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Urbanism, Neighborhood Context, and Social Networks

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Abstract

Theories of urbanism suggest that the urban context erodes individuals' strong social ties with friends and family. Recent research has narrowed focus to the neighborhood context, emphasizing how localized structural disadvantage affects community-level cohesion and social capital. In this paper, we argue that neighborhood context also shapes social ties with friends and family—particularly for community-dwelling seniors. We hypothesize that neighborhood disadvantage, residential instability, and disorder restrict residents' abilities to cultivate close relationships with neighbors and non-neighbor friends and family. Using data from the National Social Life, Health, and Aging Project (NSHAP), we find that older adults who live in disadvantaged neighborhoods have smaller social networks. Neighborhood disadvantage is also associated with less close network ties and less frequent interaction – but only among men. Furthermore, residents of disordered neighborhoods have smaller networks and weaker ties. We urge scholars to pay greater attention to how neighborhood context contributes to disparities in network-based access to resources.

A key contribution of the past several decades of social-scientific research is the recognition that people are embedded in social networks, and that these networks are consequential for both individuals and the communities within which they reside. Social networks provide access to valuable information and resources, opportunities to exercise social control, and the capacity for collective action (see, e.g., Coleman 1988; Granovetter 1973; Sampson and Groves 1989; Stack 1974; Wasserman and Faust 1994; Wellman 1983; Wellman and Wortley 1990). As a result, network structure is associated with a wide range of individual-level outcomes including status attainment and social mobility (for a review, see Lin 1999) and health benefits ranging from improved immune function, more effective disease management, and greater longevity (see, e.g., Smith and Christakis 2008; Thoits 2011).

Early ecological research of the Chicago School argued that the sheer size and density of urban areas threatened to erode the kinds of strong social bonds that typically characterize network ties with friends and family members (e.g., Wirth 1938; as well as Simmel 1903; Tönnies ([1887] 1957). As an adaptation to the unrelenting stimuli and stressors of busy

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urban environments, urban dwellers were expected to become aloof and untrusting, approaching one another with mutual trepidation (Milgram 1970; Simmel 1903). According to theories of urbanism, the reduction of social interaction to impersonal, rational, and transitory exchanges leaves urban dwellers with networks characterized by weak and instrumental ties (Wirth 1938; and see Beggs, Haines, and Hurlbert 1996; Fischer 1982; Lannoo, Verhaeghe, Vandeputte, and Devos 2011; White and Guest 2003).

More recent work challenges this notion of a monolithic urban way of life, suggesting that friendship, kinship, and associational ties are likely to be fostered – or eroded –by conditions within more localized contexts. Gans’s (1962) pivotal critique asserted that the concept of urbanism obscured important compositional and contextual variation within urban areas. And, today, evidence of deeply entrenched residential segregation by race/ethnicity and socioeconomic status (Reardon and Bischoff 2011) signals increasing spatial fragmentation of social life. Consistent with this, a large body of research shows that neighborhood-level structural characteristics generate wide variations in residents’ ties with their neighbors, as well as in community-level cohesion and social capital (see Sampson 2012). But less attention has been devoted to examining how neighborhood contexts, within urban and non-urban areas, affect individuals’ personal network ties.

This paper bridges a gap between early theories suggesting that the urban context affects individuals’ personal network ties and more recent work suggesting that neighborhood context affects neighborhood-based ties and community cohesion. We explore whether localized neighborhood conditions shape individuals’ abilities to form and maintain personal network ties, including friends and family members *who may or may not reside in the neighborhood*. We draw from previous research on social disorganization theory and exchanges of support in disadvantaged communities to develop hypotheses about how neighborhood disadvantage and disorder affect network characteristics such as size, closeness, and frequency of interaction. We test these ideas using data from the second wave of the National Social Life, Health, and Aging Project (NSHAP), collected in 2010–2011. These data provide a unique opportunity to examine individuals’ egocentric social network characteristics as well as tract-level neighborhood characteristics and field-interviewer-rated neighborhood disorder.

While our theoretical framework applies across the life course, we focus our empirical work on older adults. If neighborhood context shapes residents’ social networks, the association may be strongest within groups that are most reliant on both neighborhood resources and social support. Community-residing older adults are one such group. Previous research suggests that neighborhood effects on health increase with age (Robert and Li 2001), likely due to older adults’ greater daily and cumulative exposure to the neighborhood, increased vulnerability to neighborhood-based hazards, and heightened dependence on neighborhood resources (Cagney and York Cornwell 2010; Schieman 2005). At the same time, common changes in later life such as retirement, bereavement, and the advent of health problems often contribute to network instability (Cornwell, Laumann, and Schumm 2008). Because older adults’ social interactions are particularly likely to occur in and around the neighborhood (Krantz-Kent and Stewart 2007), neighborhood conditions may be especially important for maintaining social ties with friends and family in later life. Thus, the

relationship between neighborhood-based resources or challenges may therefore be most readily observable among – and most consequential for – older adults.

NETWORKS IN CONTEXT

Previous research on the formation and maintenance of network ties has primarily focused on the role of individual-level factors. Social networks may be viewed as a product of individuals' psychological predispositions (Kalish and Robbins 2006), strategic or entrepreneurial actions (Burt, Jannotta, and Mahoney 1998; Kadushin 2002), and cultural worldviews or consumption patterns (Lizardo 2006). Life course perspectives also draw attention to aging-related changes in daily experiences, capacities for maintaining ties, and the need for support due to bereavement or health decline (Charles and Carstensen 2010; Wellman and Wortley 1990). However, persistent disparities in network characteristics across status groups suggest that opportunities to form and maintain ties are socially structured. For example, blacks, Latinos, and individuals with less formal education tend to have smaller networks than their white and more educated counterparts (see, e.g., Ajrouch, Antonucci, and Janevich 2001; Cornwell, Laumann, and Schumm 2008; Marsden 1987). Opportunities for social connectedness in residential and organizational contexts may contribute to these disparities (Small 2007, 2009).

The idea that residential contexts shape patterns of social connectedness is not new. Classic theories of urbanism argued that the sheer population size and density of urban areas weakened the kinds of traditional social bonds and kinship-based networks that characterized rural and/or pre-industrial societies (e.g., Wirth 1938; as well as Simmel 1903; Tönnies ([1887] 1957). However, empirical research yields mixed evidence regarding the effect of urban context on network ties. Consistent with urbanism, some studies have found that urban residents have more segmented networks and fewer family ties compared to rural residents (see, e.g., Fischer 1982; Hofferth and Iceland 1998; Marsden 1987; White and Guest 2003). At the same time, other research finds that urban dwellers have larger networks and more frequent contact with family and friends, which is thought to be indicative of closer relationships or stronger ties (e.g., Beggs, Haines and Hulbert 1996; Fischer 1982; Hofferth and Iceland 1998; Lanoo et al. 2011).

