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Geography Matters: Patterns of Spatial Homogamy in the Netherlands

Karen Haandrikman,[1]* Carel Harmsen,[2] Leo J. G. van Wissen[1] and Inge Hutter[1]

[1]*Population Research Centre, Faculty of Spatial Sciences, University of Groningen, PO Box 800, 9700 AV Groningen, The Netherlands*
[2]*Statistics Netherlands, Voorburg, The Netherlands*

ABSTRACT

'Cupid may have wings, but apparently they are not adapted for long flights.' Studies on the spatial dimension of the partner market have found that the number of marriages declines as the distance between potential spouses increases. This paper explores the role of geographical distance in partner choice in the Netherlands. The availability of unique integral micro data from the population register enables us to study spatial homogamy among all new cohabiters. Spatial homogamy is measured by calculating distances between partners before cohabitation. The explorative study shows that geography matters: Dutch persons choose spatially homogamous partners. Spatial homogamy is influenced by demographic factors. With increasing age, spatial homogamy increases. Moreover, those who live with their parents and those who are single parents before cohabitation live significantly shorter to their future partners. Spatial homogamy also exhibits a distinct spatial pattern. However, conditional on population size and geographical location, long distances between partners in peripheral areas become insignificant. Finally, the distance between partners decreases as urbanisation increases. The findings stimulate the discussion on the role of cultural factors in partner choice.

Keywords: spatial homogamy; explorative spatial data analysis; spatial homogamy coefficient; partner choice; spatial patterns; the Netherlands

*Correspondence to: Karen Haandrikman, Population Research Centre, Faculty of Spatial Sciences, University of Groningen, PO Box 800, 9700 AV Groningen, The Netherlands. E-mail: k.haandrikman@rug.nl

INTRODUCTION

> 'Cupid may have wings, but apparently they are not adapted for long flights.'

This citation from Bossard (1932) recapitulates the topic of this study: the spatial dimension of the partner market.

Studies have found that around the world, individuals tend to look for a partner with similar characteristics. This similarity between marriage partners is referred to as homogamy. The homogamy literature has mostly focused on the characteristics that partners have in common, and the reasons why people marry homogamously.

Empirical work on homogamy has mostly concentrated on the level of homogamy, the variation in homogamy across groups, the extent to which homogamy changes over time, the factors that are related to homogamy, and how these factors overlap (Kalmijn, 1998). The *characteristics* most examined in relation to homogamy are race/ethnicity, religion and socio-economic status. Differences according to sex, education and region are among the most studied *variations* in homogamy (Kalmijn, 1998). Among the trends in homogamy identified across the world, as summarised by Kalmijn (1998), are an increase in intermarriage among ethnic groups, an increase in religious intermarriage, and increases as well as decreases in educational homogamy. Most research on the Dutch situation has focused on the similarity of partners with regard to education and occupation (Ultee and Luijck, 1990; Uunk and Ultee, 1995; Smits, 1996; Uunk, 1996; Uunk and Kalmijn, 1996), religion (Hendrickx, 1994, 1998), cultural participation (Uunk, 1996) and social origin (Van Tulder, 1972). Hendrickx (1998) found no significant increases in educational homogamy, whereas Uunk (1996) found a decline in occupational homogamy in recent decades in the

Netherlands. Religious homogamy was found to have decreased in the period from the Second World War until 1977, while in the 1980s the trend reversed (Hendrickx, 1998). Protestant denominations, such as the Re-Reformed, are more endogamous than the more liberal denominations as far as marriage is concerned.

Spatial homogamy, or sharing a similarity in geographical origin, is a dimension which has been under-researched in homogamy studies. There are a handful of international studies that discuss spatial homogamy (Mayfield, 1972; Küchemann *et al.*, 1974; Coleman, 1979; Fisher, 1980; Coleman and Haskey, 1986; Clegg *et al.*, 1998). Research on the spatial component of marriage markets has predominantly been done in the US and the UK. In the US in the 1940s and 1950s, so-called propinquity studies were conducted, in which the proximity of bride and groom before marriage was examined. Examples of these studies are Bossard (1932) in Philadelphia, Davie and Reeves (1939) in New Haven, Koller (1948) in Columbus, Ohio, and Ellsworth (1948) in Connecticut. For the UK, studies on marital distances include those by Küchemann *et al.* (1974) in Oxford, Coleman (1979) in Reading, Coleman and Haskey (1986) in England and Wales, and Clegg *et al.* (1998) in the Outer Hebrides. Most studies found that the number of marriages declines as the distance between potential spouses increases. For example, Bossard (1932) found that in Philadelphia a third of all married couples lived within five blocks or less of each other before marriage, and Coleman and Haskey (1986) found that the most common distance between partners in England and Wales was one kilometre. An overview of several historical studies that demonstrate geographical homogamy in the Netherlands is given by Van Poppel and Ekamper (2005). Most studies examine the marital horizons of those living in specific cities or provinces, such as the cities of Delft, Arnhem and Gouda and the province of Zeeland. The existing studies are mostly outdated, based on historical data, and most important of all, they are restricted to cities or regions.

The theoretical and empirical findings of this study may be useful to many disciplines. The effects of partner choice on the genetic structure of a population are of interest to population genetics. Increasing geographical distances between partners influence the genetic make-up of human populations. Moreover, a rise in the number of marriages that are mixed in terms of ethnic or geographical origin are of great importance to societal processes, such as internal cohesion within groups, the extent of social distance between groups, and to integration and assimilation processes. The geographical origin of (marriage) migrants is of interest to the housing market. Hence, information on partner markets has been used in the context of urban planning (Spencer, 1971; cf. Coleman, 1979).

Migration and marriage patterns are governed by the interplay between distance and information. In this respect, geographers and historians use marriage patterns to chart the break-up of tight social communities, to describe the geographical range of social and economic activity, and to measure the spatial distribution of the knowledge of people and places around the home base or the 'information field' (Marble and Nystuen, 1963; Morrill and Pitts, 1967). The spatial dimension of partner choice indicates the changing role of geographical distance in social life.

To summarise, there are no studies on the role of geographical distance in partner choice for entire populations and countries. The availability of unique integral microdata enables us to give a comprehensive picture of spatial homogamy for all cohabiting couples in the Netherlands. In the paper, the pure locational component of spatial homogamy is disentangled from other spatial effects. Moreover, with these new data, the demographic variation in spatial homogamy is explored. The research questions addressed are as follows:

- What is the level of spatial homogamy for Dutch cohabiters?
- How does spatial homogamy vary according to demographic and spatial characteristics?
- Can spatial patterns in spatial homogamy be identified?

THE ROLE OF DISTANCE IN PARTNER CHOICE

Geographical distance influences partner choice in four ways. Firstly, since proximity increases the likelihood of spontaneous social encounters between people that offer opportunities for interaction, distance-decay is highly relevant in the probability of partner choice. Bossard (1932) was the first to report that people tend to marry those who live in close proximity, and his work was fol-

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lowed by many, primarily American studies that drew similar conclusions. Moreover, people who live close to each other often attend the same schools, shop in the same stores, and so on, increasing the opportunities for meeting (Goode, 1982).

A second way in which distance influences partner choice is that the act of bridging distance involves time, energy and costs. Marriages involving long distances between partners used to be rare, since travelling was either impossible or very costly. In pre-industrial times, the geographical horizon of the activity pattern of most people did not exceed a few kilometres. In the course of the nineteenth century, mobility started to increase. Not only does an increasing portion of the population live outside their birthplace (Knippenberg and De Pater, 1988), but an ever-larger share of the labour force commutes to work: in 1947 15% of the Dutch labour force commuted, while in 1986 the figure rose to 52% (Knippenberg and De Pater, 1988). The increase in enrolment in higher education has also contributed to the increase in mobility: in 1961, 12% of all 20-year-old Dutch men were enrolled in full-time education, while by 1991 this figure had risen to 43% (Liefbroer, 1999). A large proportion of young people leave the parental home to pursue an education, particularly those who enrol in vocational training institutes and universities. In addition, the increase in leisure time has also contributed to the increase in mobility (Van Poppel and Ekamper, 2005). These changes have almost certainly had an influence on the usual practice of choosing a marriage partner from one's own region. More recently, the rise of the internet has increased the probability of a geographically distant partner. However, analysis of the 2003 Family and Fertility Survey shows that less than 1% of Dutch couples met their partner through the internet (Haandrikman, 2007). Thus, although the chances for meeting a partner who lives far away have increased, the number of people who actually meet their partner through the internet is rather small. In summary, despite the increases in mobility, distance is still seen to play a role in partner choice.

