Hillary Clinton may have popularized the proverb “it takes a village to raise a child” in her 1996 book, but interest in who raises children had been widespread among both demographers and anthropologists for some time by the late 1990s. Part of this interest stems from the potential effects of childrearing patterns on fertility rates. Women who can rely on others for support in caring for children during their reproductive years can spare more time and energy for giving birth to additional children. Support from others may therefore be critical for high fertility rates. While both demographers and anthropologists have acknowledged this fact, the two disciplines have tended to focus on different helpers. The contribution of older children to the household economy has long been of interest to the demographic community, arising particularly from Caldwell’s influential wealth flows hypothesis. He argued that when children contribute to the household economy, fertility is high; but fertility falls as modernization results in children becoming an economic burden (Caldwell 1978). Research in the 1970s demonstrated that children contribute substantial labor to the household economy in high-fertility societies (Cain 1977). More recent research on this topic convincingly argued that parents may only be able to sustain high fertility rates by making use of the labor of older children, even though each child is a net drain on the household economy (Lee and Kramer 2002; Kramer 2005).

Evolutionary anthropologists, taking a comparative cross-species perspective, were typically more interested in men, and for a long time argued that contributions from fathers are the key factor that distinguishes human childrearing from that of closely related primate species (Lovejoy 1981). More
Cooperative Breeding and the Demographic Transition

recently, however, evolutionary researchers have broadened their focus, and over the last decade or so have begun to develop the hypothesis that humans are “cooperative breeders,” a relatively unusual childrearing system in which mothers receive help from many other individuals in raising offspring (Hrdy 2009). While this help may sometimes come from fathers or other men (Hill and Hurtado 2009), more reliable helpers are likely to be relatives of the mother, particularly her own mother and older children (Hawkes, O’Connell, and Blurton Jones 1989; Turke 1988). Overall, however, the cooperative breeding hypothesis suggests that the best strategy is a flexible one, whereby a woman co-opts a wide range of other individuals, including men, her own kin, and her husband’s kin into helping raise her children, depending on who is available and willing to help (Hrdy 2005). This hypothesis suggests that where women receive little help in raising offspring, they will reduce family size—thus potentially contributing part of the explanation for the demographic transition (Draper 1989; Turke 1989). This hypothesis dovetails with (and indeed built on) earlier work by demographers, who observed that fertility tends to be higher among couples living in extended families, compared to those living in nuclear family households without the support and influence of kin (e.g., Davis and Blake 1956; see Burch and Gendell 1970 for a critical review of this early literature on family structure and fertility).

This chapter reviews the evidence that humans receive important help from other individuals in raising children, by drawing together empirical evidence that the availability of family members affects child health and well-being and female fertility rates. In the first section we will concentrate on the evidence for the effects of kin on child well-being in pre–demographic transition societies. In the second section we will tackle the effects of kin on children in post-transition societies. Finally, in the third section we will present evidence that kin may affect fertility rates.

Kin effects on child well-being in pre-transition societies

If family members are helping women to raise children, then we should find evidence that the presence of family members improves child health and well-being. Since child survival is an unambiguous signal of health and well-being, we concentrate on studies that look at the effects of specific family members on the probability of child survival. We have drawn together all published studies that have investigated the effects of fathers, maternal and paternal grandmothers, maternal and paternal grandfathers, and the child’s older siblings on child survival. We found 37 populations where the effect of the presence of at least one relative, apart from the mother, has been correlated with child survival rates (see Tables 1–3 and Figure 1: all tables slightly updated from Sear and Mace 2008, which discusses this dataset). All are populations
with high mortality and fertility rates. These studies are divided into two groups. Table 1 shows those studies where at least reasonably sophisticated statistical analysis was used to examine these correlations: at a minimum these studies used multivariate analysis to control for potentially confounding factors. Table 2 shows studies that demonstrated only a simple bivariate correlation between the presence of relatives and child survival. Table 3 provides a summary of Tables 1 and 2. A “+” in Tables 1 and 2 indicates that the presence of that relative improved child survival, “none” indicates no effect, and “–” indicates the presence of that relative reduced child survival. Parentheses indicate that the effect was of borderline significance (0.05>p<0.1), or was only seen in children of certain ages or one sex.

We include fathers in the table, since there is debate in the literature about how much men help and what they do for children (see e.g., Winking 2006). In a previous study, we also collated published data on those studies that investigated the effects of the presence of the mother on child survival. All 32 such studies found, unsurprisingly, that the absence of the mother was correlated with lower child survival (summarized in Table 3: see Sear and Mace 2008 for details; the additional studies not included in Sear and Mace 2008 are Oris, Derosas, and Breschi 2004; Penn and Smith 2007; van Bodegom et al. 2010; and Willführ 2009). However, this positive effect for mothers declined with the child’s age in all populations where an age interaction was investigated, and older children often appeared to have high survival chances even in the mother’s absence. A number of these studies found that children as young as two years old apparently suffered no higher mortality in the absence of the mother, suggesting that other individuals must be helping.
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Note: For definitions, details of other effects, and further supplementary information, see «http://www.dur.ac.uk/anthropology/staff/profile/?id=8827».

