

Social Engagement and Cognitive Aging

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Public Health Dimensions of Cognitive Aging
Public Workshop
June 9, 2014

Observations on Social Engagement

- Social activity is associated with better
 - cognitive function (Ertel, et al., 2008) and less cognitive decline (Bassuk et al., 1999; James et al., 2011)
 - reduced dementia risk (Fratiglioni et al., 2004; Karp et al., 2005; Scarmeas et al., 2001 via dancing)
 - Increased brain volume: total brain & gray matter in temporal and occipital regions (James et al., 2012)
- Social networks protective (Barnes, et al., 2004; Holtzmann et al., 2004; Seeman et al., 2001)

Cognitive Interventions that Incorporate Social Activity

- Senior Odyssey of the Mind (Stine-Morrow, 2008)
- SYNAPSE Project (Parks, 2014)
- Community of Choirs (Johnson; UCSF)- recruiting
- Theatre acting intervention (Noice & Noice, 2004, 2014)
- Experience Corps (Carlson et al., 2008, 2009)

Senior Odyssey of the Mind

YYY
MEN

- Program Design:
 - Spontaneous problems
 - Fast-paced, think on your feet
 - Cycle through problems, increase in difficulty
 - Group-based problem-solving competition (5 months)
 - Work on design, implementation, and effective solution.
 - Ill-defined, with divergent solutions that draw from different domains (engineering, literature, history, technology, etc.)
- Results: small but reliable improvements in
 - speed of processing
 - inductive reasoning
 - divergent thinking



Stine-Morrow, Parisi, Morrow, & Park (2008)

SYNAPSE Project (3 months)

Learning Groups: 1) Quilting, 2) Digital Photography, 3)

Combined

Control Groups: 4) Social, 5) No-contact

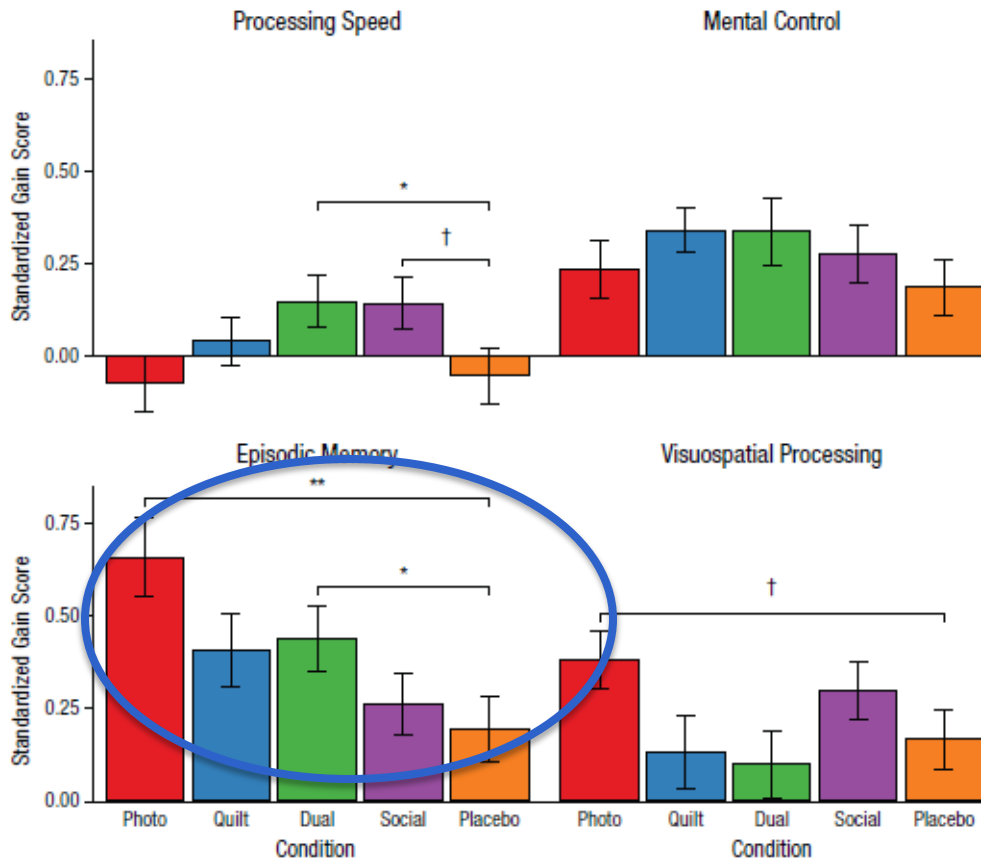


Fig. 2. Mean standardized gain score as a function of condition for each cognitive construct. The standardized scores from the posttest were subtracted from standardized scores from the pretest, yielding the mean standardized gain scores for each cognitive construct. Error bars represent ± 1 SE. Asterisks represent significant differences between conditions ($*p = .05$; $**p = .01$); daggers represent marginally significant differences between conditions ($p = .10$).

