GSA 2020 ANNUAL SCIENTIFIC MEETING
ONLINE

Turning 75: Why Age Matters

November 4-7, 2020

Accessibility to parks and trails and physical health measures in CATSLife: evaluating selection

Chandra A. Reynolds[1,2], Elijah Knaap[2], Robin Corley[3], Kyle Gebelin[1], Elizabeth Munoz[4], Soo H. Rhee[3], Sally J. Wadsworth[3]

1. UC Riverside, Psychology
2. UC Riverside, Center for Geospatial Sciences
3. CU Boulder, Institute for Behavioral Genetics
4. UT Austin, Human Development & Family Studies

#GSA2020

DISCLOSURE(S)

I have no commercial relationships to disclose.

Background & Aims

- Neighborhood walkability, parks and recreational access associated with obesity, cardiovascular and self-rated health[1-6]
- Few have evaluated self-selection that may underlie associations
- In the ongoing *Colorado Adoption/Twin Study of Lifespan behavioral development and cognitive aging* (CATSLife), we —
  - evaluate health traits with geospatial accessibility
    - Park and trail measures
    - Self-report activity-friendliness of neighborhoods
  - evaluate selection using sibling similarity

1. Pitas, et al (2017). *Preventing chronic disease, 14.* 2. Brown et al (2009), Health Place, 15(4). 3. Mason et al (2020), Soc Sci Med, 261. 4. Tarlov et al (2020), Obesity , 28(1). 5. Seo et al (2019). Environment International, 125. 6. Dalton et al (2020). PlosOne, 15(10.

Methods

CATSLife Sample

- 1240 participants in analysis sample
  - 44.4% Colorado Adoption Project (CAP)
  - 55.6% Longitudinal Twin Study (LTS)
- Ages 28-49 years (M = 33.28 , SD = 4.97)
- Female (52.9%)
- White 92.1%, Hispanic 5.9%
- 95.2% of siblings live apart (30 sib pairs live together)
  - Sibling types: Adoptive, Control, DZ twins, MZ twins
- Married/Cohabitating: 65.5% (N=1236)

