



Neighborhood cohesion, neighborhood disorder, and cardiometabolic risk

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ABSTRACT

Perceptions of neighborhood disorder (trash, vandalism) and cohesion (neighbors trust one another) are related to residents' health. Affective and behavioral factors have been identified, but often in studies using geographically select samples. We use a nationally representative sample ($n = 9032$) of United States older adults from the Health and Retirement Study to examine cardiometabolic risk in relation to perceptions of neighborhood cohesion and disorder. Lower cohesion is significantly related to greater cardiometabolic risk in 2006/2008 and predicts greater risk four years later (2010/2012). The longitudinal relation is partially accounted for by anxiety and physical activity.

Social and physical features of neighborhoods are related to residents' health (Diez Roux and Mair, 2010). In general, neighborhoods perceived as having greater social resources, such as those with high levels of social cohesion, are linked to better health (e.g., Bowling et al., 2006; Rios et al., 2012; Wen et al., 2005), and those with higher perceived social or physical hazards are related to poorer health (e.g., Bowling et al., 2006; Rios et al., 2012; Wen et al., 2005). Researchers have identified relationships between these neighborhood features and several affective and behavioral factors that may explain links to health (Dulin-Keita et al., 2013; Echeverria et al., 2008; Hill et al., 2005; Latkin and Curry, 2003). These studies provide strong support, yet the data available in prior studies create several challenges in generalization and moving toward causal inferences. Several studies relied on data collected in select areas of the United States (U. S.; e.g., Mair et al., 2011). And, although many adverse neighborhood characteristics cluster together, previous examinations of health generally examine one aspect of the neighborhood in isolation. Finally, many researchers are concerned that neighborhood features per se are not the cause of residents' health, but are instead explained by characteristics of the individuals (Pickett and Pearl, 2001).

In the present study, we used data from the Health and Retirement Study (HRS) to address several of these challenges. First, HRS is a nationally representative sample of U. S. adults and their spouses. This representative sample ensured that neighborhood-health relations were not specific to certain neighborhoods, but persisted across neighborhoods in the U. S. Second, in addition to individual-level socio-demographic variables that are commonly adjusted in neighborhoods

and health studies (e.g., household income-to-needs, wealth, marital status, race/ethnicity, age, and sex), we further adjusted for levels of neuroticism, as high levels of this personality characteristic may bias estimates relying on self-reports. Finally, we examined a potential interaction between cohesion and disorder and relations to cardiometabolic risk.

Using these data, we addressed three aims. First, we tested the hypotheses that lower levels of perceived neighborhood cohesion and higher levels of perceived neighborhood disorder are associated with greater cardiometabolic risk, both concurrently and four years later. Second, we tested the hypotheses that relations between aspects of the neighborhood and cardiometabolic risk are partially accounted for by individual-level affective (anxiety) and behavioral (physical activity) factors. Third, given that neighborhoods perceived as unsafe are often perceived as less cohesive (Greene et al., 2002), we assessed whether cohesion and disorder are associated synergistically with health.

1. Neighborhood cohesion and health

Neighborhood social cohesion is a group-level resource referring to trust and reciprocity among members of the group (Kawachi et al., 2008). Perceiving more cohesion in one's neighborhood is associated with better self-rated health into older adulthood (Bowling et al., 2006; Bures, 2003; Rios et al., 2012). Other researchers have demonstrated that residents of more cohesive neighborhoods are less likely to have physical health conditions such as hypertension (Mujahid et al., 2008). In addition to these aspects of health, older adults living in

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neighborhoods with higher levels of social cohesion are at lower risk of mortality (Wen et al., 2005).

Even before the development of chronic health conditions, perceptions of neighborhood cohesion are related to early signs of physiological risk. Aging researchers often use measures of multi-system physiological risk to determine peoples' risk for the development of disease (Sprott, 2010), and have determined that these measures are often more predictive of mortality than chronological age (Levine, 2013). Greater risk captured by such measures may relate to neighborhood environments. Some researchers have found, for example, greater multi-system physiological dysregulation among individuals with worse scores on the Perceived Neighborhood Scale (Mair et al., 2011), which includes subscales assessing people's perceptions of social embeddedness and sense of community.

Researchers posit that neighborhood social and physical features may relate to health through behavioral and affective pathways (Diez Roux and Mair, 2010). For example, the level of safety in a neighborhood may determine, in part, how often residents leave their homes to engage in physical activity. Having an active lifestyle is, in turn, related to better health. Moreover, feeling less safe in a neighborhood may increase residents' levels of psychological stress, and chronic stress is generally health-compromising. Although researchers have described these potential pathways linking neighborhood features to health, few studies have empirically tested them. We do not attempt to examine all possible pathways linking neighborhoods to health (i.e., bidirectional relations between behavioral and affective mechanisms) in the present study. Nevertheless, our hypotheses regarding relations between neighborhood social features and health, as well as potential affective and behavioral pathways, were guided by existing models (Diez Roux and Mair, 2010).