A prominent alternative to theories of urbanism is the idea that friendship, kinship, and associational ties are fostered –or eroded –by more localized contexts of daily life rather than the urban environment as a whole. Gans's (1962) famous critique of Wirth's (1938) theory of urbanism moved in this direction, suggesting that the loss and weakening of social ties in the urban areas reflects localized composition more than contextual influence. Research on neighborhood social contexts builds from this idea by exploring how neighborhood structural characteristics including socioeconomic status of residents, levels of residential turnover, and racial/ethnic composition may generate wide variations in patterns of neighborhood-based ties and community-level cohesion (Sampson 2012). Social disorganization theory, for example, elaborates a process through which concentrated poverty and residential instability weaken social bonds among neighbors and reduce community involvement. Without these, low-income neighborhoods often lack the foundation for effective social organization, exchanges of support, and informal social

control (Sampson and Groves 1989; Sampson, Raudenbush, and Earls 1997; Wilson 1987). Yet, a number of qualitative studies point to forms neighborhood-based exchanges of support and social organization that emerge in disadvantaged communities (e.g., Duneier 1999, Pattillo 1998, Whyte 1943), often as a kind of adaptive cohesion in response to a lack of local access to resources (e.g., Newman 2003; Schieman 2005; Stack 1974).

Most important for this paper is that little attention has been devoted to the role of the neighborhood context in shaping *individuals' personal social networks*. By personal social networks, we refer to network ties with individuals' close friends and family members. Personal network ties may reside inside or outside of one's neighborhood. Having close friends and family who live in the neighborhood may provide access to proximal support and resources, but close ties with non-neighbors can also be particularly valuable sources of emotional and instrumental support (Fischer 1982; van Eijk 2010; Wellman and Wortley 1990). We argue that just as neighborhood structural disadvantage may affect neighborhood-level social cohesion and community connectedness, neighborhood disadvantage may shape individuals' opportunities to form and maintain social relationships with friends and family members, *regardless of whether those people reside in the neighborhood*. An important implication is that the neighborhood context may deprive some individuals of the ability to cultivate the kinds of close relationships that can provide access to resources and support.

How might neighborhood context affect social relationships with family members and friends, even if they don't live there? Below, we build from research on neighborhood disadvantage, disorganization, and disorder to consider how concentrated disadvantage and residential instability shape residents' abilities to form and maintain personal network ties. Through this process, we develop several hypotheses to be tested in this study.

Neighborhood Disadvantage and Personal Networks

Neighborhood concentrated disadvantage and residential instability pose a number of challenges for residents and communities that may also contribute to the loss or weakening of social ties. Neighborhoods that are characterized by socioeconomic disadvantage (e.g., high rates of poverty and unemployment, low rates of education) and high rates of residential mobility often suffer from the decline or disappearance of local institutions (Sampson 2012; Wilson 1987). Apart from their manifest functions, neighborhood-based institutions can be important sites for social integration. Childcare centers, welfare and social service offices, health care clinics, retail establishments, recreational venues, and churches often promote socializing and exchanges of support (see, e.g., Desmond 2012; Klinenberg 2002; Small 2009). For older adults, senior centers can be particularly critical sites for forming and maintaining social ties (Glass and Balfour 2003). In addition to fostering interactions with fellow residents, these settings may draw in nonresidents and thereby provide opportunities to form and maintain non-local ties (van Eijk 2010). In either case, living in a neighborhood that lacks such local institutions may result in smaller social networks and/or less frequent social interaction with one's network members.

For individuals, residence in a socioeconomically disadvantaged neighborhood can also create substantial daily hurdles, which may reduce the ability and wherewithal to maintain social ties. Neighborhood disadvantage hampers child development, educational attainment,

and opportunities for social mobility (for a review, see Sampson 2012). Neighborhood disadvantage and residential instability can also cause stress and increase risks of infectious disease, respiratory illness, depression, and mortality (see, e.g., Cagney and York Cornwell 2010; Kawachi and Berkman 2003; Kim 2010). Coping with these challenges, particularly in a resource-poor environment, may sap time and energy that individuals might otherwise devote to the cultivation of social relationships. In other words, the stressors and challenges of neighborhood-level deprivation may deplete individuals' abilities to sustain social ties.

However, an important alternative to this idea is that concentrated disadvantage may lead residents to cultivate ties, including ties with family members, friends, neighbors, and fictive kin (Stack 1974). Adaptive cohesion in the face of neighborhood disadvantage is often fostered by residential stability; long-term residents of more stable neighborhoods are more likely to build the kinds of relationships that enable resource pooling and exchanges of support (Pattillo 1998; Schieman 2005; Stack 1974). Rather than eroding social relationships, then, neighborhood poverty activates exchanges of support or resources with extended kin ties that subsidize the lack of social cohesion, institutional resources, and normative organization within the community (Edin and Lein 1997; Jarrett, Jefferson, and Kelly 2010; Newman 2003; Stack 1974; and see Kim 2010).

Within disadvantaged neighborhoods, women tend to take a particularly active role in exchanging support with other residents and fictive kin (Jarrett, Jefferson, and Kelly 2010; Schieman 2005; Stack 1974), especially during later life (Newman 2003; and see Pattillo 1998). These findings are corroborated by broader research on gender differences in social networks. In general, women tend to have larger and more kin-centered networks than men as well as more emotionally close relationships and greater frequency of contact with their network members (Fischer and Beresford 2015; Liebler and Sandefur 2002). Women are also more likely to provide and receive social support, especially during times of distress (Fischer and Beresford 2014; but see Pinquart and Sorensen 2006).

But the resources that residents of disadvantaged neighborhoods may accrue through network ties should not be overstated. For one thing, not all residents of disadvantaged neighborhoods are able to cultivate supportive ties. Klinenberg's (2002) qualitative work suggests that neighborhood disadvantage can lead to social withdrawal and isolation for older men, in particular, because they have fewer relationships with kin and find it more difficult to form close ties with others. A recent empirical study finds that even among women, residents of disadvantaged neighborhoods have lower overall support from friends and family than those who reside in more advantaged neighborhoods (Turney and Harknett 2010). Tigges, Browne, and Greene (1998) find that neighborhood poverty is negatively associated with network size among Atlanta residents, and van Eijk (2010) observed a similar association in her qualitative research in Rotterdam. Finally, Small's (2007) study of Chicago residents indicates that disproportionate exposure to concentrated poverty contributes to racial disparities in network size and network-based social capital and support.

These findings are consistent with our theory that the challenges of residing in a resource-poor environment and the lack of institutional spaces for meeting and socializing restrict or weaken social ties with friends and family – including those who live in the neighborhood

and those who live elsewhere. We therefore hypothesize that *individuals who reside in disadvantaged neighborhoods and those who live in neighborhoods with greater residential instability have smaller networks and weaker network ties*. And, informed by evidence of gender differences in network characteristics and qualitative research highlighting women's larger roles in building and maintaining relationships, particularly in disadvantaged neighborhoods (Jarrett, Jefferson, and Kelly 2010; Klinenberg 2002; Newman 2003; Stack 1974), we will consider whether the relationship between neighborhood characteristics and social networks is conditioned by gender. We hypothesize that *concentrated disadvantage is more strongly negatively associated with network size and closeness among men compared to women*.

Neighborhood Disorder and Social Withdrawal

Social disorganization theory posits that neighborhood structural disadvantages such as concentrated poverty and residential instability weaken community cohesion and informal control, which reduce the community's capacity to act on and address problems. As a result, delinquent and criminal behaviors are more likely to go unchecked, resulting in the emergence of a set of conditions typically referred to as neighborhood disorder. Physical features of neighborhood disorder include abandoned buildings, graffiti, litter, and noise (Ross and Mirowsky 1999; Sampson et al. 1997; Skogan 1990).

