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## Local social engagement, satisfaction, and embeddedness in the Netherlands: which effects matter and for whom?

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**Abstract.** This paper examines to what extent, and for whom, different geographical characteristics affect the levels of local social engagement, satisfaction, and embeddedness in the Netherlands. We employ a uniquely detailed dataset of individuals in Dutch neighbourhoods and municipalities, which is examined using a multilevel hierarchical model with spatial interaction effects. The analysis shows that living in a neighbourhood with a high ethnic concentration and low economic development has negative consequences for actual engagement, satisfaction, and embeddedness. However, this effect is more relevant for natives than for immigrants (ie, Turks, Moroccans, Surinamese, and Antilleans). In addition, we find no evidence that the relationship between locality and engagement, satisfaction, and embeddedness varies between first-generation and second-generation immigrants.

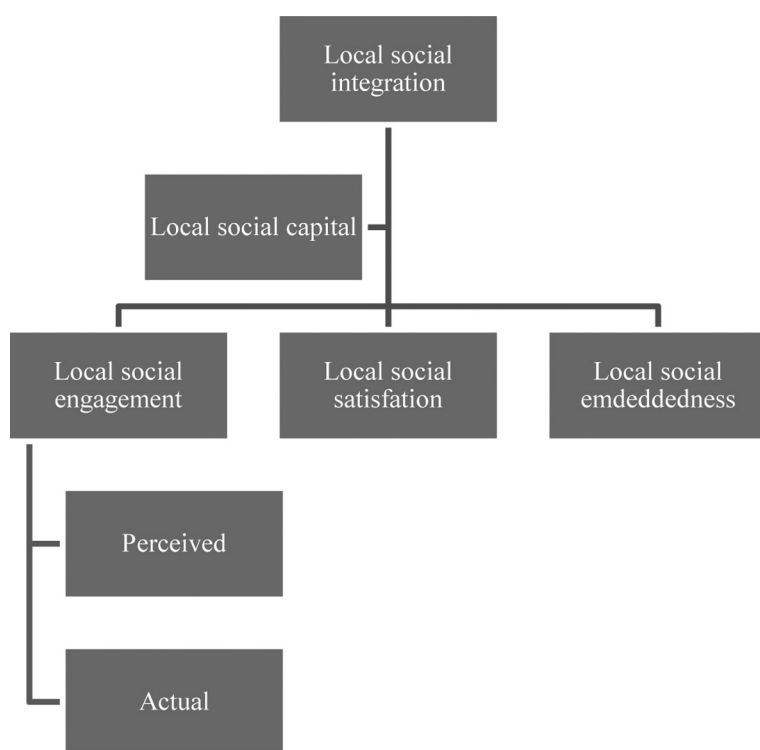
**Keywords:** local social engagement, local social satisfaction, local social embeddedness, locality, ethnicity, the Netherlands

### 1 Introduction

There are many definitions of social integration. It is usually referred to as the inclusion of all individuals, both natives and immigrants, in a system and the creation of relationships (eg, social ties) among them and their attitudes towards the society (Lockwood, 1964). In this paper we focus on the specific aspects of the localness of social integration (*local social integration*), also as experienced by different ethnic and generational groups. However, the variation and the fuzziness of the concept of local social integration often pose something of an obstacle to economic analysis, because most studies use different measurements, which rather prohibits comparisons. In order to avoid any ambiguity, for the purposes of this paper we explicitly define local social integration as the cooperative relations between people within a neighbourhood which reflect the *local social capital* investments made by individuals. In this paper local social capital is understood as a structural phenomenon (social ties) (Coffé and Geys, 2006).<sup>(1)</sup> Overall, we aim to capture the nature and importance of these social ties empirically, using proxies for local social integration and more specifically proxies for *perceived and actual local social engagement*, *local social satisfaction*, and *local social embeddedness*, which are likely to be connected to each other (see figure 1).<sup>(2)</sup>

<sup>(1)</sup> Social capital can also be understood as a cultural or attitudinal phenomenon (Coffé and Geys, 2006).

<sup>(2)</sup> The data availability does not allow us to examine other dimensions of social integration, either complementary or contradictory. For example, Esser (2002) suggests four dimensions of social integration: acculturation, placement, interaction, and identification.



**Figure 1.** Local social integration.

Local social integration is generally determined by a mix of compositional and spatial characteristics. However, most empirical studies have overlooked the potential relevance of geography, proximity, and interactions among localities as a factor determining differences in local social integration. In this paper we examine how individuals' perceptions and feelings about their local social integration vary, after controlling for their personal characteristics, according not only to the characteristics of their local area but also to those of the neighbouring areas, defined at different spatial scales. Here, we focus on the two broad questions of *which* geographical effects on social integration matter and *for whom* any such geographical effects matter. In terms of the question of *which geographical effects matter*, we first examine the extent to which differences in individuals' local social engagement, satisfaction, and embeddedness (hereafter, local social integration) are the result of the characteristics of the neighbourhood where the individuals live, those of the neighbouring neighbourhoods, those of the municipality in which the neighbourhood is located, or those of the neighbouring municipalities. In each case we examine the effects of ethnic concentration and economic development.<sup>(3)</sup> Any effects associated with the locality where the individuals live are termed 'local effects' and any effects associated with an adjacent locality are termed 'neighbouring effects' (Tselios et al, 2014). Both types of effect are examined at two different spatial scales: the sub-urban neighbourhood scale and the urban-municipality scale. In terms of the question of *for whom* geographical effects matter, we examine whether ethnicity and generation status moderate these geographical effects.

In order to undertake our analysis, we use a uniquely detailed survey-based dataset from the Netherlands based on data from the Sociale Positie en Voorzieningengebruik Allochtonen (SPVA), which focuses on native Dutch people and on the four largest

<sup>(3)</sup> Unfortunately, we do not have recorded information about the percentage of ethnic minorities by each ethnic group within a locality and, thus, we cannot measure ethnic diversity. Hence, it is not possible to explore the differences between ethnic diversity and ethnic concentration.

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non-Western ethnic minority groups in the Netherlands—Turks, Moroccans, Surinamese, and Antilleans—combined with data from Statistics Netherlands. These data, analysed within a hierarchical model framework with spatial interaction effects, allow us, after controlling for ethnicity, sex, age, country, and level of education and employment, to identify the extent to which local and neighbouring ethnic concentration and economic development effects can explain local social integration in the Netherlands, and whether these local and neighbouring effects vary between ethnic groups or between first-generation and second-generation immigrants.

The novel contribution of the present paper centres on the following two major aspects. First, it considers the multidimensional concept of local social integration by using data illustrating various types of local social capital. Social ties, as defined here, cannot be moved from one neighbourhood to another (David et al, 2010). A large body of empirical research about the Netherlands has been conducted on the individual effects on local social integration; however, less empirical evidence has been gathered on the neighbourhood or municipality effects (eg, Gijsberts et al, 2012; Tolsma et al, 2009). The literature suggests that social integration operates at different spatial scales, because geography plays a powerful role in shaping and constraining social ties. Therefore, any comprehensive empirical analysis of these phenomena must be conducted at multiple geographical scales. However, to the best of our knowledge, only a few studies have estimated the spatial interaction effects (ie, spillover effects) (Sampson and Sharkey, 2008; Sharkey, 2012; Tselios et al, 2014). Our reasons for focusing on the different levels of potential spillovers is that the local social integration of an individual may not just be a function of his or her own intrinsic characteristics (level 1), but also a function of the ethnic, demographic, and socioeconomic conditions of the neighbourhood where the individual lives and of its neighbouring neighbourhoods (level 2), and also of the ethnic, demographic, and socioeconomic conditions of the municipality where the neighbourhood is located and of its neighbouring municipalities (level 3). If this is indeed the case, then any analysis which does not allow for spillovers at these different spatial scales will misspecify the nature and strength of these spillovers. This paper, therefore, develops the analysis at each of these scales in order to identify whether such effects operate and, if so, at which scale and on whom.