RESULTS:

Only memory was improved in the Learning Conditions vs. No Contact Control

No benefit for Social Control group

Park, et al. *Psychological Science* (2014)

Does Social Engagement with a Purpose Matter?

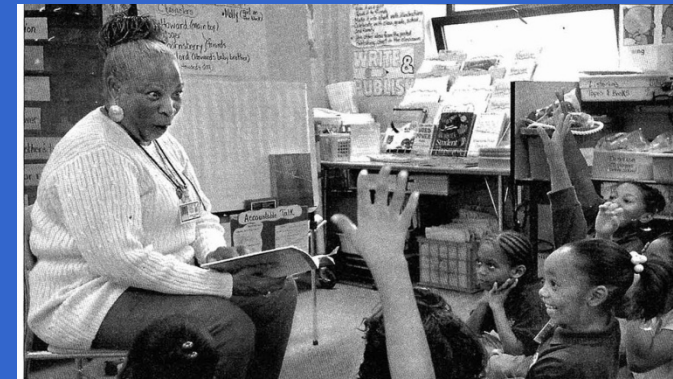
- Desire to remain generative & productive
- Harnessing one's lifetime of accumulated wisdom

Challenges

- Retirement and the resulting loss of routine contact with co-workers
- Increasing tendencies for adult offspring to live remotely
- Disability and disease among friends & spouses

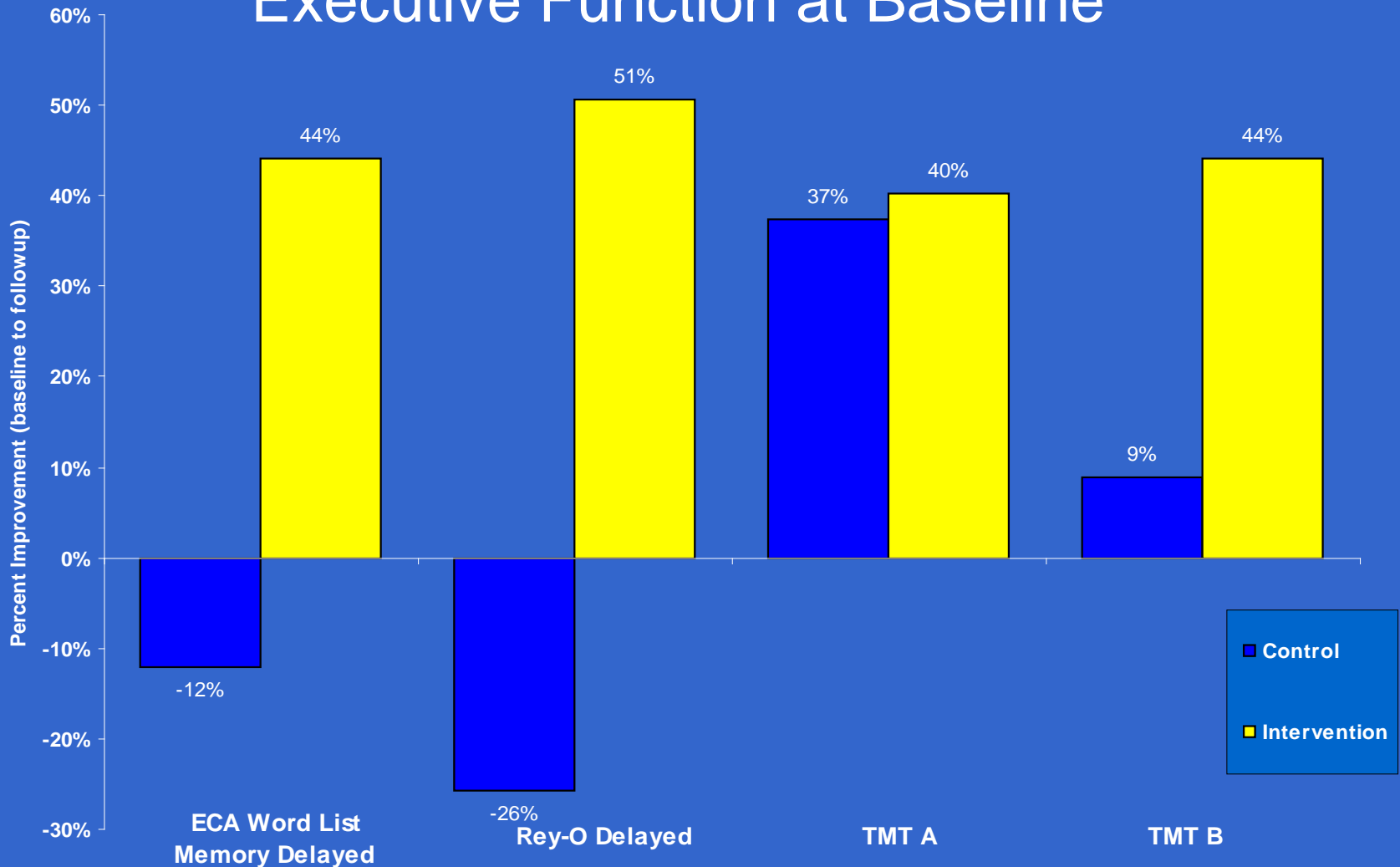
Social Health Promotion: Experience Corps

