Chapter 6
Widening Horizons? The Geography of the Marriage Market in Nineteenth and Early-Twentieth Century Netherlands

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Introduction

For men and women looking for a partner the geographical distance to a potential mate is still an important consideration. One look at the personal ads in the *Acquaintance* column of one of the most important Dutch newspapers (*NRC Handelsblad*) makes clear that the horizon of the seekers might vary a lot: 'Woman, demanding, slim and more than worth to look at. (. . .) Is looking for a (. . .) man with humour (. . .) preferably at walking distance of the Concert Hall'. Another says, '50-year old Aquarius (. . .) living in the eastern part of the country and for that reason having not enough opportunity to make the acquaintance of a definitely civilized Gentleman with sense of humour'.[1] The geographical criteria in these advertisements not only express the wish to find a mate who can easily be reached, but equally strongly articulate a preference for cultural proximity. Such a preference for a spatially close and, for that reason, a more or less familiar spouse has historically found expression in numerous proverbs and sayings (Vandenbroeke, 1986: p. 24; Van der Molen, 1961). 'Court the boy next door, so you know what you get' and 'Lovers coming from far away are to be feared' are among two of the many examples. As marriage is not commonly undertaken without regular and frequent meeting of the two parties during several months of courtship, marriage indicates the absence of spatial isolation and the presence of contact between the regions where the spouses come from. Changes over time in marital distances, in the direction of marital choices and in differentials in distances between social groups thus can be used as an indicator of the degree of contact between people from different regions.

In the latter part of the nineteenth century the development of the Dutch transportation and communication infrastructure increased the opportunities to meet potential spouses from outside the region of residence or birth. Although there is no doubt that at the same time the cultural integration of the country increased as

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well, there is not much evidence about the consequences of this process for the population at large. The evidence that does exist is scattered and relates to restricted time periods and small regions only. In this chapter we argue that changes in the experiences and attitudes of the population brought about by changes in the transportation/communication infrastructure and in cultural terms can be studied in a unique way by analysing marital distances between spouses. This information is of a more or less continuous character and includes information from more than one million marriage certificates for five provinces of the Netherlands in the period 1812–1922. With the help of simple descriptive measures, maps and more sophisticated spatial models, we first study whether the geography of the marriage market in the Netherlands has expanded over the nineteenth century and thus testifies to an increase in cultural integration of the country. Second, we examine whether there were any class differences in marital distance and whether these differences changed over time. The results will allow us to study how cultural integration and modernity developed in different segments of society, characterized by differences in access to transportation and communication networks and by a culture that could be more or less open to the outside world. The results of our study have relevance for the study of national integration as well as for the historical study of migration, geographical isolation, modernization, family structure and ideology and the use of infrastructural networks.

We start with a brief overview of the relevance of the study of marital distances, not only from a demographic but also from a geographical, historical and sociological perspective. Next we present the mechanisms affecting the degree of spatial homogamy between spouses and describe how the operation of these mechanisms changed over the nineteenth and early twentieth centuries and how they differed by social class. We then introduce the GENLIAS database and present the methods that we use to analyse marital distances. On the basis of descriptive indicators and maps we discuss time trends in marital distances, changes in the direction of the preferences of grooms and brides and time trends in marital distances by social class. Spatial regression techniques are applied using both individual explanatory variables and regional socio-economic explanatory variables. We conclude with a brief discussion of the relevance that our outcomes have for some key issues in the history of modernization, family life and technology.

Perspectives on the Geography of the Marriage Market

Historians and social scientists have used information on the geographical proximity of spouses for a variety of purposes.[2] Geographers assume that the distribution of marital distances in a community approximates the distribution of social contacts and social knowledge arising through day-to-day life; they therefore use information on the birthplaces of spouses to study the geographical range of social and economic activities and as a measure of the geographical knowledge of people and places around the home base (the mean information field) (Coleman & Haskey,

1986). Information on geographical proximity (or what might be called geographical endogamy or homogamy) has been used by social scientists as a means to define and identify social communities; it is interpreted as an index of the social distance and contact between communities that might shed light on the heterogeneity of communities and on their survival as minorities (Coleman, 1979: p. 416; Snell, 2002).

Sociologists and historians have used time trends in the marriage horizon of communities as an index of the modernization of Western societies. In pre-modern settings, the local milieu is supposed to have been the place where social relations developed and the small spatial scale of these relationships provided for their solidity. The local community was the focus of and an important base for the ontological security of people (Giddens, 1990: pp. 100–103). Crucial to modernity was a process of 'disembedding', the lifting out of social relations from local contexts of interaction, offering the possibility of change by breaking free from the restraints of local habits and practices. The advent of modernity fostered relations between people 'locationally distant from any given situation of face-to-face interaction' (Giddens, 1990: pp. 16–20). 'Modernization' was also characterized by a shift from 'ascription' to 'achievement' as the measure of a person's status in society. This was supposed to result in a broadening of people's horizons, which in its turn led to a decline in people's preference for members of their own group. Modernization, therefore, is expected to lead to increased contact and a high frequency of intermarriage between people from different regions and to a reduction of the cultural distance between them (Van de Putte, 2003). Bonvalet and Maison (2007) have pointed to the modernization of family life as a consequence of residential choices; the independence and degree of contact between generations has been strongly affected by the practice of generations living in different villages, a process that is heavily influenced by marrying outside one's own community.

Although trends in marital distances have been studied since the 1930s, existing studies have serious limitations.[3] Most of the sociological literature on geographical proximity does not focus on long-term changes (Van Leeuwen & Maas, 2005) and although much is known about the geography of marriage in rural villages in the past for various European countries, there have been relatively few studies of long-term changes in the geography of marriage in towns. Small-scale studies have dominated the field, making it impossible to study the interplay between social position, time and geographic horizons. When data are broken down into regions, time periods and socio-economic position, some sub-groupings become quite small, introducing problems of representativeness (Pooley & Turnbull, 1998: p. 51).

In this chapter, we study the changes in the geographic horizon of the Dutch population in the nineteenth and early decades of the twentieth century. The Netherlands is an interesting case for the study of marriage horizons. It was highly urbanized and densely populated from the beginning of the nineteenth century, geographical distances between communities were rather small, there were few physical barriers relative to other parts of Europe and the Netherlands was an easy territory to traverse. We make use of a very large database that allows us to study long term trends in marriage horizons for five of the eleven Dutch provinces, covering a large part of

both the area and population of the nation. The size of the database allows us to compare differentials in the spatial horizon and changes in these differentials between various social groups. The first question we want to answer is whether changes in communication and transport, in opportunities for meeting and in cultural diversity led to a geographically more scattered and more extensive choice of marriage partners and to an increase in marital distances. We will study this question by calculating distances between the birthplaces of groom and bride and by studying the specific geographical preferences for spouses from certain regions over the period 1812–1922. The second question we want to study is whether there were social class differences in geographic horizon and whether, due to improvements in the transport system, economic developments and cultural changes, these social class differences changed over time. Historical studies of the relationship between social class and geographic homogamy have been rare and usually do not focus on changes in the relationship over time (Prost, 1981; Vandenbroeke, 1986; Meurkens, 1984: pp. 34–39, p. 171; Ogden, 1980; Perry, 1969; Pooley & Turnbull, 1998). We study both of these questions by using simple descriptive measures and maps and by applying spatial regression techniques to analyse the effect of individual and regional explanatory variables on changes in the spatial location of brides and grooms.

Mechanisms Affecting Spatial Homogamy

Patterns of marital homogamy, be they educational, religious or geographical, arise from the interplay between three social forces: the preferences of the marriage candidates, the influence of the social group and the structure of interaction opportunities (Kalmijn, 1991).

Geographical homogamy primarily depends on the opportunities people have to meet and to stay in touch with future spouses from a given region. The universal tendency to choose a partner living nearby, rather than choosing geographically at random, can be understood in terms of models of human behaviour such as ‘the principle of least effort’: ‘individuals will almost always prefer not to seek far afield to satisfy needs which can be provided close at hand with minimum inconvenience’ (Coleman, 1979: p. 415). When people live near each other, they tend to meet more frequently, increasing the chances of meeting a potential partner. Proximity thus increases meeting probabilities and thereby has a direct effect on partner choice.

The level of geographical homogamy between spouses is also strongly influenced by the preferences that people have for cultural resources in future spouses: norms about marriage and the family, religious preferences, shared language and dialect, etc. As similarity of values and opinions leads to mutual confirmation of each other’s behaviour and worldviews and similarity of taste increases opportunities to participate in joint activities, people prefer to marry spouses who share similar attitudes and expectations. Such a preference makes it more likely that a partner will come from the same community or at least from a region that is culturally related. The preference for a spouse from the same community is also affected by more banal

factors. People usually marry someone with the same social and religious background and are more likely to meet a partner who satisfies this criterion through family parties, voluntary associations, religious organizations and the friendship network. These meeting spheres are strongly locally oriented. Geographically assortative mating is thus fostered by socially assortative meeting.

Geographical homogamy was also determined by third parties, individuals who were not directly involved in the marriage, specifically the parents of the spouses and the peer group, but who may have applied social sanctions to individuals who chose a spouse who did not meet their approval.

Opportunities to meet potential spouses from outside the individual's own region on a regular basis were rather limited in the Netherlands until the middle of the nineteenth century. Particularly in the eastern and southern parts of the country, connections between one settlement and another were relatively poor and the means of transport limited. For the majority of people, 5 km – an hour's walk for a young rural dweller – was perhaps the greatest distance that the average man was prepared to walk and return at fairly frequent intervals. Those who had to travel daily found it difficult to spend more than an hour on such a trip, given the long working day. On foot in accessible terrain one could perhaps occasionally walk 20 km to another village and walk the same distance back on the same day and villages that were this far apart did not present serious obstacles to a courtship. Problems could arise, however, if the partner lived further away. Assuming that most people walked or used a means of transport that had the same velocity – a regular or market ferry, a dogcart or horse and cart – one could cover 20 km at the most to meet a potential spouse and return home the same day. Staying in touch with a partner living further away required spending the night in the partner's neighbourhood or carrying on a frequent correspondence. The 20 km radius not only had practical but also symbolic meaning. Communities further away from one's own place of residence did not stir feelings of familiarity and intimacy: when one traveled a distance between 20 and 30 km, it normally meant that one left the belt of more or less familiar communities and entered an area with which one was less acquainted (Rosental, 2004; Renard, 1984).

Cultural norms of endogamy were another important mechanism in partner selection in nineteenth century society. Personal identity was strongly based on membership in the local community. One distinguished oneself from people from other regions who had competing and sometimes conflicting beliefs, values and aspirations and who were not likely to be seen as 'like us'. People coming from the same known universe could be trusted and spouses were favoured from regions where the preferred cultural characteristics were dominant. Cultural distinctiveness thus stimulated geographical endogamy.

Third parties played a role in maintaining the preference for culturally known partners with the desired identical characteristics. There was often a strong opposition to men and women from outside the community who were looking for a partner. Women were a 'local perquisite', so their courtship by outsiders often met with suspicion or violence (Snell, 2002). Village youngsters sometimes protected the stock of unmarried women by beating up outsiders, by parading people who were courting

outside their village sitting back to front on a donkey, or by depositing a trail of rotting vegetables or manure around the house of the deviant lover. Because the visibility of outsiders was relatively strong – due to their different dress, dialect, customs and habits – this opposition could easily be expressed (Van den Berg, 1941: pp. 72–73). This enforced geographical endogamy was more than an expression of local patriotism: it also served the interest of the youngsters as inheritances remained within the village and the number of nubile girls was safeguarded (De Jager, 1981; Kuipers, 1976: p. 75).

The tendency to choose a partner living nearby rather than geographically at random, all other things being equal, has the effect that distance leads to less frequent interaction. Yet, there may be factors at work that lead to a preference for partners from areas that are more distant from each other, leading to a deviation in the direction and volume of contacts between people from different regions (directional bias or prevalence of greater contact in certain directions (Morrill & Pitts, 1967)). Areas that are close to one another on a map might be very distant from each other in terms of access, leading to a deviation in the direction and volume of contacts between people from different regions. This could be due to physical barriers, such as rivers or swamps, but also to mental barriers (traditional antipathy between villages, differences in religion or ethnicity, in dialect or language, the presence of a state border), dividing the population into closed groups and hampering circulation (Segalen, 1979; Johnston & Perry, 1972: p. 23). For this reason we also explicitly focus on the regional origin of the spouses.

Changing Opportunities and Preferences

In the past 150 years, The Netherlands experienced a series of changes that fundamentally transformed cultural preferences and the opportunities to meet potential spouses. Many of the factors that until the middle of the nineteenth century had a restraining influence on the choice of a partner from outside one's own community have, in this process, lost their effect.

