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Research Article

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Health and socio-demographic conditions as determinants of marriage and social mobility: Male partner choice in Sardinia, late 19th-early 20th centuries

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Abstract

This paper makes use of data collected from military registers and marriage certificates for the population of Alghero, in Sardinia, for the period 1866-1925, with the aim of investigating the role played by physical characteristics and health in the possibility of social mobility through marriage.

Our findings demonstrate that, whereas physical defects and ill health had little impact on the chances of marrying an illiterate woman, these factors did have a negative effect on the chances of marrying a woman who was literate. In a context in which intergenerational social mobility remained limited and the family had the final say on marriage arrangements, it is likely that only healthy individuals were selected for marriages regarded as strategic for the purposes of forming and strengthening family alliances, and/or improving the social position within the community.

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1. Introduction

The selection of a mate is a behavioural process that involves both socioeconomic factors and physical elements. In evolutionary and adaptive terms, this choice is driven by the desire to maximise reproductive success and ensure the good health of future generations (Epstein and Guttman 1984). As many studies have shown, somatic traits play an important role in this choice, and may include facial beauty and symmetry (Cornwell et al. 2006; Thornhill and Gangestad 1993), height (Cavelaars et al. 2000; Silventoinen 2003), colour of hair and eyes (Frost 2006; Swami, Furnham, and Joshi 2008), and skin tone (Frost 1994; Aoki 2002). It follows that unhealthy individuals, especially those with evident signs of ill health, should have the lowest chances of marriage, and thus of reproduction.

However, physical appearance, beauty, and manifest signs of illness and well-being can also be seen as closely associated with socioeconomic status (SES). Therefore, from a theoretical point of view, both SES and physical attractiveness should concur in partner choice. In other words, people tend to choose spouses whose physical appearance and social status portray and evoke the capacity to provide sufficient economic support to family members, thereby guaranteeing their good health and standards of living. The two physical characteristics most frequently and directly associated with these are height (Alter, Neven, and Oris 2004; Murray 1997; Steckel 2005) and body mass (Whaples 1995). In other words, the investment in marriages likely to guarantee healthy progeny could be considered strategic for various reasons, depending on the family. The rich used marriage as a means of creating new and/or reinforcing old family networks, whereas the poor relied on robust and strong male descendants to farm the land and secure future agricultural contracts.

Although many previous studies have investigated and stressed the relationship between socioeconomic factors and choice of spouse for historical populations, there is little research clarifying the role of health conditions and physical characteristics in this process (Baten and Murray 1998; Hacker 2008). In addition to the difficulties in obtaining reliable data on the health and somatic traits of past populations, it is widely held that, in the past, marriage choices were dominated not only by social and religious norms but also by family strategy (Derosas 2003). Our previous research on the male population of Alghero, Sardinia, at the turn of the 19th century (Manfredini, Breschi, and Mazzoni 2010) provides evidence to support the thesis that physical characteristics also played a very important role in a marriage system that was governed by family rather than individual choice. We also found that state of health represented a decisive element in the marriage strategies of the community's wealthiest families. For the upper social strata of the population, who were characterised by a high degree of selectivity in access to marriage, height and health were found to be elements given careful

consideration in marriage strategies. Physical features, such as strength, vigour, and the absence of any manifest defects, are likely to have been regarded as qualities that would ensure the production of numerous and healthy heirs. On the other hand, marriage criteria for the lower classes were more closely connected to somatic traits such as eye and hair colour, which are not directly associated with socioeconomic conditions.

These issues raise an additional question regarding marriage choice. If physical characteristics, such as stature and general state of health, were determinants of marriage choices of historical populations, did they also affect the chances of social mobility upon marriage? Is it possible that these elements represented a means of ascending the social ladder? Our hypothesis is that unhealthy individuals, when not totally excluded from marriage, were sometimes persuaded by the family to marry down. In turn, we also argue that only healthy contenders were proposed for marriages that the family deemed strategic for the purposes of forming alliances and gaining social position within the community.

The aim of this paper is to study the determinants of partner choice based on an analysis of data recorded in the military registers on the late 19th-century male population of Alghero, Sardinia (Italy), with the intention of clarifying whether physical characteristics and general health were determinant elements in promoting social mobility upon marriage.

This paper is a revised and updated version of the paper presented at the IUSSP Seminar on *Social Mobility and Demographic Behaviour: A Long Term Perspective*, held in Los Angeles in 2008. The paper is divided into four parts. The first provides a description of our sources and data, while the second gives a brief outline of the community of Alghero. The third presents a number of descriptive analyses using military registers, with a specific focus on the degree of social mobility present in Alghero at the time. The fourth and final section is devoted to an individual-level analysis of the relationship between marriage, physical characteristics, and social mobility.

