The power of the Kashrut: older but shorter

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ORIGINAL ARTICLE

The power of the kashrut: older but shorter. The impact of religious nutritional and hygienic rules on stature and life expectancy of Jewish conscripts in the early 19th century

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BACKGROUND/OBJECTIVES: We test the impact of several demographic, economic and social factors on stature in an early nineteenth century environment.
SUBJECTS/METHODS: We use a database of conscripts from the period 1818–1860 of a rural province in The Netherlands (Drenthe). This area had a rather high biological standard of living. This database of 413 conscripts contains information about family structure, family rank order, height, tax income, occupation and age of death. Conscripts came from two communities: one from a particular village (Oosterhesselen) and the other was Jewish conscripts that came from the countryside of the province.
RESULTS: Our statistical analysis shows a positive significant relationship between family size and height, which confirms the resource dilution theory. Remarkably, the sign of the relation between family size and life expectancy is inverse. Other factors such as the potato crisis and income had the expected effect on conscript heights. The community effect was strong. Jewish conscripts were much shorter than their counterparts. Access to nutrition, the specific food laws and other factors can explain this difference.
CONCLUSIONS: An increasing sibship size had a negative impact on body height but positive effects on life expectancy when adulthood was reached. Specifically for the Jewish community was the positive effect of the death of the father on conscript height. The mechanisms behind this phenomenon are unclear and open for further research.

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INTRODUCTION

Historians are, among others, interested in the life of ordinary people. How did they live, what work did they do and under what circumstances did they grow up? Lack of sufficient data makes historians keen on methods from other scientific fields to get more information out of these archived documents than at first glance seems to be possible. An example is the use of anthropometrics or anthropometric history that has been borrowed from medical science.[1] Documents on the height of individuals in a certain population allow for statements about the welfare of people. Stature reflects environmental influences similar to nutritional intake during the first years and the adolescence period. Qualitatively and quantitatively sufficient nutrition stimulates growth of infants and youngsters more than low-calorie and low-protein diets. As we know, some families were more able to collect better nutrition than poor ones. In line with the recent studies of Öberg (ref. 2, p. 32–34), we analyze in this paper socioeconomic and demographic variables that influence the amount and allocation of resources (nutrition) within families (sibships). If we use this anthropometric model for the nineteenth century it can improve our knowledge of society and the effects of resource allocation and disease environment on the biological standard of living.

In the literature, it is often suggested that nineteenth century – the age of industrialization – Jewish people in Europe were shorter than people from other religious background.[3–7] Is this also true for The Netherlands? Is this a reflection of environmental circumstances or also a community effect (ref. 8, p. 4818)? We decided to test the effect of the community in the province of Drenthe. The main question is does the anthropometric pattern of Jewish people of Drenthe differ from a comparable group of inhabitants of Drenthe in the first half of the nineteenth century?

Because of the limitation of this paper and the labor intensive nature of historical research, we had to focus on conscripts from which we knew body length. During their medical examination conscripts were measured, and these data can still be found in the archives. We test whether there is a relation between body height and life expectation of both groups in relation to socioeconomic and demographic variables. We test the so-called resource dilution hypothesis, which means that an increase in family size or vulnerable socioeconomic position leads to diminishing returns in height (refs 2,9; 32). Öberg was unable to prove this hypotheses for the first half of the nineteenth century. Thereafter, we scrutinize the difference between Jewish conscripts and conscripts from a village in Drenthe (Oosterhesselen). We have a database with relevant data of both groups.

Drenthe

In comparison with other Dutch provinces, Drenthe had a very high biological standard of living in the period 1818–1860 (conscription years). For Dutch standards, the infrastructural connections were limited. The economy had capitalistic aspects, as well as characteristics from a peasant society. Peat and

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agricultural products as butter and pigs were exported, but next to that the majority of the population had the resources to produce a substantial part of their own consumption.

On forehand Jewish conscripts had another economic background than most other villagers in Drenthe. More than 75% of the inhabitants in Oosterhesselen were farmers, whereas more than 80% of the Jewish people were petty salesmen (for the Jewish conscripts, this percentage was 85%). This vulnerable economic position of the Jewish group, in combination with the restrictions in food consumption because of their religion, leads to the assumption that there might be a difference in the standard of living between these groups. However, we are also interested in the effects of family composition on stature, birth order on stature and also life expectancy. The size of the family can influence body length. In larger families with limited possibilities to increase income or food production, the scarce food had to be distributed among more members. Consequence is that the oldest children had initially more food, but as the family grew the quantity dropped. However, in very large families this effect disappears for the youngest children. We assume that when the youngest reached adolescence, the older brothers and sisters had already left home or attributed to family income.