First of all, the Netherlands became culturally more and more unified. Distinctive local accents, phrases and vocabulary decreased in importance, enhancing the degree to which members of the national community could communicate with each other. The distribution of goods across the country implied that people in a given region could eat the same foods and wear the same clothes as those in other areas. Local costume, customs and habits disappeared. As a result, the visibility of the fact that a person came from outside the community decreased. National newspapers and political and economic integration caused an ever-growing connectedness, emotionally as well as cognitively, between different regions and their inhabitants, stimulating cultural homogenization. Identification with the national state created a sense of membership in a national community, thereby decreasing the role of regional identities (Knippenberg & de Pater, 1988: pp. 90–91, pp. 178–179, p. 202, p. 206). As a consequence, persons from other regions were no longer perceived as strangers and began to be seen as potential partners.

The process of cultural integration was strongly intertwined with two other processes that enormously increased the opportunities to meet potential spouses from outside the region: a process of market integration, state formation and nation building (Watkins, 1991: pp. 118–138) and a radical transformation of the communication and transport systems. The three processes ran parallel to each other and are distinguished here only for analytical reasons.

The expansion of the modern economy broke down local economic boundaries and incorporated labor and capital into larger exchange networks. National labour market integration increased the possibility of direct interaction involving people from different communities. General conscription led to regular displacement of individuals and to contacts with inhabitants from a variety of regions, with marriage as one result (De Vos, 1984). Educational expansion at the secondary and university levels beginning in the last quarter of the nineteenth century brought with it social intercourse between youngsters from a wide variety of areas. The growth of the national community was not confined to the economy and the state. Local sporting clubs, political parties and labour unions became part of tightly organized national networks. The general amelioration of the conditions of the working class – the increase in wages and the reduction in working hours – made it possible for members of this class to extend their spheres of contact. A new form of mass mobility – tourism – developed and introduced people (especially from the middle classes) to areas they hitherto had never been able to visit. The geography of the country became part of the curriculum of secondary schools, leading to an increased knowledge of all parts of the Netherlands (Van der Woud, 2006: p. 135). Old social institutions of the village, such as balls and fairs, which had traditionally played a vital role as places where local residents might meet their future spouses, lost their importance (Ogden, 1980).

At the same time, there was a major improvement in transportation, facilitating mobility, and in methods of communication, which made it easier to keep in touch (telegraph, telephone and postal services). The 1850s witnessed the start of this development in the Netherlands (Van der Woud, 2006). The increase in the means and speed of transportation brought about by new and improved roads and canals and by new means of transport such as the train, the bicycle and the tram brought a wider range of potential spouses within reach. These new forms of transport increased the distance one could travel during the same day and thus expanded the geographical marriage horizon. Equally important, increased income gave larger numbers of people access to these faster means of travel (Pooley & Turnbull, 1998).

The main element in the Dutch transportation system from the middle third of the seventeenth century until the 1830s was the *trekschuit*, a system for the cheap movement of a large volume of passengers in barges, drawn by horses along specially constructed waterways over an intensive, interconnected network of routes. The system mainly served the low-lying part of the country: Holland, Groningen and Friesland (De Vries, 1978). In the 1820s and 1830s the *trekschuit* service lost ground to coaches that used the expanding network of paved roads. Although between 1810 and 1848 construction of paved roads had started, the network of paved thoroughfares remained very meager until the 1850s, outside the province of Holland. It was only around 1880 that the paving of the main roads was completed (van der Woud,

2006: p. 367). Such roads could be easily used in all seasons and all weather conditions and linked urban centres within the Netherlands to one another and to main towns in neighbouring countries (Horsten, 2005).[4] From 1850, an intricate structure of local roads that could be used almost every day became the essential link between the citizen's home, the station and the workplace. For a large part of the country, this new system signified 'a revolution in daily life': 'it offered the possibility to give up the isolation, and the desolation and to connect to the new, modern world' (Van der Woud, 2006: p. 368).

From the middle of the nineteenth century, coaches and *trekschuiten* started to lose their importance in Holland and Utrecht because of the expansion of the railways. Distances travelled by train increased markedly from the 1860s. At the end of the 1870s, the main railroad system was more or less complete. After 1880, the national railroad system was supplemented by a system of local railways and a very dense system of steam tramways (Jonckers Nieboer, 1938; Veenendaal, 1993). The railway and tram system made the largest contribution to the reduction in travel time over the period of our study. In 1850, the geographical centre of the country could be reached by people living in Groningen, most parts of Limburg and large parts of Zeeland in around 12.5 hours. In 1870, travel time to the centre had been reduced to, at most, 7.5–10 hours from the more isolated parts of the provinces and in 1920 people from almost all parts of the country were able to reach the centre of the country within 2.5–5 hours (Thurkow et al., 1984; see also Schot, 2002).

The automobile appeared on Dutch roads in the late 1890s. It was initially considered primarily a sport and recreational toy for the well-to-do and did not have much effect on transport improvement until the 1920s (Mom, Schot, & Staal, 2002). Much more important was the introduction and growing popularity of the bicycle. The first bicycles appeared in the Netherlands in 1867.[5] Cyclists in this period constituted a small elite group who had the time and money to buy bicycles, which were mainly used for leisure purposes. However, from the 1890s, the bicycle became more than a toy for the well-to-do. Considerably cheaper production of bicycles in Germany, England and the Netherlands after 1900 and increased wages brought the bicycle within reach of more people. Tax data indicate that from 1895 onwards, the demand for bicycles increased significantly. After 1920, the bicycle became the most popular mode of transport of the Dutch.

Means of communication, allowing a relationship to be maintained by correspondence when distance made frequent meeting difficult, improved as well (Van der Woud, 2006: pp. 43–45). The increased ability to write letters, the reduced costs of sending letters and improved distribution caused an increase in the number of letters and postcards written per head of the population. A national telegraph system developed in the early 1850s and by about 1855 all important towns were connected by telegraph. From the end of the 1860s, the number of telegrams received and sent increased exponentially (De Wit, 1993). The telephone system developed from the 1880s, but the number of subscribers was very restricted before the end of the nineteenth century. In 1895, access to an intercity telephone network in the eastern, northern and southern provinces was still almost non-existent (De Wit, 2002).

To summarize, between 1850 and 1880 the basis of the modern transport system was laid. A detailed network of national, regional and local paved roads was completed, the local tramway system was established and started to open up the countryside and more and more communities became connected by the primary railway system through a growing number of secondary railway lines. In addition, communication via the telegraph system and the postal service became faster, cheaper and much easier.

Before analysing whether and how people in different parts of the Netherlands, each characterized by its own transport and communication network, involvement in the national economy and regional identity, adapted the width and direction of their marriage horizons, we formulate some hypotheses on the differences that we expect between social classes in their reactions to the changed opportunities.

Social Class, Opportunities and Preferences and Their Effect on Marital Distances

There are strong indications that opportunities to meet potential spouses from more distant areas and preferences for spouses from nearby regions differed by social class. Marriage among people who earned their living in agriculture was geographically much more tightly circumscribed than in the rest of society. People working 'in industrial, commercial or service occupations had greater opportunities and need to travel both locally and further afield and, except on relatively rare social occasions or trips to the local market, the peasant tended to be rooted to the soil' (Ogden, 1980: p. 174). Given the strong tendency to marry within a particular occupational or social group, the opportunity to do so was naturally restricted by the small size of non-agricultural groups in the nineteenth-century village, which might have led to the search for a partner over longer distances. Agricultural labourers were also constrained by low wages and the operation of local and regional labour markets. Within agriculture, differences could be expected in the degree to which partners from outside the area were sought. Dairying tied its labour force 'to the cow's tail' (Perry, 1969), seven days a week and every day of the year, but the labour force in arable agriculture operated a 6-day week with a shorter working day in winter. These workers could meet more outsiders and strangers at their work and have more time to themselves outside their hours of employment than the dairy worker (Perry, 1969).

The upper and middle classes were able to select their marriage partners from a much wider area than the working class. They were more mobile as they possessed the time and money needed to travel far and often, and had more knowledge of further-off areas, giving them an advantage in getting in touch with areas further from their birthplaces. Changing transport technology may have caused a gradual reduction in average travel times in the second half of the nineteenth century, but travel remained expensive; for most ordinary working people travel by rail or steam tram remained for a long time a major and only occasional expense. The

upper classes also had a more universalistic value orientation and their lives were more organized by structures that facilitated large zones of contact. They disposed of wider means of communication (including letter-writing) and participated in a geographically more extensive political, economic and friendship network. Many of them experienced a longer educational and training period, partly spent outside their own region, which offered them the chance to meet partners from other regions. For part of the group – army officers, the professions and higher civil servants – the effect of national labour markets stimulated mobility (Pooley & Turnbull, 1998: p. 69; Van de Putte, 2003). Furthermore, for the elite the desire to preserve the family's property and social status was an overriding issue, making it necessary to broaden marriage horizons when potential partners with comparable economic and cultural qualities were scarce in their own communities.

We expect the marital horizon of the skilled and unskilled manual workers to be wider than that of the agrarian workforce. Yet, the fact that they earned low wages, operated on local and regional labour markets and had long working hours and low levels of education made them less apt to participate in modern communication networks. These characteristics also made it less necessary for them to spend part of their training outside their region of upbringing and might have led to a regionally more restricted choice of spouse. Another important factor, which could lead to marriages over characteristically shorter average distances, is that this social group met their spouses in circumstances that differed from those of the upper and middle classes. Casual encounters in the street or in local public houses were more typical of working-class courtship and were more likely to be affected by neighbourhood knowledge, the maturing of childhood friendships and the bringing together of couples who were or had been close neighbours (Coleman, 1979: pp. 418–419; Perry, 1969). The mobility of the upper and middle classes was shared to some extent by those who were 'in service', such as footmen, coachmen, lady's maids and many more (Perry, 1969; Pooley & Turnbull, 1998: p. 69). For those in the armed services, movement around the country as one was transferred from camp to camp could have produced more extensive marriage horizons.

The labour market for a large part of the middle classes was not a local one, but had at least a regional character. The income of this group made it possible for them to make use of the newly developed transport and communication networks much earlier than could people from the working class. We therefore expect this group to have had a much wider horizon than the working class and the group working in agriculture.

Many of the factors that caused differences between social classes in the width of their geographic horizons changed in the period that we selected to study. Rising real incomes and technological developments brought personal travel within reach of people from all social classes. Other forms of communication enabled information to reach all social groups. Access to secondary and tertiary education where participants might begin to look for a partner generally increased, encouraging some people to attend schools far from their birthplaces. Labour markets became national for almost all occupations. The mechanization of agriculture reduced the degree to which agricultural labourers and farmers were restricted in their movements and the

greater emphasis on production for the market increased the need to get in touch with the outside world.

To summarize, we will test the following hypotheses:

- What time trends are visible in the average marital distance between spouses and in the width of the zones in which they found each other and how did these trends vary between provinces?
- What deviations in the direction and volume of contacts between people from different provinces can be observed and did this directional bias change over time?
- What effect did the position in the social class structure (work in agriculture versus in other sectors, upper and middle classes versus lower social classes) have on marital distances and was there a change in that effect over time?

Data

The data that we use include all marriages contracted in the period 1812–1922 in five (of the eleven) provinces of the Netherlands. Data from marriage certificates have been entered into a database by dozens of volunteers and staff within the framework of the GENLIAS project. GENLIAS is a joint initiative of the National Archive Services and the Regional Historical Centers and officially started in 2004. The aim of this project is to build up a database containing genealogical information on all marriages, deaths and births that took place in the Netherlands from the introduction of the vital registration system until the date these data are no longer in the public domain. Marriage records enter the public domain only after 75 years. At the time of writing, the data set contained 36% of all marriages contracted in the period 1812–1922 in the Netherlands as a whole. Until the 1860s, almost 40% of Dutch marriages are covered, but after 1860 that percentage decreases gradually to around 30% in the 1920s.

The quality of the data in the marriage certificates was for a large part ensured by the rules governing marriage and marriage registration as laid down in the Civil Code. Marriages had to be contracted in the *de jure* place of residence of one of the partners. The birthplace of both parties can be considered as reliably registered as bride and groom had to present copies of their baptism or birth certificate to the vital registration officer.

The entry of the records in the GENLIAS database has been done in the participating archives by hundreds of volunteers. It stands to reason that a process of data entry on this scale cannot be completed faultlessly. Many marriage certificates are difficult to read and typing errors are common. Errors in data entry are frequently reported to the participating archives by the hundreds of thousands of people using the database and are corrected on a regular basis. One might expect that the volunteers were more familiar with names of places within the region and that as a consequence places further away will be more frequently misspelled,

which increases the chance that their geographic location will not be specified exactly.

As a rule, marriages were contracted in the place of residence of the bride. A larger proportion of the brides thus lived in the municipality in which the marriage took place and a larger percentage had been born there than was the case for grooms. The distance between the place of marriage and the place of residence of the groom, therefore, generally tended to be greater than the distance between place of marriage and the place of residence of the bride. Information on place of residence of bride and groom was unfortunately not included in the database. Birthplaces of bride and groom and place of marriage are our crucial geographical indicators. Using the birthplace of the groom or bride (instead of their place of residence) generally suggests a wider marriage field (Leboutte & Hélin, 1986: p. 438; Blanchet & Kessler, 1992: pp. 346–353).

