

In-law Conflict

Women's Reproductive Lives and the Roles of Their Mothers and Husbands among the Matrilineal Khasi

by **Donna L. Leonetti, Dilip C. Nath, and Natabar S. Hemam**

Human behavioral ecologists have shown that the reproductive lives of women are affected by both their husbands and the grandmothers of their children. Study of the combined effect of the roles of the husbands and mothers of 650 Khasi women aged 16–50 years supports the ideas that the reproductive agendas of husbands may require more than women want to invest and that mothers provide support and protective services to their daughters and grandchildren. In the absence of the woman's mother, the husband's agenda appears to have more influence on her reproductive career. In a cooperative vein, women's mothers may contribute to good marital choices. A view of reproductive pursuits that incorporates in-laws enhances behavioral ecology approaches to the evolutionary comprehension of human reproductive behavior. This view also more readily interfaces with the cultural systems that set up the ecologies of reproductive life.

Dependence on the help of others is a hallmark of human female reproductive behavior and success (e.g., Hrdy 1999). In view of recent controversies (Hawkes 1991; Hawkes, Rogers, and Charnov 1995; Kaplan and Lancaster 2003; Marlowe 1999, 2001, 2003) over the importance of husband and grandmother (woman's mother) support for women's reproductive success, it would seem appropriate to direct more research at the interface of these two sources of potential help. Much of the literature in evolutionary anthropology and demography has treated reproduction as the product of female-male matings with associated husband support of the reproductive venture (Alexander and Noonan 1979; Lancaster and Lancaster 1987; Strassmann 1981). Hawkes's grandmother hypothesis, however, specifically points to critical resource flow from senior postreproductive women to genetically related reproductively active junior women and their children. Data on Hadza grandmothers document the beneficial effects of these food transfers on child growth (Hawkes, O'Connell, and Blurton Jones 1997). Others have documented effects of grandmothers on fertility and child survival and growth (Beise and Voland

2002; Gibson and Mace 2005; Hill and Hurtado 1997; Laddenpera et al. 2004; Leonetti et al. 2005; Sear et al. 2002; Sear, Mace, and McGregor 2003; Sear, Allal, and Mace 2004). Kaplan and colleagues have introduced a broader view of parental investment that has focused on reorienting this research toward a three-generation model. The parental goal becomes the future support of grandchildren. Parents can endow their children's reproductive futures via investment in children's skills and strength development (termed "embodied capital") on which their capacities to access future resources for reproductive purposes depend (Kaplan 1996; Kaplan et al. 2000). Kaplan (1996) argues that this strategy became fundamental in early hominid evolution as hard-to-access food sources and the skills necessary to extract them became more important. Certainly, the intergenerational transfer of resources from highly productive older individuals to less productive younger individuals who are reproductively active and burdened with children has been demonstrated in age-based resource production and consumption models in modern hunter-gatherer/horticultural groups (Kaplan 1994). That human reproduction evolved and became successful as a three-generational process is becoming increasingly evident as data accumulate.

In reviewing the relationship between men and women, Bliege Bird (Bird 1999) observes that conflict between mates is more basic to the reproductive enterprise than cooperation. Trade-offs for men between mating and parental investment are central to this conflict (Hawkes, Rogers, and Charnov

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1995; van Schaik and Paul 1996). Issues of sexually antagonistic coevolution have also become more central to theoretical considerations of sexual conflict (Gangestad 2003; Holland and Rice 1998). With the inclusion of the senior generation on the playing field on which human reproductive success is pursued, we need to expand the concept of sexual conflict to encompass intergenerational efforts to control, protect, and manipulate the production of offspring. These efforts would include the strategies employed by parents of the reproductive individuals to influence the choice of as well as the ongoing behaviors of the mates of their children in ways favorable to their genetic lineage. Voland and Beise (2005) have addressed this issue from the perspective of women and their detrimental treatment by their mothers-in-law in historical Germany. Therefore we can speak of "in-law conflict" as an extension of sexual conflict, with parents on both sides joining the fray. Cooperation may also be part of these relationships when the interests of both sides are enhanced. This game, of course, becomes vastly more complicated than the simple struggle between the sexes but is likely to be ancient and of critical importance to human reproductive success.

Parental investment lasting into the reproductive ages of offspring is likely to generate parental interest in the marital choices and marital stability of their offspring. The desire to protect parental investment emerges, and efforts are made to align offspring with an equally or better endowed mate and, once favorably placed, to try to ensure the stability of that union. The eternal questions are "Is he/she good enough for my child?" and "Will it last?"

The role of culture in establishing mating guidelines and resource allocation rules has been critical in creating kinship ecologies within which support for reproduction is channeled. Measures to control marital choice and stability are very evident in some cultures. Investments to secure good marriages for offspring, such as dowry and bride price, and inheritances by the successor child work to put resources where reproductive success can be best achieved (e.g., Borgerhoff Mulder 1988; Gaulin and Boster 1990; Fukutake 1967; Harrell and Dickey 1985; Low 1991; Shenk 2004; Strassmann and Clarke 1998). Tests by the parents-in-law (bride service or assessment of brides' domestic work effort, fertility, and fidelity) are common (e.g., Draper 1997; Fukutake 1967; Lee 1979). Poor quality as judged by the in-laws in either case may end the marriage. Values and associated punishments involving familial honor and shame, including notions of duty, seclusion of women, and killing of violators of honor codes (usually women by their fathers or brothers) to protect future marital prospects of family members, work to control marital choice and keep marriages stable (e.g., Faqir 2001; Mernissi 1987). Also, divorce prohibitions and limitations on remarriage work to stabilize marriages and with them intergenerational resource transfers (e.g., Berreman 1993; Borgerhoff-Mulder 1988; Dube 1997; Srinivas 1976). Some of these practices, such as bride service, are likely to be ancient, while others reflect more recent property-holding developments. The lat-

ter, of course, are unlikely to have emerged without the evolutionary development of prolonged parental investment.

Given the life-history constraint of aging, the obviously preferred eventual outcome is a shift of responsibility for support of grandchildren from the older to the younger generation and their spouses. With in-law conflict, as with sexual conflict, costs of parental effort can be shifted to one side or the other (Trivers 1972). The younger in-law generation can desert (or die) or slack off, effectively shifting costs to the mate and his/her parents, the older in-law generation. Some asymmetry in which older-generation in-laws may be burdened is expected given that (1) the greater degree of obligatory investment by females in reproduction compared with males creates an investment to be protected along with certainty of maternal genetic relationship to children and (2) differences in kinship systems emphasize lineage resource-holding biases. The first issue makes the maternal-side senior generation most likely to end up being responsive to grandchildren's needs. The second makes the paternal-side senior generation responsive where paternity certainty is sufficient and the lineage has opportunities for resource investment to enhance male reproductive success (Holden, Sear, and Mace 2003; Quinlan and Flinn 2005).

We have chosen the matrilineal Khasi of Northeast India for our examination of in-law conflict because their behavior involves both maternal-side investment and matrilineal kinship structures and because they have strong traditions of intergenerational support. This paper is an attempt to examine data on woman's reproductive behavior as it reflects the roles of husbands and the maternal grandmothers of the women's children. We do not have sufficient data to include maternal grandfathers.

The Khasi are a tribal group living in the eastern hills of the state of Meghalaya in Northeast India. They follow a subsistence pattern of swidden horticulture on the hillsides and paddy cultivation on the valley floors, with the addition of cash crops (e.g., ginger, broomstick, betel nut, and pineapple) and small commercial enterprises. In rural areas the socioeconomic level is low, with average household incomes providing less than a dollar a day per person. The Khasi follow a matrilineal form of kinship, with the mother's clan name and property being passed to her daughters and her sons often providing important managerial functions for their sisters. Women are active economically—owning land, working the fields, selling and buying produce in the markets, hiring out as wage labor, running businesses, or working as professionals. A large proportion of the women also report themselves to be housewives and appear to be dependent on others for support.

Marriages are monogamous and based on free choice or "love" attachments, although matriclans are strictly exogamous. Median age at first marriage is 19 years for women and 22 years for men. When a woman marries, her husband usually joins her household. Khasi men retain full membership rights in their matrilineal natal families but do not bring

wives into their natal household; women from different matrilineages do not reside together (Nakane 1967). Men go out to marry and become attached and committed to their wives' households to varying degrees, with roles ranging from household head to peripheral member to night visitor. Husbands usually bring no wealth initially to the marriage but are expected to contribute labor in their wives' fields and in the construction of houses owned by their wives and inherited by their daughters. They may also participate in wage labor and business and therefore often have independent earning capacity from which they can contribute to their wives' households. The work and income contributions can be quite variable and appear to be related to the role of the husband in the household. The land-holding power of Khasi women places them in the position of requiring male labor to produce resources. Although consanguineal male kin may help, their efforts may often be focused on their own labor contributions to their marital partners. Even where landownership is minimal, the matrilineal, matrilineal kinship arrangements keep women in close relationships with their female kin, a setting which encourages men to come to them and offer resources from wages or business enterprises to secure mating and parental privileges.

Divorce is fairly common. In divorce the husband is the one who departs, leaving behind what he has contributed to the marriage. The children stay with their mother as members of her matrilineage. Should she die, her matrilineage would traditionally care for them (Gurdon 1907). Remarriage for both is common. Thus, when divorce occurs, "in most cases the husbands do the 'disappearing act,' they tend to leave on their own," according to one Khasi woman. "Stability is what matters. . . . Remarriage is not a problem. . . . The reason is for the much needed help. . . . Age is no bar to remarriage." The picture we get from these statements is that husbands are mobile although women value their continued presence and contributions and often remarry to keep help coming from men.

Competition for intergenerational resources among females in a sibship has been institutionally resolved in favor of the youngest daughter. She inherits her mother's house and matrilineal property and is expected to live with her mother until she dies. Youngest daughters also carry spiritual and material obligations to their matrilineages not expected of elder daughters. Elder daughters are likely to marry and set up separate households close by with their husbands. These normative patterns, however, are not always followed; some elder daughters reside with their mothers and some youngest daughters move out.

Men are always honored and respected in their natal homes, where they may act as leaders and managers in a parallel path to that of marital life. A man may withdraw from or reenter marital life from this base and may wish to orient some of his labor and other resources to it, thereby benefiting nieces and nephews. In his marital home a man's status is always contingent upon his contributions to the household, and his

contribution is often relative to that forthcoming from his wife's matrilineage. He may be necessary there only as a generator. Alternatively, he may find an opportunity with his productive talents to become a major contributor and gain increased involvement as household head, particularly when married to an elder daughter.

Our previous research has established that the Khasi women have high fertility; the maximum family size we recorded was 15 children, and 27% of women aged 16–50 years had more than 6 children (Leonetti et al. 2005). The use of family planning is limited (18%) and has no significant effect on fertility (Leonetti, Nath, and Heman 2007). The maternal grandmother has a significant positive effect on grandchild survival and growth (Leonetti et al. 2005). We have also shown the importance for fertility and child growth of a fully committed husband—one whose entire work effort and income as head of the household goes to support his wife and children. That less committed husbands, in peripheral household positions, may be a liability is apparent from their negative effect on Khasi child growth (Leonetti et al. 2004). Previous research also showed that shorter women were more likely to be in households with husbands as their heads and therefore likely to be more dependent upon them (Leonetti et al. 2004).

With in-law conflict, the reproductive agendas of the mother and the husband are unlikely to be identical with respect to any one woman. The conflict resides in that the husband is likely to want more investment in reproduction from the woman than she may be willing to contribute, given her much higher obligatory costs of reproduction. In addition, given that matrilineal resources are often subsidizing reproduction and the costs to the husband may thereby be minimized, his agenda may be to push to use a woman's energy (resource) budget for greater and faster reproduction. In response, the woman, with her mother's help, may resist this agenda. The husband, however may counter by offering greater resources and avoiding the woman's mother, usually by establishing residence apart from her. A deceased mother may put a woman at a disadvantage in negotiations for resources from husbands. Thus the mother is expected to take a more protective stance and the husband a more exploitative stance with regard to the reproductive woman.

A woman's capacity to resist may be a critical factor here. Her height, taken as a crude indicator of possible submissiveness or dependence, is likely to represent early parental investment in her (Henry and Ulijaszek 1996). In this economically poor environment, women who are taller are on average likely to have reached more of their genetic potential and have greater embodied capital (strength and skill) due to this early investment (Kaplan 1996; Kaplan et al. 2000). They will, therefore, be expected on average to be more capable and less dependent or submissive than shorter women. A woman's capacity to resist is thus also relevant to the effect of the mother's role.

Maternal grandmothers can invest in daughters' children with 100% grandmaternity certainly. Since they have high

genetic relationship to daughters and previous parental investment in them, they are likely to be highly motivated to both support and protect these irreplaceable vessels of their reproductive success. They cannot achieve this success, however, without the men their daughters mate with, and these men also represent potential resources for investment. A woman's mother's help in making a good marital choice and the support she can give until a good choice is made are therefore critical. She can also provide back-up support when choices prove inadequate. When she has several daughters, her resources must be rationed in the most strategic manner possible. Customs of prioritization appear to be the solution to such problems. Youngest-daughter inheritance allows elder daughters to be given priority temporarily because they move out and settle with husbands while youngest daughters stay with the mother and inherit her home and control of matrilineage property. Thus more potential support and protection are afforded youngest daughters than elder daughters, although the latter remain eligible for support if needed.

A husband may be viewed as having mating interests as well as kin interests (in his children and his sister's children) that stimulate his investment. A husband may respond to his wife with the usual male repertoire (stay or desert, assume more or less responsibility for supporting her and her offspring, contribute greater or fewer resources) involved in sexual conflict (Trivers 1972). Issues such as protection of previous paternal investment, the woman's residual reproductive value,¹ and paternity certainty are likely to affect his investment motivation. He may also have another marital opportunity and move on, wives, unlike daughters, being replaceable. Second or higher-order husbands will have curtailed reproductive opportunity in the lower reproductive value of a previously married woman, and some of their investment may be diverted to stepchildren.