The third way in which distance influences partner choice has to do with the fact that the population is unevenly distributed over space. The distribution, size and density of the population determine the number of people who live in close proximity, and therefore influence the opportunity to meet potential partners. Given the longer average distance to other people in the population, people in peripheral areas have to bridge longer distances to meet potential partners. Moreover, water masses or borders may act as physical barriers to social encounters.

Fourthly, patterns of partner choice act as indicators of underlying cultural and sociological phenomena; they reveal something about social and cultural groups and borders in a society (Blau, 1977; Smits, 1996). People tend to live amongst people like themselves: social and cultural groups tend to cluster together in space. Educational level, occupational class, income, stage in the life course, religion and ethnic background are all geographically clustered. These spatial clusters of people sharing similar characteristics increase the chance of finding a homogamous partner. This probability is further increased by the fact that people with similar characteristics not only tend to live in the same kind of neighbourhood, but they also go to the same schools, shops, pubs, and so on (Winch, 1971). As people tend to look for homogamous partners and because these partners are often located nearby, the chance of finding a partner within a short distance is increased. Moreover, the preference for a partner who shares similar cultural qualities, such as shared dialect, and views concerning religion and family values, stimulates the choice of a partner from the same or a culturally related region. This is based on the idea that people from the same region are thought to share cultural or emotional affinity, implying mutual confirmation of each other's behaviour and world views, leading to social confirmation and affection (Kalmijn, 1998; Van Poppel and Ekamper, 2005). The extent to which the inhabitants of a region are regionally conscious, that is, have a strong identification with that region (Paasi, 2003), is presumed to increase further the chance of finding a partner close by. Regionally differentiated phenomena such as religious denomination and dialect may act as important markers of regional identity. Hence, spatial homogamy may reflect cultural factors such as religion and regional identity.

VARIATION IN SPATIAL HOMOGAMY

The level of and variation in spatial homogamy are seen as the outcome of the four factors discussed above. Two core dimensions that cause variations in spatial homogamy are investigated: demographic and spatial.

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The Demographic Dimension

Spatial homogamy has been found to vary by age. With rising age at marriage, the geographical distance between partners before marriage decreases (e.g. Coleman and Haskey, 1986; Clegg *et al.*, 1998). Coleman and Haskey (1986), in a study in England and Wales in 1979, found that the average marital distance for men is relatively low for those who marry in their teens, rises for men marrying in their thirties, and decreases for older grooms. Household position and age constitute the stage in the life course. Spatial homogamy is expected to be influenced by stage in the life course; however, there are no other studies to corroborate this. The direction of the hypotheses concerning stage in the life course is therefore unclear. Probably, young adults living in the parental home, the single elderly and those who are divorced or widowed have smaller geographical horizons than others, leading to increased spatial homogamy.

The Spatial Dimension

The extent to which people choose a partner who is spatially homogamous varies with geographical location. In many studies, regional differences were found concerning marital distances, for instance Clegg *et al.* (1998) for the Outer Hebrides, and Bozon and Héran (1987) for France. Figure 1 shows the

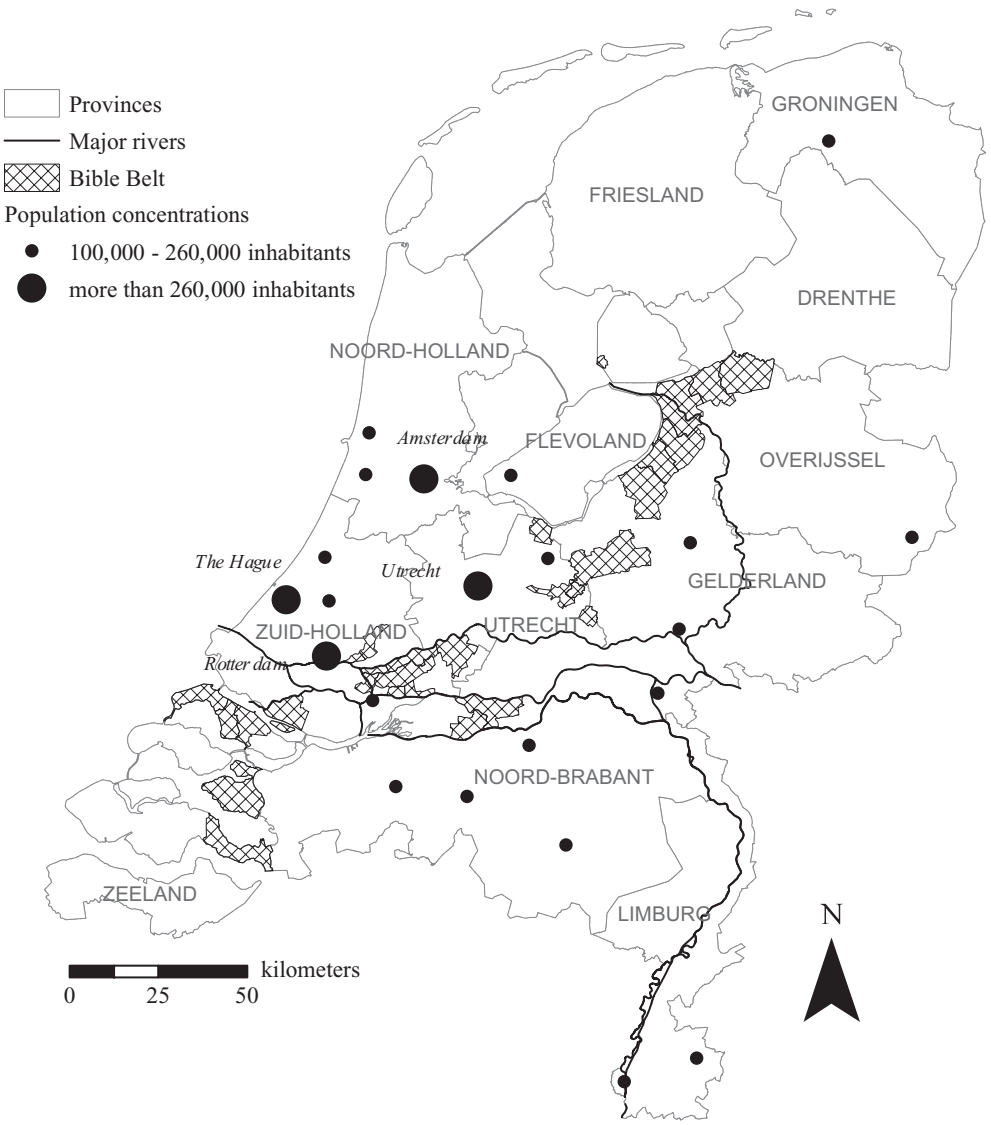

Figure 1. Geography of the Netherlands.[1]

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geography of the Netherlands. Maximum distances are about 340 km north–south and 180 km east–west, with a total area of about 40,000 km^2.

Spatial homogamy may vary by population density and degree of urbanisation. However, the relationship between population density and spatial homogamy is ambiguous. On the one hand, a higher population density in urban areas may lead to shorter distances between partners, since a city is sufficiently large to accommodate many potential marriage partners for its inhabitants. In other words, spatial homogamy is expected to be greater in cities. On the other hand, high population density may also lead to increased distances between partners, because the urban culture fosters new value orientations and open-mindedness. People in urban areas may have more contacts and opportunities that enable them to meet partners in a larger range of meeting places which are distributed across a larger area. Indeed, Blau (1977) found that with increasing urbanisation, the probability of wide social circles increases.

As Fig. 1 demonstrates, the western part of the Netherlands (also known as 'Randstad'), comprising the provinces of Noord Holland, Zuid Holland and Utrecht, is by far the most densely populated area. Given the absence of significant differences in elevation and the dense infrastructure system, *physical* attributes are not expected to act as serious geographical barriers to partner choice. The paper will explore the relationship between spatial homogamy and degree of urbanisation, but the direction of the relationship is not apparent in advance.