A problem in using the distance between birthplaces of grooms and brides to measure geographic horizons is that the information principally concerns people aged between 20 and 40 years; a move, then, might have taken place at any age between birth and the age at marriage and the exact time of the move is not known.

The five selected provinces in our sample each have their own particular ecological, social and economic structure and include larger and smaller cities as well as rural areas.

Gelderland is located in the central eastern part of the country, extending from the German border westwards to the Zuyder Zee. The south-western section was a long, narrow westward extension along the Rhine River with brickyards and dairy farming. Small regional market places and several larger towns such as Arnhem and Nijmegen hosted industrial activities and administrative services. Farms in Gelderland were relatively small, the infrastructure not well-developed.

Groningen, situated in the extreme northeast of the Netherlands, can be roughly divided into two regions: a northern area of clay soils and a southern one of sand and peat. The peat districts became an area of important industrial development in the second half of the nineteenth century. A common feature of the agriculture of both areas was the high degree of commercialization.

The province of Limburg is in the southeast of the Netherlands and adjoins the Belgian province of the same name. The population always had close ties with the German and Belgian cities close to the borders. The inhabitants of each municipality spoke their own, distinct dialects: more Germanic towards the German border, with a more French tone in the Meuse valley. From the end of the nineteenth century, coal mining became an important economic activity in Limburg. The capital city of Maastricht was the first place where large-scale industries developed in the Netherlands.

Overijssel is located in the central-eastern part of the country. In the western part, Overijssel is low-lying and covered with fertile pastures. Cattle-rearing and butter- and cheese-making were important occupations. Cotton-spinning, together with bleaching works and machine manufacturing, became very prominent in the Twente district in the east of the province beginning in the 1860s.

Zeeland forms the south-western part of the coastal zone and consists of a strip of the Flanders mainland, bordering Belgium and six former islands, all of them now

connected to each other or to the inland provinces by dams and bridges. Zeeland was for a long time a rural area of which the towns of Middelburg and Vlissingen were the administrative and industrial centres.

Together, the five regions cover a large part of the economic and cultural landscape of nineteenth-century Netherlands. Unfortunately, we do not have information on the economic heartland, the (urban) part of the provinces of Zuid- and Noord-Holland (Van Zanden & van Riel, 2004: pp. 53–64). Figure 6.1 gives an overview of the location of the five selected provinces.

In the analysis, we make use of information on age at marriage, year of marriage, marital status at time of marriage, birthplaces of bride and groom, the place in which

Fig. 6.1 Map of the Netherlands by province around 1920

the marriage took place and the occupation of the husband. The occupation of the husband is used to classify marriages by social class. The social class categorization that we applied is based on a recently developed coding scheme called HISCO (Historical International Standard Classification of Occupations) (Van Leeuwen, Maas, & Miles, 2002). HISCO translates occupational descriptions into a common code, compatible with the International Labor Organization's International Standard Classification of Occupations (ISCO68) scheme. These historical occupational titles were classified into a social class scheme recently proposed by Van Leeuwen and Maas (2005).

Van Leeuwen and Maas called their classification scheme HISCLASS. Twelve classes are distinguished. In view of the fact that some of the categories included relatively few cases, we merged categories and adopted the following classification in our analyses: upper class (higher managers and higher professionals), middle class (lower managers, lower professionals and clerical and sales personnel, lower clerical and sales personnel and foremen), skilled workers, farmers, lower skilled workers, unskilled workers and farm workers.

Marriages were also classified according to the rural or urban character of the place in which the marriage was contracted, based on the number of inhabitants, the population density, the percentage of the population working in agriculture in 1889 (approximately the mid-point of the period studied) and the historical designation of a municipality as either 'town' or 'village'.

Table 6.1 presents descriptive statistics for the relevant variables in the database. The total number of marriages in the database was 1,080,700, of which there were 344,300 in Gelderland, 189,000 in Groningen, 176,000 in Limburg, 213,700 in Overijssel and 157,700 in Zeeland. About 1,005,500 of all marriages took place in the period 1812–1922. Around 65% of all marriages were contracted by men aged between 20 and 30 years; for women this was around 73%. People living in a rural area at the time of marriage predominated. The distribution of men by social groups shows that a large majority of the grooms belonged to the labouring classes: semi-skilled and unskilled workers in agriculture constituted 23% of all grooms, workers outside agriculture 26% and skilled workers another 16%. Around 18% of the grooms were working as farmers. Members of the upper and middle classes made up less than 13% of the total.

Table 6.1 Descriptive statistics for control and dependent variables (Source: GENLIAS and ISIS database)

	Number of marriages	Percentage
Province		
Gelderland	344,286	31.9
Groningen	189,032	17.5
Limburg	176,048	16.3
Overijssel	213,693	19.8
Zeeland	157,655	14.6
Total	1,080,714	100.0

Table 6.1 (continued)

	Number of marriages	Percentage
Period of marriage		
1812–1819	43,659	4.3
1820–1829	58,773	5.8
1830–1839	63,407	6.3
1840–1849	68,238	6.8
1850–1859	78,680	7.8
1860–1869	86,644	8.6
1870–1879	92,405	9.2
1880–1889	90,807	9.0
1890–1899	106,536	10.6
1900–1909	123,552	12.3
1910–1922	192,847	19.2
Total	1,005,548	100.0
Age at marriage of men		
14–19	10,324	1.1
20–24	245,996	26.8
25–29	352,539	38.4
30–34	175,542	19.1
35–39	71,975	7.8
40–44	32,030	3.5
45–49	15,825	1.7
50–54	8,212	0.9
55–59	4,473	0.5
60–64	2,193	0.2
Total	919,109	100.0
Age at marriage of women		
14–19	58,740	6.4
20–24	374,340	40.7
25–29	296,640	32.3
30–34	115,887	12.6
35–39	42,120	4.6
40–44	17,746	1.9
45–49	8,486	0.9
50–54	3,639	0.4
55–59	1,460	0.2
60–64	616	0.1
Total	919,674	100.0
Place of marriage		
Urban	293,617	29.2
Rural	712,290	70.8
Total	1,005,907	100.0
Social class groom		
Higher managers	10,659	1.1
Higher professionals	8,544	0.9
Lower managers	17,617	1.8
Lower professional and clerical, sales	61,744	6.3
Lower clerical and sales	25,925	2.7

Table 6.1 (continued)

	Number of marriages	Percentage
Foremen	1,885	0.2
Skilled workers	161,330	16.5
Farmers	179,373	18.3
Lower skilled workers	111,886	11.4
Lower skilled farm workers	11,352	1.2
Unskilled workers	147,214	15.1
Unskilled farm workers	217,739	22.3
Not given	17,866	1.8
Explicit without	4,116	0.4
Unclear	549	0.1
Total	977,799	100.0

Methods

To study the distances between birthplaces of bride and groom and place of marriage, we first had to determine the exact name and location of the birthplaces of bride and groom as given in the marriage certificate. In many cases this proved difficult, usually due to errors and omissions committed during the process of data entry. In particular the names of the birthplaces of persons born in Belgium or Germany were not always familiar to those doing the data entry.[6] Determining the location of these places was also hampered by the fact that the vital registration officers themselves applied different spelling rules. Furthermore, municipalities with the same name could be found in more than one province and the vital registration officers did not always consider it necessary to mention the name of the province in the marriage certificate. Municipalities were also sometimes difficult to identify, particularly in countries outside the Netherlands.

The next step in the research involved the identification of the exact geographic location of the birthplace. This was done by assigning geographic coordinates according to the Netherlands National Coordinate System (*Rijksdriehoeksmeting*), the Netherlands' geodetic or surveying reference system that constitutes the standard for the determination of locations. This system was developed between 1885 and 1904. The reference frame was based on traditional triangulation of circa 5,500 assigned points in the country, using monuments such as church towers and other triangulation points, together with specifications of those points by their X- and Y-coordinates (De Bruijne, Van Buren, Kösters, & Van der Marel, 2005). To determine the relative location of an administrative unit (a municipality or a known part of such an administrative unit) in the reference system, use was made, in rank order, of a series of databases with geographic coordinates: the official Netherlands National Coordinate System points (*Rijksdriehoeksmetingpunten* or RD-points) of the Dutch Land Registry Office (*Topografische Dienst Kadaster*), the Kloeketabel of the Meertens Institute, the GEOnet Names Server (GNS) of the National

Geospatial-Intelligence Agency (NGA) and the Topographic Names Register of the Dutch Land Registry Office (*Topografisch Namenregister Kadaster*). For Belgian and German municipalities, coordinates were determined on the basis of the official Netherlands National Coordinate System points for municipalities near the Dutch frontier and the GEOnet Names Server (see Annex). The GEOnet Names Server data contain approximate longitude/latitude coordinates, which were first transformed into the Dutch coordinates system. All geographic names of the birthplaces of bride and groom have been coded according to the situation that applied in the year in which the marriage took place.

Finally, the distance between the municipality in which the marriage was contracted and the municipality of birth (or a known part of this administrative unit) of bride and groom was calculated as the distance in kilometres in a straight line. It was impossible to collect systematic information on actual journey times involved in particular contacts, so linear distances have to suffice as a reasonable surrogate. We realize that for most people the absolute distance over which movement took place was not as important as the travel time involved. Contacts were influenced as much by perceived distances as they were by actual distances. Perceptions of distance were affected by factors such as mode of transport, costs of transport, levels of information and social, cultural and physical differences. Distances were also calculated for administrative units outside the Netherlands, but only for those brides or grooms who were born in a neighbouring part of Germany (one of the neighbouring *Länder*) or Belgium.[7] For brides and grooms who were born in the place in which the marriage was contracted the distance was fixed at 0 km, though we recognize that this method may underestimate the distance between birthplaces and residence in municipalities whose surface area increased over time. We calculated average distances travelled and also grouped distances in categories in order to study separately changes in long- and short-distance migration.

To study whether there was a preference for partners from areas that are more distant from each other, leading to a deviation in the direction and volume of contacts between people from different regions (directional bias), we mapped the number of grooms who married in a given province according to their birthplace for four periods: 1812–1829, 1830–1859, 1860–1889 and 1890–1922. The number of grooms and brides coming from a specific place is partly a function of the size of the population in that place. By definition only a limited number of grooms could be selected from a municipality with a small population. Various authors have suggested calculating the ratio between the number of grooms and the population of the region from which the grooms originated (Leboutte & Hélin, 1986: p. 432; Bonneuil, 1992: p. 112). As we had no information available on the population size of the Belgian and German municipalities, we decided to refrain from this procedure. In constructing the maps, the municipal boundaries of 1922 have been used, with data for discontinued municipalities added to those of the municipalities of which they were part in 1922.

Since our procedure results in as many as twenty different maps (five provinces times four periods), we summarized the maps for readability by visualizing spatial

statistical descriptors of the original mapped data, using the weighted mean centre and the standard deviation ellipse (see Ebdon, 1988). The weighted mean centre (or centre of gravity) is calculated as the mean of the X and Y coordinates of the birthplaces of the grooms weighted by the number of grooms from these birthplaces. The standard deviation ellipse calculates the standard deviations of the X coordinates and the Y coordinates from the mean centre of the birthplaces of the grooms (all weighted by the number of grooms) in order to define the axes of the ellipse to see both the dispersion and the orientation of the spatial distribution. Both measures were calculated with CrimeStat, a spatial statistics program (Levine, 2007).

In a third stage of the research we applied spatial regression techniques (see for instance, Anselin & Bera, 1998). Spatial regression techniques are able to deal with spatial dependency in regression analysis and allow us to include individual explanatory variables such as age and social class, (regional) socio-economic explanatory variables and spatial location (according to the Dutch geographical coordinate system). In the analysis, socio-economic variables at various regional levels were used, such as urban/rural, religious composition and transport availability. The *GeoDa* software package (Anselin, 2004, 2005) contains the functionality for spatial regression modelling. *GeoDa* includes standard ordinary least squares regression with the basic diagnostics for spatial autocorrelation, heteroskedasticity and non-normality implemented; estimation of spatial lag and spatial error models is supported by means of the maximum likelihood method (Anselin, Syabri, & Kho, 2004). *GeoDa* regression routines can be applied to large data sets, such as the ones at hand in our chapter.

The Widening of the Horizon Over Time

Figures 6.2 and 6.3 present geometric mean distances between the birthplace of the groom and the birthplace of the bride and between the birthplace of the groom and the place where a couple married, by period of marriage and province of marriage.

