A Preliminary Investigation of Residential Self-Selection in Smart Growth Versus Urban Sprawl Communities

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Smart Growth Planning Principles

1. A range of housing opportunities
2. Walkable neighborhoods
3. Community and stakeholder collaboration
4. Distinctive community with sense of place
5. Cost effective development decisions
6. Mixed land use
7. Preservation of open or green space
8. Variety of transportation choices
9. Development of existing communities
10. Compact building design (increased density)

Built Environment Research

- Environmental characteristics of smart growth planning may promote physical activity.

- Designing walkable neighborhoods may help to increase adults' physical activity (Van Dyck, et al, 2011).

Residential Self-Selection

Do active persons choose activity-friendly neighborhoods?

Reverse causation—physical activity levels influence neighborhood choice instead of neighborhood built environmental characteristics influencing physical activity

Residential Self-Selection

- Residential self-selection is a primary limitation in built environment research (Diez Roux, 2004).

- It has been found to bias associations between MVPA bouts and built environment measures toward the null (Boone-Heinonen, et al., 2010).

Research Goals

(1) Determine whether reasons for moving to a smart growth community differ from reasons for moving to urban sprawl control communities.

(2) Investigate how reasons for moving relate to physical activity levels and BMI among adults who live in smart growth and urban sprawl communities.

Study Design

• Baseline data from a subsample of 112 adults participating in a quasi-experimental evaluation study of the impact of a smart growth community on physical activity and obesity.

• 57 participants recently (within 3-19 months) moved into a smart growth community and 55 lived in urban sprawl control communities (median time of residence = 102 months).

Inclusion Criteria

- Age 28 or older

- Live in the Preserve in Chino, California or one of 10 surrounding urban sprawl communities

- ≤150 min/week of MVPA during leisure time

- Household income ≤ $210,000

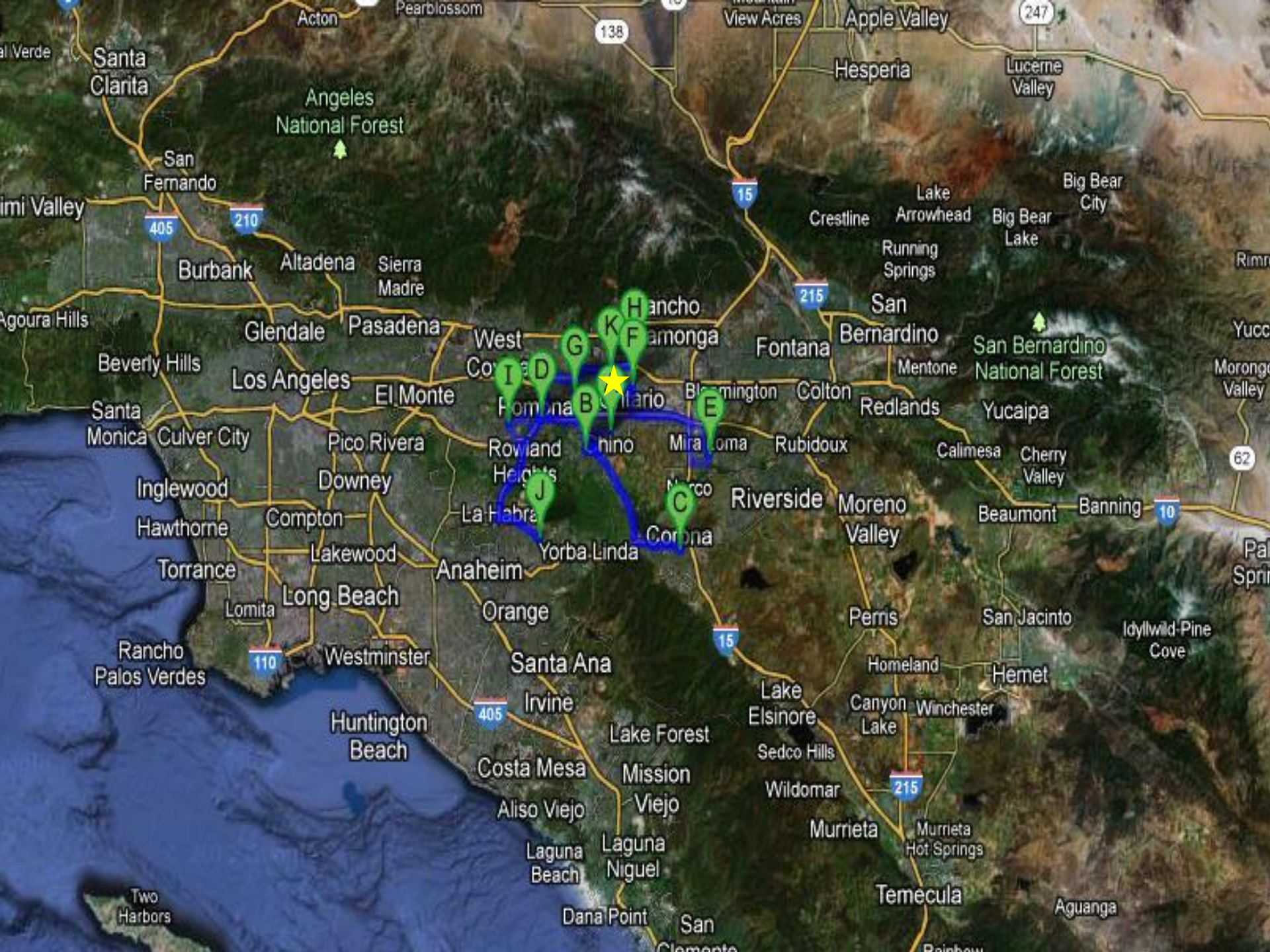- Ability to complete written surveys in English