The spatial dimension of homogamy is also affected by cultural factors that vary spatially, such as religion and dialect. In the Netherlands, the geography of religion has been surprisingly stable over centuries. The south is predominantly Catholic, while the northern part is a mixed zone of liberal Protestants and non-denominationalists. In between the two zones, a strip of towns and villages stretching from the southwest to the north is known as the Bible Belt (e.g. Knippenberg, 2005) (see Fig. 1). A large share of inhabitants of the Bible Belt are Orthodox Calvinists, characterised by rather conservative demographic behaviour such as more traditional views on marriage and relatively high fertility levels. As Sobotka and Adigüzel (2002) found that religion serves as a strong predictor of spatial demographic differences in the Netherlands, we expect that partners in the Bible Belt are spatially homogamous.

MATERIALS AND METHODS

In order to examine the level of spatial homogamy for the whole of the Netherlands, vital statistics from the population register are used. The 'Gemeentelijke Basisadministratie' (GBA) is a decentralised automated population registration system, managed by the individual municipalities. In the GBA, information on each registered inhabitant of the country is stored. Each individual can be identified through a personal identification number (PIN), which enables linkage to spouses, children and parents. So-called personal lists contain information on the person, the parents, marriage, registered partnership, widowhood and divorce, offspring, and address (Prins, 2000). Since citizens have to report any change in address, residential addresses of inhabitants can be traced over many years.[2] While young people are known to be more often incorrectly registered than other groups, emigrants who fail to report their departure cause most problems in the registration. There is no official estimate, but according to Statistics Netherlands the number of unregistered inhabitants is not likely to be high (Prins, 2000). In fact, the quality of the municipal population registers is held in very high regard (Prins, 2000).

This study focuses on homogamy of partners who start living together, and it adopts Manting's (1994) definition of a union: 'a sexual and intimate relationship between a man and a woman in which the permanence of the relationship is assumed and a *common residence* is shared' (p. 13, italics added). This definition implies that shared living marks the start of a union. In the Dutch context, these unions include persons who are married, those who have a registered partnership, and those living together without a formal status (and exclude those people living together without a romantic relationship). For the remaining part of the paper, the whole group will be referred to as 'cohabiters'.

New cohabiters are tracked down from the register in several ways. Since marriages and registered partnerships are recorded by the local registrar, these events are directly documented in the GBA. Unmarried cohabiters are identified through household statistics. These annual

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statistics are constructed by linking the personal lists of persons living at the same address, based on their PINs. Households are divided into several household types, and the persons living in households are assigned a household position. There are four household positions that a partner in a couple may occupy: unmarried without children, married without children, unmarried with children, and married with children. The derivation of household position is based on the relationship of an individual to the reference person, his or her marital status, and possibly children. If two people moved to the same address at the same date, Statistics Netherlands classifies them as a single two-person household. The remaining unmarried cohabiters are tracked down by using an imputation model to determine which persons living at the same address form a household. This logistic regression model, described in Israëls and Harmsen (1999) and Harmsen and Israëls (2003), is based on findings from the Labour Force Survey which supplies information on background variables.

To locate the new cohabiters, those living with a partner on 1 January 2005 but not living with a partner on 1 January 2004 are selected. In this way, we find that 289,248 persons started cohabitation at sometime in 2004. The largest share of new cohabiters is unmarried (see Table 2), implying that a substantial proportion of the household positions is imputed. Since the imputation model may lead to overestimation of the number of cohabiting same-sex couples (Steenhof and Harmsen, 2003), only heterosexual couples are selected for analysis.

As the objective of this paper is to explore the role of distance in partner choice, spatial homogamy is operationalised by measuring the geographical distances between the former addresses of new cohabiters. Although the meeting time is not known, we assume that the addresses of partners on 1 January 2004 approximate the addresses of partners when they met. Moreover, to compare the residential histories of partners, we compare the distance between partners just before cohabitation with the distance between the same partners five years prior to cohabitation, and the distance between the birth places of partners. Only addresses in the Netherlands are available, implying that partners living abroad before cohabitation are excluded from the analysis. For each partner, sex and age is known, as well as the marital status and household position for all points in time. Partners are matched to each other on current address.

To compute the distance between addresses, geographical coordinates from the national geographical reference system ('RD system') are used. The so-called ACN coordinates (Adres Coördinaten Nederland) uniquely identify each postal address through the 6-digit postal code, house number and possible extensions. The ACN file of coordinates of addresses registered in the GBA on 1 January 2005 is used to match the coordinates to the cohabiters' addresses. Distances in metres are calculated by computing the Euclidian distance between the addresses.

The distance between partners at birth is measured by calculating the distance between the geographical coordinates of the geographical midpoints of the birth municipalities of both partners. Since municipal re-divisions have brought about many changes in municipal borders over the last century (the number of municipalities decreased from 1121 in 1900 to 483 in 2004), the centroids of the municipalities in every single year since 1900 (since the birth year of the oldest cohabiter is 1900) have been calculated.

The maps are created using ArcGIS software, with municipality (n = 483) as the regional unit of analysis. The ArcGIS and the GeoDa software (Anselin *et al.*, 2006) are used to perform the explorative spatial data analysis.

RESULTS

Descriptive Statistics on Cohabiters

There are 289,248 individuals or 144,624 opposite-sex couples who started living together in 2004. The distribution by age, marital status and household position is displayed in Tables 1, 2 and 3. Most new cohabiters are young people in their twenties and thirties (77%), and most have never been married (64%; Table 2). From the never-married people who started living together, 12% got married between 1 January 2004 and 1 January 2005. A fifth of the new cohabiters have children, of whom a third are married and more than 40% are divorced. About half of the new cohabiters lived alone before cohabitation, while almost a third were living in the parental home. Whereas more than half of cohabiters in their twenties live

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in the parental home before cohabitation, most people that start living together in their thirties are living alone before. Although living alone before cohabitation is common in all age categories, the majority of older cohabiters (aged 30 and older) are living alone before. More men tend to live alone, whereas more women tend to be single parents before cohabitation. The cohabiters that were living with another partner one year before cohabitation (7%) were mostly unmarried without children. Those who live in institutional households prior to cohabitation (such as long-term residents of children's homes, prisons, nursing homes and rehabilitation centres) are either very young (below 20) or 65 years or older.

Table 1. New cohabiters by age, 1 January 2005.

Age group	Number	%
15–19	3,278	1.1
20–24	55,307	19.1
25–29	80,691	27.9
30–34	51,495	17.8
35–39	34,295	11.9
40–44	22,141	7.7
45–49	14,950	5.2
50–54	9,930	3.4
55–59	7,447	2.6
60–64	3,849	1.3
65–69	2,583	0.9
70–74	1,453	0.5
75–79	957	0.3
80–84	515	0.2
85–89	245	0.1
90–99	112	0.0
Total	289,248	100.0

Table 2. New cohabiters by current marital status, 1 January 2005.

Current marital status	Number	%
Never married	184,902	63.9
Married	60,459	20.9
Registered partnership	3,042	1.1
Widowed	4,608	1.6
Divorced	36,237	12.5
Total	289,248	100.0

Distance Between Partners

The average distance between Dutch partners before cohabitation is 23 km, and half of all new cohabiters find their partner within 6 km (Table 4). Very few people live a long distance away from each other just before cohabitation. The distance between current cohabiters decreases over the life course: five years before cohabitation the average distance is 27 km, while at birth, cohabiters lived on average 44 km from each other. A fifth of new cohabiters are born in the same municipality. Spatial homogamy thus increases throughout the life course (Fig. 2).

Distance decay in partner choice is obvious in Figure 3. A distance of 1 km between partners before cohabitation is the most common distance among new cohabiters in the Netherlands (13%). The second most common distance before cohabitation is (approximately) 250 metres. Thus, most partners are found at very short distances; very few people find their partner beyond 10 km.

As the frequency distribution of the distance between partners is extremely skewed, the

Table 3. New cohabiters by household position.

Current household position (1 January 2005; n = 289,248)	%	Former household position (1 January 2004; n = 269,130[a])	%
Partner in unmarried couple without children	64.5	Living in parental home	30.8
Partner in married couple without children	13.4	Living alone	48.0
Partner in unmarried couple with children	14.8	Partner in (un)married couple	8.0
Partner in married couple with children	7.3	Single parent	8.7
		Other household member	4.0
		Person in institutional household	0.5
Total	100.0	Total	100.0

[a] The number of household positions on 1 January 2004 is smaller compared with the number on 1 January 2005 due to missing household positions caused by people living abroad on 1 January 2004.