In all provinces, there is a clear trend visible in the distance between the birthplace of the groom and that of the bride. Setting aside the deviations from the trend, it is evident that, from the period 1880–1889, the horizon of young men and women started to widen. This trend gained momentum in Overijssel (and, although to a much lesser degree, in Groningen) after 1890–1899 and in Limburg and Zeeland after 1900–1909. Grooms came from regions further and further away and the average distance increased from around 15–20 km during the first three quarters of the nineteenth century to around 25–30 km in the second decade of the twentieth century. There are clear differences visible in the horizon of people who contracted a marriage in the various provinces. Until the last decades of the nineteenth century the horizon of people in Gelderland and up to 1910, the horizon of grooms and brides in Limburg and Zeeland, stretched less far than those of people in Overijssel and Groningen; after the first decades of the twentieth century Limburg grooms found their brides further away than grooms in any other province. Grooms in

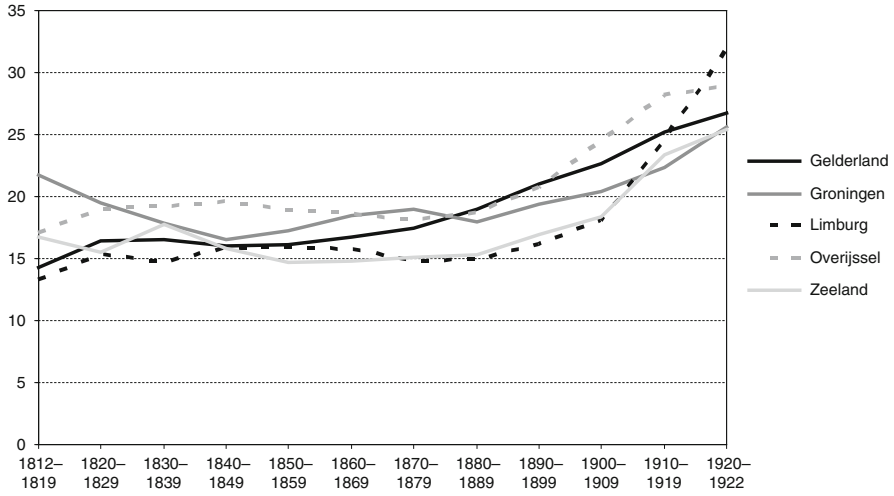

Fig. 6.2 Mean average distance (in km) between place of birth of bride and groom, by province and period of marriage

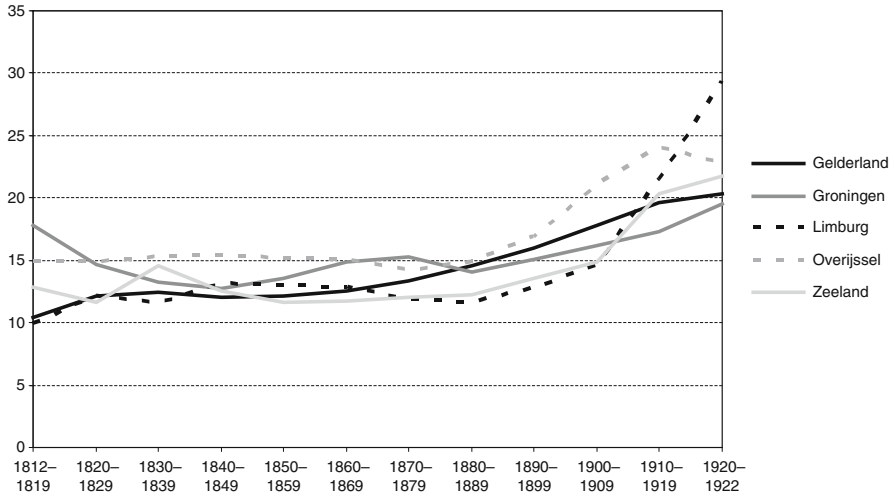

Fig. 6.3 Mean average distance (in km) between place of birth of groom and place of marriage, by province and period of marriage

Groningen now found their brides as far away as those in Gelderland and Zeeland. Differences in mean distances between provinces were around 5 km until the 1890s. In the second decade of the twentieth century, the horizon of grooms in Limburg had widened by some 15 km, that of grooms in Gelderland, Overijssel and Zeeland by some 10 km and that of grooms in Groningen only by 5 km.

Figure 6.3 shows the average distances between the birthplace of the groom and the place where the marriage was celebrated (usually the place of residence and very often the birthplace of the bride). Although distances are a little bit lower, the trends and the regional differences remain almost the same. For that reason, in the following we only make use of information on birthplaces of bride and groom.

In a second step in the analysis of the data, all distances have been grouped together in zones. The first covers contacts with neighbouring villages (walking distance, up to about 5 km, including traversing the community in which the individual lived and involving travel time of up to 2 hours back and forth). A second zone identifies contacts with communities directly contiguous to the first zone (a radius of 5–20 km), the supposed maximum walking (and later on, cycling) distance, enabling regular face-to-face contact to be maintained. The third zone includes interaction up to about 40 km and the fourth, contacts beyond 40 km. The chosen scales of interaction have already been used by other authors (Morel, 1972: p. 63; Millard, 1982). We only present here information on the two most extreme categories: marriages between brides and grooms whose birthplaces were no more than 5 km apart, and marriages in which more than 40 km separated bride and groom at the time of birth.

Figures 6.4 and 6.5 confirm the trends in marriage horizons suggested in Figures 6.2 and 6.3. There were strong differences between provinces in the degree of interaction at the local scale. Before 1900 in Limburg more than half of all marriages were contracted between partners who were born within a distance of less than 5 km; in Groningen, only 40% of marriages involved partners less than 5 km

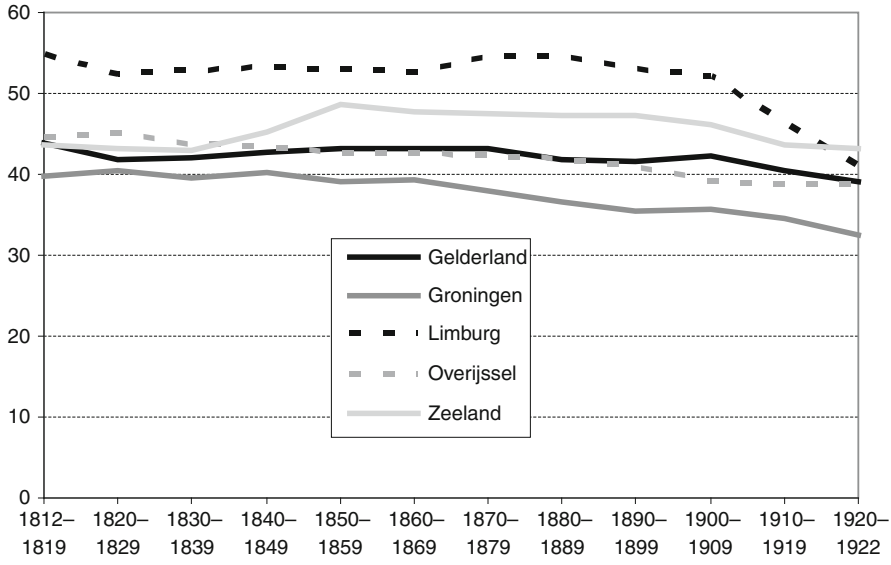

Fig. 6.4 Percentage of all marriages with a distance of less than 5 km between places of birth of bride and groom, by period of marriage and province

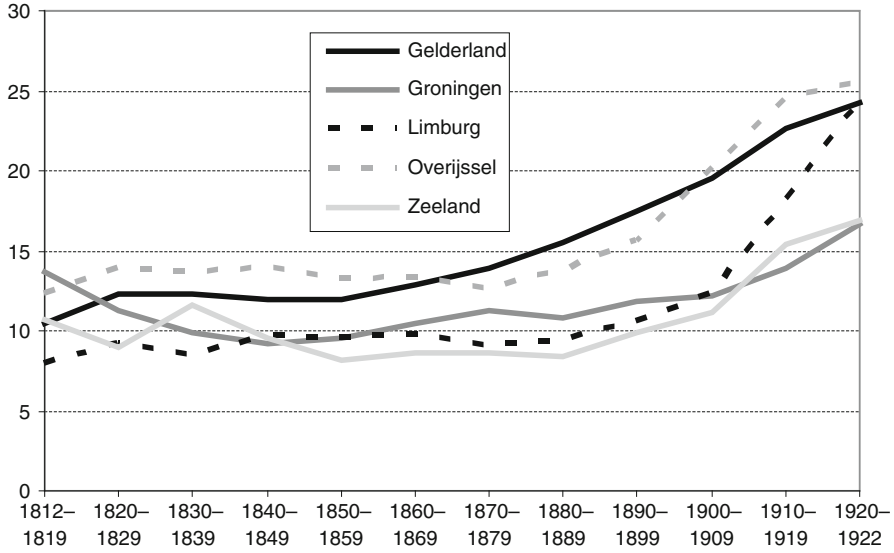

Fig. 6.5 Percentage of all marriages with a distance of more than 40 km between places of birth of bride and groom, by period of marriage and province

apart, with the percentage falling further after the 1860s. Limburg was for a long time almost completely isolated from the other provinces of the country (Van der Woud, 2006: p. 320). The strong local orientation decreased in Limburg after 1910, a period during which mining started to attract very large numbers of migrants and local communities dissolved. In all provinces, the interaction over long distances increased at first gradually (in the 1880s) and later much more strongly, in particular after 1910. For brides and grooms marrying in Zeeland it was much more difficult, given the isolation of the various islands and peninsulas that composed Zeeland, to get in touch with spouses coming from a distance beyond 40 km.

Of those coming from a distance of more than 40 km, a non-negligible proportion came from neighbouring countries. All five provinces bordered one or more other countries and this is evident in the choice of spouses (Fig. 6.6).

Figure 6.6 shows that in Limburg, located in a remote corner of the Netherlands between Belgium and Germany, more than 14% of all grooms who married in the period 1810–1819 were born outside the Netherlands. For Zeeland, the percentage was only a little bit lower. Limburg remained for a long time much more strongly oriented towards the south than towards far-away Holland. In the eastern part of southern Limburg, German was until the First World War the main language, while in Maastricht French was the first language after the local dialect. There were frequent contacts with friends and families in towns and villages across the border. However, particularly in the first half of the nineteenth century, the borders between the Netherlands and Belgium and Germany became stronger barriers. This nationalization of the border regions was a consequence of the Belgian Revolution (1830),

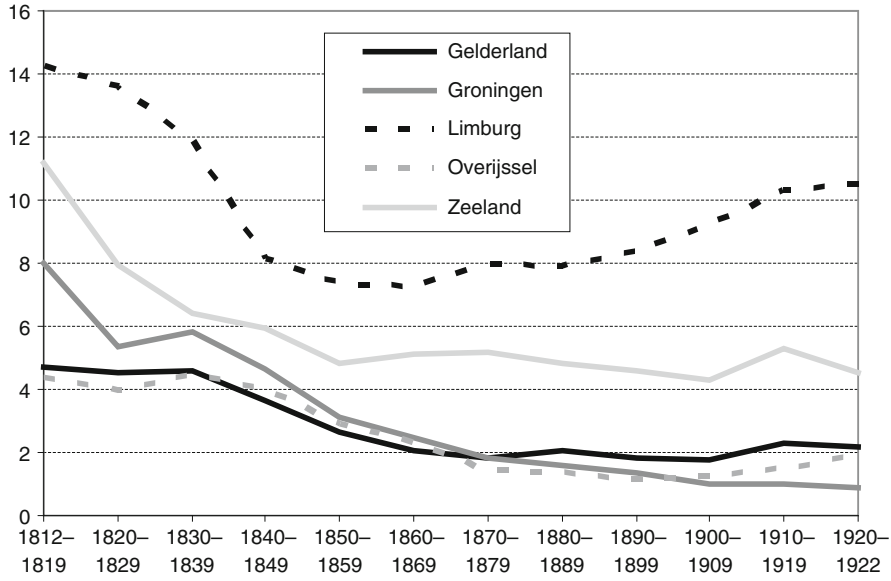

Fig. 6.6 Percentage foreign-born grooms per province, by period of marriage

during which Limburg was divided into Belgian and Dutch parts, separated by a border (Rutten, 1989). As a result, places where young people met each other became more and more organized within a national framework (schools, sporting clubs etc.). It was only from the end of the nineteenth century, when coal mining and the transport system developed, that the percentage of foreign-born grooms increased again.

To a certain degree the same development took place in Zeeland, where Zeeuws-Vlaanderen in the south had been part of what became after 1830 the Belgian region of Flanders and was for a long time much more oriented to the Belgian hinterland of Eastern Flanders, partly as a consequence of better transport connections with Belgium than with the Netherlands.

The Direction of Preferences

Possible directional bias in the spatial interaction between people from the five provinces is depicted in Figure 6.7. This figure gives the weighted mean centres for the four consecutive periods and the standard deviation ellipses for the first and the last period by province of marriage.

