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Do you see it how I see it? Differences in neighborhood perceptions explained by individuals' socioeconomic characteristics and trust attitudes

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ABSTRACT

Researchers often use register data-based measures of neighborhood characteristics to estimate neighborhood effects. However, the underlying causal mechanisms might be based on the perception of such characteristics. The mismatch between the measures and perceptions is likely influenced by individuals' characteristics and attitudes. This paper investigates the relationship between the measured percentages of low-income and foreign background neighbors and their perceptions. Using Dutch register data merged with survey data, we found that higher education is associated with the underestimation of both characteristics, but after controlling for individual institutional trust it becomes less significant to the perceived percentage of foreign background neighbors, and insignificant to that of low-income neighbors. Individuals with lower institutional trust are likely to overestimate both percentages. Older age, greater wealth and greater social embeddedness are associated with underestimation of both characteristics, and higher household income with the underestimation of the share of low-income neighbors. We find that trust in democratic and public institutions is associated with biased perceptions of social reality, which can be an important finding for the spatial inequality studies. Our results also suggest that urban research would benefit from augmenting administrative datasets with surveys and interviews.

Introduction

A central feature of the quantitative neighborhood effects literature is that the neighborhood context is often measured using spatially aggregated census or register data. These neighborhood characteristics are assumed to have an effect on a range of outcomes of neighborhood residents. However, it might be that the *perceptions* of the neighborhood context, rather than the strict economic and demographic measures, explain contextual

influence (Fagg et al., 2008). Studies have shown that the effects of individual perceptions of the spatial context can differ from those based on administrative measurements (Chiricos et al., 1997). It remains unclear from the literature how individual socioeconomic characteristics and relevant attitudes, such as institutional trust, influence the perception of neighborhood characteristics, such as the share of residents with a migration background or living in poverty.

Studies using variables based on individual perceptions of the spatial context have focused primarily on feelings, emotions or opinions seen as being experienced "subjectively". These concepts include perceptions of danger (Rosa et al., 2009), neighbors' friendliness (Munro & Lamont, 1985), or esthetics (Mackenbach et al., 2016); while researchers using supposedly objective variables choose characteristics such as neighborhood average income (Van Ham et al., 2018) or the percentage of neighborhood green spaces (Pearce et al., 2018). This difference in approach is further reinforced because, even though it is possible to numerically express neighborhood friendliness, beauty or safety, register and census data do not include such indicators, making it difficult to connect subjective measures with administrative data. The different ways in which different people may experience or perceive spatial characteristics are overlooked in the literature. For example, the positive influence of urban green space on health and wellbeing outcomes is widely studied, but depends not only on the physical presence of urban green (which can be easily and numerically measured), but also on the ability of inhabitants to notice it and interact with it (which can be more difficult to gauge) in order to allow any beneficial influence on their lives (Wilson et al., 2004).

Most studies using variables such as neighborhood deprivation or percentage of migrants assume that register data-based measurements are sufficiently accurate for capturing the causal effect of these neighborhood characteristics on individual outcomes. However, people are often inaccurate in their estimations of area characteristics, even in the context of large scale processes such as the poverty level for their entire country (Mysíková et al., 2019). Personal characteristics can bias their estimations in various ways: people can judge others' financial situation relative to their own (Bacqué et al., 2014; McCulloch, 2001), and higher education can help with recognizing relevant ethnicity and status signifiers. Individual perceptions of socio-spatial reality can also be influenced by political attitudes, including mistrust in democracy and public institutions. The growing fields of studies on geographies of discontent and left-behind places analyze how this type of mistrust can arise from socio-geographical divides; such processes can be observed even in the small and relatively equal Netherlands (Van Vulpen, 2023). Place-based resentment – the perception that an area is ignored by political elites, lacks its fair share of resources, and its inhabitants' values are disregarded by inhabitants of other areas – can be predicted from socioeconomic, cultural and political inequalities between Dutch municipalities (Huijsmans, 2023). Place-based resentment is closely related to institutional trust, which might be highly relevant for people's perceptions of the socioeconomic status of their neighborhoods, as narratives emphasizing the failures of democratic and public institutions often also emphasize the presence of ethnic minorities and increasing socioeconomic deprivation (Van Vulpen, 2023).

At the neighborhood scale, the likely absence of contact between different social groups living close by (Bolt & van Kempen, 2013) could contribute to inaccuracies in

the estimation of area characteristics. Still, even the simple act of acknowledging the presence and assumed characteristics of a neighbor can form an "invisible" social tie between people (Felder, 2020), which can be sufficient to inform perceptions of neighbors. There are many studies investigating the mediating effect of more perceptual variables, such as neighborhood disorder, on the administrative measures of neighborhood poverty (Haney, 2007; Höfelmann et al., 2015). There are also studies in fields such as criminology (Goldman-Mellor et al., 2016), which compare the effects of subjective and administrative measures, in this case of crime levels, on individual outcomes. But to our knowledge there are no studies directly comparing administratively measured and individually perceived neighborhood poverty to determine their accuracy, and very few comparing the perceived and measured presence of ethnic minorities in neighborhoods (Hooghe & De Vroome, 2015; Van Assche et al., 2014, 2016).

Given that there is an extensive literature exploring the potential influence of neighborhood characteristics – such as poverty or ethnic diversity – on people's lives, the way in which this influence is mediated by individual perceptions, and how that mediation differs across social groups, could be crucial in enabling a better understanding of the results and implications of neighborhood research. This paper contributes to the literature by studying how the administrative neighborhood characteristics from register data – the share of people with a foreign background and the share of people with low income – differ from the perceptions of those characteristics by neighborhood residents. We study the influence of individual-level predictors, including gender, education level, household income, ethnic background and social embeddedness in the neighborhood on that mismatch. Particular attention is paid to the effect of measures of institutional and generalized trust, which can influence one's perceptions of the socioeconomic situation of the neighborhood. We test if, in addition to socio-spatial inequalities shaping political views, political views can be associated with bias in the perception of local socioeconomic deprivation and the presence of foreign background neighbors. By doing so, we bring themes from the geographies of discontent studies to the low-level spatial scale of neighborhoods, relating them to the earlier literature on more generally conceptualized social trust (Gundelach & Freitag, 2014; Kokkonen et al., 2014). The latter contribution is in line with calls for research on socio-political discontent using data with greater geographic detail (Lenzi & Perucca, 2021).

