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Support for new mothers and fertility in the United Kingdom: Not all support is equal in the decision to have a second child

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Low fertility across Europe highlights the need to understand reproductive decisions in high-income countries better. Availability of support may be one factor influencing reproductive decisions, though within high-income countries availability varies between environments, including socio-economic environments. We test whether receiving higher levels of support, from different sources (informal and formal) and of different types (practical and emotional), is positively correlated with second births in the United Kingdom (UK) Millennium Cohort Study, and whether these relationships differ by socio-economic position (SEP). Our hypothesis is only partially supported: receiving emotional support correlates with higher likelihood of second birth, but the opposite is true for practical support. Availability of different types of support varies across SEP, but relationships between support and fertility are similar, with one exception: kin-provided childcare increases the likelihood of birth only among lower-SEP women. Our results highlight that not all support is equal in the decision to have a second child.

Keywords: allomaternal support; cooperative breeding; paternal investment; intergenerational support; United Kingdom (UK); fertility; socio-economic status

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Introduction

Fertility rates have been below the replacement level in most European countries for some time. Such low-fertility populations are characterized by the underachievement of reproductive goals (Westoff and Ryder 1977; Berrington 2004; Lutz 2007; Ní Bhrolcháin et al. 2010; Harknett and Hartnett 2014), suggesting an unmet need for children (Philippa 2009). A better understanding of the costs and benefits of reproduction might allow them to be altered such that women and men can more easily fulfil their reproductive intentions. Receiving support for raising children is a key factor that can alter the costs and benefits of continued reproduction, by easing conflicts with competing activities. We consider support to encompass any action or presence, from any source, that causes a real *or perceived* reduction in costs of childrearing for mothers. This could include emotional support (e.g., time with friends, counselling), financial support, or practical support (e.g., childcare). Such support may

come from informal sources (e.g., partners, friends, family; Kaptijn et al. 2010; Park et al. 2010; Fiori 2011; Waynforth 2012; Mathews and Sear 2013a) or formal sources (e.g., paid or professional, childcare workers, teachers, counsellors, doctors; Del Boca 2002; Andersson et al. 2004).

Several studies have correlated availability of support with fertility, but results are varied and sometimes contradictory. This is particularly true in Europe, where support is often positively correlated with fertility (Del Boca 2002; Hank and Kreyenfeld 2003; Kaptijn et al. 2010; Waynforth 2012; Mathews and Sear 2013a, 2013b; Thomese and Liefbroer 2013; Tanskanen et al. 2014), but sometimes not associated with fertility (Kertzer et al. 2009; Aassve et al. 2012; Thomese and Liefbroer 2013) and occasionally even negatively associated with fertility (Balbo and Mills 2011; Waynforth 2012; Schaffnit and Sear 2014; Tanskanen et al. 2014). Part of the reason for this variation may be that different studies use different measures of support and fertility, leading to problems of comparability across

studies. Support is measured in various ways: through proxies like parental survival (Del Boca 2002; Kertzner et al. 2009; Schaffnit and Sear 2014) or proximity to family (Hank and Kreyenfeld 2003; Kaptijn et al. 2010; Thomese and Liefbroer 2013; Schaffnit and Sear 2014), or using more direct measures like childcare and financial support (Waynforth 2012; Mathews and Sear 2013b). Sources of support also vary between studies and include support from parents (Kaptijn et al. 2010; Mathews and Sear 2013a; Schaffnit and Sear 2014), parents-in-law (Thomese and Liefbroer 2013; Tanskanen et al. 2014), and more formal sources like day care (Del Boca 2002; Andersson et al. 2004). Additionally, relationships between partner support and fertility are becoming a particular area of interest to researchers (Park et al. 2010; Rijken and Thomson 2011; Esping-Andersen and Billari 2015). In this paper, we examine the types and sources of support provided to first-time mothers in the United Kingdom (UK), taking the heterogeneity of the study population into account. Our aim is to provide an unusually detailed analysis of how receiving different types and sources of support is related to the likelihood of a second birth, in order to tame some of the existing confusion in the literature.

The role of support in reproductive decisions: the cooperative breeding framework

Researchers from several disciplines have shown an independent interest in testing whether the availability of support is important for reproductive decision-making. Economists and social scientists predict that support may alter the costs and benefits of starting and continuing reproduction (Del Boca 2002). Specifically, support is expected to alleviate tensions between fertility and competing activities in women's lives, such as employment and higher education, which have become more prevalent with the societal and cultural changes of the past half century (Del Boca 2002; Andersson et al. 2004; McDonald 2006; Fiori 2011). Our interest in this topic, however, stems from evolutionary theory, which also predicts that any support received by women that reduces the costs of childbearing will increase fertility (an approach, we emphasize, that is complementary to, not mutually exclusive to, other social science theories; Sear 2015). In particular, we use the cooperative breeding hypothesis as our framework. This framework highlights two important points about the role of support in women's reproductive decision-making: first, that

support is necessary for reproduction; and second, that mothers are flexible in who they seek and accept help from, depending on their environment. We return to the second point in the following subsection. The hypothesis that support from other individuals, called allomothers, is *necessary* for mothers to raise children successfully (Mace and Sear 2005; Hrdy 2009) is grounded in the premise that support has been necessary for successful reproduction throughout human history (Hrdy 2009) (and perhaps for our hominid ancestors; DeSilva 2011). Unlike most mammalian species, human mothers simply cannot raise children alone, because of the high costs of childrearing: our long period of childhood development means that mothers care simultaneously for multiple dependent children at different developmental stages. The assertion that support is necessary for reproduction is not strictly testable as, we would argue, there are no cases or societies where women receive *no* support with childrearing. Typically, mothers are embedded in social networks where they may receive varying amounts and types of support from partners, family, friends, or other social group members. In addition, a range of institutions, such as healthcare and education in welfare states, provide support on top of that from personal networks.

Despite not being directly testable, the hypothesis that support is necessary for reproduction has stimulated a considerable amount of research designed to test the corollary hypothesis that variation in levels of support received will be correlated with variation in reproductive outcomes. More precisely, mothers who receive plentiful support will be more likely to raise children 'successfully' and may have more children than those who receive less support. (Note: in the evolutionary field, 'successfully' is not a qualitative assessment of parenting skills, but refers to producing children who survive to adulthood and who are then expected to have their own children.) In high-fertility populations, availability of allomaternal support for raising children improves reproductive outcomes for women, in terms of child survival and sometimes increased fertility, which supports the cooperative breeding hypothesis (reviewed in: Sear and Mace 2008; Sear and Coall 2011). In low-fertility, high-income countries, the relationship between allomaternal support and reproduction is more equivocal, particularly in Europe (Del Boca and Sauer 2009; Balbo and Mills 2011; Waynforth 2012; Schaffnit and Sear 2014; Tanskanen et al. 2014). In such contexts, we no longer optimize reproductive output as would be expected based on the simplest hypotheses derived from evolutionary theory

(Goodman et al. 2012). Nevertheless, the cooperative breeding framework suggests our evolved physiology and psychology have been shaped to be sensitive to the availability of support when making reproductive decisions (Sear 2015), so that we still respond to cues of support.

Flexibility in use of reproductive support: the role of SEP

A second feature of the cooperative breeding framework is that it emphasizes flexibility: mothers may receive support for childrearing from a number of sources, but exactly who provides support may differ between populations (Hrdy 2005). Literature using the cooperative breeding perspective has traditionally focused on provisioning and care support from family members (e.g., grandmothers, father, siblings) in small-scale, high-fertility societies (Sear et al. 2000, 2003; Sear and Mace 2008). This is because related individuals make up a large proportion of women's social networks in such societies, making them convenient allomothers, and they also have a vested interest in the well-being of related children (Hamilton 1964). Within such settings, support from one family member is often inversely correlated with support from another family member, highlighting the flexibility of allomaternal support (Meehan 2005; Meehan et al. 2014). In contrast, in low-fertility countries, women's networks are large and often include both kin and non-kin who can provide childrearing support; such support may also be inversely correlated (Powell 2002; Botcheva and Feldman 2004; Meyers and Jordan 2006; Thomese and Liefbroer 2013). The diversity of sources of support, along with an expansion in the types of potential support that can be provided in such societies (beyond help with subsistence tasks, which has been the focus of study in small-scale societies), means that the analysis of how support influences fertility is much more complex in high-income societies and requires careful operationalization. Such societies are also large and heterogeneous, so it is important to consider whether such heterogeneity influences either the availability of support, or relationships between support and fertility (Stulp et al. 2016).