2. Sources and data

This study makes use of data taken from both civil registers and military records. From the former, we were able to extract information on the main life events for the population of Alghero for the period 1866-1925. The use of nominative techniques allowed us to connect these events and retrieve information on each individual's date of birth, marriage, and death, as well as the father's profession at birth. Information on the bride's occupation is of little use, given that 95% of marriage certificates report this as "housewife." We therefore approached the investigation of social mobility upon

marriage by proxy through the education level of spouses. Information taken from civil registers was supplemented with entries from parish registers in order to include data on religious-only marriages.[4]

This information was then superimposed upon data taken from military registers concerning the birth cohorts 1856-1900[5]. The drawing up of military registers was a complex operation conducted by the responsible Military Office on the basis of data provided by the local Civil Registry Office[6]. First, the *inscription list* identified all current 20-year-old resident males[7] and men who had been absent for any reason from the *conscription lists* of the previous year(s). Second, those who were called up had to undergo a medical examination, the outcome of which was reported in the various *conscription lists* compiled by the army corps to which the men were assigned. While we were able to retrieve the medical records for those men destined to join the National Army, there is, unfortunately, a lack of such documentation on navy conscripts, who amounted to around 30% of inscriptions. This group consisted mainly of sons of fishermen and sailors, only a small fraction of whom went on to be enlisted in the army (8%, see Table 1). However, given that sailors and fishermen constituted a select group made up primarily of people originating from Naples—who are known to have displayed culturally specific behaviours, such as tendencies to enter into endogamous marriages and to isolate from the rest of the population (Mondardini Morelli 1988; Manfredini, Breschi, and Mazzoni 2010)—the absence of records for this group probably has little impact on the results in any case.

After undergoing a medical examination, each man was classified as "fit," "unfit," or "temporarily unfit" for military service (which meant having to undergo the exam again the following year). Despite having access to data on the medical examinations for the birth cohorts 1856-1900, our analysis concentrated on the period 1866-1885. The lower limit of 1866 was selected because data on SES, reasons for discharge, and the literacy levels of all conscripts are only available from that year onwards; while the upper limit of 1885 was selected because it is impossible to study the marriage behaviour of the adult population up to the age of 40 after that year. We also excluded

[4] After 1866 it becomes essential to supplement the information taken from civil marriage certificates with that from parish registers. In fact, in 1867, the new Italian Kingdom only considered civil marriages as legal. However, in keeping with long-standing traditions, many couples continued to marry in church, legalising their status some time after by re-marrying in the town hall. For a discussion on the consequences of such behaviour, see Breschi et al. (2008b). Here, again, we wish to emphasise the fact that it was the integration of these two sources that allowed us to reconstruct the entire picture of weddings celebrated in Alghero.

[5] For a detailed description of the military registers of Alghero, see Cau, Merella, and Pozzi (2007).

[6] Military lists and documentation of the Civil Registry Office come from the 'Archivio Storico del Comune di Alghero' (Historical Archive of the Municipality of Alghero) and from the 'Archivio di Stato di Sassari' (Sassari State Archive).

[7] During the First World War, men were recruited at a younger age, around 17-18 years.

the records regarding medical re-examination from our analysis in order to obtain homogeneous data on 20-year-olds.[8]

For the purposes of our investigation, the information concerning suitability for military service is one of the most important elements in the conscription lists, since the reasons for temporary or permanent discharge from military service often depended on ill health and/or particular physical characteristics, such as low stature. The criteria for being discharged and the age for conscription changed over time, and were certainly relaxed during important conflicts (see Cau, Merella, and Pozzi (2007) for changes in height restrictions).

Almost all the single military files record both the individual's occupation at the moment of call-up, as well as that of his father. We grouped these occupations into four professional categories: farmers and shepherds; sailors and fishermen; tradesmen, artisans, and shopkeepers; and white collar workers and the bourgeoisie. Finally, another relevant piece of information reported in these military registers is the conscripts' literacy skills, or their ability to read and write.

From a methodological point of view, we devised log-linear models to evaluate the degree of intergenerational social mobility in Alghero (Van Leeuwen and Maas 1991) and logistic regression models to measure the impact of physical characteristics and health status on the likelihood of marrying up or down.

3. A brief outline of Alghero

Alghero is a costal town in the north-western part of Sardinia. The 1861 Italian census shows that it is the second largest town in the province of Sassari, with 8,419 inhabitants, a figure which had risen to 12,510 by 1921.

