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Hired helpers at the nest: The association between life-cycle servants and net fertility in North Orkney, 1851–1911

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Abstract

Objectives—The presence of kin is often, but not always, associated with higher fertility in historical populations. However, the effect of other household members on fertility is less frequently studied. While not genetically related, life-cycle servants lived and worked alongside household members and may have provided assistance to reproducing families. Female servants in particular may have helped mothers with small children through direct help with childcare activities or by replacing the economic effort of mothers whose work was not compatible with childcare. This study examines the presence of servants in the households of married women of reproductive age to assess whether households with young children are more likely to also have servants.

Materials and methods—This study uses individual-level census data from North Orkney, Scotland (1851–1911) to investigate the relationship between the presence of servants in households and a measure of recent net marital fertility, the number of women's own-children under age 5, using logistic regression models.

Results—Households with young children were more likely to have a female, but not male, servant in the household after controlling for the effects of other possible helpers, including older children, mothers, and mothers-in-law.

Discussion—These findings are consistent with prior research that indicates the importance of female labor to smallholder agricultural households and suggests that female servants may have provided support to reproducing families. Life-cycle servants should be considered one component of biocultural reproduction in historical Northwest Europe. The use of hired help is not restricted to contemporary or elite groups.

Keywords

Fertility; biocultural reproduction; historical demography; own-children; life-cycle servants

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Data Availability Statement

The data for this analysis is in the public domain and is available from the National Records of Scotland.

1. Introduction

Human reproduction is characterized by assistance from others (Hrdy, 2009). Research across a range of populations, both past and present, emphasizes the pro-natal role of kin on fertility, often motivated by evolutionary hypotheses related to inclusive fitness and cooperative breeding (Kramer, 2010; Mace & Sear, 2005). Given this orientation, many studies of the relationship between support from kin or the availability of kin and fertility outcomes focus on close family members. The grandmother hypothesis ranks among the most widely tested, and help from post-reproductive women is often, but not always, associated with measures of fertility, such as birth interval length and children ever born, or improved child survival (Alvarez, 2000; Hawkes, 2003; Hawkes, O'Connell, Jones, Alvarez, & Charnov, 1998; Sheppard & Sear, 2016; Tanskanen & Rotkirch, 2014; Volland & Beise, 2002). Older children are another source of assistance for mothers, as they can care for their younger siblings or help with household tasks, filling roles sometimes referred to as “helpers at the nest” (Crognier, Baali, & Hilali, 2001; Crognier, Villena, & Vargas, 2002; Hames & Draper, 2004; Kramer, 2005; Turke, 1988). However, in certain contexts there may be competition for scarce resources among members of a sibling set, which would not result in increased fertility (Hagen, Barrett, & Price, 2006; Nitsch, Faurie, & Lummaa, 2013; Riswick, 2018). The siblings of mothers and fathers may also provide assistance or support that would encourage higher fertility, but some of the evidence concerning the effects of aunts and uncles is mixed (Nitsch, Faurie, & Lummaa, 2014; Pollet & Dunbar, 2008; Pollet, Kuppens, & Dunbar, 2006).

Despite the strong pro-natal effects of kin on fertility observed in some contexts, in comparative research the effect appears to vary widely (Clarke & Low, 2001; Sear, 2017; Sear & Coall, 2011; Stulp, Sear, & Barrett, 2016). Kin effects are sometimes positive, sometimes negative, and other times non-existent. Alloparental support does not appear to have consistent relationships with fertility across cultures or historical periods. Instead, help from others may comprise part of the complex web of mechanisms, including social support, social learning, social pressure, and diffusion of ideas, that link social relationships and fertility behaviors and outcomes (Bernardi & Klärner, 2014; Schaffnit & Sear, 2017).

However, kin are not the sole source of support for parents as families, and mothers in particular, can receive assistance from other sources. It is argued that one of the essential differences between human and non-human forms of cooperative breeding, or biocultural reproduction, is that assistance, support, and childcare occur frequently among those who are not genetically related (Bogin, Bragg, & Kuzawa, 2014). Support from unrelated individuals, and even institutions, has been demonstrated to affect the timing and quantum of fertility across a variety of settings.