*These studies did not distinguish between maternal and paternal grandmothers or grandfathers but considered grandmothers or grandfathers together.
<table>
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<th>Authors</th>
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Note: For definitions, details of other effects, and further supplementary information, see [http://www.dur.ac.uk/anthropology/staff/profile/?id=8827](http://www.dur.ac.uk/anthropology/staff/profile/?id=8827).
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<td>(83)</td>
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</tr>
</tbody>
</table>

*aPercentages do not sum to 100 in this row because one study found a positive effect of fathers on the survival of sons and a negative effect on the survival of daughters.
these children (Sear, Mace, and McGregor 2000; Zaba et al. 2005; Masmas et al. 2004; Andersson, Högberg, and Åkerman 1996). The data presented in Tables 1 and 2 suggest who those other individuals might be.

The first thing to note from these data is the number of “+”s that appear in the tables. In the majority of the studies at least one relative appears to be positively correlated with child survival. One of the most reliable helpers is the maternal grandmother: in more than two-thirds of cases her presence improved child survival rates. Paternal grandmothers were also often associated with positive survival outcomes, though somewhat less consistently: in just over half of cases they improved child survival. Numerically, the most consistently positive relatives were older siblings of the child (beneficial in over 80 percent of cases). However, there were only six studies in this category because we used a fairly restricted definition of older siblings: only older siblings we thought were potential “helpers-at-the-nest” were included, that is, siblings several years older than the child and not those close in age to the child (exact definition depends on study). Siblings close in age are more likely to be in competition with one another for household resources, and several studies find a detrimental effect of having older siblings on child mortality when all siblings are considered (e.g., Muhuri and Menken 1997).

Fathers were rather less important: in just over a third of all cases did they improve child survival, though this proportion rises to half if only multivariate studies were included. Grandfathers on the whole made little difference. Maternal grandfathers showed few correlations with child survival. Paternal grandfathers were roughly evenly split between studies where a difference was found and those where they had no effect. But in those studies where paternal grandfathers did matter, in more than half of cases they actually reduced child survival rates. Not even fathers or grandmothers were always beneficial to children. One study found that the presence of fathers increased the mortality of girls (rural Ethiopia: Gibson 2008); one found a detrimental effect of maternal grandmothers (rural Malawi: Sear 2008); and two found detrimental effects of paternal grandmothers (historical studies in Germany and Japan: Beise 2002; Sorenson Jamison et al. 2002). Family relationships may sometimes be characterized by conflict, rather than cooperation.

We conclude that the evidence supports the hypothesis that humans are cooperative breeders. Children do better in the presence of certain relatives, including grandmothers, older siblings, and, occasionally, fathers. Data on kin effects on the survival rates of children may even underestimate the effects of relatives since mortality is an extreme indicator of child well-being. For example, in the study of Spain included in Table 2, though fathers had little effect on the survival of their young children, teenage boys had shorter stature in the absence of fathers (Reher and González-Quiñones 2003). We note some caveats, however. First, a review based on published literature
inevitably runs the risk that studies which find positive associations between relatives and child survival may be more likely to be published than those which find no associations. We hope this problem is not too severe in the case of this particular review, at least partly because many authors have included a wide range of relatives in their analysis and published the results whether positive or null. A second problem is that the studies we have presented show correlations, but not necessarily causal relationships, between the presence of relatives and child survival. The studies in Table 1 attempt to control for some potentially confounding factors (e.g., maternal age, which is likely to be correlated both with child survival and the probability that a child has a living grandparent); a number also control for heterogeneity between mothers in child survival. But many studies use the survival status of relatives as a proxy for whether they are available to help mothers, and it is possible that shared genes or shared environment might result in positive associations between the survival of children and their relatives. Such a possibility is difficult to exclude entirely, but many of the studies in Table 1 have demonstrated that only some relatives are correlated with child survival and not others. If shared genes or environment were the explanation then one might expect to see positive correlations with all relatives not just some. Further, some studies investigated whether the effects vary by age or by sex of child. In the Gambia (Sear, Mace, and McGregor 2000; Sear et al. 2002), historical Germany (Beise 2002), and Canada (Beise 2005), grandmaternal effects are age-specific; in Ethiopia (Gibson and Mace 2005), Malawi (Sear 2008), and Japan (Sorenson Jamison et al. 2002), the effects of grandmothers are sex-specific (see Fox et al. 2010 for a hypothesis to explain why grandmaternal effects are sex-specific). Again, if shared genes or environment were the explanation, these effects might be expected to be seen at all ages and for both sexes.

More convincing evidence that kin do indeed help would result from detailed research on what relatives do within the household. A handful of studies in Table 1 collected additional data to support the hypothesis that kin actively help mothers. Usefully, the study in rural Ethiopia collected time-budget data on what individuals within the household were actually doing (Gibson and Mace 2005). This research found that grandmothers were contributing household labor, with maternal grandmothers tending to help with heavy domestic tasks and paternal grandmothers with agricultural labor. The productive nature of grandmothers has been confirmed in other African agricultural (Bock and Johnson 2008) and hunter-gatherer societies (Hawkes, O’Connell, and Blurton Jones 1989). Similarly, recent work has confirmed that children contribute both domestic and productive labor to the household (Lee and Kramer 2002; Kaplan 1994).