The pattern that emerges from civic marriage records[9] regarding male occupation reflects the regional economic structure, with the addition of specifically sea-related activities, given Alghero's coastal location (about 15%-20% of male spouses). At the turn of the 19th century, the Sardinian economy was based on agriculture, sheep-

[8] Unfortunately, we are unable to comment on or investigate emigration, as our sources provide no information on the subject. We excluded from our analysis individuals who could be assumed to be emigrants. We classified individuals as emigrants if they were still unmarried at the age of 40, and if we could find no trace of any kind in Alghero's civil records of them or of their close relatives. For a full discussion of this issue, see Manfredini, Breschi, and Mazzoni (2010).

[9] The published censuses provide detailed information on occupation, education, etc. for the "Circondario" only, an administrative district which, in addition to having Alghero as its main town, also includes 19 other small municipalities. The data for this area was entirely consistent with the information found on the regional level.

farming (probably the most productive sector), and mining, which employed almost two-thirds of the male population. Farming was not intensive because of the island's under-population, and was traditionally limited to olives, vines, fruits, cereals, and legumes. The cultivation and production techniques were extremely rudimentary, giving rise to poor yields and unprofitable produce. Land use was organised according to a long-standing, semi-feudal land tenure system that was still prevalent in the final decades of the 19th century. Farmers had especially low standards of living, and were often obliged to supplement their modest earnings with additional activities, such as sheep-farming or handicrafts. The quality of these handicrafts was sufficient for domestic consumption only, while most external trading was controlled by outsiders resident on the island (Coda 1977).

Sardinia was also characterised by very low levels of education: even in 1881, more than 75% of the population over six years of age could neither read nor write. Accordingly, illiteracy proves to be a significant social component in Alghero during this period: almost half of the (civil) marriage certificates were not signed by either spouse, 26% were signed by one spouse only, and a mere 23% were signed by both. Although this indicator has some intrinsic limits, it does demonstrate the ineffectiveness of the various contemporary national laws regarding compulsory schooling in alleviating the pronounced cultural lag of the Sardinian population (Zamagni 2007).

In the pre-transitional period, Sardinia had some very unusual demographic characteristics. Despite being situated at the very heart of the Mediterranean, Sardinia is, paradoxically, the least "Mediterranean" of all the Italian regions. The population's family formation system and reproductive behaviour patterns do not fit any of the models put forward by Laslett (1983; 1988) and Hajnal (1982). The Mediterranean model par excellence – i.e., joint patrilocal household with early female marriage and high fertility levels – is a far cry from the situation that prevailed in Sardinia, which was characterised by neo-locality and late marriage for both sexes, and thus strongly resembled models typical of north-western Europe (Viazzo 2003).

Unlike other regions, the demographic history of Sardinia remains somewhat unexplored. Nominative studies are practically non-existent, especially on the period prior to the 19th century. Our initial explorative analyses on the population of Alghero depict a demographic system consistent with what we know on the regional scale (Livi Bacci 1977). Levels of both overall and marital fertility were notably low in this context compared to other continental Italian communities of the mid-19th century (Breschi et al. 2008b). A late and non-universal marriage associated with low levels of infant mortality were among the most important determinants of such fertility pattern.

In terms of nuptiality, the mean age at first marriage was found to be 27.7 for men and 23.8 for women, based on information gathered from both religious and civil records for the period 1866-86. It was also possible to detect the presence of

differentials by SES, although this was apparent from civil marriage certificates only, and solely for the male population. The occupational category that was found to have the earliest access to marriage was that of sailors and fishermen (with a mean age of 26), especially in the case of marriage within the same group; and, conversely, the group with the highest age at first marriage was that of the bourgeoisie and white collar workers (32.4). Another important feature of the town's marriage patterns was the modest exogamy rate. Between 1866 and 1925, a mere 7.6% of marriages involved one or both spouses who were not resident in Alghero, which is fairly surprising for a fishing port with a long-standing tradition of trade with mainland Italy and France. One possible reason for these high levels of endogamy may lie in the town's relative geographical isolation. To the north it was protected by a desolate, marshy, and scarcely inhabited area called Nurra. The nearest community to the south was the village of Villanova Monteleone (25 km away, perched on a hill 567m above sea level), while the nearest community to the west was the small village of Olmedo, about 15 km away. Another significant factor is that Alghero was under Spanish rule for so long that it had become a Catalan cultural-linguistic enclave within Sardinia. Many local historians hold this cultural and socio-political peculiarity to be the main reason for the specificity and isolation of Alghero's population.

4. Socioeconomic structure and social mobility in Alghero at the turn of the 19th century

The inscription lists record a total of 2,080 males born in Alghero between 1866 and 1885. Only 1,443 (69.4%) of these conscripts actually went on to be medically screened for the army, because 489 (23.5%) were enlisted in the navy (with a specific examination elsewhere), and 148 (7.1%) failed to report for assessment. Of those who underwent this medical check, around 35% were declared to be fit and were recruited immediately, 32.6% were declared to be temporarily unfit and were discharged for a year, and 32.4% were declared to be permanently unfit and were discharged for good (Table 1).