Another innovation of this paper is that it studies ethnic concentration and economic development within and across neighbourhoods, which are small urban areas, and contrasts these with ethnic concentration and economic development at a higher level of aggregation—the municipalities, which are large urban areas. Using multilevel analyses (in which individuals are ‘nested’ within neighbourhoods, which are ‘nested’ within municipalities), we are able to see whether the level of local social integration of an individual is primarily related to the characteristics of the individual living in a neighbourhood or of those living nearby either within the same neighbourhood (Putnam, 2007) or within a neighbouring neighbourhood, and also to consider these same issues at the wider spatial scales of municipalities. This paper also examines whether the geographical effects may disappear or be significantly reduced for some specific ethnic groups or generation groups.

This paper proceeds as follows. Section 2 discusses our current knowledge regarding the geographical determinants of local social integration; it then sets out the four major hypotheses to be tested. Section 3 introduces the empirical model, describes the variables implemented in the model, and presents some descriptive statistics. Section 4 discusses the econometric results, and, finally, section 5 presents some brief conclusions.

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## 2 The hypotheses arising from the literature

### 2.1 Which geographical effects matter?

There is a large body of evidence in the literature which suggests that people prefer to interact with those who resemble them and, more specifically, with others who share the same ethnic heritage, have the same social status, have the same cultural background, speak the same language, and, hence, share common experiences and tastes (Coffé and Geys, 2006; Tolsma et al, 2009; Vervoort et al, 2011). They are less likely to share resources with those whom they perceive as 'different' from themselves (Twigg et al, 2010). Immigrants tend to settle in neighbourhoods with high levels of ethnic concentration, and this has both potential benefits and costs for their degree of social integration. On the one hand, ethnic concentration may foster the formation of group-specific networks and provide access to employment opportunities, reducing the costs of assimilation to the host society (Bayer et al, 2008; Cutler et al, 2008a). On the other hand, ethnic residential concentration hinders the social integration of ethnic minorities because they have less social contact with the native population given that their statistical chance of meeting natives is lower and that they have more social contact with coethnics and other ethnic minorities (Cutler et al, 2008a; Gijsberts and Dagevos, 2007; Vervoort et al, 2011). According to the threat hypothesis, the dominant groups (ie, natives) may feel threatened by the increasing number of minority ethnic groups settling in 'their' area, because they perceive that certain resources which belong to them are being taken away or diluted and therefore they are likely to react with hostility (Blalock, 1967; Coffé and Geys, 2006; Laurence and Heath, 2008). Thus, hostility between groups may increase with higher ethnic concentration (Gijsberts et al, 2012). In contrast, and directly opposed to the threat hypothesis, is the contact hypothesis, which claims that mutual contact leads to a positive attitude towards other groups (Gijsberts et al, 2012).

Concentrations of ethnic minorities often tend to be located in economically deprived neighbourhoods. Hence, ethnic concentration goes hand in hand with economic development. High levels of neighbourhood poverty are posited to affect the amount and quality of social interaction among neighbours negatively (Letki, 2008; Mennis et al, 2013). Poor localities offer their residents less favourable circumstances for social integration, because inhabitants in these localities are more careful, fearful, and less familiar with each other (Tolsma et al, 2008; 2009). People often feel threatened by the high concentrations of ethnic minorities (Gijsberts et al, 2012; Vervoort et al, 2011), particularly where the environment is characterised by the disamenities associated with urban decay, poor public goods and crime (Gijsberts et al, 2012). In this paper we examine both the local ethnic concentration and economic development effects, because the possible negative ethnic concentration effects on social integration may disappear once the association between ethnic concentration and economic development is taken into account.

We also have strong social, economic, and empirical grounds for expecting similar geographical effects associated with the *neighbouring localities* (ie, neighbouring neighbourhoods and neighbouring municipalities). From a social perspective Schelling (1971) explains how individuals' interactions in their immediate neighbourhoods give rise to strong community-wide patterns and social structures reflected in space. However, many aspects of community life do not take place exclusively within the immediately local neighbourhood (Tolsma et al, 2009). People often engage in activities outside of the neighbourhood in which they live, leading to interdependencies among neighbourhoods (Volker et al, 2007), and while people prefer to interact with those who resemble them, they do not necessarily live in the same neighbourhood as them. Moreover, there may be positive externalities associated with the presence of social capital which could be captured through these neighbouring effects (Coffé and Geys, 2006). From an economic perspective the possible spatial interactions between neighbouring localities ought to lead to geographically interdependent areas.

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While neighbourhoods have often been identified with political or administrative areas (Clapp and Wang, 2006), in reality, a neighbourhood is a contiguous territory (Spielman and Logan, 2013). We would expect this contiguity to be reflected in it being the case that the smaller the distance between areas, the higher the intensity of interactions associated with labour migration, capital mobility, forward and backward linkages, technology transfers, and knowledge spillovers, among others (Armstrong, 2002). We would therefore expect stronger interactions between neighbourhoods than between municipalities. From an empirical perspective, these spatial spillover arguments suggest that identifying the relevant scale of analysis is very important (Bolster et al, 2007; van Ham and Manley, 2010), and studies which do not address this issue will generate bias in their empirical outcomes. The standard neighbourhood models assume that no interaction occurs among neighbourhoods and, thus, neighbourhoods with identical characteristics in terms of ethnic concentration and economic development, but dissimilar neighbouring neighbourhoods, are considered to be equivalent (Bolster et al, 2007; Dietz, 2002). In contrast, our approach explicitly acknowledges the contiguity of a territory by considering the possible spatial spillover effects associated with neighbouring areas, at the level both of neighbourhoods and of municipalities. Thus, our approach reduces problems of scale and aggregation bias (Twigg et al, 2010).

***Hypothesis 1:*** *Local social integration is negatively associated with the ethnic concentration of the local neighbourhoods and the neighbouring neighbourhoods, and is also negatively associated with the ethnic concentration of the local municipalities and neighbouring municipalities, whereas local social integration is positively associated with the economic development of these respective areas.*

However, even when taking account of any additional geographical interaction and spillover effects, it is still the case that the local area effects are expected to be more pronounced than those associated with the neighbouring areas, because being geographically further away reduces social linkages and increases the maintenance cost of social capital (David et al, 2010). The literature suggests that if individuals perceive themselves as being strongly attached to a neighbourhood (eg, if they live in the neighbourhood and, especially, if they spend most of their working or social time in this neighbourhood), they will invest in local social capital, because the returns from these local ties are relatively high (David et al, 2010; Tolsma et al, 2009; Volker et al, 2007). Generally, physical distance and travel costs reduce social connections (Glaeser et al, 2002; Putnam, 2000), and smaller areas come closer to what people may perceive as their neighbourhood than larger areas (van Ham and Manley, 2010). If it is indeed the case that more immediately local issues, rather than neighbouring issues, weigh more heavily on social capital, then this ought to be observed in the social capital data, and we examine this issue explicitly, allowing for spatial interaction as well as controlling for hierarchical nesting effects. From an empirical point of view we test the neighbouring effects using spatially weighted covariates (Elhorst, 2014; LeSage and Pace, 2009).