Relatives may also help directly with childcare. Earlier research in the Gambian population included in Table 1 demonstrated that maternal grand-
Cooperative Breeding and the Demographic Transition

mothers play an important role in childcare when children are weaned: mothers send children away to a relative during this period so that they will “forget the breast”; the majority of children are sent to their maternal grandmother (Thompson and Rahman 1967). It is notable, therefore, that the effect of maternal grandmothers in this population was seen around the time of weaning, but not before. Several other observational studies by anthropologists have confirmed that individuals other than the mother are frequently heavily involved in caring for children. Among two forager groups in Central Africa (Ivey 2000; Fouts and Brookshire 2009), infants spend more time in allomaternal care than maternal care; one of these studies found that infants were cared for, on average, by 24 individuals (Ivey 2000). In an agro-pastoralist African population, the quality of allomaternal care was found to be high whether or not the mother was present, such that the infant did not experience increased distress during the mother’s absence (Borgerhoff Mulder and Milton 1985). That kin are the most important helpers is suggested by further studies among both Martu aborigines in Australia and Hadza hunter-gatherers in Tanzania, which find that the degree of genetic relatedness affected both the probability of caring for infants and the intensiveness of care: more closely related individuals provide more care and more intensive care (Scelza 2009; Crittenden and Marlowe 2008).

Qualitative research has also demonstrated that grandmothers, in particular, seem to have influential roles around the perinatal period and in child feeding practices, by giving advice and practical support, which may provide a mechanism for affecting child survival rates. Douglass and McGadney-Douglass (2008) found that grandmothers in Ghana (usually paternal) may have a vital role to play in improving children’s rates of survival from kwashiorkor, by recognizing illness and ensuring the child’s parents complied with the daily regime of nutritional treatment. In northern Malawi (Bezner Kerr et al. 2008) and Nepal (Masvie 2007) paternal grandmothers are influential in perinatal care (for example, assisting delivery) and child feeding practices. A community health programme in Senegal demonstrated that including grandmothers in programmes aimed at improving nutritional practices related to pregnancy and infant feeding was successful in improving these practices among reproductive-aged women (Aubel, Toure, and Diagne 2004, in whose population “A home without a grandmother is like a house without a roof”). In a study in Gujarat, India, Sharma and Kanani (2006) found that grandmothers appeared to improve the calorie and nutrient intake of children (especially aged 6–11 months) leading to improvements in nutritional status. Such helpful practices related to child feeding may be part of the reason why the positive effects of relatives on child survival in the Ethiopian and Gambian studies in Table 1 were mirrored by positive effects on nutritional status (Sear and Mace 2009; Sear, Mace, and McGregor 2000; Gibson and Mace 2005).
Grandparental effects on child well-being in post-transition societies

In our survey of kin effects in post-transition societies, we focus on the effects of grandparents. A large literature on the involvement of fathers and their impact on child well-being suggests they may be more important in post-transition than many pre-transition societies; however, this large literature requires a separate review (see Amato and Rivera 1999; Sigle-Rushton and McLanahan 2004). It is also difficult to analyze the effects of older siblings in post-transition societies since, by definition, far fewer siblings are available to provide care in low-fertility societies. Moreover, siblings tend to be close in age, thereby violating our principle of analyzing only the effects of potential helpers at the nest; and universal and extended education makes sibling contributions to the household economy much less likely. Low rates of fertility and childhood mortality in post-transition societies make grandparents’ influences on classic fitness indicators difficult to assess. Rather, because of low fertility and ever-increasing investment per child, it is likely that grandparental influences, if they exist at all, will be found in measures of child development such as psychological adjustment, mental health, and cognitive ability (Coall and Hertwig 2010).

Extending a previous review (Coall and Hertwig 2010) to include grandparental effects across a range of family types, we identified 19 articles that examined the influence of grandparents on grandchild outcomes in post-transition societies: 13 examining grandchildren’s psychological adjustment (see Table 4), three examining depression (Botcheva and Feldman 2004; Ruiz and Silverstein 2007; Silverstein and Ruiz 2006), two examining academic achievement (Falbo 1991; Scholl Perry 1996), and one examining mental and physical development (Tinsley and Parke 1987). The 13 studies exploring grandparental influences on grandchildren’s psychological, social, and emotional adjustment form a relatively homogeneous group and are the focus of the discussion that follows.