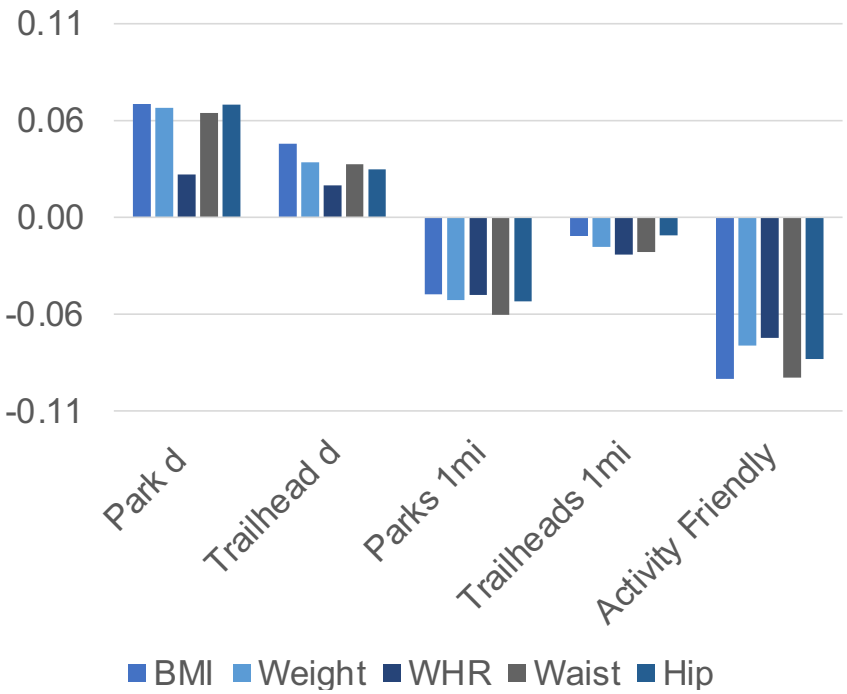
Measures

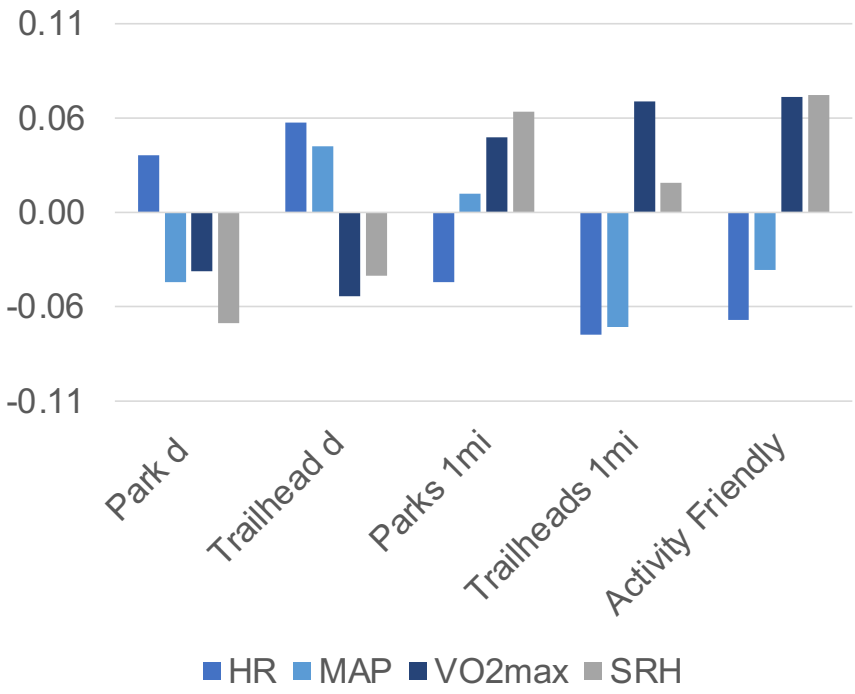
- Health
  - **BMI**, resting heart rate (**HR**), mean arterial pressure (**MAP**), **VO2Max** (calculated), self-rated health (**SRH**)
- GIS
  - Open Street Map
    - **Park features** (5): Parks, Recreation ground, Nature-reserve, Forest, Meadow
    - **Trail features**: Paths, Trailheads
  - **Closest Euclidean Distance**
  - **Counts**: ¼, ½, **1mile** radius of lat/long
- Activity Friendly Neighborhood: **IPEN**
  - 5 items used, scaled 0/1 and summed

