DEMOGRAPHIC RESEARCH

Research Article

Beyond the local marriage market: The influence of modernization on geographical heterogamy

Ineke Maas

Richard L. Zijdeman

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Ineke Maas[1]

Richard L. Zijdeman[2]

Abstract

This study examines whether the increase of geographical heterogamy in the nineteenth and early twentieth century is related to modernization. Specifically, we test whether mass communication and mass transport enhanced the likelihood of a geographically heterogamous marriage as well as the distance over which heterogamous marriages took place. Furthermore, we study whether modernization decreased the relationship between social background and geographical heterogamy. We employ individual and municipality level data of some 30,000 marriages in over 40 municipalities in the Dutch province Overijssel between 1823 and 1922. The results from our multi-level analyses suggest that mass communication was more important than mass transport.

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[1] Utrecht University, the Netherlands. E-mail: i.maas@uu.nl.
[2] Utrecht University, the Netherlands. E-mail: r.l.zijdeman@uu.nl.

1. Introduction

Studies of geographical heterogamy in Europe and the United States in the nineteenth and twentieth century show a strong tendency for people to marry someone living nearby (e.g. Bossard 1932; Rogoff Ramsoy 1966; Van Poppel & Ekamper 2005). For example, of all marriages in the first five months of 1931 in the city of Philadelphia, 30% of the couples lived one block or less apart just before marriage, and only 18 % of the couples had one partner coming from outside the city (Bossard 1932).

Most studies show that during the nineteenth and twentieth centuries the size of the marriage market increased (Gueresi, Pettener, and Maruzzi Veronesi 2001; Kok and Mandemakers 2008; Van Poppel and Ekamper 2005; but see Kok 1998 and Van de Putte 2003 for exceptions). Geographical heterogamy increased and shows the same development as heterogamy with respect to other ascribed characteristics, such as class of origin and religion (the latter after 1938) (Hendrickx, Lammers and Ultee 1991; Uunk 1996; Zijdeman and Maas forthcoming). But note that age heterogamy decreased during this period (e.g. Van Poppel et al. 2001).

Contrary to studies on heterogamy with respect to age, class of origin, and religion, studies on geographical heterogamy are relatively scarce. However studying geographical heterogamy is highly relevant because it is connected to social cohesion in society. If culture or economic prosperity strongly differs between local entities, this is a potential source of conflict. The likelihood of conflict is less if there is exchange of people between localities, either by migration or by marriage. At the same time, as a consequence of the exchange of people, cultural and economic differences diminish. In the nineteenth century differences between regions in the Netherlands were still strong. Protestants lived in the north and Catholics in the south of the country. Between small regions there were differences in manner of speech as well as manner of dress. Municipalities even differed in their measurement of time, although the use of a universal time was requested by the Dutch government (Knippenberg and De Pater 1988: 77-82). Couples from different geographical backgrounds had to deal with these differences and solve the potential local conflicts. Today the cultural and economic differences between local entities in the Netherlands are small, although still existent. By uncovering the causes of increased geographical heterogamy we may come to understand how local differences were overcome.

In an attempt to provide an explanation for the increase in heterogamy, with respect to ascribed characteristics in general and geographical heterogamy specifically, researchers refer to the modernization processes, such as the development of new means of mass transport and the appearance of mass communication (Kok and Mandemakers 2008; Van Poppel and Ekamper 2005; Uunk 1996; Zijdeman and Maas forthcoming). These two aspects of modernization affect heterogamy through different

mechanisms. Means of mass transport allow people to travel over larger distances and increase the likelihood of finding a partner outside the local region. Mass communication is thought to spread information, such as news on events, technological developments, and fashion, beyond local regions. People from different regions and perhaps social strata may therefore have become more alike and perceived cultural differences may have decreased. According to this latter explanation the lack of geographical heterogamy is a by-product of the preferences of people for a culturally similar partner and the increase of geographical heterogamy is the result of declining cultural differences between regions.

Earlier studies have shown that marriage partners born in different regions originated foremost from higher social strata (Koller 1948; Kok 1998; Van Poppel and Ekamper 2005). There is some research showing that when the size of the marriage market increased during the nineteenth and twentieth centuries the likelihood of differences between the social strata in a geographically heterogamous marriage became smaller (Van Poppel and Ekamper 2005). Again this can be explained by changes in perceived cultural differences and the changing likelihood of meeting people from further away.

Unfortunately few studies have empirically investigated these explanations. These studies are often restricted to a short period or a small number of municipalities. As a result they do not explicitly relate means of mass transport and mass communication to geographical heterogamy, but only point at parallel developments in the three processes. The only exception is the study of Kok and Mandemakers (2008), indicating that brides and grooms who lived in a community that was connected to a railway line more often found a partner outside their municipality of residence. However they do not analyze whether changes in the availability of mass transport, i.e. the appearance of a railway station, led to changes in geographical heterogamy.

In this study we will provide a direct test of whether the increase of geographical heterogamy can be related to the modernization processes. We will study data on the distance between the birthplaces of brides and bridegrooms in 31,787 marriages in 4,315 contexts (municipalities in a certain year) in the Dutch province Overijssel over the period 1823-1922. This period and region form an excellent testing ground for the two explanations. At the beginning of this period 'mass' transport was restricted to coaches and ships. During the period under study municipalities increasingly became connected by trains and trams. Furthermore, mass communication was facilitated by the growing number of post offices. Both developments did not necessarily happen in all municipalities, or at the same time. By studying 44 municipalities we can exploit the fact that mass communication and mass transport appeared in some places, but not in others. By studying 100 years we can carefully examine changes in the municipalities with regard to the appearance of mass communication and mass transportation. The

long time frame also allows us to monitor very small temporal changes that are particular to studies on social mobility and heterogamy (see for example Ganzeboom, Luijkx, and Treiman 1989; Zijdeman and Maas forthcoming).

We will also investigate the claim that geographical heterogamy spread from the higher classes to the lower and whether this happened mainly because of changes in the behaviour of the higher classes or of the lower classes. We ask the following questions:

1. Can the increase in geographical heterogamy be explained by the development of mass transport and mass communication?

2. To what extent did geographical heterogamy become less dependent on social background as a result of the development of mass transport and mass communication?

2. Theory

Empirical studies consistently show that marriage partners tend to be alike in ascribed characteristics such as place of birth, social origin, ethnicity, religion, and age (e.g. Hendrickx, Lammers, and Ultee 1991; Van Poppel et al. 2001; Van Tubergen and Maas 2007; Uunk 1996; Zijdeman and Maas forthcoming), and in achieved characteristics such as education and occupational status (Blossfeld and Timm 2003; Uunk 1996). The theory of preferences, third parties, and marriage markets is often used to explain the lack of heterogamy with respect to these characteristics (Kalmijn 1998). We will rely on this theory to derive hypotheses on changes in geographical heterogamy. According to the theory marriage candidates have a preference for a spouse with many socioeconomic resources and similar cultural resources. A preference for cultural similarity seems especially important in explaining geographical homogamy in the nineteenth century (Van Poppel and Ekamper 2005). Regional differences in culture existed and expressed themselves in dialect, clothing, and habits. People from the same municipality were culturally more similar than people from different villages or cities. Also the closer people lived the easier it was to gather information about each other's cultural preferences. Geographical homogamy might be largely a by-product of the preferences of people for cultural homogamy, in combination with the geographical segregation of culture (Bossard 1932).