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Table 4. Distance indicators for new cohabiters.

	Distance just before cohabitation	Distance 5 years before cohabitation	Birthplace distance
Mean	22.7 km	27.1 km	44.3 km
95% confidence interval	22.6–22.9 km	26.9–27.2 km	44.1–44.5 km
Median	6.2 km	7.8 km	22.9 km
Maximum	366 km	298 km	308 km
n	248,721	240,032	212,510

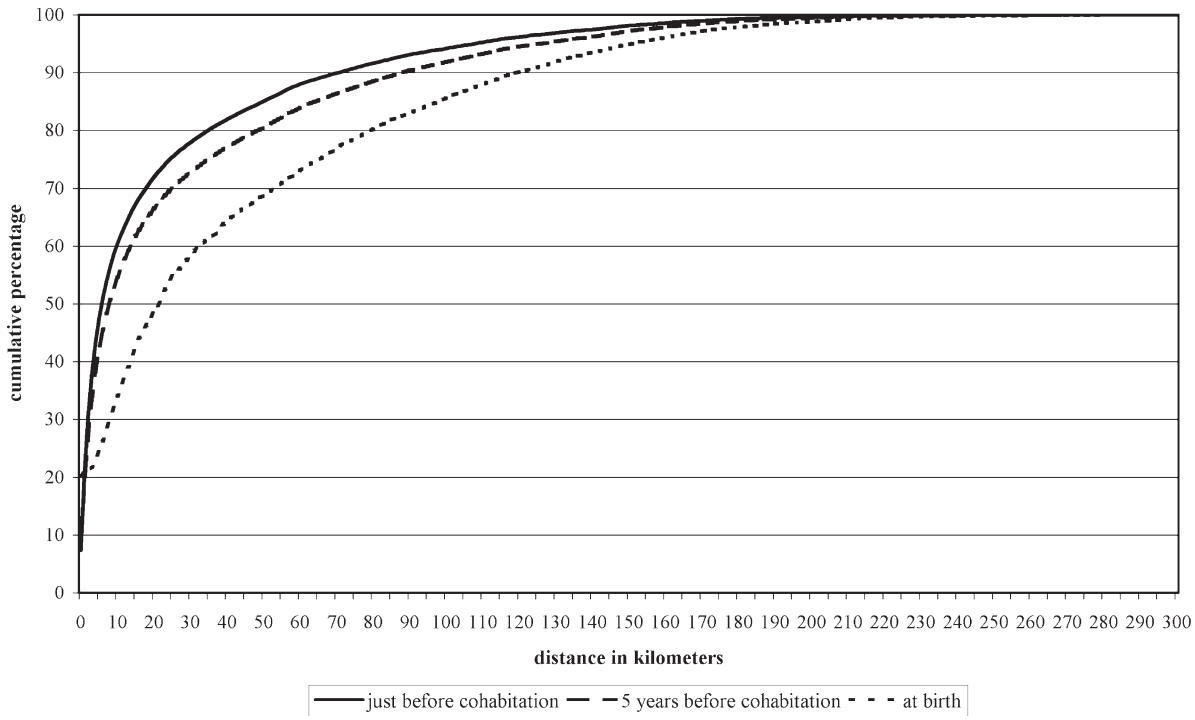

Figure 2. Distance between new cohabiters just before cohabitation, five years before cohabitation and at birth, in kilometres.

population median is a more meaningful measure of centrality than the mean. Therefore, in the remaining analysis, the median is used in examining the demographic and spatial dimensions of spatial homogamy. Following Bonett and Price (2002), confidence intervals for simultaneous pairwise comparisons of distance medians are used to test hypotheses.[3]

The Demographic Dimension of Spatial Homogamy

The variation in spatial homogamy is explored by examining the demographic dimension. Figure 4 shows the median distances between partners before cohabitation by age, and Table 5 shows all pairwise comparisons of age groups based on confidence intervals of medians. There is a clear age trend in spatial homogamy, and most differences between age groups are significant. Median distances between partners are highest at younger ages (median distance of 7.5 km for those aged below 20 years), and distances decrease with increasing age, with an exception for the 20–29 age group, where partners are chosen at significantly shorter distances than all other age groups (except the 60–69 group). The median distance between partners above 70 years of age (almost 3000 partners) is significantly lower (median of 3.8 km) than all other age groups.

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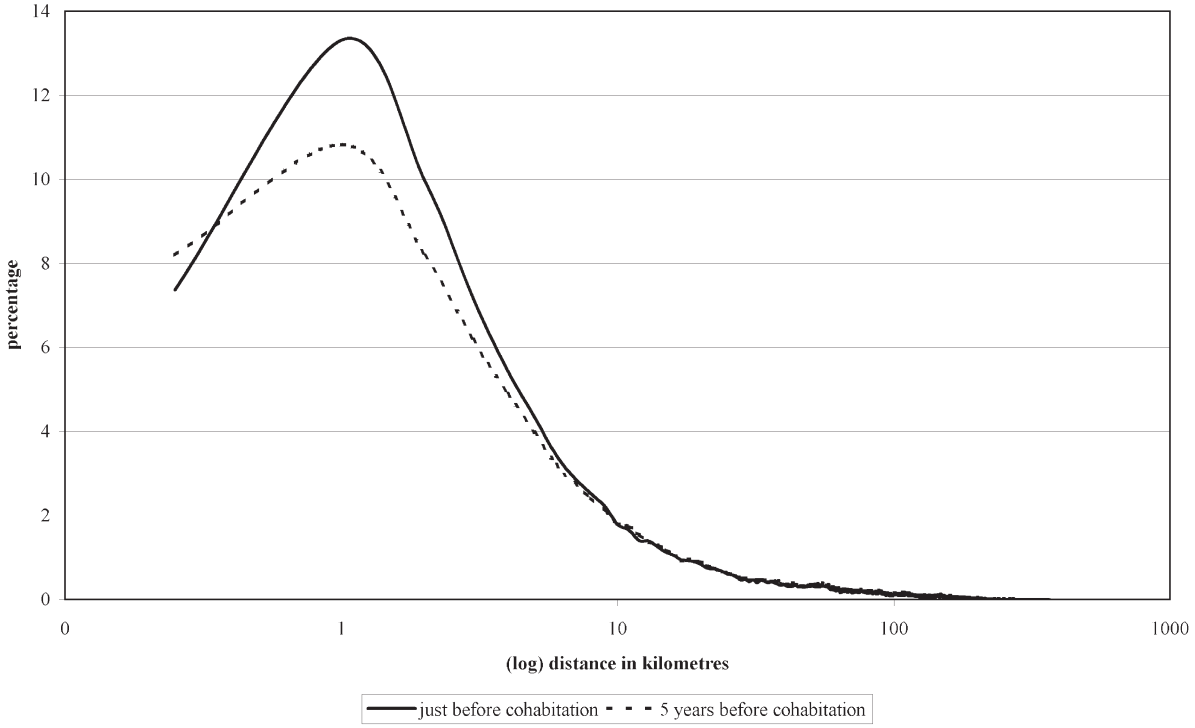

Figure 3. Distance-decay: distance between partners before cohabitation.