SEP is a key factor that patterns women's access to and use of many different types of support in high-income contexts. The UK, like other high-income countries, exhibits high socio-economic inequality (OECD 2013). Socio-economic status is correlated with the availability and use of support surrounding reproduction. In general, women with a low SEP

have smaller but more kin-dense social networks than women with a higher SEP (Ajrouch et al. 2005). Low-SEP women are also less likely to seek formal support (e.g., from a GP preceding or following a birth) than higher-SEP women, even when such support is provided freely through social welfare programmes (Séguin et al. 1995; Sword 2003; Sword and Watt 2005). Paid sources of support such as formal childcare are often inaccessible to low-SEP women because of their cost and inflexibility (Powell 2002; Meyers and Jordan 2006). Low-SEP women are also less likely to have partners (Séguin et al. 1995; Duncan and Magnuson 2005) and when present, their partners may provide less help in raising children than higher-SEP men (Harris et al. 1998; McLanahan 2004; Nettle 2008, 2010). We therefore include support from partners in our analysis since it is an important source of support for women, but also a significant source of variation in support.

This research addresses two key assertions of the cooperative breeding framework: we test the hypothesis that more support predicts higher second-order fertility, other things being equal; and explore whether women rely flexibly on different types of support depending on their environment, as measured by SEP. While we are interested primarily in testing the hypothesis that greater support will be associated with higher fertility, there are exploratory aspects to this research, in that we make no clear a priori predictions about which types of support may be more important; nor exactly how patterns of support will differ by SEP. More precisely, we will:

- (1) Establish patterns of support across SEP groups in our UK sample and explore the substitutability of support from partners. We expect that, as preferred supporters, families will play a particularly large role in filling in for absent partners among all women, and especially for lower-SEP women who may not have access to costlier support.
- (2) Test whether indicators of receiving support are correlated with the likelihood of having a second birth in the UK, while exploring potential variation by SEP. Broadly, we expect that the presence of support will positively predict having a second birth.

For (2), our primary outcome is the probability of a second birth, so that we can explore how different types of support, including support in caring for the first child, are associated with further childbearing. New mothers are in particular need of support after

the birth of a first child, so this may play an important role in the decision to progress to a second child or not. Further, progression to the second child is one important determinant of overall fertility in low-fertility societies, where relatively few individuals progress to third or higher-order births.

Methods

Data

We address these objectives using the Millennium Cohort Study (MCS), a UK-wide longitudinal survey following over 18,000 children born in 2000 and 2001 (in Northern Ireland and Scotland sample collection continued until 11 January 2002) (Hansen 2012a). The first wave of data was collected around nine months after the birth of cohort members (CMs) and subsequent waves were collected about every two years. In this analysis, we use waves one to four, covering an eight-year period after the birth of the CM. The outcome indicates whether participants had a second child in the seven to eight years following their first birth. As such, the sample is limited to women who were the main respondent, as the CM's genetic mother, and for whom the CM was their first child. The median interval between first and second births in the UK in 2012 was 36 months (Office for National Statistics 2014). In our own sample, no second births occurred after 71 months (out of 101 months available) and we included only women who were interviewed in both waves one and four (82.5 per cent of our first-time mother sample). We excluded women whose first birth was a multiple birth (twins or triplets), as the decision to have another birth may be different for those women compared with mothers of singletons. Because of our model averaging method (described later), it was essential that all models had the same sample (Symonds and Moussalli 2011). The data set had relatively little missing data: ten variables of interest for this study had missing values at a maximum of 2 per cent, while two had no missing values. We conducted all analyses described in this paper with complete cases; the final sample included 3,893 women.

Operationalizing support

Support refers to a broad range of 'currencies'—actions or presences that can alter the perceived as well as the real costs and benefits of having children. Twelve support variables—the main independent

variables—were chosen to represent the many types and sources of support available to new mothers in the UK, based on availability in the data set. Support was measured primarily in wave one. To maximize information, data on support from wave two were incorporated to update or fill in missing wave one data when relevant and available, and a second birth had not already occurred.

Support from families. We included information on childcare, financial help from, and contact with, family members. The *childcare* variable measured whether women received care for the first child from their parents, parents-in-law, both, or neither. Separately for women's parents and parents-in-law, two variables measured the number of forms of *financial support* provided to new mothers, including buying essentials for the baby, lending money, buying gifts, paying for household costs, helping with childcare costs, and other financial support. *Contact frequency* with women's parents and parents-in-law was also measured. Contact could be a proxy for more practical support (Pollet et al. 2009; Tanskanen et al. 2014), but could also be indicative of emotional closeness between parents(-in-law) and adult children, or support given to the older generation. In this study, contact frequency was a five-category variable: never sees parents(-in-law) or both have died; less than yearly contact; contact at least yearly; contact at least weekly; or co-resident. Finally, a control dummy variable for whether at least one parent was alive was also included, as support is obviously not available if both parents have died. Only 50 women had neither a living mother nor father. A control for having at least one living parent-in-law was unnecessary, as there were no partnered women in our sample whose mother-in-law and father-in-law had both died.

Support from partners. We included both practical and emotional support from partners. A *paternal investment* score measured the number of tasks that a woman's partner did equally or more often than the woman, including cooking meals, cleaning, doing laundry, managing the household money, home repairs, looking after the child when ill, looking after the child regularly, feeding the child, changing the child's nappy, and getting up in the night for the child. A *paternity leave* variable indicated whether the partner took leave from work following the birth of the CM. Finally, a woman's self-assessed *relationship quality* represented the more abstract components of support from a partner that

comes from feeling secure and stable in a relationship; women responded on a seven-point scale from low (1) to high (7) relationship quality. Women's partnership status was included as a four-category variable: single throughout; single at wave one, partnered before birth of second child or final wave; partnered at wave one, single before birth of second child or final wave; partnered throughout.

Support from unrelated individuals. We included both practical and emotional types of support from unrelated individuals. *Contact frequency with friends* indicated whether women saw friends three or more times a week, one to two times a week, or never (including 'had no friends'). Seeing friends is not a direct form of practical support, but friends do provide important emotional support to new mothers (with noted health benefits; Poortinga 2006). *Formal support* measured how many sources of support women sought after the birth of the CM, from GPs, health advisors, religious groups, family drop-in centres, or telephone advice lines. *Paid childcare* indicated whether mothers received support with childcare from paid sources. Finally, a general measure of feeling supported (which can help increase feelings of security, should one need help in the future; Seltzer and Bianchi 2013) indicated whether women agreed or disagreed with the statement that 'There are other parents I can talk to about my experiences.'

SEP and other variables. Socio-economic status is a broad concept, which can be operationalized using prestige-based or resource-based measures (Diemer et al. 2013). For the purposes of this research, we used the latter conceptualization as our primary measure of SEP: household income equalized for household composition and size (Hansen 2012b), split into terciles (low, middle, and high SEP). In contrast to prestige-based measures of SEP, equalized household income is a clear indicator of household members' hardship or experience of environmental harshness and has direct implications for the accessibility of certain types of support—particularly those that cost money—unlike prestige-based measures (Diemer et al. 2013).

Models also included variables to account for key areas confounding in the association between support and fertility: women's employment status (employed, unemployed, or self-employed), age at first birth, and partnership status. Employment status is key, in determining both the need for

support and women's reproductive schedules. Mothers' age at first birth is predictive of having further children, not only for biological reasons, but also because it can influence the support sought or needed by new mothers. Education was not included in the final models: it is not strongly linked to the likelihood of second birth in the UK (Berrington et al. 2015) and made no difference to substantive results when included in models.

Analytical methods

Patterns of support across SEP groups. To document patterns of support by SEP, we examined descriptive statistics for the full sample ($n=3,893$ women) and for each SEP tercile: low ($n=1,286$), middle ($n=1,286$), and high ($n=1,321$). We focused on the proportions of women receiving each type of support and mean amounts of support by tercile.

Substitutability of partner support. We used logistic and Poisson regressions (depending on the outcome variable) to test whether the absence of partner support predicts receiving eight other forms of support at wave one. We focused particularly on whether the absence of a partner affects the receipt of other support because partners are an important source of support in high-income populations where the nuclear family is idealized (Sear 2016); we expected women without such support to seek support elsewhere. For each outcome, a first model included partner status and SEP, and a second model included an interaction between the two predictors. All models included women's employment status and age at first birth.

Correlations between support and having a second birth. To determine whether support is correlated with the probability of second birth, we used natural model averaging. In contrast to traditional null hypothesis testing, this method takes into account information from a number of models representing probable associations between predictors and outcome; resultant parameter and error estimates represent the weighted averages of many models, thus reducing model selection uncertainty and producing robust parameter estimates (Johnson and Omland 2004). Model averaging allows us to determine not just which support variables are correlated with the probability of second birth, but also which variables are most important to this decision.