Third parties, such as the peer group and the parents of marriage candidates, had a clear interest in promoting local marriages. In many villages strong norms existed that exerted a pressure to marry locally. These norms were enforced by groups of young men who scared non-local rivals away (see for example Wikman (1937) and Kok (1998) for descriptions of such practices). In this way young men kept the young women of the village for themselves and inheritances stayed within the village (Van Poppel and Ekamper 2005). Parents also had an interest in their children's marriages, if

only because their own future depended on them. Local marriages of children made it more likely that property was kept within the family and that the children lived close by and could be called upon when needed.

The choice of a particular spouse also depends on the marriage market. The chances to marry are higher the more often one meets and the more often one interacts on a day-to-day basis (Blau, Blum, and Schwartz 1982; Kalmijn and Flap 2001). In the nineteenth century the possibilities of regularly meeting someone who lived outside of a person's village or city were limited. Most daily activities took place within an area of a few kilometers (one hour by foot). This may just have included a few neighboring villages. Van Poppel and Ekamper (2005) calculated that if one wanted to meet someone and return home on the same day, the maximum distance was 20 kilometers. Even without preferences and norms, local marriages would therefore be much more likely than marriages covering a large distance. In fact, as Kasakoff and Adams (1977) note, cultural homogamy may be (partly) a by-product of a tendency to marry nearby combined with the probability that people nearby have the same culture.

The three mechanisms concerning preferences, third parties, and the marriage market reinforce each other. Because of the preference for culturally similar others, people interact on a daily basis more often with others from the same region than with strangers, even if there are no restrictions due to distances. And because young men from the same village are more likely to meet, it is much easier to enforce a local norm than a norm covering a larger region. Finally, as Catton and Smircich (1964) suggest, the difficulties in finding a partner from far away may lead to a low number of geographically heterogamous marriages, enforcing the local customs and norms.

During the nineteenth century society changed considerably, with significant consequences for all three mechanisms, increasing the likelihood of geographically heterogamous marriages (Van Poppel and Ekamper 2005). Cultural differences between regions became smaller. Mass communication played an important role in this. Former 'boundaries of time, space and status' (Treiman 1970: 219) were crossed by means of mass communication such as newspapers, technical magazines, and fashion brochures. Newspapers enhanced the awareness of the world beyond regional boundaries, even beyond national boundaries. Newspapers also contained advertisements on products of mass consumption - by definition not restricted to a local audience. In magazines such as *De Economist* all sorts of issues were discussed that concerned the entire country: for example whether to make Vlissingen the main Dutch port (rather than Amsterdam and Rotterdam), or if everybody ought to have a letterbox at home (Van der Woud 2007: 244, 340). The rising urban culture spread through the country and also affected those in more rural areas (Van der Woud 2007: 187). People learned about habits and ways of living in other regions and increasingly copied whatever they liked most. In this way the mass media led to the "diminution of regional, ethnic, and class differences in

attitudes and behaviour" (Treiman 1970: 219). The preferences of brides and bridegrooms for a culturally similar spouse may not have changed, but with a growing tendency towards a 'mass' culture, culturally similar spouses could now also be met outside the local region (Zijdeman and Maas forthcoming).

The trend towards decreasing cultural differences between local communities also affected the influence of third parties on the selection of a spouse. Decreasing cultural differences are likely to have made it more difficult for the peer group to recognize strangers and to exclude them from the local marriage market.

The loss of influence of peers was not compensated for by the increasing influence of other third parties. On the contrary, the influence of other third parties, parents, and church on the marriage behaviour of young people also became weaker (Goode 1964; Shorter 1973). The possibilities of young adults earning a living independently from their parents increased, and the dependence of older people on financial assistance from their offspring declined. It was no longer a necessity for parents to steer their children into a good or at least an acceptable marriage. All kinds of heterogamy are therefore expected to have become more common (e.g. Van Leeuwen and Maas 2002). The diminishing cultural differences and the decreasing influence of third parties lead to the hypothesis that *people born in a place and period with better mass communication facilities find spouses at a greater distance* (H1).

During the nineteenth century bicycles, steam trams, and steam trains allowed an increasing number of people to travel (Van der Woud 2007: 188). These new means of mass transport greatly increased the distances people could travel within a short time. Whereas it is probable that the time that people were willing to invest in travelling to and from work hardly changed at all, within one hour they could now cover 50 kilometers or more. Originally trams and trains connected only a few places. Nevertheless, increasing numbers of people travelled large distances every day. On the one hand those from rural areas were drawn to the city for economic as well as cultural reasons (Verrijn Stuart 1910-1917). In the city wages were higher and the numerous developments and the diversity that characterized cities appear to have attracted especially the younger rural inhabitants (Van der Woud 2007: 186-187). On the other hand the inhabitants of more urban municipalities started to explore the countryside and visited other cities to experience what was beyond the borders of their own municipality (Van der Woud 2007, chapter 10). The likelihood that people met someone from outside their municipality increased as did the feasibility of maintaining a relationship. We therefore hypothesize that *individuals born in a place and period with better access to means of mass transport find spouses at a greater distance* (H2).

Already in the nineteenth century higher social classes showed 'modern' marriage patterns, in the sense that they found their partner outside their own municipality more often than lower social classes (e.g. Koller 1948; Van Poppel and Ekamper 2005). This

is often explained by the higher social classes' strong distaste for heterogamy with respect to economic and cultural characteristics. The more resources they had, the more they and their parents were protecting these by avoiding a marriage below their own rank. But especially in small places the number of equals was limited, and as a consequence partners had to be found elsewhere. The sparse number of people from the higher social classes, combined with their preference for a spouse from the same social background, made them search for a partner further away.

Higher classes were also more 'modern' in their use of means of transport. They could afford to travel over larger distances before relatively cheap means of mass transport were developed. Their opportunities to meet similar others from other places were thus greater than those of lower class people.

Both mechanisms causing more geographical heterogamy among the higher classes are affected by the rise of mass communication and by the development of mass transport. Mass communication was an important factor in decreasing the cultural differences between regions, but also between social classes. Although higher social classes still had economic resources to protect, cultural differences with members of other classes became easier to overcome. This made it easier for them to find a partner nearby. This trend for the higher classes to marry geographically less heterogamously is contrary to the one expected for society as a whole. Because the higher social classes are a minority within society, this trend may have been hidden in studies that focus only on the average change in heterogamy. We hypothesize that *among people in a place and period with better mass communication facilities the positive effect of social status on the distance between the places of birth of spouses is smaller* (H3).

At the same time the development of trains and trams made it possible for lower social classes to travel as far and as regularly as had previously been afforded only by the higher classes. Together with the decline of regional cultural differences, this increased the likelihood of lower class members meeting an acceptable partner living at a greater distance and of maintaining a relationship that could result in marriage. This declining association between social class and geographical heterogamy is in line with the general idea that geographical heterogamy became more common over time due to better transport possibilities. We hypothesize that *among people in a place and period with better access to means of mass transport the positive effect of social status on the distance between the places of birth of spouses is smaller* (H4).