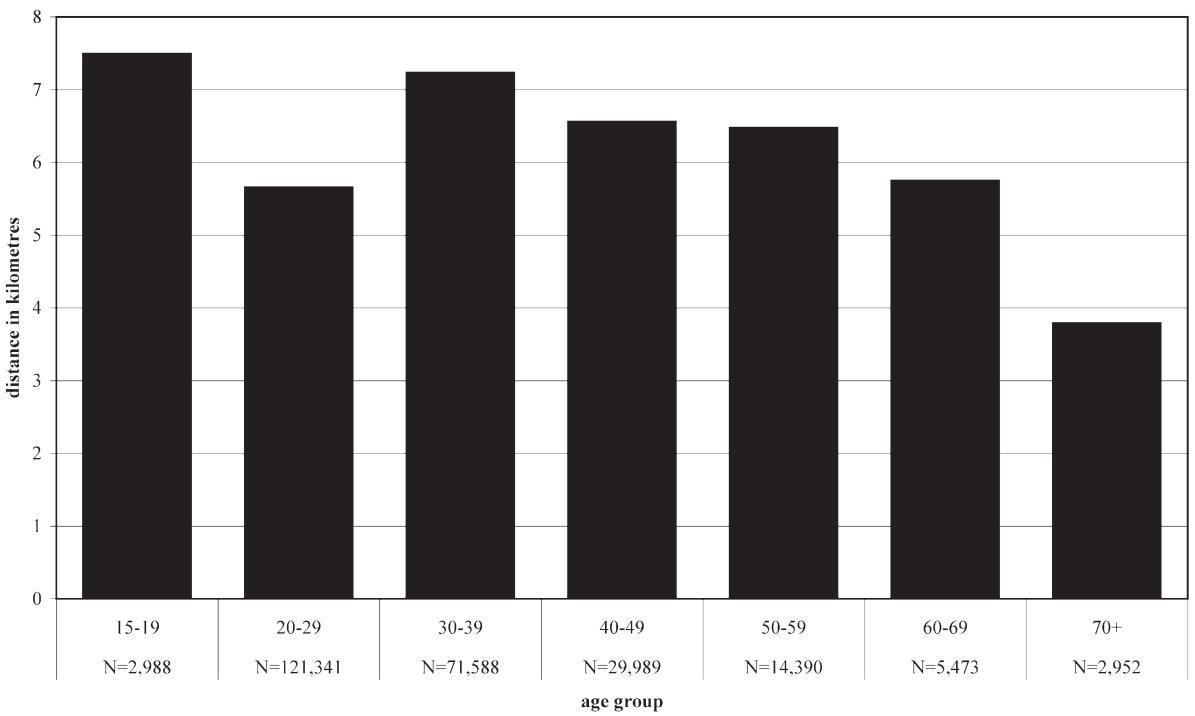

Figure 4. Median distance between partners before cohabitation, by age group.

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Table 5. Medians and confidence intervals of simultaneous pairwise compared age groups.

	15–19	20–29	30–39	40–49	50–59	60–69	70+
15–19	7.5 km	*				*	*
20–29		5.7 km	*	*	*		*
30–39			7.2 km	*	*	*	*
40–49				6.6 km		*	*
50–59					6.5 km		*
60–69						5.7 km	*
70+							3.8 km

Note: The diagonal displays the median per age group in kilometres. The asterisks indicate whether the two age groups concerned differ significantly.

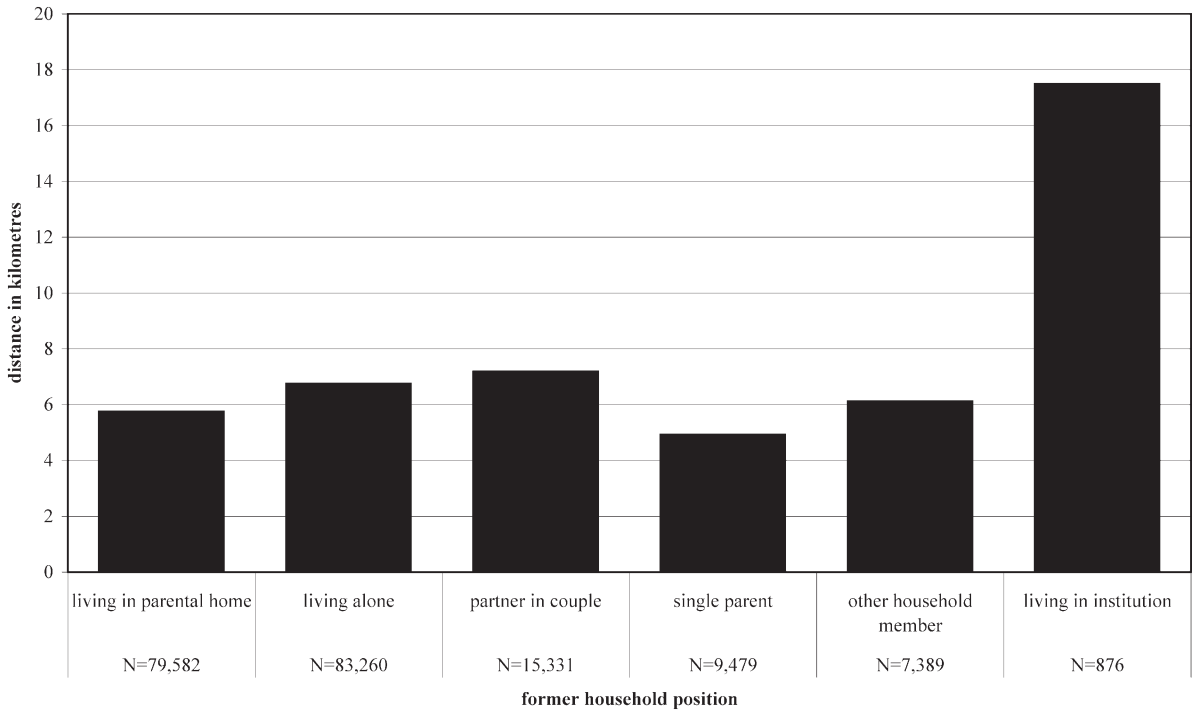

Figure 5. Median distance between partners before cohabitation, cohabiters younger than 40 years, by former household position.

Table 6. Medians and confidence intervals of simultaneous pairwise compared household positions.

	Living in parental home	Living alone	Partner in couple	Single parent	Other household member	Living in institution
Living in parental home	5.8 km	*	*	*		*
Living alone		6.8 km		*	*	*
Partner in couple			7.2 km	*	*	*
Single parent				4.9 km	*	*
Other household member					6.1 km	*
Living in institution						17.5 km

Note: The diagonal displays the median per former household position in kilometres. The asterisks indicate whether the two household positions concerned differ significantly.

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As the age range of new cohabiters is quite broad and most cohabiters are aged below 40 years, the remainder of the analysis focuses on this particular group.

Spatial homogamy also varies with household position before cohabitation. Figure 5 shows the median distances between partners according to former household position, while Table 6 shows the accompanying confidence intervals. Distances differ significantly between household positions. Single parents and those living with their parents before cohabitation have significantly shorter distances before cohabitation, while people who lived alone or lived with another partner find their partner significantly further away. Current cohabiters who previously lived in institutional households have the longest distances to their partners (median distance of 17.5 km), probably caused by the location of those institutions.

The third demographic dimension is the variation in spatial homogamy according to current marital status. Figure 6 and Table 7 show the median distance between partners by marital status, including confidence intervals. Only those

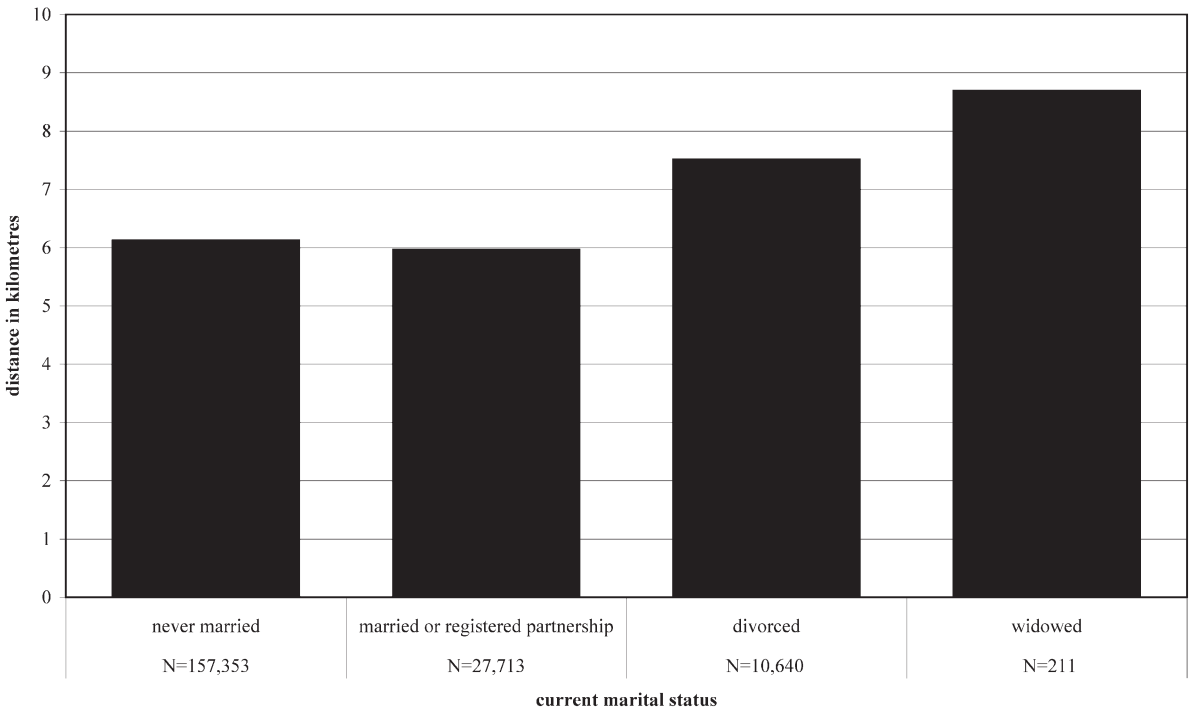

Figure 6. Median distance between partners before cohabitation, for cohabiters younger than 40 years, by current marital status.

