

Walkable Communities and Adolescent Weight

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Slater et al.(2013) American Journal of Preventive Medicine

Background and Significance

Disparities in Weight

- 1 in 3 U.S. kids is overweight or obese
- The prevalence of obesity increases as youth move into adolescence.
- 21.2 percent of Latino and 24.3 percent of Black children and adolescents are obese in comparison to 14 percent of white youth
- The prevalence of obesity is found to be significantly higher among low- versus high-income groups, and, lower-educated versus higher-educated individuals.

(Ogden et al 2012; Ogden et al. 2008)

After a Systematic Review of the Scientific Literature, the Task Force on Community Preventive Services Recommends the Following Environmental and Policy Approaches to Increase Physical Activity

Environmental Policy Approach	Strategies
Enhanced School-based Physical Education	Increase # of minutes spent in MVPA
Community-Scale and Urban Design Land Use Policies	Mixed use, street connectivity, aesthetics and safety
Street-Scale Urban Design Land Use Policies	Roadway design standards, traffic calming, safe street crossings, street lighting

The Relationship between Walkable Communities and Adolescent Weight

Promise of Built Environment Changes

- Many believe we have built a world that supports unhealthy habits.
 - Neighborhood design requires driving
 - Lack of walking and biking infrastructure
 - Many options for sedentary behavior
- For long-term solutions, built environment changes may be an essential component.
- Built environment changes are permanent

The built environment influences physical activity in our daily lives



The BTG-COMP Survey Data

- Building on existing evidence, this is the first study to examine the impact of community-level walkability on the prevalence of adolescent overweight and obesity using street data collected on the ground in a national sample of communities.
- Prevalence of overweight and obesity were constructed using student reports of height and weight obtained from the Monitoring the Future Survey (n=11,041).
 - Childhood obesity defined by Body Mass Index:
 - based on CDC growth charts:
 - ❑ If age-sex specific BMI \geq 95th percentile,
Then obese
 - ❑ If age-sex specific BMI \geq 85th percentile, but $<$ 95th percentile
then overweight

The BTG-COMP Survey Data

- A random sample of street segments was drawn based on the proportion of population of youth (aged 0-17 years) associated with the nearest census block to the street segment.
- Segments were then weighted to account for their probability of selection; and then aggregated to construct community-level measures representing, for example the proportion of streets, in a community, having sidewalks (n=154 communities).

THE ROLE OF

Transportation

IN PROMOTING PHYSICAL ACTIVITY

SIDEWALKS

People who live in neighborhoods with sidewalks on most streets are

47%

more likely to be active at least 30 minutes a day.

TRAFFIC CALMING

Medians, speed bumps and other traffic-calming efforts can reduce the number of automobile crashes with pedestrian injuries by up to

15%

PUBLIC TRANSPORTATION

Public transit users take

30%

more steps per day than people who rely on cars.

BIKE FACILITIES

In Portland, Ore., bicycle commuters ride

49% of their miles

on roads with bike facilities, even though these are only 8% of road miles.

Active Living Research

www.activelivingresearch.org

Sources: SIDEWALKS: Sallis J, Bowles H, Bauman A, et al. "Neighborhood Environments and Physical Activity among Adults in 11 Countries." *American Journal of Preventive Medicine*, 36(6): 484-490, June 2009. BIKE LANES: Dill J et al. "Bicycling for Transportation and Health: The Role of Infrastructure." *Journal of Public Health Policy* (2009) 30, 595-6110. doi:10.1057/jphp.2008.56). TRAFFIC CALMING: Bunn F, Collier T, Frost C, et al. "Area-Wide Traffic Calming for Preventing Traffic Related Injuries." *Cochrane Database of Systematic Reviews* (1), January 2003; Elvik R. "Area-Wide Urban Traffic Calming Schemes: A Meta-Analysis of Safety Effects." *Accident Analysis and Prevention*, 33(3): 327-336, May 2001. PUBLIC TRANSPORTATION: Edwards R. "Public Transit, Obesity, and Medical Costs: Assessing the Magnitudes." *Preventive Medicine*, 46(1): 14-21, January 2008.