Model averaging includes four main steps. First, logistic regression models for the probability of second birth were generated and run with every combination of the twelve measures of support (4,095 models generated using the *tuples* command in Stata 13; controls included in all models). Comparing a large number of models comes with some risk of identifying spurious effects (Johnson and Omland 2004), but all models compared represented plausible associations, so none were excluded. Further, adjusted odds ratios for the associations between support types and births produced from non-averaged logistic regression models suggested that model-averaged parameter estimates reflected genuine associations. This first step was repeated for the full sample and then for each SEP tercile, to compare correlations between SEP groups qualitatively. Second, for each group Akaike information criterion weights (wAIC) were generated for every model. A model's wAIC represents the probability of that model being the best model, given the data and other available models (Wagenmakers and Farrell 2004). For a given set of models, the sum of wAICs will be one. Third, models from each set were ranked by wAIC from highest to lowest. Parameters from models accounting for the top 95 per cent of the aggregate wAIC (21 models from the full sample; 156 for the lowest income tercile; 126 from the middle income tercile; and 85 from the top income tercile) were used to conduct model averaging in R, using the AICmodavg package.

Finally, the complete set of models (models accounting for 100 per cent of wAIC) was used to estimate *variable importance* for each support measure in each SEP tercile. Variable importance is the cumulative wAIC of models containing each variable (Symonds and Moussalli 2011) and represents the probability that the predictor (type of support) is in a 'best' model for the data; variables with an importance close to one are more likely to be in a best model than variables with an importance nearer to zero. (For a fuller discussion of AIC model averaging and examples, see Burnham and Anderson 2002, 2004; Richards 2005; Alvergne et al. 2011; Borgerhoff Mulder and Beheim 2011; Burnham et al. 2011; Richards et al. 2011; Symonds and Moussalli 2011; Alvergne et al. 2013).

Results

Patterns of support across SEP groups

Table 1 shows patterns of support for new mothers by SEP in our UK sample. Broadly, lower-income

mothers receive lower levels of support than higher-income women, though some variation is evident. Mothers in higher-income groups more often have partners and have partners who provide more support. A lower proportion of women in the lowest tercile of income are partnered throughout the study period and, among those that have partners, fathers are less likely to take paternity leave and mothers report lower scores for paternal investment and relationship quality than mothers from higher-income terciles. Similarly, paid and formal support are most common in the highest income group: larger proportions of high-SEP mothers use paid childcare and they make use of more sources of formal support than poorer women. Frequent contact with friends is most common for women in the lowest income tercile, but in the same group nearly a third of respondents report having no friends or never seeing them, and low-income respondents represent the largest proportion feeling that they do not have other parents to speak to. Some types of support from families are most common in the poorest sample: women in the lowest income tercile receive more types of financial support from parents or parents-in-law and more commonly receive childcare from their parents than do those with higher incomes. Family contact and family childcare relate non-linearly to SEP.

Substitutability of partner support

Results from testing whether the absence of a partner is associated with the substitution of support from families and unrelated individuals are shown in Figure 1 (drawn from the models including interaction between SEP and partner status). In the absence of a partner, women have a higher probability of receiving a variety of other types of support, particularly with regard to support from families, and especially for poorer women (who are most likely to be unpartnered). Women in the lowest income tercile without partners have higher predicted probabilities of receiving childcare from parents and paid sources, have higher expected levels of financial support from families, and are more likely to live with their parents and see their friends frequently than comparable women with partners. Financial support and the probability of co-residing with parents are also higher for unpartnered than partnered women in the middle income tercile, but the differences disappear for the highest income

Table 1 Descriptive statistics for fertility and support variables by socio-economic position, women with a first birth in 2000–01, UK

		Equivalized household income			Full sample
		Low	Middle	High	
	<i>n</i>	1,286	1,286	1,321	3,893
	Had second birth within eight years of first (%)	46.97	61.20	68.05	58.82
	Age at first birth (mean)	22.78	27.30	30.53	26.90
Family	Frequency of contact with parents (%)				
	Never	2.18	1.63	2.35	2.05
	Less than yearly	2.72	1.48	1.51	1.90
	At least yearly	11.66	18.82	33.46	21.42
	At least weekly	62.29	73.87	61.70	65.91
	Co-resident	21.15	4.20	0.98	8.71
	Frequency of contact with parents-in-law (%)				
	Never	3.92	1.16	0.77	1.54
	Less than yearly	8.97	2.83	1.31	3.40
	At least yearly	24.80	26.12	47.19	34.66
	At least weekly	57.42	68.30	49.27	58.22
	Co-resident	4.89	1.58	1.46	2.18
	Childcare from family (%)				
	None	60.34	45.65	54.73	53.58
From parents only	31.49	28.54	24.00	27.97	
From parents-in-law only	4.12	11.04	8.78	7.99	
From both parents and parents-in-law	4.04	14.77	12.49	10.45	
Amount of financial support from parents (mean no. types)	2.09	1.68	1.34	1.70	
Amount of financial support from parents-in-law (mean no. types)	1.47	1.42	1.24	1.35	
Partner	Partner status (%)				
	Single	42.85	5.29	1.51	16.41
	Single → partnered ¹	9.49	1.24	0.00	3.54
	Partnered → single ¹	4.51	4.04	2.50	3.67
	Partnered	43.16	89.42	95.99	76.37
	Paternity leave taken (%)	57.59	81.03	87.09	78.95
Paternal investment (mean no. tasks done/shared)	3.91	4.18	4.46	4.24	
Relationship quality (mean self-assessed score)	5.65	5.74	5.88	5.78	
Other	Amount of formal support (mean no. sources)	0.92	1.14	1.34	1.14
	Uses paid childcare (%)	20.37	41.68	62.45	41.69
	Has other parents to speak to (%)				
	Can't say	2.26	1.24	0.68	1.39
	Agree/strongly agree	73.87	82.66	88.95	81.89
	Neither agree nor disagree	11.04	6.61	3.71	7.09
	Disagree/strongly disagree	12.83	9.49	6.66	9.63
	Frequency of seeing friends (%)				
3+ times a week	21.00	15.55	19.83	18.80	
1–2 times a week	46.03	50.47	52.54	49.70	
Never/no friends	32.97	33.98	27.63	31.49	

¹Change in partnership status from wave one to either birth of second child or final wave.

Note: Statistics relating to support from partners or parents-in-law are only for women with partners. Family support data refer only to those with at least one living parent.

Source: Millennium Cohort Study.

tercile. Despite overall evidence of substitution of support, unpartnered women in the middle income tercile are less likely to feel that they have other parents to speak to and unpartnered women in the bottom two income terciles receive fewer types of formal support than women of similar income with partners.

Correlations between support and having a second birth

Table 2 shows results from our tests to determine whether receiving support is correlated with the likelihood of having a second birth in the UK, both in the full sample and in each SEP tercile. The results