Where the husband is peripheral or absent, he is less likely to provide all of his effort and income to his wife and children, instead devoting some to his mother and his sisters and their children. He may also be tempted to reduce his investment if his wife's mother is providing for his children. The risk of providing resources in marital households where he could have little control may be offset by the security of his matrilineal home, where he is more sure of his kin relationships and can influence resource management. Given, however, that his nieces and nephews are at best only half as related to him as his children, if he can establish headship in his wife's household he may be motivated to commit his full effort and income there. Household headship and full commitment may also act to stimulate the wife's allegiance and increase paternity certainty, promoting stable marital bonds. Finally, given differential access to maternal material resources among daughters, the response of husbands may vary depending on

1. Reproductive value is defined as the number of children a female can be expected to bear in the future given her current age, her probability of survival, and the reproductive rates of the population.

the inheritance status (elder or youngest) of the daughters they marry.

The combination of responses by both husbands and mothers thus sets up a triangle of strategic interactions centered on the reproductive-age woman. We argue here that intergenerational consanguineal and marital affinal reproductive interests should be viewed in conjunction with one another for a more complete picture of human reproductive efforts. In general, we predict that mother investment will be sensitive to husband investment and vice versa. We also present specific hypotheses that predict a woman's marital behavior and fertility and children's survival, given the local kin ecology represented by her mother's and her husband's characteristics, her inheritance status as an elder or youngest daughter, and her capacities as indexed by her height. Constraints of aging also arise. Age of the woman is critical to her reproductive achievement. Also, once reproductive-age women have passed their peak reproductive value or potential, their access to resources from husbands may decline if husbands leave, and remarriage may not be possible. As women age, the probability of having a deceased mother also increases. Therefore, woman's age is inherent in every scenario proposed.

Our hypotheses regarding marital behavior are as follows:

MB1. Early failure of first marriages is more likely when the woman's mother is deceased than when she is alive, presumably because of the lack of her advice and protection when the woman makes her choice.

MB2. Coresidence with her mother should provide a woman with economic security and is expected to be associated with less exposure to a husband's reproductive agenda via delayed first marriage and reproduction (i.e., age at first birth), increased divorce, and not remarrying after divorce.

MB3. Loss of intergenerational resources where the mother is deceased may stimulate greater acceptance of husband support as household head, while good access to mother resources (via residence with her) may promote less acceptance of the husband as household head.

MB4. Shorter women are expected to accept more dependence on husbands as household heads than taller women, who are more likely to resist such dependence with their mothers' support.

MB5. Daughter inheritance status (as elder or youngest) will interact with the effects of the mother and husband in all of the above hypotheses.

Our hypotheses regarding fertility and child survival are as follows:

F1a. Fertility will be reduced where the woman resides with her mother because of reduced exposure to the reproductive agenda of a husband via delayed first reproduction, increased divorce, and not remarrying after divorce.

F1b. Remarriage is likely to increase the pace of fertility because the second husband's resources are valued and his reproductive opportunities are curtailed.

F2a. Where the husband exhibits a household role of full

headship support, he has a stronger basis on which to pursue his reproductive agenda, regardless of the woman's mother's residence, and a woman married to such a man is expected to show higher fertility than a woman whose husband does not assume this role.

F2b. Daughter inheritance status (as elder or youngest) will alter the effects of coresidence with her mother and husband's household role on her fertility.

CS1. Children of second husbands, given a rapid reproductive pace, are likely to suffer greater mortality than children of first husbands, particularly where their grandmothers are deceased.

CS2. Women with a husband (either first or second) as household head, given a rapid reproductive pace, are expected to have lower child survivorship than women with peripheral or absent husbands, who are likely to be coresident with their mothers.

Methods

Sample

The sample is from rural areas and is community-based in five Khasi villages scattered widely over a large area of the Khasi region, excluding the southern portions where War-Khasi reside. After obtaining permission from village headmen, we requested an interview of every woman who had borne at least one child. Women of reproductive age (50 years or less) were selected for the analysis presented here ($n = 650$). Structured interviews conducted with Khasi interpreters covered current household composition and socioeconomic characteristics, women's reproductive histories, and mortality among their children (dates of births and deaths of live-born children, $n = 2,666$). The data from the household records and reproductive histories were checked for internal consistency. Daughter inheritance status (elder or youngest) was recorded. Heights (cm) of the women were measured with a steel anthropometer.

The order (i.e., first, second, third) of the husband who fathered each child was recorded. Information on the husband's role in the household (i.e., head, peripheral member, or absent) was collected. The percentage contribution of his total income and work effort to the household was ascertained to confirm his stated role. No data on the husband's previous marital experience were collected.

The child's grandmother is the woman's mother, and the terms "grandmother" and "woman's mother" in this paper refer to the same person. The grandmother's living status (alive, deceased) at the time of each birth was recorded, as well as her current living and residential status (coresident with the woman or resident elsewhere) at the time of the interview, along with her age and reported health status (good or poor) if alive. The association of mothers with youngest daughters with respect to shared residence suggests the possibility that older mothers with reduced capacities may be less

helpful to these daughters. However, only 3% of the Khasi grandmothers were reported to be in poor health or more than 80 years of age (4.4% of the mothers of youngest daughters and 2.1% of mothers of elder daughters [n.s.]). The percentage of women with a living grandmother for their children at the time of their first births was 89%. At the time of the interview, this percentage was 76%, and 22% of the women lived with their mothers. Coresidence with the mother provided a mean annual household income of $40,560 \pm 1,840$ rupees (\sim US\$900), compared with $29,800 \pm 1,160$ rupees (\sim US\$660) when the mother resided elsewhere and $31,750 \pm 1,750$ rupees (\sim US\$700) when she was deceased ($F = 12.4$, $p < .001$).

Analysis

The categories of women's divorce histories are married once, divorced and not remarried, and divorced and remarried (including a subcategory of divorced after first birth and remarried). Grandmother living status (alive, deceased) at the time of each birth and the order (first, second, etc.) of the husband who fathered the child allow a backward look at the context of each birth. Second- and third-husband data are combined except where noted because third husbands are rare ($n = 7$). On the basis of husband's role in the household, we identify four marital history strategies: (1) married to first husband recognized as head, (2) married to second-plus husband recognized as head, (3) married to first or second-plus husband who is peripheral, (4) previously married once or twice but with no husband present. Categories 3 and 4 merge first and subsequent marriages on the assumption that husbands in these marriages will have had similar experiences. The data are cross-sectional, and, of course, a woman following one of these strategies may change to another one in the future. Birth intervals are calculated from the dates of adjacent live births. Child's age at death is calculated from birth and death dates. Initiation of reproduction (age at first birth), divorce histories, marital strategies, dependency (indexed by woman's height), access to grandmothers' resources (coresidence and daughter inheritance status), fertility (number of children live born to date of interview adjusted for woman's age), pace of fertility (birth intervals), and child survivorship (to age 10 years) represent factors contributing to the reproductive progress of the women and appear in various analyses. Woman's age is included in all analyses.

The generalized linear model used in multivariate tests of differences between categories of women with differing experiences provides adjusted means (\pm standard error [SE]) from these models for variables of interest after controlling for other variables. Multivariate logistic binomial and multinomial regression models provide odds ratios (OR) and 95% confidence intervals (CI) for the probabilities of falling into one category compared with a reference category for the predictor variables of interest, with controls for other variables in the model. Multivariate Cox proportional hazards models provide hazard ratios (HR) and 95% confidence intervals for

the risk of offspring death prior to 10 years of age in each category compared with a reference category, with appropriate control variables. Robust estimates of the standard errors are used to adjust for the inclusion of more than one child from many of the women and the resulting lack of independence (StataCorp 2001). Chi-square tests are applied to cross-tabulations of unadjusted categorical data. All p values smaller than 0.10 are reported. Unadjusted means are presented with standard deviations (SD).

Results

Marital Behavior

(MB1) Early marital terminations are likely to reflect poor marital choices. Of the Khasi women in our sample with two or more children ($n = 575$), 7.3% have taken a new husband to father their second child. The odds ratio of a woman's divorcing her first husband and taking a new husband to father her second child, adjusted for the woman's age, age at first birth, and daughter status, is 2.8 (CI 1.3, 6.2, $p = 0.012$) times greater if her mother is deceased at the time of the first birth than if her mother is alive. The proportion of women taking second husbands after the first birth is higher in (1) youngest daughters with deceased mothers, regardless of age at first birth, and (2) elder daughters with deceased mothers who bore their first child before they were 20 years of age (fig. 1). In the case of these elder daughters, early marital mistakes may be viewed as more specifically related to youth and the absence of motherly guidance and support when early-age transitions to marriage and motherhood are made. For youngest daughters, who inherit their mothers' houses, the mother's premature death appears to be associated with first-marriage mistakes in general. Beyond youth, this situation may result from these women's being targeted by opportunistic men because of their enhanced resource base. Youngest daughters compared with elder daughters may also feel freer to divorce because of their inheritance status.

(MB2) Associations of the age at first birth with relationships with both husbands and mothers are important reflections of the roles both have played in relation to the onset of a woman's reproductive life, a critical aspect of her total fertility (Bongaarts 1983). Younger age at first birth shows a higher odds ratio of ever being divorced (1.09; CI 1.01, 1.16, $p = 0.004$, age-adjusted). However, in table 1 we see that divorce *with* remarriage is associated with youngest mean age at first birth (19.4 years) while divorce *without* remarriage is associated with oldest mean age at first birth (20.8 years). Among women with living mothers, those who reside with them have a higher age at first birth (20.8 years) than those whose mothers reside elsewhere (19.9 years). The combination of residence with the mother and divorce without remarriage shows the highest age at first birth (21.0 years) and is reflected in the interaction term of the generalized linear model.

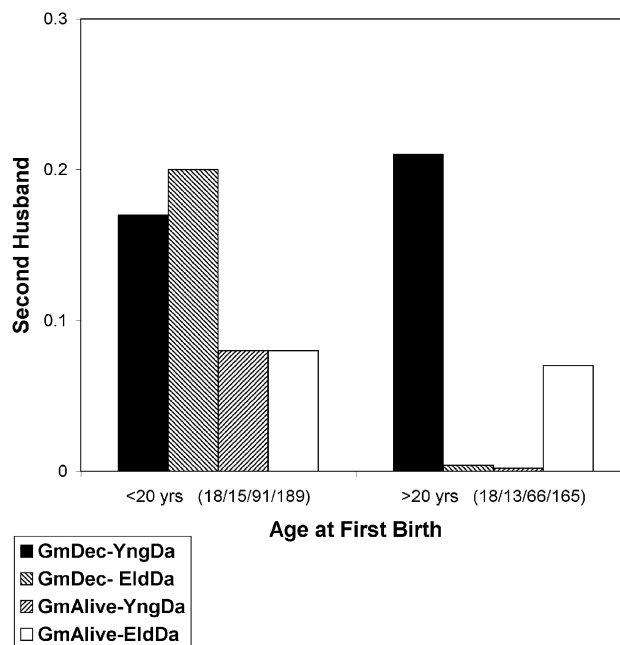


Figure 1. Proportion of women who have a second husband as the father of their second child, adjusted for woman's age, for 575 Khasi women aged 50 or under who have given birth to two or more children, by woman's mother's living status at the time of the first birth (GmAlive = grandmother alive; GmDec = grandmother deceased), daughter status as youngest or elder (YngDa = youngest daughter; EldDa = elder daughter), and age at first birth (< 20 yrs, \geq 20 yrs). N 's for bars are in parentheses. Binary logistic regression (includes age, age at birth): GmAlive versus all other categories, Wald = 9.5, $df = 4$; $p = .049$.

Having any history of divorce increases across age-groups among Khasi women from 15.9% ($n = 295$) for those younger than 30 years to 28.9% ($n = 253$) for those aged 30–39 years to 36.3% ($n = 102$) for those aged 40–49 years ($\chi^2 = 23.7$, $df = 2$, $p < 0.001$). The mother's being alive or deceased, currently or at the time of the woman's first birth, has no effect on having any history of divorce. However, if the mother is alive, currently residing with her is associated with a significantly higher age-adjusted odds ratio of ever being divorced (2.1 [fig. 2]). Also, for ever-divorced women, residence with the mother is also significantly associated with not remarrying (OR = 5.5, CI 2.0, 14.1, $p < 0.001$, age-adjusted). Thus the mother appears to provide a niche for women who are unwilling or unable to marry early and stay married. Conversely, men may be more likely to leave women who have their mothers' support.

Where the mother is alive, the age-adjusted association of a history of divorce with residence with the mother is significant for elder daughters (OR = 3.8, CI 1.7, 8.8, $p = 0.001$) but not for youngest daughters (OR = 1.9, CI 0.7, 4.7, ns). Since residence with the mother is expected of youngest daughters, its association with history of divorce is some-

what muted for them. Elder daughters who have been divorced, however, appear to gain support from their mothers via nonnormative coresidence.

(MB3) Marital histories can be viewed as strategies to hold one husband or move on to the next one (or not remarry) and either recognize him as head of household or not. The effects of the woman’s mother on four such strategies—(1) first husband head, (2) second husband head, (3) peripheral husband, and (4) absent husband—are shown in table 2.

Compared with the first-husband-head strategy, where only the living status of the woman’s mother is considered, a woman following the second-husband-head strategy is less likely (OR = 0.56) while a woman following the peripheral-husband strategy is more likely (OR = 2.84) to have a living mother. Where mother’s residence is also in the model, a woman with the peripheral-husband strategy is much more likely to be residing with her mother (OR = 9.74), and so is a woman following the absent-husband strategy (OR = 4.76). When daughter inheritance status is included in the model and mother’s residence is omitted (because of confounding between the two), a woman following the peripheral-husband strategy is less likely to be an elder daughter (OR = 0.29). Thus, while the absence of the mother through death may have an undermining effect on early marital stability, as seen earlier, her death may encourage remarriage with men as household heads. We also see that the mother’s presence in the household may reduce the importance of having a husband or keep him peripheral within the household.²

(MB4) Our previous research showed that shorter women

2. In this analysis we have assumed that the deceased husbands of the 26 widows were heads of their households. If we assume that widows who are youngest daughters residing with their mothers had husbands who were peripheral (4 women fall into that category—1 from second-husband head and 3 from first-husband head), the results become slightly more significant where they differ. Thus, the version of the analysis presented is the more conservative one. If we leave widows out of the analysis, we cannot capture remarriage behavior adequately, since widows tend to be older and to have had more second marriages.