- Volunteers 60 and older
- Serve in public elementary schools: K-3
- Multiple roles to exercise executive function, memory
 - Reading literacy
 - Library support
 - Math support
 - Behavioral support
- ≥ 15 hours per wk
- Reimbursement for expenses: \$250/mo
- Sustained dose: full school year

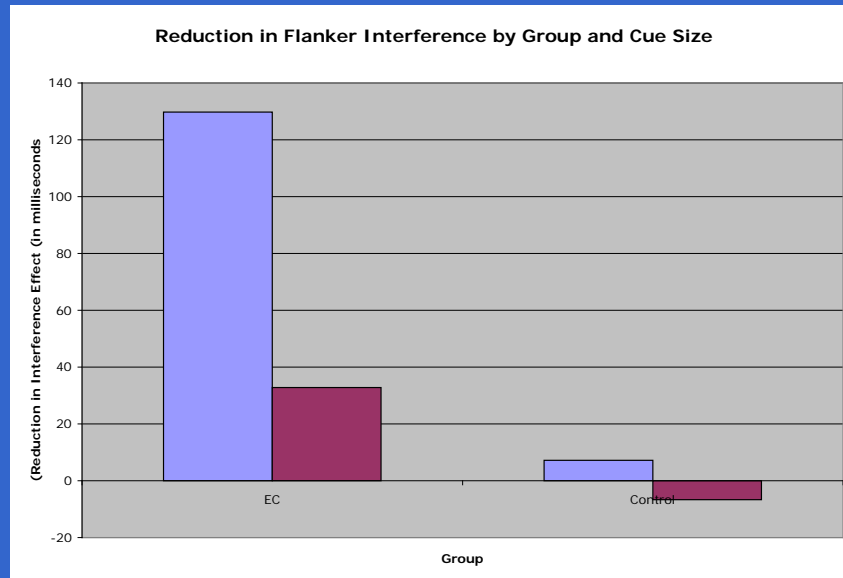
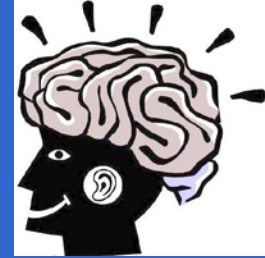


“YOU ARE A FRIEND IN THE CLASSROOM.”
AUDREY WEEMS, 70, READING A STORY TO STUDENTS IN A THIRD-GRADE CLASS AT WAVERLY. A MOTHER OF EIGHT, SHE WORKED AT THE SOCIAL SECURITY ADMINISTRATION FOR 35 YEARS, RETIRING IN 2002. WEEMS LEARNED ABOUT THE BALTIMORE EXPERIENCE CORPS PROGRAM THROUGH HER CHURCH.

