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Heterogeneity in 'High Fertility' Societies

Insights From Compositional Demography

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ABSTRACT

Demographic transition theory has been conducive to a rather dichotomous view of global fertility: traditional versus modern, high versus low fertility. The knowledge that high fertility could be achieved by subpopulations with different characteristics and reproductive behaviors somehow vanished from (historical) demographers' attention. This study unpacks heterogeneity in a 'high fertility' society, i.e. 19th-century Zeeland, the Netherlands. Sequence and cluster analysis were employed to distinguish groups with disparate reproductive trajectories with data from Genlias/LINKS including 15,014 full birth histories and 87,204 observed live births over the period 1811–1911. Multilevel binomial logistic regression models of membership of the two discerned high fertility subgroups were then estimated. The 'Traditional 1' subpopulation, with 10.5 children per woman on average, was composed of skilled, unskilled, and farm workers living in rural areas. Couples married early and were characterized by large spousal age gaps. The 'Traditional 2' subpopulation had on average 7.2 children per woman, more often lived in towns, married significantly later, and had more equal gender relations. Compositional demography, revealing subpopulations with divergent cultures of marital self-restraint and reproductive management, not only nuances previous (historical) demographic findings, but may well offer more tools to develop family planning and reproductive health policies than the demographic transition model does.

Keywords: Fertility; Birth histories; Compositional demography; Demographic transition theory; Family planning and reproductive health; Zeeland; The Netherlands; 19th Century

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1 INTRODUCTION

In the Western world, as well as in large swaths of Asia, fertility has fallen drastically since the 19th century. Globally, however, there are still countries with persistent patterns of high fertility, defined as five or more births per woman over their reproductive career (World Bank, 2010). Most of these are located in sub-Saharan Africa. In landlocked Niger in Western Africa, for instance, women bear on average 7.4 children, a level of high fertility which has remained stable for decades. As there are no signs of family limitation at higher parities, the fertility transition — in its conventional definition — has not yet begun in Niger. Yet, recent research reveals that there are groups that have started to postpone first childbearing, leading to compression of fertility at higher ages (Spoorenberg & Maga, 2018).

The case of Niger illustrates how heterogeneity may exist even within high fertility societies. Different population subgroups may have different characteristics and practice varying reproductive strategies, but reach similar levels of high fertility. Hence, high fertility, just like low fertility, is a composite, comprising different groups located in specific geographic and social contexts, with their own traits, reproductive strategies, gender relations, and social networks. Compositional demography aims to uncover such subpopulations nuancing existing knowledge of high — or for that matter low — fertility (Kreager, 2011; Schröder-Butterfill, 2012; Szreter & Garrett, 2000).

In this article, I apply a compositional demography approach to unpack high fertility in Zeeland, a 19th-century Dutch society before and during the early stages of the fertility transition in this region. I will start with a brief description of the setting, then present the data, measures, and methods, and finally focus on the results and place them in a broader perspective of what compositional demography may offer to scientific and practice communities.

2 SETTING

The province of Zeeland, where this study is situated, is located in the south-western corner of the Netherlands and consists of peninsulas, islands, and a mainland area that borders with Belgium to the south. During the 19th century, Zeeland's economy was based on market-oriented, capital-intensive farming specializing in the production of cash crops, such as wheat, flax, madder, and sugar beets. Social structure in the countryside was composed of a small group of wealthy gentlemen farmers (10% of the population — see Table 1) and a mass of farm workers (55%). The cash crops produced were labor intensive and stimulated the demand for cheap labor, while the remunerative contribution brought in by women and children was needed to sustain the family income of most farm laborers. Hence, most women bore and raised many children. Part of the study population lived in urban areas (12%). The Zeeland towns fulfilled a regional function in trade, industry, and administration. Industrialization took off after about 1850 when shipbuilding, beer brewing, shoemaking, textiles, concrete production, and wood sawing started to grow, providing ample labor opportunities for skilled and unskilled laborers.

Zeeland's population was religiously diverse, consisting of Catholics and Liberal and Orthodox Protestants, differing considerably in rigidity. The Catholic Church opposed birth control and exerted a strong pronatalist pressure on married couples. In predominantly Catholic communities, the power positions of parents and the local clergy were strong, making it almost impossible for couples not to conform to the ideal of large families. Orthodox Protestants adhered to roughly the same firm morality and childbearing norms, staying virulently opposed to birth control within marriage until at least the 1920s.

