



The social environment and walking behavior among low-income housing residents

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ABSTRACT

Walking, both for leisure and for travel/errands, counts toward meeting physical activity recommendations. Both social and physical neighborhood environmental features may encourage or inhibit walking. This study examined social capital, perceived safety, and disorder in relation to walking behavior among a population of low-income housing residents. Social and physical disorder were assessed by systematic social observation in the area surrounding 20 low-income housing sites in greater Boston. A cross-sectional survey of 828 residents of these housing sites provided data on walking behavior, socio-demographics, and individual-level social capital and perceived safety of the areas in and around the housing site. Community social capital and safety were calculated by aggregating individual scores to the level of the housing site. Generalized estimating equations were used to estimate prevalence rate ratios for walking less than 10 min per day for a) travel/errands, b) leisure and c) both travel/errands and leisure. 21.8% of participants walked for travel/errands less than 10 min per day, 34.8% for leisure, and 16.8% for both kinds of walking. In fully adjusted models, those who reported low individual-level social capital and safety also reported less overall walking and less walking for travel/errands. Unexpectedly, those who reported low social disorder also reported less walking for leisure, and those who reported high community social capital also walked less for all outcomes. Physical disorder and community safety were not associated with walking behavior. For low-income housing residents, neighborhood social environmental variables are unlikely the most important factors in determining walking behavior. Researchers should carefully weigh the respective limitations of subjective and objective measures of the social environment when linking them to health outcomes.

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Background

Walking is the most common form of physical activity for Americans (CDC, 2000; Rafferty, Reeves, McGee, & Pivarnik, 2002; Tudor-Locke, Johnson, & Katzmarzyk, 2010). Both leisure-time walking and walking for travel and errands “count” toward meeting physical activity recommendations (Ainsworth et al., 2011; Berrigan, Troiano, McNeel, DiSogra, & Ballard-Barbash, 2006), and yet the majority of Americans do not get recommended levels of physical activity (Carlson, Fulton, Schoenborn, & Loustalot, 2010; Rafferty et al., 2002; Tucker, Welk, & Beyler, 2011) which can lead to deleterious effects on health (Luepker et al., 1996; U.S. Department of Health and Human Services, 1996; Warburton, Nicol, & Bredin, 2006). Evidence has suggested that obesity risk is lower for residents of more pedestrian-oriented neighborhoods (Smith et al., 2008). Features of the built environment that encourage walking

may include the presence of sidewalks, proximity to walkable destinations, higher density, and greater land-use mix (Brownson, Baker, Housemann, Brennan, & Bacak, 2001; Cunningham & Michael, 2004; Pikora et al., 2006; Saelens & Handy, 2008).

Beyond the physical environment, the social environment may also drive walking patterns (Ball et al., 2010; Echeverria, Diezroux, Shea, Borrell, & Jackson, 2008; Fisher, Li, Michael, & Cleveland, 2004; de Leon et al., 2009; Wen, Kandula, & Lauderdale, 2007). The social environment is a multi-faceted concept meant to encompass all of the “immediate physical surroundings, social relationships and cultural milieus” (Barnett & Casper, 2001, p. 465) in a given area. At the macro level, influences of the social environment on health may include economic processes and social inequality (Barnett & Casper, 2001; McNeill, Kreuter, & Subramanian, 2006). Alternately, the social environment may affect health through interpersonal relationships and interactions, such as social support or interpersonal racial discrimination (McNeill et al., 2006). And in between these levels of influence, at the meso-level, the social environment can be conceived of as a set of locally-determined

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and community-owned characteristics – for instance, social capital and neighborhood disorder – wielding another influence on health and health behaviors (Franzini, Caughy, Spears, & Fernandez Esquer, 2005; Wen, Browning, & Cagney, 2003).

Social capital has been defined as “the features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions” (Putnam, 1993, p.167). In studies relating the concept to health outcomes, social capital has been proposed to act via the perpetuation of social norms; increased safety; the promotion of collective efficacy and the utilization of network-based resources (Kawachi, 2010). Important to the conceptualization of social capital is the notion of social capital as a “public good” (Putnam, 2000, p.20), in which social investments are recognized as positive collective attributes above and beyond individual characteristics (Lochner, Kawachi, & Kennedy, 1999). By this conception, social capital has often been assessed by aggregating individual responses on survey-based measures to the neighborhood level (Harpham, 2008). Several studies suggest that community-level social cohesion, a sub-construct of social capital (McNeill et al., 2006), affects physical activity in residents (Ball et al., 2010; Echeverria et al., 2008; Fisher et al., 2004; de Leon et al., 2009).