Previous research suggests that the presence of physical disorder causes fear and discomfort among neighbors. Kelling and Wilson (1982:32) describe that residents of disordered neighborhoods try to avoid the streets – and when they do go out, they “stay apart from their fellows, moving with averted eyes, silent lips, and hurried steps” (and see Perkins and Taylor 1996). Reactions to disorder depend on preexisting neighborhood cohesion, crime rates, and racial composition, as well as individual perceptions, prior exposure, and bias (Sampson and Raudenbush 2004). But, overall, empirical research suggests that fear stemming from neighborhood disorder reduces contact among neighbors (Krause 1993), leading to subsequent declines in neighborhood-level cohesion and informal control (Steenbeek and Hipp 2011).

However, previous research has not considered whether residing in a disordered neighborhood disrupts individuals' relationships with friends and family members. We argue that disorder may serve as a mechanism through which neighborhood socioeconomic disadvantage and residential instability affect individuals' social networks. There are a number of reasons why physical disorder in one's neighborhood may restrict or weaken ties with friends and family.

First, neighborhood disorder heightens fear of crime and victimization, especially among female and older residents (LeGrange and Ferraro 1989; Perkins and Taylor 1996). Klinenberg's (2002) qualitative study of the Chicago heat wave of 1995 vividly illustrates how fear of crime can lead to extreme social isolation for low-income older adults who seal themselves inside their homes and are reluctant to open their doors to anyone. Fear of victimization may therefore lead residents to enact avoidance or defensive behaviors that ultimately diminish or weaken their relationships with friends and family members. At the

same time, friends and family may avoid visiting someone who resides in a disordered neighborhood due to their own fear of victimization.

Second, neighborhood disorder is associated with greater risk of psychological distress and depression (Kim 2010), which in turn limit the wherewithal or desire to form social relationships and to socialize with family and friends. Depressive symptoms may also reduce one's attractiveness to others as a potential confidant (see Schaefer, Kornienko, and Fox 2011). At the same time, neighborhood disorder may reflect a local normative environment characterized by a lack of care and concern toward others, which can lead residents to adopt a similar outlook and adapt their behavior accordingly. Consistent with this, neighborhood disadvantage has been linked with both distrust of neighbors and generalized distrust, especially when features of disorder are present (Ross, Mirowsky, and Pribesh 2001). Distrustful individuals may be less inclined to establish new relationships, and may limit emotional intimacy or reduce the frequency of interaction with existing ties.

We propose that neighborhood disorder creates fear, distress, depression, and distrust – all of which may restrict opportunities for social interaction, reduce social visits from friends and family, and lead to social withdrawal. Thus, we hypothesize that *individuals who reside in more disordered neighborhoods have smaller social networks and weaker network ties*. We also hypothesize that *disorder mediates the associations between neighborhood structural disadvantages and network characteristics*.

An important consideration is that disorder is typically studied as a characteristic of urban neighborhoods; few studies have examined the emergence and effects of disorder in non-metropolitan contexts. Previous work suggests that disorder is not limited to urban areas, but that higher-density blocks in urban and non-urban settings tend to have more disorder than lower-density blocks (York Cornwell and Cagney 2014). However, perceptions of and reactions to disorder may be shaped by characteristics of the surrounding area, such as poverty and racial/ethnic composition (Sampson and Raudenbush 2004). A related possibility is that common indicators of disorder (e.g., abandoned buildings, broken windows, litter) take on different meanings with different consequences for urban and non-urban residents. Thus, we devote particular attention to examining whether the relationship between disorder and social networks varies across individuals who reside in urban and non-urban areas.

DATA AND METHODS

We use data from the second wave of the National Social Life, Health, and Aging Project (NSHAP), conducted in 2010–2011. This is a nationally representative, population-based study of community-residing older adults, ages 62 to 91, and their co-resident partners. The NSHAP sample was selected at Wave 1 using a multi-stage area probability design that oversampled by race/ethnicity, age, and gender. The second wave of data collection includes 2,261 of the original 3,005 Wave 1 respondents (weighted response rate of 88.8 percent), as well as 161 respondents who were sampled for Wave 1 but did not participate then. Wave 2 also added 744 cohabiting spouses or romantic partners of Wave 2 respondents who are

within the NSHAP age range. Thus, there are 3,166 age-eligible respondents, including partners, in Wave 2.

We are unable to use data from Wave 1 because key measures of neighborhood context, including interviewer assessments of disorder in respondents' neighborhoods, were added in Wave 2. The majority of data in Wave 2 were captured through 90-minute in-home interviews. In addition, respondents were given a Leave-Behind Questionnaire (LBQ) to complete on their own and return to NORC at the University of Chicago using a stamped envelope that was provided. The return rate for the LBQ was 87 percent.

Dependent Variables: Social Network Characteristics

Our goal is to examine how social network characteristics vary across neighborhood contexts. Our dependent variables include network characteristics derived from an egocentric network roster collected during the in-person interview. The roster asked respondents to name up to five persons with whom they discuss things that are important to them. The number of ties named provides an indicator of network size, which reflects the extent to which the respondent has relatively strong, frequently accessed relationships through which important resources and social influence can flow (Bailey and Marsden 1999; c.f., Bearman and Parigi 2004).

For each network member, respondents were asked to indicate the closeness of their relationship, from 1 "not very close" to 4 "extremely close," and how often they talk, from 1 "less than once a year" to 8 "every day." We average the responses on these two items across all of the respondent's network members to arrive at two measures: overall closeness and overall frequency of interaction with one's network ties. Both of these are indicative of tie strength as well as access to support and a sense of intimacy and companionship with family and friends.

Density and Neighborhood Disadvantage

We utilize tract-level indicators from the 2010 US Census and the 2006–2010 American Community Survey (ACS) to determine the urbanicity and neighborhood structural characteristics of the respondent's local area. We use two measures to assess the urbanicity of the respondent's residential context: 1) whether the respondent's census tract is located inside a Metropolitan Statistical Area, as defined by the US Census and 2) the persons per square mile (in thousands) in the tract. Table 1 presents summary statistics for all of the variables included in our analyses, across respondents residing in metropolitan and non-metropolitan areas.

We examine the role of neighborhood structural disadvantage by considering concentrated disadvantage and residential instability. We follow prior research by constructing an index of concentrated disadvantage based on multiple characteristics of respondents' Census tracts (e.g., Sampson et al. 1997; Schieman 2005). This includes the percent of residents with incomes below poverty and the percent of residents age 25 and above who did not attend college, both drawn from the 2010 Census. We also include the percent of households that are female-headed and the percent of residents age 16 and over who are unemployed, based on the 2006–2010 ACS. The scale has good internal consistency reliability. Cronbach's

alpha is .83 and item-rest correlations are above .57. The characteristics are standardized and averaged to arrive at an indicator of concentrated disadvantage within the respondent's Census tract.

An index of residential instability within the respondent's census tract is determined by standardizing and averaging two tract-level characteristics: the percent of housing units that are owner-occupied (2010 Census; reversed) and the percent of residents who moved in the past year (2006–2010 ACS). These two items are strongly correlated ($r = -.62$; $p < .001$) and Cronbach's alpha is .76. Higher scores indicate greater residential instability in the respondent's tract.

