The Role of Length of Residence and Selective Residential Mobility in Social Contact Formation in Ethnically Diverse Neighborhoods

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Abstract

The association between local ethnic composition and social cohesion has received widespread scholarly attention. Studies consistently find negative associations between neighborhood-level ethnic diversity and neighborhood cohesion indicators. However, hypotheses are formulated statically, empirical analyses rely mostly on cross-sectional data, and scholars worry about potential selection effects into and out of neighborhoods. This study presents a way to overcome these issues. The article derives hypotheses about how individuals' contact with their neighbors develops over time. Then, it examines trajectories of contact experiences by asking a clearly defined causal question: How would contact develop due to ethnic composition if households did not leave their neighborhood? The findings show a substantial increase in perceived contact quality and the probability to visit neighbors after staying in a neighborhood for five years, particularly in neighborhoods with high shares of ethnic minorities. These findings are at odds with theoretical accounts that suggest "hunkering down" in diverse contexts. However, findings also suggest that perceptions of a cohesive community do not increase in diverse neighborhoods. Taken together, the findings indicate that basic social interaction guided by reciprocity and close individual contacts are widespread in ethnically diverse contexts.

Introduction

For more than a decade, there has been widespread social scientific interest in the stylized fact that greater local ethnic diversity[1] accompanies lower social cohesion (Dinesen, Schaeffer, and Sønderskov 2020). Particularly at the level of small-scale residential contexts, research findings are fairly robust. Several literature reviews suggest that increased neighborhood-level ethnic diversity is associated with fewer local contacts with neighbors and other indicators of individually perceived neighborhood cohesion (Dinesen et al. 2020; Dinesen and Sønderskov 2018; van der Meer and Tolsma 2014; Schaeffer 2014).

Putnam (2007), one of the seminal contributors to the scholarly debate about the consequences of ethnic diversity, made two claims: His first, famously called "hunkering down", claim states that individuals retreat from social life in ethnically diverse social contexts. While the "hunkering down" claim received a great deal of scholarly attention, there is far less research on another claim he makes in his seminal paper: immigration societies are able to overcome the negative effects of ethnic diversity in the long-run by creating new forms of identities and solidarity. Thus, the question of whether ethnic diversity affects social cohesion is of a longitudinal nature. This article presents an approach to study the claim that "hunkering down" can be overcome on a small-scale level, namely, the neighborhood.

Despite its longevity, the scholarly debate is still far from reaching a consensus about the substantive importance and causal implications of the association between ethnic composition and cohesion. This study extends the existing body of research by introducing length of residence as a major aspect to consider in research efforts on neighborhood diversity effects. This extension is important for three reasons. First, by analyzing *developments* of contact acquisition with the length of residence, we can learn about the existence of underlying social processes that might inhibit contacts. Different theories might predict different shapes of contact acquisition. Furthermore, insights from social network analysis illustrate why length of residence matters in ethnically diverse contexts: tie formation among groups divided by bright ethnic boundaries might require a longer time than tie formation within the same ethnic boundary. However, once inter-ethnic ties are established, they tend towards reciprocity in much the same way as intra-ethnic ties (Munniksma et al. 2017; Windzio 2018).

Second, by studying the development of neighborhood contacts with the length of residence, this study allows for a more nuanced assessment of the relevance of diversity for local cohesion. Forming ties in diverse neighborhoods might require more time than in less diverse areas and ethnic majority households typically stay for shorter periods in diverse areas on average (Bolt, van Kempen, and van Ham 2008; Crowder, Hall, and Tolnay 2011; Hall and Crowder 2014; Skifter Andersen 2017). Under these conditions, previous studies that do not distinguish households by their length of residence might overstate the negative effect of diversity because long-term stayers are overrepresented in less diverse neighborhoods.

However, differentiating households by their time of residence brings an issue to the fore that has plagued the literature on diversity effects, and neighborhood effect research in general, from the very beginning: selective residential sorting (Dawkins 2008). Households might not only stay for shorter periods in diverse neighborhoods, but those households that leave might have specific traits that affect future neighborhood embeddedness. This leads to selection bias (Elwert and Winship 2014) in cross-sectional studies that include households that stayed long enough to be at risk of processes of selective out-mobility. The third contribution is to propose a methodological approach to address this methodological issue. This approach asks for the causal effect of ethnic composition on individual embeddedness after staying put in the same neighborhood for a fixed period. With this procedure, this study answers calls for more studies with an explicit focusing on causal inference in the field of diversity effects (Dinesen et al. 2020).

Previous Research and Theoretical Mechanisms

The Negative Association between Neighborhood Ethnic Diversity and Social Cohesion

There is much supportive evidence for Putnam's (2007) "hunkering down" claim on the neighborhood level. Several systematic reviews show that the majority of studies that measure ethnic diversity within small-scale, neighborhood-like units yield negative associations between diversity and various indicators of individually reported social cohesion (Dinesen et al. 2020; van der Meer and Tolsma 2014). This association holds particularly when those indicators are related to the neighborhood, such as trust in neighbors (Dinesen et al. 2020), contact with neighbors (Lancee and Dronkers 2011; Laurence 2013; Scheepers, Schmeets, and Pelzer 2013), or other indicators measuring neighborhood social cohesion (van der Meer and Tolsma 2014). The association is also found in Germany (Koopmans and Schaeffer 2016), the national context of the present study. Moreover, there is quasi-experimental evidence that supports a causal interpretation of this association (Algan, Hémet, and Laitin 2016).

Even though general connectedness is lower in diverse neighborhoods, they still present opportunities for interethnic contacts (Schönwälder et al. 2016; Tolsma and van der Meer 2018). For example, ethnic diversity in the proximity at different neighborhood scales is *positively* associated with contacts with non-Western immigrant neighbors and *negatively* associated with contact with Dutch neighbors in native Dutch respondents (Sluiter, Tolsma, and Scheepers 2015). Similarly, ethnic diversity does not seem to have large negative associations with trust in ethnic out-groups (Dinesen et al. 2020) or other indicators of interethnic social cohesion (van der Meer and Tolsma 2014).

Considering the state of research at large, there is still a shortage of studies that focus on causal inference (Dinesen et al. 2020). In one of the few longitudinal studies of neighborhood-related social cohesion indicators, Laurence and Bentley (2016) employ a panel fixed-effects design and utilize British data spanning over almost three decades. They study how changes in neighborhood composition affect neighborhood attachment for both stayers and movers (measured in 1991, 2001 and 2009). A major contribution of this study is to separate the effects of changes in composition by moving from those that happen due to households that stay in a certain neighborhood. This distinction between movers and stayers proves to be important. Laurence and Bentley (2016) find that increased diversity is associated with less attachment for stayers. For movers, however, they find that moves into diverse neighborhoods are not associated with a decline in attachment, but movers from diverse to homogeneous areas experience a rise in attachment.

Accounts for Negative Ethnic Diversity Effects

A variety of theoretical accounts seek to explain the phenomenon of "hunkering down" established by Putnam (2007). In the following, I restrict my review to "anomie" and "negative exposure" accounts. Other explanations, for example group conflict, group threat or group competition accounts (van der Meer and Tolsma 2014:463; see also Schaeffer 2014:36-40) are also commonplace in the literature. However, group conflict is better suited to explain negative sentiments towards neighboring ethnic groups (and not general distrust in all neighbors) and the group conflict account encounters empirical anomalies in some national contexts (Algan et al. 2016; Danckert, Dinesen, and Sønderskov 2017; Laurence, Schmid, and Hewstone 2019). In contrast to group conflict, anomie mechanisms explain why neighborhood diversity is associated with less cohesion in terms of general indicators such as connectivity with neighbors, lower neighborhood satisfaction and lower collective efficacy (Koopmans and Schaeffer 2016) and is only marginally related to outcomes that target specific out-groups (Dinesen et al. 2020).

A first prominent set of explanations sees cultural differences as a cause of low social cohesion in ethnically diverse areas. These differences might lead to differing preferences for certain public goods, which decreases the likelihood of finding a common denominator to facilitate cooperative actions. Or they might lead to coordination problems between inhabitants because of differences in language and symbols (Schaeffer 2014:43-46). In a similar fashion, van der Meer and Tolsma (2014) note that cultural diversity could lead to anomie through a lack of consensus on shared norms and communication, which negatively relates to embeddedness. These shared feelings of anomie could affect both relations to majority and minority individuals due to a generalized perceived lack of common ground with others (Algan et al. 2016). Thus, anomie accounts (Dinesen et al. 2020) suggest that individuals in diverse areas are generally more uncertain and reserved towards their neighbors and thus less ready to engage

in contact with newcomers. This phenomenon leads us to expect consistent low levels of contact between neighbors in diverse areas.

A second argument is concerned with the link between small-scale contextual diversity and social trust. According to Dinesen and Sønderskov (2015), encountering cues that are associated with untrustworthiness reduces generalized trust and particularly trust in neighbors (Dinesen et al. 2020). In this framework, the visible ethnicity of others is a marker of untrustworthiness, for example, through internalized stereotypes (Dinesen and Sønderskov 2015). As cumulative exposure to cues of untrustworthiness is at the core of this explanation, we would expect that the more time an individual spends in ethnically diverse areas, the less he or she will trust others and therefore will also engage in fewer contacts with neighbors.

However, anomie and negative exposure approaches are similar in predicting that diverse neighborhoods present social contexts that are detrimental to individuals' casual and intimate contact experiences with neighbors and lead them to shun neighborhood life.

Hypothesis H1: Individual contact is experienced as more negative in ethnically diverse neighborhoods in comparison to ethnically homogenous neighborhoods staying in neighborhoods for the same period of time.

The Role of Time for Tie Formation in Uncertain Contexts

When evaluating the impact of ethnic diversity on individual embeddedness in the neighborhood, it is useful to distinguish the period directly after moving into a neighborhood from later points in time. This distinction is useful because arguments from social exchange theory and social network analysis suggest that the initiation of ties in the period directly after moving in is strongly based on individuals' subjective prior beliefs about the uncertainty and success of the potential social exchange (Carlin and Love 2013; Windzio 2018). For example, stereotypes guide initial contact formation, particularly if out-group members are the target of social exchange. However, the concept of reciprocity (Gouldner 1960) suggests that once initial ties to neighbors are established, these ties are sustained by mutual feelings of obligation and dependence. Over longer time-periods of sustained contact, these feelings become stronger and more and more detached from the rational considerations that guided initial contact (Carlin and Love 2013; Windzio 2018).

Applying these theoretical arguments to ethnically diverse neighborhoods leads to the hypothesis that individual contact experiences with neighbors in diverse neighborhoods can be as intimate as in less diverse neighborhoods, but the process of tie formation is likely to require more time than in homogenous neighborhood. This is because of two mechanisms. First, initial exchange across ethnic boundaries (Wimmer 2013) is more uncertain than ties with persons of similar ethnic backgrounds. In inter-ethnic encounters, partners might have different expectations of shared norms and interpret the same behavior differently (Windzio 2018). Once a successful exchange across ethnic boundaries occurs,

however, it can trigger positive emotions (Lawler 2001) and obligations of reciprocity (Gouldner 1960; Gundelach and Traunmüller 2014), which extend and sustain the relationship (Munniksma et al. 2017; Windzio 2018, see Carlin & Love 2013 for exchange across ideological boundaries). Second, reciprocity helps in overcoming initial insecurities in the formation of ties between peers of the same ethnicity. The theoretical approaches in the previous section suggest that ethnically diverse neighborhoods present contexts in which individuals are uncertain about the prevailing norms or where they are faced with an untrustworthy social environment. Reciprocity is based on individuals' experiences with single neighbors on the ground and therefore can transcend these initial insecurities (Gundelach and Traunmüller 2014).

Under favorable conditions, reciprocity might even increase integration of the overall neighborhood (Windzio 2018). Processes of reciprocating social exchange should foster individual integration into the neighborhood, which is further strengthened when other neighbors who know the two initial partners of exchange establish contact as well (triadic closure). Furthermore, a certain degree of connectivity among neighbors creates the conditions needed to establish trust (Coleman 1988), thus extending from single ties to the larger community. Furthermore, particular kinds of social exchange lead to positive emotions towards the relationship or the larger social unit (Lawler 2001), in this case, the neighborhood.

These arguments from social exchange theory and network analysis lead to the following hypothesis which is contrary to hypothesis H1:

Hypothesis H2: Individual contact experiences reach similar quality in ethnically diverse neighborhoods and ethnically homogenous neighborhoods after staying in neighborhoods for a sufficient period of time.