In some contexts, non-relatives, some of whom might be considered fictive kin, assist with the provision and care of children, which could have a pro-natal influence on women's fertility. For example, among the Hadza of Tanzania, physical proximity is as important as genetic relatedness in predicting childcare activities (Apicella, Marlowe, Fowler, & Christakis, 2012). Arrangements for the care and provisioning of children include both biologically- and socially-defined kin in many societies (Lancy, 2015). The varied and

flexible nature of such social relationships has been cited in critiques that note a tendency in the social sciences to overemphasize biological definitions of kinship and dichotomize kin into separate social and biological categories (Carsten, 1995; 2000; Collier & Yanagisako, 1987; Schneider, 1984).

However, much like the research on kin effects, findings on the effects of non-kin on fertility are also mixed. Social learning among peers plays a role in reductions in fertility. For example, information about contraceptive use transmits among non-relatives, especially during the fertility transition (Bongaarts & Watkins, 1996; Madhavan, Adams, & Simon, 2003; Montgomery & Casterline, 1996). Indeed, some theories related to the demographic transition highlight the potential anti-natal influence of non-kin contacts (Newson & Richerson, 2009; Newson, Postmes, Lea, & Webley, 2005). On the other hand, some studies have observed a pro-natal diffusion or social learning effect in post-transition societies (Lois & Becker, 2014; Pink, Leopold, & Engelhardt, 2014).

Non-family institutions also shape fertility outcomes. The support offered by kin and fictive kin can be supplemented or partially replaced in some institutional contexts, as in the case of governments and employers with family-friendly policies or the availability of hired childcare and subsidies to offset its cost. However, much of this research concludes that the pro-natal effect of family policies and childcare availability may be somewhat limited (Brewster & Rindfuss, 2000; Gauthier, 2007; Hank & Kreyenfeld, 2003; Jónsson, 2018; McDonald, 2006; Rindfuss & Brewster, 1996; Rindfuss, Guilkey, Morgan, & Kravdal, 2010). Despite small observed effect sizes on fertility outcomes, institutional contexts and hired care can be socially and emotionally salient as professional caregivers are at times described as fictive kin by their clients (Karner, 1998; Nelson, 2013).

1.1 Life-cycle servants as sources of support and their status as prospective fictive kin

In historical Europe, one source of non-kin support for parents may have been life-cycle servants. These coresident workers were nearby and able to help with direct childcare, perform a mother's other household duties, or provide general assistance with the economic activities of a household. Indeed, servants seem likely candidates for the kind of assistance that might be offered by nearby fictive kin, blurring the lines among nearby family members, coresident kin, and fictive kin.

Life-cycle servants were typically hired on annual contracts and provided room and board in addition to wages, often used to save for marriage or remit to families. During the nineteenth century most dwellings were small, and it was common practice for life-cycle servants to live as alongside their employer's family and eat from the same table (Kussmaul, 1981a; Whittle, 2000). The status of the life-cycle servant was therefore ambiguous; they might not be closely related to their employer genetically, yet they lived as part the family and were often described using familial terms (Hasbach, 1908; Kussmaul, 1981b). Unlike other types of laborers, who were hired for a day, week, or specific task, the labor of life-cycle servants was continuously available to the employer during the contract period, similar to that of coresident kin (Whittle, 2005).

Both young men and women worked as servants in the time between adolescence and marriage, with the majority between ages 12 and 30, and they contributed to the productive work of the household, such as farming or crafts, rather than solely domestic tasks as one might expect from professional servants in wealthy households such as butlers, maids, and housekeepers (Hajnal, 1982). The social class of a servant before or after their period of employment was often the same as their employer. Indeed, the term “life-cycle servant” acknowledges the temporary nature of this work (Laslett, 1977). The specific nature of the institution of service and the prevalence of servants in the population varied regionally within Europe, but servants were usually between 6 and 10 percent of the total population and the majority of young people worked as servants at some point in their lives. Life-cycle service was ubiquitous in the United Kingdom in the nineteenth century, and persisted into the early twentieth century in parts of Northern England and Scotland, likely related to the more labor-intensive style of agriculture practiced there (Ewan, 2004; Gray, 1984; Whyte & Whyte, 1988).