This high rejection rate of those screened (65%) was mainly attributed to height below the military standard (40.1%) (Table 2). Low stature was a typical characteristic of the Sardinian population, who were found to have had the lowest mean height in the whole of Italy (Giuffrida-Ruggeri 1918; Arcaleni 1998, 2006).

Table 1: Inscription list and conscription list of the Army National Service, with final statement of suitability for military service by profession (%) – Birth cohorts 1866-85

Profession	Inscription list		Conscription list			
	N	%	Fit	Temporarily unfit	Permanently unfit	N
Farmer / Shepherd	1006	48.4	30.1	32.4	37.5	914
Sailor / Fisherman	364	17.5	31.0	31.0	37.9	29
Shopkeeper / Artisan	392	18.9	37.6	36.7	25.6	324
Bourgeoisie / Upper class	157	7.5	59.7	26.6	13.7	139
Unknown	161	7.7	43.2	24.3	32.4	37
Total	2080	100.0	35.0	32.6	32.4	1443

Table 2: Reasons for temporary or permanent discharge, Birth cohorts 1866-85

Motive	N	%
Insufficient chest circumference	146	15.8
Eye disease	166	18.0
Insufficient height	369	40.1
Physical debilitation & malaria	166	18.0
Other health problems	73	7.9
Total	920	100.0

Source: Conscription list of the Army National Service

Regarding SES, agriculture was shown to have played a dominant role in the area, as the findings indicate that a high proportion of men, or about 48% of conscripts, were employed in farming, agricultural labour, and shepherding. Sea-related vocations, or fishermen and sailors, accounted for almost 19% of conscripts, while about 26% fell into the category of artisans, shopkeepers, and petty bourgeoisie (Table 1). It is also possible to see a close association between SES and literacy. We have information on the literacy skills for about 86% of the 1,443 individuals who underwent medical examination. The picture that emerges from Table 3 makes this relationship clear: the

higher the social status, the lower the rate of illiteracy. Whereas only 18.7% of farmers could read and write, all those belonging to the upper class were fully literate.[10]

Table 3: Literacy by SES (%) – Birth cohorts 1866-85

Occupation	Illiterate	Literate	N
Farmer	81.3	18.7	797
Sailor / Fisherman	70.4	29.6	27
Shopkeeper / Artisan	40.3	59.7	273
Bourgeoisie / Upper class	0.0	100.0	129
Unknown	63.2	36.8	19
Total	63.4	36.6	100.0
N	789	456	1245

Source: Conscription list of the Army National Service

Since the information on the bride's SES in the marriage certificates is unreliable, we chose to analyse intergenerational social mobility. To be more precise, we used the professions of those called up for military service, as well as their fathers' occupations, to assess the pattern of intergenerational social mobility in Alghero at the turn of the 19th century. The inscription list covered the entire population of 20-year-old males, but to maximise the numbers for analysis, we broadened the cohort sample, from 1856 to 1891. Individuals whose personal occupation or whose father's occupation was missing were excluded from the analysis.[11] At first glance, the socioeconomic formation of Alghero's population appears to be rather immobile, with more than 80% of sons following in their father's professional footsteps in the two cohort periods of 1856-73 and 1874-91 (Table 4). This can be considered an initial, rough indication that the socioeconomic fabric of this community had remained largely unchanged in the last intergenerational period.

[10] We wish to clarify that the proportion of people involved in sea-related activities with literacy skills is based on the few cases of those who actually joined the army. However, this figure (29.6%) is quite close to that based on the information recorded on marriage certificates for grooms from the same occupational group (27.4%).

[11] These individuals account for about 11% of the total number recorded in the inscription list. This proportion remains more or less constant throughout the birth cohorts studied.

Table 4: Intergenerational social mobility by son's cohort, 1856-1891

	Intergenerational occupational heterogamy	
Cohort	%	N
1856-73	18.7	1530
1874-91	19.6	1615
Total	19.2	3145

Source: Military service inscription list.
Note: Only father/son couples with information on both

However, in order to arrive at a more detailed picture of social mobility, we devised a series of log-linear models to study the association between the son's profession at age 20, and that of his father. One of the prerequisites of log-linear models is that socio-occupational categories need to be ordered to a scale. It would have been possible to determine this order from the literacy rate by SES as shown in Table 3, but we chose to use a variant of Goodman's homogenous equal row and column effects model II. This is a log-linear model whose parameters are useful not only in ranking SES groups, but also in estimating the distances between them on the basis of off-diagonal elements only (Goodman 1979; Guveli and De Graaf 2007; Van Bavel, Peters, and Matthijs 1998)[12]. Table 5 presents the order and relative scores of the occupational classes resulting from this quasi-equal row and column model. The quite pronounced distances which emerge between them confirm our previous division into four occupational categories. As expected, the bourgeoisie was at the top of the social ladder, farmers were at the bottom, and those involved in sea-related activities[13] and artisans were in the middle.