Neighborhood Disorder

We use NSHAP field interviewer observations to construct a measure of neighborhood disorder (see York Cornwell and Cagney 2014). This approach was informed by methods of systematic social observation of disorder introduced in the Project on Human Development in Chicago Neighborhoods (PHDCN), in which trained observers visited and tallied the presence of particular features of disorder on residential blocks in Chicago (Sampson and Raudenbush 1999). NSHAP's use of in-home interviews affords field interviewers a unique opportunity to observe respondents' residential contexts. At the conclusion of each interview, the field interviewer completed a questionnaire during which s/he was asked to "describe the street (one block, both sides) where the respondent lives." We use field interviewers' ratings of five features of the respondent's local area: the presence of litter, noise, and odor/pollution on the respondent's block, as well the level of disrepair of the respondent's building and other buildings on the block. Table 2 presents summary statistics for each of the items included in this scale, across respondents who reside in metropolitan and non-metropolitan areas.

Following previous research (see York Cornwell and Cagney 2014), we combine these items into a scale assessing neighborhood problems. Because the number of response categories varies across the items, we first standardize the measures and then average the scores to arrive at an overall rating of disorder on each respondent's block. The scale has good internal consistency reliability (Cronbach's alpha of .82; item-rest correlations from .47 to .71).¹ Higher scale scores indicate more disorder on the respondent's block.

Covariates

All of our models control for individual-level status characteristics and socioeconomic status, including age, gender, racial/ethnic background, and educational attainment. We control for whether the respondent has a co-resident partner (yes = 1) and co-residents. Respondents were asked to indicate how long they have lived in their local area on the LBQ, with eight categories ranging from "less than 1 year" and "1 to 5 years" to "more than 50 years." Only about 2 percent ($n = 61$) of respondents indicated that they had lived in their local area for less than a year, and more than 55 percent ($n = 1,552$) have lived in their local

¹Scale reliability and scores are calculated for the full sample. In supplemental analyses, we find that the scale retains good internal consistency reliability when assessed separately within metropolitan areas (Cronbach's alpha of .81; item-rest correlations from .63 to .86) and within non-metropolitan areas (Cronbach's alpha of .74; item-rest correlations from .58 to .80).

area for more than 20 years. To control for residential mobility and attachment, we collapse responses to three categories: less than 5 years, 6–20 years, and more than 20 years in the area. Finally, we control for self-reported physical health, a shortened, 11-item version of the Center for Epidemiological Studies of Depression Scale (CES-D) (Radloff 1977), and whether the respondent reported difficulty with any of nine daily tasks such as walking one block or getting in and out of bed (yes = 1).

Analytic Strategy

We theorize that neighborhood structural characteristics and physical conditions shape residents' opportunities to form and maintain social relationships, thereby shaping the structure and characteristics of their social networks. Data from Wave 2 of NSHAP offer an unprecedented opportunity to examine neighborhood context, including field-interviewer-assessed disorder, and network characteristics within a population-based sample. However, we are limited to cross-sectional analyses. Thus, rather than building causal models, we use regression analysis as a tool to examine net associations between respondents' neighborhood contexts and social networks.

We are cognizant that an association between neighborhood context and network characteristics may reflect selection. We have theorized that neighborhood context affects social networks, but one's network size or tie strength may also affect where one lives. For example, older adults with fewer or weaker network ties may be more likely to reside in disadvantaged neighborhoods because they lack access to network-based resources that might help them to relocate to a more advantaged area. We consider this in our discussion of the results.

NSHAP is based on a nationally representative, population-based sample of older adults. Because respondents are spread out across the United States rather than clustered within neighborhoods, multilevel models with respondents nested within neighborhoods are not feasible. Model specifications vary according to the functional form of our dependent variables. Poisson regression is used to estimate the associations between neighborhood characteristics and social network size. Poisson is appropriate because network size is a count of the number of ties named by the respondent, and there is little evidence of overdispersion (i.e., the variance of the count is only about half as large as the mean). OLS regression is used to estimate the relationship between neighborhood context and network closeness and frequency of interaction.

Our analyses exclude respondents who do not have valid data on all variables in our models. This reduces the sample size from the 3,166 age-eligible respondents in NSHAP Wave 2 to 2,602 respondents who are included in our models predicting network size.² Of these, 21 respondents did not name any network members and one respondent had missing data on network characteristics. Models predicting network closeness and frequency of interaction therefore include 2,580 respondents.

²Of the 3,166 age-eligible NSHAP W2 respondents, 423 are missing data on residential tenure because they did not return the LBQ (n = 397) or did not respond to the item (n = 26). Another 165 respondents (103 of whom were not interviewed in their homes) have missing data on neighborhood disorder. We also drop respondents who have missing data on depressive symptoms (n = 35), functional impairment (n = 12), race/ethnicity (n = 12), self-rated physical health (n = 3), and tract characteristics (n = 1).

We adjust all models for design effects resulting from NSHAP's multistage sampling procedures, and variance estimates are adjusted for strata and primary sampling units. We also incorporate person-level weights in all models to account for differential probabilities of selection into the study, with post-stratification adjustments for non-response. We adjust the person-level weights for each model using a complete-case weighting procedure to attenuate selection effects from the exclusion of respondents who had missing data on one or more variables in our analyses (Morgan and Todd 2008). This approach affords disproportionate weight to cases that are least likely to be included in each of the models.

Finally, note that our sample includes 670 pairs of co-resident partners. Our adjustment of variance estimates for the survey sampling design assumes independence of primary sampling unit clusters, while allowing dependence within them. Thus, inferences and variance estimates should not require further adjustment for non-independence within couples. We have explored alternative model specifications, including gender stratified models and multilevel models, in order to assess the degree to which our inferences vary across different methods of accounting for the clustering of couples within households.³ However, the substantive findings reported here do not differ from those obtained in multilevel or gender stratified specifications (results available upon request).

RESULTS

Below, we examine results from regression analyses estimating net associations between characteristics of neighborhood context and social network characteristics. Table 3 shows results from Poisson regression models predicting network size. We present incident rate ratios (IRRs), which indicate the change in the rate of naming network members associated with a one-unit increase in the independent variable of interest. For example, in Model 1 of Table 3, the IRR of 1.141 for female respondents indicates that women name network alters at a rate about 1.14 times that of men, or at a 14 percent higher rate than men. Education is also associated with network size. Older adults who attended college and those who earned a college degree have significantly higher rates of naming network members ($IRR = 1.107$; $p < .001$ and $IRR = 1.138$; $p < .001$, respectively) compared to those who did not attend college. Network size is not significantly associated with age, racial/ethnic background, marriage, or co-residence. Network size is modestly negatively associated with residential tenure, but it does not differ across

Next, we consider our hypotheses that older adults who reside in disadvantaged and unstable neighborhoods have smaller social networks. As shown in Model 2, an increase of one standard deviation in the scale of concentrated disadvantage in the respondent's tract is associated with a nearly 4 percent lower rate of naming network members ($IRR = .961$; $p < .01$). However, residential instability is not associated with network size. We do not find any evidence that these relationships are conditioned by gender.

³In multilevel models with respondents clustered within households, intraclass correlations (indicative of within-couple variance in our dependent variables) are .07 for network closeness, .13 for network size, and .22 for frequency of interaction. metropolitan and non-metropolitan areas or according to the population density of respondents' tracts.