Our hypotheses on heterogamy apply to both brides and grooms. Heterogamy is a characteristic of a marriage, not of a person. If a bride marries heterogamously, the same is per definition true for the bridegroom. However, personal characteristics and characteristics of places of birth may be different for brides and bridegrooms. According to the theory, the general mechanisms of preferences, opportunities, and third parties are the same for bridegrooms and brides. We therefore refrain from

formulating hypotheses on gender differences in the effects of the characteristics of bride and groom and their places of birth.

3. Data, variables, and method

3.1 Data

In order to test our hypotheses we need data both on the birthplaces of the bride and the bridegroom as well as data on the timing of these events. This information is derived from the marriage records of the total population of the Dutch province of Overijssel born after 1808 and married before 1923. The data were collected as part of the Genlias project. This is an ongoing project in which marriage (and birth and death) registers of the Dutch population are being digitalized. The work is not finished for all provinces in the Netherlands. Therefore we restricted the analyses to the province of Overijssel. Overijssel was preferred over other Dutch provinces for several reasons. Although Overijssel has a border with Germany, the part of the population of this province that was born in Germany but married in Overijssel, or vice versa, was relatively small compared to other provinces (e.g. Limburg). Furthermore, Overijssel is not divided by large bodies of water, as is the province of Zeeland. The river Ijssel flows through Overijssel, but comparable rivers can be found in all provinces of the Netherlands. Finally, Overijssel is one of the larger provinces of the Netherlands. Birthplaces within the province can be almost 100 kilometres apart; clearly a distance for which a train is important.

The dataset includes 175,539 marriages in total. For six municipalities in Overijssel context data could not be linked.[3] Furthermore sometimes there was no information on the birth municipality of bride and/or groom, decreasing the number of useful marriage records to 119,281.

Some studies (also) analyze the distance between places of residence of bride and bridegroom at the time of their marriage (e.g. Bossard 1932; Van Poppel and Ekamper 2005). However such information should be retrieved from sources other than marriage records, because places of residence are not recorded on Dutch marriage certificates. To retrieve places of residence for all brides and grooms in our sample would be a very time-intensive undertaking, if it proved feasible and successful at all. Moreover, the analysis of places of birth has a distinct advantage. Problems of causal order are greater when analyzing places of residence at marriage than when analyzing places of birth. Since we do not know when and where couples met, we cannot distinguish between

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[3] Almelo, Delden, Hardenberg, Kedingen (Richterambt), Ommen, and Vollenhove.

moves before and after meeting. Moves after meeting, however, can be affected by the partnership. To exclude these reversed effects, it is better to analyze distances between places of birth than between places of residence at marriage.

Due to data limitations the information on the characteristics of the municipalities of birth is restricted to municipalities in the province of Overijssel. Therefore only marriages will be analyzed in which both the bride and the bridegroom not only marry in but are also born in Overijssel, which is the case for about half of the marriages (52.5%). As a consequence the geographical heterogamy will be underestimated in our data and probably also the amount of change over time. Since this works against our hypotheses, they will be put to an especially strong test. The selection of marriages by those born in Overijssel also causes some bias with regard to the groom's background. On average grooms from Overijssel have a somewhat lower social background than grooms born beyond the Overijssel borders (3.2 points on the occupational prestige score HIS-CAM, which ranges from 1 to 99). There is no significant difference in social background for brides.

Another reduction in the number of marriages that will be analyzed is the result of missing information on independent variables. On almost all variables, information is only missing in a few cases. The exceptions are the occupational status of the father of the bride and the bridegroom. Usually marriage registers contain occupational information on about half of the fathers. Most missing values are caused by the early death of the parents. In the Netherlands in this period adult mortality is not related to social class (Van Poppel and Van Gaalen 2008). The 31,787 marriages that will be analyzed are therefore probably a good representation of all marriages of brides and grooms who were born and married in the province of Overijssel.

3.2 Dependent variables

Geographical heterogamy - likelihood determines whether a bride and groom originate from different municipalities of birth (1) or not (0). The names of the places of birth were coded into the Amsterdam Code (Van der Meer and Boonstra 2006). This Dutch geographical coding system was developed to overcome coding issues with regard to name changes of municipalities or even merging of municipalities.

Geographical heterogamy - distance is defined as the distance between the municipality of birth of the bridegroom and the municipality of birth of the bride. The distance is measured as a straight line between two points.

3.3 Independent variables

Status of the groom's/bride's father is a HIS-CAM score (Lambert et al. 2008). HIS-CAM is an historical occupational stratification scale, developed with techniques analogous to the CAMSIS scales (Stewart, Prandy, and Blackburn 1982). The scales are based on the principle that the social positions of those who interact more often are closer. For HIS-CAM the association scores were derived using Goodman's RCII models on observations derived from 1.5 million marriage records from 6 different countries (Britain, Canada, France, Germany, the Netherlands, and Sweden) covering the period 1800-1938. Next the associations were transformed onto a scale ranging from 1 to 99, the minimum and maximum values of HIS-CAM. In the analyses the HIS-CAM scores of the groom's and bride's father are centered on the grand mean, the average score across all observations. In order to assign HIS-CAM scores to the occupation of the fathers of the groom and bride, the occupations were first coded into HISCO (Van Leeuwen, Maas, and Miles 2002). HISCO is an historical international standard classification of occupations based on ISCO'68. A matching procedure available from the HIS-CAM website (http://www.camsis.stir.ac.uk/hiscam/) was used to code occupations from HISCO to HIS-CAM.

   Year of marriage is measured in years since 1800. We divided the number of years by 10. Effects can thus be interpreted as the amount of change in the dependent variable per 10 years. We include year of marriage in the models in order to show that geographical heterogamy increased over time.

   Means of mass transport in the municipality of birth of the bridegroom/bride: This variable indicates whether there was a steam train or tram station present in the year when and municipality where the bridegroom/bride was born. The information was derived from two archival studies: Sluiter (2002) and Bramer (2008). The first train station in Overijssel was opened in 1864 in Zwolle, connecting it to Utrecht about 90 kilometers south-west of Zwolle. Several stations followed soon after, and by 1890 there were about two-dozen train stations.

   Mass communication facilities in the birth municipality of the bridegroom/bride: indicates whether there was a post office available in the year and municipality of the birth of the bridegroom/bride. The information was derived from the annual reviews of the Dutch service for mail and telegraphy. Post offices distributed letters but also mail intended for a broader audience, such as newspapers, magazines, and fashion brochures. Opinions on how to behave and dress as well as news from outside the local region reached an increasing number of people, despite differences in, for example, social background, religion, or local culture. The number of post offices increased dramatically in the nineteenth century. Whereas at the beginning of the nineteenth century there were only five municipalities with a post office (Almelo, Deventer,

Enschede, Kampen, and Zwolle), the number of post offices had increased five-fold by the beginning of the twentieth century.

3.4 Control variables

Age at marriage of the bridegroom/bride: it has often been found that older brides and grooms marry more heterogamously than younger ones. However, research on geographical heterogamy failed to replicate this general finding (e.g. Kok and Mandemakers 2008). Nevertheless we include age at marriage as a control variable in the analyses.

