

The Built Environment and Social Interactions: Evidence from Panel Data

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Abstract

It has been argued by Jane Jacobs (1961) and others that the built environment has a causal effect on social engagement. Using a rich panel data set this paper explores the relationship between the built environment - measured as neighborhood walkability, county density, and average neighborhood sociability - and social interactions. Results show a strong and positive cross-sectional relationship that is consistent with the work of Jacobs and with previous literature. However, the location decisions of individuals are not random and may be impacted by unobservable propensities to engage socially and to live in socially conducive (i.e. walkable/high-density) neighborhoods. This endogenous relationship is addressed by employing a first-difference specification that exploits the panel nature of the data set. The cross-sectional relationship with social interactions disappears for both neighborhood walkability and density, while the relationship between own sociability and average neighborhood sociability persists. This suggests that socially inclined people are sorting into more walkable, high-density, neighborhoods, with this sorting generating the cross-sectional relationship between the built environment and social interactions.

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1 Introduction

How the features of one's neighbourhood can be conducive to social interactions and foster social engagement has long been a question of theorists, activists, and policy makers alike. Some of the more prominent discussions around the subject have come from Jane Jacobs (1961) who criticized urban planning practices as not catering to the needs of the residents, Robert Putnam (2000) who criticized sprawl for destroying civic engagement, and Mancur Olson (1965) who saw high-density neighbourhoods as contributing to free-rider problems in the provision of public goods. Lacking conclusive evidence, the optimal design of neighbourhoods is still the subject of debate.

Jane Jacobs has written extensively on the potential benefits of a built environment that fosters social engagement. In particular, neighbourhoods should be designed to generate interactions between residents from different socio-demographic backgrounds by bringing people into contact on the streets. If neighbourhoods do not provide grounds for social interaction and engagement, the civic interests of the more advantaged members will persist. All over the world city planners are redesigning neighbourhoods to decrease traffic and congestion and increase green-space and walkability with the intention of increasing community involvement - a Jacobs-esque idea of getting people out of their houses and onto the streets.

In New York City between 2007 and 2009, the NYC Department of Transport hired an architecture firm to transform the car-heavy infrastructure surrounding Times Square to one with a people-centered design. As a result of the redesign and reappropriation of inefficiently used spaces, more people in NYC are out on the streets, which are now viewed as safer and less congested.¹ While this is undoubtedly a desired outcome, this paper questions whether having these new public spaces actually *causes* people to interact more (and subsequently become more involved in their community). Previous literature has often concluded that because more walkable communities have more social interactions on average, these walkable communities cause more social interactions.² Indeed, many cities undergoing changes similar to those in New York City, list increased social interactions as a benefit of a more walkable community.

Clearly walkable communities facilitate social interactions, but perhaps they are just changing

¹For more on this: <http://gehlarchitects.com/cases/new-york-usa/> - The architecture firm responsible for transforming NYC streets. They have undertaken similar projects in Brighton, UK, Carlsberg, Denmark, and Mexico City, Mexico, to name a few.

²Previous cross-sectional studies include, French et al. (2013), Leyden (2003), Maas (2006) and Wood et al. (2008).

where and how people interact as opposed to whether or how often they interact. It is important to recognize that the location decisions of individuals are not random and may, at least in part, be driven by unobservable propensities to be around a certain group of people, or to engage in particular behaviours. As such, previous estimates of the social interaction effects attributed to environmental characteristics likely suffer from endogeneity due to this sorting of social people into socially conducive neighbourhoods. Thus far, only a handful of papers have addressed this issue of endogeneity.

In a recent paper by Brueckner and Largey (2008), the authors look at the relationship between social interactions and population density. Using density at the MSA level as an instrument for density at the census tract level, they estimate a negative effect of urban density on social interactions. This result contradicts Putnam's critique of suburbs as destroying social capital relationships. In similar work, Borck (2005) looks at the relationship between city size and social interactions, consumption opportunities, and group memberships. Using lagged population density as an instrument for current population density, results are largely ambiguous with some evidence of consumption externalities. Glaeser and Gottlieb (2006) also consider the impact of density on amenities, as well as civic engagement and political involvement. They conclude that although density is correlated with consumer amenities, there is no apparent relationship with civic engagement. This result is similar to Borck (2005) and is also in contradiction of Putnam's theory that urban sprawl destroys social capital relationships.

The present paper differs from these previous studies by utilizing an extensive panel dataset to address issues of endogeneity. Furthermore, while these previous papers primarily explore the relationship between social interactions and density, this paper also looks at the relationship between social interactions and access to amenities (i.e. neighbourhood walkability) as well as the relationship between own sociability and average neighbourhood sociability. As such, in addition to questioning Putnam's theories regarding density and social capital, I also question the theories of Jane Jacobs regarding the importance of neighbourhood walkability and interactions.

This paper also relates to a literature on neighbourhood effects which links built environment characteristics with either labor market outcomes (Andersson et al. (2014); la Roca and Puga (2012)) or improved mental health (Katz, Kling, and Liebman (2001); Ludwig, Duncan and Hirshfield (2001)). This second stream of literature largely attributes the positive effects of moving from a relatively poor to a less poor neighbourhood to decreased violence and increased safety on the

streets. Furthermore, a literature on social networks links social relationships with improved health outcomes by facilitating access to resources and information (Hawkley and Cacioppo (2010); Fiorillo and Sabatani (2011)), as well as with neighbourhood resiliency in the wake of natural disasters (Robert J. Sampson (2011)).³ Jane Jacobs would, at least partially, credit this impact to the built environment - stores, restaurants, schools, and parks (among others) encourage street interactions which will in turn make people feel more connected with those around them and create reciprocally rewarding relationships.

To explore the relationship between environmental characteristics and social interactions, this paper first estimates the cross-sectional relationship, and then addresses endogeneity using a first-differences econometric specification that focuses on how changes to neighbourhood characteristics will affect social interactions. Given the panel nature of the dataset, this is the first paper to explore this question using a first-differencing econometric specification.⁴ First-differenced equations are estimated for three distinct subsets of the population; those who have not moved over the sample period ('stayers') - providing time series variation in the built environment over time - and those who have moved both within counties and between counties ('movers') - providing variation to the built environment following the move. To reiterate, the environmental characteristics of interest are: access to various neighbourhood common spaces within a one kilometre radius of one's home ('walkability index'),⁵ county density,⁶ and the average county sociability - measured as the portion of a county falling in either the top 30 percent or the bottom 30 percent of the entire country's social interactions distribution.⁷

I find a strong and positive cross-sectional relationship that is consistent with the work of Jane Jacobs and with previous literature. However, after controlling for observable characteristics and time-invariant unobservables, the physical built environment (measured as neighbourhood walka-

³Refer to the chapter by Durlauf and Fafchamps (2005) for a summary of the social capital literature. Also, Blume et al (2010).

⁴This approach has been applied in other contexts, see Eid et al (2008) and Galster et al (2008) but to the best of my knowledge has been absent from the literature looking at determinants of social interactions. Borck (2005) includes estimates using fixed-effects however, as previously mentioned, he explores a different research question.

⁵In the analysis, results are presented for a summation of all environmental features within a one kilometer radius of one's home. These include, parks, shops, restaurants, public schools, kindergartens, transit, sports centers, doctors' offices, youth centers, and old age homes. I will discuss the difference between these features in terms of their direct and indirect influences on interactions.

⁶Throughout this paper I use 'county' and 'neighbourhood' interchangeably. Aside from self-reported access to certain amenities, all of my data is at the county level.

⁷Average sociability gives rise to the topic of peer effects and the Manski reflection problem (Manski, 1993). To those concerned about peer effects impacting my results, I would argue that the large geographic area is unlikely to be an accurate representation of one's peer group. An individual is more likely to identify with those at the localized neighbourhood level, as opposed to the more aggregated county level.

bility and county density) appears to have no causal impact on social interactions. Interestingly, the social built environment (average neighbourhood sociability) remains a significant predictor of own sociability. These results are consistent with sorting behaviour; it appears that individuals are sorting into bigger neighbourhoods (in terms of density and access to amenities) due to unobservable characteristics (e.g. propensities to be social) and that this sorting is generating the cross-sectional relationship.

The remainder of the paper is organized as follows. Section 2 presents a simple conceptual framework within which to think about the relationship between social interactions and the urban environment. This is followed by Section 3 which presents the analogous empirical framework. Section 4 discusses the dataset and the creation of the social interaction variables of interest. Baseline cross-section and first differenced results are presented in Section 5 which also includes an extension looking at alternative specifications. Section 6 concludes with policy implications.

2 Conceptual Framework

2.1 Social Interactions as a Production Function: Quality and Quantity of Social Interactions

In this section I present a preliminary theory of the decision to socially interact and the influence of the environment on this decision.⁸ In this simple framework it is assumed that an individual derives utility from social interactions (among other things) and that utility is increasing in social engagement. Given this premise, environments that are conducive to social engagement are optimal. I consider both quality and quantity of social interactions. Both are desirable (since they both increase utility) however, due to the social-psychological benefits from groups and networks, quality relationships are preferred and provide a larger marginal benefit from any given interaction. The purpose of this framework is to reconcile the results of previous literature as well as the difference between the cross-sectional and first-differenced results.

Before formalizing the theory, the ambiguity in the environmental impact on social interactions can be characterized as follows. Higher quality interactions come about from repeated interactions. I assume that the more frequently two individuals interact, the closer they become in each other's

⁸This paper does not explicitly model the decision to invest in social capital as per the work of Glaeser et al (2002). Rather it assumes some underlying decision process that is affected by the built environment.

social network. For simplicity, assume that the probability that an individual visits a common space, say a park, is a function of the distance to the park;⁹ as distance increases, the cost to visiting increases. However, the probability of repeated interactions within the park is a function of the quantity of people who frequent the park;¹⁰ as the number of people increases beyond some threshold, the probability of interacting with any one person decreases. Given this, I propose that quality social interactions depend on access and population density.

Similarly, the quantity of social interactions also depends on access and population density. As the number of people in a neighbourhood increases (i.e. density increases), spontaneous community interactions increase. Furthermore, assuming each individual faces the same incentives regarding costs and distance, when distance decreases the probability of visiting increases for everyone and so quantity increases. As was previously mentioned, where the quantity and quality of social interactions differ is in the marginal benefit to the individual; quality interactions confer a higher benefit to the individual.

Therefore, I consider two potentially competing mechanisms through which social interactions are determined: distance to the common space and the density of the neighbourhood itself. The quantity of social interactions are decreasing in distance and increasing in density. Quality of social interactions are decreasing in both distance and density.

The reduced form equation for the ‘production’ of social interactions (SI) is as follows:

$$SI_{it} = f(A_{it}, D_{it}, R_{it}, \sum_{j \neq i} R_{jt}) = f(\text{Quality}SI_{it}, \text{Quantity}SI_{it})$$

where, A_{it} are the amenities (i.e. access to common spaces/neighbourhood walkability) of individual i 's neighbourhood at time t . D_{it} is the density of individual i 's neighbourhood at time t . R_{it} is one's own sociability, and $\sum_{j \neq i} R_{jt}$ is the sociability of everyone else in person i 's neighbourhood. Own sociability, R_i , will be affected by observable characteristics such as age, education, and income, as well as unobservable characteristics such as extroversion or introversion.¹¹

⁹There are obviously many other factors that determine the probability of visiting. For example, labor force status and leisure time, income, and health. These observable characteristics will be addressed and controlled for in the empirical section.

¹⁰See previous footnote.

¹¹Helsley and Zenou (2014) develop a theory for social interactions in cities considering the networks of the interacting individuals. When agents can choose their location, there is a tendency for those more central in the network to locate more centrally in the city. This would imply an endogenous relationship between location and social interactions. While the present paper does not look explicitly at the networks of an individual, there is an

The cost to the production of social interactions comes from distance, travel time, or the probability of interaction. I allow the optimal social interactions for individual i to be updated each period given any changes to individual or environmental characteristics in the present.¹² To illustrate more formally the channels through which the environment impacts social interactions, I first consider density and then common spaces.

2.2 The Role of Density

Clearly quantity of social interactions are increasing in density. However, I propose that quality of social interactions are increasing to a threshold (\bar{n}), beyond which they decrease. This is in support of the ‘alienating city’ hypothesis.¹³ The derivative of social interactions with respect to density (n), can be expressed as:

$$\frac{\partial SI_i}{\partial n} = \begin{cases} > 0 & \text{if } n < \bar{n} \\ \leq 0 & \text{if } n \geq \bar{n} \end{cases}$$

Figure 1 depicts the marginal cost (MC) and the marginal benefit (MB) of social interactions for a given individual. The initial equilibrium is indicated by point A. Consider first an individual who moves to a higher density neighbourhood. Given that density has increased, the marginal cost of social interactions has decreased (MC to MC'). This decrease is due to either an increased probability of repeat interactions or simply a larger quantity of people and therefore less required effort to interact with any one person (two potential ‘costs’ to social interactions).

If the marginal benefit remains unchanged, the estimated impact of an increase in density on social interactions should be positive (a move from point A to point B). However, if following a move, it becomes harder to engage in quality relationships, we may actually see the marginal benefit decrease (MB to MB'). The overall benefit of social interactions are lower as they contribute to quantity of, as opposed to quality of, social interactions. As can be shown in Figure 1, this could result in an increase or a decrease in social interactions depending on the relative magnitude of the shift in the MB and MC curves.

element of disentangling this endogeneity from the impact of the built environment.