Not very much is known about food consumption for individual households in Drenthe, but using taxes and agriculture production numbers allows for an estimation of the most important products and for estimates of food consumption of the entire population in Drenthe. The diet in the first half of the nineteenth century was characterized by the consumption of dairy (buttermilk), rye and potatoes. In some areas, this was complemented by buckwheat. Rye, potatoes and buckwheat supplied calories, whereas butter, buttermilk and beef and pork gave the necessary protein. In addition, vegetables, fruit, sugar and honey were consumed. Tax lists of the year 1807 indicate that most households kept cows, sheep, pasture and possessed arable land. They could produce their own food. This was different for Jewish households. Only a small part (21%) owned cattle, and only 26% was able to cultivate products such as rye and potatoes. This means that they had to pay more money to get hold of food and did not have the privilege of auto consumption.

METHODS

Most data of this study were derived from military registers, which appeared consistent during the whole period (1818–1860). On 8 January 1817, Dutch parliament accepted de Nationale Militiewet (the Law on the National Militia). The most important aspect of this new legislation was the introduction of general conscription. From that year onward, all male inhabitants of The Netherlands with Dutch nationality had to be medically examined in the year in which they reached the age of 19. The examination included measurements of body height. All information on stature was collected in the lists even if conscripts were shorter than the minimum height, which means that the data are not hindered by truncation. One conscript with a height of 1.29 meter is excluded from the statistical analysis.

In this study, we make use of standard multivariate regression to differentiate between economic, demographic and community effects. We collected some additional information that we used as (cofounding) variables in our multivariate regression. We needed additional information about the size of the family in which conscripts grew up and about their age of death. For both groups, we build a database of 119 Oosterhesselen and 83 Jewish families, with one or more conscripts. In these databases, we reconstructed the number of family members and their day of birth and death as closely as possible from civil registries. As we do not know the size of households over time, we had to rely on the number of sibs born into the families. As the nuclear family was the rule, we did not expect that other family members (such as grandparents) laid a claim on family resources. In our results, stillbirths were excluded. As variable for family size, we used a dummy variable for small families. In line with the conclusions of Öberg, we considered a family of three children or less as small.

Information on tax classes is based on the tax registration of the parents. One of the databases (Oosterhesselen) contains exact information about tax paying. The tax classes are reconstructed by using the so-called Hoofdelijke Omslag. The inhabitants of Oosterhesselen paid individual taxes based on income and capital. Group 4 consists mainly of workers and cottagers, group 3 consists of smallholders, group 2 includes medium size farmers and trades men with employees, whereas group 1 is formed by the elite (large farmers) in the village. As the Jewish conscripts came from several parishes, it is not possible to collect individual tax information for those conscripts. Evidence from those parish registers suggests that almost all Jewish households were in the lowest classes. Therefore, we ranked all Jewish conscripts in class 4 and included this variable in our model.

For the Jewish community, we have information of the occupation of the conscript and his father at the moment of conscription. Furthermore, the registers notify the absence of the father or both parents. We include this variable in our test for the Jewish population. Specific for the Jewish population is the substantial number of slaughters. You might expect that they had direct access to food and have a higher standard of living. We test this in our model.

On forehand we have to note that conscripts from Drenthe were rather tall (163.4 cm) compared with their peers elsewhere in The Netherlands. However, this difference decreased during the period 1818–1860. The Potato crisis (1845–1847) caused a decrease in mean height of 2.2 centimeters over the years 1847–1860. Oosterhesselen was no exception. The Potato crisis seems to have had a marked impact on the system of auto consumption. Western European farmers were severely hit by the *Phytoftora infestans*. During the first years of the crisis, the potato crop dropped by half. Later, *Phytoftora* had minor but structural effects on the potato crop. Therefore, we included this variable (conscript years 1847–1860) in our model.

When analyzing the life expectancy of the conscripts, we did not include all variables. We exclude the life expectancy of the 1847–1860 period, as we do not expect that the Potato Crisis effected life expectancy. Preliminary testing confirmed this hypothesis. For the same reason, we excluded food processing as dummy variable.

RESULTS

A first analysis of demographic and anthropometric data confirms the expected difference between the conscripts from Oosterhesselen and the Jewish conscripts.

Jewish conscripts were shorter than their peers from Oosterhesselen (Table 1). The difference is 4.4 cm. At the same time, their life expectation is on average 4.7 years higher.

The socioeconomic position (tax class) had an effect on the body height of conscripts (Table 2). A higher tax class, which means a lower socioeconomic position, had a negative impact on height. However, we could not yet test this for the Jewish population.