Neighborhood disorder, meanwhile, has been conceived of as a barometer of the overall social health of a neighborhood, one which may “[trigger] attributions and predictions in the minds of insiders and outsiders alike.” (Sampson & Raudenbush, 1999, p.604). Several studies provide empirical support for the notion that disorder may exert a negative influence on health for a range of age groups (King, 2008; de Leon et al., 2009; Molnar, Gortmaker, Bull, & Buka, 2004; Stafford et al., 2007). However, overall support for the relationship between disorder and physical activity has been modest. Several studies using perceived and objective assessments of incivilities (Ball et al., 2010), neighborhood problems (Echeverria et al., 2008; Fisher et al., 2004) and physical disorder (Hoehner, Ramirez, Elliott, Handy, & Brownson, 2005) have not shown an association with physical activity.

Safety has been proposed as a mediator in the relationship between social capital and health outcomes (Foster & Giles-Corti, 2008), and between disorder and physical activity (Miles, 2008), yet the relationship between safety and physical activity remains elusive. Results from a review article (Foster & Giles-Corti, 2008) exploring support for this relationship in 42 studies were somewhat mixed, which was likely attributable to the inconsistency of measurement instruments used to capture both safety and physical activity. Additionally, safety can be a multidimensional construct (fear of crime, traffic, or dogs) and if the dimension of safety believed to be associated with the health behavior (e.g., fear of crime) is not defined and measured, elucidation of the specific role that safety has on health behaviors can be hampered.

Challenges in assessing the social environment and physical activity

There are several challenges in constructing an accurate picture of the social environmental determinants of health. The first is deciphering the relative contribution of different facets of the social environment. Relationships between constructs like safety and social cohesion have demonstrated that they may be interconnected. For instance, a study by King (2008) found evidence of mediation by social capital and safety in the relationship between physical environmental features (yard maintenance, window bars) and the frequency that residents performed community-based physical activity (King, 2008). Fisher et al. (2004) used structural equation modeling to examine social cohesion, perceived safety, and neighborhood problems simultaneously and found that, when modeled together, only social cohesion was related to walking behavior (Fisher

et al., 2004). Despite strong conceptual links between such social environmental variables, empirical assessments of these interrelationships and simultaneous effects are less common.

Additionally, the literature is rife with inconsistencies on the operationalization of the social environment – for example, studies may use individual-level and neighborhood-level social capital constructs interchangeably even though social capital may have different consequences in the individual and aggregate domains (Putnam, 2000). An individual attending a neighborhood crime watch group may experience a positive psychological effect from participating in such a group, but even an individual who does not participate may experience the effects of the group if their neighborhood becomes safer as a result. Despite the importance of disentangling compositional and contextual effects, there is a dearth of studies that tease out the relative contribution of individual and neighborhood effects on physical activity. de Leon et al. (2009) estimated both individual and neighborhood level contributions of social cohesion to walking among older adults and found that only individual-level social cohesion was associated, although the relationship between community social capital and physical activity has been supported elsewhere in the literature for other adult populations (Echeverria et al., 2008; Fisher et al., 2004; Wen, Browning et al., 2007).

A corresponding challenge in measuring social environmental variables is the distinction between subjective versus objective measures of the social environment. This distinction is particularly relevant to measures of disorder, which can be assessed through individual surveys or by systematic social observation. While objective measures have the advantage of avoiding common source bias between social exposures and health outcomes (de Jong et al., 2011), perceived measures of the environment may be more adept at incorporating the actual environmental realities most relevant to subjects and may be more strongly linked to health behaviors (Caspi, Kawachi, Subramanian, Adamkiewicz, & Sorensen, 2012; Weden, 2008). While both perceived and objective measures of disorder have demonstrated an association with walking behavior (King, 2008; Molnar et al., 2004; Stafford et al., 2007), studies which have sought to distinguish between these measures have largely focused on the built rather than the social environment (Ball et al., 2008; Hoehner et al., 2005; McGinn, Evenson, Herring, Huston, & Rodriguez, 2007).

This study aims to explore multiple features of the social environment in relationship to neighborhood walking behavior among low-income housing residents in an urban area. Low-income housing residents may be particularly at risk of not getting enough physical activity as they may have limited access to recreational facilities (Gordon-Larsen, Nelson, Page, & Popkin, 2006), and they may also be particularly influenced by their social environment given the high population density of the sites and close quarters in which residents live. This study uses a mix of perception-based, aggregate, and neighborhood audit measures of the social environment to explore how different facets of the social environment, acting at different levels, might influence health behavior. Specifically, we test the association between social capital, neighborhood disorder, and safety and walking behavior. We hypothesized that residents in housing sites with higher levels of social capital and safety and lower levels of social and physical disorder would report more walking than residents with low levels of social capital and safety and high social and physical disorder.

Methods

The research protocol was approved by the Human Subjects Protection committee at the Harvard School of Public Health and informed consent was obtained for participation in the research.

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