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Research Article

Educational heterogamy during the early phase of the educational expansion: Results from the university town of Tartu, Estonia in the late 19th century

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Contents

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Abstract

BACKGROUND
From a historical perspective, the transition from a pre-industrial to a modern society is associated with increasing social status heterogamy. As individuals' acquired characteristics became more important for partner selection than inherited class status, the importance of status homogamy declined and marrying outside one's own social group became more frequent.

OBJECTIVE
We investigate educational heterogamy in a university town at the end of the 19th century. We ask whether marriage of unequally educated partners is related to dissimilarity in the partners' other characteristics. Ethnic background, origin (place of birth), and age difference between the spouses are considered as characteristics that may associate with sorting into educationally heterogamous unions.

METHODS
The analysis uses data from the 1897 census in Tartu. Using logistic regression modelling, we estimate how age difference, origin heterogamy, and ethnic heterogamy of the spouses associate with educational heterogamy.

RESULTS
The results indicate a positive relationship between educational heterogamy and marrying outside one's own ethnic or origin group, but no effect for spousal age difference.

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CONCLUSIONS
Our study provides new evidence about marriage markets during modernisation, specifically regarding the role of education. We show that educationally heterogamous unions in Tartu were often also more heterogamous in terms of partners' background characteristics. This suggests that the partner's education may have motivated intermarriage by ethnicity and origin.

CONTRIBUTION
Previous literature on this period has focused on social homogamy based on occupational information, while research on educational assortative mating mostly exists for the second half of the 20th century and later. We contribute by studying the importance of education in marital selection in the early phase of educational expansion and economic modernisation.

1. Introduction

Pre-industrial societies are usually described as having relatively closed social groups with limited possibility of mobility between them. The prevalence of social homogamy is considered as evidence of such barriers between different social strata (Bras and Kok 2005; Dribe and Lundh 2005), meaning that in these societies it was not easy to improve social status by 'marrying up'. Historical perspectives of social mobility through marriage are relatively well studied in Western European countries, mostly using occupational data (Van Leeuwen and Maas 2010, 2019). Marriage as a demographic subject has also long been researched in Western countries (e.g., Hajnal 1953). In Eastern Europe, despite some early inquiries into this topic (e.g., Chojnacka 1976; Sklar 1974), development of data sources and research has been relatively modest compared to the scholarship in the West (Wetherell and Plakans 1997). At the same time, Eastern European countries located at the border of a large demographic divide have the potential to provide interesting insights into family and marriage systems, as shown by some more recent studies (Liczbińska 2012; Szołtysek 2007). The mentioned divide is the Hajnal line, placed between St. Petersburg in Russia and Trieste in Italy. This imaginary line designates the eastern border of the area that historically experienced the European marriage pattern (Hajnal 1965, 1982). The European marriage pattern is associated with a relatively high age at marriage and large proportions of adults who remained single, both of which had significant implications for fertility and demographic transition.

   In this article we investigate educational heterogamy in the late 19th century Tartu, Estonia, in order to extend the geographical horizon of research on marriage patterns

and to gain insight into the importance of education in marital selection at the time. Estonian territory, then divided between the Tsarist Empire provinces of Livland and Estland, was to the west of the Hajnal line. It was among the few areas of the Empire that, in the sense of demographic development, followed trajectories similar to North-Western Europe. From at least the end of the 18th century, Estonian nuptiality followed the European marriage pattern (Palli 1984, 1988), and Estonia experienced one of the earliest fertility transitions in Europe (Coale, Anderson, and Härm 1979; Coale and Watkins 1986; Gortfelder and Puur 2019; Katus 1994). Tartu was not one of the largest towns in the region, but due to the presence of a university and a number of secondary schools it had a unique importance and a comparatively diverse population consisting of different educational, social, ethnic, and religious groups (Berendsen and Maiste 1999). Because of this population heterogeneity, Tartu is an excellent setting to study social heterogamy in the late 19th century.

Our main research question is whether educational heterogamy was more probable if a person married outside of their origin (place of birth), ethnicity, or age group. We use individual-level data from the first imperial census of Russia in 1897, which was carried out in Tartu in a particularly detailed manner (Berendsen and Maiste 1999). Our findings suggest that educational heterogamy was more often the characteristic of couples in which the spouses were from different origins and ethnic backgrounds. This result speaks to the potential importance of formal schooling in the 19th century urban marriage market.

2. Background and research questions

2.1 Social heterogamy during modernisation

While modern partnerships are considered mostly as romantic relationships, traditional marriage associates less with individuals' own will, or affection, and more with kinship interests or obvious socioeconomic gains from marriage (Cherlin 2004; Coontz 2004, 2006). Formation of a new marital union provided an opportunity to widen social networks, increase wealth, and enlarge land holdings. This made marriage and partner choice a question of strategy and an object of social pressure (Van Leeuwen and Maas 2005, 2010; Dribe and Lundh 2009).

Sociological literature has considered partner choice as constrained by three main factors: the structure of the marriage market, social influences, and the individual's own preferences. The first refers to the availability of marriageable partners and means that marriages between different social groups are less frequent if the size of the groups is very different. The two other factors, however, pertain to forces that guide the choice of

a spouse. Social pressure from the community or family could influence people to find a partner from the same religion or same geographical area (Kalmijn 1998).

Partner choice in pre-industrial times was critical because of the role that social status played in an individual's success or failure. Socioeconomic status was the primary predictor of welfare and access to resources (Bengtsson, Campbell, and Lee 2004). Status was often inherited or attached to the ownership of inheritable resources such as land. In this context, marrying someone from a higher class, with higher social status, or simply from a wealthier family was one of the few opportunities for upward mobility. Conversely, marrying an individual with lower social status implied a risk of downward mobility (Dribe and Lundh 2005). In short, partnering someone from the same social group was a common strategy to maintain or improve status, while partnering with someone from a lower stratum entailed considerable risk. Therefore, marriages tended towards social endogamy, which in turn maintained relative social immobility in pre-industrial societies (Bras and Kok 2005; Bull 2005; Dribe and Lundh 2010; Maas and Van Leeuwen 2002).