However, as pointed out above, previous studies usually find lower connectivity in ethnically diverse neighborhoods. The "hunkering down" claim holds that even casual day-to-day contacts are negatively affected by diversity (Putnam 2007). There are two possible reasons for the prevailing lower connectedness in ethnically diverse neighborhoods. First, the contextual forces described by the canonical theories are simply stronger and overshadow the effects of mutual reciprocity. Second, the negative association could be the result of complex and dynamic selective mobility behavior, either in or out of the neighborhood. In this case, the negative association between diversity and individual embeddedness is an effect of confounding mechanisms of third variables.

Selective Residential Mobility as an Alternative Explanation of Negative Diversity Effects

Apart from diversity itself, another reason for lower connectedness in ethnically diverse neighborhoods is that individuals with specific traits move into ethnically diverse neighborhoods, and that individuals with specific traits typically stay for a shorter period of time in ethnically diverse neighborhoods. If traits

of in- and out-movers affect their future neighborhood contact experiences, estimates of the effects of ethnic diversity are biased. Selective in- and out-mobility as alternative explanations must be addressed to attribute differences in cohesion indicators causally to ethnic diversity. Importantly, it is not a priori clear in which direction selective in- and out-mobility biases diversity effects because residential mobility is dependent on a multitude of factors (Dawkins 2008).

It has long been acknowledged that households that move *into* diverse areas systematically differ from households that move into nondiverse areas. This is probably the most important reason why most studies control for a variety of variables in their statistical analyses. As an example, households might consider neighborhood characteristics other than diversity such as the socioeconomic composition when choosing a place to settle. High unemployment or lower socioeconomic status in neighborhoods in turn might contribute to lower social cohesion and is highly correlated with ethnic diversity (Letki 2008). Similarly, a main driver of residential mobility is risk aversion (Clark and Lisowski 2017). It might affect both the openness of households to settle in more diverse and urban areas and to engage in contact with initially foreign neighbors. The available infrastructure is equally important. If there is a paucity of adequate housing that meets their standards, certain families will shun ethnically diverse neighborhoods. The evidence that ethnic majority households have strong tendencies to settle in less ethnically diverse areas (Andersson 2013; Bolt et al. 2008; Bråmå 2006) shows that there is great potential for confounding influences through selective in-mobility.

A second important manifestation of selective mobility might occur moving *out* of ethnically diverse neighborhoods. "White Flight", that is, the tendency of white majority households to leave ethnically concentrated areas, found support in studies of U.S. American (Crowder et al. 2011; Hall and Crowder 2014) and European data (Bolt et al. 2008; Skifter Andersen 2017). This mobility flow might consist of individuals with certain characteristics that are related to social cohesion. To give a prominent example, households might move out of ethnically diverse neighborhoods when they are planning to have children (Goyette, Iceland, and Weininger 2014). At the same time, children are important for social integration in a neighborhood (Schaeffer 2013b). Other important life course events are also known to drive mobility decisions (Clark 2013) and might similarly affect how individuals engage in a neighborhood.

Prior cross-sectional studies pooled long-term stayers and short-term stayers.[2] Assuming no selective out-mobility as just described, and after appropriately adjusting for factors of selective in-mobility, it suffices to analyze embeddedness by length of residence and ethnic diversity. Such an analysis takes into account that households stay shorter in diverse neighborhoods, for reasons unrelated to future embeddedness. However, this assumption seems unrealistic given the current state of the literature on residential mobility. Long-term stayers possibly stayed in diverse neighborhoods for reasons that might affect the level of neighborhood cohesion that they experience. This complicates estimation of diversity effect appreciably. Households that moved away are missing in the sample of cross-sectional studies. Thus, in order to estimate the level of average local embeddedness that would have occurred if certain

households stayed in the neighborhoods, we have to make strong assumptions about the selection processes that occurred to long-term stayers.

The present paper asks the following counterfactual question in order to address the issue of selective mobility: How would an individual's contacts with neighbors develop if individuals were assigned to neighborhoods at random and, after assignment, would stay in their neighborhood for a prespecified period? Posing this question to observational data requires adjustment for causes of in-mobility and causes of out-mobility that are associated with individual social connectivity. In the present study, issues of selective in- and out-mobility are addressed by tracking individual contact with neighbors in a cohort of recent in-movers and model their potential selective out-mobility as a time-varying selection process.

Data and Methods

Data Set and Measurement of Diversity and Embeddedness

This study uses data from the German Socio-Economic Panel (SOEP; Wagner, Frick, & Schupp, 2007) from the years 2009 to 2014, combined with neighborhood data provided by the private company Microm (Goebel et al. 2014).[3] In 2009 and 2014, three neighborhood embeddedness indicators were available; thus, 2009 is treated as the baseline year, and 2014 constitutes the endpoint of this study. Neighborhood embeddedness is only assessed by one respondent per household (the head of household), leaving me with one observation per SOEP household.

Germany is one of the world's leading immigration countries and has grown more ethnically diverse over recent decades. In 2020, about 26 percent of inhabitants are of migration background.[4] At the same time, there are frequent discussions about how migration and increasing ethnic diversity affect German identity and culture, making ethnic boundaries a salient feature of German everyday life.

Neighborhoods in 2009 were divided according to small-scale geographical areas, so-called "Marktzellen" (Microm 2015), which encompass on average 1329 inhabitants in the main sample.

Recent findings in the literature on diversity effects show that it is essential to differentiate analyses by ethnic groups. Ethnic groups show different contact behaviors in relation to other ethnic groups and that this drives apparent ethnic diversity effects (Abascal and Baldassarri 2015; Tolsma and van der Meer 2018). In this study, the main analyses are restricted to ethnic majority households (defined as households without first generation immigrants) to avoid a color-blind analysis that mixes the experiences of different ethnic groups uncritically (Abascal and Baldassarri 2015). Unfortunately, case numbers of individuals of specific ethnic groups are too low to draw firm conclusions from the data (for

preliminary analyses, see the appendix). Thus, the main arguments and findings only refer to ethnic majority individuals.

Ethnic Composition

Ethnic neighborhood composition is captured by a measure of the share of ethnic minorities in a given neighborhood in 2009 (also referred to as ethnic concentration). As most of the mechanisms are related to either ethnic categorization or cultural differences between ethnicities, this study focuses on groups that are likely to be perceived as foreign by the native German population and are thus able to trigger the types of mechanisms outlined above. Specifically, African, Asian, Balkan, Eastern European, Turkish and non-European Muslim origin are considered as ethnic minorities.

Using this measure instead of widespread indices of diversity appropriately captures the out-group opportunity structure of ethnic majority households (Abascal and Baldassarri 2015). However, note also that different indices of diversity and simple shares of minorities are almost indistinguishably correlated in most national contexts (Schaeffer 2013a; Tolsma and van der Meer 2018). This correlation is in line with the observations that high concentrations of single minority groups are rare in Germany (Schönwälder and Sohn 2009) and that German natives most often represent the majority within local contexts (Schaeffer 2013a).

Information on the origin of the inhabitants of certain neighborhoods comes from a name analysis that traces the linguistic origin of household heads living in the "Marktzellen" (Kruse and Dollmann 2017; Microm 2015). Microm data have been used and validated in several recent research papers (Kruse and Dollmann 2017; Lancee and Schaeffer 2015; Maxwell 2019). These data present unique opportunities to study small-scale geographical contexts in Germany.

In the main sample, the minority share variable has a mean of 4.6, a standard deviation of 4.4 (Table A1) and the 95th percentile is 13.1. When compared to official statistics on individuals with immigration background or foreign citizens in Germany[5], these numbers seem rather small. This is partly due to the restrictive definition of ethnic minorities. Furthermore, as a probability sample of the German population, the SOEP includes those neighborhoods that are common in Germany. The low shares of ethnic minorities then simply reflect the low local concentration of immigrant groups in Germany (Schönwälder and Sohn 2009).

To validate and interpret the Microm measure of ethnic minority share, Figure 1 shows how this objective measure of ethnic composition predicts individual perceptions of neighborhood diversity. These perceptions were assessed in 2009, where respondents were asked whether any families who immigrated from abroad lived in their residential area.[6] The graph in the upper left shows that the perception of "no" immigrants in the neighborhood quickly declines with an increasing share of minorities according to the Microm measure. At approximately five percent minorities, only approximately 10 percent of respondents perceive no immigrants. In the upper right graph, we can

additionally see that at approximately 5 percent of ethnic minorities, there is a peak in responding that "some" immigrants families live in the neighborhood. Starting with approximately 10 percent minorities, the majority of respondents indicate that "many" immigrants live in the neighborhood. Thus, when interpreting the effects of minority share, we must keep in mind that individuals perceive neighborhoods with seemingly low shares of minorities according to the Microm measure to be highly diverse (as indicated by the response "many").

FIGURE 1 ABOUT HERE

Ethnic composition is treated as time-invariant in this study. This is for three reasons. First, large changes of neighborhood social composition are unlikely within five years (Zwiers, van Ham, and Manley 2018). Second, Microm introduced new geographical units that resemble neighborhoods from 2010 onwards, abandoning the Marktzellen. Keeping the boundaries of 2009 for the following years avoids introducing artificial changes in ethnic composition due to changes in context size. Third, although accounting for factors that lead to changes in neighborhood diversity is generally possible in the overall methodological framework, such an approach would require an additional model for the evolution of diversity between neighborhoods. For the short time period considered here, this requirement would add too much complexity to the analysis.

Most prior research assumes a linear relationship between ethnic diversity and social cohesion. In this article, ethnic concentration in 2009 is modeled as a restricted cubic spline function with four knots at one, four, eight and twelve percent minorities. These knots are informed by both the subjective perception of neighborhood composition in Figure 1 (the peak of "some" at five percent and the majority response "many" at ten percent) and an equal spacing between the knots.

Neighborhood Contact Experiences

The outcomes in the present study capture individuals' perceptions of their own social ties with neighbors and individuals' perceptions of the overall connectedness among neighbors. Focusing on the connectedness of individuals with others presents a direct way of testing Putnam's (2007) "hunkering down thesis". A retreat from social life should be visible in a decline in ties with neighbors for individuals living in diverse settings, irrespective of neighbors' ethnicity. All outcomes are measured in the 2009 and 2014 waves of the SOEP.

Table 1 shows the three different outcome measures with their respective questionnaire items, their response categories and the statistical methods used to model a given outcomes. The first item measures respondents' *closeness of contact* with their neighbors. This is a promising measure of neighborhood embeddedness, because an individual stating close relationships with her neighbors signals trust and a certain familiarity with her neighbors. The second item asks respondents to indicate the *frequency of visiting neighbors at home*. Thus, it captures a behavioral dimension of social embeddedness. The item is also indicative of close relationships with single neighbors. The third item asks for an assessment of

the *relations between neighbors*. It is informative on how tight the networks within the neighborhoods are perceived by the respondent. The response to this item captures perceptions about the overall neighborhood community that go beyond a single respondent's ego network.

TABLE 1 ABOUT HERE

The embeddedness measures do not ask respondents to specify their neighbors' ethnicity. This allows us to compare between homogeneous and diverse areas more easily. Consider, in contrast, a hypothetical item that asks for contact with members of specific ethnic groups. This item would confound the theoretical mechanisms listed above with a simple opportunity structure effect. It would not be surprising to find that those living in neighborhoods with few minorities also have few contacts with them in their neighborhood. One downside of not targeting specific ethnic groups is that the items in Table 1 do not allow us to test how much local networks are ethnically segregated.

Analytical Strategy

Some outcomes of neighborhood effect research are best studied by asking how an outcome would develop if individuals stayed in the same neighborhood. Contact with neighbors is a case in point since neighborhood contacts are unique for a given neighborhood (when moving away, households have to acquaint new contacts). Thus, our interest lies in how neighborhood characteristics shape contact trajectories in a counterfactual scenario where households stayed in the *same* neighborhood.[7]

This study seeks to answer this causal questions by attempting to emulate a randomized trial (Hernán and Robins 2016). An ideal design for investigating *individual level* effects of ethnic composition involves a sample of households that are randomly assigned to neighborhoods of varying ethnic composition (Algan et al. 2016). In a second step, the neighborhood integration of these households is tracked over a pre-defined period of time after assignment. To estimate the effect of staying in a neighborhood of a certain level of ethnic diversity, we must additionally measure and adjust for time-varying factors that could both lead households to leave the neighborhood and affect future embeddedness. This adjustment is even necessary if randomization in the first step can be guaranteed (Hernán and Robins 2017).

To approach this design with observational data, we, first, restrict the sample to households that moved into their current home in 2009 or no more than three years before 2009. This restriction is necessary because addressing out-mobility means that we have to follow households from as early as possible after moving into a neighborhood. The cohort of in-movers in 2009 constitute the baseline sample. They are followed until they either move out of their neighborhood (see below), get lost due to panel attrition or are interviewed in 2014, where they are again asked about their contacts with their neighbors.