The Walkability Index

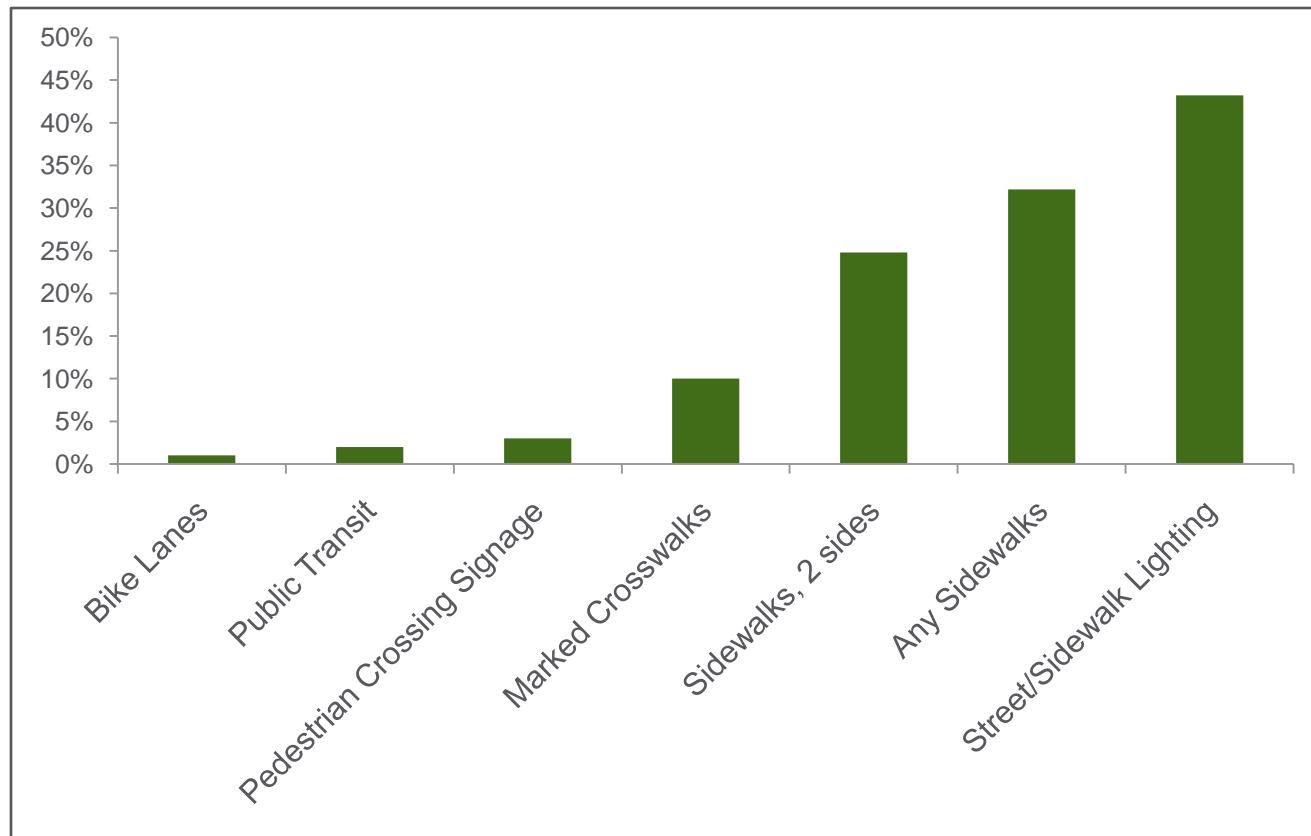
We drew upon existing evidence showing a connection between built environment correlates and physical activity behavior to construct the walkability index. The final index is a sum of the proportion of streets in a community that have:

- Mixed land use;
- Sidewalks
- Sidewalk buffers
- Sidewalk/street lighting
- Other sidewalk elements
- Traffic lights
- Pedestrian signal at traffic light
- Marked crosswalks
- Pedestrian crossing and other signage
- Presence of public transit.

