Does the Spatial Distribution of Social Ties Impact Neighborhood and City Attachment? Differentials among Urban/Rural Contexts [1]

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Bio

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Abstract

Using social network data from the American Social Fabric Project (ASFP), this study examines how the distance to social alters may lead to different perceptions of neighborhood and city attachment among urban versus rural residents, and considers which types of relations play influential roles in shaping attachment. Overall, a key finding is that having more local neighborhood ties is positively associated with attachment at both the neighborhood level and city level, holding for any social relationship in our sample and for urban and rural environments. Notably, long distance ties are *not* irrelevant for attachment; rather, we see that long distance ties are associated with greater neighborhood and city attachment. Among different social relations measured, neighborhood safety ties consistently show the strongest positive relationship with neighborhood and city attachment. Surprisingly, we find that the spatial distribution of social ties appears more consequential for attachment in the rural sample than it does in the urban sample. Further, geographically dispersed ties also matter for urban versus rural settings: physically close and midrange core ties are associated with weaker attachment for urban residents, whereas they do not affect rural residents' perceptions of attachment.

Keywords: attachment, neighborhoods, social ties, spatial, urban/rural

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INTRODUCTION

Neighborhood and city attachment is a long-standing inquiry within the broad fields of sociology, social policy, psychology, social psychology, and recently in public health (Almquist and Butts 2015, Bolan 1997, Knez 2005, Scannell and Gifford 2010, Woolever 1992). Especially within the flourishing literature of urban studies and community psychology, attachment to the neighborhood or city has been highlighted as one key characteristic of the *quality* of societies (Berger-Schmitt 2000, Fonseca, Lukosch and Brazier 2019, Ujang and Zakariya 2015). Defined as a social-psychological property that captures one's emotional connection to his or her place of residence (Brown, Perkins and Brown 2003, Brown, Perkins and Brown 2004), neighborhood or city attachment is shaped by features and perceptions of the built environment as well as the social bonds in that environment (Comstock et al. 2010, Hummon 1992). Urban sociologists contend that having strong feelings of attachment to communities, shared values, and trust among individuals is usually an indispensable ingredient for healthy and effective societies (Berger-Schmitt 2000). In this view, citizens who feel a sense of belonging to their local area and those who have more social bonds in the community are more willing to engage in civic activities and invest time and resources to build a pleasant environment and provide benefits for all members of the community/city.

Among empirical studies focused on neighborhood or city attachment, one key question commonly asked is to what extent do residents' social ties contribute to the reported attachment? In recent decades, scholars have found that residents with more social ties in the neighborhood tend to express greater attachment to their neighborhood or broader community (Hipp and Perrin

2006). One proposed mechanism of action is group identification: to the extent that ego identifies with his or her alters, an ego whose alters primarily reside in a particular locale is hypothesized to identify more strongly with that locale him or herself. Almquist and Butts (2015) show evidence of this mechanism among U.S. residents, with individuals' regional self-identification being better predicted by social exposure than by their own immediate place of residence. As a proxy for such exposure, many studies have focused on the relationship of attachment with numbers of kinship ties or local friendship ties in the neighborhood (Mesch and Manor 1998, Sampson 1988), motivated by the logic that an increasing volume of strong contacts in the immediate vicinity should strengthen local attachment. There is a rich social network literature considering how the structure of the network or a person's position in the network can result in the emotional attachment to a group (Friedkin 2004), whether a small group such as a sorority (Paxton and Moody 2003) or a school (Moody and White 2003). Considering the possible mechanisms through which various social relations might bring about greater attachment to the neighborhood is essential, and one recent study of a few neighborhoods explored how social relations that might provide emotional support, or those that can be used to directly address neighborhood problems, are also positively related to attachment in two small communities (see: Boessen et al. 2014).

One crucial factor for understanding the role that social ties might play in fostering neighborhood or city attachment, therefore, is their spatial distribution. Nonetheless, studies have yet to sufficiently take this into account. Often, studies measure the presence of social ties in the neighborhood and assess their relationship with neighborhood or city attachment. Left unaddressed is what role more spatially distant ties have. Are they indeed irrelevant in building perceptions of belonging and attachment? Or are they important, either through a "crowding-out"

effect in which they reduce neighborhood attachment, or through a symbiotic relationship in which they provide access to broader resources that increase residents' attachment with their own neighborhood? We explicitly explore this question here.

To further understanding of neighborhood and city attachment and its social dimensions, this study has three main goals. First, we will explore how the spatial distribution of residents' social ties impacts their perceptions of neighborhood and city attachment. We therefore distinguish between residents' attachment to the spatial unit of the neighborhood versus attachment to the broader spatial unit of the city. Given information on the spatial location of these ties, we will assess whether more spatially distant ties are important as well, or whether only local ties matter for fostering this attachment, as often presumed in existing research. Second, we will assess whether the spatial distribution of ties has different consequences depending on the particular social resources that the tie measures given the possible mechanisms that different resources represent. We distinguish between social activity or kinship ties—which are most commonly focused upon in existing research—versus ties that provide more emotional support or those that can help in addressing neighborhood problems. Third, we explore whether the spatial distribution of these ties have different consequences for neighborhood and city attachment in urban environments versus small town or rural environments. Only occasionally have studies examined how neighborhood or community attachment might differ across urban and rural settings (Goudy 1990, Sampson 1988, Theodori and Luloff 2000), and the presumption is typically that fundamentally different social processes drive the relationship between social ties and attachment in urban versus small town and rural environments. We test an alternative perspective here that it is simply the structural spatial distribution of where potential alters live in these different environments that drives any observed differences, and not necessarily that there

are different individual-level behavioral models in these settings. Using data from the American Social Fabric Project (ASFP), we are able to explicitly measure the spatial distribution of residents' social ties along four different social relations (that provide different social resources), and ask what impact more long-distance ties might have for this attachment, in addition to more local ties in the neighborhood. Furthermore, the large, geographically diverse sample of the ASFP containing information on multiple relations allows us to assess whether the spatial distribution of social ties has different consequences for attachment in urban environments versus small town and rural environments.

BACKGROUND

Neighborhood and community studies constitute an important thread within the broader literature on urban studies, with a tradition that extends back at least as far as the earliest writings of Ferdinand Tonnies (1887) on *Gemeinschaft* (or community) and *Gesellschaft* (or society). Within this body of urban research, neighborhood and community attachment has been an area of particular focus, motivated by its presumed importance for neighborhood safety and policy implications. Most studies measuring perceived attachment by residents have, sometimes implicitly, measured two key dimensions that William McDougall articulated in his book *The Group Mind* (McDougall 1920: 86): "The development of the group spirit consists in two essential processes, namely, the acquisition of knowledge of the group and the formation of some sentiment of attachment to the group." Some scholars have therefore defined these two dimensions of attachment as feelings of morale towards the group and a sense of belonging towards the group (Bollen and Hoyle 1990, Hogg 1992, Tajfel 1981, Tajfel and Turner 1986). Although research finds that these two dimensions are strongly correlated (Boessen et al. 2014, Bollen and Hoyle 1990, Hipp and Perrin 2006), they nonetheless differ conceptually and

empirically: as one example, Hunter (1974) found that Chicago residents who reported more attachment to their neighborhood did not necessarily like the neighborhood. And a study of residents in one small community found that having more strong or weak ties to fellow residents significantly increased sense of belonging to the neighborhood but not sense of morale (Hipp and Perrin 2006). Thus, exploring the determinants of each of these dimensions is useful.

While scholars have assessed the level of attachment at various geographical levels of analysis and the determinants of this attachment, there is evidence that attachment at one geographic level does not necessarily translate to another level (Forrest and Kearns 2001, Hipp and Perrin 2006, Kearns and Forrest 2000). There are two broad views on how attachment at one geographic scale may be related to attachment at a larger geographic scale. In the first view, greater attachment to a local neighborhood will result in reduced attachment to the broader city or community (Gans 1962, Granovetter 1973). This can occur if there is a "crowding out" effect in which the emotional attachment to the local neighborhood limits the emotional resources available for experiencing attachment to the broader community (Forrest and Kearns 2001, Kearns and Forrest 2000). In this view, residents in a tightly knit neighborhood might spend much of their time locally and therefore withdraw from the larger city/community (Butler 2003). In the second view, there may be a reinforcing effect between attachment at the two geographic scales. For example, residents who feel more attachment with the local neighborhood may experience a "halo effect" in which they feel greater attachment to the broader community. Another possible mechanism is that more cohesive neighborhoods may be more effective in obtaining resources from the broader community to address neighborhood problems (Donnelly and Majka 1996), which may then translate into greater attachment to the broader community if this helps solve local problems. There is only limited empirical evidence regarding this question

from two small-scale studies, and both found a positive relationship between neighborhood and city attachment: one of a small neighborhood in North Carolina (Hipp and Perrin 2006) and one of two small communities in Southern California (Boessen et al. 2014).