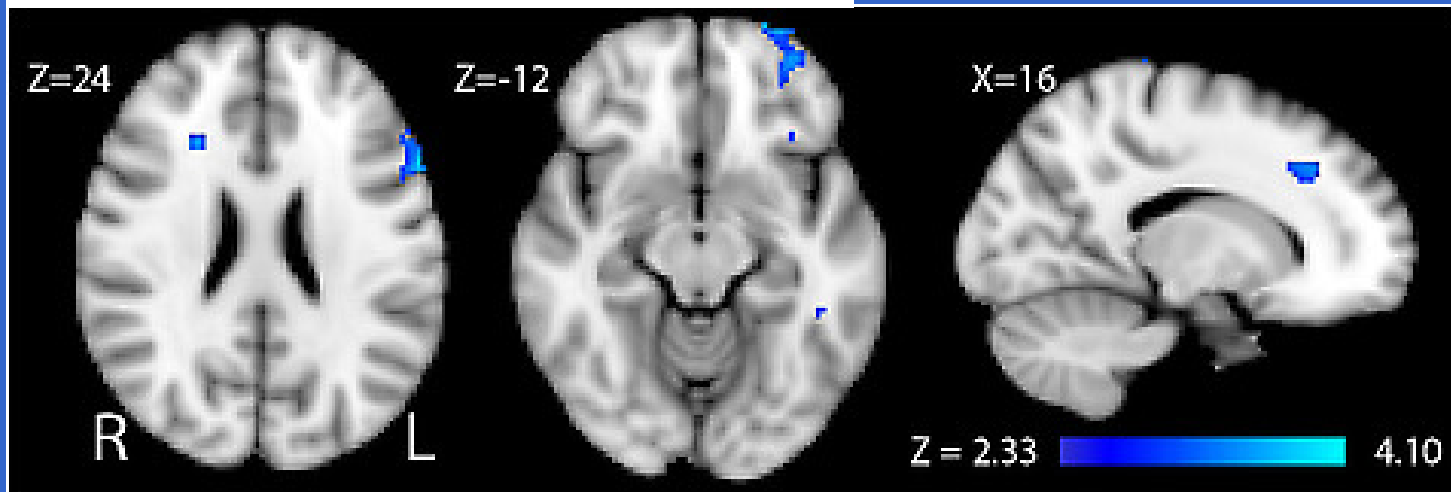
After 1 academic year, Experience Corps Led to Improved Cognition in those With Poor Baseline Executive Function at Baseline



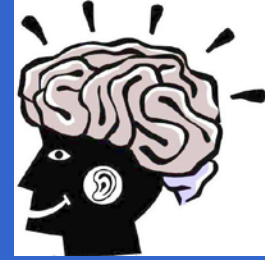
Does Experience Corps Improve Brain Function Related to Executive Function?