Population size of municipality of birth: Catton and Smircich (1964) compared several models for the likelihood that two people from two different places marry, and concluded that this not only depends on the distance between the two places but also on the sizes of the population. In crowded cities meeting opportunities at distances close to zero are much larger than in extended rural communities. We therefore have to take into account the population size of the municipality of birth of the bride and the groom. This is all the more necessary because we cannot distinguish distances between birth locations within municipalities. Previous studies showed more geographic endogamy in larger places (e.g. Gueresi, Pettener and Maruzzi Veronesi 2001; Kok and Mandemakers 2008). Since larger places are also more likely to have a train station and post office, we need to include population size as a control variable in order to correctly estimate the effects of these indicators of mass transport and mass communication. Information on population size was derived from the Historical Database of Dutch Municipalities (HDNG) for the years 1809, 1829, 1849 and 1851-1915 (Beekink et al. 2003). Population size is measured as the number of inhabitants per hundred. For the years in between for which no information is available we use weighted estimates, where the weights are based on proximity to the years for which information is available.

Table 1 provides a description of all variables in the analyses, while Table 2 indicates how the availability of mass transport and mass communication changed from decade to decade within the province of Overijssel.

Table 1: **Descriptive information on the dependent and independent variables, Overijssel 1809-1906 (1922)**

	N	Mean	Std. Dev.	Min	Max
Independent variables					
Bride and bridegroom originate from different municipalities (1) or not (0)	31787	0.39			
Distance between birthplaces of bride and bridegroom (km)	31787	5.75	11.33	0.00	91.27
Marriage characteristics					
Status of the bridegroom's father[a]	31787	0.00	8.54	-37.62	50.78
Status of the bride's father[a]	31787	0.00	8.54	-37.53	50.87
Year of marriage/10 (in years since 1800)	31787	8.82	2.52	2.90	12.20
Age at marriage of the bridegroom	31787	26.54	4.43	16.00	61.00
Age at marriage of the bride	31787	24.23	3.98	16.00	53.00
Characteristics of the birth municipality of the bridegroom in a certain year					
Presence of a train or tram station (1) or not (0)	4277	0.17			
Presence of a post office (1) or not (0)	4277	0.12			
Population size (per hundred)	4277	42.55	42.31	2.55	379.39
Characteristics of the birth municipality of the bride in a certain year					
Presence of a train or tram station (1) or not (0)	4315	0.17			
Presence of a post office (1) or not (0)	4315	0.13			
Population size (per hundred)	4315	43.05	42.96	2.42	379.39

[a] centered around the grand mean

Table 2: **Expansion of mass transport and mass communication, Overijssel 1801-1910**

Time	Number of municipalities with post offices	Number of municipalities with a tram or train station
1801-1810	3	0
1811-1820	5	0
1821-1830	5	0
1831-1840	6	0
1841-1850	7	0
1851-1860	7	0
1861-1870	9	15
1871-1880	16	15
1881-1890	20	22
1891-1900	24	22
1901-1910	25	28

Source: Own calculations based on the annual reviews of the Dutch service for mail and telegraphy for post offices 1880-1910 and Sluiter (2002) and Bramer (2008) for tram and train stations.

3.5 Method

The research questions will be answered by estimating hierarchical linear models of marriages clustered in contexts. A context is a municipality in a certain year. Because there are two persons involved in each marriage there are two sets of municipalities, those of the bride and those of the bridegroom. Therefore we will estimate separate models related to the municipalities of birth of the groom and of the bride. The number of contexts differs slightly between the analyses for brides and for grooms. This is caused by the fact that some municipalities are so small that it is possible that in a certain year only boys or only girls are born who eventually marry in Overijssel. To answer our research questions we will use both logistic regression and linear regression in order to estimate whether brides and grooms were born in different municipalities, and if so how far apart the municipalities were. In order to answer the second question, on the changing influence of the father's occupational status, interaction effects between the indicators of mass transport, mass communication, and social status of the bride and the bridegroom will be added. Correlations between the indicators of mass transport, mass communication, and population size are small to moderate ($.42 \leq r \leq = .55$), allowing us to include all three of them simultaneously in the models.

4. Results

4.1 Descriptive results

Not all persons marrying in Overijssel were also born there. Figure 1 provides an overview of the birthplaces of brides and grooms of 119,258 couples marrying in Overijssel. This scatterplot resembles the Netherlands, indicating that grooms and brides from outside Overijssel came from various parts of the Netherlands, not just from regions bordering Overijssel. Most markers representing the shape of the Netherlands indicate birthplaces of grooms, suggesting that the geographical background of Overijssel grooms was more heterogeneous than that of Overijssel brides. The size of the markers is related to the number of brides and grooms from a certain municipality. The figure shows that most grooms and brides are from municipalities within Overijssel. In total 88.2 % of Overijssel brides and 84.0 % of Overijssel grooms were born in Overijssel.

Figure 1: **Birthplaces of brides and grooms, born after 1808 and married in the province of Overijssel, before 1923. N = 119,258; $N_{birthplaces\ bride}$ = 614; $N_{birthplaces\ groom}$ = 814.**
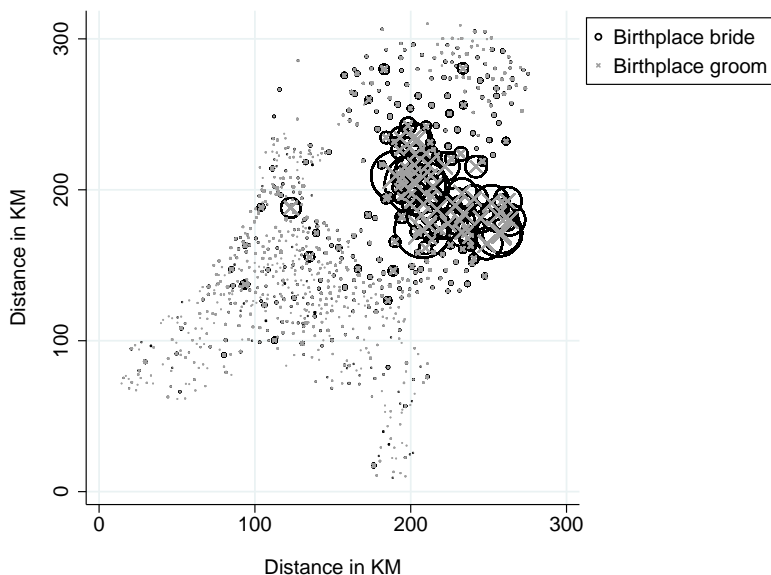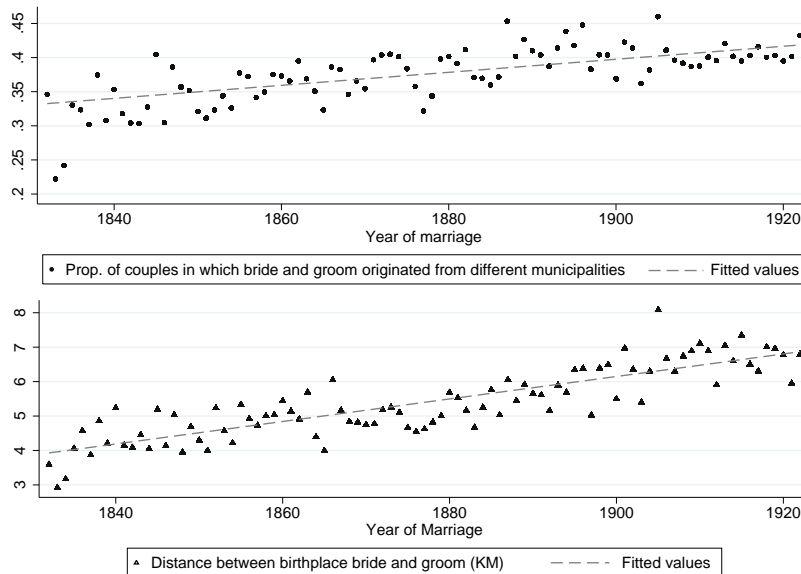
Figure 2 addresses the question of whether there was an increase in the proportion of heterogamous couples over time, and whether grooms and brides were able to find each other over increasingly large distances. About 35% per cent of brides and grooms born and marrying in Overijssel were from different municipalities. The figure shows a slight increase in the proportion of these heterogamous marriages over time. Over a century the proportion increased significantly by about 9 % (p = 0.000).