Model 3 lends support for our hypothesis that older adults who live in more disordered neighborhoods have smaller social networks. In Model 4, we investigate whether the association between disorder and network size differs across metropolitan and non-metropolitan residents. We find that an interaction term crossing disorder and metropolitan residence is significantly associated with network size, and its inclusion significantly improves the overall model fit ($F_{(df=1, 50)} = 4.35; p < .05$). Among residents of non-metropolitan areas, a one-standard deviation increase in disorder is associated with a decrease of nearly 9 percent in the rate of naming network members ($IRR = .912; p < .01$). However, in metropolitan areas, a one-unit increase in disorder is associated with a more modest 2 percent decrease in the rate of naming network members ($IRR = 1.073; p < .05$ for the interaction term crossing disorder with metropolitan residence; $1.073 * .912 = .979$).

Contrary to our hypothesis, disorder does not explain the relationship between concentrated disadvantage and network size. Neighborhood disadvantage and disorder – as well as the respondent's educational attainment – are each separately associated with network size.

The overall magnitude of the associations between neighborhood context and network size is modest, but additional analyses indicate that the association between disorder and network size is particularly notable when focusing on the likelihood of having a small network – that is, naming fewer than three alters. As shown in Table 1, about 20 percent of respondents named fewer than three ties. We estimate a series of logistic regression models predicting the likelihood of having fewer than three ties (see Appendix A). A model including all of the predictors and covariates shown in Model 4 of Table 3 indicates that metropolitan residence, density, concentrated disadvantage, and residential instability are not associated with the risk of having fewer than three network ties. Neighborhood disorder, however, is associated with the risk of having a small network. Further, the inclusion of an interaction term crossing neighborhood disorder and metropolitan residence is also significant in this model and its inclusion improves model fit ($F_{(df=1, 50)} = 6.94; p < .05$). This indicates that the relationship between disorder and having a small network differs across respondents in urban and non-urban contexts. Specifically, for non-metropolitan residents, an increment of one standard deviation in neighborhood disorder is associated with a 90 percent greater risk of having a small network ($OR = 1.900; p < .001$). Among metropolitan residents, a one-unit increment in disorder is associated with a 22 percent greater risk of having a small network ($OR = .644; p < .05$ for the interaction term crossing disorder with metropolitan residence; $1.900 * .644 = 1.224$).

Figure 1 depicts these results as predicted probabilities of having a small network (i.e., with fewer than three ties) across neighborhood disorder. We estimate these predicted probabilities by fixing covariates in Model 4 at their mean or mode (for categorical variables) and allowing levels of disorder to vary among residents of metropolitan and non-metropolitan contexts. For those who reside in urban areas, the predicted probability of having a small network increases by about .11 as disorder increases from low to high. But the relationship between disorder and the risk of having a small network among non-metropolitan residents is particularly striking. Among non-metropolitan residents, probabilities of having a small network increase from about .15 among who live in areas with low disorder to more than .60 among those who reside in disordered areas.

Tie Strength

Next, we examine closeness and frequency of interaction with network members as indicators of overall tie strength within the social network. Table 4 presents unstandardized coefficients from OLS regression models predicting average closeness with network members (Models 1–3) and average frequency of interaction with network members (Models 4–6).

Tie strength varies significantly across status groups. As shown in Models 1 and 4, women and African Americans have stronger network ties. Women report higher average closeness and more frequent interaction with their network members. Compared to white older adults, African-American older adults have closer relationships and more frequent interaction with their confidants. There is some evidence that Latinos have less close relationships with their network members compared to whites, but their frequency of interaction does not differ. Older adults who have college degrees have less close relationships and less frequent interaction with their confidants compared to those who did not attend college. Not surprisingly, those who have a co-resident partner have closer network ties and those who have larger households have greater frequency of interaction. This likely reflects the presence of the partner and/or co-residents in the network. Length of residence in one's local area, metropolitan residence, and population density are not associated with tie strength.

We hypothesized that concentrated disadvantage and residential instability are negatively associated with the strength of older adults' network ties. In Models 2 and 5, we do not find any association between residential instability and tie strength. Concentrated disadvantage is associated with tie strength – but we find that the relationship is conditioned by gender. For women, concentrated disadvantage is associated with stronger network ties. Interaction terms crossing gender with concentrated disadvantage indicate that women who reside in more disadvantaged neighborhoods have closer relationships ($b = .089$; $p < .05$ in Model 2) and more frequent interaction with their network members ($b = .203$; $p < .01$ in Model 5). Among men, concentrated disadvantage is associated with lower levels of network closeness ($b = -.068$; $p = \text{n.s.}$ in Model 2) and lower frequency of interaction ($b = -.146$; $p < .05$ in Model 5). The interaction terms significantly improve the fit of both the network closeness ($F_{(df=1, 50)} = 6.17$; $p < .05$) and frequency of interaction models ($F_{(df=1, 50)} = 7.84$; $p < .01$).

To illustrate the magnitude of the gender difference, we present predicted frequencies of interaction across levels of concentrated disadvantage for men and women in Figure 2. These frequencies are calculated using the results in Model 5, with covariates fixed at their mean (for continuous variables) or mode (for dichotomous variables). Consistent with our hypothesis, the frequency of interaction scores for men who reside in very disadvantaged neighborhoods are about .40 lower than those of men who live in less disadvantaged neighborhoods. Among women, frequency of interaction increases by about .15 from neighborhoods with low levels of concentrated disadvantage to those that are very disadvantaged.

Finally, we consider the role of neighborhood disorder in network tie strength. We find that neighborhood disorder is associated with network closeness, but an interaction term crossing

neighborhood disorder with metropolitan residence is also significant and improves model fit ($F_{(df=1, 50)} = 7.27; p < .01$). This indicates that the relationship between disorder and network closeness varies across metropolitan and non-metropolitan areas. As shown in Model 3, neighborhood disorder is negatively associated with network closeness – and the relationship is particularly strong among older adults who reside in non-metropolitan areas. The coefficient for neighborhood disorder ($b = -.147; p < .01$) indicates that an increment of one standard deviation on the disorder scale for those who reside outside of metropolitan areas is associated with a decrease of .147 in average closeness with network members. But for residents of metropolitan areas, a one-unit increase in disorder is associated with a decrease of only .031 in closeness ($b = .115; p < .01$ for the interaction term crossing disorder with metropolitan residence; $-.147 + .115 = -.032$). However, we do not find evidence for our hypothesis that disorder mediates the association between concentrated disadvantage and network closeness.

In Model 6, we find that disorder is neither associated with frequency of interaction, nor does it account for the association between concentrated disadvantage and frequency of interaction. The interaction crossing disorder with non-metropolitan residence is not significant and does not improve model fit, so we present only the main effect.

DISCUSSION

This paper bridges a gap between early studies of urban context and social ties, and more recent work on neighborhood effects, by proposing that neighborhood context structures individuals' personal social networks. Classic urbanism theory posited that broader residential context has a profound effect on individuals' relationships with their friends and family members, leading to the dominance of secondary, emotionally distant, and role-based ties among urban residents (Wirth 1938). More recent work has narrowed the focus to the neighborhood level. However, this research has focused mainly on the effects of neighborhood context on ties with and among neighbors (Sampson and Groves 1989; Sampson et al. 1997). In the analyses presented here, we find that neighborhood context also affects one's social ties with friends and family members – regardless of whether they reside within one's own neighborhood.

