

Physical Capacity Across Social Strata

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Resilience and Reserve in Aging
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Outline

Existing Research

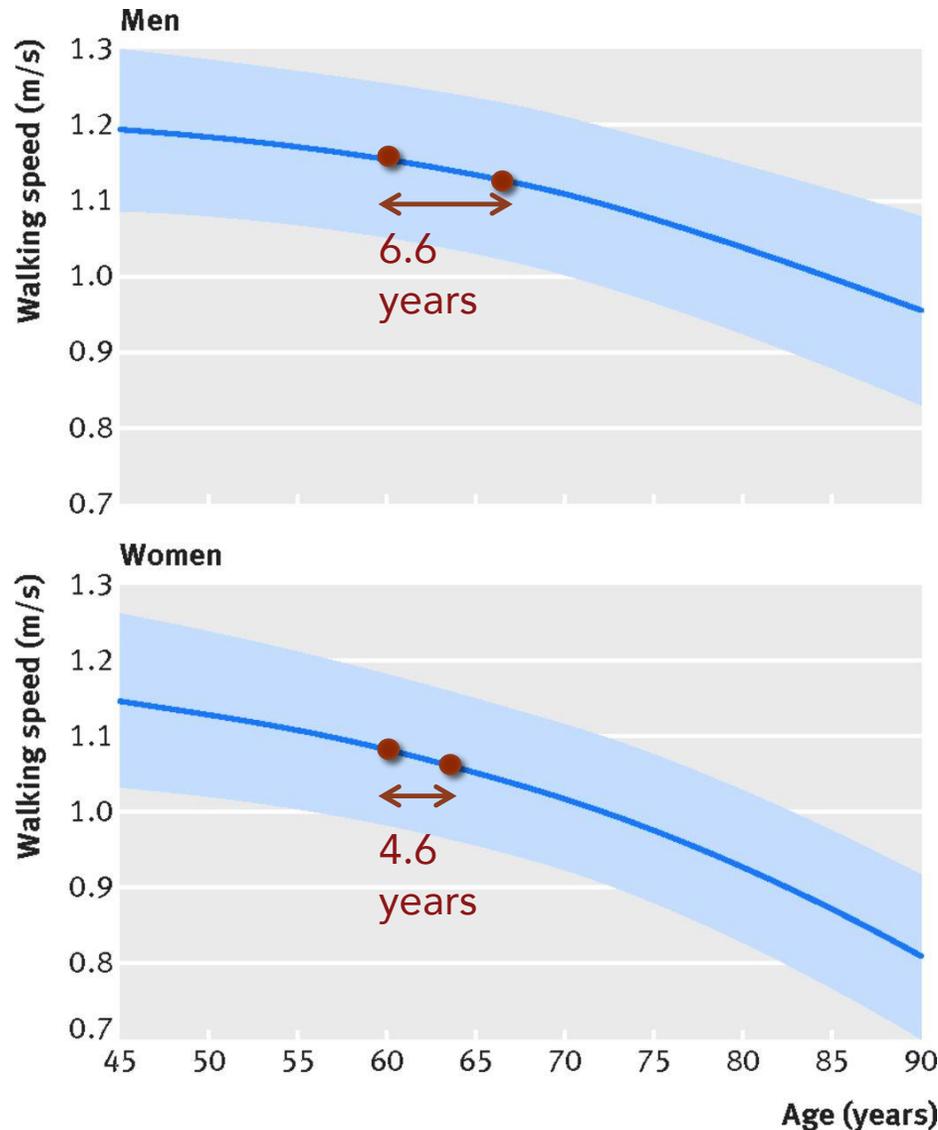
1. Disparities exist
2. Disparities begin early in life
3. Environment matters
4. Plasticity of physical capacity
5. High heterogeneity

Opportunities for future research

Low Social Class Accelerates Age Effect on Gait

- Pooled 37 cohort studies from 24 countries in Europe, the United States, Latin America, Africa, and Asia, conducted from 1990-2017
- Sample size: 109,107 men and women age 45-90 years
- Outcome: gait speed
 - Converted to “years of functioning lost”, based on age-expected trajectories of gait
- Socioeconomic class assigned by occupational title
 - Wealth was used when occupation was missing