Table 7. Medians and confidence intervals of simultaneous pairwise compared marital statuses.

	Never married	Married or registered partnership	Divorced	Widowed
Never married	6.1 km		*	
Married or registered partnership		6.0 km	*	
Divorced			7.5 km	
Widowed				8.7 km

Note: The diagonal displays the median per current marital status in kilometres. The asterisks indicate whether the two marital statuses concerned differ significantly.

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who are divorced before cohabitation significantly differ from other marital statuses: divorced persons choose partners at significantly longer distances compared with married and never-married persons.

The Spatial Dimension of Spatial Homogamy

Spatial variation is the other core dimension of spatial homogamy investigated in this study. Figure 7 and Table 8 show the median distance between partners before cohabitation according to different levels of urbanisation, including confidence intervals. The degree of urbanisation is based on address density[4] of the postal code area of the residential address before cohabitation. With increasing level of urbanisation, the distance between partners decreases. In other words, spatial homogamy increases with increasing urbanisation. All differences between the five levels of urbanisation are significant.

Figure 8 shows median distances between partners before cohabitation for the 483 municipalities of the Netherlands in 2004. Upper outliers, or areas of high spatial heterogamy, are

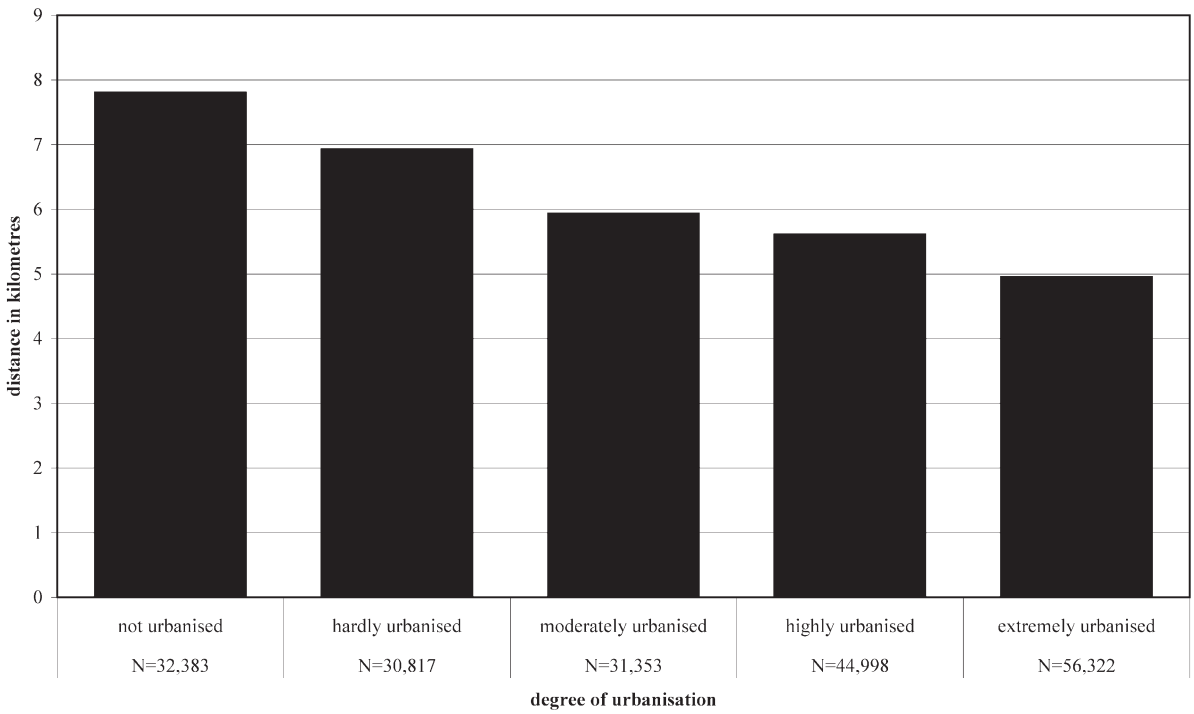

Figure 7. Median distance between partners before cohabitation, for cohabiters younger than 40 years, by degree of urbanisation of former address.

Table 8. Medians and confidence intervals of simultaneous pairwise compared degrees of urbanisation.

	Not urbanised	Hardly urbanised	Moderately urbanised	Highly urbanised	Extremely urbanised
Not urbanised	7.8 km	*	*	*	*
Hardly urbanised		6.9 km	*	*	*
Moderately urbanised			5.9 km	*	*
Highly urbanised				5.6 km	*
Extremely urbanised					5.0 km

Note: The diagonal displays the median per degree of urbanisation of former municipality of residence in kilometres. The asterisks indicate whether the two degrees of urbanisation concerned differ significantly.

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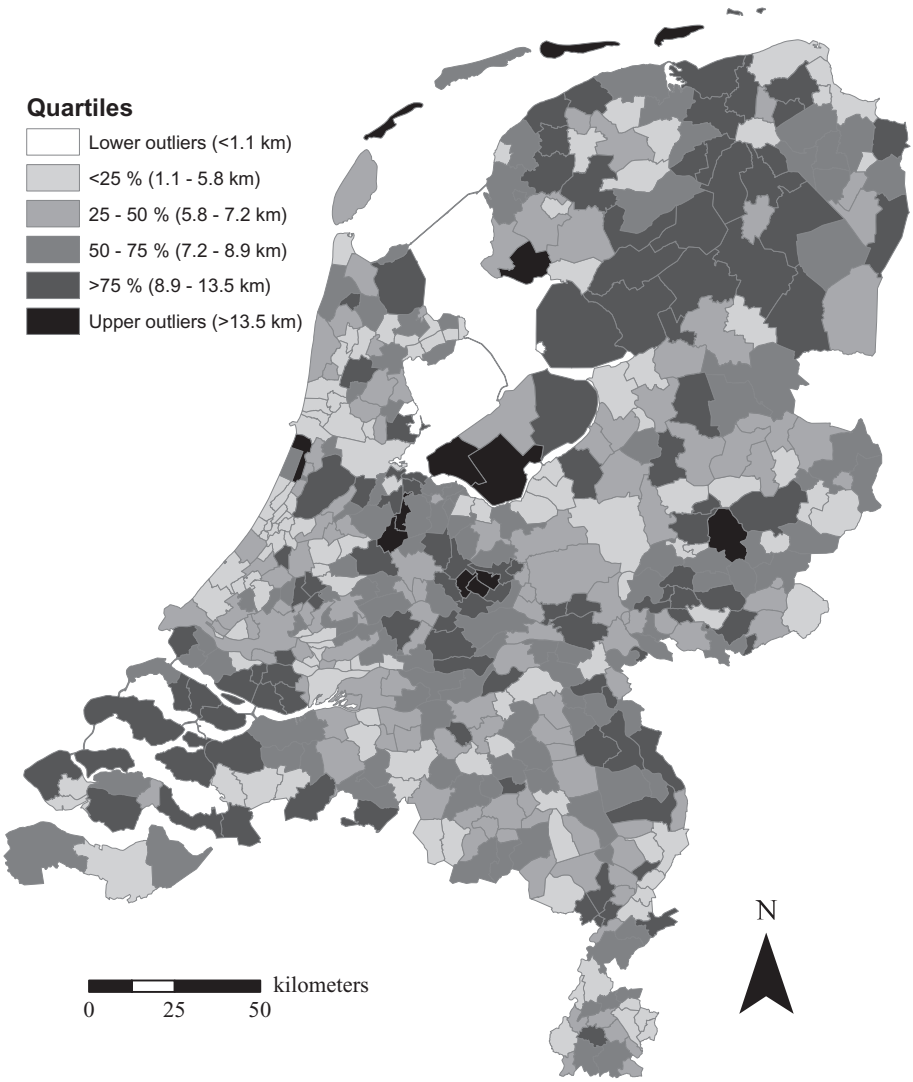

Figure 8. Median distance by quartiles between new cohabiters before cohabitation, for cohabiters younger than 40 years, by former municipality of residence.

found in the peripheral north (including the Wadden Islands) and southwest, and in the central part of the country (Flevoland and a cluster of municipalities in the area between Amsterdam, Utrecht and Tiel).