The first log-linear model used was the so-called *Independence* model, which was also the foundation for our three next models. First we used our *Inheritance* model, which corrected for the usual excess of cases in the main diagonal cells. A further parameter was thus estimated in the assumption of equal social immobility across the groups. Then we employed the less restrictive *Quasi-Independence* model, which assumes that intergenerational social immobility varies across groups. And, finally, the *Quasi-Uniform Association* model was applied to eliminate the constraint of independence between the fathers' and the sons' occupations for off-diagonal cells by

[12] For a discussion of this model and its application to historical data, see Van Leeuwen and Maas (1991).
[13] It is worth stressing that this analysis was based on the inscription list, thereby including the entire population of fishermen and sailors, and not on the fraction recorded in that of army conscription.

presupposing their shared association. The degree of this association is assumed to be equal (uniform) across all social groups.

Table 5: Intergenerational social mobility by son's cohort, 1856-1891. Adjusted scores of the relative positions of occupational classes

Occupational class	Father's and son's profession at son's marriage
Farmers	-0.623
Sailors / Fishermen	-0.251
Artisans	0.149
Bourgeoisie	0.725

Source: Military service inscription list.
Note: Only father/son couples with information on both

As shown in Table 6, the closest correlation to empirical data result from the *Quasi-Uniform Association* model, which displays the lowest deviance value (G^2), as well as the lowest and sole example of negative BIC statistics (Dribe and Lundh 2005).

Table 6: Intergenerational social mobility by son's cohort, 1856-1891. Goodness-of-fit parameters of the estimated log-linear models

Model	Father's and son's profession at son's marriage		
	G^2	df	BIC
Independence	3298.4	9	3225.9
Inheritance	219.9	8	155.5
Quasi-independence	79.5	5	39.2
Quasi-Uniform Association	18.9	4	-13.3

Source: Military service inscription list.
Note: Only father/son couples with information on both

The parameter estimates relative to this latter model can be seen in Table 7. All four socio-occupational groups display positive and statistically significant coefficients of social immobility, which demonstrates that, as a general rule, sons took on their father's profession. The group with the highest coefficient, and which therefore had the greatest degree of intergenerational immobility, was that of sailors and fishermen; meanwhile, the group with the highest degree of mobility was that of artisans. Fishing

and sailing activities undoubtedly played a key role in the local economy of Alghero, and were secure occupations passed down from father to son over many generations. The fact that the vast majority of these sailors came from outside Sardinia, in particular Naples, supports the hypothesis of a socially isolated and closed group inclined towards the preservation of its particular traditions and social role. We can also observe that the *Uniform Association* parameter differs significantly from zero, with a coefficient that indicates the increasing difficulty of changing socio-occupational class in proportion to the distance between them.

Table 7: Intergenerational social mobility by son's cohort, 1856-1891. Parameter estimates relative to Quasi-Uniform Association model

	β	exp(β)	p-value
Father's occupation (Marginal distribution effect)			
Farmers	0.000	1.000	
Sailor / Fisherman	-0.927	0.396	0.000
Artisan	-0.058	0.944	0.645
Bourgeoisie	-3.130	0.044	0.000
Son's occupation (Marginal distribution effect)			
Farmers	0.000	1.000	
Sailor / Fisherman	-0.614	0.541	0.000
Artisan	0.702	2.017	0.000
Bourgeoisie	0.171	1.186	0.170
Social Immobility (Main diagonal effect)			
Farmers	2.012	7.478	0.000
Sailor / Fisherman	3.215	24.903	0.000
Artisan	0.977	2.655	0.000
Bourgeoisie	1.365	3.914	0.000
Uniform association	1.001	2.720	0.000
n° of cases	3,145		

Source: Military service inscription list.
Note: Only father/son couples with information on both

5. Relationship between marriage, physical characteristics, and social mobility: An individual analysis

In this section, we investigate whether certain negatively perceived physical characteristics (such as low stature) and ill health affected men's chances of social mobility on marriage. More precisely, we are interested in knowing if such factors favoured downward social mobility, or, at the very least, blocked upward social mobility. In the case of families consenting to unhealthy and/or short men marrying, we wish to know if they were ever barred from access to marriages that were thought to represent upward social mobility, either from a social or an educational point of view. Equally, we wish to know whether tall and/or healthy people were given greater opportunities to improve their social position through marriage. Naturally, upward social mobility was limited for already wealthy individuals, who could at best hope to preserve the status quo by marrying a woman from the same class. Wealthy people could, however, face downward social mobility. Our hypothesis is that wealthy but unhealthy men would have been more likely to marry beneath them than their healthy counterparts.