Low Social Class Accelerates Age Effect on Gait



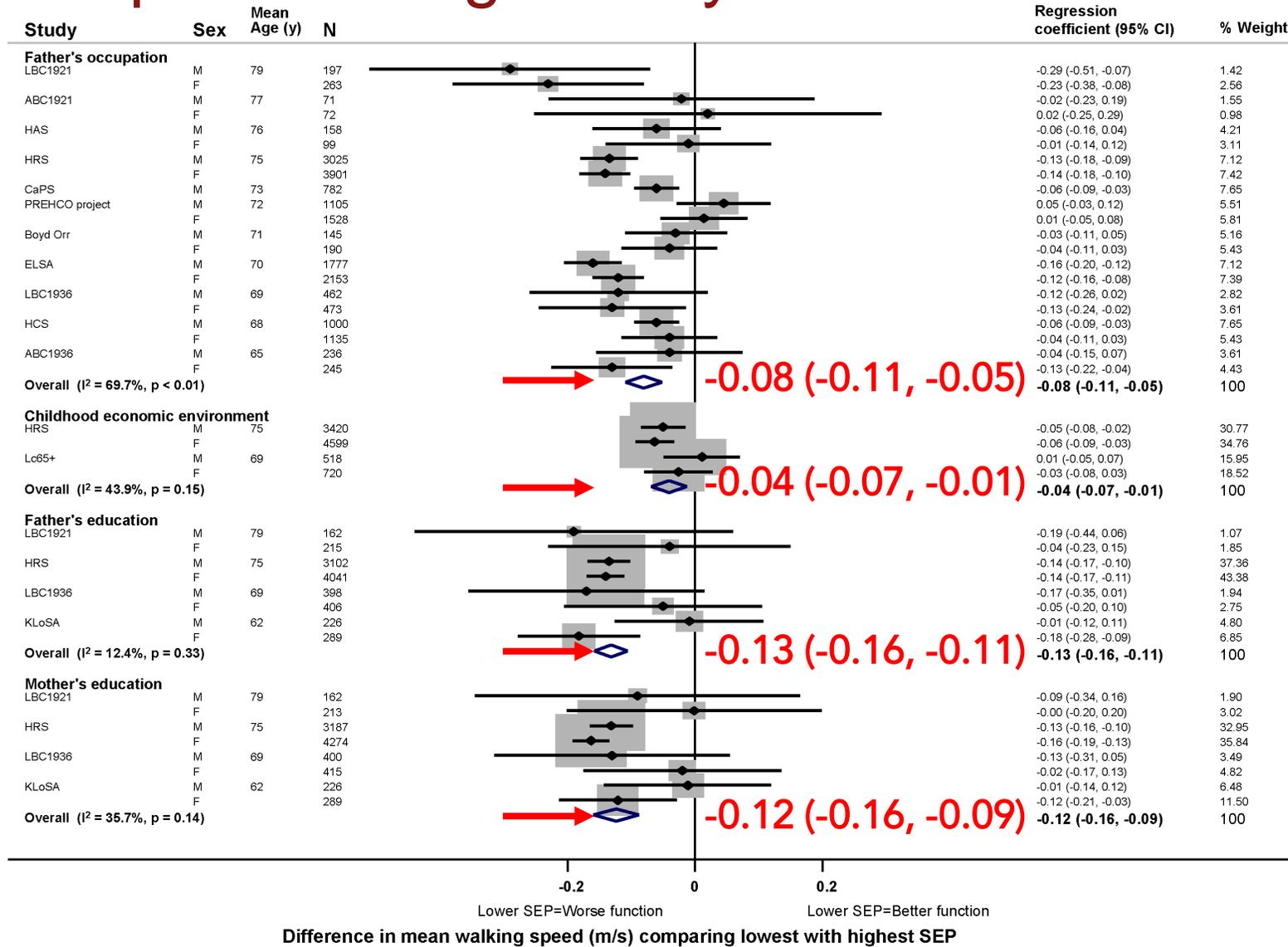
Men: Low socioeconomic class, -6.6 (95% CI: -9.4, -5.0) Years Function Lost

Women: Low socioeconomic class, -4.6 (95% CI: -6.2, -3.6) Years Function Lost

Disparities Begin Early

- Pooled 19 studies for inclusion in meta-analyses from years 1950 - 2010
- Sample sizes: N = 20,770
- Age range: 18 to 79 years
- Exposure: childhood socioeconomic position (SEP) given by parental occupation or education, & childhood economic environment.
- Outcome: gait speed (also looked at grip strength, chair rises, standing balance)

Disparities Begin Early



Association of parental education with walking speed was stronger than association of either father's occupation or childhood economic environment