Geographic Distribution of Social Relations

When asking why some residents perceive more attachment to the neighborhood or city, one mechanism that scholars have been greatly interested in is the role of residents' social ties (Mesch and Manor 1998, Sampson 1988). There are two broad challenges for these studies: 1) which social relations to focus on when measuring ties; and 2) at what geographic scale should ties be measured? We will return to the question of the types of social relations to focus on, but at this point we highlight that regarding the second challenge, studies focusing on the question of neighborhood or city attachment typically measure social ties to other residents in the same neighborhood or community (see some exceptions: Guest 2000; Viry 2012). This implicitly ignores more geographically distant ties. Thus, studies have tested whether the presence of more kinship or close friends nearby results in a person feeling more attached to the neighborhood (Goudy 1977, Mesch and Manor 1998). The presumption is that the neighborhood is a setting for local social interactions that can enhance a sense of belonging and attachment to the neighborhood or community (Lewicka 2010). How these neighborhood ties might impact city attachment would depend on whether this increased neighborhood attachment has a crowding out effect, in which case they would have a negative impact on attachment at the broader scale, or if there is a symbiotic relationship, which would lead to increased attachment with the city. Nonetheless, there is evidence that although some social ties will be broken due to mobility, those that remain will become longer distance ties (Fudolig, Monsivais, Bhattacharya, Jo, and Kaski 2021), which can still provide social support (Viry 2012).

A challenge for studies assessing the relationship between residents' social ties and attachment to the neighborhood or city is that residents have social ties to many persons, not all of whom reside within the local neighborhood (Boessen et al. 2017, Guest 2000). We can consider three broad geographic scales of social ties: 1) local neighborhood ties, 2) more geographically dispersed ties that are still located in the broader community, and 3) very long-range ties that are outside one's metropolitan area. The question then is how to treat categories 2 and 3, the more geographically dispersed ties outside the neighborhood? One strategy is to simply ignore them and only ask residents about the number of social ties they have in the local neighborhood (Mesch and Manor 1998). Besides the challenge of determining the proper boundaries of the neighborhood, this strategy also implicitly presumes that these more geographically distant ties do not matter for attachment. However, it is possible that these more distant ties may nonetheless impact a resident's attachment to the neighborhood or city in various manners, which we consider next.

A second view is that geographically distant ties can *enhance* neighborhood attachment. One possible mechanism is that more mid-range ties—that is, outside the neighborhood, but still within the broader community—can enhance the ability of the neighborhood to petition for and obtain resources from the broader community to address local neighborhood issues (Bursik and Grasmick 1993, Granovetter 2005). A consequence is that the resident might therefore feel more attachment with the local neighborhood because of the resources these more distant ties can bring to the neighborhood. These mid-range ties might also provide social activities that are enjoyable for the resident; one possible implication is that this would result in higher morale about the local neighborhood (although it may not increase sense of belonging). For more geographically dispersed ties that are still located in the broader community, we would expect

them to have an unambiguously positive impact on a residents' attachment to the city. That is, they are beyond the neighborhood, but presumably still on the spatial scale of the city. Furthermore, ties of any distance can provide access to information that might help residents address neighborhood problems, and therefore help increase neighborhood attachment.

A third view is that these more distant ties can actually have a negative impact on a resident's attachment to the neighborhood or city. In this view, more distant ties contain a time and emotional cost to the resident that reduces their attachment to the neighborhood or city. Indeed, influential research by Robert Sampson and his colleagues (Sampson and Groves 1989, Sampson 1991) implicitly measured this idea: in their data, the survey question asked about the *proportion* of a resident's ties that were in the neighborhood. This measure therefore implicitly captured the proportion of ties that existed outside the neighborhood, and they found that a greater proportion of within-neighborhood ties resulted in higher levels of neighborhood attachment (Sampson 1991). Nonetheless, this strategy did not actually assess the *number* of ties in the neighborhood, and only focused on the proportion, which leaves unanswered question of how local and more distant ties might operate simultaneously to impact residents' sense of neighborhood attachment. Indeed, although technological advancements can allow individuals to be accessible and connected with others regardless of physical distance constraints (Wellman 2002), there is evidence from a study of two small communities that more spatially dispersed social ties are negatively associated with neighborhood and city attachment (Boessen et al. 2014).

Types of Social Relations

Another question when considering the possible relationship between residents' social ties and perceived attachment is that social ties can capture various relations. Some ties are used for social activities, whereas others provide strong emotional support, and others yet primarily

provide useful information, and some are simply casual acquaintances. Researchers also sometimes distinguish between social ties that provide expressive needs such as kin or friendship ties, or those providing instrumental needs such as protecting property, gaining resources for education, or addressing problems like neighborhood crime (Guest 2000). Nonetheless, most existing research focuses almost exclusively on either social activity ties or kin ties and how they relate to neighborhood attachment, but do not consider other possible social relations (Birkel and Reppucci 1983, Kazak and Wilcox 1984). An important question is what mechanism(s) allow social ties to impact neighborhood attachment? The presumption with social activity ties is that the enjoyment of such interactions would increase attachment with the neighborhood, particularly if the ties live nearby (for a review of how space shapes the formation of social ties, see Small and Adler 2019). And the presumption with kin ties is that they provide potential social activity with individuals who may be perceived as quite close to oneself given the familial relations, and this may generate a particularly strong sense of attachment to the place—either the neighborhood or the city.

Another mechanism through which ties may increase attachment is if they provide various forms of emotional support for a resident. Therefore, it may not be enough to simply ask which persons residents socialize with, but rather the ties to whom residents turn when discussing important matters that may be particularly important for fostering attachment to the neighborhood or city. Further, these social relations may provide skills and resources with regard to helping to build a strong united community (Viry 2012), especially when people encounter unpredictable challenges and difficulties. Thus, the people to whom a resident turns when addressing important issues may be more important for increasing neighborhood attachment, particularly if these ties are local as there may be a sense that ego can obtain his/her emotional

support from the neighborhood through these persons. If, on the other hand, ties providing various types of emotional support are located far away, we would expect this to have either no effect on neighborhood or city attachment or even a negative one if it fosters the sense that one's primary resources are not contained in the neighborhood or city.

Another important possible mechanism of social ties is that they can be used to solve neighborhood problems, or what has been described as meeting the instrumental needs for the community or city (Guest 2000), whose solution can then increase attachment. However, it is not necessarily the case that all social relations are equally effective for addressing neighborhood problems. For example, when concerned about a crime in their neighborhood, residents may contact neighbors rather than their friends and family. Solving such problems would likely increase a sense of attachment to the neighborhood. This idea ties in with the concept of collective efficacy—the sense that neighborhood residents can address problems—and how this collective efficacy may enable residents to reduce levels of crime (Sampson, Raudenbush, and Earls 1997). The ability to address problems in the neighborhood may be particularly important for fostering a sense of attachment. For example, one prior study explicitly measured the social ties that residents might potentially use to address neighborhood problems—what they termed safety ties (Boessen et al. 2014). Thus, rather than making an assumption about which social relations are more likely to be activated to address neighborhood problems—such as social activity ties or social support ties—this study explicitly asked respondents to list the ties they would turn to when addressing neighborhood problems. Given the evidence from this prior study of the importance of these safety ties for residents' sense of attachment to the neighborhood in a sample of residents in a small number of neighborhoods (Boessen et al. 2014), we measure these

safety ties here and assess their importance on a sample of a much larger number of residents and neighborhoods.

Only recently have researchers begun to probe how various social relations might matter; for example, there is some evidence from a study of two small communities that having more core discussion ties that provide social support increases neighborhood attachment (Boessen et al. 2014). In addition, having kin or friends in one's local neighborhood may bring access to social support (Fischer 1982), which might promote one's social integration into the community. Kin ties may also be able to provide social activity, which can increase neighborhood attachment.

Urban/Rural Distinctions

Up to now, we have focused implicitly on urban settings, given the preponderance of research focused on urban environments. Nonetheless, our discussion of spatial scale for both social ties as well as perceived attachment raises the question of how these may operate depending on the spatial scale of the environment. That is, if we compare residents living in a dense urban environment to residents living in small towns and more rural environments, does the spatial scale of social ties equally matter for neighborhood and city attachment? Whereas some scholars presume that social life in rural environments differs fundamentally from that in urban environments (Fischer 1975, Wirth 1938), we explore here whether the differences can be accounted for by the spatial scale of where residents live in the environment, and not necessarily some fundamentally different individual-level model driving resident behavior across the two settings.

Building upon Wirth's (1938) classic article on urbanism as a way of life or what is called traditional Wirthian theory, it is widely hypothesized that higher levels of attachment are present in rural communities. There is some evidence that rural adults appear more rooted in

their local communities than are urban or suburban residents (Pew Research Center 2018), thus leading to the presumption that smaller or more rural communities foster stronger levels of solidarity, integration, and, in turn, attachment (Simmel 1903, Tönnies 1887, Wirth 1938). Sampson (1988) also argued that urbanization had dual effects, in which urban residents were more active socially but expressed less attachment to the community. In addition, urbanization may weaken local kinship and friendship networks and impede social participation in local affairs (Fischer 1982). However, the general differences between attachment in urban versus rural areas assumed to exist have also been challenged. For example, there is evidence showing that attachment to place is expressed by a majority of urban residents in Mesch and Manor (1998)'s study. Theodori and Lufoff (2000) tested Wirth's hypothesis in four agricultural communities of varying levels of urbanization in Pennsylvania and also found significantly higher levels of attachment among residents of urban communities.

When considering the role of social ties for fostering neighborhood and community attachment in small towns and rural environments, the spatial scale of residents' social ties will tend to be more geographically dispersed compared to urban environments. Note, however, that this occurs simply because of the actual distribution of residents in the physical environment, and not necessarily because of any preference for more distant ties. One possible implication is that the conception of the local neighborhood might be broader geographically, and therefore the importance of the spatial scale of social ties will be less geographically constrained compared to urban settings. One study found that personal network characteristics varied at different spatial scales (i.e. local area, broader city region, or more macro spatial scale) or distribution of population and various land use characteristics (Boessen et al. 2018), but more research is required to assess how this is related to perceived attachment.