Life-cycle service provided a means for households to secure reliable, 24-hour labor without depending solely on a labor force composed of their own children and close relatives. In more general terms, service can be seen as a means of temporarily redistributing labor across households as servants could be hired in or young adult family members could be sent out in an effort to balance household production and consumption needs or respond to changes in economic conditions (Smith, 1984). These features make service part of what Wall (1986) called the “adaptive family economy,” as it allowed for flexibility in the social, familial, and economic relationships that drove the economic inputs and outputs of the household.

The presence of servants in the household may affect the fertility of other household members by provisioning help with childcare efforts, offsetting the reduced productivity of mothers with young children, or increasing overall household production to meet the increased consumption needs of a growing family. However, this assistance comes at the cost of dwelling space, food, wages, and time devoted to the search and hiring process. In this sense, life-cycle servants should be considered as part of a single shared household energy budget (Kramer & Boone, 2002). Male and female servants may have different associations with the presence of young children, especially given the gender division of labor during the study period (Devine, 1984; Gray, 1984; Pinchbeck, 1969; Whittle, 2000). Indeed, in Orkney, there appears to be an effort to hire servants differentially by sex to balance skewed sex ratios of household members of working age (Jennings, Wood, & Johnson, 2011). If direct help to a mother or the replacement of her labor increases her ability to have and care for children, or if higher fertility increases the demand for such labor, then the presence of female servants should be more strongly associated with measures of fertility than that of male servants, who would increase total household productive capacity, but not directly assist with childcare or replace the lost economic effort of mothers. Finally, servants may have bridged a gap in the types of assistance offered by others. For example, in some contexts it has been noted that kin are willing to accept alloparental roles but are less eager to take on other tasks for women with small children, such as household work other than direct childcare (Leonetti, Nath, Heman, & Neill, 2004; Quinlan & Quinlan, 2007; Quinlan, Quinlan, & Flinn, 2003).

1.2 Setting: Late nineteenth and early twentieth century North Orkney, Scotland

The Orkney Islands are located north of mainland Scotland at the confluence of the North Atlantic and North Sea. The six northernmost islands are the focus of the North Orkney Population History Project (NOPH), a multidisciplinary project that examines the population and landscape history of the islands over the past 300 years (Jennings, Sparks, & Murtha, 2019). In the study period (1851–1911) the inhabitants of the northern isles practiced mixed smallholder agriculture and rural trades. All household members contributed to the economic production of the household if they were able, including women, adolescents, and older children. Most families worked tenant holdings, as landowners divided their estates into small parcels to be rented and managed locally. The landowning class tended to reside in the nearest town, Kirkwall, or locations farther south. The population was dispersed over the landscape with only a few small nucleated villages or townships. The institution of life-cycle service was already established in Orkney by the 17th century, when documents indicate that there were three or four servants for every 10 households (Flinn et al., 1977). Life-cycle service persisted until the early 20th century in this community, as agricultural modernization came late to the islands and labor-intensive mixed farming, focused on primarily barley, oats, potatoes, turnips, and livestock, was practiced within living memory (Jennings et al., 2011).

During the study period, the crude birth rate (CBR) ranged between 32 per thousand and 20 per thousand while the crude death rate (CDR) was more stable, ranging between 15.5 and 15.8 per thousand (Sparks, 2007). Estimates of period life expectancy at birth (e_0) fall between a low of 44.4 in 1861 and a high of 50.6 in 1881. Period total marital fertility rates (TMFR) varied between 8.38 and 11.89. The average age at marriage was high throughout the study period, as was typical of Northwest Europe, with observed the mean age at marriage calculated from marriage records falling between 24 and 26 for women and 26 and 29 for men. Estimates of the singulate mean age at marriage (SMAM), a census-based measure, are about 3–5 years higher for men and women.