Features of Higher SES Environment Promote Physical Activity

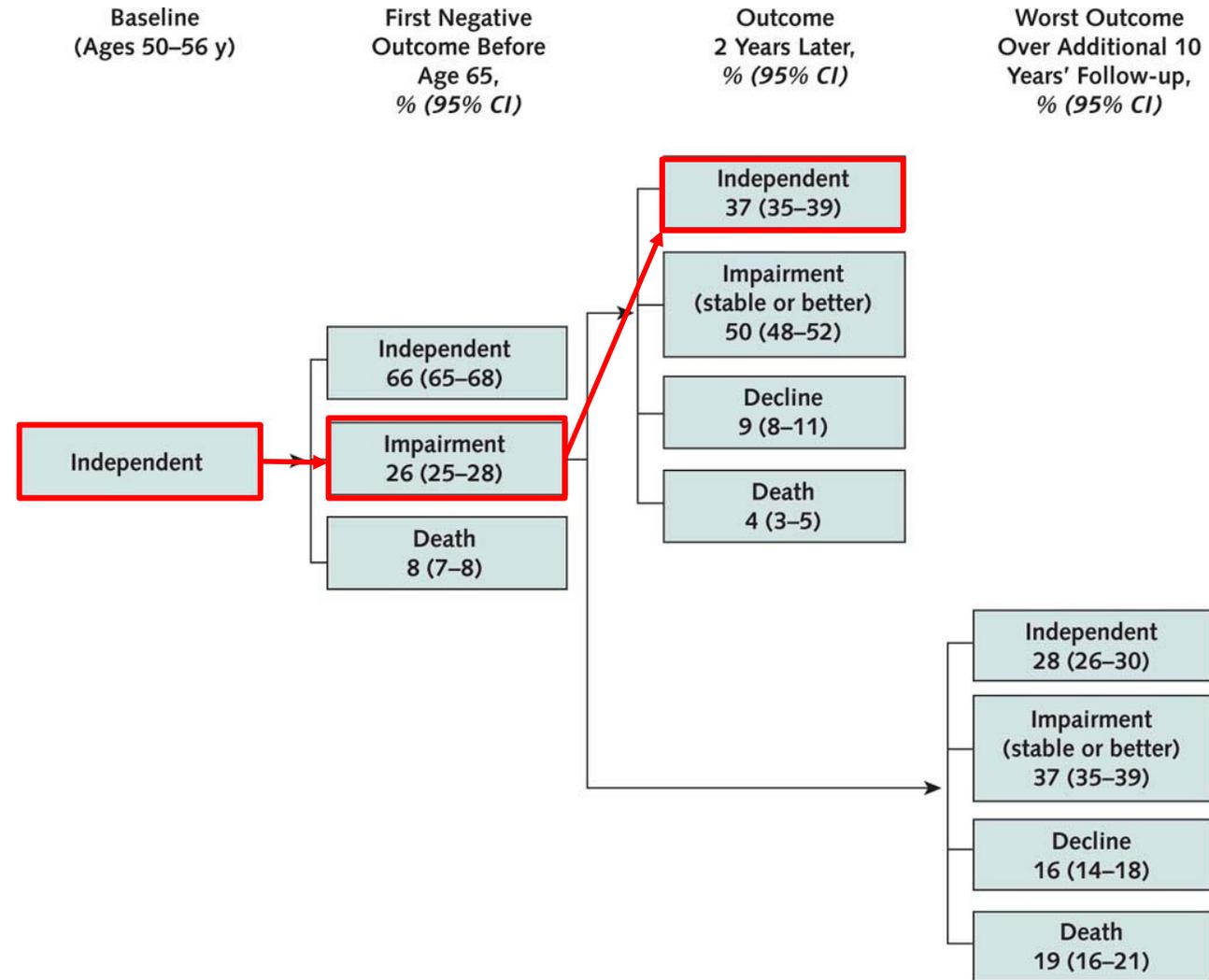
A systematic review of 100 studies of the built environment found that the following features were associated with more physical activity:

- Safety
- Access to destinations/services
- Recreational facilities
- Parks/open spaces
- Shops/commercial destinations
- Greenery/aesthetically pleasing scenery
- Walkability