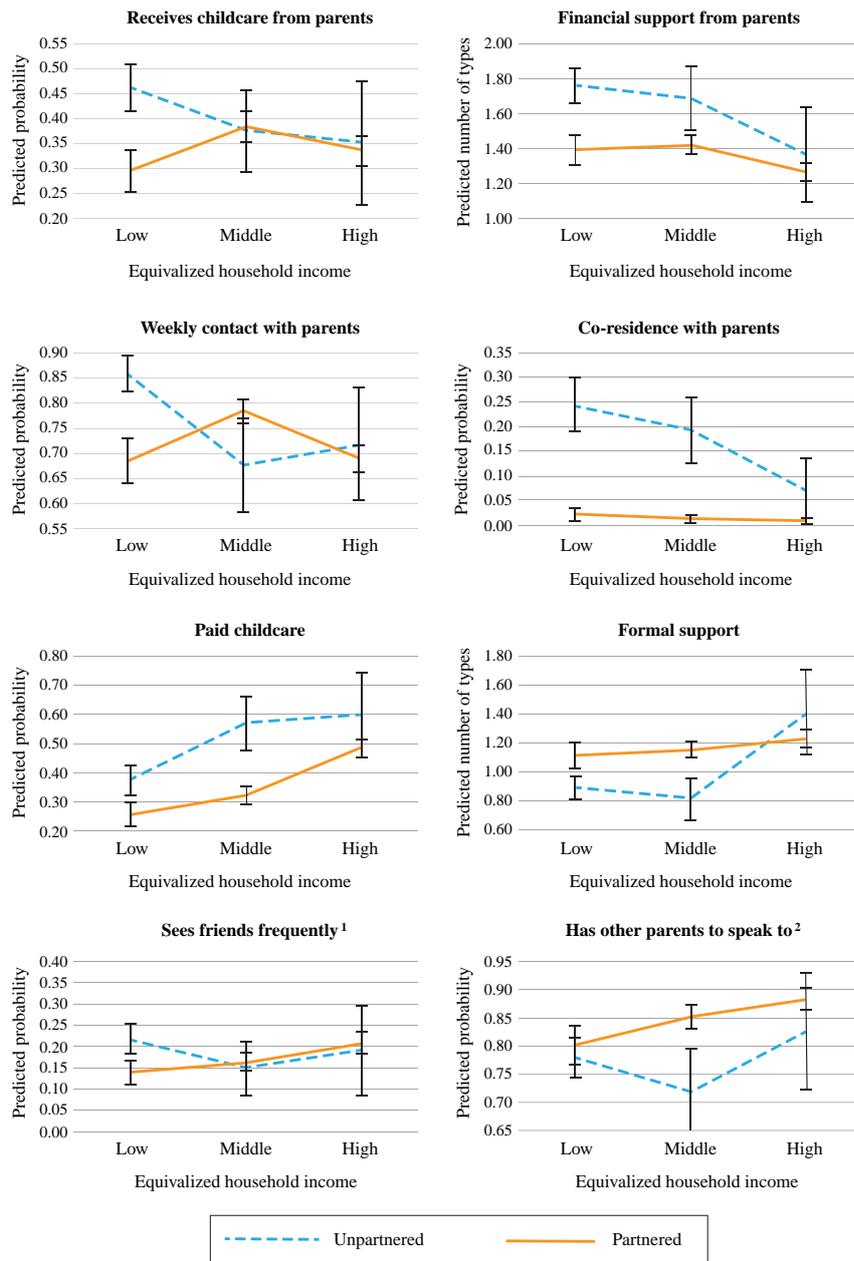


Figure 1 Predicted probabilities of receiving different types of support and predicted values of support for partnered and unpartnered women, by socio-economic position: women with a first birth in 2000–01, UK.

¹Sees friends 3+ times per week.

²Agrees with the statement: ‘There are other parents I can talk to about my experiences’

Note: Vertical bars show 95 per cent confidence intervals around the estimates.

Source: Analysis of data from Millennium Cohort Study.

presented show the magnitude and direction of association between each type of support and the probability of second birth. The variable importance measures in Table 3 represent the probability that a given type of support is in the ‘best’ model, given the data and candidate models.

Overall, practical and emotional support are associated in different ways with second births (Table 2). Receiving practical support after the birth of a first child is associated with lower odds of

having another child: women receiving more financial support from families have 15–29 per cent lower odds of having a second birth (depending on SEP group) than those with less financial support; and those using paid childcare have 45–52 per cent lower odds of having a second birth than those not using paid childcare. In contrast, receiving non-practical or emotional support predicts higher odds of having a second child. Such support includes frequent contact with friends, high relationship quality,

having other parents to speak to, and formal support from GPs, counsellors, etc. Women who rank their relationship quality more highly have 10–15 per cent higher odds of a second birth, while receiving more formal sources of support relates to 7–19 per cent higher odds of birth, though the latter is only statistically significant among the high-income tercile. Contact with families has a non-linear relationship with the probability of a second birth. Moderate levels of contact with parents and parents-in-law are associated with higher odds of having a second birth overall, and among low-SEP women, compared with having more frequent contact. (In the middle income tercile, a strong positive association between never seeing parents and having a second birth is noted, but very few women with a living parent fall into this category so little weight should be attached to this finding.)

Comparing results qualitatively between SEP terciles, the general negative association between practical support and second births, and the positive associations between non-practical forms of support and births are largely consistent, with a few exceptions. There is weak evidence that women in the lowest income tercile have 89 per cent higher odds of having a second birth when receiving childcare from both parents and parents-in-law than women receiving no childcare from family. If anything, the opposite is true for women in the middle and highest income groups, with lower odds of a second birth when families help with childcare, although these relationships are not significant. Paternal investment negatively predicts having a second birth, but this result is only statistically significant ($p < 0.05$) for women in the middle income tercile.

Parameter importance estimates (Table 3) suggest that some forms of support are important predictors of second birth regardless of income tercile, while others are more important to particular income groups. Financial support from parents, paid childcare, relationship quality, and the frequency of seeing friends have high probabilities of being important (0.73–1.00) in all three income groups: financial support and paid childcare are negatively associated with the probability of birth, while relationship quality and seeing friends positively predict births. Paternal investments (antnatal associations), having other parents to speak to, and formal support (both pronatal associations) have greater importance in the higher-income terciles, while financial support from parents-in-law (antnatal associations) ranks more highly in the bottom two income terciles.

Discussion

The cooperative breeding hypothesis, derived from evolutionary theory, predicts that higher levels of support will correlate with higher fertility, although it highlights that there is flexibility in how support is provided and used depending on the environment. Our analysis demonstrates variability in access to, and use of, certain support types based on SEP, one aspect of the environment: poorer women in the UK receive less support from partners and formal sources, but this is partially compensated for by greater support from family. Those types of support which women are more likely to receive have greater importance in predicting their likelihood of second birth. However, the hypothesis that higher levels of support would be correlated with higher probabilities of second birth is only partially supported. Across SEP groups, practical support is broadly negatively correlated with second births, with the exception that, for lower-income women, childcare from families is associated with a higher probability of second birth. Emotional support, on the other hand, though less tangible, does positively correlate with second births. This may suggest the primacy of perceptions of support over actual support in such modern, post-industrial societies where most women have access to enough resources to raise children, including the buffer provided by formal institutions.

Patterns of support across SEP groups

With the exception of support from families, mothers in the lowest income tercile receive generally lower levels of support from partners and other sources. There are undoubtedly numerous reasons behind these patterns. Drawing on evolutionary life history theory, and providing an explanation at an ‘ultimate’ level (in terms of evolutionary function), environmental harshness (approximated by SEP) is predicted to influence reproductive strategies, including strategies related to parental investments in children (Stearns 1992; Mace 2014). Living in harsh environments, such as those associated with low SEP, may be associated with lower levels of parental investment (Stearns 1992). In such contexts, there are fewer opportunities for children to capitalize on intensive parental investment to increase their SEP, so parents may gain fewer benefits from investing heavily in child ‘quality’ (Kaplan et al. 1998; Nettle 2008; Dotson et al. 2009). This framework could account for fathers’ low involvement with childrearing and low-SEP mothers experiencing less support from formal sources surrounding reproduction. Higher

Table 2 Model averaged odds ratios, 95 per cent confidence intervals, and *p*-values for logistic regressions on having a second child by socio-economic position, women with a first birth in 2000–01, UK

	Equalized household income											
	Low			Middle			High			Total sample		
	Odds ratio	95% CI	<i>p</i> -value	Odds ratio	95% CI	<i>p</i> -value	Odds ratio	95% CI	<i>p</i> -value	Odds ratio	95% CI	<i>p</i> -value
Family												
Childcare from family (ref.: none)												
From parents only	0.91	(0.68–1.21)	0.50	1.10	(0.79–1.54)	0.56	0.98	(0.71–1.37)	0.93	1.01	(0.85–1.21)	0.92
From parents-in-law only	1.50	(0.75–3.02)	0.25	0.92	(0.60–1.41)	0.71	0.92	(0.56–1.51)	0.73	1.07	(0.80–1.43)	0.63
Both	1.89	(0.93–3.80)	0.08	0.87	(0.58–1.30)	0.49	0.71	(0.46–1.11)	0.13	0.96	(0.74–1.25)	0.75
Financial support from parents	0.80	(0.72–0.89)	<0.001	0.85	(0.75–0.96)	0.01	0.71	(0.61–0.82)	<0.001	0.78	(0.73–0.84)	<0.001
Financial support from parents-in-law	0.81	(0.68–0.96)	0.02	0.87	(0.76–1.00)	0.04	0.96	(0.82–1.13)	0.64	0.91	(0.83–0.99)	0.03
Contact with parents (ref.: at least weekly)												
Never	0.85	(0.29–2.47)	0.77	12.28 ¹	(0.79–191.20)	0.07	0.22	(0.04–1.28)	0.09	0.77	(0.33–1.81)	0.56
Less than yearly	1.45	(0.62–3.36)	0.39	0.76	(0.27–2.12)	0.60	1.40	(0.42–4.66)	0.58	1.13	(0.63–2.02)	0.68
At least yearly	1.50	(0.99–2.29)	0.06	1.33	(0.94–1.86)	0.10	1.07	(0.79–1.44)	0.65	1.22	(1.00–1.49)	0.05
Co-resident	0.86	(0.61–1.2)	0.37	1.67	(0.76–3.65)	0.20	2.34	(0.47–11.63)	0.30	0.95	(0.71–1.28)	0.76
Contact with parents-in-law (ref.: at least weekly)												
Never	2.12	(0.70–6.41)	0.19	1.73	(0.47–6.35)	0.41	0.37	(0.09–1.51)	0.17	1.27	(0.63–2.57)	0.51
Less than yearly	2.03	(0.96–4.29)	0.06	1.57	(0.67–3.68)	0.30	0.37	(0.09–1.51)	0.17	1.51	(0.92–2.47)	0.10
At least yearly	1.26	(0.78–2.03)	0.34	1.23	(0.90–1.68)	0.19	1.69	(1.28–2.23)	<0.001	1.40	(1.16–1.69)	<0.001
Co-resident	0.66	(0.28–1.56)	0.34	0.78	(0.29–2.11)	0.62	1.13	(0.37–3.49)	0.83	0.78	(0.46–1.35)	0.38
Partner												
Paternal investment	0.97	(0.90–1.05)	0.45	0.95	(0.90–1.00)	0.05	0.96	(0.90–1.01)	0.13	0.95	(0.92–0.99)	0.01
Paternity leave taken	1.41	(0.98–2.03)	0.07	0.93	(0.67–1.30)	0.68	0.92	(0.62–1.36)	0.67	1.11	(0.90–1.36)	0.33
Relationship quality	1.15	(1.02–1.30)	0.02	1.13	(1.03–1.24)	0.01	1.10	(1.00–1.21)	0.05	1.13	(1.06–1.19)	<0.001
Other												
Uses paid childcare	0.55	(0.40–0.77)	<0.001	0.49	(0.38–0.64)	<0.001	0.48	(0.35–0.65)	<0.001	0.50	(0.42–0.59)	<0.001
Formal support	1.07	(0.94–1.22)	0.31	1.09	(0.96–1.25)	0.18	1.19	(1.05–1.35)	0.01	1.13	(1.05–1.21)	<0.001
Sees friends (ref.: never/no friends)												
3+ times a week	1.94	(1.38–2.74)	<0.001	2.70	(1.78–4.09)	<0.001	2.37	(1.56–3.58)	<0.001	2.23	(1.78–2.78)	<0.001
1–2 times a week	1.05	(0.80–1.39)	0.72	1.56	(1.19–2.04)	<0.001	1.18	(0.88–1.57)	0.27	1.22	(1.04–1.44)	0.01
Has other parents to speak to (ref.: agree/strongly agree)												
Can't say	1.23	(0.53–2.86)	0.63	1.06	(0.34–3.37)	0.92	0.58	(0.13–2.52)	0.46	0.97	(0.52–1.81)	0.93
Neither agree nor disagree	1.07	(0.72–1.58)	0.75	0.70	(0.43–1.15)	0.16	0.56	(0.29–1.05)	0.07	0.83	(0.63–1.09)	0.19
Disagree/strongly disagree	0.72	(0.49–1.05)	0.08	0.70	(0.45–1.07)	0.10	0.54	(0.34–0.88)	0.01	0.67	(0.52–0.85)	<0.001