The social structure of the islands was relatively flat as wealthy landowners tended to live outside of the study area. However, within the remaining population, farmers and others involved in agriculture experienced advantages relative to non-agricultural workers. This includes higher fertility (Sparks, 2009), lower infant mortality (Sparks, Wood, & Johnson, 2013), and higher standard of living measured in terms of demographic responses to short-term economic stress (Jennings, Quaranta, & Bengtsson, 2017). Occupation is the best way to assess socioeconomic standing in this dataset, as direct information about wages, income, and educational attainment is not available. Some information exists concerning landholding size, but the interpretation of landholdings is not straightforward, as the system of tenancies and sub-tenancies was not clearly reflected in these documents. For example, relatively small-scale rented plots could all be listed under the single large holding of the landowner. This makes it difficult to discern exactly how much land was held by individual workers on large farms, who were provided small plots and gardens and allowed to keep some livestock in addition to their wages. Thus, although somewhat crude, categorical variables indicating occupational groups remains the best proxy measure for socioeconomic status in this dataset.

2. Methods and Materials

This study uses complete-count decennial census microdata from the six northernmost islands of Orkney, Scotland, from 1851–1911 (Orkney Family History Society, 2012). The beginning of the study period is determined by the earliest census with adequate information for individual-level demographic analysis and the end of the period is marked by the latest census available to the public following the 100-year UK embargo on the release of census microdata. In these returns, people are grouped into households and within each household every person's relationship to the household head is listed. Other sociodemographic information includes name, age, sex, marital status, occupation, and place of birth. This information allows family relationships to be linked within households as well as the identification of life-cycle servants if any are present. The presence of servants in households is observed only in census listings and the exact timing of the entry and exit of servants cannot be observed in the years between census enumerations. This measurement issue excludes longitudinal approaches and limits analysis to cross-sectional census-based methods.

Logistic regression models are estimated with binary indicators of the presence or absence of any servant (model 1), female servants only (model 2) and male servants only (model 3) as the outcome variable. Some households include more than one servant; however, these households are relatively rare, and few contain more than two servants (Table 1). To avoid the excessive influence of the rare households with several servants, the indicator variables are coded as binary (1=at least one servant present; 0=none). The models presented here are robust to using Poisson models of count variables of all servants and counts of male or female servants as well as to excluding households with three or more servants from the analysis. The presence of servants was selected as the outcome variable for these analyses as servants were hired on short-term contracts and the literature suggests that they were hired in response to household labor needs. This contrasts with recent work on kin effects on fertility using similar census measures that takes the number of children as the outcome variable (Hacker and Roberts, 2017). The substantive findings presented here do not change if the number of own-children under five is used as the outcome variable in Poisson models that include servants as a predictor variable, as the association persists and remains positive.

Reproduction is assessed using a census-based measure of recent net marital fertility based on the child-woman ratio developed for population-level analysis (Breschi, Kurosu, & Oris, 2003; Cho, Retherford, & Choe, 1986; Shryock, Siegel, & Stockwell, 1976). This measure is adapted for the household-level by taking the count of a focal woman's own children under age 5 living in the same household. For these analyses, only currently married woman aged 15–49 with a spouse present are included in the analytical sample. Of the 9,206 total observations of women aged 15–49, 4,831 are unmarried, 237 are widows, 23 are missing information on marital status, and 30 are missing information on their relationship to the household head. Of the remaining 4,085 married women, 195 are living in a household without their spouse present. The final study sample includes 3,890 observations of 3,162 married women.

The census only reports living children, which restricts analysis to net fertility. It is possible that there are systematic differences in infant and early childhood mortality that are associated with the presence of servants that could affect reported results. However, it has been argued that differences in net fertility are the result of differences in marital fertility rather than differences in mortality (Dribe, Hacker, & Scalone, 2014; Scalone & Dribe, 2017). Further, the child-woman measure has been used to evaluate a range of sociodemographic differences in fertility, including the effects of kin proximity (Hacker & Roberts, 2017), the secular decline in fertility (Dribe & Scalone, 2014; Klüsener, Dribe, & Scalone, 2019), and socioeconomic differences in fertility (Dribe et al., 2014; Scalone & Dribe, 2010).