We use data from the LISS (Longitudinal Internet studies for the Social Sciences) panel, including a unique neighborhood perceptions survey collected in 2020, and the Statistics Netherlands geocoded microdata based on administrative registers. With these data, we create bespoke neighborhoods based on a 10-minute walking distance, conceptualized to coincide with the area the respondents of the LISS survey could consider as the extent of their neighborhood. Within the survey, the respondents are asked specifically to assess the percentage of the neighborhood population who are poor and the percentage of inhabitants who are of foreign background within their 10-minute-walk neighborhood. As such, the data offer a unique opportunity to compare these popular social science variables, as captured by governmental registers, with inhabitants' own perceptions. Ultimately, we believe that developing a fuller understanding of the predictors of the discrepancy between individual perceptions and measures from administrative sources is critical for urban research and social science research in general.

Theoretical background

Individual perceptions in neighborhood effects research

The existing body of work on neighborhood perceptions has focused on subjective characteristics such as the esthetics or social atmosphere of the neighborhood (Bowling & Stafford, 2007; Drukker & van Os, 2003; Kamphuis et al., 2010; Mackenbach et al., 2016). Several studies investigated the opinions of inhabitants about their local amenities, including green spaces and playgrounds (Bailey et al., 2014; Hoehner et al., 2005; Munro & Lamont, 1985). Other researchers have studied feelings of safety and social cohesion in the neighborhood (Bowling et al., 2006; Jones & Dantzler, 2021; Munro & Lamont, 1985; Semyonov et al., 2012). Another group of studies focused on the neighborhood reputation, pointing out that there are differences between how the inhabitants perceive their neighborhood and how it is seen by outsiders (Permentier et al., 2008).

Next to investigating the effect of the perceptions themselves on individual outcomes, researchers have also explored the relationship between the administratively measured variables such as neighborhood socioeconomic status and inhabitants' perceptions. The contexts of statistics collected by the state and people's local or "common sense" geographies vary not only in their operationalization's (quantitative, structured, versus more qualitative and chaotic) but also regarding the goals for which they are commonly used (Harvey, 2006). By using register data, researchers attempt to employ information created to monitor the national population to get scientific insights in societal patterns. In the field of neighborhood effects research, most studies accept the validity of numerically measured economic and ethnic composition variables. This is partially driven by the relationship between this field and applied governmental policies. Yet even in these contexts the issues listed in this section inspire questions around individuals' more subjective geographies. How much of the quantified socio-spatial situations translates directly to people's perception of their neighborhood? Haney (2007) tested the "broken windows" theory by investigating the roles that perceptions of neighborhood disorder and administratively measured neighborhood poverty could have in influencing individual self-esteem. Haney's results indicate that the impact of neighborhood poverty (as measured by the proportion of people in respondent's census block below the US poverty line) on self-esteem is mediated by the perceived neighborhood disorder. This is not surprising, as the measure of disorder – based on an amalgamation of issues including the quality of city services (such as garbage collection), housing and property upkeep, and crime and vandalism – is broad, and encapsulates many symptoms of neighborhood poverty an individual will directly perceive. Key socioeconomic variables, such as neighborhood income, employment, or education level, are often conceptualized as proxies encompassing a wide range of associated mechanisms – to the degree that some authors describe the processes in neighborhoods as obscured by the "black box" of neighborhood effects (Van Ham & Manley, 2012). Using survey data based on individual perceptions of neighborhood characteristics is, therefore, an attempt to cast some light into that box.

At the same time, there have been few studies looking specifically at individual perceptions of neighborhood socioeconomic characteristics such as neighborhood poverty or the percentage of ethnic minorities. These administrative, also called archival (Roosa et al., 2009), variables are constructed from quantitative data such as population registers

and require the definition of categories (e.g. country of origin), or scales (e.g. income). Often, these measures are seen as strictly defined. For example, the previous[1] Statistics Netherlands criteria used to identify people of non-Dutch origin divided them into Western (defined as including individuals from European and Northern American countries plus Japan, Australia and Indonesia) or non-Western (the rest of the world). This choice, like many necessitated by quantitative analysis, was to some extent arbitrary (why is Japan Western while South Korea is not), although it also reflected colonial and trading histories. Ethnic categories detailed at the level of country of birth still omit many within-country differences (Jennissen et al., 2018). The crux here is that measuring a trait such as ethnicity necessitates creating groups, and these groups are just approximate representations of the diversity of belonging and identity. When it comes to income, often used as a proxy of socioeconomic status, many researchers highlight that a complete measure of socioeconomic resources should include not only the amount of money an employer pays but also individual wealth and relations to processes of production, as well as education, occupation and, more generally, social and cultural capital (Savage, 2015).