***Hypothesis 2:*** *The immediate local effects are more pronounced than the neighbouring effects, both at the level of the neighbourhood and also at the level of the municipality.*

## **2.2 For whom do geographical effects matter?**

Although, as we have seen, geography, proximity, and interactions have been put forward as important factors in local social integration, the argument about who these factors are important for is much less well developed in the literature. In particular, the impact of geographical characteristics on local social integration may vary across social groups. Ethnic concentration and economic development may not be perceived in the same way by different ethnic groups, or between first-generation and second-generation immigrants.

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First, ethnic groups differ in their assessment of different neighbourhoods as people tend to have a preference for neighbourhoods where the ethnic and socioeconomic characteristics of the majority of the population are similar to their own (Permentier et al, 2008). Neighbourhoods differ in the extent to which they offer their inhabitants the resources and facilities to meet and mingle (Tolsma et al, 2009), and natives, in particular, may receive and exploit these resources and facilities in a more advantageous manner than immigrants. Ethnic groups, and particularly economically marginalised ones, may therefore suffer if their residential enclaves are not proximate to areas populated by more well-off members of other groups (Kain, 1968), and they may perceive advantages from such proximity. In contrast, however, the reverse may not be true. According to Tolsma et al (2009, page 288), “living in close proximity to ethnic minorities might not be such a big deal for ethnic minorities themselves, while for natives, higher levels of ethnic heterogeneity might be much more threatening.” Feelings of threat and alienation on the part either of the immigrant or of the native groups will hamper social interactions between these groups (Letki, 2008), and for citizens who no longer like their local environment, leaving the locality is a viable option. However, this selective out-migration may obscure the distinction between the remaining population, which is comprised of those with positive feelings about their neighbourhood and who therefore choose to stay, and those who do not have such associations but for whom the options to move are very limited (Tolsma et al, 2009). Putnam (2007) and Tolsma et al (2009) have found that ethnic concentration has a stronger negative effect on social integration for natives than it does for immigrants, and Bolt et al (2008) have shown that native Dutch people living in neighbourhoods where ethnic minorities are overrepresented are more likely to move than are minority ethnic residents.

***Hypothesis 3:*** *The relationship between local social integration and geographical characteristics varies across ethnic groups.*

Social contacts are generally lower than average among ethnic minorities, and this tends to be particularly marked for first-generation immigrants because of socioeconomic and cultural factors, such as income and host-country language (Gijsberts et al, 2012). First-generation immigrants are typically forced into the lowest socioeconomic areas, with lower levels of social integration. However, many immigrants tend to reduce their degree of isolation as they spend more time in the host country (Cutler et al, 2008a; 2008b), the result of which is that their second-generation offspring become a much more integrated part of the host society (Gijsberts and Dagevos, 2007). A first-generation immigrant’s most likely optimal residential strategy is initially to be located in an enclave community and then to move away to another area once a certain amount of social assimilation has taken place (Cutler et al, 2008a). Yet, while we expect that, in general, first-generation immigrants will be less socially integrated than second-generation ones, the process of transition may not always be so clear-cut, and this intergenerational transition process may also depend on the specific area in which first-generation immigrants live. For example, as we have already argued, living in an ethnically concentrated neighbourhood may isolate these immigrant groups from the majority population and from the types of contact that are useful for social integration (Gijsberts and Dagevos, 2007); and residing in certain specific neighbourhoods may sometimes lead to a further deterioration in the relative social position and the degree of social integration of specific ethnic groups. Moving away from such areas may become increasingly difficult, depending on the spatial distribution of real estate prices, and specific groups may differ in the extent to which they successfully achieve this transition process.

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**Hypothesis 4:** *The relationship between local social integration and geographical characteristics varies between the first-generation and the second-generation immigrants.*

### 3 Econometric specification, data, and variables

#### 3.1 The econometric specification

All of the four hypotheses to be tested call for a multilevel design, known as hierarchical linear modeling<sup>(4)</sup> (Bryk and Raudenbush, 1992; Snijders and Bosker, 1999; van Oort et al, 2012), as we distinguish between three levels of analysis: individuals  $i$  (level 1), neighbourhoods and neighbouring neighbourhoods  $r$  (level 2), and municipalities and neighbouring municipalities  $s$  (level 3).<sup>(5)</sup>

In order to examine the first two hypotheses, relating to which geographical effects matter, we build the following cross-sectional econometric specification:

$$S_{irs} = \beta_0 + I_{irs}\beta_1 + N_{rs}\beta_2 + A_{rs}\beta_3 + M_s\beta_4 + Z_s\beta_5 + v_{irs} + v_{0rs} + \omega_{00s},$$

where  $S_{irs}$  is a proxy for the local social integration (ie, local social engagement, satisfaction, or embeddedness) of individual  $i$  nested in neighbourhood  $r$ ; which is nested in municipality  $s$ .<sup>(6)</sup>  $I_{irs}$  is a vector of variables for individual  $i$ , which includes ethnicity, sex, age, educational attainment, country, and level of education and employment, and a series of individual-level control variables, such as length of residence and work experience in the Netherlands, occupation, and income.  $\beta_0$  is contact (fixed intercept). The vector coefficient  $\beta_1$  captures the individual (internal or people-specific) effects on integration.  $N_{rs}$  is a vector of variables for neighbourhood  $r$  where the individual lives and  $A_{rs}$  is a vector of variables for the (average) neighbouring neighbourhoods of neighbourhood  $r$ . The specification of the interneighbouring interactions, which are likely to be the major source of spatial dependence, is represented by a spatial weights matrix  $\mathbf{W}$ . An advantage of our analysis is that all the neighbouring neighbourhoods of a neighbourhood may not necessarily be located in the municipality where this neighbourhood is located: some of them may be located in a neighbouring municipality. Thus, the interneighbouring neighbourhoods may cross the boundaries of municipalities (eg, boundary neighbourhoods).  $N_{rs}$  and  $A_{rs}$  include the percentage of foreigners in neighbourhoods and in neighbouring neighbourhoods, respectively, and the income per capita of neighbourhoods and of neighbouring neighbourhoods, respectively, as well as a series of control variables at the neighbourhood level, such as population density; the percentage of people receiving a low income, a high income, and who are not active; and the total land area. The vector coefficients  $\beta_2$  and  $\beta_3$  capture the neighbourhood and neighbouring-

<sup>(4)</sup> We prefer to use a multilevel linear model, rather than a multilevel nonlinear model (eg, multilevel logistic model), because the response variables could be assumed to be ratio variables (Permentier et al, 2011; Tselios et al, 2014). Moreover, nonlinear models often result in multicollinearity problems.

<sup>(5)</sup> We do not include the household level in our empirical specification because a four-level hierarchical model is fairly complicated in itself. However, the focus of this paper is that it is not who is living in a locality that matters (ie, compositional effects which incorporate individual-level and household-level variables) but, rather, the geographical characteristics. Moreover, all four hypotheses refer to geographical effects.