Brides and grooms in Gelderland were strongly focused on the province itself, but there were also clear deviations from a pattern that one could expect when only distance played a role. These deviations might first of all be understood by referring to the location of the big cities (Amsterdam, Rotterdam and The Hague) and

Fig. 6.7 Weighted mean centre points and standard deviation ellipses for birthplaces of grooms by period of marriage and province of marriage

the other urbanized parts of the country in the west that are related to the density and distribution of the population. Gelderland also had a relatively high level of interaction with Germany, particularly the Land of Cleves in the Lower Rhine area. With respect to the German grooms, the 1890–1922 data show a shift to the Ruhr Area. Gelderland started to attract grooms from all parts of the Netherlands from 1830. In the period 1812–1829 grooms originated from around 900 different Dutch places. This figure increased to around 1,460 different places in the period 1890–1922. Figure 6.7 shows that the mean centre of the birthplaces of the grooms married

in Gelderland shifted more to the west. The same applies to the standard deviation ellipse: the area of the ellipse and thus the dispersion, increased to the (north)west.

As expected, in Groningen the most frequent contacts were indeed with places that were closest to the municipalities in question (other municipalities in the province itself and nearby Friesland). Yet, there were also clear deviations from a pattern that one could expect when only distance played a role. These deviations might again be understood by referring to the location of the big cities and the other urbanized parts of the country in the west. The same factor also explains the small number of grooms coming from nearby, but scarcely populated, Drenthe (the province to the south of Groningen). The channels of communication of Drenthe also were more directed to the south than to the north. In the course of time, grooms marrying in Groningen came from an ever-increasing number of municipalities throughout the Netherlands (from around 640 in the period 1812–1829 to around 1,310 in the period 1890–1922). There remained over time two areas from which only small numbers of grooms were coming: the eastern part of Noord-Brabant and the northern part of Limburg. Both were strictly Catholic regions (whereas Groningen was predominantly Dutch Reformed) and similarly sparsely populated. Small numbers originated in the Veluwe, an area with low population densities. Relatively large numbers of grooms originated from Zeeland, a province that was far away and physically isolated, but with a comparable agricultural system and religion. In Groningen, the mean centre of the birthplaces of the grooms shifted more to the southwest from the period 1830–1859 (see Fig. 6.7). The area of the standard deviation ellipse actually decreased in 1830–1859 and from then on increased and shifted to the southwest again.

Brides and grooms in Limburg were strongly focused on the province itself, and much less on nearby and likewise Catholic Brabant. Relatively more grooms from Gelderland, the province to the north of Limburg, married in Limburg. With Drenthe, Overijssel and the Veluwe, interaction was very restricted, and that applied to Zeeland as well. Large parts of these areas were Orthodox Calvinist and cultural barriers might have been strong. Marriage fields stretched far out into Belgium and Germany. Germany was very popular especially in the first decades of the twentieth century, when mining in Limburg became an important economic activity: the number of places where German grooms originated increased from around 390 places in the period 1860–1889 to 635 in the period 1890–1922 (the similar number of Dutch places in the same period increased from around 730 to around 1,020). Former barriers with the north and southwest lost their importance in that period as well. Figure 6.7 shows that the mean centre of the birthplaces of the grooms married in Limburg shifted more to the north. The same applies to the standard deviation ellipse, which increased in size and thus dispersion and shifted towards the northwest.

Overijssel also had a high level of interaction with Germany. This province started, like Gelderland, to attract grooms from all parts of the country from 1830 on. In general, the interaction with the southern provinces of Noord-Brabant and Limburg and with Zeeland was much less intense than one would expect and certainly less than with the north of the country. Figure 6.7 shows that the mean centre

of the birthplaces of the grooms married in Overijssel shifted (to the north and west), but much less so than in the other provinces. The same applies to the standard deviation ellipse: the dispersion increased to a lesser extent than elsewhere.

In the beginning of the nineteenth century, the situation in Zeeland was comparable to that in Limburg. As a consequence of its isolated position, almost all grooms had been born in this province. Interaction with the northern part of eastern Flanders was rather frequent. The number of places from which Belgian grooms originated, however, declined from around 300 in the period 1812–1829 to 200 in the period 1830–1859. From the period 1860–1889 to 1890–1922, the number increased from around 180 to 290. Contacts with Catholic Brabant were relatively few, with Orthodox Calvinist parts of Zuid-Holland and Gelderland much more common. Figure 6.7 shows that the mean centre of the birthplaces of the grooms married in Zeeland shifted to the northeast (in the direction of Zuid-Holland). The same applies to the standard deviation ellipse, which increased in size and thus dispersion and shifted mainly towards the northeast and only slightly towards the direction of Eastern Flanders.

The strong directional component in migration could thus be explained in part by regional variations in levels of urbanization and in part by cultural differences, connected with differences in religion.

Distances and Social Classes

Table 6.2 gives the average distance between the birthplace of the groom and his wife for the various social classes and for each time period. In the five provinces there are common trends visible but also clear differences. Common to all provinces is that the higher social classes had, as expected, the widest horizon; on average, members of these classes were born 40–70 km away from their spouses. Only the middle class came near the distances travelled by the higher social classes, but nonetheless the distance between the birthplaces of the spouses remained on average some 20 km less. In the five provinces there were clear differences visible in the trends over time in the higher social class: in Overijssel distances increased regularly after 1830–1839, from around 57 km to almost 70 in the first decade of the twentieth century. In Zeeland, the distance between the birthplaces of the spouses increased even more markedly, whereas distances travelled by the higher social class in Gelderland and Groningen increased much more gradually. In Limburg, on the other hand, the circle within which partners were found narrowed considerably after the middle of the nineteenth century. It was only from the first decade of the twentieth century that the horizon of the upper class seemed to widen again.

As for the middle class, Gelderland, Overijssel and Zeeland showed comparable trends, indicating a widening of geographic horizons beginning in the middle of the nineteenth century and continuing until the First World War (and beyond in the case of Zeeland). Stability of distances between birthplaces of bride and groom was the main characteristic of the middle class in Limburg and Groningen.

Table 6.2 Mean average distance (in km) between place of birth of bride and groom, by social class of groom, period of marriage and province

		Social class of groom							
Province	Period	Higher	Middle	Skilled workers	Farmers	Semi-skilled workers	Farm workers	Unskilled workers	Total
Gelderland	1812–1819	52.9	31.8	19.5	6.7	22.5	9.9	15.9	14.3
	1820–1829	53.8	40.2	19.6	7.2	24.9	10.4	20.3	16.4
	1830–1839	60.5	39.5	20.1	6.3	25.3	9.8	18.0	16.5
	1840–1849	55.7	40.0	19.6	6.5	20.4	9.4	19.8	16.1
	1850–1859	55.2	42.4	19.9	7.0	21.6	9.3	17.9	16.1
	1860–1869	52.7	45.7	20.6	7.0	22.9	9.0	17.6	16.7
	1870–1879	57.2	44.9	20.6	7.3	24.4	8.9	15.9	17.5
	1880–1889	61.0	46.0	21.2	7.6	24.7	9.4	15.9	18.9
	1890–1899	66.0	47.7	24.8	7.7	26.5	9.8	18.2	21.0
	1900–1909	65.3	48.6	26.2	7.8	26.9	10.5	18.9	22.7
	1910–1919	61.9	48.6	27.9	9.8	28.9	14.1	21.0	25.2
	1920–1922	61.7	47.8	28.1	10.0	28.4	15.4	20.5	26.8
Groningen	1812–1819	46.8	35.9	25.5	8.2	35.4	13.5	27.0	21.7
	1820–1829	49.5	32.9	24.9	9.0	28.5	11.9	22.7	19.5
	1830–1839	53.9	33.3	21.7	9.5	23.5	10.8	20.3	17.8
	1840–1849	46.7	32.3	18.8	9.1	21.4	9.8	19.0	16.5
	1850–1859	52.2	37.8	18.3	9.1	23.8	9.6	21.8	17.2
	1860–1869	47.3	40.2	18.6	9.1	25.6	10.5	24.5	18.5
	1870–1879	53.5	37.1	19.1	10.2	25.8	10.6	23.6	18.9
	1880–1889	57.3	34.6	18.6	10.0	24.3	10.4	17.7	18.0
	1890–1899	51.7	38.9	20.9	10.9	22.2	10.4	16.6	19.4
	1900–1909	55.6	38.4	21.6	12.1	22.2	9.7	18.1	20.5
	1910–1919	57.8	41.4	23.3	13.5	25.1	10.2	19.2	22.3
	1920–1922	61.3	41.1	28.8	17.8	27.0	11.3	20.5	25.6
Limburg	1812–1819	50.3	37.5	14.5	5.9	21.3	7.9	11.6	13.3
	1820–1829	55.7	47.7	13.3	5.9	23.9	9.6	12.5	15.4
	1830–1839	58.6	42.2	12.0	6.0	25.9	8.7	11.6	14.7
	1840–1849	58.8	47.1	13.6	5.3	24.5	9.1	14.2	15.8
	1850–1859	53.0	44.6	14.5	6.1	19.8	9.1	16.2	16.0
	1860–1869	48.6	47.7	14.4	5.7	19.7	9.3	14.4	15.7
	1870–1879	51.5	46.0	12.9	5.9	16.2	8.4	12.8	14.7
	1880–1889	48.7	42.8	13.6	5.8	13.2	9.7	11.6	14.9
	1890–1899	42.4	45.3	15.0	6.6	13.5	11.5	14.2	16.1
	1900–1909	45.4	44.2	17.3	7.2	17.5	11.9	16.1	18.1
	1910–1919	50.4	47.7	23.3	8.6	27.5	18.5	21.0	24.6
	1920–1922	57.9	48.9	27.1	9.7	36.2	21.9	28.0	31.8
Overijssel	1812–1819	57.0	36.2	25.4	7.6	22.8	10.9	20.0	17.1
	1820–1829	63.0	39.4	25.4	6.5	20.5	12.6	22.6	19.0
	1830–1839	61.1	38.3	24.4	6.4	20.3	13.2	22.9	19.2
	1840–1849	56.4	39.7	24.7	6.9	18.0	14.8	24.3	19.6
	1850–1859	61.5	39.4	22.9	7.4	19.2	13.5	23.0	18.9
	1860–1869	59.7	41.8	22.8	7.1	22.6	12.2	19.1	18.6
	1870–1879	62.0	41.8	21.6	7.3	21.9	11.8	16.9	18.1

Table 6.2 (continued)

Province	Period	Social class of groom							
		Higher	Middle	Skilled workers	Farmers	Semi-skilled workers	Farm workers	Unskilled workers	Total
	1880–1889	64.4	42.4	23.3	6.9	22.5	11.2	16.0	18.7
	1890–1899	66.8	45.7	26.3	7.2	21.9	10.8	19.1	20.7
	1900–1909	68.1	49.5	29.3	7.4	25.0	12.1	24.2	24.5
	1910–1919	66.7	52.0	31.3	8.8	29.1	14.5	28.6	28.2
	1920–1922	69.9	48.2	30.9	8.5	27.5	16.2	29.5	28.9
Zeeland	1812–1819	46.7	32.6	20.6	8.3	16.9	9.8	22.3	16.8
	1820–1829	49.5	31.0	19.7	7.3	19.4	9.0	21.0	15.5
	1830–1839	55.2	36.3	21.5	7.6	31.2	8.6	23.4	17.7
	1840–1849	48.3	34.2	18.4	7.2	24.2	8.2	20.7	15.9
	1850–1859	55.1	36.1	19.0	7.7	23.3	6.8	16.5	14.7
	1860–1869	63.7	35.7	19.4	7.1	22.9	6.6	15.8	14.8
	1870–1879	63.5	35.9	19.0	7.6	18.5	6.5	17.0	15.1
	1880–1889	66.8	32.2	19.6	7.2	23.8	6.6	14.9	15.3
	1890–1899	68.7	38.2	21.0	7.5	20.7	6.4	15.6	16.9
	1900–1909	71.6	39.3	22.8	8.5	24.7	6.6	15.5	18.4
	1910–1919	71.6	42.4	28.5	11.8	33.1	8.6	22.2	23.4
	1920–1922	75.9	45.5	28.3	12.9	31.7	8.2	21.6	25.4

At the other end of the scale, two groups that had their basis in farming can be distinguished. Both were characterized by the fact that grooms found their brides close to their own birthplaces. Until the middle of the nineteenth century, the birthplaces of farmers and those of their wives were on average no more than 4–6 km apart. Distances increased gradually at first, but much more strongly after 1910. In the early twentieth century in particular, farmers in Groningen married brides who were born further away than had been the case earlier on.

Farm workers were also very strongly locally oriented. In four of the five provinces, this local orientation hardly changed during the century that we studied and in some cases the data suggest that the horizon of this group became further restricted. There was one exception to this trend: farm workers in Limburg. Here, after 1890 a very strong increase in their horizon is apparent.