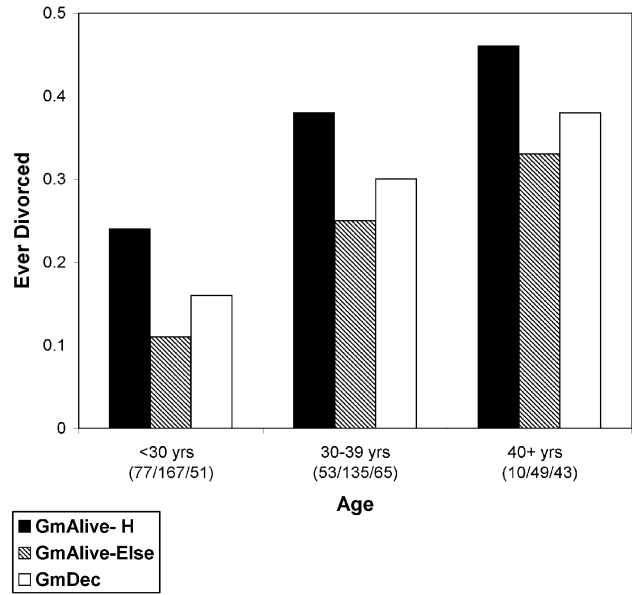


Figure 2. Proportion of women ever divorced, for 650 Khasi women aged 50 or under, by woman’s mother’s living/residential status (GmAlive-H = mother alive in woman’s household; GmAlive-Else = mother alive, elsewhere; GmDec = mother deceased) and age. *N*s for bars are in parentheses. Binary logistic regression (includes age): GmDec versus GmAlive (reference), OR = 1.3, CI 0.8, 2.1, ns; GmAlive-H versus GmAlive-Else (reference), OR = 2.1; CI 1.3, 3.4; *p* = 0.001.

were more likely to be in households with husbands as their heads and to receive greater contributions from their husbands than taller women, leading us to conclude they were more dependent upon them (Leonetti et al. 2004). In this analysis, we look only at women with living mothers (i.e., women who have a chance to reside with their mothers). First, we see that youngest daughters and elder daughters are very similar in age-adjusted height (150.5 ± 0.4 cm, *n* = 147, versus 150.4 ± 0.3 cm, *n* = 340, respectively; $F_{1,484}$ =

Table 1. Woman’s Age at First Birth (*n*) (Mean ± S.E.), Adjusted for Woman’s Age, by Mother’s Living/Residential Status and Divorce History for 650 Khasi Women Aged 50 or Under

	Woman’s Age at First Birth (<i>n</i>)			
	Mother Alive		Mother Deceased	All
	In Household	Elsewhere		
Mother living/ residential status	20.8 ± 0.40 (139)	19.9 ± 0.24 (352)	20.0 ± 0.22 (159)	20.2 ± 0.19 (650)
Married once	20.7 ± 0.30 (96)	20.0 ± 0.19 (284)	20.6 ± 0.28 (115)	20.4 ± 0.16 (495)
Divorced/remarried	19.7 ± 0.43 (15)	19.0 ± 0.37 (46)	19.6 ± 0.39 (93)	19.4 ± 0.35 (93)
Divorced/not remarried	21.0 ± 0.45 (28)	20.4 ± 0.45 (22)	20.0 ± 0.49 (62)	20.8 ± 0.42 (62)

Note: Generalized linear model predicting age at first birth (adjusted for woman’s age): mother living status, $F_{1,642} = 0.28$, ns; mother residential status, $F_{1,642} = 5.65$, *p* = 0.018; divorce history, $F_{2,642} = 11.12$, *p* < 0.001; mother residential status × divorce history, $F_{2,642} = 2.95$, *p* = 0.053. Specific *F*-tests (age-adjusted): mother alive versus deceased, $F_{1,646} = 0.11$, ns; mother residential status, $F_{1,646} = 8.62$, *p* = 0.003; divorce history, $F_{2,646} = 15.1$, *p* < 0.001.

0.01, ns). However, women residing with their mothers are significantly taller than those whose mothers reside elsewhere (151.6 ± 0.5 cm, $n = 348$, versus 149.9 ± 0.3 cm, $n = 139$, respectively; $F_{1,483} = 5.2$, $p = 0.023$), controlling for daughter inheritance status because reasons for coresidence vary with inheritance status. An assortment process appears to have taken place such that youngest daughters who have taken husbands as household heads are shorter. Then, although expected by custom to live with their mothers, these women sometimes move out ($n = 34$ [fig. 3]) so that youngest daughters residing with their mothers are the taller ones. Elder daughters who do not have husbands who are household heads are taller, and some reside with their mothers ($n = 21$ [fig. 3]), adding height to the group residing with mothers. Mothers seen in this light may be an avenue for reproductive-age women to pursue more independent living from husbands if they have the capacities and can have help to do so in the form of coresidence with their mothers. At the same time, husbands who are household heads when married to youngest daughters can sometimes remove their families from the mothers' households and their more direct influence. The 34 women in this category also show the highest observed fertility. Thus, some sort of tug-of-war between husbands and mothers is suggested here. We can also see that the women (youngest and elder daughters) who choose to live more independently from both husbands and mothers are among the tallest (fig. 3).

Fertility and Child Survival

Total number of live-born children is not the best measure of reproductive success because child losses must ultimately be subtracted. The age-adjusted number of births, however, does reflect the intensity of reproductive output, particularly

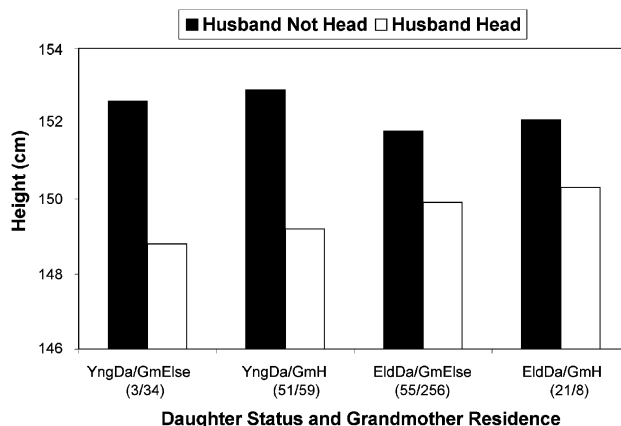


Figure 3. Women's mean height (cm) for 487 Khasi women aged 50 or under with living mothers by daughter status (YngDa = youngest; EldDa = elder), mother residential status (GmElse = mother elsewhere; GmH = mother in woman's household), and husband's role in household (Not head, Head). *N*'s for bars are in parentheses. Heights for four women are missing.

in response to husbands' presence, so we take up total fertility and child survival separately.

(*F1a, b*) Women with deceased mothers have 4.10 children, women residing with living mothers have 3.68 children, and women with living mothers residing elsewhere have 4.28 children. The difference between the latter two residential categories is highly significant ($p = 0.001$). Age-adjusted total number of live-born children is also associated with a woman's divorce history (table 3). Women divorced and remarried have the highest fertility (4.32 children), followed by those still in their first marriage (4.20 children) and those

Table 2. Multinomial Logistic Regression Analyses, Adjusted for Woman's Age, Comparing Marital Strategies with Reference to First Husband as Household Head ($n = 449$) by Mother Living Status, Mother Living/Residential Status, and Mother Living/Daughter Inheritance Status for 650 Khasi Women Aged 50 or Under

	Mother Living Status			Mother Living/Residential Status			Mother Living/Daughter Inheritance Status		
	OR	CI	<i>p</i>	OR	CI	<i>p</i>	OR	CI	<i>p</i>
Second-husband head ($n = 63$)									
Alive (versus deceased)	0.56	0.32, 0.99	0.047	0.60	0.34, 1.08	0.088	0.58	0.32, 1.03	0.061
In household (versus elsewhere)	–	–	–	0.56	0.19, 1.66	ns	–	–	–
Elder (versus youngest)	–	–	–	–	–	–	0.88	0.50, 1.58	ns
Peripheral husband ($n = 42$)									
Alive (versus deceased)	2.84	0.98, 8.20	0.054	1.05	0.33, 3.40	ns	3.62	1.24, 10.58	0.019
In household (versus elsewhere)	–	–	–	9.74	4.60, 20.63	< 0.001	–	–	–
Elder (versus youngest)	–	–	–	–	–	–	0.29	0.15, 0.56	< 0.001
Absent husband ($n = 96$)									
Alive (versus deceased)	1.39	0.80, 2.42	ns	0.83	0.45, 1.51	ns	1.50	0.86, 2.67	ns
In household (versus elsewhere)	–	–	–	4.76	2.80, 8.11	< 0.001	–	–	–
Elder (versus youngest)	–	–	–	–	–	–	0.68	0.43, 1.09	ns

Note: For predictor variables, reference category is in parentheses.

Table 3. Number of Live-Born Children (Mean ± SE), Adjusted for Woman’s Age, by Mother Living/Residential Status and Divorce History for 650 Khasi Women Aged 50 or Under

Divorce History	Number of Live-Born Children (<i>n</i> Women)			
	Mother Alive, in Household	Mother Alive, Elsewhere	Mother Deceased	Total
Married once	3.87 ± 0.17 (96)	4.33 ± 0.11 (284)	4.15 ± 0.16 (115)	4.20 ± 0.08 (495)
Divorced/remarried	4.00 ± 0.25 (15)	4.46 ± 0.21 (46)	4.28 ± 0.23 (32)	4.32 ± 0.20 (93)
Divorced/Not remarried	2.84 ± 0.26 (28)	3.30 ± 0.26 (22)	3.12 ± 0.28 (12)	3.06 ± 0.24 (62)
Total	3.68 ± 0.16 (139)	4.28 ± 0.10 (352)	4.10 ± 0.15 (159)	3.82 ± 0.11 (650)

Note: Generalized linear model predicting number of live-born children (adjusted for woman’s age): mother living/residential status, $F_{2,644} = 3.0$, $p = 0.049$; divorce history, $F_{2,644} = 8.9$, $p < 0.001$. Specific *F*-tests (age-adjusted): mother living/residential status, $F_{2,646} = 5.2$, $p = 0.006$; divorce history, $F_{2,646} = 11.1$, $p < 0.001$. *T*-tests (age-adjusted): mother alive in household versus elsewhere, $t = 3.2$, $p = 0.002$; mother alive in household versus deceased, $t = 1.9$, $p = 0.59$; mother alive elsewhere versus deceased, $t = 1.0$, ns; married versus divorced/remarried, $t = 0.6$, ns; married versus divorced/not remarried, $t = 4.6$, $p < 0.001$; divorced/remarried versus divorced/not remarried, $t = 4.1$, $p < 0.001$.

divorced and not remarried (3.06 children). The former two groups do not differ in fertility, but at the same time the fertility of the first group reflects the faster pace of reproductive effort that must have taken place given the delays inherent in divorce and remarriage. Comparisons of birth intervals between women in first marriages and women in second marriages show most intervals for which data could be tested to be significantly shorter among the latter (table 4). Fertility of the divorced/not remarried women is significantly less than that of both of the other groups (both $p < 0.001$). When age-adjusted total fertility is examined by both divorce history and mother’s living/residential status (table 3), the lowest fertility is for women divorced and not remarried who are residing with their mothers (2.84 children), while the highest fertility is for women divorced and remarried with mothers residing elsewhere (4.46 children).

(*F2a, b*) The age-adjusted fertility of women whose husbands are household heads is significantly higher (4.37 ± 0.08 , $n = 486$) than that of women whose husbands are peripheral (3.72 ± 0.28 , $n = 42$) or absent (3.20 ± 0.17 , $n = 122$; $F_{2,646} = 20.4$, $p < 0.001$). Significantly, however, given a living mother, men are less likely to establish headship when the woman’s mother is coresident with her (48.6%) than when she resides elsewhere (82.9%; $\chi^2 = 60.0$, $df = 1$, $p < 0.001$).

The interplay of husband and mother effects on fertility is

further displayed when we specify the husband’s role along with whether the woman is residing normatively or not given her inheritance status as daughter (fig. 4). This analysis is restricted to women with living mothers ($n = 491$) who therefore have some chance of residing with them. The significant interaction term between normative/nonnormative residence and daughter inheritance status reflects the lower fertility of elder daughters living nonnormatively (with their mothers), especially compared with the quite high fertility of youngest daughters living nonnormatively (not with their mothers) with the husband as head of household. It is these 34 women who have been noted above for their short stature.

(*CS1*) The effects of husbands and mothers on survival to 10 years of age of the 2,666 children (156 deaths) born to the women in our sample are seen in figure 5, *a*. In a Cox multivariate hazards analysis, compared with children of first husbands while the grandmother is alive, children of second husbands while the grandmother is alive show no significant difference in survivorship (HR = 0.8, CI 0.4, 1.7). In fact, the risk is somewhat (but nonsignificantly) less. Children born of first husbands when the grandmother is deceased show increased risk of death (HR = 1.4, CI 0.9, 2.1) although this result also does not reach significance. Children born of second husbands when the grandmother is deceased show a significant increase in risk of death (HR = 3.2, CI 1.8, 5.8,

Table 4. Birth Intervals in Months (*n*) (Mean ± SE), for Women in First Marriages Compared with Women in Second Marriages, Adjusted for Woman’s Age and Woman’s Age at End of Birth Interval, for Khasi Women Aged 50 or Under with No Change in Husband between the Births Defining the Interval

	Birth Interval in Months (<i>n</i> Women)			
	First Husband	Second Husband	<i>F</i>	<i>p</i>
Births 2 to 3	30.2 ± 0.6 (402)	25.4 ± 2.4 (27)	3.7	0.056
Births 3 to 4	31.6 ± 0.7 (288)	26.3 ± 2.4 (30)	4.3	0.040
Births 4 to 5	29.5 ± 0.8 (196)	30.0 ± 2.2 (30)	0.2	ns
Births 5 to 6	30.5 ± 1.0 (130)	24.0 ± 2.2 (25)	7.6	0.007
Births 6 to 7	29.4 ± 1.4 (74)	21.0 ± 2.9 (17)	6.7	0.011
Births 7 to 8	31.2 ± 1.2 (48)	24.0 ± 2.3 (12)	7.8	0.007
Births 8 to 9	26.3 ± 1.7 (25)	22.9 ± 2.9 (8)	3.8	0.062

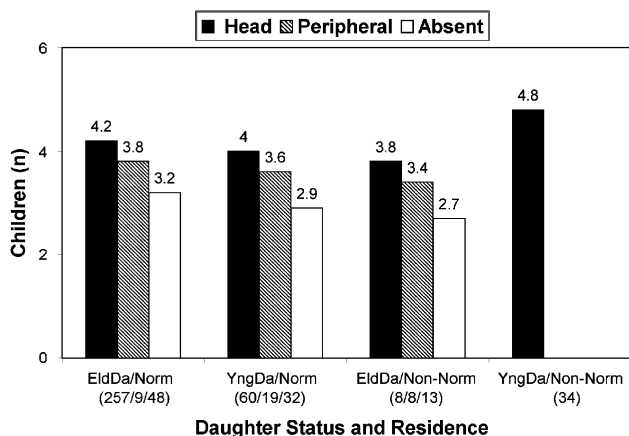


Figure 4. Mean number of children ever live-born, adjusted by woman's age, for 491 Khasi women aged < 50 yrs with living mothers, by household role of husband (Head, Peripheral, Absent), daughter status (EldDa = elder; YngDa = youngest), and residence (Norm = youngest daughter residing with mother or elder daughter not residing with the mother; Non-Norm = youngest daughter not residing with mother or elder daughter residing with the mother). *N*'s for bars are in parentheses. Data for youngest nonnormative with peripheral or absent husbands not shown because cases are too few (< 3). General linear model predicting number of children (adjusted for woman's age): husband role, $F_{2,484} = 12.0$, $p < 0.001$; residence $F_{1,484} = 0.6$, ns; daughter status, $F_{1,484} = 2.9$, $p = 0.091$; residence \times daughter status, $F_{1,484} = 6.6$, $p = 0.010$.

