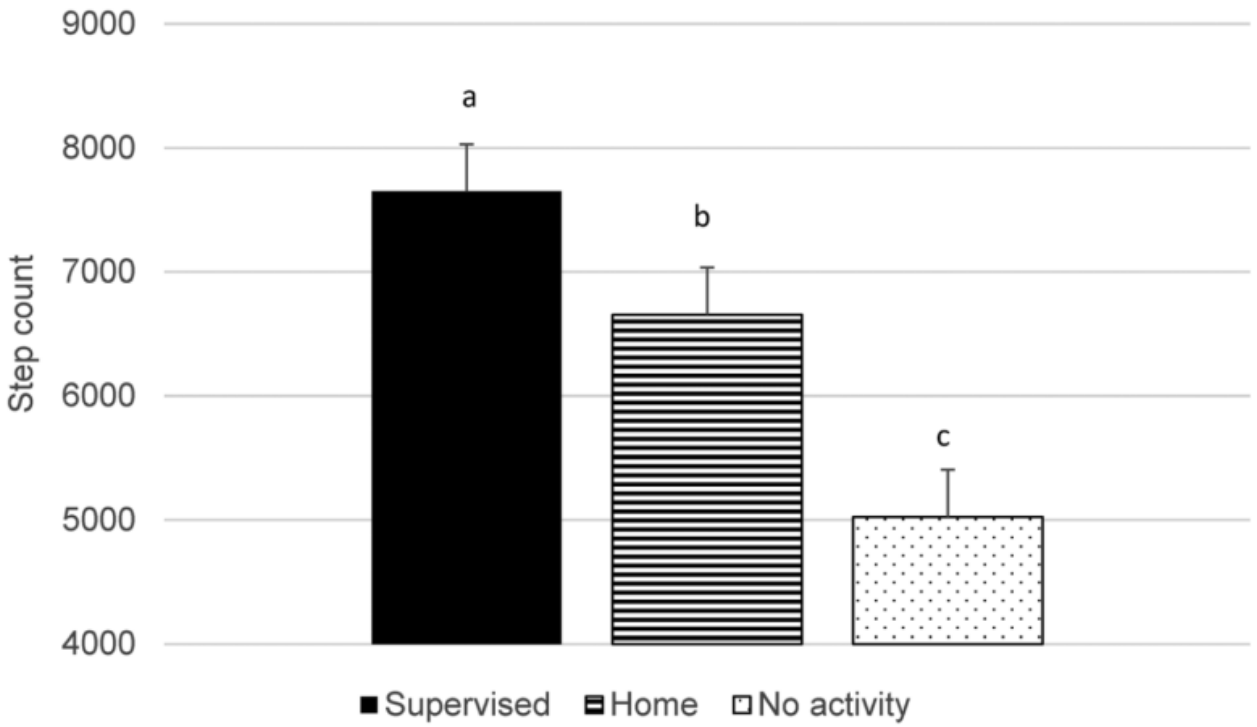
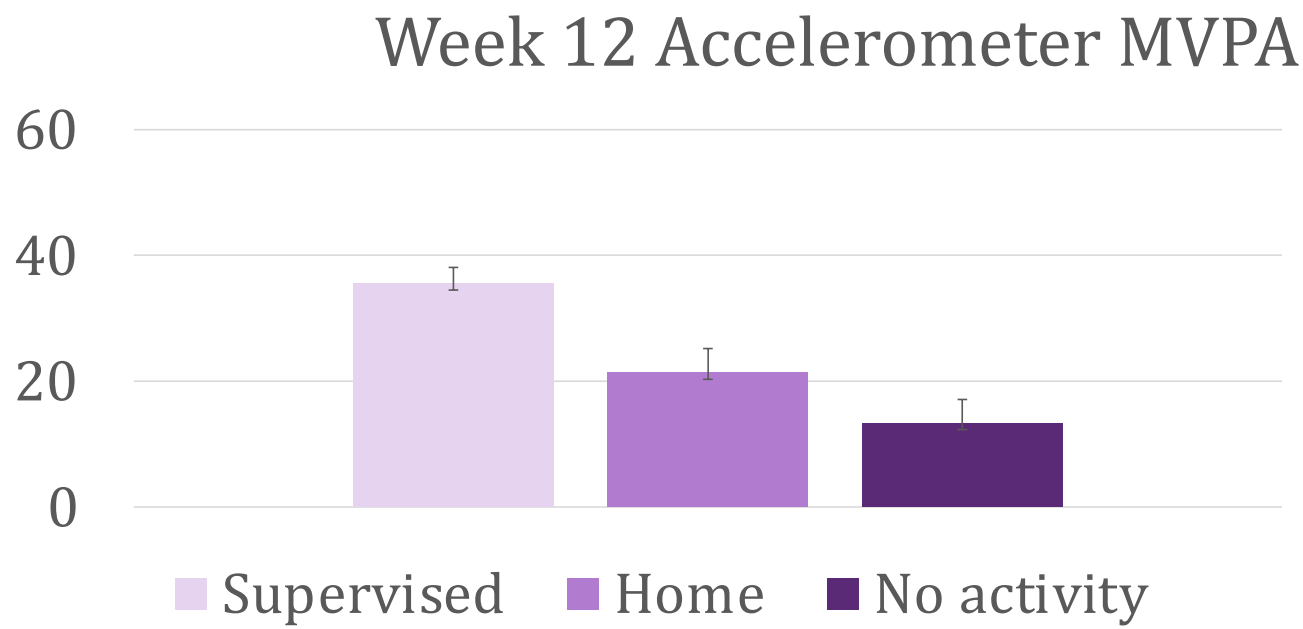


