

# Ethnic Diversity and Social Trust: Evidence from the Micro-Context

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## Abstract

We argue that residential exposure to ethnic diversity reduces social trust. Previous within-country analyses of the relationship between contextual ethnic diversity and trust have been conducted at higher levels of aggregation, thus ignoring substantial variation in actual exposure to ethnic diversity. In contrast, we analyze how ethnic diversity of the immediate micro-context—where interethnic exposure is inevitable—affects trust. We do this using Danish survey data linked with register-based data, which enables us to obtain precise measures of the ethnic diversity of each individual's residential surroundings. We focus on contextual diversity within a radius of 80 meters of a given individual, but we also compare the effect in the micro-context to the impact of diversity in more aggregate contexts. Our results show that ethnic diversity in the micro-context affects trust negatively, whereas the effect vanishes in larger contextual units. This supports the conjecture that interethnic exposure underlies the negative relationship between ethnic diversity in residential contexts and social trust.

## Keywords

social trust, ethnic diversity, micro-context, interethnic exposure, national registers

As a result of increased immigration, Western societies have grown increasingly ethnically diverse over the past decades. This development has spurred a heated debate about the consequences of increased ethnic diversity in immigrant-receiving societies. One of the key themes of this debate is the question of whether social trust—and social cohesion more generally—can be maintained in the face of an increasingly diverse populace (Putnam 2007). Social trust reflects a positive expectation about the trustworthiness of the generalized, abstract other, and a person's level of social trust is thus a standard estimate of the trustworthiness of an unknown other (Robinson and Jackson 2001).<sup>1</sup> Concerns over the potential erosion of this form of trust relate to its multiple positive consequences

for collective action, democratic governance, and economic performance. At the individual level, social trust is associated with volunteering, donating to charity, tolerance, and other forms of pro-social behavior (Sønderskov 2011; Uslaner 2002). In the aggregate, societies with a higher density of high-trusters are characterized by more efficient collective decision-making, and better democratic

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government more generally, as well as higher economic growth (Bjørnskov 2009; Knack 2002; Knack and Keefer 1997). Consequently, answering the question about whether ethnic diversity has an adverse effect on trust is of utmost importance for understanding the challenges that increasingly ethnically diverse Western societies are facing.

Exposure to people of different ethnic background is the mechanism typically expected to underlie the relationship between ethnic diversity and social trust, although this is rarely stated explicitly. That is, being in physical proximity to people of different ethnic background is expected to affect people's estimate of the trustworthiness of the generalized other. Multiple contexts—including schools, workplaces, and religious institutions—may serve as arenas for exposure to people of different ethnic background, but residential areas are the main contextual domains in which the impact of interethnic exposure on trust has been analyzed in the literature. This focus probably reflects the fact that residential context is a universal setting in which almost everyone is exposed to other people on a regular basis.

Following the debate about the consequences of increased ethnic diversity, the past decade has seen a surge in within-country studies scrutinizing the relationship between trust and residential ethnic diversity at various contextual levels (Alesina and La Ferrara 2002; Dincer 2011; Dinesen and Sønderskov 2012; Fieldhouse and Cutts 2010; Gijsberts, van der Meer, and Dagevos 2012; Laurence 2011; Letki 2008; Marschall and Stolle 2004; Phan 2008; Putnam 2007; Stolle, Soroka, and Johnston 2008; Sturgis et al. 2011; Uslaner 2012). The results vary but generally point toward a moderate negative—although sometimes statistically insignificant—relationship (see van der Meer and Tolsma [2014] for a review regarding the effect of ethnic diversity on the wider concept of social cohesion).

However, given that previous intra-country studies have examined the relationship between ethnic diversity and trust in geographically vast residential areas (with

municipalities or census-tracts typically being the smallest contextual units), they are of limited value in examining whether interethnic exposure actually underlies the negative impact of ethnic diversity on trust. In the words of Stolle and colleagues (2008:60), “diversity measured at the level of country, state, city or even census tract might not accurately reflect the actual experiences (or perceptions) of heterogeneity in people's daily lives.” Moreover, recent research suggests that “failing to measure the aggregate effects at the proper unit of analysis given the hypothesized theoretical mechanisms may in part explain why some contextual effects appear to be small” (Hipp 2007:677). Hence, inaccurate measurement may well explain the null findings of some previous studies. The point is that measures of ethnic diversity in more aggregate contextual units will inevitably be imprecise, concealing substantial variation in ethnic diversity experienced in one's immediate residential context. This in turn makes it impossible to infer whether the suggested mechanism, interethnic exposure in residential areas, is in fact what underlies the negative relationship between ethnic diversity and social trust found in the literature, or if other mechanisms account for this relationship—for example, decreasing trust in response to political conflict over immigration-related issues.

This article is the first to examine how ethnic diversity in the residential micro-context affects people's level of social trust, and thus explicitly test whether interethnic exposure is driving the relationship between ethnic diversity and trust. We analyze the relationship between ethnic diversity in the micro-context and trust using nationally representative survey data merged with detailed individual-level data from the national Danish registers. This enables us to calculate precise measures of actual exposure to residential ethnic diversity, because the registers contain reliable information about the country of origin of all residents living in very close proximity of respondents' residence (down to within 80 meters [87 yards]).

## THEORETICAL BACKGROUND

The notion that contextual ethnic diversity affects individuals' social trust reflects an *experiential* perspective on the formation of trust, which posits that people's trust in the generalized other is based on experiences in their social environment (Dinesen 2012; Glanville and Paxton 2007). That is, people's beliefs about the trustworthiness of others are to some extent flexible and informed by cues from their social surroundings (for a general argument regarding the role of social context, see Huckfeldt and Sprague 1995). In broader terms, this notion of trust is related to Gambetta and Hamill's (2005) conception of the decision to trust others as being based on signs about the trustworthiness of the trustee. As we will explain, ethnicity is one such sign and, not least, an immutable one. From this perspective, the central mechanism underlying the diversity-trust nexus is exposure to people of different ethnic background in our daily life.<sup>2</sup> In this regard, the neighborhood environment provides social cues informing our assessment of the trustworthiness of the generalized other through regular exposure to other people—what Cho and Rudolph (2008) term “casual observation” (see also Baybeck and McClurg 2005; Huckfeldt and Sprague 1995).

The negative relationship between residential ethnic diversity and trust is often explained with reference to *conflict theory* or the closely related *group threat* theory (Blumer 1958; Bobo and Hutchings 1996; Quillian 1995), which essentially posit that exposure to out-groups—especially groups with different ethnic background—spurs conflict and competition over scarce resources. These theories originally predicted that conflict leads to out-group prejudice, but the negative consequences are assumed to extend to social trust (Gijssberts et al. 2012; Putnam 2007). However, the tenability of this extension is questionable. First, the empirical evidence for a negative relationship between residential ethnic diversity and interethnic prejudice is mixed (Oliver and Wong 2003;

Pettigrew and Tropp 2006), which questions the original argument and hence also the extension made with regard to social trust. Second, the theoretical justification for the extension is problematic. While conflict theory predicts that ethnic diversity leads to negative attitudes toward out-group members, it also predicts more positive in-group attitudes in the face of ethnic diversity (Putnam 2007; Tajfel 1981). Because both in-group and out-group trust are positively correlated with social trust (Bahry et al. 2005), it is unclear whether the result of increased ethnic diversity in residential areas would be a net increase or decrease in trust in the generalized other. The general point is that the adaptation of conflict theory to the relationship between residential ethnic diversity and social trust is problematic.

Acknowledging the shortcomings of conflict theory, we argue that the negative relationship between ethnic diversity and trust may instead be explained with reference to insights from social psychology and related fields. Several studies report a general human tendency to evaluate members of other ethnic groups as less trustworthy, and generally more threatening, compared to in-group members. Evidence from trust games in experimental economics shows lower levels of initial trust when the trustee has a different ethnic background than that of the truster (Fershtman and Gneezy 2001). Similarly, studies using cardiovascular or skin conductance responses show higher levels of perceived threat and fear in encounters with opponents of a different ethnic background than the subject (Mendes et al. 2002; Olsson et al. 2005). Learned prejudice probably explains part of this tendency (Stanley et al. 2011), but recent studies also point to its evolutionary roots. These studies show that humans are better at inferring other humans' thoughts, intentions, and feelings if a person belongs to their own ethnic group as opposed to a different ethnic group (Adams et al. 2010). The ability to infer others' intentions is a crucial component in building trust in specific others, and it is also likely to increase

empathy (Chiao and Mathur 2010), which feeds back and increases trust in specific others further (Barraza and Zak 2009). Importantly, positive experiences with and trust in specific others affect evaluations of the generalized other positively and thus spill over to social trust (Freitag and Traummüller 2009; Glanville and Paxton 2007).