$p < 0.001$). Although this result might suggest that this effect is simply due to the higher birth orders of these children, the analysis controlled for year of birth, woman's age at the birth, twin status, and birth order of the child. Thus, without the protective effect of the grandmother, having a father who is not the first husband of the mother carries considerable survival risk, regardless of the child's birth order. The mortality of children born to the first husband when their mother has had children by two or more husbands is not significantly higher than that of children from sibships all fathered by one husband, given the same control variables (2,390 children, 134 deaths: HR = 1.2, CI 0.7, 2.0, ns). The interval between the last birth in the first marriage and the first birth in the second marriage is over 3 years in 75% of remarriages, and this could provide considerable protection to the children of first husbands. The mean age (\pm SD) at the birth of the first child after remarriage is 27.8 ± 4.9 years ($n = 93$).

(CS2) As we see in figure 5, *b*, the negative effect on child survival of second husbands appears to be confined to those who are heads of households compared with the effect on child survival of first husbands who are household heads (HR = 1.7, CI 1.0, 2.6, $p = 0.05$). Men who are peripheral or absent, whether first or second husbands, appear to pose even less risk than men who are first-husband household heads. We can probably attribute this lower mortality risk to the grandmothers who are likely to be present in these cases

(as seen in table 2). We can also note that the children of youngest daughters who reside nonnormatively with husbands as household heads have experienced higher mortality than children of youngest daughters residing with the grandmother (HR = 2.3, CI 1.0, 5.1, $p = 0.038$).

Discussion

As we have seen in the Khasi data, there appears to be a basic in-law conflict between men seeking to pursue their reproductive success through fecundable women and mothers seeking the same thing through their daughters but also adopting a protective stance to prevent exploitation of and preserve the parental investment already made in their daughters and daughters' children. Thus, the husband is expected to be relatively more oriented to quantity, while the mother is expected to be relatively more oriented to quality (survival) than the husband, who may move on to a new wife. It seems that Khasi mothers may protect daughters from reproductive exploitation by men by (1) providing resource security from the matrilineage so that daughters are less tempted by men's offers, (2) monitoring their daughters' behaviors to encourage them to choose wisely, (3) demanding quality in men (e.g., labor/wages commitment) for sexual access to their daughters via intimidation or other means, and (4) protecting daughters and their children in the event of underinvestment or desertion by husbands.

With respect to our hypotheses regarding marital behavior, we found evidence for the supportive influence of a living mother and the protections of coresidence with her, enjoyed disproportionately by youngest daughters but also by elder daughters in need. The provision of parental support in the case of a failed marriage is not uncommon. A runaway Kipsigis bride finds help in her natal home (Borgerhoff Mulder 1988). Among the Kel Tamasheq a divorced woman is welcomed back by her family with a feast (Fulton and Randall 1988). In South India a daughter's divorce is considered a "disaster" but she is likely to be given help (Srinivas 1976, 142). Returning women may even be seen as sources of support for relatives (Burton 1990; Stack 1974). There is also related evidence that a secure natal environment is associated with delay in marriage (Belsky, Steinberg, and Draper 1991).

Effects of remarriage on child mortality are an area of concern regarding the value of stable marriages for reproductive success. Although the number of children born to women in second marriages when the grandmother was deceased is small, their relatively poor survivorship is striking even after controlling for birth order. What approach does a husband take in his reproductive agenda when he marries a previously married woman with children? Given the lower residual reproductive value of the woman and the costs of previously born children, is he more anxious about his chances for reproductive success? And, where he has headship, does he push for faster reproduction, resulting in a higher mortality rate of his own children? The shorter birth intervals shown for second marriages could lower offspring viability via maternal

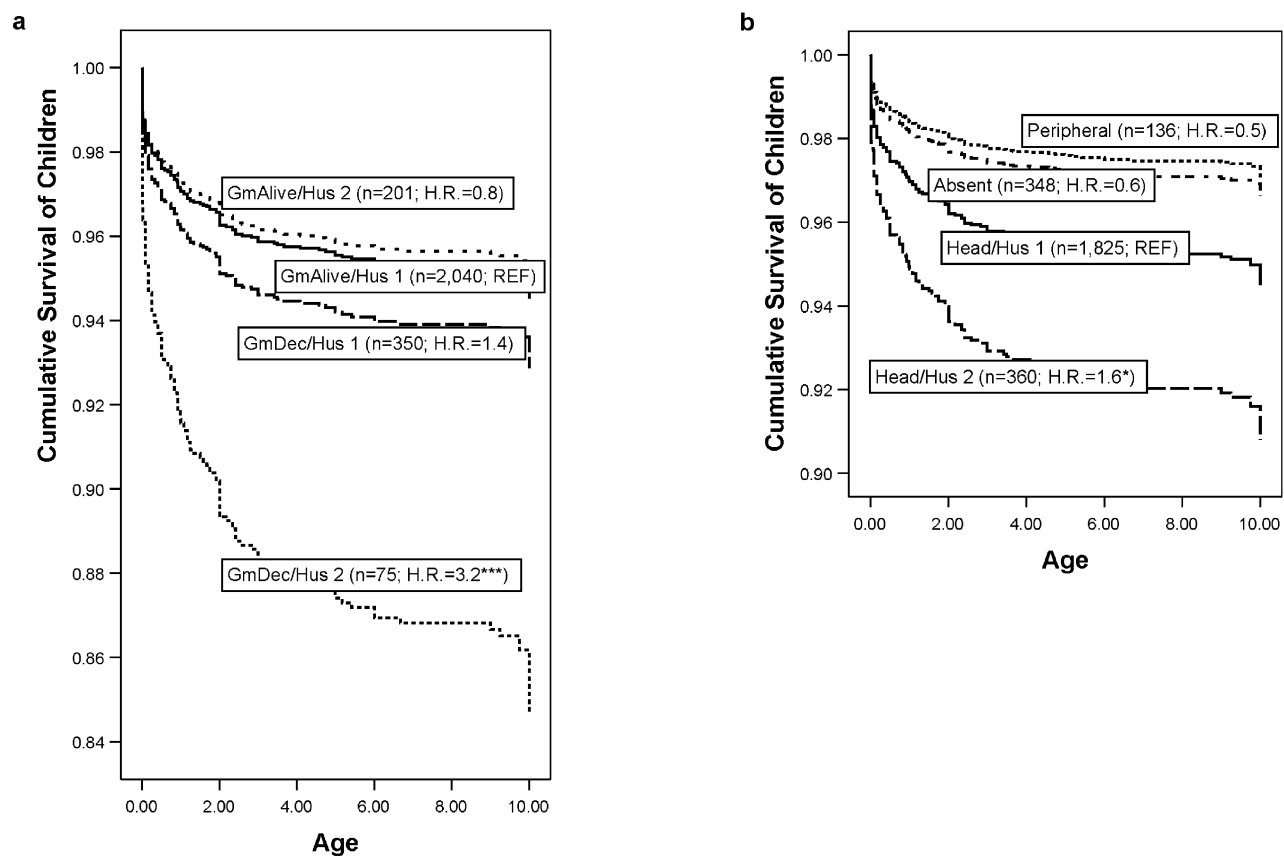


Figure 5. *a*, Child survivorship to age 10 years by living status of the grandmother at the time of the birth and order of the husband who fathered the child and *b*, current husband's household role and his order if head for 2,666 children (156 deaths) born to 650 Khasi women aged 50 or under, adjusted for birth order, age of mother at birth, year of birth, and twin status. Hazard ratios (HR) with respect to the reference group (REF) are given after the *n* for each subgroup. Gm = grandmother; Dec = deceased; Hus 1 = first husband; Hus 2 = second+ husband; Head = head of household. * $p = 0.05$, *** $p < 0.001$.

depletion or other pathways that would lower resource availability to the offspring (Tracer 1996; Knodel and Hermalin 1984). Certainly where the grandmother is alive she has a protective effect on children born to second husbands. An alternative explanation for the higher offspring mortality is that second husbands, given that they are willing to accept this type of marital situation, may be of lower quality with fewer resources to offer. This argument, however, conflicts with the results of previous work showing that resource contributions of second husbands are at least as great as those of first husbands (Leonetti et al. 2004). The lack of a negative effect of a second husband on the survival of the children of the first husband suggests that the risks to stepchildren found by Daly and Wilson (1988) may not apply where there is protection from matrilineal resources.

Residence of youngest daughters apart from their mothers,

where they otherwise would be expected to live, is associated with short stature. The husbands of these women are also usually heads of their households. Such a youngest daughter, perhaps in view of her short stature, may be more submissive to and dependent on her husband and willing to follow him to live separately from her mother. Elder daughters' seeking coresidence with the mother is, conversely, significantly associated with tallness and absent or peripheral husbands. The former women also have high fertility while the latter have low fertility. One explanation for this result may be the ability of men to dominate the shorter women and impose on them their own more intense reproductive agenda, an action that would favor the preservation of sexual dimorphism, as Smuts and Smuts (1993) have pointed out. Alternatively, shortness in women could be associated with earlier menarche (Onland-Maret et al. 2005), leading to earlier and, therefore, higher

fertility among shorter women. Among Khasi, however, age at first birth is not related to woman's height and therefore cannot be the reason for higher fertility among shorter women. At the same time, the apparent avoidance of husband domination by taller women with their mothers' assistance is consistent with female resistance to male mating tactics. As noted in Leonetti et al. (2004), taller Khasi women are also more likely to run businesses or otherwise be economically resourceful. Having experienced greater parental investment and currently greater economic activity, they may have a greater desire for fewer and higher-quality children than shorter women. Female resistance is expected to develop as part of the antagonistic coevolution of male versus female mating strategies (Clutton-Brock and Parker 1995; Holland and Rice 1998). The costs in reproductive success of such resistance in this case, however, appear to be high, as shorter women have more children if they accept male household headship.

With low sexual dimorphism in the population, taller women would also be in a better position to resist male domination. No height and weight data on adult men were collected, but children less than 7 years of age had a mean weight-for-age z -score of -1.60 ± 0.04 , with no male advantage (Leonetti et al. 2005). Although these growth data indicate deficits below the World Health Organization standard, the expectation would be that adult men would not have any distinct size advantage over women as a result of biased early care. Thus, we would expect minimal adult sexual dimorphism in this population. Judging from the work of Holden and Mace (1999), this expectation would also fit with Khasi women's important contributions to subsistence.

The protective response of grandmothers, reflected even by Hrdy's (1999) langur grandmothers, points to a trajectory of selection for a longer postreproductive life span. The hominoid reproductive pattern in its evolutionary path led to fewer and fewer offspring's being produced at greater and greater maternal cost (Charnov and Berrigan 1993). Given this slow reproductive tempo, the added value to grandmothers' reproductive success of protecting their investment in daughters and grandchildren could have been very significant for our hominid ancestors and a stimulus for its initial selection. The potential for material aid to daughters and grandchildren via food sharing by the grandmother has been recognized (Hawkes, O'Connell, and Blurton Jones 1997) and, of course, is implicit in our Khasi data on coresidence with the grandmother and previously reported positive effects of grandmother work effort on Khasi child growth (Leonetti et al. 2005). Once grandmothers in the remote past took this protective step of investment, however, they may also have had more reason to monitor the relationships between daughters and their mates. With grandmother contributions to provisioning of offspring, lactational amenorrhea would be reduced and reproductive opportunities for males increased. The risk that males represented to their daughters and grandchildren with increased mating activity could have

been considerable. Direct male mating coercion would have threatened the welfare and lives of women and their children. Simply more pressure from males to divert maternal resources to new reproduction could also have increased the chances of child mortality due to birth spacing effects that led to maternal depletion (Tracer 1996; Knodel and Hermalin 1984) and possibly maternal death. With declining sexual dimorphism, grandmaternal challenges may have had a real deterrent effect on males. Older-generation females would also have some advantage in such challenges in terms of longer life experience in social interactions. Commonly commented upon in many societies is tension between a man and his mother-in-law. He may try to avoid her and presumably her pressure on him to be a better husband and provider to her daughter. Tensions between the woman's mother and her husband among the Khasi were often the subject of complaint among husbands.

Given the female-male friendships observed among cercopithecines, which are often protective of the female and her infant, it has been surmised that human males evolved their own at-times protective strategy toward females, a response that has been suggested to be foundational to pair bonding (Hrdy 1981; Smuts 1992; Hawkes 2004). The domestic violence common today must also have deep evolutionary roots (Daly and Wilson 1988), as sexual coercion is common among chimpanzees and orangutans (Goodall 1986; Mitani 1985). The association of short stature with dependency on husbands as household heads among the Khasi additionally provides some suggestive evidence for the hypothesis that pair bonding was originally based on the protection that males could provide (Hawkes 2004; Smuts 1992) but also speaks to the accompanying theme of coercion. The females most needy of protection and most vulnerable to coercion would be the smaller ones. Western men tend to find shorter women more attractive than taller women and to choose mates who are shorter than themselves (Shepperd and Strathman 1989; Gilles and Avis 1980), although Sear, Allal, and Mace (2004) found female height unrelated to marriage or divorce patterns in the Gambia. Larger females may also be more comfortable maintaining alliances with other females (their mothers or other relatives). Although greater height has been found to be associated with better reproductive output (e.g., better birth outcomes and greater viability of children [Sear, Allal, and Mace 2004; Witter, Caulfield, and Stoltzfus 1995; Moller and Lindmark 1997]), preferences of males for shorter females may undermine the advantages of females' being tall. Protective responses from both mother and mate are certainly possible, and both make sense from a life-history perspective in that protections from their mothers as females transitioned into reproductive life could be complemented by transition to male protectiveness as a pair bond was forged and male investment increased.