The treatment initiation window of three years results from a trade-off between a theoretically sound sample of recent in-movers and a reasonable sample size. On the one hand, choosing such a long treatment initiation time might lead to the exact same bias due to out-mobility that this design should prevent. This bias occurs if a large share of households make selective moving decisions within the first three years. On the other hand, the three-year window allows me to include more cases from more diverse areas and yields estimates that are more precise. As a robustness check, restricting the sample to households that lived at maximum two years in their current dwelling in 2009 yields less precise estimates, but did not change the results in substantive terms (see Online Appendix O1).

Confounding by Selective Mobility into Diverse Neighborhoods

Given that this study uses observational data, random assignment to neighborhoods of certain shares of ethnic minorities cannot be assumed (see Table A2 for characteristics of households different neighborhoods). There might potential baseline confounders that are indicated by X_{2009} in the directed acyclic graph (DAG) (Elwert 2013) in Figure 2.

FIGURE 2 ABOUT HERE

To statistically adjust for the variables in X_{2009}, they are included as time-stable predictors in regression models (hence the box around X_{2009} in Figure 1). The X_{2009} are measured in 2009, shortly after households move into their new dwelling. These variables are considered informative about factors that are causally prior to diversity in 2009 and affected the decision to move *into* a neighborhood of certain ethnic composition. Table A1 in the appendix shows descriptive statistics of these baseline variables and the outcome variables in 2009 and 2014.[8]

The variables X_{2009} in the following analyses include three sets of variables. The first set captures the social context in the target neighborhood that households might consider when deciding to move into neighborhoods of certain ethnic composition: neighborhood unemployment rate, log number of residents, the type of building a household lives in (measured in five categories), self-reported distance to the nearest large city center (in categories), and the type of residential area (mere residential, business/industrial, or mixed).

On the household level, control variables are the presence of newborn children; children of preschool age; children of school age (Goyette et al. 2014); homeownership; family status (single, married or cohabiting); mean age of household members; whether at least one household member is either not working, in training, unemployed, working or changed job; log household income[9]; a subjective assessment of the appropriateness of the size of the dwelling; and an indicator of the highest educational degree in the household. These variables capture household level factors that might deter individual from moving into highly diverse areas, for example, because of their children.

Furthermore, attitudinal variables that are potentially affected by experiences with ethnic diversity in prior neighborhoods are included. These encompass an indicator of willingness to take risks when

meeting strangers and an indicator of general risk aversion to proxy social trust. The SOEP also offers attitudinal indicators that ask respondents about their worries regarding immigration to Germany, about xenophobic hostility towards immigrants in Germany, and about their own economic situation on a three-point scale ("not at all worried", "somewhat worried" and "very worried"). The first two are indicative of openness towards migration-induced diversity. These attitudinal variables are aggregated within households by calculating the mean of all household members per year.

Note that this study uses mostly household characteristics instead of characteristics of the household head since moving decisions are typically a function of characteristics of the whole household.

Selective Out-mobility after Baseline and Selection Bias

The only way to leave a neighborhood is to move away. Because the interest is in neighborhood integration after a household stays in the *same* neighborhood for five years, household panels are censored after the household moved out of their current dwelling between 2009 and 2013. For households that left the neighborhood, it is impossible to observe future neighborhood contacts in their baseline neighborhood. Thus, the sample is conditioned upon staying in the neighborhood, which is indicated by boxes around the $stay_t$ variable in the DAG in Figure 2.

In the main sample, of the 1,741 households that are present in 2009, 40 percent were censored because they moved out before 2014 (Table A1, second row). Further households are lost due to panel attrition. This leaves 471 households that are again interviewed in 2014.

"Inverse Probability of Censoring Weighting" (Robins et al. 2000:557) is applied to account for possible selection bias due to out-mobility based on household characteristics that both affect staying in a neighborhood and embeddedness. This involves estimating the probability of being artificially censored due to moving out and using these probabilities to construct weights that adjust for selection bias.

The weights to be estimated take the following form:

$$IPOW_{i,T} = \frac{\prod_{t=2009}^{T}\left(1 - pr\left(Move_{i,t}\middle|Move_{i,t-1} = 0, g\left(t, W_{i,2009}\right)\right)\right)}{\prod_{t=2009}^{T}\left(1 - pr\left(Move_{i,t}\middle|M_{i,t-1} = 0, g\left(t, Z_{i,t}, W_{i,2009}\right)\right)\right)}$$

where i indicates households, t indicates survey wave, $Z_{i,t}$ are time-varying causes of out-mobility as in Figure 2 and $W_{i,2009}$ is a subset of $X_{i,2009}$ in Figure 2 used to stabilize the weights (Robins et al. 2000).

A pooled logistic regression of moving out in in any given year between 2009 to 2013 is used to estimate probabilities of out-mobility, where each household year is treated as a unit of analysis (Hernán, Brumback, and Robins 2002; Robins et al. 2000). These probabilities are then used to construct what, in the following, will referred to as the "inverse probability of out-mobility weights" (IPOW). Applying these weights in the outcome regressions for observations in the year 2014 gives a larger weight to households with characteristics that make them more likely to move, such that the final sample in 2014

consists of households is as if no selective out-mobility took place. Thus, even though households that left the neighborhood are not included in the outcome regression in 2014, they add information to the estimation of the weights, which in turn affects the results of the outcome regression in 2014.

The DAG in Figure 1 depicts the result of weighting by the IPOW by drawing the effects from time-varying factors Z_{it} on staying in the neighborhood ($stay_t$) with dashed arrows. Weighting the sample with the IPOW balances the Z_{it} between different histories of out-mobility, and thus, the dashed arrows can be removed from the DAG.

The model of out-mobility include yearly varying indicators of the presence of a newborn child, whether there was a change in employment for persons within a household, an indicator of general risk aversion, dwelling satisfaction and the three worries indicators. Furthermore, the model includes a measure of closeness of neighborhood contacts in 2009 to account for mobility due to baseline values of the outcome itself. Neighborhood contacts in 2009, having a child and concerns about immigration are interacted with the share of minorities in the neighborhood in 2009. See the appendix for descriptive statistics of the time-varying variables (Table A3) and for regression tables (Table A4) of these selection models.

This approach requires adjustment for all important confounding variables. In contrast to prior cross-sectional studies, however, this longitudinal approach allows to model confounding due to selective in-mobility and selection bias due to selective out-mobility as two separate phenomena. Standard errors are clustered at the household head level to account for both the weighting procedure and correlations within households over time.

Results

Main Results

The following section reports main results for each of the three outcomes by evaluating changes between 2009 and 2014 at specific values of minority share for each of the three outcomes. These values have been chosen for ease of exposition. Ethnic minority share is still treated as a continuous spline function in the underlying models (Table A5 and A6). These values reflect homogenous neighborhoods (1 percent minorities), moderate neighborhoods (3 and 6 percent minorities) and neighborhoods with high shares of minorities (9, 12 and15 percent).

FIGURE 3 ABOUT HERE

Figure 3 shows the results for the first outcome, an indicator of the closeness of neighborhood contact. The left panel shows predicted values from a OLS regression just including minority share in 2009, a dummy variable indicating whether the observation is in 2009 or 2014, and their interaction (see Model 1 in Table A5). This graph shows that (a) the closeness of neighborhood contact increases substantially

over the course of the five years studied, particularly in neighborhoods with higher minority shares, and (b) closeness to neighbors is negatively associated with the percentage of ethnic minorities in the neighborhood in 2009 and, to a lesser extent, in 2014. These descriptive results show that those moving into neighborhoods with higher shares of ethnic minorities start with a lower quality of neighborhood contacts but improve these contacts substantially over time.

The middle panel in Figure 3 shows that the moderate negative association with minority share in both 2009 and 2014 from the left panel is largely due to selective in-mobility and time-stable confounding (Figure 1, middle panel). After adjustment for baseline variables, the negative association from the left panel shrinks considerably. Furthermore, we can still observe substantial increases within five years of staying in the neighborhood for 1 percent minority neighborhoods and neighborhoods with high shares of ethnic minorities (9%, 12% and 15%).

Comparing the right panel of Figure 3 to the middle panel shows that, once baseline variables are taken into account, weighting observations by their inverse probability of staying in the current neighborhood yields highly similar results to a model that only adjusts for baseline confounding variables (see also models (2) and (3) in Table A5). Thus, selective out-mobility during the period of five years is not a main driver of the negative association between ethnic composition and neighborhood contact.

The most important finding from Figure 3 is that we can observe an increase in contact quality in neighborhoods with high shares of ethnic minorities after adjustment for baseline variables and the probability to leave the neighborhood between the two measurement occasions (right panel). The increase for neighborhoods with 1 percent minority share is .19 (95% CI: [0.03; 0.34]). In contrast, this increase is higher for households living in more ethnically concentrated areas (see lines for 9, 12 and 15 percent minorities), who start from slightly lower average closeness and reach slightly higher levels of closeness after five years of staying in their neighborhood. To give a substantive impression of the effect size, contact closeness increases from -0.19 to 0.13 between 2009 and 2014 for households living in neighborhoods with 12 percent minorities. This increase by 0.32 is statistically significant (95% CI: [0.15; 0.49]). These findings are in line with hypothesis H2.

Results for the second outcome, the frequency of visiting neighbors at home, are very similar to those for the indicator of closeness of neighborhood contacts in Figure 3. Figure 4 shows predicted probabilities of the response category visiting neighbors "once a week" from an ordered logistic regression. We can observe that visiting neighbors once a week is negatively associated with the share of ethnic minorities, particularly in the baseline year 2009 (Figure 4, left panel). However, after taking into account possible selection effects into neighborhoods, this association is reduced substantially (Figure 4, middle panel. We can now observe a higher increase in the propensity to visit neighbors regularly in neighborhoods with high percentages of ethnic minorities. Finally, weighting by the inverse probability of staying in the neighborhoods does not change the overall results (Figure 4, right panel).

As an illustrative example from the right panel of Figure 4, respondents in neighborhoods with a minority share of 12 percent experience an increase of 8 percentage points in the probability of visiting a neighbor weekly (95% CI: [0.03;0.14]), whereas this increase is only 3 percentage points in homogenous neighborhoods (1 percent minorities; 95% CI: [0.00;0.07]). This differential increase leads to similar levels in the inclination to visit neighbors between neighborhoods with high and low shares of ethnic minorities after staying five years in the neighborhood (difference in 2014 is statistically insignificant). The results from Figure 4 are in line with hypothesis H2: Not only can households increase their embeddedness substantially over time in neighborhoods with high shares of ethnic minorities, but also they reach similar or even slightly higher levels after a period of five years.[10]

FIGURE 4 ABOUT HERE

Another interesting finding from the right panels of both and Figure 3 and 4 pertains to the non-linear relationship between ethnic composition and both contact closeness (Figure 3) and the inclination to visit neighbors (Figure 4). Apparently, households that moved into neighborhoods with moderate shares of ethnic minorities (3 and 6 percent minorities) experience the lowest increase in neighborhood contacts and fail to reach levels of contact closeness of households in more diverse neighborhoods. For example, in 2014 the difference in contact closeness between households in neighborhoods with 12 percent minorities and neighborhoods with 6 percent minorities is 0.32 and is statistically significant (95% CI: [0.16;0.48]). In contrast, the difference between 1 percent minorities and 12 percent minorities is 0.08 and not significant. This speaks against a straight forwards dose-response relationship between ethnic diversity and individual neighborhood embeddedness. Instead, moderate diversity is associated with the lowest perceived individual embeddedness.

The third outcome variable is an item asking about perceived neighborhood relations to measure perceptions of the neighborhood community. Figure 5 shows the predicted probability of households reporting "fairly cohesive" neighborhood relations. The unadjusted predictions in the left panel of Figure 5 show striking differences between neighborhoods of different ethnic minority shares. About thirty percent of households in neighborhoods with 1 percent minorities report strong relations among their neighbors in 2009, whereas only approximately ten percent report strong relations in neighborhoods with 12 percent minorities. We can also see no substantive increases between 2009 and 2014.

FIGURE 5 ABOUT HERE

After adjustment for baseline variables and selective out-mobility (right panel of Figure 5), the differences in perceiving relations among one's neighbors as "fairly cohesive" are, as in Figure 3 and 4, strongly diminished. However, in contrast to Figure 3 and 4, we can still observe a negative association of perceiving a cohesive community and the share of ethnic minorities. For example, in 2014, households' probability to perceive a fairly cohesive neighborhood community in neighborhoods with 12 percent minorities is about ten percentage points lower than in neighborhoods with 1 percent minorities (difference: -0.09, 95% CI: [-0.20;0.011]). This difference is only significant if defined at a

p-value cutoff of 0.10. However, it is still the biggest difference between homogenous and highly diverse neighborhoods we can observe in the data and thus worth elaborating on (see below). In addition, staying in the neighborhood for five years does not raise the probability of perceiving a close-knit community in neighborhoods with high shares of ethnic minorities. Thus, residents in ethnically concentrated areas do not reach similar levels as those in less concentrated areas, even after a period of five years. Instead, the perception of cohesive neighborhood relations remains rather stable throughout time for all values of the neighborhood share of minorities.