A likely explanation for a negative relationship between residential exposure to ethnic diversity and social trust thus originates in a general human disposition to evaluate individuals with a different ethnic background as less trustworthy. This disposition exists regardless of the level of ethnic diversity in the residential setting. However, being more heavily exposed to people of different ethnic background leads to lower levels of social trust because ethnic background functions as a social cue about the trustworthiness of specific others, which in turn affects the overall assessment of the generalized other. The crux of this argument is thus that residential exposure to people of different ethnic background affects social trust negatively, because more diverse contexts provide cues—of which humans are receptive due to an evolved or learned negative out-group bias—that lead residents to believe that the generalized other is less trustworthy.

The proposed explanation is *a priori* free of assumptions about racial, cultural, or behavioral differences between ethnic groups (and their implications for conflict and competition between groups), but such differences may increase (or decrease) the effect of residential ethnic diversity (Leigh 2006). However, according to our argument, residential ethnic diversity should be negatively related to social trust, even without such group differences, because of the noted out-group bias (for a similar argument regarding anti-immigrant attitudes, see Enos 2014).

On the face of it, the argument predicts a uniform negative effect of ethnic diversity for natives as well as immigrants. However, it seems reasonable to expect the effect to be contingent on the ethnic background of the person exposed to ethnic diversity (Marschall and Stolle 2004; Stolle et al. 2008). To take

one obvious example, the fact that natives make up by far the largest share of the population (in most countries) would, on average, imply a greater familiarity with this group on the part of immigrants, which may dampen the negative out-group bias, and hence the effect of exposure to natives for immigrants. While this potential conditional effect of ethnic diversity is interesting, the analyses here concern only the consequences of exposure to diversity for the native population, due to a limited number of immigrants in our sample.<sup>3</sup>

### *Distinguishing Exposure from Contact*

It is important to distinguish the concept of *exposure* to people of different ethnic background, which is the concept of main interest here, from the related concept of interethnic *contact*, which has recently been introduced to research on the consequences of ethnic diversity for trust. Drawing on contact theory from research on prejudice (Allport 1954), this line of research emphasizes how interethnic contact furthers social trust by reducing ethnic stereotypes and, furthermore, potentially moderates the negative impact of contextual ethnic diversity (Stolle et al. 2008; Uslaner 2012). Focusing on attitudes toward homelessness, Lee, Farrell, and Link (2004) argue in favor of expanding the term “contact” so as to differentiate between interactions of different intensity.<sup>4</sup> Most pertinent to the present study, they distinguish between *observation* “in the course of everyday life” and *interaction*, which they take to refer to face-to-face interaction. Although we use different terms, we find a similar distinction to be fruitful for our purposes. We thus take interethnic *contact* to denote more intimate forms of social interactions, such as talking to (i.e., having a conversation with) people of different ethnic background, whereas interethnic *exposure* implies simply being around and casually observing people of different ethnic background.

One key difference between interethnic contact and exposure relates to the extent to which they are subject to self-selection. That

is, whether individuals self-select into contact with or exposure to people of different ethnic background. In this regard, interethnic exposure is essentially unavoidable in ethnically diverse neighborhoods, whereas actual interethnic contact is arguably more of a deliberate decision (we discuss self-selection into neighborhoods later).<sup>5</sup> Consequently, interethnic exposure in a neighborhood is likely to have greater implications for social trust in the aggregate than would interethnic contact, because exposure is pertinent to everyone living in diverse neighborhoods.<sup>6</sup>

While it is important to distinguish interethnic contact from interethnic exposure to gauge their separate effects on social trust, the two might operate in conjunction, as suggested by scholars drawing on contact theory (Laurence 2011; Stolle et al. 2008; Uslaner 2012). Illustratively, in a study from the United States, Stolle and colleagues (2008) show that the extent to which ethnic diversity in a neighborhood erodes trust is moderated by actual contact. To test this idea, we examine whether the (potential) effect of residential interethnic exposure on trust is contingent on interethnic contact.

## RESEARCH DESIGN

Using data from Denmark, we test the hypothesis that exposure to people of different ethnic background influences natives' social trust. Specifically, we combine representative survey data on social trust from the Danish part of the European Social Survey (ESS) with contextual data on ethnic diversity from the national Danish registers maintained by Statistics Denmark. The registers contain very detailed and up-to-date (anonymized) information about all individuals legally residing in Denmark, including their country of origin, the geographic location of their residence, and a range of other characteristics. Hence, it is possible to locate all individuals by their address in the registers and to identify exactly how far apart everyone lives. Using these data, we calculated the geodesic distance (in intervals of 10 meters) between each respondent in the ESS and all individuals living in

the 20,000 nearest households. By drawing a circle with a given radius around each respondent, and subsequently calculating contextual measures of ethnic diversity based on the country of origin of the other individuals living within that circle, we obtain an individualized contextual measure of diversity for each respondent.

To measure interethnic exposure we calculate the ethnic diversity of a circle with a radius of 80 meters around each respondent. The 80 meter context is well suited for tapping actual exposure: it is a narrow geographic area that at the same time constitutes a meaningful social context, as a substantial number of other individuals live within this radius (86 people, on average, in our data).<sup>7</sup> That said, the 80 meter context is somewhat arbitrary, in the sense that contexts with a radius of 90 or a 100 meters could serve equally well as micro-context. However, because we can flexibly adjust the size of the context, we can examine exactly how the results vary with the specific radius chosen. Specifically, our data enable us to expand the measure of contextual diversity beyond the immediate neighborhood (up to 2,500 meters [2,734 yards]).<sup>8</sup> As we will explain, expanding the context beyond the micro-context serves the important theoretical purpose of substantiating interethnic exposure as the underlying mechanism linking residential ethnic diversity and social trust.

Our measure of contextual ethnic diversity represents an important improvement over previously used measures for several reasons. Most important, because this measure captures ethnic diversity in the micro-context, it taps actual exposure to ethnic diversity; individuals can hardly refrain from being exposed to their (diverse) neighbors in their immediate residential surroundings. This, in turn, provides a direct and critical test of the proposition that interethnic exposure is the mechanism linking contextual ethnic diversity and trust. This stands in contrast to previous studies of the diversity-trust nexus that rely on highly aggregate contextual data on diversity, which are likely poor reflections of the diversity actually experienced in residential areas. Specifically,

previous studies all use aggregate data from administrative entities (e.g., municipalities or census tracts) when assigning contextual diversity to a given respondent. This approach is problematic because it does not locate a respondent's place of residence within a large contextual unit. One therefore remains agnostic about whether the aggregate level of diversity in this unit corresponds to what individuals experience in their immediate surroundings (for a similar point regarding structural neighborhood characteristics, see Hipp 2007; see also Sampson 2012). For example, within ethnically diverse municipalities or census tracts, one often finds ethnically homogenous enclaves consisting primarily of people with the same ethnic background. Residents in such enclaves are hardly exposed to ethnic diversity in their immediate neighborhood, although the aggregate measure suggests otherwise.

Another related source of measurement error when measuring interethnic exposure using highly aggregate data is that one cannot infer whether an individual lives in the center of a given contextual unit or on the border of this unit and another one. This is especially problematic in more heavily populated areas, where the boundaries of administrative units are likely to be somewhat arbitrary. For individuals living on the border between two (or more) contextual units, ethnic diversity measured in the administrative unit in which they reside may over- or underestimate the exposure to ethnic diversity they actually experience.

The general point is that the existing measures of ethnic diversity in rather aggregate contextual units constitute inaccurate portraits of the diversity individuals experience in their immediate surroundings and are therefore ill-suited for examining whether interethnic exposure is the mechanism explaining the impact of diversity on trust. Conversely, using data on the ethnic diversity of individuals' immediate residential surroundings allows for a more direct and valid test of whether interethnic exposure affects social trust, because individuals are inevitably exposed to people of different ethnicity in ethnically diverse micro-contexts. If we find

no effect using these data, it suggests that mechanisms other than interethnic exposure account for the empirical relationship between contextual ethnic diversity and trust.