Khasi men can and usually do step up to full responsibility as household heads and provide resources and labor contributions that underwrite high fertility and better child growth

(Leonetti et al. 2004). Child survival, however, tends to be reduced with husband headship, especially that of second husbands. We also know that Khasi men often leave wives or contribute less than 100% of their income and labor and so their dependability is not complete. We also see that in the protective world of the mother's household, where intergenerational resources are available (Leonetti et al. 2005), men are limited in their roles and children survive better. Khasi mothers, however, are constrained by aging processes as well as having multiple daughters to protect. They respond where needed, especially where marriages have failed. Blurton Jones, Hawkes, and O'Connell (2005) see evidence among the Hadza of mothers' replacing the help of missing husbands. In the American black underclass, maternal grandmothers have shouldered a heavy load of caring for their daughters' children when these daughters do not marry the child's father or he fails to provide support (Burton 1990; Stack 1974). This pattern is also common in the Caribbean (Brody 1981).

Thus, as we have seen with the Khasi, the maternal grandmother's help may be associated with low fertility when she responds to need. The possibility also exists that variability among women in fecundity and maternal competence could alter mothers' and husbands' behavior, particularly as the woman's reproductive value diminishes with age. This aspect may be captured in our data on low fertility with divorce and no remarriage, as well as with coresidence with the mother. All of the women in our sample, however, show evidence of their basic fecundity in the fact that all have at least one live-born child. In addition, the associations of tallness in women with coresidence with the mother and husbands who are absent or peripheral would suggest higher fecundity (associated with tallness) in at least some of these women.

The lower fertility of Khasi youngest daughters who reside with their mothers could also be explained by the mothers' responsibilities, as leaders of their matrilineages, to their other members. Members may depend on them in various ways that shift resources away from their resident daughters' reproduction but for which they may be compensated via inclusive-fitness benefits. The needs of others may also discourage marital stability and headship roles for husbands of these daughters. This phenomenon has been observed by Stack (1974) among urban underclass black women in the U.S.A. In an extreme example of matrilineal household organization, the Moso of southwestern China follow a system of sexual union with visiting men who provide few or no economic contributions to the household. Economic security and presumably protection for women, along with "virtually unlimited reproductive autonomy," is provided by the matrilineage. Along with prolonged lactation, this system apparently leads to a low-fertility regime in this kin context (Shih and Jenike 2002, 22).

The maternal grandmother's motivations to support and protect could combine to show consistent reductions in grandchild mortality in her presence. These somewhat differing motivations, however, may lead to her association with

enhanced fertility in some cases. In other cases the protective grandmother response could associate her with low fertility, especially in the case of elder daughters who are divorced/not remarried. Thus the overall effect of the maternal grandmother on fertility may tend to be neutral or even negative (Mace and Sear 2005). A paternal grandmother, in contrast, may be more supportive of high fertility and less protective of the daughter-in-law and therefore more exploitative (Leonetti et al. 2005). Daughters-in-law who follow a tighter fertility schedule are likely to produce fewer viable offspring. Voland and Beise (2002) found that the presence of maternal grandmothers reduced mortality while that of paternal grandmothers *increased* mortality in a historical German population. Hill and Hurtado (1996) found no evidence of grandmother effects on reproductive success among the Ache, but they did not distinguish between maternal and paternal grandmothers. Ladhenpera et al. (2004), however, found positive associations of both types of grandmothers with fertility.

Data on Khasi paternal grandmothers' behavior with respect to their daughters-in-law were not collected. The idea of in-law conflict in theory, of course, applies in both directions, but the effects may differ. The cultural kinship constructions and living arrangements of lineage-based societies are likely to create emphasis on one side or the other as resource flow is directed by kinship ecologies. Among Khasi, matrilineage ideology, resource control, and responsibility for its members are likely to be barriers to the creation of a strong role for the paternal grandmother, whose attentions are likely to be oriented to her own matrilineage. No wealth is contributed from the husband's side to the marriage, and therefore she has no leverage through such resources. She also has less paternity certainty, particularly where, in the case of matrilocal residence, she does not gain any direct control over the reproductive woman's behavior. With the concept of in-law conflict it is clear that the agendas of the senior generation may vary with the gender and associated reproductive needs of their offspring and the pertinent kinship resource context.

The data appear to show a combination of higher fertility and lower survival when the husband is the household head. Although this outcome of a father-present strategy can be viewed as a straightforward consequence of short birth intervals, it also appears counter to predictions based on Draper and colleagues' work (Draper and Harpending 1982, 1988; Belsky, Steinberg, and Draper 1991) and that of Chisholm (1999) that father's presence will be a protective and supportive influence. Given this apparent contradiction, it is important to recognize that the Khasi resource base of land is matrilineally held. Fathers are not providing fundamental access to and security from resources. They do provide income from wages and a critical labor supply for extracting resources from the land, but this function allows interchangeability of men in households. Since inheritance is through the matrilineage, a father's motivation to keep fertility low because of the necessity of transmitting sufficient resources after his death to his children would be low in comparison with this

concern as seen among patrilineal groups (Borgerhoff Mulder 2000; Mace 1998). Since marital stability remains an advantage for most Khasi women, recognition of men as household heads when their commitment is high may provide a stabilizing effect without changing the fundamental control of the resource base or the logic of the system. The perspective of Western (and other) cultures in which men are in control and the source of resources may set up a logic and a psychocultural environment in which Draper and colleagues' predictions appear to hold. Blackwood (2005) has similarly found that among the Minangkabau in West Sumatra male domestic dominance is not viewed as essential. The alternate scenario provided by Draper and Harpending (1982) under which males are less necessary to the welfare of women and their children and pair bonds are less stable may better represent the basic logic of the Khasi system.

Perhaps the complexity of the possible avenues of senior-generation manipulation of the reproductive environments of their offspring grew so daunting in the past that it became a major stimulus for the evolution of institutional cultural solutions that simplify these avenues in the form of lineal kinship systems. Matrilineal kinship structures have, for example, been argued to be a form of daughter-biased inheritance (Holden, Sear, and Mace 2003), from grandparents to grandchildren, which makes sense in terms of the certainty of genetic relationship through daughters and the reproductive advantages suggested by direct help from maternal grandmothers (Hawkes et al. 1997; Gibson and Mace 2005; Leonetti et al. 2005) and protective services described above. Bonds among female relatives are well documented for recent societies and result in increased female interactions under conditions of perturbations in family systems brought about by immigration (Yanagisako 1977), economic uncertainty (Brody 1981; Stack 1974), or shifts in marital systems from polygyny to monogamy (Bledsoe and Isiugo-Abanihe 1989). When male property control developed, patrilineal systems may have become more useful as three-generational investment systems in the pursuit of reproductive success in that they could intensify resource control and impose reproductive schedules on females that further increased their rate of reproduction. Bridewealth and dowry provided by the senior generations probably arose in order to place offspring in marriages in patrilineal systems, but they need to be examined also for their effects on strategies of protection and coercion in pursuit of reproductive agendas by men (Takyi and Dodoo 2005). Ecological circumstances could shift the system in favor of the direction from which the most reproductive success could be gained, as is suggested by shifts from matrilineality to patrilineality among pastoralists (Holden and Mace 2003). Anthropologists have long studied marriage as an alliance between families and noted the elaborate systems whereby parents often search for and negotiate extensively for the best marital placement for their offspring (Borgerhoff Mulder 1988; Shenk 2004; Harrell 1997). Literature also elaborates on this theme (e.g., *A*

Suitable Boy by Vikram Seth or *Pride and Prejudice* by Jane Austen, wherein women's mothers are instrumental in placing daughters in male-dominated systems). This influence often does not cease with the marriage but may carry on through its reproductive years. The dreaded in-law themes in modern comedy are, of course, well known, and the demanding mother-in-law as viewed by both husbands and wives is notorious in many cultures. Continuing intergenerational investment may occur that is accompanied by manipulative interactions with the offspring's spouse to extract support from him or her in the service of the in-law's reproductive success.

We have dealt only with the interface of maternal grandmother and husband effects. Insight on maternal grandfather effects might have been valuable, although few direct effects on reproductive success by grandfathers have been found by others (Mace and Sear 2005). Previous marital experiences of husbands might also have provided more context with regard to other children they may have sired, although divorce appears to terminate a husband's responsibility to the matrilineage to which those children belong even though emotional bonds between father and children continue (Khongphai 1974).

More exploration is needed of what we are calling in-law conflict in differently structured societies (e.g., Borgerhoff Mulder 1988; Turke 1996; Voland and Beise 2005). If reproductive pursuits are viewed by more researchers as including in-laws, behavioral ecology approaches to the evolutionary comprehension of human reproductive behavior can more readily interface with the cultural systems that set up the ecologies of reproductive life. The nexus of in-law conflict may also have potential for generating theory on how kinship systems evolved. We need to recognize the interconnectedness of biological and cultural foundations of sexual and biological kin relationships, on the one hand, and marriage and cultural kinship constructions, on the other. These together channel behaviors via the basic differences in male and female biological costs of reproduction and the ecological framework created by kinship definitions of resource access and control by gender and generation and their associated ideologies.

Acknowledgments

Supported by the INDO-US Programme on Contraceptive and Reproductive Health Research sponsored by the Indian Ministry of Science and Technology and the U.S. National Institute for Child Health and Development, Family Health International, the Andrew W. Mellon Foundation, and the Center for Studies in Demography and Ecology, University of Washington. The cooperation of the Khasi participants is deeply appreciated. The assistance of Dawn Neill and useful comments and suggestions from Mary Shenk, Robert Quinlan, David Nolin, Banrida Langstieh, and several anonymous reviewers are gratefully acknowledged.

Comments

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This article looks at maternal grandmothers and husbands in a matrilineal society to understand their relative effect on women's reproductive success. What I would like to offer here, as a cultural anthropologist who has done research on matrilineal societies and is not at all convinced by evolutionary anthropology models, is encouragement to rethink these models in light of current critiques of kinship theory.

Transferring models of reproductive success to studies of matrilineal societies seems to me problematic. The primary assumption driving this research is that husbands have reproductive agendas that conflict with those of their wives. In addition, Leonetti and colleagues assume that stable marital unions are more beneficial to reproductive success, echoing nothing less than the Western model of marital stability based on a male-headed nuclear family. Although they appear to take cultural factors into account in their analysis of Khasi mothers and daughters, they do not explain why a "husband is likely to want more investment in reproduction from the woman than she may be willing to contribute." The usual factors found in patrilineal societies do not hold here. Men are not gaining heirs, status, or other benefits through marriage and reproduction; women are. Women are bearing children for their own matrilineages and are very keen to ensure that they have female heirs. Husbands' investments, if any, may be directed to their sisters' offspring and their natal groups rather than to the children of their wives. Men do invest some care in their offspring, but given that investment it would seem to be in their interest to have fewer offspring, thus reducing the level of care required. Claiming that men have a reproductive agenda for more children relies on biological models that fly in the face of kinship practices in this context.

Leonetti et al. also assume the importance of husbands to households and therefore seek to understand why husbands are present or not, postulating conflict between mothers and sons-in-law. The assumption that husbands should be present and inclined to be heads of households echoes outmoded kinship theories that assumed that men in matrilineal societies would want to be heads of households and to have rights in their "own" children. This assumption in effect makes patriliney the norm and matriliney a troublesome deviation. The norms of Khasi society support a different type of husband. The importance of the matrilineal unit and women's ability to inherit land and wealth mean that where such resources are available women do not need to be dependent on hus-

bands or look to husbands for their support. Husbands are important in bringing in additional resources, but marital stability and a husband in this case are not critical. It is problematic to assume that men will by nature seek to take charge or that mothers-in-law therefore work to keep men peripheral. Cultural anthropology has provided a telling critique of kinship theory's assumptions in that regard (see Blackwood 2005 and McKinnon 2001).

The designation "head of household" is generally inappropriate in households that are owned and run by women and may only be a political necessity—prompted by state expectations about who should be head (the husband) rather than based on the actuality of who is head in a matrilineal unit. Leonetti et al. do not address how they identified the "head of household," and a serious bias results from their having asked only what percentage of their income husbands contributed to their wives' households. After all, a man could make very little money and contribute all of it to his wife's household, but that would certainly not make him head or give him much power.

This case study could have been used to challenge older theories about men's reproductive agendas if the authors had prioritized the matrilineal unit of mother, daughter, and offspring and their reproductive interests to see where that would lead them. In this case mother's and daughter's interests are closely aligned, but some interesting differences appear across sibling sets. The question of the effects of "grandmother support" is an important one but is captured neither in the concept of "in-law conflict" nor in the researchers' assumptions about marriage. I am further troubled by the asymmetry of the kin categories (grandmother and husband) used in this article, because it obscures the actual position of "mother." Apropos of future research, an examination of women's reproduction, particularly in matrilineal societies, that takes into account not just grandmothers and husbands but the wider kin network of siblings, etc., would be welcome.

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Anthropologists who have taught and theorized about matrilineal kinship and the matrilineal puzzle should have a good time reading this paper. The classic literature on the matrilineal puzzle is usually couched in terms of the men's perspective: How does the husband balance the simultaneous claims of his matrikin versus those of his wife, her children, and her kin (Aberle 1961; Douglas 1969; Gough 1962; Greene 1980; Schneider 1961)? Here we gain a different insight, this one focused primarily on the adult woman, her children, and her mother (the grandmother). With women foregrounded, the demographic data reveal, in the concrete terms of female

fertility and child survivorship, the consequences of the trade-offs which women as well as men confront in a matrilineal social system.

