Public Health & Built Environment

The built environment
- includes homes, schools, workplaces, parks/recreation areas, business areas and roads.
- extends overhead in the form of electric transmission lines, underground in the form of waste disposal sites and subway trains, and across the country in the form of highways.
- encompasses all buildings, spaces and products that are created or modified by people.
- impacts indoor and outdoor physical environments as well as social environments (e.g., civic participation, community capacity and investment) and subsequently our health and quality of life.

Public Health & Built Environment

- 19th century- Industrial revolution & immigration moves population to cities; unsanitary conditions lead to infectious disease epidemics
- 20th century- Public health policy implemented through zoning that restricts population density; and separates commerce, industry and residences
- 21st century- Primary public health problems are chronic diseases rather than infectious diseases, and half of Americans live in suburban rather than urban or rural settings

Image, South Street NYC, Fordham University

Until lately the best thing that I was able to think of in favor of civilization, apart from blind acceptance of the order of the universe, was that it made possible the artist, the poet, the philosopher, and the man of science. But I think that is not the greatest thing. Now I believe that the greatest thing is a matter that comes directly home to us all. When it is said that we are too much occupied with the means of living to live, I answer that the chief worth of civilization is just that it makes the means of living more complex; that it calls for great and combined intellectual efforts, instead of simple, uncoordinated ones, in order that the crowd may be fed and clothed and housed and moved from place to place. Because more complex and intense intellectual efforts mean a fuller and richer life. They mean more life. Life is an end in itself, and the only question as to whether it is worth living is whether you have enough of it.

I will add but a word. We are all very near despair. The sheathing that floats us over its waves is compounded of hope, faith in the unexplainable worth and sure issue of effort, and the deep, sub-conscious content which comes from the exercise of our powers.

The Strength of Weak Ties
Mark S. Granovetter
Johns Hopkins University

Analysis of social networks is suggested as a tool for linking micro and macro levels of sociological theory. The procedure is illustrated by elaboration of the macro implications of one aspect of small-scale interaction: the strength of dyadic ties. It is argued that the degree of overlap of two individuals' friendship networks varies directly with the strength of their tie to one another. The impact of this principle on diffusion and information, mobility opportunity, and community organization is explored. Stress is laid on the cohesive power of weak ties. Most network models deal, implicitly, with strong ties, thus confusing their applicability to small, well-defined groups. Emphasis on weak ties lends itself to discussion of relations between groups and to analysis of segments of social structure not easily defined in terms of primary groups.

A fundamental weakness of current sociological theory is that it does not relate micro-level interactions to macro-level patterns in any convincing way. Large-scale statistical, as well as qualitative, studies offer a good deal of insight into such macro phenomena as social mobility, community organization, and political structure. At the micro level, a large and increasing body of data and theory offers useful and illuminating ideas about what transpires within the confines of the small group. But how interaction in small groups aggregates to form large-scale patterns eludes us in most cases.

I will argue, in this paper, that the analysis of processes in interpersonal networks provides the most fruitful micro-macro bridge. In one way or another, it is through these networks that small-scale interaction becomes translated into large-scale patterns, and that these, in turn, feed back into small groups.

Sociometry, the precursor of network analysis, has always been curiously peripheral—invisible, really—in sociological theory. This is partly because it has usually been studied and applied only as a branch of social psychology; it is also because of the inherent complexities of precise network analysis. We have had neither the theory nor the measurement and sampling techniques to move sociometry from the usual small-group level to that of larger structures. While a number of stimulating and suggestive

Social Relationships and Health
James S. House, Karl R. Landis, Debra Umberson

Recent scientific work has established both a theoretical basis and strong empirical evidence for the causal impact of social relationships on health. Prospective studies, which control for baseline health status, continuously show increased risk of death among persons with a low quantity, and sometimes low quality, of social relationships. Experiential and quasi-experimental studies of human and animal models also suggest that social isolation is a major risk factor for mortality from widely varying causes. The mechanisms through which social relationships affect health are not yet clearly understood, but the factors that promote or inhibit the development of social relationships remain to be explored.

Social relationships have long been viewed as an association between social relationships and health. More specifically, social isolation or low social integration is associated with poor health, psychologically and physically, and very likely to die. The first major work of empirical sociology on the relationship between social isolation and mortality is by Robert S. M. Stoltenberg (1974). His study of over 42,000 individuals in the United States showed a significant relationship between social isolation and mortality. The relationship was strongest among the elderly, with a significant increase in mortality among those who reported having few or no friends. These findings were replicated in subsequent studies, with similar results reported in other populations worldwide.