If households in neighborhoods with high shares of ethnic minorities do more rarely perceive their neighbors as being closely connected, how do they perceive them instead? Figure 6 shows predicted probabilities for all four other possible response categories of the item on neighborhood relations from the same model that underlies the right panel in Figure 5. Figure 6 reveals that the majority of respondents in all neighborhoods report that people occasionally talk to each other. Households in neighborhoods with high minority shares perceive that people "occasionally talk to each other" more often than in neighborhoods with low minority shares. As in Figures 3 and 4, we can observe interesting non-linear relationships between ethnic minority share and contact measures. Households in neighborhoods with a 3 percent minority share are the most likely to report that neighbors barely know each other in their neighborhood.

<div align="center">FIGURE 6 ABOUT HERE</div>

The results for the third outcome (Figure 5 and 6) allow for two basic interpretations. First, one could argue that the sample size does not allow for the detection of small differences between neighborhoods of high and low ethnic minority shares (see the confidence intervals in Figure 5). Add to this, that the response "occasionally talk to each other" is chosen most often in across all levels of ethnic minority share (Figure 6). These two aspects suggest that the influence of ethnic minority share on neighborhood relations is at best restricted. However, a second interpretation views Figures 5 to reveal an interesting departure from the empirical patterns of the previous outcomes under analysis. Apparently, individuals in neighborhoods with high and moderate shares of ethnic minorities, despite the fact that they have individual contacts with neighbors, do not perceive relations among other neighbors to be as cohesive as in homogeneous neighborhoods (1 percent minorities). In other words, households in more diverse neighborhoods are more likely to perceive neighborhood relations as less community-like than individuals do in homogenous neighborhoods. In the concluding discussion, the second interpretation is given special emphasis, because it suggests important avenues for future research and theory building.

Discussion and Conclusion

Discussion of Results and Data Limitations

Two general observations are worth emphasizing. First, the results do not allow us to infer a negative causal effect of ethnic diversity on two indicators of contacts with neighbors, namely, closeness of contacts and the frequency of visiting neighbors. Individual contact experiences initially are of lower quality in ethnically concentrated neighborhoods when compared to homogenous neighborhoods, but these experiences increase steadily and reach similar, or even higher, levels as in neighborhoods without ethnic minorities after five years of residence. These results reject hypothesis H1 and the "hunkering down" claim (Putnam 2007): inhabitants of diverse neighborhoods do not retreat from social neighborhood life over time. As these findings pertain to recent in-movers, they are in line with a British study that suggests that those who move *into* ethnically diverse neighborhoods are less susceptible to the effects of ethnic diversity (Laurence and Bentley 2016).

This finding is in contrast to hypothesis H1 and, thus, not predicted by canonical theories in the field (van der Meer and Tolsma 2014). Were individuals to retreat from social life due to an uncertain environment shaped by latent ethnic conflict, a lack of shared norms or exposure to cues of untrustworthiness, we would not expect that newly arriving households show increasing embeddedness over time. The results are instead more consistent with an account that allows for the possibility that households are able to form individual ties with single neighbors in diverse and homogenous neighborhoods over time if they stay long enough.

The second important finding is that an outcome that relates to the perception of the neighborhood community shows differences between more diverse and less diverse neighborhoods. These differences particularly stand out when compared to the results of the other outcomes under study. There is a negative relationship between the perception of "fairly cohesive" neighborhood relations and ethnic composition. Furthermore, this perception does not change or even gets more negative over time (Figure 5). This suggests that despite the fact that households are able to build up individual contacts in diverse neighborhoods as measured by the first two outcomes, they still perceive the density of networks between their neighbors as less close-knit than do individuals in homogeneous areas. In contrast to individual neighborhood embeddedness as measured by the first two outcomes, the indicator of neighborhood relations is less dependent on individual actions. This finding hints at differences in neighborhood networks between diverse and less diverse areas that are not easily overcome by single households. Thus, the lower perceived connectedness among other neighbors might be a result of the past evolution of networks within neighborhoods with high shares of ethnic minorities that the cohort of movers in this study encounters after settling down.

The finding of null effects of ethnic composition on closeness of neighborhood contact and the frequency of visiting neighbors for homogenous and diverse neighborhoods is noteworthy because most research shows negative associations between ethnic diversity and individual contact with neighbors (Dinesen et al. 2020; van der Meer and Tolsma 2014). There are three possible reasons for this departure from prior studies.

First, this study shows that the adjustment strategy matters greatly for the results. Adjustment for baseline variables measured shortly after moving into a new neighborhood greatly reduces the association between neighborhood contacts and ethnic composition. To give one example, buildings with many housing units are more prevalent in ethnically diverse neighborhoods and the type of building is an important aspect that households consider when moving into specific neighborhoods. After moving in, the built environment cumulatively shapes future contact trajectories and tendencies to move out.

Second, the null results also provoke the question whether they are only applicable to the cohort of in-movers under consideration, or due to the arguably short observation period of five years. In other words, maybe the results are not generalizable to long-term stayers. This question cannot be answered with the data at hand, because it, again, requires a model of time-varying selection for older cohorts of movers and such long-term data is not available. To shed some light on this issue, the online appendix shows the results for the main models on a sample of households that already stayed in their dwellings between 10 to 20 years in 2009. This analysis reveals the pronounced negative association commonly found in studies of ethnic diversity effects, even after adjusting for all variables used in the main analyses (see Online Appendix O2). This negative association can be interpreted as the combined effect of selective out-mobility within these cohorts and potential long-term effects of ethnic composition.

Third, the results suggest strong non-linear dose-response relationships between ethnic diversity and social cohesion indicators which might have been hidden from the linear modelling strategies of prior studies. The lowest increase in contacts is experienced by households in neighborhoods with moderate shares of ethnic minorities. On the one hand, this raises further doubt about the causal influence of ethnic minority shares to influence individual embeddedness. On the other hand, it also lends itself to the premise that in neighborhoods with sizable numbers of ethnic minorities, familiarity with diversity is predominant. Then, the cultural differences that are supposed to lead to lower cohesion according to anomie and negative exposure theories are of less importance because the insecurities that are present when forming social bonds across ethnic boundaries are lower in more diverse neighborhoods.

A further interesting finding is that, in contrast to adjustment for baseline variables, adjustment for potential selective out-mobility via inverse probability weighting does not change the results *after adjustment for baseline variables*. This is in itself an interesting finding, as the inverse probability weights adjust for factors that are often discussed as triggers of selective out-mobility and which are prone to influence future social embeddedness in the neighborhood. Note that this does not mean that selective out-mobility is unimportant. It might be of particular importance when future studies

investigate the trajectories of households that stay longer than five years. Selective out-mobility might get stronger the longer a cohort of in-movers stays in their neighborhoods, making long-term stayers a particularly selective group.

There are several limitations of this study, both related to the data and to the research design. First, SOEP respondents, being a random sample of the entire German population, only rarely live in the most diverse neighborhoods. This underrepresentation might lead to an underestimation of the diversity effect because those affected the most by diversity are missing in the main analysis. Thus, to pursue more rigorous avenues in future research, there is a need for longitudinal stratified sampling designs that increase the variance in ethnic diversity.

Second, interpretations of the causal effect of diversity require the adjustment of important confounding variables. This assumption is ubiquitous, but this study shows that the choice of variables and adjustment strategy matters to a large degree. Additionally, this study draws attention to the importance of appropriate timing of measuring confounding factors. Some variables, like building type, homeownership and unemployment rates might matter greatly for moving into a neighborhood and are therefore modeled as baseline variables that cumulatively shape future embeddedness trajectories. Other factors, like dissatisfaction with the current dwelling develop more continuously over time, lead to out-mobility, and are therefore modeled as time-varying variables.

Third, in the present study, neighborhood composition is treated as time-constant. However, it is important to consider that individually experienced diversity can change through the mobility of other individuals while the individual stays in a given context. These changes in neighborhood composition should be modeled in future studies that are interested in long-term effects of exposure to diversity that exceed five years. The correction for time-varying out-mobility of single households in this study can be supplemented with further corrections for changes in neighborhood composition that are caused by confounding variables on the neighborhood level. This would require an additional model for neighborhood level ethnic composition that takes into account changes in structural factors that affect mobility streams into the neighborhood that also affect inhabitants' inclinations to form ties with neighbors. Such an approach is recommended for research that analyzes similar data over decades or longer (Zwiers et al. 2018).

Finally, although the findings are contrary to the notion of "hunkering down" (Putnam 2007) in diverse areas, the analyses cannot rule out that individual neighborhood networks are ethnically segregated as, for example, suggested by group conflict theories. Thus, other promising ventures for future research are analyses of neighborhood networks. More effectively than other methods, network analysis would allow researchers to investigate the segregation of networks within neighborhoods while adjusting for the relative impact of ethnic homophily and opportunities for contact.

Conclusion and Suggestions for Future Research

The literature on diversity effects has reached a point at which theoretical explanations abound (Dinesen and Sønderskov 2018; van der Meer and Tolsma 2014; Schaeffer 2014). Furthermore, most studies focus on the implications of these theories from a cross-sectional perspective. One aim of the present study is to show that one way to gain new empirical insights to advance theory building is to assess predictions about the overtime trajectories of individuals. This study proposes a methodological approach that selects a cohort of recent movers into neighborhoods of differing ethnic composition and tracks their integration into the neighborhood over time. One advantage of this approach is that it distinguishes periods of in- and out-mobility and models selection processes at the time point they actually occur. Furthermore, the approach takes into account selective mobility out of the neighborhood over time by using Inverse Probability of Censoring Weighting (Robins et al. 2000).

In his seminal paper, Putnam (2007) asserts that ethnic diversity has detrimental short-term effects on social life. However, he also states that diversity might give rise to positive effects in the long-run. In his view, these positive effects are contingent on a common identity. As noted by Abascal and Baldassarri (2015), Putnam's (2007) view is strongly communitarian because of its emphasis on shared culture, dense networks and generalized trust. This view is in stark contrast to the reality in modern societies (Abascal and Baldassarri 2015).

The results of the present study speak to this debate in suggesting that even if individuals in ethnically diverse neighborhoods view their overall community as slightly less cohesive than in less diverse neighborhoods, they are very well able to establish contacts with neighbors and reach a similar quality of neighborhood contact as in less diverse neighborhoods. These results suggest that it is possible to be integrated into the social life in ethnically diverse environments without a strong sense of community. Thus, the present results show that there is a middle way between Putnam's (2007) short-term, "hunkering down", and his long-term, communitarian, unified identity, claim. As theorized by Gundelach and Traunmüller (2014), this middle way views reciprocity in human interactions as a main component. Reciprocity allows individuals to establish durable ties across ethnic boundaries, also in culturally insecure settings (Windzio 2018). Durkheim's (1933) concept of "organic solidarity" presents a way to conceive that this multitude of individually developed connections between dissimilar neighbors is able to create a form of cohesion that does not require that neighbors are forming and perceiving a close-knit community that enforces conformity. The only drawback of this form of cohesion based on reciprocity is, however, that it requires more time to develop (Windzio 2018).[11]

This study proposes an analytical strategy after clarifying the causal question it seeks to answer. This question asks for a hypothetical intervention (Hernán 2005) that randomly assigns individuals to neighborhoods of differing diversity and then forces households to stay in the initial neighborhood. This longitudinal perspective has important implications for research on neighborhood ethnic diversity and

its effects on individually experienced local cohesion. As most studies use cross-sectional data, they must rely on the respondents that lived in their neighborhoods for a fixed duration at the time that the study is conducted. If inhabitants in diverse areas are slower to establish ties but would ultimately be able to catch up with inhabitants in less diverse areas if they stayed put, the results from previous studies might to some extent be attributable to higher residential turnover in diverse areas. Estimating an effect of diversity is only possible by tracking and correcting for selective out-mobility over time.