As noted, these data also allow us to vary the level of contextual aggregation in the analyses from contexts with radii of 80 meters up to 2,500 meters. Hence, we follow Hipp's (2007:675) recommendation that "a more ideal approach would flexibly aggregate the structural characteristics to varying geographic sized areas, rather than just the block or tract." As a consequence, we can further validate whether interethnic exposure is in fact the mechanism linking diversity to trust by comparing the impact of ethnic diversity on trust at various levels of contextual aggregation. If exposure drives the relationship, we would expect the impact of diversity on trust to be found only in the immediate surroundings, where interethnic exposure is inevitable. At higher levels of aggregation, contextual ethnic diversity becomes an increasingly inaccurate measure of actual exposure due to random measurement error. This would lead to a larger standard error of the estimated effect of diversity on trust, and likely also to the estimate being biased toward zero as a result of attenuation bias (Wooldridge 2013). Conversely, if other mechanisms, operating in more aggregate contexts, explain the relationship, we should not see higher standard errors or attenuation bias at higher levels of aggregation. Relatedly, Putnam (2007) reports findings from the United States substantiating the idea that the impact of ethnic diversity on trust is more likely to emerge when measured in less aggregate contextual units (census tracts rather than counties). However, compared to this and other studies (Phan 2008), which analyze contexts of different size at quite aggregate levels, we can systematically vary the context size from the micro-context to more aggregate surroundings.

### *The Danish Context*

Our primary purpose is theory testing in the sense that we, by means of the best available

data, wish to test the notion that interethnic exposure is the underlying mechanism linking ethnic diversity and trust. To our knowledge, the Danish data described earlier are the best data available for this purpose. However, the test would obviously be of even greater value if these results could be expected to generalize to other countries (i.e., are externally valid). We believe there are good reasons to expect this to be the case, as Denmark is fairly representative of Western European countries on a number of dimensions potentially relevant for the relationship between ethnic diversity and trust. First, immigration trends in Denmark are broadly in line with those observed in many other Western European countries (see Figure S1 in the online supplement). Among the Danish population, 8.7 percent were born abroad, which is slightly below the current Western European average (12.9 percent). Denmark's population thus resembles the demographic shift taking place in other Western European countries. Second, anti-immigrant/foreigner sentiments in Denmark are close to the Western European average (see Figure S2 in the online supplement; for a similar finding predating the period studied here, see Semyonov, Raijman, and Gorodzeisky 2006). This is reassuring for the transferability of our findings to other Western European countries; a particularly negative opinion climate in Denmark may have meant that the Danish setting would be more conducive to observing a negative effect of ethnic diversity on trust. Similarly, the presence of a populist radical-right party (the Danish People's Party) as a political manifestation of anti-immigrant attitudes is akin to what is found in most other Western European countries (Carter 2005; Mudde 2013).

Because Denmark is similar to other Western European countries with regard to the demographic phenomenon studied, increased ethnic diversity induced by immigration, and the auxiliary opinion climate at the mass and elite levels, we would, *prima facie*, expect the patterns found in Denmark to be reflective of the relationship in similar Western European contexts.

### *Survey Data, Measures, and Specifications*

We use the first five rounds of the Danish version of the European Social Survey (ESS) conducted in 2002/3, 2004/5, 2006/7, 2008/9, and 2010/11. The ESS is generally held to be a highly valid and reliable data source for survey data on political and social attitudes in Europe (Norris 2004). Respondents in the Danish version of the ESS were randomly sampled from the national civil registry, and their civil registration numbers were retained by the data collection agency. This allows us to link individual-level and contextual information from the Danish national registers to each respondent.<sup>9</sup>

#### *Dependent Variable: Social Trust*

We measure social trust with a widely used and validated three-item scale (Reeskens and Hooghe 2008; Zmerli and Newton 2008) (see wording in Table A1 in the Appendix). These three items offer a reliable scale of social trust with reasonably strong internal coherence across the five waves (Cronbach's alpha = .71). The mean score on the trust scale, ranging from 0 to 10, is 6.82 (std. dev. = 1.53) across all waves.

#### *Independent Variable: Three Measures of Ethnic Diversity*

As noted earlier, the national registers contain information about addresses and the country of origin of everyone residing in Denmark, which allows us to generate flexible contextual measures of ethnic diversity. In the registers, each individual is classified as native Danish, immigrant (i.e., first-generation immigrant), or descendant of immigrants (i.e., second-generation immigrant) according to the definition by Statistics Denmark (Ministeriet for Flygtninge, Indvandrere og Integration 2009). A person having at least one parent, who was born in Denmark and who holds Danish citizenship, is classified as *native Danish*, regardless of whether the person was actually born in

Denmark or holds Danish citizenship. For people who do not meet these criteria, individuals born outside of Denmark are considered (first-generation) *immigrants*, and individuals with parents born outside of Denmark are classified as *descendants* (second-generation immigrants).<sup>10</sup> We do not generally distinguish between immigrants and descendants in the article and for brevity we use the former term to denote both groups. The registers also contain information about immigrants' country of origin (and similarly for the parents of descendants), thus allowing us to make fine-grained ethnic distinctions when calculating diversity measures.<sup>11</sup>

We use three measures of ethnic diversity: *ethnic fragmentation* in terms of the number and relative size of various ethnic groups in a given contextual unit, and two measures of *ethnic concentration*, namely the share of immigrants and the share of non-Western immigrants. We include the latter measure because non-Western immigrants differ the most from the native population (ethnically as well as culturally) and are the group over which most contention has occurred. The three measures are operationalized as follows:

*Ethnic fragmentation*: Operationalized as  $1 -$  the Herfindahl-index:

$$\text{Ethnic fragmentation}_j = 1 - \sum_{i=1}^N s_{ij}^2$$

where  $s_{ij}$  is the concentration of the ethnic group  $i$  ( $i = 1 \dots N$ ) in context  $j$ . Ethnic group is operationalized as country of origin.

*Concentration of immigrants*: The share of immigrants and descendants.

*Concentration of non-Western immigrants*: The share of immigrants and descendants not originating in the EU-15, Iceland, Norway, Switzerland, the European micro-states, the United States, Canada, Australia, or New Zealand.

These three measures are highly correlated (Pearson's  $r$  of .93 or higher) and are thus

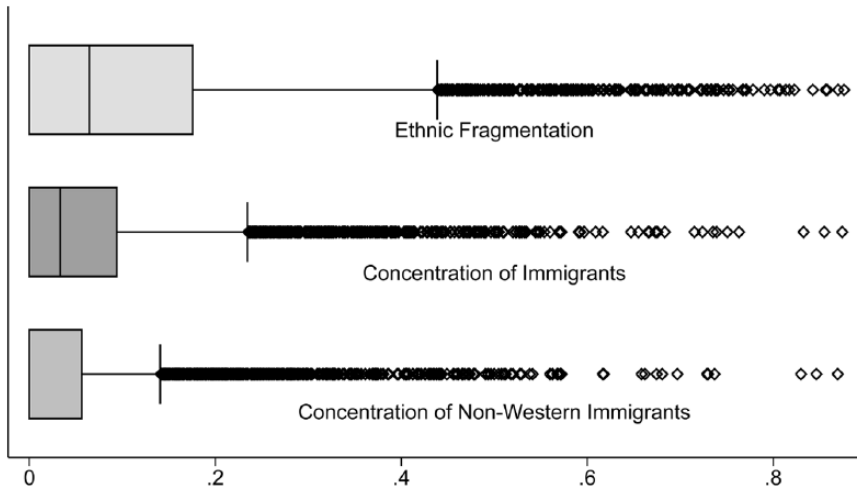
included in separate models. As such, the point of the analysis is to probe the robustness of the relationship across different measures of ethnic diversity rather than distinguish between these and their implied mechanism (Schaeffer 2013).

Figure 1 displays the distribution of the three measures of ethnic diversity in respondents' micro-context (within a radius of 80 meters). Most native respondents live in micro-contexts that are not particularly diverse. For example, 75 percent of respondents live in a micro-context with less than 10 percent immigrants. At the same time, there is large variation in ethnic diversity across micro-contexts, and a number of respondents live in highly ethnically diverse settings.