Results

Associations, Selection, Models

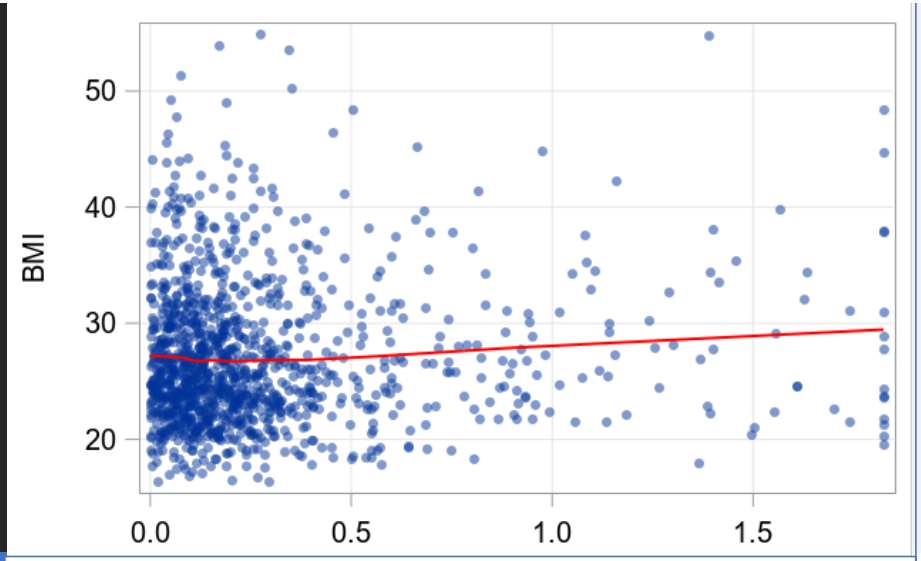
Correlations: Access & Health

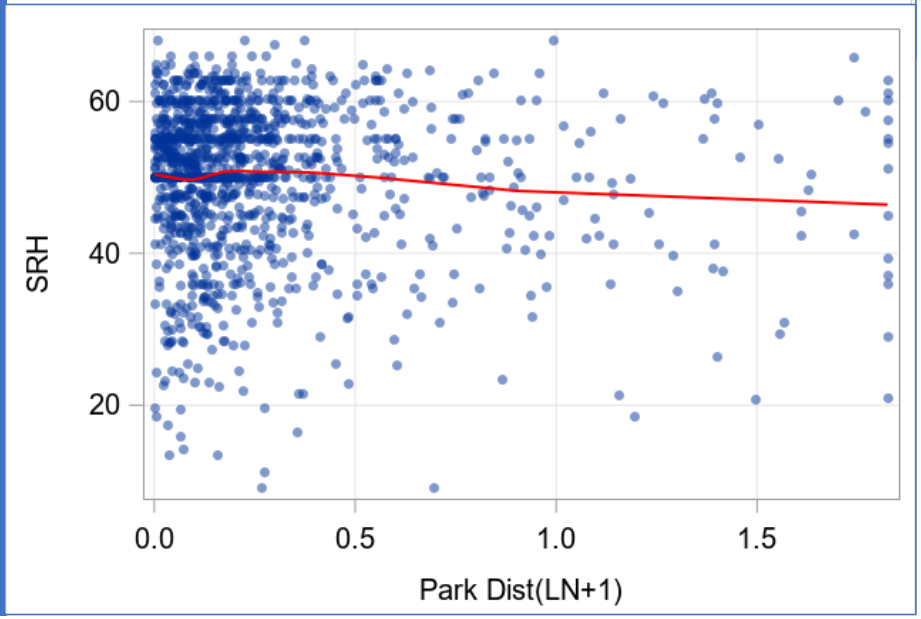




GIS measures log-transformed (LN+1), *r*'s partialed: sample, age, female, white, Hispanic

Ns = 1185 - 1221

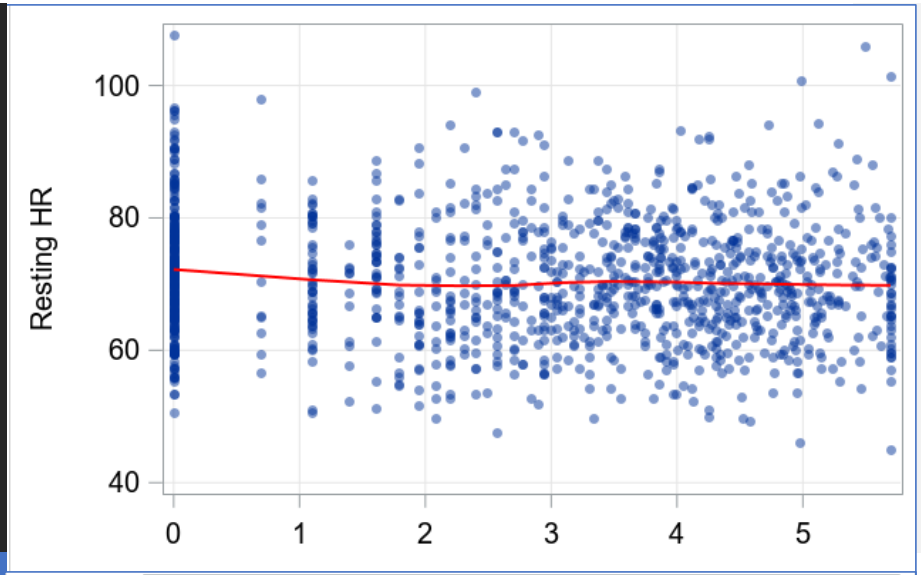




BMI & SRH by Park Distance (LN+1)

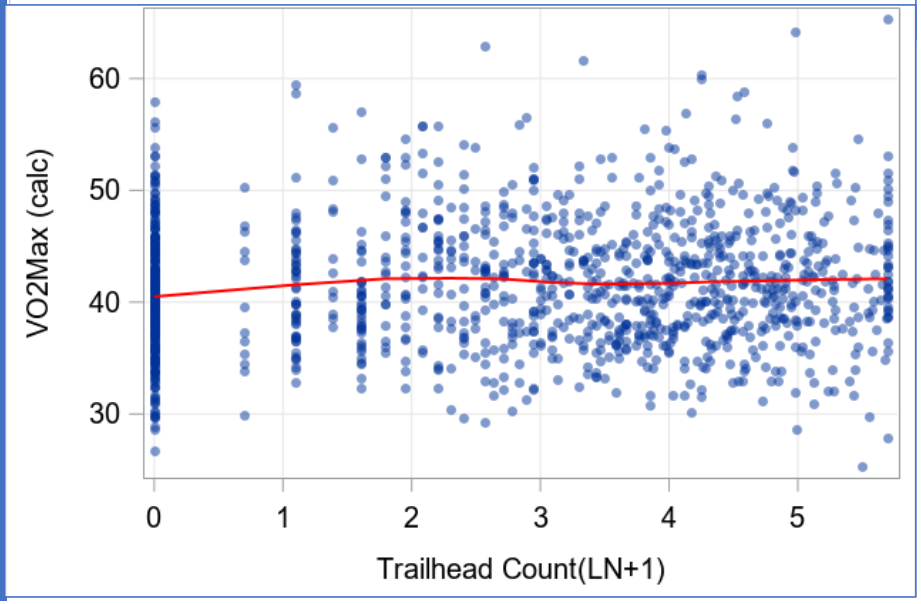
Greater distance: higher BMI & worse SRH