An open question is how well defined the "neighborhood" or the "city" is in small towns or rural settings, which could then impact one's sense of attachment. For those in very rural locations, it is unclear whether they would consider some larger unit with which to identify—either a neighborhood or a city. Although those living in a small town may not perceive it as a city, we would anticipate that they would consider their town as analogous to their "city", and therefore their report of attachment would be regarding the town. It is also unclear whether residents in small towns identify with a "neighborhood". In this case, there would be less reason to expect that social ties would increase neighborhood attachment. If this was the case, small town residents may be more likely to express greater attachment to the broader city or town, rather than to the local neighborhood. As a consequence, geographically close ties would unambiguously increase one's attachment to the city, in contrast to the urban environment in which we said that they could also act as an inhibiting force to the extent that they increase attachment to the local neighborhood and this then acts to crowd-out attachment to the city. Nevertheless, these are empirical questions that we will explore in this study.

Building upon previous research, the current study assesses the impact of the spatial distribution of four different social relations on neighborhood and city attachment using the ASFP sample. Furthermore, this study aims to examine how personal networks' effects on attachment differ across urban/rural settings. Our analytical approach closely follows the Boessen et al. (2014)'s study on the relationship between network and residents' perception of attachment, with extensions: whereas they used only a single subsample of the ASFP—the Twin Communities Network Study—and focused on respondents in a few neighborhoods of just two cities, our analysis uses the entire ASFP dataset, which allows us to better understand the

relationship between personal spatial networks and attachment to the neighborhood or city, and also allows us to stratify the sample by urban/rural status.

DATA AND METHOD

Data

There are two different data sources for our analyses. First, the main one is from the American Social Fabric Project (ASFP), which is a spatially stratified, large-scale egocentric network study containing spatial locations of both egos and alters (Butts et al. 2014). The ASFP contains four component surveys: Twin Communities Network Study (TCNS, N=273), Los Angeles Network Study (LA, N=220), Southern California Regional Network Study (CRS, N=1,105), and the Western United States Network Study (Western, N=2,039). These four subsamples differ in the sampling design and/or target population, and the overall sample size for the analysis is 3,637. The respondents were solicited by block group or tract. In addition, the subjects were recruited through postal mail inviting them to conduct a web-based survey following with a cash incentive. The overall response rate was 19.3% for all surveys, which is in line with other studies using similar postal recruitment and online survey instruments (Messer and Dillman 2011). The period of data collection spanned from 2010 for the TCNS sample and approximately 4/2012–1/2013 for the LA, CRS, and Western samples. The ASFP collected information ranging from basic demographic questions, network relationships, community assessments, egocentric network information, and the geographical location of social ties. For our purposes, the ASFP includes a large sample among different geographical areas (i.e., the TCNS and LA study areas are almost entirely urban, while the CRS and Western samples are predominantly rural areas) of residents reporting on social ties, which allows for a comparison of geographical differentials of the effects of social ties on respondents' perception of neighborhood

and city attachment. Second, to include several neighborhood-level measures in the analyses, we merge data from the American Community Survey (ACS) 5-year average estimates from 2010-2014 (matching up with the ASFP data collection period) into our main ASFP dataset.

Dependent Variables

Neighborhood and City Attachment. The outcome variables for the analyses are respondents' perception of attachment with the neighborhood and the city. Specifically, the ASFP used a modified scale from Bollen and Hoyle (1990) to measure neighborhood and city attachment, which includes neighborhood/city belonging, neighborhood/city membership, neighborhood/city happiness, and neighborhood/city pleasure. Following previous research (Boessen et al. 2014), the former two measures are categorized as a scale of sense of belonging and the latter two as a sense of morale to the neighborhood and the city. Sense of belonging has been widely used as one dimension of neighborhood attachment (Woolever 1992). The ASFP collected information about respondents' neighborhood belonging by asking two questions: (1) "I feel a sense of belonging to my neighborhood." and (2) "I feel that I am a member of my neighborhood community." The sense of neighborhood morale is assessed with two questions: (1) "I am happy to live in my neighborhood." and (2) "Being in this neighborhood gives me a lot of pleasure." The ASFP collected the same information for the sense of belonging and feelings of morale at the city level using the word *city* instead of *neighborhood* in the above-mentioned four questions. The responses range from 1 to 10 for each question with higher values indicating higher sense of belonging and morale.

Network Measures

There are two commonly used network generator variables—kinship network and social activity network—in models predicting attachment. The kinship network generator question asks

respondents to report on social ties that are kin, including spouse or partner, children, parents, additional parents, and siblings. The social activity network generator question asks the respondent: "Which of the following people do you engage in social activities with, such as going out for a meal, visiting, going out socially, etc.?" Following previous research (Boessen et al. 2014), we also include two other network generator questions: a neighborhood safety network and a core discussion of important matters network. The network generator for neighborhood safety is: "Imagine that you personally observed a crime or other event taking place near your home which made you concerned about the safety of your neighborhood. Which of the following people would you seek to contact to discuss this issue?" Lastly, the network generator for core discussion of important matters is: "From time to time, most people discuss important matters with other people. Looking back over the last 6 months, who are the people with whom you discussed matters important to you?" The respondents were asked to list the people for each question (with no limit on number named). Although there is overlap in the persons named for these network generators, there are nonetheless important differences. Whereas 62% of the kin ties were named as social activity ties, of social activity ties just 53% were named as core discussion ties and 37% were safety ties. Although about half of kin ties were named as core discussion ties, less than 1/3 were named as safety ties.

One advantage of the ASFP dataset is that respondents provide spatial information on their location as well as their alters, thus we know how far these alters live from ego. We construct several different measures to capture this distance to alters. We first construct *degree* measures – the count of the number of ties for each social relationship (regardless of distance): *kinship degree, social activity degree, neighborhood safety degree, and core discussion degree*. We then construct measures capturing the *proportion of ties based on different distances* to alter

on each of the four network relations. We therefore compute the proportion of ties for each social relationship (i.e., kinship, social activity, neighborhood safety, core discussion) within different distance bins: 1) within 2 miles (3.2 km.); 2) 2-4 miles (3.2-6.4 km.); 3) 4-10 miles (6.4-16 km.) (with the remainder being more than 10 miles (>16 km.)). The logic here is that the nearby ties are most likely to capture neighborhood ties, the second category captures ties outside the neighborhood but still likely important for impacting city attachment, the third category is ties farther away but plausibly still in the same metropolitan area, and the farthest ties capture ties that are often not even in the metropolitan area.

We assessed the robustness of the results by constructing bins with varying distances, and the results are quite robust. Specifically, we constructed varying distance bins for each of the social relations and estimated separate models for each of the four latent variables on both the urban and rural samples separately.[1] The results showed considerable consistency, with very little differences across the results. We chose the model specification with the optimal fit. Whereas the best fit for nearly all the models is with near ties specified as 0-2 miles, the one exception is that for safety ties in the urban sample it is better to define nearby ties as within 1 mile (1.6 km.) and the second category as 1-4 miles (1.6-6.4 km.).

Ego Measures

Beyond social networks, there are a number of demographic factors of ego that may relate to variation in the perception of neighborhood and city attachment. We capture the demographic information of ego's gender as an indicator, coded 1 for *males* and 0 for females, and previous research has shown that women have greater attachment than men (Kamalipour,

[1] We constructed nearby bins of 0-1, 0-2, and 0-3 miles. For the second bin we constructed all possible combinations between 1 and 6 miles (based on mile integers). For the third bin we constructed all possible combinations between 4 and 10 miles. The fourth bin was distances beyond the third bin.

Yeganeh and Alalhesabi 2012). *Age,* is a strong predictor of attachment to community (Sampson 1988), and is a continuous variable that ranges from 18 to 102; age squared is included to capture possible nonlinearity.[2] We also measure *race/ethnicity* with three dummy variables of *black*, *Latino*, and *other race*, with white as the reference category. *Marital status* of ego is included as a binary variable where 1 denotes respondents who are currently married. *Education* is a continuous variable with higher number indicating higher years of education. Higher income residents often express greater attachment (Brown, Perkins and Brown 2003, Weijs-Perrée et al. 2017), and ego's economic resources are captured with a measure of *income* ranging from less than $10,000 to greater than $200,000. Much research has found that long-term residents have higher levels of attachment to the neighborhood (Brown, Perkins and Brown 2003, Knez 2005, Sampson 1988, Sampson 1991, Taylor 1996). Thus, we include ego's *length of residence* as a measure of how many years a respondent has lived in the current address. Respondents are asked how often they go to church, and we control for *church attendance*[3] in the models as well. We also include a measure of the number of *organized group meetings (logged)* that respondents attend that are not work-related.

Neighborhood Measures

Extending beyond individual-level predictors, we also specify that social and ecological features of urban neighborhoods are related to attachment (Woolever 1992). All neighborhood measures in our models are from the 2010-2014 ACS 5-year estimates and are based on one-mile

[2] Researchers have found that attachment to communities varies at different ages (Riger and Lavrakas 1981): young people without families tend to treat their residence more as a temporary base of operations, whereas middle-aged adults often have families and are more likely to discuss neighborhood problems with neighbors or have more social interactions; but then older residents can be less invested in the neighborhood environment. This implies a non-linear relationship between age and attachment; thus, we include age squared in our analyses. For the analyses, we divide age by 10 and divide income by 1,000 to give the variables similar variances, improving estimation convergence.