Lower outliers, or areas where people choose partners that are highly spatially homogamous, are the municipalities of Urk, where half of all new cohabiters find partners within 800 metres, and Edam-Volendam where the median is 1 km. Urk, a fisherman's village and a former island (part of the province of Flevoland), is known for its closed community, orthodox Protestant churches, and its unusual dialect. The village of Volendam, also a fisherman's village, in the municipality Edam-Volendam is a Catholic enclave in a Protestant area, also known for its particular dialect. Other areas where spatially homogamous partners are chosen are found in other Protestant strongholds such as Bunschoten (Spakenburg), Kampen, Rijnsburg and Rijssen-Holten. Furthermore, distances between partners are relatively short in and around larger and middle-sized cities, and in some areas in the south of Limburg, Noord Holland and the north of Groningen and Friesland.

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Spatial Homogamy Coefficient

From the geographical variation in median distances between partners, we deduce that spatial heterogamy is higher in low-density areas and on islands and other more remote areas. One important reason for this result is that the average distance to any other person in the Netherlands is also greater than in the core and densely populated regions. Therefore, we should standardise the distance between partners for *the average distance to all other inhabitants in the Netherlands*. This is done as follows. Firstly, for a person living in municipality i we calculate the distance to all other persons in the Netherlands. For practical purposes this is approximated by aggregating to the municipality level. Let d_{ij} be the distance between the geometric centres of municipality i and j. Then the average distance for any person living in i to another person in the Netherlands is approximated by:

$$\bar{d}_i = \frac{1}{N}\sum_j d_{ij}P_j$$

where P_j is the population size of municipality j and N is the population of the Netherlands. As distances to partners within the same municipality are not zero, these distances are approximated by:

$$d_{ii} = \tfrac{2}{3}\sqrt{\frac{area_i}{\pi}}$$

where $area_i$ is the area of municipality i in square metres on 1 January 2004. The underlying assumption of this formula is that the population is uniformly distributed within the municipality and that the form is a circle.

Next, let $\bar{s}_i$ be the average distance to cohabitation partners for all those who started cohabiting in 2004 and who were living in municipality i on 1 January 2004. The spatial homogamy coefficient for municipality i is calculated as:

$$SHC_i = \frac{\bar{s}_i}{\bar{d}_i}$$

A value of 0.5 for this coefficient means that for a person in municipality i the average distance to his or her partner before cohabitation is half that of the average distance to the average person in the Netherlands.

Figure 9 shows the map of each municipality's spatial homogamy coefficient. The average spatial homogamy coefficient for the whole of the Netherlands is 0.23, as the average distance between cohabiters is 23 km and the average distance to all other inhabitants is 102 km. Thus, the average distance to cohabitation partners is about a quarter of the average distance to other inhabitants, indicating the very local dimension of partner choice. The coefficient ranges from 0.09 to 0.54. Municipalities with a high spatial homogamy coefficient are municipalities which have a longer distance between partners compared to the expectation on the basis of their geographical location and number of inhabitants; municipalities with a low score on the spatial homogamy coefficient are municipalities which have a shorter distance than one would expect if geographical location and population were the only determinants of spatial homogamy.

The application of the spatial homogamy coefficient shows that the long distances between partners found in the northern provinces and the southwest are due to their peripheral position and low population density, and that conditional on these geographical factors, partner choice in these regions is not different from other regions. Actually, several northern and southern areas have a relatively low spatial homogamy coefficient, implying much lower distances between partners than expected on the basis of geographical location. Other areas with low coefficients are Urk, Rijnsburg and Edam-Volendam and the east of Overijssel. In contrast, high coefficients are found in the central part of the country.

SUMMARY AND DISCUSSION

Geography does matter. This study has shown that distance-decay is highly relevant in partner choice, as Dutch people choose spatially homogamous partners. Half of all new cohabiters lived within a distance of 6 km of each other before cohabitation, while the most common distance between partners was 1 km. As the chance of meeting a partner is greater at close distance and since bridging distance (still) involves time, energy and costs, partners are found close by.

Spatial homogamy varies with stage in the life course. Firstly, a clear age trend is apparent, with younger couples finding their partner at relatively long distances and decreasing distances between partners as age increases, with an

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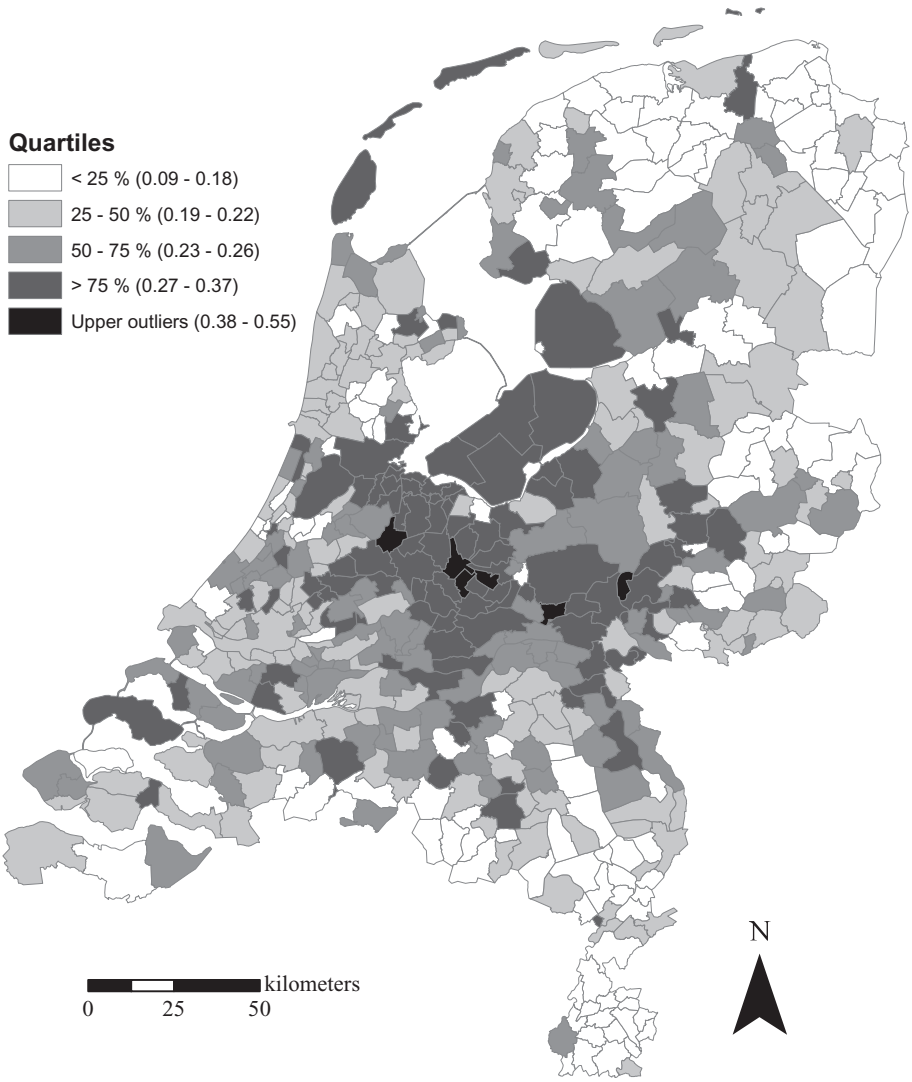

Figure 9. Spatial homogamy coefficient, by quartiles.

exception to the trend of partners in their twenties, who find their partner relatively close by. The long distances at younger ages are not in line with studies by Coleman and Haskey (1986) and Clegg *et al.* (1998), who found that marital distances decrease with increasing age. Secondly, household position before cohabitation affects the extent of spatial homogamy. Those living in the parental home before cohabitation lived significantly closer to their future cohabitation partner compared with most other household positions. This suggests that the geographical horizon of those living with their parents is relatively narrow. This finding seems to be contradictory to the finding that young people have significantly greater distances to partners, as most people under the age of 20 are living with their parents. However, the majority of people living with their parents before cohabitation are over 25. A possible explanation for the long distances of the age group 15–19 is that some of these young cohabiters leave the parental home in order to pursue higher education, and start cohabitation soon after having lived alone or with others for a while. As distances are compared for the addresses on January 1 of two consecutive years, people may have changed household positions more than once. In addition,

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since a high share of household positions of 15–19 year-olds are imputed, distances between partners for this group may be biased if part of the 15–19 year group is actually not cohabitating but living with other people. The imputed allocation of household position might be more often incorrect in this age group.