The major implication of these findings is that social relationships play a crucial role in determining health outcomes. Social connections provide emotional support, social identity, and a sense of belonging, all of which are important for maintaining good health. Without these connections, individuals may experience social isolation and loneliness, which can lead to poor health outcomes.

Therefore, interventions aimed at improving social relationships may be beneficial in promoting health. For example, community programs that encourage social interaction, such as community centers, senior centers, and social clubs, can help to reduce social isolation and promote good health. Additionally, healthcare providers can play a role in addressing social isolation by incorporating social support into their treatment plans.

In conclusion, the relationship between social relationships and health is a significant and complex topic that requires further research. However, the available evidence suggests that social relationships play an important role in determining health outcomes, and interventions aimed at improving social relationships are likely to be beneficial in promoting good health.
The National Institute of Environmental Health Sciences of the National Institutes of Health and other funding agencies sponsored a range of studies and in 2003, Richard J. Jackson, as guest editor, drew upon this body of work for the September issue of *The American Journal of Public Health*, “The Impact of the Built Environment on Health: An Emerging Field.”
Regular physical activity is important for health, and inadequate physical activity is a major, largely preventable public health problem.

Built environments that facilitate more active lifestyles and reduce barriers to physical activity are desirable because of the positive relationship between physical activity and health. (8)
People walk to get to places they want to go when places are nearby.

% of Trips to Shops by Walking
- Within 1 mile: 40%
- Within 2-4 miles: 1%

% of Trips to School or Church by Walking
- Within 1 mile: 46%
- Within 2-4 miles: 1%

% of Trips to Work by Walking
- Within 1 mile: 35%
- Within 2-4 miles: 1%

% of Trips for Social or Recreational Fun by Walking
- Within 1 mile: 60%
- Within 2-4 miles: 5%

More People Walk to Better Health

48% About half of all adults get enough aerobic physical activity* to improve their health.

6 in 10 Walking is the most popular aerobic physical activity. About 6 in 10 adults reported walking for at least 10 minutes in the previous week.

6% Adults who walk for transportation, fun, or exercise went up 6 percent in 5 years.

Physical activity helps control weight, but it has other benefits. Physical activity such as walking can help improve health even without weight loss. People who are physically active live longer and have a lower risk for heart disease, stroke, type 2 diabetes, depression, and some cancers. Improving spaces and having safe places to walk can help more people become physically active.

* Aerobic activities like brisk walking, running, swimming and bicycling make you breathe harder and make your heart and blood vessels healthier.
Physical Activity & Health

- Regular physical activity seems to protect from diabetes and cardiovascular disease (Carnethon et al., 2005).
- Walking, the most common form of physical activity (CDC, 1991) has been associated with reduced weight (Schilling & Linton, 2004), and reduced risk for diabetes and cardiovascular disease (Carnethon et al., 2005).
- Fitness increases with even minimal levels of activity. Moving from totally sedentary to an activity level of approximately 72.2 minutes per week—a little over 10 minutes per day—resulted in improved cardiorespiratory fitness. (Carnethon, 2009).

Built Environment & Physical Activity

- 11 country (Belgium, Brazil, Canada, Colombia, China (Hong Kong), Japan, Lithuania, New Zealand, Norway, Sweden, U.S., with a combined sample of 11,541 adults living in cities) survey on physical activity
- Five of seven environmental variables were significantly related to meeting physical activity guidelines, ranging from access to low-cost recreation facilities (OR1.16) to sidewalks on most streets (OR1.47).
- Supportive neighborhoods: 100% higher rates of sufficient physical activity compared to those with no supportive attributes.
- Conclusions: Neighborhoods built to support physical activity have a strong potential to contribute to increased physical activity. Designing neighborhoods to support physical activity can now be defined as an international public health issue (Sallis et al. 2009).

Built Environment Influence on Physical Activity

- Frank et al. (2004) investigated the relationships among obesity, physical activity, and urban form in greater Atlanta.
- Proximity to mixed use destinations, and higher density of intersections and housing, were associated with reduced obesity rates and increased walking trips.

Older women who lived within a 20-minute walk of stores, parks or trails had significantly higher pedometer readings than women who did not. The more destinations that were near the home, the more they walked (King et al., 2003).

Proximity to mixed use destinations was related to lower rates of obesity in a study of low-income, uninsured women from five U.S. states (CT, MA, NE, NC, SD).

Women living in areas with greater diversity of use showed a lower BMI and lower coronary heart disease risk while women living in more residential areas evidenced higher BMI and coronary risk (Mobley et al., 2006).