### Control Variables

To minimize confounding of the relationship between contextual ethnic diversity and trust, we include a range of individual-level and contextual control variables in the estimated models. As emphasized in recent studies (Letki 2008; Phan 2008; Sampson and Graif 2009; Sturgis et al. 2011), ethnic diversity and social trust co-vary with the broader social—and especially socioeconomic—environment. Controlling for these aspects of the neighborhood environment is thus paramount in isolating the impact of ethnic diversity on trust. Specifically, we include contextual (aggregate) measures of income, unemployment, education, single-parent households, and home ownership to examine whether it is socioeconomic deprivation in the residential setting, rather than ethnic diversity (or both), that influences trust. Similarly, we control for economic inequality of the contextual unit, because inequality is generally regarded as an important predictor of trust (Rothstein and Uslaner 2005; Uslaner 2002). We also include a measure of contextual crime, because unsafe neighborhoods may affect residential choice (and hence diversity of the context) as well as trust (Sturgis et al. 2011). Research shows that residential turnover inhibits the development of related forms of trust (Laurence 2011; but see Sampson and Graif 2009), so





**Figure 1.** Distribution of the Three Measures of Ethnic Diversity in Contexts with a Radius of 80 Meters

*Note:* The distribution is based on the 6,543 respondents included in the analyses reported in Table 1. The black vertical lines within the box show the median (this value is zero for Concentration of Non-Western Immigrants); the right hinges (the right-most horizontal line of the boxes) and adjacent lines (the horizontal lines to the right of the boxes) specify the 75th percentiles and the upper adjacent values, respectively.

we also include this variable in the models. Finally, we include the population density of a given contextual unit. Because immigrants generally live in larger cities with higher population density, we include this variable to ascertain that any observed effect of ethnic diversity on trust cannot be attributed to ethnically diverse contexts being more populous than less diverse contexts.<sup>12</sup> This also implies that a person's residential context (including the ethnic composition) is not contingent on the absolute number of people living there. Similar to the ethnic diversity measures, all other contextual variables are derived from the national registers based on information about the people living within a given radius (the same as the diversity measure) of a respondent in the survey. Coding of and descriptive statistics for all control variables can be found in Table A1 in the Appendix.

We also include several individual-level control variables that are standard predictors of trust (see, e.g., Alesina and La Ferrara 2002; Li, Pickles, and Savage 2005; Uslaner 2002). We include these to minimize bias from self-selection that may occur if individuals sort into residential locations based on such individual-level characteristics. Specifically, we include

gender, age, education, personal disposable income, unemployment, cohabitation status, length of residence at the current address, being a victim of crime, institutional trust, and life satisfaction. Although some of these predictors, especially institutional trust and life satisfaction, may be endogenous to social trust, we chose to include them in the model to provide a conservative test of the impact of ethnic diversity on trust (i.e., to avoid confounding by any individual-level variable). Finally, we include survey-round fixed effects to take differences between the five waves not captured by other variables in the model into account. Despite having included a very rich set of individual-level control variables, self-selection cannot be completely ruled out; we will therefore return to this issue.

## ANALYSIS

We report results from the empirical analysis in two steps. First, Table 1 reports OLS<sup>13</sup> regression analyses of how social trust is affected by the three measures of ethnic diversity of the micro-context (defined as within 80 meters of the individual).<sup>14</sup> Second, we provide a graphic presentation of the

**Table 1.** The Impact of Ethnic Diversity of the Micro-Context on Social Trust

Measure of Diversity	Model 1. Ethnic Fragmentation	Model 2. Concentration of Immigrants	Model 3. Concentration of Non-Western Immigrants
<b>Individual Characteristics</b>			
Gender (male)	-.445*** (13.08)	-.444*** (13.07)	-.444*** (13.06)
Age (years)	.007*** (5.91)	.007*** (5.90)	.007*** (5.88)
Education (years)	.058*** (8.69)	.058*** (8.69)	.058*** (8.67)
Disposable yearly income (mill. Danish kroner)	-.101 (1.09)	-.102 (1.10)	-.103 (1.12)
Unemployed (yes)	.062 (.68)	.063 (.69)	.062 (.68)
Cohabitation (yes)	-.071 (1.69)	-.071 (1.68)	-.069 (1.65)
Length of residence (years)	.002 (1.19)	.002 (1.18)	.002 (1.18)
Victimization (yes)	-.076 (1.89)	-.078 (1.90)	-.077 (1.92)
Institutional trust (0 to 10)	.337*** (25.05)	.337*** (25.06)	.337*** (25.05)
Life satisfaction (0 to 10)	.183*** (12.54)	.183*** (12.55)	.183*** (12.55)
<b>Contextual Characteristics</b>			
Ethnic diversity	-.416** (2.69)	-.650** (2.81)	-.612* (2.42)
Mean level of education (years)	.046** (2.79)	.046** (2.73)	.043* (2.54)
Mean disposable yearly income (mill. Danish Kroner)	-.133 (.81)	-.134 (.82)	-.124 (.76)
Unemployment rate	.241 (1.03)	.269 (1.15)	.213 (.91)
Single-parent households	.075 (.74)	.070 (.70)	.071 (.70)
Income inequality (Gini coefficient)	.298 (1.55)	.291 (1.51)	.264 (1.37)
Crime incidents (100s)	.003 (1.01)	.003 (1.05)	.003 (1.10)
Residential turnover	-.039 (.40)	-.042 (.42)	-.048 (.48)
Homeownership	.028 (.38)	.031 (.42)	.035 (.48)
Population density (number of residents within context)	.000 (.03)	-.000 (.03)	-.000 (.19)
<b>ESS round (ref = 2002/3)</b>			
2004/5	-.207*** (3.73)	-.207*** (3.73)	-.207*** (3.71)
2006/7	-.086 (1.58)	-.086 (1.57)	-.086 (1.58)
2008/9	-.094 (1.76)	-.093 (1.74)	-.094 (1.77)
2010/11	-.043 (.81)	-.043 (.80)	-.045 (.85)
Constant	1.694*** (6.91)	1.700*** (6.93)	1.736*** (7.02)
N	6,543	6,543	6,543
R-square	.23	.23	.22

Note: The table reports unstandardized OLS-regression coefficients with absolute *t*-values in parentheses (based on White-corrected standard errors). The dependent variable, social trust, is scaled from 0 to 10.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$  (two-tailed tests).

impact of the three measures of ethnic diversity at contextual levels ranging from the least aggregate (within 80 meters of the individual) to the most aggregate (within 2,500 meters of the individual) in our data. This illustrates how the impact of ethnic diversity varies with different levels of contextual aggregation and thus tests the notion that interethnic exposure underlies the relationship between diversity and trust.

Results displayed in Table 1 provide clear evidence that diversity in the micro-context affects social trust negatively: we observe a significant negative relationship for all three measures of diversity. The predicted level of trust is, *ceteris paribus*, roughly .30 point lower on the scale running between 0 and 10 among individuals living in a micro-context with 50 percent immigrants or non-Western immigrants than among individuals living in a context with no immigrants. Similarly, a change in the level of ethnic fragmentation from 0 to .5 is predicted to reduce trust by .21 point on the trust scale, but because the scale of ethnic fragmentation is different than for the concentration measures, the effect of the different measures are not directly comparable. These effects are moderate in size, but at the same time they are also based on very sizable changes in the ethnic composition of the micro-context. If we instead look at more realistic increases in ethnic diversity, the effects are much more modest. Using an increase in the contextual share of immigrants parallel to that at the national level from 1980 to 2010 (6 percentage points), the predicted drop in social trust is only .04 (based on Model 2). Similarly, a one standard deviation increase in ethnic diversity leads to a predicted reduction in trust of .06 points (across all diversity measures). In comparative terms, however, the latter effect is non-negligible as it corresponds to the partial effect of around one year of education (one of the most important correlates of trust at the individual level, see Helliwell and Putnam 2007; Uslaner 2002).

Looking at the contextual control variables, we note that mean level of education is the only other contextual variable to have a

significant effect on trust: living among better-educated neighbors apparently furthers social trust. The effect of a one standard deviation change in contextual education is comparable to that of diversity (.05/.06 versus .06). The remaining contextual variables are all insignificant. This is not an artifact of multicollinearity, as the variance inflation factor (VIF) for the variables in our models is 2.77 or less.<sup>15</sup> Hence, contrary to a number of analyses focusing on trust and related aspects of social cohesion in more aggregate contexts (Laurence 2011; Letki 2008; Phan 2008; Sampson and Graif 2009; Sturgis et al. 2011), our results suggest that ethnic diversity is one of the most important (micro-)contextual factors shaping social trust.

Turning to the individual-level control variables, we mostly see a confirmation of well-known patterns from previous research. Being female, older, and better educated is associated with higher trust. The potentially endogenous variables—institutional trust and life satisfaction—are both strongly, positively associated with trust, whereas none of the remaining controls reaches significance.