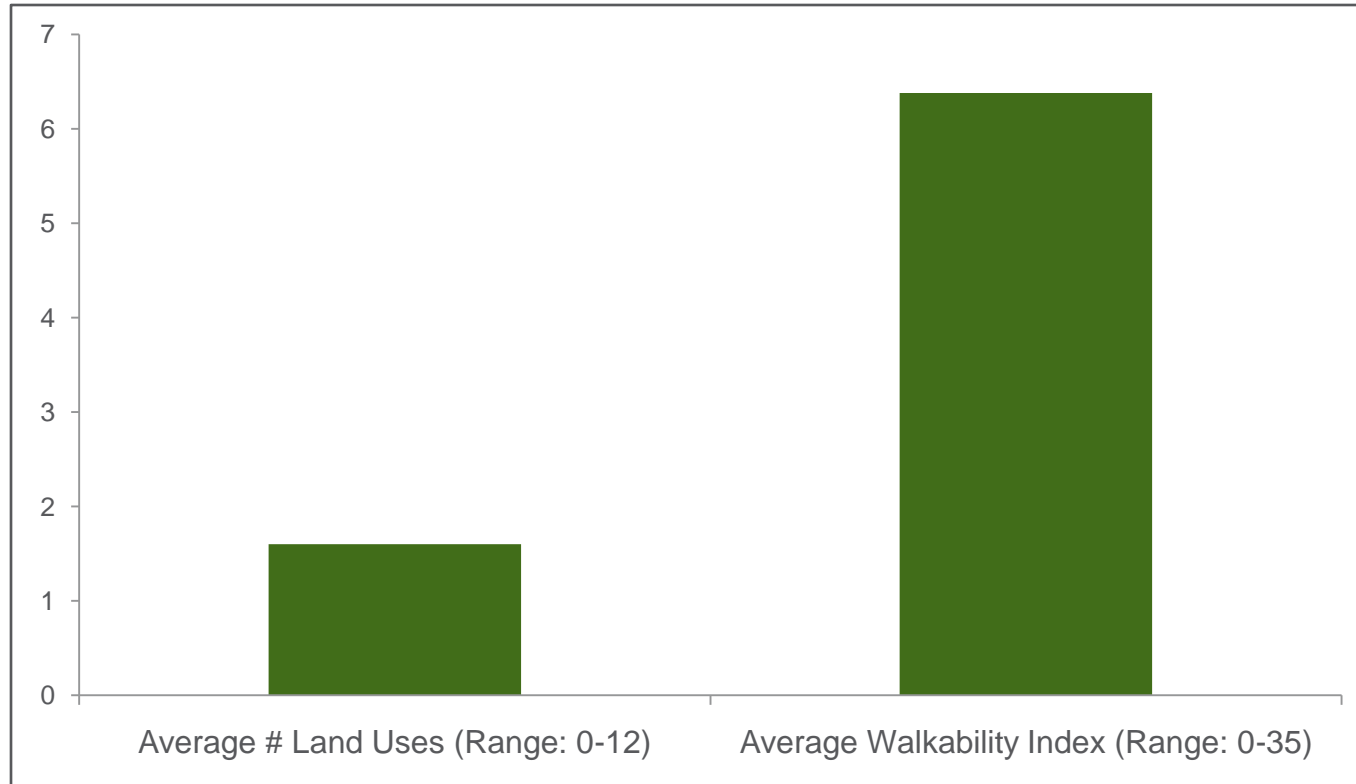


A Snapshot of the Built Environment

Descriptive results of 10,777 street segments audited in a nationally representative sample of communities where 8th, 10th and 12th grade students reside shows:



A Snapshot of the Built Environment



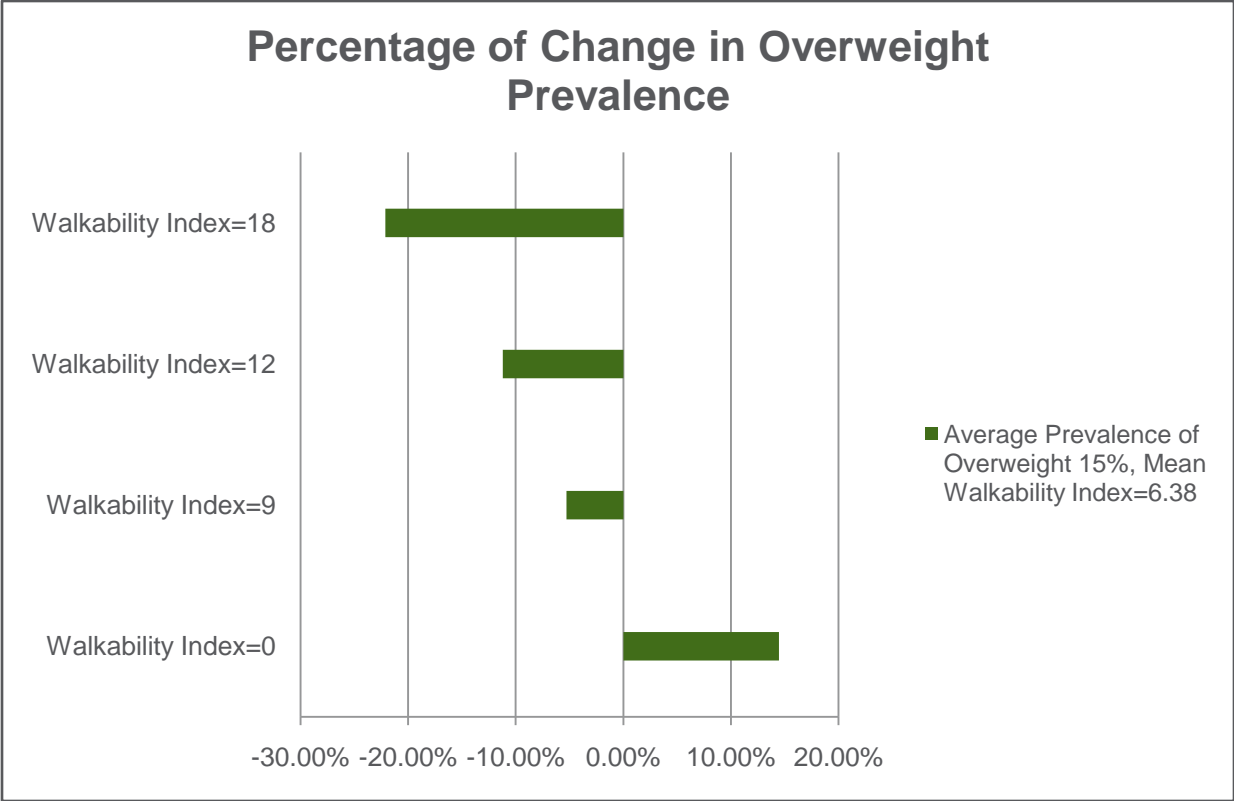
The BTG-COMP Survey Data

- Cross sectional analyses were conducted using survey commands in Stata 12.0. Sampling weights were used and clustering of communities was accounted for in the models.
- All models controlled for gender, race/ethnicity, grade, parental education, students perceptions of feeling unsafe going to and from school, community-level median household income, neighborhood physical disorder, presence of bike lanes and off-road trails, and community-level sprawl.
- Predicted probabilities were calculated to assess the magnitude of the association in the models by separately setting the environmental variables at varying levels, holding all other independent variables at their mean.