¹Few participants were in this category and thus we interpret this result with caution.

Notes: All models control for woman's age at first birth, employment status, partner status, and survival status of parents. Ref. denotes the reference category; CI is the confidence interval. Results in italics if $p < 0.1$.

Source: Analysis of data from Millennium Cohort Study.

Table 3 Variable importance (numbers) and direction of association (\pm) between support variables and probability of a second birth, by socio-economic position, women with a first birth in the Millennium Cohort Study, UK

		Low income		Middle income		High income		Total sample	
		Importance	Effect	Importance	Effect	Importance	Effect	Importance	Effect
Family	Family provides childcare	0.17	+	0.04	\pm	0.07	-	0.02	\pm
	Financial support from parents	<i>1.00</i>	-	<i>0.91</i>	-	<i>1.00</i>	-	<i>1.00</i>	-
	Financial support from parents-in-law	<i>0.88</i>	-	<i>0.74</i>	-	0.29	-	<i>0.80</i>	-
	Frequency of contact with parents	0.08	\pm	0.22	\pm	0.07	\pm	0.08	\pm
	Frequency of contact with parents-in-law	0.10	\pm	0.04	\pm	<i>0.96</i>	\pm	<i>0.94</i>	\pm
Partner	Paternal investment	0.33	-	<i>0.70</i>	-	<i>0.54</i>	-	<i>0.94</i>	-
	Paternity leave taken	0.41	+	0.13	-	0.13	-	0.18	+
	Relationship quality	<i>0.85</i>	+	<i>0.93</i>	+	<i>0.73</i>	+	<i>1.00</i>	+
Others	Frequency of seeing friends	<i>1.00</i>	+	<i>1.00</i>	+	<i>1.00</i>	+	<i>1.00</i>	+
	Uses paid childcare	<i>0.99</i>	-	<i>1.00</i>	-	<i>1.00</i>	-	<i>1.00</i>	-
	Has other parents to speak to	0.10	+	0.13	+	<i>0.62</i>	+	<i>0.85</i>	+
	Formal support	0.38	+	0.47	+	<i>0.94</i>	+	<i>0.98</i>	+

+ = pronatal association; - = antinatal association; \pm = non-linear association.

Notes: Importance shown in italic when value is greater than 0.5.

Source: As for Table 2.

levels of support from high-SEP fathers could reflect: (1) high perceived costs of raising high-SEP children (and thus the need for extensive biparental care) (Lawson and Mace 2010); (2) higher expected returns to investment in these children in terms of their future SEP; as well as (3) the greater ability of high-income fathers to invest in children than those with fewer resources. At a proximate level, poorer mothers may also be less likely to seek long-term or high-investing partners because they are reluctant to pay the 'costs' of partnership if partners are unreliable sources of support because of unemployment, low wages, or high rates of incarceration (Geronimus 1987; Carbone and Cahn 2014). Further, among poor women, fear of being judged and negative experiences with professional support (such as from GPs and counsellors) may deter such women from seeking such support (Sword and Watt 2005).

Substitutability of partner support

Although support is not equally available to or used by all women, the cooperative breeding framework highlights the flexibility of allomaternal support during reproduction. It is therefore unsurprising that families are important sources of compensatory support when women's partners are absent, particularly for women in the lower-income terciles—those

women most likely to be unpartnered. Support from maternal grandparents can improve their grandchildren's health and educational outcomes (Aquilino 1996; Dunifon and Kowaleski-Jones 2007; Sear and Coall 2011), as predicted by kin selection theory, which states that individuals can increase their (genetic) fitness by investing in kin (Hamilton 1964). Previous studies have suggested similarly that grandparental support may be targeted at those most in need (Meyers and Jordan 2006; Snopkowski and Sear 2015). Non-familial support is also correlated with the absence of a partner, though not always as a substitute. Women without partners, particularly those in the lower-income terciles, are more likely to use paid childcare but make less use of other formal sources of support. The latter likely reflects the aforementioned fear of judgement and previous negative experiences that act as barriers to formal support for poorer women (Sword and Watt 2005), and in some cases may reflect financial barriers.

Correlations between support and having a second birth

The primary prediction of cooperative breeding, that receiving support will increase the likelihood of a second birth, is partially supported by our results in that some forms of support are positively correlated

with the likelihood of a second birth, but others are negatively associated. Perhaps surprisingly, the source of support does not matter in terms of identifying patterns of association (Leonetti et al. 2007; Borgerhoff Mulder 2009; Sheppard et al. 2014; Tanskanen et al. 2014). Rather, we find that: (1) receiving practical support is negatively related to having a second child; and (2) receiving emotional (less tangible) support positively predicts having a second birth. Correlations are broadly consistent across SEP groups.

The division between practical and non-practical support in predicting second births suggests that different types of support can have different meanings for reproductive decision-making. The presence of non-practical, emotionally oriented support may signal the availability of untapped practical support *should it be needed* (Low et al. 2002; Waynforth 2012; Seltzer and Bianchi 2013; Tanskanen and Rotkirch 2014) and may be more relevant in promoting higher fertility than the actual receipt of practical support. In contrast, receiving practical support can indicate greater need on the part of mothers who seek out such support (Seltzer and Bianchi 2013; Snopkowski and Sear 2015) and the latter may deter further reproduction. Alternatively, receiving practical support could allow investment in non-reproductive goals such as career opportunities. To illustrate, high paternal investment might suggest that the partner is unemployed and that the mother is the primary family earner, thus reducing the probability of future reproduction. Paid childcare represents a financial cost and may indicate that women are focusing on employment rather than further childrearing. Financial support may be an indicator of greater financial need, or represent the opportunity for the family to invest in the quality of a first child at the cost of having more children. It is therefore possible that residual confounding resulting from unmeasured needs could be driving the observed correlations. This could be a fruitful line of enquiry for future research on the subject, though needs could be difficult to measure as they may be perceived rather than 'real'.

Childcare from family, a practical form of support, breaks this general pattern; it positively predicts second births for women in the poorest group but not for those in the highest income tercile. Childcare from families may represent different contexts and opportunities depending upon SEP: high-SEP women may use the time-freeing support to invest in a career, while lower-SEP women are less likely to be employed and may focus the time saved into further reproduction. Contact with parents and parents-in-

law is also related inconsistently (and non-linearly) to the probability of second birth across income terciles. When correlated to births, moderate levels of contact predict higher odds of birth than more frequent contact. This may be because the various meanings of frequent contact with parents(-in-law) between and within income groups dilute associations; frequent contact may be an indicator of a large amount of support either received from or *given to* the older generation, or may simply be a marker of family orientation and emotional closeness.