Answer: Yes

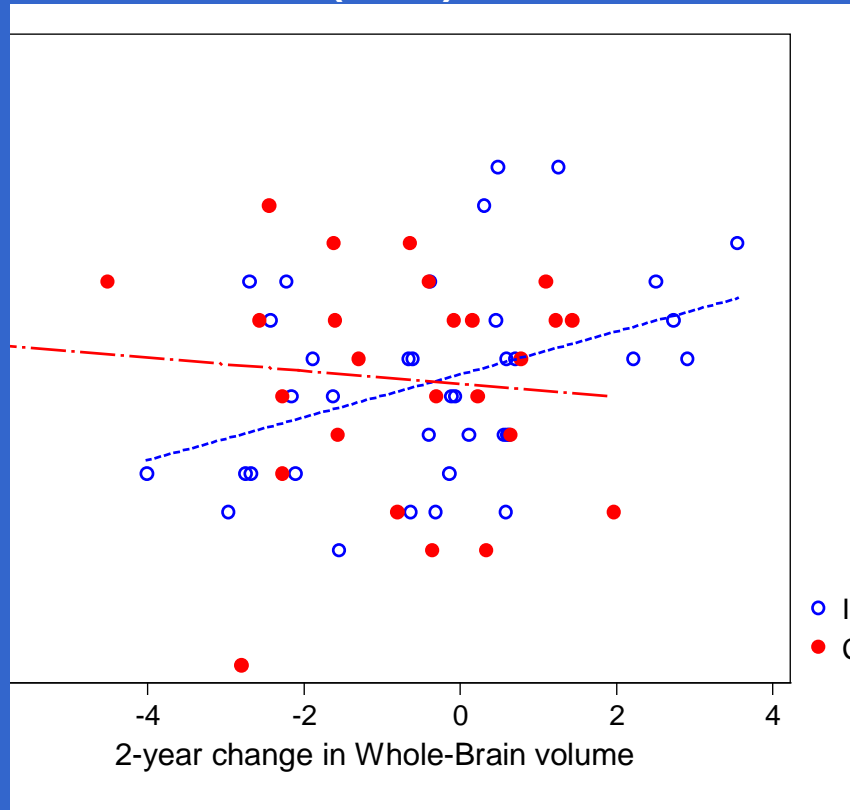


Does Experience Corps Lead to Benefits in Brain Volume (Size)?

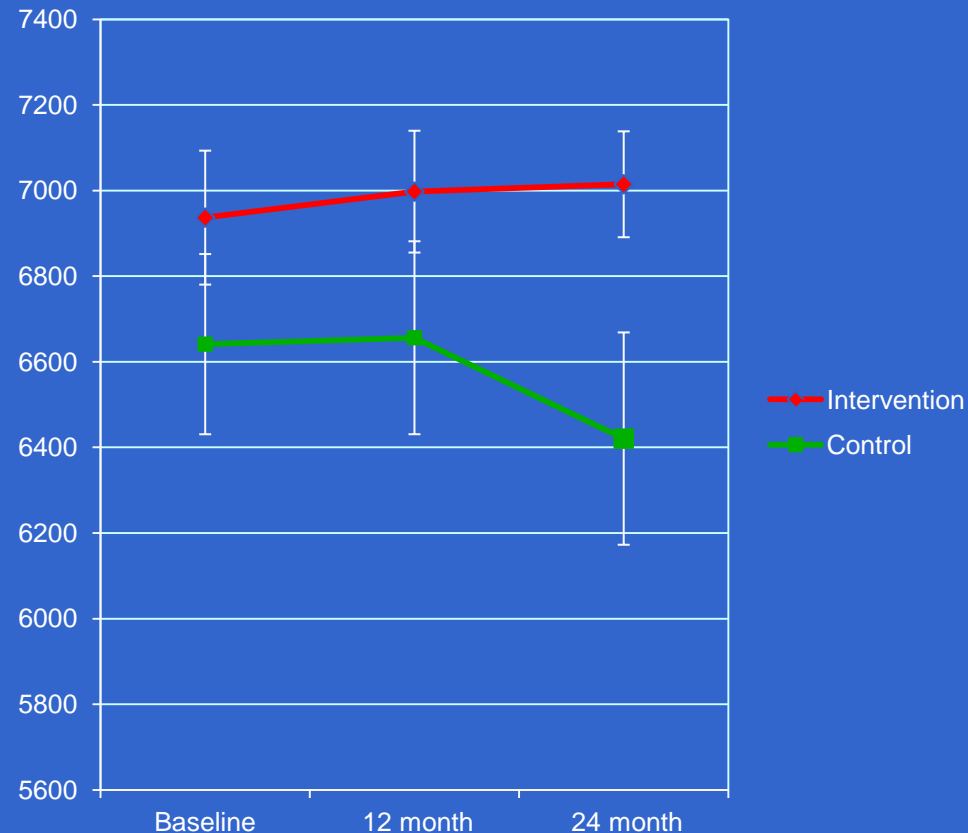


Results from the 2-Year Brain Health Study Trial (N=120)

2-year improvement in memory related to 2-year increase in whole brain volume in EC (blue)



Hippocampal Volume (mm³) Increased in men in EC



More to Come from the Baltimore Experience Corps Trial

- Randomized: 702 adults 60 yrs. and older to EC or low-activity control
- Exposure: 2 years of high-intensity service
- Cognitive Outcomes:
 - Memory (Rey Auditory Verbal Learning Task)
 - Executive Function (Stroop)
 - Speed of Processing (Pattern Comparison)