According to the industrialisation thesis, modernisation favoured status attainment through individual achievement and reduced the relevance of previously important ascribed characteristics (Treiman 1970). Similarly, the status-attainment hypothesis argues that with changes in the labour market, individuals' achieved characteristics, such as occupation or education, become more important in partner selection than the ascribed characteristics, e.g., social class of origin (Smits et al. 1998). Empirical findings supporting these theories have demonstrated clear shifts in partner formation as modernisation progressed (Zijdeman and Maas 2010). Taking a collective approach to study social homogamy in the past, the authors of a special issue of The History of the Family demonstrate that men's own occupational status gains in importance over parental status in the second half of the 19th century and that this shift occurs similarly across different historical communities, for example in the Netherlands, Belgium, and Hungary (Lippényi et al. 2019; Maas and Van Leeuwen 2019; Van Leeuwen et al. 2019). On the other hand, in France, parental status homogamy remained the same during the 19th century (Maas et al. 2011). In some countries, industrialisation may have started a decline in social homogamy among the rural population, but the economic pressure of societal change supported the tendency to protect against resource dilution and thus marry homogamously by social class, as in Norway (Bull 2005) and Finland (Roikonen and Häkkinen 2019). Such somewhat contradictory effects of modernisation are probably expected among rural populations, since they generally had more limited access to education and new occupations than those living in towns. Thus, social or occupational class (often based on landownership) probably remained strong factors in the marriage market in the countryside, whereas we would expect that education as a

criterion for partner selection strengthened first in towns, where more opportunities existed to capitalise on formal schooling.

As seen in the research cited above, occupation is often the key status variable in historical social homogamy literature. Education has not received so much attention, partly because historical data sources favour occupational data (Van Leeuwen and Maas 2010), but also because educational expansion and the increasing role of education as a predictor of income mainly happened in the 20th century. The literature on educational assortative mating demonstrates a long-term interest in the issue (see Michielutte 1972), but analyses of assortative mating typically consider periods after the mid-20th century (Rockwell 1976; Kalmijn 1991a; Mare 1991; Smits, Ultee, and Lammers 1998; Schwartz and Mare 2005). Less is known about the earlier period of educational expansion when the changing educational distribution began to affect the balance of educational homogamy (Michielutte 1972). Because the educational aspects of 19th century social homogamy are understudied, in this paper we try to fill some of that gap by focusing on assortative mating in the modernisation period. As suggested above, it is more difficult to address this question in a rural context. However, it is more likely that in towns, education emerged quite early as a predictor of economic success and therefore was an important factor in marital selection. Education could be especially important in a town like Tartu, as we will describe in the next section.

Besides choosing a spouse by occupation or education, the heterogeneity of urban populations generally implies other potential variability in partner characteristics. The urban setting of the modernisation period was influenced by an influx of migrants from rural areas and in many cases also from abroad, and this affected partner choice and family formation (Moreels and Matthijs 2010; Schumacher, Matthijs, and Moreels 2013). In Finland, the more urbanised or industrialised regions were more likely to have higher levels of heterogamy (Roikonen and Häkkinen 2019). Similarly, in France, partner formation in cities was less homogamous by parental status (Maas et al. 2011). It has been found that migrants generally were disadvantaged in the urban marriage market, since urban-born individuals preferred to marry within their own group (Van de Putte 2003). Migrants usually faced adaptation problems, which made finding a partner difficult, although this may have varied depending on the country (Puschmann et al. 2014).

Sociological and historical research generally agrees that people prefer a partner who is ethnically, religiously, and culturally similar (Kalmijn 1998; Mare 1991; Van Leeuwen and Maas 2005), which may add to the disadvantage of migrants from abroad. It is also known that spouses became more similar in age during modernisation (Dribe and Lundh 2009; Van Poppel et al. 2001). Age heterogamy in the pre-industrial period was explained by the importance of wealth prior to marriage and patriarchal relationships in the family, which favoured older men (Beekink, Liefbroer, and Van

Poppel 1998). Decreasing age heterogamy can be interpreted as a decline in the importance of property-related social status, possibly in favour of affection-related characteristics (Dribe and Stanfors 2017; Van Poppel et al. 2001). The latter could be a factor supporting educational homogamy, because equally educated individuals are more likely to share similar values (Kalmijn 1991b).

To summarise, the modernising urban setting of the 19th century may have brought about unprecedented opportunities for choosing a spouse from a different social group. On the other hand, individual preferences to marry someone culturally similar ("like marries like") may have even increased, as also demonstrated by the rising age homogamy. At this point it is relevant to ask how these opposing factors shaped the marriage market. Was marrying someone from a different cultural background motivated by potential gains from the partner's education? Before formulating our hypotheses we describe the context of late 19th century Tartu.

2.2 The population of Tartu

In the late 19th century the territories of modern-day Estonia and Latvia were divided into the three provinces of Estland, Livland, and Kurland, which together made up the Baltic provinces of the Tsarist Empire. They were to a large degree autonomous from the central authorities in St. Petersburg and were ethnically, linguistically, and religiously different from Russia. Culturally, the provinces were more intertwined with Germany and Protestant culture. Since the 13th century the Baltic Germans had dominated local political, economic, and cultural life, even though they constituted only a small proportion of the total population (5%). In the countryside Estonians (in Estland and Northern Livland) and Latvians (in Southern Livland and Kurland) were the ethnic majority. In urban areas the proportions of Estonians (or Latvians) and Baltic Germans were more similar (Berendsen and Maiste 2005: 128–132).

This traditional setting started to unravel in the second half of the 19th century. Economic modernisation brought about industrialisation, and while the development of industry was far behind that in Western Europe, Estland and Livland still became one of the more industrialised areas in the Tsarist Empire. Tartu, however, was little affected by this. In terms of heavy industry there was only one factory, specialising in agricultural machinery, and a gas plant that mainly supplied the town. In total there were only about a thousand industrial workers in Tartu at the end of the 19th century and the town preserved more of its merchant-artisanal outlook than the new industrial centres. However, artisans became part of larger enterprises rather than owning their own businesses, as was the norm beforehand (Palamets 2005; Rosenberg 2010: 163).

In terms of educational development, the Baltic provinces had already achieved full literacy by the time of the 1881 census, which is very early by European standards (Kasekamp 2010: 85; Raun 1979). This was related to the dominant role of the Lutheran Church and its teachings that prioritised the ability of individual believers to read scripture. Tartu played an important role in these developments, since it was the main educational and cultural centre in the provinces due to the presence of a number of secondary schools, the only classical university in the provinces, and a teachers' seminary, plus the scientific and cultural societies that revolved around them (Berendsen and Maiste 1999: 166–172). This meant that in Tartu differences in schooling concerned the level of education rather than simply literacy.

A considerable proportion of people had secondary or higher education, which was rare at the time, By 1897 20% of the adult male and 12% of the adult female population (for the subset of married population, see Table 1) had achieved a level of education higher than primary, which was approximately six times higher than in Estonia as a whole (Riigi Statistika Keskbüroo 1924: 46). Very few women had the opportunity to gain a tertiary education as they were not admitted to the local university but had to go to St. Petersburg or Germany. The university, a major employer in Tartu (Leppik 2006), and other educational, medical, and cultural institutions provided employment for those with secondary or tertiary education.