The increase in the distance between the birthplaces of brides and grooms is clearly visible in Figure 2. In the nineteenth century the distance increased significantly at a rate of approximately 300 meters per decade, from about 4 kilometers in 1829 to 7 kilometers in 1922 (p=0.000). Thus over time brides and grooms came more often from different municipalities, and the distance between the municipalities increased. In the next section we will try to explain these changes using information on the brides and grooms and their municipalities of birth.

Figure 2: **Proportion of couples in which the bride and groom originated from different municipalities and average distance between municipalities of birth. N$_{proportion}$ = 31,787; N$_{distance}$ = 12,274.**

4.2 Test of the hypotheses on the likelihood of marrying outside the municipality of birth

For each hypothesis there are four separate tests. We separately analyze the likelihood of marrying outside the municipality of birth and the distance between the municipalities of birth of brides and bridegrooms in the case where these municipalities are not the same, and we do so for the bride and the bridegroom.

Tables 3 and 4 show the results of the analyses of the likelihood of marrying outside the municipality. Model 0 shows that there is considerable variance in the likelihood of marrying outside the municipality of birth at the context level (i.e. municipalities of birth in a certain year). Since the variance at the level of marriages is fixed at 3.29 (Snijders and Bosker 1999) the percentage of variance at the context level (the intraclass correlation) is 9.8% in the case of bridegrooms (0.357/(0.357+3.29)) and 10.2% in the case of brides. In other words, 10% of the variation in the choice for a geographically heterogamous spouse has to do with the period and region a bride or groom was born in, rather than with characteristics of the bride and groom themselves. Subsequent analyses not shown here indicate that most of this contextual variation is regional rather than temporal.

In line with our expectations, the likelihood of marrying outside the municipality of birth increased over time, both for brides and bridegrooms. The odds of a geographically heterogamous marriage increased by approximately 8% per decade ($e^{0.08}$ = 1.08). Contrary to our expectations, this likelihood is neither connected to the status of the father of the bride nor to that of the father of the bridegroom (Model 1). Older brides and bridegrooms are, compared to younger ones, more likely to marry someone born in another municipality than their own municipality of origin.

The effects of the presence of a train or tram station in the municipality of birth on the likelihood of a heterogamous marriage are negative both for the bride and the bridegroom, but only in the case of the bridegroom is this effect significant. We hypothesized that this effect would be positive because the train or tram would facilitate meeting and mating over a larger distance. The effect of the presence of a post office is, as expected, positive, but again only significant for bridegrooms. Bridegrooms who are born in a municipality with a post office are more likely to marry to a woman who is not born in that same municipality than bridegrooms born in municipalities without a post office. Finally, Model 1 shows that brides and grooms born in large municipalities are more likely to find a spouse in their municipality of birth than brides and grooms born in small municipalities. An increase in population size by 1,000 inhabitants decreases the odds of a geographically heterogamous marriage by 5 %, an increase of 10,000 inhabitants decreases the odds by 39 %.

Table 3: Logistic multilevel regression model of difference (1) in birthplace of marriage partners or not (0), explained by individual and contextual characteristics of grooms born after 1808 and married before 1923, Overijssel, the Netherlands.

	Model 0		Model 1		Model 2	
	coef.	s.e.	coef.	s.e.	coef.	s.e.
Constant	**-.371**	.016	**-1.193**	.093	**-1.192**	.093
Marriage characteristics						
Father's status			.001	.001	.002	.002
Year of marriage/10			**.079**	.007	**.079**	.007
(in years since 1800)						
Age at marriage			**.014**	.003	.014	.013
Characteristics of the municipality of birth						
in a certain year						
Presence of a train or tram station			**-.131**	.052	**-.125**	.052
Station x father's status					-.007	.004
Presence of a post office			**.264**	.050	**.260**	.050
Post x father's status					.000	.000
Population size (per hundred)			**-.005**	.000	**-.005**	.000
Population size x father's status					.000	.000
Variance components						
Marriage						
Municipality bridegroom * year	**.357**	.021	**.292**	.019	**.292**	.019
Father's status			.000	.000	.000	.000

N of marriages = 31,787; N of birth places of the groom * year = 4,277.
Bold coefficients are significant at the p<.05 level.

Table 4: **Logistic multilevel regression model of difference (1) in birthplace of marriage partners or not (0), explained by individual and contextual characteristics of brides born after 1808 and married before 1923, Overijssel, the Netherlands.**

	Model 0		Model 1		Model 2	
	coef.	s.e.	coef.	s.e.	coef.	s.e.
Constant	**-0.403**	.016	**-1.197**	.094	**-1.206**	.095
Marriage characteristics						
Father's status			-.000	.001	.001	.002
Year of marriage/10			**.084**	.007	**.085**	.003
(in years since 1800)						
Age at marriage			**.015**	.003	**.015**	.003
Characteristics of the municipality						
of birth in a certain year						
Presence of a train or tram station			-.039	.050	-.025	.051
Station x father's status					**-.008**	.004
Presence of a post office			.016	.050	.001	.050
Post x father's status					**.009**	.004
Population size (per hundred)			-.005	.000	**-.005**	.000
Population size x father's status					.000	.000
Variance components						
Marriage						
Municipality bride * year	**.373**	.021	**.297**	.019	**.296**	.019
Father's status			.000	.000	.000	.000

N of marriages = 31,787; N of birth places of the bride * year = 4,315.   Bold coefficients are significant at the p<.05 level.

With Model 2 we test the hypothesis that access to mass communication and mass transport led to a decreasing positive effect of father's social status on the likelihood of marrying outside the municipality of birth. Overall we did not find such a positive effect, but for brides we find two significant interaction effects. Whereas the presence of a train or tram station, as expected, decreases the effect of the father's status on geographical heterogamy, the presence of a post office has the opposite effect. Small and large municipalities show no difference with respect to a social gradient of geographical heterogamy.