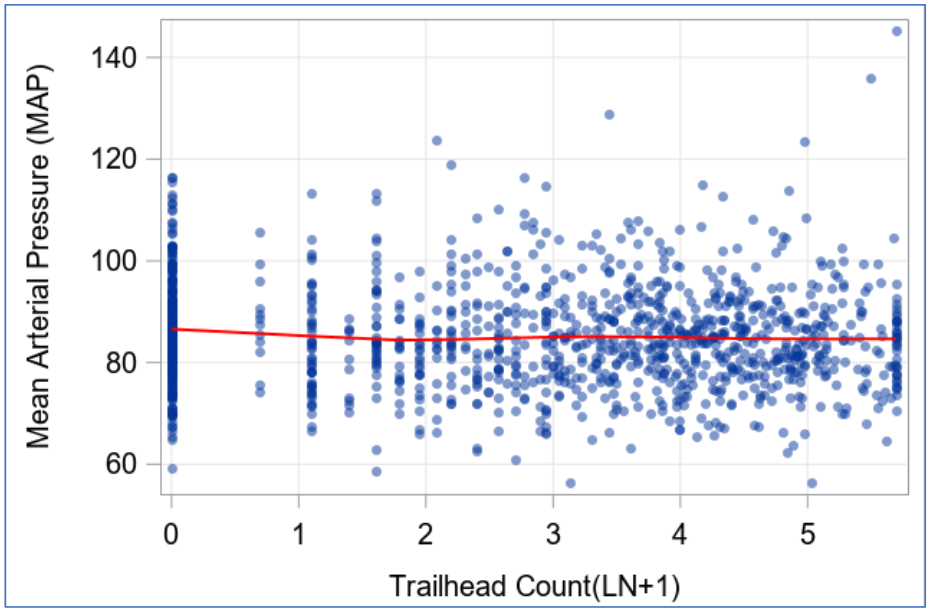
- Especially > ¼ mile equivalent [LN(¼ + 1) = .22]
- ¼ mile (400 meters) traditionally considered walkable by planners (https://morphocode.com/the-5-minute-walk/)
- Tested spline regressions at ¼, ⅓ & ½ mile
  - ¼ mile best-fitting



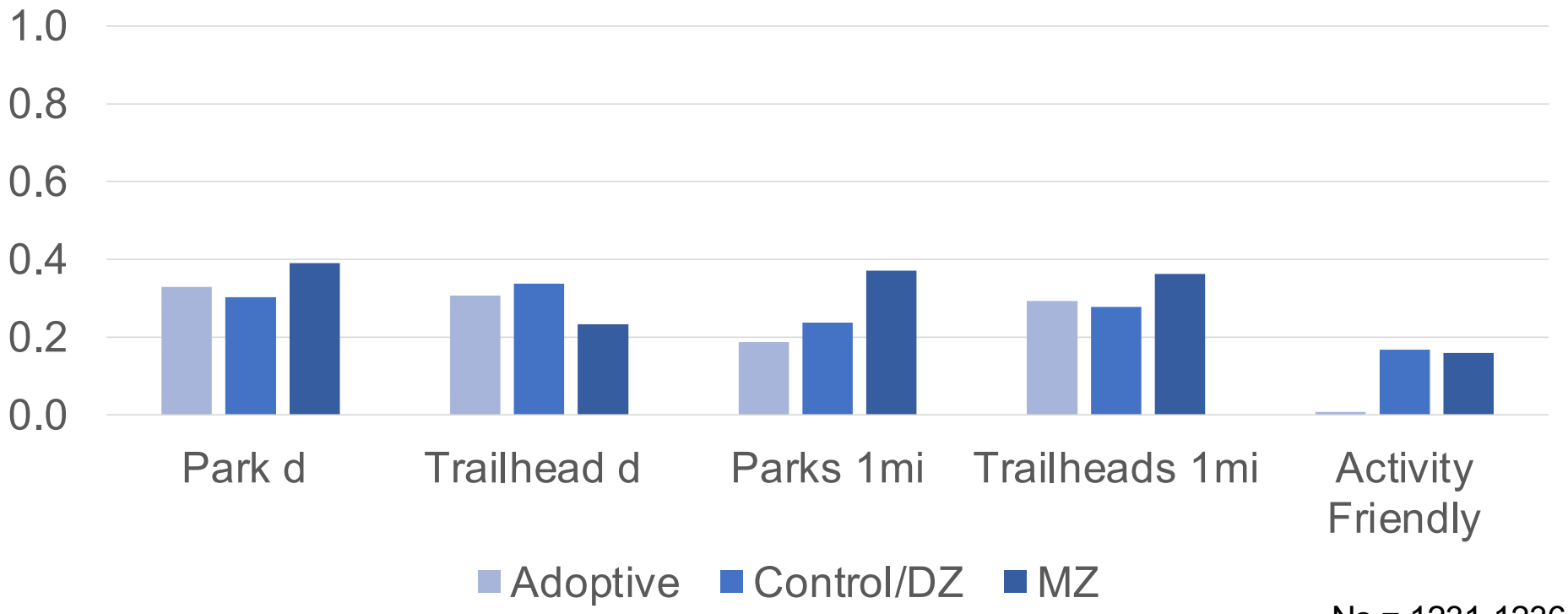
Resting HR, VO2Max, & MAP by Trailheads (LN+1)