During the last decades of its existence the Tsarist Empire started to curtail the autonomy of the Baltic provinces and the power of the Baltic Germans (Thaden 1981). The main wave of Russification occurred between the mid-1880s and the mid-1890s, i.e., right before the 1897 census. It focused on both the legal-administrative sphere and the cultural-linguistic-religious domain. The central government widened its area of competence and increased the number of state officials, consisting largely of Russian immigrants. Thus, the importance of the Russian language in the conduct of public affairs increased, while the importance of the German language fell (Kiverik 2010) and the absolute and relative values of Baltic German officials declined (Raun 1995: 92–93).

The blueprint for Russification was the senatorial inspection carried out in 1882 by the then Senator and future imperial Minister of Justice, Nikolai Manassein. In his report Manassein paid special attention to Tartu and its university, which he saw as the focal point of Baltic German particularism (Thaden 1981: 58–59). In 1894 the name of the town and its university was changed from the German Dorpat to the Russian Yuryev, and Russian became the main language of instruction in the university. This significantly lowered the proportion of German academics and students: by the end of the century the share of German students had fallen below 40% (Tamul 2009) and Russian students became a new feature of the town (Leppik 2006: 92). Secondary schools had been Russified to varying degrees a few years earlier, and this also affected

the ethnic makeup of teachers and students (Kiverik 2010: 42–49). As earlier restrictions on Jewish settlement were eased, the Jewish population grew from the 1860s onwards and more students came to study in Tartu (Jokton 1992: 8–14).

Between the 1867 and 1897 censuses the population of Tartu doubled as a result of an influx of Estonian peasant-origin population. This changed the ethnic structure of the population: between these two years the proportion of Estonians rose from 46% to 71% and the proportion of the Baltic Germans fell from 42% to 17% (Körber 1902: 40–43). As the number of Estonians increased, so did their educational, economic, and political strength. The earlier tendency of more successful Estonians to become Germanised ended, and in many cases actually reversed (Jansen 2007: 376–386; Haltzel 1981: 150). The increasing Estonian intellectual and entrepreneurial stratum became the backbone of the Estonian national movement, and due to its educational and cultural institutions, Tartu had become its centre by the end of the century (Raun 2002: 75).

These developments can be discerned in the age structure of Tartu's population that is shown in Figures 1 and 2, providing numbers by ethnic and origin group respectively. To indicate how the different family, fertility, and migration patterns influenced the marriage market, both figures also distinguish between marital statuses. The role of Tartu as an educational centre is demonstrated in both figures, as the ages when especially males attend secondary and tertiary institutions stand out from the population pyramids for all ethnic groups (but more for the smaller Russian and Jewish communities and those born abroad). Based on the pyramids, we assume that many students coming to Tartu remained single during their studies. This can be explained by the high cost of education and also a lack of culturally similar partners.

Figure 1:   **Age, sex, and marital status distribution of the population of Tartu, four major ethnic groups**
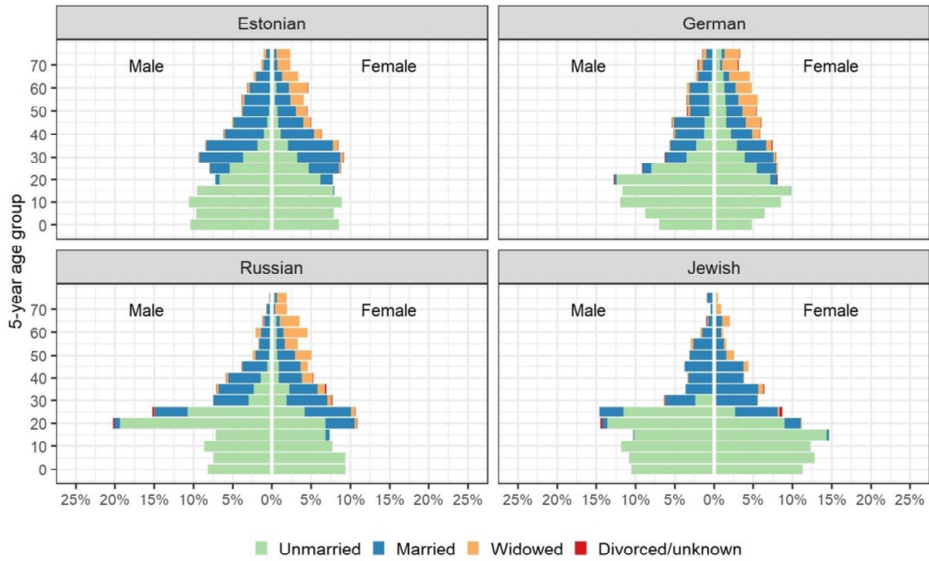
Figure 2: **Age, sex, and marital status distribution of the population of Tartu, by origin group**
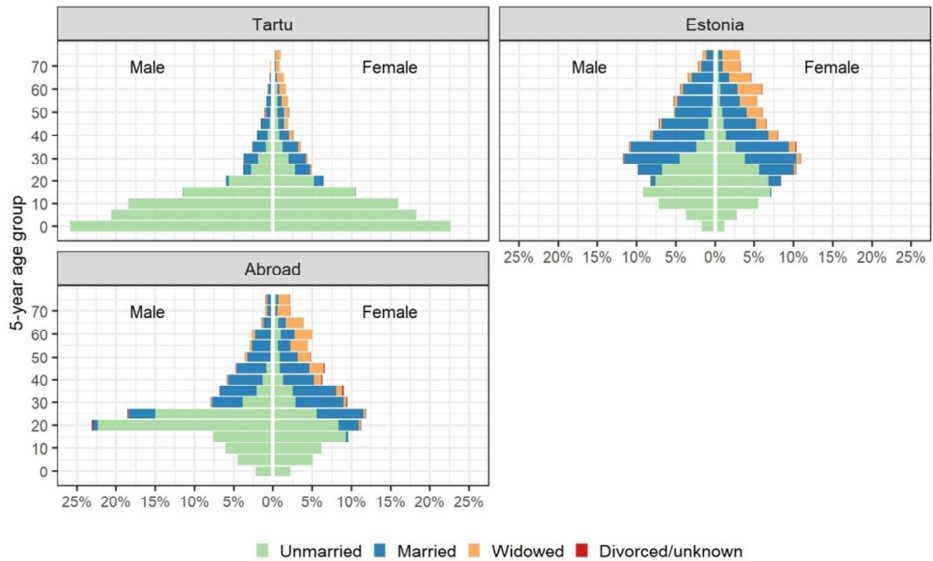
Source: First imperial census in Tartu 1897 (Berendsen and Maiste 1999), own estimation.

The student-age group is a lot less evident for Estonians and those born in Estonia, who mostly moved to Tartu to work in the low-wage sector. The population pyramids of Estonians and those born in Estonia also show that by the time of the 1897 census the influx of people had begun to slow down, with age group in the thirties being larger than the younger age groups. This observation is also supported by population counts. During the thirty years before 1897 the population of Tartu had grown from 20,494 to 40,521. In the following decades the growth was modest and by 1919 the population size of the town was 45,812 (Berendsen and Maiste 2005: 118–119).