First, we find that residents of socioeconomically disadvantaged neighborhoods have smaller social networks. This finding echoes early theories of urbanism and social disorganization theory, as it suggests that some broader social contexts lead to the loss or weakening of social ties (Simmel 1903; Wirth 1938). While social disorganization theory posits that neighborhood disadvantage weakens ties among neighbors (Sampson and Groves 1989), our findings suggest that residence in a disadvantaged neighborhood may also lead to the erosion of relationships with family members and friends who may or may not reside in the neighborhood. In this way, neighborhood disadvantage may restrict network-based access to social capital and support for precisely those individuals who would benefit most from these informal resources.

A second key finding is that neighborhood disadvantage is associated with weaker network ties – but only among men. Older men who live in disadvantaged neighborhoods have less

close relationships and less frequent interactions with their network members. For women, neighborhood disadvantage is associated with closer relationships and more frequent interaction. This is consistent with previous research suggesting that adverse conditions such as socioeconomic disadvantage may, in some cases, spark social engagement and mobilization rather than withdrawal and isolation. Qualitative studies of the urban poor have documented particularly strong ties among women, who often play central roles in local networks (e.g., Newman 2003; Stack 1974), while men in disadvantaged neighborhoods are more susceptible to social isolation (Klinenberg 2002). In other work, a variety of factors including race/ethnicity and residential mobility condition the relationship between neighborhood context and social support (e.g., Schieman 2005). Thus, a fruitful direction for further research on inequalities in social capital is the consideration of both individual-level and contextual factors in the etiology of social networks.

Third, we find that neighborhood disorder is associated with network characteristics even after accounting for socioeconomic disadvantage. Older adults who reside on more disordered blocks have smaller networks and less emotionally close relationships. It is well documented in previous research that disorder weakens neighborhood-level social cohesion and social ties (Kelling and Wilson 1982; Skogan 1990; Steenbeek and Hipp 2011). Disordered neighborhoods may simply be inhospitable contexts for social interaction – either with neighbors or with family members and friends. Individuals who reside in disordered areas may decline visits because they do not want to invite others into an uncomfortable, chaotic, or threatening area. At the same time, family members and friends may distance themselves from residents of disordered neighborhoods because they feel threatened. Or, they may feel overwhelmed by the needs of those who live in disordered areas, since disorder can be a vivid indicator of the lack of localized social capital and resources.

An alternative explanation for our results is selection – that having a smaller network and/or weaker ties increases the risk of living in a disordered or disadvantaged neighborhood. We have theorized that neighborhood context affects network characteristics, and our results are consistent with this. But the cross-sectional NSHAP data do not allow us to elucidate the extent to which social networks may also affect the neighborhoods where people live. This is a particularly important consideration when thinking about older adults. For example, older adults who have larger networks, more frequent contact, and closer relationships with family and friends are more likely to have social resources and support that would help them to move out of a disordered neighborhood. But if neighborhood disorder also erodes network ties, then older adults who reside in disordered neighborhoods may, over time, become both socially isolated and geographically trapped.

Finally, the relationships between neighborhood disorder and network size and closeness are particularly strong for residents of non-metropolitan areas. This is striking given that disorder has been primarily considered in research on urban neighborhoods. Our findings may reflect that features of disorder are more salient and/or more threatening in non-metropolitan areas where population and building densities are lower. Lower density areas may lack the street activity and shops and restaurants that provide “eyes on the street,” which create a sense of safety even in the midst of disorder (Jacobs 1961). Furthermore, lower-density areas tend to have fewer shoppers, commuters, and passers-by, which means

that residents may be more likely to attribute features of disorder such as litter to fellow residents rather than outsiders. This, coupled with greater physical isolation, may render disorder particularly threatening or isolating for non-metropolitan residents.

The greater magnitude of the association between disorder and network characteristics in non-metropolitan areas may also stem from the fact that disorder in NSHAP was assessed at the block level. In examining neighborhood disadvantage and instability, we followed previous research on neighborhood effects by using Census-tract-level characteristics as a proxy for the characteristics of the respondent's neighborhood. In urban areas, tracts tend to be geographically small due to high population density, but non-metropolitan tracts are much larger and more varied. As a result, block-level assessments of disorder may serve as particularly meaningful indicators of localized socioeconomic disadvantage among non-metropolitan residents. Consideration of the contributions of block- and tract-level characteristics for individual-level outcomes is a promising path for further research comparing neighborhood effects within and across urban and non-urban areas.

CONCLUSION

Classic theories of urbanism recognized a fundamental point that has been overlooked in more recent research on neighborhood effects – that is, that the broader social context shapes individuals' abilities to form and maintain close personal network ties. Personal network ties represent some of the most important relationships in individuals' lives. These close relationships are often key sources of emotional support, instrumental support, sociability, and influence (e.g., Coleman 1988; Thoits 2011; Wasserman and Faust 1994; Wellman and Wortley 1990). Building from urbanism's ecological approach and putting networks in context opens up new lines of inquiry for research in urban sociology, inequality, and social networks.

Our main goal in this paper has been to draw attention to how individuals' neighborhood contexts shape their social network ties to close friends and family members. We have argued that characteristics of disadvantaged neighborhoods – including decaying infrastructure, lack of services and institutions, and a lack of organizations that foster social connectedness – can hamper residents' abilities to maintain ties or form new relationships. The extent to which ties with friends and family members are localized is an important question, and this may modify the relevance of neighborhood context for social relationships. There is some evidence that socioeconomically disadvantaged groups, due to differences in resources and mobility, are less able to access non-neighborhood settings (e.g., work, services, organizations) where they might cultivate network ties. This may heighten the extent to which disadvantaged groups in disadvantaged neighborhoods depend on localized settings for the maintenance of relationships (van Eijk 2010). At a more macro level, the spatial location or clustering of services can promote the segregation of daily activities and routines that further reinforce network homophily (Jones and Pebley 2014; Small 2004), ultimately perpetuating inequalities. Problematizing how people are sifted and sorted into particular settings, and how these settings promote (or restrict) close personal ties may therefore shed new light on important questions about the sources of inequality in network-based resources and the durability of neighborhood disadvantage.

In addition to being affected by neighborhood structural conditions, residents' personal networks are likely to be intertwined with neighborhood-level social processes. We have uncovered evidence that concentrated disadvantage and disorder weaken personal network ties. But this association may also reflect the fact that personal networks create strain on individuals in disadvantaged communities, making it difficult for them to maintain close ties. There is some indication of this in qualitative research that highlights how individuals involved in crime and underground economies are often connected to others in the community through friendship and family ties (Anderson 1990, Venkatesh 1997). For law-abiding individuals, these ties -- particularly if they are close personal ties -- may provide some measure of protection and safety, while also leading to reluctance to engage in larger, community-based efforts toward informal control (Patillo 1998). A large literature has explored how neighborhood disadvantage erodes neighborhood-level cohesion, collective efficacy, and social organization, but this work largely overlooks the role of personal networks in these processes. Personal networks may be implicated in deepening inequalities in urban areas to the extent that they are both eroded by neighborhood disadvantage and complicate efforts toward community mobilization around order maintenance and problem solving. In this way, putting networks in neighborhood context both revitalizes ecological frameworks and points to new possibilities for exploring the relationships between space and social processes.