The majority of studies (77 percent) included in Table 4 and reviewed here suggest grandparents continue to have a beneficial impact on grandchild development in post-transition societies. Grandparental involvement with their grandchildren and the quality of their relationships appear to influence grandchild well-being, specifically psychological adjustment. In family situations where fewer parental resources are available (e.g., step- and single-parent families), the resources grandparents provide appear to have a stronger positive association with grandchild well-being (Henderson et al. 2009; Lussier et al. 2002). Although having a custodial grandparent seems to result in poorer grandchild outcomes, this is likely to be a consequence of the family situation that resulted in the grandparent assuming that role (Pittman 2007). Perhaps surprisingly, three studies have found weak negative associations between
<table>
<thead>
<tr>
<th>Population/location</th>
<th>Authors</th>
<th>Sample</th>
<th>Age of grandchild (years)</th>
<th>Grandparental involvement measure</th>
<th>Grandchild's psychological adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>England and Wales</td>
<td>Attar-Schwartz et al. 2009</td>
<td>1,515 children</td>
<td>11–16</td>
<td>Grandparental involvement (summed across 6 items)</td>
<td>Strengths and difficulties questionnaire</td>
</tr>
<tr>
<td>England and Wales</td>
<td>Griggs et al. 2010</td>
<td>1,596 children</td>
<td>11–16</td>
<td>Grandparental involvement across 9 individual items</td>
<td>Strengths and difficulties questionnaire</td>
</tr>
<tr>
<td>Bristol (England)</td>
<td>Fergusson et al. 2008</td>
<td>8,752 families</td>
<td>4</td>
<td>Regular grandparental childcare (i.e., at 8, 15, and 24 months of age)</td>
<td>Strengths and difficulties questionnaire</td>
</tr>
<tr>
<td>Bristol (England)</td>
<td>Lussier et al. 2002</td>
<td>155 children</td>
<td>7 or older</td>
<td>Sum of closeness to and importance of grandparent as rated by grandchild</td>
<td>Composite measure including child behavior checklist</td>
</tr>
<tr>
<td>Bristol (England) (140 from above study)</td>
<td>Bridges et al. 2007</td>
<td>385 children</td>
<td>7–22</td>
<td>Closeness to grandparent rated by grandchild</td>
<td>Child behavior checklist</td>
</tr>
<tr>
<td>Khartoum (Sudan)</td>
<td>Al Awad and Sonuga-Barke 1992</td>
<td>210 families</td>
<td>4–9</td>
<td>Grandmother involvement in everyday child care</td>
<td>Childhood psychological adjustment questionnaire</td>
</tr>
<tr>
<td>Chicago (US)</td>
<td>Kellam, Ensminger, and Turner 1977</td>
<td>1,387 families</td>
<td>6</td>
<td>Co-residence with mother and grandchild</td>
<td>Adequacy of social role performance in classroom (teacher rated)</td>
</tr>
<tr>
<td>Virginia (US)</td>
<td>Hetherington 1989</td>
<td>144 families</td>
<td>4</td>
<td>Contact with grandparents</td>
<td>Psychological adjustment</td>
</tr>
<tr>
<td>US national</td>
<td>Cherlin and Furstenburg 1986</td>
<td>510 grandparents</td>
<td>13–17</td>
<td>Grandparental involvement</td>
<td>Social and psychological adjustment (parent, teacher, and child rated)</td>
</tr>
<tr>
<td>Detroit (US)</td>
<td>Radin, Oyserman, and Benn 1991</td>
<td>66 multi-generational teen mother families (biological father absent)</td>
<td>1 or 2</td>
<td>Grandparent involvement</td>
<td>Socio-emotional functioning</td>
</tr>
<tr>
<td>Detroit (US)</td>
<td>Oyserman, Radin, and Benn 1993</td>
<td>As above</td>
<td>As above</td>
<td>As above</td>
<td>As above</td>
</tr>
</tbody>
</table>

NOTE: For definitions, details of other effects, and further supplementary information, see «http://www.dur.ac.uk/anthropology/staff/profile/?id=8827». 
grandparental childcare and grandchild outcomes (Cherlin and Furstenburg 1986; Fergusson, Maughan, and Golding 2008; Hetherington 1989). Unfortunately, none of these studies considered the quality of childcare provided to establish whether it is grandparental childcare or underlying familial factors that contribute to this association. It appears more likely that in difficult financial or behavioral situations, parents are more likely to turn to grandparents for help, rather than that grandparental childcare has a negative influence on grandchildren (Cherlin and Furstenburg 1986; Hetherington 1989; Pittman 2007).

In contrast to pre-transition societies, grandfathers in post-transition societies appear to have an equal if not greater impact on grandchild development than grandmothers. Interestingly, grandfathers appear to have a more positive impact even though they have less contact with grandchildren than grandmothers. This finding may be due, in part, to the availability of family members. For example, in the studies that explicitly chose families with a biological mother present and biological father absent, a resident grandfather had a large influence on grandchild development. This may indicate that the grandfather assumed the father figure role while the grandmother, usually the maternal grandmother, had a smaller role since the mother was present (Oyserman, Radin, and Benn 1993; Radin, Oyserman, and Benn 1991). It must be noted, however, that studies focusing on grandmothers, especially co-residing grandmothers, find consistent beneficial influences (e.g., Henderson et al. 2009). There is some evidence that maternal grandparents have a more beneficial effect than paternal grandparents (Bridges et al. 2007; Lussier et al. 2002); however, a clear limitation in the post-transition literature is the lack of distinction between grandparent types, a distinction that seems to be influential in pre-transition societies.