Perceptions of poverty

Subjective poverty has been approached in multiple ways ranging from openly political approaches, in which the consciousness of one's working class belonging is a prerequisite of system-changing action (Wright, 2009), to psychologized approaches equating broadly understood poverty with lack of life satisfaction or even lack of happiness (Praag & Ferrer-i-Carbonell, 2008). What unites these approaches, even if for some poverty is a concrete material situation and for others it is a feeling, is the relationality of poverty. Except for those absolutely penniless or undeniably rich, one can only be poor in comparison to a personal situation from the past or the current situation of someone else. This idea has inspired many studies on relative deprivation, including in the neighborhood effects field. These studies test the assumption that being richer compared to one's neighborhood has its own advantages, and vice versa, being relatively poorer breeds disadvantage. The reason behind any apparent disadvantage could be the psychological distress – manifested through feelings of shame and guilt – caused by the comparisons between oneself and one's neighbors. The evidence for the relative deprivation theory in the neighborhood context remains inconclusive, with studies supporting it (Bacqué et al., 2014; McCulloch, 2001), and others not finding significant effects (Knies et al., 2007; Stafford & Marmot, 2003).

People do not develop their perceptions in isolation, removed from external influences. Opinions are strongly influenced by the media, education and politics, often controlled by people whose interests align more closely with the general obfuscation of social inequality rather than seeking to promote accurate knowledge. There have been detailed analyses of such processes, mostly by theorists studying the Marxist concept of false class consciousness (Fuchs, 2021) – people acting against their socioeconomic interests because of the cultural and social propaganda of the capitalist class. These processes can be understood by employing the relational approach to spatial phenomena in geography (Khan et al., 2013), also called relationism (Jones, 2009), with perceptions of poverty (and poverty itself) being co-linked or relationally produced by perceptions of wealth.

Even looking at the single measure of individual income, rather than the entire concept of social class, the subjective idea of having a low income can be substantially influenced by cultural signifiers of wealth (Bourdieu, 1986). For instance, someone with an objectively low income, compared to the whole population, can regard themselves as richer if they can afford fashionable clothes considered high quality according to their vision of culture; on the other hand, someone objectively affluent can feel poor if they compare their current life situation, in which they cannot afford expensive restaurant dinners or luxury holidays, to something they know as the norm from their past, friends' stories, or media representations. The limits of social networks and media information can contribute to perception bias both for richer and poorer people. The comparison effect can happen on a scale as large as entire countries: Mysíková et al. (2019) show how Slovakians considered themselves to be poorer than Czechs years after the initial economic differences between the two countries diminished.

The complicated processes of people trying to determine their economic position in relation to what they know from the media, their workplaces, and their own past experiences point to the difficulty of gauging the situation of others in their neighborhood. The lack of clarity when it comes to the economic standing of one's neighborhood could explain the inconclusive results of the neighborhood effects studies investigating relative deprivation: two people, relatively rich compared to their neighborhoods according to their exact income and wealth, may have very different perceptions of their neighbors and therefore their experience of relative deprivation differs. Social contacts in the neighborhood can aid accurate (or alternatively reinforce inaccurate) perceptions; although one could argue that for assessing a large number of neighbors, the "invisible ties" – knowing of someone's presence without necessarily *knowing* them personally (Felder, 2020) – are more important. These fleeting, everyday encounters could be seeing one's neighbors driving expensive cars or staying home all day because of unemployment. One's education and cultural awareness may also help with correctly estimating neighborhood affluence or poverty, and avoiding prejudices: for example, assuming that a relatively low quality of housing upkeep is indicative of neighborhood poverty, when in reality the central location of the neighborhood in the city causes high rents and therefore necessitates higher incomes from the inhabitants.

Perceptions of foreign origin neighbors

Because of the substantial public and academic interest in migration, the presence of ethnic minorities in neighborhoods has been widely researched. Some of the earliest neighborhood studies and models have focused on the exclusion (Liebow, 2003) and segregation processes (Schelling, 1971) experienced by Black inhabitants of large American cities. In European research, people of immigrant background are cast in a similar role to the minority racial groups in the United States. In the Dutch context, many are the descendants of the so-called "guest workers" from the 1960s and 1970s and originate mostly from Turkey and Morocco. The supposed temporariness within the Netherlands contributed to the low socioeconomic position of their families in the following decades. The two other big immigrant groups hail from Suriname and the Antilles, former Dutch colonies. In addition, the expansion of the European Union brought a new wave of immigrants from Eastern Europe, who have so far been overlooked in neighborhood

research, potentially because they initially settled away from the largest urban conurbations.

The presumed characteristics of the main migrant groups – low income, working in low prestige low security occupations, and a greater propensity for crime and delinquency than the majority population – are so widely implied in neighborhood research that papers often control for "immigrant presence" in the neighborhood without motivating the underlying mechanisms. While qualitative studies show evidence for immigrant social networks discouraging their members from seeking prestigious career paths in Dutch society, by providing them with low-income jobs (Pinkster, 2007), in many quantitative models the effect of the share of immigrant background inhabitants disappears when variables like income and share of social housing are included (Van Ham et al., 2018). Still, the presence of ethnic minorities is often used as a proxy for neighborhood effects related to income and education (Harris, 1999), linked to low-income migrant job networks or language difficulties experienced at schools. Relatedly, there is an association between socioeconomic deprivation and several migrant groups in the Dutch public discourse. Since the beginning of the twenty-first century, there have been many texts and statements by the government, political parties and opinion leaders on migrants in general and Muslim migrants in particular, calling for closing the country as much as possible to migrants and forcing the residing migrants to assimilate into Dutch culture and society (Siebers & Dennissen, 2015). As a part of what Siebers & Dennissen describe as cultural fundamentalism, people with a Muslim background are associated with crime, terrorism and female oppression. Çankaya and Mepschen (2019) argue that Dutch anti-immigrant sentiments are not only culture-based, but also have a racist character. Interestingly, middle-class Dutch people without a migration background tend to distance themselves both from the migrant "Other" and the working-class non-migrant "Other" in the context of diverse city areas. "Beyond her distaste for the 'mess', 'noise' and men spitting on the streets, it was the 'simplistic' racism of the 'ordinary Whites' around her that troubled her most", Çankaya and Mepschen (2019, p. 636) write about a middle-class inhabitant of Amsterdam's Slotermeer. Taking both class and ethnicity into account, one could theorize that native Dutch people are more likely to expect and therefore perceive people with a migration background in poorer neighborhoods. At the same time, human physical appearance is constantly interpreted in terms of ethnicity, and people from backgrounds racialized as non-White will be noticed regardless of context (as evidenced by the first vignette described by Çankaya & Mepschen, 2019).