Between those working in agriculture and the high and middle classes were the various groups of workers outside agriculture. Although the numbers are relatively large in all three groups, we find strong fluctuations over time that are hard to explain. Among these groups, unskilled workers were in general characterized by a narrower geographic horizon than that of the others. The distances separating the birthplaces of skilled workers and their brides in Gelderland, Groningen, Limburg and Zeeland were relatively stable over the period 1810–1890. Later, a clear increase took place. In Overijssel the horizon narrowed initially, but this trend came to an end after 1880, when, as in other provinces, the distances between the birthplaces of skilled workers and those of their brides started to widen. Semi-skilled

and unskilled workers had more or less the same distances between their own and their bride's birthplace. In Zeeland, both groups at first witnessed a clear narrowing of the geographic range within which they found a bride and after 1900 an increase. In Limburg and Overijssel, a more or less comparable pattern was found (although in the first half of the nineteenth century stability, rather than a clear decrease, was observed). In both groups the distances between birthplaces of bride and groom increased after 1900 by some 15–20 km. This increase started earlier in Overijssel than in Limburg. Groningen had a different pattern: here the distances decreased as well, but did reach higher levels again later in the century.

Finally, we compared again the two groups of couples whose birthplaces were nearest and furthest apart. For all provinces and social classes this involved a comparison of the percentages found in 1812–1819 with those observed one century later in 1910–1919 (see Table 6.3).

In all provinces the higher class had already in the first decades of the nineteenth century a relatively high percentage of marriages (between 40 and 55%) in which brides and grooms were born more than 40 km apart. Usually, this percentage increased in the century that followed, but it did not do so in Groningen and did so only slightly in Limburg. Members of the higher classes relatively rarely found their spouses near their birthplaces; this happened in less than one quarter of all marriages (but in just over a quarter in Limburg in both periods). In the middle class, a relatively even share of local and far-away interactions is evident, never falling below 20% or exceeding 48% for any combination of region or time period. Over time, in all provinces a strong increase occurred in marriages between spouses who had been born far apart. The only major exception was again Groningen. Farmers and farm workers were very locally oriented: marrying someone who was born more than 40 km away was very rare. Over time, the marked preferences of farmers for brides born in the direct neighbourhood of their own community of birth declined, in particular in Groningen. A considerable proportion of the various groups of workers outside agriculture found a spouse nearby; nonetheless, marriages with partners who were born rather far away were relatively frequent as well (on average around a quarter). The development over time is far from consistent; in Gelderland, Overijssel and Limburg, more interaction took place with regions further away, leading to increases in the number of brides born outside the 40-km zone. In Zeeland, this tendency was observed among almost all groups of workers, whereas in Groningen the marriage market of workers was more contracted in the 1920s than it was in the first decades of the nineteenth century.

Spatial Regression

The previous sections have analysed the spatial interaction and widening geographic horizons in a descriptive way. This section will extend those analyses with a first attempt to apply spatial regression techniques (see, for instance, Anselin (1988); Anselin and Bera (1998)). Spatial regression techniques allow us to deal with spatial

Table 6.3 Percentages of all marriages with a distance of less than 5 or more than 40 km between places of birth of bride and groom, by province and social class of groom, 1812–1819 and 1910–1919

	Gelderland		Groningen		Limburg		Overijssel		Zeeland	
	1812–1819	1910–1919	1812–1819	1910–1919	1812–1819	1910–1919	1812–1819	1910–1919	1812–1819	1910–1919
Higher class										
<5 km	16.8	14.4	21.6	19.2	28.9	27.3	19.4	15.8	22.8	16.8
40+ km	54.5	60.5	40.0	39.7	40.8	41.1	51.5	62.0	39.7	53.2
Middle class										
<5 km	30.6	23.6	29.1	23.0	36.2	30.0	30.5	24.1	33.8	31.0
40+ km	28.7	46.6	28.7	28.5	29.8	36.9	31.8	48.2	27.1	30.7
Skilled workers										
<5 km	40.8	37.6	35.0	32.5	52.1	47.1	35.4	37.7	43.8	41.6
40+ km	16.3	25.1	17.8	13.7	9.2	18.3	22.1	28.6	14.2	19.8
Farmers										
<5 km	55.9	52.9	50.7	34.6	65.9	55.4	55.5	52.3	48.7	46.4
40+ km	2.1	5.1	2.1	4.7	2.1	3.5	2.9	3.5	2.0	4.8
Lower skilled workers										
<5 km	38.2	38.8	36.0	34.4	47.0	47.4	41.1	39.8	47.5	35.5
40+ km	19.5	26.5	24.8	15.2	13.8	21.2	17.1	26.4	10.0	23.5
Farm workers										
<5 km	41.1	52.3	39.6	47.3	56.7	45.3	42.4	43.6	46.6	54.6
40+ km	4.1	9.6	6.8	3.8	2.9	12.6	5.0	9.4	4.0	3.6
Unskilled workers										
<5 km	44.1	42.0	41.8	36.9	49.9	48.8	41.7	36.2	39.6	45.5
40+ km	12.5	17.0	17.8	11.1	6.0	16.9	15.5	26.3	16.1	15.7

autocorrelation in regression analysis by including individual explanatory variables such as age and social class, (regional) socio-economic explanatory variables and spatial location (in our case identified according to the Dutch geographical coordinate system). Spatial autocorrelation occurs when a value at any one point in space is dependent on values at the surrounding points. Spatial autocorrelation can either be positive or negative: positive means that similar values tend to be near each other, whereas negative means that different values tend to be near each other. The *GeoDa* software package (Anselin, 2004, 2005) contains the functionality for spatial regression modelling, including the standard ordinary least squares regression and basic diagnostics for spatial autocorrelation (Anselin et al., 2004). Since the data sets are very large, estimation of spatial regression models requires intensive and time-consuming computational effort from the software (for example matrix inversion and computing of spatial weights). *GeoDa* regression routines can be applied to quite large data sets, but ours appeared to be too large to include in a single spatial regression analysis. We therefore had to split and limit our spatial regression to separate 7.5% random samples of each of the five data sets of grooms married in the provinces of Gelderland, Groningen, Limburg, Overijssel and Zeeland.

In the spatial regression analysis we included independent variables at the level of the individual (such as age, social class and birthplace from the marriage certificates), the municipality (such as classification of the area as either rural or urban and the predominant religious denomination) and the nation (national income and transport availability, i.e. length of railway tracks, number of bicycles). The dependent variable in our analysis is the distance between birthplace of groom and birthplace of bride. See Table 6.4 for an overview of the variables.

Tables 6.5-6.9 present the summary outcomes of the regression models in *GeoDa* for each province. The regression outcomes confirm our earlier findings. The fit of the models are not that impressive, with adjusted R^2s ranging from 0.115 to 0.155, but most of the variables are highly significant with the expected sign except for the national variables.

Table 6.4 Variables used in the spatial regression analysis

Dependent	– Distance between place of birth of groom and place of birth of bride (in kilometres)
Independent	– Social class/occupation of the groom (in dummy variables): – Higher class – Middle class – Skilled workers – Farmers – Lower skilled workers – Farm workers – (Unskilled workers – the reference category) – Age of the groom at marriage – Age of the bride at marriage – Marriage rank number (first/second marriage) – Working status of the bride (working or non-working)

Table 6.4 (continued)

– Groom is born abroad (or not)
– Rural or non-rural area
– Municipality of marriage is a (large) city (or not)
– Religion: percentage of Catholics in municipality of marriage
– National income per capita in the Netherlands (index 1920 = 1.00)
– Total length of the railway tracks in the Netherlands (index 1920 = 1.00)
– Number of bicycles in the Netherlands (index 1920 = 1.00)
– Observation period (in dummy variables):
  – Period from 1830 to 1860
  – Period from 1860 to 1890
  – Period from 1890 to 1922
  – (Period before 1830 – the reference category)
– Municipality of marriage is (or is not) located on an island; (applies to Zeeland only)

Table 6.5 Summary output of spatial regression analysis for province of Gelderland

Regression summary of output	*Ordinary Least Squares estimation*		
Dependent variable	Distance between places of birth of groom and bride (in km)		
Number of observations	27,355		
Mean dependent var	19.842	Number of variables	21
S.D. dependent var	33.4764	Degrees of freedom	27,334
R-squared	0.120605	F-statistic	187.437
Adjusted R-squared	0.119962	Prob(F-statistic)	0
Sum squared residual	2.70E+07	Log likelihood	–133,096
Sigma-square	986.266	Akaike info criterion	266,234
S.E. of regression	31.4049	Schwarz criterion	266,407
Sigma-square ML	985.509		
S.E of regression ML	31.3928		

Variable	Coefficient	Std. error	t-Statistic	Probability
Constant	14.32465	1.404252	10.20091	0.0000000
Higher class	30.05507	1.91527	15.69235	0.0000000
Middle class	32.6492	1.831569	17.8258	0.0000000
Skilled workers	0.195748	0.5442099	0.359692	0.7197760
Farmers	–11.52719	0.5122099	–22.5048	0.0000000
Lower skilled workers	1.923424	0.6109526	3.148237	0.0016446
Farm workers	–2.959372	1.423229	–2.07934	0.0376131
Age at marriage (groom)	0.1915213	0.03036064	6.308213	0.0000000
Age at marriage (bride)	0.2601479	0.03756227	6.925776	0.0000000
Marriage rank number	–3.720393	0.859088	–4.33063	0.0000149
Working status of bride	–3.053386	0.4394115	–6.94881	0.0000000
Groom is born abroad	28.13122	1.668276	16.86245	0.0000000
Rural area	–7.605051	0.4937407	–15.4029	0.0000000
City	12.04401	0.7208599	16.70783	0.0000000
Percentage of Catholics	–0.04532509	0.006920918	–6.549	0.0000000
National income	3.698576	2.584235	1.431207	0.1524076
Length of railway tracks	2.839017	1.77351	1.60079	0.1094008
Number of bicycles	1.301872	1.500747	0.867483	0.3856220

Table 6.5 (continued)

Period 1830–1859	–0.4479198	0.8561976	–0.52315	0.6008555
Period 1860–1889	–0.4474313	1.169629	–0.38254	0.7017782
Period 1890–1922	1.775433	1.659024	1.070167	0.2845239
Regression diagnostics				
Multicollinearity condition number			27.4001	
Test on normality of errors				
Test	*DF*	*Value*	*Prob*	
Jarque-Bera	2	87,288.08	0	
Diagnostics for heteroskedasticity				
Random coefficients				
Test	*DF*	*Value*	*Prob*	
Breusch-Pagan test	20	6,024.552	0	
Koenker-Bassett test	20	1,287.277	0	
Specification robust test				
Test	*DF*	*Value*	*Prob*	
White	230	N/A	N/A	
Diagnostics for spatial dependence				
Test	*MI/DF*	*Value*	*Prob*	
Moran's *I* (error)	0.021486	16.5322564	0.0000000	
Lagrange multiplier (lag)	1	62.8893805	0.0000000	
Robust LM (lag)	1	3.479866	0.0621198	
Lagrange multiplier (error)	1	75.7716067	0.0000000	
Robust LM (error)	1	16.3620923	0.0000523	
Lagrange multiplier (SARMA)	2	79.2514727	0.0000000	

Table 6.6 Summary output of spatial regression analysis for province of Groningen

Regression summary of output	*Ordinary least squares estimation*		
Dependent variable	Distance between places of birth of groom and bride (in km)		
Number of observations	15,617		
Mean dependent var	19.7528	Number of variables	21
S.D. dependent var	36.6919	Degrees of freedom	15,596
R-squared	0.116204	F-statistic	102.531
Adjusted R-squared	0.115071	Prob(F-statistic)	0
Sum squared residual	1.86E+07	Log likelihood	–77,456.1
Sigma-square	1,191.45	Akaike info criterion	154,954
S.E. of regression	34.5174	Schwarz criterion	155,115
Sigma-square ML	1,189.85		
S.E of regression ML	34.4942		

Variable	Coefficient	Std. error	t-Statistic	Probability
Constant	11.1	1.964313	5.65083	0.0000000
Higher class	23.91941	2.096008	11.41189	0.0000000
Middle class	12.71445	1.015652	12.51851	0.0000000
Skilled workers	–0.8991385	0.8756594	–1.02681	0.3045506
Farmers	–6.984254	1.054539	–6.62304	0.0000000
Lower skilled workers	1.401745	1.184578	1.183329	0.2367258

Table 6.6 (continued)