The relatively short distances between cohabiters who are in their twenties could be related to the availability of spatially close partners. At earlier ages, sufficient potential partners are available at close distance, leading to spatially homogamous couples. Consequently, those who start living together in their thirties have to search for partners in a wider geographical area. In addition, with increasing age the radius of action may also increase due to increased mobility and therefore expanding work and friendship networks. The geographical horizons of elderly people are small: beyond age 60, distances between partners decrease considerably. In historical studies, decreasing marital distance with increasing age has been associated with low affluence (e.g. Clegg *et al.,* 1998). In present-day societies, it seems more likely that the lower distances between partners at higher ages are related to a shrinking spatial pattern of activities. The long distances for persons in institutional households may be explained by the geography of rehabilitation centres, prisons and other institutions. Moreover, if these persons return to their partner after a substantial time apart from each other, they may have been wrongly imputed as being new cohabiters.

Spatial homogamy linearly increases with degree of urbanisation. Although people living in highly urbanised areas may have wider geographical networks (Blau, 1977), this is not reflected in the distances at which partners are found. The short distances in urbanised areas may be explained by the sufficient number of potential marriage partners within city borders. Furthermore, different degrees of spatial homogamy within urban or regional areas may reflect different degrees of social cohesion.

Spatial homogamy exhibits a distinct spatial pattern, with extremely long distances between partners in the central Netherlands, and in peripheral areas such as the north and the southwest. This study adds to the existing body of research on spatial homogamy (Coleman, 1979; Coleman and Haskey, 1986; Van Poppel and Ekamper, 2005) that the long distances between partners in rural and peripheral areas are induced by population size and geographical location. This is concluded from applying the *spatial homogamy coefficient*. This coefficient is a methodological novelty in analysing geographical differences in spatial homogamy, and may be applied to any type of behaviour that is governed by interaction, such as migration or commuter behaviour. As geographical location and population size heavily influence interaction between people, using the spatial homogamy coefficient separates geographical from other effects.

A disadvantage of the coefficient might be that the results for central locations can be somewhat biased, as partners are 'expected' to be found at (too) close distance, since the average distance to all other Dutch people is relatively short at these places. Therefore, the values of the spatial homogamy coefficient for the central part of the country might be too high.

The spatial patterns of homogamy and the spatial homogamy coefficient show that areas with short distances between partners are found in urban areas, but also in the north and south. This is unexpected, given that the peripheral locations and low population densities of these areas are generally associated with longer distances. The explorative spatial data analysis in this paper has suggested potentially interesting dimensions in spatial homogamy. Specifically, the role of cultural factors such as religion, dialect, and the extent to which communities are closed, appears to be important in the explanation of spatial homogamy, as suggested earlier. Some regions seem to have preserved or even strengthened their regional identity, although small societies have increasingly integrated into larger structures, indicated by a decreasing proportion of couples in which both partners were living in the same region when they met (Knippenberg and De Pater, 1988). Religion surely seems to serve as a predictor of spatial differences in partner choice, as short distances between partners are found in the Bible Belt, thereby adding weight to Sobotka and Adigüzel (2002). As patterns of partner choice reveal something about cultural and social groups and borders in a society, they have been associated with open-

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ness. An increase in mixed marriages in terms of geographical origin decreases the internal cohesion within groups and decreases cultural and social distance in society. In the last two centuries, economic, social and cultural changes such as the growth in education, the increase in social and geographical mobility, and the expansion of the welfare state have changed personal relationships (Beekink *et al.*, 1998). These changes have widened the autonomy of individuals and have decreased the effectiveness of sanctions on social norms, enabling widening horizons for the partner market. As a reverse development, some tight social communities limit the geographical range of their social and economic activities, and mainly choose partners from within the region. In this way, the regional identity of such areas is strengthened further.

The remaining geographical variation in spatial homogamy should be further examined. Therefore, in a subsequent study the role of demographic, socio-economic, cultural and pure spatial factors in patterns of spatial homogamy will be investigated using spatial regression techniques. In such models, the clustering of socio-economic and cultural groups can be taken into account.

In this study, spatial homogamy was measured as the distance between former addresses of new cohabiters at two points in time. Although these addresses indicate where people were living before they started living together, they may not be the exact places where partners met. For that reason, further research will also focus on the geography of meeting places.

When it comes to matters of the heart, geography is highly pertinent. Spatial homogamy is strongest for those who start living together in their twenties and those who start cohabitation at old ages. Moreover, single parents and those living with their parents find their partner relatively close by. Spatial homogamy varies geographically, although extremely long distances in peripheral locations are mainly due to geographical factors. Partners are found at increasingly shorter distances as urbanisation increases. It is plausible that our findings (especially the demographic and spatial variations in spatial homogamy) apply to other populations as well. In countries where the urban–rural divide is greater than in the densely populated Netherlands, differences might even be larger. Obviously, local cultural circumstances differ across countries, and therefore regional differences in spatial homogamy will differ according to local cultural settings.

NOTES

(1) The area symbolising the Bible Belt indicates those municipalities in which more than 15% of eligible votes in the national parliamentary elections of 2003 were given to one of the two Christian democrat parties: the Christian Union (CU) and the Political Reformed Party (SGP).

(2) Residential addresses in the Netherlands can be traced back to at least 1 October 1994, when the GBA system was introduced. Municipalities are allowed to convert addresses from before 1994 from the former personal cards into the automated register. As all personal cards are saved by the municipalities, the accounting of the population is complete to before 1994 (personal communication with Kees Prins, Statistics Netherlands, 2008).

(3) We follow Bonett and Price (2002)'s procedure to estimate confidence intervals for a linear function of medians. Simultaneous pairwise comparisons of distance medians are conducted to test whether one or more groups differ significantly. The linear function of medians is defined as $c_1\eta_1 + c_2n_2 + \ldots + c_kn_k$ where c is a number specified by the researcher, $\sum c_j = 0$, and η_j is the population median. Confidence intervals are calculated using distribution-free estimates of the variance of the median. The 95% confidence interval for $\sum c_j\eta_j$ is calculated as $\sum c_j\hat{\eta}_j \pm z_{\alpha/2}(\sum c_j^2 \operatorname{var}\hat{\eta}_j)^{1/2}$, where $var\,\eta_j$ is a distribution-free estimate of the variance of η_j and $z_{\alpha/2}$ is a two-tailed critical z-value. The variance of η_j is defined as $var\,\hat{\eta}_j = [(Y_{(n_j-a_j+1)j} - Y_{(a_j)j})/2z_j]^2$ where $a_j = (n_j + 1)/2 - \sqrt{n_j}$ and is rounded to the nearest non-zero integer; $Y_{(a_j)j}$ is the a^{th} largest score of group j, and z_j is extracted from Table 1 in Bonett and Price (2002).

(4) The degree of urbanisation is based on the so-called 'surrounding address density', which is the number of addresses around an address within a radius of 1 km, and is calculated for each 500 by 500 m square according to the national triangulation system (RD system). For each 6-digit postal code area, the average surrounding address density for each 500 by 500 m square is calculated and weighted by the number of addresses for each square. The following classes are used, based on the classification by Statistics Netherlands: not urbanised (<500 addresses per km^2), hardly urban-

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ised (500–1000), moderately urbanised (1000–1500), highly urbanised (1500–2500), and extremely urbanised (>2500 addresses per km^2).

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