Next to studies predicting economic and educational outcomes of neighborhood ethnic diversity, researchers have investigated its possible influence on social cohesion (Tolsma et al., 2009), neighborhood inhabitants' political views (Janssen et al., 2019) and feelings of safety (Jacobs et al., 2017). The effect of ethnic minorities' presence on social cohesion, neighborhood atmosphere and reputation, and political views has been hypothesized to be either positive or negative, confirming or debunking the biases people tend to develop about immigrant groups (Janssen et al., 2019). The size of the outgroup – in this case, the percentage of foreign background neighbors as perceived by someone from the ethnic majority – has also been researched, with results highlighting both perceived threat (Semyonov et al., 2012) or, contrastingly, positive opinions towards the outgroup, possibly because of more opportunities for interaction (Wagner

et al., 2006). For these processes, the perceived share of foreign origin neighbors is of crucial importance.

In a study using Belgian municipality-level data, Hooghe and De Vroome (2015) show that, in general, people exhibit a tendency to overestimate the presence of non-nationals. A study by Chiricos et al. (1997) shows that both Black, but especially White people greatly overestimate the proportion of Black neighbors in their surroundings. The tendency described by Hooghe & De Vroome is further influenced by respondent's individual characteristics such as age, gender, and TV watching (or cultural) habits – pointing to the important role of these predictors.

Current study: individual predictors of neighborhood perception bias

Developing a better understanding about the relationship between perceptions and administrative measures of neighborhood characteristics is highly relevant for key issues in urban research: the "black box" of mechanisms between the neighborhood level variables such as income and individual outcomes; the acknowledgment of one's socioeconomic and cultural position relative to that of other neighbors; and the assessment of the actual presence of migrants, who are commonly seen as influential for city communities. Whether or not perceptions match register data, an individual's perception of their neighborhood is a crucial moderator for many socio-spatial processes. If strong discrepancies exist, knowing what individual characteristics predict these perceptions can help with interpreting the sometimes puzzling results of neighborhood effects studies.

Social embeddedness and individual demographic characteristics

We start with the basic demographic characteristics – gender, income, education, and ethnic background – as well as social embeddedness in the neighborhood. The role of the last variable is to control for whether actual social contacts in the neighborhood make the perceptions more comparable with official statistics. Even though the link seems logical, the search for a relationship between embeddedness and neighborhood effects has proven inconclusive (Miltenburg, 2015).

The survey we use asked respondents about how many of their neighbors struggle to make ends meet based on income, but even this specific question can trigger very different associations with poverty and "struggling", based on knowledge and life experience. Low-income individuals can project their own experiences on the characteristics of the whole neighborhood (Kamphuis et al., 2010). Similarly, while asked about "foreign origin", the respondents might not recognize its symptoms if they are less aware of people's appearance and behaviors being different (Van Assche et al., 2016). We may assume that having a higher level of education leads to more accurate perceptions; however, the diversity perceptions model of Hooghe and De Vroome (2015) points to gender and age being more important than education, with women and older people more likely to estimate a high percentage of people with foreign background.

Generalized and institutional trust

Among the emotion-related characteristics relevant for neighborhood perceptions, trusting other people and institutions can play a crucial role when it comes to neighbors' foreign background (associated with "otherness") or seeing local households as

struggling to make ends meet. Several studies investigated the effect of neighborhood exposure to ethnic minorities (Gundelach & Freitag, 2014; Kokkonen et al., 2014) and deprivation (Wang et al., 2017) on social trust. This influence can have a dialectical character, as trusting people might underestimate local deprivation, and low trust in institutions can go together with overestimating local poverty and the presence of ethnic minorities. Janssen et al. (2019) note that dissatisfaction with political institutions can predict voting for anti-immigrant parties, but it is not related to register data-measured presence of ethnic minorities in the neighborhood; it could be that people's perceptions of their surroundings influenced by their political mistrust, are more important than the administrative measures of neighborhood diversity. This is related to the idea of certain places perceived as being left-behind, regardless of their ethnic composition (Van Vulpen, 2023). Van Assche et al. (2014, 2016) use both administrative and perceived diversity measures in their studies. The detailed investigation into the relationship between these measures and individuals' authoritarianism suggests that highly authoritarian people are more likely to have an accurate estimate of the proportion of ethnic minorities, possibly because of their "vigilance" when it comes to immigrant groups (Van Assche et al., 2016). Responding to this literature we include two measures of trust as predictors. To control for personal values and attitudes, we measure generalized trust – how likely the individuals are to expect good intentions from people beyond their friends and family members (Kwon, 2019). We also measure institutional trust, based on people's confidence in institutions such as the Dutch government and the police, and groups such as politicians, to capture respondents' satisfaction with the public sphere and democracy.

Data and methods

For our empirical analysis we combine the Statistics Netherlands longitudinal, geocoded microdata from the Social Statistical Database (SSD), which covers the entire population of the Netherlands, and LISS (Longitudinal Internet studies for the Social Sciences) panel administered by CentERdata (Tilburg University, The Netherlands), which included a specific questionnaire on neighborhood perceptions. The LISS panel is a representative sample of Dutch individuals who participate in monthly internet surveys. The panel is based on a true probability sample of households drawn from the population register (households that could not otherwise participate are provided with a computer and internet connection). We include all 2663 individuals who responded to the LISS neighborhood perceptions questionnaire and match them with their geographic location in the SSD. Some individuals had to be omitted from the final analyses as a result of Statistics Netherlands privacy limitations; being in the dataset together with their partner (which creates another, unwanted level in the structure of our data; we could not account for such dependencies with the number of respondents), and; having missing values on the variables of interest. The final dataset comprises 1794 respondents, aged 18–95 years old. We also added variables from other LISS datasets (Background Variables, Politics and Values, and Personality), choosing the waves closest to waves of the neighborhood perceptions questionnaire (July 2020). The full documentation of the LISS panel can be found at www.lissdata.nl.