The pyramid for the Germans in Figure 1 is much narrower at the bottom of the age structure. This is partly due to lower marital fertility, but an even bigger factor is the share of never-married, which for German women in their forties was an astounding 31.3% (Estonians 16.6%). The majority of these never married German women came from noble and merchant backgrounds and lived in the wealthier areas of Tartu, but the families probably had too little capital for marriage or could not find 'worthy' suitors. Compared to the Germans, the pyramids of the Russians and Jews (who primarily came from Polish and Lithuanian territories) are wider at the bottom, since they were not part of the European marriage pattern and experienced a later fertility transition (Coale and

Watkins 1986). Only a small share of Russians and no Jews remained unmarried by their forties.

2.3 Research questions

We investigate how educational heterogamy, as a potential avenue of social mobility, was associated with marrying outside one's own cultural group. This question is analogous to the issue of age heterogamy that says that brides married outside their own age group because older men were wealthier.

As an example, less-educated local women could marry more-educated, foreign-origin men, thus compromising on cultural similarity but gaining by the husband's income potential. Such heterogamous unions could be desirable for both partners (Kalmijn 2010; Merton 1941). An example of such an exchange in modern times is when highly educated immigrants marry low-educated but locally established partners (Schwartz, Zeng, and Xie 2016). In 19th century Tartu, even excluding foreign-born migrants, there was a lot of room for social and cultural intermarriage. For instance, the Baltic German women of noble background but declining family fortune could have married local Estonian men who had made gains in education but lacked in social status.

In constructing our hypotheses a basic assumption is that in an occupationally diverse urban environment where the university and local schools were one of the largest employers, having an education was clearly a positive asset. More education could be used to acquire economic benefits through higher-paid jobs or by having a more respected position in society. A highly educated person was a more attractive potential spouse in the marriage market than a person with less education, ceteris paribus. We also need to take into consideration the fact that higher social status and wealth facilitated education because parents were in a better position to invest in their children. Thus, in the marriage market a potential partner's low education could be associated with a financially poor family background.

Our hypotheses cover three characteristics of the couple that we expect to predict educational heterogamy. First, we expect that one of the reasons for an individual to marry outside their own ethnic group was the potential partner's education. If this is so, educational heterogamy and ethnic heterogamy are positively correlated:

Hypothesis 1: Educational heterogamy is more probable if the husband and the wife are from different ethnic groups.

The second hypothesis is similar to the first but pertains to origin. Origin, indicated by a rough measure of place of birth, adds a dimension that ethnicity may not always cover. For instance, town-born individuals may have been less interested in marrying the rural-born, despite a similar ethnic background. But, as with ethnic difference, the partner's education could be a motivation to form such a union:

Hypothesis 2: Educational heterogamy is more likely if the husband and the wife have different migratory backgrounds.

Our third hypothesis concerns age difference. We expect that women were attracted to more-educated men. Men, however, were interested in women who were relatively young, as youth is generally associated with better reproductive chances and therefore counts as an asset. Because of this we expect a positive correlation between educational heterogamy and husband–wife age difference.

Hypothesis 3: Age difference between the spouses (the man's age minus the woman's age) is positively associated with the probability that the marriage is educationally heterogamous.

Although the reasoning behind our hypotheses may suggest certain causality – for instance, that ethnically heterogamous unions were formed because of the intention to marry up in terms of education – we certainly are not able to infer causal relations from our data. Therefore, it is not reasonable to specify our hypotheses in a causal way: We can only infer and discuss associations.

3. Data and methods

We use data from the first imperial census of 1897 (Berendsen and Maiste 1999), which includes all married individuals in Tartu at the time of the enumeration. The analysis of educational heterogamy draws information from both partners' characteristics.

To establish the type of educational pairing we used the educational-level variable derived from the school type (Berendsen and Maiste 1999). The school system at the time included a number of different primary and secondary education facilities that were not strictly comparable to each other. To accommodate this diversity the educational-level variable distinguishes two levels of primary education. The lower level of primary education was completed in three years (we also include in this category those who were home-schooled, since the length of schooling cannot be determined for such cases). The higher level of primary education added a further 1–2

years to that. Secondary education includes attending gymnasium or equivalent schools. Tertiary education means having a university degree. Thus, the level of education has four categories: lower primary, higher primary, secondary, and tertiary. Our binary dependent variable is derived from the spouses' educational level; it takes value 0 if the husband's education is the same as the wife's and 1 if they are different.

There are three main predictor variables: heterogamy by origin (place of birth), ethnic heterogamy, and age difference. The age difference variable is a continuous measure that subtracts the wife's age from the husband's age. Origin heterogamy is a binary indicator that takes value 0 if the spouses share the same broad category of birthplace (born in Tartu, domestic migrant, or international migrant) and 1 if they are from different categories. To consider ethnic background, two types of basic information were available, mother tongue and religious denomination. Yet, for a large part of the population, including one of the characteristics makes the other one redundant: German and Estonian speakers tended to be mostly Lutheran, Russian speakers were mostly Orthodox, and so on. We collapsed larger ethnic groups based on language, the Jews remained a separate group based on religion, and a small number of Catholics were grouped together with people of other, unidentified ethnic descent. This resulted in a five-category ethnicity variable: Estonians, Germans, Russians, Jews, and 'other'. The binary ethnic heterogamy variable indicates that the spouses do not belong in the same category. In addition to the two heterogamy dummy variables, in the models we include variables covering the origin of the wife and her ethnic background, as defined above. In this way, we control for the differences in educational heterogamy levels between various ethnic and origin groups.

At the time, one of the most important markers of status was occupation. In most historical studies of status attainment and heterogamy, occupation is the default variable of interest. Unfortunately, in the 1897 census in Tartu, occupation is not recorded for over 50% of women aged 16 and more (18% for men). Considering only married individuals, more than 80% of women lack information on occupation whereas among men the percentage is less than 5%. As a result, the occupation of both partners is available for only 16.6% of the couples included in our analysis. Since it is difficult to determine whether the omission of married women's occupation is random and what their occupation might have been before marriage, the included occupational information for women could be very selective. Thus, we are not able to address the question of occupational heterogamy in this study. The information on the husband's occupation, however, is used in an extended model to control for his social standing. His occupation is collapsed into the following five broad categories: unskilled manual workers, skilled manual workers, lower non-manual workers, managers, and professionals (ILO 1990).

The second additional control variable to account for the husband's status is social estate. This characteristic was implemented in the census as an amalgam of the local medieval notion of estate (clergy, nobility, urban citizens, peasantry) and the imperial table of ranks (Leppik 2006). There were different categories of nobility, which we collapsed into one for analysis. The category of literati consisted of educated professionals, which is not a traditional part of the estate system but a 19th century addition. Notably, there was no category of workers, which means that at the time the population of Tartu was mostly made up of peasants (actually peasant-origin), while the traditional urban upper and middle classes, the citizens (Bürgers), comprised only a fifth of the population (distributions among the married population are shown in Table 1).