funded by NIA BSR: 2006-2012

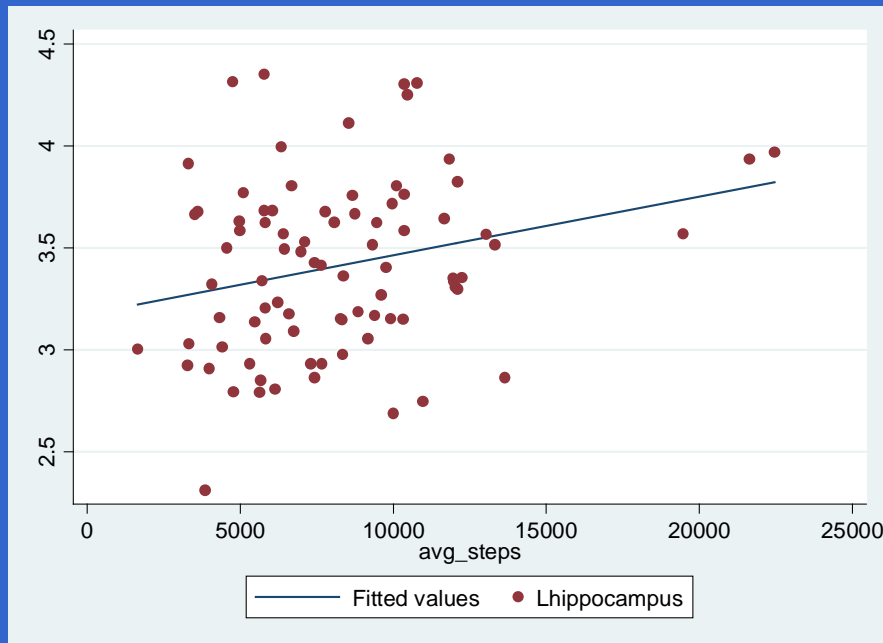
Social Activity with a Purpose is Good for Cognitive & Brain Aging

So how do we get more of it in our daily
lives?

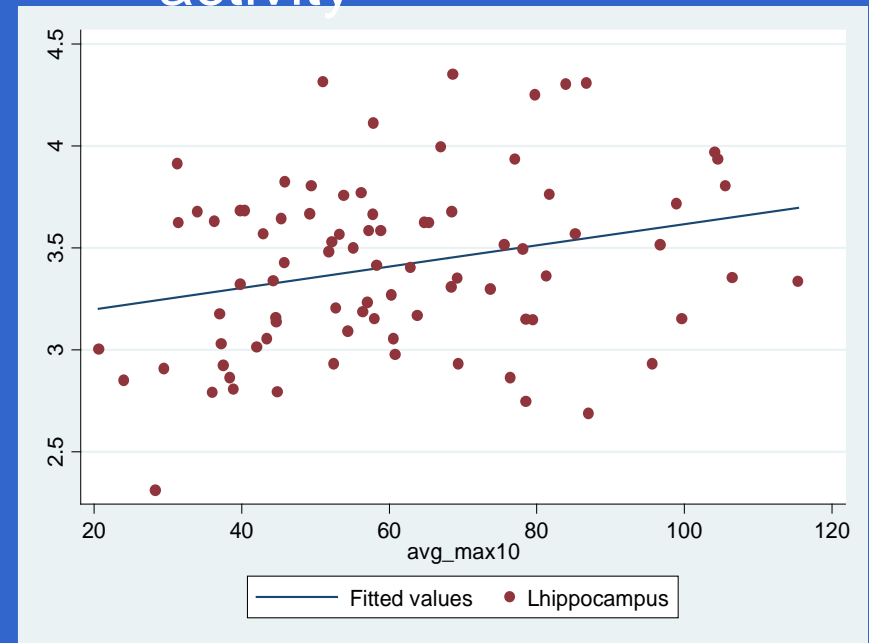
Everyday Physical Activity: Small Increases in Daily Step Activity is Associated with Larger Hippocampus Size