Main variables

The two dependent variables we use, *perceived percentage of foreign background neighbors* and *perceived percentage of low-income neighbors*, are based on questions from the LISS neighborhood perceptions questionnaire. The questionnaire beings: "This questionnaire is about your neighborhood. By 'your neighborhood' we mean the area around your home, which can be reached on foot in about 10 minutes.". The relevant questions are "What do you estimate, what percentage of the residents of your neighborhood are of foreign origin?" and "What do you estimate, what percentage of the residents of your neighborhood struggle to make ends meet from their monthly income?", with respondents of the survey asked to choose between answers such as 0%, 10%, 20% up to 100%.

Closely related to these dependent variables are the two key predictors, *register data percentage of foreign background neighbors* and *register data percentage of low-income neighbors*, which we constructed to correspond to the perception variables from the LISS survey as closely as possible. Firstly, we matched the respondents to their 100 × 100 m grid cells in the Statistics Netherlands microdata. Then, using a dataset (*Nationaal Wegen bestand*) which includes all named roads and footpaths in the Netherlands we created bespoke neighborhoods, based on the area that the respondents can reach within 10 minutes (a distance of 600 m), starting in their home grid square. From microdata, we created the percentages of foreign background (at least one parent or the person themselves born abroad) and low income (using the Eurostat definition of the at-risk-of-poverty rate of households with an equivalized disposable household income below 60% of the national median equivalized disposable income) neighbors per square, and then aggregated these percentages (weighted by the covered square area) for each bespoke neighborhood. For inhabitants with foreign background, the mean percentage in the LISS respondents' neighborhoods is 23% (closely corresponding to the 22% perceived according to survey answers), while for low-income inhabitants it is 12% (compared to 22% perceived according to the survey).

We measure the *institutional trust* of a respondent with a scale variable, based on the nine answers from the LISS Politics and Values Core Study, Wave 13, in which respondents had to rate their trust in the following institutions, groups and organizations on a 10-point scale: Dutch government, Dutch parliament, the legal system, the police, politicians, political parties, European Parliament, United Nations, and the media (Cronbach's alpha: 0.94). For *generalized trust*, we use a variable from the LISS Personality Core Study, Wave 12, containing the answers to the question "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?", recorded on a 10-point scale (from 1, "You can't be too careful", to 10, "Most people can be trusted").

Control variables

The control variables in the models include individual *gender* (female or male), *age*, and ethnicity, coded as *native Dutch* (i.e. both parents born in the Netherlands) or not, to reflect the binary nature of the "foreign background neighbors" variables. Education is measured using five levels, with level 1 indicating primary (*basisonderwijs*) and preparatory vocational (*vmbo*) education, level 2 being secondary academic education (*havo* or

vwo), level 3 vocational education (*mbo*), level 4 more practical academic education (*hbo*) and, level 5 theoretical academic education (*wo*). *Household income* (unequivalized disposable income) and *household wealth* (total value of bank and savings deposits, securities, bonds and shares, own home, business assets, and other assets of a household) are both measured at the start of 2020. To control for the urban character of the neighborhood we included a spatial control variable *urbanicity*, based on address density per km^2 (in five categories from "less than 500", meaning "not urban", to "2500 or more", "extremely urban"). We also include a measure of individuals' *social embeddedness* in the neighborhood to assess how likely people were to be familiar with their neighbors. This was based on six questions from the LISS such as knowing local residents by name or visiting them (Cronbach's alpha: 0.78; for the list of questions, see Appendix). Descriptive statistics can be found in Table 1.

Analytical approach

Because of the ordinal nature of our dependent variables, we use ordered logit regression for our models. Even though the ten possible answers are numerically spaced at equal intervals, it is difficult to assume how the respondents interpreted them – for example, the "0%" answer could be interpreted as exactly zero neighbors of foreign background, or low income, but also a "0%−5%" category, considering the next possible answers are 10% and 20%. Therefore, we consider it appropriate to treat the variable as ordinal. Ordered logit is also intuitive to interpret, as a linear function is estimated of

Table 1. Descriptive statistics.

	Mean	SD	Min	Max
Perceived % foreign background neighbors (in 10%)	2.199	1.840	0	10
Percent of foreign background in bespoke neighborhoods	0.226	0.144	0	0.84[a]
Perceived % low income neighbors (in 10%)	2.196	1.903	0	10
Percent of low income in bespoke neighborhoods	0.119	0.078	0	0.50[a]
Urbanicity				
Not urban	0.228	0.420	0	1
Slightly urban	0.184	0.388	0	1
Moderately urban	0.189	0.392	0	1
Very urban	0.230	0.420	0	1
Extremely urban	0.170	0.376	0	1
Social embeddedness	2.610	0.755	1	5[a]
Gender (women)	0.516	0.500	0	1
Household income (in 1000 euro)	33.307	13.740	[b]	[b]
Household wealth (in 1000 euro)	227.125	305.573	[b]	[b]
Native Dutch	0.815	0.388	0	1
Age				
18–34	0.137	0.344	0	1
35–64	0.482	0.500	0	1
65+	0.380	0.486	0	1
Education				
Level 1	0.223	0.416	0	1
Level 2	0.070	0.257	0	1
Level 3	0.244	0.430	0	1
Level 4	0.297	0.457	0	1
Level 5	0.166	0.372	0	1
Institutional trust	5.712	1.777	0	10[a]
Generalized trust	6.120	2.255	0	10[a]

[a]Rounded up because of the Statistics Netherlands privacy restrictions.
[b]Minimum and maximum removed because of the Statistics Netherlands privacy restrictions.

the independent variables and a set of cut points, which represent an underlying score (Van Ham & Manley, 2009). Because the perception of the percentage of foreign or low-income neighbors are the dependent variables, and the register data variables for the percentage of foreign and low income neighbors are included in their relevant models, the effects of other variables show either under – (negative coefficients) or over-estimation (positive coefficients) of the "objective" situation in individual perceptions. The perception is the outcome of the model, predicted both by the register-based measure of foreign background or low-income neighbors and various individual characteristics.