4.3 Test of the hypotheses on the distance between municipalities of birth in the case where these are not the same

Tables 5 and 6 show the analyses of the distance between the municipalities of birth of bride and bridegroom in the case where these municipalities are not the same. Model 0 shows that there is considerable variance in the distance between birth municipalities between marriages and between contexts. In the case of bridegrooms, the variance at the level of the context (intraclass correlation) is 7.2% (14.049/(14.049+181.521)); in the case of brides this is 10.5%.

Table 5: **Multilevel model of distance (in km) between the birth places of marriage partners explained by individual and contextual characteristics of grooms born after 1808 and married before 1923, Overijssel, the Netherlands.**

	Model 0		Model 1		Model 2		Model 3	
	coef.	s.e.	coef.	s.e.	coef.	s.e.	coef.	s.e.
Constant	**14.623**	.143	**12.538**	.938	**12.515**	.938	**11.083**	.939
Marriage characteristics			**.125**	.016	**.106**	.020	**.098**	.023
Father's status			**.322**	.061	**.320**	.061	**.292**	.060
Year of marriage/10					**-.061**	.028	-.051	.028
(in years since 1800)								
Age at marriage			**-.062**	.028				
Characteristics of the municipality					-.127	.443	**-1.161**	.442
of birth in a certain year								
Presence of a train or tram station			-.179	.441	-.033	.047	-.056	.050
Station x father's status					**3.906**	.378	**1.383**	.429
Presence of a post office			**3.983**	.375	**.085**	.042	.076	.048
Post x father's status							**.037**	.003
Population size (per hundred)							.000	.000
Population size x father's status								
Variance components								
Marriage	**181.521**	2.626	**174.305**	2.634	**174.211**	2.633	**173.569**	2.615
Municipality bridegroom * year	**14.049**	1.624	**8.879**	1.431	**8.888**	1.429	**7.083**	1.358
Father's status			**.087**	.014	**.087**	.014	**.089**	.014
Deviance (-2*loglikelihood)	99473.180		99111.080		99106.650		98972.080	

N of marriages = 12,274 (only marriages of which the birth places are not the same); N of birthplaces of the bridegroom * year = 3,695.
Bold coefficients are significant at the p<.05 level.

Table 6: **Multilevel model of distance (in km) between the birthplaces of marriage partners explained by individual and contextual characteristics of brides born after 1808 and married before 1923, Overijssel, the Netherlands**.

	Model 0		Model 1		Model 2		Model 3	
	coef.	s.e.	coef.	s.e.	coef.	s.e.	coef.	s.e.
Constant	**14.576**	.148	**10.898**	.950	**10.880**	.950	**9.643**	.949
Marriage characteristics								
Father's status			**.128**	.016	**.081**	.019	**.102**	.023
Year of marriage/10			.237	.063	.230	.063	**.194**	.062
(in years since 1800)								
Age at marriage			.023	.031	.025	.031	.031	.031
Characteristics of the municipality								
of birth in a certain year								
Presence of a train or tram station			**1.257**	.456	**1.368**	.456	.410	.445
Station x father's status					-.072	.045	-.045	.047
Presence of a post office			**3.658**	.404	**3.596**	.404	**1.143**	.453
Post x father's status					**.218**	.042	**.273**	.048
Population size (per hundred)							**.037**	.003
Population size x father's status							-.001	.000
Variance components								
Marriage	**174.412**	2.548	**167.779**	2.567	**167.435**	2.562	**167.014**	2.548
Municipality bridegroom * year	**20.372**	1.787	**14.756**	1.602	**14.753**	1.598	**12.868**	1.536
Father's status			**.078**	.014	**.076**	.014	**.075**	.014
Deviance (-2*loglikelihood)	99316.730		98945.520		98916.810		98785.850	

N of marriages = 12,274 (only marriages of which the birth places are not the same); N of birthplaces of the bride * year = 3,649.
Bold coefficients are significant at the p<.05 level.

As expected brides and bridegrooms with a higher status social background marry over a greater distance on average than brides and bridegrooms with a lower status social background (Model 1). A difference of about 8 status points (on a scale of 0 to 100) leads to a one-kilometer greater distance on average for both brides and bridegrooms. In line with the bivariate results, the distance between the places of birth increased over time. These effects persist after taking into account differences between municipalities with respect to access to mass transport and mass communication.

The presence of a tram or train station only has the predicted positive effect on the distance between birth municipalities if this train station was located in the municipality of the bride. The size of the effect is small. On average brides who are born in a municipality with access to these modern means of transport marry someone one kilometer further away than those born in municipalities without such access.

The presence of a post office is connected to greater distances between the birth municipalities of spouses. The effects are comparable for the birth municipalities of the bride and of the bridegroom. In both cases the distance is almost 4 kilometers greater if the bride or the bridegroom was born in a municipality with these mass communication facilities.

Model 2 tested whether the positive effect of the status of the spouses' social background is smaller in contexts (municipalities and years) with more access to mass communication and mass transport. The presence of a train station appears to be unrelated to the status gradient in distance. If there is a post office in the municipality of birth, the difference between high and low status groups with respect to distance is greater than if there is no post office. This is contrary to expectations. The access to mass communication seems to have enlarged the status differences in geographical heterogamy. This finding is consistent for the birth municipality of the bride and of the bridegroom, but the effect is larger for brides' municipalities.

Finally, in model 3 we investigate whether other aspects of the municipality of birth affect the distance at which brides and bridegrooms find their spouse. We do so by adding population size of the birth municipality to the model. This indicator is connected to many aspects of modernization. Contrary to the likelihood of marrying within the municipality of birth the population size is not per definition connected to the distance between the municipalities of birth. However the results show a strong relation. If people born in larger cities marry someone from another municipality, they do so at a greater distance than people born in smaller municipalities. For grooms, the size of the municipality also decreases the social gradient of geographical homogamy. The effect of a groom's background status on the distance over which he finds a bride is smaller in larger municipalities.

Population size, and the many aspects of modernization connected to it, explains part of the positive effect of access to mass communication on geographical heterogamy. The positive effect of the presence of a train or tram station in the place of birth of the bride is no longer significant after population size is taken into account.

5. Discussion

Our first research question was whether the increase in geographical heterogamy that took place during the nineteenth century can be explained by the development of mass transport and mass communication. Descriptive analyses confirmed the existence of a trend towards more geographical heterogamy. Both the likelihood of marrying outside the municipality of birth and the distance between municipalities of birth when these

were not the same increased over time. This increase of heterogamy did not completely disappear after taking into account access to mass communication and mass transport.

According to our first hypothesis individuals born in a place and period with better mass communication facilities found spouses at a greater distance. Three of the four tests of this hypothesis are positive. The presence of a post office in the municipality of birth increases the likelihood of bridegrooms marrying outside this municipality, and it also increases the distance between the municipalities of birth, both in the case where the post office was located in the birthplace of the bride and in the case where it was located in the birthplace of the bridegroom.