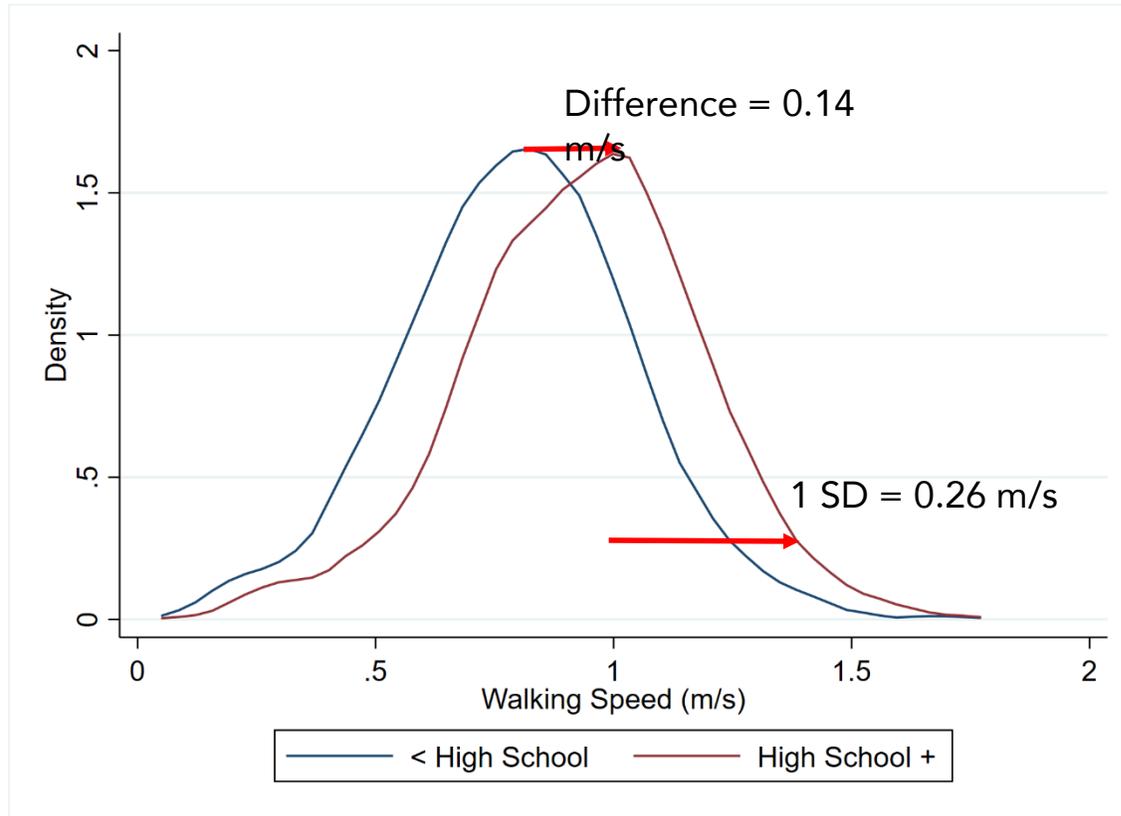
Barnett, D.W. et al. Built environmental correlates of older adults' total physical activity and walking: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act.* 2017

People Transition In and Out of Limitations



- Jackson Heart Study (mean age 55 years):
- 33% reported incident mobility impairment over 12 years of follow-up
 - 54% recovered within one year

Population Heterogeneity > Differences by Social Class



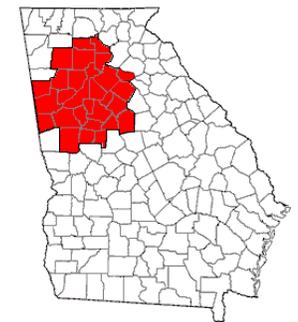
NHANES data (1999-2002)

Morehouse/Emory Cardiovascular (MECA) Center for Health Equity Study

Goal is to identify resilient communities of Blacks residing in the Atlanta metropolitan area

Resilient: lower than expected CVD rates based on SES

At Risk: higher than expected CVD rates based on SES



Micro “Blue Zones”

Kim et al. Prev Chronic Dis. 2019; 16: 180505

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Opportunities for Future Research

Research Need: Studies within marginalized communities

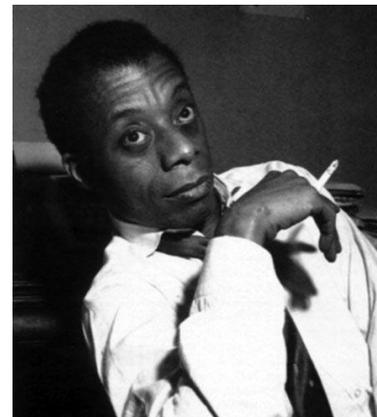
Comparison of marginalized and advantages communities can establish disparities

Less helpful for identifying opportunities for prevention

We need more research within marginalized communities, specifically focused on those who are thriving, despite disadvantage

This could inform interventions to improve resilience within marginalized communities

“The wonder is not that so many are ruined but that so many survive” –
James Baldwin.