Additional independent variables include other potential sources of coresident help or support for women: the number of daughters over age 11, the number of sons over age 11, the focal woman's mother, and the focal woman's mother-in-law. The number of sons and daughters ages 5–10 are more ambiguous in terms of their household roles. It is unclear whether they should be expected to be potential helpers at the nest or whether they still require more intense care and represent a burden on their mothers' time and effort. Indicators of inter-island migration are used to account for differences in non-household sources of support, as women or spouses who live on the same island where they were born are more likely to live near kin and have stronger local social ties than those who have moved to a different island.

Other independent variables adjust for factors known to be associated with fertility differences or servant hiring practices. These include women's participation in the labor force taken from occupational listings in the census. Most women do not have a listed occupation in the census and only those occupations that are not markers of marital status, such as "fisherman's wife," or domestic duties, such as "housewife" are used as labor force indicators in this variable. Examples of such occupations include "dressmaker" and "weaver". Participation in the labor force is associated with lower fertility in this period. The occupation of the spouse is used as a proxy for socioeconomic status and adjusts for differences in fertility, mortality, and servant hiring preferences among occupational groups. Occupations are coded into the following categories: farming, other lower-status agricultural labor, non-agricultural work and trades, and high-status non-agricultural occupations. If the spouse's occupation is missing, the occupation of the household head is used if available. Otherwise, occupation is coded as missing. During the study period, farmers tend to have higher fertility than non-farmers (Sparks, 2009) and farmers hired more servants than non-farmers (Jennings et al., 2011). Farmers also had lower infant mortality and higher standard of living than non-farmers (Jennings, Quaranta, & Bengtsson, 2017; Sparks, Wood, & Johnson, 2013). Fixed effects for the age of the focal woman control for age patterns of fertility and stage in the family cycle and fixed effects for census year control for period change in fertility and the frequency of life-cycle servants. The substantive findings are robust to excluding the two earliest and two latest census years, suggesting that the findings are not driven by period processes. Robust standard errors are clustered over the woman's identifier to adjust for the non-independence of observations of the same woman across more than one census year. Analysis is conducted using Stata 15 (StataCorp, 2017).

A limitation of this cross-sectional approach is that causation cannot be clearly established, as the exact timing the entry and exit of servants from the household cannot be measured. However, the analysis can provide insight into whether the presence of these non-kin household members is associated with recent net fertility after controlling for other factors, including other potential sources of support.

3. Results

Characteristics of the servant population are consistent with the definition of life cycle servants. Between 2.2 and 8.8 percent of the census population of the study area are servants in a census year. Individuals listed as servants are predominantly adolescents and young adults, 86 percent of whom are aged 12–30, representing between 13 and 28 percent of all inhabitants aged 12–30 in a census year. The average age of servants ranges between 19 and 23 for both men and women during the study period. Fourteen percent of households contain servants, and some rare households contain several (Table 1). On average, married women aged 15–49 have just over one child under age 5 living in the same household (Table 2). It is more common for these women to coreside with a servant in a given census year (14 percent) than with a mother (3 percent) or mother-in-law (8 percent).

Results of logistic regression models are shown in Table 3. Higher recent net fertility is associated with the presence of at least one servant of either sex (Model 1). The chances of a servant living in a household increase by 23.5 percent for each additional child under age 5. For each child under 5, households are 24.6 percent more likely to have at least one female servant present (Model 2). In contrast, the presence of young children is not associated with the presence of a male servant (Model 3). These findings are consistent with the prediction that the presence of female servants would have a stronger association with a focal woman's net fertility than male servants, as they could either replace the lost labor of a woman or assist with childcare. In contrast, given the gender division of labor during the study period, male servants would increase overall household production, but not the specific tasks associated with women's work. While it is not possible to measure directly the specific kinds of assistance offered by female servants, their presence is more likely in households with greater numbers of young children.

For each additional daughter over age 11, a household is 26.6 percent less likely to have a female servant present. Similarly, the number of sons over age 11 is negatively associated with both male servants (25.6 percent less likely) and a servant of either sex (20.7 percent less likely). It appears that older children may offset the need to hire servants of the same sex. The findings for children aged 5–10 suggest that their role in the household may have been more similar to that of older children than that of younger children. The presence of sons and daughters in this age group is associated with a reduced chance of having a servant present in the household, with the strongest associations between children and servants of the same sex.