The Khasi, whose kinship and residential and reproductive histories are analyzed here, are excellent grist for the mill of research on the dynamics of matrilineal social organization. A finely differentiated analysis is possible because there are data on hundreds of women, not to mention thousands of children, who have had different marital histories, different histories of living with their own mothers, living near their mothers but not in their mother's houses, and living virilocally with their husbands and not close to their mothers. The general finding is that the presence of a woman's mother in this matrilineal cultural context creates a protective effect for children, whose survivorship is enhanced. Further, the women whose mothers live with them are older at first birth than women whose mothers are dead or live elsewhere. The clear implication is that in societies structured in this way, mothers (and presumably additional matrikin) are resources that compete with those that husbands have to offer. Especially valuable are the findings regarding the fertility of women who live with their husbands, among whom fertility is higher but survivorship of children is less than for children whose grandmothers live with them. This effect is especially marked for youngest daughters. These and other findings speak directly to issues of conflict between the sexes over reproductive rights. This topic has received increased attention in recent years now that good demographic data on geographically and culturally distinct populations have become available.

This paper provides a kind of empirical mortar for the conceptual building blocks we usually must content ourselves with when we construct models of matrilineal kinship and social organization. We can pile up our blocks and provide plausible interpretations of how people live in structures constituted of such materials. However, without data such as are provided here, we cannot "know" that the system produces the consequences we imagine. Leonetti and colleagues are to be congratulated for providing a richly documented account of how people behave and what factors their strategies must encompass given the specific familial and cultural context in which they live.

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19 VII 07

Intergenerational family relationships are the subject matter of various disciplines, and a look over the fence is a must for any student of this topic. A look into the garden of North American and British anthropology makes me envious. My own garden is largely devoid of beds cultivated with the comparative method because of the dominance of the Wundtian tradition of experimental methodology, and the neighboring

German anthropological garden is small because of the loss of ground due to its Third Reich entanglement in typology and race studies (Euler and Voland 2001). The ethological garden is nice but small as well, with the result that materials for comparison are most often not there. The sociological garden is large and well kept, but in the areas of family relationships such as grandparental care or intergenerational relations, distinctions of sex and lineage are often missing because of either neglect or political correctness, as if the four grandparents were a homogeneous quartet of similar cards. The garden of Anglo-American anthropology, however, bears the nicest fruit, cultivated mostly by women. The fruit is not that of quick questionnaire convenience samples of freshman students but that of samples far away and hard to get at. Leonetti and her coauthors present data from a good-sized sample of individually interviewed Khasi participants.

The theoretical starting point of the article is well chosen: a three-generational look at parental investment. Sexual conflict, based on sex-specific reproductive strategies, thus becomes intergenerational conflict, including in-law conflict, with the mother-in-law/daughter-in-law conflict as the most intense, at least in the data from our Western convenience samples (Euler, Hoier, and Rohde n.d.; Euler and Michalski n.d.). Data on the paternal mother are unfortunately not included in the Leonetti et al. study but would have been of particular interest in this matrilineal and matrilocal tribal group.

The central finding of protection of the reproductive woman by her mother and reproductive exploitation by her husband and presumably his family ties in well with other findings (e.g., Mace and Sear 2005), even down to the genetic level, where maternally imprinted genes may inhibit and paternally imprinted genes stimulate fetal growth (Burt and Trivers 2006). A surprise is the finding that a Khasi woman's second husband poses no survival risk to the children of the first, contrary to the data of Daly and Wilson (1988, but cf. Temrin, Buchmayer, and Enquist 2000), which demonstrated the disturbingly large risk of growing up in a step-family. A matrilineal and matrilocal society, with its kin protection, is different from our neolocal societies, in which a woman and her child may more often be at the mercy of the husband/father. This is a truism for an anthropologist but not necessarily for an ethnocentric psychologist with little comparative sensitivity. With our rising divorce rates and child custody typically given to the mother, men may be increasingly marginalized from the family, which in turn strengthens matrilineal ties. Therefore it might be wise, even for public policy makers, to study the anthropology of the Khasi and similar matrilocal cultures.

No garden is free of weeds if it has light and water. There are some weeds in this discussion according to my norms of gardening—too many post hoc and ad hoc speculations, which bewilder rather than clarify. A good gardener needs a sharp knife and a cold heart to prune properly.

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Leonetti et al. present a significant and interesting paper combining theory from evolutionary ecology with anthropological and demographic data to explore conflict arising between Khasi mothers and husbands who compete to manipulate women's reproductive lives. Their paper represents a significant advance over other studies of grandmother investment by exploring the contingency of this support within one matrilineal population. The findings are consistent with the notion of maternal grandmothers' playing an important protective and supportive role; in addition, Khasi mothers closely monitor their daughters' marital and reproductive careers, adjusting their level of support where necessary.

While the paper clearly demonstrates conflicting sex-specific reproductive strategies in humans, it does leave some unanswered questions about mechanisms. It would be interesting to know if the negative effect of husband status on child survival is mediated by male quality (e.g., labor contributions, social status). The authors do cite previous studies which show that second husbands contribute materially as much as first husbands; however, the mortality data presented for the Khasi suggest that there are real costs in terms of child survival. This may suggest that second husbands are unable to provide the same level of care as first husbands.

This paper raises a range of additional evolutionary questions relating to parental investment that may merit further investigation. It would be interesting to determine the level of competition between female siblings in the household, given that same-sex conflict influences the reproductive success of males in patrilineal societies. Assuming that only one daughter inherits and benefits from extra maternal support following marriage, both the number and the order of same-sex siblings may affect female reproductive success. Furthermore, the authors indicate that there are no sex biases in child growth. Does that vary across households? Given that there are such strong bonds between female relatives in matrifocal households, sons may do better in households where married daughters move away from the matrilineage.

The significance of this paper lies in its exploration of universal themes such as the tension between a man and his mother-in-law while identifying a range of strategies of paternal and grandmaternal behaviour which are dependent on a woman's reproductive value. Importantly, the authors are also able to place their findings in a wider evolutionary context, providing a thoughtful discussion of how studies of human kin investment contribute to an understanding of our evolutionary past. Their work shows how evolutionary anthropologists continue to help us to understand our present.

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Leonetti and colleagues' extension of ideas about sexual conflict to in-laws is a welcome experiment with powerful tools. They expand the concept of parental effort to include investments in more distant kin: grandmothers enhancing women's fitness by protecting preferences for fewer, healthier children, husbands spending less on their wives' children and more on their sisters' instead. However kin effort is directed and divided, sexual conflict models also assume that the total available is limited by competing allocations to mating. What if, in addition to the aspects of kin allocation that Leonetti and colleagues report, we also knew more about mating effort?

The idea that selection can favor allocations to mating instead of parenting comes from Darwin's theory of sexual selection. Whenever it requires one mother and one father to generate an offspring and sex ratios are equal, average reproductive success must be the same for males and females. If one sex has a faster potential reproductive rate, members of that sex will be in competition with each other for mating opportunities that depend on the slower sex. Males usually have faster potential reproductive rates. In the consequent competition, any male who has more offspring than the average female pushes other males below the female average. This fundamental asymmetry makes mating competition especially important for male fitness (Andersson 1994).

Leonetti et al. cite uses of this theoretical framework to explain sexual "divisions of labor" among hunter-gatherers. A man's hunting often provides more meat for others and less for his own wife and children than would alternative foraging options. The fitness rewards for the men themselves may come from hunting reputations that contribute to their mating success. From a woman's point of view, she and her children get less nutritional assistance from her husband than if he allocated more to parenting, but she also gets more from other men than if those men devoted more effort to their own families (Hawkes 1990). Mating competition supplies public goods (Hawkes 1993, 2001), so mothers and children benefit not only from husband/father's parenting effort (even if meager) but even more from the mating effort of all men (Hawkes and Bliege Bird 2002).

What of the Khasi? According to Nakane (1967), a man marrying a youngest daughter (heiress) could not head his wife's familial household, where authority belonged to her brother (or other male uterine relative). Husbands could head only new households established by elder daughters who could not inherit. Leonetti and colleagues found exceptions to these arrangements, but they indicate that the allegiances described by Nakane persist. A man who holds authority in his natal household and also establishes a household with his wife says "one leg is in my sister's household, and one is in my wife's," and he feels more at home in his sister's" (Nakane

1967, 143). Leonetti and colleagues categorize as in-law conflict the tensions between brothers-in-law and husbands that are widely found with matrilineal institutions (Schneider and Gough 1961).

What about mating effort? Nakane (1967, 133) reported that while women engage in trading activities at markets, “these activities on the part of women are controlled and accounted for by her uncle or brother, or even son (or, if no male member is available, by the husband), though in many cases they form separate domestic families. The man’s control over the trade appears more marked when the scale of business is large.” A man’s success at building a business may aid his kin but also increase the standing among men that affects his mating success. Distinctions between mating and parenting can be tricky (Hawkes 2004). With divorce common, a man may gain by mate guarding or attention to business may improve his chances of acquiring another wife.

A man’s social position may depend especially on activities that occur elsewhere, competing with kin effort at home. Traditionally Khasi men were obliged to protect the clan by military service. “Moreover the government administration and state representation in the Indian Union is solely the responsibility of Khasi men, who hold most political positions, as mayors, priests, village heads or campaign managers, to name a few” (Stirn and van Hamm 2000, 155). These positions may involve activities that, like hunting, also supply public goods: community defense, social order, and resource flows that affect the welfare of women and their children whether or not those women are wives or sisters of the suppliers.

Grandmothers face more transparent trade-offs in choosing which daughters or grandchildren to assist (Blurton Jones, Hawkes, and O’Connell 2005). They might, however, give less effort to daughters while assisting the social advance of sons. A successful man is always a fitness credit to his mother. Intergenerational agendas highlighted by Leonetti and colleagues make human reproductive allocations complicated, but additional explanatory power might come from attention to mating competition.

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By placing “in-law conflict” at the center of their analysis of reproduction among Khasi women, Leonetti et al. have generated novel and unexpected results. One of the most interesting of these is the depressive effect of mothers on the fertility of their daughters that shows up when they are residents of their daughters’ households (table 3). The researchers argue that the presence of their mothers may help women to resist the high-fertility agenda of husbands in favor of a

more moderate pace of reproduction that better preserves maternal health and future reproductive capacity and reduces child mortality.

One of the questions raised by this finding is how this effect is accomplished. Leonetti et al. show that the presence of a woman’s mother increases age at first birth by about one year (table 1), accounting for some of the fertility reduction. Might there be other proximate mechanisms through which day-to-day maternal support for adult daughters reduces fertility? Family-planning prevalence is low and of little significance for fertility, so it is unlikely that reduced fertility is achieved via greater support for active family planning. In addition, Khasi women’s physical workload is high and nutritional status sometimes poor (Leonetti et al. 2005), suggesting that the presence of a working mother might increase fecundability through enhanced access to resources rather than reduce it. As Leonetti et al. note in a discussion of hominin reproduction more generally, “with grandmother contributions to provisioning of offspring, lactational amenorrhea would be reduced and reproductive opportunities for males increased.” However, when seen through the lens of the in-law-conflict model, the linkage between grandmother effects, lactational amenorrhea, and male reproductive interests suggests another form of interaction.

Because the reduction of lactational amenorrhea, by promoting male reproductive agendas, potentially threatens child survivorship and risks maternal depletion, the in-law-conflict model predicts that women’s mothers will favor longer periods of lactational amenorrhea than husbands, even in the context of the potentially shortening effect of their contributions to provisioning offspring. Though lengthening lactational amenorrhea by withholding provisioning would not be fitness-promoting for mothers, supporting their daughters’ choices to breastfeed longer and more intensively relative to husbands’ preferences might be so. Humans are unique among primates in the flexibility of weaning age and in the use of complementary foods, setting up the possibility for adaptive lactational responses to variable social as well as nutritional environments (Sellen 2007). The psychosocial support and labor contribution of her mother might enable a woman to breastfeed longer and more intensively, to delay the introduction of complementary foods, and to limit the use of complementary foods in favor of increased breastfeeding when indicated by the changing needs of individual infants. This could have the effect of strengthening and prolonging lactational amenorrhea and slowing the pace of reproduction (as well as reducing child mortality).

Further investigation of infant feeding practices in relation to grandmother presence and fertility may be indicated. By focusing on the conflict of interest between husbands and women’s mothers, Leonetti et al. have raised new questions in human reproductive ecology that will have cross-cultural relevance.

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This paper is an important contribution to the biocultural and evolutionary study of in-law conflict with the respect to marital and reproductive behavior among the Khasi of North-east India. However, the Khasi population is not homogeneous from either the biological or the sociocultural point of view (Gurdon 1907; Das 1978), and therefore it is difficult to draw any conclusions without taking into account the variation within it. The population consists of several groups and subgroups with various shades of difference. Although Leonetti and colleagues mention having excluded the War Khasi from their sample, it is unclear whether their sample included the Bhoi, Lyngngam, and Pnar Khasi. I presume that the sample villages were drawn from the Khyrniam or Khasi proper, and I will use "Khasi" to refer to this group.

The status of a man in Khasi society is by custom high in both natal and marital homes. He exercises a dual function as a maternal uncle to his natal kin and a father to his marital family (Bareh 1974; Mawrie 1981). Leonetti and colleagues are right in saying that the Khasi maternal uncle is manager and counselor to his natal kin, especially in the matter of ancestral property. Therefore, the youngest daughter is simply the custodian of the ancestral property. The role of maternal uncle has, however, weakened in contemporary Khasi society because of the impact of Christianity and modernization, and a man enjoys higher status in his marital home as the main supporter and decision maker (Bareh 1974). In most marriages to elder daughters, the husband is the head of the household and makes all the important decisions and plans. The assertion that the status of the husband in the Khasi family is "always contingent upon his contributions to the household" is more pertinent to Pnar custom, despite considerable changes in Pnar society. Who is the main source of property in the Khasi family, especially in the marital family of an elder daughter? One should not overlook the importance of self-acquired property that has become ancestral property. The reproductive performances of women with husbands as household heads might become clearer if appropriate allowances were made for variation in socioeconomic status.

Leonetti and colleagues found that age at first birth was higher in women with living mothers and those residing with them. All daughters are supposed to live with their mothers before marriage. If the mother's effect on age at first birth is linked to her effect on age at first marriage, this effect cannot be ignored if she dies after the daughter's first marriage. The mother's effect on the age at first birth is also dubious because the individual socioeconomic status of the woman, including her education, may be a significant covariate. The effect of a woman's mother on marital behavior could be better ex-

plained if the age at first marriage and socioeconomic status of the woman were included in the analysis. Another interesting finding is the higher prevalence of divorce where the mother is coresident, possibly because of conflict between husband and his mother-in-law. I do not, however, get a sense of the role of Khasi mothers and/or fathers in influencing their daughters' marital choices and stability. Of course, the causes of divorce among the Khasi are much more than what the paper has highlighted.