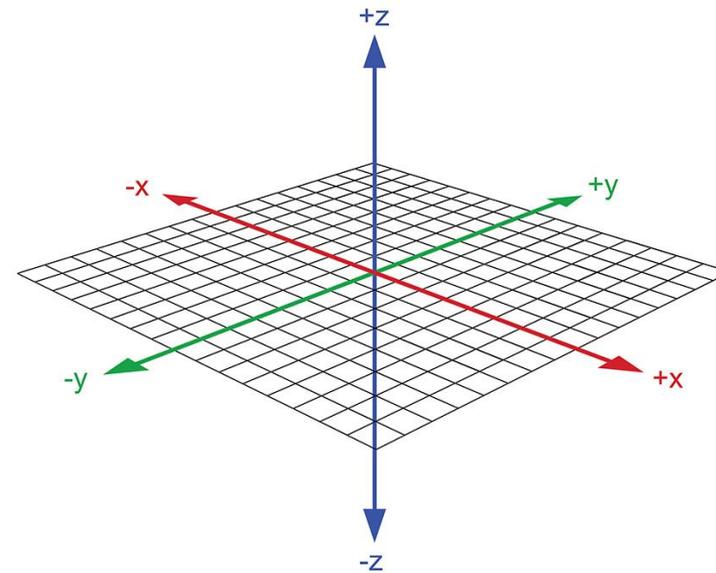
Research Need: Studies in space and time

The built environment supports walking; does it also support physical capacity and disability prevention?

How do protective features vary by community?

Walkability may not be as protective in South where walking is not cultural norm

What promotes recovery/resilience?



Research Need: Can interventions build reserve?

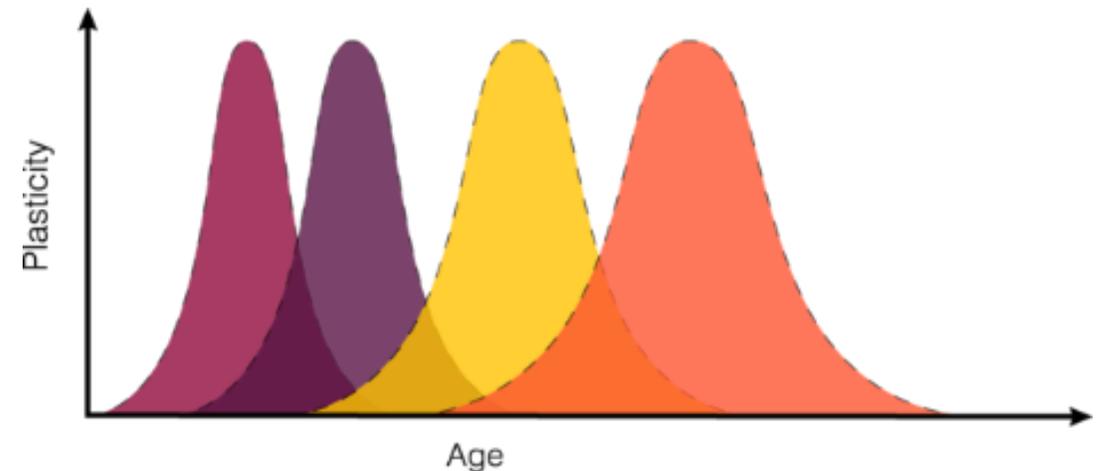
The Lifestyle Interventions and Independence for Elders (LIFE) study demonstrated a structured physical activity program reduced the risk of incident major mobility disability (HR: 0.82, 95% CI: 0.69, 0.98)

Are there critical periods at which we can intervene to optimize resilience?

Focus on early life

Tailor interventions to communities

One size does not fit all



Thank you

QUESTIONS?



Assessment of Physical Capacity

Domain Specific

- **Measured physical performance**
 - Gait speed
 - Grip Strength
 - Balance
- **Self-report**
 - Functional limitation – difficulty walking, climbing stairs, lifting 10 lbs
 - Instrumental Activities of Daily Living – paying bills, cooking, shopping, etc.
 - Activities of Daily Living – dressing, toileting, bathing, etc.

Broad Measures

- **Disability**
 - Defined as difficulty completing usual activities
 - Often assessed by ADL limitation
 - Some definitions consider the gap between capability and environmental demand
- **Frailty**
- **Employment**
- **Life-Space**