The effects grandparents have on grandchild development are generally small (but see Henderson et al. 2009; Radin et al. 1991). The fact that these associations are found across grandchild ages, study designs, and diverse populations, and generally take into account a range of potential confounding variables, adds strength to these findings. We reiterate that the direction of the causal association cannot be established from these correlational studies. From the current literature we cannot establish whether grandparental investments specifically improve grandchild outcomes. Rarely is it possible to rule out the alternative explanation that grandparents are more attracted to happy and responsive grandchildren and that their increased investment is purely a side effect of this interaction. Likewise, it may be that grandchildren live with custodial grandparents when very difficult circumstances have befallen a family and that these conditions, not the grandparents’ investment, influence grandchild development. However, the ability in longitudinal studies to adjust for earlier measures of the grandchild’s environment and development is showing promise (see Coall and Hertwig 2010). For example, in a longitudinal analysis that controlled for earlier psychological adjustment, Pittman and Boswell (2007) found
that grandchildren who moved into custodial grandparent households demonstrated improved psychological adjustment. Moreover, like the ethnographic data, these findings are supported by qualitative analyses that show it is not the grandparent–grandchild relationship per se that makes a difference; rather it is how grandparents care for their grandchildren that is crucial (see Al Awad and Sonuga-Barke 1992; Botcheva and Feldman 2004; Griggs et al. 2010; Coall and Hertwig 2010; Kennedy and Kennedy 1993). The burgeoning field of grandparental investment in post-transition societies does suggest grandparents play a crucial supportive role to mothers and grandchildren reminiscent of that found in many pre-transition societies. With the demographic transition the child outcomes have changed; however, the evidence that grandparents have a positive influence on grandchild development, especially in the trying times of divorce, re-marriage, and economic hardship, is growing.

**Kin effects on female fertility**

We have seen that kin help mothers in both pre- and post-transition societies, but do their presence and assistance also affect fertility rates? Such help in reducing the costs of childrearing may plausibly affect fertility rates in both pre- and post-transition societies. In pre-transition, poorly nourished societies, relieving some of women’s energetic burden of reproduction may result in more frequent conceptions and higher birth rates. In both types of societies, women may be more inclined to have children, and to have more children, when they are surrounded by supportive kin networks. Kin may also take an active role in encouraging childbearing, at least when conditions are suitable for successfully raising children, so that social norms may be more pronatal in situations where women are surrounded by kin (Newson et al. 2007). Here, we review studies that contribute empirical data to the question of whether kin influence fertility (a more detailed description of this dataset is in preparation: Sear and Mathews in prep). We restrict our review to published studies that investigated the impact of the presence of parents or parents-in-law on women’s fertility. We do not include the many studies which have investigated whether sibship size influences fertility, since we are keen to restrict our analysis to those kin known to be available to influence a woman’s fertility during her reproductive years. We have also only included those studies which indicated whether named relatives were available to the woman, rather than including the several studies which have analyzed the effects of family form or household composition on female fertility (such as living in a nuclear versus extended family), since such analyses also do not provide precise data on which kin are available to influence fertility. We argue that it is important to know exactly who is available to women, since different relatives may have different roles to play within the household.
We identified 39 populations in which the effects of parents and parents-in-law on female fertility have been statistically investigated (Tables 5 and 6 for multivariate and bivariate studies respectively, substantially updated from Mace and Sear 2005, and summarized in Table 7). Each row in these tables represents a different sample of women: in some cases more than one row relates to the same national population, but the sample of women is different in each case; where clearly distinct populations of women were identified in the same study (such as ethnic groups with different postmarital residence patterns) and analyzed separately, a separate row is devoted to each distinct sample of women. These tables and Figure 2 should therefore be interpreted with caution, since this dataset may both over- and under-estimate the effects of kin on fertility (for example, because different samples from the same national population are not necessarily independent datapoints; and because analyzing large national populations may hide kin effects if they are only found in some sections of the population). In some cases more than one row relates to the same national population, but the sample of women is different in each case. A variety of fertility outcomes is included—mostly age at first birth (in some studies proxied by teenage birth), length of birth intervals, and total number of children born (which may or may not be restricted to post-reproductive women). A “+” in Tables 5 and 6 represents an increase in fertility in the presence of kin, as indicated by earlier age at first birth, shorter birth intervals, and higher total number of children born; “–” represents a decrease in fertility, and “none” indicates no effect. In this case the relationship of each kin category refers to the woman herself, so that “mothers” in these tables are equivalent to “maternal grandmothers” in Tables 1 and 2. Because these
<table>
<thead>
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<th>Population†</th>
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<th>Fertility</th>
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</table>