FIGURE 4—Average daily Fitbit step count data based on self-reported activity in PAG participants. Bars with different letters are significantly different from one another.

Newton, et al., Med Sci Sports Exerc, 2022



- 3.3 days/week of no PA
- 2.7 days/week of home PA
- 1.9 days/week of group PA

Newton, et al., Med Sci Sports Exerc, 2022

RBANS

Baseline (W0) $\bar{x}$ ± S.E.	PAG	SAG	p-value
Global Cognitive Function	93.6 ± 2.1	95.3 ± 2.15	0.589
Subdomains			
Immediate memory	99.1 ± 2.8	98.8 ± 2.8	0.943
Visuospatial function	86.8 ± 2.8	92.4 ± 2.8	0.170
Language capacity	98.9 ± 2.1	95.9 ± 2.1	0.326
Attention	93.0 ± 2.7	91.8 ± 2.7	0.747
Delayed memory	99.9 ± 2.5	102.9 ± 2.6	0.408

Note: $\bar{x}$ ± S.E. = mean ± standard error

M = 100, SD (15)

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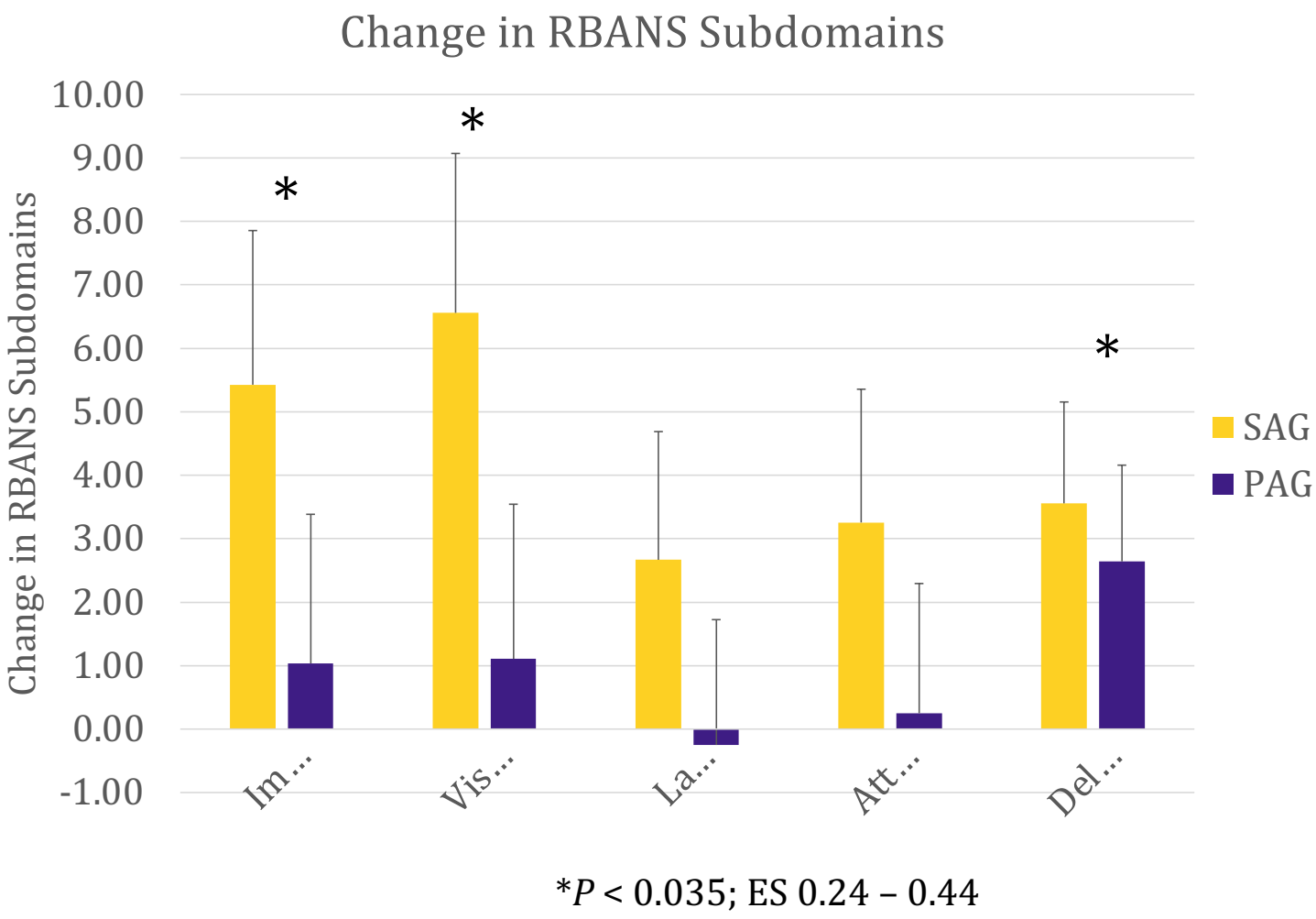
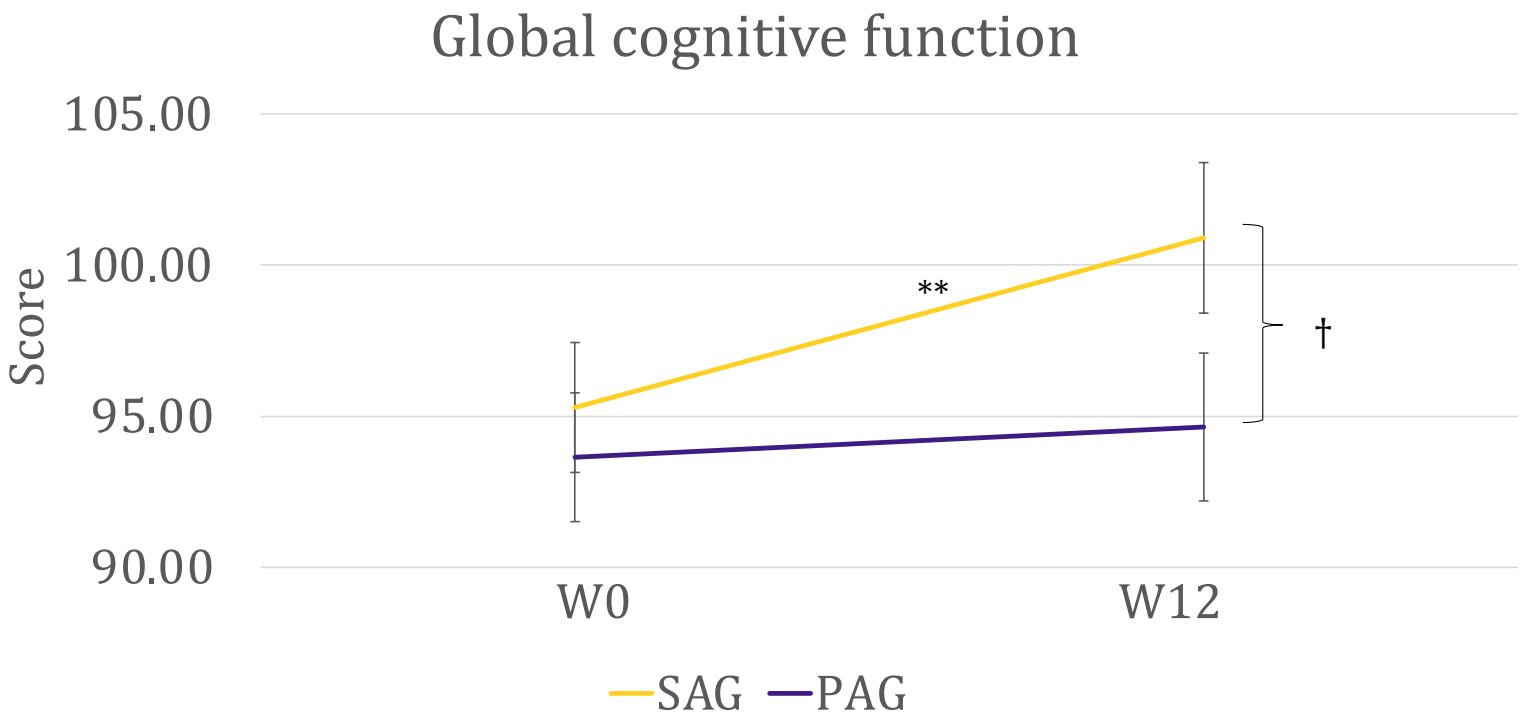
Gwizdala et al., Front Aging Neurosci, 2022