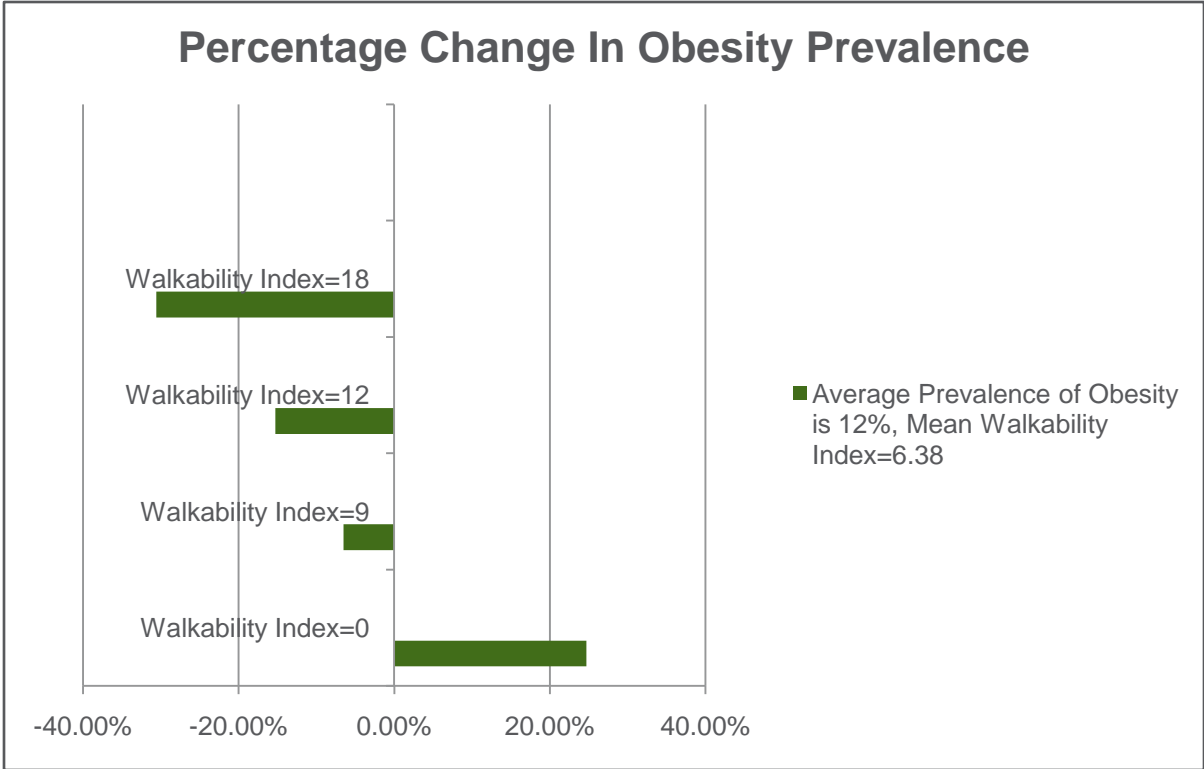
Markers of Neighborhood Walkability are Associated with Lower Prevalence of Adolescent Overweight and Obesity

- Communities with more walkable streets were associated with significant reductions in the prevalence of adolescent overweight (OR: 0.98, 95% CI: 0.95, 0.99)
- Communities with more walkable streets were associated with significant reductions in the prevalence of adolescent obesity (OR: 0.97, 95% CI: 0.95, 0.99)
- Sensitivity analyses showed the key street features associated with:
 - reduced prevalence of overweight were increased presence of sidewalks, having a pedestrian signal at traffic lights, and presence of marked crosswalks.
 - reduced prevalence of obesity were increased presence of sidewalks and public transit.

Predicted Probability Models: Overweight



Predicted Probabilities: Obesity



Conclusions and Policy Implications

- These findings can help inform federal, state and local policy, such as:
- **Local:** community development plans (Zoning and Subdivision ordinances), the development of comprehensive growth management plans, encouraging mixed land use policies, rails to trails programs, and zoning code reforms.
- **State:** State-level SRTS laws
- **Federal:** funding for transportation enhancements and SRTS - the two largest programs that fund biking and walking infrastructure- would make our streets more walkable and help to combat the obesity epidemic
- Together these steps require dedication and long-term planning, but they also have lasting health effects and provide one possible solution to help combat the obesity epidemic.

Next Steps:

**Examining the Association between
Local Zoning/Land Use Laws, the Built
Environment, and Adolescent Physical
Activity and Weight**

Questions?

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