[3] For church attendance, response categories range from more than once a week, once a week, almost every week, once or twice a month, several times a year, to a few times a year or never. We reverse code this variable.

(1.6 km.) buffer of the census data. For Census data in blocks, it is straightforward to aggregate the information for all blocks within a particular buffer. For Census data in block groups, we first impute the data to blocks using the synthetic estimation for ecological inference approach; this approach builds an imputation model at the block group level and then uses existing block level information to impute values for the variables only available at the block group level (Boessen and Hipp 2015). We then compute the buffer values based on the blocks within each buffer. We first capture the economic resources of the neighborhood with *average household income of residents* as a neighborhood-level predictor. Since residents who have lived in the area longer are expected to willingly put more effort to the neighborhoods and feel more attached to the neighborhood or community (Goudy 1990, Sampson 1988), we measure the *average length of residence* in the neighborhood in years. Then, we capture the *racial/ethnic heterogeneity* of the neighborhood with a Herfindahl index of five racial/ethnic groupings (White, Black, Hispanic, Asian, Other). *Racial composition*, that is, the percentage of different racial groups in the neighborhood, is measured as *percent black* and *percent Latinos*. We include the *population* in the surrounding buffer, which is effectively population density given the fixed size of the buffers. Moreover, some research shows that rural residents have a higher perception of attachment, but others conclude it is urbanites who feel more attached. Following previous research (Boessen et al. 2018), we use a measure of the population within 20 miles (32 km.) of the resident's tract and code *urban* areas as those with a population cutoff of 50,000 or higher.

Modeling Strategy

The analyses of effects of social ties on neighborhood and city attachment proceed using structural equation models (SEM) specifically designed for latent variables. We begin the analyses with confirmatory factor analysis (CFA) model of our measures of neighborhood and

city attachment. Specifically, there are four latent variables: neighborhood belonging, neighborhood morale, city belonging, and city morale. We present CFA models for the full sample as well as split by urban/rural status. Next, we estimate a series of full SEMs using our covariates to predict these four outcome variables. All models split the sample by urban and rural to test the differences in perception of attachment among urban and rural settings. The first set of models includes measures of degree and proportion of ties for each social relationship within the four distance bins we construct, one relationship at a time. The second set of models includes variables of degree and proportion of ties within three distance bins (0-2m. and 2-10m., with 10m. up as the reminder) for all social relationships in the same model to assess which one(s) appear most important when simultaneously accounting for the other social relationships. Notably, the variance inflation factor (VIF) values in our final models are all below 2.5, indicating no cause for concern. Missing data is handled by using a full information maximum likelihood estimation strategy for all models.

RESULTS

Table 1 presents the descriptive statistics for variables measuring the latent factors and the independent variables from the ASFP data. Besides the full sample, we have also broken the data down by urban/rural status. This descriptive information shows differences in most of the variables among these groups and we mainly focus on the network measures here. For the indicators of the latent variables, the mean value is often higher in rural settings compared to urban areas; the one exception is that there is almost no difference between the rural and urban sample regarding morale with the city. In terms of the number of social ties for different social relationships, mean degrees on different relationships are higher among rural residents than urban residents, though the difference is not very large. We also observe that rural residents have

a higher percentage of longer distance ties to alters than urbanites for the four social relations, while there are generally higher percentages of close and midrange alters among urban residents. Although these descriptive differences are suggestive, we further test how they impact attachment.

<<<Table 1 about here>>>

Confirmatory Factor Analysis

We next estimate CFA testing a four latent construct measurement model: neighborhood belonging and morale, city belonging and morale. The results of the CFA model for the full sample are presented in Figure 1.[4] The R-squared for the observed variables are all above 0.83, indicating at least 83% of the variance of the observed variables are explained by the latent constructs. The overall model goodness of fit is satisfactory. The chi-square with 14 degrees of freedom is 355.03, the root mean squared error of approximation (RMSEA) is 0.084, and the comparative fit index (CFI) is 0.987, which is much better than the standard of 0.95, indicating a good model fit. The means of neighborhood belonging and morale are somewhat higher than the means of these measures for the city. The correlation of the dimensions of belonging and morale is 0.73 at the neighborhood level and 0.79 at the city level. The correlation of neighborhood belonging and city belonging is 0.63 and the correlation of neighborhood morale and city morale is 0.61. So we see evidence of a reinforcing positive effect in which those who feel more attachment to their neighborhood also feel more attachment to their city, and no evidence of a crowding out effect.

<<<Figure 1 about here>>>

[4] For CFA models, the number of observations (N = 3,413) is smaller than the overall sample size, as there are 224 all-missing observations excluded from the analysis.

We next test whether there are differences across urban and rural settings with a multiple-group CFA model (Figure 2). The initial model estimates separate parameters for each group. We then constrain the lambda loadings and intercepts to be equal across groups, and the model fit was improved (RMSEA improved from .087 to .081 and CFI improved from .98 to .984). The results indicate that the model with equal loadings and intercepts is preferred, indicating no differences in how rural and urban residents respond to these questions. The gap in mean values between urban and rural residents is somewhat narrow, as urban residents report about 0.2 points lower levels of neighborhood sense of belonging and morale, and city sense of belonging compared to rural residents (the differences are statistically significant). There is no significant difference across urban and rural residents for the mean of city morale.

<<<Figure 2 about here>>>

Models for Social Relationships Separately

We next turn to the models assessing the relationship between our measures of these various social relationships and neighborhood and city attachment in the urban sample, for each social relationship one at a time. There is consistent evidence across these models that a greater number of ties of these social relationships is associated with higher levels of neighborhood and city attachment in the urban sample (Panel A of Table 2). Each additional social activity tie is associated with more neighborhood belonging and morale (β=.030, β=.029) and more city belonging and morale (β=.023, β=.031). The relationship between kinship ties and neighborhood attachment is stronger, with coefficients 55% to 80% larger than for social activity ties. Core discussion ties also have a stronger relationship with neighborhood and city attachment than social activity ties, as each additional core tie has almost twice the strength of the relationship with neighborhood attachment as do social activity ties. Nonetheless, the strongest relationships

with both neighborhood and city attachment occur for safety ties, as each safety tie is generally twice as strongly related to both neighborhood and city attachment as are social activity ties.

<<<Table 2 about here>>>

Despite the importance of the presence of these social ties, their spatial location generally appears less important for neighborhood attachment in the urban sample. For kinship, social activity and core ties, their spatial location has no relationship with neighborhood attachment as none of the proportion bins are significant for these social relations. It is only for safety ties that their nearby presence boosts a sense of neighborhood belonging. To get a sense of the relative magnitude of these effects, whereas an increase of 3 safety ties (one standard deviation) increases neighborhood sense of belonging .31 units, going from no nearby safety ties to 30% nearby safety ties (one standard deviation) increases it .17 units. Interestingly, the spatial distribution of social activity ties is more important for city attachment than it is for neighborhood attachment, as a greater proportion of social activity ties within two miles is associated with greater city attachment. Likewise, a greater proportion of nearby kinship ties are moderately associated with more city attachment ($p < .10$).

In the rural sample, the pattern of results is somewhat different from the urban sample (Panel B of Table 2). One similarity is that the presence of more safety, social activity, and core discussion ties is associated with higher levels of neighborhood attachment. Another similarity is that the presence of more nearby safety ties is associated with more neighborhood attachment; however, a difference we detect is that "nearby" ties are better measured within 1 mile in urban areas but 2 miles in rural areas (1.6 km. versus 3.2 km.). A difference is that the presence of more nearby kinship and core discussion ties is related to greater neighborhood and city attachment in the rural sample, whereas this is not the case in the urban sample. Furthermore, it

is only the nearness of kinship ties that matters in the rural sample, and not the number of such ties, for neighborhood and city attachment.

A particularly notable difference for the rural sample compared to the urban sample is that it is only the number of safety ties that is associated with city attachment, and the degrees of the other three social relationships are not related to city attachment. For both kinship ties and social activity ties, it is their relative nearness that is important for increasing a sense of city attachment in the rural sample, and not the number of them.[5] In short, and perhaps surprisingly, the spatial distribution of these ties appears more consequential for attachment in the rural sample than it does in the urban sample.

Models of All Social Relations

Our final models assess the difference in residents' perceptions of neighborhood and city attachment across urban and rural settings with all social relation measures included simultaneously in the model (Table 3). Here, we combine the proportion of ties within 2-4 miles and 4-10 miles together as midrange ties, thus the model includes the degree of each of the four social relations, and the proportion of nearby (0-2 miles) and midrange (2-10 miles) ties for each of the four social relations (except for safety ties in urban areas, which are 0-1 and 1-10 miles). In the urban sample, the presence of more safety ties is associated with greater neighborhood attachment and city belonging. The presence of a higher proportion of nearby safety ties is associated with greater neighborhood sense of belonging, whereas those with a greater proportion of midrange safety ties report more city attachment. Once controlling for safety ties, the other social relationships are not statistically significant for neighborhood attachment. Thus,

[5] We also estimated models in which we binned the count of the number of ties, rather than the proportion of ties within each social relationship, and the results were broadly similar to those presented here.

it appears that it is these safety ties that are particularly important for explaining neighborhood or city attachment in the urban sample.

<<<Table 3 about here>>>

For rural residents, those with more safety ties report greater neighborhood sense of belonging and greater city attachment. Those with more nearby safety ties report more neighborhood attachment. It appears that those with more social activity ties are more likely to report greater neighborhood morale in the rural sample. Also, those with a greater proportion of proximate kinship ties report a greater sense of belonging with the city in the rural sample.