Even small increases in physical activity may matter

Average steps/day

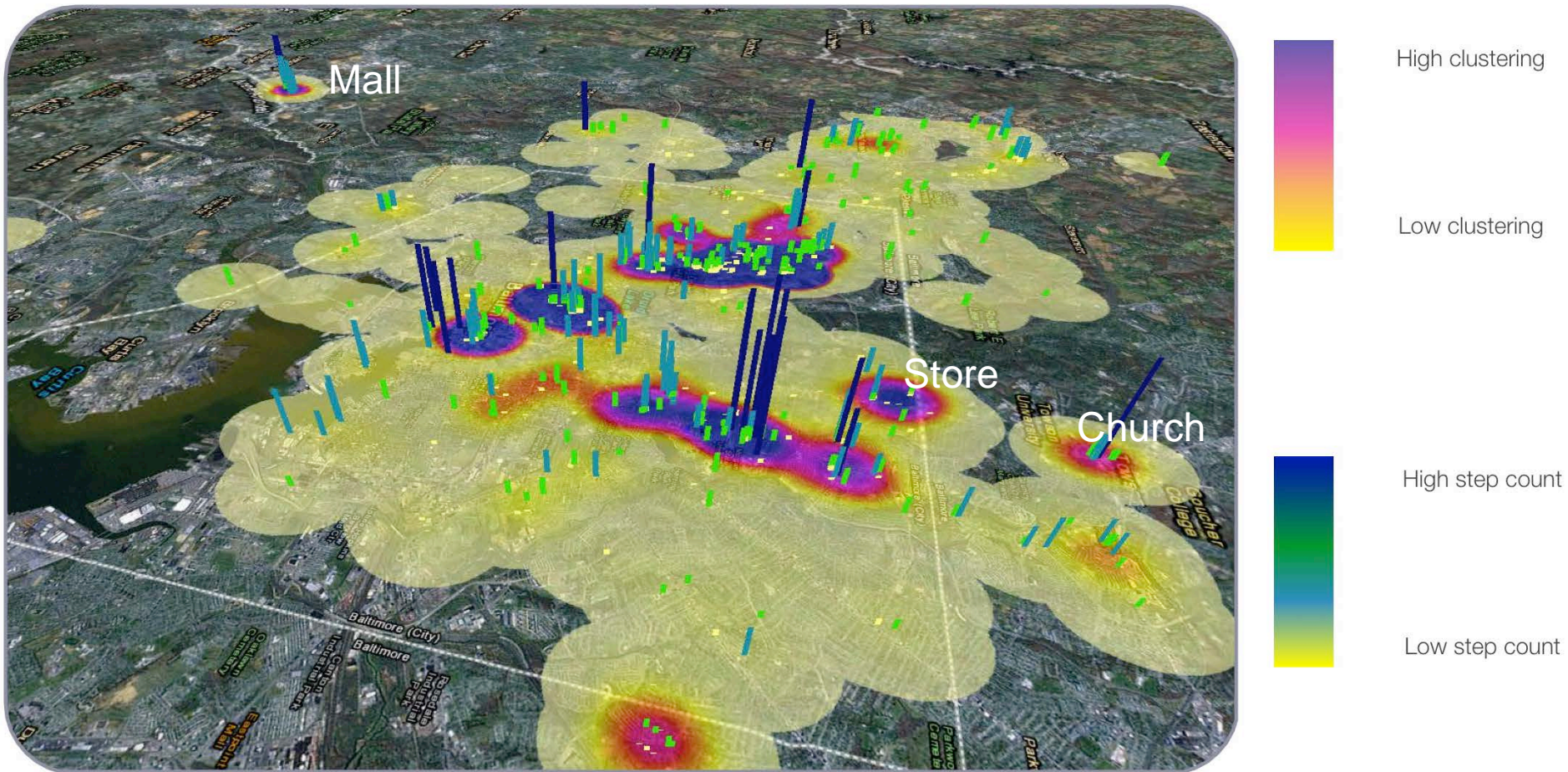


Peak bout of daily activity



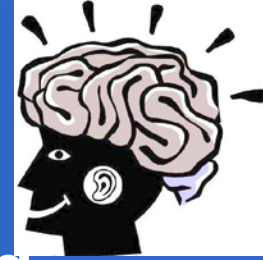
Preliminary Work: Greatest Amount of Daily Step Activity May Occur Outdoors in Social, Community Spaces

3D HEAT MAP OF BHS PARTICIPANT ACTIVITY (STEP COUNT)

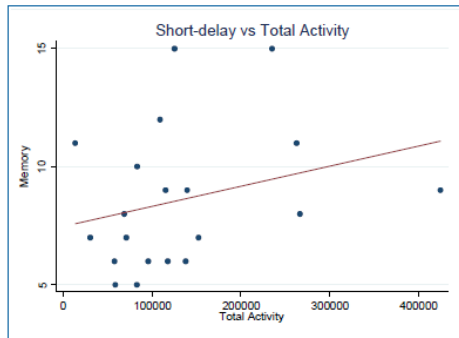


Does it Matter?