Due to the impossibility of determining women's SES from marriage certificates, we made use of spouses' literacy levels as a proxy, based on the strong association between literacy and SES highlighted in Table 3. Marrying an illiterate woman is regarded as downward social mobility for wealthy men, and failed social advancement for the poor. Conversely, marrying a literate woman is considered upward social mobility for the poorest strata of the population, and as maintenance of social status for the richest.

In order to test this relationship, we devised logistic competing-risk models with the outcome of marriage to women who were either literate or illiterate. The dependent variable indicates whether a man who underwent a military medical examination at the age of 20 married an illiterate or an literate woman before the age of 40. We naturally excluded from our analysis cases in the military registers which lacked reference to health status – i.e., navy conscripts and those who failed to report for service – along with men who died while still unmarried before the age of 40. We devised two operative models for each alternative outcome: Model 1 looks at only the final assessment for suitability for military service, while Model 2 goes into more detail, taking the specific reasons for discharge into account.

The results of these two alternative outcomes are presented in Table 8. There is clear evidence in both models of the high degree of selectivity in access to marriage among the upper class and artisans, compared to that of farmers and shepherds. It is worth noting that the model shows that, of the 63 men from the upper class, not one married an illiterate woman. In light of the results presented in Table 3, this absence

suggests behaviour that entails a class-oriented partner choice, indicating that social homogamy in marriage was widely practiced within the upper class.

Whereas the chances of marrying an illiterate woman do not appear to have been affected by any differential risk by suitability for military service, ill health, and/or physical defects, these factors did have a marked influence on the chances of marrying a literate woman. In particular, men of a stature that was below the military standard, or who had symptoms of malaria (or physical debilitation), or who suffered from splenic cancers or other serious long-term health problems, were significantly less likely to marry a literate woman before the age of 40 than were individuals classed as fit for military service (47%, 36%, and 60% respectively).

Table 8: Competing-risk models of marrying a literate vs. an illiterate woman before the age of 40. Birth cohorts, 1866-85, Alghero

Covariates	Illiterate woman			Literate woman		
	Mean	Model 1	Model 2	Mean	Model 1	Model 2
Birth cohort		**1.092**	**1.092**		**1.104**	**1.103**
Occupation (ref. Farmer and shepherd)	73.0	1.000	1.000	57.1	1.000	1.000
Fisherman / sailor	2.7	1.090	1.143	1.8	0.791	0.752
Artisan / shopkeeper / trader	21.6	**0.443**	**0.449**	26.5	0.839	0.789
Bourgeois and noble		-	-	12.0	**0.311**	**0.295**
Missing	2.8	**0.150**	**0.158**	2.6	**0.216**	**0.199**
Fitness for military service (ref. Fit)	30.4	1.000		39.1	1.000	
Temporarily Unfit	33.4	1.043		33.5	**0.732**	
Permanently Unfit	36.2	1.189		27.4	**0.576**	
Literacy skills at military check up (ref. Not able to read and write)	63.9	1.000	1.000	49.1	1.000	1.000
Able to read and write	20.0	**0.577**	**0.585**	37.4	1.332	1.353
Unknown	16.1	1.039	1.066	13.4	0.776	0.778
Reasons for unfitness (ref. Fit)	30.4		1.000	39.1		1.000
Insufficient chest circumference	9.1		1.285	9.3		0.722
Eye disease	9.6		0.972	13.7		1.064
Insufficient height	30.5		1.191	21.2		**0.534**
Physical debilitation and malaria	15.9		1.329	12.3		**0.643**
Other health reasons	4.5		0.672	4.4		**0.404**
Individuals	710			767		
Marriages	382			376		

Note: In bold coefficients statistically significant at p<0.05
Source: Conscription list of the Army National Service.

6. Conclusive remarks

Previous studies have already demonstrated that men suffering from ill health and/or with specific physical characteristics were disadvantaged in many demographic respects. Not only were they more likely to die in early adulthood (Breschi et al. 2008a), but they were also less likely to marry before the age of 40 (Manfredini, Breschi, and Mazzoni 2010). Here we have taken this research one step further by investigating whether these factors influenced not only the quantitative, but also the qualitative aspects of marriage. In other words, we have analysed the possible effects of physical characteristics and health on partner choice in terms of social mobility on marriage.