<sup>(6)</sup> It should be noted here that we do not combine local social engagement, satisfaction, and embeddedness into a single index using multivariate analysis (such as cluster analysis, multidimensional scaling, principal component analysis, confirmatory factor analysis and structural equation models) because, by merging these aspects into one index, we follow the main strand of the literature arguing that the components of social integration have a systematic interrelationship with one another and are thus part of a joined-up concept (Coffé and Geys, 2006). We argue that all the proxies for social integration should be kept separate and the relations between them treated as a matter for investigation (Coffé and Geys, 2006). Finally, the exploratory analysis below does not indicate that we should use multivariate analysis, because the correlation between the indicators is low (see table 1 below).

neighbourhood effects (geographical, external, or area-specific effects), respectively.  $M_s$  is a vector of variables for municipality  $s$  and  $Z_s$  is a vector of variables for the (average) neighbouring municipalities of municipality  $s$ .  $M_s$  and  $Z_s$  include the percentage of foreigners of municipalities and of neighbouring municipalities, respectively, and the income per capita of municipalities and of neighbouring municipalities, respectively, as well as a series of control variables at the municipality level. The vector coefficients  $\beta_4$  and  $\beta_5$  capture the municipality and neighbouring-municipality effects (geographical, external, or area-specific effects), respectively. The effects of the neighbourhood ( $N_{rs}$ ) and municipality ( $M_s$ ) characteristics can be assumed to represent the ‘direct’ local environment (local effects), while the effects of the neighbouring-neighbourhood ( $A_{rs}$ ) and neighbouring-municipality ( $Z_s$ ) characteristics can be assumed to represent the ‘indirect’ local environment (neighbouring effects) (Elhorst, 2014; LeSage and Pace, 2009). Apart from the local and neighbouring effects at the neighbourhood and municipality levels, there might be other spatially lagged variables which are not included in the model (ie, model misspecification) but which could affect an individual’s social integration. Finally,  $\nu_{irs}$  is the level-1 error term (ie, individual-level random variation),  $\nu_{0rs}$  is the level-2 error term (ie, neighbourhood-level random variation), and  $\omega_{00s}$  is the level-3 error term (ie, municipality-level random variation). This equation allows us to test hypotheses 1 and 2.

In order to examine the two hypotheses relating to the specific ethnic or generational group effects (for whom geographical effects matter), our model approach aims to identify whether ethnicity (hypothesis 3) or generational status (hypothesis 4) moderate the geographical effects. We use the following two-way interaction model.<sup>(7)</sup>

$$S_{irs} = \zeta_0 + I_{irs}\zeta_1 + D_{\lambda irs}N_{rs}\zeta_2 + D_{\lambda irs}A_{rs}\zeta_3 + D_{\lambda irs}M_s\zeta_4, \\ + D_{\lambda irs}Z_s\zeta_5 + \phi_{irs} + \varrho_{0rs} + \vartheta_{00s},$$

where  $D_{\lambda irs}$  is a vector of dummy variables for ethnicity, with  $\lambda$  denoting categories (either  $\lambda = 1, 2, 3, 4, 5$ : Turks, Moroccans, Surinamese, Antilleans, and native Dutch people; or  $\lambda = 1, 2$ : first-generation and second-generation immigrants). The vector coefficients  $\zeta_2$ ,  $\zeta_3$ ,  $\zeta_4$ , and  $\zeta_5$  capture the geographical differences in local social integration across ethnic or generation groups.

The effects and standard errors of all variables at the individual, neighbourhood, and municipality levels are estimated by a maximum-likelihood estimator. Our empirical analysis does not address the fundamental causality issues raised by Durlauf (2002) because, since our empirical specifications are cross-sectional, it is difficult to make statements about the causality of the relationships. We can only speculate about mechanisms of causation, and distinguish between mechanisms of selection versus influence (Mennis et al, 2013; Putnam, 2007). However, in order to minimise the potential risk of causality between geographical variables and indicators of integration, all of the geographical factors are time-lagged variables. Finally, we perform a perturbation analysis to test whether there are multicollinearity problems (Belsley, 1991). The strong relationships between explanatory factors can lead to incorrect conclusions if effects cancel each other out or reinforce each other (Gijssberts et al, 2012). As we expect a high negative correlation between ethnic concentration and economic development, we do not estimate these characteristics simultaneously (in a single model).

<sup>(7)</sup> We resort to an interaction analysis because comparing subgroup-based correlation coefficients has lower explanatory capacity, as the division into subgroups reduces the sample size (Tselios et al, 2012).



### 3.2 Data and variables

The statistical information employed in this study was supplied by the SPVA survey and the Statistics Netherlands database.

#### (a) *The SPVA survey*

The initial sample (14 967 individuals) was drawn from the population registers in 345 neighbourhoods<sup>(8)</sup> and in thirteen municipalities in the Netherlands in 1998, and there were random samples of citizens from five ethnic groups: the four largest ethnic minority groups (Turks, Moroccans, Surinamese, and Antilleans) and native Dutch group (Tselios et al, 2014). Since the thirteen municipalities of our sample are urban areas, the neighbourhoods represent ‘small urban areas’, and the municipalities represent ‘large urban areas’. Of 14 809 individuals (there were 158 missing observations on ethnicity), 2843 are native Dutch people, 3755 are Turks, 3112 are Moroccans, 3408 are Surinamese, and 1696 are Antilleans. An advantage of this database is that the sampling procedure resulted in a large percentage of immigrants in our dataset. Of the 11 784 immigrants, 8851 are first-generation immigrants and 2933 are second-generation immigrants (sixth year).

#### (b) *The Statistics Netherlands database*

We linked characteristics of the neighbourhoods and the municipalities to the SPVA survey, drawing on data produced by Statistics Netherlands. These contextual data relate to the year 1995. As has been noted, the geographical factors are time-lagged variables in order to minimise the potential risk of causality between geographical variables and indicators of local social integration. We merge both databases using the neighbourhood classification, which is based on the four-digit postcode areas. These areas are quite a good approximation to what people understand to be their direct local environment (Volker et al, 2007). Overall, there were 3733 neighbourhoods and 633 municipalities in 1995.

Our resulting database has a multilevel structure, with individuals being ‘nested’ in neighbourhoods which, in turn, are ‘nested’ in municipalities. After removing individuals with missing observations on ethnicity, gender, age, country and level of education, and employment, as these variables constitute our benchmark variables at the individual level, we ended up with a total of 12 817 individuals, who live in 341 neighbourhoods and thirteen municipalities.

#### 3.2.1 *Local social integration: differences by ethnicity and generation status*

The SPVA survey has the advantage of containing a large number of measures associated with local social integration. Five indicators (proxies) of local social integration are measured at the individual level. It should be noted here that some people may regard a neighbourhood as the streets immediately around their home, while others may refer to a larger area of a city such as a postal district or an electoral district (Eurofound, 2011). There is no one-to-one relationship between four-digit postal codes and neighbourhoods as perceived by residents (van Ham and Feijten, 2008). However, “in urban areas four-digit postal codes come close to what people may perceive as their neighbourhood” (van Ham and Feijten, 2008, page 1157). People were asked about their ideal relation between neighbours (proxy for ‘perceived local social engagement’), their degree of contact with people in the neighbourhood (proxy for ‘actual local social engagement’ based on the degree of contact), the quality of their contact with people in the neighbourhood (proxy for ‘actual local social engagement’ based on the quality of contact), their comfort in the neighbourhood (proxy for ‘local social satisfaction’), and their feeling that they would miss people in the neighbourhood if they moved (proxy for ‘local social embeddedness’). These indicators refer to the way individuals are tied to others within a neighbourhood. They are categorical, apart from the

<sup>(8)</sup>In this paper an administrative area (four-digit postcode) is used to define a neighbourhood.

