tween women—increases the survival of the group and all its members and reduces the impact of skill-based repertoires like hunting on fitness. A group bound through many male and female-female exchanges of food permits the survival of children of the best and poorest hunters. The modest reproductive advantage of the better hunters extends till their death, and there is no evidence that any evolutionary advantage accrues to a third or more distant generation. The emergence of cooperative food acquisition and sharing may be sufficient to explain the generation of long-term bonds on every level of human society—between mother and offspring, mating pairs, kin groups, community members, and even communities.

Food sharing appears to have emerged as groups of men cooperated to hunt packages of meat too large to be hoarded, the semidependency of human childhood extended, and women cooperated in the feeding and parenting of slowly growing, closely spaced children. Mauss (1990) argued that social bonds established and maintained through gifts between individuals created collectivities and hierarchies of collectivities (Mauss 1990, 5):

It is not individuals but collectivities that impose obligations of exchange and contract upon each other. . . . These total services and counter-services are committed to in a somewhat voluntary form by presents or gifts, although in the final analysis they are strictly compulsory, on pain of private or public welfare.

Perhaps the pertinent social fact is the tension between group- and pair-bonds, an economic trade-off between the bonds that bind the group and those that bind mates rather than that between status signaling and family provisioning. When cooperative group activity increases in importance, exchanges between men increase; as the importance of male cooperation and cohesion lessens, as it does when the Ache are out of the forest, provisioning of the family and pair-bonds intensify. The tension between reproductive pairing and group cohesion—a sociopolitical cost/benefit rather than an individual evolutionary benefit—may result in a more comprehensive understanding of the variability we encounter in the examples. Support for the economics of the facts lies in the flow of meat and plant foods—that is, the relative density and direction of exchanges within and between communities—and the effect of changes in flow from those between adult men to those between men and women. Those male bonds are important way beyond status or signaling benefits; the alliances create and maintain the social group. Gifts of food between women generate a second level of cohesion within the group that reinforces long standing (kin) ties and binds women marrying in from other groups. Direct provisioning of offspring by women is undisputed and a fairly convincing rational for the division of labor. All these forms of exchange ultimately lead to a more stable existence that enhances the reproductive fitness of everyone in the group.

Gurven and Hill deliver a battering criticism of the view that status and mating benefits alone explain hunting in extant foragers. Their reevaluation of the hard data used to support signaling theory—namely, data on the caloric yield of big game hunting and on its distribution in the group—should be of major impact, but it is surprising how often they also point out ways in which the criticized theory simply fits badly with commonsensical facts. For example, caloric value alone does not measure nutritional impact; a specific desire for meat, due to nutrients difficult to replace, can explain willingness to risk hunting failure. If you control for size of resources, there are no differences in amounts shared by men and women outside the family, and yet no signaling hypothesis is proposed for women’s sharing; men get upset when shares are not returned, but why should they, if they share for mating and status benefits? The signaling theory does not explain marriage; if marriage’s only function is to curb the dangerous effects of competition for status, men surely would have devised alternatives (e.g., hierarchies) to the self-imposition of obligations to wives and children. The publicly recognized benefit for good hunters is marrying more or better wives, which includes the burdens of marriage. Women do not complain when their husbands go hunting, but they should if it leads to status rather than to provisioning. Women should be indifferent to marrying good hunters if hunting were all about status, but they are not; men should abandon their wives as their fertility declines, but few do.

These arguments have the demolishing force of common sense but are in tension with the taste for hard data that dominates the debate. And yet there is a sense in which data are hard only against a background of conceptual assumptions that belong in the domain of common sense. Gurven and Hill demand a measure of contingency in sharing that attends to the particular representations of fair exchange and reciprocity governing each society. To me, this demand is plain common sense. Will colleagues in the other camp accept it?

Some of their arguments assume that the debate is also about the proximate/psychological and not only about the evolutionary explanation of hunting. Although evolutionary explanations are normally not concerned with proximate mechanisms, it is often impossible to analyze human behavior abstracting fully from the psychological. Norms and similarly complex sociopsychological structures are here the correct proximate stance. Bliege Bird and Bird (2008) make a recent move in this direction. They analyzed Murta foraging data and concluded that in Murta society, big game hunting is the publicly recognized behavioral signature for magnanimity motives. In Murta ideology, these motives are socially required if men are to climb the social hierarchy and obtain the re-
productive benefits of marrying more or younger wives. But then, if competition for status surfaces in male magnanimity at the sociopsychological level and in a normative ideology for upholding the group, the signaling hypothesis loses its teeth. Kirsten Hawkes (2008) urged the Birds to dilute magnanimity motives into "tolerated theft." Why? Tolerated theft strips sharing from all apparent generosity and from socio-normative motivations. However, this way of adjusting claims about motivations to her preferred evolutionary explanation ignores independent evidence to what those motivations are. Claims about motives should also attend to other research programs that have been producing “hard data” on human motivation. Recall here experimental economics and also a sophisticated experimental research program that addressed an analogous debate: the egoism-altruism debate (Batson 1991).