Mothers and mothers-in-law of focal women are other possible sources of support. The presence of the focal woman's mother decreases the chances that the household has a female servant by 43.1 percent. In contrast, households with a mother-in-law present are more 66.1

percent more likely to include at least one male servant and are 49.7 percent more likely to include a servant of either sex. This pattern may relate to stem-family household formation. Inheriting men and their families may live in the same household as their parents, especially on larger farms or holdings with secure tenure that can be inherited, which could create higher labor demands and encourage the hiring of servants. Focal women are listed at daughters-in-law in 38 percent of households with a mother-in-law present. This household position suggests that their spouse has remained in his natal household but has not yet inherited. Given the cross-sectional nature of the data, it is difficult to demonstrate with certainty how many of the remaining households with a mother-in-law present represent an heir living with the older generation. In addition, it is possible that these estimates are biased downward, as only coresident mothers and mothers-in-law are included in the models. It is likely that women could receive assistance from nearby, but not coresident mothers and mothers-in-law, which is not captured in this analysis. Further, coresidence may be associated with illness or the inability of these older mothers-in-law to live independently, which may be a strain on household resources rather than a source of support (Hareven, 1994). However, others have noted that elders in poor health during this period are more likely to live alone than with adult children (Ruggles, 2003). The cross-sectional data cannot be used to disentangle the relationship between the timing of changes in household kin composition and the hiring of servants, so it is difficult to assess which, if any, of these mechanisms may be at work. Households with a migrant focal woman or spouse are more likely to have female servants or servants of either sex, but not male servants, a finding consistent with expectations that families living on an island other than that of their birth may have fewer local kin outside of the household to assist with the care and provision of young children.

A woman's participation in the labor force is not associated with the presence of servants. The occupation of the household head is associated with servants, as farmers are more likely to have servants in their households than lower-status agricultural workers and non-agricultural workers. Households engaged in high-status non-agricultural occupations, such as clergy and physicians, are more likely to have servants than farmers. It is possible that servants in high-status households are more akin to professional domestic workers, such as butlers, cooks, and maids who remained servants for most of their working years, than life-cycle servants who went on to other occupations after marriage. However, the results of a sensitivity analysis (not reported here) show that findings concerning the association between young children and the presence of servants are robust to excluding the small number of elite households from the analysis.

4. Discussion

Help from others is an essential feature of human reproduction. A majority of the literature on support for mothers focuses on the role of biological or affinal kin. However, non-kin including fictive kin, those unrelated others who hold special social significance, can also provide essential assistance for mothers with young children. In the context of historical Northwest Europe, life-cycle servants lived and worked in an environment that crossed social boundaries. They were coresident household members but were not close genetic relatives. Yet, they were described in familial terms, much like fictive kin, while also being

paid in wages and in room and board for their work. In this unique social and economic role, servants were well positioned to provide support to women with children in the household.

This study finds that the presence of at least one female servant is associated with recent net marital fertility in late 19th and early 20th century North Orkney. Female servants may have helped women with childcare tasks or replaced the time and economic effort of women with infants and young children. Households with other sources of support, especially older daughters, are less likely to have female servants present. Focal women and women with spouses who remained on their island of birth are also less likely to coreside with a life-cycle servant, a finding consistent with predictions about the presence of nearby kin or other sources of support outside of the household reducing the need for servants. The negative association between the presence of a focal woman's mother and female servants is consistent with expectations that these women may have replaced some of the potential labor provided by female servants. However, the estimates of the effects of mothers and mothers-in-law may be biased downward by conditioning on household coresidence rather than geographic proximity.

In contrast, households with mothers-in-law present were more likely include male servants or a servant of either sex. This finding may be related to strain produced by intra-household resource competition if the older generation required assistance. Further, the effect observed for mothers-in-law may also be associated with the life cycle of stem-family households, where the mother-in-law represents the oldest generation in a three-generation household of an inheriting son. These households may require male labor rather than female labor as the land holding or other economic enterprise may be larger for heirs than non-heirs.