**Table 1.** Descriptive statistics and correlations for local social engagement, satisfaction, and embeddedness.

a/a	Proxy	Variable	Scales	Descriptive statistics				Pairwise correlation coefficient						
				number of observations	mean	standard deviation	minimum	maximum	1st	2nd	3rd	4th	5th	
1st	Perceived local social engagement	Ideal relation between neighbours	1 "As little as possible" 2 "Greeting only" 3 "Have a chat" 4 "Occasionally visiting" 5 "Frequently meeting"	7482	3.4067	0.9627	1	5	1.0000 (7482)					
2nd	Actual local social engagement ( <i>degree of contact</i> )	Degree of contact with people in the neighbourhood	1 "None" 2 "Few" 3 "Many" 4 "Very many"	7504	2.3615	0.6834	1	4	0.3545* (7459)	1.0000 (7504)				
3rd	Actual local social engagement ( <i>quality of contact</i> )	Relations between people in the neighbourhood	1 "Almost not at all" 2 "Bad" 3 "Ordinary" 4 "Good" 5 "Very good"	6764	3.6260	0.9151	1	5	0.1210* (6725)	0.3031* (6743)	1.0000 (6764)			
4th	Local social satisfaction	Do you feel comfortable in this neighbourhood?	1 "Not comfortable" 2 "Not very comfortable" 3 "It's ok" 4 "Comfortable"	7524	3.5231	0.7347	1	4	0.1056* (7480)	0.2681* (7501)	0.3346* (6762)	1.0000 (7524)		
5th	Local social embeddedness	Would you miss people in the neighbourhood if you moved?	1 "Would not miss" 2 "Would miss"	7472	1.4553	0.4980	1	2	0.3069* (7427)	0.4417* (7450)	0.3375* (6715)	0.2080* (7469)	1.0000 (7472)	

\* Denotes all correlation coefficients significant at the 5% level or better.

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proxy for local social embeddedness, which is binary. However, here they are considered as ratio variables in order to make them comparable and to enable linear regression models to be used. Each variable is based on an assumption about the degree (low or high) of local social integration of an individual. For example, individuals with very many contacts with people in the neighbourhood are the most socially integrated within a neighbourhood (local social integration = 4) and individuals with no contact with people in the neighbourhood are the least socially integrated within a neighbourhood (local social integration = 1). Moreover, since we assume that the variables are ratios, the difference between 4 and 3 is the same as that between 3 and 2 and that between 2 and 1. Table 1 presents the assumptions, the descriptive statistics, and correlations of all indicators of local social integration. None of these indicators are strongly related. The strongest correlation is observed between the actual local social engagement (degree of contact) and the local social embeddedness (0.4417). Generally, the low correlation underlines the importance of analysing these indicators of social integration separately (Tolsma et al, 2009). It also highlights the fact that integration is a multidimensional concept and all the indicators are complementary rather than similar in meaning.

### 3.2.2 *Ethnic concentration and economic development*

Ethnic concentration is measured as the percentage of foreigners or, more specifically, the number of foreigners per inhabitant, for 1365 neighbourhoods and 598 municipalities in 1995. Economic development is measured as the per-capita income (divided by 1000) for 3269 neighbourhoods and 633 municipalities in 1995. An initial step of the exploratory spatial data analysis was to map these variables in order to see whether ethnic concentration and economic development are randomly distributed over space or if there are similarities between neighbourhoods and/or municipalities. All maps illustrate the variation across localities in ethnic concentration and economic development, which probably suggests the existence of spatial autocorrelation.<sup>(9)</sup> The next step of the exploratory spatial data analysis was to include tests for, and visualisations of, both ‘global’ (test for clustering) and ‘local’ (test for clusters) statistics (Anselin, 1995), using different spatial weights matrices which contain information on the socioeconomic structure of each neighbourhood and municipality. We ended up with  $k$ -nearest neighbours ( $k = 3, 5, 7$ ) as the most appropriate spatial weights scheme, in order to minimise the number of island neighbourhoods and municipalities which have missing observations due to an absence of immediate neighbours, while controlling for high spatial autocorrelation and minimising the effects of spatial outliers. We test for the unevenness in the spatial distributions of ethnic concentration and economic development using a global and local variant of Moran’s contiguity ratio.<sup>(10)</sup> Finally, taking into account the correlations between the geographical variables, we cannot analyse the effect of ethnic concentration and economic development simultaneously due to their high correlation (eg, the correlation between the percentage of foreigners and income per capita within a neighbourhood is  $-0.7934$ ).

### 3.2.3 *Controls*

Assessing whether geographical characteristics have an impact on local social integration is a difficult issue, since many other individual, neighbourhood, and municipality factors—which in many cases are difficult to control for—have an influence on local social engagement, satisfaction, and embeddedness. By adding a set of control variables which are

<sup>(9)</sup>These maps can be provided upon request.

<sup>(10)</sup>For example, at the municipality level, the Moran’s  $I$  index for economic development for the five-nearest neighbours is 0.3939 and that for ethnic concentration for the five-nearest neighbours is 0.1239. Both indices are statistically significant, which shows the presence of positive spatial autocorrelation.

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able to capture the main intrinsic characteristics of an individual and the main structural and socioeconomic features of the neighbourhood and municipality where an individual lives, some important sources of heterogeneity are taken into account. To rule out compositional effects, we controlled for a number of individual characteristics; to rule out contextual effects, we controlled for a number of neighbourhood and municipality characteristics. For example, we include population density as a control variable because low-density living reduces social capital (Brueckner and Largey, 2008; Putnam, 2000). We verify the robustness of the ethnic concentration and economic development effects by examining the sensitivity of our results to the inclusion of different control variables. The control variables were chosen after considering the literature and the empirical studies on local social integration and data availability. The individual control variables were extracted from the SPVA survey for 1998 and the geographical control variables are extracted from Statistics Netherlands for 1995: for example, type of highest degree of education, length of residence and work experience in the Netherlands, type of occupation and income levels (level 1); and degree of urbanisation, percentage of people receiving a low income, high income and who are not active, number of inhabitants, and total land area (levels 2 and 3). As most of these controls are highly correlated, we do not include all control variables simultaneously in order to avoid problems of collinearity.

#### 4 Regression results

This section is devoted to the results arising from regression analyses, interpreting the key findings of the two main research questions and the four embedded hypotheses. Our models are stable with respect to the inclusion of individual and geographical control variables as well as to the value of  $k$  (with  $k = 3, 5, 7$ ) of the spatial weights matrix.<sup>(11)</sup> Here, we present the results for  $k = 5$ .