- Absence of medical conditions
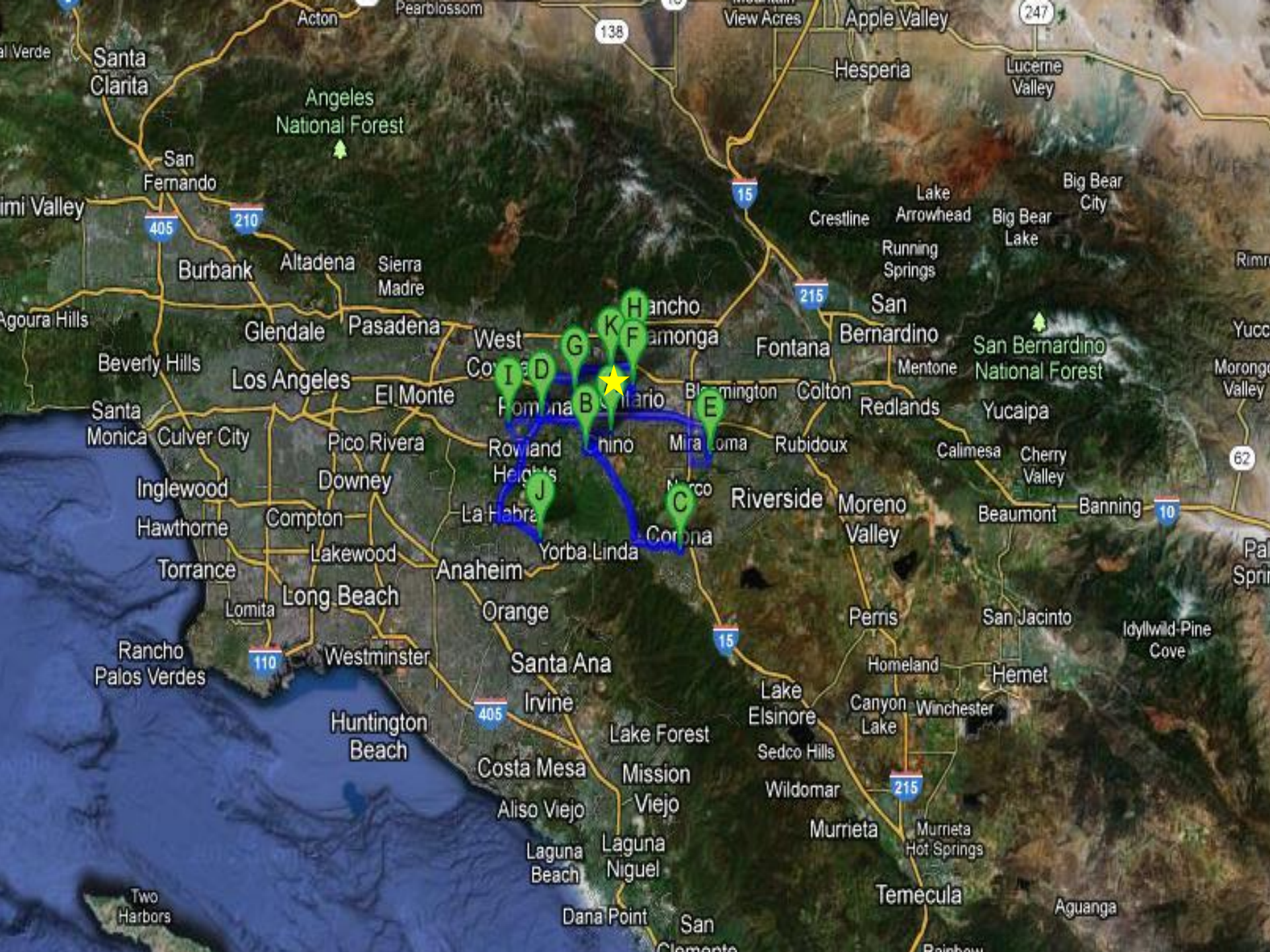
Reasons for Moving Survey