Childbearing usually started as soon as people married. Men's average age at marriage was 28.4 years; women married on average around 26.1 years, but variation was high (see Table 1). Gender relations in Zeeland could be characterized as patriarchal, just as elsewhere in 19th-century Europe. Zeeland's fertility transition, was rather late, starting only after 1880. Hence, this study focuses mainly on pre-transitional and early-transitional fertility.

3 METHODS

The study is based on a large historical database, Genlias (release Siblings.010), which is now named LINKS, containing all available birth, marriage, and death certificates from Zeeland between 1811 and 1911. The point of departure is a data file that includes coded information from all birth certificates for the period 1811–1866 that could be linked with the marriage certificates of the parents of the new-born child (N=209,300, among which are 40,939 girls and 36,595 boys who got married in the province of Zeeland). The restriction that the youngest cohort should be born no later than 1866 was based on the fact that reproductive histories needed to be reconstructed, while there was no access at the time of the construction of the file to documents more recent than 1911 (=1866 + 45) due to legal restrictions imposed by Dutch privacy laws. Since information is needed about the full reproductive life span, and since such information is only to be found within the province of Zeeland, all individuals for whom no death certificate was found were excluded. Absence of a death certificate (in the province of Zeeland) is a strong indication of out-migration. Among the 40,939 women with observed marriage certificates, 15,014 remained married until age 45 (i.e., the bride's and groom's deaths occurred after the bride's 45th birthday, and no second marriage was observed for the bride until that date). The database provides the exact dates of birth of the first six children and the total number of children ever born, as well as the exact date of birth of the last child. The analytical sample of 15,014 full birth histories comprises a total of 87,204 observed live births.

The dependent variable comprises different reproductive subgroups. These are measured by the wife's birth history, which was constructed and analysed using sequence analysis. Women's childbearing trajectories were represented as sequences of 31 yearly states from ages 15 to 45. Three categories of states, each corresponding to the main sub-sequences of the reproductive life course, were distinguished: a starting component that spans from age 15 to the age at first birth; a reproductive subsequence, which starts at the age at first birth and ends at the age at last birth; and the stopping phase between the age at last birth and the onset of sterility (age 45). Fertility subtypes in each cohort were assessed by first computing pair-wise optimal matching distances between all trajectories of a given generation. Based on these dissimilarity matrices, a cluster analysis was performed to identify specific reproductive subtypes (see Bras & Schumacher, 2019).

We examine the association of high fertility birth histories with a number of independent variables that could be collected from the sources. Dummies for six *birth cohorts* were included. *Social class* was indicated by the occupation of the groom taken from the marriage certificate coded in HISCO. The occupational categories were then grouped into the following categories (based on HISCLASS): 1) higher and middle class, 2) skilled workers, 3) farmers and fishermen, 4) unskilled workers, and 5) farm workers. *Groom's and bride's marriage ages* were included by four categories: groom/bride <24 years old, groom/bride 24–26 years old, groom/bride 27–29 years old, groom/bride 30+ years old. *Spousal age differences* were included as an indicator of gender relations. Nominal categories were constructed to distinguish between the different types of age gaps, i.e. spouses of more or less equal age (-2 until +2 years difference), grooms 3–6 years older, grooms 7 or more years older, brides 3–6 years older, and brides 7 or more years older. Birth places (of the wife) were classified as *urban or rural* on the basis of the historical designation of the municipality as a town. Unfortunately, the marriage certificates do not state the religious denomination of the wife and husband. Hence the *religious climate* in the wife's birthplace was used as a proxy. This variable is based on two indicators: 1) the proportion of Catholics in the community in 1849; and 2) the proportion of eligible voters for the main orthodox Calvinist party for the municipal and provincial elections in 1935 (1935 being the first year when it was possible to chart voters for this party).

The data is characterized by a hierarchical structure: women are nested within families and within communities. To address nesting within families, two-level multilevel models were estimated and, to address nesting within communities, fixed effects dummies at the community level were included in the models. Five childbearing trajectories were generated: a 'stoppers' trajectory of families with on average 3 children (17% of all couples), a 'late starters' trajectory of couples with on average 3.8 children (16%), an 'almost childless' trajectory (zero and one-child families) (13%), and two high fertility trajectories, named 'Traditional 1' (24%) and 'Traditional 2' (30%). Previous analyses showed that the two high fertility subgroups remained relatively stable in terms of size over successive cohorts (Bras & Schumacher, 2019, pp. 892–893).