##### 4.1 Which geographical effects matter?

Table 2 presents the impact of ethnic concentration and economic development on local social engagement (regressions 1–6), satisfaction (regressions 7–8), and embeddedness (regressions 9–10).<sup>(12)</sup> Considering the individual factors, the regression results show that Turks have the highest perceived engagement, are the most actually engaged (degree of contact), and are the most embedded; Moroccans are the most actually engaged (quality of contact); and the Dutch are the most satisfied. Females are more socially embedded than are males. Engagement, satisfaction, and embeddedness first rise and then fall with age, which is consistent with the results of Glaeser et al (2002). Education is an important variable for local social integration. People who have acquired formal qualifications in the Netherlands are more socially engaged and satisfied, whereas those who have acquired formal qualifications in their country of origin are more socially embedded. Employed people are more satisfied than unemployed people.

As for the geographical effects, the results show that ethnic concentration ( $N$ ,  $A$ , or  $Z$ ) is negatively associated with local social integration (engagement, satisfaction or embeddedness), whereas economic development ( $N$  or  $A$ ) is positively associated with local social integration. Nevertheless, ethnic concentration of municipalities ( $M$ ) is positively related to local social embeddedness, and economic development of neighbouring municipalities ( $Z$ ) is negatively related to all proxies. Overall, our results show that high ethnic concentration and low economic development at the neighbourhood level ( $N$  or  $A$ ) hinder the local social integration, probably because these people have fewer social contacts and ties with the local

<sup>(11)</sup> These results can be provided by the authors upon request.

<sup>(12)</sup> We also ran regressions 9 and 10 using a multilevel logit model and the results are similar to those from the multilevel linear model. These results can be provided by the authors upon request.

population.<sup>(13)</sup> The results at the municipality level ( $M$  or  $Z$ ) are not robust. Thus, the results fail to reject hypothesis 1—but only at level 2.

There is also evidence that there are spatial interactions and spillovers between neighbourhoods ( $A$ ) and between municipalities ( $Z$ ), leading to geographically dependent areas (Grossman and Helpman, 1991; Krugman, 1991). However, the results do not show that the ‘immediate’ local effects ( $N$  and  $M$ ) are more pronounced than the neighbouring effects ( $A$  and  $Z$ ). Hence, there is no strong evidence to support hypothesis 2.

Finally, we observe that the random-effects parameters of our specification are lower than those of the random intercept model. This implies that both the individual and the geographical independent factors explain some variation in social integration, but also that individual characteristics provide by far the strongest explanation for local social integration.

#### 4.2 For whom do geographical effects matter?

In this subsection we investigate the extent to which the geographical environment influences our indicators of local social integration differently for individuals from different ethnic backgrounds (Turks, Moroccans, Surinamese, Antilleans, and native Dutch people) and for immigrants from different generations (first-generation and second-generation immigrants). Using two-way interactions, we examine whether the impact of geographical characteristics is conditional on ethnicity (table 3) and generation status (table 4).

Table 3 shows that the detrimental effect of residential ethnic concentration and the beneficial effect of residential economic development on actual local social engagement (quality of contact), on local social satisfaction, and on local social embeddedness is stronger for natives than for immigrants ( $N \times$  Native Dutch people). This probably relates to the fact that natives differ in their assessment of neighbourhoods compared with immigrants. People generally tend to have a preference for neighbourhoods where the ethnic and socioeconomic characteristics of the majority of the population are similar to their own (Permentier et al, 2008), but our result suggests that ethnic minorities may have a stronger preference for neighbourhoods where the ethnic and socioeconomic characteristics of the majority of the population are similar to their own than do natives and also neighbourhoods with a high ethnic concentration and low economic development may hinder Dutch local social integration, as native Dutch people might feel threatened by the high concentration of ethnic minorities. Overall, our results fail to reject hypothesis 3.

Turning to the final issue concerning generations, table 4 shows that the differences in social integration between first-generation and second-generation immigrants are not statistically significant. In other words, there is no evidence that second-generation immigrants are more locally integrated than first-generation immigrants, or vice versa. Moreover, our results reject the hypothesis that the relationship between geographical characteristics and local social integration varies between first-generation and second-generation immigrants (hypothesis 4).

## 5 Conclusions

Using the case study of the Netherlands this paper has examined the extent to which geographical characteristics influence different aspects of local social integration (ie, local social engagement, satisfaction, and embeddedness), and also the ways in which various different ethnic and generational groups experience such effects. The empirical findings are, firstly, that in terms of people’s perceptions and feelings about their localities, living in a high ethnic concentration and low economic development neighbourhood has negative

<sup>(13)</sup>If we include both the ethnic concentration and economic development characteristics, the results show that ethnic concentration turns out to be a more important geographical characteristic influencing local social satisfaction and embeddedness than economic development (see the appendix).

**Table 2.** The impact of ethnic concentration and economic development.

	Perceived local social engagement		Actual local social engagement (degree of contact)		Actual local social engagement (quality of contact)		Local social satisfaction		Local social embeddedness	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Native Dutch people</b>										
Turks	base 0.7016***	base 0.6887***	base 0.1599***	base 0.1530***	base 0.1584***	base 0.1535***	base -0.1063***	base -0.1195***	base 0.2757***	base 0.2656***
Moroccans	-0.1628***	-0.1688***	-0.0997**	-0.1053***	0.1968***	0.1976***	-0.1993***	-0.2089***	0.1829***	0.1754***
Surinamese	-0.1128**	-0.1189***	-0.0631*	-0.0695**	0.1010**	0.1016**	0.0194	0.0057	-0.0322	-0.0387*
Antilleans	-0.1107**	-0.1144**	-0.1074***	-0.1118***	0.0410	0.0407	0.0698*	0.0494	-0.0609**	-0.0681**
Female	base	base	base	base	base	base	base	base	base	base
Male	-0.0093	-0.0103	0.0258	0.0278	-0.0089	-0.0087	0.0221	0.0230	-0.0359***	-0.0370***
Age	0.0111**	0.0109**	0.0220***	0.0216***	0.0064	0.0091*	0.0123***	0.0133***	0.0174***	0.0170***
Age <sup>2</sup>	-0.0001*	-0.0001*	-0.0002***	-0.0002***	-0.0001	-0.0001	-0.0001**	-0.0001**	-0.0001***	-0.0001***
<i>Country of education</i>										
<b>The Netherlands</b>										
origin and the Netherlands origin	base -0.0050	base -0.0027	base -0.0714**	base -0.0663**	base -0.1031**	base -0.1069**	base -0.0580*	base -0.0524*	base 0.0065	base 0.0103
no education	-0.0174	-0.0162	-0.0829***	-0.0841***	-0.0168	-0.0239	-0.0620*	-0.0560*	0.0709***	0.0685***
highest obtained degree so far	-0.1570***	-0.1504***	-0.1209***	-0.1188***	0.0359	0.0351	-0.0829**	-0.0864**	0.0162	0.0189
unemployed	0.0182***	0.0185***	-0.0065	-0.0070	-0.0064	-0.0056	0.0043	0.0043	-0.0121***	-0.0126***
employed	base -0.0100	base -0.0004	base 0.0107	base 0.0132	base 0.0138	base 0.0152	base 0.0800***	base 0.0772***	base -0.0109	base -0.0101
<i>Ethnic concentration</i>										
<b>N</b>	-0.1442		0.0846		-0.3259**		-0.9950***		-0.2121***	
<b>A</b>	-0.3234		-0.4736***		-0.1273		0.0603		-0.0039	
<b>M</b>	0.3786		0.1988		0.0847		0.6448		0.5088**	
<b>Z</b>	-5.7219**		-2.6218		-0.3371		-1.7883		-2.8909***	