Households with older sons are less likely to include male servants and servants of either sex. This is consistent with prior research that found that life-cycle servants represent one way that households can balance skewed sex ratios (Jennings et al., 2011). Households with older sons would demand less adult male labor, and thus be less likely to hire servants. The presence of young children is not associated with male servants, which suggests that while these workers could increase total household production reproducing households may have been in need of female-specific labor rather than higher overall productivity.

Households have both productive and reproductive functions, and family and social relationships are essential for balancing these tasks (Goody, 1976; Leonetti & Chabot-Hanowell, 2011; Reyna, 1976). Life-cycle service represents one way that households can manipulate their composition to adjust economic production and consumption to meet the demands of or respond to reproduction. In a context where the gendered division of labor generates demand for both men's and women's work, economic production is labor-intensive, and geographic isolation compels households to rely on local resources, the practice of life-cycle service in North Orkney offers households a means to adapt to changing demographic and economic circumstances. This practice provides households, albeit a minority in each cross-section, flexibility in their options as they adjust to changes associated with family growth. Unfortunately, the cross-sectional nature of the data does not allow for estimates of the proportion of households that had servants at any point during their reproductive period. It may be the case that most households hired a servant at some

time during the family building period, however, it may also be the case that the majority of families were able to grow without assistance provided by servants.

The association between the presence of life-cycle servants and net fertility suggests that these household members provision support for women in their reproductive years. While servants are hired helpers, they may function more like fictive kin than employees as they eat, live, and work with their employer's family. This historical case study provides some insight into how social and economic relationships within a household may influence and be influenced by reproductive behavior. As modern biological kinship networks become sparser and more geographically dispersed, other sources of support for mothers, such as fictive kin and hired caregivers, may become increasingly important in determining women's fertility outcomes. However, the findings presented here suggest that some reproducing families may have looked to non-kin for assistance before the advent of modern systems of hired childcare and that such options were available to ordinary people and not restricted to the elite.

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Table 1.

Percent of households in the census by number of servants present (both male and female). Source: NOPH database.

Number of servants	Percent of households
0	86.08
1	8.95
2	2.63
3	1.13
4+	1.21

Table 2.

Sample summary statistics. Mean of count or continuous variables, proportion of binary variables. Source: NOPH database.

Variable	Mean or proportion	Std. Dev.
Servant present, any sex (1=yes; 0=no)	0.139	0.346
Female servant present (1=yes; 0=no)	0.102	0.303
Male servant present (1=yes; 0=no)	0.074	0.262
Number of children under 5 present	1.054	0.918
Number of sons age 5–10	0.525	0.741
Number of daughters age 5–10	0.512	0.730
Number of sons age 11+	0.468	0.785
Number of daughters age 11+	0.444	0.759
Mother present (1=yes; 0=no)	0.029	0.169
Mother-in-law present (1=yes; 0=no)	0.076	0.265
Island immigrant (1=yes; 0=no)	0.276	0.447
Husband island immigrant (1=yes; 0=no)	0.214	0.410
Woman's labor force participation (1=yes; 0=no)	0.027	0.162
Husband's occupation		
farming	0.480	0.500
agricultural laborer	0.197	0.397
non-agricultural, low status	0.289	0.453
non-agricultural, high status	0.028	0.166
occupation missing	0.006	0.077
Census year		
1851	0.165	0.371
1861	0.163	0.369
1871	0.158	0.365
1881	0.151	0.358
1891	0.137	0.344
1901	0.120	0.325
1911	0.107	0.309
Age of woman		
15–20	0.008	0.087
20–24	0.076	0.265
25–29	0.170	0.375
30–34	0.184	0.388
35–39	0.202	0.401
40–44	0.182	0.386
45–49	0.179	0.383

Table 3.

Logistic regression models of the presence of at least one servant in the household of focal women aged 15–49 with a spouse present. Robust standard errors estimated by clustering over woman's ID. Source: NOPH database.