- Lower HR, MAP and higher VO2Max with increasing Trailheads in 1 mile, 0 to ~6 Trailheads [LN (6+1)=1.94]
  - Tested spline regressions at 6, 12, 18 equivalent
    - 6 best-fitting





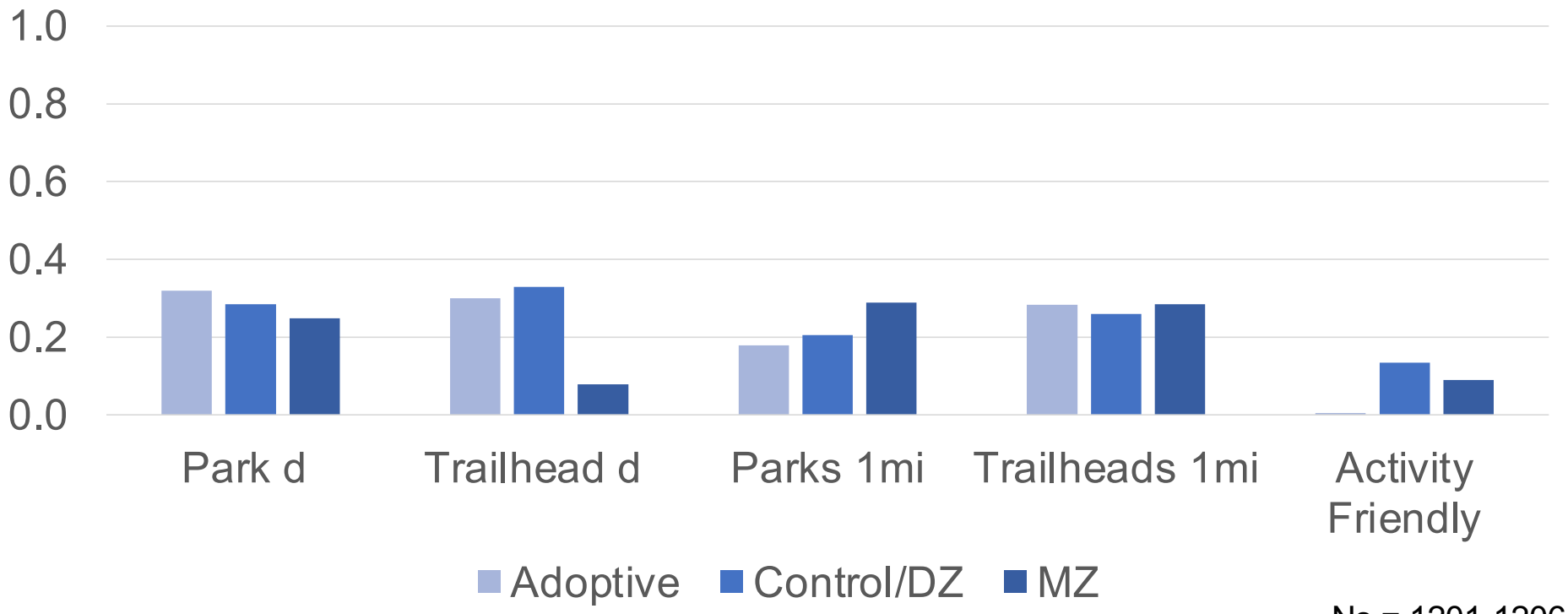
ICCs by Sibling Type



Ns = 1231-1236

GIS measures log-transformed (LN+1). Covariates: sample, age, female, white, Hispanic, Sibs Live Together, Married/Cohabit