Results

Before reporting the results of the regression models, we explore the correlations between the key variables. The correlation between the perceived percentage of foreign neighbors and that percentage based on register data is 0.61, relatively high for human behavior-related variables, and positive. The correlation between the perceived percentage of low-income neighbors and that percentage as derived from register data is much smaller at 0.38. That suggests that people are better able to accurately assess the presence of foreign background neighbors than the percentage of low-income neighbors, as already implied by the less direct effects of the latter (see theoretical background). Also notable are the correlations between the two perception-based variables, and the two register data-based ones. There is a relatively strong positive correlation between the perception-based percentages of foreign background and low-income neighbors, 0.55, and an even stronger positive one (0.64) for the register data-based percentages of foreign background and low-income neighbors. Perceptions of the percentage of neighbors in questions are thus likely based on similar predictors, and possibly the fact that in the Netherlands, many people with foreign background live in neighborhoods with many low-income households.

Foreign background neighbors models

In Table 2, models 1a, 2a and 3a predict the ten categories of the percentage of foreign background neighbors, as perceived by the individuals in our dataset, in the context of their 10-minute-walk neighborhoods. Model 1a is the basic model, while model 2a adds the institutional trust variable; 3a includes both the institutional and generalized trust. As expected, in all three models the percentage of foreign background neighbors based on register data has a strong and positive relationship. By including this variable in the model, the other effects point to the relative over – or underestimation of the percentage of foreign background neighbors because of individuals' characteristics or opinions. One exception is the urbanicity of the neighborhood; its effect is positive for the urban areas, as could be expected, considering that most people with an immigrant background in the Netherlands live in cities (Greft et al., 2016).

When it comes to individual-level variables, people socially embedded in their neighborhoods, those in older age groups and having the highest level of education tend to underestimate the percentage of foreign background neighbors in all the models. Interestingly, only having the highest, theoretical academic (*wo*) level of education is

Table 2. Ordered logit regression models predicting the perceived neighborhood characteristics.

	(1a)		(2a)		(3a)		(1b)		(2b)		(3b)	
	DV: perceived % foreign background neighbors						DV: perceived % low income neighbors					
Foreign bespoke nbh	8.568***	(0.438)	8.540***	(0.439)	8.583***	(0.440)						
Low income bespoke nbh							7.269***	(0.687)	7.277***	(0.684)	7.378***	(0.684)
Urbanicity (ref. not urban)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)
Slightly urban	0.259	(0.142)	0.271	(0.142)	0.263	(0.142)	0.131	(0.134)	0.137	(0.134)	0.133	(0.134)
Moderately urban	0.285*	(0.145)	0.306*	(0.146)	0.300*	(0.146)	0.163	(0.135)	0.185	(0.135)	0.180	(0.135)
Very urban	0.553***	(0.143)	0.575***	(0.143)	0.570***	(0.143)	0.520***	(0.130)	0.541***	(0.130)	0.543***	(0.130)
Extremely urban	0.341*	(0.173)	0.379*	(0.174)	0.359*	(0.174)	0.227	(0.155)	0.259	(0.155)	0.226	(0.156)
Social embeddedness	−0.222***	(0.064)	−0.205**	(0.064)	−0.187**	(0.065)	−0.225***	(0.063)	−0.188**	(0.063)	−0.150*	(0.063)
Female	0.156	(0.088)	0.179*	(0.089)	0.174*	(0.089)	0.113	(0.087)	0.149	(0.087)	0.144	(0.087)
Household income	−0.000	(0.002)	0.000	(0.002)	0.000	(0.002)	−0.006**	(0.002)	−0.005**	(0.002)	−0.005*	(0.002)
Household wealth	−0.001***	(0.000)	−0.001***	(0.000)	−0.001***	(0.000)	−0.001***	(0.000)	−0.001***	(0.000)	−0.001***	(0.000)
Native Dutch	−0.206	(0.117)	−0.177	(0.117)	−0.149	(0.118)	−0.111	(0.115)	−0.051	(0.115)	−0.000	(0.116)
Age (ref. 18–34)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)
35–64	−0.613***	(0.138)	−0.655***	(0.138)	−0.661***	(0.138)	−0.137	(0.136)	−0.213	(0.137)	−0.206	(0.137)
65+	−0.923***	(0.154)	−0.931***	(0.154)	−0.917***	(0.154)	−0.559***	(0.152)	−0.572***	(0.152)	−0.527***	(0.152)
Education: Level 1 (ref.)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)	0.000	(.)
Level 2	−0.193	(0.199)	−0.149	(0.200)	−0.117	(0.201)	−0.152	(0.190)	−0.054	(0.191)	0.006	(0.191)
Level 3	−0.098	(0.135)	−0.071	(0.135)	−0.064	(0.135)	−0.100	(0.131)	−0.045	(0.131)	−0.020	(0.131)
Level 4	−0.177	(0.130)	−0.116	(0.131)	−0.082	(0.132)	−0.234	(0.127)	−0.091	(0.128)	−0.014	(0.130)
Level 5	−0.549***	(0.154)	−0.439**	(0.156)	−0.397*	(0.158)	−0.398**	(0.151)	−0.179	(0.153)	−0.087	(0.154)
Institutional trust			−0.117***	(0.027)	−0.100***	(0.028)			−0.207***	(0.026)	−0.172***	(0.028)
Generalized trust					−0.042	(0.022)					−0.088***	(0.022)
Cut 1 (10%)	−2.278***	(0.288)	−2.822***	(0.314)	−2.889***	(0.316)	−2.703***	(0.285)	−3.646***	(0.310)	−3.774***	(0.311)
Cut 2 (20%)	0.340	(0.282)	−0.194	(0.307)	−0.258	(0.309)	−0.693*	(0.278)	−1.603***	(0.301)	−1.722***	(0.303)
Cut 3 (30%)	1.422***	(0.283)	0.893**	(0.307)	0.831**	(0.309)	0.361	(0.278)	−0.523	(0.299)	−0.637*	(0.300)
Cut 4 (40%)	2.555***	(0.288)	2.035***	(0.311)	1.975***	(0.312)	1.203***	(0.280)	0.344	(0.300)	0.234	(0.301)
Cut 5 (50%)	3.372***	(0.295)	2.859***	(0.316)	2.800***	(0.317)	1.715***	(0.283)	0.872**	(0.301)	0.766*	(0.302)
Cut 6 (60%)	4.148***	(0.304)	3.641***	(0.324)	3.582***	(0.325)	2.301***	(0.287)	1.476***	(0.305)	1.374***	(0.305)
Cut 7 (70%)	4.862***	(0.316)	4.360***	(0.335)	4.302***	(0.336)	2.980***	(0.297)	2.169***	(0.313)	2.070***	(0.314)
Cut 8 (80%)	6.035***	(0.354)	5.548***	(0.369)	5.490***	(0.371)	3.819***	(0.321)	3.017***	(0.335)	2.924***	(0.336)
Cut 9 (90%)	7.277***	(0.444)	6.809***	(0.456)	6.755***	(0.457)	5.297***	(0.433)	4.503***	(0.444)	4.415***	(0.444)
Cut 10 (100%)	8.925***	(0.773)	8.465***	(0.780)	8.415***	(0.780)	6.815***	(0.759)	6.022***	(0.765)	5.936***	(0.766)
Pseudo R^2	0.143		0.146		0.147		0.063		0.073		0.075	