¹²This updating of preferences implies that if environments are changing slowly I shouldn’t see sharp behavioural changes one period to the next. As I will discuss in the next section, this is supported by the data.

¹³This can be thought of as the Kuznets curve with respect to social engagement and density. Works looking at optimal city size and social alienation include: Geis and Ross (1998), Hitzschke (2011), and Parker (1978).

This heuristic analysis displays the potential ambiguity that arises in the estimation of social interactions. If we allow for peoples' unobservable characteristics to influence the marginal benefit derived from social interactions, the effects estimated cross-sectionally are biased upwards. How this bias plays into the empirical estimation is discussed further in the next section.

The implications of density on social interactions are thus as follows. In the absence of controls for unobservables, I should expect to see that as density increases social interactions increase. Evidence in support of the alienating city hypothesis would find a negative relationship as density increases beyond some threshold (i.e. negative in the quadratic).¹⁴

2.3 The Role of Access to Common Spaces

There are two types of neighbourhood common spaces that I consider - those that directly affect social interactions (i.e. parks) and those that indirectly affect social interactions (i.e. restaurants) - both of which contribute to the walkability of a neighbourhood. Spaces that indirectly affect social interactions are a proxy for density such that the more people there are in a neighbourhood, the more shops and restaurants the neighbourhood's population can support.¹⁵ These spaces are likely to affect the quantity of social interactions (spontaneous socialization) and indirectly increase community involvement.¹⁶

Graphically depicted, Figure 2 considers first a supply side increase (MC to MC'). If an individual moves and access to common spaces increases, the marginal cost in terms of travel time has decreased (analogous to a supply side increase). Now, if we consider only this supply side effect following a move, the estimated impact on social interactions will be positive (a move from point A to point B). However, there may be demand side effects as well. In particular, if the marginal benefit from interaction increases (MB to MB') then we should still see a positive impact on social interactions. For example, a new park may bring people into contact who otherwise may not have met. In this sense, a new park raises the potential to form a quality-type relationship. On the other

¹⁴This density relationship is reminiscent of Putnam (2000). He argues that density should be preferred to sprawl given that sprawl destroys civic and social capital.

¹⁵As will be discussed in the Data section, I have data aggregated to the county level. I have county density and individual responses to access to certain amenities. Given that I do not observe where in the county an individual lives, this access variable likely provides a better measure of the respondent's actual built environment. Furthermore, the correlation between number of amenities and density in my data is approximately 67% and is statistically significant at the 1 percent level.

¹⁶Again, I do not explicitly model the decision to interact. In a paper by Helsley and Strange (2007), the authors develop a model where agents decide on visiting a location for the purpose of interacting. As per the assumption of their model, the greater the aggregate number of visits, the greater the value from any given visit.

hand, if the marginal benefit decreases due to the density arguments previously discussed (MB to MB''), we revert to the case analyzed in Figure 1 and the impact becomes ambiguous. Therefore, the implications of access to amenities on social interactions are as follows. The quantity and quality of social interactions are decreasing in distance (which is an increase in cost) and increasing in neighbourhood sociability (which is an increase in marginal benefit).¹⁷ Empirical estimates which ignore this ‘demand’ side effect will overestimate the environmental impact on social interactions. The next section translates this conceptual framework to empirics.

3 Empirical Framework

In my empirical estimation there are four types of social interactions that I focus on: (i) a measure of group or associational activities that involve a specific group of people (Group Interactions), (ii) frequency of interactions with family members (Family Interactions) (iii) frequency of interactions with neighbours (Neighbour Interactions), and (iv) a measure of the respondent’s involvement in the community outside of her house (Community Interactions).

In estimating the relationship between each of these types of social interactions and environmental characteristics there is the possibility that an individual’s unobserved characteristics, among which is his unobservable propensity to engage in social activities, are driving some of the results. With this in mind, the ideal model I would like to estimate for individual i in county c at time t can be formally expressed as:

$$\begin{aligned} \text{Social Interactions}_{ict} &= \alpha + \beta N_{ct} + \Gamma X_{it} + \epsilon_{ict}, & t = 1, \dots, T \\ &\rightarrow \epsilon_{ict} = \delta_i + \delta_{it} + \eta_c + \eta_{ct} + \mu_{ict} \end{aligned} \tag{1}$$

where, N_{ct} is a vector of neighbourhood characteristics that describe the built environment of the county that individual i resides at time t (this includes my variables of interest: access to amenities, density, and average neighbourhood sociability). X_{it} is a vector of observable individual characteristics and ϵ_{ict} is the error term comprised of unobservable time-invariant and time-variant individual characteristics (δ_i and δ_{it} , respectively), unobservable time-invariant and time-variant

¹⁷This is in the vein of Jacobs (1961), which exhibits a preference for public spaces within walking distance as a necessity for community engagement.

county characteristics (η_c and η_{ct} , respectively), as well as an idiosyncratic error term (μ_{ict}).¹⁸ In a cross-sectional estimation, δ_i , δ_{it} , η_c , and η_{ct} are assumed to be zero. However, by omitting them from the estimation equation the coefficient on location characteristics will be biased upwards if individuals with a propensity to be social locate in high-density neighbourhoods or within walking distance to a number of amenities. Similarly, if there are unobservable characteristics of a county that affect both social interactions and access to amenities, cross-sectional estimates will be biased upwards. In addition to my differencing specifications, these unobservables should be largely incorporated into my variable for average county sociability.¹⁹

I address this bias by using a first-differencing specification that focuses first on the time-series variation in the environment of those who do not move over the sample period ('stayers'), then on both movers within counties and movers between counties.²⁰

3.1 First Differencing

Consider an individual in periods t and $t-1$. By differencing (1) with respect to time, I obtain:

$$\begin{aligned} \text{Social Interactions}_{ict} - \text{Social Interactions}_{ict-1} \\ = \alpha - \alpha + \beta(N_{ct} - N_{ct-1}) + \Gamma(X_{it} - X_{it-1}) + \epsilon_{ict} - \epsilon_{ict-1} \end{aligned} \quad (2)$$

or,

$$\begin{aligned} \Delta \text{Social Interaction}_{ict} &= \beta \Delta N_{ct} + \Gamma \Delta X_{it} + \Delta \epsilon_{ict}, & t = 2, \dots, T \\ \rightarrow \Delta \epsilon_{ict} &= \Delta \delta_{it} + \Delta \eta_{ct} + \Delta \mu_{ict} \end{aligned} \quad (3)$$

where Δ denotes the time difference operator.

Note that differencing removes time invariant characteristics that are both observable and unobservable. For those who move between periods $t-1$ and t , the variation in their neighbourhood

¹⁸Assumed to be iid.

¹⁹As an additional check, I also run my specifications using county fixed effects (FE) with little-to-no difference in the results. County FE explicitly removes the county characteristics that are time-invariant.

²⁰An attractive feature of the differencing approach is that it removes the assumption of strict exogeneity of the error term; $E[\epsilon_{it}|\alpha, X_i, X_{it}] = 0$. Weak exogeneity simply requires, $E[\Delta X'_{it} \Delta \epsilon_{it}] = 0$ (Wooldridge, *Econometric Analysis of Cross-Section and Panel Data*, Second Edition, 2010). Similarly, in the presence of heteroskedasticity or serial correlation of the error term, first differencing is efficient. In the following estimations, standard errors are clustered at the county level to control for the possibility of serial correlation in the errors.

characteristics following a move can be used to analyze the impact of the environment on social engagement.²¹

As can be seen from equation (3) there could still be unobservable time-varying characteristics that I am not controlling for. By exploiting the time series variation in stayers' neighbourhood characteristics, given these individuals do not move, changes to county density and average neighbourhood sociability should be exogenous and uncorrelated with any unobserved time-varying individual characteristics.²² Furthermore, controlling for average county sociability should be capturing unobservables that are correlated at the county level with both the built environment and social interactions.

Because environmental changes occur slowly, for the 'stayers' I look at environmental changes over both a five year and a ten year period. For 'movers' (both within and between counties), I use changes in the social interactions one year after moving compared to one year prior to moving as well as five years after moving compared to one year prior.²³

As has previously been mentioned, the primary difficulty with estimating the environmental impact is the fact that individuals choose where to live and how many amenities to "consume" based on unobservable individual characteristics. If cities are full of people with high social capital, or high social propensities, we should see this in the sorting of highly social individuals into cities. In other words, residents of high-density neighbourhoods should be consuming higher levels of social interactions.

As I will show in the cross-sectional results, there is a strong positive correlation between an individual's social interactions and the county density. Therefore, individuals within high density neighbourhoods do on average have higher levels of annual interactions. Omitting individual propensities will bias the coefficients on urban characteristics if these individual effects are not randomly distributed across locations. If there is sorting behaviour of highly social people into higher-density neighbourhoods, I should find fairly insignificant results in my first-differenced spec-

²¹Over the 15 years of my sample, just over two percent of surveyed individuals move between counties per year; eight percent move within counties per year.

²²It could be argued that changes in access to amenities may still be correlated with time-varying unobservables if say individuals suddenly decide to be more social and lobby for a park nearby. I will speak to the direction of any residual bias in my results. Provided this does not happen frequently, my results should still be capturing the average effect.

²³If the move occurred at time t , I look at the difference between $t+1$ and $t-1$. Using the longer lag following a move allows for the possibility that it may take more than a year for interactive behaviours to change, given that social capital is very community specific.

ifications.

4 Data

4.1 The German Socio-Economic Panel

In order to estimate the effect of the built environment on social behaviours I construct a data set from the German Socio-Economic Panel (SOEP). The SOEP is conducted by the German Institute for Economic Research (DIW Berlin). The panel begins in 1984 in West Germany (FRG) and is being conducted annually with participation from households and individuals. As early as June 1990, the SOEP expanded to include the states from the former East Germany (GDR).²⁴

The standard SOEP dataset includes the German state in which the household is located. Remote access to county information for each individual and household is available through DIW.²⁵ While the regional dataset does include county data on area, unemployment rates, and average household incomes, the population data provided is only for 2009. To allow for an analysis with respect to population densities, I merge the SOEP dataset with population data from the Federal Statistical Office.²⁶ Population data is provided for years 1995, 2001, 2005, and 2011. This data provides me with my first measure of one's environmental characteristics: density. The second measure of the built environment comes from household access to common spaces, or the walkability of one's neighbourhood. The construction of these indicators is described in the next subsection.

In order to carry out my analysis of the social interaction effects of one's environment, I require information on interpersonal relationships as well as information on the frequency of various activities. In each wave of the survey individual respondents are asked how often they participate or engage in various activities with neighbours and family, groups and associations, as well as how often they go to the cinema, eat at restaurants, or utilize various other urban amenities.

In the regression analysis I control for a large number of socio-economic characteristics such as age, household income, education, labor force status, and marital status, as well as regional controls

²⁴For the purposes of this paper, I focus solely on those years following reunification and for which questions regarding household neighbourhood characteristics were asked (1994 to 2009). As a robustness check, I do exclude East Germany due to the possibility of differential perspectives on social engagement as compared to the West.

²⁵There are 16 states in total; 10 in West Germany and 6 in East Germany. There are currently 439 counties in Germany with 438 of them included in the dataset as of 2004. The average size of a county is 808 km^2 , with an average density of $539/\text{km}^2$.

²⁶<https://www.destatis.de/EN/Homepage.html>, and <http://www.citypopulation.de>

such as State and county median income. The full list of variables used as socio-economic and regional controls is shown in Table A1 of the appendix along with their definitions and descriptive statistics. The merged dataset spanning 1994 to 2009 consists of 145,455 observations for 25,806 unique individuals. Care has been taken by DIW to ensure a weighted representation of each county, proportional to its size. In the dataset there is an average movement rate within counties of eight percent per year and between counties of two percent per year. Six percent of the sample is included in all 15 years of the study and the average number of years of participation is seven. Table 1 shows the descriptive statistics for my independent and dependent variables of interest, each of which are discussed next.

4.2 The Measurement of the Built Environment

As mentioned, my primary measure of environmental characteristics comes from a household's access to amenities. In 1994, 1999, 2004, and 2009, there was an extended household survey that focused on neighbourhood characteristics. In particular, they ask how long it takes to walk to each of the following: shops, restaurants, family doctor, kindergarten school, primary school, youth center, old age home, park, sports center, and public transit. The respondent can answer less than 10 minutes, 10 to 20 minutes, greater than 20 minutes, or can not be walked to. Considering the total amenities that an individual can walk to within 10 minutes (approximately 0.8 kms) provides me a measure of the overall walkability of their neighbourhood - an index that lies between zero and 10 for each respondent. Less than nine percent of the sample has all amenities within a 10 minute walk from home, and approximately 30 percent has all 10 within a 20 minute walk.

Table 2 displays the time series variation in the environmental characteristics for those categorized as movers and stayers over the sample period; the values reported are the average at the county level. As can be seen, the built environment changes slower for stayers than for movers, and slower for movers within counties than for movers between counties. For those who move, I exploit these changes as a shock to the built environment and for those who do not move, I exploit the exogenous changes to the environment around them. The variability in access to these common spaces following a move, as well as the change in access over time for stayers, provides time-series variation in the built environment. The time series and panel characteristics of the dataset allow for a new analysis of the relationship between environmental characteristics and social behaviours.