Farm workers	–5.019742	0.8380199	–5.99	0.0000000
Age at marriage (groom)	0.2072703	0.05032128	4.11894	0.0000383
Age at marriage (bride)	0.1037542	0.05661012	1.832785	0.0668652
Marriage rank number	–1.59047	0.9815981	–1.62029	0.1051719
Working status of bride	–1.889122	0.6475232	–2.91746	0.0035346
Groom is born abroad	36.21525	2.267746	15.96972	0.0000000
Rural area	–4.482644	0.8677672	–5.16572	0.0000002
City	11.60837	1.070393	10.84496	0.0000000
Percentage of Catholics	0.1908934	0.05322492	3.586541	0.0003362
National income	3.277446	2.320512	1.412381	0.4345110
Length of railway tracks	–2.221491	2.487614	–0.89302	0.3718160
Number of bicycles	3.157791	4.042126	0.781221	0.1578218
Period 1830–1859	–1.100149	1.180849	–0.93166	0.3514439
Period 1860–1889	1.46925	1.627176	0.902945	0.3665729
Period 1890–1922	1.433851	2.325026	0.616703	0.5374982
Regression diagnostics				
Multicollinearity condition number			25.98997	
Test on normality of errors				
Test	*DF*	*Value*	*Prob*	
Jarque-Bera	2	201,107.2	0	
Diagnostics for heteroskedasticity				
Random coefficients				
Test	*DF*	*Value*	*Prob*	
Breusch-Pagan test	20	6,885.588	0	
Koenker-Bassett test	20	759.4399	0	
Specification robust test				
Test	*DF*	*Value*	*Prob*	
White	230	N/A	N/A	
Diagnostics for spatial dependence				
Test	*MI/DF*	*Value*	*Prob*	
Moran's *I* (error)	0.004292	2.688123	0.0071856	
Lagrange multiplier (lag)	1	1.114525	0.2911005	
Robust LM (lag)	1	1.702834	0.1919178	
Lagrange multiplier (error)	1	1.726262	0.1888890	
Robust LM (error)	1	2.314571	0.1281667	
Lagrange multiplier (SARMA)	2	3.429095	0.1800452	

Table 6.7 Summary output of spatial regression analysis for province of Limburg

Regression summary of output	*Ordinary least squares estimation*		
Dependent variable	Distance between places of birth of groom and bride (in km)		
Number of observations	14,226		
Mean dependent var	17.787	Number of variables	21
S.D. dependent var	37.4594	Degrees of freedom	14,205
R-squared	0.155807	F-statistic	131.087
Adjusted R-squared	0.154619	Prob(F-statistic)	0

Table 6.7 (continued)

Sum squared residual	1.69E+07	Log likelihood	–70,525.5
Sigma-square	1,186.33	Akaike info criterion	141,093
S.E. of regression	34.4431	Schwarz criterion	141,252
Sigma-square ML	1,184.58		
S.E of regression ML	34.4177		

Variable	Coefficient	Std. error	t-Statistic	Probability
Constant	75.07561	5.924068	12.67298	0.0000000
Higher class	26.51208	2.071121	12.80083	0.0000000
Middle class	23.70225	1.176396	20.1482	0.0000000
Skilled workers	–0.06968816	0.9893649	–0.07044	0.9431800
Farmers	–7.021315	0.9070016	–7.74124	0.0000000
Lower skilled workers	2.686111	1.013469	2.650412	0.0080474
Farm workers	–1.53047	1.167306	–1.31111	0.1898460
Age at marriage (groom)	0.1452882	0.04657861	3.119204	0.0018175
Age at marriage (bride)	0.007675968	0.05203559	0.147514	0.8820525
Marriage rank number	0.2077095	1.012734	0.205098	0.8369867
Working status of bride	–1.456864	0.6271511	–2.32299	0.0201914
Groom is born abroad	17.09421	1.042231	16.40155	0.0000000
Rural area	–8.123077	0.7612207	–10.6711	0.0000000
City	2.682365	0.9701267	2.764963	0.0056988
Percentage of Catholics	–0.6422265	0.05742621	–11.1835	0.0000000
National income	0.1354192	4.102846	0.033006	0.9767870
Length of railway tracks	–5.740627	2.824298	–2.03259	0.0421097
Number of bicycles	11.85288	2.404787	4.92887	0.0000008
Period 1830–1859	2.508045	1.06387	2.357473	0.0184149
Period 1860–1889	3.64413	1.674722	2.175961	0.0295826
Period 1890–1922	4.074876	2.524424	1.61418	0.1065007
Regression diagnostics				
Multicollinearity condition number			86.54396	
Test on normality of errors				
Test	*DF*	*Value*	*Prob*	
Jarque-Bera	2	106,372.2	0	
Diagnostics for heteroskedasticity				
Random coefficients				
Test	*DF*	*Value*	*Prob*	
Breusch-Pagan test	20	8,402.116	0	
Koenker-Bassett test	20	1,199.498	0	
Specification robust test				
Test	*DF*	*Value*	*Prob*	
White	230	N/A	N/A	
Diagnostics for spatial dependence				
Test	*MI/DF*	*Value*	*Prob*	
Moran's *I* (error)	0.018105	9.565514	0.0000000	
Lagrange multiplier (lag)	1	22.13177	0.0000025	
Robust LM (lag)	1	0.001073	0.9738713	
Lagrange multiplier (error)	1	27.97997	0.0000001	
Robust LM (error)	1	5.849269	0.0155835	
Lagrange multiplier (SARMA)	2	27.98104	0.0000008	

Table 6.8 Summary output of spatial regression analysis for province of Overijssel

Regression summary of output	*Ordinary least squares estimation*		
Dependent variable	Distance between places of birth of groom and bride (in km)		
Number of observations	16,549		
Mean dependent var	21.2401	Number of variables	21
S.D. dependent var	36.1079	Degrees of freedom	16,528
R-squared	0.139846	F-statistic	134.358
Adjusted R-squared	0.138805	Prob(F-statistic)	0
Sum squared residual	1.86E+07	Log likelihood	–81,588.7
Sigma-square	1,122.87	Akaike info criterion	163,219
S.E. of regression	33.5093	Schwarz criterion	163,381
Sigma-square ML	1,121.45		
S.E of regression ML	33.4881		

Variable	Coefficient	Std. error	t-Statistic	Probability
Constant	19.62607	1.780918	11.0202	0.0000000
Higher class	28.72034	2.570128	11.17467	0.0000000
Middle class	11.1134	1.544397	7.195944	0.0000000
Skilled workers	–1.579172	0.7834699	–2.01561	0.0438552
Farmers	–15.05616	0.6862466	–21.9399	0.0000000
Lower skilled workers	–3.218326	0.8815811	–3.65063	0.0002624
Farm workers	–6.680784	2.70659	–2.46834	0.0135880
Age at marriage (groom)	0.2385199	0.04397825	5.423589	0.0000001
Age at marriage (bride)	0.06586974	0.04978295	1.323138	0.1857959
Marriage rank number	–0.7520247	0.8626111	–0.8718	0.3834719
Working status of bride	–2.009069	0.5716142	–3.51473	0.0004415
Groom is born abroad	53.6953	1.977575	27.1521	0.0000000
Rural area	–10.23132	0.5863851	–17.4481	0.0000000
City	3.66751	0.9827259	3.731976	0.0001906
Percentage of Catholics	0.01983569	0.01112928	1.782298	0.0747227
National income	5.095453	3.729718	1.366177	0.1719437
Length of railway tracks	5.916897	2.368952	2.497685	0.0125114
Number of bicycles	2.370952	2.144382	1.105658	0.2688562
Period 1830–1859	–1.403677	1.101914	–1.27385	0.2027344
Period 1860–1889	–5.040092	1.541246	–3.27014	0.0010773
Period 1890–1922	–3.843945	2.200736	–1.74666	0.0807344
Regression diagnostics				
Multicollinearity condition number			25.24618	
Test on normality of errors				
Test	*DF*	*Value*	*Prob*	
Jarque-Bera	2	64,405.3	0	
Diagnostics for heteroskedasticity Random coefficients				
Test	*DF*	*Value*	*Prob*	
Breusch-Pagan test	20	4,789.851	0	
Koenker-Bassett test	20	927.3398	0	
Specification robust test				
Test	*DF*	*Value*	*Prob*	
White	230	N/A	N/A	

Table 6.8 (continued)

Diagnostics for spatial dependence			
Test	*MI/DF*	*Value*	*Prob*
Moran's *I* (error)	0.032003	19.58624	0.0000000
Lagrange multiplier (lag)	1	128.6497	0.0000000
Robust LM (lag)	1	29.23055	0.0000001
Lagrange multiplier (error)	1	101.6977	0.0000000
Robust LM (error)	1	2.27864	0.1311669
Lagrange multiplier (SARMA)	2	130.9283	0.0000000

Table 6.9 Summary output of spatial regression analysis for province of Zeeland

Regression summary of output	*Ordinary least squares estimation*		
Dependent variable	Distance between places of birth of groom and bride (in km)		
Number of observations	12,337		
Mean dependent var	17.5516	Number of variables	22
S.D. dependent var	38.0578	Degrees of freedom	12,315
R-squared	0.141784	F-statistic	96.8825
Adjusted R-squared	0.14032	Prob(F-statistic)	0
Sum squared residual	1.53E+07	Log likelihood	–61,457.9
Sigma-square	1,245.26	Akaike info criterion	122,960
S.E. of regression	35.2882	Schwarz criterion	123,123
Sigma-square ML	1,243.04		
S.E of regression ML	35.2568		

Variable	Coefficient	Std. error	t-Statistic	Probability
Constant	15.34991	2.30747	6.65227	0.0000000
Higher class	41.17853	2.40102	17.15044	0.0000000
Middle class	19.16284	1.218985	15.72032	0.0000000
Skilled workers	1.884111	1.16816	1.612888	0.1068071
Farmers	–6.776013	1.387297	–4.88433	0.0000011
Lower skilled workers	5.329122	1.441063	3.698049	0.0002182
Farm workers	–5.047125	1.030641	–4.89707	0.0000010
Age at marriage (groom)	0.1126482	0.05656801	1.991376	0.0464520
Age at marriage (bride)	0.1126415	0.06302906	1.787137	0.0739363
Marriage rank number	–1.099182	1.109783	–0.99045	0.3220347
Working status of bride	–3.13019	0.7442065	–4.20608	0.0000262
Groom is born abroad	6.169954	1.622154	3.803557	0.0001433
Rural area	–7.643262	1.021237	–7.48432	0.0000000
City	10.47486	1.191457	8.791643	0.0000000
Percentage of Catholics	–0.01005445	0.01179407	–0.8525	0.3939605
National income	6.942392	4.901479	1.416387	0.1566584
Length of railway tracks	1.123544	2.959703	0.379614	0.7044684
Number of bicycles	1.371071	2.784965	0.492312	0.6226053
Period 1830–1859	–0.4006058	1.271391	–0.31509	0.7529237
Period 1860–1889	–2.17712	1.852233	–1.1754	0.2398512
Period 1890–1922	–1.326655	2.69381	–0.49248	0.6226053
Island	–1.739572	0.8148644	–2.1348	0.0328000
Regression diagnostics				
Multicollinearity condition number			24.32744	
Test on normality of errors				

Table 6.9 (continued)

Test	*DF*	*Value*	*Prob*
Jarque-Bera	2	174,614.4	0
Diagnostics for heteroskedasticity Random coefficients			
Test	*DF*	*Value*	*Prob*
Breusch-Pagan test	21	8,233.752	0
Koenker-Bassett test	21	865.4642	0
Specification robust test			
Test	*DF*	*Value*	*Prob*
White	252	N/A	N/A
Diagnostics for spatial dependence			
Test	*MI/DF*	*Value*	*Prob*
Moran's *I* (error)	0.020453	9.964293	0.0000000
Lagrange multiplier (lag)	1	36.41522	0.0000000
Robust LM (lag)	1	7.717704	0.0054682
Lagrange multiplier (error)	1	30.96581	0.0000000
Robust LM (error)	1	2.268295	0.1320451
Lagrange multiplier (SARMA)	2	38.68351	0.0000000

The geographic horizon of grooms from higher social classes and to a lesser extent from the middle class is much larger than that of other social classes. In particular, farmers and farm workers had a much smaller geographic horizon. The ages of the partners indicate that the older the partners, the wider their geographic horizon. People marrying for the first time tend to find their partner further away than those marrying for a second time, but this effect is only significant in Gelderland. If the bride was employed at the time of marriage, a negative coefficient resulted, meaning that the geographic horizon was smaller. Both the coefficients of the variables indicating the transportation availability in the Netherlands have the expected sign in Gelderland, Overijssel and Zeeland. However, the (increasing) number of bicycles is significant in Limburg only. National income per capita is also positively correlated, but is not significant. The time variables show a mixed picture and are not significant in most cases. Table 6.9 presents the summary outcomes for the province of Zeeland including one extra variable, i.e. whether the municipality of marriage is located on a (less accessible) island. The additional 'island' variable indeed confirms the negative effect on marriage horizons of less accessible regions.

The first statistic to determine spatial dependence is Moran's *I* (Moran, 1950). Moran's *I* is a spatial autocorrelation measure for variables with interval and ratio scales. The value of Moran's *I* ranges from -1 for negative spatial autocorrelation (nearby units have dissimilar values or characteristics) to +1 for positive spatial autocorrelation (adjacent units have similar values or characteristics). If no spatial autocorrelation exists there is no particular systematic spatial pattern. Tables 6.5-6.9 reveal that the Moran's *I* statistics show slightly positive values and are highly significant. The Moran's *I* statistic is less helpful in suggesting which alternative specification should be used. To this end, the so-called Lagrange Multiplier (LM)

test statistics can be used to determine whether the spatial autocorrelation is due to spatial autocorrelation in the residuals (spatial errors) or spatial autocorrelation in the dependent variable (spatial lags) (see Anselin, 2005). Spatial autocorrelation in the residuals of the regression model indicates that the model specification is incomplete and additional independent variables that would fully explain the spatial patterns in the residuals are missing. Spatial autocorrelation in the dependent variable might incorporate spatial effects of unmeasured independent variables but also an additional effect of neighbouring dependent variables, i.e. the lagged dependent variable (as in diffusion processes). In Tables 6.5-6.9 the first two Lagrange Multiplier test statistics (LM lag and Robust LM lag) refer to the spatial lag model as the alternative and the next two (LM error and Robust LM error) refer to the spatial error model as the alternative. However, the Robust Lagrange Multipliers are only relevant if the others are significant (see Anselin (2005) for an extensive discussion on this issue).