Built Environment Influence on Physical Functioning

“Eyes on Street” & Elders’ Health

- 16,000 households in East Little Havana enumerated for Hispanic elders > 70 years.
- 273 elder-blocks were included in the final study – 1 elder per block.
- Elders assessed at baseline, 12, 24, 36, and 54 months post baseline.
- Built environment coded before baseline.

Elders who lived in blocks with few positive front-entrance-features were 2.7 times as likely to have poor physical functioning, compared to elders residing on blocks with greater numbers of positive front-entrance qualities.

NIMH/NIEHS Grant No. MH63709 NIA Grant No. AG27527 PI: J. Szapocznik; Brown et al. (2008) “Built environment and physical functioning in Hispanic elders: The role of "eyes on the street".” Environmental Health Perspectives, 116(110), 1300-1307.
Christine M. Hoehner, Laura K. Brennan Ramirez and colleagues conducted a study of residents in Savannah, Georgia and St. Louis, Missouri, and found that physical activity increased when greater numbers of non-residential destinations occurred within walking distance of a person’s home.

Built Environment & Metabolic Syndrome: Walk Score

Walkability measured by Walk Score® is associated with “Purposive Walking” in the last week (measured by IPAQ)

- Whether walked: Each 10-pt. increase associated with significant 19% increase in purposive walking
- Amount walked: Each 10-pt. increase associated with significant 27% increase in number of minutes of purposive walking
- Meeting PA recommendations (CDC ≥ 150min): Each 10-pt. increase associated with significant 26% increase in likelihood of meeting PA recommendations through purposive walking.
- Participants residing in “highly-walkable” neighborhoods (Walk Score®=70-100) were 2.23 times as likely to meet PA recommendations through walking as were those who lived in “car-dependent” neighborhoods (Walk Score®=0-49).

Regression analyses examined UDB distance in relation to baseline walking (adjusting for age, gender, education, BMI, days in US, and habitual walking in Cuba):

For each 1-mile increase in the distance from the UDB, there was a 10% increase (statistically significant) in WHETHER the participant walked in the last week.

For each 1-mile increase in distance from the UDB, there was an 11% increase (statistically significant) in the AMOUNT of purposive walking in the last week (Brown et al., 2013, in prep.).
Supportive Neighborhoods:
*Car-Dependent to Walkable Built Environment*

[Image of car-dependent parking lot]

[Image of walkable street]

[Map image of street network]

[YouTube video link]


[Website links]

- [http://www.smartgrowthamerica.org/complete-streets/complete-streets-fundamentals#presentation](http://www.smartgrowthamerica.org/complete-streets/complete-streets-fundamentals#presentation)
- [http://www.cnu.org/Intro_to_new_urbanism](http://www.cnu.org/Intro_to_new_urbanism)
- [http://www.youtube.com/watch?v=VGJt_YXioI&feature=c4-overview-vl&list=PL0C21005D4A380716](http://www.youtube.com/watch?v=VGJt_YXioI&feature=c4-overview-vl&list=PL0C21005D4A380716)
Supportive Neighborhoods: *Car-Dependent* to Walkable Built Environment

Disconnected

Connected

Images by Dover Kohl & Partners, www.doverkohl.com
Supportive Neighborhoods: Indicators

- 5-Minute Walk
- Mixed Use
- Centers & Edges
- Access to Transit
- Access to Green
Vegetation & Safety

- Study using police crime reports to examine the relationship between vegetation and crime in an inner-city neighborhood. Crime rates for 98 apartment buildings with varying levels of nearby vegetation were compared.

- Results indicate that although residents were randomly assigned to different levels of nearby vegetation, the greener a building’s surroundings were, the fewer crimes reported. Furthermore, this pattern held for both property crimes and violent crimes.

- Results indicate that although residents were randomly assigned to different levels of nearby vegetation, the greener a building’s surroundings were, the fewer crimes reported. Furthermore, this pattern held for both property crimes and violent crimes.

- The relationship of vegetation to crime held after the number of apartments per building, building height, vacancy rate, and number of occupied units per building were accounted for.

Ida B. Wells Buildings with varying tree cover

Buildings with high levels of vegetation had 52% fewer total crimes, 48% fewer property crimes, and 56% fewer violent crimes than buildings with low levels of vegetation. (354-5)

Street Trees & Value

- Study using hedonic price model to simultaneously estimate the effects of street trees on the sales price and the time-on-market (TOM) of houses in Portland, Oregon.
- On average, street trees add $8870 to sales price and reduce TOM by 1.7 days.
- Benefits of street trees spill over to neighboring houses.
- Because the provision and maintenance of street trees in Portland is the responsibility of adjacent property owners, ... results suggest that if the provision of street trees is left solely to homeowners, then there will be too few street trees from a societal perspective.