4.3 The Measurement of Social Capital

Fukuyama (1995) offered three broad categories of social capital that are used in empirical works: voluntary community association activity, trust and informal cooperation, and quality of family relations. Consistent with this and previous literature, I categorize the questions on social interactions in the SOEP into four categories: (i) group involvement, (ii) familial relations, (iii) neighbour interactions, and (iv) general community involvement.²⁷

To measure social interactions with neighbours and family, from 1994 to 2009 respondents were asked how often they visit their neighbours, and how often they visit their family. To measure community involvement, respondents were asked how often they go out for dinner, to the cinema and concerts, to cultural events, and how often they attend social gatherings. Finally, group involvement or group memberships is measured as annual participation in local politics, volunteer work, attendance at church, and participation in sports.²⁸ From these survey responses I have created four social interaction indices to be used as separate dependent variables across the four types of interactions (i.e. groups, family, neighbours, and community). Table 3 shows the variation across the respondents in the SOEP in their year to year social interactions. As can be seen, movers (both within and between counties) show more variation in their yearly measures of social interactions than do stayers.

In addition to county density and neighbourhood walkability, I also consider the impact of the average sociability of one's neighbourhood on own sociability. To calculate average county sociability I take the entire distribution of social interactions across all counties in Germany. I then divide these into deciles and calculate the proportion of each county's population that falls into either the top 30 percent or bottom 30 percent of the distribution. The higher the percentage of the county's population falling in the top 30 percent compared to the average, the more relatively

²⁷In the paper by Brueckner and Largey (2008), they divide social interactions into those from neighbourhood contacts and friendship and those from group involvement. They use the following measures of an individuals' neighbourhood contacts and friendships: how often the respondent socializes with neighbours, the number of people the respondent can confide in, the number of close friends, the frequency of socializing with friends in a public place, and the frequency with which friends are invited to the respondent's house. To measure the respondent's group involvement they use: whether the respondent works with neighbours to make neighbourhood improvements, whether they are a member of a hobby-oriented club, the frequency of attendance at club meetings, and the number of non-church groups to which the member belongs. In the paper by Borck (2005), he focuses on questions around trust, close friendships, attitudes towards crime, as well as memberships in unions, professional bodies, staff councils, environmental organizations, and other club-type organizations.

²⁸Questions in the SOEP ask about the frequency of various activities: daily, weekly, monthly, or yearly. Answers are recoded such that daily corresponds to 4, weekly to 3, monthly to 2, yearly to 1 and never to 0.

socially engaged is the county.²⁹

The subsequent regression analysis allows me to quantify the effect of the built environment on the participation in social capital building activities; either interaction with family and neighbours, interaction with one’s community, or participation in groups or associational activities. For all types of interactions aside from perhaps family, it is reasonable to assume that the walkability to each of these should influence community engagement. The next section presents results from a pooled cross-section of the entire sample followed by the stayers subset and finally the movers subsets.

5 Results

5.1 Baseline OLS Results

The baseline OLS results from the pooled regression for all years and all individuals are presented in Table 4. I present the results for the indices of social interactions: interactions with groups (Panel A), family (Panel B), neighbours (Panel C), and the general community (Panel D). Table 5 presents a partial decomposition of these results into dependent variables of particular interest - local political involvement, volunteer work, time spent with neighbours, and time spent attending social events - and neighbourhood characteristics of interest - shops, primary schools, and parks. I also include the results using ‘distance to’ as opposed to the dummy amenity variable.³⁰ The full decomposition for all possible combinations of interactions and environmental characteristics is presented in Tables A2 and A3 of the Appendix.

Looking at Table 4, the cross-sectional results for the built environment’s impact on all measures of social interactions are very significant and positive. This is true even after controlling for socio-demographic characteristics and regional controls.³¹ This is consistent with the previous literature that has looked at the correlation between the environment and social engagement. Column (2) shows some evidence of an inverted-U shape relationship with respect to density, which was predicted in my conceptual framework. For most types of social interactions (except family)

²⁹As was previously mentioned, controlling for this average county sociability should capture most unobservable time-varying county characteristics.

³⁰Distance to ranges from a 10 minute walk to inaccessible (approx. 0.8kms to beyond 1.6kms).

³¹Note: To check for reporting bias (i.e. that those who use certain amenities may have a more accurate estimation of the distance from their home) I run the same regressions using county averages. Overall, the magnitudes of the coefficients decrease slightly but there is no change to the significance of the results.

the coefficient on density is significant and positive whereas the coefficient on density-squared is significant and negative.³²

Given the discrete nature of the dependent variables, the coefficients do not have an immediately straightforward interpretation. In Panel A, column (4) of Table 4, the coefficient of 0.025 on neighbourhood walkability represents a positive and significant effect where, for a one standard deviation change in neighbourhood walkability, social interactions with groups should have a corresponding increase of 0.032 of a standard deviation. An individual with all 10 amenities compared to an individual with zero, will have on average 10 percent of a standard deviation more social interactions with groups.

Tables A2 and A3 of the appendix provide an extensive breakdown of both the social interaction indices and the environmental characteristics. Table 5 presents a subset of the results found in Table A3. I highlight the impact of shops, primary schools, and parks, on political involvement and volunteer work (subsets of *Group Interactions*), time spent with neighbours, and time spent at social community events (a subset of *Community Interactions*). For most types of social interactions I find that each of the environmental features have a positive and significant effect.³³ This is particularly true for access to parks. I find that an individual with a park within walking distance of home (compared to one without) is more likely to visit with neighbours, attend community social events, conduct volunteer work and even participate in local politics. These results support the Jane Jacobs perspective of urban design - walkable neighbourhoods are correlated with community involvement.

The final point I will make with respect to the cross-sectional results regards average neighbourhood sociability. Recall, ‘% in the top third’ reflects the portion of a respondent’s county that falls in the top 30 percent of the country’s distribution of social interactions. Similarly, ‘% in bottom third’ reflects the portion that falls in the bottom 30 percent of the distribution.³⁴ Across all specifications, aggregated and otherwise, the coefficients on average neighbourhood sociability are

³²People with a lot of amenities around them are likely to be located more centrally in the city than someone with one or two amenities. Therefore, the walkability index can be thought of as a proxy for urban location. It is interesting to note that when I include both access to amenities (walkability) and density, the significance on density often disappears. This is potentially due to the fact that this aggregate amenity measure is partially estimating a density effect on social interactions.

³³Local political involvement is largely unaffected by the environmental characteristics. In the German SOEP, the average time spent in local politics is less than any other measure of social engagement. It would be interesting to look at this relationship in a more politically active population. Although, Glaeser and Gottlieb (2006) found similar results for the relationship between density and civic involvement in the US context.

³⁴In all specifications, I control for the top third and the bottom third, with the middle third being the excluded category. Therefore all coefficients are in comparison to this middle third.

significant and positive at the one percent level. This suggests that the distribution of individuals with low, middle, and high levels of sociability within a county is correlated with a resident’s own sociability.

The overall strong positive and significant results on access to amenities, and in particular parks and shops, may seem appealing from a policy perspective. However, these estimates are likely contaminated by endogenous factors. It could be that unobservable characteristics are affecting both an individual’s social interactions as well as their location choice. For example, if more social people choose to live near parks, the estimated impact of parks on social interactions will be biased upwards. The next two subsections address this issue using first differences for both the sample of non-movers (‘stayers’) and the sample of movers.

5.2 First Differences of Stayers

Table 6 presents the first differenced results for those who have not moved over the sample period (‘stayers’). Using the time-series variation in a stayer’s environment I difference over five and 10 year intervals, reporting the 10 year intervals - the differences between 1999 and 2009. All regressions include year dummies to allow for contemporaneous effects, as well as state fixed effects. Columns (3) add individual controls and columns (4) add regional controls.

As the econometric framework laid out, this first-differencing removes unobservable time-invariant individual characteristics. Given that individuals are rational and evaluate their optimal environment in every period, changes to their environment should be exogenous to own location decisions. The results in Table 6 show that much of the significance found in the cross-sectional regressions is no longer apparent.³⁵ For each of, interactions with groups (Panel A), interactions with family (Panel B) and neighbours (Panel C), and interactions with the general community (Panel D), I do not find any significance on access to amenities (neighbourhood walkability). However, as with the pooled cross-section, I find that increasing a neighbourhood’s average sociability will increase an individual’s own sociability. This result also holds when I decompose the social interaction indices into their component parts.

Tables A4 and A5 of the Appendix present the breakdown by types of interactions and neighbour-

³⁵As with the cross-sectional results, access to amenities are self-reported and may not be accurate one period to the next. To try and address this, I also used county averages (as I did in the cross-section). The results from the regression of county averages are largely the same. As part of my robustness checks I perform the same analysis over various sample restrictions with little to no change.

hood characteristics for changes over 10 years. Table 7 presents a subset of the results found in Table A5, for changes in distance to parks, schools, and shops over time. The significant results found in the pooled cross-section have for the most part disappeared after controlling for unobservable characteristics which could have caused these individuals to move closer to amenities or to high-density neighbourhoods.³⁶ This implies that the unobservable propensity to socialize is likely contaminating previous results and that the environment does not play much of a role in fostering social engagement.³⁷ This contradicts the views of Jacobs (1961) - urban planning practices focused on the placement of shops, parks and public schools (among other things) to generate social engagement may not actually be very effective. Furthermore, whereas Brueckner and Largey (2008) find a negative effect of density on social interactions, I find no significant effect (although an often negative coefficient). While, these differences could be largely due to an analysis on very different populations, it is interesting that both of our attempts to address endogeneity have refuted cross-sectional results.

These results, compared to those found in the pooled cross-section, provide evidence of sorting behaviour by more social individuals into high-density neighbourhoods. One concern still inherent in these estimates for stayers is that changes in a county's environmental characteristics happen very slowly (beyond 10 years). Therefore, in the next section I look at those who move; first, those who move within a county and second, those who move between counties.

5.3 First Differences of Movers

5.3.1 Movers within a County

Approximately eight percent of the respondents in the SOEP dataset move within counties per year. I exploit the change in the environment following a move to estimate the impact of environmental characteristics on social interactions. The decision to move is not random and individuals who value social interactions may move closer to amenities or to higher density neighbourhoods. As

³⁶Interestingly, as a check, I also run an undifferenced pooled cross-section for the five and 10 year restricted 'stayers' sample. The results are largely similar to those of the pooled cross-section for all years, both in magnitude and significance.

³⁷As an alternative check on the non-randomness of location choice, I look specifically at the regression of social interactions on environmental characteristics for children who have entered the SOEP survey upon turning 17 but who have not moved from their parents' house, I have 1193 observations for 1097 individuals. I find no significance on access to amenities or on density, or density squared. This is true for interactions with family, with neighbours, with the community and with groups.

with the stayers I look at the difference over two time periods. First, I consider one year following a move compared to the year prior to moving.³⁸ Second, I consider five years following a move compared to one year prior to moving. For brevity, I report the differences one year following a move given that the results do not change when I extend to the differences over five years.

It should be noted here that although the stayers are analyzed using own responses to the built environment questions of the questionnaire, the movers are analyzed using county average responses.³⁹ I use county averages because the built environment questions were only asked in 1994, 1999, 2004, and 2009. Therefore, given that people move outside of these years, a move in say 1995 would not have the individual's own responses to environmental questions until 1999, four years after their actual move and this would drastically reduce the sample size.

Table 8 presents the main results and is analogous to Table 6 for the stayers. The first four columns present the first differences for one year after moving compared to one year prior for *Group Interactions*, followed by *Family*, *Neighbours*, and the *Community*. Overall, I find no significant impact of access to amenities on any of the social interactions indices, nor on any of their component parts (Table A6 of the appendix). Table A7 of the Appendix presents the complete first-difference results for each type of interaction and environmental characteristic, analogous to Table A5 for the stayers. Table 9 presents a subset of these results for changes in local political involvement, volunteer work, time spent with neighbours, and attending community social events.

Interestingly, I now find that neighbourhood walkability significantly affects political involvement and interactions with neighbours. The significant result for politics is coming largely from schools. While this is potentially interesting, these effects disappear when looking at movers outside of counties in the next subsection.

The most interesting results are again on my measures of average neighbourhood sociability. As with the stayers subsample I find a significant and positive result for those in the top 30 percent of the distribution. While access to amenities and county density generally have no significant impact on social interactions, the sociability of one's neighbours does (in particular the average sociability of more social neighbours). This is consistent with the results for the 'stayers' and the next subsection shows that this is also true for movers between counties.

³⁸I exclude the year of the move due to a large number of missing values for social interactions in these years. Similarly, I do not have the month of the move in the current data set.

³⁹Given that the pooled cross-section and the stayers sample did not change when I replaced own-responses with county averages, I do not expect this to bias the results.

5.3.2 Movers between Counties

Approximately two percent of the respondents in the SOEP dataset move between counties per year. Table 10 presents the results for movers between counties and are analogous to those in Table 6 for the stayers and Table 8 for the movers within counties. As with the stayers and the movers within counties, I find an insignificant impact of an increase in neighbourhood walkability following a move on social interactions.

When considering the decomposition further into the specific features of the environment (Table A9, and Table 11), I again find no pattern or significance with any of the environmental variables. With respect to average neighbourhood sociability, I find positive and significant results for the percentage of individuals in the bottom 30 percent. When looking at the breakdown by the individual interactions, this effect is particularly strong for participation on sports teams and going out to eat or drink (Table A8).

So far, across the sample of stayers, the sample of movers within counties, and the sample of movers outside of counties I find no significant impact of either access to amenities or density on social interactions. As a final set of robustness checks I look at changes in access to amenities for more specific groups of respondents; specific both in terms of their geographic locations and their socio-demographic characteristics.⁴⁰ There could be certain people who have more time elasticity such that they can go to shops and parks more often. Alternatively, parents of young children are more likely to use schools and youth centers than those without children. In the next section I consider these possibilities.