Standard errors in parentheses. $N = 1794$.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.00$.

associated with biased perceptions, with the lowest level as a reference category. Being native Dutch or having a high income is not significant in the models, while being female is associated with overestimation, but only in Models 2a and 3a. Household wealth is significant, with having more wealth associated with an underestimation of the foreign background neighbors percentage. In Model 2a, having higher trust in institutions is associated with underestimating the percentage of foreign neighbors; adding this variable also lowers the significance of the education effect. Generalized trust in people, added in Model 3a, is not significant on its own, but it does lower the significance of the effects of institutional trust and social embeddedness.

We considered the possibility that perceptions are being influenced by the foreign background inhabitants of affluent neighborhoods passing as native Dutch more often than the foreign background inhabitants of poorer neighborhoods, because of their appearance, cultural habits and occupational choices (see Pinkster, 2007). As a robustness check, we ran the model for perception of foreign background neighbors including the register data-based measurement of share of low-income neighbors to control for neighborhood income. The results were the same when it comes to the significance and direction of the predictors, except for the effect of gender becoming non-significant (see the Appendix for the full model).

Low income neighbors models

Models 1b, 2b and 3b in Table 2 predict the ten categories of the percentage of low-income neighbors, as perceived by the individuals in the dataset, considering their 10-minute-walk neighborhoods. The institutional trust and generalized trust variables are added to Models 2b and 3b mirroring Models 2a and 3a, described above. Again, in all three models, the relationship with the percentage of low-income neighbors based on register data is strong and positive. Urbanicity of the neighborhood has a non-linear effect, with "very urban" being positive and significant, but not "extremely urban". This effect is consistent with most of the low-income neighborhoods in the Netherlands being situated in urban areas, but on the outskirts of the expensive inner cities.

The individual level variables largely repeat the patterns found in the foreign background neighbors models (Models 1-3a), with being native Dutch having no significant effect on perceptions, and social embeddedness in the neighborhood having a significant negative effect, suggesting that people with more social contacts in the neighborhood tend to underestimate the percentage of low income households living there. Being female has no significant effect. The effects of the respondent's household income and wealth are significant and negative in all three models, 1-3b, again pointing towards underestimation – which can be explained by affluent people being less likely to notice or acknowledge their poorer neighbors. Age also is not a significant predictor in the 35–64 category (compared to 18–34), suggesting only retirement age people tend to underestimate the percentage of low-income households in their neighborhood. The most notable changes between the models occurred in the educational effects: in the first model (1b) the effect of the highest education level was significant and negative, and after taking the negative, significant effect of institutional trust into account the education effect becomes insignificant. Moreover, for the low-income perception, the effect of generalized trust is also significant and negative. In other words, people at the highest

level of education (*wo* – theoretical academic education) tend to underestimate how many low-income neighbors live around them in the first model, but this effect appears to be explained by their higher trust in public institutions and that, in turn, is partially explained by higher trust in people in general. Conversely, those who mistrust institutions and other people overestimate the percentage of their neighbors struggling to make ends meet.