Finally, even with general consistency in the *direction* of associations between support and fertility, the *importance* of certain types of support in the decision to have a second child sometimes differs by SEP. This variation in parameter importance seems to reflect differences by SEP in the availability and use of support among first-time mothers. For example, formal support becomes successively more important scores as SEP increases, which may reflect the positive correlation between SEP and use of formal support. Further, paternal investments are more important and are negatively correlated with fertility for middle- and high-SEP women. These women are more likely than low-SEP women to: (1) have a partner; (2) be employed, particularly if their partner is unemployed and investing more heavily in childcare and household tasks; and thus (3) not be in a position to have another child. The role of partner support in childbearing decisions in high-income populations has been researched elsewhere (Duvander and Andersson 2006; Rijken and Liefbroer 2009; Yoon 2017). Here again, our results differ somewhat from previous studies, at least some of which find positive relationships between indicators of partner support (such as partner's childcare involvement and taking of paternity leave) and fertility. Our analysis suggests the role of partners needs to be examined very carefully, to take into account both differences across groups of women and differences in the types of support that partners provide. While indicators of practical support from partners are negatively associated with second births in our study, better relationship quality with one's partner is associated with a higher likelihood of birth.

Issues in operationalizing support

Like all researchers studying support and fertility, we made choices about how to operationalize support and, while benefiting from a rich data set, we were constrained by the available data. A comparison of our results with those from other UK studies on

family support and second births highlights that variation in the operationalization of support can lead to quite different conclusions. Also using MCS data, Tanskanen et al. (2014) concluded that contact with women's parents-in-law is positively associated with timing of second births (i.e., greater contact shortened the interval to second birth). The authors interpreted their result as evidence that support encourages further reproduction because a previous study using the MCS had found greater contact to be correlated with receiving greater support (Pollet et al. 2009). Here, we find that *moderate*, but not *frequent* contact from women's parents-in-law is correlated with a higher likelihood of having an additional child in models that control for direct measures of support. When controlling for direct support from families, frequent contact could represent the provision of support to ageing family members and may explain some differences in associations between contact and fertility in this study and that of Tanskanen et al. (2014). In other UK-based studies, Mathews and Sear (2013b) noted that receiving childcare from relatives and formal sources was related *positively* to having a second birth among British Household Panel Survey (BHPS) respondents, while Waynforth (2012) found that childcare from families was *negatively* associated with having additional births among members of the 1970 British Cohort Study (BCS70). These studies were based on women having births in roughly similar periods (1990s–2000s), but each survey collected information on the availability of support and childcare in different ways: the BHPS only recorded childcare for employed women while working, while the BCS70 measured any childcare received from one's parents since finishing education. These contrasting associations between childcare and probability of birth in different studies could therefore reflect the way in which support is measured. Such contrasting associations highlight the fact that researchers need to specify clearly how support is measured, to facilitate comparisons with similar studies (see Stulp et al. 2016 for further discussion).

Stepping back to compare our results with the international literature on support and fertility highlights the important role of context. For example, in contrast to our results, practical support from families is positively associated with women's fertility in the Netherlands (Kaptijn et al. 2010; Thomese and Liefbroer 2013). This variation could be caused by structural or cultural differences, or the inclusion of higher-order births in these studies. Shifting attention to low-fertility Asian countries, there is more consistency across studies: practical support from parents-

in-law, but not parents, is correlated positively with fertility (Thornton et al. 1986; Chi and Hsin 1996; Tsay and Chu 2005; Fukukawa 2013). Such consistency may be explained by structural or cultural factors, but may also be a result of the consistent operationalization of support as co-residence with parents(-in-law) in these studies.

Conclusion

We tested the hypothesis that support for childbearing, which is predicted to reduce the costs or perceived costs of childbearing, would be associated with a higher probability of having a second child in the UK. Our results only partially supported this hypothesis. While measures of emotional support were positively associated with the likelihood of second birth, practical measures of support were, surprisingly, *negatively* associated with having another birth.

We further explored patterns of support by SEP and found substantial differences across SEP groups in sources of support: women in the lowest SEP tercile were less likely to have a partner or to use formal sources of support and so, although they compensated for this with higher levels of family support, they seemed to receive less overall support than women in the highest SEP tercile. Despite this, relationships between support and likelihood of a second birth appeared broadly similar across SEP groups, although, as might be expected, the importance of different types of support for fertility appeared to reflect the availability of that type of support. The sole exception was childcare provided by families, which increased the likelihood of second birth among lower-income but not higher-income women.

To identify barriers to achieving reproductive intentions, it is crucial to understand how support is associated with fertility and how individual factors, as well as cultural, economic, and institutional context, influence these associations. Our results serve as a caution against using any form of support as a proxy for another in studies of support and fertility. They also open the door to further research into the more specific circumstances that inform and alter women's reproductive choices in low-fertility contexts. We conclude that not all allomaternal support is equal when it comes to the second birth decision in the UK.

Notes and acknowledgements

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References

- Aassve, A., E. Meroni, and C. Pronzato. 2012. Grandparenting and childbearing in the extended family, *European Journal of Population/Revue européenne de Démographie* 28(4): 499–518. <https://doi.org/10.1007/s10680-012-9273-2>
- Ajrouch, K. J., A. Y. Blandon, and T. C. Antonucci. 2005. Social networks among men and women: the effects of age and socioeconomic status, *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 60(6): S311–S317. Available: <http://www.ncbi.nlm.nih.gov/pubmed/16260713>
- Alvergne, A., M. A. Gibson, E. Gurmu, and R. Mace. 2011. Social transmission and the spread of modern contraception in rural Ethiopia, *Plos One* 6(7): e22515. <https://doi.org/10.1371/journal.pone.0022515>
- Alvergne, A., D. W. Lawson, P. M. R. Clarke, E. Gurmu, and R. Mace. 2013. Fertility, parental investment, and the early adoption of modern contraception in rural Ethiopia, *American Journal of Human Biology* 25(1): 107–115. <https://doi.org/10.1002/ajhb.22348>
- Andersson, G., A. Z. Duvander, and K. Hank. 2004. Do child-care characteristics influence continued child bearing in Sweden? An investigation of the quantity, quality, and price dimension, *Journal of European Social Policy* 14(4): 407–418. <https://doi.org/10.1177/0958928704046881>
- Aquilino, W. S. 1996. The life course of children born to unmarried mothers: childhood living arrangements and young adult outcomes, *Journal of Marriage and the Family* 58(2): 293–310. <https://doi.org/10.2307/353496>
- Balbo, N. and M. Mills. 2011. The influence of the family network on the realisation of fertility intentions, *Vienna Yearbook of Population Research* 9: 179–206.
- Berrington, A. 2004. Perpetual postponers? Women's, men's and couple's fertility intentions and subsequent fertility behaviour, *Population Trends* 117: 9–19. Available: <http://eprints.soton.ac.uk/34148/1/BerringtonPopTrends2004.pdf>
- Berrington, A., J. Stone, and E. Beaujouan. 2015. Educational differences in timing and quantum of childbearing in Britain, *Demographic Research* 33: 733–764. <https://doi.org/10.4054/DemRes.2015.33.26>
- Borgerhoff Mulder, M. 2009. Tradeoffs and sexual conflict over women's fertility preferences in Mpimbwe, *American Journal of Human Biology* 21(4): 478–487. <https://doi.org/10.1002/ajhb.20885>
- Borgerhoff Mulder, M. and B. Beheim. 2011. Understanding the nature of wealth and its effects on human fitness, *Philosophical Transactions of the Royal Society B: Biological Sciences* 366(1563): 344–356. <https://doi.org/10.1098/rstb.2010.0231>
- Botcheva, L. B. and S. S. Feldman. 2004. Grandparents as family stabilizers during economic hardship in Bulgaria, *International Journal of Psychology* 39(3): 157–168. <https://doi.org/10.1080/00207590344000321>
- Burnham, K. P. and D. R. Anderson. 2002. *Model Selection and Multimodel Inference* (2nd ed.). New York: Springer.
- Burnham, K. P. and David R. Anderson. 2004. Multimodel inference: understanding AIC and BIC in model selection, *Sociological Methods and Research* 33: 261–304. <https://doi.org/10.1177/0049124104268644>
- Burnham, K. P., D. R. Anderson, and K. P. Huyvaert. 2011. AIC model selection and multimodel inference in behavioral ecology: some background, observations, and comparisons, *Behavioral Ecology and Sociobiology* 65 (1): 23–35. <https://doi.org/10.1007/s00265-010-1029-6>
- Carbone, J. and N. Cahn. 2014. *Marriage Markets: How Inequality is Remaking the American Family*. Oxford: Oxford University Press.
- Chi, P. S. K. and P. L. Hsin. 1996. Family structure and fertility behavior in Taiwan, *Population Research and Policy Review* 15(4): 327–339. <https://doi.org/10.1007/BF00128428>
- Del Boca, D. 2002. The effect of child care and part time opportunities on participation and fertility decisions in Italy, *Journal of Population Economics* 15(3): 549–573. <https://doi.org/10.1007/s001480100089>
- Del Boca, D. and R. M. Sauer. 2009. Life cycle employment and fertility across institutional environments, *European Economic Review* 53(3): 274–292. <https://doi.org/10.1016/j.euroecorev.2008.06.001>
- DeSilva, J. M. 2011. A shift toward birthing relatively large infants early in human evolution, *Proceedings of the National Academy of Sciences of the United States of America* 108(3): 1022–1027. <https://doi.org/10.1073/pnas.1003865108>
- Diemer, M. A., R. S. Mistry, M. E. Wadsworth, I. López, and F. Reimers. 2013. Best practices in conceptualizing and measuring social class in psychological research, *Analyses of Social Issues and Public Policy* 13(1): 77–113. <https://doi.org/10.1111/asap.12001>