One way to gain further insights into potential effects of diversity is to take a long-term view that still analyzes individually perceived cohesion, but emulates a hypothetical intervention (Hernán 2005) that changes neighborhood composition over long time frames while households stay put. The present study indicates that it is not the individual networks of newcomers that are negatively affected by diversity (see also, Laurence and Bentley 2016). A long-term view, in contrast, takes into account how neighborhoods historically developed and how larger changes in ethnic composition affect the networks of long-term stayers. For example, there might have been past conflicts in diverse neighborhoods that are not directly experienced by new cohorts of in-movers, but still leave their marks in the social networks that they encounter when they move into these neighborhoods (as suggested by the results for the third outcome). The relevance of such a view is again backed by Laurence and Bentley (2016), who find that an increase in diversity is associated with a decrease in neighborhood attachment for those who stay in a neighborhood over a decade.

This leads to a final remark about the typical research questions in the field of ethnic diversity effects. Most research, including this article, analyze individual perceptions of trust or contacts to make statements about social cohesion. However, ultimately, the sociological interest is in cohesion of aggregates like the neighborhood or even societies. Researchers like Putnam (2007) motivate their research by maintaining that ethnic diversity affects *societal* cohesion. This is different from analyzing the mean levels of individual trust or contact between certain statistical groupings. In order to understand the cohesiveness of large social systems and how group differences in culture and habit play into the emergent property of cohesion, traditional survey research might be insufficient (Maes 2018). Rather, research questions like this ask for a relational approach. Such an approach involves resorting to methods like agent based models or network analysis to understand how cohesive structures emerge through the complex interrelations between individuals. This opens interesting avenues for future research. For example, from a neighborhood network perspective, higher population turnover in diverse areas itself might be a root cause of lower aggregate cohesion in these areas, even in the absence of bright ethnic boundaries. The fact that households leave an area leads to holes in the network that require time to fix. Reasons for higher turnover might be causally unrelated to ethnicity, but still we would find lower cohesiveness in diverse areas.

To conclude, this study shows that after a time span of five years, individuals' neighborhood contacts in ethnically concentrated neighborhoods are of similar quality as in less concentrated neighborhoods. Thus, certain cohorts of movers into diverse areas are increasingly embedded in their neighborhoods.

However, this increase in individual contacts does not necessarily lead to increased community-like perceptions of relations between neighbors. Taken together with findings from other studies, these findings suggest that future research should investigate how neighborhoods' social composition change over long periods of time and how this affects long-term stayers. At the same time, we must deepen our understanding about how individual differences in contact formation and residential mobility lead to emerging cohesion in complex social systems like neighborhoods.

Acknowledgements:

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Notes

Tables and Figures
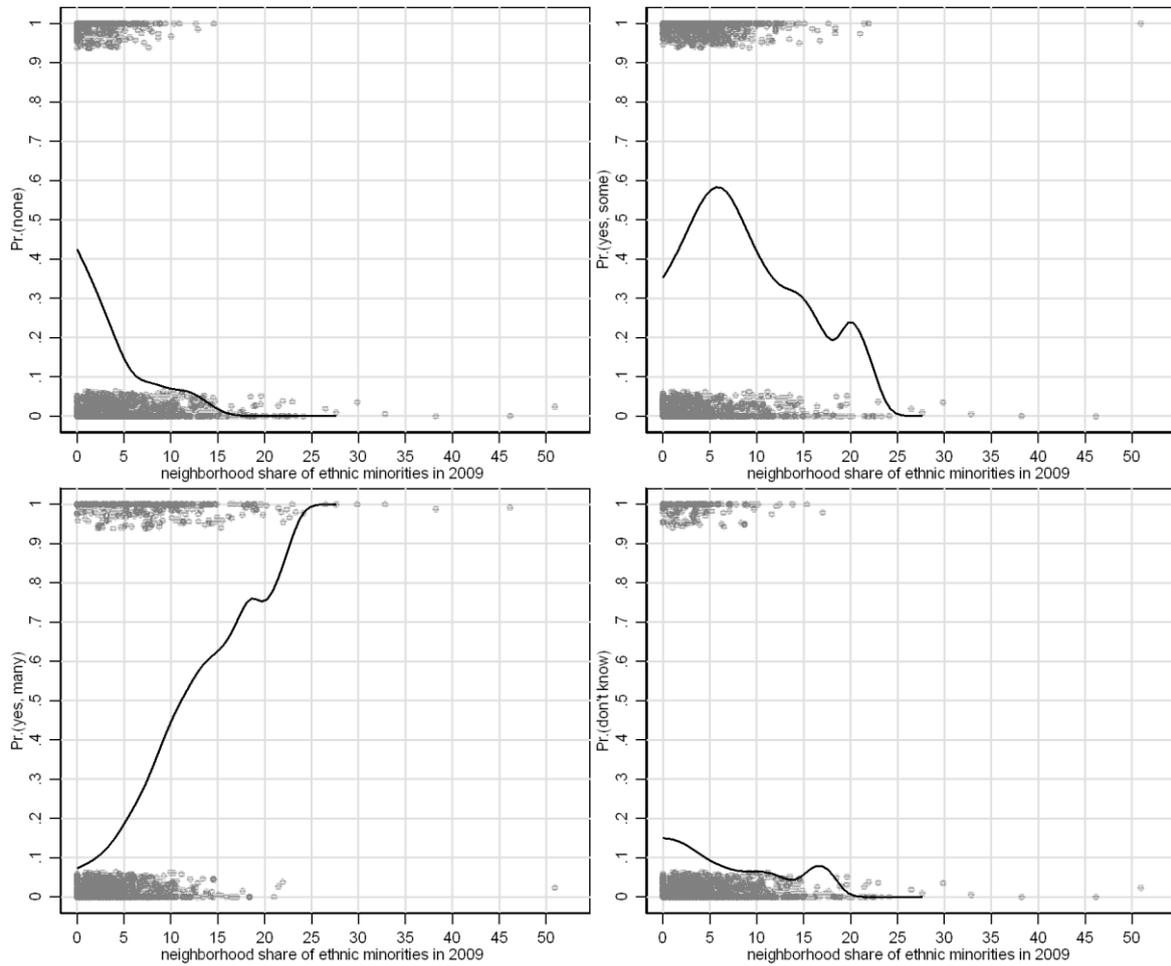
Figure 1: Proportion of responses to four subjective perception categories (y-axis) of ethnic diversity by objective ethnic diversity (x-axis). Black line: local polynomial fit. Gray dots: jittered observations to visualize distribution of objective ethnic composition. Based on the main sample of analysis.
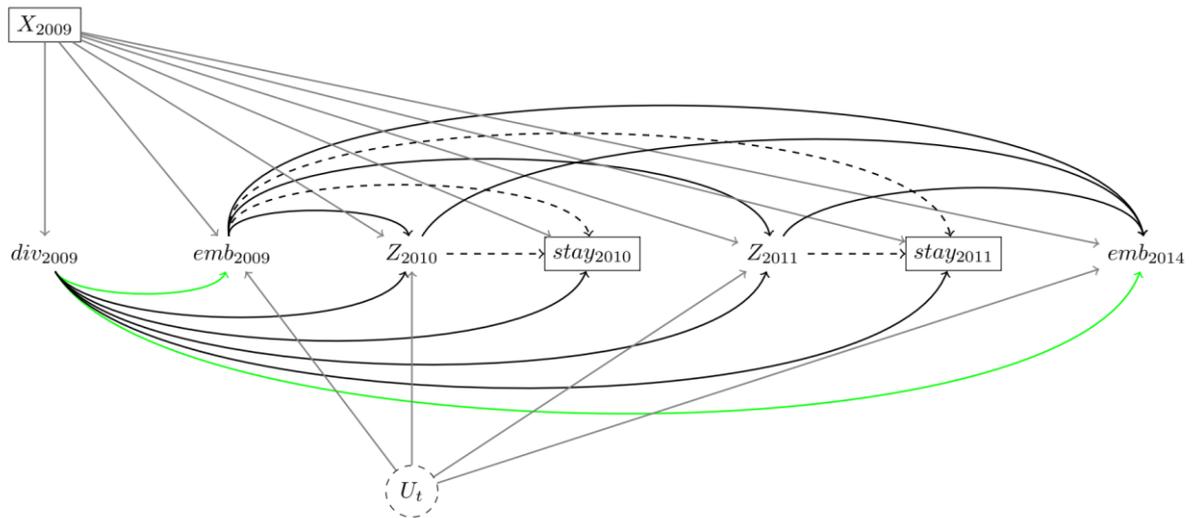
Figure 2: Directed acyclic graph for study design. Arrows show causal effects. Green arrows: effect of interest from diversity in 2009 to embeddedness in 2009 and 2014. Boxes around "stay" illustrate that the sample is conditional upon staying in the baseline neighborhood. Z are time-varying causes of out-mobility. Dashed arrows are erased by weighting the censored sample with inverse probability weights. X_{2009} are baseline confounders and conditioned on via regression. U_t are possible unmeasured factors that are allowed in my estimation strategy.
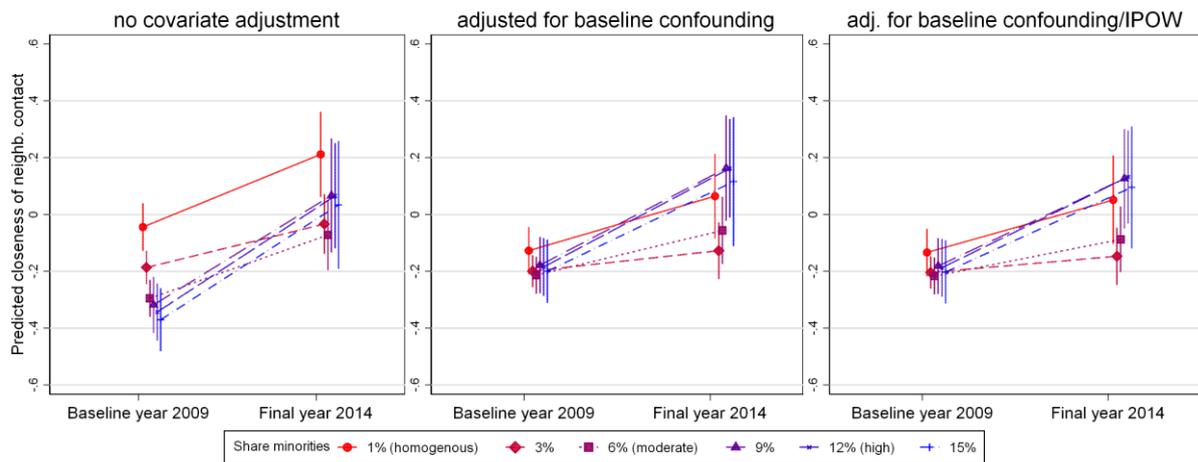
Figure 3: Predicted values of closeness of contact with neighbors. Results from OLS regressions. Full models are shown under (1), (2) and (3) in Table A5.
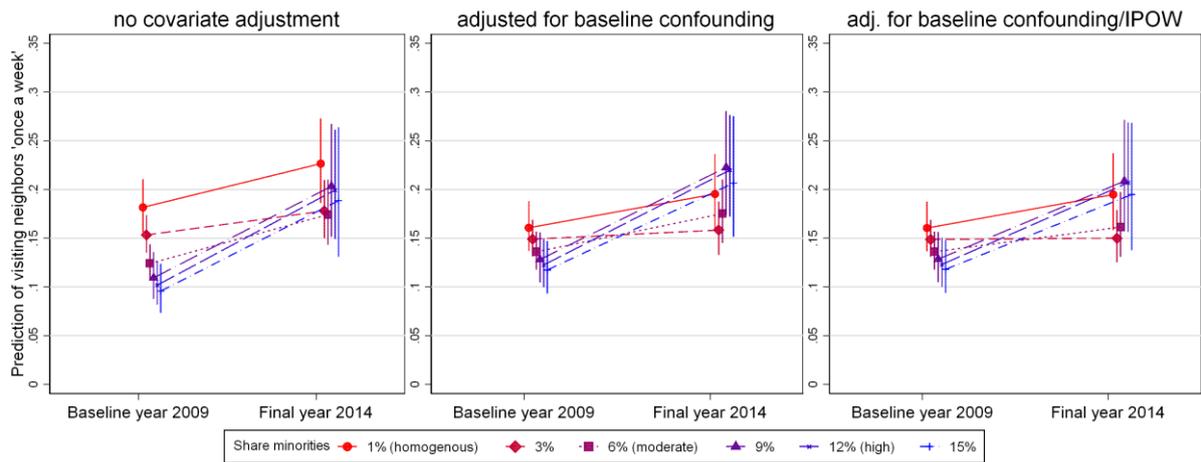
Figure 4: Predicted probabilities of visiting neighbors once a week. Results from ordered logistic regression models. Full models are shown under (7), (8) and (9) in Table A5.
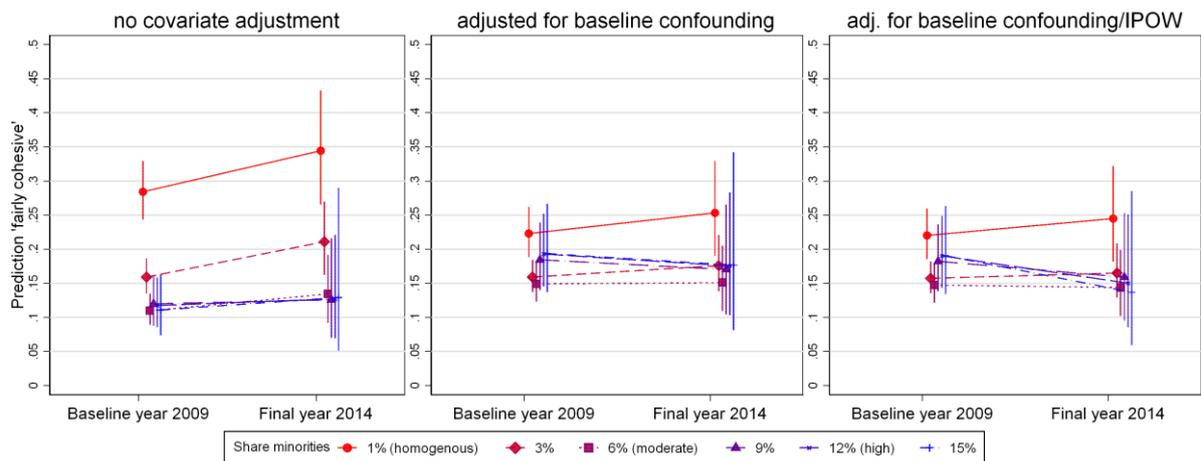
Figure 5: Predicted probabilities of perceiving cohesive relations between neighbors. Results from multinomial logistic regression models. Full models are shown under (1), (2) and (3) in Table A6.
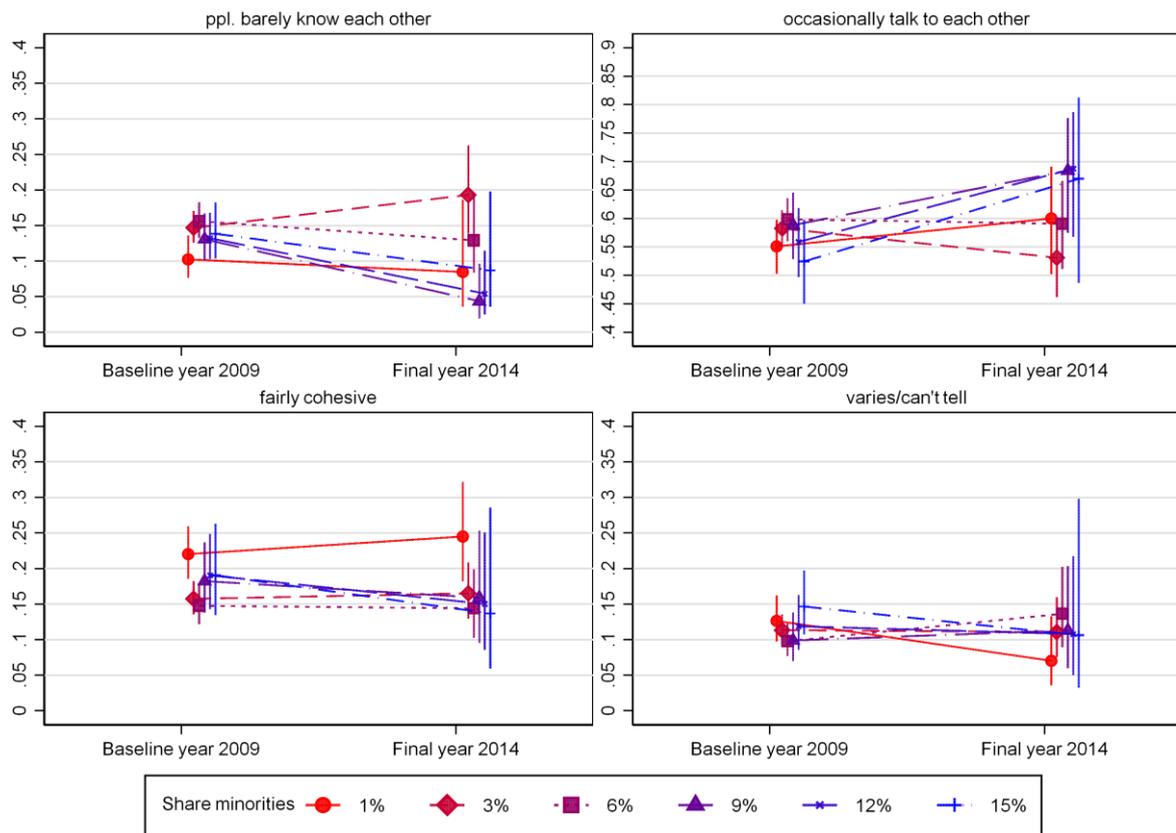
Figure 6: Predicted probabilities of all four possible response categories of relations between neighbors. Results from multinomial logistic regression models. The full model is shown under (3) in Table A6.