In conclusion, the fact that our three measures of residential ethnic diversity emerge as significant predictors of trust in rich models, controlling for other prominent explanations, is strong evidence that ethnic diversity in the micro-context has an independent negative impact on social trust, which cannot be explained by contextual socioeconomic deprivation, crime, or individual-level characteristics.

Thus far, we have shown that ethnic diversity of the immediate micro-context shapes trust negatively. While this analysis provides unprecedented support for interethnic exposure being the mechanism linking diversity to trust, our data allow us to test this hypothesis even more rigorously. We now compare the impact of ethnic diversity across contextual units of varying size. If interethnic exposure is the driver of the relationship, we would expect the negative impact of ethnic diversity on trust to be strongest in the more immediate surroundings, where exposure is inevitable, and to be diluted (and estimated less precisely) at

more aggregate contextual levels, where exposure is captured much less accurately. Figure 2 illustrates the estimated effect of ethnic diversity on trust across different levels of contextual aggregation. The figure displays the effect of a given measure of ethnic diversity based on regressions with similar specifications as in Table 1, with contextual control variables measured in contexts of the same size as the diversity variables.

Figure 2 shows that the effect of ethnic diversity differs markedly when measured at the lowest (80 meters) and the highest (2,500 meters) levels of aggregation in our data. For all three measures of ethnic diversity, we see the same pattern: ethnic diversity has a significant negative impact on trust at low levels of aggregation (up to 180 meters [197 yards]), after which the estimate gradually moves toward zero and becomes less precise (as indicated by the increasing confidence intervals). In other words, in the micro-context, where interethnic exposure is captured more accurately, ethnic diversity has a negative impact on trust, whereas this effect is diluted in contexts of higher aggregation, where exposure is measured more crudely. This supports the notion that interethnic exposure is the mechanism accounting for the negative impact of ethnic diversity on trust. As for the context size being consequential for trust, it is interesting to observe that a radius somewhere between 180 and 250 meters seems to be the cut-off point after which the effect of ethnic diversity starts to wane. This is an important result, as it shows that ethnic diversity must be measured in quite disaggregate contexts to detect an effect on trust, which may also explain some of the insignificant effects found in previous studies at higher levels of aggregation.

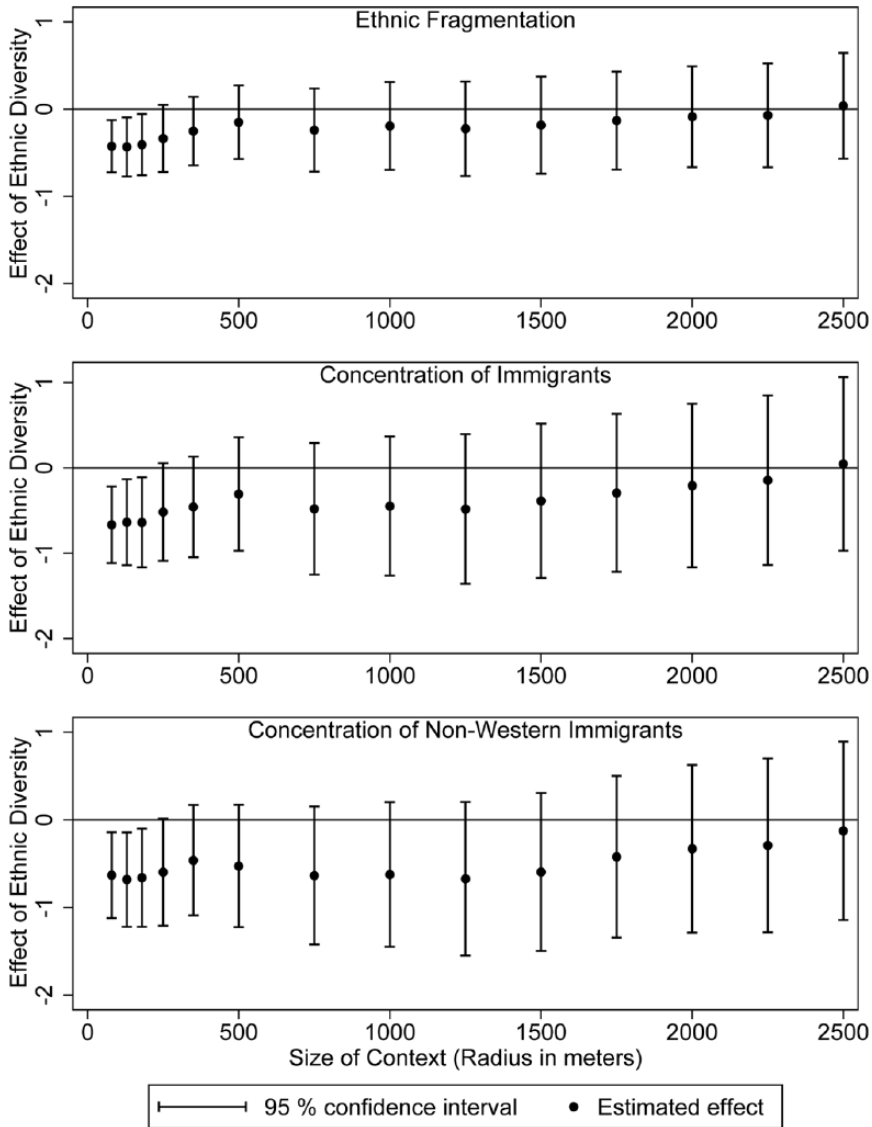
### *Is the Negative Impact of Exposure to Ethnic Diversity Moderated by Contact?*

As noted earlier, a recent line of research focuses on how the impact of ethnic diversity on trust may be moderated by intense contact with people of different ethnic background. If there is a cushioning effect of interethnic

contact, this would suggest that the negative consequences of interethnic exposure do not reflect deep-held negative dispositions toward ethnic out-groups, but can be curbed under specific circumstances. It is important to point out that moderation by interethnic contact—or any other variable—does not compromise the finding that there is a negative impact of ethnic diversity on trust on average. However, the effect of diversity on trust may be heterogeneous in the sense that the overall negative effect may conceal stronger effects for some people—for example, individuals without interethnic contact (or other characteristics)—and, by implication, weaker effects for others.

Our data allow us to gain some purchase on the notion that interethnic contact moderates the impact of interethnic exposure on trust, as the first wave of the ESS contains (separate) measures of having immigrant friends or colleagues (see Table A1 in the Appendix for details). Admittedly, these measures may not reflect interethnic contact *per se*, but they arguably tend to tap this form of contact. The two measures complement each other well, in the sense that friendship is an intense form of personal contact that is less common (over 50 percent of respondents indicated having no immigrant friends) and arguably more self-selected, whereas contact in the workplace is more pronounced and less self-selected, but also less intense. Ideally, one would also have a measure of actual interethnic contact in the neighborhood, but this does not exist in the survey.

To test the idea that interethnic contact moderates interethnic exposure, we follow the approach of Stolle and colleagues (2008) and include the two measures of contact (measured categorically) as well as interactions between these variables and each measure of ethnic diversity in the micro-context (measured within a radius of 80 meters of the respondent). None of the interaction terms are significant, nor are they jointly significant. This suggests that interethnic contact does not—at least not as measured in the ESS—moderate the negative impact of ethnic diversity of the micro-context on social trust. It is also worth noting that including only the



**Figure 2.** The Effect of Ethnic Diversity Estimated at Different Contextual Sizes

constitutive terms of the two contact measures, our point estimate of the impact of contextual ethnic diversity on trust remains substantively unaffected, which corroborates Laurence's (2011) findings regarding neighborhood trust in Britain. This suggests that the effect of interethnic exposure is not mediated by interethnic contact, and it also underlines that interethnic exposure and contact are empirically different phenomena. In conclusion, although we cannot assess the potential

moderation by interethnic contact in full detail, the data at hand suggest there is an unconditional negative impact of interethnic exposure in the micro-context on social trust.

### *Is the Effect of Ethnic Diversity Heterogeneous?*

In addition to interethnic contact, the literature suggests other potential moderators of the influence of ethnic diversity. Two

categories of moderators appear particularly relevant with regard to the impact of ethnic diversity on trust: neighborhood-related factors, which may moderate the experience of ethnic diversity in the neighborhood context, and individual-level characteristics pertaining to resources and vulnerability.