Please rate how important each of the following reasons was in your decision to move to your neighborhood. For each reason, please circle a number between 1 and 5, with 1 = not at all important and 5= very important.

1. Affordability/Value
2. Closeness to open space (e.g. parks)
3. Closeness to job or school
4. Closeness to public transportation
5. Desire for nearby shops and services
6. Ease of walking
7. Sense of community
8. Safety from crime
9. Quality of schools
10. Closeness to recreational Facilities
11. Access to freeways

(Adapted from Sallis et al., 2009; Frank et al., 2007)

Walkability Scale

To examine for walkability-related self-selection of neighborhoods a scale (internal consistency alpha of 0.75) of reasons for moving to one's current home was computed by averaging ratings of importance of three items:

1. "desire for nearby shops and services"

2. "ease of walking"

3. "closeness to recreational facilities"

(Sallis et al., 2009; Frank et al., 2007)

Accelerometer

- Actigraph GT2M (30-sec. epoch)

- Seven days (Sat-Fri)

- MVPA ≥ 3 METs
  (1010 counts per 30-sec. thresholds)

Measures

- BMI = kg/m^2
  - Measured using electronic scale and stadiometer

- Self-report survey/ demographics
  (e.g., age, ethnicity, household size, income)

- The likelihood of being obese has been found to be related to age, race, income and household size (Frank et al., 2007).

Participants

	Smart Growth	Control
N	57	55
Age	28-73 years (M = 40.54)	29-60 years (M = 39.63)
Sex	68.4% Female	78.2% Female
Ethnicity	33.3% White/ Caucasian 10.5% African-Am. 35.1% Asian 21.1% Other	54.5% White/ Caucasian 3.6% African-Am. 20% Asian 21.9% Other
Hispanic	26.3% Yes	34.5% Yes
Income	26.4% < $45,000 19.3% ≥ $100,000 14% Missing	27.3% < $45,000 29.2% ≥ $100,000 10.9% Missing
Time in Residence	78.9% moved to a new residence in past 2 years	18.2% moved to a new residence in past 2 years

Results

- Average Minutes of MVPA/day:
    - Smart growth group 24.5 (SD = 16.23)

    - Control group 29.7 (SD = 54.58)

- Average Body Mass Index:
    - Smart growth group 27.74 (SD = 6.98)

    - Control group 28.09 (SD = 6.55)

- Average Household Size:
    - Smart growth group 3.5 (SD=1.48) (range= 5)

    - Control group 4.5 (SD=1.41) (range= 8)

Linear Regression Analysis for the Association of Reasons for Moving and Group

	Smart Growth Mean (SD)	Control Mean (SD)	Beta	p-value
Affordability/value	4.37 (.957)	4.53 (.690)	.080	.429
Closeness to open space	3.53 (1.23)	3.44 (1.24)	-.034	.735
Closeness to job or school	3.19 (1.39)	3.58 (1.17)	.158	.117
Close to public transport.	1.84 (1.13)	1.64 (.988)	-.042	.675
Desire for shops & services	2.70 (1.19)	2.82 (1.09)	.026	.802
Ease of walking	3.07 (1.26)	2.91 (1.19)	-.075	.461
Sense of community	3.67 (1.23)	3.73 (1.08)	-.034	.731
Safety from crime	4.49 (.869)	4.51 (.836)	-.036	.705
Quality of schools	4.02 (1.29)	4.29 (1.07)	.089	.378
Close to rec. facilities	3.29 (1.28)	2.96 (1.09)	-.104	.312
Access to freeways	3.54 (1.07)	3.53 (1.23)	-.023	.824
Walkability Score	3.04 (.997)	2.90 (.934)	-.079	.442
Total *n*	56-57	55		

*: $p<.05$, **: $p<.01$.