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APPENDIX – to be provided online or by request

Table A1

Odds Ratios from Logistic Regression Models Predicting the Likelihood of Having Fewer Than Three Network Ties

	Model 1		Model 2		Model 3		Model 4	
	OR	(SE)	OR	(SE)	OR	(SE)	OR	(SE)
<i>Neighborhood Context</i>								
Metropolitan Statistical Area								
Inside metro area	1.001	(.156)	1.024	(.154)	.995	(.156)	.983	(.153)
Outside metro area (<i>ref.</i>)	--		--		--		--	
Population density (tract)	1.001	(.004)	1.003	(.004)	1.000	(.004)	1.001	(.005)
Concentrated disadvantage			1.129	(.105)	1.067	(.100)	1.082	(.102)
Residential instability			.917	(.073)	.903	(.070)	.898	(.070)
Disorder					1.344 **	(.126)	1.900 **	(.275)
Disorder * Inside metro area							.644 *	(.108)
<i>Respondent Characteristics</i>								
Age (in decades)	1.043	(.087)	1.059	(.091)	1.091	(.095)	1.094	(.094)

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	Model 1		Model 2		Model 3		Model 4	
	OR	(SE)	OR	(SE)	OR	(SE)	OR	(SE)
Female	.430 **	(.052)	.433 **	(.052)	.449 **	(.055)	.446 **	(.054)
Racial/ethnic background								
Black	1.169	(.174)	1.089	(.176)	1.007	(.170)	1.004	(.169)
Latino	.991	(.199)	.944	(.198)	.813	(.180)	.848	(.184)
White or other (<i>ref.</i>)	--	--	--	--	--	--	--	--
Educational Attainment								
High school or less (<i>ref.</i>)	--	--	--	--	--	--	--	--
Some college	.521 **	(.080)	.526 **	(.081)	.545 **	(.084)	.544 **	(.085)
BA or higher	.466 **	(.065)	.485 **	(.071)	.500 **	(.073)	.500 **	(.074)
Co-resident partner	.784	(.129)	.792	(.129)	.885	(.152)	.882	(.152)
Number of co-residents	.932	(.073)	.928	(.073)	.909	(.072)	.905	(.072)
Length of residence in area								
0–5 years (<i>ref.</i>)	--	--	--	--	--	--	--	--
6–20 years	1.370	(.311)	1.340	(.307)	1.348	(.308)	1.388	(.319)
More than 20 years	1.420	(.325)	1.380	(.324)	1.338	(.311)	1.364	(.323)
Constant	.329	(.292)	.285	(.264)	.231	(.217)	.233	(.218)
Unweighted N	2,602		2,602		2,602		2,602	
Wald test for added parameters (<i>df</i>)	5.03 ***	(15,50)	1.01	(2,50)	9.98 **	(1,50)	6.94 *	(1,50)

Note: Estimates presented are survey-adjusted and weighted for the probability of selection, with post-stratification adjustments for non-response and item-level missing data. Indicators of health, including self-rated health, functional impairment, and depressive symptoms are included as covariates in each model, but not shown here.

* $p < .05$;

** $p < .01$;

*** $p < .001$ (two-tailed tests)

Figure 1.
Predicted Probability of Having Fewer than Three Network Ties, by Urbanicity and
Neighborhood Disorder

Figure 2.
Predicted Frequency of Interaction with Network Members, by Concentrated Disadvantage and Respondent Gender

Table 1

Summary Statistics for Key Variables, across Respondents in Metropolitan and Non-Metropolitan Areas

	Inside Metropolitan Statistical Area		Outside Metropolitan Statistical Area	
	Mean or Proportion ^a	(SD)	Mean or Proportion ^a	(SD)
Neighborhood Context				
Population per square mile (tract)	4.222	(9.504)	.351	(.657)
Concentrated disadvantage (tract)	-.151	(.802)	.109	(.717)
Residential instability (tract)	-.035	(.915)	-.066	(.770)
Disorder (block)	-.082	(.750)	-.130	(.634)
Social Network Characteristics				
Network size [range = 0, 5]	3.763	(1.347)	3.722	(1.381)
Fewer than 3 network ties [1 = yes, 0 = no]	.195	--	.217	--
Average closeness ^b	3.092	(.515)	3.131	(.519)
Average frequency of interaction ^b	6.766	(.825)	6.830	(.859)
Covariates				
Age (in decades)	7.243	(.723)	7.200	(.720)
Female [1 = yes; 0 = no]	.543	--	.529	--
Racial/Ethnic background				
Black	.131	--	.117	--
Hispanic, non-black	.117	--	.034	--
White or other	.724	--	.838	--
Education				
High school degree or less	.412	--	.515	--
Some college	.320	--	.313	--
College degree or higher	.269	--	.183	--
Co-resident partner [1 = yes; 0 = no]	.717	--	.698	--
Number of co-residents	1.029	(1.102)	.870	(.809)
Length of residence in local area				
0–5 years	.136	--	.134	--
6–20 years	.315	--	.255	--
More than 20 years	.550	--	.611	--
Self-rated health	3.327	(1.054)	3.133	(1.000)
Physical impairment [yes = 1; no = 0]	.322		.368	
Depressive symptoms [range = 11,44]	16.001	(4.862)	16.055	(4.556)
Unweighted N	2,072		530	

^aMeans are survey-adjusted and weighted for probability of selection, with post-stratification adjustments for non-response. Proportions are unweighted and based on the N shown at the bottom of each column.

^bSummary statistics exclude 21 respondents who did not name any network members and one respondent who had missing data on network characteristics.

Table 2
Indicators of Neighborhood Disorder Rated by NSHAP Field Interviewers, across Metropolitan and Non-Metropolitan Respondents

Variable	Range	Inside Metropolitan Area		Outside Metropolitan Area	
		Mean	(SD)	Mean	(SD)
Litter	clean → full of litter or rubble	1.561	(.827)	1.447	(.737)
Noise	quiet → noisy	2.668	(.946)	1.389	(.819)
Odor/pollution	no smell or air pollution → strong smell or air pollution	1.336	(.689)	1.160	(.471)
R's building^a	1 = very well kept to 4 = very poorly kept (needs major repairs)	1.491	(.710)	1.604	(.800)
Other buildings^a	1 = very well kept to 4 = very poorly kept (needs major repairs)	1.594	(.719)	1.704	(.707)
		N = 2072		N = 530	

^aResponse categories are reverse coded from their presentation in the Field Interviewer Questionnaire.