- Dotson, V. M., M. H. Kitner-Triolo, M. K. Evans, and A. B. Zonderman. 2009. Effects of race and socioeconomic status on the relative influence of education and literacy on cognitive functioning, *Journal of the International Neuropsychological Society* 15(4): 580–589. <https://doi.org/10.1017/S1355617709090821>
- Duncan, G. J. and K. A. Magnuson. 2005. Can family socioeconomic resources account for racial and ethnic test score gaps? *The Future of Children* 15(1): 35–54. Available: <http://www.ncbi.nlm.nih.gov/pubmed/16130540>
- Dunifon, R. and L. Kowaleski-Jones. 2007. The influence of grandparents in single-mother families, *Journal of Marriage and Family* 69(2): 465–481.
- Duvander, A.-Z. and G. Andersson. 2006. Gender equality and fertility in Sweden, *Marriage and Family Review* 39(1–2): 121–142. https://doi.org/10.1300/J002v39n01_07
- Esping-Andersen, G. and F. C. Billari. 2015. Re-theorizing family demographics, *Population and Development Review* 41(1): 1–31. <https://doi.org/10.1111/j.1728-4457.2015.00024.x>
- Fiori, F. 2011. Do childcare arrangements make the difference? A multilevel approach to the intention of having a second child in Italy, *Population, Space and Place* 17(5): 579–596. <https://doi.org/10.1002/psp.567>
- Fukukawa, Y. 2013. Grandparental investment and reproductive success in modern Japanese society, *Journal of Evolutionary Psychology* 11(1): 35–48. <https://doi.org/10.1556/JEP.11.2013.1.4>
- Geronimus, A. T. 1987. On teenage childbearing and neonatal mortality in the United States, *Population and Development Review* 13(2): 245–279. <https://doi.org/10.2307/1973193>
- Goodman, A., I. Koupil, and D. W. Lawson. 2012. Low fertility increases descendant socioeconomic position but reduces long-term fitness in a modern post-industrial society, *Proceedings of the Royal Society B: Biological Sciences* 279(1746): 4342–4351. <https://doi.org/10.1098/rspb.2012.1415>
- Hamilton, W. D. 1964. The genetical evolution of social behaviour I-II, *Journal of Theoretical Biology* 7(1): 1–16. [https://doi.org/10.1016/0022-5193\(64\)90038-4](https://doi.org/10.1016/0022-5193(64)90038-4)
- Hank, K. and M. Kreyenfeld. 2003. A multilevel analysis of child care and women's fertility decisions in Western Germany, *Journal of Marriage and Family* 65(3): 584–596. <https://doi.org/10.1111/j.1741-3737.2003.00584.x>
- Hansen, K. (ed.). 2012a. *Millennium Cohort Study First, Second, Third and Fourth Surveys: A Guide to the Datasets* (7th ed.). London: Centre for Longitudinal Studies.
- Hansen, K. 2012b. *Millennium Cohort Study: A Guide to the Datasets* (7th ed.). London: Centre for Longitudinal Studies, Institute of Education, University of London.
- Harknett, K. and C. S. Hartnett. 2014. The gap between births intended and births achieved in 22 European countries, 2004–07, *Population Studies* 68(3): 265–282. <https://doi.org/10.1080/00324728.2014.899612>
- Harris, K. M., F. F. Furstenberg, and J. K. Marmer. 1998. Paternal involvement with adolescents in intact families: the influence of fathers over the life course, *Demography* 35(2): 201–216. <https://doi.org/10.2307/3004052>
- Hrdy, S. B. 2005. Cooperative breeders with an ace in the hole, in E. Voland, A. Chasiotis, and W. Schiefenhovel (eds), *Grandmotherhood: The Evolutionary Significance of the Second Half of Female Life*. New Brunswick, NJ: Rutgers University Press, pp. 295–318.
- Hrdy, S. B. 2009. *Mothers and Others: The Evolutionary Origins of Mutual Understanding*. Cambridge, MA: Belknap Press of Harvard University Press.
- Johnson, J. B. and K. S. Omland. 2004. Model selection in ecology and evolution, *Trends in Ecology and Evolution* 19(2): 101–108. <https://doi.org/10.1016/j.tree.2003.10.013>
- Kaplan, H. S., J. B. Lancaster, and K. G. Anderson. 1998. Human parental investment and fertility: the life histories of men in Albuquerque. in A. Booth and A. Crouter (eds), *Men in Families: When do they get involved? What Difference Does it Make?* Mahwah: Lawrence Erlbaum Associates, Publishers, pp. 55–109.
- Kaptijn, R., F. Thomese, T. G. van Tilburg, and A. C. Liefbroer. 2010. How grandparents matter: support for the cooperative breeding hypothesis in a contemporary Dutch population, *Human Nature* 21(4): 393–405. <https://doi.org/10.1007/s12110-010-9098-9>
- Kertzer, D. I., M. J. White, L. Bernardi, and G. Gabrielli. 2009. Italy's path to very low fertility: the adequacy of economic and second demographic transition theories, *European Journal of Population / Revue européenne de Démographie* 25(1): 89–115. <https://doi.org/10.1007/s10680-008-9159-5>
- Lawson, D. W. and R. Mace. 2010. Optimizing modern family size, *Human Nature* 21(1): 39–61. <https://doi.org/10.1007/s12110-010-9080-6>
- Leonetti, D. L., D. C. Nath, and N. S. Hemam. 2007. In-law conflict, *Current Anthropology* 48(6): 861–890. <https://doi.org/10.1086/520976>
- Low, B. S., C. P. Simon, and K. G. Anderson. 2002. An evolutionary ecological perspective on demographic transitions: modeling multiple currencies, *American Journal of Human Biology* 14(2): 149–167. <https://doi.org/10.1002/ajhb.10043>
- Lutz, W. 2007. Adaptation versus mitigation policies on demographic change in Europe, *Vienna Yearbook of Population Research* 2007: 19–25. <https://doi.org/10.1553/populationyearbook2007s19>