Finally, given the empirical overlap in the different social relations, we estimate three models in which safety ties are paired with one of the other social relations. Thus, the models include the degree and proportion of near and midrange ties of 1) safety and socializing ties; 2) safety and kinship ties; 3) safety and core discussion ties. The results are quite similar to Table 3. Safety ties remain the most important for explaining attachment to the neighborhood and city, whereas the other measures generally remain nonsignificant predictors of attachment. Thus, our Table 3 findings are reinforced that these other measures are not as important once accounting for safety ties.[6]

CONCLUSION

The current study enables us to examine the relationship between the spatial distribution of social ties and social attachment at the neighborhood or city level. Whereas prior evidence suggests that social ties exert an influential effect on residents' attachment to the neighborhood or city, an underexplored question in the literature is whether the geographic location of

[6] The coefficients and standard errors generally change modestly, and in only rare cases do they change enough to create a statistically significant effect (despite the small change in the coefficient). The results show that nearby socializing ties are positively associated with city belonging in the urban and rural samples, near and midrange kin ties are positively associated with city morale in the rural sample, and that core discussion degree is positively associated with city morale in the rural sample. Results are available upon request.

residents' social alters impacts their sense of attachment to the neighborhood or city. Our results indicate that there is not a crowding out effect here, but rather a symbiotic relationship between neighborhood and city attachment: residents who report more neighborhood attachment also tend to report more city attachment. More importantly, this study offers insight for how the spatial distribution of a variety of social relationships impacts residents' attachment with their neighborhood and city, and compares these patterns between urban and rural settings.

A particularly notable finding is that long distance ties are *not* irrelevant for impacting neighborhood or city attachment, and therefore existing research that often ignores these ties is potentially missing an important feature of residents' social networks. This conclusion is evident in the generally strong positive relationships between the Degree measures and attachment, and the proportions of ties in different distance bins, even when significant, do not overwhelm this result. Furthermore, there is little evidence that long distance ties operate in a crowding-out fashion to reduce attachment. Instead, the presence of more long-distance ties is often related to *higher* levels of neighborhood and city attachment, indicating that they can play important roles in how residents feel attached to the local environment. Thus, even though longer distance alters are not necessarily as impactful as nearby alters, they nonetheless can play an important role for neighborhood or city attachment. One possibility is that these longer distant alters provide information and resources to a resident that helps in addressing neighborhood problems, and therefore can increase attachment with the neighborhood.

As further evidence of the importance of the role of information by social ties, we find that safety ties consistently show the strongest positive relationship with neighborhood and city attachment. Furthermore, it tends to be the case that more safety ties at *any distance* are associated with greater attachment. Clearly, this type of tie is quite important for residents given

the potential information they can provide, and can enable residents to address neighborhood problems when they arise. Nearby safety alters are even more important, as they presumably can also enhance the ability for collective action, analogous to the concept of collective efficacy (Sampson, Raudenbush, and Earls 1997), in addition to the information they provide. Prior evidence finds that residents who report more neighborhood safety ties express more trustworthiness of neighbors, have greater access to social support, and also report less fear of crime (Boessen et al. 2017). Thus, it is reasonable to expect, and is evident in our analyses, that respondents with more neighborhood safety ties express greater attachment to the neighborhood and city.

A somewhat surprising result is that it appears that the nearness of ties has a stronger impact on neighborhood and city attachment in the rural sample than it does in the urban sample. This is the case for all social relationships. Due to their physical closeness, these nearby alters presumably have the ability to provide more frequent social interaction and emotional support, but also have the ability to provide persons with whom to collaborate when engaging in collective action to improve the neighborhood. This is also consistent with what Small and Adler (2019) have argued: physical space plays a central role in shaping social relationships, and therefore spatial propinquity matters. Nonetheless, despite the presumption of many that spatial patterns are more important in urban environments—and a possible presumption that spatial patterns would not even be consequential in rural and small-town areas—we find the opposite. A greater proportion of nearby ties within 2 miles for all four social relations consistently has a much stronger relationship with neighborhood and city attachment in the rural sample compared to the urban sample. This is an important corrective to presumptions that in small town and rural environments distance is less important because of the general sparseness of the population: we

find that it is in fact even more important here than in urban environments. The sparse population of rural areas may limit the opportunities in the broader area, and therefore increase the attractiveness of nearby social interactions. Thus, the presence of more geographically close ties in a rural environment appears to more strongly increase attachment, and this effect is particularly strong for neighborhood attachment.

Finally, in models that account for all four social relationships simultaneously, we find that safety ties have by far the strongest effect on neighborhood and city attachment. In fact, it often appears that this is the only important social relationship for fostering greater attachment. This is the case in both the urban and rural samples. It appears that network ties that can provide information and support in addressing neighborhood problems are the most able to increase a sense of attachment, even more so than network ties that provide social activity alone (which are often the focus in prior studies). We also highlight three key differences between the rural and urban samples. First, it is only in the rural sample that those with more social activity ties report greater neighborhood morale, whereas purely social activity relationships appear less important in the urban sample. Second, the presence of kin in the local area appears to foster a sense of attachment to the city for rural residents in a way that we do not observe in the urban sample. This may be because having kinship ties in the general area provides group social activities that provide a source of entertainment that is particularly important in a rural environment, but less so in an urban environment with many more amenities and opportunities. Third, an interesting pattern for core discussion ties is observed only in the urban sample in which having a greater proportion of nearby and midrange core discussion ties (that do not serve other social relationships) is associated with lower neighborhood and city attachment. These ties might

represent an emotional and time cost to residents that reduces their attachment to the city if they do not also enhance the ability to address local problems, at least in an urban environment.

While we believe this study is a contribution to literatures on neighborhood and city attachment as well as literature on social networks, there are some limitations that deserve mention. One limitation is that when respondents were asked about their perceptions of neighborhood and city attachment, they were not provided a specific definition of neighborhood or city. This ambiguity might lead to differences in interpretation in how residents are interpreting attachment, particularly to the neighborhood. For respondents in rural areas, the definition of what a neighborhood is might be unclear, or even the definition of the city in some environments. Second, we employ a cross-sectional dataset, which can only capture a one-time assessment of attitudes, beliefs, or behaviors, and thus precludes understanding the temporal relationships between the variables of interest in the analysis. Although it is reasonable to think that neighborhood and city attachment are stable constructs which take a period of time to develop (Brown and Perkins 1992), in the future longitudinal data on individual and neighborhood covariates would be valuable to better understand the relationship between these covariates and neighborhood and city attachment.

Despite these limitations, we believe our research advances the understanding of the relationship between social ties and neighborhood/city attachment in multiple dimensions. First, the ASFP allows us to uncover how different geographic scales of social ties play a role in shaping residents' neighborhood and city attachment. Secondly, we map out how different types of social ties or social relationships function variously across urban and rural settings and how effect of spatial distribution of specific tie on neighborhood and city attachment might differentiate among different contexts. Finally, due to the high percentage of respondents in rural

areas in the ASFP sample, it allows us to formally compare how social ties shape individuals' perception of attachment within different geographical areas.

REFERENCES

Almquist, Zack W. and Carter T. Butts. 2015. "Predicting Regional Self-Identification from Spatial Network Models." *Geographical Analysis* 47(1):50-72.

Berger-Schmitt, Regina. 2000. *Social Cohesion as an Aspect of the Quality of Societies: Concept and Measurement*: ZUMA.

Birkel, Richard C and N Dickon Reppucci. 1983. "Social Networks, Information-Seeking, and the Utilization of Services." *American Journal of Community Psychology* 11(2):185-205.

Boessen, Adam, John R. Hipp, Emily J. Smith, Carter T. Butts, Nicholas N. Nagle and Zack Almquist. 2014. "Networks, Space, and Residents' Perception of Cohesion." *American Journal of Community Psychology* 53(3):447-61.

Boessen, Adam and John R Hipp. 2015. "Close- Ups and the Scale of Ecology: Land Uses and the Geography of Social Context and Crime." *Criminology* 53(3):399-426.

Boessen, Adam, John R. Hipp, Carter T. Butts, Nicholas N. Nagle and Emily J. Smith. 2017. "Social Fabric and Fear of Crime: Considering Spatial Location and Time of Day." *Social Networks* 51:60-72.

Boessen, Adam, John R. Hipp, Carter T. Butts, Nicholas N. Nagle and Emily J. Smith. 2018. "The Built Environment, Spatial Scale, and Social Networks: Do Land Uses Matter for Personal Network Structure?". *Environment and Planning B: Urban Analytics and City Science* 45(3):400-16.

Bolan, Marc. 1997. "The Mobility Experience and Neighborhood Attachment." *Demography* 34(2):225-37.

Bollen, Kenneth A and Rick H Hoyle. 1990. "Perceived Cohesion: A Conceptual and Empirical Examination." *Social Forces* 69(2):479-504.

Brown, Barbara, Douglas D. Perkins and Graham Brown. 2003. "Place Attachment in a Revitalizing Neighborhood: Individual and Block Levels of Analysis." *Journal of Environmental Psychology* 23(3):259-71.

Brown, Barbara B, Douglas D Perkins and Graham Brown. 2004. "Crime, New Housing, and Housing Incivilities in a First- Ring Suburb: Multilevel Relationships across Time." *Housing Policy Debate* 15(2):301-45.

Brown, Barbara B. and Douglas D. Perkins. 1992. "Disruptions in Place Attachment." Pp. 279-304 in *Place Attachment*, edited by I. Altman and S. M. Low. Boston, MA: Springer US.