The extent to which people's experience of ethnic diversity in a neighborhood channels into mistrust is likely conditioned by other aspects related to the neighborhood context. Of particular relevance is the length of residence in a neighborhood. Given the negative impact of ethnic diversity, one may expect that having spent longer time in more ethnically diverse surroundings would tend to magnify this effect. Conversely, in line with contact theory, one may also expect the negative effect of ethnic diversity to wither over time as people familiarize themselves and (maybe) become comfortable with diverse surroundings. To test these predictions, we interacted the diversity variables with length of residence and found no support for either.<sup>16</sup> Hence, the impact of ethnic diversity on trust does not significantly vary with length of residence in a neighborhood. Because the effect of diversity operates independently of cumulative experiences in the neighborhood context, this may implicitly be taken as tentative evidence for our theory that a deep-held negative out-group bias triggers the negative impact of interethnic exposure on trust in the micro-context. However, given that length of residence may also reflect self-selection when using observational data, further evidence is needed to substantiate this assertion more fully.

Another potential neighborhood moderator is the general social composition of this context. As some have suggested, economic deprivation and inequality (Putnam 2007; Sturgis et al. 2011) may amplify the negative effects of ethnic diversity on trust. Cues regarding other people's ethnicity perhaps become more salient, and thus more consequential for trust, when resources are scarce or unevenly distributed. To assess this, we interacted contextual income inequality and mean disposable income with the measures of

ethnic diversity. In line with results from Putnam (2007) and Sturgis and colleagues (2011), we find no evidence that the impact of ethnic diversity varies by either neighborhood income or inequality.

Individual resources and vulnerability are also potential moderators of the effect of ethnic diversity. Resourceful and less vulnerable people may be less sensitive to negative cues, including interethnic exposure in the micro-context. Using two measures of resources—education and income—and one of vulnerability—victimization—from our models, we find no evidence of moderation by these factors. We also examined heterogeneous effects by gender and age, two potential demographic indicators of vulnerability, but in accordance with Putnam (2007) we found no differential effects for different groups.

Based on these tests, we conclude that the effect of ethnic diversity on trust is strikingly universal: it does not vary significantly by factors related to either the neighborhood or the individual. Natives appear to respond uniformly negatively to interethnic exposure in the micro-context. This may suggest that the negative relationship is due to a dispositional skepticism toward people of other ethnic background.

### *Do These Results Reflect Self-Selection?*

The inherent problem in all analyses of the relationship between contextual characteristics and individual-level attitudes using observational data is that it is not possible to rule out that a correlation—rather than a causal effect of living in these contexts—reflects self-selection of individuals into certain contexts either based on these attitudes or various unobserved characteristics. In other words, the estimated effect of micro-contextual ethnic diversity on trust may be biased because of self-selection.

Putnam (2007) and Rudolph and Popp (2010) argue that self-selection seems *prima facie* implausible as an explanation for an observed negative relationship between ethnic diversity and trust, as this would imply

that the least trusting individuals would locate themselves in the most diverse environments. They argue that the opposite is more plausible, namely that the least trusting would choose to live in the least diverse environments. This in turn implies that, if biased, the impact of contextual ethnic diversity on trust is likely underestimated (i.e., more negative than our results suggest). However, while self-selection based on trust may be an implausible explanation for the negative relationship between diversity and trust, it seems likely that unobserved factors simultaneously affecting both residential choice and trust (e.g., a deep-held preference for homogenous social surroundings [i.e., homophily; McPherson, Smith-Lovin, and Cook 2001] or fundamental dispositions toward out-groups) could potentially confound the relationship, although the potential bias from this form of self-selection is arguably reduced by the inclusion of a rich set of control variables in our models. Therefore, in an attempt to assess the magnitude of potential self-selection, we conducted a number of empirical tests comparable to those used in previous studies.<sup>17</sup>

First, equivalent to the strategy used by Oliver and Wong (2003), we included a variable tapping respondents' preferences for the ethnic mix of an ideal living area (see coding in Table A1 in the Appendix). This variable was only measured in the first round of the ESS and thus we had to limit the analysis to this subset of the sample. By including preference for ethnic mix of the ideal living area, we take into account the fact that this inclination may affect both residential choice and trust and thus confound the relationship between the two. The analysis shows this is not the case, however, as the estimated effect of ethnic diversity on trust is virtually unaffected by including the measure of preferred living area. In other words, the negative impact of ethnic diversity on trust does not appear to reflect a preference for living in homogenous surroundings.

As a second strategy for assessing self-selection, we followed the approach of Putnam (2007) and Rudolph and Popp (2010) in examining how patterns of relocating and

staying put in residential areas correlate with trust. We examined whether trusting individuals are more likely to self-select out of ethnically diverse micro-contexts, as this would imply that the lower levels of trust found in more diverse areas are a result of this selection process. We assessed this by estimating a model for the propensity to change residence (based on residential data from the registers) within three years after being interviewed in the ESS. The model includes individual-level trust and an interaction term between trust and contextual ethnic diversity, as well as the other covariates in the models reported in Table 1. These results show no higher propensity for trusting individuals to relocate from more ethnically diverse areas; hence, we find no evidence indicating that this form of self-selection is driving our results. Similarly, the finding that the impact of ethnic diversity on trust does not depend on length of residence in a context (reported in the previous section) indirectly indicates that self-selection based on resources cannot explain the negative impact of ethnic diversity on trust. If staying put reflects not having the means for moving, this group should, *ceteris paribus*, be less self-selected. By implication, we would have expected a stronger negative effect of ethnic diversity on trust for those staying.<sup>18</sup>

In summary, although we cannot rule out self-selection as a potential explanation for the observed negative relationship between micro-contextual ethnic diversity and social trust given the observational nature of our data, empirical tests provide no indication that this is a likely interpretation of the results. This strengthens our faith that interethnic exposure does in fact have a negative impact on trust.

## CONCLUSIONS AND DISCUSSION

In this article we tested whether ethnic diversity in one's immediate residential surroundings has an impact on social trust. Using survey data merged with data from the national Danish registers, our results show that ethnic diversity of the micro-context—measured within a radius of 80 meters of a

person—has a statistically significant negative impact on social trust, controlling for a large number of potentially confounding variables. When expanding the size of the context, the effect of ethnic diversity is diluted, and we take this as an indication that interethnic exposure—which is inevitable in the micro-context, but not in more aggregate contexts—is the mechanism underlying the negative relationship between residential ethnic diversity and trust.

Our results suggest that coupling survey data on trust with rich, flexible contextual data on ethnic diversity in individualized contexts of small size is indeed fruitful, not least because this allows for a more direct assessment of the mechanism—interethnic exposure—expected to underlie the relationship between contextual ethnic diversity and trust. Our results indicate that continuing to use measures of ethnic diversity within administrative units at rather aggregate contextual levels will likely lead to erroneous inference about the impact of ethnic diversity on trust. However, the consequences of not analyzing appropriate contextual-level data extend far beyond that of the specific research question analyzed here. Dating back more than a century, there has been massive interest in the question of how residential context affects attitudes, perceptions, and behaviors. Scholars have examined how living among others with certain characteristics affects individuals' propensity to participate in politics (Cho and Rudolph 2008), attitudes toward out-groups (Bobo and Hutchings 1996), and opinions about redistribution (Luttmer 2001), to take just a few examples. Our results imply that revisiting these questions using individualized, flexibly aggregated micro-contextual data is a promising avenue for further research. This would lead to a better understanding of the mechanisms underlying the relationship between contextual characteristics and individual-level outcomes, and ultimately provide new insights into the social contingency of individual behavior and attitudes.

We argued that our study holds several important advantages over previous research

investigating the relationship between contextual ethnic diversity and trust, but we should also acknowledge that our study is only one step in the direction of gaining a better understanding of this question. Multiple steps along different lines must be taken to push this research agenda forward. We now consider some of the paths we believe would contribute to this development.

Theoretically, we suggested that the interaction between a dispositional out-group mistrust and contextual social cues in terms of exposure to people of different ethnic background in residential contexts accounts for the negative effect of contextual ethnic diversity on trust. However, we still need to know in more detail what it is exactly about interethnic exposure that lowers trust. Although empirically challenging, a logical next step would be to follow the lead of Schaeffer (2013) and try to parse out the various out-group cues embodied in contextual interethnic exposure—for example, racial, cultural, and behavioral differences between ethnic groups—and examine their importance for trust.

Directly related to the approach used in this article, the question of the specification of the appropriate contextual unit consequential for trust and other attitudes still looms large in the literature. We argued and empirically verified that using individual-level data to generate flexible “objective” contextual measures is a methodological advance in this regard. At the same time, this approach could arguably profit from being supplemented with a “subjective” approach, such as that by Wong and colleagues (2012), in which individuals themselves define their (perceived) neighborhood. A combination of the two approaches would shed light on the forces in individuals' residential environment—subjectively experienced or operating subconsciously—that shape their trust in other people.