5.4 Robustness/Specification Tests

Up to this point I have estimated the first differences for stayers, for those who move both within a county and for those who move between counties. In this section I now consider various splits of these original subsamples. In Tables A10 and A12 I present the first set of robustness checks for changes in the interactions of stayers over 10 years and changes in the interactions of movers between counties, respectively. The three panels of Tables A10 and A12 divide the results by

⁴⁰As a further specification test I considered looking at partners who move following a job change of their spouse. Unfortunately in the SOEP dataset there are a relatively small percentage of movers which implies an even smaller percentage who move for any one particular reason. When I look at this subset of the sample I am left with less than 100 observations. Therefore, I do not pursue this further at this point.

changes in *Group Interactions*, changes in *Family Interactions* and *Neighbour Interactions* and changes in *Community Interactions*.

First, columns (2) of Table A10 and A12 expands the access to 1.6 kilometers from home. For all three types of interactions the magnitude of the coefficients for each of access to amenities, density, and density-squared decreases. Next, I restrict the sample of stayers to those in East Germany, those in West Germany, and then I exclude Berlin (columns (3), (4), and (5), of Table A10).⁴¹ This allows me to explore persistent differences that may be present in either region and ensures that the large representation of Berlin in the sample is not driving the results. Overall the results are largely similar. For the movers I consider possible differences between Germans and non-Germans (columns (7) and (8) of Table A12). A very small percentage of the movers are non-German and so the results for the full sample of movers coincide with those for the German born.

For both the stayers and the movers I then divide the sample into those who experience increases in their access to neighbourhood amenities and those who experience decreases (Table A10 columns (6) and (7), Table A12 columns (3) and (4)). This is an attempt to look specifically at those who experience the biggest changes in their neighbourhood characteristics. Similarly, I look at those who faced the biggest top quarter increase in density and those who faced the biggest bottom quarter decrease in density (Table A10, columns (8) and (9), Table A12, columns (5) and (6)). For the stayers (Table A10), the only significance I find is with respect to interactions with neighbours and family. These results disappear when I consider the same changes for movers.

Next, I focus specifically on changes in access to shops, primary schools, and parks, for each of: respondents less than 40 years old, females only, parents of children less than 16 years old, and respondents who are either retired or on maternity leave. Each of these groups of people have different uses for certain amenities and different elasticities with respect to their time available to use either. Table A11 contains the results for the stayers, Table A13 contains the results for the movers. For the stayers, I find an overwhelming set of insignificant results over all sample stratifications. For movers between counties I find some significance of access to primary schools in increasing family interactions for individuals less than 40, females only, and those with young children. I also find that access to a primary school increases time spent in group interactions for individuals less than 40 and those with young children (Table A13). While this may seem

⁴¹For the movers, I considered looking at those who move between East and West Germany however, less than 100 people in the sample moved between the two.

interesting, the number of movers between counties who fall into each of these categories is quite small and this result may not hold in a larger sample.

Overall, the original results I present looking at changes in social interactions with groups, family and neighbours, and the general community, are very robust to alternative specifications and sample selections. Across all specifications for all groups of people, I find overwhelmingly insignificant results for the impact of environmental characteristics on social interactions. This indicates that the significance found in the pooled cross-section (in both my paper and in the previous literature) is contaminated by endogenous regressors and individuals with a propensity to be social are sorting into neighbourhoods with greater access to amenities or a higher density.

6 Conclusion and Discussion

The optimal design of the built environment aimed to facilitate social interactions and community engagement has a great deal of policy relevance and is still the subject of much debate and ambiguous results. Jane Jacobs criticized urban planners for not catering to the needs of the residents - walkable neighbourhoods with access to amenities are necessary for social interactions. Robert Putnam criticized urban sprawl as destructive to social and civic engagement. In this paper I provide a conceptual framework to characterize the decision to socially interact, considering how environmental characteristics affect this decision. Following this, I empirically estimate the relationship between urban form and social interactions considering three characteristics of one's environment - neighbourhood walkability (i.e. access to amenities), county density, and the average neighbourhood sociability.

In a pooled cross-section, results corroborate previous literature - social interactions are significantly and positively correlated with neighbourhood walkability and density. However, the location decisions of individuals are not random and will be influenced by unobservable attributes, such as the propensity to be social. These unobservable propensities may cause people to sort into more social neighbourhoods, or neighbourhoods that have more street level interactions. To address this issue of sorting, I employ a first-differences specification over different subsets of the population - stayers, movers within counties, and movers between counties.

The significant effects found in the cross-section disappear for both access to amenities and county density. This implies that the cross-sectional results of previous research are subject to endogeneity

bias and that there is sorting by relatively social individuals into high-density neighbourhoods or cities. That said, in the differenced estimates, the results for ‘average neighbourhood sociability’ remain consistently positive and significant. This provides evidence that the composition of individuals in a neighbourhood matter more than the physical, built features of the environment at generating interactions. These results should be viewed with caution, however; while the first differencing has allowed me to address sorting behaviours, it does not allow me to make definitive statements as to the causal relationship between the built environment and social interactions.

For all types of social interactions, including those with family and neighbours, those with the general community, and involvement with more formal groups, I find that the built environment itself appears to have no quantitative impact on social interactions whereas the composition of one’s neighbours (in terms of average sociability) does. That said, having locations for people to interact (such as parks) is undoubtedly important - not as a causal determinant of changes in neighbourhood interactions but rather as a correlate. Furthermore, there are any number of benefits derived from a more walkable community including safety, a sense of connectedness, improved health, and aesthetic appeal, which should not be disregarded. So, while I may not find a significant relationship between the built environment and social interactions specifically, there are a number of other positive benefits whose true relationship requires further investigation.

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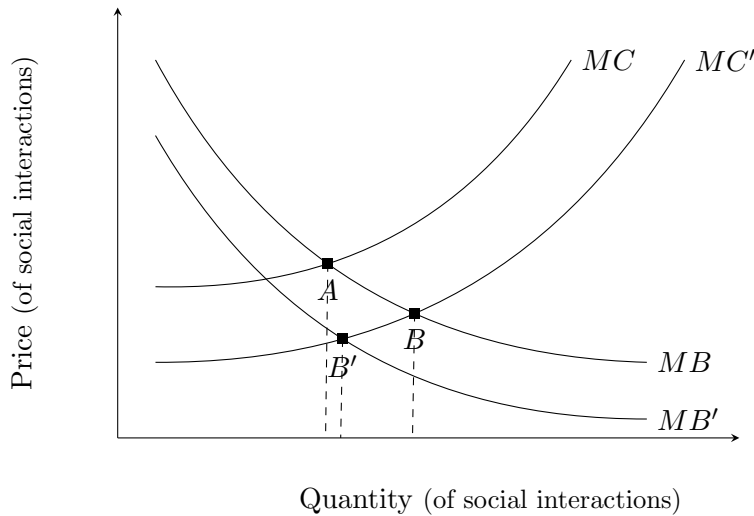


Figure 1: The Impact of a Change in Density on Social Interactions

The above figure shows the potential ambiguity in the relationship between density and social interactions. Assuming that there is a price to interacting socially (e.g. travel costs), when density increases (say, following a move), the marginal cost of interacting decreases (MC to MC'). If there is a corresponding decrease in the marginal benefit of interacting (say, a decrease in quality interactions) then the resulting change in the quantity of interactions is ambiguous.

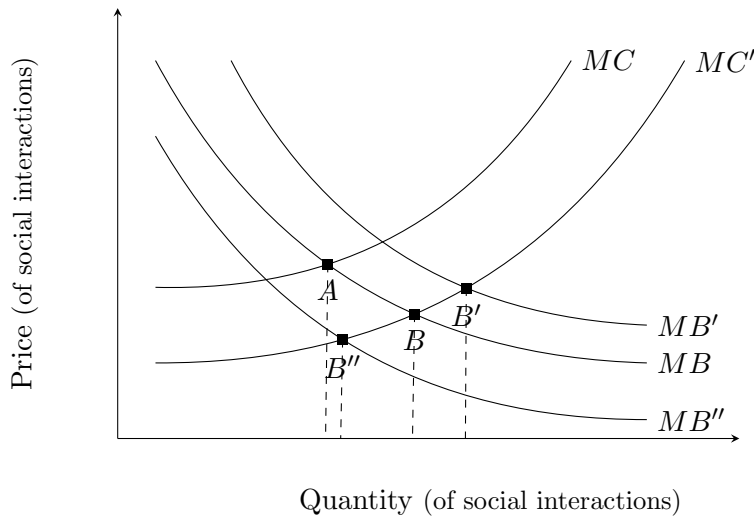


Figure 2: The Impact of a Change in Amenities on Social Interactions

The above figure shows the potential ambiguity in the relationship between access to amenities and social interactions. Assuming that there is a price to interacting socially, when access to amenities increases (say, following a move), the marginal cost of interacting decreases (MC to MC'). If there is a corresponding increase in the marginal benefit of interacting (MB to MB') then there is an unambiguous increase in the quantity of social interactions. If, however, there is a decrease in the marginal benefit, the impact becomes ambiguous.

Table 1: Descriptive Statistics for Measures of Social Interaction and Measures of the Built Environment

Variable	Definition	Mean	S.D.	Min.	Max.
<i>Dependent Variables</i>					
Total Interaction	participation in any activity, 1994-2009	12.77	4.45	0	33
Group Interactions	group participation, 1994-2009	2.75	2.36	0	16
politics	participate in local politics (d/y)	0.16	0.49	0	4
volunteer	perform volunteer work (d/y)	0.56	1.00	0	4
church	attend church (d/y)	0.82	0.99	0	4
sports	participate in sports (d/y)	1.22	1.31	0	4
Neighbor Interactions	visiting neighbors (d/y), 1994-2009	2.23	0.91	0	4
Family Interactions	visiting family (d/y), 1994-2009	2.33	0.95	0	4
Community Interactions	community presence, 1994-2009	5.45	2.28	0	14
drinks	going out for dinner/drinks (d/y)	1.62	0.96	0	4
cinema	going to cinema/concerts (d/y)	0.87	0.84	0	4
cultural	attending cultural events (d/y)	0.82	0.72	0	4
social	attending social gatherings (d/y)	2.14	0.82	0	4
<i>Environmental (Independent) Variables</i>					
AM 0.8km	amenities within 0.8km (\approx 10 min walk)	5.04	2.97	0	10
AM 1.2km	amenities within 1.2km (\approx 10-20 min walk)	7.77	2.47	0	10
AM 1.6km	amenities within 1.6km ($>$ 20 min walk)	8.71	2.05	0	10
park	distance to park (km)	0.97	0.26	0	1.6
kindergarten	distance to kg school (km)	1.01	0.26	0	1.6
primary school	distance to primary school (km)	1.03	0.27	0	1.6
shops	distance to shops (km)	0.96	0.24	0	1.6
pubs	distance to restaurants (km)	0.92	0.23	0	1.6
doctor	distance to family doctor (km)	0.91	0.29	0	1.6
youth center	distance to youth center (km)	1.11	0.30	0	1.6
old age home	distance to old age home (km)	1.14	0.30	0	1.6
sports center	distance to sports center (km)	1.08	0.29	0	1.6
transit	distance to public transit (km)	0.86	0.15	0	1.6
cdensity	county density (county population/sq km)	795	1005	6	5600
city center	= 1 if house in city center, 0 otherwise	0.11	0.29	0	1
<i>Observations: 145,455</i>					
<i>Individuals: 25,806</i>					

Table 2: County Level Environmental Variation for Full Sample, Stayers, and Movers

Variable <i>differences over:</i>	Full Sample		Stayers		Movers (between)		Movers (within)	
	1 year	1 year	5 years	10 years	1 year	5 years	1 year	5 years
AM 0.8km								
average (county)	1.20	0.40	0.83	0.95	1.38	1.25	0.67	0.94
increase	(1.4)	(0.6)	(0.7)	(0.8)	(1.2)	(1.1)	(1.0)	(0.8)
average (county)	1.36	0.39	0.85	1.00	1.41	1.43	0.70	1.09
decrease	(1.6)	(0.6)	(0.7)	(0.8)	(1.2)	(1.2)	(0.8)	(0.9)
County Density								
average (county)	34.95	31.67	44.19	71.72	1070.61	879.40	90.85	118.18
increase	(252.5)	(212.3)	(267.0)	(343.6)	(1051.4)	(1002.9)	(392.5)	(443.8)
average (county)	25.21	24.63	43.66	40.79	1071.08	980.25	158.43	179.73
decrease	(225.8)	(218.4)	(289.9)	(62.7)	(1074.4)	(1094.4)	(534.4)	(531.9)
Observations:	119,646	74,309	9,009	2,546	1,190	950	6,398	3,283