While confirming the "grandmother hypothesis" with regard to child survival, Leonetti and colleagues have left out the role of elder (adolescent) sisters, particularly eldest sisters, in providing food and care to their younger siblings. In addition, the grandmother's contribution to child survival is expected to be associated with a shortening of birth interval or lactational amenorrhea, but the data on fertility behavior do not support this contention. If appropriate allowances are made for confounding factors, the effect of the grandmother on fertility would be theoretically expected to operate through some (if not all) of the "proximate determinants" suggested by Bongaarts (1978, 1982). Although the Khasi data suggest the grandmother's effect on fertility, the pathways for this effect are highly subjective.

In conclusion, this paper is likely to generate various research questions. It is, therefore, a commendable contribution to the biocultural and evolutionary study of sexual conflict. It presents several hypotheses that should stimulate future research on the reproductive, sociocultural, and nutritional aspects of in-law conflict. Leonetti and colleagues deserve to be congratulated on expanding the scope of research on sexual conflict with regard to the complexity of the differential reproduction through which natural selection operates on human populations.

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Building on the idea of the conflict of interest between female and male reproductive agendas, Leonetti et al. introduce in-law conflict as a framework for observing the differential effects of Khasi women's husbands and mothers on their reproductive careers. The underlying anthropological problem that they are concerned with is the cost of human reproduction. Because children's ability to support themselves falls below their consumption, in all human societies children are subsidized by others throughout much of their growth and development. However, because infants, young children, and older children require different kinds of time and energy investment, mothers are often unable to meet the needs of multiple dependents alone. Since Turke's (1988) seminal study introduced the idea of cooperative breeding into anthropol-

ogy, attention has centered on the importance of grandmothers (Hawkes et al. 1989, 1997), male parental investment (Kaplan et al. 2000; Lancaster et al. 2000), and older siblings (Hrdy 1999; Kramer 2005*a, b*) in helping to support dependent young. The help of fathers and that of grandmothers are often construed and analyzed as disparate alternatives. Leonetti et al.'s approach and important contribution is to direct their research toward "the interface of these two sources of potential help."

Although the issue of who supports human young has been visited many times, this article is a step toward viewing father and grandmother support as interdependent. It illustrates the complex kin dynamics that need to be accounted for to unravel the effects of multigenerational help on a woman's reproductive career. The authors convincingly demonstrate that the residential statuses of her mother and her husband is associated with a woman's marital behavior (patterns of divorce, remarriage, and age at marriage), her fertility, and child mortality experience.

Several compelling correlations that surface from the Khasi analyses direct attention toward considerations that may provide further insight into the ongoing debate over the role of fathers and grandmothers. A number of recent studies have shown that the presence of grandmothers is correlated with child survival (Jamison et al. 2002; Volland and Beise 2002). However, in the absence of behavioral data, it is unknown whether it is their help, social status, or some other form of support that is related to the probability of child survival. Supporting time allocation, economic data, or other behavioral data are critical to make this causal link and to develop a comprehensive explanation of why and how nonmaternal kin help subsidize the cost of children.

The impact of Khasi fathers and grandmothers on maternal reproduction is determined by their presence and status in the household. Because levels of male, female, and child production and consumption vary tremendously cross-culturally and individually, the question remains whether the effect of fathers or grandmothers can be made by demographic stipulation. The extent to which these demographic data are an adequate proxy for the flow of resources, allocare, and protection is a topic for future research.

The payoff to nonmaternal kin for providing help, which is what needs to be explained from a natural-selection point of view, is sensitive to ecology, the kinds of resources males and females provide, and changes as children grow and mature. Evidence from foragers suggests that postmarital locality is flexible seasonally and interannually in response to children's age distribution. For example, when children are young or during times of year when resource dependence is foraging-based, they may benefit from matrilineal residence. When children are older or during other times of the year, access to resources, territories, or marriage alliances may be facilitated through patrilineal kin. Irrespective of subsistence ecology, we may suspect that the payoff to fathers and grandmothers for

supporting children will vary as the kinds of investment that children benefit from change.

The article succinctly outlines several potential sources of conflict and cooperation among women and their husbands and mothers. If males and females are assumed to have inherently different perspectives on the quality/quantity trade-off, the nature of their interaction will be agonistic. Recent research suggests that some of our ideas about sexual selection may benefit from expanding the simple dichotomy of male/female reproductive agendas and ways of describing the complexity of male/female interactions. The data presented in this article are a good example that outcomes are not always straightforward; in the Khasi case, the interests of fathers and grandmothers appear to have opposing effects on fertility and mortality.

Allomaternal care is an important human reproductive strategy for both buffering child mortality and underwriting fertility. The article suggests that we are perhaps at a crossroads in the discussion of the roles of fathers and grandmothers and need to consider that allomaternal strategies are ecologically variable, conditioned by the survivorship of older adults, the age distribution of surviving children, and the fitness advantage of different kinds of investment.

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Leonetti and colleagues provide interesting insights from human behavioral ecology in the case of the matrilineal Khasis of Meghalaya. I am no expert in human behavioral ecology, but I hope to offer an insider's view of the traditions and customs that we follow to this day.

I am a little skeptical about the term "in-law conflict," which has a negative connotation. Is this conflict general, or is it specific to these research findings and/or to exceptional cases? From a broader perspective on Khasi culture, the positive is always welcomed, particularly when it comes to the birth of a child, when the husband's "reproductive agenda" is supported even by the woman's mother.

I have reservations about the use of the term "husband's reproductive agenda," because what we normally understand by "agenda" is something of a pre-planned activity. "Husband's motive" might be more appropriate.

Among Khasis the concept of increasing one's tribe or one's clan is the pride of most mothers and therefore no hindrance to the greater productivity of daughters. As the old adage has it, that every newborn child is a blessing from God.

In the rural context, a woman is more than willing to invest in reproduction not for her husband but for her matrilineage. Despite the government's population policies, family planning practices in this part of India have failed. They tend to be

confined to a select few who reside in cities—working mothers or career women with individual pursuits.

Matrilineal (land) resources are only a standby, a familial security deposit in case of need.

A woman whose mother is deceased may be at a disadvantage not in negotiations for resources from her husband but because she lacks parental guidance and care, especially physical support. The protective stance of the mother cannot be denied, though in her absence the role of the maternal uncle is activated. He is the guardian and manager who is more than willing to serve when the family's ancestral property is at stake and is the one consulted in crises.

Deciphering “in-law conflict” or “sexual conflict” is complex, and no straightforward answers can be expected. Human nature has its own individual, group, community, and/or ethnic ideologies, which are of course a reflection of varied cultures. The traditional rites, beliefs, and practices of the Khasi are well structured to promote the reproductive agendas of men and women.

Kinship terminologies include reference to “in-laws” as “propagators” respected by the individual and the clan. A maternal grandmother (*meiieid*) is referred to with love; a paternal grandmother (*meikha*) is revered from the initiation rites for a newborn (*ka nguh meikha*) until long beyond adulthood.

The “reproductive agenda” of the husband may be “positive” if his motives are self-centered in reflecting an interest in the welfare of his own children—when he is the head of the household and has complete power and authority that is “self-acquired.” On the contrary, the role of the peripheral husband may reflect more “negative” agendas and selfish motives, investing more in reproduction only.

Hypothesis MB4 is peculiar because both Khasi men and women are short (males ~156.66 cm, females ~147.15 cm). Whether the stature of a woman can be taken as a crude indicator of possible submissiveness or dependence is questionable. What about other indicators such as economic status, health status, and psycho-social fitness? Finally, it may be interesting for the researchers to know that the matrilineal system amongst Khasis has been a question of debate, and in some sections of the society switching to a patrilineal/patriarchal system is being tested. The Syngkhong Rympei Thymmai is one group that is pursuing the interests of Khasi men in this matrilineal society.

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In-law conflict in South Asian culture is almost always analyzed in patrilineal systems, where a bride's relationship with her mother-in-law is often characterized by intense social pressure to shape her behavior to her affines' expectations,

overt criticism of subfecundity, and elaborate machinations to maximize the production of grandsons. The bride's consanguineal kin may look on with dismay but are usually incapable of mitigating the impacts on her of this family system. Leonetti, Nath, and Hemam make an excellent contribution to these analyses by studying the impact of coresidence of the bride's mother in the matrilineal system of the Khasi in Northeast India, a fascinating departure from the standard fare of in-law-conflict analyses and one that highlights the roles open to mothers and grandmothers in this society.

The primary mother and grandmother roles that are explored by Leonetti et al. include protection of daughters from the desire of men to overtax their reproductive capacity and the protection of grandchildren from mortality via an increased household resource base and strengthened kin network. It would be interesting to learn more about the inheritance system and postmarital residence patterns practiced by the women in these households. In the patrilineal polyandrous households from northwestern Nepal whose marital histories I have analyzed, there is no question that birth order, inheritance, marital trajectory, and fertility of a man are linked. Largely because of the system of (male) primogeniture practiced in this area, higher-birth-order men had much more varied marital histories than firstborns, and their reproductive success was negatively impacted by decisions compelling them to separate from their natal households and co-husbands. Their second wives were “lower-quality” on a variety of measures and suffered most obviously from their sheer distance on average from their female kin, especially when compared with the first wives of their formerly polyandrous husbands. Leonetti et al. also mention negative impacts on noninheritors, such as lowered reproductive success, but they report that noninheriting daughters often set up housekeeping directly adjacent to the households of their mothers and may reside with them postmaritally until the marriage of the youngest. It would be instructive to learn in more detail about the protective function of the mother whether the woman was the formal heiress or not. Does the sheer proximity of a household to the mother play a role whether the daughter inherits or not, since proximity gives her some measure of influence over the intrahousehold affairs of any closely residing daughter? Or is the critical feature impacting both reproductive success and survivorship of children actually household socioeconomic status and “inheritance status” simply a proxy for the latter?

Leonetti et al. mention that a limitation of the study is that data on grandfathers are missing. I would like to understand the ethnographic context for men's joining the matrilineal households described in this paper even in the absence of quantitative data. In the patrilineal polyandrous households I studied, a man whose postmarital residence was uxorilocal (because he had married an heiress without brothers) was often thought of by community members as being “bossed” by his affines and even by his wife. Although as the spouse of the heiress to an entire estate he commanded more re-

sources on average than he might have had he stayed at home with his brothers and shared wife, becoming a uxori-locally resident husband was widely regarded as emasculating. What is the ethnographic context for the man in a Khasi matrilineal household? What role does he play in the household, how is his behavior shaped by his affines, and what forms of resistance to the influence of his mother-in-law are open to him? Is the move into the household of a bride whose mother is coresident considered less desirable for a man than a move into the household of a bride whose mother resides elsewhere or is deceased? If men perceive a hierarchy relating to the desirability of certain affinal households, what kinds of men succeed in the competition for the most desirable ones? These are fascinating details that shed light on many important topics in anthropology, not the least of which is the evolutionary significance of grandmothers and the various ways in which human systems have evolved to take advantage of the post-reproductive life spans of women. Leonetti et al. have made important strides toward helping us understand these issues.

I would like to know more about the interaction of socio-economic status with current husband's household role, but the striking impacts of type of household head on child survivorship demonstrated by the analyses in this paper and the fact that this relationship is neatly predicted by theory show the great value of the human behavioral ecology approach for professionals in the health professions. Among the other contributions that this study makes is to highlight the potential importance of targeting households without a surviving grandmother for child nutrition and other health-related interventions.

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The role of grandmothers in human reproductive ecology has been of increasing interest since the proposal of the grandmother hypothesis, which posits a selective advantage for postreproductive longevity in human females due to the increased reproductive fitness of daughters who receive grandmaternal aid (Hawkes et al. 1998). Studies on the effect of grandmothers on maternal fertility have tended to assume that the beneficial effect of the maternal grandmother as reflected by increased grandchild survival should also be seen in shortened interbirth intervals facilitated by faster weaning of infants. Although the effect on grandchild survival is well-documented, the effect on interbirth intervals in these same studies has either not been found (Volland and Beise 2002; Ragsdale 2004) or found only in association with the paternal grandmother (Sear, Mace, and McGregor 2003). Nath, Leonetti, and Steele (2000) found that the presence of a grandmother in the household decreased the third interbirth interval, but in this case the population under study was a

patrilineal Bengali caste and therefore the grandmother in question was likely to be paternal rather than maternal. The lack of evidence for an influence of the maternal grandmother on interbirth interval has been perplexing. This paper suggests a plausible explanation in that the maternal grandmother's influence will tend to increase rather than decrease those intervals.

It would be interesting to investigate cause and effect in some of the correlations found here. Is short female stature a preferred trait when men marry? In other words, to what extent do dominant men choose shorter women as opposed to shorter women's enabling men to become dominant? Are taller daughters more likely to reside with their mothers because they are more dominant? In other words, do women generally prefer to reside with their mothers? Or are women more likely to choose to live elsewhere if their husbands show signs of providing sufficient resources? Interestingly, the husband as head of household has the highest fertility despite being more responsible for providing resources in the form of subsistence, implying that the conscious proximate mechanism involves sexual access rather than concern over resources.

It would be interesting to know in more detail what female "resistance" to increased reproduction consists of, for example, in terms of decreased sexual access or later weaning, both of which will affect interbirth intervals. Is it correct to label this "resistance," implying that the wives universally prefer to limit sexual access by their husbands, and, if so, are they consciously trying to limit their family size? To what extent is this apparent resistance an active process on the part of the wife or her mother as opposed to a natural consequence of coresidence? The latter would have implications for modeling this process in human prehistory. As a natural consequence, it may be largely or entirely culturally determined; as an active process, it is more likely to represent a universal dynamic between mothers and their adult daughters.

Volland and Beise pointed out that the grandmother hypothesis must take into account the neutral or possibly negative impact of the paternal grandmother on grandchild survival such that the overall influence of having a living grandmother increases the reproductive fitness of the parents. Perhaps this negative effect of the paternal grandmother is offset by an influence that decreases interbirth intervals and thereby increases the total number of offspring even accounting for decreased child survival (assuming that the paternal grandmother has the same or greater influence as her son). Whose reproductive fitness is ultimately greater, the woman who resides with her mother and has fewer children but increased child survival or the one who moves out with her husband and has more children but higher child mortality? Since fertility in this data set is taken as the number of live births and child mortality is recorded separately, it is not clear whether any estimate of this kind could be made for this data set—that is, whether this matrilineal system is currently adaptive.