Table 1: Measures of social ties in the neighborhood employed in this study.

Dimension of Social Cohesion	SOEP Item	Item responses and value coding	Statistical model used
Perception of closeness of contact with neighbors (subjective assessment of own contacts with neighbors)	"How close is your contact with your neighbors in this building or in this neighborhood?"	-2. Fleeting -1. No contact 0. Moderate 1. Close 2. Very close	OLS linear regression
Visiting neighbors at home (own, intimate contact behavior with neighbors)	"Do you have neighbors who you get along with so well that you visit each other at home?" (yes/no). If reply was "yes": "How often do you visit each other?"	0. no 1. Less than once a month 2. At least once a month 3. At least once a week 4. Almost daily	Ordered logistic regression
Perception of relations among neighbors (assessment of overall neighborhood cohesion beyond own contacts)	"How would you evaluate the relationships among people in this neighborhood? Which statement fits best?"	1. People barely know each other 2. People talk to each other occasionally 3. Fairly strong relations 4. "It varies widely/unable to comment on this"	Multinomial logistic regression

Appendix

Descriptive Sample Statistics

Table A2: Variables in 2009 and in 2014. Except for the outcome variables, all other variables are measured in 2009 and are time-invariant. Changes in the marginal distribution between 2009 and 2014 in those variables are due to right censoring by panel attrition or artificial censoring (due to out-mobility). HH=household.

	2009				2014			
	mean	sd	min	max	mean	sd	min	max
Neighb. share minorities	4.6	4.4	0	53.0	4.3	3.7	0	26.5
Moves at some point after 2009 and before 2014	0.4	0.5	0	1	0	0	0	0
Outcome variables								
Closeness of contact with neighbors	-0.2	0.9	-2	2	0.04	0.9	-2	2
Perceived relations among neighbors: 1. ppl. barely know each other	0.1	0.4	0	1	0.09	0.3	0	1
2. occasionally talk to each other	0.6	0.5	0	1	0.6	0.5	0	1
3. fairly cohesive	0.2	0.4	0	1	0.2	0.4	0	1
4. varies/can't tell	0.1	0.3	0	1	0.10	0.3	0	1
Neighborhood visits: 1. no visits	0.6	0.5	0	1	0.4	0.5	0	1
2. less than once a month	0.09	0.3	0	1	0.2	0.4	0	1

3. at least once a month	0.1	0.3	0	1	0.2	0.4	0	1
4. at least once a week	0.2	0.4	0	1	0.2	0.4	0	1
5. daily	0.05	0.2	0	1	0.06	0.2	0	1
Time-stable control variables								
Unemployment rate	8.6	6.2	0	31.2	8.4	6.2	0	27.2
log(No. of inhabitants)	7.1	0.5	1.8	8.9	7.0	0.6	1.8	8.9
Building type: 1. Detached one or two family house	0.2	0.4	0	1	0.3	0.5	0	1
2. One or two family terrace house	0.1	0.3	0	1	0.1	0.3	0	1
3. Residential building 3-4 dwellings	0.2	0.4	0	1	0.1	0.3	0	1
4. Residential building 5-8 dwellings	0.3	0.5	0	1	0.2	0.4	0	1
5. Residential building 9 or more dwellings	0.2	0.4	0	1	0.2	0.4	0	1
Distance to next city center: 1. In center	0.2	0.4	0	1	0.1	0.3	0	1
2. below 10km	0.3	0.5	0	1	0.3	0.5	0	1
3. 10 to 25km	0.3	0.4	0	1	0.2	0.4	0	1
4. 25 to 40km	0.1	0.3	0	1	0.2	0.4	0	1
5. 40 to 60km	0.08	0.3	0	1	0.09	0.3	0	1
6. 60km or more	0.10	0.3	0	1	0.09	0.3	0	1
Type of neighborhood: 1. Mere residential area, old buildings	0.4	0.5	0	1	0.5	0.5	0	1
2. Mere residential area, new buildings	0.3	0.4	0	1	0.3	0.5	0	1
3. Mixed area	0.3	0.4	0	1	0.2	0.4	0	1
4. Business/industrial area	0.02	0.1	0	1	0.01	0.1	0	1
log(household income)	10.1	0.8	0	12.6	10.3	0.7	7.5	12.6
Homeownership	0.2	0.4	0	1	0.3	0.5	0	1
Persons per room	0.7	0.3	0.08	3	0.6	0.3	0.08	1.7
Child of age 0 to 2	0.09	0.3	0	1	0.09	0.3	0	1
Child of pre-school age	0.1	0.3	0	1	0.1	0.3	0	1
Child of school age	0.2	0.4	0	1	0.2	0.4	0	1
Family relations in HH: 1. No partner	0.5	0.5	0	1	0.4	0.5	0	1
2. Partner in HH (ref. no partner)	0.2	0.4	0	1	0.2	0.4	0	1
3. Spouse in HH (ref. no partner)	0.3	0.5	0	1	0.4	0.5	0	1
Concerns about immigration in HH	1.8	0.7	1	3	1.8	0.7	1	3
Concerns about hostility towards foreigners in HH	2.0	0.6	1	3	1.9	0.6	1	3
Risk aversion towards strangers	3.6	2.3	0	10	3.6	2.1	0	9
General risk aversion	4.3	1.9	0	10	4.1	1.8	0	10
Mean household age	39.1	13.9	19	89	43.9	13.5	19.5	85
At least one HH member changed jobs	0.2	0.4	0	1	0.1	0.3	0	1

At least one HH member not working	0.08	0.3	0	1	0.10	0.3	0	1
At least one HH member in training	0.1	0.3	0	1	0.07	0.3	0	1
At least one HH member unemployed	0.1	0.3	0	1	0.09	0.3	0	1
At least one HH member working	0.6	0.5	0	1	0.7	0.5	0	1
Observations	1741				471			

Table A3: Mean values of household characteristics in 2009 by ethnic composition.