Table 3: Variation in Social Interactions for Full Sample, Stayers, and Movers

Variable <i>differences over:</i>	Full Sample		Stayers		Movers (between)		Movers (within)	
	1 year	1 year	5 years	10 years	1 year	5 years	1 year	5 years
Group Int's	-0.02	-0.03	-0.09	-0.02	-0.04	0.15	0.10	0.21
	(0.7)	(0.7)	(2.1)	(2.1)	(1.8)	(2.1)	(1.8)	(2.0)
Family Int's	-0.01	-0.01	-0.04	-0.08	-0.03	-0.06	0.05	-0.02
	(0.3)	(0.2)	(0.9)	(1.0)	(1.1)	(1.1)	(1.0)	(1.0)
Neighbor Int's	-0.02	-0.02	-0.09	-0.19	-0.12	-0.14	-0.09	-0.15
	(0.2)	(0.2)	(0.8)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)
Community Int's	-0.02	-0.01	-0.18	-0.32	-0.25	-0.57	-0.29	-0.37
	(0.6)	(0.5)	(1.5)	(1.9)	(2.0)	(2.0)	(1.8)	(2.1)
Observations:	119,646	74,309	9,009	2,546	1,910	950	6,398	3,283
Individuals:	20,104	11,746	6,483	2,546	1,658	791	5,287	2,698

Table 4: Baseline OLS Results for Interactions with Groups, Close Relations, and the General Community

<i>Dependent Variable</i>	Panel A Group Interactions (1994-2009)				Panel B Family Interactions (1994-2009)			
	(1)	(2)	(3)	(4) [†]	(1)	(2)	(3)	(4) [†]
<i>Independent Variables</i>								
Walkability	0.017* (0.009)		0.025*** (0.007)	0.025*** (0.005)	0.012*** (0.003)		0.016*** (0.003)	0.013*** (0.002)
Density (/1,000)		0.076 (0.110)	-0.224** (0.085)	0.012 (0.042)		0.017 (0.048)	-0.006 (0.046)	-0.033** (0.017)
Density ² (/100,000)		-0.001 (0.003)	0.003 (0.003)	-0.001 (0.001)		-0.001 (0.001)	-0.001 (0.001)	0.001** (0.000)
Average Sociability: % in top third				3.759*** (0.127)				1.174*** (0.054)
% in bottom third				-2.329*** (0.083)				-1.455*** (0.029)
<hr/>								
<i>Dependent Variable</i>	Panel C Neighbor Interactions (1994-2009)				Panel D Community Interactions (1994-2009)			
	(1)	(2)	(3)	(4) [†]	(1)	(2)	(3)	(4) [†]
<i>Independent Variables</i>								
Walkability	0.022*** (0.003)		0.015*** (0.003)	0.010*** (0.002)	0.071*** (0.009)		0.040*** (0.007)	0.033*** (0.005)
Density (/1000)		0.183*** (0.001)	0.090*** (0.001)	-0.028* (0.000)		0.481*** (0.105)	0.314*** (0.082)	0.006 (0.049)
Density ² (/100,000)		-0.004*** (0.001)	-0.002** (0.001)	0.001 (0.000)		-0.008*** (0.003)	-0.005* (0.002)	-0.000 (0.001)
Average Sociability: % in top third				0.948*** (0.088)				2.621*** (0.118)
% in bottom third				-1.409*** (0.036)				-2.809*** (0.120)
<hr/>								
Individual Controls			•	•			•	•
Regional Controls				•				•
Observations	145,455	145,455	140,710	140,710	145,455	145,455	140,710	140,710
Individuals	25,806	25,806	24,745	24,745	25,806	25,806	24,745	24,745

Notes: The above table presents the baseline OLS regressions for Social Interactions with each of *Groups* (Panel A), *Family* (Panel B), *Neighbors* (Panel C), and *the Community* (Panel D) as a function of Neighborhood Walkability, Density, and Average Neighborhood Sociability. Point estimates are reported and standard errors are in parenthesis and are clustered at the county level; * significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year fixed effects; [†] include controls for state fixed effects.

Table 5: Baseline OLS Results for local politics, volunteer, neighbors, social events and neighborhood characteristics of interest

<i>Independent Variable</i>	<i>Neighborhood Characteristics</i>						
	Walkability	(access to (0/1 dummy))			(distance to (0.8 to 1.6 km))		
	Index	Parks	Schools	Shops	Parks	Schools	Shops
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Dependent Variables</i>							
Group Interactions	0.025*** (0.01)	0.114*** (0.03)	0.157*** (0.03)	0.069*** (0.03)	-0.429** (0.13)	-0.736*** (0.14)	-0.420** (0.16)
Political Involvement	0.041 (0.03)	0.013** (0.01)	0.006 (0.01)	0.000 (0.01)	-0.023 (0.03)	-0.021 (0.03)	-0.024 (0.03)
Volunteer Work	0.182** (0.07)	0.038** (0.01)	0.044** (0.01)	0.007 (0.01)	-0.093 (0.07)	-0.253*** (0.07)	-0.148* (0.08)
Neighbor Interactions	0.010*** (0.01)	0.029** (0.01)	0.034** (0.01)	0.079*** (0.01)	-0.531*** (0.16)	-0.217 (0.16)	-0.301* (0.17)
Community Interactions	0.033*** (0.01)	0.158*** (0.03)	0.148*** (0.03)	0.103*** (0.03)	-0.395** (0.14)	-0.604*** (0.12)	-0.589*** (0.14)
Social Events	0.203*** (0.06)	0.063*** (0.01)	0.032** (0.01)	0.015 (0.01)	-0.243*** (0.07)	-0.059 (0.06)	-0.071 (0.06)
		Observations: 140,710			Observations: 116,535		
		Individuals: 24,745			Individuals: 21,212		

Notes: The above table presents a sample of the baseline OLS regression results broken down by neighborhood characteristics and social interactions of particular interest. Columns (2), (3), and (4) present the results for having access to each of parks, schools, and shops within a 10 minute walk of home, as a yes/no dummy variable. Columns (5), (6), and (7) present the results for the approximate distance to each of parks, schools, and shops. Standard errors are reported in parenthesis and are clustered at the county level; * significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

Table 6: First Difference Results for Social Interactions with Groups, Family, Neighbors, and the General Community

Difference Model: Stayers - 10 year Time Variation (1999-2009)

<i>Dependent Variable</i>	Panel A				Panel B			
	Group Interactions (1994-2009)				Family Interactions (1994-2009)			
	(1)	(2)	(3)	(4) [†]	(1)	(2)	(3)	(4) [†]
<i>Independent Variables</i>								
Walkability	-0.014 (0.02)		-0.017 (0.02)	-0.013 (0.02)	-0.010 (0.01)		-0.013 (0.01)	-0.015 (0.01)
Density (/1,000)		0.162 (1.44)	-0.171 (1.43)	0.737 (1.26)		0.733 (0.79)	0.954 (0.80)	1.191 (0.94)
Density ² (/100,000)		0.002 (0.02)	0.010 (0.02)	-0.006 (0.02)		-0.006 (0.01)	-0.009 (0.01)	-0.014 (0.01)
Average Sociability:								
% in top third				2.950*** (0.60)				0.914** (0.38)
% in bottom third				-1.623*** (0.45)				-0.935** (0.19)
<hr/>								
<i>Dependent Variable</i>	Panel C				Panel D			
	Neighbor Interactions (1994-2009)				Community Interactions (1994-2009)			
	(1)	(2)	(3)	(4) [†]	(1)	(2)	(3)	(4) [†]
<i>Independent Variables</i>								
Walkability	0.008 (0.01)		0.007 (0.01)	0.006 (0.01)	0.004 (0.02)		0.004 (0.02)	0.005 (0.02)
Density (/1000)		-0.799 (0.65)	-0.797 (0.66)	0.266 (0.69)		-0.724 (1.27)	-1.524 (1.29)	-0.759 (1.35)
Density ² (/100,000)		0.007 (0.01)	0.008 (0.01)	-0.009 (0.01)		0.005 (0.02)	0.020 (0.02)	0.011 (0.02)
Average Sociability:								
% in top third				1.503** (0.58)				1.209** (0.53)
% in bottom third				-0.813*** (0.21)				-2.182*** (0.45)
<hr/>								
Individual Controls			•	•			•	•
Regional Controls				•				•
Observations	2,546	2,546	2,464	2,464	2,546	2,546	2,464	2,464
Individuals	2,546	2,546	2,464	2,464	2,546	2,546	2,464	2,464

Notes: The above table presents the first differenced results for the stayers subset of the population. First-differences are taken over 10 years of panel data, looking at changes to the built environment between 1999 and 2009. Results are shown for interactions with each of *Groups*(Panel A), *Family* (Panel B), *Neighbors* (Panel C), and *the Community* (Panel D) as a function of Neighborhood Walkability, Density, and Average Neighborhood Sociability. Point estimates are reported and standard errors are in parenthesis and are clustered at the county level; * significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year fixed effects; [†] include controls for state fixed effects.

Table 7: First Difference Results for local politics, volunteer, neighbors, social events, and neighborhood characteristics of interest
Difference Model: Stayers - 10 Year Time Variation (1999 - 2009)

<i>Independent Variable</i>	Walkability Index (1)	<i>Neighborhood Characteristics</i>					
		(access to (0/1 dummy))			(distance to (0.8 to 1.6 km))		
		Parks (2)	Schools (3)	Shops (4)	Parks (5)	Schools (6)	Shops (7)
<i>Dependent Variables</i>							
Group Interactions	-0.013 (0.02)	-0.018 (0.08)	-0.148 (0.09)	-0.115 (0.09)	-0.007 (0.02)	0.011 (0.02)	0.020 (0.02)
Political Involvement	-0.002 (0.01)	0.006 (0.02)	-0.005 (0.02)	0.005 (0.02)	-0.005 (0.01)	0.001 (0.01)	-0.004 (0.01)
Volunteer Work	-0.006 (0.01)	0.004 (0.04)	-0.079* (0.05)	-0.048 (0.05)	-0.008 (0.01)	0.009 (0.01)	0.014 (0.01)
Neighbor Interactions	0.006 (0.01)	0.025 (0.01)	0.051 (0.04)	-0.011 (0.04)	-0.006 (0.01)	-0.015 (0.01)	-0.008 (0.01)
Community Interactions	0.005 (0.02)	0.001 (0.08)	0.019 (0.09)	0.011 (0.09)	0.001 (0.02)	-0.031 (0.02)	-0.005 (0.02)
Social Events	0.006 (0.01)	-0.018 (0.04)	0.030 (0.05)	-0.051 (0.04)	0.006 (0.01)	-0.011 (0.01)	0.005 (0.01)
		Observations: 2,464			Observations: 2,464		
		Individuals: 2,464			Individuals: 2,464		

Notes: The above table presents a sample of first-differenced regression results for the stayers subset of the population. Results are broken down by neighborhood characteristics and social interactions of particular interest. Columns (2), (3), and (4) present the results for changes in access to each of parks, schools, and shops within a 10 minute walk of home, as a yes/no dummy variable. Columns (5), (6), and (7) present the results for changes in the approximate distance to each of parks, schools, and shops. Standard errors are reported in parenthesis and are clustered at the county level; * significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

Table 8: First Difference Results for Social Interactions with Groups, Family, Neighbors, and the General Community

Difference Model: Movers within Counties - 1 Year After Move ((t+1) - (t-1))

<i>Dependent Variable</i>	Panel A				Panel B			
	Group Interactions (1994-2009)				Family Interactions (1994-2009)			
	(1)	(2)	(3)	(4) [†]	(1)	(2)	(3)	(4) [†]
<i>Independent Variables</i>								
Avg. Walkability	0.005 (0.03)		-0.006 (0.03)	-0.009 (0.03)	0.022 (0.02)		0.017 (0.02)	0.014 (0.02)
Density (/1,000)		0.380 (1.41)	0.042 (1.56)	0.145 (1.39)		1.074 (0.83)	0.820 (0.90)	0.831 (0.85)
Density ² (/100,000)		-0.007 (0.03)	-0.001 (0.03)	-0.003 (0.03)		-0.020 (0.02)	-0.015 (0.02)	-0.015 (0.02)
Average Sociability:								
% in top third				1.627*** (0.37)				0.751** (0.24)
% in bottom third				-1.471*** (0.27)				-0.972*** (0.12)
<hr/>								
<i>Dependent Variable</i>	Panel C				Panel D			
	Neighbor Interactions (1994-2009)				Community Interactions (1994-2009)			
	(1)	(2)	(3)	(4) [†]	(1)	(2)	(3)	(4) [†]
<i>Independent Variables</i>								
Avg. Walkability	0.038** (0.02)		0.035** (0.02)	0.025* (0.02)	0.065** (0.03)		0.056* (0.03)	0.035 (0.03)
Density (/1000)		-0.264 (0.74)	-0.136 (0.80)	0.139 (0.84)		0.786 (0.83)	1.206 (0.88)	1.282 (1.07)
Density ² (/100,000)		0.006 (0.01)	0.003 (0.02)	-0.002 (0.02)		-0.014 (0.02)	-0.023 (0.02)	-0.025 (0.02)
Average Sociability:								
% in top third				1.502*** (0.25)				1.756*** (0.35)
% in bottom third				-1.126*** (0.12)				-1.828*** (0.26)
<hr/>								
Individual Controls			•	•			•	•
Regional Controls				•				•
Observations	5,279	5,279	5,059	5,059	5,279	5,279	5,059	5,059
Individuals	4,675	4,675	4,489	4,489	4,675	4,675	4,489	4,489

Notes: The above table presents the first differenced results for the subset of the population who move within their county. First-differences are taken as the difference one year after moving compared to one year prior to moving, straddling the year of the move. Results are shown for interactions with each of *Groups* (Panel A), *Family* (Panel B), *Neighbors* (Panel C), and *the Community* (Panel D) as a function of Average Neighborhood Walkability, Density, and Average Neighborhood Sociability. Point estimates are reported and standard errors are in parenthesis and are clustered at the county level; * significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year fixed effects; [†] include controls for state fixed effects.