All analyses controlled for age, gender, ethnicity, household size, income and if the participant moved to their residence in the past two years. Results show **raw** means.

Baseline Linear Regression Analysis for the Association of Reasons for Moving and MVPA

	Smart Growth (Beta)	p-value	Control (Beta)	p-value
Affordability/value	.172	.312	.208	.248
Closeness to open space	.099	.562	.211	.214
Closeness to job or school	.133	.436	-.198	.267
Close to public transport.	-.175	.308	.363*	.043
Desire for shops & services	.259	.102	.101	.556
Ease of walking	.315	.077	.108	.522
Sense of community	.131	.452	-.003	.983
Safety from crime	.121	.558	-.133	.444
Quality of schools	.170	.375	-.030	.868
Closeness to rec. facilities	.000	.999	.021	.903
Access to freeways	.171	.278	-.006	.975
Walkability Score	.218	.185	.092	.583
Total *n*	52		55	

*: $p<.05$, **: $p<.01$.
All analyses controlled for age, gender, ethnicity, household size, income and if the participant moved to their residence in the past two years.

Baseline Linear Regression Analysis for the Association of Reasons for Moving and BMI

	Smart Growth (Beta)	p-value	Control (Beta)	p-value
Affordability/value	-.119	.443	.222	.191
Closeness to open space	-.186	.253	-.266	.094
Closeness to job or school	-.274	.075	-.036	.833
Close to public transport.	-.170	.283	-.112	.519
Desire for shops & services	-.085	.562	-.229	.150
Ease of walking	.157	.342	-.346*	.025
Sense of community	.065	.689	-.331*	.031
Safety from crime	.181	.326	-.154	.348
Quality of schools	-.247	.144	-.048	.780
Close to rec. facilities	-.238	.101	-.348*	.025
Access to freeways	.002	.988	-.397*	.015
Walkability Score	-.150	.316	-.365*	.016
Total n	49		49	

*: $p<.05$, **: $p<.01$.

All analyses controlled for age, gender, ethnicity, household size, income and if the participant moved to their residence in the past two years.

Conclusions

• These results suggest that residential self-selection into walkable neighborhoods may exist in both smart growth and urban sprawl communities.

• Marginal findings in the smart growth group versus significant findings in the control group.

• Implications/ future research

Limitations

- Recall bias

- Sample size & statistical power

- Sample derived from confined geographic area

- Study does not address change over time

- Data was not collected immediately after residential relocation

Acknowledgements

References

Boone-Heinonen, J. , Gordon-Larsen, P., Guilkey, D.K., Jacobs Jr., D.R., & Popkin, B.M. (2011). Environment and physical activity dynamics: The role of residential self-selection. *Psychology of Sport and Exercise*, 12: 54-60.

Boone-Heinonen,J., Guilkey, D.K., Evenson, K.R., & Gordon-Larsen, P. (2010). Residential self-selection bias in the estimation of built environment effects on physical activity between adolescence and young adulthood. *International Journal of Behavioral Nutrition and Physical Activity*, 7:70.

Frank, L.D., Saelens, B.E., Powell, K.E., & Chapman, J.E. (2007). Stepping towards causation: Do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity? *Social Science & Medicine*, 65: 1898-1914.

Sallis, J.F., Saelens, B.E., Frank, L.D., Conway, T.L., Slymen, D.J., Cain, K.L., Chapman, J.E., & Kerr, J. (2009). Neighborhood built environment and income: Examining multiple health outcomes. *Social Science & Medicine*, 68: 1285-1293.

Van Dyck, D., Cardon, G., Deforche, B., Owen, N., & De Bourdeaudhuij, I. (2011). Relationships between neighborhood walkability and adults' physical activity: How important is residential self-selection? *Health Place*, 17(4): 1011-4.

Thank You