Several studies, to our knowledge, examined relations between neighborhood cohesion and both behavioral and affective outcomes. In two studies, researchers identified relationships with an affective factor, showing that low neighborhood cohesion was significantly related to more symptoms of depression (Ahern and Galea, 2011; Echeverria et al., 2008). A behavioral factor was also identified, such that people perceiving lower neighborhood cohesion were less likely to walk for exercise (Echeverria et al., 2008). Others, however, found no evidence of a relation between social cohesion and levels of physical exercise among older adults (Mendes de Leon et al., 2009). In another study, white, but not black, residents of an urban community who perceived more neighborhood cohesion reported lower anxiety, stress, and depression than those perceiving less cohesion (Gary et al., 2007). In the present study, we examined two individual-level factors that may explain links between features of the neighborhood and cardiometabolic health: anxiety and physical activity. The degree to which people observe cohesion or disorder in their neighborhoods may relate to their sense of safety or state of vigilance, which we believe is captured by people's level of anxiety. Moreover, we used a fairly comprehensive measure of physical activity which asked participants about their mild, moderate, and vigorous physical activity.

2. Neighborhood disorder and health

Neighborhood disorder is generally defined as the presence of features such as trash, vacant buildings, and crime (Ross and Mirowski, 2001). Residents often interpret these examples of disorder as signs of social deterioration, or a lack of social control or respect. Observed and perceived crime, common components of measures of neighborhood disorder, are associated with measures of cumulative physiological risk and self-rated health (Bowling et al., 2006), and mortality among older adults (Wen et al., 2005). Others have observed that perceptions of neighborhood safety, another indicator of neighborhood disorder, are also related to poorer physiological health (Burdette and Hill, 2008; Mujahid et al., 2008; Robinette et al., 2016) and physical functioning (Clark et al., 2009). Individuals perceiving less safety in their

neighborhoods report more physiological arousal (e.g., difficulty breathing; Burdette and Hill, 2008) and exhibit greater objectively assessed physiological dysregulation (Robinette et al., 2016).

Greater perceptions of disorder in the neighborhood are associated with higher levels of fear, which are, in turn, related to poorer physiological risk factors, poorer self-reported health and physical functioning, and the development of more chronic health conditions (Ross and Mirowski, 2001). For example, one study found that the relation between neighborhood safety perceptions and health is partially accounted for by depressive symptoms and levels of anxiety (Hill et al., 2005). Additional research indicates that greater perceptions of neighborhood disorder and related safety concerns are associated with lower levels of physical activity (Dulin-Keita et al., 2013; Mendes de Leon et al., 2009; Meyer et al., 2014).

3. Challenges in neighborhoods and health research

The aforementioned studies suggest that physical and physiological health are related to perceptions of neighborhood disorder and perceptions of neighborhood cohesion. Furthermore, these relations may be established or maintained via psychological distress and poor health behaviors. Several methodological challenges among neighborhood and health studies, however, limit generalizability and confidence in drawing causal inferences. First, findings are often difficult to generalize, as many studies are conducted with geographically select samples (e.g., Mair et al., 2011). Studies conducted with large national samples still lack generalizability when the participants are not racially or ethnically representative (e.g., Bures, 2003; Robinette et al., 2016). To test our hypotheses, we used data from participants in the HRS who represent the racial and ethnic background of older adults in the U. S.

Second, adverse neighborhood conditions are posited to affect one another (Diez Roux and Mair, 2010). For example, environments where there are few areas for socialization can thwart levels of cohesion. For this reason, we examined whether perceptions of neighborhood cohesion and perceptions of neighborhood disorder interact with one another to predict cardiometabolic risk. Finally, a long history of research attests to the associations between health and individual-level characteristics. Characteristics such as personality and SES, which have arguably received the most attention in the literature, are related to both health (Gruenewald et al., 2012; Lahey, 2009) and neighborhood selection (Jokela et al., 2014; Pickett and Pearl, 2001). For these reasons, we not only adjusted for commonly included sociodemographic characteristics, but also for a psychological characteristic, levels of neuroticism, to reduce the effect of any potential selection biases.

4. Data and methods

4.1. Participants and procedures

The Health and Retirement Study (HRS) is a large, nationally representative sample of U. S. men and women aged 50 years and older. The purpose of the survey was to examine the health and retirement status of the growing aging population. All participants completed a core interview (conducted face-to-face at baseline and by telephone during follow-up assessments). Starting in 1992, data have been collected every two years on participants' economic, physical, mental, and cognitive well-being. Response rates for the original HRS sample was high (81.6%), and re-interview response rates have remained high over time, ranging from 85.4 to 89.4% over the two-year follow-up periods. In 2006, a random half of respondents (selected at the household-level and excluding residents of nursing homes and other institutions) participated in enhanced face-to-face interviews in which they provided blood samples and received a physical exam. At the end of these interviews, participants were left with questionnaires assessing aspects of their psychosocial functioning and perceptions of their neighborhoods. The other half of the HRS respondents completed this same protocol in

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