Due to the educational expansion at the time, one of our expectations is that educational heterogamy is more likely in younger birth cohorts. For this reason we control for the birth cohort of the wife. This variable indicates the decade in which she was born, ranging from the 1820s to the 1870s.

The original census data cover 40,565 individuals, including children and the elderly. We analyse married people who were at least 15 years old at the time of the census. In order to consider the educational pairing of the couple, individuals lacking information about the level of education (n = 1,730) had to be excluded. As a result, the final study sample consists of 5,283 couples (see Table 1). In models that control for the husband's occupation the sample size is further reduced to 4,983, as for some men the relevant information is missing.

To test our hypotheses, we apply logistic regression modelling with stepwise addition of variables. First, we present bivariate models that each include only one of the three main predictor variables. In the second step all three predictors are included simultaneously and the wife-specific control variables (her origin, ethnic group, and birth cohort) are added. In the third step we add the husband-specific control variables (his occupation and social estate). We also fit both of these multivariate models separately for older (wives born before 1860) and younger birth cohorts. In the final step of the analysis, interaction effects between heterogamy dummies and the wife's background variables are estimated and reported graphically.

Table 1: **Distribution of married men and women by main variables and the percentage of educational heterogamy in each group**

	Men		Women	
	%	Educational heterogamy %	%	Educational heterogamy %
Education				
Primary lower	79.2	3.1	88.0	12.8
Primary higher	10.8	85.2	3.6	55.6
Secondary	5.1	48.1	8.4	68.2
Tertiary	4.9	98.8	0.1	25.0
Educational pairing				
Homogamy	81.0		81.0	
Hypergamy	15.1		15.1	
Hypogamy	3.9		3.9	
Ethnic group				
Estonian	81.2	10.4	80.9	10.2
Jewish	1.8	22.9	1.8	20.8
Other	1.8	52.1	1.4	45.5
German	11.5	62.1	12.3	61.2
Russian	3.7	55.6	3.6	59.7
Origin				
Estonia	79.3	12.2	77.3	11.7
Abroad	12.0	53.1	11.2	52.1
Tartu	8.7	33.7	11.5	35.4
Estate				
Peasant	77.2	9.6	77.1	9.6
Nobility	3.9	77.3	4.0	76.7
Citizen	14.3	42.8	14.7	43.2
Literati	1.4	72.6	1.3	69.6
Other	3.2	44.3	3.0	44.3
Occupation				
Lower non-manual	9.5	19.4	3.9	7.2
Managers	14.9	27.5	0.8	27.9
Professionals	6.3	73.4	0.4	68.0
Skilled manual	31.0	17.3	4.2	23.0
Unskilled manual	32.9	4.3	8.1	4.7
Missing	5.3	30.6	82.6	20.4
N	5,283		5,283	

Source: First imperial census in Tartu 1897 (Berendsen and Maiste 1999), own estimation.
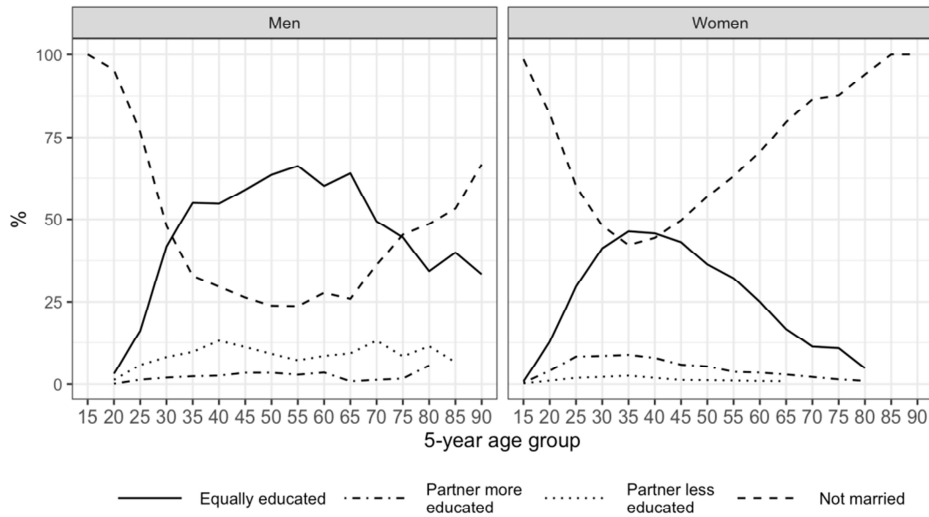
4. Results

4.1 Descriptive results

Table 1 shows the distribution of the main variables in the study sample. Most of the married population has the lowest level of schooling. At the primary level, men are more likely than women to have upper primary education. At the post-primary level, women are almost all in the group of secondary education due to their limited access to universities (there are in total only four women with higher education in the sample). About 10% of men and 8.5% of women have secondary or higher education. It is known that at the time women with education beyond the primary level had a lower likelihood of family formation (see for example Van Bavel et al. 2018), but our data show relatively similar proportions of married men and women in the post-primary group. A large majority, 81% of the sample, is educationally homogamous, about 15% are in a traditional heterogamous union in which the man is more educated, and in less than 4% the wife has more education than the husband.

As shown in Table 1, most of the town dwellers were Estonian but born outside of Tartu. A slightly higher proportion of men than women had migrated from abroad, and a larger proportion of women than men had been born in the town. In terms of social estate, most of the married town population had a peasant background and the second largest group were citizens. About two-thirds of the married male population were skilled and unskilled workers, and managers were the third largest occupation group. Women, if their occupation was registered, were most often unskilled manual workers.

To illustrate how partnership status varies by age, we plot the percentage of married in the total town population (Figure 3). The married population is subdivided into educationally homogamous and heterogamous groups. For comparison, the percentage of non-married population is also shown. At younger ages the proportion of singles is high for both men and women, reaching well over 50% for those aged 25–29. After ages 40–44 the proportion of non-married males drops below 25% and does not change much at older ages. The proportion of non-married women declines until ages 35–39 and increases again at older ages. Among the married population, educationally homogamous partnerships are dominant in all age groups, followed by marriages in which the man is more educated than the wife.

Figure 3: **Proportion of the sample married according to different educational pairs and not married, by sex and age group**

Source: First imperial census in Tartu 1897 (Berendsen and Maiste 1999), own estimation.

4.2 Regression results

We present our regression tables in three steps. We first present one unadjusted model using each main predictor separately. We then present adjusted models that include all main predictors and control for the wife's characteristics, separately for the total sample and different cohorts. Lastly, we present adjusted models that add the husband's status variables. In all regression models the dependent variable is the binary indicator of heterogamy that takes the value 1 if the husband and the wife have different levels of education. We comment first on the results of the main predictor variables in all fitted models and then examine control variables.