**Table 2** (continued).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Perceived local social engagement		Actual local social engagement (degree of contact)		Actual local social engagement (quality of contact)		Local social satisfaction		Local social embeddedness	
<i>Economic development</i>										
<i>N</i>		0.0166		-0.0001		0.0388***		0.0746***		0.0160**
<i>A</i>		0.0204		0.0423***		-0.0020		0.0244		0.0063
<i>M</i>		0.0187		-0.0210		-0.0013		-0.0780		0.0232
<i>Z</i>		-0.1407***		-0.0920***		-0.0777***		-0.0635**		-0.0454***
Constant	3.2741***	3.9400***	2.0018***	2.6030***	3.4760***	3.7978***	3.3467***	3.6574***	1.0172***	1.0226***
Log-likelihood	-8122.9347	-8441.8915	-6245.5911	-6477.1103	-7330.4708	-7580.4064	-6591.3754	-6832.9392	-4005.4759	-4177.9302
Wald $\chi^2$ ( <i>p</i> -value)	820.42 (0.000)	818.51 (0.000)	246.74 (0.000)	258.84 (0.000)	66.26 (0.000)	74.97 (0.000)	418.24 (0.000)	379.10 (0.000)	807.89 (0.000)	791.75 (0.000)
<i>Random-effects parameters</i>										
<i>I</i>	0.9022	0.9040	0.6624	0.6619	0.8995	0.8963	0.6967	0.6953	0.4617	0.4630
<i>N</i>	0.1078	0.1017	0.0807	0.0825	0.1048	0.1024	0.1125	0.1184	0.0612	0.0650
<i>M</i>	0.0456	0.0702	0.0347	0.0321	0.0003	0.0001	0.0001	0.0254	0.0001	0.0001
<i>Intercept model</i>										
Constant	3.4721***	3.4729***	2.3884***	2.3943***	3.6406***	3.6409***	3.5718***	3.5801***	1.4624***	1.4603***
Log-likelihood	-8498.7275	-8822.5759	-6362.9840	-6599.3872	-7362.7875	-7617.1580	-6760.9784	-6991.0305	-4375.3663	-4543.9377
<i>Random-effects parameters</i>										
<i>I</i>	0.9560	0.9566	0.6731	0.6727	0.9038	0.9010	0.7077	0.7051	0.4876	0.4880
<i>N</i>	0.1386	0.1356	0.1010	0.1000	0.1091	0.1102	0.2074	0.2044	0.0917	0.0904
<i>M</i>	0.1297	0.1315	0.0670	0.0725	0.0501	0.0414	0.0283	0.0375	0.0410	0.0396
Number of observations	6143	6375	6162	6394	5559	5765	6178	6410	6134	6366

\*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.1.

**Table 3.** Differences by ethnic groups (all regressions include a constant and individual characteristics—ethnicity, sex, age, country of education, educational attainment, and employment).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Perceived local social engagement		Actual local social engagement (degree of contact)		Actual local social engagement (quality of contact)		Local social satisfaction		Local social embeddedness	
<i>Ethnic concentration</i>										
<i>N</i> × Turks	0.2660		0.4752**		-0.1123		0.1339		-0.5892***	
<i>N</i> × Moroccans	-0.6177**		0.4183**		-0.2072		-0.4538		-0.8250***	
<i>N</i> × Surinamese	-0.1168		-0.0984		-0.2309*		-0.4073*		-1.2909***	
<i>N</i> × Antilleans	0.0444		0.0713		0.1122		-0.0941		-0.7573***	
<i>N</i> × Native Dutch people	-0.4887		-0.4164*		-0.5264***		-1.0324***		-1.5601***	
<i>A</i> × Turks	-0.9483**		-0.6043*		-0.0890		0.3477		0.1105	
<i>A</i> × Moroccans	0.0140		-1.1263***		-0.3672		-0.3136		-0.2554	
<i>A</i> × Surinamese	-0.4245		-0.2842		-0.0990		-0.4546		0.1455	
<i>A</i> × Antilleans	-0.0057		-0.2108		-0.3407		0.1322		-0.4567*	
<i>A</i> × Native Dutch people	-0.2340		-0.1649		0.0456		0.4826		0.1352	
<i>M</i> × Turks	3.0196***		0.2802		0.3047		-0.3382		-0.2284	
<i>M</i> × Moroccans	-0.4688		-0.6601		0.6752		-0.3055		1.0042	
<i>M</i> × Surinamese	-0.5075		0.1274		0.3098		0.3906		1.8933**	
<i>M</i> × Antilleans	-0.5468		-0.2969		0.7394		0.3141		-0.1561	
<i>M</i> × Native Dutch people	0.2542		0.4201		0.5133		0.0573		0.1263	
<i>Z</i> × Turks	-10.1745***		-2.2963		-2.3023		-1.3958		-0.9031	
<i>Z</i> × Moroccans	-5.8438		-2.4324		-2.1717		3.7949		-5.7893**	
<i>Z</i> × Surinamese	-1.0409		-4.4447*		-5.1903***		-0.1792		-3.1324	
<i>Z</i> × Antilleans	-8.3927*		1.6889		-3.7228*		-0.6222		4.6421	
<i>Z</i> × Native Dutch people	-4.0256		-0.8388		-0.8866		-1.3166		0.0658	



Table 3 (continued).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Perceived local social engagement		Actual local social engagement (degree of contact)			Actual local social engagement (quality of contact)		Local social satisfaction		Local social embeddedness
<i>Economic development</i>										
<i>N</i> × Turks		-0.0346		-0.0207		0.0017		-0.0035		0.0634***
<i>N</i> × Moroccans		0.0846***		-0.0014		0.0203		0.0873***		0.0915***
<i>N</i> × Surinamese		0.0006		0.0017		0.0209*		0.0270		0.0927***
<i>N</i> × Antilleans		0.0000		-0.0151		-0.0178		0.0011		0.0448**
<i>N</i> × Native Dutch people		0.0319		0.0175		0.0308***		0.0751***		0.0752***
<i>A</i> × Turks		0.0064		0.0090		-0.0042		-0.0241		-0.0465
<i>A</i> × Moroccans		-0.0428		0.0670**		0.0198		-0.0092		0.0257
<i>A</i> × Surinamese		0.1019***		0.0691***		-0.0152		0.0190		0.0898***
<i>A</i> × Antilleans		0.0141		0.0834***		0.0640***		0.0643		0.0380
<i>A</i> × Native Dutch people		0.0023		0.0095		0.0008		-0.0339		0.0177
<i>M</i> × Turks		0.2287**		0.1201		0.0772		0.1490		-0.0464
<i>M</i> × Moroccans		-0.1481		-0.2380***		-0.0671		-0.0417		0.0252
<i>M</i> × Surinamese		-0.1416		0.0461		0.0571		-0.1533		-0.1214
<i>M</i> × Antilleans		0.1490		-0.0050		0.0394		-0.0936		-0.2507***
<i>M</i> × Native Dutch people		0.0228		-0.0601		-0.0106		0.0514		-0.0675
<i>Z</i> × Turks		-0.2150***		-0.1064***		-0.0482*		-0.1211**		-0.0267
<i>Z</i> × Moroccans		-0.1915***		-0.1974***		-0.0509**		-0.0342		-0.1645***
<i>Z</i> × Surinamese		-0.1600**		-0.1417***		-0.0907***		-0.0453		-0.0833*
<i>Z</i> × Antilleans		-0.1117		0.0187		-0.0327		-0.1344**		-0.0282
<i>Z</i> × Native Dutch people		-0.0652		-0.0260		-0.0066		-0.0967**		-0.0379