Bursik, Robert J and Harold G Grasmick. 1993. *Neighborhoods & Crime*: New York: Lexington.

Butler, Tim. 2003. "Living in the Bubble: Gentrification and Its' Others' in North London." *Urban Studies* 40(12):2469-86.

Comstock, Nicole, L. Miriam Dickinson, Julie A. Marshall, Mah- J. Soobader, Mark S. Turbin, Michael Buchenau and Jill S. Litt. 2010. "Neighborhood Attachment and Its Correlates: Exploring Neighborhood Conditions, Collective Efficacy, and Gardening." *Journal of Environmental Psychology* 30(4):435-42.

Donnelly, Patrick G and Theo J Majka. 1996. "Change, Cohesion, and Commitment in a Diverse Urban Neighborhood." *Journal of Urban Affairs* 18(3):269-84.

Friedkin, Noah E. 2004. "Social Cohesion." *Annual Review of Sociology* 30:409-425.

Fischer, Claude S. 1975. "Toward a Subcultural Theory of Urbanism." *American Journal of Sociology* 80(6):1319-41.

Fischer, Claude S. 1982. *To Dwell among Friends: Personal Networks in Town and City*: University of chicago Press.

Fonseca, Xavier, Stephan Lukosch and Frances Brazier. 2019. "Social Cohesion Revisited: A New Definition and How to Characterize It." *Innovation: The European Journal of Social Science Research* 32(2):231-53.

Forrest, Ray and Ade Kearns. 2001. "Social Cohesion, Social Capital and the Neighbourhood." *Urban Studies* 38(12):2125-43.

Fudolig, Mikaela Irene D., Daniel Monsivais, Kunal Bhattacharya, Hang-Hyun Jo, and Kimmo Kaski. 2021. "Internal Migration and Mobile Communication Patterns among Pairs with Strong Ties." *EPJ Data Science*.

Gans, Herbert. 1962. "Urbanism and Suburbanism as Ways of Life: A Reevaluation of Definitions." *The Urban Sociology Reader*:42.

Goudy, Willis J. 1977. "Evaluations of Local Attributes and Community Satisfaction in Small Towns." *Rural Sociology* 42(3):371.

Goudy, Willis J. 1990. "Community Attachment in a Rural Region." *Rural Sociology* 55(2):178-98.

Granovetter, Mark. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78(6):1360-80.

Granovetter, Mark. 2005. "The Impact of Social Structure on Economic Outcomes." *Journal of economic perspectives* 19(1):33-50.

Guest, Avery M. 2000. "The Mediate Community: The Nature of Local and Extralocal Ties within the Metropolis." *Urban Affairs Review* 35(5):603-27.

Hipp, John R. and Andrew J. Perrin. 2006. "Nested Loyalties: Local Networks' Effects on Neighborhood and Community Cohesion." *Urban Studies* 43(13):2503-23.

Hogg, Michael A. 1992. *The Social Psychology of Group Cohesiveness: From Attraction to Social Identity*: Harvester Wheatsheaf.

Hummon, DM. 1992. "Community Attachment: Local Sentiment & Sense of Place.". *New York: Plenum Press*.

Hunter, Albert D. 1974. "Symbolic Communities: The Persistence and Change of Chicago's Local Communities." *University of Chicago Press.*

Kamalipour, Hesam, Armin Jeddi Yeganeh and Mehran Alalhesabi. 2012. "Predictors of Place Attachment in Urban Residential Environments: A Residential Complex Case Study." *Procedia - Social and Behavioral Sciences* 35:459-67.

Kazak, Anne E and Brian L Wilcox. 1984. "The Structure and Function of Social Support Networks in Families with Handicapped Children." *American Journal of Community Psychology* 12(6):645-61.

Kearns, Ade and Ray Forrest. 2000. "Social Cohesion and Multilevel Urban Governance." *Urban Studies* 37(5-6):995-1017.

Knez, Igor. 2005. "Attachment and Identity as Related to a Place and Its Perceived Climate." *Journal of Environmental Psychology* 25(2):207-18.

Lewicka, Maria. 2010. "What Makes Neighborhood Different from Home and City? Effects of Place Scale on Place Attachment." *Journal of Environmental Psychology* 30(1):35-51.

McDougall, William. 1920. *The Group Mind: A Sketch of the Principles of Collective Psychology, with Some Attempt to Apply Them to the Interpretation of National Life and Character*: Putnam.

Mesch, Gustavo S. and Orit Manor. 1998. "Social Ties, Environmental Perception, and Local Attachment." *Environment and Behavior* 30(4):504-19.

Messer, Benjamin L and Don A Dillman. 2011. "Surveying the General Public over the Internet Using Address-Based Sampling and Mail Contact Procedures." *Public opinion quarterly* 75(3):429-57.

Moody, James and Douglas R. White. 2003. "Social Cohesion and Embeddedness: A Hierarchical Conception of Social Groups." *American Sociological Review* 68:103-127.

Paxton, Pamela and James Moody. 2003. "Structure and Sentiment: Explaining Emotional Attachment to Group." *Social Psychology Quarterly* 66:34-47.

Pew Research Center. (2018). What unites and divides urban, suburban and rural communities. Retrieved from: http://www.pewsocialtrends.org/2018/05/22/what-unites-and-divides-urban-suburban-and-rural-communities/

Riger, Stephanie and Paul J. Lavrakas. 1981. "Community Ties: Patterns of Attachment and Social Interaction in Urban Neighborhoods." *American Journal of Community Psychology* 9(1):55-66.

Sampson, Robert J. 1988. "Local Friendship Ties and Community Attachment in Mass Society: A Multilevel Systemic Model." *American Sociological Review* 53(5):766-79.

Sampson, Robert J and W Byron Groves. 1989. "Community Structure and Crime: Testing Social-Disorganization Theory." *American Journal of Sociology* 94(4):774-802.

Sampson, Robert J. 1991. "Linking the Micro-and Macrolevel Dimensions of Community Social Organization." *Social Forces* 70(1):43-64.

Sampson, Robert J., Stephen W. Raudenbush, and Felton Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277:918-924.

Scannell, Leila and Robert Gifford. 2010. "Defining Place Attachment: A Tripartite Organizing Framework." *Journal of Environmental Psychology* 30(1):1-10.

Simmel, G. 1903. "The Metropolis and Mental Life in Wolff, Kh (Ed.), the Sociology of Georg Simmel (Pp. 409-424)." Glencoe, IL: Free Press.

Small, Mario L. and Laura Adler. 2019. "The Role of Space in the Formation of Social Ties." *Annual Review of Sociology* 45(1):111-32.

Tajfel, Henri. 1981. *Human Groups and Social Categories: Studies in Social Psychology*: Cup Archive.

Tajfel, Henri and John C Turner. 1986. "The Social Identity Theory of Intergroup Behaviour (Pp. 7–24)." *1986). Psychology of Intergroup Relations. Chicago, United States of America: Nelson.*

Taylor, Ralph B. 1996. "Neighborhood Responses to Disorder and Local Attachments: The Systemic Model of Attachment, Social Disorganization, and Neighborhood Use Value." *Sociological Forum* 11(1):41-74. doi: 10.1007/BF02408301.

Theodori, Gene L and Albert E Luloff. 2000. "Urbanization and Community Attachment in Rural Areas." *Society & Natural Resources* 13(5):399-420.

Tönnies, Ferdinand. 1887. *Community and Civil Society*: trans. by J. Harris and M. Hollis. Cambridge University Press.

Ujang, Norsidah and Khalilah Zakariya. 2015. "Place Attachment and the Value of Place in the Life of the Users." *Procedia-Social and Behavioral Sciences* 168(9):373-80.

Viry, Gil. 2012. "Residential Mobility and the Spatial Dispersion of Personal Networks: Effects on Social Support." *Social Networks* 34(1):59-72.

Weijs-Perrée, Minou, Pauline Van den Berg, Theo Arentze and Astrid Kemperman. 2017. "Social Networks, Social Satisfaction and Place Attachment in the Neighborhood." *Region* 4(3):133-51.

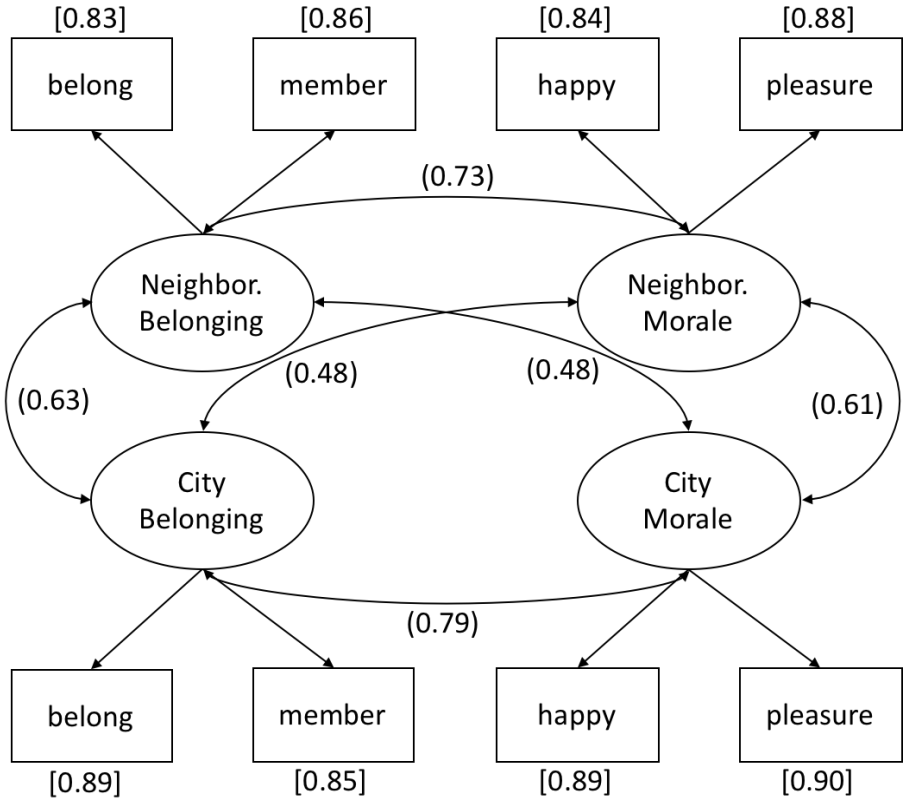
Wellman, Barry. 2002. "Little Boxes, Glocalization, and Networked Individualism." Pp. 10-25 in *Digital Cities II: Computational and Sociological Approaches*, edited by M. Tanabe, P. van den Besselaar and T. Ishida. Berlin, Heidelberg: Springer Berlin Heidelberg.