Conclusions and discussion

In this paper, we have studied the relationship between administratively measured neighborhood characteristics – the share of people with foreign background and low income – drawn from population registers and the survey-derived perceptions of those socioeconomic neighborhood characteristics by inhabitants of the neighborhood. As expected, we found that the perceptions – and register data-based measures correlate, although surprisingly not very strongly in the case of the percentage of low-income neighbors. Investigating the predictors of this mismatch, we found that older age, greater household wealth and greater social embeddedness in the neighborhood are associated with an underestimation of both characteristics, and respondents with a higher household income tend to underestimate how many of their neighboring households struggle to make ends meet. Having a very high level of education is also associated with an underestimation in the initial models, but then becomes less significant to the perceived percentage of foreign background neighbors, and insignificant to the perception of low-income neighbors after a measure of institutional trust is controlled for. This is consistent with studies showing high political trust among the higher educated in the Netherlands (Muis et al., 2022). Still, regardless of their education, individuals with lower trust in public institutions are likely to overestimate the ratios of their foreign background and low-income neighbors. In the case of low income, the same can be said for generalized trust – trust in people in general: the less trusting someone is, the higher the share of their neighbors they perceive to be struggling financially.

Our investigation into the individually perceived and administrative data-based socioeconomic neighborhood characteristics has produced several insights relevant for researchers and policymakers. Firstly, the perceptions and administratively measured characteristics can be very different. Although not a new finding, this is especially important for variables such as neighborhood income-related poverty, often used as a proxy for crucial processes in the neighborhood. Much of the poverty present in the neighborhood affects its inhabitants indirectly, possibly without being consciously perceived. Secondly, the extent of this mismatch, between perception and register data vary based on individuals' characteristics such as household income, age and social embeddedness in the neighborhood. Some characteristics, such as education, can be influenced by emotional attitudes of an individual: trust in institutions or people in general. Many of these characteristics could remain unmeasured, while possibly playing a salient role in neighborhood effects mechanisms. These findings are critical for the growing fields of studies on geographies of discontent and left-behind places, analyzing the mistrust in democracy and public institutions arising from socio-geographical divides (Van Vulpen, 2023). Our results indicate that not only can low trust in democratic and public institutions be caused by the lack of political attention and development in a region; it is also associated

with biased perceptions of social reality at the scale of neighborhoods. Individuals who mistrust institutions and other people overestimate the percentage of their neighbors struggling to make ends meet, consistently with their more critical view of society. The mistrust of institutions can reinforce the pessimistic perception of society, but seeing social struggle also likely contributes to the mistrust of institutions. In this context, the mistrust of institutions seen as elite could be seen as class solidarity with those who cannot access institutional positions of power. At the same time, higher wealth is consistently associated with underestimating the percentage of foreign-background and economically struggling neighbors, which suggests their relative "invisibility" in places inhabited by affluent people. Another important finding is that only people at the highest theoretical education level seem to underestimate the share of foreign background neighbors, compared to people with the lowest education level. One implication of this could be that that the university educated have different perceptions than other social groups, which is consistent with the recent public debates about education-based inequalities and group belonging in the Dutch society, emphasizing the group identity of the highest educated in a highly stratified education system (Van Rijsbergen, 2024; for parallels in other countries see e.g. Goodhart, 2017). Another possible explanation could be that the highest educated respondents try to avoid overestimating the share of immigrant background neighbors and are therefore overcorrecting. This would be consistent with how Dutch middle-class people strive to maintain a non-racist self-image (Çankaya & Mepschen, 2019). These linkages between education, social class position, geographical location and attitudes such as institutional trust are highly confounded and likely differ depending on national contexts.

Our results confirm that even in the case of social phenomena that can be numerically measured, like poverty with (lack of) money, further effects on people are influenced by subjective emotions, as previously discussed (Praag & Ferrer-i-Carbonell, 2008). This implies that spatial effects research could benefit from more mixed-methods approaches and augmenting large register-based datasets with surveys and interviews highlighting feelings and values. At the same time, administrative data continue to be the most reliable resource for gauging spatial distributions of people and households' traits which can be inaccurately perceived. Researchers should very carefully consider what kind of measures – administrative, subjective, or both – are most suitable for their analyses, and aim to be guided by theoretical reasoning rather than data availability.

Future research could develop in several directions, including comparing the effects of perceived and register-based measures on the outcomes of interest (specifically which type of measure matters more for which outcomes, and with which predictors?), and further exploring the reasons for the mismatch we have observed. Even with the very detailed surveys we used, it is not totally clear why, for example, older people are likely to underestimate the percentage of foreign background neighbors. We can hypothesize that it is because of more interactions with people of immigrant background happening in the younger generations, or maybe simply because of more older people being native Dutch themselves and having social contacts with that ethnicity. Interviews with older inhabitants of neighborhoods with varying ethnic diversity levels could shed some light on this. Similarly, future research could explore the reasons for richer people underestimating the share of poor households in their neighborhoods – perhaps an inability to see the signs of poverty or refusal to accept even that there is poverty close to home.

Because of relying on existing datasets with detailed variables only on perceptions of the share of foreign and low-income neighbors, we could not directly investigate the perceptions of affluent neighbors; the same is true for perceptions of specific migration background groups. With appropriate data, future studies should replicate our approach to include perceptions of affluence and explore relationality of neighborhood perceptions. Future research could also explore how the perceptions vary over space – for example, investigating whether residents are likely to overestimate neighborhood poverty when living close to affluent or poor areas. Finally, the relationship with institutional trust deserves more attention, possibly with comparisons across countries where views on migration might not be as related to political dissatisfaction as they are in the Netherlands (Janssen et al., 2019).

Notes

1. From 2022, a new categorization focusing more on the country of birth and continents was introduced (https://www.cbs.nl/nl-nl/dossier/dossier-asiel-migratie-en-integratie/herover weging-indeling-westerse-en-niet-westerse-migratieachtergrond).

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The data that support the findings of this study are not publicly available due to privacy restrictions of Statistics Netherlands. The Microdata team of Statistics Netherlands can be reached for data access inquiries at the following e-mail address: microdata@cbs.nl. The paper also includes explanation of the Statistics Netherlands privacy agreements: https://www.cbs.nl/en-gb/about-us/organisation/privacy.

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