Table 9: First Difference Results for local politics, volunteer, neighbors, social events, and neighborhood characteristics of interest

Difference Model: Movers within counties - 1 Year After Move ((t+1) - (t-1))

<i>Independent Variable</i>	Walkability Index (Average) (1)	<i>Neighborhood Characteristics</i>					
		(access to (0/1 dummy))			(distance to (0.8 to 1.6 km))		
		Parks (2)	Schools (3)	Shops (4)	Parks (5)	Schools (6)	Shops (7)
<i>Dependent Variables</i>							
Group Interactions	-0.009 (0.03)	-0.097 (0.06)	0.022 (0.07)	-0.038 (0.07)	0.041 (0.02)	-0.007 (0.02)	0.023 (0.03)
Political Involvement	0.019** (0.01)	0.022 (0.02)	0.029* (0.02)	0.009 (0.02)	0.005 (0.01)	-0.008 (0.01)	-0.005 (0.01)
Volunteer Work	0.002 (0.01)	-0.005 (0.05)	0.003 (0.03)	-0.015 (0.03)	0.018 (0.01)	-0.004 (0.01)	-0.009 (0.01)
Neighbor Interactions	0.025* (0.01)	-0.012 (0.04)	0.055 (0.04)	0.059 (0.04)	0.024** (0.01)	0.009 (0.01)	0.009 (0.02)
Community Interactions	0.035 (0.02)	-0.055 (0.07)	0.028 (0.07)	0.001 (0.07)	0.009 (0.02)	0.012 (0.02)	0.027 (0.03)
Social Events	0.011 (0.01)	-0.010 (0.03)	0.032 (0.03)	0.033 (0.03)	0.011 (0.01)	0.014 (0.01)	0.015 (0.01)

Observations: 5,059

Individuals: 4,489

Notes: The above table presents a sample of first-differenced regression results for the subset of the population that moves within their county. Results are broken down by neighborhood characteristics and social interactions of particular interest. Columns (2), (3), and (4) present the results for changes in the average access to each of parks, schools, and shops within a 10 minute walk of home, as a yes/no dummy variable. Columns (5), (6), and (7) present the results for changes in the average distance to each of parks, schools, and shops. Standard errors are reported in parenthesis and are clustered at the county level; * significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

Table 10: First Difference Results for Social Interactions with Groups, Family, Neighbors, and the General Community

Difference Model: Movers between Counties - 1 Year After Move ((t+1) - (t-1))

<i>Dependent Variable</i>	Panel A				Panel B			
	Group Interactions (1994-2009)				Family Interactions (1994-2009)			
	(1)	(2)	(3)	(4) [†]	(1)	(2)	(3)	(4) [†]
<i>Independent Variables</i>								
Avg. Walkability	0.003 (0.03)		0.023 (0.04)	0.022 (0.04)	0.028 (0.02)		0.020 (0.02)	0.012 (0.02)
Density (/1,000)		-0.055 (0.12)	-0.068 (0.14)	-0.028 (0.14)		0.014 (0.08)	0.039 (0.08)	0.077 (0.09)
Density ² (/100,000)		0.001 (0.01)	0.001 (0.01)	0.001 (0.01)		-0.001 (0.02)	-0.001 (0.02)	-0.001 (0.02)
Average Sociability:								
% in top third				0.788 (0.53)				0.577 (0.44)
% in bottom third				-1.193** (0.42)				-0.801*** (0.22)
<hr/>								
<i>Dependent Variable</i>	Panel C				Panel D			
	Neighbor Interactions (1994-2009)				Community Interactions (1994-2009)			
	(1)	(2)	(3)	(4) [†]	(1)	(2)	(3)	(4) [†]
<i>Independent Variables</i>								
Avg. Walkability	-0.018 (0.02)		-0.021 (0.02)	-0.029 (0.02)	0.053 (0.03)		0.036 (0.04)	0.020 (0.04)
Density (/1000)		0.016 (0.05)	0.041 (0.07)	0.018 (0.07)		0.063 (0.13)	-0.065 (0.12)	-0.203* (0.12)
Density ² (/100,000)		-0.001 (0.01)	-0.002 (0.01)	-0.001 (0.01)		-0.001 (0.01)	0.001 (0.01)	0.005 (0.01)
Average Sociability:								
% in top third				0.036 (0.63)				1.654*** (0.53)
% in bottom third				-0.687*** (0.22)				-0.950** (0.43)
<hr/>								
Individual Controls			•	•			•	•
Regional Controls				•				•
Observations	1,384	1,384	1,320	1,320	1,384	1,384	1,320	1,320
Individuals	1,309	1,309	1,248	1,248	1,309	1,309	1,248	1,248

Notes: The above table presents the first differenced results for the subset of the population who move *between* counties. First-differences are taken as the difference one year after moving compared to one year prior to moving, straddling the year of the move. Results are shown for interactions with each of *Groups*(Panel A), *Family* (Panel B), *Neighbors* (Panel C), and *the Community* (Panel D) as a function of Average Neighborhood Walkability, Density, and Average Neighborhood Sociability. Point estimates are reported and standard errors are in parenthesis and are clustered at the county level; * significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year fixed effects; † include controls for state fixed effects.

Table 11: First Difference Results for local politics, volunteer, neighbors, social events, and neighborhood characteristics of interest

Difference Model: Movers between counties - 1 Year After Move ((t+1) - (t-1))

<i>Independent Variable</i>	Walkability Index (Average) (1)	<i>Neighborhood Characteristics</i>					
		(access to (0/1 dummy))			(distance to (0.8 to 1.6 km))		
		Parks (2)	Schools (3)	Shops (4)	Parks (5)	Schools (6)	Shops (7)
<i>Dependent Variables</i>							
Group Interactions	0.022 (0.04)	0.033 (0.10)	0.026 (0.09)	-0.010 (0.10)	-0.011 (0.03)	-0.047* (0.02)	-0.007 (0.06)
Political Involvement	0.002 (0.01)	-0.024 (0.03)	0.030 (0.02)	0.018 (0.03)	0.011 (0.01)	-0.010 (0.01)	0.002 (0.01)
Volunteer Work	0.006 (0.02)	-0.021 (0.04)	-0.008 (0.04)	0.001 (0.05)	-0.012 (0.01)	-0.006 (0.01)	-0.005 (0.02)
Neighbor Interactions	-0.027 (0.02)	-0.042 (0.06)	-0.033 (0.05)	-0.053 (0.06)	-0.005 (0.02)	-0.013 (0.02)	-0.003 (0.02)
Community Interactions	0.020 (0.04)	-0.114 (0.09)	0.017 (0.09)	-0.059 (0.10)	-0.011 (0.03)	-0.007 (0.03)	-0.021 (0.03)
Social Events	-0.015 (0.01)	0.012 (0.05)	-0.031 (0.04)	-0.096 (0.05)	0.003 (0.02)	-0.011 (0.01)	0.011 (0.02)

Observations: 1,320

Individuals: 1,309

Notes: The above table presents a sample of first-differenced regression results for the subset of the population that moves *between* counties. Results are broken down by neighborhood characteristics and social interactions of particular interest. Columns (2), (3), and (4) present the results for changes in the average access to each of parks, schools, and shops within a 10 minute walk of home, as a yes/no dummy variable. Columns (5), (6), and (7) present the results for changes in the average distance to each of parks, schools, and shops. Standard errors are reported in parenthesis and are clustered at the county level; * significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

Appendix

Table A1: Expanded List of Descriptive Statistics by Variable (cont'd from Table 1)

Variable	Definition	Mean	Min.	Max.
<i>Socioeconomic Characteristics</i>				
male	= 1 if male, 0 if female	0.48	0	1
age	age of the respondent	46.58	17	100
age^2	age squared			
child16	= 1 if children less than 16 in household	0.32	0	1
married	= 1 if married, 0 otherwise	0.61	0	1
separated	= 1 if serparated 0 otherwise	0.02	0	1
single	= 1 if single 0 otherwise	0.24	0	1
divorced	= 1 if divorced 0 otherwise	0.07	0	1
widowed	= 1 if widowed 0 otherwise	0.07	0	1
lfs: working	= 1 if fully employed, 0 otherwise	0.57	0	1
lfs: unemployed	= 1 if unemployed, 0 otherwise	0.06	0	1
lfs: maternity leave	= 1 if on mat leave, 0 otherwise	0.02	0	1
lfs: in training/school	= 1 if in school, 0 otherwise	0.04	0	1
lfs: retired	= 1 if retired, 0 otherwise	0.16	0	1
lfs: other	= 1 if working pt, in military, etc.	0.15	0	1
log annual income	log of annual income	10.45	2.5	13.8
educ	number of years of education	11.84	7	18
owner	= 1 if owns home, 0 otherwise	0.48	0	1
german	= 1 if German born	0.86	0	1
move	= 1 if moved county between two periods	0.02	0	1
move within	= 1 if moved within a county between two periods	0.076	0	1
<i>Regional Controls</i>				
East Germany	= 1 if county is in E. Germany, 0 otherwise	0.23	0	1
median income	median income of the county	36,769		
State1-State16	set of dummy variables controlling for state		0	1
Low SI Groups	% in bottom third of SI Groups dist'n	0.36	0	1
High SI Groups	% in top third of SI Groups dist'n	0.25	0	1
Low SI Family	% in top third of SI Family dist'n	0.47	0	1
High SI Family	% in bottom third of SI Family dist'n	0.10	0	1
Low SI Neighbors	% in top third of SI Neighbors dist'n	0.51	0	1
High SI Neighbors	% in bottom third of SI Neighbors dist'n	0.05	0	1
Low SI Comm	% in bottom third of SI Community dist'n	0.28	0	1
High SI Comm	% in top third of SI Community dist'n	0.26	0	1
<i>Observations: 145,455</i>				
<i>Individuals: 25,806</i>				

**Table A2: Baseline OLS Results for Interactions -
Breakdown by Types of Interactions**

Panel A				
<i>Dependent Variables</i>				
Group Interactions:	politics	volunteer	church	sports
<i>Independent Variables</i>				
Walkability	0.003** (0.001)	0.008** (0.002)	0.002 (0.003)	0.013*** (0.003)
Density (/1,000)	-0.006 (0.017)	-0.62** (0.023)	-0.063 (0.040)	0.143*** (0.035)
Density ² (/100,000)	-0.001 (0.001)	0.001** (0.000)	0.001 (0.001)	-0.003** (0.001)
Average Sociability:				
% in top third	0.485*** (0.049)	1.545*** (0.076)	1.024*** (0.115)	0.705*** (0.080)
% in bottom	-0.075** (0.028)	-0.233*** (0.050)	-0.954*** (0.105)	-1.067*** (0.080)
Panel B				
<i>Dependent Variables</i>				
Community Interactions:	cultural	social	eat/drink	concert/ cinema
<i>Independent Variables</i>				
Walkability	0.007*** (0.002)	0.008*** (0.002)	0.014*** (0.002)	0.004** (0.002)
Density (/1,000)	0.032* (0.019)	0.017 (0.035)	-0.026 (0.029)	-0.017 (0.016)
Density ² (/100,000)	-0.001* (0.000)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Average Sociability:				
% in top third	0.574*** (0.076)	0.354*** (0.073)	0.900*** (0.063)	0.793*** (0.043)
% in bottom	-0.619*** (0.039)	-0.771*** (0.062)	-0.828*** (0.056)	-0.592*** (0.036)
Individual Controls	•	•	•	•
Regional Controls	•	•	•	•
Observations	140,710	140,710	140,710	140,710
Individuals	24,745	24,745	24,745	24,745

Notes: The above table presents the baseline OLS regression results broken down into the specific types of interactions. In the main results, politics, volunteer work, sports, and church attendance are grouped together into *Group Interactions*; cultural, social events, going out to eat/drink, and going to the concert/cinema are grouped together into *Community Interactions*. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

**Table A3: Baseline OLS Results for Interactions -
Breakdown by Neighborhood Characteristics**

<i>Independent Variables</i>	<i>Neighborhood Amenities</i>										
	Walkability	Shops	Restau- rants	Doctor	Kinder- garten	Primary garten	Youth School	Old-age Center	Park Home	Sports	Transit Center
Panel A											
Group	0.025***	0.069***	0.062*	0.065*	0.157***	0.096**	0.162***	0.110**	0.114***	0.103***	0.057
Interactions	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Politics	0.003**	0.000	0.013*	0.006	0.006	-0.001	0.022**	0.017**	0.013**	0.018**	0.002*
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Volunteer	0.008**	0.007	0.011	0.020	0.044***	0.026*	0.065***	0.033**	0.038*	0.029**	0.019
	(0.00)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)
Church	0.002	0.026	0.037**	0.004	0.001	-0.002	0.036**	0.003	-0.000	-0.003	-0.006
	(0.002)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Sports	0.013***	0.035**	0.001	0.034**	0.106***	0.072***	0.039**	0.057**	0.063***	0.058***	0.042**
	(0.00)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Panel B											
Family	0.013***	0.038**	0.059***	0.034**	0.051***	0.042**	0.054***	0.044**	0.084***	0.071***	0.055**
Interactions	(0.00)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
Panel C											
Neighbor	0.010***	0.029**	0.032**	0.028**	0.034**	0.016	0.038**	0.027**	0.079***	0.056***	0.025
Interactions	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Panel D											
Community	0.033***	0.103***	0.084***	0.085***	0.148***	0.102***	0.134***	0.145***	0.158***	0.150***	0.157***
Interactions	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Cultural	0.007***	0.028***	0.120	0.012	0.029**	0.024**	0.021**	0.036**	0.045***	0.020**	0.041***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Social	0.008***	0.015	0.027**	0.015	0.032**	0.017	0.027**	0.027**	0.063***	0.050***	0.041**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Eat/drink	0.014***	0.048***	0.045***	0.051***	0.060***	0.045***	0.057***	0.063***	0.034**	0.057***	0.054***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Cinema/Concert	0.004**	0.012	-0.001	0.007	0.026**	0.017**	0.028**	0.019*	0.016*	0.022**	0.021*
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	140,710	140,710	140,710	140,710	140,710	140,710	140,710	140,710	140,710	140,710	140,710
Individuals	24,745	24,745	24,745	24,745	24,745	24,745	24,745	24,745	24,745	24,745	24,745