†Dominica is an outlier in this analysis. For Dominica, different sets of authors have been chosen, based on different samples and study periods.
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<tr>
<th>Country</th>
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</tr>
<tr>
<td>Taichung</td>
<td>Lee 2001</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern</td>
<td>Wang and Chou 1999</td>
<td>Low</td>
<td>Teenage birth</td>
<td>-</td>
</tr>
<tr>
<td>UK (NCDS) Nat. rep.</td>
<td>Kiernan 1992</td>
<td>Low</td>
<td>Teenage birth</td>
<td>/none&lt;sup&gt;e&lt;/sup&gt; none/&lt;sup&gt;f&lt;/sup&gt; -</td>
</tr>
<tr>
<td>Finland Nat. rep.</td>
<td>Vikat et al. 2002</td>
<td>Low</td>
<td>Teenage birth</td>
<td>-</td>
</tr>
<tr>
<td>Australia Nat. rep.</td>
<td>Parr 2005</td>
<td>Low</td>
<td>Childlessness</td>
<td>none +</td>
</tr>
<tr>
<td>Australia</td>
<td>Chisholm et al. 2005</td>
<td>Low</td>
<td>AFB</td>
<td>-</td>
</tr>
<tr>
<td>Taiwan Nat. rep.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980 KAP</td>
<td>Thornton et al. 1986&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Low</td>
<td>TCH</td>
<td>+</td>
</tr>
<tr>
<td>1999–2000 PSFD</td>
<td>Tsay and Chu 2005&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Low</td>
<td>IBI</td>
<td>+</td>
</tr>
<tr>
<td>1990 THRS</td>
<td>Chi and Hsin 1996&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Low</td>
<td>TCH</td>
<td>IBI +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/none&lt;sup&gt;h&lt;/sup&gt;</td>
</tr>
<tr>
<td>West Germany Nat. rep.</td>
<td>Hank and Kreyenfeld 2003&lt;sup&gt;h&lt;/sup&gt;</td>
<td>Low</td>
<td>AFB</td>
<td>+ IBI none</td>
</tr>
<tr>
<td>Canada Nat. rep.</td>
<td>Wu and Schimmele 2003&lt;sup&gt;h&lt;/sup&gt;</td>
<td>Low</td>
<td>AFB</td>
<td>- TCH</td>
</tr>
<tr>
<td>US Nat. rep. HSB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1995 NSFG</td>
<td>Manlove, Terry et al. 2000&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Low</td>
<td>Teenage birth</td>
<td>-</td>
</tr>
<tr>
<td>1982 NSFG</td>
<td>McLanahan and Bumpass 1988&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Low</td>
<td>Teenage birth</td>
<td>-</td>
</tr>
<tr>
<td>NELS</td>
<td>Lopoo 2004&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Low</td>
<td>Teenage birth</td>
<td>-</td>
</tr>
<tr>
<td>US, NW Teenage mothers</td>
<td>Gillmore et al. 1997&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Low</td>
<td>IBI</td>
<td>none</td>
</tr>
<tr>
<td>US Teenage mothers</td>
<td>Manlove, Mariner, and Papillo 2000&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Low</td>
<td>IBI</td>
<td>-</td>
</tr>
</tbody>
</table>

NOTE: For definitions, details of other effects, and further supplementary information, see <http://www.dur.ac.uk/anthropology/staff/profile/?id=8827>.  
<sup>e</sup>Unless otherwise stated, data were collected in recent decades.  
<sup>f</sup>High = TFR ≥ 3; Low = TFR < 3.  
<sup>g</sup>Reproductive-aged mother -- post-reproductive mother +.  
<sup>h</sup>These studies did not distinguish between mothers and fathers or mothers-in-law and fathers-in-law but considered parents or parents-in-law together.  
<sup>i</sup>Nationally representative sample.  
<sup>j</sup>Parental absence due to death/divorce.  
<sup>k</sup>Significant effect for second IBI but not third.
Table 6: Bivariate studies of the effects of parents and parents-in-law on fertility

<table>
<thead>
<tr>
<th>Population</th>
<th>Authors</th>
<th>Fertility</th>
<th>Fertility outcome</th>
<th>Effect of mothers</th>
<th>Effect of fathers</th>
<th>Effect of mothers-in-law</th>
<th>Effect of fathers-in-law</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trinidad</td>
<td>Flinn 1986, 1989</td>
<td>High</td>
<td>TCH</td>
<td>–/+ d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>Madrigal and Meléndez-Obando 2008</td>
<td>High</td>
<td>TCH</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary Gypsies</td>
<td>Bereczkei 1998, Bereczkei and Dunbar 2002</td>
<td>High</td>
<td>TCH</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary Non-Gypsies</td>
<td>Bereczkei 1998, 2002 Bereczkei and Dunbar 2002</td>
<td>Low</td>
<td>TCH</td>
<td>none</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>Bereczkei and Csandaky 1996</td>
<td>Low</td>
<td>Total conceptions</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TCH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: For definitions, details of other effects, and further supplementary information, see «http://www.dur.ac.uk/anthropology/staff/profile/?id=8827».