Wirth, Louis. 1938. "Urbanism as a Way of Life." *American Journal of Sociology* 44(1):1-24.

Woolever, Cynthia. 1992. "A Contextual Approach to Neighbourhood Attachment." *Urban Studies* 29(1):99-116.

FIGURES

Figure 1. Confirmatory factor analysis for neighborhood and city belonging and morale for full sample.

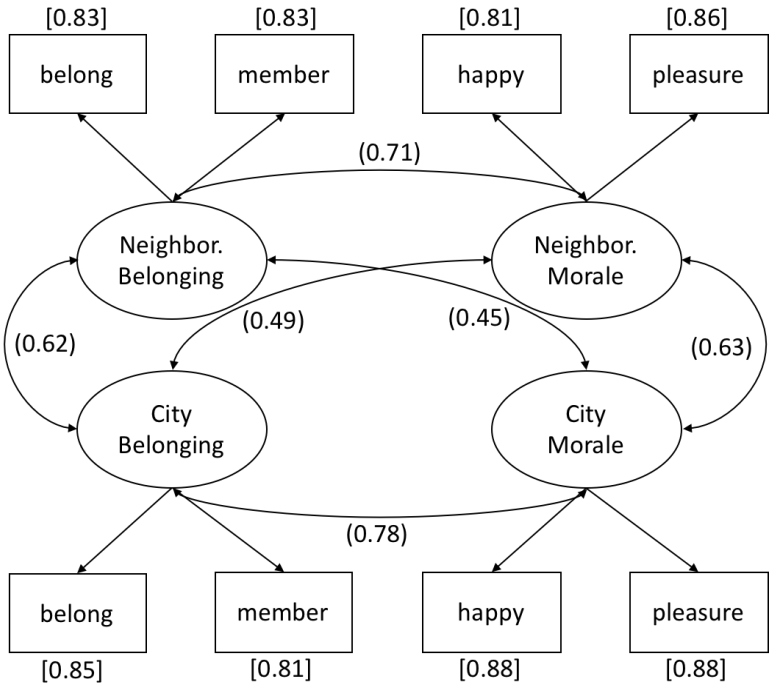


χ^2 (14) = 355.03; p = 0.000
RMSEA = 0.084
CFI = 0.987
N = 3,413

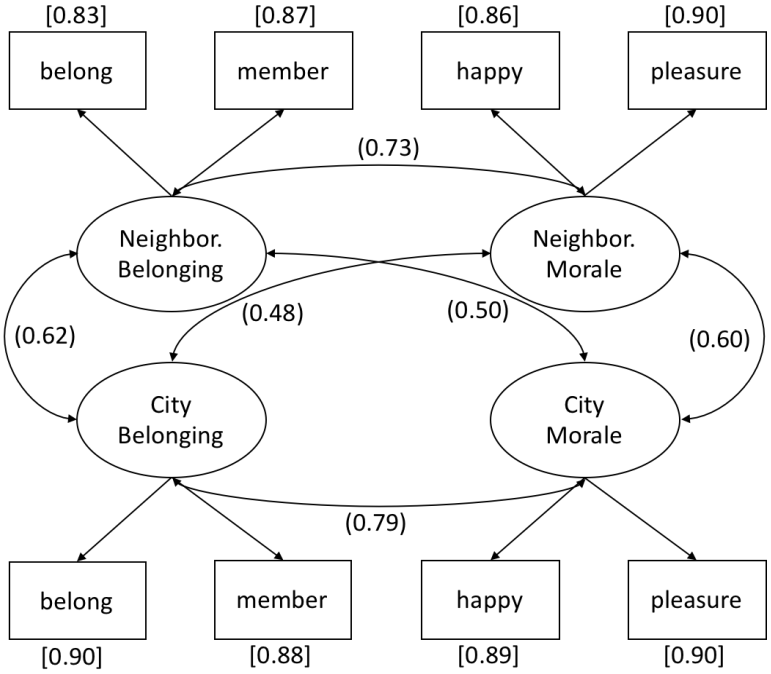
Source: American Social Fabric Project. Correlations between latent factors are given in the parentheses. R^2 value are shown in the brackets.

Figure 2. Confirmatory factor analysis for neighborhood and city belonging and morale by urban/rural.

Panel a: CFA model for urban area



Panel b: CFA model for rural area



	Urban vs. Rural		
	Mean difference	SE	Signif.
Neighbor. belong	-0.23	0.04	***
Neighbor. morale	-0.13	0.04	**
City belong	-0.17	0.04	***
City morale	0.02	0.04	

χ^2 (36) = 439.62; p = 0.000
RMSEA = 0.081
CFI = 0.984
$N_{panel\ a}$ = 1,326
$N_{panel\ b}$ = 2,087

Source: American Social Fabric Project. Correlations between latent factors are given in the parentheses. R^2 values are shown in the brackets.

TABLES

Table 1. Summary statistics.

	Full sample		Urban		Rural	
	Mean	SD	Mean	SD	Mean	SD
Latent Factor Variables						
Neighborhood belong	6.84	2.73	6.57	2.63	7.00	2.78
Neighborhood member	6.74	2.83	6.34	2.76	6.99	2.84
Neighborhood happy	8.12	2.39	7.96	2.37	8.22	2.40
Neighborhood pleasure	7.65	2.62	7.46	2.56	7.78	2.65
City belong	6.51	2.68	6.34	2.57	6.62	2.74
City member	6.28	2.76	5.97	2.62	6.48	2.83
City happy	7.36	2.61	7.43	2.44	7.32	2.72
City pleasure	6.95	2.73	6.95	2.59	6.95	2.82
Independent Variables						
Kinship degree	4.61	3.27	4.15	3.02	4.91	3.39
Pct. Kinship degree (0-2m)	4%	15%	6%	18%	4%	13%
Pct. Kinship degree (2-4m)	3%	12%	4%	14%	2%	10%
Pct. Kinship degree (4-10m)	5%	16%	7%	18%	4%	14%
Pct. Kinship degree (10+m)	81%	33%	76%	36%	84%	31%
Social activity degree	5.47	6.51	5.04	6.33	5.74	6.60
Pct. Social degree (0-2m)	7%	20%	9%	22%	6%	18%
Pct. Social degree (2-4m)	4%	15%	5%	17%	3%	13%
Pct. Social degree (4-10m)	9%	21%	11%	22%	8%	20%
Pct. Social degree (10+m)	61%	42%	55%	41%	65%	41%
Safety degree	2.66	3.49	2.27	3.13	2.90	3.68
Pct. Safety degree (0-1m)	9%	25%	12%	29%	8%	23%
Pct. Safety degree (0-2m)	13%	30%	16%	33%	11%	28%
Pct. Safety degree (1-4m)	10%	26%	11%	27%	9%	25%
Pct. Safety degree (2-4m)	6%	21%	7%	22%	6%	20%
Pct. Safety degree (4-10m)	11%	28%	12%	28%	11%	28%
Pct. Safety degree (10+m)	43%	46%	34%	43%	48%	46%
Core disc. Degree	3.68	4.25	3.42	4.04	3.84	4.38
Pct. Core degree (0-2m)	7%	19%	8%	21%	5%	17%
Pct. Core degree (2-4m)	4%	15%	5%	17%	3%	13%
Pct. Core degree (4-10m)	8%	21%	10%	23%	7%	19%
Pct. Core degree (10+m)	61%	42%	54%	42%	65%	41%
Male	0.55	0.50	0.56	0.50	0.55	0.50
Age	5.42	1.55	5.30	1.58	5.49	1.53
White	0.77	0.42	0.65	0.48	0.85	0.36
Black	0.02	0.13	0.03	0.16	0.01	0.11
Latino	0.13	0.33	0.19	0.39	0.09	0.28
Other race	0.09	0.29	0.14	0.35	0.06	0.24
Married	0.66	0.48	0.63	0.48	0.67	0.47

Education	11.45	2.31	11.71	2.44	11.28	2.20
Income	70.96	55.06	83.95	62.63	62.74	47.90
Length of residence	12.56	11.83	11.91	10.93	12.98	12.36
Church attendance	2.00	2.18	2.03	2.17	1.98	2.19
Meetings attend(log)	0.63	0.77	0.61	0.76	0.64	0.77
Urban	0.39	0.49	1.00	0.00	0.00	0.00
Racial/ethnic heterogeneity	0.32	0.21	0.44	0.18	0.23	0.19
% black	1.77	5.12	3.00	6.77	0.77	2.87
% Latino	21.68	25.03	29.07	25.73	15.70	22.76
Population	6.39	14.27	15.49	19.26	0.35	0.92
Ave. household income (log)	3.85	0.35	4.00	0.34	3.73	0.29
Ave. length of residence	9.47	2.69	8.99	2.54	9.77	2.75

Source: American Social Fabric Project. SD = Standard Deviation.