Our findings reveal that men classed as unfit for military service not only had lower chances of marriage, but that those who did marry were also strongly conditioned in their partner choice. In a community where intergenerational social mobility was still greatly limited, with the overwhelming majority of sons following in their father's footsteps, marriage would have represented a rare opportunity for changing or improving social status. Our findings show that the chances of marrying a literate woman, used here as a proxy of social and economic status, were negatively influenced by both poor health and physical defects. This implies that, for men with compromised health and/or physical characteristics, not only were the chances of upward social mobility on marriage undoubtedly reduced for the poorest, but also for the wealthiest the chances of simply remaining in their father's SES group were not guaranteed. We can conclude that unhealthy and/or short men were deemed unsuitable by the family for strategic marriages that could strengthen alliances and improve social position and prestige within the community.

References

Alter, G., Neven, M., and Oris, M. (2004). Stature in Transition: A Micro-Level Study from Nineteenth-Century Belgium. *Social Science History* 28(2): 231-247. doi:10.1215/01455532-28-2-231.

Aoki, K. (2002). Sexual selection as a cause of human skin colour variation: Darwin's hypothesis revisited. *Annals of Human Biology* 29(6): 589-608. doi:10.1080/0301446021000019144.

Arcaleni, E. (1998). La statura dei coscritti italiani delle generazioni 1864-1976. *Bollettino di Demografia Storica* 29: 23-59.

Arcaleni, E. (2006). Secular trend and regional differences in the stature of Italians, 1854-1980. *Economics & Human Biology* 4(1): 24-38. doi:10.1016/j.ehb.2005.06.003.

Baten, J., and Murray, J.E. (1998). Women's stature and marriage markets in preindustrial Bavaria. *Journal of Family History* 23(2): 124-135. doi:10.1177/036319909802300202.

Breschi, M., Fornasin, A., Manfredini, M., Mazzoni, S., Melis, P.M., and Pozzi, L. (2008a). *Socioeconomic Status, Health and Mortality from Birth to Early Adulthood, Italy 19th and 20th Centuries*. Paper presented at the IUSSP Seminar "The emergence of social differences in mortality: Time trends, causes and reactions", Alghero, Italy, May 29-30, 2008.

Breschi, M., Manfredini, M., Mazzoni, S., and Pozzi, L. (2008b). *Fertility and socio-cultural determinants at the beginning of demographic transition. Sardinia, 19th and 20th Centuries*. Paper presented at the Annual Meeting of the Social Science History Association, Miami, USA, October 23-26, 2008.

Cau, P., Merella, C., and Pozzi, L. (2007). Lo stato di salute della popolazione di Alghero fra '800 e '900. Uno studio condotto attraverso i registri militari. In: Breschi, M., and Pozzi, L. (eds.). *Salute, malattia e sopravvivenza in Italia fra '800 e '900*. Udine: Forum: 135-156.

Cavelaars, A., Kunst, A.E., Geurts, J.J.M., Crialesi, R., Grotvedt, L., Helmert, U., Lahelma, E., Lundberg, O., Mielck, A., Rasmussen, N.K., Regidor, E., Spuhler, T., and Mackenbach, J.P. (2000). Persistent Variations in Average Height between Countries and between Socioeconomic Groups: An Overview of 10 European Countries. *Annals of Human Biology* 27(4): 407-421. doi:10.1080/03014460050044883.

Coda, L. (1977). *La Sardegna nella crisi di fine secolo. Aspetti dell'economia e della società sarda nell'ultimo ventennio dell'Ottocento*. Sassari: Dessì.

Cornwell, R.E., Law Smith, M.J., Boothroyd, L.G., Moore, F.R., Davis, H.P., Stirrat, M., Tiddeman, B., and Perrett, D.I. (2006). Reproductive strategy, sexual development and attraction to facial characteristics. *Philosophical Transaction of the Royal Society B – Biological Sciences* 361(1476): 2143-2154. doi: 10.1098/rstb.2006.1936.

Derosas, R. (2003). A family affair: marriage, mobility, and living arrangements in nineteenth-century Venice. In van Poppel, F., Lee, J.Z., and Oris, M. (eds.). *The Road to Independence. Leavers and Stayers in the Household in Europe*. Bern: Peter Lang: 143-196.

Dribe, M., and Lundh, C. (2005). Finding the right partner: Rural homogamy in nineteenth-century Sweden. *International Review of Social History* 50: 149-177. doi:10.1017/S0020859005002105.

Epstein, E., and Guttman, R. (1984). Mate selection in man: evidence, theory, and outcome. *Social Biology* 31(3-4): 243-278.