aUnless otherwise stated, data were collected in recent decades.
bHigh = TFR ≥ 3; Low = TFR < 3.
cAFB = age at first birth; IBI = length of birth intervals; TCH = total number of children born.
d – for women 18–21 years; + 22–29 years.
<table>
<thead>
<tr>
<th></th>
<th>High fertility</th>
<th></th>
<th>Low fertility</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Positive effect</td>
<td>Negative effect</td>
<td>No effect*</td>
<td>Number</td>
<td>Positive effect</td>
</tr>
<tr>
<td></td>
<td>of studies</td>
<td>(58)</td>
<td>(33)</td>
<td>(25)</td>
<td>of studies</td>
<td>(56)</td>
</tr>
<tr>
<td>Mothers</td>
<td>12</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>(Mothersb)</td>
<td>(63)</td>
<td>(38)</td>
<td></td>
<td></td>
<td>(33)</td>
<td>(17)</td>
</tr>
<tr>
<td>Fathers</td>
<td>8</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>(63)</td>
<td>(38)</td>
<td>(33)</td>
<td></td>
<td></td>
<td>(33)</td>
<td>(17)</td>
</tr>
<tr>
<td>Unspecified parents</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Mothers-in-law</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(67)</td>
<td>(33)</td>
<td>(67)</td>
<td></td>
<td></td>
<td>(0)</td>
<td>(33)</td>
</tr>
<tr>
<td>Fathers-in-law</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(60)</td>
<td>(40)</td>
<td>(60)</td>
<td></td>
<td></td>
<td>(40)</td>
<td>(40)</td>
</tr>
<tr>
<td>Unspecified parents-in-law</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>(25)</td>
<td>(75)</td>
<td>(100)</td>
<td></td>
<td></td>
<td>(100)</td>
<td>(100)</td>
</tr>
</tbody>
</table>

*a Population was counted as having "No effect" only if there was no correlation between any fertility outcome in that population and the relative in question.

*b Percentages do not always sum to 100 because some studies find both positive and negative effects.
100  

Cooperative Breeding and the Demographic Transition

studies include both pre- and post-transition societies, we divide Tables 5 and 6, somewhat arbitrarily, into high-fertility populations (top panels: defined as TFR ≥3) and low-fertility populations (bottom panels: TFR < 3).

This preliminary survey should be interpreted with caution: as with the data on child survival, a review of empirical findings may be distorted if studies that find significant effects are more likely to be published, and these studies only demonstrate correlation not causation. The picture for female fertility is less clear-cut than for child survival. Table 5 suggests that the effects of parents and parents-in-law on fertility are not always consistent across all measures of fertility. We may draw some tentative conclusions, however. First, kin effects are again common: in only five (13 percent) of the 39 populations was there no evidence that parents or parents-in-law influenced fertility. But which relatives are important differs somewhat from those important for improving children’s survival (compare Figures 1 and 2). The direction of the effect is also more variable than for child mortality: a woman’s parents, in particular, seem if anything more likely to reduce than increase her fertility. Many of these parental antinatal effects can be attributed to the protective effects against teenage childbearing of living with both parents in low-fertility societies. A woman’s parents-in-law almost invariably increase her fertility, although few studies include parents-in-law in low-fertility societies. If we focus on high-fertility societies (see Table 7), we can still tentatively conclude that a woman’s parents-in-law tend to have pronatal effects, while the effects of a woman’s own parents may be more variable. More data need to be collected, however, before such a conclusion can be drawn with confidence.

A further caveat is that it is more difficult to interpret these fertility results than results for child survival. While all family members should be interested in improving child health and well-being once a child is born (with certain exceptions), whether family members are interested in increasing or decreasing the number of children produced is more difficult to determine. Giving birth to many, closely spaced children may not be in a woman’s best interest, for example, since it can lead to maternal depletion (Jelliffe and Maddocks 1964). Her husband, however, may wish to have many children and may desire a higher fertility than is optimal from the woman’s point of view (since he does not bear the same costs of reproducing that she does). Studies of fertility preferences in men and women tend to show that, where they differ (and mostly they don’t), men want more children than women (Ratcliffe, Hill, and Walraven 2000; Gebreselassie 2008). A woman’s husband and his family may therefore encourage high fertility, whereas a woman’s own family may attempt to protect her from the high fertility demands of her husband and in-laws, and not encourage rapid childbearing (Mace and Colleran 2009; Sear, Mace, and McGregor 2003). Evidence for this hypothesis comes from a recent study in rural Africa which found that a woman’s kin may actually
assist her uptake and use of modern contraception, thereby potentially reducing her fertility (Borgerhoff Mulder 2009), but perhaps optimizing the total output of children to maintain her own health.