Table 2: Models with social ties' degree and percent degree of different distance predicting attachment
Panel A: urban environment

	Model 1: Kinship				Model 2: Social activity			
	Neigh belong	Neigh morale	City belong	City morale	Neigh belong	Neigh morale	City belong	City morale
ties	0.053*	0.047*	0.015	0.056*	0.030**	0.029**	0.023*	0.031**
	(0.024)	(0.022)	(0.024)	(0.023)	(0.011)	(0.010)	(0.011)	(0.011)
pct. ties	-0.051	0.104	0.630+	0.616+	0.346	0.099	0.642*	0.509+
(0-2m)	(0.367)	(0.328)	(0.357)	(0.345)	(0.307)	(0.274)	(0.299)	(0.289)
pct. ties	-0.195	0.085	-0.136	-0.191	0.332	0.530	0.182	0.099
(2-4m)	(0.472)	(0.423)	(0.461)	(0.447)	(0.385)	(0.343)	(0.375)	(0.362)
pct. ties	0.148	0.106	-0.558	-0.448	0.154	0.164	-0.263	0.023
(4-10m)	(0.361)	(0.324)	(0.353)	(0.341)	(0.301)	(0.269)	(0.294)	(0.286)
R square	0.130	0.169	0.113	0.126	0.133	0.174	0.115	0.126
	Model 3: Safety [a]				Model 4: Core discussion			
ties	0.105***	0.078***	0.065**	0.059**	0.072***	0.058***	0.038*	0.057***
	(0.022)	(0.020)	(0.022)	(0.021)	(0.018)	(0.016)	(0.017)	(0.017)
pct. ties	0.547*	-0.036	-0.014	-0.009	0.159	-0.236	0.490	0.080
(0-2m)	(0.236)	(0.212)	(0.232)	(0.227)	(0.310)	(0.278)	(0.304)	(0.294)
pct. ties	-0.033	0.051	0.267	0.220	-0.172	0.241	-0.067	0.099
(2-4m)	(0.251)	(0.226)	(0.247)	(0.239)	(0.390)	(0.350)	(0.382)	(0.368)
pct. ties	0.213	0.222	0.062	0.099	0.550+	0.251	-0.284	-0.230
(4-10m)	(0.241)	(0.217)	(0.237)	(0.230)	(0.289)	(0.260)	(0.284)	(0.275)
R square	0.150	0.178	0.117	0.125	0.143	0.177	0.115	0.127
N	1,420							

a: For safety relationship, we use the proportion of distance bins as 0-1 mile, 1-4 miles, 4-10 miles for urban residents.

Panel B: rural environment

	Model 1: Kinship				Model 2: Social activity			
	Neigh belong	Neigh morale	City belong	City morale	Neigh belong	Neigh morale	City belong	City morale
ties	0.018	0.017	0.010	0.018	0.038***	0.033***	0.007	0.011
	(0.018)	(0.016)	(0.018)	(0.019)	(0.009)	(0.008)	(0.009)	(0.009)
pct. ties	1.470***	0.894*	1.605***	1.292**	1.164***	0.831**	1.011**	0.991**
(0-2m)	(0.420)	(0.376)	(0.426)	(0.429)	(0.313)	(0.280)	(0.319)	(0.321)
pct. ties	0.071	0.725	0.809	0.819	0.055	1.085**	0.932*	1.071*
(2-4m)	(0.529)	(0.474)	(0.537)	(0.538)	(0.430)	(0.385)	(0.439)	(0.439)
pct. ties	0.768+	0.423	1.059**	0.651	0.288	0.280	0.355	0.260
(4-10m)	(0.405)	(0.362)	(0.410)	(0.413)	(0.273)	(0.244)	(0.279)	(0.280)
R square	0.131	0.117	0.106	0.096	0.139	0.128	0.104	0.097
	Model 3: Safety				Model 4: Core discussion			
ties	0.097***	0.051***	0.067***	0.061***	0.051***	0.040**	0.020	0.026+
	(0.015)	(0.014)	(0.016)	(0.016)	(0.014)	(0.012)	(0.014)	(0.014)
pct. ties	0.690***	0.591**	0.387+	0.541*	1.129***	0.689*	0.882**	0.924**
(0-2m)	(0.205)	(0.184)	(0.210)	(0.212)	(0.327)	(0.292)	(0.333)	(0.336)
pct. ties	-0.050	0.403	0.393	0.374	-0.299	0.582	0.394	0.728+
(2-4m)	(0.274)	(0.247)	(0.282)	(0.282)	(0.427)	(0.383)	(0.435)	(0.435)
pct. ties	0.278	0.313+	0.013	-0.036	0.507+	0.347	0.390	0.199
(4-10m)	(0.200)	(0.180)	(0.206)	(0.207)	(0.286)	(0.257)	(0.293)	(0.295)
R square	0.150	0.127	0.109	0.102	0.138	0.122	0.103	0.096
N	2,217							

Note: We control for all ego and neighborhood characteristics variables in Table 1 (except for urban) in all models, but only present coefficients of network measures to save space. Standard errors in parentheses. + p<.10, * p<.05, ** p<.01, *** p<.001

Table 3: Models with all social relations' degree and distance to alters between urban/rural

	Neigh belong	Neigh morale	City belong	City morale
Urban environment				
Kinship ties	0.027	0.022	-0.008	0.031
	(0.026)	(0.024)	(0.026)	(0.025)
Social activity ties	-0.017	-0.001	0.006	0.004
	(0.016)	(0.014)	(0.015)	(0.015)
Safety ties	0.088***	0.056*	0.061*	0.034
	(0.026)	(0.024)	(0.026)	(0.025)
Core discussion ties	0.039	0.028	0.002	0.027
	(0.025)	(0.022)	(0.024)	(0.023)
Pct. Kin ties(0-2m)	-0.371	0.236	0.351	0.555
	(0.465)	(0.418)	(0.455)	(0.442)
Pct. Kin ties(2-10m)	0.458	0.425	0.240	0.225
	(0.418)	(0.382)	(0.413)	(0.401)
Pct. Social ties(0-2m)	0.216	0.194	0.448	0.521
	(0.463)	(0.418)	(0.455)	(0.440)
Pct. Social ties(2-10m)	-0.399	-0.304	-0.077	-0.155
	(0.432)	(0.398)	(0.432)	(0.417)
Pct. Safety ties(0-1m)	0.697*	0.081	-0.149	-0.047
	(0.271)	(0.244)	(0.266)	(0.259)
Pct. Safety ties(1-10m)	0.319	0.304	0.496*	0.472*
	(0.227)	(0.205)	(0.222)	(0.215)
Pct. Core ties(0-2m)	-0.468	-0.701+	-0.144	-0.711+
	(0.426)	(0.384)	(0.418)	(0.405)
Pct. Core ties(2-10m)	-0.394	-0.335	-1.020*	-0.891*
	(0.410)	(0.373)	(0.403)	(0.391)
R square	0.157	0.185	0.131	0.142
N		1,420		
Rural environment				
Kinship ties	-0.017	-0.013	0.007	0.012
	(0.020)	(0.018)	(0.021)	(0.021)
Social activity ties	0.012	0.024*	-0.018	-0.012
	(0.012)	(0.011)	(0.013)	(0.013)
Safety ties	0.091***	0.028	0.082***	0.065**
	(0.020)	(0.018)	(0.020)	(0.020)
Core discussion ties	0.001	0.009	-0.002	0.005
	(0.018)	(0.016)	(0.018)	(0.018)
Pct. Kin ties(0-2m)	0.688	0.317	1.227*	0.673
	(0.552)	(0.496)	(0.563)	(0.567)
Pct. Kin ties(2-10m)	0.618	0.193	0.886+	0.475
	(0.456)	(0.410)	(0.467)	(0.468)
Pct. Social ties(0-2m)	0.205	0.370	0.397	0.340
	(0.513)	(0.461)	(0.525)	(0.530)
Pct. Social ties(2-10m)	-0.654	0.238	-0.129	0.293
	(0.483)	(0.438)	(0.490)	(0.494)
Pct. Safety ties(0-2m)	0.490+	0.478+	0.053	0.284
	(0.288)	(0.260)	(0.295)	(0.298)
Pct. Safety ties(2-10m)	0.309	0.248	-0.021	-0.075
	(0.304)	(0.277)	(0.310)	(0.311)
Pct. Core ties(0-2m)	0.036	-0.249	-0.161	-0.025
	(0.508)	(0.456)	(0.519)	(0.525)
Pct. Core ties(2-10m)	0.246	-0.057	0.204	0.025
	(0.466)	(0.416)	(0.479)	(0.475)
R square	0.155	0.133	0.118	0.106
N		2,217		

Note: We control for all ego and neighborhood characteristics variables in Table 1 (except for urban) in all models, but only present coefficients of network measures to save space. Standard errors in parentheses. + p<.10, * p<.05, ** p<.01, *** p<.001