Notes: The above table presents the baseline OLS regression results broken down into each surveyed neighborhood characteristic. In the main regression results, these amenities are aggregated into a walkability index, *Walkability*. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

**Table A4: First Difference Results for Social Interactions -
Breakdown by Types of Interactions**
Difference Model: Stayers - 10 year Time Variation (1999-2009)

Panel A				
<i>Dependent Variable</i>				
{Group Interactions:}	politics	volunteer	church	sports
<i>Independent Variables</i>				
Walkability	-0.002 (0.01)	-0.006 (0.01)	0.002 (0.01)	-0.007 (0.01)
Density (/1,000)	0.159 (0.42)	0.031 (0.59)	-0.427 (0.62)	0.975 (0.75)
Density ² (/100,000)	-0.003 (0.01)	-0.001 (0.01)	0.011 (0.01)	-0.013 (0.01)
Average Sociability:				
% in top third	0.188 (0.12)	1.237*** (0.33)	0.490* (0.25)	1.035** (0.35)
% in bottom third	-0.164 (0.10)	-0.097 (0.25)	-0.636** (0.21)	-0.726** (0.26)
Panel B				
<i>Dependent Variable</i>				
{Community Interactions:}	cultural	social	eat/drink	concert/ cinema
<i>Independent Variables</i>				
Walkability	0.003 (0.01)	0.006 (0.01)	-0.006 (0.01)	0.002 (0.01)
Density (/1,000)	0.429 (0.45)	-0.761 (0.50)	0.460 (0.88)	-0.888* (0.49)
Density ² (100,000)	-0.006 (0.01)	0.012* (0.01)	-0.011 (0.01)	0.016** (0.01)
Average Sociability:				
% in top third	0.329* (0.19)	0.148 (0.22)	0.191 (0.27)	0.542** (0.20)
% in bottom decile	-0.356** (0.16)	-0.320** (0.16)	-1.067*** (0.23)	-0.440** (0.16)
Individual Controls	•	•	•	•
Regional Controls	•	•	•	•
Observations	2,468	2,468	2,468	2,468
Individuals	2,468	2,468	2,468	2,468

Notes: The above table presents the first-differenced results for the ‘stayers’ subset of the population broken down into the specific type of social interactions and differenced over 10 years of panel data. In the main results, politics, volunteer work, sports, and church attendance are grouped together into *Group Interactions*; cultural, social events, going out to eat/drink, and going to the concert/cinema are grouped together into *Community Interactions*. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

**Table A5: Change in Interactions with Groups, Close Relations, and the General Community -
Breakdown by Neighborhood Characteristics**

Difference Model: Stayers - 10 Year Time Variation (99-09)

<i>Independent Variables</i>	<i>Neighborhood Amenities</i>										
	AM 0.8km	Shops	Restau- rants	Doctor	Kinder-	Primary garten	Youth School	Old-age Center	Park Home	Sports	Transit Center
Panel A:											
Group	-0.013	-0.115	-0.052	-0.095	-0.148	-0.099	0.059	-0.096	-0.018	-0.102	0.000
Interactions	(0.02)	(0.09)	(0.09)	(0.10)	(0.09)	(0.10)	(0.09)	(0.09)	(0.08)	(0.08)	(0.09)
Politics	-0.002	0.005	-0.035*	-0.002	-0.005	-0.037	-0.002	-0.015	0.006	-0.015	0.003
	(0.01)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)
Volunteer	-0.006	-0.048	-0.065	-0.059	-0.079*	-0.071	-0.075	-0.028	0.004	0.021	0.027
	(0.01)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)
Church	0.002	-0.043	0.048	-0.035	-0.013	-0.003	0.002	0.042	0.013	-0.021	-0.044
	(0.01)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.05)
Sports	-0.007	-0.029	0.001	0.002	-0.050	0.012	-0.017	-0.095*	-0.041	-0.088*	0.014*
	(0.01)	(0.05)	(0.06)	(0.06)	(0.05)	(0.06)	(0.05)	(0.06)	(0.05)	(0.05)	(0.06)
Panel B:											
Family	-0.015	0.002	-0.063	-0.068	-0.059	-0.077	-0.035	0.016	0.028	-0.059	-0.010
Interactions	(0.01)	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.06)
Panel C:											
Neighbor	0.006	-0.011	-0.086*	-0.018	0.051	0.025	-0.006	0.059	0.025	0.029	0.041
Interactions	(0.01)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.06)
Panel C:											
Community	0.005	0.011	-0.034	-0.005	0.019	-0.008	0.036	0.062	0.001	-0.115	-0.057
Interactions	(0.02)	(0.09)	(0.09)	(0.10)	(0.09)	(0.10)	(0.09)	(0.09)	(0.08)	(0.08)	(0.11)
Cultural	0.003	0.045	-0.004	-0.033	-0.002	-0.011	0.004	-0.034	0.019	-0.032	0.045
	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Social	0.006	-0.051	-0.000	0.049	0.030	0.056	0.053	0.063	-0.018	-0.026	0.003
	(0.01)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Eat/drink	-0.006	-0.011	-0.017	-0.012	0.027	-0.050	-0.031	-0.000	-0.022	-0.032	-0.015
	(0.01)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)
Cinema/Concert	0.002	0.029	-0.013	-0.009	-0.035	-0.003	0.009	0.033	0.022	-0.025	0.024
	(0.01)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Observations	2,468	2,468	2,468	2,468	2,468	2,468	2,468	2,468	2,468	2,468	2,468
Individuals	2,468	2,468	2,468	2,468	2,468	2,468	2,468	2,468	2,468	2,468	2,468

Notes: The above table presents the first-differenced results for the ‘stayers’ subset of the population broken down into each surveyed neighborhood characteristic and differenced over 10 years of the panel data. In the main regression results, these amenities are aggregated into a walkability index, *Walkability*. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

**Table A6: First Difference Results for Social Interactions -
Breakdown by Types of Interactions**

Difference Model: Movers within counties - 1 Year After Move ((t+1) - (t-1))

Panel A				
<i>Dependent Variable</i> {Group Interactions}	Change in:			
	politics	volunteer	church	sports
<i>Independent Variables</i>				
Avg. Walkability	0.019** (0.01)	0.002 (0.01)	-0.017 (0.01)	-0.012 (0.02)
Density (/1,000)	-0.189 (0.63)	0.591 (0.68)	-0.728** (0.34)	0.470 (1.15)
Density ² (/100,000)	0.004 (0.01)	-0.012 (0.01)	0.014** (0.01)	-0.009 (0.02)
Average Sociability:				
% in top third	0.279** (0.09)	0.880*** (0.20)	0.066 (0.12)	0.402* (0.21)
% in bottom third	0.002 (0.06)	0.057 (0.13)	-0.446*** (0.10)	-1.085*** (0.18)
Panel B				
<i>Dependent Variable</i> {Community Interactions}	Change in:			
	cultural	social	eat/drink	concert/ cinema
<i>Independent Variables</i>				
Avg. Walkability	0.011 (0.01)	0.011 (0.01)	-0.009 (0.02)	0.022* (0.01)
Density (/1,000)	0.796** (0.36)	-0.127 (0.41)	0.215 (0.61)	0.397 (0.59)
Density ² (/100,000)	-0.015* (0.01)	0.004 (0.01)	-0.004 (0.01)	-0.009 (0.01)
% in top third	0.382** (0.12)	0.219 (0.13)	0.538** (0.14)	0.618*** (0.11)
% in bottom third	-0.413 (3.50)	-0.272** (3.75)	-0.699*** (7.73)	-0.445*** (2.25)
Individual Controls				
Regional Controls	•	•	•	•
Observations	5,059	5,059	5,059	5,059
Individuals	4,489	4,489	4,489	4,489

Notes: The above table presents the first-differences results for the ‘movers within counties’ subset of the population broken down into the specific type of social interactions. Differences are over 1 year after moving compared to 1 year prior. In the main results, politics, volunteer work, sports, and church attendance are grouped together into *Group Interactions*; cultural, social events, going out to eat/drink, and going to the concert/cinema are grouped together into *Community Interactions*. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

**Table A7: First Difference Results for Social Interactions -
Breakdown by Neighborhood Characteristics**
Difference Model: Movers within counties - 1 Year After Move ((t + 1) – (t – 1))

<i>Independent Variables</i>	<i>Neighborhood Amenities</i>										
	AM 0.8km (avg)	Shops	Restau- rants	Doctor	Kinder-	Primary garten	Youth School	Old-age Center	Park Home	Sports	Transit Center
Panel A											
Group	-0.009	-0.038	0.084	-0.000	0.022	-0.051	0.160*	0.010	-0.097	0.026	-0.042
Interactions	(0.03)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.09)	(0.10)	(0.06)	(0.06)	(0.14)
Politics	0.019**	0.009	0.009	-0.010	0.029*	0.016	0.012	-0.013	0.022	0.030*	-0.005
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.04)
Volunteer	0.002	-0.015	0.055	-0.020	0.003	-0.017	0.012	-0.012	-0.005	0.039	0.076
	(0.01)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.07)
Church	-0.017	-0.030	-0.008	-0.008	-0.024	-0.026	0.021	0.021	-0.021	-0.021	-0.012
	(0.01)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)	(0.03)	(0.03)	(0.05)
Sports	-0.012	-0.002	-0.029	0.038	0.014	-0.023	0.115**	0.014	-0.093**	-0.021	-0.100
	(0.02)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.07)	(0.05)	(0.05)	(0.09)
Panel B											
Family	0.015	-0.061	0.028	0.001	0.025	0.055	0.061	0.152**	0.017	0.050	-0.043
Interactions	(0.01)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.04)	(0.09)
Panel C											
Neighbor	0.025*	0.059	0.010	-0.017	0.055	0.067**	0.043	-0.008	-0.012	0.055	-0.049
Interactions	(0.02)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.03)	(0.07)
Panel C											
Community	0.035	0.000	0.050	0.099	0.028	0.031	0.139	0.127	-0.055	0.049	0.158
Interactions	(0.03)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.09)	(0.07)	(0.07)	(0.07)	(0.16)
Cultural	0.011	-0.043	-0.017	0.023	0.012	-0.006	-0.028	-0.066	0.000	0.011	0.037
	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.07)
Social	0.011	0.033	0.031	0.048*	0.032	0.029	0.069	0.104**	-0.010	0.019	-0.018
	(0.01)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.05)	(0.05)	(0.03)	(0.03)	(0.07)
Eat/drink	-0.009	0.023	0.051	0.006	-0.018	0.008	0.064	0.062	-0.049	-0.058	0.079
	(0.02)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.05)	(0.03)	(0.04)	(0.09))
Cinema/Concert	0.022*	-0.013	-0.015	0.022	0.002	-0.000	-0.034	0.027	0.004	0.077**	0.060
	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.06)
Observations	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059
Individuals	4,489	4,489	4,489	4,489	4,489	4,489	4,489	4,489	4,489	4,489	4,489

Notes: The above table presents the first-differenced results for the ‘movers within counties’ subset of the population broken down into each surveyed neighborhood characteristic. Differences are taken over 1 year after moving comported to 1 year prior. In the main regression results, these amenities are aggregated into a walkability index, *Walkability*. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

**Table A8: First Difference Results for Social Interactions -
Breakdown by Types of Interactions**

Difference Model: Movers between counties - 1 Year After Move

$$((t + 1) - (t - 1))$$

Panel A				
<i>Dependent Variable</i>	Change in:			
{Group Interactions}	politics	volunteer	church	sports
<i>Independent Variables</i>				
Avg. Walkability	0.002 (0.01)	0.006 (0.02)	0.001 (0.01)	0.012 (0.02)
Density (/1,000)	-0.003 (0.03)	-0.021 (0.06)	-0.008 (0.06)	0.004 (0.09)
Density ² (/100,000)	0.000 (0.01)	-0.000 (0.01)	0.000 (0.01)	-0.000 (0.01)
Average Sociability:				
% in top third	0.258 (0.16)	0.355 (0.23)	-0.101 (0.19)	0.275 (0.33)
% in bottom third	-0.033 (0.10)	-0.143 (0.17)	-0.537** (0.17)	-0.489* (0.29)
Panel B				
<i>Dependent Variable</i>	Change in:			
{Community Interactions}	cultural	social	concert eat/drink	cinema
<i>Independent Variables</i>				
Avg. Walkability	-0.006 (0.02)	-0.015 (0.02)	0.023 (0.02)	0.018 (0.01)
Density (/1,000)	-0.084 (0.05)	-0.042 (0.07)	-0.051 (0.06)	-0.026 (0.06)
Density ² (/100,000)	0.002 (0.01)	0.001 (0.01)	-0.001 (0.01)	0.001 (0.01)
% in top third	0.290 (0.27)	0.434 (0.26)	0.440* (0.26)	0.490** (0.22)
% in bottom third	-0.398* (0.20)	-0.043 (0.23)	-0.317 (0.21)	-0.192 (0.18)
Individual Controls	•	•	•	•
Regional Controls	•	•	•	•
Observations	1,320	1,320	1,320	1,320
Individuals	1,248	1,248	1,248	1,248