There is less support for the hypothesis that access to mass transport was an important determinant of the trend towards heterogamy. Of the four tests of this hypothesis (brides and bridegrooms, likelihood of heterogamy, and distance) only one shows the predicted result: if there was a train or tram station in the municipality of birth of the bride, she married at a greater distance. However this effect seems to be caused by the fact that larger places are more likely to have a train or tram station. If we take the population size of the municipality of birth of the bride into account, whether or not there is a station is no longer important. Since the two other tests show no significant effect and one test even shows the opposite, we conclude that this hypothesis is not supported.

Our second question was whether the social gradient in geographical heterogamy weakened over time and whether this could be explained by the development of mass transport and mass communication. Overall we did not find a social gradient in the likelihood of marrying within the municipality of birth, but there was such a gradient in the distance between municipalities of birth of those who did not do so.

Although all the four interaction effects between access to mass transport and father's social status were negative, only one of them was significant. In municipalities without a train or tram station daughters of high status fathers were just as likely to marry someone outside their municipality of birth as daughters of low status fathers. In municipalities with a train station, high status daughters were less likely to do so. Although this interaction effect is negative, as predicted, it is not in line with the hypothesis, because it was not expected that the effect of status on heterogamy would become negative. The hypothesis that among people in a place and period with better access to means of mass transport the positive effect of social status on the distance between the places of birth of spouses is smaller is therefore not supported.

There are at least two explanations for why we do not find that mass transportation brought about a reduction in the social gradient of geographical heterogamy. First, our measurement of mass transport may be too crude. It could be improved upon in several ways. The railroad network could be studied, rather than treating all municipalities with a train or tram station in the same way. While some of the stations gave access to

national and even international railway lines, others were only connections between a few neighbouring places. Furthermore, it could be taken into account that inhabitants of municipalities within a certain radius of the railway station (e.g. 5 kilometers) also had access to the railway station. By just looking at the municipality with a station we may have underestimated this.

A second reason why we do not find variation in the social gradient of heterogamy due to mass transport might be that men and women with different social-economic backgrounds used different types of mass transport. The new means of mass transportation may have been restricted to the wealthier at first, whereas the more traditional and less efficient means of transport, such as horse-and-carriage and tow boat, were financially more attractive to those of lower standing. Since archival accounts on the traditional means of transport are fragmental we could only take the modern means of transport into account.

There is even less support for the hypothesis that among people in a place and period with better facilities of mass communication, the positive effect of social status on the distance between the birthplaces of spouses is smaller. Three of the four tests show a significantly stronger social gradient in municipalities with a post office than in municipalities without. In the fourth case, that of bridegrooms marrying someone from within or outside their municipality of birth, the presence of a post office is not related to social gradient.

In our analyses we treated the results for men and women and for heterogamy and distance as four independent tests of our hypotheses. Was that a reasonable approach, or are there systematic differences? As the summary of results shows, there are not many deviations from the general pattern. The only one worth mentioning is the absence of a positive effect of the availability of mass communication on the likelihood of women to marry someone outside their place of birth. It is difficult to explain this deviation.

If we look beyond our hypotheses there are two interesting differences between the analyses of whether or not to marry someone outside the municipality of birth, and of the distance between the birthplaces of brides and grooms. First, social status of the father only matters for the latter. This can probably be explained by the fact that it does not require many resources to travel to a neighboring village, but this changes if long distances have to be covered. Secondly, men and women born in larger municipalities are more likely to marry someone from their own municipality, but if they marry someone from another municipality, this person comes from farther away. The first is probably a direct effect of the larger size of the marriage market in cities compared to villages. The latter may be explained by the more universalistic values of people born in cities. Alternatively, it may point to a preference of people born in cities for a partner who was also born in a city. The distance between two 'neighboring' cities is on average longer than the distance between two 'neighboring' villages.

That cities and their culture played a key role in the development of geographical heterogamy is indirectly supported by historical accounts of the unification of the Netherlands. Apart from economic attractiveness cities provided a cultural appeal to those who wanted to enjoy life more intensely and diversely (Verrijn Stuart 1910). Van der Woud (2007, ch. 10) emphasizes that this new urban culture extended beyond the city boundaries and was adopted in more rural areas as well. But while the longing for urban culture may have overcome differences in regional background, enhancing social cohesion on the national level, we find no evidence that it also decreased the social gradient in heterogamy.

All in all, explanations of changes in geographical heterogamy based on culture, indicated by the presence of a post office, seem more important than explanations based on the opportunity structure, as indicated by the presence of a train or tram station. But this may be too strong a conclusion. Although the appearance of means of mass communication especially seems to affect geographical heterogamy through the weakening of cultural differences, and the development of new means of mass transport through the decreasing importance of distance, the distinction is not perfect. Newspapers included matrimonial advertisements, increasing the likelihood of coming into contact with someone from a different region. Keeping contact through letters was also made easier because of the increasing efficiency of the post. On the other hand travelling may also have increased people's knowledge and acceptance of other cultures.

The persistent (unexplained) trend towards more geographical heterogamy demands alternative explanations. There are several possibilities. First, of the many developments in the nineteenth century we only took three into account: mass communication, mass transportation, and, to a lesser extent, urbanization. Other developments, especially with regard to occupational structure such as industrialization and educational expansion, are argued to have shifted the preferences of people looking for a partner from ascribed towards achieved characteristics. Therefore the partner selection process in more industrialized municipalities may have differed from that in less developed regions not only because the importance of a shared birthplace – an ascribed characteristic – differed, but also because of differential preferences for similarity in other characteristics. In general the stronger these other preferences, the more likely the marriage will be geographically heterogamous.

Secondly, geographical heterogamy is probably also affected by changes in geographical segregation on 'preferred' characteristics (e.g. social class or religion). If segregation decreases but preferences remain the same, this should enhance geographical heterogamy. However it may also be the case that segregation decreases as a consequence of the declining importance of a certain characteristic. For example, geographical segregation with respect to religion may decline because religion plays a

less important role in life. In that case the decrease in segregation probably does not have any consequences for geographical heterogamy.

Thirdly, the importance of local culture may also decline because of reasons other than the development of means of mass communication. Both educational expansion and increasing economic contacts between regions are plausible alternative causes. These three alternative explanations ask for an empirical test.

Finally, the present analyses can be improved with respect to the modelling of meeting opportunities. The number of people living at certain distances may differ greatly between municipalities. In general at a greater distance the area is larger, and thus more people live within this area (Bossard 1932). However this effect is certainly not linear since it depends on the relative locations of cities and sparsely populated areas. It would also be an improvement to look beyond the presence of means of mass transportation by taking into account which municipalities were connected to each other by means of railways. Finally, there are natural barriers that may effect who meets whom (e.g. the river 'Lek' in the case of Gouda - Van Poppel and Ekamper 2005 and the Ebro river in Spain - Esparza, Carcía-Moro, and Hernández 2006). Esparza et al. (2006) find that permanent inhabitants of the region are especially influenced by such barriers, whereas in-migrants are less bothered. Including natural barriers in the models may improve the estimation of the other effects.

6. Acknowledgements

Literature

Beekink, E., Boonstra, O.W.A. Engelen, T., and Knippenberg, H. (2003). *Nederland in Verandering. Maatschappelijke ontwikkelingen in kaart gebracht, 1800-2000*. Amsterdam: Aksant.