American Forests - Portland: Top 10 Best Cities for Urban Forests in the U.S.: "Goals for the city’s canopy are actually built into multiple management plans, and the improvements the city is seeing are related to the work of a dedicated government, nonprofits and community groups. Meanwhile, the city is using green infrastructure as a cost-effective alternative to gray infrastructure and is protecting its trees through public and private ordinances and a diversification strategy. Portland estimates that its street trees alone have added more than $13 million in property resale value, and its entire urban forest provides more than $38 million in environmental benefits."
Community Garden Impacts

- Study of associations between participation in community gardening/beautification projects and neighborhood meetings with perceptions of social capital at both the individual and neighborhood levels, Flint, Michigan (N=1916).

- At the individual level, household involvement in community gardening/beautification activities and in neighborhood meetings were associated with residents’ perceptions of bonding social capital, linking social capital, and neighborhood norms and values.

- Results suggest involvement in neighborhood meetings augment the individual and neighborhood-wide perceptions of social capital associated with community gardening and beautification projects.

- Neighborhood community gardens’ impact on neighborhood residents’ perceptions of social capital can be enhanced by neighborhood wide meetings.

We estimate the cumulative stress mitigating impact of neighborhood greenness by investigating whether neighborhood green mitigates stress directly, and indirectly by encouraging physical activity and/or fostering social support.

Using data from a recent community health survey in Chicago and two-stage instrumental variables regression modeling, we find that different components of neighborhood green play distinct roles in influencing stress.

- **Park spaces are found to indirectly mitigate stress by fostering social support.**
Intrapersonal and environmental factors associated with dog walking (N = 483) were examined.

A greater proportion of regular (80%) than irregular (59%) dog walkers met the recommended 150 minutes of physical activity per week.

Owners who perceived greater social support and motivation from their dog to walk, and who had access to a dog-supportive park within their neighborhood, were more likely to regularly walk with their dog, even after adjustment for other well-known correlates of physical activity.

The higher level of physical activity of regular dog walkers can be attributed to the additional walking these owners perform with their dog.

Park Attributes & Park Use

- Attributes including safety, aesthetics, amenities, maintenance, and proximity are important for encouraging park use.

- Physical attributes of parks as well as perceptions of these attributes (formed in relation to broader social contexts) may influence physical activity patterns.

Bryant Park, NYC
“before”

“after”

http://blog.bryantpark.org/search/label/20th%20anniversary

An increase in mean block-level NDVI from -1 SD below to +1 SD above the mean was associated with reductions of:

- 10% Hyper-Lipidemia
- 13% Hypertension
- 15% Diabetes

*Adjusting for age, gender, race, ethnicity, and neighborhood median household income

U.S. Dept. of Housing & Urban Development (HUD) Sustainable Communities Research Grant# HUD H-21620-RG; Health Foundation of South Fl. Grant, PIs: S. Brown, E. Plater-Zyberk, Is, J. Lombard, M. Byrne K. Wang, J. Szapocznik
An increase in mean block-level NDVI from -1 SD below to +1 SD above the mean was associated with reductions of:

- 3 years reduction in biomedical aging of population
- 49 fewer chronic conditions per 1000 individuals

*Adjusting for age, gender, race, ethnicity, and neighborhood median household income

U.S. Dept. of Housing & Urban Development (HUD) Sustainable Communities Research Grant# HUD H-21620-RG; Health Foundation of South Fl Grant, PIs: S. Brown, E. Plater-Zyberk, Is, J. Lombard, M. Byrne K. Wang, J. Szapocznik
Checklists

**Neighborhood Design Checklist**
- 1. Identifiable Center & Edge within 5-minute walk
- 2. Mixed Use
- 3. Connectivity
- 4. Streetscape Transparency & Definition
- 5. Greenscape & Parks within 5-minute walk

**Walkability Checklist**
- 1. Connectivity (4-way intersections/roundabouts)
- 2. Block Size (1000-2000 foot perimeter)
- 3. Mixed Use
- 4. Proximity of Transit (within 2500’)
- 5. Pedestrian Safety
- 6. Sidewalks
- 7. Residential Density
- 8. Parks

“Before” and “After” images from *Downtown Kendall Plan*, Dover Kohl & Partners

Checklists: Florida Department of Health / University of Miami Built Environment Behavior & Health Team
Intervention

Downtown Kendall, Dover, Kohl & Partners


Short-range
Intervention

Downtown Kendall, Dover, Kohl & Partners