Notes: The above table presents the first-differences results for the ‘movers between counties’ subset of the population broken down into the specific type of social interactions. Differences are over 1 year after moving compared to 1 year prior. In the main results, politics, volunteer work, sports, and church attendance are grouped together into *Group Interactions*; cultural, social events, going out to eat/drink, and going to the concert/cinema are grouped together into *Community Interactions*. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

**Table A9: First Difference Results for Social Interactions -
Breakdown by Neighborhood Characteristics**
Difference Model: Movers between counties - 1 Year After Move ((t + 1) – (t – 1))

<i>Independent Variables</i>	<i>Neighborhood Amenities</i>										
	AM 0.8km (avg)	Shops	Restau- rants	Doctor	Kinder-	Primary garten	Youth School	Old-age Center	Park Home	Sports	Transit Center
Panel A											
Group	0.022	0.033	-0.210*	0.006	0.026	0.228**	0.176	0.177	-0.010	0.044	-0.139
Interactions	(0.04)	(0.10)	(0.11)	(0.10)	(0.10)	(0.10)	(0.15)	(0.16)	(0.10)	(0.10)	(0.20)
Politics	0.002	0.018	-0.016	-0.014	0.030	0.027	0.009	0.019	-0.024	-0.030	-0.147**
	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.07)
Volunteer	0.006	0.000	-0.076	-0.018	-0.008	0.108**	0.093	0.133*	-0.021	0.060	0.062
	(0.02)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.07)	(0.07)	(0.04)	(0.05)	(0.10)
Church	0.001	-0.018	-0.043	-0.032	-0.005	0.008	0.015	-0.010	0.015	-0.023	-0.030
	(0.01)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.05)	(0.05)	(0.04)	(0.04)	(0.09)
Sports	0.012	0.032	-0.075	0.070	0.009	0.085	0.059	0.035	0.021	0.038	-0.025
	(0.02)	(0.06)	(0.07)	(0.06)	(0.06)	(0.07)	(0.09)	(0.10)	(0.06)	(0.07)	(0.15)
Panel B											
Family	0.012	-0.040	-0.078	-0.019	0.030	0.133**	0.068	-0.008	0.015	0.014	-0.025
Interactions	(0.02)	(0.05)	(0.07)	(0.06)	(0.06)	(0.05)	(0.07)	(0.07)	(0.07)	(0.05)	(0.15)
Panel C											
Neighbor	-0.029	-0.058	-0.106	-0.031	-0.033	0.028	0.054	0.011	-0.039	-0.057	-0.030
Interactions	(0.02)	(0.06)	(0.07)	(0.06)	(0.05)	(0.05)	(0.07)	(0.07)	(0.06)	(0.05)	(0.11)
Panel D											
Community	0.020	-0.059	-0.060	0.227**	0.017	0.147	0.374**	0.283*	-0.114	0.078	0.056
Interactions	(0.04)	(0.10)	(0.11)	(0.10)	(0.10)	(0.10)	(0.13)	(0.15)	(0.09)	(0.09)	(0.24)
Cultural	-0.006	0.045	-0.074	0.030	-0.037	-0.010	0.048	-0.021	-0.040	-0.010	0.159*
	(0.02)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.04)	(0.05)	(0.09)
Social	-0.015	-0.096*	-0.011	-0.016	-0.031	0.049	0.042	0.023	0.012	0.030	-0.041
	(0.02)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.07)	(0.07)	(0.05)	(0.05)	(0.11)
Eat/drink	0.023	-0.036	0.039	0.102*	0.029	0.076*	0.184**	0.173**	-0.060	0.025	0.012
	(0.02)	(0.05)	(0.06)	(0.05)	(0.04)	(0.05)	(0.06)	(0.07)	(0.05)	(0.05)	(0.11)
Cinema/Concert	0.018	0.029	-0.014	0.112**	0.056	0.034	0.100*	0.108*	-0.027	0.034	-0.074
	(0.01)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.06)	(0.06)	(0.04)	(0.05)	(0.08)
Observations	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320
Individuals	1,248	1,248	1,248	1,248	1,248	1,248	1,248	1,248	1,248	1,248	1,248

Notes: The above table presents the first-differenced results for the ‘movers between counties’ subset of the population broken down into each surveyed neighborhood characteristic. Differences are taken over 1 year after moving compared to 1 year prior. In the main regression results, these amenities are aggregated into a walkability index, *Walkability*. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

Table A10: Change in Interactions with Groups, Close Relations, and the General Community
Difference Model: Stayers, Alternative Specifications - 10 Year Time Variation (1999-2009)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Full Sample	East only	West only	No Berlin	Increase in AM	Decrease in AM	Top Increase in Density	Top Decrease in Density
Panel A								
<i>Dependent Variable</i>	Change in Group Interactions							
<i>Independent Variables</i>								
Walkability	-0.013 (0.02)	-0.023 (0.04)	-0.012 (0.02)	-0.017 (0.02)	0.018 (0.03)	-0.024 (0.02)	-0.011 (0.04)	0.049 (0.05)
Panel B								
<i>Dependent Variable</i>	Change in Family Interactions							
<i>Independent Variable</i>								
Walkability	-0.015 (0.01)	0.004 (0.02)	-0.018* (0.01)	-0.014 (0.01)	-0.009 (0.01)	-0.024* (0.01)	0.009 (0.04)	0.010 (0.03)
Panel C								
<i>Dependent Variable</i>	Change in Neighbor Interactions							
<i>Independent Variable</i>								
Walkability	0.006 (0.01)	0.014 (0.02)	0.005 (0.01)	0.006 (0.01)	0.016 (0.02)	0.001 (0.01)	0.023 (0.04)	-0.008 (0.02)
Panel D								
<i>Dependent Variable</i>	Change in Community Interactions							
<i>Independent Variable</i>								
Walkability	0.005 (0.02)	-0.014 (0.03)	0.014 (0.02)	0.003 (0.02)	-0.016 (0.03)	0.038 (0.02)	0.060 (0.05)	0.039 (0.05)
Observations	2,464	677	1,787	2,395	1,051	1,405	222	327
Individuals	2,464	677	1,787	2,395	1,051	1,405	222	327

Notes: The above table presents the first-differenced results for the ‘stayers’ subset of the population, considering different samples characterized by specific regional changes. Differences are taken over 10 years of the panel data and consider heterogenous effects across different regions in Germany. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

Table A11: Change in Interactions with Groups, Close Relations, and the General Community

Difference Model: Stayers (Subsets of Population) - 10 Year Time Variation (1999-2009)

<i>Independent Variables</i>	<i>Neighborhood Characteristics</i>											
	Shops				Primary School				Park			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Panel A												
<i>Dependent Variable</i>												
Group	-0.160	-0.026	0.117	-0.144	-0.352	0.046	-0.426	-0.114	0.324	-0.010	-0.152	0.101
Interactions	(0.41)	(0.11)	(0.30)	(0.15)	(0.33)	(0.12)	(0.35)	(0.17)	(0.35)	(0.10)	90.29	(0.13)
Panel B												
<i>Dependent Variable</i>												
Family	-0.263	-0.011	0.062	-0.098	-0.013	-0.099*	-0.029	-0.134**	-0.171	0.008	-0.105	0.054
Interactions	(0.20)	(0.06)	(0.15)	(0.08)	(0.24)	(0.05)	(0.16)	(0.07)	(0.19)	(0.05)	(0.12)	(0.07)
Panel C												
<i>Dependent Variable</i>												
Neighbor	-0.133	0.006	-0.023	-0.064	-0.123	0.022	0.042	-0.017	0.196	0.012	-0.045	0.060
Interactions	(0.28)	(0.06)	(0.15)	(0.08)	(0.18)	(0.05)	(0.14)	(0.07)	(0.19)	(0.05)	(0.12)	(0.07)
Panel D												
<i>Dependent Variable</i>												
Community	0.118	-0.002	-0.198	-0.107	0.421	0.013	0.212	-0.074	0.103	-0.041	-0.114	-0.001
Interactions	(0.52)	(0.11)	(0.30)	(0.14)	(0.47)	(0.11)	(0.41)	(0.16)	(0.37)	(0.09)	(0.29)	(0.13)
Observations	105	1,316	212	1,006	105	1,316	212	1,006	105	1,316	212	1,006
Individuals	105	1,316	212	1,006	105	1,316	212	1,006	105	1,316	212	1,006
less than 40	•				•				•			
female only		•				•				•		
children			•				•				•	
retired/mat				•				•				•

Notes: The above table presents the first-differenced results for the ‘stayers’ subset of the population, considering further subsamples - individuals less than 40, females only, those with young children and those who are retired or on maternity leave. Differences are taken over 10 years of the panel data and consider heterogenous effects across different regions in Germany. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

Table A12: Change in Interactions with Groups, Close Relations, and the General Community (using county averages)

Difference Model: Movers between counties, Alternative Specifications - 1 Year After Move

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full Sample	Foreign	German	Increase in AM	Decrease in AM	Top Increase in Density	Top Decrease in Density
Panel A							
<i>Dependent Variable</i>	Change in Group Interactions						
<i>Independent Variables</i>							
Walkability	0.022 (0.04)	0.230** (0.11)	-0.004 (0.04)	-0.014 (0.09)	-0.027 (0.07)	0.099 (0.10)	0.036 (0.11)
Panel B							
<i>Dependent Variable</i>	Change in Family Interactions						
<i>Independent Variables</i>							
Walkability	0.012 (0.02)	-0.022 (0.06)	0.012 (0.02)	0.026 (0.04)	0.070* (0.04)	-0.032 (0.06)	-0.065* (0.04)
Panel C							
<i>Dependent Variable</i>	Change in Neighbor Interactions						
<i>Independent Variables</i>							
Walkability	-0.029 (0.02)	-0.043 (0.05)	-0.025 (0.02)	-0.061 (0.04)	-0.006 (0.04)	0.009 (0.05)	-0.068 (0.04)
Panel D							
<i>Dependent Variable</i>	Change in Community Interactions						
<i>Independent Variables</i>							
Walkability	0.020 (0.04)	0.189 (0.13)	-0.001 (0.04)	-0.051 (0.08)	-0.033 (0.08)	-0.139 (0.10)	-0.012 (0.07)
Observations	1,320	186	1,134	611	704	280	375
Individuals	1,248	179	1,069	602	692	280	375

Notes: The above table presents the first-differenced results for the ‘movers between counties’ subset of the population, considering different samples characterized by specific regional changes. Differences are one year after moving compared to one year prior. and consider heterogenous effects across different regions in Germany. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.

**Table A13: Table : Interactions with Groups, Close Relations, and the General Community (using county averages)
Breakdown by Neighborhood Characteristics**

Difference Model: Movers between counties - 1 Year After Move ((t + 1) – (t – 1))

<i>Independent Variables</i>	<i>Neighborhood Characteristics</i>											
	Shops				Primary School				Park			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Panel A												
<i>Dependent Variable</i>												
Group	0.168	-0.010	0.321*	-0.297	0.243*	0.189	0.607***	-0.286	-0.024	-0.173	-0.096	0.509
Interactions	(0.14)	(0.13)	(0.19)	(0.34)	(0.14)	(0.13)	(0.17)	(0.33)	(0.14)	(0.13)	(0.21)	(0.34)
Panel B												
<i>Dependent Variable</i>												
Family	-0.054	-0.037	-0.038	-0.101	0.110*	0.141**	0.154*	-0.031	0.0222	0.084	-0.020	0.364
Interactions	(0.07)	(0.07)	(0.09)	(0.18)	(0.07)	(0.07)	(0.08)	(0.17)	(0.08)	(0.08)	(0.11)	(0.22)
Panel C												
<i>Dependent Variable</i>												
Neighbor	-0.042	0.122*	-0.172*	0.033	0.026	-0.052	0.002	-0.005	-0.030	-0.005	-0.048	-0.288
Interactions	(0.07)	(0.07)	(0.09)	(0.24)	(0.06)	(0.06)	(0.08)	(0.20)	(0.08)	(0.08)	(0.14)	(0.25)
Panel D												
<i>Dependent Variable</i>												
Community	-0.029	-0.146	0.005	0.118	0.120	0.218*	0.242	0.434	-0.198	0.027	-0.013	-0.375
Interactions	(0.13)	(0.12)	(0.19)	(0.30)	(0.13)	(0.12)	(0.17)	(0.34)	(0.14)	(0.12)	(0.16)	(0.31)
Observations	712	680	465	165	712	680	465	165	712	680	465	165
Individuals	682	646	446	160	682	646	446	160	682	646	446	160
less than 40	•				•				•			
female only		•				•				•		
children			•				•				•	
retired/mat				•				•				•

Notes: The above table presents the first-differenced results for the ‘movers between counties’ subset of the population, considering further subsamples - individuals less than 40, females only, those with young children and those who are retired or on maternity leave. Differences are taken one year after moving compared to one year prior. Standard errors are reported in parenthesis and are clustered at the county level; *significant at 10 percent, **significant at 5 percent. ***significant at 1 percent. All regressions include year and state fixed effects, individual and regional controls.