Binomial logistic regression analysis was then used to estimate the probability that a couple belonged to the 'Traditional 1' subpopulation (model 1) and to the 'Traditional 2' subgroup (model 2) in comparison to all others. In model 3, the odds of belonging to 'Traditional 1' versus the 'Traditional 2' group are assessed.

4 RESULTS

Table 1 presents the descriptive and multivariate results. As can be observed, the 'Traditional 1' trajectory (N=3,582) has a very short starting phase — women in this cluster marry when they are on average 21.5 years old. From a previous study we know that they also had an extremely long reproductive phase and a very short stopping phase (see Bras & Schumacher, 2019). Hence, completed fertility in this subgroup is very high, with 10.5 children on average.

What characterizes this high fertility subgroup in terms of its geographic and social context, reproductive strategies, and gender relations? Model 1 shows that 'Traditional 1' families differed from other couples in that the wives were significantly more often born in the early 19th century (1811–1839) and less often in the youngest cohort (1860–1866) than others. This high fertility subpopulation consisted not only more often of farm workers and unskilled workers, but also of skilled workers. These high fertility families were also more often than other groups from rural communities and from places characterized by a rigorous religious climate with high percentages of Orthodox Protestants and Catholics. Not surprisingly, women in these high fertility families married at significantly younger ages than others, i.e. below the age of 24 and less often at older ages (27+). Husbands married at a similarly young age. 'Traditional 1' high fertility families had more patriarchal gender relations than others, with husbands being — more than in other couples — between 3 to 6 years and over 7 years older than their wives. The profile of this extremely high fertility group fits well with couples in which the bride was already pregnant. In Zeeland, bridal pregnancy occurred among 40% of all couples during the second half of the 19th century, and this percentage was even higher during the first half of the 19th century (Kok, Bras, & Rotering, 2016). Such high fertility couples may have been more fecund, less knowledgeable about reproductive control, or may simply have been more reckless than others.

The wives of the 'Traditional 2' subpopulation (N=4,502) differed from those in the 'Traditional 1' group in that they married more than 3 years later (mean=24.9), spaced their births more, and stopped earlier (Bras & Schumacher, 2019). However, the 'Traditional 2' subgroup was also a high fertility group with a completed family size of 7.2 children per woman on average. Couples belonging to this subgroup were more often than other couples born in the cohort 1830–1839, which meant that they started their reproductive career around the middle of the century. They were, like the 'Traditional 1' group, more often composed of unskilled workers and farm workers compared to other couples. They also more often than others lived in communities with a rigid religious climate. Both wives and husbands married at an average age in comparison to other couples. The group was characterized by rather equal spousal power relations (relatively small spousal age gaps).

Finally, we estimated how the 'Traditional 1' subgroup differed from 'Traditional 2' (model 3). The 'Traditional 1' couples belonged more often to the older birth cohort (1820–1829) and less often to the youngest cohort than the 'Traditional 2' group. No significant differences were found in social class background. 'Traditional 1' couples lived less often in urban places compared to the 'Traditional 2' subgroup, while the religious climate of the communities where they lived did not differ significantly. What did diverge was the (on average) early age at which both wives and husbands were married in the 'Traditional 1' group compared to the 'Traditional 2' one. Spousal power relations were significantly more patriarchal in the 'Traditional 1' group, with husbands being many years older than their wives in comparison to the 'Traditional 2' group.

Table 1 *Results of multilevel binomial logistic regression analyses of factors associated with high fertility child bearing trajectories: Odds ratios. Including summary statistics of the data and variables used.*