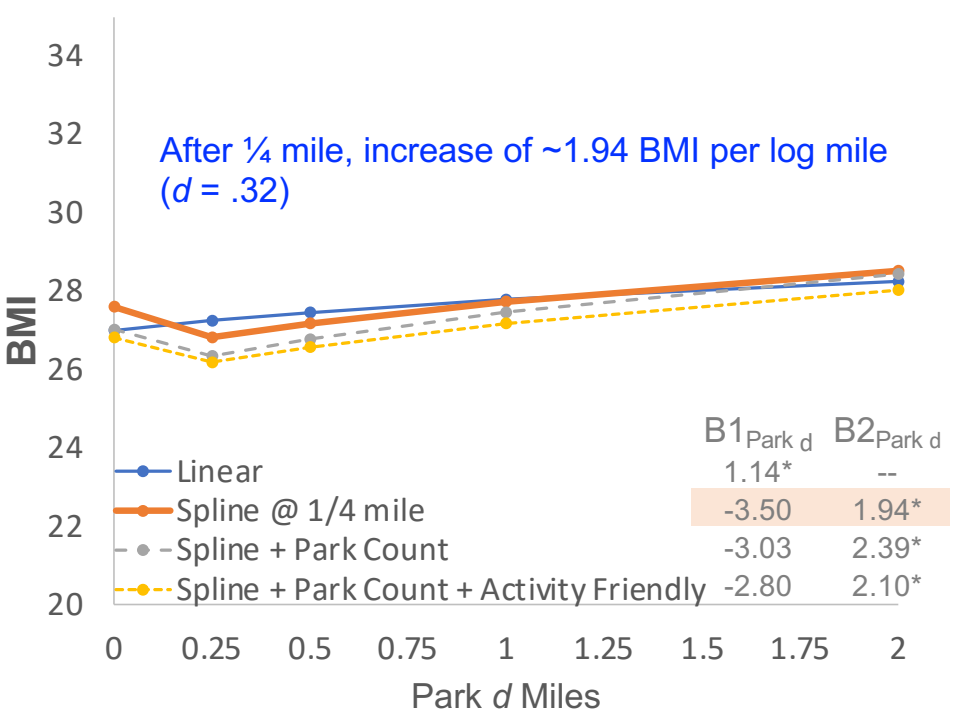
ICCs by Sibling Type: Drop Live Together 1 Sibling

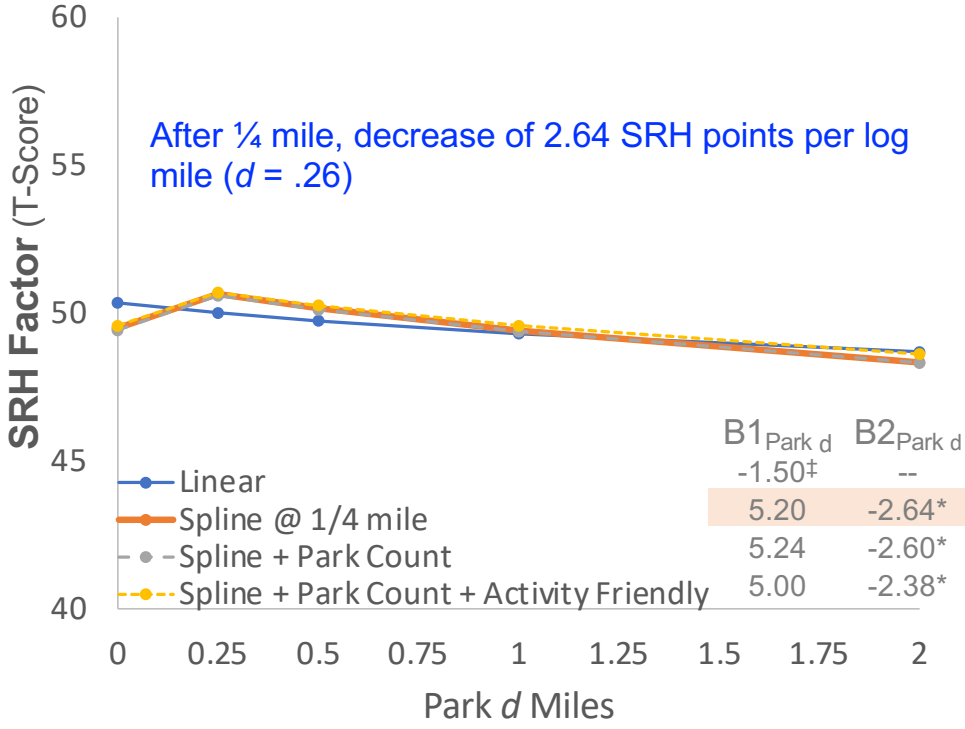


Ns = 1201-1206

GIS measures log-transformed (LN+1). Covariates: sample, age, female, white, Hispanic, Sibs Live Together, Married/Cohabit