The Potato Crisis had a strong impact on the body height. The conscripts of Oosterhesselen faced a three centimeter potato penalty during this years, but the effect was insignificant for the

Table 1. Average family size, body heights and life expectation of conscripts from Oosterhesselen and Jewish conscripts (1818–1860)

	Both groups	*N*	*Conscripts from Oosterhesselen*	*N*	*Jewish conscripts*	*N*
Average family size	5.7	202	5.2	119	6.8	83
Average body heights in cm	160.6	413	162.6	228	158.3	185
Average life expectation in years	63.2	398	61.2	229	65.9	169

Table 2. Estimated effects for heights in multivariate regression, two communities in Drenthe (The Netherlands), 1818–1860

Dependent value: height (cm)	
Panel a (combined databases)	
R^2	0.10
Number of observations	413
Intercept	166 148
Tax class	**−0.97[a]**
Working in food processing	1.08
Conscripted 1847–1860	**−1.80[b]**
Birth order	−0.03
Small family (⩽3 children)	**2.51[a]**
Jewish conscript	**−3.32[b]**
Panel b (database Oosterhesselen)	
R^2	0.06
Number of observations	228
Intercept	166 225
Tax class	**−0.89[a]**
Conscripted 1847–1860	**−2.96[b]**
Birth order	0.05
Small family (⩽3 children)	2.52
Panel c (database Jewish conscripts)	
R^2	0.05
Number of observations	185
Intercept	158 281
Conscripted 1847–1860	−0.59
Working in food processing	1.69
Fatherless or orphan	**3.37[b]**
Birth order	−0.18
Small family (⩽3 children)	1.55

[a]Significance $P < 0.10$. [b]significance $P < 0.05$. Coefficients are in bold if the probability of obtaining this value is < 0.10 when the zero value is zero.

Table 3. Estimated effects on life expectancy in multivariate regression, two communities in Drenthe (The Netherlands), 1818–1860

Dependent value: life expectancy of conscripts (19-year-old boys)	
Panel a (combined databases)	
R^2	0.03
Number of observations	400
Intercept	62 342
Tax class	0.57
Birth order	−0.69
Small family (⩽3 children)	**−5.58[a]**
Jewish conscript	**4.14[a]**

[a]Significance $P < 0.10$. Coefficients are in bold if the probability of obtaining this value is < 0.10 when the true value is zero.

Jewish conscripts. This makes sense. Only the non-Jewish population was dependent on the potato, for auto consumption and fodder, and faced a decreasing nutritional intake after 1845 (ref. 1, p. 147–148). The mild and statistically insignificant effect on Jewish conscript height may be explained by the rising food prices.

Sibship size mattered for early life height (Table 2). Smaller families are positively associated with stature. This in relation with the significant relation between the socioeconomic position is an indicator of resource dilution.

For panel b (the conscripts from Oosterhesselen) and panel c (the Jewish conscripts), this is not statistically significant, but the algebraic sign supports our expectation. As in other studies, birth order was not a relevant factor. Nevertheless, the direction of the algebraic sign illustrates that younger people were in a less fortunate position than their older sibs. Yet, the relation is weak. This may be due to non-linearity of this effect, as the oldest and the youngest grew up in a period with better nutritional resources (Tassenaar and Karel, forthcoming).

Another interesting aspect is the impact of the absence, mainly caused by an early death, of the father or both parents. The absence of a father or of both parents has a significant stimulating effect on body height of Jewish conscripts. The stimulatory effect on height can be explained by the resource dilution hypothesis – food is distributed among fewer family members. On the other hand, in most cases, the father was the main contributor to the family resources.

The effects of sibship size and community on life expectancy are even more fascinating (Table 3). In contrast to the effect on heights, the effect of family size is negative and religion seems to have a positive effect on life expectancy. Children in smaller families did not reach the same age as their peers from large families, but Jewish conscripts became older.

The other surprise is the positive sign for the life expectancy of the Jewish conscripts. This fact cannot be explained by their large families, as we used that aspect as cofounding variable. Their religious rules on hygiene and food preparation are the most logical explanation.

DISCUSSIONS

In contrast to the recent research of Alter and Ortis (Belgian Wallonia) and Hermanussen, Hermanussen and Burmeister (North-Germany), but in accordance with a study of Öberg (Skåne), we found that children in small families had a better biological life standard than those in large families.

Even in the absence of statistical significance, we have good reasons to assume that younger children in large families were less fortunate than in large families, both concerning life expectation and body height. This, however, is different in very large families. In these, the youngest children profit when the oldest siblings left the home. This might explain the difficulty to find significant results in this kind of testing. Cohort analysis can give more information on household composition and help find stronger relations.