In methodological terms, a main challenge is to further substantiate causal claims by addressing the issue of potential self-selection of individuals into more or less ethnically diverse micro-contexts. Natural experiments—for example, in terms of exogenous



changes in contextual ethnic composition due to abolishment of public housing (Enos forthcoming)—or field experiments (Enos 2014) would arguably provide further leverage with regard to bypassing issues of self-selection and thus drawing inferences about the causal impact of contextual ethnic diversity on trust.

Finally, another question that warrants further attention is whether the negative impact of micro-contextual interethnic exposure on trust found in the Danish setting generalizes to other contexts—that is, is externally valid. As argued earlier, it seems, *prima facie*, reasonable to expect a similar relationship in Western European countries that have experienced similar immigration-induced increases in ethnic diversity and share a comparable opinion climate at the mass and elite levels. It appears more problematic to infer from the Danish context to countries with different immigration trajectories and histories of ethnic and racial relations. That said, the study that comes closest to ours in terms of scrutinizing the relationship between micro-contextual ethnic diversity and social trust was conducted in New Zealand, where a similar negative relationship was found across proximate local contexts (i.e., meshblock units) (Sibley et al. 2013). Thus, while not having the same advantages with regard to examining interethnic exposure (the size of the contexts are not fixed or flexibly varied), and therefore not strictly comparable to our study, the best available evidence suggests the negative relationship found in Denmark can be reproduced in a developed country with a rather different immigration history.

As a logical conclusion of our article, we should stress that our results have substantial

implications for the discussion about consequences of immigration for social cohesion in destination countries, and for which policy alternatives may be effective in addressing the suggested negative consequences. In this regard, it is important not to overstate the impact of contextual ethnic diversity when compared to other factors shaping social trust. The Danish experience is illustrative in this regard. Over the past 30 years, the level of ethnic diversity in Denmark has increased by about three-fold when measured as the share of immigrants (and about six-fold when measured as the share of non-Western immigrants), while trust in the same period has increased from just about 50 percent expressing social trust in 1979 to almost 80 percent in 2009—a level of trust unparalleled anywhere in the world except other Nordic countries (Sønderskov and Dinesen 2014). At the same time, this increased ethnic diversity is associated with lower levels of trust across Danish municipalities (Dinesen and Sønderskov 2012). Hence, ethnic diversity has a negative impact on trust, but this is clearly overshadowed by other forces driving trust to unseen heights in the Danish context. This means that while we should obviously take the negative consequences of ethnic diversity for trust seriously, we should not lose sight of other factors—most importantly education at the individual level (Helliwell and Putnam 2007; Uslaner 2002; but see Oskarsson et al. 2014) and institutional quality at the society level (Dinesen 2013; Rothstein and Stolle 2008; Sønderskov and Dinesen 2014)—which matter more for people's social trust. By strengthening these factors, governments would likely counterbalance the negative impact of ethnic diversity on trust.

# APPENDIX

**Table A1.** Information about Variables

Variable	Coding/Remarks	Mean/Std. dev. <sup>a</sup>	Source <sup>b</sup>
<i>Individual Characteristics</i>			
Social trust	Scale based on the following three questions: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?"; "Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?"; and "Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?" All questions were measured on an 11-point scale ranging from 0 ("You can't be too careful")/"Most people would try to take advantage of me"/"People mostly look out for themselves") to 10 ("Most people can be trusted"/"Most people would try to be fair"/"People mostly try to be helpful"). The final scale is calculated as the mean of the three items, thus running between 0 and 10. It only includes respondents with a valid answer for at least two of the three questions. The scale has a Cronbach's alpha of .71.	6.82/1.53	ESS (pp1trst, pplfair, pplhlp)
Gender (male)	0 = female, 1 = male.	.50/–	Register data (koen)
Age (years)	Age in years when interviewed.	47.60/17.69	Register data (FOED_DAG)/ESS (inwyr/inwvys)
Education (years)	Years of full-time education completed. For most respondents, this is calculated as the time required to obtain their highest level of education. For 2.5 percent of the sample (mainly older respondents) this information is not present in the registers. In these cases, we use survey data.	12.24/2.96	Register data (hipria)/ESS (eduysr)
Disposable yearly income (mill. Danish Kroner)	Disposable yearly income measured in million Danish kroner (indexed at 2000 level) in year 2002, 2004, 2006, 2008, or 2010. <sup>c</sup>	.16/0.15	Register data (DISPON_NY)
Unemployed (yes)	Dummy variable indicating whether the respondent was unemployed for more than half a year in 2002, 2004, 2006, 2008, or 2010. <sup>c</sup>	.04/–	Register data (SOCIO02)
Cohabitation (yes)	0 = single; 1 = living with partner.	.69/–	ESS (lvgtptn/lvgtptna)
Victimization (yes)	A dummy variable tapping whether the respondent or other members of the household have been a victim of burglary or an assault within the past five years.	.25/–	ESS (crmvct)
Length of residence (years)	Years lived at current address at time of survey.	14.25/16.17	Register data (BOP_VFRA)/ESS (inwyr/inwvys)
Institutional trust (0 to 10)	A scale consisting of four items regarding trust in parliament, politicians, the legal system, and the police. The scale has a Cronbach's alpha of .79 and is calculated as the mean of the four items, thus running between 0 (lowest trust) and 10 (highest trust). It only includes respondents who have a valid answer for at least two of the four questions.	6.75/1.55	ESS (trstpl, trstlgl, trstplc, trstplt)
Life satisfaction (0 to 10)	Response to the question "All things considered, how satisfied are you with your life as a whole now-a-days?" Scaled from 0 ("extremely dissatisfied") to 10 ("extremely satisfied").	8.48/1.45	ESS (stflife)

(continued)

**Table A1.** (continued)

Variable	Coding/Remarks	Mean/Std. dev <sup>a</sup>	Source <sup>b</sup>
ESS round	Round that respondent participated in: Round 1 Round 2 Round 3 Round 4 Round 5	.20/- .20/- .19/- .21/- .20/-	ESS (essround)
Immigrant friends <sup>f</sup>	Response to the question "Do you have any friends who have come to live in Denmark from another country?" with the following response categories: "Yes, several" "Yes, a few" "No, none at all"	.07/- .39/- .54/-	ESS, Round 1 (imgfrnd)
Immigrant colleagues <sup>f</sup>	Response to the question "Do you have any colleagues at work who have come to live in Denmark from another country?" with the following response categories: "Yes, several" "Yes, a few" "No, none at all"	.07/- .34/- .38/- .21/-	ESS, Round 1 (imgcolg)
Preferred ethnic mix of residential area <sup>g</sup>	Respondents were asked to indicate their preferred ethnic mix, choosing between the following alternatives: "an area where almost nobody was of different race or ethnic group from most Danish people" "some people were of different race or ethnic group from most Danish people" "many people were of a different race or ethnic group" "it would make no difference"	.37/- .36/- .01/- .27/-	ESS, Round 1 (idetaltv)
Moved <sup>g</sup>	Dummy variable indicating whether the respondent moved to another location within three years after being surveyed. This measure is only calculated for respondents from ESS 1 through 4, as this information was not available for ESS 5 at the time of writing of the article.	.25/-	Register data (BOP_VFRA)/ ESS (inwyr/inwys)
<i>Contextual Characteristics</i>			
Ethnic diversity	All contextual data are calculated using information about place of residence on January 1 in 2003, 2005, 2007, 2009 or 2011. <sup>d</sup> The descriptive information is for contexts with a radius of 80 meters. See also description in the text and Figure 1 for additional descriptive information. Ethnic fragmentation (The number of ethnic groups vary across contexts; Mean = 4.72; SD = 6.79) Concentration of immigrants Concentration of non-Western immigrants	.11/.15 .07/.10	Register data (ietype, ieland)
Mean level of education	Mean years of full-time education completed. Data is missing for a fraction of (mainly older) residents. We use the average of available observations.	11.96/1.20	Register data (hfpria)

(continued)