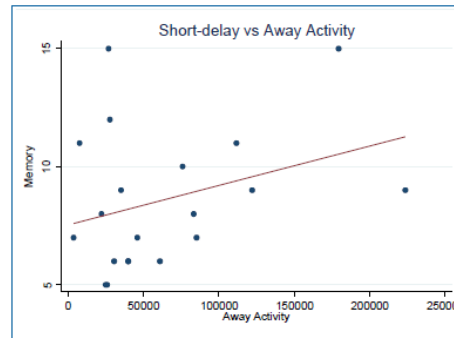
Answer: Activity in community spaces most strongly associated with memory & mental speed



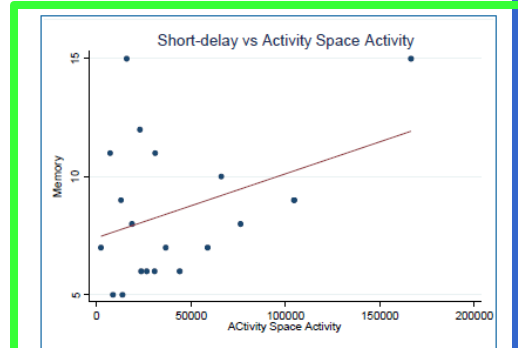
Memory (RAVLT: short delay) and Activity (accelerometer counts)



Total activity
 $r = 0.28$ ($p = 0.23$)

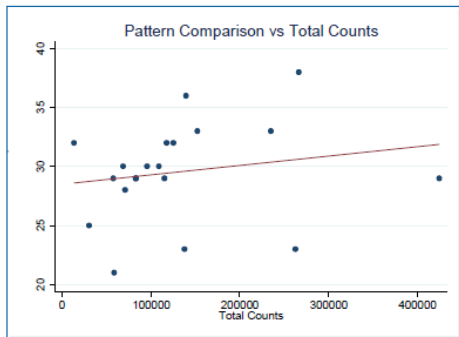


Activity away from home
 $r = 0.32$ ($p = 0.16$)

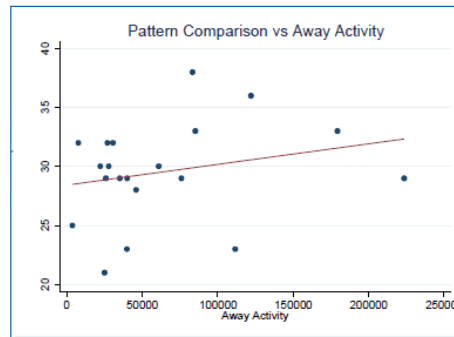


Activity in activity spaces
 $r = 0.38$ ($p = 0.10$)

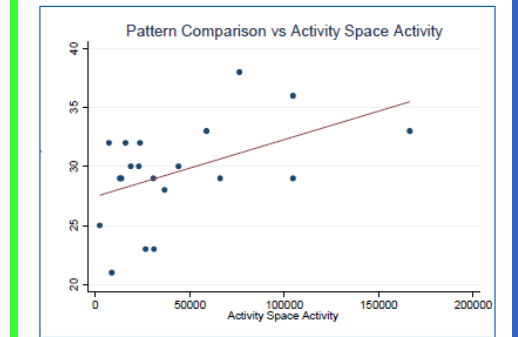
Pattern Comparison and Activity (accelerometer counts)



Total activity
 $r = 0.18$ ($p = 0.44$)



Activity away from home
 $r = 0.24$ ($p = 0.31$)



Activity in activity spaces
 $r = 0.48$ ($p = 0.03$)

Discussion

- Social Activity as a Vehicle to promote and sustain:
 - cognitive and physical activities
 - Meaning and value in one's life– **activity in the service of a generative goal**
 - Activity with others provides the glue or “Stickiness” factor to sustain it

Funding Acknowledgments

Experience Corps Trial

- Alzheimer's Drug Discovery Foundation
- NIA BSR Grant # P01AG027735-03 supplement
- Greater Homewood Community Corporation
- Johns Hopkins OAIC Pepper Center Grant #P30AG021334
- Johns Hopkins Neurobehavioral Research Unit
- S.D. Bechtel Award

Geo-Coded Activity

- Johns Hopkins ADRC Pilot Grant
- Johns Hopkins OAIC Pepper Center Grant #P30AG021334