Another interesting finding is the relation between family size and life expectation. As conscripts from larger families became older, the disease environment of a large family may have been an advantage in the long run. Perhaps, children of larger families build up a better immune system than their peers from smaller families. Fascinating is the positive effect of the passing away of the father on conscript height in the Jewish community. The question is whether this can be explained by the resource dilution theory. The stimulatory effect on height may also be explained by a lack of growth restriction or other social factors.

The height differences between conscripts from the Jewish community and from Oosterhesselen are fascinating. Community rules such as the religious food laws seem to have had an impact on conscript height.

To some extent, the differences between Jewish and non-Jewish conscripts (Table 1) can be explained by lower socio-economic position and large sibships. However, most of the differences are caused by other factors. Presumably, an insufficient access of accessible nutrition was important. Jews did not cultivate rye or potato or breed cattle. The differences between both groups may be explained by the more vulnerable economic position of the Jewish people, the higher cost for food because of their religious rules and the limited possibilities concerning auto consumption.

On the other hand, Jews reached a higher life expectancy than most other inhabitants in Oosterhesselen. This seems to be contradictory. However, one should be aware that conscript height in historical populations is determined between age 15 and 19.[10] The life expectation for the conscripts depends also from the life these youngsters led after the age of 19. Apparently, they were less susceptible for diseases and other ailments. It remains uncertain to what extent these phenomena were caused by factors related to their religious community (ref. 8, p. 4818). The stature of your peer group has an effect on height.

Resource scarcity seems to have little influence in the long run. Obviously, the Jewish people had an advantage. The religious rules concerning physical hygiene and preparation of food appeared to exhibit a positive impact on life expectance. Even though they were short, they lived longer. This sheds a different light on the presumed relation between nutrition and life expectancy.

CONCLUSION

People in the nineteenth century did not have the resources of today's Western populations. The effect of sibship size decreased in the course of time. Our research confirmed that this relation was strong in the nineteenth century societies even earlier than reported by Öberg.[2] Although they were market oriented, pre-modern societies were more vulnerable for environmental stress such as the potato crisis. Consequently, this effect was less pronounced for groups that did not rely on auto consumption. An increasing sibship size had a negative impact on body height but positive effects on life expectancy when adulthood was reached. As not all households were able to increase their resources (income or food production), larger families faced resource scarcity.[11–13]

The Jewish population in Drenthe had a special mix of a low biological life standard, short stature and a relatively high life expectation.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1 Tassenaar V. De biologische levensstandaard in Drenthe, 1815-1860. *Het verloren Arcadia*. Labyrinth Publisher: Capelle ad Ijssel, The Netherlands, 2000.
2 Öberg S. Sibship size and height before during and after the fertility decline: A test of the resource dilution hypothesis. *Demogr Res* 2015; **32**: 29–74.
3 Ripley WZ. *The Races of Europe: A Sociological Study*. D. Appleton and Co: New York, 1899.
4 Bolk L. Over de toeneming in lichaamslengte der mannelijke bevolking in Nederland. *Ned Tijdschr Geneeskd* 1909; **53**: 1703–1721.
5 Kopczynski M. The physical stature of Jewish men in Poland in the second half of the 19th century. *Economics and Human Biology* 2011; **9**: 203–210.
6 Bogar D. Wealthier Jews, taller Gentiles: inequality of income and physical stature in fin-de-siècle Hungary. *Econ Human Biol* 2013; **11**: 433–435.
7 Hermanussen M, Meitlinger T, Veldhuis JD, Low MJ, Pfäffle R, Staub K *et al.* Adolescent growth: genes, hormones and the peer group. *Pediatr Endocrinol Rev* 2014; **11**: 341–353.
8 Bogin B, Hermanussen M, Blum WF, Aßmann C. Sex, sport, IGF-1 and the community effect in height hypothesis. *Int J Environ Res Public Health* 2015; **12**: 4816–4832.
9 Becker GS. *A Treatise on the Family*. Harvard University Press: Cambridge, 1993.
10 Oppers VM. *Analyse van de Acceleratie van de menselijke Lengtegroei door Bepaling van het Tijdstip van de Groeifasen*. University of Amsterdam: Amsterdam, 1963.
11 Alter George, Oris Michel. Effects of inheritance and environment on the heights of brothers in nineteenth-century Belgium. *Human Nature* 2008; **19**: 44–55.
12 Hermanussen M, Hermanussen B, Burmeister J. The association between birth order and adult stature. *Ann Human Biol* 1988; **15**: 161–165.
13 Karel EH, Paping R. In the shadow of the nobility: local farmer elites in the Northern Netherlands from the 17th to the 19th centuryFreist D, Schmekel F. *Hinter dem Horizont: Projection und Distinktion ländlicher Oberschichten im europäischen Vergleich 17. bis 19. Jahrhundert*. Aschendorff Verlag: Münster, 2013; 43–54.