Minority share:	0-1%	1-4%	4-8%	8-12%	12-Max%
	mean	mean	mean	mean	mean
Outcome variables					
Closeness of contact with neighbors	0.17	-0.18	-0.25	-0.35	-0.37
Perceived relations among neighbors: 1. ppl. barely know each other	0.047	0.12	0.17	0.20	0.23
2. occasionally talk to each other	0.47	0.57	0.60	0.58	0.53
3. fairly cohesive	0.40	0.19	0.12	0.12	0.11
4. varies/can't tell	0.085	0.12	0.11	0.099	0.14
Neighborhood visits: 1. no visits	0.45	0.54	0.59	0.66	0.71
2. less than once a month	0.093	0.094	0.11	0.075	0.081
3. at least once a month	0.17	0.14	0.13	0.11	0.090
4. at least once a week	0.23	0.16	0.15	0.11	0.054
5. daily	0.054	0.055	0.023	0.043	0.063
Time-varying predictors of moving out					
Newborn child (age 0 to 1)	0.10	0.061	0.052	0.056	0.018
At least one HH member changed jobs	0.12	0.23	0.23	0.20	0.23
Concerns about immigration in HH	1.89	1.82	1.71	1.78	1.79
Concerns about hostility towards foreigners in HH	1.99	1.96	1.99	2.01	1.93
Concerns about own economic situation in HH	2.21	2.11	1.98	1.97	2.02
Moves at some point after 2009 and before 2014	0.29	0.35	0.43	0.39	0.49
Time-stable control variables					
Unemployment rate	8.11	8.24	7.67	10.2	12.8
log(No. of inhabitants)	6.56	7.06	7.19	7.24	7.24
Building type: 1. Detached one or two family house	0.44	0.31	0.15	0.11	0.045
2. One or two family terrace house	0.18	0.11	0.10	0.11	0.054
3. Residential building 3-4 dwellings	0.11	0.17	0.16	0.14	0.13
4. Residential building 5-8 dwellings	0.18	0.25	0.34	0.39	0.44

5. Residential building 9 or more dwellings	0.093	0.17	0.24	0.25	0.33
Distance to next city center: 1. In center	0.054	0.100	0.20	0.25	0.34
2. below 10km	0.19	0.26	0.32	0.36	0.41
3. 10 to 25km	0.29	0.29	0.24	0.16	0.12
4. 25 to 40km	0.14	0.16	0.12	0.043	0.054
5. 40 to 60km	0.12	0.094	0.049	0.075	0.027
6. 60km or more	0.20	0.10	0.068	0.11	0.054
Type of neighborhood: 1. Mere residential area, old buildings	0.50	0.46	0.41	0.45	0.40
2. Mere residential area, new buildings	0.31	0.29	0.27	0.12	0.14
3. Mixed area	0.17	0.23	0.31	0.40	0.44
4. Business/industrial area	0.023	0.015	0.012	0.025	0.018
log(household income)	10.1	10.1	10.1	10.0	9.88
Homeownership	0.33	0.22	0.18	0.12	0.063
Persons per room	0.63	0.67	0.67	0.62	0.66
Child of age 0 to 2	0.15	0.10	0.082	0.075	0.045
Child of pre-school age	0.18	0.12	0.082	0.093	0.12
Child of school age	0.15	0.21	0.16	0.14	0.090
Family relations in HH: 1. No partner	0.39	0.47	0.53	0.55	0.50
2. Partner in HH (ref. no partner)	0.27	0.22	0.17	0.23	0.26
3. Spouse in HH (ref. no partner)	0.34	0.31	0.30	0.22	0.23
Concerns about immigration in HH	1.89	1.82	1.71	1.78	1.79
Concerns about hostility towards foreigners in HH	1.99	1.96	1.99	2.01	1.93
Risk aversion towards strangers	2.99	3.53	3.99	3.93	3.33
General risk aversion	3.97	4.23	4.38	4.38	4.16
Mean household age	38.2	39.5	38.9	40.2	35.9
At least one HH member changed jobs	0.12	0.23	0.23	0.20	0.23
At least one HH member not working	0.078	0.077	0.080	0.062	0.072
At least one HH member in training	0.12	0.099	0.13	0.14	0.17
At least one HH member unemployed	0.12	0.13	0.089	0.081	0.099
At least one HH member working	0.68	0.62	0.63	0.57	0.58
Observations	129	913	427	161	111

Selective Out-mobility

Table A4: Mean values of time-varying variables between 2009 and 2013. The drop in observations over the years is due to both panel attrition and artificial censoring after moving. HH=household.

	2009	2010	2011	2012	2013
Newborn child (age 0 to 1)	0.059	0.052	0.043	0.045	0.050
At least one HH member changed jobs	0.22	0.17	0.17	0.15	0.15
Concerns about immigration in HH	1.80	1.81	1.88	1.74	1.79
Concerns about hostility towards foreigners in HH	1.97	1.97	1.94	1.97	1.98
Concerns about own economic situation in HH	2.06	1.99	1.92	1.89	1.82
General risk aversion	4.26	4.71	4.77	4.92	4.65
Satisfaction with dwelling	7.72	7.59	7.50	7.61	7.65
Moves next year	0.11	0.10	0.10	0.095	0.069
Observations	1741	1286	910	692	562

Table A5: Logistic regression to predict out-mobility for the years between 2009 to 2013. Predicted probabilities from these models are used for the construction of the inverse-probability of out-mobility weights. Probabilities from model (2) serve only to stabilize the weight, and the outcome regression adjusts for these time-constant factors.

	(1) Denominator model		(2) Numerator model	
Neighb. share minorities	0.059*	(0.025)	0.030**	(0.009)
Closeness of contact with neighbors	-0.263**	(0.087)		
Neighb. share minorities *X* Closeness of contact with neighbors	0.024+	(0.013)		
Newborn child (age 0 to 1), 1yr lag	0.141	(0.301)		
Newborn child (age 0 to 1), 1yr lag *X* Neighb. share minorities	0.043	(0.041)		
At least one HH member changed jobs	0.597***	(0.124)		
Neighb. share minorities *X* Concerns about immigration in HH, 1yr lag	-0.017	(0.014)		
Concerns about immigration in HH, 1yr lag	-0.042	(0.112)		
Concerns about hostility towards foreigners in HH, 1yr lag	0.031	(0.090)		
Concerns about own economic situation in HH, 1yr lag	-0.124	(0.092)		
General risk aversion, 1yr lag	0.079**	(0.029)		
Satisfaction with dwelling, 1yr lag	-0.338***	(0.027)		
Survey year=2011	-0.221	(0.140)	-0.131	(0.134)
Survey year=2012	-0.217	(0.154)	-0.098	(0.144)
Survey year=2013	-0.310+	(0.163)	-0.200	(0.158)
Survey year=2014	-0.580**	(0.195)	-0.548**	(0.190)
Constant	0.006	(0.414)	-2.216***	(0.098)
No. household-years	4449		4449	

Outcome Regressions

Table A6: Outcome regressions of quality of neighborhood contact (OLS) and visiting neighbors (ordered logistic regression). Standard errors clustered within households (in parentheses). The table continues on the following pages.

	Contact closeness with neighbors (OLS):			Neighborhood visits (ordered logit):		
	(1) no covariate adjustment	(2) baseline confounding	(3) baseline confounding, IPOW-weighted	(4) no covariate adjustment	(5) baseline confounding	(6) baseline confounding, IPOW-weighted
Minority share in 2009, spline term one	-0.076**	-0.040	-0.039	-0.120*	-0.055	-0.056
	(0.027)	(0.027)	(0.027)	(0.061)	(0.065)	(0.065)
Restricted cubic spline term two	0.140	0.128	0.126	0.100	0.045	0.050
	(0.101)	(0.098)	(0.098)	(0.237)	(0.238)	(0.238)
Restricted cubic spline term three	-0.253	-0.263	-0.261	-0.119	-0.063	-0.073
	(0.217)	(0.209)	(0.209)	(0.518)	(0.509)	(0.509)
Survey year=2014	0.318*	0.264*	0.261*	0.422+	0.431+	0.470+
	(0.123)	(0.121)	(0.126)	(0.239)	(0.234)	(0.245)
Survey year=2014 X Minority share in 2009, spline term one	-0.062	-0.072	-0.076	-0.086	-0.133	-0.173+
	(0.050)	(0.049)	(0.051)	(0.102)	(0.101)	(0.104)
Survey year=2014 X Restricted cubic spline term two	0.310	0.368+	0.365+	0.609	0.824*	0.908*
	(0.192)	(0.188)	(0.190)	(0.399)	(0.392)	(0.406)
Survey year=2014 X Restricted cubic spline term three	-0.669	-0.807+	-0.791+	-1.360	-1.838*	-1.986*
	(0.421)	(0.413)	(0.414)	(0.877)	(0.855)	(0.887)
Baseline controls measured in 2009:						
Unemployment rate		-0.009*	-0.009*		-0.019*	-0.021*
		(0.004)	(0.004)		(0.008)	(0.008)
log(No. of inhabitants)		-0.082**	-0.088**		-0.241**	-0.241**
		(0.031)	(0.032)		(0.074)	(0.075)
One or two family terrace house		-0.018	-0.015		0.193	0.185
		(0.066)	(0.066)		(0.146)	(0.148)
Residential building 3-4 dwellings		0.003	0.000		0.247	0.249
		(0.070)	(0.070)		(0.153)	(0.154)
Residential building 5-8 dwellings		-0.093	-0.089		-0.085	-0.112
		(0.064)	(0.064)		(0.155)	(0.156)

Residential building 9 or more dwellings	-0.320***	-0.311***	-0.111	-0.108
	(0.072)	(0.072)	(0.166)	(0.168)
below 10km	0.106^{+}	0.104	0.280^{+}	0.258
	(0.064)	(0.064)	(0.164)	(0.165)
10 to 25km	0.181*	0.185**	0.192	0.160
	(0.070)	(0.070)	(0.174)	(0.175)
25 to 40km	0.168*	0.169*	0.364^{+}	0.337^{+}
	(0.080)	(0.080)	(0.194)	(0.194)
40 to 60km	0.129	0.131	0.278	0.226
	(0.089)	(0.087)	(0.209)	(0.215)
60km or more	0.259**	0.260**	0.578**	0.550**
	(0.083)	(0.084)	(0.199)	(0.198)
Mere residential area, new buildings	-0.114*	-0.111*	-0.122	-0.096
	(0.048)	(0.048)	(0.109)	(0.110)
Mixed area	-0.025	-0.028	-0.121	-0.118
	(0.049)	(0.049)	(0.117)	(0.118)
Business/industrial area	-0.152	-0.160	-0.311	-0.260
	(0.178)	(0.177)	(0.309)	(0.315)
log(household income)	-0.035	-0.032	-0.024	-0.039
	(0.039)	(0.040)	(0.084)	(0.084)
Homeownership	0.270***	0.276***	0.407***	0.420***
	(0.054)	(0.054)	(0.122)	(0.123)
Persons per room	-0.036	-0.044	-0.208	-0.180
	(0.092)	(0.092)	(0.221)	(0.224)
Child of age 0 to 2	0.031	0.039	0.265^{+}	0.252
	(0.067)	(0.066)	(0.158)	(0.157)
Child of pre-school age	0.313***	0.309***	0.586***	0.591***
	(0.068)	(0.068)	(0.143)	(0.144)
Child of school age	0.040	0.039	0.068	0.052
	(0.056)	(0.056)	(0.126)	(0.126)
Partner in HH (ref. no partner)	0.021	0.023	0.013	0.023
	(0.061)	(0.061)	(0.145)	(0.146)
Spouse in HH (ref. no partner)	0.103^{+}	0.103^{+}	0.170	0.188
	(0.060)	(0.059)	(0.144)	(0.144)
Concerns about immigration in HH	0.058^{+}	0.061*	0.155*	0.154*
	(0.031)	(0.031)	(0.073)	(0.073)
Concerns about hostility towards foreigners in HH	0.100**	0.096**	0.257**	0.283***
	(0.034)	(0.034)	(0.081)	(0.082)
Risk aversion towards strangers	0.012	0.012	0.027	0.024
	(0.010)	(0.010)	(0.022)	(0.022)
General risk aversion	0.018	0.018	0.020	0.022

		(0.012)	(0.012)		(0.027)	(0.027)
Mean household age		0.003+	0.003+		0.004	0.004
		(0.002)	(0.002)		(0.004)	(0.004)
At least one HH member changed jobs		0.031	0.040		0.075	0.091
		(0.053)	(0.053)		(0.125)	(0.126)
At least one HH member in training		-0.094	-0.087		-0.144	-0.180
		(0.071)	(0.071)		(0.188)	(0.188)
At least one HH member unemployed		-0.091	-0.083		0.082	0.064
		(0.075)	(0.075)		(0.190)	(0.194)
At least one HH member working		0.008	0.012		-0.171	-0.163
		(0.055)	(0.055)		(0.127)	(0.129)
Constant	0.032	0.241	0.258			
	(0.066)	(0.451)	(0.453)			
Ordered logit cut-offs:						
cut1				-0.177	-0.712	-0.825
				(0.145)	(1.007)	(1.009)
cut2				0.299*	-0.200	-0.314
				(0.146)	(1.008)	(1.011)
cut3				1.026***	0.566	0.442
				(0.148)	(1.009)	(1.011)
cut4				2.640***	2.219*	2.092*
				(0.169)	(1.018)	(1.020)
No. household-years	2212	2212	2212	2210	2210	2210

Standard errors in parentheses. Data: German Socio-Economic Panel 2009 to 2014 and microm neighborhood data. Inverse probability of out-mobility weights (IPOW) calculated with SOEP from 2009 to 2013. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Neighborhood Ethnic Composition and Individual Contact with Neighbors

Table A7: Multinomial logistic regressions of neighborhood relations. Standard errors clustered within households (in parentheses). The table continues on the following pages.