	(1) Any Servant	(2) Female Servant	(3) Male Servant
Number of children under 5	1.235 [1.096, 1.391]	1.246 [1.087, 1.428]	1.105 [0.940, 1.299]
Number of sons 5–10	0.748 [0.644, 0.870]	0.785 [0.658, 0.937]	0.663 [0.542, 0.812]
Number of daughters 5–10	0.934 [0.812, 1.075]	0.997 [0.853, 1.166]	0.895 [0.741, 1.080]
Number of sons 11+	0.793 [0.669, 0.940]	0.929 [0.765, 1.128]	0.744 [0.597, 0.928]
Number of daughters 11+	0.893 [0.750, 1.064]	0.734 [0.593, 0.908]	1.08 [0.887, 1.315]
Mother present (1=yes; 0=no)	0.716 [0.405, 1.265]	0.569 [0.282, 1.148]	0.956 [0.487, 1.876]
Mother-in-law present (1=yes; 0=no)	1.497 [1.080, 2.076]	1.284 [0.888, 1.856]	1.661 [1.129, 2.442]
Island immigrant (1=yes; 0=no)	1.627 [1.295, 2.044]	1.943 [1.509, 2.501]	1.214 [0.907, 1.626]
Husband island immigrant (1=yes; 0=no)	1.254 [0.964, 1.632]	1.348 [1.004, 1.811]	1.171 [0.832, 1.648]
Woman's labor force participation (1=yes; 0=no)	1.164 [0.593, 2.283]	1.678 [0.828, 3.402]	0.711 [0.215, 2.349]
Husband's occupation			
farming	ref. --	ref. --	ref. --
agricultural laborer	0.146 [0.0998, 0.214]	0.127 [0.0778, 0.206]	0.142 [0.0859, 0.235]
non-agricultural, low status	0.253 [0.193, 0.334]	0.323 [0.237, 0.440]	0.141 [0.0915, 0.218]
non-agricultural, high status	2.861 [1.776, 4.609]	3.528 [2.137, 5.825]	0.361 [0.153, 0.852]
occupation missing	0.831 [0.242, 2.852]	1.35 [0.391, 4.655]	0.433 [0.0593, 3.162]
Census year			
1851	ref. --	ref. --	ref. --
1861	0.818 [0.600, 1.117]	0.872 [0.613, 1.239]	0.665 [0.447, 0.988]
1871	0.832	0.847	0.723

	(1) Any Servant	(2) Female Servant	(3) Male Servant
1881	[0.604, 1.146] 0.672	[0.588, 1.221] 0.61	[0.483, 1.082] 0.562
1891	[0.483, 0.937] 0.541	[0.414, 0.899] 0.503	[0.366, 0.865] 0.485
1901	[0.380, 0.771] 0.5	[0.334, 0.757] 0.507	[0.306, 0.769] 0.45
1911	[0.340, 0.736] 0.373	[0.329, 0.783] 0.337	[0.275, 0.737] 0.468
	[0.245, 0.567]	[0.205, 0.556]	[0.286, 0.768]
Age of woman			
15–20	0.28 [0.0569, 1.377]	0.154 [0.0148, 1.602]	0.892 [0.158, 5.038]
20–24	ref. --	ref. --	ref. --
25–29	0.703 [0.457, 1.081]	0.613 [0.381, 0.986]	0.678 [0.385, 1.196]
30–34	1.182 [0.784, 1.783]	1.054 [0.671, 1.656]	1.207 [0.711, 2.051]
35–39	1.018 [0.654, 1.585]	0.864 [0.523, 1.426]	1.139 [0.650, 1.995]
40–44	1.015 [0.634, 1.625]	0.845 [0.498, 1.435]	1.082 [0.585, 1.999]
45–49	0.693 [0.420, 1.143]	0.595 [0.335, 1.057]	0.622 [0.325, 1.189]
Intercept	0.365 [0.232, 0.573]	0.236 [0.142, 0.390]	0.275 [0.156, 0.486]
Number of observations	3890	3890	3890
Number of individuals	3162	3162	3162
BIC	2943.8	2409.7	2022

Odds ratios; 95% confidence intervals in brackets