Grandparental childcare and fertility—
post-transition societies

As with the analysis of child survival, correlations between the availability of relatives and fertility do not necessarily demonstrate causal relationships. We have argued that one potential pathway through which parents could influence their children’s fertility is by providing practical help with raising grandchildren, and data collected from post-transition societies suggests that grandparents still play a pre-eminent role as childcare providers in post-transition societies (see Hank and Buber 2009). Despite this, surprisingly few studies have examined in detail these grandparental influences on fertility. Using population-level data Coall and Hertwig (2010) examined the association between total fertility rate and grandparental childcare across ten European countries; we extend their analysis and present it graphically here (see Figures 3 and 4). The percentage of grandparents who took care of their grandchildren, without the presence of their parents, regularly (almost weekly or more often) or at all (any) over the last 12 months was taken from Hank and Buber’s analysis of the Survey of Health, Ageing and Retirement in Europe. If grandparents rated frequency of child care for more than one of their children, the child who received the most frequent care was counted. Total fertility rates are the 2009 estimates from the CIA’s world fact book (Central Intelligence Agency 2009). Figure 3 shows a strong negative association between regular childcare by grandmothers and total fertility rate across Europe \( (r = -0.90) \) with a slightly weaker association for grandfathers \( (r = -0.88 \) not shown). Perhaps surprisingly this means that in countries where grandparents provide less regular care fertility is higher and where a higher proportion of grandparents provide regular care the fertility rates are lower. In line with Hank and Buber’s interpretation we suggested this reflects the inadequate provision of institutional childcare and support for women to return to work after having a family in countries such as Greece and Italy. In these countries it would appear that if women want a career and a family, grandparents must step up to provide regular childcare. Evidence from a German study suggests when state-funded childcare provisioning is inadequate, it is this informal childcare that influences parents’ fertility decisions (Hank and Kreyenfeld 2003). Importantly, grandparental childcare in countries with adequate state-funded childcare has not been crowded out; it has merely changed. As Figure 4 shows, a higher proportion of grandmothers from the higher fertility countries provide any childcare \( (r = 0.82) \) and for grandfathers \( r = 0.66 \). This suggests that grandparents in the lower fertility Mediterranean countries are less likely
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FIGURE 3  Association between total fertility rate and percentage of grandmothers providing regular grandchild care for ten European countries

FIGURE 4  Association between total fertility rate and percentage of grandmothers providing any grandchild care for ten European countries
to care for their grandchildren at all. A range of cultural, demographic, and historical factors could conceivably explain this association. However, Hank and Buber (2009) show this association holds after adjustment for, among other things, grandparental age, health, lineage, partner status, employment status, and distance to child’s residence. These analyses suggest that even in post–demographic transition societies grandparents still influence classic fitness indicators such as fertility.

Implications for the demographic transition—past and future

This survey suggests that relatives are clearly beneficial to mothers in raising children in pre-transition societies. Evidence from post-transition societies also broadly suggests that the presence of grandparents confers benefits on children. We also found tentative evidence that kin affect fertility—sometimes by increasing it, other times by lowering it. Do these findings have any relevance for the demographic transition? The demographic transition tends to follow economic development. As societies move from a subsistence economy to an industrial wage-based economy, fertility declines. This shift in subsistence strategy tends to be accompanied by changing social networks: individuals associate more often with non-kin and may physically move away from kin to enhance their prospects of work. This does not mean that kin become unimportant, rather that the relative significance of, and frequency of interactions with, non-kin increase. This reduction in kin-based social support may raise the perceived costs of childrearing, since mothers and parents have to shoulder far more of the burden of childcare in the absence of helpful kin. In post-transition societies, the shift from an emphasis on the quantity of children to their quality means that parents still invest heavily in their children (Becker 1991; Mace 2007). But parents may instead have to rely on non-kin-based help. Such help, whether purchased in the market or provided by the state, may be less reliable, of lower quality, or less readily available compared to help provided by a supportive network of kin.

The availability of certain kin will also change as societies move through the demographic transition. Grandparents may well become more widely available as mortality rates decline, but, in the later stages of the demographic transition, they may also spend a longer period of time in poor health and therefore require help from their children rather than being able to provide it. As fertility declines, older children will be less available as helpers, and the overall size of kin networks will also decline, reducing the availability of siblings, cousins, aunts, and uncles. The demographic transition undoubtedly has many contributing factors, not all of which will necessarily apply in any one case, but a loosening of kin ties, which increases the costs and perceived costs of raising children, is a plausible contributing factor.
It has recently been suggested that these changing patterns of kin association and childcare, along with demographic changes, may affect more than just future demography. Children in contemporary industrial societies now require much less intense care in order to survive to adulthood. They also tend to receive care from a different set of individuals than was typical in the past. Hrdy (2009) has proposed that it was the evolution of a cooperative breeding strategy which was responsible for our cognitive divergence from other apes. One of the hallmarks of our species is our ability to empathize with and understand the intentions of others (Tomasello 1999), a characteristic that, according to Hrdy, arose through the needs of infants to acquire care from a variety of individuals in addition to the mother. Hrdy speculates that because contemporary, low-fertility populations no longer raise children in cooperative kin networks, our cognitive abilities may not develop in the same way as in the past, leading perhaps to a decline in our ability to empathize with and cooperate with others. We leave to her the last, rather pessimistic word (p. 293) on the long-term implications of demographic and childrearing changes:

To all the reasons people might have to worry about the future of our species… add one more having to do with just what sort of species our descendants millennia hence might belong to. If empathy and understanding develop only under particular rearing conditions, and if an ever-increasing proportion of the species fails to encounter those conditions but nevertheless survives to reproduce, it won’t matter how valuable the underpinnings for collaboration were in the past. Compassion and the quest for emotional connection will fade away as surely as sight in cave-dwelling fish.

Notes

Figures in this chapter are available in color in the electronic edition of the volume.

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