- Mace, R. 2014. When not to have another baby: An evolutionary approach to low fertility, *Demographic Research* 30(April): 1074–1096. <https://doi.org/10.4054/DemRes.2014.30.37>
- Mace, R. and R. Sear. 2005. Are humans cooperative breeders?, in E. Volland, A. Chasiotis, and W. Schiefelhoevel (eds), *Grandmotherhood: The Evolutionary Significance of the Second Half of Female Life*. Piscataway: Rutgers University Press, pp. 143–159.
- Mathews, P. and R. Sear. 2013a. Does the kin orientation of a British woman's social network influence her entry into motherhood? *Demographic Research* 28: 313–340. Available: <http://www.demographic-research.org/volumes/vol28/11/default.htm>
- Mathews, P. and R. Sear. 2013b. Family and fertility: kin influence on the progression to a second birth in the British Household Panel Study, *PloS One* 8(3): e56941. <https://doi.org/10.1371/journal.pone.0056941>
- McDonald, P. 2006. Low fertility and the state: the efficacy of policy, *Population and Development Review* 32 (September): 485–510. <https://doi.org/10.1111/j.1728-4457.2006.00134.x>
- McLanahan, S. 2004. Diverging destinies: how children are faring under the second demographic transition, *Demography* 41(4): 607–627.
- Meehan, C. L. 2005. The effects of residential locality on parental and alloparental investment among the Aka foragers of the Central African Republic, *Human Nature* 16(1): 58–80. <https://doi.org/10.1007/s12110-005-1007-2>
- Meehan, C. L., C. Helfrecht, and R. J. Quinlan. 2014. Cooperative breeding and Aka children's nutritional status: is flexibility key? *American Journal of Physical Anthropology* 153(4): 513–525. <https://doi.org/10.1002/ajpa.22415>
- Meyers, M. K. and L. P. Jordan. 2006. Choice and accommodation in parental child care decisions, *Community Development* 37(2): 53–70. <https://doi.org/10.1080/15575330609490207>
- Nettle, D. 2008. Why do some dads get more involved than others? Evidence from a large British cohort, *Evolution and Human Behavior* 29(6): 416–423. <https://doi.org/10.1016/J.Evolhumbehav.2008.06.002>
- Nettle, D. 2010. Dying young and living fast: variation in life history across English neighborhoods, *Behavioral Ecology* 21(2): 387–395. <https://doi.org/10.1093/beheco/arp202>
- Ní Bhrolcháin, M., E. Beaujouan, and A. Berrington. 2010. Stability and change in fertility intentions in Britain, 1991–2007, *Population Trends* 141: 13–35. <https://doi.org/10.1057/pt.2010.19>
- OECD. 2013. *OECD Economic Surveys United Kingdom*. Office for National Statistics. 2014. *Birth Statistics: Metadata*.
- Park, S. M., S. I. Cho, and M. K. Choi. 2010. The effect of paternal investment on female fertility intention in South Korea, *Evolution and Human Behavior* 31(6): 447–452. <https://doi.org/10.1016/J.Evolhumbehav.2010.07.001>
- Philipov, D. 2009. Fertility intentions and outcomes: The role of policies to close the gap. *European Journal of Population/Revue Européenne de Démographie* 25(4), 355–361. <https://doi.org/10.1007/s10680-009-9202-1>
- Pollet, T. V., M. Nelissen, and D. Nettle. 2009. Lineage based differences in grandparental investment: evidence from a large British cohort study, *Journal of Biosocial Science* 41(3): 355–379. <https://doi.org/10.1017/S0021932009003307>
- Poortinga, W. 2006. Do health behaviors mediate the association between social capital and health? *Preventive Medicine* 43(6): 488–493. <https://doi.org/10.1016/j.ypmed.2006.06.004>
- Powell, L. M. 2002. Joint labor supply and childcare choice decisions of married mothers, *The Journal of Human Resources* 37(May): 106–128. <https://doi.org/10.2307/3069605>
- Richards, S. A. 2005. Testing ecological theory using the information-theoretic approach: examples and cautionary results, *Ecology* 86(10): 2805–2814. <https://doi.org/10.1890/05-0074>
- Richards, S. A., M. J. Whittingham, and P. A. Stephens. 2011. Model selection and model averaging in behavioural ecology: the utility of the IT-AIC framework, *Behavioral Ecology and Sociobiology* 65(1): 77–89. <https://doi.org/10.1007/s00265-010-1035-8>
- Rijken, A. J. and A. C. Liefbroer. 2009. The influence of partner relationship quality on fertility, *European Journal of Population/Revue européenne de Démographie* 25(1): 27–44. <https://doi.org/10.1007/s10680-008-9156-8>
- Rijken, A. J., and E. Thomson. 2011. Partners' relationship quality and childbearing. *Social Science Research* 40(2): 485–497. <https://doi.org/10.1016/j.ssresearch.2010.10.001>
- Schaffnit, S. B. and R. Sear. 2014. Wealth modifies relationships between kin and women's fertility in high-income countries, *Behavioral Ecology* 25(4): 834–842. <https://doi.org/10.1093/beheco/aru059>
- Sear, R. 2015. Evolutionary contributions to the study of human fertility, *Population Studies* 69(sup1): S39–S55. <https://doi.org/10.1080/00324728.2014.982905>
- Sear, R. 2016. Beyond the nuclear family: An evolutionary perspective on parenting, *Current Opinion in Psychology* 7(September): 98–103. <https://doi.org/10.1016/j.copsyc.2015.08.013>
- Sear, R. and D. A. Coall. 2011. How much does family matter? Cooperative breeding and the demographic transition, *Population and Development Review* 37 (Suppl 1): 81–112.

- Sear, R. and R. Mace. 2008. Who keeps children alive? A review of the effects of kin on child survival, *Evolution and Human Behavior* 29(1): 1–18. <https://doi.org/10.1016/j.evolhumbehav.2007.10.001>
- Sear, R., R. Mace, and I. A. McGregor. 2000. Maternal grandmothers improve nutritional status and survival of children in rural Gambia, *Proceedings of the Royal Society B: Biological Sciences* 267(1453): 1641–1647. <https://doi.org/10.1098/rspb.2000.1190>
- Sear, R., R. Mace, and I. A. McGregor. 2003. The effects of kin on female fertility in rural Gambia, *Evolution and Human Behavior* 24(1): 25–42.
- Séguin, L., C. Bouchard, S. D. Michèle, L. Jacinthe, and L. Potvin. 1995. Évolution du réseau de soutien social lors d'une première naissance: comparaison entre des mères défavorisées et des mères de classe moyenne [Evolution of social support network at first birth: comparison between disadvantaged mothers and middle-class mothers], *Revue Canadienne de Santé Publique* 86 (6): 392–396.
- Seltzer, J. A. and S. M. Bianchi. 2013. Demographic change and parent-child relationships in adulthood, *Annual Review of Sociology* 39(1): 275–290. <https://doi.org/10.1146/annurev-soc-071312-145602>
- Sheppard, P., S. B. Schaffnit, J. R. Garcia, and R. Sear. 2014. Fostering relations: first sex and marital timings for children raised by kin and non-kin carers, *Evolution and Human Behavior* 35(3): 161–168. <https://doi.org/10.1016/j.evolhumbehav.2013.12.002>
- Snopkowski, K. and R. Sear. 2015. Grandparental help in Indonesia is directed preferentially towards needier descendants: A potential confounder when exploring grandparental influences on child health, *Social Science and Medicine* 128: 105–114. <https://doi.org/10.1016/j.socscimed.2015.01.012>
- Stearns, S. C. 1992. *The Evolution of Life Histories*. Oxford: Oxford University Press.
- Stulp, G., R. Sear, and L. Barrett. 2016. The reproductive ecology of industrial societies, Part I: why measuring fertility matters, *Human Nature* 27(4): 422–444. <https://doi.org/10.1007/s12110-016-9269-4>
- Sword, W. 2003. Prenatal Care Use Among Women of Low Income: A Matter of “Taking Care of Self”, *Qualitative Health Research* 13(3): 319–332. <https://doi.org/10.1177/0095399702250128>
- Sword, W. and S. Watt. 2005. Learning needs of postpartum women: does socioeconomic status matter?, *Birth* 32(2): 86–92. <https://doi.org/10.1111/j.0730-7659.2005.00350.x>
- Symonds, M. R. E. and A. Moussalli. 2011. A brief guide to model selection, multimodel inference and model averaging in behavioural ecology using Akaike's information criterion, *Behavioral Ecology and Sociobiology* 65(1): 13–21. <https://doi.org/10.1007/s00265-010-1037-6>
- Tanskanen, A., M. Jokela, M. Danielsbacka, and A. Rotkirch. 2014. Grandparental effects on fertility vary by lineage in the United Kingdom, *Human Nature* 25(2): 269–284. <https://doi.org/10.1007/s12110-014-9200-9>
- @Tanskanen, A. and A. Rotkirch. 2014. The impact of grandparental investment on mothers' fertility intentions in four European countries, *Demographic Research* 31(July 2014): 1–26. <https://doi.org/10.4054/DemRes.2014.31.1>
- Thomese, F. and A. C. Liefbroer. 2013. Child care and child births: the role of grandparents in the Netherlands, *Journal of Marriage and Family* 75(2): 403–421. <https://doi.org/10.1111/jomf.12005>
- Thornton, A., R. Freedman, T. H. Sun, and M. C. Chang. 1986. Intergenerational relations and reproductive behavior in Taiwan, *Demography* 23(2): 185–197. <https://doi.org/10.2307/2061615>
- Tsay, W.-J. and C. Y. C. Chu. 2005. The pattern of birth spacing during Taiwan's demographic transition, *Journal of Population Economics* 18(2): 323–336. <https://doi.org/10.1007/s00148-004-0200-7>
- Wagenmakers, E.-J. and S. Farrell. 2004. AIC model selection using Akaike weights, *Psychonomic Bulletin and Review* 11(1): 192–196. <https://doi.org/10.3758/BF03206482>
- Waynforth, D. 2012. Grandparental investment and reproductive decisions in the longitudinal 1970 British cohort study, *Proceedings of the Royal Society B: Biological Sciences* 279(1731): 1155–1160. <https://doi.org/10.1098/rspb.2011.1424>
- Westoff, C. F. and N. B. Ryder. 1977. The predictive validity of reproductive intentions, *Demography* 14(4): 431–453.
- Yoon, S.-Y. 2017. The influence of a supportive environment for families on women's fertility intentions and behavior in South Korea, *Demographic Research* 36(January): 227–254. <https://doi.org/10.4054/DemRes.2017.36.7>