Hard facts aside, some hypotheses are prima facie more plausible than others. Gurven and Hill make an intelligent move when they plead for a pluralism of motives: men want to provision their families but they also want status. If we are interested in evolutionary explanations of human motives, a safe move is to assume that natural selection has long tinkered with the human psyche. The results are probably not neat and are analogous to kludges or Rube Goldberg machines. If men evolved paternal investment from an ancestral state similar to present male chimp mating behavior, we are likely to see a mix of status hunger and genuine concern for offspring, even more so if, as Gurven and Hill point out, status reverts often into benefits for offspring. Pluralism of motives also discloses a disregarded possibility: a polymorphism of strategies as the evolutionary outcome. Plausibly, status motivates (predominantly) some men while provisioning drives others. Changes in the data analysis practiced so far may well be required to tap into evidence for polymorphisms.

Proper development of the interaction between the ultimate and the proximate levels of explanation is a challenge for the evolutionary anthropology of hunting, sharing, and marriage. The bargaining model presented by Gurven and Hill could give readers a wrong idea about purely selfish motivations in married couples. Although they warn about this in a footnote, a more explicit picture of the evolution of genuine emotional concern for spouses and children would be welcome.

Reply

We summarize our position: signaling may be important in some socioecological contexts but is unnecessary to explain why men hunt. Provisioning alone can often explain why men hunt and women gather, but additional benefits are common because of the nature of human sociality. Aside from direct offspring provisioning, good hunters who share may gain fitness benefits from contingent reciprocity, social insurance policies, group augmentation, and costly displays. Displays of generosity enhance a hunter’s reputation, which helps family members indirectly and provides alliance and mating benefits for the hunter (fig. 4). A sexual division of labor in which men hunt and women gather describes specialization based on comparative advantage of complementary activities providing a nutrient-rich diet. Spousal interests will not always converge, and one partner may free ride on the household contributions of the other. We agree that moving beyond simple depictions of the sexual division of labor is a priority for future research. We describe future directions, highlighting themes brought up by the reviewers: (a) the need for diverse methodologies, (b) broader implications for male psychology and behavior, (c) complex sharing arrangements and evolutionary mechanisms, and (d) sexual divisions of labor in our evolutionary past.

Methodological pluralism. Kameda and McDermott argue that only experiments can reliably show causality. We agree that inferences based on observational ethnographic methods often face problems of self-selection, bias, and endogeneity. Careful research design and statistical controls can reduce these problems in multivariate analyses. Experiments are another solution but should be designed to have external (and if possible, ecological) validity (Gurven and Winking 2008) for relevance outside the laboratory. By necessity, these will be quasi experiments in field settings because often participants will not be random samples but part of an ongoing study. Experiments employing standardized stimuli or exposure in naturalistic settings can help inform causal relationships. Two examples illustrate our point. The Wood experiments described in the target article—where participants presented with standardized scenarios of hunting parties consisting of hunters of varying skill but with a constant number of reproductive-aged women—showed that Ache and Hadza hunters preferred to hunt in bands of good hunters. Their choice is consistent with a desire to eat well rather than to receive high prestige from being the successful hunter (Wood 2006; Wood and Hill 2000). Only Ache hunters without dependent offspring preferred to join a group of poor hunters, where they might have opportunities for “showing off.” McMillan (2001) investigated whether Ache hunters encountering prey call other hunters within earshot to help with pursuit. Helpers increase the proportion of success and can increase caloric return rate but can diminish the direct hunting success of the caller. McMillan’s analysis of calls and responses is most consistent with the goal of maximizing food production for the band rather than for individual prestige.

Hames and Kameda and McDermott comment on our choice of study populations. We focused primarily on the Hadza, Ache, !Kung, and Hiwi because they are well-studied hunter-gatherers and were the original groups cited by Hawkes and colleagues to support the hunting-as-signaling view. Ethnographic data from many other foraging groups lend support to our views on sharing and the sexual division of labor. Hames provides several examples. Our emphasis on