Unadjusted models are shown in Table 2. The odds of educational heterogamy are over four times higher in ethnically heterogamous unions than in ethnically homogamous marriages. The spouses coming from different origin groups is associated with three and a half times higher likelihood of educational heterogamy compared with marriages in which both share the same origin. Each additional year of age difference slightly increases the odds of educational heterogamy. All three tested associations are highly statistically significant.

Table 2:   **Logistic regression of educational heterogamy, unadjusted**

	M1		M2		M3	
	OR	*p*	*OR*	*p*	*OR*	*p*
Ethnic heterogamy	4.377***	0.000				
Origin heterogamy			3.517***	0.000		
Age difference					1.019***	0.000
N	5,283		5,283		5,283	
Pseudo R2	0.02		0.05		0.003	
Correctly classified %	81		81		81	
LL	−2512		−2445		−2559	

Notes: * p<0.05, ** p<0.01, *** p<0.001
Source: As Table 1.

    In Table 3 the three main predictor variables are included in one model that is adjusted for the wife's background characteristics. In the model that includes all birth cohorts, only origin heterogamy remains a statistically significant predictor of educational heterogamy: the couples that do not share the same origin group have around 60% higher chances of being in an educationally heterogamous union than couples of the same origin. The other two heterogamy variables are not statistically significant. The results for the main predictor variables hold if we fit the model separately for cohorts born before 1860 and those born later. The contrast between origin heterogamy vs. origin homogamy is smaller in older cohorts (OR 1.422*) and larger in younger cohorts (OR 1.692***). Ethnic heterogamy makes only a small difference in older cohorts, but has a positive, almost statistically significant ($p = 0.067$) association with educational heterogamy in younger cohorts.

Table 3:   **Logistic regression of educational heterogamy, adjusted**

	M1		M2		M3	
	All cohorts		Cohort <1860		Cohort >=1860	
	OR	p	OR	p	OR	p
Ethnic heterogamy	1.178	0.315	0.879	0.605	1.485	0.067
Origin heterogamy	1.606***	0.000	1.422*	0.028	1.692***	0.000
Age difference	0.999	0.931	0.996	0.600	1.003	0.701
Wife's ethnicity						
Estonia	1		1		1	
Jewish	1.110	0.711	—		1.442	0.240
Other	3.589***	0.000	3.659**	0.003	3.612***	0.000
German	9.560***	0.000	13.330***	0.000	6.710***	0.000
Russian	6.674***	0.000	9.135***	0.000	5.866***	0.000
Wife's origin						
Tartu	1		1		1	
Estonia	0.681**	0.002	0.676	0.051	0.704*	0.033
Abroad	1.397*	0.027	1.481	0.083	1.424	0.084
Wife's birth cohort						
1820s	0.806	0.493	1			
1830s	0.702*	0.050	0.891	0.743		
1840s	0.714*	0.021	0.913	0.788		
1850s	1		1.341	0.371		
1860s	1.414**	0.001			1	
1870s	1.731***	0.000			1.180	0.158
N	5,283		2,657		2,599	
Pseudo R2	0.22		0.26		0.18	
Correctly classified %	84		87		82	
LL	−2004		−846		−1146	

Notes: * p<0.05, ** p<0.01, *** p<0.001
Source: As Table 1.

Next, we add the husband's background variables to the model (Table 4). Origin heterogamy remains a positive and statistically significant predictor of educational heterogamy in the model that applies to the entire sample (OR 1.534***) and in the model that only includes younger birth cohorts (OR 1.694***). The variable is not statistically significant in the model that is applied to older cohorts. Somewhat surprisingly, age difference has a small negative effect on the odds of educational heterogamy in the model of older cohorts. Ethnic heterogamy is positively associated

with educational heterogamy in all models but does not reach the level of statistical significance. In short, in these models we only find support for Hypothesis 2, which was about origin heterogamy.

Regarding the ethnic group control variable, Estonian women have lower odds of being in an educationally heterogamous union (all models in Table 3) compared with all other groups except the Jewish group. The models suggest that German and Russian wives were more often in educationally heterogamous marriages. This estimate for the wife's ethnic group holds also in models that control for the husband's characteristics, although the differences are smaller (all models in Table 4). Another change after adding the husband-specific control variables is that the Jewish wives have the lowest odds of educational heterogamy among all ethnic groups (M1 and M3 in Table 4).

Table 4: **Logistic regression of educational heterogamy, adjusted for the husband's characteristics**

	M1		M2		M3	
	All cohorts		Cohort <1860		Cohort >=1860	
	OR	*p*	*OR*	*p*	*OR*	*p*
Ethnic heterogamy	1.284	0.139	1.168	0.547	1.327	0.215
Origin heterogamy	1.534***	0.000	1.264	0.179	1.694***	0.000
Age difference	0.991	0.150	0.979*	0.029	1.001	0.944
Wife's ethnicity						
Estonian	1		1		1	
Jewish	0.291***	0.001	–		0.401*	0.022
Other	0.939	0.850	0.995	0.993	0.937	0.880
German	2.784***	0.000	3.350***	0.000	2.273***	0.000
Russian	2.157***	0.001	2.750**	0.008	2.047*	0.019
Wife's origin						
Tartu	1		1		1	
Estonia	0.771*	0.049	0.604*	0.017	0.916	0.607
Abroad	1.128	0.477	1.098	0.717	1.193	0.434
Husband's occupation						
Lower non-manual	1		1		1	
Managers	1.300	0.091	1.761*	0.022	1.052	0.800
Professionals	2.377***	0.000	2.913***	0.002	2.233**	0.004
Skilled manual	0.885	0.399	0.938	0.788	0.845	0.360
Unskilled manual	0.340***	0.000	0.420**	0.002	0.297***	0.000

Table 4:   (Continued)

|	M1		M2		M3	
	All cohorts		Cohort <1860		Cohort >=1860	
	OR	*p*	*OR*	*p*	*OR*	*p*
Husband's estate						
Peasant	1		1		1	
Nobility	7.961***	0.000	11.730***	0.000	5.248***	0.000
Citizen	2.474***	0.000	2.377***	0.000	2.548***	0.000
Literati	3.274***	0.000	2.566	0.079	3.637**	0.004
Other	2.029**	0.001	2.051*	0.031	1.964*	0.025
Wife's birth cohort						
1820s	0.636	0.218	1			
1830s	0.530**	0.002	0.882	0.760		
1840s	0.616**	0.002	1.068	0.866		
1850s	1		1.826	0.115		
1860s	1.331*	0.012			1	
1870s	1.539**	0.003			1.130	0.346
N	4,983		2,476		2,482	
Pseudo R2	0.28		0.33		0.23	
Correctly classified %	86		88		83	
LL	−1715		−709		−993	

Notes: * p<0.05, ** p<0.01, *** p<0.001
Source: As Table 1.

