

## Supplementary Information

to the Technical Comment (submitted to *Science*) of **Jan Beise and Eckart Voland:**  
**Different effects of producing sons on maternal longevity in pre-modern populations**

**Selection criteria:**

We applied the same selection criteria as Helle et al., i.e. only women who lived to over 50 years of age were included. Furthermore, we included only women and men who were married just once in order to avoid confounding effects by children from several successive unions. Moreover, we excluded infertile couples. The women's birth cohorts were limited to the time before 1800 for Krummhörn and before 1700 for Québec in order to not over-represent the women died young (in Krummhörn death records were evaluated until 1899, in Québec until 1799).

**Multiple regression models:**

We used the same model as Helle et al. In this multiple regression model the life span of the women entered as the dependent variable while the number of sons, the number of daughters and the life span of the husband entered as independent variables – all of these variables were continuous variables.

First, we analyzed the relationship between number of sons born and number of daughters on maternal age at death. We found no significant relationship between these quantities (see "Round 1" in Table 1).

Then, we excluded all cases in which the husband died before the mother turned 50, in order to account for those cases in which an early death of the husband prevented the full exhaustion of the woman's reproductive potential. Again, no significant correlation of the number of sons or daughters with maternal life span was found (see "Round 2" in Table 1). The results of these last models are presented in the comment submitted.

Furthermore, since it is known for the Krummhörn population that the reproductive behavior differed significantly according to the availability and the access to resources

(1), separate models were estimated for the wealthiest group, the farmers, and the relatively poor group of workers. These models revealed opposite effects concerning the number of brothers: an increasing number brothers shortened the life of the mother in farmer families but prolonged her life in worker families (see “Round 3” in table 1; note that the large group of families without information about the social status and which are therefore excluded in round 3 showed a negative relationship between the number of brothers and the maternal longevity, note furthermore that all these effects are not significant).

**Table 1: Estimated coefficients of the multiple regression models, number of children born (description in the text).**

		Models	Round 1	Round 2	Round 3	
					workers	farmers
Krummhörn	Intercept	66.797	64.669	68.535	68.749	
	n sons born	-0.186	-0.180	0.462	-0.886	
	n daughters born	0.056	0.049	0.280	0.676	
	Age of husband	0.069 **	0.098 **	0.007	0.041	
	N	959	803	303	66	
Québec	Intercept	69.624	65.312	-	-	
	n sons born	0.033	0.081	-	-	
	n daughters born	0.112	0.197 *	-	-	
	Age of husband	0.005	0.055 *	-	-	
	N	2976	2051	-	-	

Note: + p<0.1, \* p<0.05, \*\* p<0.01

Next we repeated the first two rounds of estimations considering only the number of children raised to adulthood. In the Krummhörn case the age of adulthood is defined as age 15, an age until which children usually still lived in the parental household.

Individuals with missing information about date of death get censored at this age. For the Québec data set, which comprises a whole population and which therefore shows almost no out migration, survival to age 18 (the age Helle et al. used for the Sami population) was calculated using the information about the date of death. The results of these models are shown in Table 2.

In the Krummhörn any relationship of the number of sons or daughters with maternal longevity disappeared almost completely. Also for the Québec population the results

appears unstable. The increasing effect of the number of sons on the maternal longevity increased and even surpassed the effect of the daughters (and reaches in round 2 a significance level of  $p<0.1$ ; note that all other relationships concerning the number of children raised is not significant).

**Table 2: Estimated coefficients of the multiple regression models, number of children raised to adulthood (Krummhörn: to age 15 years, Québec: to age 18 years; further description in the text).**

		Models	
		Round 1	Round 2
Krummhörn	Intercept	66.437	64.361
	n sons raised	0.036	0.021
	n daughters raised	0.006	-0.017
	Age of husband	0.067 **	0.097 **
	N	959	803
Québec	Intercept	69.648	65.821
	n sons raised	0.179	0.225 +
	n daughters raised	0.104	0.120
	Age of husband	0.005	0.056 *
	N	2976	2051

Note: +  $p<0.1$ , \*  $p<0.05$ , \*\*  $p<0.01$

## References

1. E. Voland, in: Dunbar, R. I. M., Ed., *Human Reproductive Decisions - Biological and Social Perspectives* (MacMillan, Hounds mills, 1995), p. 137

The www address of this file is:

<http://www.demogr.mpg.de/publications/files/beisesupp.pdf>.