Frost, P. (1994). Geographic distribution of human skin colour: A selective compromise between natural selection and sexual selection? *Human Evolution* 9(2): 141-153. doi:10.1007/BF02437260.

Frost, P. (2006). European hair and eye colour. A case of frequency-dependent sexual selection? *Evolution and Human Behavior* 27(2): 85-103. doi:10.1016/j.evolhumbehav.2005.07.002.

Giuffrida Ruggeri, V. (1918). A sketch of the anthropology of Italy. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 48: 80-102. doi:10.2307/2843504.

Goodman, L.A. (1979). Simple models for the analysis of association in cross-classifications having ordered categories. *Journal of the American Statistical Association* 74(367): 537-552. doi:10.2307/2286971.

Guveli, A., and De Graaf, N.D. (2007). Career Class (Im)mobility of the Social-Cultural Specialists and the Technocrats in the Netherlands. *European Sociological Review* 23(2): 185-201. doi:10.1093/esr/jcl028

Hacker, J.D. (2008). Economic, demographic, and anthropometric correlates of first marriage in the mid-nineteenth-century United States. *Social Science History* 32(2): 307-345. doi:10.1215/01455532-2008-001.

Hajnal, J. (1982). Two Kinds of Preindustrial Household Formation System. *Population and Development Review* 8(3): 449-494. doi:10.2307/1972376.

Laslett, P. (1983). Family and Households as Work Group and Kin Group: Areas of Traditional Europe Compared. In: Wall, R., Robin, J., and Laslett, P. (eds.). *Family Forms in Historic Europe.* Cambridge: Cambridge University Press: 513-563.

Laslett, P. (1988). Family, Kinship and Collectivity as Systems of Support in Pre-industrial Europe: A Consideration of the 'Nuclear Hardship' Hypotheses. *Continuity and Change* 3: 153-175. doi:10.1017/S026841600000093X.

Livi Bacci, M. (1977). *A History of Italian Fertility during the Last Two Centuries*. Princeton: Princeton University Press.

Manfredini, M., Breschi, M., and Mazzoni, S. (2010). Spouse selection by health status and physical traits. Sardinia, 1856-1925. American Journal of Physical Anthropology 141(2): 290-296. doi:10.1002/ajpa.21150.

Mondardini Morelli, G. (1988). Insediamenti e abitazioni dei pescatori di Sardegna. *La ricerca folklorica* 17: 95-102. http://www.jstor.org/stable/1479516.

Murray, J.E. (1997). Standards of the present for people of the past: Height, weight, and mortality among men of Amherst College, 1834-1949. *The Journal of Economic History* 57(3): 585-606. http://www.jstor.org/stable/2951191.

Silventoinen, K. (2003). Determinants of variation in adult body height. *Journal of Biosocial Science* 35: 263-85. doi:10.1017/S0021932003002633.

Steckel, R. (2005). Health and nutrition in the pre-industrial era: Insights from a millennium of average heights in northern Europe. In: Allen, R., Bengtsson, T., and Dribe, M. (eds.). *Living standards in the past. New perspectives on well-being in Asia and Europe.* New York: Oxford University Press: 227-253.

Swami, V., Furnham, A., and Joshi, K. (2008). The influence of skin tone, hair length, and hair colour on ratings of women's physical attractiveness, health and fertility. *Scandinavian Journal of Psychology* 49(5): 429-437. doi:10.1111/j.1467-9450.2008.00651.x.

Thornhill, R., and Gangestad, S.W. (1993). Human facial beauty: Averageness, symmetry, and parasite resistance. *Human Nature* 4(3): 237-269. doi:10.1007/BF02692201.

Van Bavel, J., Peters, H., and Matthijs, K. (1998). Connections between intergenerational and marital mobility – A case study: Leuven, 1830-1910. *Historical Methods* 31(3): 122-134. doi:10.1080/01615449809601195.

Van Leeuwen, M.H.D., and Maas, I. (1991). Log-linear analysis of changes in mobility patterns. *Historical Methods* 24(2): 66-79. http://www.uu.nl/uupublish/content/1991Loglinear.PDF.

Viazzo, P.P. (2003). What's so special about the Mediterranean? Thirty years of research on household and family in Italy. *Continuity and Change* 18(1): 111-137. doi:10.1017/S0268416003004442.

Whaples, R. (1995). The standard of living among Polish- and Slovak-Americans: Evidence from fraternal insurance records, 1880-1970. In: Komlos, J. (ed). *The biological standard of living on three continents*. Boulder: Westview: 151-171.

Zamagni, V. (2007). *Introduzione alla storia economica d'Italia*. Bologna: il Mulino.