	(1)				(2)			
	Perceived relations among neighbors (multinomial logit): no covariate adjustment				regression adjustment for baseline confounding			
	People barely know each other	People occasionally talk to each other	Fairly cohesive	Varies/can't tell	People barely know each other	People occasionally talk to each other	Fairly cohesive	Va...n't...
Minority share in 2009, spline term one	0.242*	0.000	-0.386***	-0.104	0.211*	0.000	-0.261**	-(
	(0.095)	(.)	(0.086)	(0.095)	(0.107)	(.)	(0.094)	(0
Restricted cubic spline term two	-0.535	0.000	0.892**	0.063	-0.713+	0.000	0.806*	0
	(0.336)	(.)	(0.343)	(0.353)	(0.377)	(.)	(0.357)	(0
Restricted cubic spline term three	1.053	0.000	-1.653*	0.099	1.499+	0.000	-1.582*	0
	(0.713)	(.)	(0.753)	(0.756)	(0.802)	(.)	(0.773)	(0
Survey year=2014	-1.134	0.000	-0.004	-1.103*	-0.913	0.000	-0.007	-1
	(0.698)	(.)	(0.329)	(0.560)	(0.773)	(.)	(0.372)	(0
Survey year=2014 *X* Minority share in 2009, spline term one	0.397	0.000	0.124	0.368	0.438	0.000	0.068	0.
	(0.260)	(.)	(0.152)	(0.224)	(0.291)	(.)	(0.165)	(0
Survey year=2014 *X* Restricted cubic spline term two	-1.867*	0.000	-0.605	-0.836	-2.124*	0.000	-0.371	-(
	(0.919)	(.)	(0.622)	(0.850)	(1.040)	(.)	(0.653)	(0
Survey year=2014 *X* Restricted cubic spline term three	4.048*	0.000	1.304	1.348	4.693*	0.000	0.784	1
	(1.960)	(.)	(1.391)	(1.876)	(2.239)	(.)	(1.433)	(1
Baseline controls measured in 2009:								
Unemployment rate					0.029*	0.000	-0.022+	-(
					(0.013)	(.)	(0.013)	(0
log(No. of inhabitants)					0.117	0.000	-0.446***	0
					(0.168)	(.)	(0.114)	(0
One or two family terrace house					-0.005	0.000	-0.011	-(
					(0.463)	(.)	(0.202)	(0
Residential building 3-4 dwellings					0.819*	0.000	-0.172	0
					(0.330)	(.)	(0.212)	(0
Residential building 5-8 dwellings					0.682*	0.000	-1.006***	-(
					(0.315)	(.)	(0.219)	(0
Residential building 9 or more dwellings					1.077**	0.000	-0.738**	-(
					(0.338)	(.)	(0.249)	(0
below 10km					-0.293	0.000	0.445	0.
					(0.202)	(.)	(0.312)	(0
10 to 25km					-0.432+	0.000	0.720*	0.
					(0.237)	(.)	(0.322)	(0
25 to 40km					-0.493+	0.000	0.595+	0
					(0.284)	(.)	(0.342)	(0
40 to 60km					-0.892*	0.000	0.629+	0.
					(0.400)	(.)	(0.355)	(0
60km or more					-1.047**	0.000	0.486	0

Neighborhood Ethnic Composition and Individual Contact with Neighbors

					(0.329)	(.)	(0.355)	(0
Mere residential area, new buildings					0.225	0.000	-0.149	-(
					(0.192)	(.)	(0.160)	(0
Mixed area					0.187	0.000	-0.289	-(
					(0.174)	(.)	(0.178)	(0
Business/industrial area					0.913	0.000	-0.336	-1
					(0.569)	(.)	(0.536)	(1
log(household income)					0.006	0.000	0.051	-(
					(0.145)	(.)	(0.129)	(0
Homeownership					-0.663*	0.000	0.438*	0.
					(0.335)	(.)	(0.177)	(0
Persons per room					0.026	0.000	-0.735*	0
					(0.340)	(.)	(0.309)	(0
Child of age 0 to 2					-0.361	0.000	0.341	-(
					(0.337)	(.)	(0.230)	(0
Child of pre-school age					-0.668*	0.000	0.751***	0
					(0.323)	(.)	(0.206)	(0
Child of school age					-0.336	0.000	-0.051	0
					(0.267)	(.)	(0.180)	(0
Partner in HH (ref. no partner)					0.057	0.000	0.106	-(
					(0.212)	(.)	(0.215)	(0
Spouse in HH (ref. no partner)					-0.366	0.000	-0.213	-0
					(0.247)	(.)	(0.207)	(0
Concerns about immigration in HH					-0.079	0.000	0.029	-(
					(0.112)	(.)	(0.107)	(0
Concerns about hostility towards foreigners in HH					-0.043	0.000	0.184	0
					(0.122)	(.)	(0.118)	(0
Risk aversion towards strangers					0.006	0.000	0.049	-(
					(0.035)	(.)	(0.032)	(0
General risk aversion					0.066	0.000	-0.032	0
					(0.042)	(.)	(0.036)	(0
Mean household age					-0.018*	0.000	-0.006	-0
					(0.007)	(.)	(0.007)	(0
At least one HH member changed jobs					-0.199	0.000	-0.121	-(
					(0.205)	(.)	(0.180)	(0
At least one HH member in training					0.041	0.000	0.021	-(
					(0.256)	(.)	(0.279)	(0
At least one HH member unemployed					-0.085	0.000	-0.133	0
					(0.265)	(.)	(0.246)	(0
At least one HH member working					-0.336	0.000	-0.159	-(
					(0.213)	(.)	(0.194)	(0
Constant	-2.143***	0.000	-0.203	-1.292***	-2.444	0.000	2.302	-(
	(0.249)	(.)	(0.185)	(0.229)	(1.815)	(.)	(1.453)	(1
No. household-years	2212				2212			

Standard errors in parentheses. Data: German Socio-Economic Panel 2009 to 2014 and microm neighborhood data. Inverse probability of out-mobility weights (IPOW) calculated with SOEP from 2009 to 2013. $^{+} p < 0.10$, $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Immigrant Households

Ethnic groups differ substantially in their perceptions of cohesion in neighborhoods with sizable shares of ethnic minorities. In the U.S., for example, Whites are less trusting in neighborhoods with high percentages of Blacks (Abascal and Baldassarri 2015). Thus, to give a more complete picture of neighborhood experiences, Figure 7 provides results for households of immigrant origin. Figure 7 show results of the same models as shown for native households, but restricted to households with at least one member who is either herself a migrant or whose ancestors migrated to Germany.
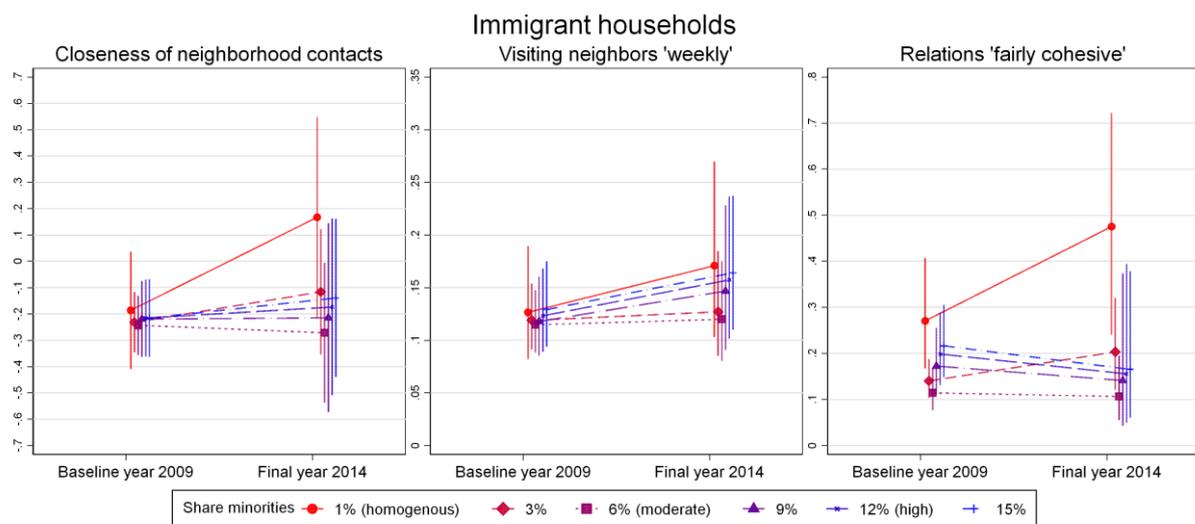

Figure A7: Immigrant households: Predicted values for the three outcomes under study from full models with baseline covariates and weighted by inverse probability of staying in neighborhood.

The results in Figure 7 are very similar to the results for native households (Figure 3 to 6). They also suggest that ethnic concentration does not have negative effects on visiting neighbors weekly (Figure 7, middle panel) but has negative effects on the perceived relations between neighbors when using very homogenous neighborhoods as a comparison (Figure 7, right panel). The latter finding is in line with the interpretation of a negative effect of ethnic minority share on the perception of the overall neighborhood community (see also Figure 5). However, there is one exception to native households. Considering the indicator of contact closeness (Figure 7, left panel), immigrant households experience greater closeness with neighbors in neighborhoods with very low shares of ethnic minorities. This perceived closeness to neighbors in non-diverse neighborhoods even increases after living in a non-diverse neighborhood for five years.

The results in the left panel of Figure 7 hint to potential positive effects of living among ethnic majority Germans and non-visible minorities for households of immigrant origin in particular. One explanation for this finding could be that neighborhoods with high shares of ethnic minorities in Germany are also often diverse in terms of the groups that live in these neighborhoods (Schönwälder and Sohn 2009). In other words, particular origin groups only rarely live only among their own co-ethnics but with many

other ethnic groups. Thus, the results in Figure 7 could be explained by the conjecture that ethnic minority group members view other ethnic groups with immigration background as less trustworthy than German natives.

However, this analysis of households with persons of immigrant origin should be seen as a first step towards a more comprehensive analysis. This is because, first, the items measuring neighborhood contacts might be interpreted differently depending on social norms within specific ethnic groups. Second, the category of households who have one member of immigrant origin might overshadow important ethnic differences within the group of persons of immigrant origin. Thus, these results hint at potential interesting social differences by ethnic groups that should stimulate further research.

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[1] The term "ethnic diversity" is used to refer to different measurements of the composition of ethnic groups in a specific context (Dinesen et al. 2020). Thus, ethnic diversity can refer to the number of groups, or the size of specific groups, or indices that are a composite of both. The statistical analyses in this article focus on group shares of ethnic minorities.

[2] The importance of length of residence has been noted in prior research, but has not yet received a more elaborate empirical and theoretical treatment. In most studies an indicator of length of residence is included in the models as control variable or used for robustness checks. For example, in his famous U.S. study, Putnam (2007:168) restricted the analysis to individuals who lived in neighborhoods for a long time as a robustness check, but these analyses are not described in detail and might suffer from the selection bias described in this section and the methods section. Dinesen and Sønderskov (2015:563) report that the effect of diversity on generalized trust remains constant over the time that individuals lived in small-scale contexts, but do not track how trust develops over time.

[3] SOEPlong v33.1: Socio-Economic Panel (SOEP), data for years 1984-2016, version 33.1, SOEP, 2018, doi: 10.5684/soep.v33.1. The Microm-SOEP dataset is provided by the German Institute for Economic Research (DIW) in Berlin (Goebel et al. 2014) and is only accessible at site for reasons of data protection.

[4] https://www.destatis.de/EN/Press/2020/07/PE20_279_12511.html

[5] See, for example, the results of the 2011 German census: https://ergebnisse.zensus2011.de/

[6] In German "Leben hier im Wohngebiet auch ausländische bzw. aus dem Ausland zugewanderte Familien?".

[7] Other research questions require different methodologies. For example, Wodtke, Harding, and Elwert (2011) ask how a long history of, potentially different, neighborhood environments affects educational outcomes. In contrast, a difference-in-difference design could be used to analyze how attitudes towards immigration change before and after moving into a diverse area (Lancee and Schaeffer 2015).

[8] Some of the variables in the X_{2009} (see figure 2) might themselves be affected by diversity in 2009. The underlying assumption is that they are measured close enough to the actual moving decision that they are rather indicative of the moving process. This might be a plausible assumption when considering factors that relate to the build environment. However, factors like risk aversion might be themselves affected by ethnic composition. In further robustness analyses, leaving out potential mediators of the effect of diversity does not change the results substantively (not shown, available upon request).

[9] Income is used as an imputed version from the SOEP pequiv data file. Leaving income out of the regression did not change results substantively.

[10] Visiting neighbors, to an even larger degree than the two other outcome measures, is likely to measure ties within ethnic groups in ethnically diverse areas (i.e., bonding social capital). If ethnic boundaries are strong, these visits might be primarily with coethnics. Even if this is true, this finding shows that inhabitants of diverse areas have similar inclinations to form intimate ties with their neighbors, thus providing evidence against the strong hunkering down claim by Putnam (2007), which relates to both in-group and out-group ties.

[11] Even more, as noted by (Sampson 2004), dense networks are not necessary to foster collective efficacy. Ties to single neighbors, in contrast to a close-knit neighborhood community, might be sufficient to allow neighborhoods to function in the face of collective action problems.