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The general message of this article has been developed in a way that is empirically conclusive and theoretically well founded. Sexual conflict turns into in-law conflict in human families. This is so because humans have evolved to be cooperative breeders and reproduction has become a three-generation enterprise. In-law conflict expresses itself in the fact that in-laws have higher expectations regarding the reproductive effort (and the economic performance of work) of young women, while the women's mothers (and perhaps other relatives from their kin group) tend to be supportive of the women's own interests. In short, exploitation meets care and protection—a direct consequence of the different kin relationships in families with different life-history trade-offs. Leonetti et al.'s considerations fit into the existing theory of behavioral ecology perfectly. Occasionally, science generates results—as in this case—that appear to be so self-evident and directly plausible that one asks oneself why the scientific community has taken so long to come up with them.

Like all good work, this paper generates more far-reaching questions. First of all, one would like to know how robust the findings are and if they can be generalized to different family systems. Do the Khasi data reflect more than a merely idiosyncratic characteristic of the people under investigation and their cultural niche? Interestingly enough, in my own study population, the historic Krummhörn of Northwest Germany, there tends to be a finding with the same core, even though the population, as a typical European farming society, clearly differs in many respects from the matrilineal Khasi. Although divorce is an extremely rare event in the Krummhörn, the death of a husband is not. If women become widows, their probability of remarriage lessens (when controlled statistically for the age of the widows and the number of living children) if the widow's mother is still alive, and if there is remarriage the waiting time is longer. Although these effects do not attain statistical significance, their size is very noticeable. Thus, it appears that here, too, mothers tend to keep second sons-in-law away. However, this is the case only in families that hold land, and the strength of the effect (above the threshold of significance) increases with the extent of the landholding.

The fact that this tendency is indicated in farmer but not in laborer families makes it clear that the compromise found in in-law conflict is moderated by intervening variables. There are some initial signs that at least three socio-ecological context variables have an impact on the outcome of in-law conflict. First of all, access to resources plays a critical role. The kin group that controls the resources will be able to demand more. Furthermore, demography and, in particular, the sup-

ply-demand situation of the marriage market play an important role. Exploitation appears to be all the more probable the more the exploited persons can be replaced. Beise (2005) has been able to demonstrate that in the French founding settlements of Quebec in-law conflict tended to be defused because daughters-in-law were more highly appreciated given the prevailing scarcity of women at that time. Finally, behavioral aspects such as the geographic proximity of the parties play a role (Voland and Beise 2005) because in-law conflict ultimately needs behavioral transactions to be able to manifest itself. For a better understanding of in-law conflict and its adaptive plasticity, therefore, what we need is a cross-cultural perspective.

In addition to sexual and kin conflict, parent-offspring conflict (Trivers 1974) is also observable in human families. Children are selected to demand more investment than mothers are prepared to give voluntarily. During weaning conflict, mothers fight for a reduced weaning period, while children demand a longer period of breastfeeding. Thus there is a conflict of interest which to a certain degree is at odds with kin conflict. The demanding children tend to reduce maternal fertility and thus find a natural ally in the maternal grandmother. Mothers, however, if they are pursuing weaning in the interest of resuming ovulation, paradoxically find support from their mothers-in-law, who appear to be interested in an increase in fertility (cf. Kadir et al. 2003; Mace and Sear 2005). I would like to know whether Leonetti and colleagues have found any indications of interaction between parent-offspring conflict and in-law conflict in their study population. Does the advice related to weaning given by mothers-in-law differ from the advice given by the women's mothers?

Reply

We thank the commentators for their challenges to move the discussion of in-law conflict further. Voland's call for research in other cultures on the questions generated by the article is most welcome. The combination of cultural kinship studies with the biologically mandated costs of reproduction must be ecologically grounded, and Voland gives a good example from the historic Krummhörn. He also mentions the critical interplay of kinship resources and the marriage market as well as proximity to other players. Exploring these issues presents an exciting challenge for anthropologists and can produce linkages across subdisciplines.

The usefulness of evolutionary perspectives lies in their ability to address such issues as why men do not wish fewer offspring as Blackwood suggests would be "in their interest" given that from the perspective of a matrilineal cultural model they should wish to invest only in their own matrilineages. She enjoins us to ignore the biology of the differential reproductive costs that men and women bear. As Draper stresses, with a large data set

we can see how people actually behave within their cultural context. Demographic data are like x-rays of the kinship system and lay open to view the outcomes of reproductive behavior influenced by both biology and kinship ideology. Actual behaviors are seen to fly in the face of an exclusively ideological interpretation of kinship. Demographic data provide evidence regarding various strategies for human resource management (culturally encoded in kinship systems) to support human life. Births, deaths, and dispersals into households allow us to view the outcomes of these strategies on the ground. The arrays of data we present relating to women's mothers' living and residential statuses and husbands' household roles reveal the general patterns of resource access within which Khasi people tend to be obliged to live and reproduce. Each player has an agenda for his or her own reproductive success. Of course, women are reproducing not for men but for themselves. Their costs, however, are greater than those of men, and therefore their strategies are bound to differ from men's. Men can adopt a strategy to offset the costs that women bear that may result in greater reproductive success for themselves. The same is true for women's mothers. Men can also adopt a lower-cost strategy of contributing less to wives and frequently do so. Women's mothers also may help daughters choose men who will contribute more. Contra Blackwood, no one strategy is assumed. The underlying biological constraints of sex-specific reproductive costs either fit with the cultural configuration or create tensions that are revealing with regard to individual human decision making or agency.

Matrilineal systems are of major interest even though rare because they reveal a further extension of the opportunities and constraints within which the reproductive efforts of women and men are played out. Indeed, kinship systems themselves are cultural evolutionary products responsive to ecological opportunities and constraints (Holden and Mace 2003). Blackwood says that we assume that marital stability leads to greater reproductive success. Not so. Rather, we have laid out the dimensions of marital and intergenerational relations in an effort to see how they affect women's reproductive lives. We found, in fact, that women who had two or more husbands had the greatest fertility. We also found that women appeared to "resist" male reproductive agendas with help from their mothers. Blackwood says that we have neglected women's capacity to be independent and prioritized men rather than women. Again, not so. As Draper indicates, we have shifted the focus of the study of matrilineality from men to women, without, however, neglecting the behavior of men. With regard to the male headship found in many Khasi households, we must confess that we expected women to be the household heads; our data indicated that some men are household heads while others are clearly not.

As Kramer indicates, we are concerned with the "cost of human reproduction." Demographic data provide a good assay of the investment strategies of the players involved—the woman, the husband, and her mother. Others (such as elder sister) are also contributing to this cost, as Kramer and

Khongsdier suggest, or competing for resources, as Gibson points out. The possible effects of elder sisters on child survival and the reproductive success of younger sisters remain to be explored. In patrilineal societies the woman's mother-in-law would play a larger role. Kramer wonders whether "demographic data are a good proxy for the flow of resources"; we believe that they are. Embodiment of capital has been extensively discussed by Kaplan and colleagues (Kaplan 1996; Kaplan and Lancaster 2003; Kaplan et al. 2000). Demographic data reveal the baseline embodiment of resources (fertility) and its sufficiency and durability (mortality). The timing of first births and the pacing of fertility and its cessation point to decisions regarding resource investment in offspring by the strategists involved. Of course, growth data and the supporting data on work effort (see Leonetti et al. 2004, 2005) are also very important. Others also have provided such data from various groups (Kramer 2005*a, b*; Gibson and Mace 2005; Hawkes, O'Connell, and Blurton Jones 1997). Kramer also comments on the payoffs to investment by different providers, particularly as they may change as the child matures. The roles of fathers have been receiving more attention recently with regard to impacts on later phases of child development, particularly with respect to coming of age and marriage eligibility (Scelza 2007; Shenk 2005). The role of Khasi fathers in investment in educational achievement is a topic we will be addressing in further work.

We acknowledge the call by McKay and Khongsdier for socioeconomic variables in these analyses and refer readers to our other publications (Leonetti et al. 2004, 2005), which provide good information on the effect of land ownership by households and the income and work effort of individuals on fertility, mortality, and child growth. The current results involve factors (household headship, inheritance status, residence and living status of the woman's mother, and height) that are founded upon resources and function as indicators of those resources, some of them currently measurable and others not. The point here is to highlight access to resources as organized by Khasi kinship and marital systems.

A woman's mother's influence on her reproductive success is presumably exercised through both protection and energetic support of gestation and lactation. Khongsdier, Jenike, and Ragsdale all express interest in how the proximate pathway represented by lactational amenorrhea might be affected by women's husbands and mothers. Jenike supposes that the mother's support could allow the luxury of longer lactation and thus counteract the husband's reproductive agenda. The domestic help provided by Khasi grandmothers demonstrated by Leonetti et al. (2005) could explain the beneficial effects on child survival that we have observed. This idea is not inconsistent with the effect of grandmothers in the remote evolutionary past, when their aid in feeding weanlings may have had the effect of shortening birth intervals from the very lengthy ones seen in our hominoid relatives (Hawkes, O'Connell, and Blurton Jones 1997). We must remember that the grandmother also has an agenda with regard to her own

reproductive success (and that of her matrilineage, as Langstieh points out). Our data (unpublished) on self-reported breast-feeding duration indicates that having a living mother is associated with shorter duration. The husband as household head is associated with even shorter breastfeeding durations, and the shortest durations are found among women with both living mothers and husbands who are household heads. Thus, here we have an apparent case of in-law cooperation. The in-law conflict occurs primarily where contributions from husbands are reduced and women's mothers take up the slack. In these cases durations are longer.

The issue raised by Ragsdale of how women "resist" male reproductive agendas cannot be clarified with the data available. What we know is that having a living coresident mother is significantly related to later and lower fertility and having a husband who is household head and no coresident mother is related to higher fertility. We surmise that women's mothers provide refuge separate from husbands or inhibit husbands' headship and its associated freer sexual access. Alternatively, by providing resources husbands may increase their sexual access to wives in separated households as heads. One corollary is that women with deceased mothers, if divorced, are more likely to take second husbands as household heads and then experience shorter birth intervals (see table 2).

The urging of Euler for public policy makers to pay attention to studies of matrilineal cultures is very appropriate. Recent rural-urban and global migration and the instability of job markets around the world create economic marginality for men (Quinlan 2006; Stack 1974). This sets up an ecology in which women must depend on each other, and their intergenerational relationships become critical to everyday life. Humans evolved such cooperative breeding strategies in their distant past (Hrdy 1999) and appear to return to them when cultural constructions of kinship centered on male contributions and control of resources fail. The evolved intergenerational alliance of women could be viewed as the first staging area upon which males were tested as they discovered ways to increase their reproductive success via proffered protection and resource contributions, as well as through alliances among themselves and with their own mothers. The women's alliance provided them with critical negotiating strength and a fall-back stance, an "ace in the hole" (Hrdy 2005) or "familial security deposit in case of need" (Langstieh).

The topic of male mating competition, as Hawkes and McKay emphasize, clearly needs to be addressed. Knowledge of the mating behavior of men in matrilineal systems may be especially important in yielding new insights into the full range of possible mating strategies, given the differing construction of constraints on resource access that these systems represent. In particular, how does the woman's brother or uncle influence the competition for her hand? As McKay points out, in patrilineal societies in South Asia, after marriage the woman's kin stand by helplessly when she is abused, whereas among Khasi male behavior toward a woman will be closely monitored by her kin. Gibson raises the associated

issue of male quality. Khasi male mating strategies surely consider the costs and benefits associated with the inheritance status of the woman, their own matrilineage duties as uncles and brothers, and the qualities they offer as influenced by their matrilineage's resources. We are currently finishing a manuscript on mating versus paternal investment behavior of Khasi second husbands that addresses our finding that shorter birth intervals are found in women's second marriages, but further work needs to be done on Khasi male investment strategies. McKay points to feelings of emasculation among men in northwestern Nepal who marry uxori-locally in their polyandrous, patrilineal society. Langstieh mentions the Khasi men's movement to switch to a patrilineal system. Khongsdier emphasizes the Khasi maternal uncle's role. All call attention to an apparent male agenda of control over resources.

We have argued that the direct influence of the paternal grandmother may be minimal in the Khasi case, as her matrilineage provides few resources to the men's wives. Given the comments by Langstieh, Euler, and Voland, however, we wish that we had documented her effect. We cannot answer Voland's question regarding the interface of parent-offspring conflict and in-law conflict and the potentially differing influences on weaning by mothers on the two sides. We also lack information on a man's mother's effect on his reproductive success. As Hawkes says, "A successful man is always a fitness credit to his mother." Answers to some questions regarding male quality that Gibson refers to might also be discovered in a study of men's mothers.

We thank Khongsdier and Langstieh for additional details of Khasi life from their own lived experiences with the Khasi. We recognize that the Khasi population, although clearly one descendant population of isolated Mon-Khmer language speakers, is not culturally uniform, and we are working to elucidate the ecological foundations of variability across the area, especially with regard to reproductive behaviors. The sample includes women from several subgroups of the Khasi people and uses the blanket term "Khasi" to refer to all, following the cultural anthropologists Nakane (1967), Mathur (1979), and Böck (1998). Specifically, participants identified themselves as Bhoi, Pnar, and Khyntiam. Although subgroup members can point out differences that can be variously emphasized to create subgroup identities, the demographic data showed large overlapping ranges of behavioral variation among the villages studied that supported inclusion of all in one analysis. In addition, with recent historical responses to Western culture (e.g., Christianization efforts by missionaries since the 1840s [Mathur 1979] and more recent economic modernization whereby access to resources via wages and businesses has increased), changes in marital and kin relationships are occurring, as Langstieh points out, although the matrilineal system remains strong. The findings we present appear to be the demographic resolutions of changes in individuals' lives and thus present a useful picture of these relationships.

The dynamics of Khasi approaches to reproductive success have yet to be fully elucidated. Our offering is one view that appears to us to be crucial, but, as the many questions and issues raised by the commentators attest, it is not complete.

—Donna L. Leonetti, Dilip C. Nath,
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