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

**Table 4.** Differences by generation (individual characteristics include sex, age, country of education, educational attainment and employment).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Perceived local social engagement		Actual local social engagement (degree of contact)		Actual local social engagement (quality of contact)		Local social satisfaction		Local social embeddedness	
	base	yes	base	yes	base	yes	base	yes	base	yes
Second generation										
First generation	-0.1490	0.0324	-0.0644	-0.9744	-0.0411	1.8903*	0.0504	0.1761	0.0475	-0.2837
Individual characteristics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>Ethnic concentration</i>										
<i>N</i> × first generation	-0.0333		0.1477		-0.2097		-0.9150***		-0.1320	
<i>N</i> × second generation	0.5857		0.5853**		-0.1173		-1.3637***		0.2478	
<i>A</i> × first generation	-0.0786		-0.3501		-0.0185		-0.1042		0.1566	
<i>A</i> × second generation	-0.3323		-1.0171**		-0.0949		0.1798		-0.2128	
<i>M</i> × first generation	0.1988		-0.0792		-0.0222		0.8865*		0.2278	
<i>M</i> × second generation	-0.8198		-0.1081		1.0999		0.9834		-0.0498	
<i>Z</i> × first generation	-7.9707*		-3.5345		-1.4463		-2.7750		-3.4593***	
<i>Z</i> × second generation	-9.3915		-2.2404		-6.2330		-0.9911		-1.3098	
<i>Economic development</i>										
<i>N</i> × first generation		0.0045		-0.0039		0.0210		0.0786***		0.0055
<i>N</i> × second generation		-0.0470		-0.0557**		-0.0047		0.1020***		-0.0104
<i>A</i> × first generation		-0.0006		0.0397**		-0.0056		0.0282		-0.0078
<i>A</i> × second generation		0.0203		0.1089***		0.0205		0.0291		-0.0032
<i>M</i> × first generation		0.0003		0.0055		-0.0464		-0.0568		0.0284
<i>M</i> × second generation		0.1466		-0.1499		0.3207**		-0.0193		-0.0451
<i>Z</i> × first generation		-0.2129***		-0.1299***		-0.0966**		-0.0733***		-0.0666***
<i>Z</i> × second generation		-0.3126***		-0.1025*		-0.2231***		-0.1104*		-0.0217
Constant	3.6282***	5.1837***	1.9646***	3.6264***	3.6335***	2.7774***	3.3483***	3.3685***	1.1230***	1.8007***
Observations	4912	5060	4923	5071	4394	4519	4932	5080	4895	5043

\*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.1.

consequences for actual engagement (quality of contact), satisfaction, and embeddedness. These geographical factors pose a threat to the social ties within the community, thereby further hindering local social integration. But such effects also appear to be relatively very localised. Indeed, at the wider municipal level (including the effects of neighbouring municipalities) the results are not robust. The detrimental effects of residential ethnic concentration and the beneficial effects of residential economic development on local social integration are found to be stronger for natives than for immigrants (Turks, Moroccans, Surinamese, and Antilleans). Finally, there is no evidence that the relationship between local characteristics and local social integration varies between first-generation and second-generation immigrants.

Taken together, our results add value to the discussions regarding the relationships between local social integration, ethnic concentration, and economic development. In particular, by focusing explicitly on the local dimensions of these issues, we have been able to uncover some findings not previously available. Most specifically, the stronger adverse effects of the native population have not previously been observed. At the same time, the spatial spillover effects are, in general, not very strong, whereas the effects of high levels at the neighbourhood level of ethnic concentration and low levels of economic development are much stronger. As far as policy issues are concerned, it appears to be the case that the effects of local ethnic concentration and local economic development on social integration differ between the local scale and the national scale (Tselios et al, 2014).

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**Appendix**  
**Table A1.** The simultaneous impact of ethnic concentration and economic development.

	Perceived local social engagement (1)	Actual local social engagement (degree of contact) (2)	Actual local social engagement (quality of contact) (3)	Local social engagement satisfaction (4)	Local social embeddedness (5)
Native Dutch people	base	base	base	base	base
Turks	0.7017***	0.1603***	0.1567***	-0.1074***	0.2752***
Moroccans	-0.1606***	-0.0974**	0.1963***	-0.1996***	0.1832***
Surinamese	-0.1115**	-0.0633*	0.1029**	0.0182	-0.0327
Antilleans	-0.1078**	-0.1034***	0.0404	0.0723*	-0.0597**
Female	base	base	base	base	base
Male	-0.0079	0.0273	-0.0069	0.0235	-0.0351***
Age	0.0109**	0.0219***	0.0063	0.0123***	0.0173***
Age <sup>2</sup>	-0.0001*	-0.0002***	-0.0000	-0.0001**	-0.0001***
<i>Country of education</i>					
The Netherlands	base	base	base	base	base
origin and the Netherlands	-0.0048	-0.0705**	-0.1028**	-0.0566*	0.0068
origin	-0.0173	-0.0818***	-0.0166	-0.0605*	0.0714***
no education	-0.1558***	-0.1198***	0.0364	-0.0809**	0.0174
highest obtained degree so far	0.0185***	-0.0065	-0.0057	0.0042	-0.0119***
unemployed	base	base	base	base	base
employed	-0.0081	0.0122	0.0168	0.0812***	-0.0097
<i>Ethnic concentration</i>					
<i>N</i>	-0.1129	0.0956	-0.2846	-0.9261***	-0.2323*
<i>A</i>	-0.3492	-0.1175	-0.3918	0.4290	0.1126
<i>M</i>	0.4940	-0.0497	0.4237	0.3708	0.4807
<i>Z</i>	-4.6746**	-1.6936	0.7932	-2.0002	-2.6832***

Table A1 (continued).

	Perceived local social engagement (1)	Actual local social engagement (degree of contact) (2)	Actual local social engagement (quality of contact) (3)	Local social satisfaction (4)	Local social embeddedness (5)
<i>Economic development</i>					
<i>N</i>	0.0040	0.0022	0.0049	0.0084	-0.0021
<i>A</i>	-0.0017	0.0391*	-0.0271	0.0402	0.0129
<i>M</i>	0.0128	-0.0360	0.0601	-0.0683	-0.0095
<i>Z</i>	-0.0765**	-0.0634**	-0.0772**	-0.0205	-0.0238
Constant	3.8181***	2.5083***	3.8264***	3.6916***	1.2154***
Log-likelihood	-8120.5044	-6240.7573	-7326.6390	-6588.8456	-4003.7043
Wald $\chi^2$ ( <i>p</i> -value)	836.32 (0.000)	264.11 (0.000)	74.76 (0.000)	430.44 (0.000)	813.35 (0.000)
<i>Random-effects parameters</i>					
<i>I</i>	0.9022	0.6622	0.8996	0.6968	0.4617
<i>N</i>	0.1051	0.0787	0.0967	0.1088	0.0599
<i>M</i>	0.0343	0.0219	0.0001	0.0001	0.0001
Number of observations	6143	6162	5559	6178	6134

\*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.1.