Summary statistics		**Traditional 1 vs. all others (model 1)**		**Traditional 2 vs. all others (model 2)**		**Traditional 1 vs. Traditional 2 (model 3)**	
Average parity reached	5.8	10.5		7.2			
Mean age (SD) at first marriage (wife)	26.1 (6.0)	21.5		24.9			
Mean age (SD) at first marriage (husband)	28.4 (7.1)						
Number of couples	15,014	3,582		4,502			
Cohort		Exp(B)	Sig	Exp(B)	Sig	Exp(B)	Sig
1811–1819	4%	1.318	0.023	1.010	0.931	1.240	0.162
1820–1829	11%	1.369	0.000	1.002	0.979	1.338	0.004
1830–1839	19%	1.244	0.001	1.170	0.007	1.142	0.115
1840–1849	22%	1.095	0.153	1.020	0.717	1.114	0.172
1850–1859	24%	0	Ref	0	Ref	0	Ref
1860–1866	20%	0.802	0.000	0.936	0.247	0.826	0.017
Social class							
Higher/middle class	8%	1.163	0.179	1.091	0.360	1.018	0.904
Skilled workers	20%	1.227	0.027	1.145	0.083	0.965	0.771
Farmers	10%	0	Ref	0	Ref	0	Ref
Unskilled workers	6%	1.411	0.004	1.302	0.011	0.999	0.994
Farm workers	55%	1.489	0.000	1.196	0.011	1.124	0.294
No class/unknown	1%	1.233	0.418	0.986	0.949	1.258	0.538
Urbanization							
Rural	88%	0	Ref	0	Ref	0	Ref
Urban	12%	0.767	0.000	1.017	0.783	0.760	0.004
Religion							
<10 % Orthodox Protestants & Catholics	19%	0	Ref	0	Ref	0	Ref
10%–60% Orthodox Protestants & Catholics	70%	1.100	0.088	1.038	0.459	1.083	0.255
> 60% Orthodox Protestants & Catholics	11%	1.195	0.039	1.364	0.000	1.020	0.857
Wife's marriage age							
Wife <24 years	38%	5.232	0.000	0.330	0.000	5.434	0.000
Wife 24–26 years	26%	0	Ref	0	Ref	0	Ref
Wife 27–29 years	16%	0.246	0.000	0.632	0.000	0.174	0.000
Wife 30+ years	20%	0.485	0.000	0.035	0.000	0.642	0.640
Husband's marriage age							
Husband <24 years	23%	1.584	0.000	0.799	0.000	1.958	0.000
Husband 24–26 years	27%	0	Ref	0	Ref	0	Ref
Husband 27–29 years	24%	0.586	0.000	1.049	0.410	0.465	0.000
Husband 30+ years	26%	0.255	0.000	0.790	0.004	0.162	0.000
Spousal age difference							
Husband ≥ 7 years older	16%	2.321	0.000	0.876	0.111	4.565	0.000
Husband 3–6 years older	27%	1.579	0.000	0.795	0.000	2.191	0.000
Spouses equal age (-2–2 years)	44%	0	Ref	0	Ref	0	Ref
Wife 3–6 years older	10%	0.733	0.001	1.304	0.000	0.593	0.000
Wife ≥ 7 years older	3%	0.465	0.000	1.142	0.468	0.218	0.000
Intercept		0.105	0.000	0.879	0.164	0.219	0.000
Information Criterion							
Akaike Corrected		73274.486		68971.188		37707.875	
Bayesian		73282.101		68978.803		37714.869	
Total number of birth histories		15015				8084	

Source: GENLIAS_2010_01_Siblings. All models include fixed effects dummies to address the nesting of women within communities.

5 CONCLUSION

Szreter and Garrett (2000) have argued that demographic transition theory, and the policy perspective that evolved from it in the 1950s and 1960s, has been conducive to a rather dichotomous view of global fertility: traditional versus modern, high versus low fertility. The knowledge that natural fertility could consist of many levels, and that high fertility could be achieved by subpopulations with different characteristics and reproductive behaviours somehow vanished from (historical) demographers' attention.

This study has disclosed considerable variation in a historical high fertility society. Two subpopulations were discerned with high, but varying, levels of fertility and different characteristics and reproductive strategies. The 'Traditional 1' subpopulation, with 10.5 children per woman on average, comprised skilled, unskilled, and farm workers living in rural areas. Couples married early and had patriarchal gender relations, visible in large spousal age gaps. The 'Traditional 2' subpopulation by current definitions also classifies as high fertility, with 7.2 children per woman. Although their social background or religious signature did not differ from the 'Traditional 1' subgroup, their members more often lived in towns, married significantly later, and had more equal gender relations. The urban context, more egalitarian gender relations, and the practice of reproductive control (evidenced by the fact that their families were smaller than the 'Traditional 1' group) were closely intertwined.

Apart from nuancing previous historical demographic findings, this study is also relevant for policy and practice in contemporary high — or for that matter low — fertility populations. A compositional demography approach, revealing subpopulations with differing cultures of marital self-restraint and reproductive management, may well offer more tools to develop family planning and reproductive health policies than the demographic transition model does.

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