The wife's origin is an important predictor in models that adjust only for the wife's characteristics. Those wives originating from Estonia but outside Tartu have lower odds of educational heterogamy than those born in Tartu (statistically significant difference in M1 and M3 in Table 3). However, wives with an immigrant background have relatively higher odds of educational heterogamy than women born in Tartu (statistically significant in M1 in Table 3). When the husband-specific control variables are added, the difference between internal migrants and town-born women is statistically significant only in models including all cohorts and older cohorts (M1 and M2). We conclude that the gap in the odds of educational heterogamy between ethnic groups reduced over time and was becoming less relevant in younger birth cohorts.

With regard to differences between the wives' birth cohorts, there is a clear positive gradient over time (M1 in Table 3 and M1 in Table 4). Educational heterogamy is more common among younger cohorts. This is in accordance with our expectations regarding the influence of educational expansion.

To gain further insight into the association between spouses' background characteristics and educational heterogamy, we estimated two interaction models. First, we added interaction terms between the wife's ethnic group and the ethnic heterogamy dummy to model M1 in Table 4. Using the estimated model (full results shown in Table A-1 in Appendix) we predicted the probability of educational heterogamy by interaction variables. The results, shown in Figure 4, suggest that among ethnically homogamous couples the Germans are most likely and the Jewish least likely to be in an educationally heterogamous union. However, if the husband's ethnic background is different from the wife's, the probability of educational heterogamy is almost at the same level for German, Russian, and Estonian women (the Jewish group includes no observations to estimate the interaction effect).

Figure 4:   Probability of educational heterogamy by the wife's ethnic group
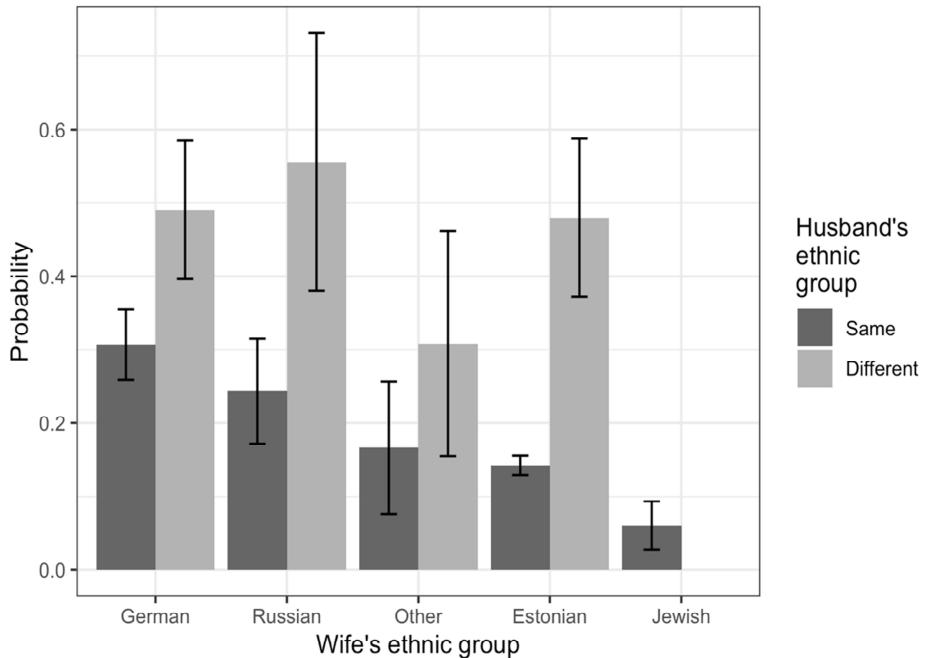
Notes: Vertical lines indicate 95% confidence intervals of the predicted values.
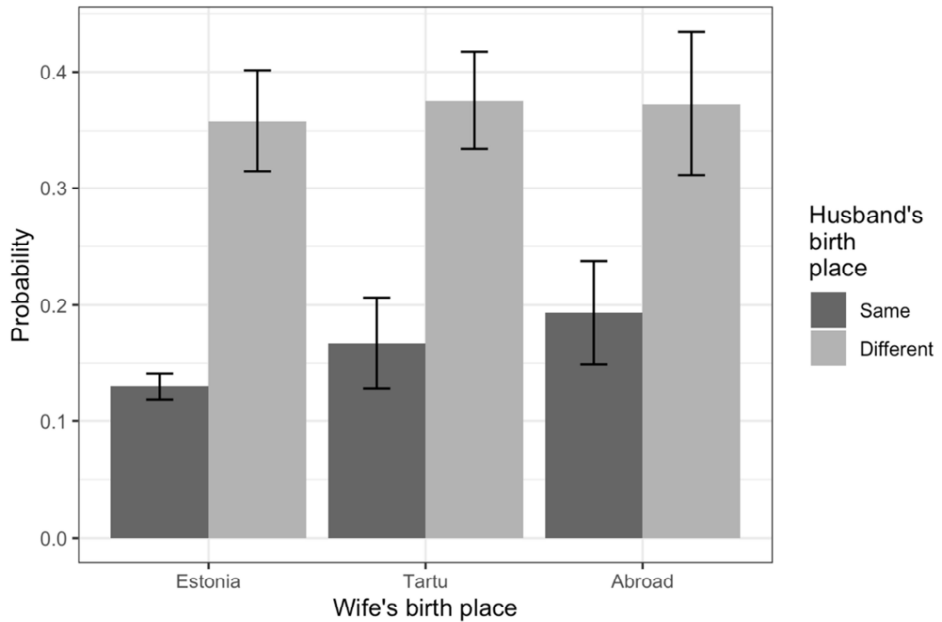*Source*: Table A-1 in Appendix.

We draw two important conclusions from this interaction model. First, we find support for Hypothesis 1: women of all ethnic groups have higher chances of

educational heterogamy if they married outside their own ethnic group (except the Jews, for whom we do not have an estimate). Second, for some groups, like Estonians, marrying outside one's own group increases the probability of educational heterogamy more than for other ethnicities because of the low probability of heterogamy among ethnically homogamous unions. For others, especially Germans, the increase is smaller, as ethnically homogamous unions have a relatively high probability of being heterogamous by education. This can be interpreted as a feature of the marriage market in Tartu – non-native women were more likely to find a differently educated partner within their own ethnic group, while Estonian women had better chances of this by marrying outside their own group.