Multi-level regression results: Park Distance

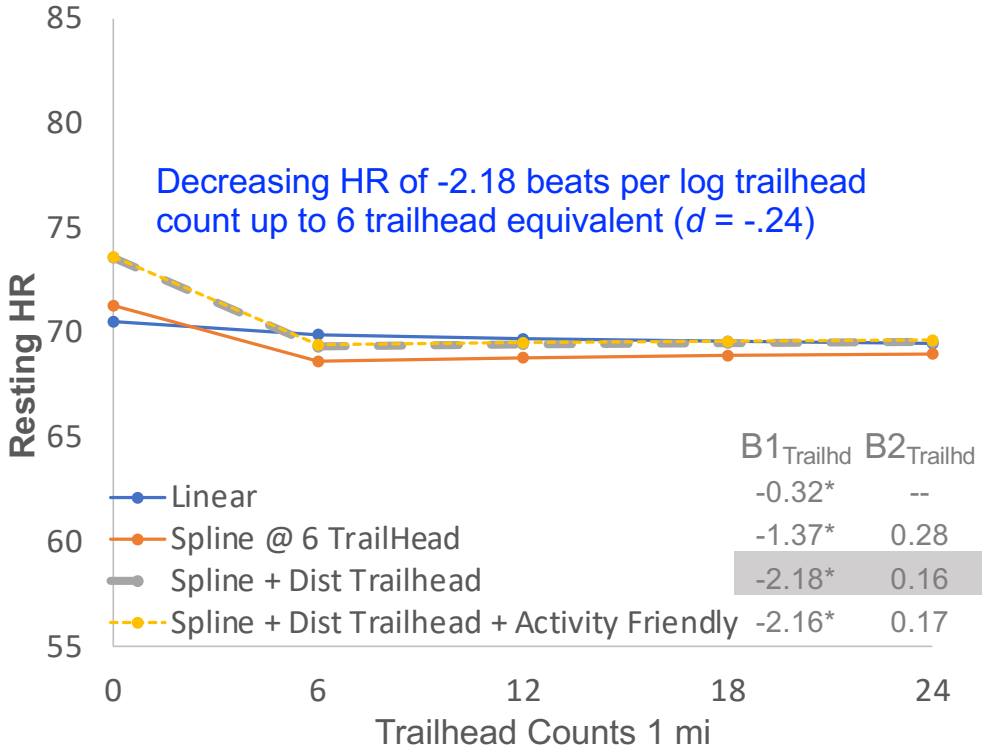


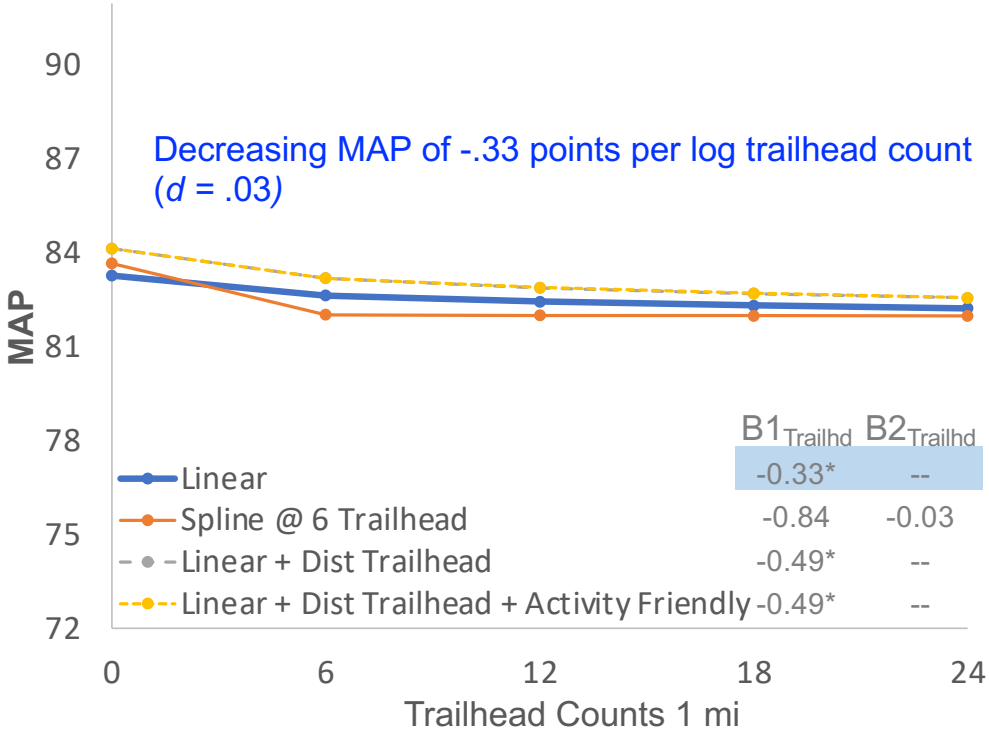


GIS measures log-transformed in analysis (LN+1). Covariates: Project, Age, Female, White, Hispanic, Education

* $p < .05$; ‡ $p < .10$

Multi-level regression results: Trailhead Count





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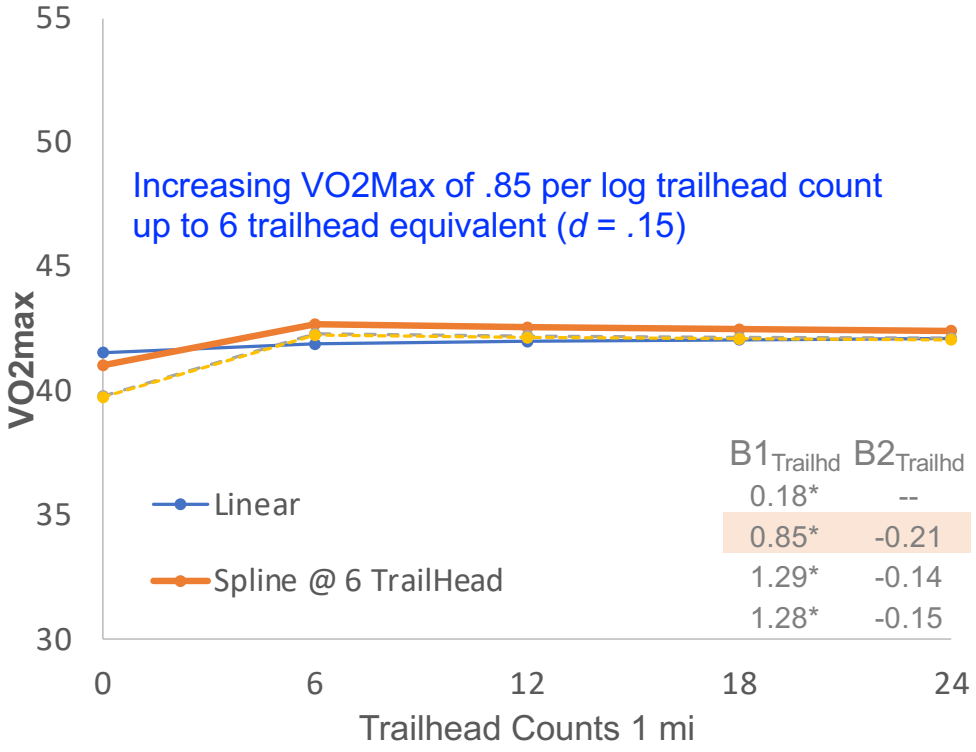
Multi-level regression results



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Discussion

- Evidence of environmental selection effects
  - Moderate sibling similarity: shared environmental influences
  - Park Density tracked with genetic similarity: small genetic influences
- Nonlinear associations of accessibility with most health traits
  - Park Distance after ~ ¼ mile tracked with less optimal health values
  - Trailhead Density up to ~6 tracked with more optimal health values
- Forthcoming: other accessibility indices, land use & neighborhood characteristics
- Longitudinal follow-up — whether and when change in access is associated with differential health outcomes?[1,2]

1. Slater et al. (2019). *Health & Place*, *56*, 127–134. https://doi.org/10.1016/j.healthplace.2019.01.013; 2. Hobbs et al. (2019). *Social Science & Medicine*, *227*, 76-83.

RESEARCH IMPLICATIONS

- Access to parks and trails may relate to health profiles in adults approaching midlife, particularly outside of optimal distance or density (1/4 mile or further, < 6 trailheads)
- With ‘good enough’ access, associations are unclear and suggests that other factors may be at play, requiring further study

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THANK YOU

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Reynolds (Contact), Wadsworth, MPIs

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