**Table A1. (continued)**

Variable	Coding/Remarks	Mean/Std. dev. <sup>a</sup>	Source <sup>b</sup>
Mean disposable yearly income (mill. Danish Kroner)	Mean disposable personal yearly income (in million Danish kroner) in 2002, 2004, 2006, 2008, or 2010. <sup>c</sup> Indexed at 2000-level to adjust for inflation. Based on data on adults only.	.15/.07	Register data (DISPON_NY, SOCIO02)
Unemployment rate	Share of the adult population in the workforce who were unemployed for more than half a year in 2002, 2004, 2006, 2008, or 2010. <sup>c</sup>	.06/.07	Register data (SOCIO02)
Single-parent households	Share of single-parent households.	.19/.23	Register data (K)
Income inequality (Gini coefficient)	Gini coefficient calculated using disposable income and the <code>ineqdec0</code> routine in Stata. <sup>h</sup>	.28/.09	Register data (DISPON_NY)
Crime incidents (100s)	The number of criminal verdicts (in 100s) of residents in the context plus the number of crime victims in the context. Data are summed over two years (either 2002+2003, 2004+2005, 2006+2007, 2008+2009, or 2010+2011). <sup>e</sup>	7.90/13.78	Register data (AFG_GER7.AFG_AFGTYP3, OFR_GER7)
Residential turnover	Share of current residents who moved into the context within a three-year period.	.28/.20	Register data (BOP_VFRA)
Homeownership	Share of housing units within the context inhabited by the owner.	.65/.40	Register data (UDLEJNINGSFOR-HOLD, BOPIKOM)
Population density	Number of residents within the context. <sup>i</sup>	86.24/117.50	Register data

<sup>a</sup>All descriptives are based on the 6,543 respondents included in the analyses reported in Table 1 (or a subsample of respondents from ESS 1; see notes f and g).  
<sup>b</sup>Further information about the ESS variables, sampling, and fieldwork can be found at <http://www.europeansocialsurvey.org/>. Information about the register data can be found at <http://www.dst.dk/en/TilSalg/Forskningsservice.aspx> and Pedersen (2011).

<sup>c</sup>Depending on which year the respondent was surveyed: 2002 for respondents surveyed in 2002 or 2003, 2004 for respondents surveyed in 2004 or 2005, 2006 for respondents surveyed in 2006 or 2007, 2008 for respondents surveyed in 2008 or 2009, and 2010 for respondents surveyed in 2010 or 2011.

<sup>d</sup>Depending on which year the respondent was surveyed; 2003 for respondents surveyed in 2002 or 2003 and so on.

<sup>e</sup>Depending on which year the respondent was surveyed; 2002+2003 for respondents surveyed in 2002 or 2003 and so on.

<sup>f</sup>This variable is only used in the analysis reported in the section on the potential moderating effect of interethnic contact on ethnic diversity.

<sup>g</sup>This variable is only used in the analysis reported in the section on self-selection.

<sup>h</sup>fenkins (1999).

<sup>i</sup>The number of residents within (selected) other sizes of contexts are 130 meters: 209; 180 meters: 373; 250 meters: 889; 500 meters: 2,975; 1,000 meters: 9,600; 1,500 meters: 18,831; 2,000 meters: 31,055; and 2,500 meters: 45,563.

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## Notes

1. We keep in line with most of the literature by using the term “social trust,” although the more precise term is arguably “*generalized* social trust,” which underlines that this is the specific type of social trust associated with trust in other people in general. This stands in contrast to more contextualized conceptions of trust that emphasize trust in a “specific person in a particular situation” (Cook and Gerbasi 2009:222) or what Sampson and Graif (2009:182) call “*grounded* or *working* trust.” Similarly, the generalized form of social trust is different from trust in well-known, specific others (particularized trust) and trust in specific groups (Freitag and Bauer 2013).
2. We use the term “mechanism” in line with Gerring (2007:178), namely as “the pathway or process by which an effect is produced or a purpose is accomplished” (for a related definition from analytical sociology, see Hedström and Bearman 2009:5).
3. In addition, immigrants in the sample are likely to be selected (the survey was asked only in Danish) and generally a quite heterogeneous group in terms of factors that may interact with ethnic diversity (e.g., length of stay and country of origin), which also speaks in favor of limiting the sample to natives only. Excluding immigrants from the sample does not affect the results markedly; our findings in the sample of native Danes replicate using the full sample. Table S1 in the online supplement reports these results (<http://asr.sagepub.com/supplemental>).
4. To complicate matters somewhat in relation to the present article, Lee and colleagues (2004:43) use the overarching label of “exposure” to differentiate between different types of contact.
5. While self-selection into neighborhoods of different ethnic diversity based on prior levels of trust is also likely, a similar self-selection into actual contact with people of different ethnic background is arguably more pronounced. In other words, the relationship between interethnic exposure and trust is,

*ceteris paribus*, likely to be less plagued by endogeneity than that between contact and trust.

6. There is also a methodological aspect of the distinction between exposure and contact relating to their measurement. Measuring contact one generally has to rely on self-reported survey measures (Stolle et al. 2008; Uslander 2012), whereas exposure (at least in our case) can be measured by objective contextual characteristics drawn from official registers. Using self-reported measures of contact from the same survey as the measure of trust will most likely result in an upward bias in the relationship between the two because of common method bias (Podsakoff et al. 2003). That is, the relationship would, to some extent, reflect, for example, a respondent’s mood state when responding to the survey. Conversely, an association between trust and contextual exposure using distinct data sources cannot be caused by common method bias.
7. However, the 80 meter context may consist of only a few people in remote areas, which may, in turn, result in the contextual variables being sensitive to the specific size of the context. Therefore, we tried limiting our sample to respondents whose context consists of at least 20 people to probe the robustness of the results. Table S2 in the online supplement reports these results. They remain substantively unchanged compared to those for the full sample reported here, thereby providing evidence that our results are insensitive to the number of people that the contextual measures are based on.
8. The upper limit of 2,500 meters is the largest context for which we have contextual data for all respondents; in the most densely populated areas, the 20,000 nearest households are located within 2,500 meters of respondents.
9. The survey data used are available from <http://www.europeansocialsurvey.org>. The survey data merged with register data are not publicly available because the use of the latter is restricted to authorized users by Danish law.
10. The definition of immigrants and descendants employed by Statistics Denmark includes refugees and asylum seekers. Throughout the article, the term “immigrant” also refers to the latter two groups.
11. Admittedly, immigrants’ country of origin is only a proxy for ethnic background; as such, our contextual diversity measures do not measure ethnic diversity *per se*. Nevertheless, this is in line with most previous studies, and we thus find it useful to continue using this terminology. Moreover, national origin is arguably the “objective” measure available in the public registers that corresponds most closely to the mechanism we propose is underlying the relationship between ethnic diversity and trust, namely exposure to identifiable (ethnic) out-groups.
12. We also tried including respondents’ perceived city size in the models. The main results remain insensitive to inclusion of this variable.

13. Using OLS regression could yield biased estimates or standard errors if people living in close proximity tend to have similar levels of social trust (i.e., spatial autocorrelation), for example, due to common exposure to unobserved contextual characteristics. Given that we have a random sample from a large, and geographically scattered, population, and that we include a rich set of control variables in our models, there is not strong reason to be particularly worried about autocorrelation in this study, compared to previous studies (but see Sampson and Graif 2009). Because we only have information about the spatial distance between each respondent and people residing in the 20,000 nearest households, the best test of spatial autocorrelation in our data is to focus on the most densely populated area in Denmark, the adjacent municipalities of Copenhagen and Frederiksberg, where a substantial number of respondents reside. This test (carried out in each survey wave) suggests that spatial autocorrelation is not a concern, as the Moran's  $I$  statistics is not significant.
14. To substantiate that the relationship between the ethnic diversity measures and trust is linear, we examined augmented component plus residual plots (see Figure S3 in the online supplement). Similar to Putnam (2007), we found no evidence of tipping-point effects or other signs of nonlinearity. This is also evidenced by quadratic terms of the ethnic diversity measures being insignificant when added to the models. Moreover, we found no signs of outliers driving the results; excluding respondents with critical ( $> 2 / \sqrt{n}$ ) DFBETA values for the diversity variables yields slightly larger and more precise effects.
15. The only exception is contextual crime, which is highly collinear with population density because crime is measured in absolute levels. However, including crime incidents per capita does not render the variable significant, nor does it change the relationship between ethnic diversity and trust.
16. This and subsequent moderation tests were carried out in contexts with a radius of 80 meters.
17. All the empirical analyses addressing self-selection are carried out on the three indicators of ethnic diversity measured in contexts of a radius of 80 meters.
18. Following a similar reasoning, we also examined whether there is a differential impact of diversity on trust for wealthy respondents (measured by personal disposable income), who are more prone to self-select into residential areas due to being less economically restricted (Putnam 2007). This is not the case, again pointing to self-selection not driving our results.

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