*$P < 0.035$; ES 0.24 – 0.44

Gwizdala et al., Front Aging Neurosci, 2022



**p<0.005; † p = 0.072; ES = 0.31

Attendance

SAG: 86%
PAG: 93%

TABLE 3. Participant satisfaction ratings.

Variable	*n*	Mean	Minimum	Maximum
Group				
PAG	27	24.3 (1.7)	20	25
SAG	25	24.6 (0.81)	22	25
Group leader				
PAG	28	19.6 (0.78)	17	20
SAG	25	19.8 (0.52)	18	20
Equipment				
PAG activity monitor	28	14.3 (1.3)	11	15
SAG materials	24	15.0 (0.0)	15	15
Overall				
PAG	28	4.9 (0.27)	4	5
SAG	25	5.0 (0.0)	5	5

Group: 5 items, 25 point maximum; group leader: 4 items, 20 point maximum; equipment: 3 items, 15 point maximum; overall: 1 item, 5 point maximum.

Newton, et al., Med Sci Sports Exerc, 2022

Conclusions

Program resulted in increased physical activity

PA may not have been of sufficient FITT

There was a social component to the SAG

Sub-threshold changes across multiple domains

Future directions

Continue to analyze data

- Physical function, telomeres, sleep, biomarkers

Two federally funded physical activity trials

Qualitative work in rural populations

Considering multi-component trials

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Questions

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