Blau, P.M., Blum, T.C., and Schwartz, J.E. (1982). Heterogeneity and intermarriage. *American Sociological Review* 47: 45-62. doi:10.2307/2095041.

Blossfeld, H.-P. and Timm, A. (eds.) (2003). *Who marries whom? Educational systems as marriage markets in modern societies*. Dordrecht/Boston/London: Kluwer Academic Publishers.

Bossard, J.H.S. (1932). Residential propinquity as a factor in marriage selection. *American Journal of Sociology* 38: 219-224. doi:10.1086/216031.

Bramer, W. (2008). url: http://www.stationsweb.nl. November 14, 2008.

Catton, W.R., and Smircich, R. (1964). A comparison of mathematical models for the effect of residential propinquity on mate selection. *American Sociological Review* 29: 522-529.

Esparza, M., Carcía-Moro, C., and Hernández, M. (2006). Genetic relationships between parishes in the Ebro Delta region (Spain) as estimated by migration matrix and surnames. *Human Biology* 78: 647-662. doi:10.1353/hub.2007.0010.

Ganzeboom, H.B.G., Luijkx, R., and Treiman, D.J. (1989). Intergenerational class mobility in comparative perspective. *Research in Social Stratification and Mobility* 8: 3-84.

Goode, W. (1964). *The Family*. Englewood Cliffs.

Gueresi, P., Pettener, D., and Maruzzi Veronesi, F. (2001). Marriage behaviour in the Alpine Non Valley from 1825 to 1923. *Annals of Human Biology* 28: 157-171. doi:10.1080/03014460151056356.

Hendrickx, J., Lammers, J., and Ultee, W. (1991). Religious assortative marriage in the Netherlands, 1938-1983. *Review of Religious Research* 33: 123-145. doi:10.2307/3511909.

Kalmijn, M. (1998). Intermarriage and homogamy: causes, patterns, trends. *Annual Review of Sociology* 24: 395-421. doi:10.1146/annurev.soc.24.1.395.

Kalmijn, M. and Flap, H. (2001). Assortative meeting and mating: unintended consequences of organized settings for partner choices. *Social Forces* 79: 1289-1312. doi:10.1353/sof.2001.0044.

Kasakoff, A.B. and Adams, J.W. (1977). Spatial location and social organisation: an analysis of Tikopian patterns. *Man* New Series 12: 48-64.

Knippenberg, H. and de Pater, B. (1988). *De eenwording van Nederland*. Nijmegen: SUN.

Kok, J. (1998). 'Vrijt daar je zijt'; huwelijk en partnerkeuze in Zeeland tussen 1830 en 1950. *Zeeland* 7: 131-143.

Kok, J. and Mandemakers, K. (2008). Free choice from a limited supply. The marriage market in two Dutch provinces, 1840-1940. *Romanian Journal of Population Studies* 2: 82-104.

Koller, M.R. (1948). Residential propinquity of white mates at marriage in relation to age and occupation of males, Columbus, Ohio 1938 and 1946. *American Sociological Review* 13: 613-616.

Lambert, P.S., Zijdeman, R.L., Maas, I., Prandy, K., and van Leeuwen, M. (2008) *HIS-CAM - Presentation and evaluation of an historical occupational stratificaton scale based upon the analysis of social interaction.* Paper presented at the European Social Science History conference, Lisbon, 26 February - 1 March 2008.

Rogoff Ramsoy, N. (1966). Assortative mating and the structure of cities. *American Sociological Review* 31: 773-785. doi:10.2307/2091657.

Shorter, E. (1973). Female emancipation, birth control, and fertility in European history. *American Historical Review* 78: 605-640. doi:10.2307/1847657.

Sluiter, J.W. (2002). *Overzicht van de Nederlandse spoor- en tramwegbedrijven*. Leiden: Mattrijs.

Snijders, T.A.B. and Bosker, R.J. (1999). *Multilevel analysis: an introduction to basic and advanced multilevel modeling*. London: Sage Publications.

Stewart, A.K., Prandy, K., and Blackburn, R.M. (1982). *Social stratification and occupations*. London: MacMillan.

Treiman, D.J. (1970). Industrialization and Social Stratification. *Social Inquiry* 40: 207-234.

Uunk, W. (1996). *Who marries whom? The role of social origin, education and high culture in mate selection of industrial societies during the twentieth century*. Nijmegen: Thesis.

Van de Putte, B. (2003). Homogamy by geographical origin: segregation in nineteenth-century flemish cities (Gent, Leuven, and Aalst). *Journal of Family History* 28: 364-392. doi:10.1177/0363199003256015.

Van der Meer, A. and Boonstra, O.W.A. (2006). *Repertorium van Nederlandse gemeenten 1812-2006.* Den Haag: DANS.

Van der Woud, A. (2007). *Een nieuwe wereld. Het ontstaan van het moderne Nederland*. Amsterdam: Bakker.

Van Leeuwen, M.H.D. and Maas, I. (2002). Partner choice and homogamy in the nineteenth century: was there a sexual revolution in Europe? *Journal of Social History* 36: 101-123. doi:10.1353/jsh.2002.0111.

Van Leeuwen, M.H.D., Maas, I., and Miles, A. (2002). *HISCO –Historical International Standard Classification of Occupations*. Leuven: Leuven University Press.

Van Poppel, F. and Ekamper, P. (2005). De Goudse horizon verruimd. Veranderingen in de herkomst van Goudse bruiden en bruidegoms. In: Kok, J. and Leeuwen, M.H.D. van (eds.). *Genegenheid en gelegenheid. Twee eeuwen partnerkeuze en huwelijk*. Amsterdam: Aksant: 181-211.

Van Poppel, F. and Gaalen, R. van (2008). Sociale klasse, sociale mobiliteit en sterfte in Nederland, 1850-2007. In: Maas, I., Leeuwen, M.H.D. van, and Mandemakers, K. (eds.). *Honderdvijftig jaar levenslopen. De Historische Steekproef Nederlandse bevolking*. Amsterdam: Amsterdam University Press: 205-236.

Van Poppel, F., Liefbroer, A.C., Vermunt, J.K., and Smeenk, W. (2001). Love, necessity and opportunity: changing patterns of marital age homogamy in the Netherlands, 1850-1993. *Population Studies* 55: 1-13. doi:10.1080/00324720127681.

Van Tubergen, F. and Maas, I. (2007). Ethnic intermarriage among immigrants in the Netherlands: an analysis of population data. *Social Science Research* 36: 1065-1086. doi:10.1016/j.ssresearch.2006.09.003.

Verrijn Stuart, C.A. (1910-1917). *Inleiding tot de beoefening der statistiek*. Haarlem 1910-1917, three parts.

Wikman, K.R.V. (1937). Die Einleitung der Ehe. Eine vergleichende Ethno-soziologische Untersuchung über die Vorstufe der Ehe in den Sitten des Schwedischen Volkstum. *Acta Academiae Aboensis Humaniora* XI: 1-384.

Zijdeman, R.L. and Maas, I. (forthcoming). Assortative mating by occupational status during early industrialization. *Research in Social Stratification and Mobility*.