Both the LM lag and the LM error are significant in the spatial regression models for Gelderland, Limburg, Overijssel and Zeeland. In the case of Groningen, neither the LM lag nor the LM error are significant, suggesting that no spatial dependency is left unexplained. For Gelderland and Limburg, the Robust LM lag is significant and seems to point to a spatial lag model more than to a spatial error model. For Overijssel and Zeeland the Robust LM error is significant, suggesting a spatial error model. These analyses and models need further exploration, which is beyond the scope of this chapter.

Conclusion

This chapter is the first attempt to study the widening of the geographic horizon for a large part of a whole country over a long time period.

As we expected, clear time trends were visible in the average marital distance between spouses and in the width of the zones in which they found each other. From the 1880s, the geographic horizon of young men and women in the Netherlands started to increase, an increase that gained momentum after the 1890s. The average horizon increased from around 15–20 km to around 25–30 km in the second decade of the twentieth century. At the same time, there were large differences between provinces, the horizon of people in Gelderland, Limburg and Zeeland being smaller before 1880 than those of people in Overijssel and Groningen. When a distinction is made between contacts within different zones, it appears that there were in particular strong differences between provinces in the degree of interaction at the local scale. In Limburg more than half of all marriages before 1900 were contracted between partners born fewer than 5 km apart; in Groningen, the proportion marrying locally never exceeded 40%. The strong local orientation eased in Limburg after 1910. In all provinces the interaction with regions further away increased, at first gradually, (around 1890, but earlier in Gelderland and Overijssel) and later much more strongly, particularly after 1910. Limburg has been depicted as

a region with less intensive contacts with the outside world due to the less developed transportation network and agricultural activities that were less market-oriented. As a consequence, the province was touched to a lesser degree by an individualistic orientation (Wichers, 1965). It was only when mines were opened and transport and communication with the rest of the Netherlands improved that the province became better integrated into the country, its cultural peculiarities lessened and its geographic horizon opened.

Social status had the expected strong effect on marital distances. The higher social classes had a much wider horizon than any other social class. Those working in the agricultural sector, whether as farmers or farm workers, had very restricted geographic horizons. The geographic horizons of the various groups of workers outside agriculture usually extended much further than those of the farmers and rural labourers, but much less so than those of the high and middle classes. There was thus a close relationship between an individual's social position and the degree to which he interacted with the world outside his own community – the lower classes focusing on the locality or at the most on the region, the higher classes having a inter-regional or national orientation. Members of the lower socio-economic groups often spoke only dialect, had a low level of education, read few newspapers and had no free time and even less money with which to travel outside their own community. The middle class and higher class – particularly those working in trade and as entrepreneurs – had, because of their work, frequent contacts with people and regions outside the community, had received better education, were more open to the world outside, and had better access to all means of communication and transport.

During the nineteenth and early twentieth centuries, the differences in geographic horizon between the higher and middle classes and the agricultural workers and farmers increased in most provinces. The same trend over time, an accentuation of the social differences as a consequence of a constant widening of the marriage distances for the non-agricultural population and few changes for the agricultural one, has been observed elsewhere (Ogden, 1980).

Over time, the marriage horizons of the working classes widened, but nonetheless remained much smaller than those of the upper and middle classes. Even directly after the end of the First World War, the various social classes still varied strongly in their interaction with the outside world. How the geographic horizons of the various social classes evolved over time differed by province. In particular, the marriage horizons of working class grooms marrying in Gelderland and Groningen scarcely expanded at all in the last decades of the nineteenth century. Both agricultural provinces were hit very hard by the agricultural crisis. The real disposable incomes of farmer-households fell steadily and it was only at the beginning of the twentieth century that the economic position of the farmers improved again because of increasing agricultural prices and rising productivity. The differences in trends over time for the various regions make clear that local studies do not provide a comprehensive picture of marriage horizons and reveal the need to make use of large databases covering significant portions of a country.

The time trends we observed and the social differentials we found more or less parallel those reported by authors studying these issues in the UK and France.

Previous work on temporal trends in the nineteenth century generally showed increases in mobility after 1870 (Coleman, 1979), after 1886 (Perry, 1969) and after 1890 (Morel, 1972), depending on the area. The various provinces of the Netherlands fit into this time frame.

As mentioned in this chapter, the GENLIAS database does not yet contain information on marriages contracted in the economic heartland of the country, the provinces of Zuid- and Noord-Holland. Earlier studies, based respectively on the cities of Delft and Gouda, both situated in the province of Zuid-Holland (Van Poppel and Ekamper, 2005; Van Poppel, 1994), showed for the same time period comparable trends and differences as observed in the five provinces studied here. In both cities there was an increase in marriages in which one of the spouses came from contact zones not enabling regular face-to-face contact. This trend started in Gouda earlier than in the five provinces. A clear social gradient was also observed in both cities, corresponding with the one found in the GENLIAS data.

Our study does not provide a complete answer to all the questions that one might pose concerning changes to the geographic horizon of the Dutch population. Although marriage was one of the most frequently mentioned reasons for geographical mobility, we cannot interpret this form of spatial contact as representative of all moves: the mobility pattern of those who remained single is different from those of the majority who married (Pooley & Turnbull, 1998: p. 49, p. 69). Individuals who never married are excluded from our study, but marriage registers do record a very large segment of the population. In most European countries during the nineteenth century only a small proportion of the population remained unmarried.[8] Marriage registers principally measure the geographic proximity of younger adults, not that of persons in late middle age or the elderly. Moreover, the registers record only the overall horizon of brides and grooms, without indicating the exact date at which contacts were made. Mobility, then, is defined in a more restricted way than is the case for more general mobility measures. Local studies of marriage registers reveal nothing about how many people leave their home village to contract a marriage elsewhere. It will be clear that this issue plays a less serious role in our case, as our study uses information on hundreds of localities in five provinces. Apart from the fact that it is difficult to assign a precise date to changes in the geographic horizon (we know only that migration from the birthplace took place between the date of marriage and 20–30 years before marriage), a further problem is that the data do not allow us to know whether the horizon of grooms and brides in a given region widened because people from that province started to migrate over longer distances to other regions, or whether this was caused by the fact that more and more migrants born outside the province started to live in that province. The establishment of a link between changes in the horizon and a specific change in the propensity of the inhabitants of that province to migrate is therefore not fully justified.

Our study convincingly shows that changes in the transportation and communication network and the closely linked processes of national and cultural integration had far-reaching consequences for human behaviour. It caused in the most literal sense of the word a large increase in the emotional and cognitive connectedness between

inhabitants of the various parts of the country. In its turn, this process of increasing marital distances further stimulated cultural homogenization and decreased the importance of regional identity.

The process of national integration not only narrowed cultural distances within the Netherlands: at the same time it widened cross-border cultural distances, as could be concluded from the decrease in marriages between people born in the Netherlands and those in Germany and Belgium.

Our study also has wider implications for the study of historical migration processes, family life and family ideology, modernization and technology. The results of the spatial analysis confirm that the long-term evolution of migration distances in the nineteenth and twentieth centuries is difficult to link to specific processes and events, such as the increase in rail travel, the introduction of the bicycle and economic development. The regularity of the increase in distance travelled by couples therefore indicates the existence of much more complex processes, for which a large number of factors are responsible and which are difficult to control or validate. Instead of a definitive explanation, the best we can do at present is to suggest how the relevant variables might have operated (Rosental, 1999: pp. 18–19).

Our study provides some new perspectives on issues that have been studied by social scientists and historians and that had previously been based on rather restricted and scattered sources. Our study has demonstrated that, judging by the information on marriage horizons, there were strong differences in the geographical range of activities and in geographical knowledge of different social classes until at least the second decade of the twentieth century, with higher social classes having the widest horizons and agricultural workers and farmers the narrowest. From the last decade of the nineteenth century, these horizons increased markedly over time. Our study also showed that in the nineteenth and early twentieth centuries the Netherlands still contained a series of strongly isolated regional entities; the distance between the south and the north of the country proved to be large not only in geographical terms, but also from a cultural and social perspective. At the same time, contacts with the core area of the Netherlands, the three large cities in the west, was frequent in all the provinces included in the study. The process of what Giddens (1990: pp. 100–103) calls ‘disembedding’, the withdrawal from the local social contexts of interaction, a process crucial to modernity, can on the basis of our study also be dated much more precisely; in the first half of the nineteenth century, this process had hardly made any progress in the eastern and southern provinces, but was more advanced in the coastal regions. From the fourth quarter of the nineteenth century the eastern and southern provinces took the lead in this process. As far as the modernization of family life is concerned, based on the choice of spouses, it could be argued that by marrying within one’s own community, the degree of contact between generations remained very strong in the eastern and southern provinces until at least the beginning of the twentieth century. This phenomenon was less common in Zeeland and Groningen. This conclusion is in line with the vast body of more qualitative literature that has been published on the differences in family ideology, family structure and family relations between the western and northern part of the Netherlands (the coastal areas) and the south and the east (Wichers, 1965;

Lesthaeghe & Wilson, 1986). In the latter regions, households were larger and of a more complex structure (Bulder, 1993), more importance was attached to the family, and solidarity between generations and parental authority was strongly stressed.

We also think that the results of our study might function as a useful addition to recent scholarship on the history of technology and infrastructure in the Netherlands. These studies postulate changes in the living conditions of the population as a consequence of the new technologies, but very few authors have been able to describe in detail how the experiences, attitudes and worldview of the population changed (Van der Woud, 2006: pp. 11–19). How the new technologies and infrastructure changed the geographical knowledge of the average citizen and whether or not this change led to a massive increase in knowledge of – and closer personal relations with – people from other cities and regions, can at least in part be answered with the data presented here (Van der Woud, 2006: p. 135, pp. 327–328).

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Notes

1. *NRC Handelsblad* 21 May 1994 and 7 February 2004; Zeegers, 1998.
2. The distances between marriage partners of course also determine the genetic structure of communities and the topic has therefore attracted the attention of physical anthropologists and geneticists as well.
3. Geographic endogamy has been the subject of many historical studies in the Netherlands. Those focusing on the nineteenth century (Rutten, 1989; Peeters, 1967; Boekholt, 1979; Boekholt, 1981; Meurkens, 1984; Van Poppel, 1994; Van Poppel & Ekamper, 2005 and Kok, 1998) have for the most part been based on small, mostly strictly local samples.
4. Lesger (2006) convincingly showed how important easy access by water was for the choice of spouses in seventeenth century Holland.
5. The historical description is based on Directorate General for Passenger Transport (1999). We are indebted to Frank Veraart (Department of Technology Management, Eindhoven University of Technology) for sharing this and other information with us.
6. The total number of administrative units mentioned in the database for the province of Gelderland (including all spelling variants) was 12,963, for Groningen 10,154, for Limburg 23,761, for Overijssel 8,450 and for Zeeland 7,477, giving a total (including double counting) of 62,805. The largest number of spelling variants (86) was found for the Belgian municipality of Sint-Gillis-Waas in East Flanders.
7. For Gelderland, Groningen, Limburg and Overijssel one or more neighbouring German Länder were involved, for Limburg and Zeeland the whole of Belgium. Distances to places in France, the UK and other countries were not calculated.

8. For the Dutch population, the percentage never married females and males among cohorts born between 1800 and 1900 varied between 14 and 16 for women and between 11 and 14 for males (Frinking & van Poppel, 1979: pp. 77–85).

Annex: Geographic Coordinates Databases

- Topographical Service of the Dutch Land Registry Office (Topografische Dienst Kadaster):
  - Official Netherlands National Coordinate System points (Rijksdriehoeks metingpunten or RD-points) [www.rdnap.nl]
  - Topographic Names Register (Topografisch Namenregister) [http://www.kadaster.nl/namenregister/]
- Meertens Institute
  - Kloeke-tabel [http://www.meertens.knaw.nl/projecten/mand/CARTkartografiefie.html]
- National Geospatial-Intelligence Agency (NGA)
  - GEOnet Names Server (GNS) [http://earth-info.nga.mil/gns/html/]
    - Belgium [http://earth-info.nga.mil/gns/html/cntyfile/be.zip].
    - Germany [http://earth-info.nga.mil/gns/html/cntyfile/gm.zip]
    - Netherlands [http://earth-info.nga.mil/gns/html/cntyfile/nl.zip]

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