In the second interaction model (Table A-2 in the Appendix), also based on model M1 in Table 4, we interacted the wife's origin variable and the origin heterogamy indicator. Predicted values based on this model (Figure 5) suggest that origin heterogamy is positively associated with educational heterogamy for all women regardless of their origin. This confirms what was seen in Tables 3 and 4, corroborating support for Hypothesis 2. However, when the husband and the wife are both from the same origin group the couples that were born abroad are slightly more likely to be educationally heterogamous than those born in Estonia outside Tartu. Couples from Tartu and from abroad who are homogamous by origin have overlapping confidence intervals in Figure 5, so we cannot say that they differ in the probability of educational heterogamy. If the couple is heterogeneous by origin, the wife's birth place does not make much of a difference: for all three origin groups of the wife, the probability of educational heterogamy is estimated at between 0.3 and 0.4, which is roughly double that estimated for couples who are homogamous by origin.

Figure 5: **Probability of educational heterogamy by the wife's origin group**

Notes: vertical lines indicate 95% confidence intervals of the predicted values.
Source: Table A-2 in Appendix.

5. Summary

We investigated educational heterogamy in late 19th century Tartu, Estonia. Using data from the first imperial census of Russia in 1897, we were able to cover almost the entire married population of the town. Our main question was whether marriage between unequally educated partners was correlated with marrying outside one's own ethnic origin or age group. The findings of our analysis suggest that educational heterogamy was more often observed among couples in which the wife and the husband were either from different ethnic groups or had a different background regarding their place of birth (origin). Against our expectation, however, age difference between partners was not positively correlated with the odds of educational heterogamy.

The finding that educational heterogamy in Tartu correlated with heterogamy by ethnicity or origin is not surprising. Earlier studies have found that the migratory background of individuals is associated with their partner's status origin (Zijdeman and

Maas 2010; Roikonen and Häkkinen 2019). Other studies have pointed out that age heterogamy was more likely if one of the spouses was a migrant (Van de Putte et al. 2009; Dribe and Stanfors 2017). It has also been found for rural populations that partner selection may involve 'exchange' of partner characteristics in different dimensions (Dribe and Lundh 2009). It is possible that our results reflect a similar pattern: heterogamy by ethnicity and origin correlate with educational heterogamy because intermarriage by ethnicity or origin was one way to form a union with a more educated partner. We interpret our finding as a subtle indicator of the significance of education in this particular marriage market. This interpretation rests on the assumption that people generally tend to match with partners who are from the same cultural background and who have higher achieved characteristics like education (Kalmijn 1991b). Thus, an educationally and ethnically heterogamous union is a trade-off resulting from the choice to marry someone more educated at the expense of cultural dissimilarity, which speaks to the importance of education in partner selection.

There also might have been other features that correlated with marrying someone more educated. For example, since schooling was costly, a higher level of education signalled a wealthier family background, and we would be inclined to conclude that educationally upward marriages were motivated by parental wealth. Unfortunately, our data do not permit elaborating on the role of family wealth. In either case, however, the observed positive correlation between educational heterogamy and ethnic/origin group heterogamy could be explained by potential gains in status due to the higher education of the spouse.

The main limitations of this study relate to the cross-sectional nature of our data. The spouses' characteristics that can be considered mostly apply to the post-marriage period; thus, it is difficult to estimate how important education was in the process of partner search and union formation. An additional limitation is the inability to distinguish first marriages from remarriages after widowhood. Considering that spouses often accumulated wealth in the first marriage, partner selection after widowhood may have been more influenced by the surviving partner's economic standing. Regarding comparability with studies that employ the intergenerational perspective of status attainment, the biggest drawback of our data is the lack of information on the social status of the spouses' parents. To overcome the cross-sectional nature of our analysis, other data sources such as vital statistics records may be considered to address these questions with a dynamic union formation analysis. Another potential improvement over our approach is to extend the analysis to later periods and examine the growing importance of education in the marriage market.

6. Acknowledgements

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Appendix

Table A-1:   Logistic regression of educational heterogamy, including interaction between wife's ethnic group and the ethnic heterogamy indicator

	OR	*p*
Wife's ethnic group		
Estonian	1	
Jewish	0.323**	0.002
Other	1.258	0.589
German	3.383***	0.000
Russian	2.271**	0.002
Ethnic heterogamy	2.480***	0.001
Interaction terms		
Ethnic heterogamy #Other	0.337	0.090
Ethnic heterogamy #German	0.311**	0.002
Ethnic heterogamy #Russian	0.629	0.400
Origin heterogamy	1.493***	0.000
Age difference	0.990	0.137
Wife's origin		
Estonia	0.769*	0.047
Abroad	1.142	0.433
Tartu	1	
Wife's birth cohort		
1820s	0.628	0.208
1830s	0.528**	0.002
1840s	0.617**	0.003
1850s	1	
1860s	1.331*	0.013
1870s	1.532**	0.003
Husband's occupation		
Lower non-manual	1	
Managers	1.318	0.075
Professionals	2.410***	0.000
Skilled manual	0.888	0.414
Unskilled manual	0.345***	0.000

Table A-1:   (Continued)

	OR	*p*
Husband's social origin		
Nobility	6.881***	0.000
Citizen	2.220***	0.000
Literati	2.971**	0.002
Other	1.801**	0.009
Peasant	1	
N	4,983	
Pseudo R2	0.28	
Correctly classified %	86	
LL	−1710.7	

Notes: * p<0.05, ** p<0.01, *** p<0.001
Source: First imperial census in Tartu 1897 (Berendsen and Maiste 1999), own estimation.

Table A-2:   Logistic regression of educational heterogamy, including interaction between wife's origin group and the origin heterogamy indicator

	OR	*p*
Wife's ethnic group		
Estonian	1	
Jewish	0.260***	0.000
Other	0.880	0.706
German	2.727***	0.000
Russian	2.001**	0.004
Ethnic heterogamy	1.289	0.132
Wife's origin group		
Estonia	1	
Abroad	1.848**	0.003
Tartu	1.469	0.056
Origin heterogamy	1.850***	0.000
Interaction terms		
Abroad #Origin heterogamy	0.590	0.068
Tartu #Origin heterogamy	0.755	0.300
Age difference	0.991	0.181

Table A-2:   (Continued)

	OR	*p*
Wife's birth cohort		
1820s	0.651	0.244
1830s	0.536**	0.003
1840s	0.618**	0.003
1850s	1	
1860s	1.321*	0.015
1870s	1.523**	0.003
Husband's occupation		
Lower non-manual	1	
Managers	1.315	0.078
Professionals	2.346***	0.000
Skilled manual	0.878	0.370
Unskilled manual	0.344***	0.000
Husband's social origin		
Nobility	7.432***	0.000
Citizen	2.367***	0.000
Literati	3.149***	0.001
Other	1.890**	0.005
Peasant	1	
N	4,983	
Pseudo R2	0.28	
Correctly classified %	86	
LL	−1714.1	

Notes: * p<0.05, ** p<0.01, *** p<0.001.
Source: As Table A-1.