Table 3

Coefficients from Poisson Models Predicting Network Size

	Social Network Size							
	Model 1		Model 2		Model 3		Model 4	
	IRR	(SE)	IRR	(SE)	IRR	(SE)	IRR	(SE)
<i>Neighborhood Context</i>								
Metropolitan statistical area								
Inside metro area	.992	(.028)	.982	(.026)	.984	(.026)	.995	(.028)
Outside metro area (<i>ref.</i>)	--		--		--		--	
Population density (tract)	1.000	(.001)	1.000	(.001)	1.000	(.001)	1.000	(.001)
Concentrated disadvantage			.961**	(.014)	.967*	(.014)	.965*	(.014)
Residential instability			1.006	(.010)	1.008	(.010)	1.009	(.010)
Disorder					.965*	0.02	.912**	(.030)
Disorder * Inside metro area							1.073*	(.036)
<i>Respondent Characteristics</i>								
Age (in decades)	1.000	(.012)	.998	(.013)	.994	(.012)	.995	(.012)
Female	1.141***	(.022)	1.141***	(.022)	1.137***	(.022)	1.137***	(.022)
Racial/ethnic background								
Black	.947	(.028)	.982	(.030)	.990	(.031)	.991	(.031)
Latino	.965	(.035)	.984	(.033)	.999	(.033)	.994	(.033)
White or other (<i>ref.</i>)	--		--		--		--	
Educational Attainment								
High school or less (<i>ref.</i>)	--		--		--		--	
Some college	1.107***	(.024)	1.104***	(.024)	1.100***	(.024)	1.099***	(.024)
BA or higher	1.138***	(.030)	1.125***	(.030)	1.120***	(.030)	1.120***	(.030)
Co-resident partner	1.017	(.023)	1.013	(.022)	1.001	(.023)	1.002	(.023)
Number of co-residents	1.013	(.011)	1.014	(.011)	1.016	(.011)	1.016	(.011)
Length of residence in area								
0–5 years (<i>ref.</i>)	--		--		--		--	

	Social Network Size							
	Model 1		Model 2		Model 3		Model 4	
	IRR	(SE)	IRR	(SE)	IRR	(SE)	IRR	(SE)
6–20 years	.949 *	(.024)	.954	(.024)	.953	(.023)	.951 *	(.023)
More than 20 years	.947	(.027)	.953	(.027)	.956	(.028)	.954	(.028)
Self-rated health	1.020	(.012)	1.018	(.013)	1.017	(.013)	1.017	(.012)
Physical impairment	1.020	(.024)	1.018	(.024)	1.021	(.024)	1.022	(.024)
Depressive symptoms	.992 *	(.002)	.995 *	(.002)	.996 *	(.002)	.996 *	(.002)
Constant	3.383 ***	(.407)	3.477 ***	(.437)	3.540 ***	(.447)	3.506 ***	(.441)
N	2,602		2,602		2,602		2,602	
Wald test for added parameters(df)	7.27 ***	(15, 50)	3.85 *	(2, 50)	5.05 *	(1, 50)	4.35 *	(1, 50)

Note: Estimates presented are survey-adjusted and weighted for the probability of selection, with post-stratification adjustments for non-response and item-level missing data.

* p < .05;

** p < .01;

*** p < .001 (two-tailed tests)

Table 4
Results from OLS Regression Models Predicting Network Closeness and Frequency of Interaction

	Average Closeness with Network Members						Average Frequency of Interaction with Network Members					
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)
<i>Neighborhood context</i>												
Metropolitan statistical area												
Inside metro area	-.021	(.039)	-.027	(.038)	-.009	(.036)	-.042	(.051)	-.052	(.055)	-.053	(.054)
Outside metro area (<i>ref.</i>)	--	--	--	--	--	--	--	--	--	--	--	--
Population density (tract)	.001	(.001)	.001	(.001)	.001	(.001)	.002	(.001)	.002	(.001)	.002	(.001)
Concentrated disadvantage			-.068	(.040)	-.060	(.039)			-.146 [*]	(.065)	-.148 [*]	(.064)
Concentrated disadvantage [*] Female			.089 [*]	(.036)	.086 [*]	(.035)			.202 ^{**}	(.073)	.203 ^{**}	(.072)
Residential instability			-.009	(.020)	-.005	(.020)			-.019	(.028)	-.019	(.028)
Disorder					-.147 ^{**}	(.044)					.012	(.032)
Disorder [*] Inside metro area					.115 [*]	(.043)						
<i>Respondent characteristics</i>												
Age (in decades)	-.044 ^{**}	(.014)	-.043 ^{**}	(.014)	-.048 ^{**}	(.014)	-.035	(.031)	-.033	(.033)	-.032	(.033)
Female	.158 ^{***}	(.027)	.167 ^{***}	(.026)	.162 ^{***}	(.026)	.138 ^{**}	(.045)	.159 ^{**}	(.046)	.161 ^{**}	(.046)
Racial/ethnic background												
Black	.102 ^{***}	(.027)	.121 ^{***}	(.032)	.136 ^{***}	(.033)	.256 ^{**}	(.051)	.289 ^{**}	(.058)	.286 ^{**}	(.060)
Latino	-.201 [*]	(.098)	-.178 [*]	(.088)	-.162	(.086)	-.053	(.224)	-.006	(.200)	-.011	(.201)
White or other (<i>ref.</i>)	--	--	--	--	--	--	--	--	--	--	--	--
Educational Attainment												
High school or less (<i>ref.</i>)	--	--	--	--	--	--	--	--	--	--	--	--
Some college	-.039	(.032)	-.044	(.033)	-.049	(.033)	-.106	(.067)	-.116	(.069)	-.114	(.070)
BA or higher	-.099 ^{***}	(.026)	-.113 ^{***}	(.028)	-.118 ^{***}	(.027)	-.147 ^{***}	(.051)	-.175 ^{***}	(.058)	-.174 ^{***}	(.059)
Co-resident partner	.089 ^{**}	(.027)	.088 ^{**}	(.029)	.070 [*]	(.028)	.013	(.051)	.010	(.052)	.014	(.051)
Number of co-residents	.016	(.013)	.017	(.013)	.021	(.013)	.091 ^{**}	(.026)	.093 ^{**}	(.026)	.092 ^{**}	(.026)
Length of residence in local area												

	Average Closeness with Network Members						Average Frequency of Interaction with Network Members					
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)
0–5 years (<i>ref.</i>)	--		--		--		--		--		--	
6–20 years	-.033	(.034)	-.030	(.033)	-.038	(.032)	-.115	(.070)	-.109	(.073)	-.109	(.073)
More than 20 years	-.009	(.044)	-.006	(.042)	-.004	(.041)	.031	(.057)	.037	(.053)	.036	(.054)
Self-rated health	.032	(.012)	.030	(.012)	.030	(.012)	-.001	(.032)	-.003	(.032)	-.003	(.032)
Physical impairment	-.022	(.039)	-.023	(.039)	-.017	(.037)	-.039*	(.057)	-.041*	(.059)	-.042*	(.059)
Depressive symptoms	-.006	(.004)	-.006	(.004)	-.006	(.004)	-.007	(.007)	-.007	(.007)	-.007	(.007)
Constant	3.684***	(.153)	3.684***	(.146)	3.712***	(.147)	7.976***	(.342)	7.971***	(.347)	7.963***	(.355)
N	2,580		2,580		2,580		2,580		2,580		2,580	
R-squared	.109		.114		.122		.177		.186		.186	
Wald test for added parameters (<i>df</i>)	13.14***	(16,50)	2.33(3,50)		5.88**	(2,50)	26.86***	(16,50)	3.85*	(3,50)	.14	(1,50)

Note: Estimates presented are survey-adjusted and weighted for the probability of selection, with post-stratification adjustments for non-response and item-level missing data. Respondent network size is included in each of the models but not shown here.

* $p < .05$;

** $p < .01$;

*** $p < .001$ (two-tailed tests)